iEPF-9010S-EY4
iEPF-9012S-EY4
iEP-9010E
iEP-9012E

User Manual

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock Rack's Website: www.ASRockRack.com

Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Read the Specifications section of this manual for detailed information on the recommended operating environment.
4. Disconnect the equipment from all AC outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or sprayed detergent.
5. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
6. Do not leave the equipment in an environment with a storage temperature of below -40 °C (-40 °F) or above 85 °C (185 °F) as this may cause damage. The equipment should be stored in a controlled environment.
7. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
8. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
9. If the equipment is not used for a long time, disconnect the equipment from the power source to avoid damage from transient over-voltage.
10. All cautions and warnings on the equipment should be noted.
11. To avoid electrical shock and/or damage to the device:

- Keep the device away from water or liquid sources.
- Keep the device away from high heat or humidity.
- Keep device properly ventilated (do not block or cover ventilation openings).
- Always use designated voltage and power source settings.
- Always install and operate the device near an easily accessible electrical outlet.
- Secure the power cord (do not place any object on/over the power cord).
- Only install/attach and operate the device on stable surfaces and/or designated mountings.
- The power cord must be connected to a socket or outlet with a ground connection.

12. If one of the following occurs, have the equipment checked by service personnel:

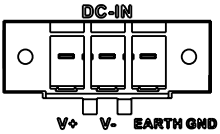
- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment is malfunctioning or does not operate according to the user manual.
- The equipment has been dropped and damaged.
- The equipment shows obvious signs of breakage.

13. Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.
14. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
15. This equipment is not suitable for use in locations where children are likely to be present.
16. The equipment should only be installed in a restricted access area.
17. Restricted Access Location:

The device must be installed only in a server room or computer room where access is:

- Access can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken.
- Access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.
- Leave enough clearance (25 inches in the front and 30 inches in the back of the rack) to allow the front door to be opened completely and to allow for sufficient airflow.
- This product is for installation merely in a Restricted Access Location.
- This product is not suitable for use with visual display workplace devices according to §2 of "the German Ordinance for Work with Visual Display Units".

18. The equipment is intended to be supplied by the external power source (UL listed/ IEC 60950-1/ IEC 62368-1 approved) whose output complies with ES1/SELV. To reduce potential safety issues, only the AC adapter provided with the product, a replacement AC adapter provided by ASRock Industrial or agency, or an AC adapter purchased as an accessory from ASRock Industrial or agency should be used with the product.
19. This power adapter (FSP330-AAAN3) is intended to be supplied based on a UL-certified and suitable for use at an operating/storage temperature of 0 °C (32 °F)~ 40 °C (104 °F)/ -20 °C (-4 °F)~80 °C (176 °F), and the current output is rated 13.75A. If you need further assistance, contact ASRock Industrial for additional information.
20. The ambient temperature of the iEP-9010E series: 70 °C (158°F) max.; the ambient temperature of the iEPF-9010S series: 75 °C (167°F) max.
21. The terminal block is suitable for V+& V-, 3 units for each (16~18AWG) which means 6 units in total. The torque value is 0.69Nm. And use copper conductors only. Kindly note that must be installed by a skilled person.



22. LAN port must use shielded LAN cable.

Replaceable Batteries



BURN HAZARD
Hot surface! Do not touch! Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

CAUTION
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

CAUTION
The equipment is equipped with a battery-powered real-time clock circuit. There is a risk of explosion if a battery is incorrectly replaced. Replace only with the same or equivalent type as designated by the manufacturer. Discard all used batteries according to the manufacturer's instructions.

LITHIUM-METAL BATTERY WARNING
Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type designated by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

WARNING
All interconnection to the EUT is for indoor location and therefore PoE network interconnected to the EUT is considered as ES1/SELV for connected only to PoE network without routing to the outside plant.

WARNING
Input voltage rated 9~36V, 30~18A
Packing: The unit should be carried with both hands and handled with care.
Maintenance: Use only approved products or a dry applicator to clean and maintain the surfaces.

The terms HDMI™ and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

Contact Information

If you need to contact ASRock Industrial or want to know more about ASRock Industrial, you're welcome to visit ASRock Industrial's website at www.asrockind.com ; or you may contact your dealer for further information.

ASRock Industrial Incorporation

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Chapter 1 Introduction

Thank you for purchasing iEPF-9010S-EY4 / iEPF-9012S-EY4 / iEP-9010E / iEP-9012E, a reliable barebone system produced under ASRock Industrial's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock Industrial's commitment to quality and endurance.

Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock Industrial's website without further notice. If you require technical support related to this product, please visit our website for specific information about the model you are using.
ASRock Industrial's Website: www.ASRockInd.com

The illustrations shown in this manual are examples only. The actual system may differ depending on the product model you purchsed.

1.1 Key Features

iEPF-9010S-EY4

- Intel® 12th Gen Core™ Processors with R680E Chipset
- 4 x 260-pin DDR4 SO-DIMM up to 128GB (32GB per DIMM)
- 1 x PCIe x16 (PCIe Gen4) or 2 x PCIe x8 (PCIe Gen4), 2 x PCIe x4 (PCIe Gen4)
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 6 x USB 3.2 Gen2x1, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 5 x Intel 2.5G LAN (2 support PoE, 1 supports vPro)
- 1 x Displayport, 1 x HDMI 2.0b, 1 x VGA
- Powerful Edge AI acceleration enabled by the most flexible mechanical, thermal, and power design, with support for 275mm x 111.15 mm (L x H) max. and up to 255W graphic cards

iEPF-9012S-EY4

- Intel® 12th Gen Core™ Processors with H610 Chipset
- 2 x 260-pin DDR4 SO-DIMM up to 64GB (32GB per DIMM)
- 1 x PCIe x16 (PCIe Gen4), 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 2 x USB 3.2 Gen2x1, 2 x USB 3.2 Gen1x1, 2 x USB 2.0, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 4 x Intel 2.5G LAN (2 support PoE)
- 1 x Displayport, 1 x HDMI 2.0b, 1 x VGA
- Powerful Edge AI acceleration enabled by the most flexible mechanical, thermal, and

English

power design, with support for 275mm x 111.15 mm (L x H) max. and up to 255W graphic cards

iEP-9010E

- Intel® 12th Gen Core™ Processors with R680E Chipset
- 4 x 260-pin DDR4 SO-DIMM up to 128GB (32GB per DIMM)
- 1 x M.2 Key M, 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 6 x USB 3.2 Gen2x1, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 5 x Intel 2.5G LAN (2 support PoE, 1 supports vPro)
- 1 x Displayport, 1 x HDMI 2.0b, 1 x VGA

iEP-9012E

- Intel® 12th Gen Core™ Processors with H610 Chipset
- 2 x 260-pin DDR4 SO-DIMM up to 64GB (32GB per DIMM)
- 1 x M.2 Key B, 1 x M.2 Key E, 2 x Mini PCIe
- 2 x USB 3.2 Gen2x1, 2 x USB 3.2 Gen1x1, 2 x USB 2.0, 6 x COM, 4 x SATA3, 8 x DI, 8 x DO
- 4 x Intel 2.5G LAN (2 support PoE)

The LAN ports also supporting IEEE 802.3AT PoE (PoE output max 30W/port) only use 12~36V DC insource.

1.2 Package List

Item	Quantity
iEPF-9010S Series / iEP-9010E Series	1
Rubber foot	4
M3x8L Round Head Bolts for Rubber foot	4
Desk Mount	2
M3x5L Countersunk Screws for Desk Mount	8
M4x10L Round Head Bolts for Desk Mount	4
M3x4L Round Head Bolts for SODIMM Bracket	4
Terminal Block 1X3P ST 7.62m	1
Terminal Block 1X3P ST 5.0m	1
Terminal Block 1X10P ST 3.5m	2
Screw for M.2 I-Head M2*2	3
Screw for MiniPCIe 3.7xM2.0x3.3L	2
Screw M3*4mm for 2.5" Tray	16
M.2 Heatsink	1
SODIMM Bracket w/Mylar	2
SODIMM Heatsink	2
Nut M2 H=3.35mm w/Thread(Hex)	1
Option: Power Adapter 330W, FSP330-AAAN3 /9NA3300208	1

1. If any items are missing or appear damaged, contact your authorized dealer.
2. Based on different configuration, package list may be different.

Note:

Please refer to the following for more information about the adapter:

330W Power adapter

- Input voltage: 100-240 Vac
- Input frequency: 47-63 Hz(±1Hz)
- Rating output current: 13.75A
- Rating output voltage: 24.0 V ±5%

English

Actual power consumption may differ based on different applications and different hardware configurations. Sufficient power for the entire system is required to meet these specifications. We recommend that 330W adapter (Certified adapter, Output: 24Vdc,13.75A) is used if there is no PCIe or PCI add-on cards assembled on the iEPF-9010S-EY4. Users may use a DC source instead of the optional 330W adapter (Certified adapter, Output: 24Vdc,13.75A) when power consumption is over 330W in an environment where the temperature is 40°C and DC source should be within 9~36 VDC/30~18A.

WARNING! Use ONLY approved NRTL LISTED ITE power supply with electrical ratings.

English

1.3 Specifications

iEPF-9010S-EY4

Processor System

CPU	Intel® 12th Gen Core™, Pentium or Celeron Processors
Chipset	Intel® R680E
Socket	LGA 1700

Memory

Technology	Dual Channel DDR4 2933MHz (ECC memory supported by R680E + Selected CPU)
Capacity	128 GB (32 GB per DIMM)
Socket	4 x 260-pin SO-DIMM

Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.4a , DP++ Max resolution up to 4096x2160@60Hz
HDMI	HDMI 2.0b Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz

Expansion Slot

PCIe	1 x PCIe Gen4 x16 (single x16 or dual x8), PCIe x16 slot with default power cable can support up to 180W graphic card (275mm x 111.15 mm (L x H), dual slot width max).. Graphic card can be up to 255W with optional VGA module 1 x PCIe Gen4 x8 (shared with dual x8) 2 x PCIe Gen4 x4
Mini-PCIe	2 x Full/Half size with PCIe Gen3 x1 and USB 2.0
RF& Antenna	8 x SMA connector hole reserved
M.2	1 x M.2 (Key E, 2230) with CNVI/PCIe Gen3 x1 and USB2.0 for Wi-Fi/BT module 1 x M.2 (Key B, 2280/3042/3052) with PCIe Gen3 x1 / USB3.2 Gen1x1 for 4G / 5G
SIM Socket	2 x Nano SIM Card slot (1 connected to Mini PCIe, 1 connected to M.2 Key B)

Audio

Interface	Realtek ALC897, High Definition Audio.

Ethernet

Controller/ Speed	5 x Intel 2.5G LAN (2 support PoE, each port supports IEEE 802.3AF PoE, PoE output max.15.4W/port), (1 supports vPro)
Connector	5 x RJ45

English

Storage

M.2	1 x M.2 (Key M, 2280) with Gen4/Gen3 x4 for NVMe SSD
SATA	4 x SATA3 (6Gb/s), support RAID 0/1/5/10 4 x 2.5" HDD/SSD Tray
CFast (Option)	1 x Type II socket (Shared with SATA3)

Front I/O

DisplayPort	1
HDMI	1
VGA	1
Ethernet	5 x 2.5G LAN
USB	6 x USB 3.2 Gen2x1, 1 x USB2.0 internal connector w/ lock function
Audio	1 x Mic-in, 1 x Line-out
COM	4 x RS232/422/485 2 x RS232
DIO	8DIs/8DOs

Watchdog Timer

Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

Power Requirements

Input PWR	9V~36V VDC with Ignition control and remote power on/off switch. 80V Surge Protection, OVP, UVP, OCP and reverse protection Ignition Power Input w/ 13-mode condition

Environment

Operating Temperature	35W CPU: -40°C~75°C (-40°F~167°F) 46W~65W CPU: -40°C~55°C (-40°F~131°F) (with FAN inside) (w/ air flow 0.5~0.8 m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~95% @ 40°C (non-condensing)
Shock	Operating: 50 G, half sine 11ms duratio with SSD
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes with SSD
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	LVD

Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Desk Mount
Dimensions	202mm (W) x 290mm (D) x 209.3mm (H) (7.95" x 11.42" x 8.24")
Net Weight	10kg

Others

OS Support	Windows 10 & Linux
SW Support	ACRN (https://projectacrn.org/)
TPM	TPM 2.0
Real-Time Enablement	TSN, TCC support under YOCTO

iEPF-9012S-EY4

Processor System

CPU	Intel® 12th Gen Core™, Pentium or Celeron Processors
Chipset	Intel® H610
Socket	LGA 1700

Memory

Technology	Dual Channel DDR4 2933MHz
Capacity	64 GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.4a , DP++ Max resolution up to 4096x2160@60Hz
HDMI	HDMI 2.0b Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz

Expansion Slot

PCIe	1 x PCIe Gen4 x16*, PCIe x16 slot with default power cable can support up to 180W graphic card (275mm x 111.15 mm (L x H), dual slot width max).. Graphic card can be up to 255W with optional VGA module
Mini-PCIe	1 x Full/Half size with PCIe Gen3 x1 and USB 2.0 1 x Full/Half size with PCIe Gen3 x1
RF& Antenna	8 x SMA connector hole reserved
M.2	1 x M.2 (Key E, 2230) with CNVI/PCIe Gen3 x1 and USB2.0 for Wi-Fi/BT module 1 x M.2 (Key B, 2280/3042/3052) with PCIe Gen3 x1 / USB2.0 for 4G / 5G
SIM Socket	2 x Nano SIM Card slot (1 connected to Mini PCIe, 1 connected to M.2 Key B)

Audio

Interface	Realtek ALC897, High Definition Audio.

Ethernet

Controller/ Speed	4 x Intel 2.5G LAN(2 support PoE, PoE output max.15.4W/port, each port supports IEEE 802.3AF PoE)
Connector	4 x RJ45

Storage

SATA	4 x SATA3 (6Gb/s) 4 x 2.5" HDD/SSD Tray
CFast (Option)	1 x Type II socket (Shared with SATA3)

Rear I/O

DisplayPort	1
HDMI	1
VGA	1
Ethernet	4 x 2.5G LAN
USB	2 x USB 3.2 Gen2x1, 2 x USB 3.2 Gen1x1, 2 x USB 2.0, 1 x USB2.0 internal connector w/ lock function
Audio	1 x Mic-in, 1 x Line-out
COM	4 x RS232/422/485 2 x RS232
DIO	8DIs/8DOs

Watchdog Timer

Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

Power Requirements

Input PWR	9V~36V VDC with Ignition control and remote power on/off switch. 80V Surge Protection, OVP, UVP, OCP and reverse protection Ignition Power Input w/ 13-mode condition

Environment

Operating Temperature	35W CPU: -40°C~75°C (-40°F~167°F) 46W~65W CPU: -40°C~55°C (-40°F~131°F) (with FAN inside) (w/ air flow 0.5~0.8 m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~95% @ 40°C (non-condensing)
Shock	Operating: 50 G, half sine 11ms duration with SSD
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes with SSD
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	LVD

Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Desk Mount
Dimensions	202mm (W) x 290mm (D) x 209.3mm (H) (7.95" x 11.42" x 8.24")
Net Weight	10kg

Others

OS Support	Windows 10 & Linux
TPM	TPM 2.0
Real-Time Enablement	TSN, TCC support under YOCTO

*The PCIe x16 slot locates at the second slot from the right hand side.

iEP-9010E

Processor System

CPU	Intel® 12th Gen Core™, Pentium or Celeron Processors
Chipset	Intel® R680E
Socket	LGA 1700

Memory

Technology	Dual Channel DDR4 2933MHz (ECC memory supported by R680E + Selected CPU)
Capacity	128 GB (32 GB per DIMM)
Socket	4 x 260-pin SO-DIMM

Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.4a , DP++ Max resolution up to 4096x2160@60Hz
HDMI	HDMI 2.0b Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz

Expansion Slot

Mini-PCIe	2 x Full/Half size with PCIe Gen3 x1 and USB 2.0
RF& Antenna	8 x SMA connector hole reserved
M.2	1 x M.2 (Key E, 2230) with CNVI/PCIe Gen3 x1 and USB2.0 for Wi-Fi/BT module 1 x M.2 (Key B, 2280/3042/3052) with PCIe Gen3 x1 / USB3.2 Gen1x1 for 4G / 5G
SIM Socket	2 x Nano SIM Card slot (1 connected to Mini PCIe, 1 connected to M.2 Key B)

Audio

Interface	Realtek ALC897, High Definition Audio.

Ethernet

Controller/ Speed	5 x Intel 2.5G LAN(2 support PoE, each port supports IEEE 802.3AF PoE, PoE output max.15.4W/port), (1 supports vPro)
Connector	5 x RJ45

Storage

M.2	1 x M.2 (Key M, 2280) with Gen4/Gen3 x4 for NVMe SSD
SATA	4 x SATA3 (6Gb/s), support RAID 0/1/5/10 4 x 2.5" HDD/SSD Tray
CFast (Option)	1 x Type II socket (Shared with SATA3)

Rear I/O

DisplayPort	1
HDMI	1
VGA	1
Ethernet	5 x 2.5G LAN
USB	6 x USB 3.2 Gen2x1, 1 x USB2.0 internal connector w/ lock function
Audio	1 x Mic-in, 1 x Line-out
COM	4 x RS232/422/485 2 x RS232
DIO	8DIs/8DOs

Watchdog Timer

Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

Power Requirements

Input PWR	9V~36V VDC with Ignition control and remote power on/off switch. 80V Surge Protection, OVP, UVP, OCP and reverse protection Ignition Power Input w/ 13-mode condition

Environment

Operating Temperature	35W CPU: -40°C~70°C (-40°F~158°F) 46W~65W CPU: -40°C~50°C (-40°F~122°F) (w/ air flow 0.5~0.8 m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~95% @ 40°C (non-condensing)
Shock	Operating: 50G, half sine 11ms duration with SSD
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes with SSD
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	LVD

Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Desk Mount
Dimensions	202mm (W) x 244mm (D) x 108.7mm (H) (7.95" x 9.61" x 4.28")
Net Weight	6.5kg

Others

OS Support	Windows 10 & Linux
SW Support	ACRN (https://projectacrn.org/)
TPM	TPM 2.0
Real-Time Enablement	TSN, TCC support under YOCTO

iEP-9012E

Processor System

CPU	Intel® 12th Gen Core™, Pentium or Celeron Processors
Chipset	Intel® H610
Socket	LGA 1700

Memory

Technology	Dual Channel DDR4 2933MHz
Capacity	64 GB (32 GB per DIMM)
Socket	2 x 260-pin SO-DIMM

Graphics

Controller	Intel® UHD Graphics
DisplayPort	DisplayPort 1.4a , DP++ Max resolution up to 4096x2160@60Hz
HDMI	HDMI 2.0b Max resolution up to 4096x2160@60Hz
VGA	Max resolution up to 1920x1200@60Hz

Expansion Slot

Mini-PCIe	1 x Full/Half size with PCIe Gen3 x1 and USB 2.0 1 x Full/Half size with PCIe Gen3 x1
RF& Antenna	8 x SMA connector hole reserved
M.2	1 x M.2 (Key E, 2230) with CNVI/PCIe Gen3 x1 and USB2.0 for Wi-Fi/BT module 1 x M.2 (Key B, 2280/3042/3052) with PCIe Gen3 x1 / USB2.0 for 4G / 5G
SIM Socket	2 x Nano SIM Card slot (1 connected to Mini PCIe, 1 connected to M.2 Key B)

Audio

Interface	Realtek ALC897, High Definition Audio.

Ethernet

Controller/ Speed	4 x Intel 2.5G LAN (2 support PoE, each port supports IEEE 802.3AF PoE, PoE output max.15.4W/port)
Connector	4 x RJ45

Storage

SATA	4 x SATA3 (6Gb/s) 4 x 2.5" HDD/SSD Tray
CFast (Option)	1 x Type II socket (Shared with SATA3)

Rear I/O

DisplayPort	1
HDMI	1
VGA	1
Ethernet	4 x 2.5G LAN
USB	2 x USB 3.2 Gen2x1, 2 x USB 3.2 Gen1x1, 2 x USB 2.0, 1 x USB2.0 internal connector w/ lock function
Audio	1 x Mic-in, 1 x Line-out
COM	4 x RS232/422/485 2 x RS232
DIO	8DIs/8DOs

Watchdog Timer

Output	From Super I/O to drag RESETCON#
Interval	256 Segments, 0, 1, 2, ...255sec

Power Requirements

Input PWR	9V~36V VDC with Ignition control and remote power on/off switch. 80V Surge Protection, OVP, UVP, OCP and reverse protection Ignition Power Input w/ 13-mode condition

Environment

Operating Temperature	35W CPU: -40°C~70°C (-40°F~158°F) 46W~65W CPU: -40°C~50°C (-40°F~122°F) (w/ air flow 0.5~0.8 m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~95% @ 40°C (non-condensing)
Shock	Operating: 50 G, half sine 11ms duration with SSD
Vibration	Operating: 5 Grms, 5-500 Hz, 3 axes with SSD
ESD	Contact +/-4kV, Air +/-8kV
EMC	EN61000-6-4/-2, CE & FCC Class A
Safety	LVD

Mechanical

Construction	Aluminum heatsink + Metal chassis
Mounting	Desk Mount
Dimensions	202mm (W) x 244mm (D) x 108.7mm (H) (7.95" x 9.61" x 4.28")
Net Weight	6.5kg

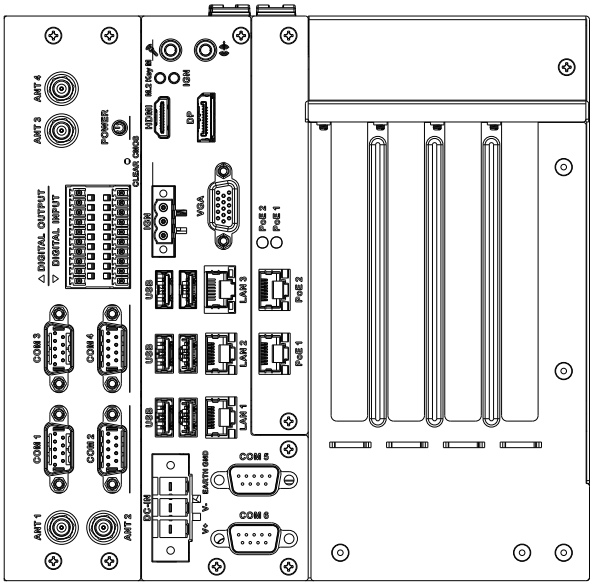
Others

OS Support	Windows 10 & Linux
TPM	TPM 2.0
Real-Time Enablement	TSN, TCC support under YOCTO

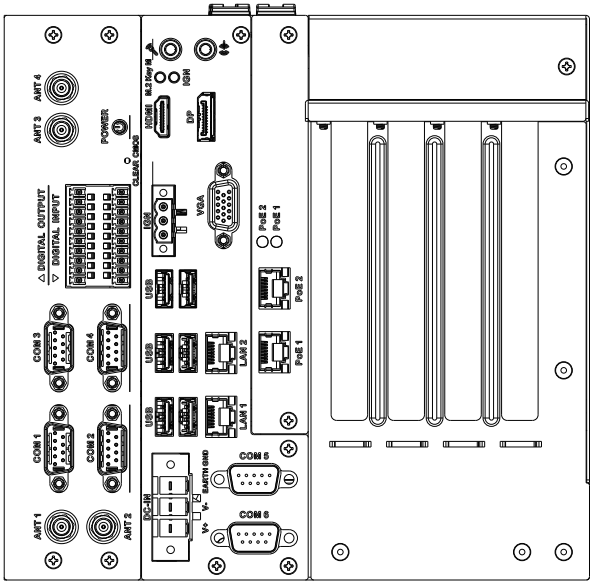
1.4 Dimensions

iEPF-9010S-EY4 / iEPF-9012S-EY4

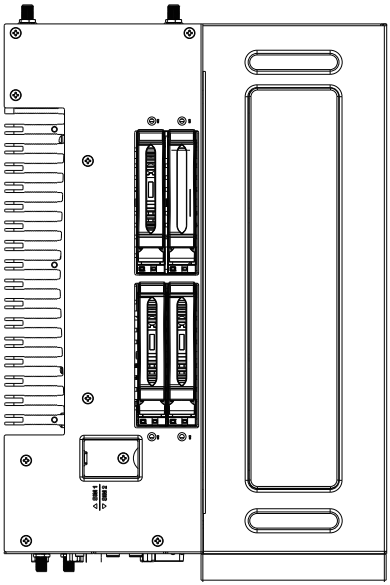
Front View - iEPF-9010S-EY4



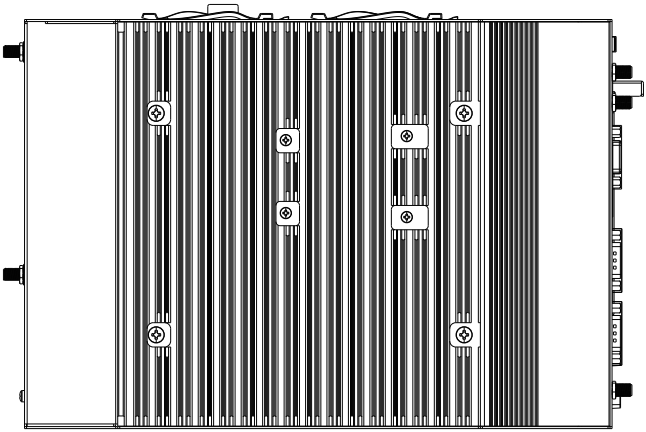
Front View - iEPF-9012S-EY4



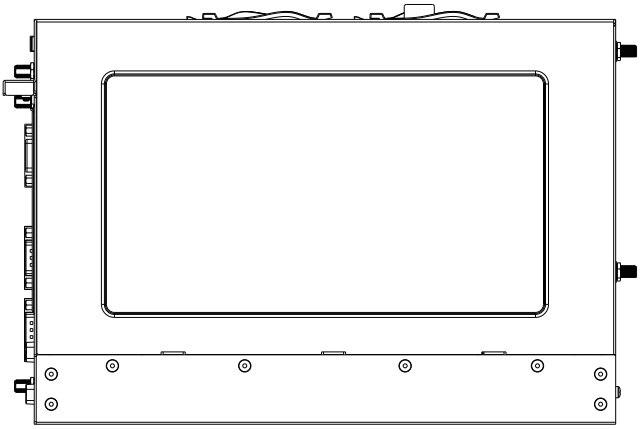
Top View



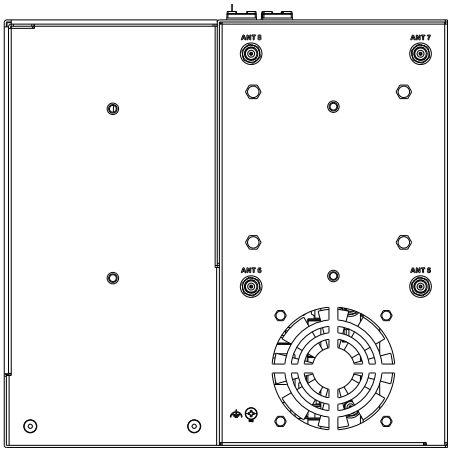
Left-Side View



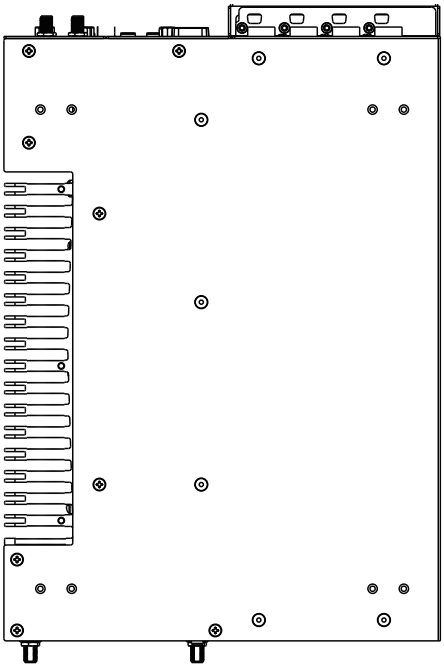
Right-Side View



Rear Side View

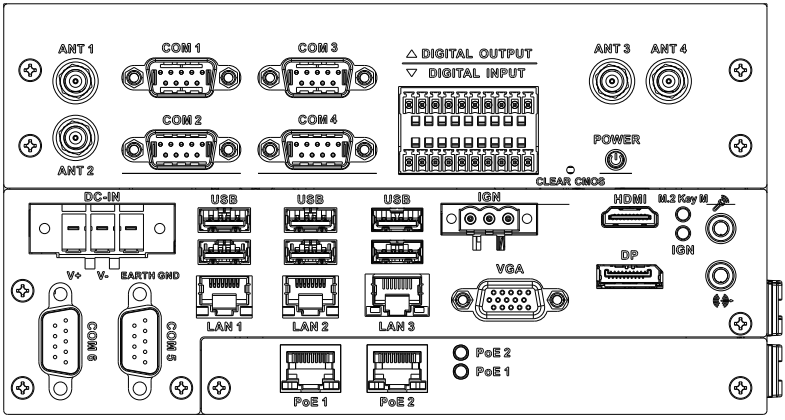


Bottom View

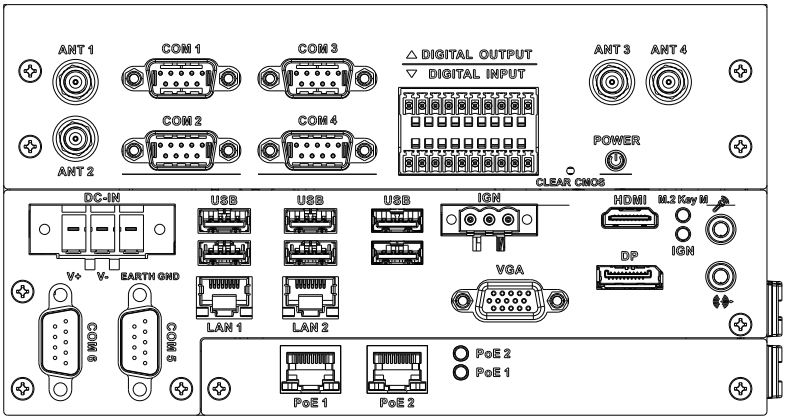


iEP-9010E / iEP-9012E

Front View - iEP-9010E

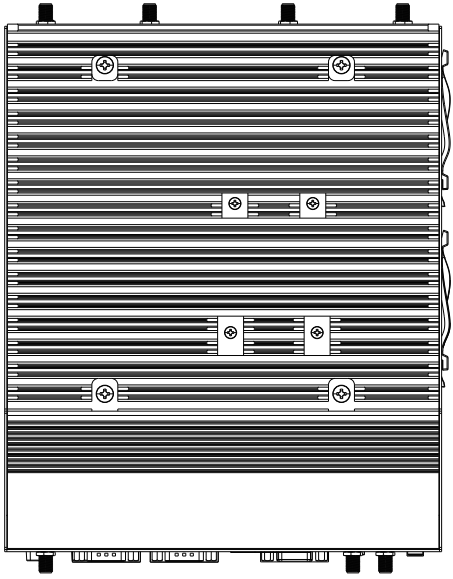


Front View - iEP-9012E

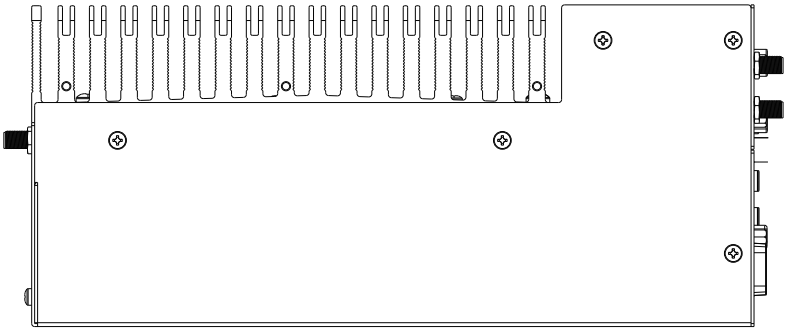


English

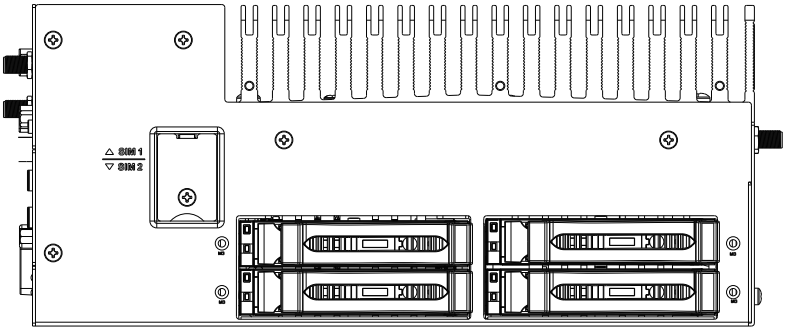
Top View



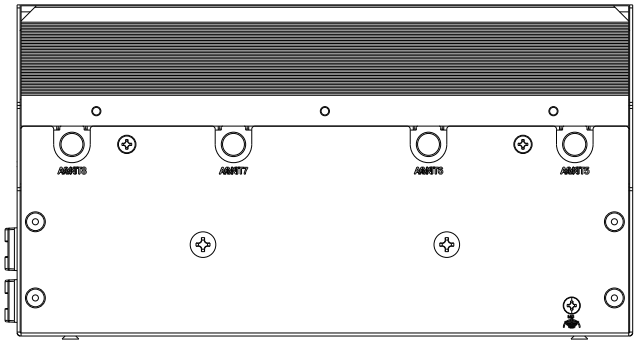
Left-Side View



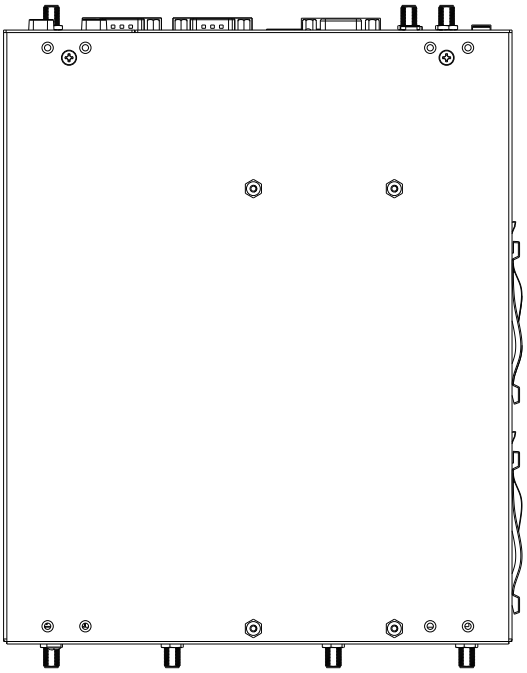
Right-Side View



Rear Side View

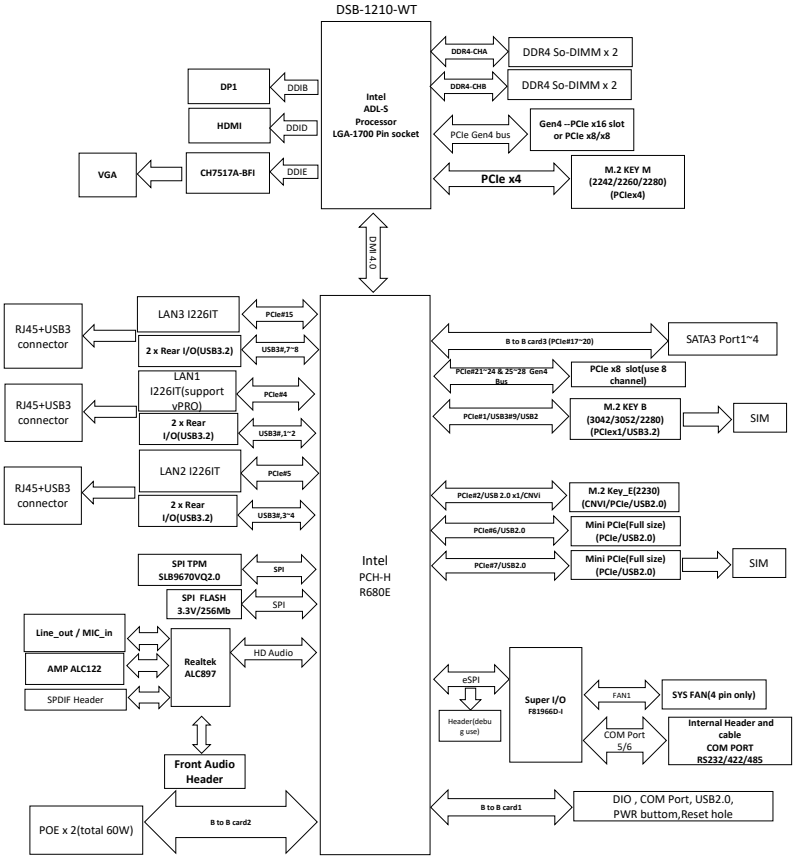


Bottom View

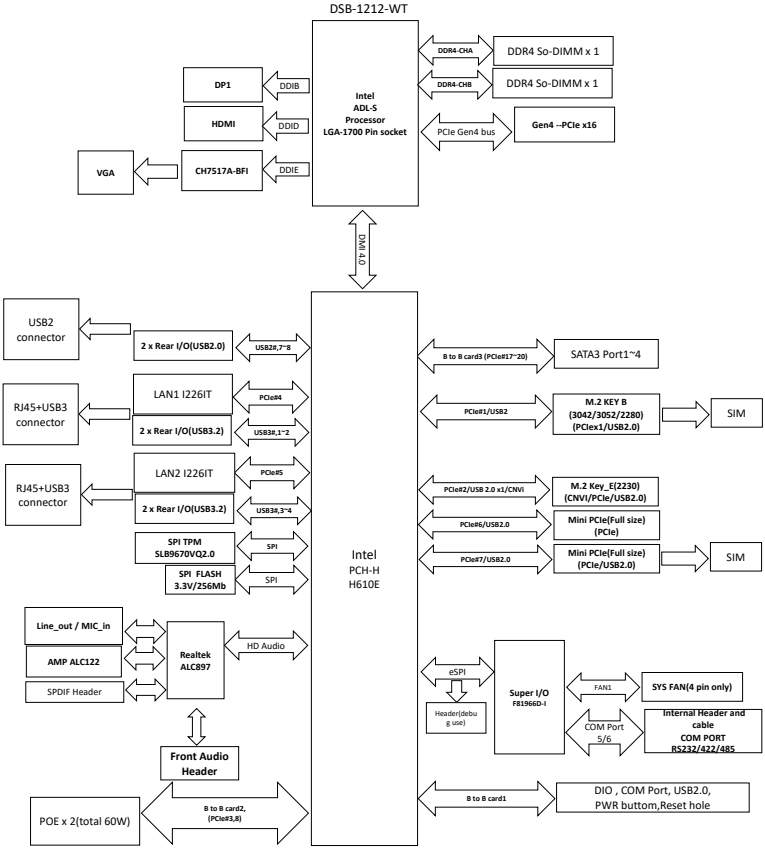


1.5 Block Diagram

iEP(F)-9010E/S Series



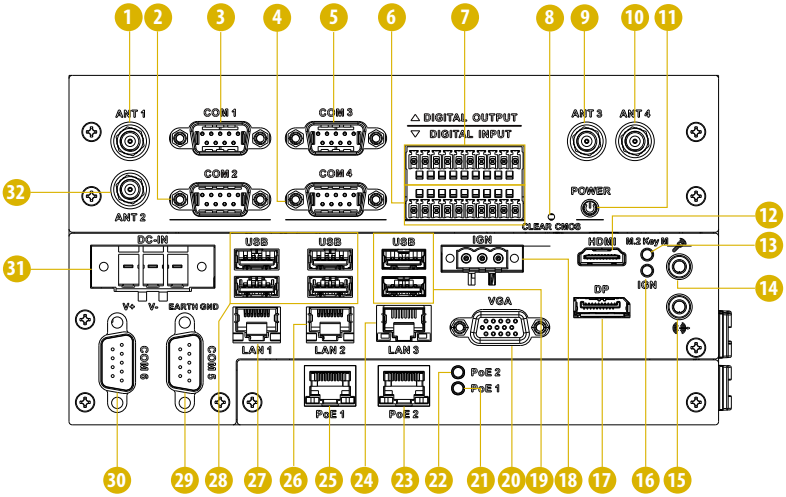
iEP(F)-9012E/S Series



Chapter 2 System Overview

This chapter provides diagrams showing the location of important components of the system system.

2.1 System Front Panel



No.	Description
1	Antenna Port 1
2	Serial Port (COM 2)
3	Serial Port (COM 1)
4	Serial Port (COM 4)
5	Serial Port (COM 3)
6	Digital Input
7	Digital Ouput
8	ClearCMOS Button
9	Antenna Port 3
10	Antenna Port 4
11	Power Switch
12	HDMI
13	M.2 Slot (Key M) Status LED
14	Audio (Mic-in)
15	Audio (Line-out)
16	IGN Status LED
17	DisplayPort

18	Remote Power On/Off Switch (IGN)
19	2 x USB 3.2 Gen2x1 Ports (R680E sku) 2 x USB 2.0 Ports (H610 sku)
20	VGA Port
21	PoE1 Port Status LED (PoE 1)
22	PoE2 Port Status LED (PoE 2)
23	LAN RJ-45 PoE Port (PoE 2)
24	LAN RJ-45 Port (LAN 3) (R680E sku)
25	LAN RJ-45 PoE Port (PoE 1)
26	LAN RJ-45 Port (LAN 2)
27	LAN RJ-45 Port (LAN 1)
28	4 x USB 3.2 Gen2x1 Ports (R680E sku) 2 x USB 3.2 Gen2x1 Ports, 2 x USB 3.2 Gen1x1 Ports (H610 sku)
29	Serial Port (COM 5)
30	Serial Port (COM 6)
31	DC Power Input (DC-IN)
32	Antenna Port 2

➢ The PoE ports on the system are only be linked to the PoE networks in the indoor environment. They would be not connected the networks in the outdoor space.

2.1.1 Control Panel Buttons and LED Indicators

Power Switch

Press the power switch button to toggle the system power-on and power-off modes. To remove all power from the system completely, disconnect the power cord from the system.

ClearCMOS Button

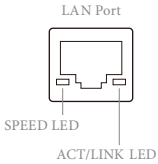
Use this button to manually reset the system. Press and hold the reset switch for a few seconds to reboot the system without shutting it off.

Remote Power On/Off Switch (IGN connector)

This switch is for ignition power control and operation. Use this switch to remotely monitor or turn on/off the ignition signal for in-vehicle applications, for instance.

Ethernet Port LED

There are two LEDs on the LAN port. Please refer to the table below for the LAN port LED indications.



Activity / Link LED		Speed LED	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10/100Mbps connection
Blinking	Data Activity	Orange	1000Mbps connection
On	Link	Green	2.5Gbps connection

PoE 1 Port Status LED

Status	Description
Solid Green	PoE 1 Port is connected to a PoE device
Off	No PoE onnection

PoE 2 Port Status LED

Status	Description
Solid Green	PoE 2 Port is connected to a PoE device
Off	No PoE connection

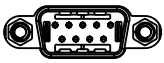
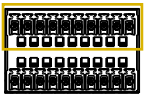
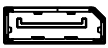
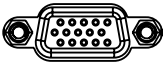
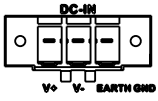
M.2 Slot (Key M) Status LED

Status	Description
Blinking Green	M.2 Slot (Key M) on the motherboard is populated with a M.2 module.
Off	Empty M.2 Slot (Key M)

IGN Status LED

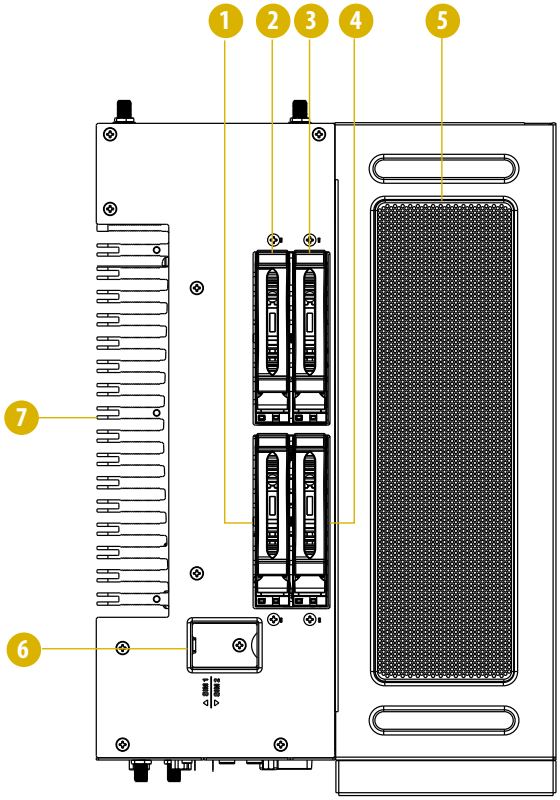
Status	Description
Solid Green	The IGN connector is connected and working normally.
Off	No connection

2.1.2 I/O Connectors

Connector		Description
Antenna Port		Connect the antenna cable to this connector.
Serial Port (COM)		This system provides six COM ports through D-sub 9-pin connectors.
Digital Ouput		This system provides non-isolation digital input circuits for customer's device.
Digital Input		This system provides non-isolation digital output circuits for customer's device.
DisplayPort 1.4a		Connect this DisplayPort to VGA, DVI, HDMI and DisplayPort monitors via adapter cables.
Audio (Mic-in)		The Mic-in audio connector on the I/O panel supports 5.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.
Audio (Line-out)		Connect stereo speakers to the Line-out connector for better sound quality.
USB 2.0 Port		This system provides two USB 2.0 ports supporting Type A USB connection on the I/O panel.
USB 3.2 Gen1/ Gen2 Port		This system provides four USB 3.2 Gen1/Gen2 ports supporting Type A USB 3.2 connection on the I/O panel.
VGA Port		Use a VGA cable to connect between the system and your monitor.
DC Power Input		Insert a power cable to this connector for power supply.

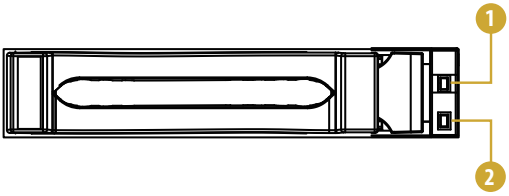
2.2 HDD Panel

iEPF-9010S Series / iEP-9010E Series



No.	Description
1	2.5" HDD/SSD Tray (HDD0)
2	2.5" HDD/SSD Tray (HDD1)
3	2.5" HDD/SSD Tray (HDD3)
4	2.5" HDD/SSD Tray (HDD2)
5	Side Vent
6	2 x SIM Card Slots (SIM1 is for M.2 B key slot)
7	System Heatsink

2.3 Drive Tray LEDs



No.	Description
1	HDD Power LED
2	HDD Activity LED

Status LED Definitions

HDD Power LED	
Status	**Description**
Blue	HDD powered-on
Off	No power to HDD

HDD Activity LED	
Status	**Description**
Solid Green	HDD active
Blinking Green	HDD accessing or reading
Red	HDD failed
Off	HDD powered-off

Chapter 3 Hardware Installation and Maintenance

This chapter helps you disassemble the system and install components.

Before You Begin

Before you work with the system, pay close attention to the "Important Safety Instructions" at the beginning of this manual.

1. Make sure the system is powered off.
   Power down the system if it is still running.
   (1) Press the Power button to power off the system. The Power LED at the front turns from solid green to dark.
   (2) Disconnect the power cord first from the AC outlet and then from the system. The power LED turns off.
2. Ensure you have a clean and stable working environment. Avoid dust and dirt because contaminants may cause malfunctions.
3. Ground yourself properly before touching any system component. A discharge of static electricity may damage components. Wear a grounded wrist strap if available.

Screw Driver Recommended Torque Value	
Items secured to Chassis	**Vaule (Kgf-cm)**
Chassis & Top Case/Heatsink	3.0 + / - 0.5
Rubber Foot	3.0 + / - 0.5
Desk Mount	3.0 + / - 0.5
2.5" Tray and 2.5" Device	3.0 + / - 0.5
Items secured to PCBA	**Vaule (Kgf-cm)**
DIMM BKT	2.0 + / - 0.5
Device : M.2 & Mini PCIE Module	2.0 + / - 0.5
Phoenix DC in & IGN	2.0 + / - 0.5

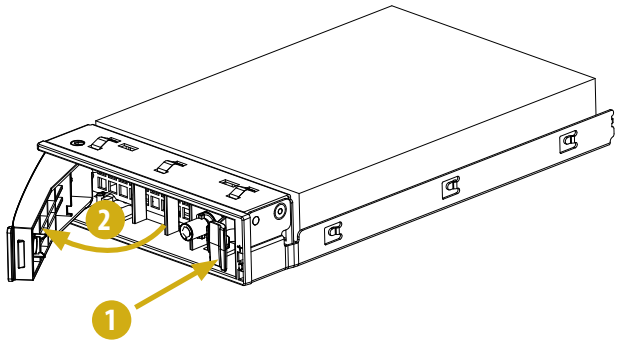
3.1 How to Install the Hard Disk Drive

Installing a Hard Disk Drive into 2.5" Hard Drive Tray

The system supports hot-swappable 2.5" hard drives.

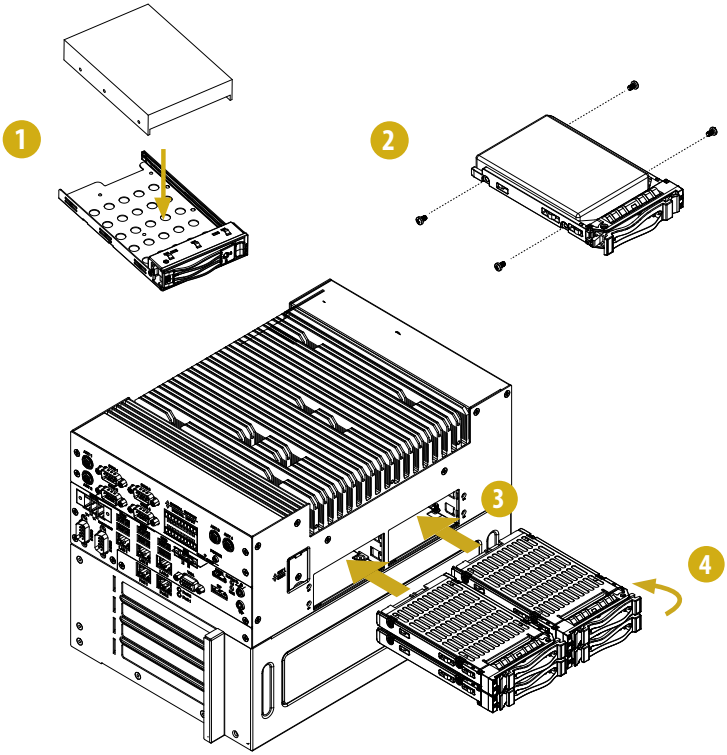
Removing 2.5” Hard Drive Trays from the Chassis

1. Press the locking lever latch on the drive tray to unlock the retention lever.
2. Rotate the lever out and away from the module bay and pull the hard drive out of the HDD tray.



Installing a 2.5” Hard Drive to the Hard Drive Tray

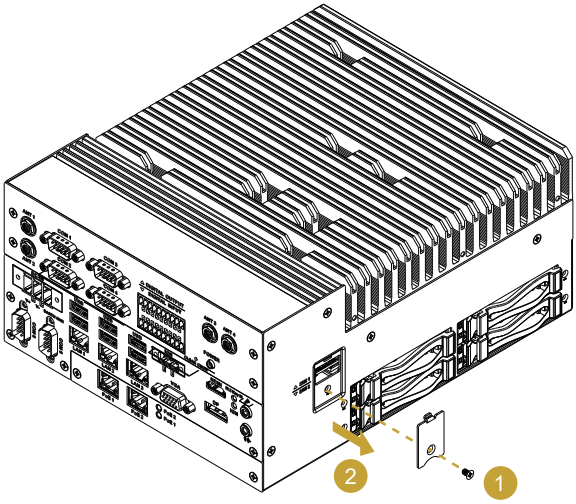
1. Place a 2.5" HDD into the tray with the printed circuit board side facing down. Carefully align the mounting holes in the hard drive and the tray.
2. Secure the hard drive using four screws.
3. Slide the drive tray into the HDD bay until the drive is fully seated.
4. Push in the locking lever to lock the HDD tray into place.



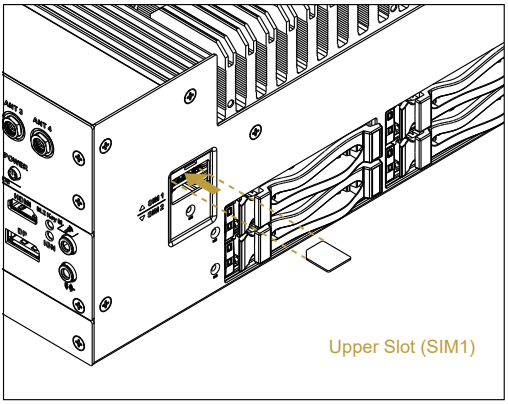
3.2 How to Install the SIM Card

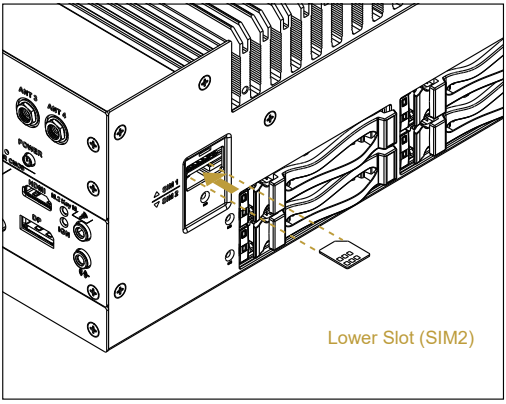
Installing a SIM Card into a SIM Card Slot

1. Release the screw and remove the SIM card slot cover.



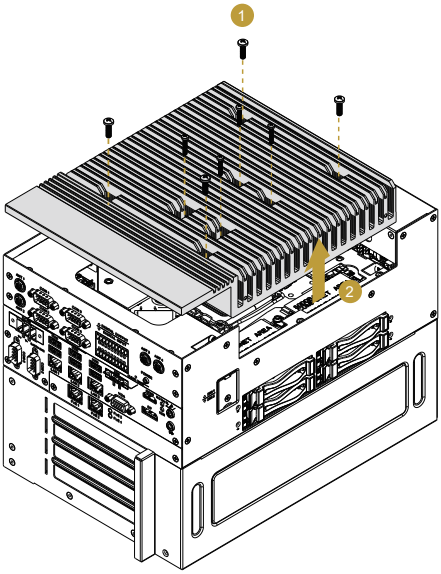
2. Insert a SIM card to the SIM car slot.
   SIM1 (Upper Slot): When inserting the SIM Card to the upper slot, make sure the notch on the SIM card is oriented with the gold contacts face down.
   SIM2 (Lower Slot): When inserting the SIM Card to the lower slot, make sure the notch on the SIM card is oriented with the gold contacts face up.



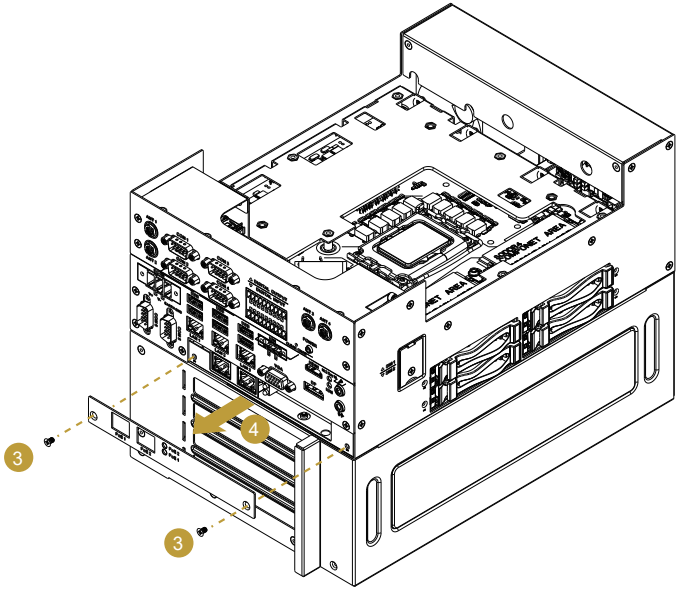


3.3 How to Disassemble the System

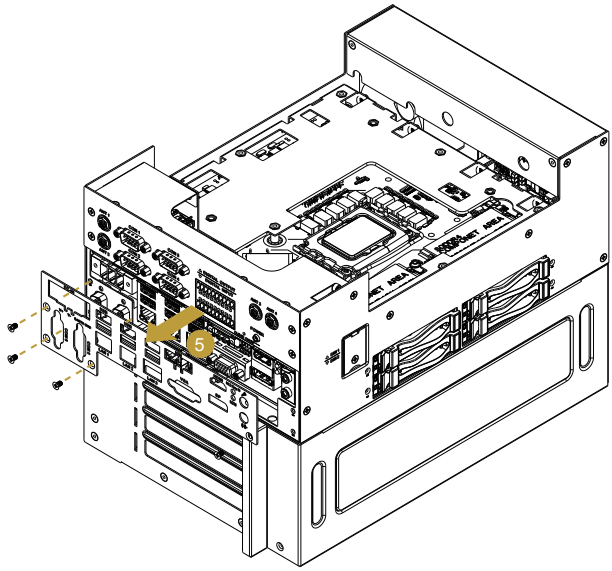
1. Release all screws on the heasink side
2. Remove the heatsink..



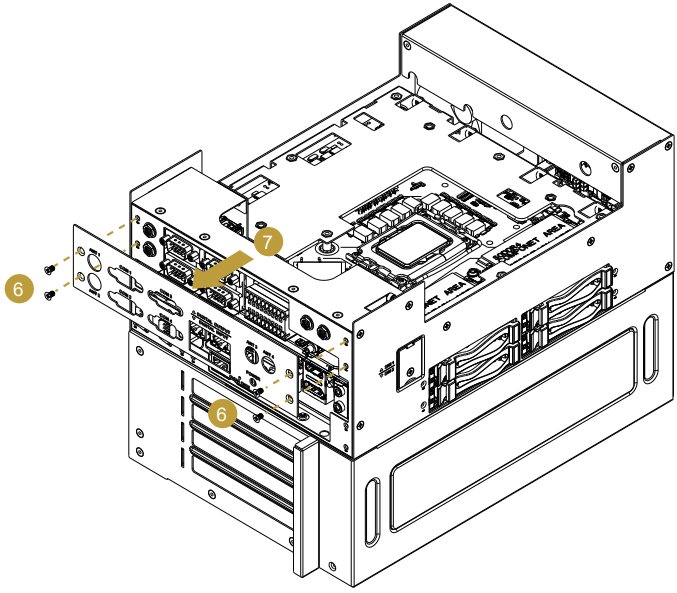
3. Release the screws.
4. Remove the small panel from the I/O side of the system.



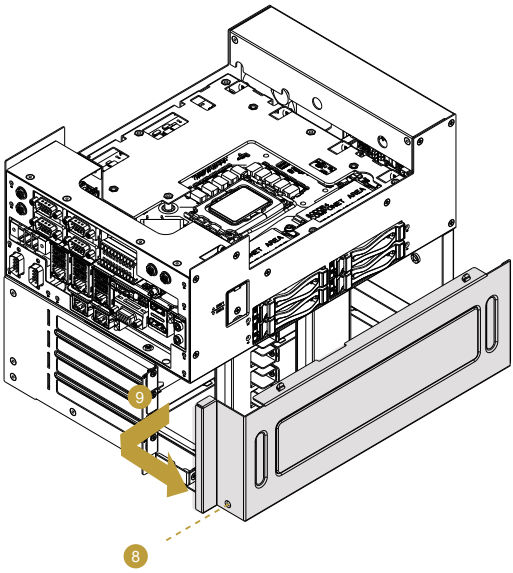
5. Release the screws and remove the middle panel from the I/O side of the system.



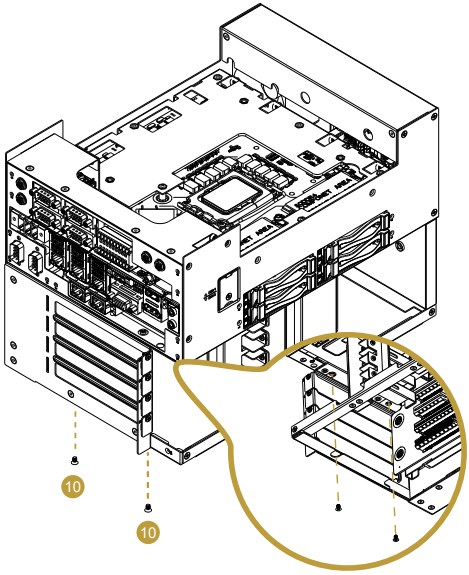
6. Release the screws.
7. Remove the big panel from the I/O side of the system.



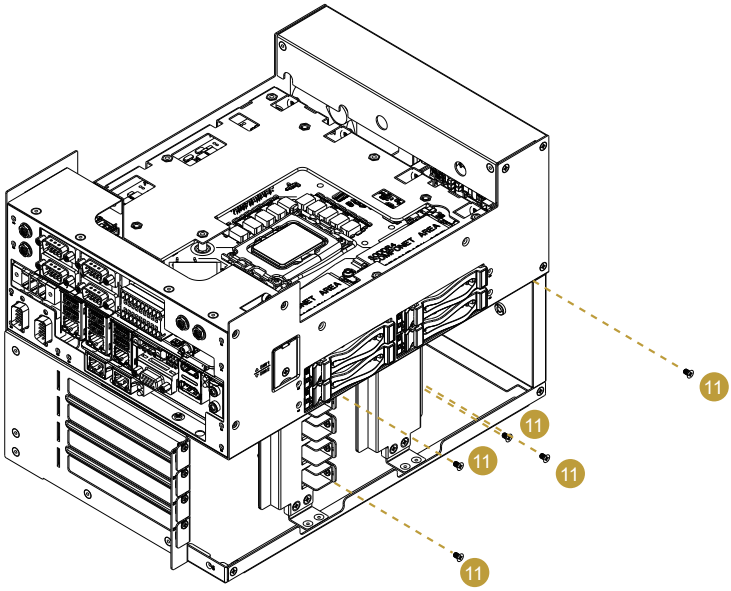
8. Release the screw.
9. Push the cover toward the I/O side of the chassis to remove the cover from the locked position. Remove the cover.



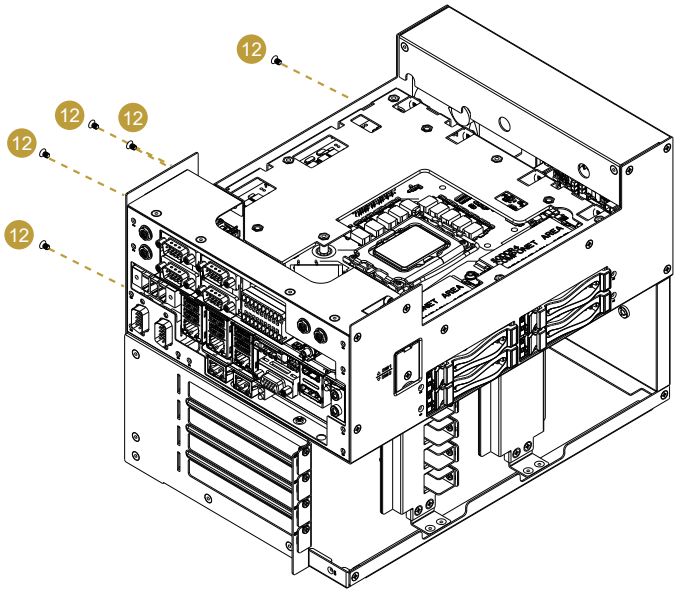
10. Release the two screws from the inside of the chassis.



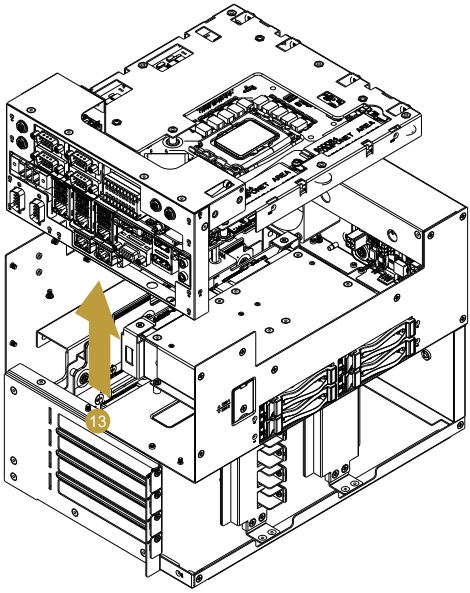
11. Remove the screws from the inside of the chassis.



12. Remove the screws from the rear side of the chassis.

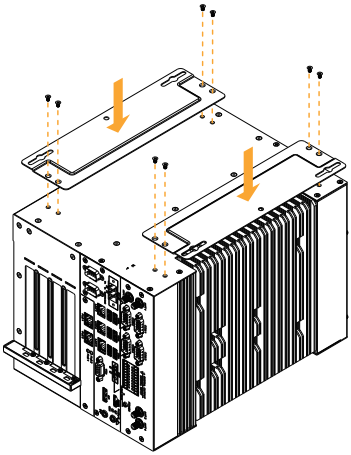


13. Pull out the motherboard tray from the system.

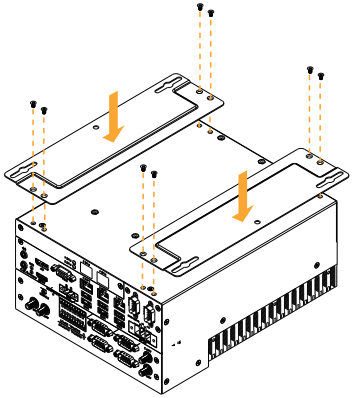


3.4 How to Install the Desk Mount Bracket

1. Attach the two desk mount brackets to the iEPF-9010S Series or iEP-9010E Series and secure them with eight screws.

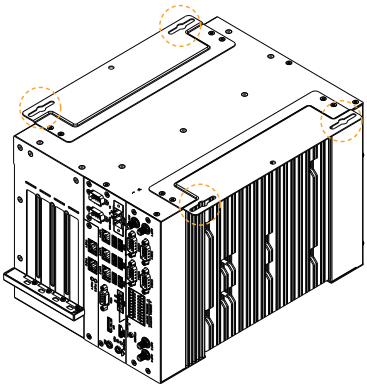


iEPF-9010S Series

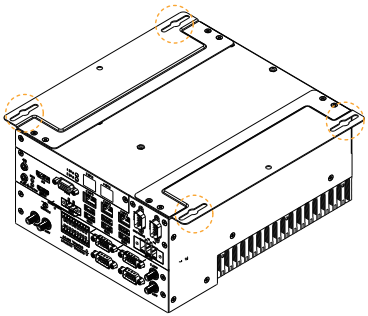


iEP-9010E Series

2. Then you can attach the iEPF-9010S Series or iEP-9010E Series to any horizontal surface.



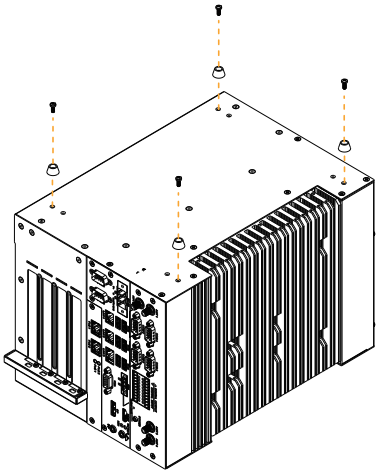
iEPF-9010S Series



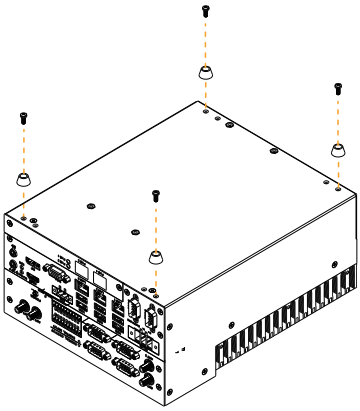
iEP-9010E Series

3.5 How to Install the Rubber Foot

1. Attach four rubber foots to the iEPF-9010S Series or iEP-9010E Series and secure them with four screws.

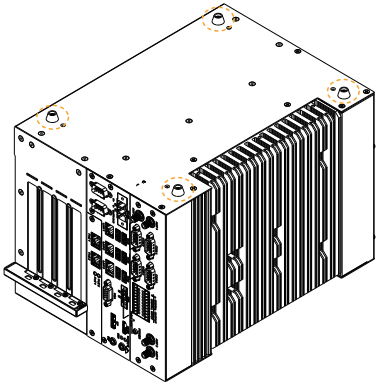


iEPF-9010S Series

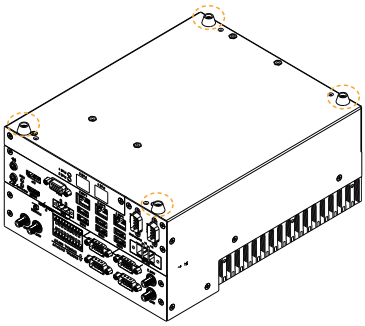


iEP-9010E Series

2. Then you can put the iEPF-9010S Series or iEP-9010E Series to any horizontal surface.



iEPF-9010S Series

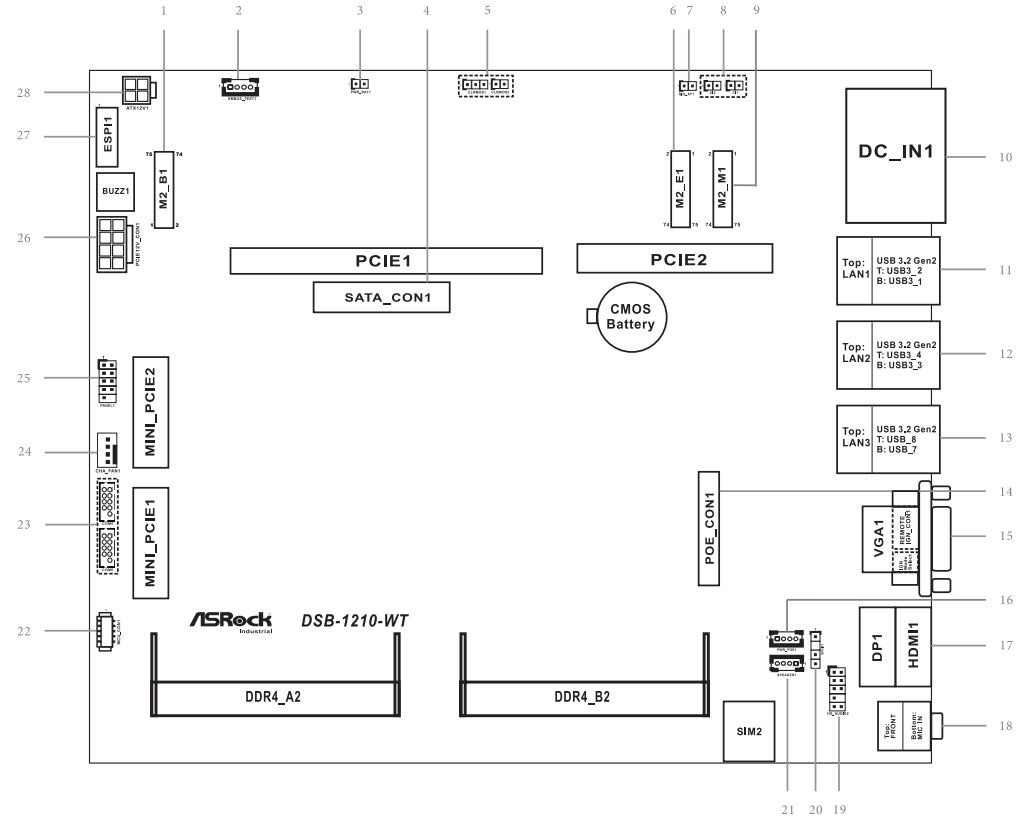


iEP-9010E Series

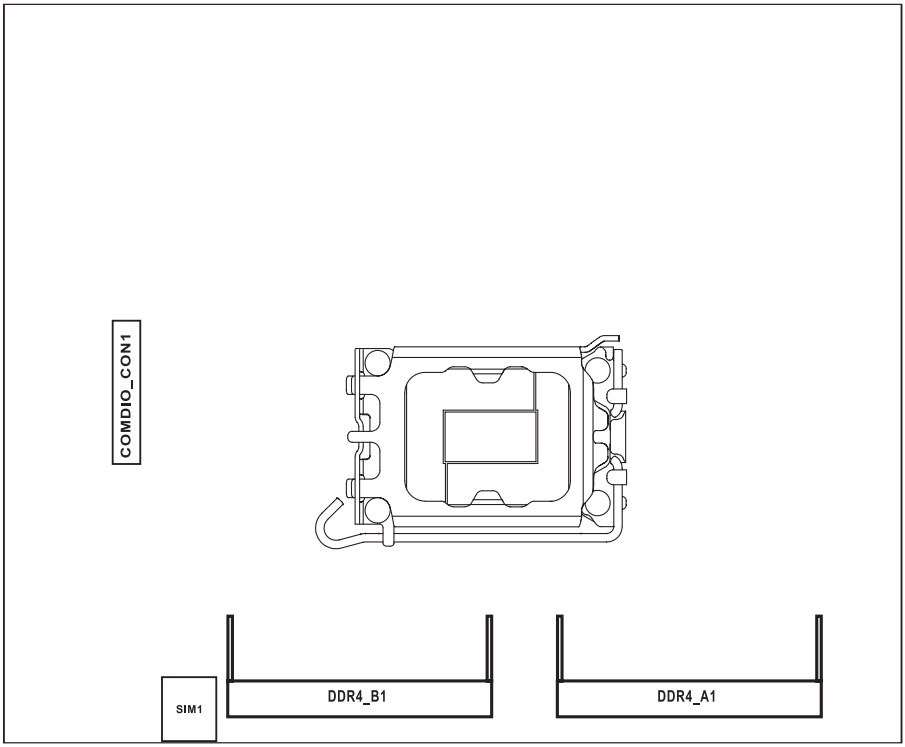
Chapter 4 Motherboard

4.1 Motherboard Layout

Top Side



Rear Side



1 : M.2 Key-B Socket (M2_B1)

Pin	Signal	Signal	Pin
1	NA	+3.3V	2
3	GND	+3.3V	4
5	GND	FuLL_Card_Power_off	6
7	USB_D+	W_DISABLE	8
9	USB_D-	WWAN_LED#	10
11	GND		
21	GND	NA	20
23	NA	NA	22
25	NA	NA	24
27	GND	NA	26
29	USB3_RX-	NA	28
31	USB3_RX+	UIM_RESET	30
33	GND	UIM_CLK	32
35	USB3_TX-	UIM_DATA	34
37	USB3_TX+	UIM_PWR	36
39	GND	NA	38
41	PERn0	NA	40
43	PERp0	NA	42
45	GND	NA	44
47	PETn0	NA	46
49	PETp0	NA	48
51	GND	PERST#	50
53	PEFCLKn	CLKREQ#	52
55	PEFCLKp	WAKE#	54
57	GND	NA	56
59	NA	NA	58
61	NA	NA	60
63	NA	NA	62
65	NA	NA	64
67	NA	NA	66
69	NA	NA	68
71	GND	+3.3V	70
73	GND	+3.3V	72
75	NA	+3.3V	74

2 : SMBUS_TEST1



PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
1	SMBUS_TEST	2	SMB_CLK	3	SMB_DATA	4	GND

3 : PWR_BAT1

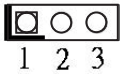


Open : Normal
Short : Charge Battery

4 : SATA Connector (SATA_CON1)

5 : Clear CMOS Headers

CLRMOS1 :



1-2 : Normal
2-3 : Clear CMOS
CLRMOS2 :



Open : Normal
Short : Auto Clear CMOS (Power Off)

6 : M.2 Key-E Socket (M2_E1)

Pin	Signal	Signal	Pin
1	GND	+3.3V	2
3	USB_D+	+3.3V	4
5	USB_D-	NA	6
7	GND	NA	8
9	CNV_WR_D1-	CNV_RF_RESET	10
11	CNV_WR_D1+	NA	12
13	GND	MODEM_CLKREQ	14
15	CNV_WR_D0-	NA	16
17	CNV_WR_D0+	GND	18
19	GND	NA	20
21	CNV_WR_CLK-	CNV_BRI_RSP	22
23	CNV_WR_CLK+		
33	GND	CNV_BGI_DT	32
35	PETp	CNV_RGI_RSP	34
37	PETn	CNV_BRI_DT	36
39	GND	NA	38
41	PERp	NA	40
43	PERn	NA	42
45	GND	NA	44
47	PEFCLKp	NA	46
49	PEFCLKn	NA	48
51	GND	SUSCLK	50
53	CLKREQ#	PERST0#	52
55	WAKE#	W_DISABLE1#	54
57	GND	W_DISABLE2#	56
59	CNV_WT_D1-	SMB_DATA	58
61	CNV_WT_D1+	SMB_CLK	60
63	GND	NA	62
65	CNV_WT_D0-	CLKIN_XTAL_LCP	64
67	CNV_WT_D0+	NA	66
69	GND	NA	68
71	CNV_WT_CLK-	NA	70
73	CNV_WT_CLK+	+3.3V	72
75	GND	+3.3V	74

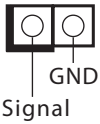
7 : ATX/AT Mode Jumper (SIO_AT1)

Open : ATX Mode
Short : AT Mode



8 : Chassis Intrusion Headers (CI1, CI2)

CI1 :
Open : Normal
Short : Active Case Open
CI2 :
Open : Active Case Open
Short : Normal



English

9 : M.2 Key-M Socket (M2_M1)

Pin	Signal	Signal	Pin
1	GND	+3.3V	2
3	GND	+3.3V	4
5	PERn3	NA	6
7	PERp3	NA	8
9	GND	SATA_LED	10
11	PETn3	+3.3V	12
13	PETp3	+3.3V	14
15	GND	+3.3V	16
17	PERn2	+3.3V	18
19	PERp2	NA	20
21	GND	NA	22
23	PETn2	NA	24
25	PETp2	NA	26
27	GND	NA	28
29	PERn1	NA	30
31	PERp1	NA	32
33	GND	NA	34
35	PETn1	NA	36
37	PETp1	DEVSLP	38
39	GND	SMB_CLK	40
41	PERn0	SMB_DATA	42
43	PERp0	NA	44
45	GND	NA	46
47	PETn0	NA	48
49	PETp0	PERST#	50
51	GND	CLKREQ#	52
53	PEFCLKn	WAKE#	54
55	PEFCLKp	NA	56
57	GND	NA	58
67	NA	NA	68
69	PEDET	+3.3V	70
71	GND	+3.3V	72
73	GND	+3.3V	74
75	GND		

10 : DC Input Connector (DC_IN1)

11 : Top : RJ45 LAN Port (LAN1)(Supports vPRO)
Bottom : USB3.2 Gen2 Ports (USB3_1_2)

12 : Top : RJ45 LAN Port (LAN2)
Bottom : USB3.2 Gen2 Ports (USB3_3_4)

13 : Top : RJ45 LAN Port (LAN3)
Bottom : USB3.2 Gen2 Ports (USB_7_8)

14 : POE Connector (POE_CON1)

15 : Top : D-Sub Port (VGA1)
Bottom Right : REMOTE_IGN_CON1
Bottom Left : IGN Mode Select

PIN	Signal Name
3	IGNITION
2	PWRBTN#
1	GND

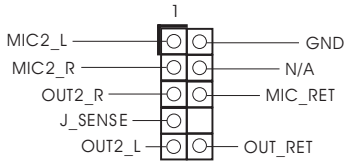
16 : POE Power Connector (PWR_POE1)

PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
1	+12V	2	+12V	3	GND	4	+3VSB

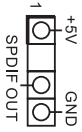


17 : Top : DislpayPort (DP1)
Bottom : HDMI Port (HDMI1)
18 : Audio Jacks
Green - Line Out
Pink - Mic In

19 : Front Panel Audio Header



20 : SPDIF Header



21 : 3W Audio Output Wafer (SPEAKER1)

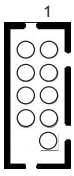


PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
4	OUTRN	3	OUTRP	2	OUTLP	1	OUTLN

22 : MCU Connector (MCU_CON1)

23 : COM Port Headers (COM5, 6)
(RS232/422/485)

PIN	Signal Name	PIN	Signal Name
2	RRXD	1	DDCD#
4	DDTR#	3	TTXD
6	DDSR#	5	GND
8	CCTS#	7	RRTS#
10	N/A	9	N/A

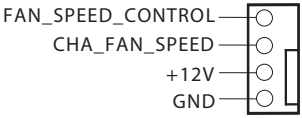


* This motherboard supports RS232/422/485 on COM5, 6 ports. Please refer to below table for the pin definition. In addition, COM5, 6 port (RS232/422/485) can be adjusted in BIOS setup utility > Advanced Screen > Super IO Configuration. You may refer to our user manual for details.

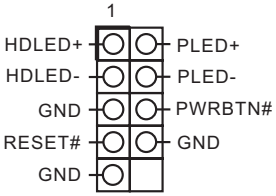
COM5, 6 Ports Pin Definition

PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	TX+	RTX+
3	TXD	RX+	NA
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	N/A	N/A	N/A

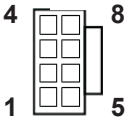
24 : Chassis FAN Connector (+12V)



25 : System Panel Header



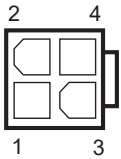
26 : 12V PCIe Power Connector



English

27 : ESPI Connector (ESPI1)

28 : 4-Pin 12V ATX Power Connector
1-2 : GND
3-4 : DC Input



Chapter 5 UEFI Setup Utility

5.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. The UEFI chip on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or <Del> during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherwise, POST will continue with its test routines.

If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.



Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

5.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

Main	To set up the system time/date information
Advanced	To set up the advanced UEFI features
H/W Monitor	To display current hardware status
Security	To set up the security features
Boot	To set up the default system device to locate and load the Operating System
Exit	To exit the current screen or the UEFI SETUP UTILITY

Use < ←> key or < →> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

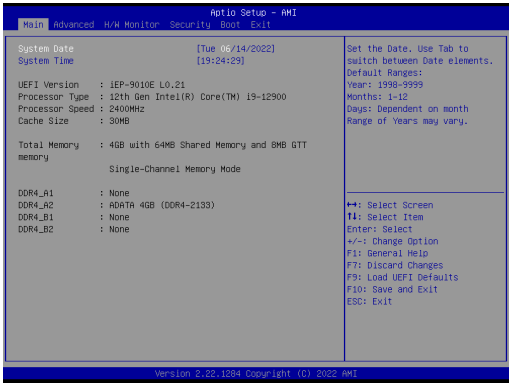
5.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

Navigation Key(s)	Function Description
← / →	Moves cursor left or right to select Screens
↑ / ↓	Moves cursor up or down to select items
+ / -	To change option for the selected items
<Enter>	To bring up the selected screen
<F1>	To display the General Help Screen
<F7>	Discard changes
<F9>	To load optimal default values for all the settings
<F10>	To save changes and exit the UEFI SETUP UTILITY
<F12>	Print screen
<ESC>	To jump to the Exit Screen or exit the current screen

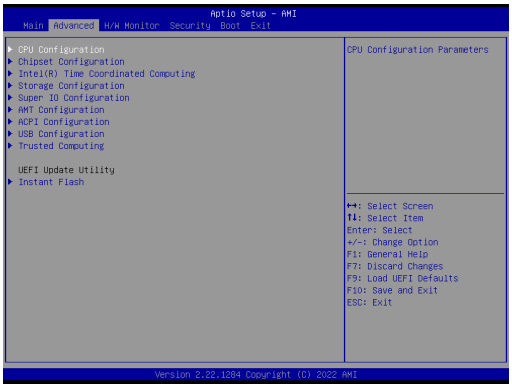
5.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.



5.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, Intel(R) Time Coordinated Computing, Storage Configuration, Super IO Configuration, ACPI Configuration, USB Configuration and Trusted Computing.

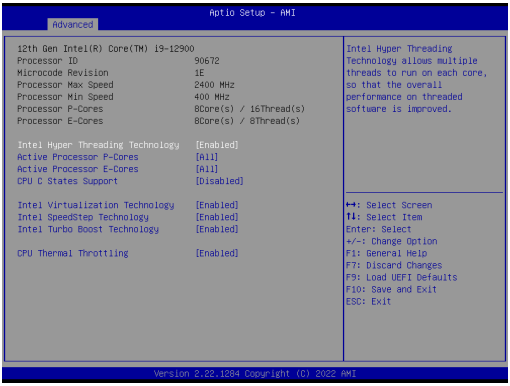


Setting wrong values in this section may cause the system to malfunction.

Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after UEFI update process completes.

5.3.1 CPU Configuration



Intel Hyper Threading Technology

Intel Hyper Threading Technology allows multiple threads to run on each core, so that the overall performace on threaded software is improved.

Active Processor P-Cores

Select the number of cores to enable in each processor package.

Active Processor E-Cores

Select the number of E-Cores to enable in each processor package.

CPU C States Support

Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Intel Virtualization Technology

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel Virtualization Technology.

Intel SpeedStep Technology

Intel SpeedStep technology is Intel's new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled]. If you install Windows® OS and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to [Disabled] if above issues occur.

English

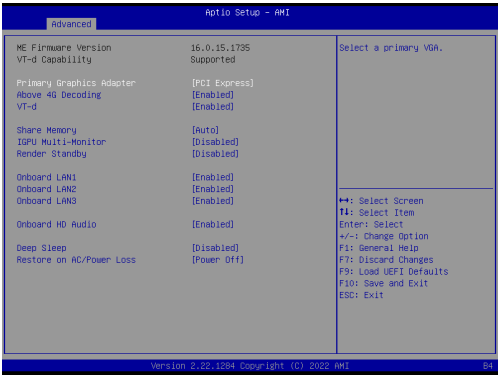
Intel Turbo Boost Technology

Intel Turbo Boost Technology enables the processor to run above its base operating frequency when the operating system requests the highest performance state.

CPU Thermal Throttling

You may select [Enabled] to enable CPU internal thermal control mechanism to keep the CPU from overheating.

5.3.2 Chipset Configuration



Primary Graphics Adapter

Select a primary VGA.

Above 4G Decoding

Enable or disable 64bit capable Devices to be decoded in Above 4G Address Space (only if the system supports 64 bit PCI decoding).

VT-d

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

Share Memory

Configure the size of memory that is allocated to the integrated graphics processor when the system boots up.

IGPU Multi-Monitor

This allows you to enable or disable IGPU Multi-Monitor. The default value is [Disabled].

Render Standby

Power down the render unit when the GPU is idle for lower power consumption.

Onboard LAN1

This allows you to enable or disable the Onboard LAN1 feature.

Onboard LAN2

This allows you to enable or disable the Onboard LAN2 feature.

Onboard LAN3

This allows you to enable or disable the Onboard LAN3 feature.

Onboard HD Audio

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged.

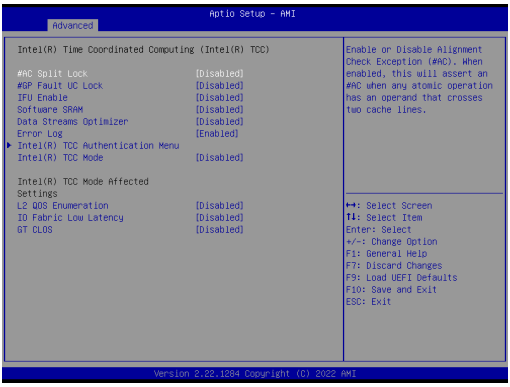
Deep Sleep

Configure deep sleep mode for power saving when the computer is shut down.

Restore on AC/Power Loss

Select the power state after a power failure. If [Power Off] is selected, the power will remain off when the power recovers. If [Power On] is selected, the system will start to boot up when the power recovers.

5.3.3 Intel(R) Time Coordinated Computing



#AC Split Lock

Enable or Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crisses two cache lines.

#GP Split Lock

Enable or Disable GP Fault Exception (GP#). When enabled, this will assert an GP# when encountering a Lock to un-cacheable memory before the bus is locked.

IFU Enable

Enable or Disable Instruction Fetch Unit(IFU). When enabled, Instructions will be prefetch to the cache.

Software SRAM

Enable or Disable Software SRAM. Enable will allocate 1 way of LLC; if Cache Configuration subregion is available, it will allocate based on the subregion.

Data Streams Optimizer

Enable or Disable Data Streams Optimizer (DSO). Enable will utilize DSO Subregion to tune system. DSO settings supercede Intel(R) TCC Mode settings that overlap between the two.

Error Log

Enable or Disable Error Log. Enable will record errors related to Intel(R) TCC and save them to memory.

Inte(R) TCC Authentication Menu

Press Enter to configure Intel(R) TCC Authentication Menu options.

Inte(R) TCC Authentication

Intel(R) TCC Authentication determines the key to be used. OEM Enrolled Key is built in by OEM. Non-OEM Enrolled Key can be add by user.

Intel(R) TCC Mode

Enable or Disable Intel(R) TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled.

L2 QOS Enumeration

Enable or Disable L2 QOS Enumerate.When Enable CPUID Enumeration for L2 QOS gets enabled.

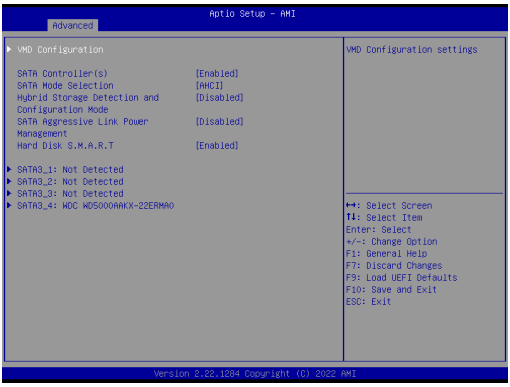
IO Fabric Low Latency

Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.

GT CLOS

Enable or Disable Graphics Technology(GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC.

5.3.4 Storage Configuration



SATA Controller(s)

Use this item to enable or disable the SATA Controller feature.

SATA Mode Selection

Use this to select SATA mode. The default value is [AHCI Mode].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

Hybrid Storage Detection and Configuration Mode

This item allows you select Hybrid Storage Detection and Configuration Mode.

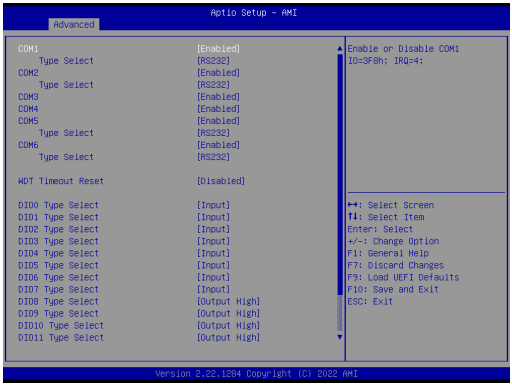
SATA Aggressive Link Power Management

Use this item to configure SATA Aggressive Link Power Management.

Hard Disk S.M.A.R.T

S.M.A.R.T stands for Self-Monitoring, Analysis, and Reporting Technology. It is a monitoring system for computer hard disk drives to detect and report on various indicators of reliability.

5.3.5 Super IO Configuration



COM1 Configuration

Use this to set parameters of COM1.

Type Select

Use this to select COM1 port type: [RS232], [RS422] or [RS485].

COM2 Configuration

Use this to set parameters of COM2.

Type Select

Use this to select COM2 port type: [RS232], [RS422] or [RS485].

COM3 Configuration

Use this to set parameters of COM3.

COM4 Configuration

Use this to set parameters of COM4.

COM5 Configuration

Use this to set parameters of COM5.

Type Select

Use this to select COM5 port type: [RS232], [RS422] or [RS485].

COM6 Configuration

Use this to set parameters of COM6.

Type Select

Use this to select COM6 port type: [RS232], [RS422] or [RS485].

WDT Timeout Reset

Use this to set the Watch Dog Timer.

DID0 Type Select

Use this to set DIO Type: [Input].

DID1 Type Select

Use this to set DIO Type: [Input].

DID2 Type Select

Use this to set DIO Type: [Input].

DID3 Type Select

Use this to set DIO Type: [Input].

DID4 Type Select

Use this to set DIO Type: [Input].

DID5 Type Select

Use this to set DIO Type: [Input].

DID6 Type Select

Use this to set DIO Type: [Input].

DID7 Type Select

Use this to set DIO Type: [Input].

DID8 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID9 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID10 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID11 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID12 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID13 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

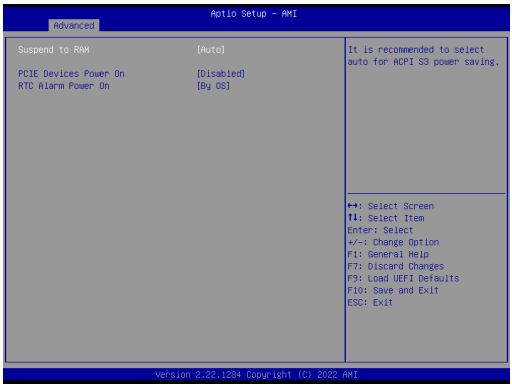
DID14 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

DID15 Type Select

Use this to set DIO Type: [Output Low] or [Output High].

5.3.6 ACPI Configuration



Suspend to RAM

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it.

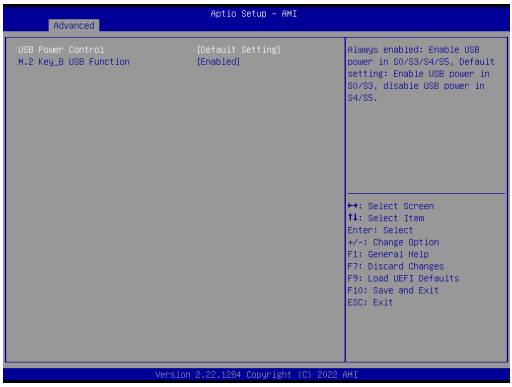
PCIE Devices Power On

Allow the system to be waked up by a PCIE device and enable wake on LAN.

RTC Alarm Power On

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

5.3.7 USB Configuration



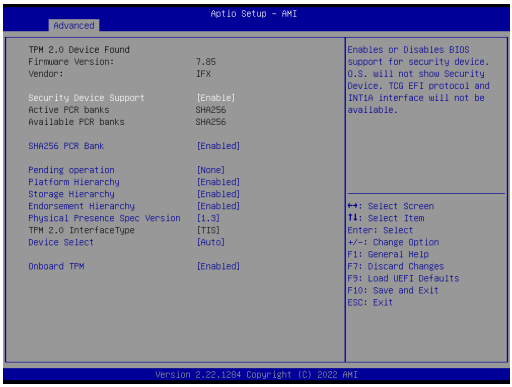
USB Power Control

Use this option to control USB power.

M.2 Key_B USB Function

Use this option to enable or disable M.2 Key_B USB Function.

5.3.8 Trusted Computing



Security Device Support

Enable or disable BIOS support for security device.

SHA256 PCR Bank

Use this item to enable or disable SHA256 PCR Bank.

Pending Operation

Schedule an Operation for the Security Device.

Platform Hierarchy

Use this item to enable or disable Platform Hierarchy

Storage Hierarchy

Use this item to enable or disable Storage Hierarchy.

Endorsement Hierarchy

Use this item to enable or disable Endorsement Hierarchy.

Physical Presence Spec version

Select this item to tell OS to support PPI spec version 1.2 or 1.3. Please note that some HCK tests might not support version 1.3.

TPM 2.0 InterfaceType

Select the Communication Interface to TPM 2.0 Device.

Device Select

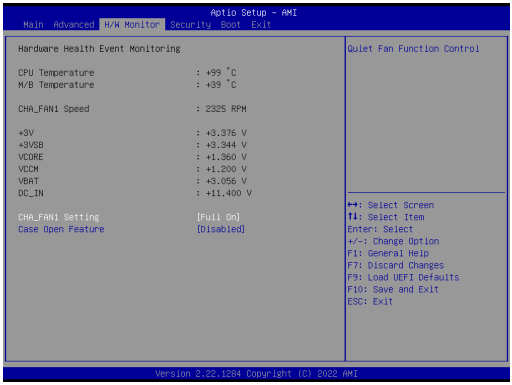
Use this item to select the TPM device to be supported. TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices. If TPM 2.0 devices are not found, TPM 1.2 devices will be enumerated.

Onboard TPM

Use this item to enable or disable the onboard TPM interface controller.

5.4 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.



CHA_FAN1 Setting

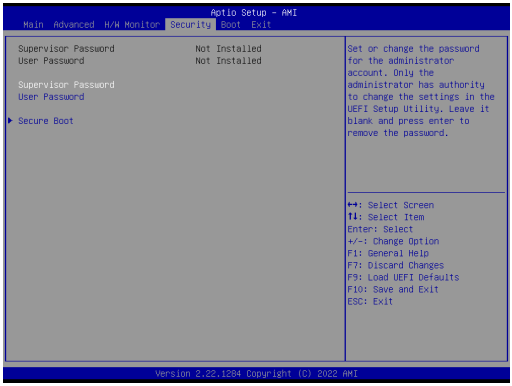
Select a fan mode for Chassis Fan 1, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Case Open Feature

Enable or disable Case Open Feature to detect whether the chassis cover has been removed.

5.5 Security Screen

In this section, you may set, change or clear the supervisor/user password for the system.



Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

User Password

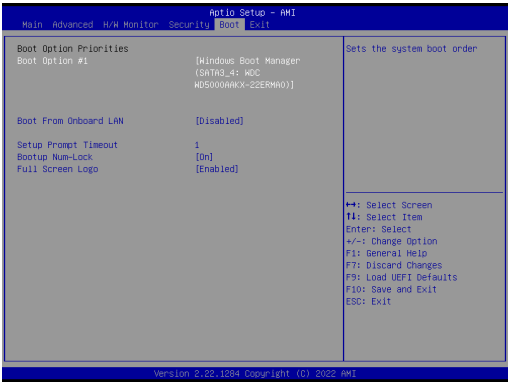
Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Enable to support Windows Secure Boot.

5.6 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



Boot Option1

Use this item to set the system boot order.

Boot From Onboard LAN

Use this item to enable or disable the Boot From Onboard LAN feature.

Setup Prompt Timeout

This shows the number of seconds to wait for setup activation key. 65535(0XFFFF) means indefinite waiting.

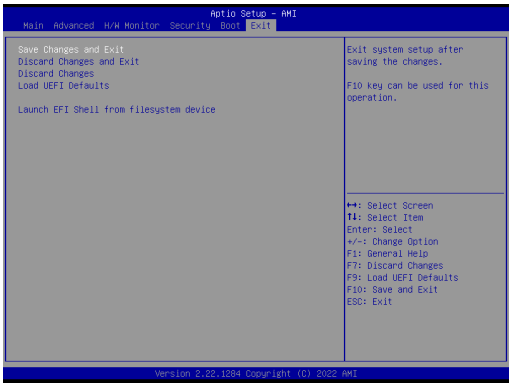
Bootup Num-Lock

If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

Full Screen Logo

Use this item to enable or disable OEM Logo. The default value is [Enabled].

5.7 Exit Screen



Save Changes and Exit

When you select this option, it will pop-out the following message, “Save configuration changes and exit setup?” Select [OK] to save the changes and exit the UEFI SETUP UTILITY.

Discard Changes and Exit

When you select this option, it will pop-out the following message, “Discard changes and exit setup?” Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

Discard Changes

When you select this option, it will pop-out the following message, “Discard changes?” Select [OK] to discard all changes.

Load UEFI Defaults

Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.