ASRock Industrial

iEP-6010E-Series

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"

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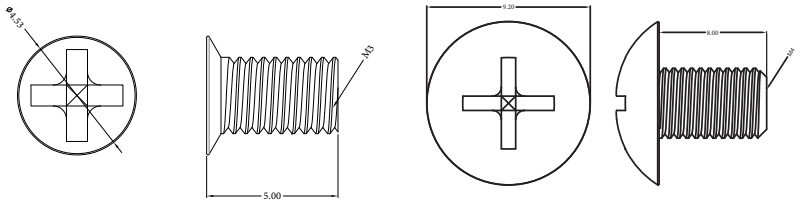
Important Safety Instructions

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 device:
    - Keep device away from water or liquid sources.
    - Keep device away from high heat or humidity.
    - Keep device properly ventilated (do not block or cover ventilation openings).
    - Always use recommended voltage and power source settings.
    - Always install and operate 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 device on stable surfaces and/or recommended 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.

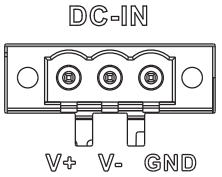
13. Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.
14. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
15. This equipment 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 : It is recommended that the device be installed only in a server room or computer room where access is:
    - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required.
    - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.



DIN Rail/Wall Mount: M3x5mm Screws *(for securing the mounting bracket(s) to the chassis)*

VESA Mount: M4x8mm Screws *(for securing the VESA bracket to the monitor)*

18. This model is intended to be supplied by an UL-certified power supply. (For BASIC SKU Adapter: FSP/FSP120-ABAN3 is suitable for usage at TMA 40 °C (104 °F), and the output is rated 19Vdc, 6.32A, ES1.) (For POE/5G SKU Adapter: FSP/FSP330-AAAN3 is suitable for usage at TMA 40 °C (104 °F), and the output is rated 24Vdc, 13.75A, ES1.) If you need further assistance, contact ASRock Industrial for additional information.
19. The terminal block is suitable for V+& V- for 14~28AWG. The torque value is 3.5 +/- 0.5kgf-cm. Use copper conductors only. Kindly note that this must be installed by a skilled person.



Replaceable batteries

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



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

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 same or equivalent type as recommended by the manufacturer. Discard all 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 is rated at 12-36V, 10-3.33A (for Basic SKU)/12-36V, 12.5-4.17A (for POE/5G SKU).

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.

Button Battery Safety Notice

⚠WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Battery type: CR2032
- Battery voltage: 3V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- This product contains an irreplaceable battery.
- This icon indicates that a swallowed button battery can cause serious injury or death. Please keep batteries out of sight or reach of children.

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HIGH-DEFINITION MULTIMEDIA INTERFACE

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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

Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice.

1.1 Package Contents

iEP-6010E Series

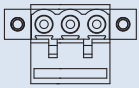
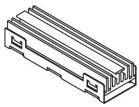
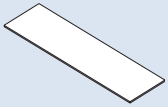
- NVIDIA Jetson Orin NX SOM support, up to 100 SPARSE (50 DENSE) INT8 TOPS
- NVIDIA Jetson Orin Nano SOM support, up to 40 SPARSE (20 DENSE) INT8 TOPS
- Wide range operating temperature (-25~60°C)
- 12V~36V wide range DC input
- 2nd DC IN Interface for USB Type-C power adaptor
- Ultra Compact Size
- Carrier board reserved 2pcs Dual Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.01).
  Carrier board reserved 2pcs Four Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.02)*

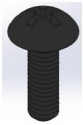
* MIPI-CSI2 camera needs to be turned off before the system going to sleep mode. It is current NVIDIA JetPack limitation.

If any items are missing or appear damaged, contact your authorized dealer.

English

The iEP-6010E Series System Package Contents

No.	Accessories	Qty	Picture	Description
1	M.2 Screw (PN:13G020773010AK)	2 (POE SKU) 3 (BASIC/5G SKU)		To fix M.2 module
2	Terminal Block 1x3P ST 5.0m (PN:12G082000033AI)	1		3-pin phoenix type matting connector for Phoenix Type DC input wiring.
3	M.2 Heatsink for SSD (PN:13G070640000AI)	1		M Key or B Key M.2 2280 SSD module thermal heatsink
4	Thermal Pad (PN:15G252202000AI)	1		The second thermal pad to be pasted within M.2 heatsink for SSD when M Key or B Key M.2 2280 SSD module Flash are mounted on M.2 bottom side.
5	QIG (PN:15G06M131000AI)	1		Quick Installation Guide
6	Thermal Pad (PN:15G252201500AI)	1		15G252201500AI is the accessory only for the 5G SKU (iEP-6010E-003, iEP-6012E-003). When system shipment is without M.2 5G or 4G LTE module, one piece of 15G252201500AI should be put into the Zip bag. Customer can paste it between M.2 module and Chassis Heatink during installation.

7	NYLOK Screw M3*9.5	4		Spare screws for BASIC SKU only. When shipment is BASIC SKU iEP-601XE-000, X=0, 1, 2, or 3, NYLOK Screw M3*9.5 4 pieces will be left.
8	NYLOK Screw M3*3.5	4		Spare screws for POE or 5G SKU only. When shipment is POE or 5G SKU iEP-601XE-00Y, X=0, 1, 2, or 3, Y=1 or 3, NYLOK Screw M3*3.5 4 pieces will be left.

Please refer to the following for more information about the adapters (Option):

1. 120W Power adapter (PN:04G266001001AI)

- Rated Input Voltage: 100-240 Vac
- Input frequency: 50Hz to 60Hz
- Output Current: 6.32A
- Output Rated Voltage: 19V

2. 330W Power adapter (PN:04G266001200AI)

- Rated Input Voltage: 100-240 Vac
- Input frequency: 50Hz to 60Hz
- Output Current: 13.75A
- Output Rated Voltage: 24V

1.2 Order Information

Model Name	PN	Description
iEP-6010E-000	90PCA1E0-00000000	BASIC SKU with NVIDIA Jetson Orin NX 16GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS.
iEP-6010E-001	90PCA1E0-01000000	POE SKU with NVIDIA Jetson Orin NX 16GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS.
iEP-6010E-003	90PCA1E0-03000000	5G SKU with NVIDIA Jetson Orin NX 16GB SOM, w/o Storage, Mount, Adapter, WiFi, 4G LTE or 5G module, and w/o OS.
iEP-6011E-000	90PCA1E0-10000000	BASIC SKU with NVIDIA Jetson Orin NX 8GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS
iEP-6012E-000	90PCA1E0-20000000	BASIC SKU with NVIDIA Jetson Orin Nano 8GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS
iEP-6012E-001	90PCA1E0-21000000	POE SKU with NVIDIA Jetson Orin Nano 8GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS
iEP-6012E-003	90PCA1E0-23000000	5G SKU with NVIDIA Jetson Orin Nano 8GB SOM, w/o Storage, Mount, Adapter, WiFi, 4G LTE or 5G module, and w/o OS
iEP-6013E-000	90PCA1E0-30000000	BASIC SKU with NVIDIA Jetson Orin Nano 4GB SOM, w/o Storage, Mount, Adapter, WiFi, and w/o OS
ORIN NX 16GB DEV KIT	90PCA1E0-04320010	ORIN NX 16GB DEV KIT with 256GB SSD/ OS and 120W Adaptor, w/o WiFi and 4G LTE/5G module.
ORIN NX 8GB DEV KIT	90PCA1E0-14320010	ORIN NX 8GB DEV KIT with 256GB SSD/ OS and 120W Adaptor, w/o WiFi and 4G LTE/5G module.
ORIN NANO 8GB DEV KIT	90PCA1E0-24320010	ORIN Nano 8GB DEV KIT with 256GB SSD/ OS and 120W Adaptor, w/o WiFi and 4G LTE/5G module.
ORIN NANO 4GB DEV KIT	90PCA1E0-34320010	ORIN Nano 4GB DEV KIT with 256GB SSD/ OS and 120W Adaptor, w/o WiFi and 4G LTE/5G module.

1.3 Optional Items

Model Name	PN	Description
ADAPTER 330W 24V W/O CONN	04G266001200AI	FSP 330W adaptor for POE/5G SKU
DIN RAIL Kit	13G020761000AI	For securing the DIN RAIL bracket to the DIN RAIL
WALL MOUNT Kit (Vertical)	13G020760000AI	Vertically mounting the iEP-6010E series on the surface
ADAPTER 120W 19V W/O Connector	04G266001001AI	FSP 120W adaptor for Basic SKU
WALL MOUNT Kit (Horizontal)	13G0207860A0AI	Horizontally mounting the iEP-6010E series on the surface (only for Basic SKU)
VESA MOUNT Kit	13G020554010AI	For securing the VESA bracket to the monitor (only for Basic SKU)
5G Module Kit (For QUECTEL/ RM520N-GL)	14G000035300AI	SMA CABLE MHF-4 不帶針 , L=180mm x4
	14G15A004000AI	Antenna x4
	04G200000000AI	RM520N-GL 5G M.2 3052 module x1
4G LTE Module Kit (For QUECTEL/ EM05-G)	14G000035300AI	SMA CABLE MHF-4 不帶針 , L=180mm x2
	14G15A004000AI	Antenna x2
	04G200002000AI	EM05-G 4G LTE Cat 4 M.2 3042 Module x1
Wi-Fi Module Kits (For Intel/AX210. NGWGII.NV)	14G15A005000AI	Antenna x2
	14G000032200AI	WIFI SMA CABLE 帶針 , L=185mm x2
	04G520017050AK (Wide Temperature module), or 04G520017010AK (Non-Wide Temperature module)	802.11AX 2X2 WLAN+BT M.2 2230 (WT) x1, or 802.11AX 2X2 WLAN+BT M.2 2230 (non-WT) x1

1.4 Product Specifications

iEP-6010E Series

Processor System

System on Module	- NVIDIA Jetson Orin NX SOM 16GB support (Basic SKU iEP-6010E-000, PoE SKU iEP-6010E-001, 5G SKU iEP-6010E-003) - NVIDIA Jetson Orin NX SOM 8GB support (Basic SKU iEP-6011E-000) - NVIDIA Jetson Orin Nano SOM 8GB support (Basic SKU iEP-6012E-000, PoE SKU iEP-6012E-001,5G SKU iEP-6012E-003) - NVIDIA Jetson Orin Nano SOM 4GB support (Basic sku iEP-6013E-000)
Video	1 x HDMI 2.0 (Orin NX)/ 1.4 (Orin Nano)
Memory	16GB 128-bit LPDDR5 (Jetson Orin NX 16GB) 8GB 128-bit LPDDR5 (Jetson Orin NX 8GB) 8GB 128-bit LPDDR5 (Jetson Orin Nano 8GB) 4GB 64-bit LPDDR5 (Jetson Orin Nano 4GB
TPM	TPM2.0

I/O Interface

Ethernet	2 x Gigabit LAN (Two Realtek LAN on DSC-NV002 R1.01, one Realtek LAN1 and one Intel LAN2 on DSC-NV002 R1.02)
PoE (Option)	2x Intel I210AT ports, each port supports IEEE 802.3AF PoE (Orin NX SOM 16GB PoE SKU iEP-6010E-001, Orin Nano SOM 8GB PoE SKU iEP-6012E-001)
Serial Port	1 x RS-232, 1 x RS-232/422/485 (Pin9 default is N/A, +5V or +12V/1A software programmable)
USB	2 x USB 3.2 Gen 2x1 (one with Locking) 2 x USB 2.0, 1 x Micro USB 2.0 (Device mode only, for OS Flash)
Proprietary IO (DPR connector is proprietary design of DIO, Power/GND, Remote Power Button signals and power/GND pins. ISC connector is proprietary design of I2C, SPI, CANBUS Interface and Power/GND Pins.)	DPR connector: 1 x DB15 for 4*DI, 4*DO, GND, Power Pin (Default is N/A, +5V/1A software programmable), PowerOn, LED+,LED-, GND, Reset ISC connector: 1 x DB15 for Power Pin(Default is N/A, +3V/1A software programmable), 5 x GND, 1 x I2C, 1 x SPI, 1 x CANBUS

Expansion

SIM	1 x Nano SIM Card slot
RF& Antenna (Option)	up to 4 x 5G/4G LTE antenna + 2 x Wi-Fi antenna for 5G SKU
M.2 Socket	1 x M.2 (Key B, 3042/3052/2280) -For PCIe Gen3 x1 / USB3.2 Gen2x1 5G module (Option) (5G SKU Only, Orin NX SOM 16GB 5G SKU iEP-6010E-003, Orin Nano SOM 8GB 5G SKU iEP-6012E-003) -For PCIe Gen3 x1 / USB3.2 Gen2x1 4G LTE module (Option) (5G SKU Only, Orin NX SOM 16GB 5G SKU iEP-6010E-003, Orin Nano SOM 8GB 5G SKU iEP-6012E-003) -For PCIe Gen3 x1 M.2 B Key 2280 SSD module (Option, Basic SKU Only) 1 x M.2 (Key E, 2230) for PCIe Gen3 x1 Wi-Fi and USB2.0 Bluetooth module (Option)

Power Requirements

DC Input	1st DC IN source: 12V~36V DC input, 80V Surge Protection. OVP, UVP, OCP, Reverse Protection, Phoenix type connector 2nd DC IN source: PD3.0 20V USB Type-C power adaptor interface (Locking feature), It can be backup DC input when 1st DC IN is 21V~36V
AC to DC Adaptor (Option)	For Basic SKU: 120W Adapter, AC input 100-240Vac, 1.8A 50~60Hz, DC output 19V, 6.32A For POE/5G SKU: 330W Adapter, AC input 100-240Vac, 4.2A 50~60Hz, DC output 24V, 13.75A

Storage Device

M.2 Socket	1 x M.2 (Key M, 2280) for wide temperature PCIe Gen3 x 4 NVMe SSD module (System Operating temperature -25° C~60° C) 1 x M.2 (Key M, 2280)for wide temperature PCIe Gen4 x 4 NVMe SSD module (System Operating temperature -25° C~55° C) PCIe Gen4 x 4 SSD only supported by Orin NX SOM
Micro SD Card slot	1 x Micro SD Card Slot (UHS-I/SDR-50)

Mechanical

Dimensions	Basic SKU : 55(W) x 170(H) x 134(D) mm POE/5G SKU : 68(W) x 170(H) x 134(D) mm
Indicator	1 x Storage LED 1 x DC-IN LED
Function	Power on button with LED, OS Flash Button, Reset Tact Switch Enable/Disable Auto power on Switch
Net Weight	Basic SKU: 1.3kg, 5G/POE SKU: 1.6kg
Mounting (Option)	- Horizontal Wall mounting or VESA mounting bracket (Basic SKU only) - Vertical Wall mounting or Din Rail mounting bracket (All SKU)

Environmental

Operating Temperature	-25~60° C (-13~140°F) for Basic sku, PoE sku, or 5G sku w/ 4G LTE Module when installed with WT SSD Gen3 x 4 -25~55° C (-13~131°F) for Basic sku, PoE sku, or 5G sku w/ 4G LTE Module when installed with WT SSD Gen4 x 4 -25~55° C (-13~131°F) for 5G sku w/ 5G Module when installed with WT SSD Gen4 x 4 or WT SSD Gen3 x 4 (w/ air flow 0.5~0.8m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~90% @ 45°C (non-condensing)
EMC	CE, FCC Class A (EN61000-6-4/-2) *(e)
Safety	LVD*(e)
Shock	IEC 60068-2-27, Operating Shock 100G with 11 ms duration, half sine wave
Vibration	IEC 60068-2-64, Operating Random Vibration 5 Grms, 5-500 Hz, 3 axes, 30 min/axis

Add-on Feature / OS Support

2nd DC IN Interface	PD3.0 20V USB Type-C power adaptor interface (Locking feature), It can be backup DC input when 1st DC IN is 21V~36V
Carrier board feature	Carrier board reserved 2pcs Dual Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.01), Carrier board reserved 2pcs Four Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.02)***
OS Support	NVIDIA JetPack 5.1.2

*(e) means estimation.

***MIPI-CSI2 camera need to be turned off before system going to sleep mode.
It is current NVIDIA JetPack limitation.

iEP-6010E Series_Developer Kit

Processor System

System on Module	- NVIDIA Jetson Orin NX SOM 16GB support - NVIDIA Jetson Orin NX SOM 8GB support - NVIDIA Jetson Orin Nano SOM 8GB support - NVIDIA Jetson Orin Nano SOM 4GB support
Video	1 x HDMI 2.0 (Orin NX)/ 1.4 (Orin Nano)
Memory	16GB 128-bit LPDDR5 (Jetson Orin NX 16GB) 8GB 128-bit LPDDR5 (Jetson Orin NX 8GB) 8GB 128-bit LPDDR5 (Jetson Orin Nano 8GB) 4GB 64-bit LPDDR5 (Jetson Orin Nano 4GB)
TPM	TPM2.0

I/O Interface

Ethernet	2 x Gigabit LAN (Two Realtek LAN on DSC-NV002 R1.01, one Realtek LAN1 and one Intel LAN2 on DSC-NV002 R1.02)
PoE (Option)	2x Intel I210AT ports, each port supports IEEE 802.3AF PoE
Serial Port	1 x RS-232, 1 x RS-232/422/485 (Pin9 default is N/A, +5V or +12V/1A software programmable)
USB	2 x USB 3.2 Gen 2x1 (one with Locking) 2 x USB 2.0, 1 x Micro USB 2.0 (Device mode only, for OS Flash)
Proprietary IO (DPR connector is proprietary design of DIO, Power/GND, Remote Power Button signals and power/GND pins. ISC connector is proprietary design of I2C, SPI, CANBUS Interface and Power/GND Pins.)	DPR connector: 1 x DB15 for 4*DI, 4*DO, GND, Power Pin (Default is N/A, +5V/1A software programmable), PowerOn, LED+,LED-, GND, Reset ISC connector: 1 x DB15 for Power Pin(Default is N/A, +3V/1A software programmable), 5 x GND, 1 x I2C, 1 x SPI, 1 x CANBUS

Expansion

SIM	1 x Nano SIM Card slot
RF& Antenna (Option)	up to 4 x 5G/4G LTE antenna + 2 x Wi-Fi antenna
M.2 Socket	1 x M.2 (Key B, 3042/3052/2280) -For PCIe Gen3 x1 / USB3.2 Gen2x1 5G module (Option) -For PCIe Gen3 x1 / USB3.2 Gen2x1 4G LTE module (Option) -For PCIe Gen3 x1 M.2 B Key 2280 SSD module (Option) 1 x M.2 (Key E, 2230) for PCIe Gen3 x1 Wi-Fi and USB2.0 Bluetooth module (Option)

Power Requirements

DC Input	1st DC IN source: 12V~36V DC input, 80V Surge Protection. OVP, UVP, OCP, Reverse Protection, Phoenix type connector
AC to DC Adaptor (Option)	120W Adapter, AC input 100-240Vac, 1.8A 50~60Hz, DC output 19V, 6.32A

Storage Device

M.2 Socket	1 x M.2 (Key M, 2280) for wide temperature PCIe Gen3 x 4 NVMe SSD module (System Operating temperature -10° C~60° C) 1 x M.2 (Key M, 2280)for wide temperature PCIe Gen4 x 4 NVMe SSD module (System Operating temperature -10° C~55° C) PCIe Gen4 x 4 SSD only supported by Orin NX SOM Default is PCIe Gen3 x4 256GB WT SSD
Micro SD Card slot	1 x Micro SD Card Slot (UHS-I/SDR-50)

Mechanical

Dimensions	140(W) x 70(H) x 175(D) mm
Indicator	1 x Storage LED 1 x DC-IN LED
Function	Power on button with LED, OS Flash Button, Reset Tact Switch Enable/Disable Auto power on Switch
Net Weight	1kg

Environmental

Operating Temperature	-10~60° C (14~140°F) for Basic sku, PoE sku, or 5G sku w/ 4G LTE Module when installed with WT SSD Gen3 x 4 -10~55° C (14~131°F) for Basic sku, PoE sku, or 5G sku w/ 4G LTE Module when installed with WT SSD Gen4 x 4 -10~55° C (14~131°F) for 5G sku w/ 5G Module when installed with WT SSD Gen4 x 4 or WT SSD Gen3 x 4 (w/ air flow 0.5~0.8m/s)
Storage Temperature	-40°C~85°C (-40°F~185°F)
Humidity	~90% @ 45°C (non-condensing)
EMC	CE, FCC Class A (EN61000-6-4/-2) *(e)

Add-on Feature / OS Support

Carrier board feature	Carrier board reserved 2pcs Dual Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.01), Carrier board reserved 2pcs Four Lane MIPI-CSI2 connectors (Option for DSC-NV002-WT R1.02)**
OS Support	NVIDIA JetPack 5.1.2

*(e) means estimation.

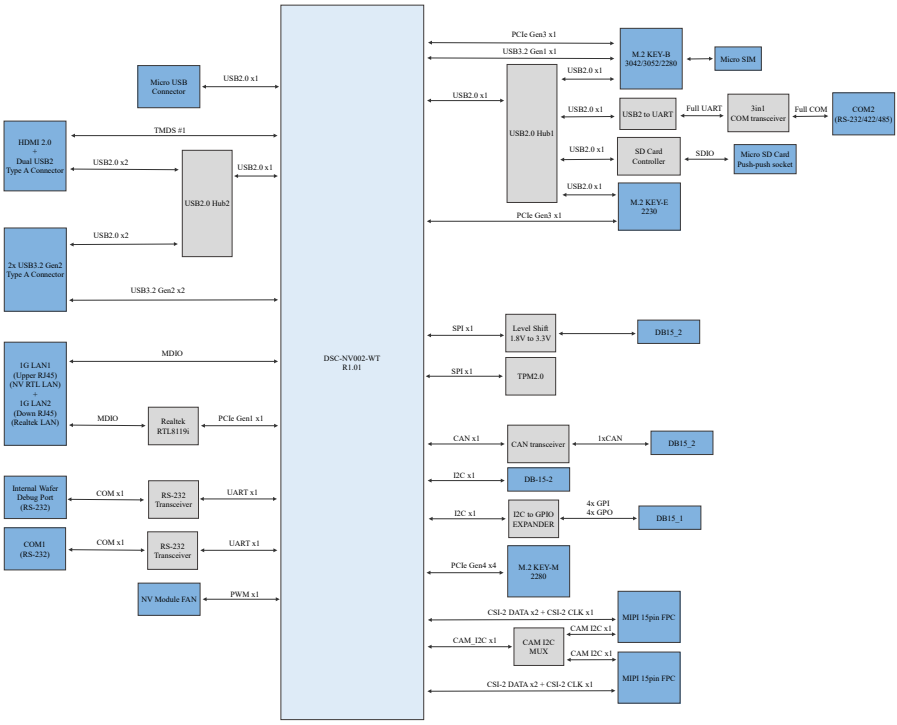
**MIPI-CSI2 camera need to be turned off before system going to sleep mode.
It is current NVIDIA JetPack limitation.

Part Number	Product Name	Specification
90PCA1E0-04320010	ORIN NX 16GB DEV KIT/AI	ONX16G,256GB
90PCA1E0-14320010	ORIN NX 8GB DEV KIT/AI	ONX8G,256GB
90PCA1E0-24320010	ORIN NANO 8GB DEV KIT/AI	ONANO8G,256GB
90PCA1E0-34320010	ORIN NANO 4GB DEV KIT/AI	ONANO4G,256GB
Packing List		
Item	Description	Qty
1	NV Jetson Orin NX 16GB, Orin NX 8GB, Orin Nano 8GB, or Orin Nano 4GB SOM	1 pc
2	DSC-NV002-WT R1.01 for orders before 2024/10/1 DSC-NV002-WT R1.02 for orders after 2024/10/1	1 pc
3	SOM Cooler	1 pc
4	Stand	4 pcs
5	Screw for Stand	4 pcs
6	DC in Phoenix Type Mating Connector	1 pc
7	M.2 Screw	3 pcs
8	Screw for Locking SOM	2 pcs
9	M.2 Key M PCIe Gen3x4 SSD WT 256GB	1 pc
10	120W Adaptor	1 pc
11	Optional Power Cord	1 pc
12	Optional AX210 Wifi Module	1 pc
13	Optional Wifi Cable	2 pcs
14	Optional Wifi Antenna	2 pcs
15	Optional 4G LTE M.2 Key B Module	1 pc
16	Optional 4G LTE Cable	2 pcs
17	Optional 4G LTE Antenna	2 pcs
18	Optional 5G M.2 Key B Module	1 pc
19	Optional 5G Cable	4 pcs
20	Optional 5G Antenna	4 pcs

1.5 Block Diagram

DSC-NV001-WT R1.01

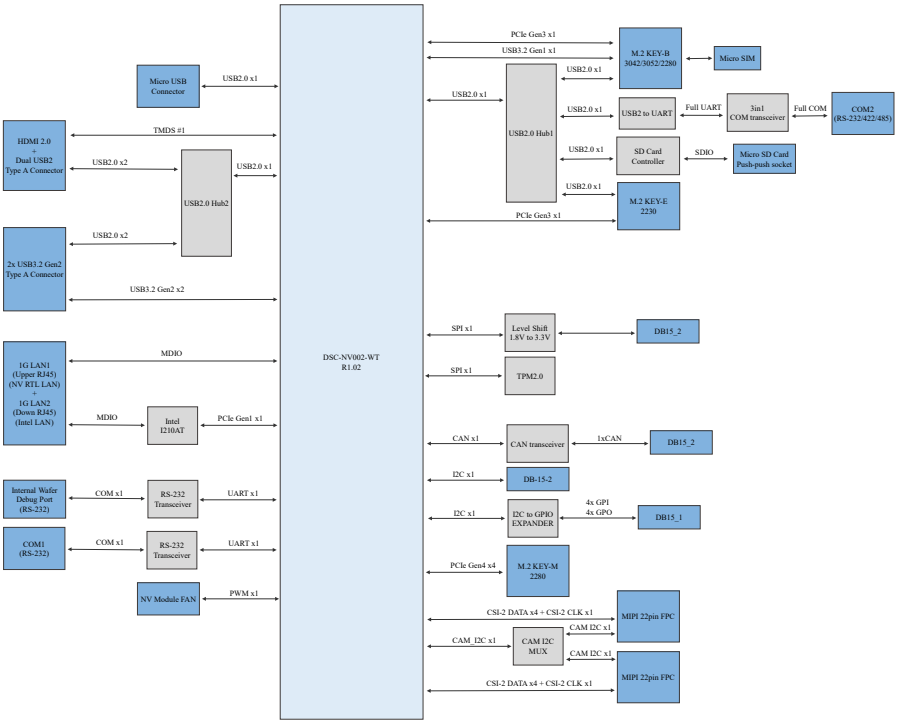
(DSC-NV002-WT R1.01 for the orders before 2024/10/1.)



English

DSC-NV001-WT R1.02

(DSC-NV002-WT R1.02 for the orders after 2024/10/1.)



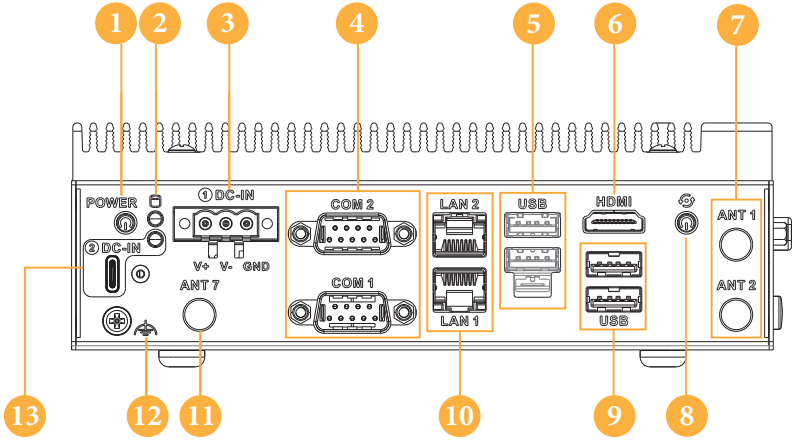
English

Chapter 2 Product Overview

This chapter provides diagrams showing the location of important components of the iEP-6010E Series.

2.1 System Front Panel

2.1.1 System : Basic SKU (iEP-6010E-000/iEP-6011E-000/iEP-6012E-000/ iEP-6013E-000)



No.	Description
1	**Power Button:** The power button allows you to turn the iEP-6010E Series on or off (Press Power Button for 10 seconds to shut down).
2	**Storage LED and DC IN LED:** Storage LED indicator behaviors vary depending on the M.2 M Key storage module you use. For the system equipped with DSC-NV002-WT R1.01: Located below the Storage LED is the secondary DC-IN LED. The system features two DC-IN power inputs. It will prioritize the DC-IN with the higher voltage as the primary power source, while the other serves as a backup (e.g., Phoenix-type DC-IN 24V, Type-C DC-IN 20V) The secondary DC-IN LED will remain illuminated when the secondary DC-IN is connected, even if the system is powered off or if the primary power source is the first DC-IN (e.g., Phoenix-type 24V, Type-C 20V) For the system equipped with DSC-NV002-WT R1.02: Located below the Storage LED is the secondary DC-IN LED. The system features two DC-IN power inputs. It will prioritize the DC-IN with the higher voltage as the primary power source, while the other serves as a backup (e.g., Phoenix-type DC-IN 24V, Type-C DC-IN 20V) The secondary DC-IN LED will illuminate only when the secondary DC-IN serves as the main power source, regardless of whether the system is operational or connected to the first DC-IN (e.g., Phoenix-type DC-IN 19V, Type-C DC-IN 20V).
3	**1st DC-IN Connector:** The phoenix type DC-IN connector can support 12V~36V DC input.

<table>
<tr><td>4</td><td>COM1: 1 x RS-232

COM2*: 1 x RS-232/422/485 (Pin9 default is N/A, +5V or +12V/1A software programmable)
 

* This motherboard supports RS232/422/485 on COM2 port. Please refer to table below for the pin definition. In addition, COM2 port (RS232/422/485) can be adjusted in Chapter 6 iEP-6010E Series Setting Tool. You may refer to our user manual for details.

COM2 Port Pin Definition

<table>
<tr><th>Pin</th><th>RS232</th><th>RS422</th><th>RS485</th></tr>
<tr><td>1</td><td>DCD, Data Carrier Detect</td><td>TX-</td><td>RTX-</td></tr>
<tr><td>2</td><td>RXD, Receive Data</td><td>TX+</td><td>RTX+</td></tr>
<tr><td>3</td><td>TXD, Transmit Data</td><td>RX+</td><td>N/A</td></tr>
<tr><td>4</td><td>DTR, Data Terminal Ready</td><td>RX-</td><td>N/A</td></tr>
<tr><td>5</td><td>GND</td><td>GND</td><td>GND</td></tr>
<tr><td>6</td><td>DSR, Data Set Ready</td><td>N/A</td><td>N/A</td></tr>
<tr><td>7</td><td>RTS, Request To Send</td><td>N/A</td><td>N/A</td></tr>
<tr><td>8</td><td>CTS, Clear To Send</td><td>N/A</td><td>N/A</td></tr>
<tr><td>9</td><td>N/A or power pin</td><td>N/A or power pin</td><td>N/A or power pin</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>USB 3.2 Gen2 ports (one with locking): The USB 3.2 Gen2 ports provide a transfer rate up to 10 Gbit/s. To release the locking connector please press the latch.</td></tr>
<tr><td>6</td><td>HDMI: HDMI port is a digital interface used to transmit high-quality audio and video signals between devices.</td></tr>
<tr><td>7, 11</td><td>Antenna Holes: The antenna holes allow you to connect a wireless antenna to enhance wireless signal reception.</td></tr>
<tr><td>8</td><td>OS Flash Button: This Button will be needed during the process of refreshing the OS image.</td></tr>
<tr><td>9</td><td>USB 2.0 ports: The USB 2.0 ports provide a transfer rate up to 0.48 Gbit/s.</td></tr>
</table>

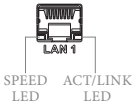
10 **LAN ports**:** The RJ-45 LAN ports support a standard Ethernet cable for 10/100/1000 Mbps connection to the local network.

For the system equipped with DSC-NV002-WT R1.01:

LAN1 port (SOM, 1G LAN): There are two LEDs on the LAN 1port. Please refer to the tables below for the LAN1 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

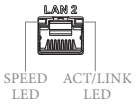
SPEED LED	
Status	Description
Off	10/100 Mbps connection
Green	1Gbps connection



LAN2 port (RTL8119i 1G LAN): There are two LEDs on the LAN2 port. Please refer to the tables below for the LAN2 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED	
Status	Description
Off	10 Mbps connection
Orange	100 Mbps connection
Green	1Gbps connection

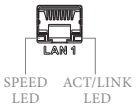


For the system equipped with DSC-NV002-WT R1.02:

LAN1 port (SOM, 1G LAN): There are two LEDs on the LAN 1port. Please refer to the tables below for the LAN1 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

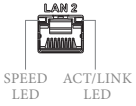
SPEED LED	
Status	Description
Off	10/100 Mbps connection
Green	1Gbps connection



LAN2 port (Intel I210AT 1G LAN): There are two LEDs on the LAN2 port. Please refer to the tables below for the LAN2 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED	
Status	Description
Off	10 Mbps connection
Orange	100 Mbps connection
Green	1Gbps connection

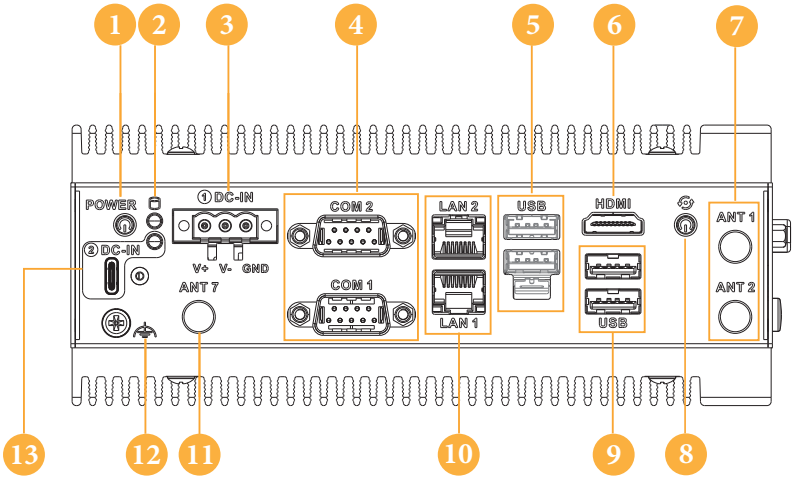


12 **Ground:** The functional earth ground provides you with a grounding point.

13 **2nd DC-IN Connector:** PD3.0 20V/5A (MAX 100W) USB Type-C power adaptor interface (Locking feature). It can be a backup DC input when 1st DC-IN is 21V~36V.

English

2.1.2 System : PoE/5G SKU (iEP-6010E-001/iEP-6012E-001/iEP-6010E-003/ iEP-6012E-003)



No.	Description
1	**Power Button:** The power button allows you to turn the iEP-6010E Series on or off (Press Power Button for 10 seconds to shut down).
2	**Storage LED and DC IN LED:** Storage LED indicator behaviors vary depending on the M.2 M Key storage module you use. For the system equipped with DSC-NV002-WT R1.01: Located below the Storage LED is the secondary DC-IN LED. The system features two DC-IN power inputs. It will prioritize the DC-IN with the higher voltage as the primary power source, while the other serves as a backup (e.g., Phoenix-type DC-IN 24V, Type-C DC-IN 20V) The secondary DC-IN LED will remain illuminated when the secondary DC-IN is connected, even if the system is powered off or if the primary power source is the first DC-IN (e.g., Phoenix-type 24V, Type-C 20V) For the system equipped with DSC-NV002-WT R1.02: Located below the Storage LED is the secondary DC-IN LED. The system features two DC-IN power inputs. It will prioritize the DC-IN with the higher voltage as the primary power source, while the other serves as a backup (e.g., Phoenix-type DC-IN 24V, Type-C DC-IN 20V) The secondary DC-IN LED will illuminate only when the secondary DC-IN serves as the main power source, regardless of whether the system is operational or connected to the first DC-IN (e.g., Phoenix-type DC-IN 19V, Type-C DC-IN 20V).
3	**1st DC-IN Connector:** The phoenix type DC-IN connector can support 12V~36V DC input.

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<tr><td>4</td><td>COM1: 1 x RS-232

COM2*: 1 x RS-232/422/485 (Pin9 default is N/A, +5V or +12V/1A software programmable)
 

* This motherboard supports RS232/422/485 on COM2 port. Please refer to table below for the pin definition. In addition, COM2 port (RS232/422/485) can be adjusted in Chapter 6 iEP-6010E Series Setting Tool. You may refer to our user manual for details.

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<tr><td>5</td><td>GND</td><td>GND</td><td>GND</td></tr>
<tr><td>6</td><td>DSR, Data Set Ready</td><td>N/A</td><td>N/A</td></tr>
<tr><td>7</td><td>RTS, Request To Send</td><td>N/A</td><td>N/A</td></tr>
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<tr><td>9</td><td>N/A or power pin</td><td>N/A or power pin</td><td>N/A or power pin</td></tr>
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<tr><td>5</td><td>USB 3.2 Gen2 ports (one with locking): The USB 3.2 Gen2 ports provide a transfer rate up to 10 Gbit/s. To release the locking connector please press the latch.</td></tr>
<tr><td>6</td><td>HDMI: HDMI port is a digital interface used to transmit high-quality audio and video signals between devices.</td></tr>
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<tr><td>9</td><td>USB 2.0 ports: The USB 2.0 ports provide a transfer rate up to 0.48 Gbit/s.</td></tr>
</table>

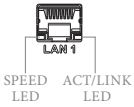
10 **LAN ports**:** The RJ-45 LAN ports support a standard Ethernet cable for 10/100/1000 Mbps connection to the local network.

For the system equipped with DSC-NV002-WT R1.01:

LAN1 port (SOM, 1G LAN): There are two LEDs on the LAN 1port. Please refer to the tables below for the LAN1 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

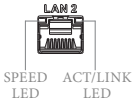
SPEED LED	
Status	Description
Off	10/100 Mbps connection
Green	1Gbps connection



LAN2 port (RTL8119i 1G LAN): There are two LEDs on the LAN2 port. Please refer to the tables below for the LAN2 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED	
Status	Description
Off	10 Mbps connection
Orange	100 Mbps connection
Green	1Gbps connection

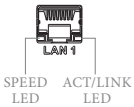


For the system equipped with DSC-NV002-WT R1.02:

LAN1 port (SOM, 1G LAN): There are two LEDs on the LAN 1port. Please refer to the tables below for the LAN1 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

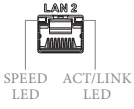
SPEED LED	
Status	Description
Off	10/100 Mbps connection
Green	1Gbps connection



LAN2 port (Intel I210AT 1G LAN): There are two LEDs on the LAN2 port. Please refer to the tables below for the LAN2 port LED indications.

Activity/Link LED	
Status	Description
Off	No Link
Blinking	Data Activity
On	Link

SPEED LED	
Status	Description
Off	10 Mbps connection
Orange	100 Mbps connection
Green	1Gbps connection



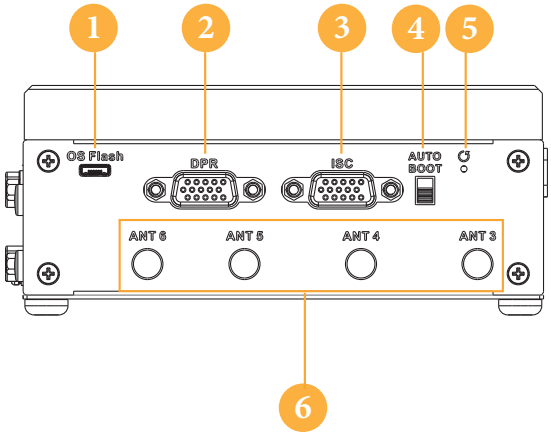
12 **Ground:** The functional earth ground provides you with a grounding point.

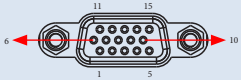
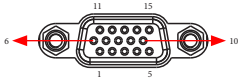
13 **2nd DC-IN Connector:** PD3.0 20V/5A (MAX 100W) USB Type-C power adaptor interface (Locking feature). It can be a backup DC input when 1st DC-IN is 21V~36V.

English

2.2 System Top Panel

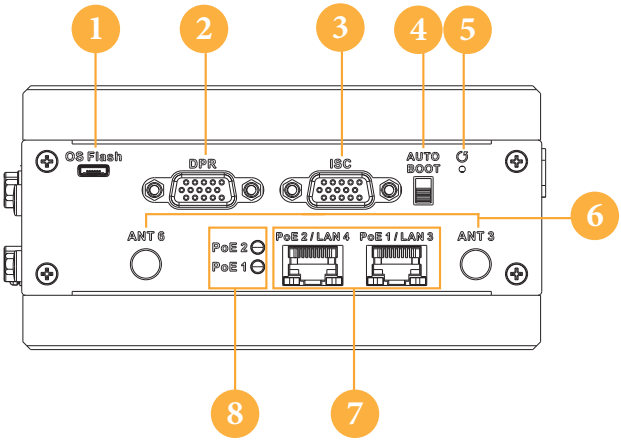
2.2.1 System : Basic SKU (iEP-6010E-000/iEP-6011E-000/iEP-6012E-000/ iEP-6013E-000)

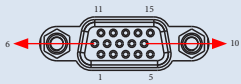
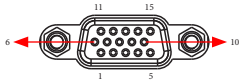


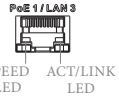
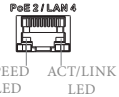
No.	Description
1	**OS Flash:** 1 x Micro USB 2.0 that supports Device mode only. It will be connected to a host computer to refresh the OS image.
2	**DPR:** DPR connector is proprietary design of DIO, Power/GND, Remote Power Button signals and power/GND pins. 
3	**ISC:** ISC connector is proprietary design of I2C, SPI, CANBUS Interface and Power/GND Pins. 
4	**Auto power on switch:** It is Auto Boot mode when switch is turned up. When DC power source is connected, it is power on automatically. When switch is turned down, it is not Auto Boot mode and when DC power source is connected, user needs to press the power on button to bootup.
5	**Reset Button:** Use this button on a computer that allows you to turn it off and on again when a program does not work correctly.
6	**Antenna Holes:** The antenna holes allow you to connect a wireless antenna to enhance wireless signal reception.

English

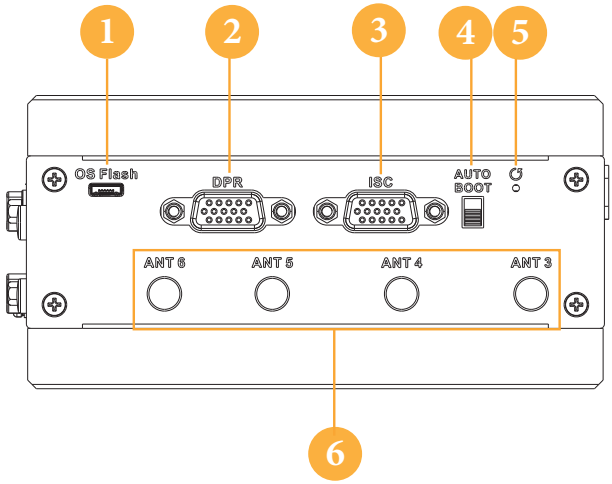
2.2.2 System : PoE SKU (iEP-6010E-001/ iEP-6012E-001)

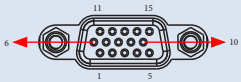
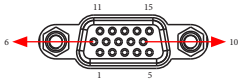


No.	Description
1	**OS Flash:** 1 x Micro USB 2.0 that supports Device mode only. It will be connected to a host computer to refresh the OS image.
2	**DPR:** DPR connector is proprietary design of DIO, Power/GND, Remote Power Button signals and power/GND pins. 
3	**ISC:** ISC connector is proprietary design of I2C, SPI, CANBUS Interface and Power/GND Pins. 
4	**Auto power on switch:** It is Auto Boot mode when switch is turned up. When DC power source is connected, it is power on automatically. When switch is turned down, it is not Auto Boot mode and when DC power source is connected, user needs to press the power on button to bootup.
5	**Reset Button:** Use this button on a computer that allows you to turn it off and on again when a program does not work correctly.
6	**Antenna Holes:** The antenna holes allow you to connect a wireless antenna to enhance wireless signal reception.

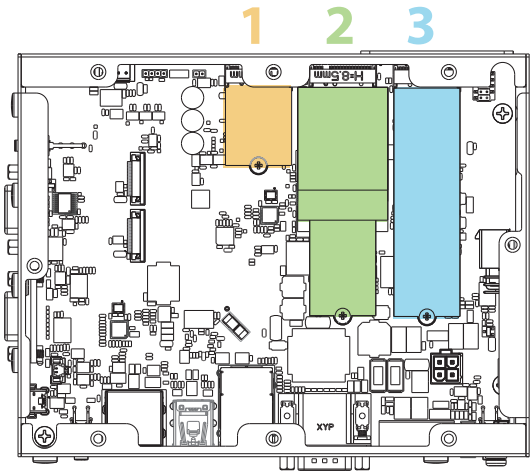
7	**POE or LAN ports*:** 2x Intel I210AT ports, each port supports IEEE 802.3AF PoE when connecting with POE devices. It can be LAN ports to support a standard Ethernet cable for 10/100/1000 Mbps connection to local network. *PoE1/LAN3 port: There are two LEDs on the PoE1/LAN3 port. Please refer to the tables below for the PoE1/LAN3 port LED indications.* **Activity/Link LED** Status: Off — Description: No Link Status: Blinking — Description: Data Activity Status: On — Description: Link **SPEED LED** Status: Off — Description: 10 Mbps connection Status: Orange — Description: 100 Mbps connection Status: Green — Description: 1Gbps connection  *PoE2/LAN4 port: There are two LEDs on the PoE2/LAN4 port. Please refer to the tables below for the PoE2/LAN4 port LED indications.* **Activity/Link LED** Status: Off — Description: No Link Status: Blinking — Description: Data Activity Status: On — Description: Link **SPEED LED** Status: Off — Description: 10 Mbps connection Status: Orange — Description: 100 Mbps connection Status: Green — Description: 1Gbps connection  The PoE SKU has the following features: 1. Independent PSE Channel 2. PoE Output (DC): 54V (IEEE 802.3af for two POE ports, IEEE 802.3at for only one POE port). Imax 0.6A. 3. Powered Device (PD) auto detection and classification of PoE power requirements
8	**POE LED:** This indicator lights up when POE ports are connected with POE devices and are provided Power over Ethernet accordingly.

2.2.3 System : 5G SKU (iEP-6010E-003/iEP-6012E-003)



No.	Description
1	**OS Flash:** 1 x Micro USB 2.0 that supports Device mode only. It will be connected with a host computer to refresh the OS image.
2	**DPR:** DPR connector is proprietary design of DIO, Power/GND, Remote Power Button signals and power/GND pins. 
3	**ISC:** ISC connector is proprietary design of I2C, SPI, CANBUS Interface and Power/GND Pins. 
4	**Auto power on switch:** It is Auto Boot mode when switch is turned up. When DC power source is connected, it is power on automatically. When switch is turned down, it is not Auto Boot mode and when DC power source is connected, user needs to press the power on button to bootup.
5	**Reset Button:** Use this button on a computer that allows you to turn it off and on again when a program does not work correctly.
6	**Antenna Holes:** The antenna holes allow you to connect a wireless antenna to enhance wireless signal reception.

2.3 Inside View

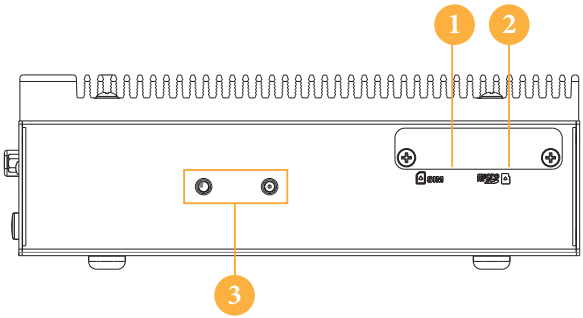


No.	Description
1	**M.2 Slot (E Key) :** The M.2 slot allows you to install 2230 Wi-Fi/BT module.
2	**M.2 Slot (B Key) :** The M.2 slot allows you to install 3042/3052 4G LTE/5G module or 2280 M.2 device.
3	**M.2 Slot (M Key) :** The M.2 slot allows you to install 2280 M.2 devices.

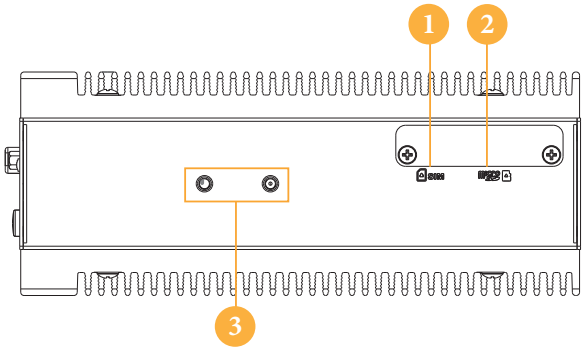
- Torque to lock screws on chassis screw hole is 3.5 +/- 0.5kgf-cm.
- Torque to lock screws on PCBA screw hole, connector screw hole, or M.2 NUT is 3.5 +/- 0.5kgf-cm.
- Torque to lock NV Jetson SOM screws on the carrier board is 2.5+/-0.5kgf-cm
- Torque to lock screws for wallmount to attach surface is 4.5 +/- 0.5kgf-cm.

2.4 Rear View

- Basic SKU (iEP-6010E-000/iEP-6011E-000/iEP-6012E-000/iEP-6013E-000)



- POE/5G SKU (iEP-6010E-001/iEP-6011E-001/iEP-6010E-003/iEP-6011E-003)

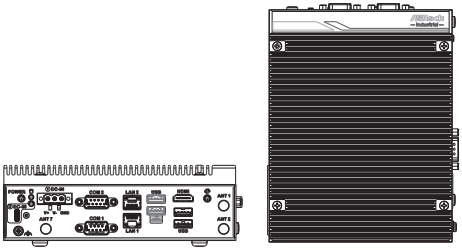


No.	Description
1	**SIM Card Slot :** The SIM Card slot allows you to install a Nano type SIM card.
2	**Micro SD Slot :** The slot supports Micro SD card.
3	**Mounting Holes :** The holes support Wall Mount and DIN Rail brackets for system in vertical position.

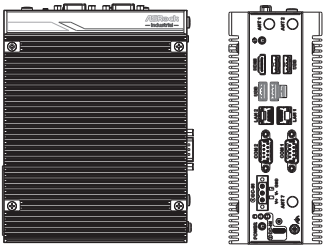
2.5 Position

The POE & 5G SKU should be placed in vertical position only.

- Positions of Basic SKU: vertical & horizontal



- Positions of POE & 5G SKU: only vertical

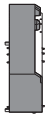


Chapter 3 Hardware Installation

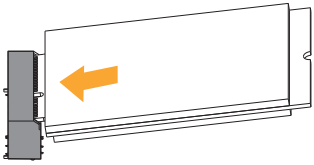
This chapter helps you install or remove important components.

3.1 How to Install the Wi-Fi Module (2230) to the M.2 Key E Slot (Optional)

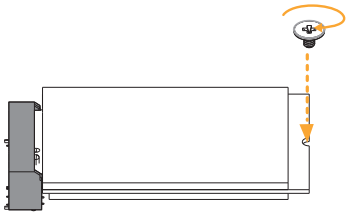
1. Locate the WiFi Module slot on the motherboard.



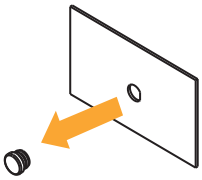
2. Carefully insert the WiFi Module into the slot at a 30-degree angle.



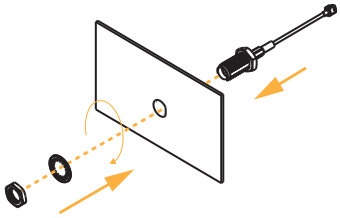
3. Tighten the screw to secure the WiFi Module to the motherboard.



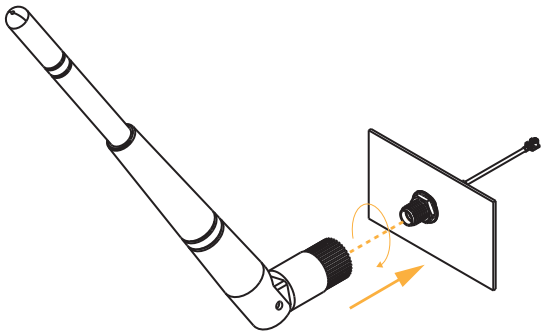
4. Remove the antenna rubber on the box cover.



5. Attach the SMA cable and washer to both sides of the cover, and secure them with the nut.



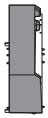
6. Install the Wifi antenna onto the SMA cable.



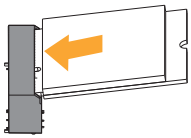
	Intel/AX210.NGWGII.NV WiFi module for BASIC SKU (Horizontal)	RM520N-GL 5G module and Intel/AX210.NGWGII.NV WiFi module for 5G SKU (Vertical)	EM05-G 4G LTE module and Intel/AX210.NGWGII.NV WiFi module for 5G SKU (Vertical)
ANT1	14G000032200AI WIFI SMA CABLE 帶針, L=185mm	14G000032200AI WIFI SMA CABLE 帶針, L=185mm	14G000032200AI WIFI SMA CABLE 帶針, L=185mm
ANT2		14G000032200AI WIFI SMA CABLE 帶針, L=185mm	14G000032200AI WIFI SMA CABLE 帶針, L=185mm
ANT3		14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm	14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm
ANT4		14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm	
ANT5		14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm	14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm
ANT6		14G000035300AI SMA CABLE MHF-4 不帶針, L=180mm	
ANT7	14G000032200AI WIFI SMA CABLE 帶針, L=185mm		

3.2 How to Install the 4G LTE/5G Module (3042/3052) to the M.2 Key B Slot (Optional)

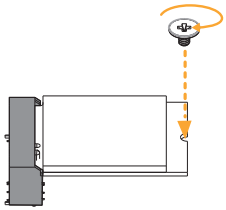
1. Locate the 4G LTE/5G Module slot on the motherboard.



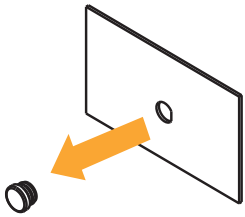
2. Carefully insert the 4G LTE/5G Module into the slot at a 30-degree angle.



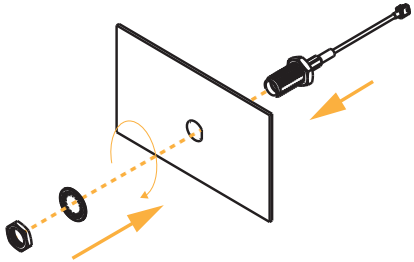
3. Tighten the screw to secure the 4G LTE/5G Module to the motherboard.



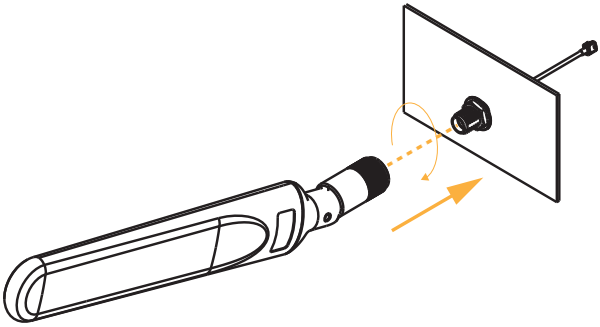
4. Remove the antenna rubber on the box cover.



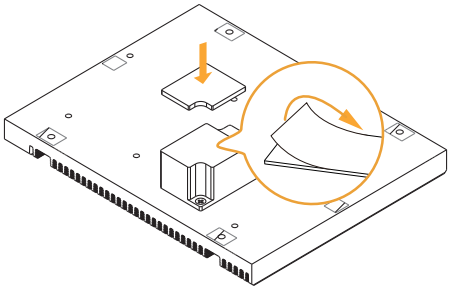
5. Attach the SMA cable and washer to both sides of the cover, and secure them with the nut.



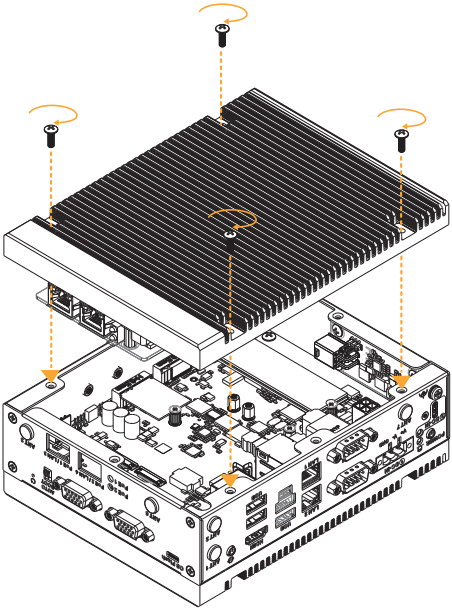
6. Install the 4G LTE/5G antenna onto the SMA cable.



7. Remove the membranes on the both sides of the 5G heatsink. Attach the 5G Module Heatsink to the internal side of the front cover.



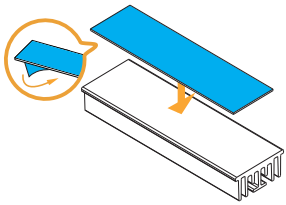
8. Turn over the front cover and secure it with four screws.



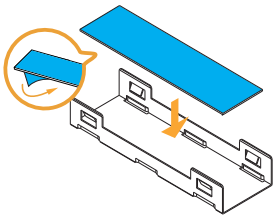
15G252201500AI Thermal Pad is the accessory only for the 5G SKU (iEP-6010E-003, iEP- 6012E-003). When system shipment is without M.2 5G or 4G LTE module, one piece of 15G252201500AI should be put into the Zip bag. Customer can paste it between M.2 module and Chassis Heatink when installing it.

3.3 How to Install the M.2 SSD (2280) with the Heasink to the M.2 Key M/B Socket

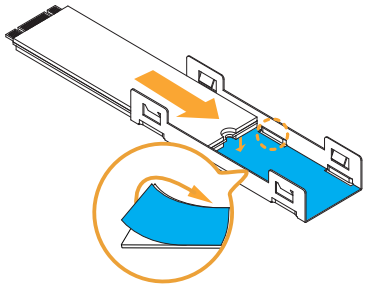
1. Remove the bottom membrane from a thermal pad, and attach it to the heatsink.



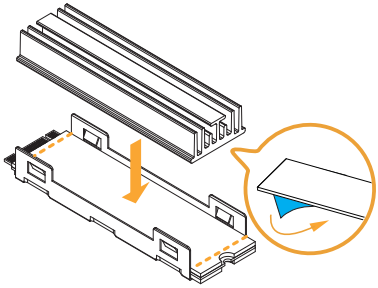
* Use the additional thermal pad provided if you use double-sided M.2 SSD. Attach the sceond thermal pad to the bracket and remove the bottom membrane.



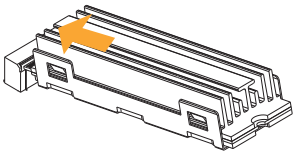
2. (For the double-sided M.2 SSD, remove the membrane first.) Gently insert the M.2 module, along the guiding tabs, into the bracket, and press it down.



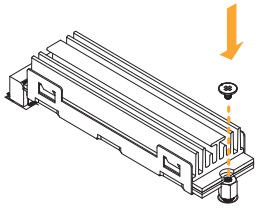
3. Remove the bottom membrane from the heatsink. Align the heatsink to the edge of the bracket and press it down into the bracket.



4. Carefully insert the M.2 Module with heatstink into the slot at a 30-degree angle.

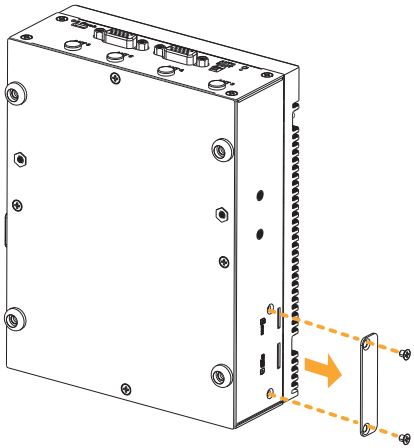


5. Tighten the screw to secure the M.2 module and the heatsink to the motherboard.

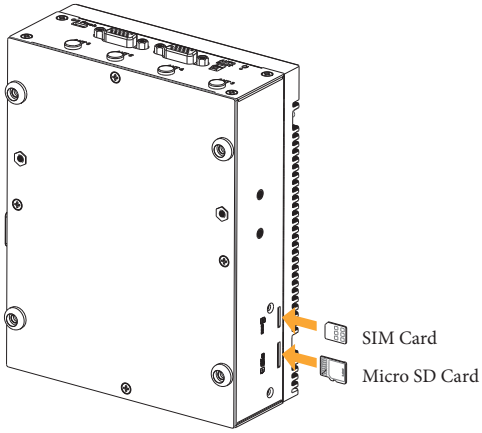


3.4 How to Install a Nano SIM Dard and Micro SD Card

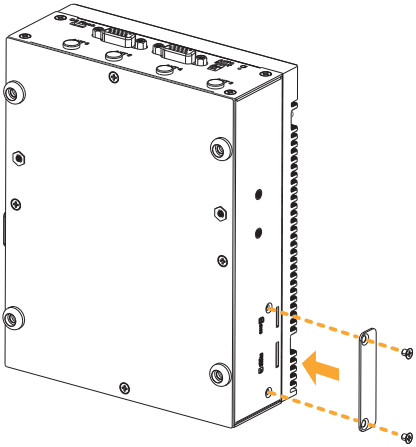
1. Release the screws on the iEP-6010E Series and remove the SIM/Micro SD Card slot cover.



2. With the gold contacts facing front, carefully insert the SIM Card or the SD Card into the designated slot until it clicks.



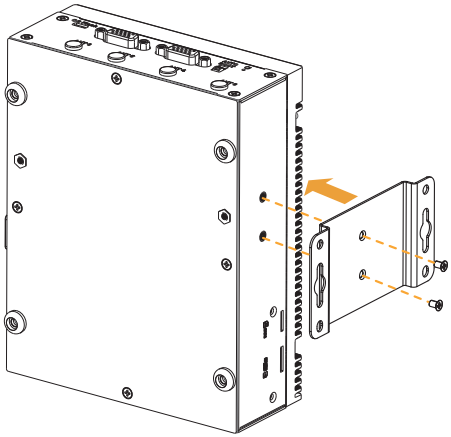
3. Place the cover back and secure it to the iEP-6010E Series with screws.



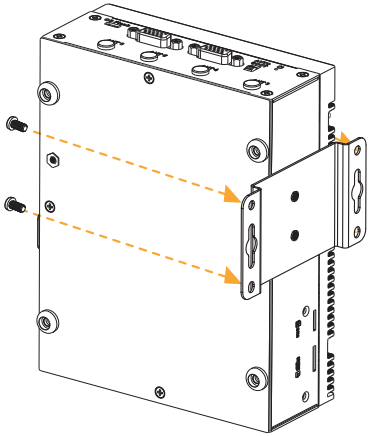
3.5 How to Install the Wall Mounting Bracket (Optional)

- iEP-6010E Series

1. Attach the wall mounting brackets to the iEP-6010E Series and secure it with screws.



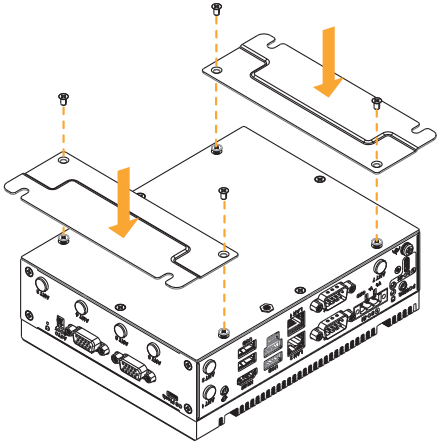
2. Then you can attach the iEP-6010E Series to the wall with screws.



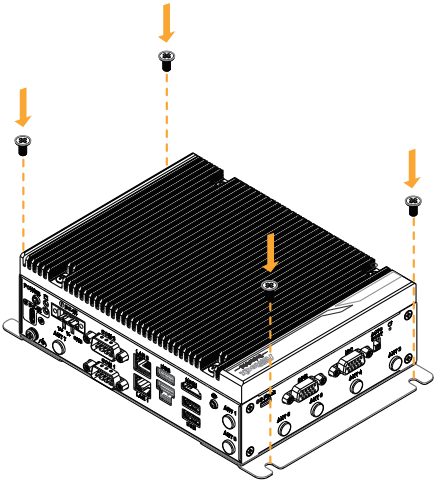
Wall Mounting Bracket is not provided by default. Please purchase it seperately if needed.

- Basic SKU

1. Attach the wall mounting brackets to the Basic SKU and secure it with screws.

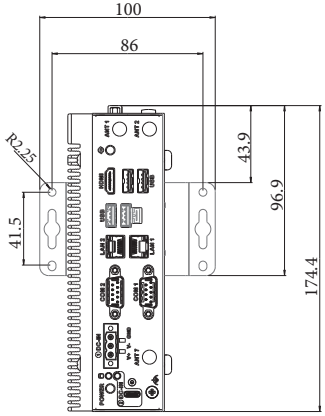


2. Then you can attach the Basic SKU to the wall with screws.

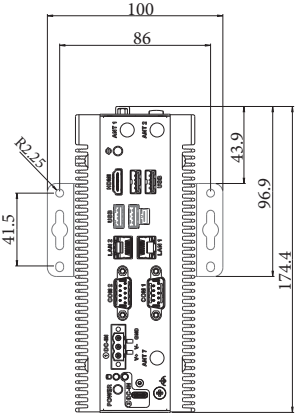


* measurement unit: millimeter

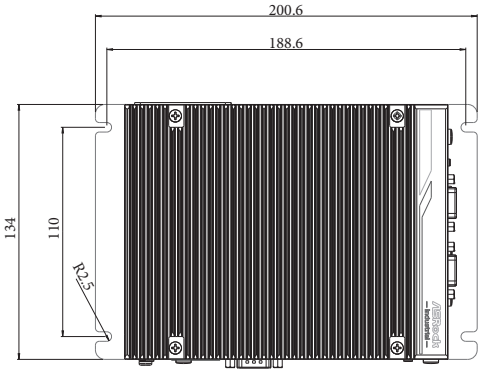
Dimension of the Basic SKU
with Wall Mounting Bracket Installed



Dimension of the PoE/5G SKU
with Wall Mounting Bracket Installed



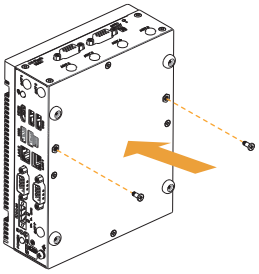
Dimension of the iEP-6010E Series
Horizontally Wall Mounted



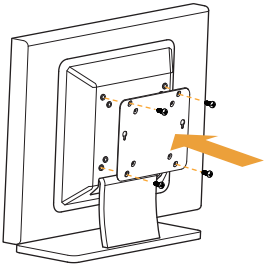
English

3.6 How to Install VESA Bracket (For Basic SKU) (Optional)

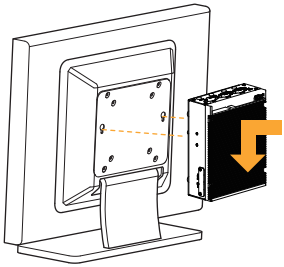
1. Attach the two screws to the base of the Basic SKU.



2. Attach the VESA Bracket to the rear of a compatible display using the four screws.
   *Choose mounting holes depending on the mounting hole pattern of your LCD screen (75 mm × 75 mm or 100 mm × 100 mm).

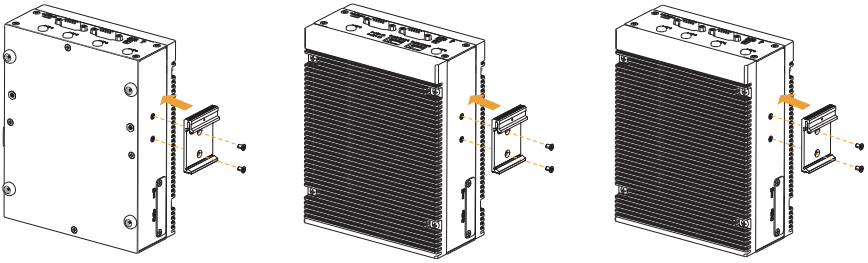


3. Mount the Basic SKU by sliding it into place.



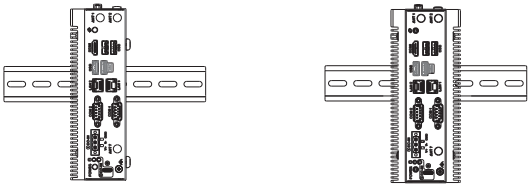
3.7 How to Install the Din Rail Mounting Bracket (Optional)

1. Attach the Din Rail Bracket to the iEP-6010E Series and secure it with screws.



Basic SKU PoE SKU 5G SKU

2. Then you can place the iEP-6010E Series onto the Din Rail.

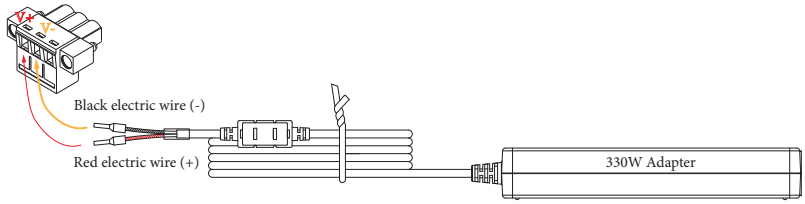


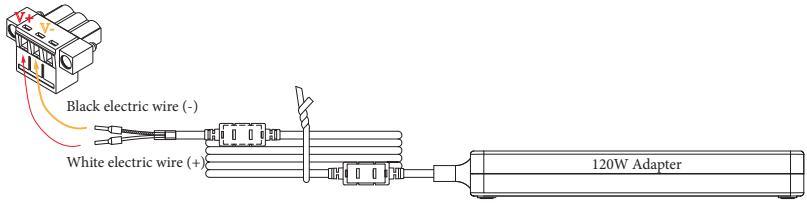
Basic SKU POE/5G SKU

Din Rail Bracket is not provided by default. Please purchase it seperately if needed.

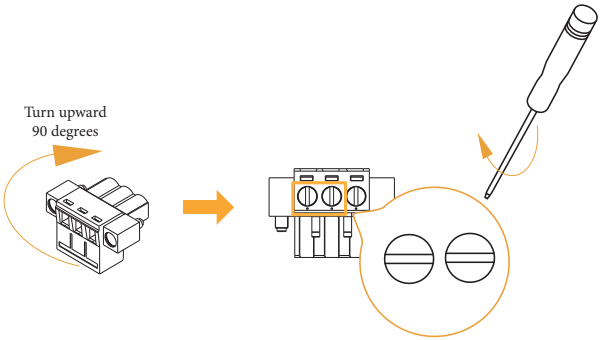
3.8 How to Install Phoenix Connector and the Adapter (Optional)

1. Tighten the left two screws from the top of the phoenix connector with a flathead screwdriver. Ensure the cables are inserted to the end and cannot be unplugged.





2. Tighten the left two screws from the top of the phoenix connector with a flathead screwdriver. Ensure the cables are inserted to the end and cannot be unplugged. (The torque value is 3.5 +/- 0.5kgf-cm)



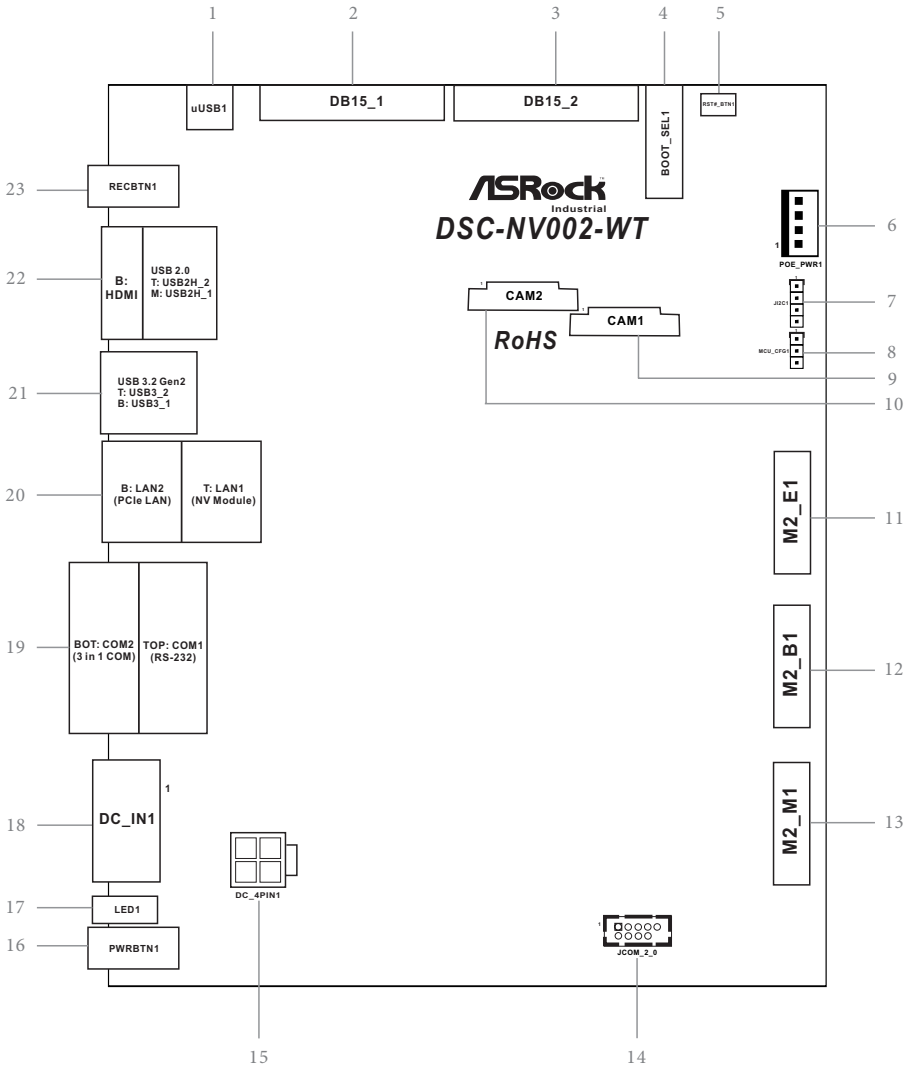
Chapter 4 Carrier Board

4.1 Carrier Board Layout_R1.01

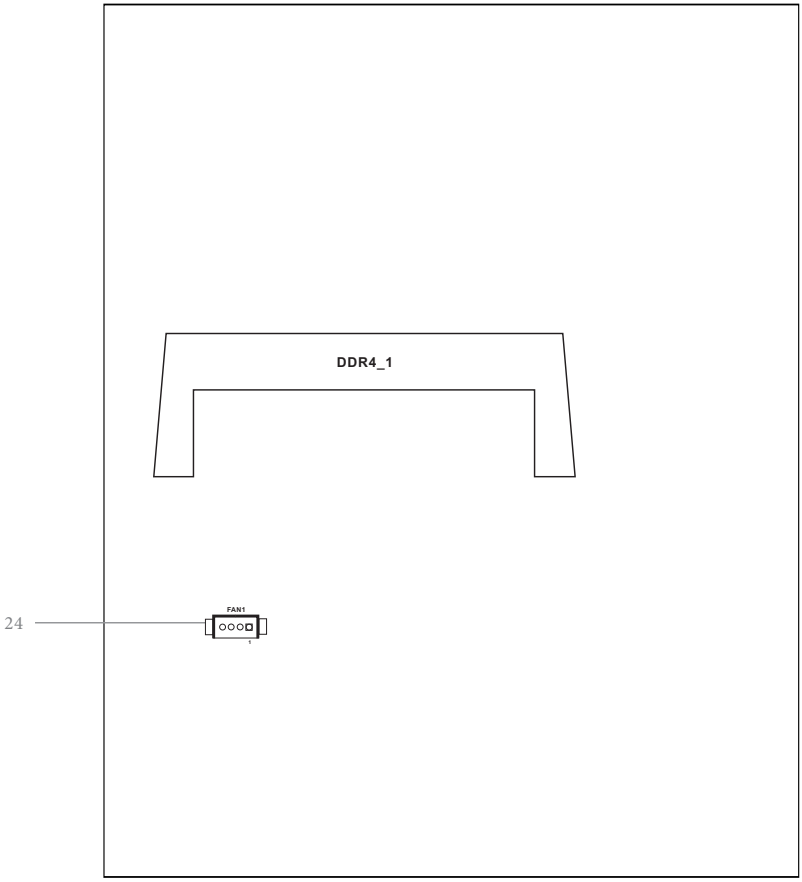
iEP-6010E Series Carrier Board (DSC-NV002-WT)

DSC-NV002-WT R1.01

Top:



Bottom:

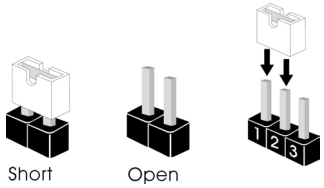


1 : Micro USB Port (uUSB1)
2 : DB15 Connector (DB15_1)
3 : DB15 Connector (DB15_2)
4 : Boot Select (BOOT_SEL1)
5 : Reset Button (RST#_BTN1)
6 : 12V/30W Out for POE (POE_PWR1)
7 : JI2C1 Header
8 : MCU_CFG1
9 : CAM1
10 : CAM2
11 : M.2 Key-E Socket (M2_E1)
12 : M.2 Key-B Socket (M2_B1)
13 : M.2 Key-M Socket (M2_M1)
14 : JCOM_2_0 Header
15 : DC_4PIN1
16 : Power Button (PWRBTN1)
17 : LED (LED1)
Top : Type C PWR_LED
Bottom : SSD LED
18 : DC_IN1
19 : Top : COM1 (RS232)
Bottom : COM2 (RS232/422/485)
20 : Top : RJ45 LAN Port (LAN1_NV Module)
Bottom : RJ45 LAN Port (LAN2_PCIe LAN)
21 : Top : USB 3.2 Gen2 Port (USB3_2)
Bottom : USB 3 .2 Gen2 Port (USB3_1)
22 : Top : USB 2.0 Port (USB2H_2)
Middle : USB 2.0 Port (USB2H_1)
Bottom : HDMI
23 : Recovery Button (RECBTN1)

Backside:
24 : Fan Connector (FAN1)

4.2 Jumpers Setup_R1.01

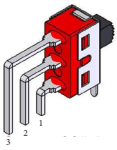
The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is "Short." If no jumper cap is placed on pins, the jumper is "Open." The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when a jumper cap is placed on these 2 pins.



Boot Select

(BOOT_SEL1)

(see p. 45, No. 4)



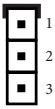
Setting	Description
1-2	Auto Boot
2-3	No Auto Boot

Auto power on switch: The system operates in Auto Boot mode when the switch is in the on position. Upon connection of a DC power source, the system will power on automatically. However, when the switch is in the off position, manual intervention is necessary to initiate the boot sequence via the power-on button.

MCU_CFG1

(3-pic MCU_CFG1)

(see p. 45, No. 8)

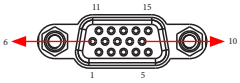


4.3 Onboard Headers and Connectors_R1.01

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard!

DB15 Connector

(15-pin DB15_1)
(see p. 45, No. 2)



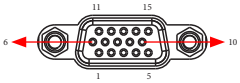
Pin	Signal name
1	DI_1
2	DI_2
3	DI_3
4	DI_4
5	GND
6	GND
7	PLED+
8	PLED-
9	+5V/1A
10	PWR BTN#
11	DO_1
12	DO_2
13	DO_3
14	DO_4
15	RST BTN#

GPI:
ViH (HIGH-level input voltage) = 2V (min.)~5.5V (max.)
ViL (LOW-level input voltage) = 0V (min.)~0.8V (max.)

GPO:
VoH (High-level output voltage) = 2.4V~3.3V (max.)
VoL (LOW-level output voltage) = 0V~0.8V (max.)
IoH (High-level output current) = 10 mA (max.)
IoL (LOW-level output current) = 10 mA (max.)

DB15 Connector

(15-pin DB15_2)
(see p. 45, No. 3)



Pin	Signal name
1	SPI_3V_SCL
2	SPI_3V_MISO
3	SPI_3V_MOSI
4	SPI_3V_CS0
5	SPI_3V_CS1
6	GND
7	GND
8	GND
9	GND
10	GND
11	I2C_3V_SDA
12	I2C_3V_SCL
13	CAN_H
14	CAN_L
15	+3V/1A

12V/30W(Option) Out for POE

(4-pin POE_PWR1)

(see p. 45, No. 6)

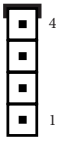


Pin	Signal name
1	+5V +12V BOM option
2	GND
3	GND
4	+12V

JI2C1 Header

(4-pin JI2C1)

(see p. 45, No. 7)

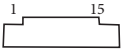


Pin	Signal name
1	I2C1_SDA_JI2C
2	I2C1_SCL_JI2C
3	GND
4	+3V

CAM1

(15-pin CAM1)

(see p. 45, No. 9)

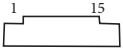


Pin	Signal name
1	+3V
2	I2C_SDA
3	I2C_SCL
4	MCLK
5	PWRDN
6	GND
7	CLK0_P
8	CLK0_N
9	GND
10	CSI0_D1_P
11	CSI0_D1_N
12	GND
13	CSI0_D0_P
14	CSI0_D0_N
15	GND

CAM2

(15-pin CAM2)

(see p. 45, No. 10)

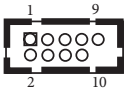


Pin	Signal name
1	+3V
2	I2C_SDA
3	I2C_SCL
4	MCLK
5	PWRDN
6	GND
7	CLK2_P
8	CLK2_N
9	GND
10	CSI2_D1_P
11	CSI2_D1_N
12	GND
13	CSI2_D0_P
14	CSI2_D0_N
15	GND

JCOM_2_0 Header

(15-pin JCOM_2_0)

(see p. 45, No. 14)

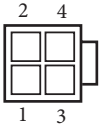


Pin	Signal name	Signal name	Pin
1	X	COM2_RX_232	2
3	COM2_TX_232	X	4
5	GND	X	6
7	UART0_ TXD_3V	UART0_ RXD_3V	8
9	GND		10

DC_4PIN1

(4-pin DC_4PIN1)

(see p. 45, No. 15)

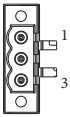


Pin	Signal name
1	GND
2	GND
3	+USBC_PWR
4	+USBC_PWR

DC_IN1

(DC_IN1)

(see p. 45, No. 18)



Pin	Signal name
1	GND_Shield
2	V-
3	V+ (+12V~+36V)

Backside:

Fan Connector

(4-pin FAN1)

(see p. 46, No. 24)



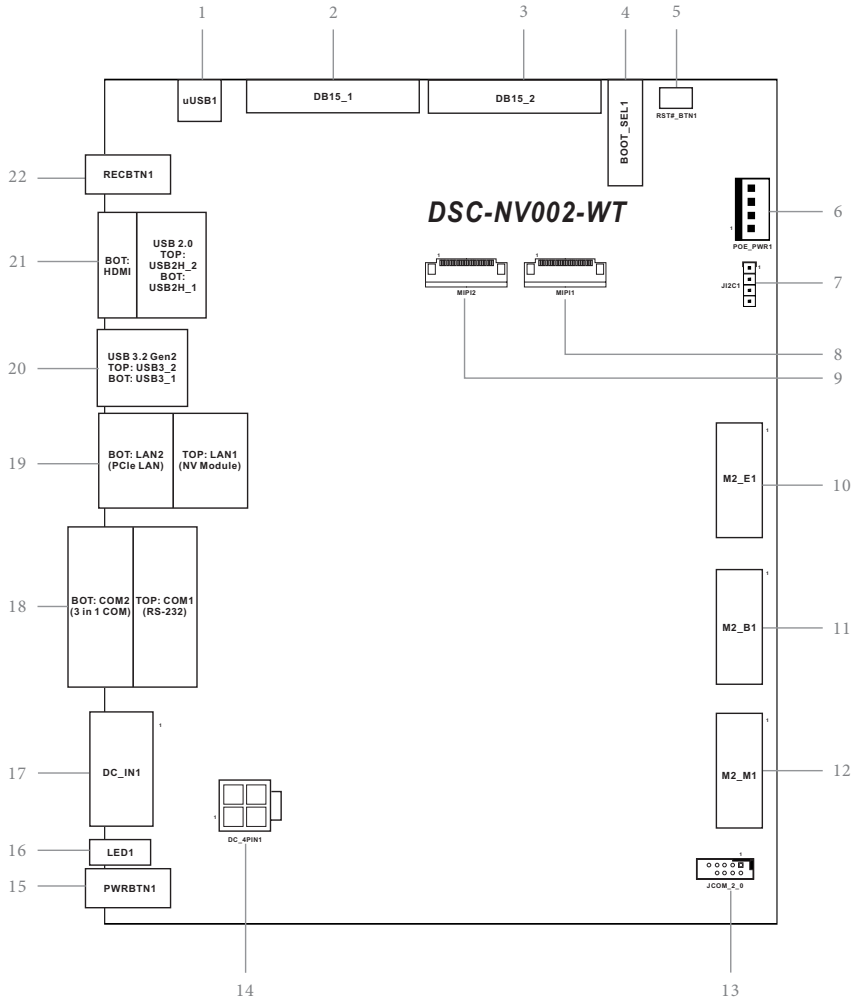
Pin	Signal name
1	GND
2	+5V
3	FAN_SPEED
4	FAN_SPEED_CONTROL

4.4 Carrier Board Layout_R1.02

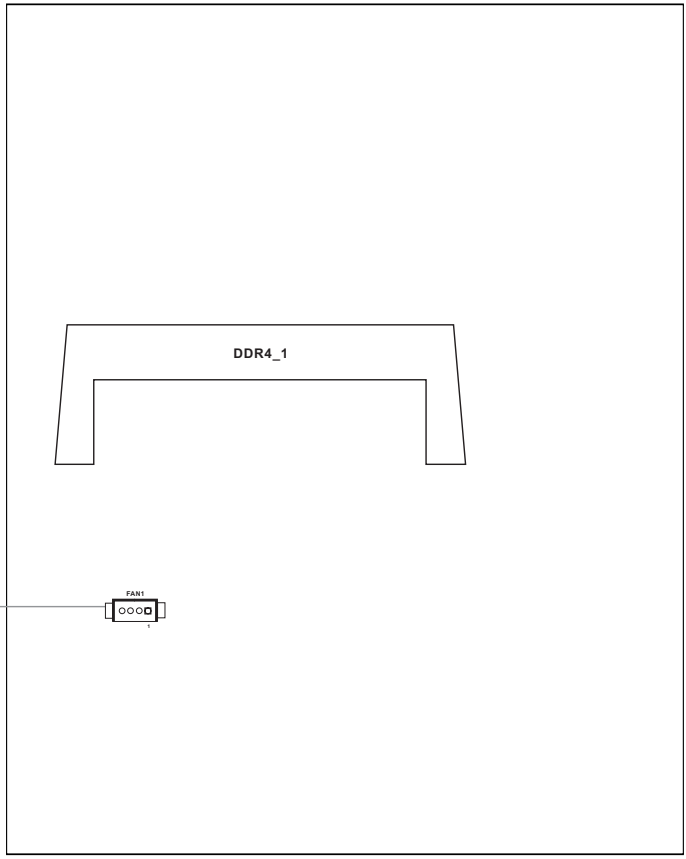
iEP-6010E Series Carrier Board (DSC-NV002-WT)

DSC-NV002-WT R1.02

Top:



Bottom:

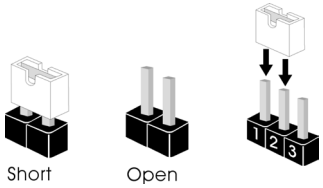


1 : Micro USB Port (uUSB1)
2 : DB15 Connector (DB15_1)
3 : DB15 Connector (DB15_2)
4 : Boot Select (BOOT_SEL1)
5 : Reset Button (RST#_BTN1)
6 : 12V/30W Out for POE (POE_PWR1)
7 : JI2C1 Header
8 : MIPI Header (MIPI1)
9 : MIPI Header (MIPI2)
10 : M.2 Key-E Socket (M2_E1)
11 : Key-B Socket (M2_B1)
12 : M.2 Key-M Socket (M2_M1)
13 : JCOM_2_0 Header
14 : DC_4PIN1
15 : Power Button (PWRBTN1)
16 : LED (LED1)
17 : DC_IN1
18 : Top : COM1 (RS232)
19 : Top : RJ45 LAN Port (LAN1_NV Module)
Bottom : RJ45 LAN Port (LAN2_PCIe LAN)
20 : Top : USB3.2 Gen2 Port (USB3_2)
Bottom : USB3.2 Gen2 Port (USB3_1)
21 : Top : USB2.0 Port (USB2H_2)
Middle : USB2.0 Port (USB2H_1)
Bottom : HDMI
22 : Recovery Button (RECBTN1)

Backside:
23 : Fan Connector (FAN1)

4.5 Jumpers Setup_R1.02

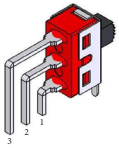
The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is “Short.” If no jumper cap is placed on pins, the jumper is “Open.” The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.



Boot Select

(BOOT_SEL1)

(see p. 52, No. 4)



Setting	Signal name
1-2	Auto Boot
2-3	No Auto Boot

Auto power on switch: The system operates in Auto Boot mode when the switch is in the on position. Upon connection of a DC power source, the system will power on automatically. However, when the switch is in the off position, manual intervention is necessary to initiate the boot sequence via the power-on button.

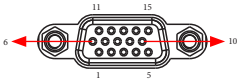
4.6 Onboard Headers and Connectors_R1.02

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard!

DB15 Connector

(15-pin DB15_1)

(see p. 52, No. 2)



Pin	Signal name
1	DI_1
2	DI_2
3	DI_3
4	DI_4
5	GND
6	GND
7	PLED+
8	PLED-
9	+5V/1A
10	PWR BTN#
11	DO_1
12	DO_2
13	DO_3
14	DO_4
15	RST BTN#

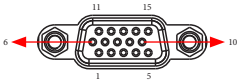
GPI:
ViH (HIGH-level input voltage) = 2V (min.)~5.5V (max.)
ViL (LOW-level input voltage) = 0V (min.)~0.8V (max.)

GPO:
VoH (High-level output voltage) = 2.4V~3.3V (max.)
VoL (LOW-level output voltage) = 0V~0.8V (max.)
IoH (High-level output current) = 10 mA (max.)
IoL (LOW-level output current) = 10 mA (max.)

DB15 Connector

(15-pin DB15_2)

(see p. 52, No. 3)



Pin	Signal name
1	SPI_3V_SCL
2	SPI_3V_MISO
3	SPI_3V_MOSI
4	SPI_3V_CS0
5	SPI_3V_CS1
6	GND
7	GND
8	GND
9	GND
10	GND
11	I2C_3V_SDA
12	I2C_3V_SCL
13	CAN_H
14	CAN_L
15	+3V/1A

12V/30W(Option) Out for POE

(4-pin POE_PWR1)

(see p. 52, No. 6)

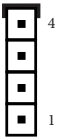


Pin	Signal name
1	+5V +12V BOM option
2	GND
3	GND
4	+12V

JI2C1 Header

(4-pin JI2C1)

(see p. 52, No. 7)



Pin	Signal name
1	I2C1_SDA_JI2C
2	I2C1_SCL_JI2C
3	GND
4	+3V

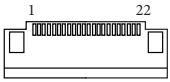
MIPI Headers

(22-pin MIPI1)

(see p. 52, No. 8)

(22-pin MIPI2)

(see p. 52, No. 9)

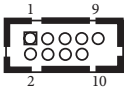


Pin	MIPI1 Signal Name	MIPI2 Signal Name
1	+3V	+3V
2	CAM0_I2C_SDA	CAM1_I2C_SDA
3	CAM0_I2C_SCL	CAM1_I2C_SCL
4	GND	GND
5	CAM0_MCLK	CAM1_MCLK
6	CAM0_PWDN	CAM1_PWDN
7	GND	GND
8	CSI1_D1_P	CSI3_D1_P
9	CSI1_D1_N	CSI3_D1_N
10	GND	GND
11	CSI1_D0_P	CSI3_D0_P
12	CSI1_D0_N	CSI3_D0_N
13	GND	GND
14	CSI0_CLK_P	CSI2_CLK_P
15	CSI0_CLK_N	CSI2_CLK_N
16	GND	GND
17	CSI0_D1_P	CSI2_D1_P
18	CSI0_D1_N	CSI2_D1_N
19	GND	GND
20	CSI0_D0_P	CSI2_D0_P
21	CSI0_D0_N	CSI2_D0_N
22	GND	GND

JCOM_2_0 Header

(15-pin JCOM_2_0)

(see p. 52, No. 13)

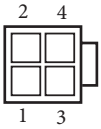


Pin	Signal name	Signal name	Pin
1	X	COM2_RX_232	2
3	COM2_TX_232	X	4
5	GND	X	6
7	UART0_ TXD_3V	UART0_ RXD_3V	8
9	GND		10

DC_4PIN1

(4-pin DC_4PIN1)

(see p. 52, No. 14)

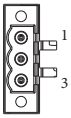


Pin	Signal name
1	GND
2	GND
3	+USBC_PWR
4	+USBC_PWR

DC_IN1

(DC_IN1)

(see p. 52, No. 17)



Pin	Signal name
1	GND_Shield
2	V-
3	V+ (+12V~+36V)

Backside:

Fan Connector

(4-pin FAN1)

(see p. 53, No. 23)



Pin	Signal name
1	GND
2	+5V
3	FAN_SPEED
4	FAN_SPEED_CONTROL

4.7 Expansion Slots (M.2 Sockets)

There are three M.2 sockets on the motherboard.

M.2 Key-E Socket (M2_E1)

(see p. 45, No.11)
(see p. 52, No.10)

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

M.2 Key-B Socket (M2_B1)

(see p. 45, No.12)
(see p. 52, No.11)

Pin	Signal Name	Signal Name	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		
		NA	20
21	GND	NA	22
23	NA	NA	24
25	NA	NA	26
27	GND	NA	28
29	USB3_RX-	UIM_RESET	30
31	USB3_RX+	UIM_CLK	32
33	GND	UIM_DATA	34
35	USB3_TX-	UIM_PWR	36
37	USB3_TX+	NA	38
39	GND	NA	40
41	PERn0	NA	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
59	NA	NA	60
61	NA	NA	62
63	NA	NA	64
65	NA	M2B_SIM_DETECT	66
67	NA	NA	68
69	NA	+3.3V	70
71	GND	+3.3V	72
73	GND	+3.3V	74
75	NA		

M.2 Key-M Socket (M2_M1)

(see p. 45, No.13)
(see p. 52, No.12)

Pin	Signal Name	Signal Name	Pin
1	GND	+3.3V	2
3	GND	+3.3V	4
5	PERn3	NA	6
7	PERp3	NA	8
9	GND	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	NA	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		

Chapter 5 Flash the OS

5.1 DSC-NV002-WT R1.01

For the system equipped with DSC-NV002-WT R1.01
< NVIDIA® Jetson Orin NX/Nano System On Module IPC OS flash SOP >

1. Power off the IPC. Ensure the IPC power must be completely OFF, instead of staying in the sleep mode.
2. Prepare one host PC, an x86 PC installed with Ubuntu 20.04, which will be used to re-program the new system files into NVIDIA® Jetson Orin NX/Nano System On Module IPC.
   - Please type the command on the Ubuntu 20.04 host PC to install below:
     - sudo apt update
     - sudo apt install sshpass nfs-kernel-server python libxml2-utils
3. Connect the USB cable from iEP-601XE Micro USB port to the host PC.
4. Press and hold down OS Flash Button of IPC, and then press the Power On button to turn on the IPC.
5. After three seconds, release OS Flash Button.
6. NVIDIA® Jetson Orin NX/Nano System On Module IPC will be shown up on the USB list of the host PC as a new NVIDIA target device. You will need to flash boot loader files.
   - If you order the system but do not have the BSP file, please request the source file by providing the serial number from the ASRI website (https://www.asrockind.com/technical-support) to obtain the BSP file. After receiving it, transfer the BSP file to the Ubuntu 20.04 host PC.
   - Launch the Ubuntu 20.04 host PC Terminal and type the command to decompress and flash the file.
     - sudo tar -zxvf iEP-601XE_v1.3.tar.gz
     - cd ./iEP-601XE/
     - sudo ./asri_flash.sh
     - Select your iEP-601XE IPC version (iEP-6010E is for Orin NX 16GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6011E is for Orin NX 8GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6012E is for Orin Nano 8GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6013E is for Orin Nano 4GB

SOM, BASIC/POE/5G SKUs share the same image).

7. After Step 6 is completed, the IPC is rebooted from NVMe and updated successfully.
8. Our Default BSP Linux ID and password is asri. Any inquiries about custom BSP or BSP installation steps for the factory, please contact our sales representatives or TSD members.

5.2 DSC-NV002-WT R1.02

For the system equipped with DSC-NV002-WT R1.02

< NVIDIA® Jetson Orin NX/Nano System On Module IPC OS flash SOP >

1. Power off the IPC. Ensure the IPC power must be completely OFF, instead of staying in the sleep mode.
2. Prepare one host PC, an x86 PC installed with Ubuntu 20.04, which will be used to re-program the new system files into NVIDIA® Jetson Orin NX/Nano System On Module IPC.
   - Please type the command on the Ubuntu 20.04 host PC to install below:
     - sudo apt update
     - sudo apt install sshpass nfs-kernel-server python libxml2-utils
3. Connect the USB cable from iEP-601XE Micro USB port to the host PC.
4. Press and hold down OS Flash Button of IPC, and then press the Power On button to turn on the IPC.
5. After three seconds, release OS Flash Button.
6. NVIDIA® Jetson Orin NX/Nano System On Module IPC will be shown up on the USB list of the host PC as a new NVIDIA target device. You will need to flash boot loader files.
   - If you order the system but do not have the BSP file, please request the source file by providing the serial number from the ASRI website (https://www.asrockind.com/technical-support) to obtain the BSP file. After receiving it, transfer the BSP file to the Ubuntu 20.04 host PC.
   - Launch the Ubuntu 20.04 host PC Terminal and type the command to decompress and flash the file.
     - sudo tar -zxvf iEP-601XE_v1.5.tar.gz
     - cd ./iEP-601XE/

- sudo ./asri_flash.sh
- Select your iEP-601XE IPC version (iEP-6010E is for Orin NX 16GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6011E is for Orin NX 8GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6012E is for Orin Nano 8GB SOM, BASIC/POE/5G SKUs share the same image, iEP-6013E is for Orin Nano 4GB SOM, BASIC/POE/5G SKUs share the same image).

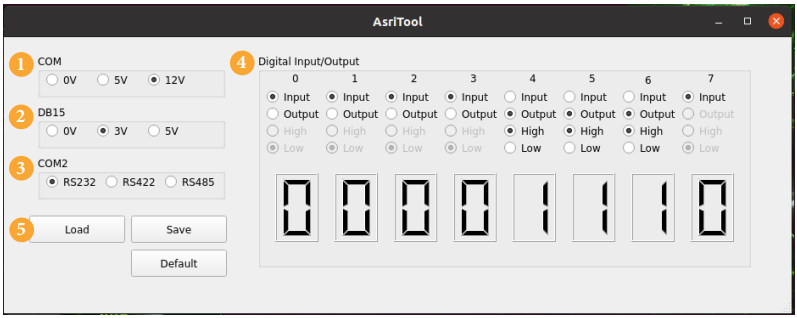
7. After Step 6 is completed, the IPC is rebooted from NVMe and updated successfully.
8. Our Default BSP Linux ID and password is asri. Any inquiries about custom BSP or BSP installation steps for the factory, please contact our sales representatives or TSD members.

Chapter 6 iEP-6010E Series Setting Tool

6.1 AsriTool

Enter the following string to execute AsriTool.

#sudo /opt/asri/AsriTool



1. Set COM voltage to 0/5/12V.
2. Set DB15 voltage to 0/3/5V.
3. Set COM2 mode to RS232/RS422/RS485
4. Set Digital IO to input/Ouput. The digital pin state cannot be set to high/low when it is set into input mode. The LCD number means IO status.
5. Save/Load the settings and set the settings to default status.

6.2 iEP-601XE Series API Programming Guide (V1.3/2024.01.02)

6.2.1 setComVolt()

Set comport voltage.

- Syntax

  setComVolt(volt = 0)

- Parameters

volt (Int)	Note
0	Set voltage to 0V.
5	Set voltage to 5V.
12	Set voltage to 12V.

- Return

  {'status' : 0, 'msg' : 'COM : 0V.'}

Key	Value	Type
Status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	COM : 0/5/12V.	String

- Example

```
from AsriToolAPI import *
volt = 12
ret = setComVolt(volt)
if ret['status'] != 0:
    print('Set com voltage fail. ')
else:
    print(ret['msg'])
```

6.2.2 getComVolt()

Get comport voltage.

- Syntax

  getComVolt()

- Parameters

  None

- Return

  return {'status' : 0, 'volt' : 12, 'msg': 'Current COM : 12V.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Current COM : 0/5/12V.	String
volt	0/5/12	Int

- Example

```
from AsriToolAPI import *
ret = getComVolt()
if ret['status'] != 0:
    print('Get com voltage fail. ')
else:
    print(ret['volt'])
```

6.2.3 setDB15Volt()

Set DB15 voltage.

- Syntax

  setDB15Volt(volt = 0)

- Parameters

volt (Int)	Note
0	Set voltage to 0V.
3	Set voltage to 3V.
5	Set voltage to 5V.

- Return

  {'status' : 0, 'msg' : 'DB15 : 0V.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	DB15 : 0/3/5V.	String

- Example

```
from AsriToolAPI import *
volt = 5
ret = setDB15Volt(volt)
if ret['status'] != 0:
    print('Set DB15 voltage fail. ')
else:
    print(ret['msg'])
```

6.2.4 getDB15Volt()

Get DB15 voltage.

- Syntax

  getDB15Volt()

- Parameters

  None

- Return

  return {'status' : 0, 'volt' : 5, 'msg' : 'Current DB15 : 5V. '}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Current DB15 : 0/3/5V.	String
volt	0/3/5	Int

- Example

```
from AsriToolAPI import *
ret = getDB15Volt()
if ret['status'] != 0:
	print('Get DB15 voltage fail. ')
else:
	print(ret['volt'])
```

6.2.5 setDIODirection()

Set digital input/output.

- Syntax

  setDIODirection(pin, direction='in')

- Parameters

Parameter	value	Note
pin(int)	0~6	DIO pin number 0~6. #Pin 7 can only be input.
direction(string)	in: input out: output	Set DIO pin input/output.

- Return

  return {'status' : 0, 'msg' : 'Set gpio0 to input. '}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Set gpioN to input/output.	String

- Example

```
from AsriToolAPI import *
value = 1
ret = setAllDOut(value)
if ret['status'] != 0:
    print('Set digital output fail.')
else:
    print(ret['msg'])
```

6.2.6 setDOutValue()

Set digital output high/low.

- Syntax

  setDOut(pin, value = 0)

- Parameters

Parameter	value	Note
pin(int)	0~6	DIO pin number 0~6. #Pin 7 can only be input.
direction(string)	0, 1	Set output high/low.

- Return

  return {'status' : 0, 'msg' : 'Set gpo1 to 1. '}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Set gpoN to 0/1.	String

- Example

```
from AsriToolAPI import *
pin = 2
value = 1
ret = setDOut(pin, value)
if ret['status'] != 0:
    print('Set digital output fail.')
else:
```

6.2.7 getDIO()

Get all digital input/ouput.

- Syntax

  getDIO()

- Parameters

  None

- Return

  {'status': 0, 'msg': '', 'dio': [{'pin': 0, 'direction': 'out', 'value': '1'}, {'pin': 1, 'direction': 'out', 'value': '1'}, {'pin': 2, 'direction': 'out', 'value': '1'}, {'pin': 3, 'direction': 'out', 'value': '1'}, {'pin': 4, 'direction': 'in', 'value': '1'}, {'pin': 5, 'direction': 'in', 'value': '1'}, {'pin': 6, 'direction': 'in', 'value': '1'}, {'pin': 7, 'direction': 'in', 'value': '1'}]}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Current DB15 : 0/3/5V.	String
dio	List of pin 0~7	Lsit
pin	0~7	Int
direction	in/out	String
value	0/1	Int

- Example

```
from AsriToolAPI import *
ret = getDIOVolt()
if ret['status'] != 0:
    print('Get Digital IO fail. ')
else:
    print(ret[dio])
```

6.2.8 setUartMode()

Set UART mode.

- Syntax

  setUartMode(mode = 0)

- Parameters

mode (Int)	Note
0	Set uart mode to RS232.
1	Set uart mode to RS422.
2	Set uart mode to RS485.

- Return

  return {'status' : 0, 'msg' : 'Set to RS232.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Set to RS232.	String

- Example

```
from AsriToolAPI import *
mode = 0
ret = setUartMode(mode)
if ret['status'] != 0:
    print('Set uart mode fail. ')
else:
    print(ret['msg'])
```

6.2.9 getUartMode()

Get uart mode.

- Syntax

  getUartMode()

- Parameters

  None

- Return

  return {'status' : 0, 'msg' : 'RS232', 'mode' : 0 }

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	RS232/RS422/RS485	String
mode	0: RS232 1: RS422 2: RS485	Int

- Example

```
from AsriToolAPI import *
ret = getUartMode()
if ret['status'] != 0:
    print('Get uart mode fail. ')
else:
    print(ret['mode'])
```

6.2.10 saveConfigs ()

Save current io configs.

- Syntax

  saveConfigs()

- Parameters

  None

- Return

  return {'status' : 0, 'msg' : ''}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Error message.	String

- Example

```
from AsriToolAPI import *
ret = saveConfigs()
if ret['status'] != 0:
    print('Save configs fail.')
else:
    print(ret['msg'])
```

6.2.11 loadConfigs ()

Load configs to io seetings.

- Syntax

  loadConfigs()

- Parameters

  None

- Return

  {'status' : 0, 'msg' : 'DB15 : 0V.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Error message.	String

- Example

```
from AsriToolAPI import *
ret = loadConfigs()
if ret['status'] != 0:
    print('Load configs fail.')
else:
    print(ret['msg'])
```

6.2.12 defConfigs ()

Load default configs to io seetings.

Default settings:

Item	Default Value
COM	0V
DB15	0V
COM2	RS232
Digital IO	Pin0~3: output 1, Pin4~7: input

- Syntax

  defConfigs()

- Parameters

  None

- Return

  {'status' : 0, 'msg' : 'DB15 : 0V.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	Error message.	String

- Example

```
from AsriToolAPI import *
ret = defConfigs()
if ret['status'] != 0:
    print('Load default configs fail.')
else:
    print(ret['msg'])
```

6.2.13 getVersion ()

Get AsriTool API Version.

- Syntax

  getVersion()

- Parameters

  None

- Return

  return {'status' : 0, 'volt' : 12, 'msg' : 'Current COM : 12V.'}

Key	Value	Type
status	0: Succeeds. -1: Fail. -2: Other errors.	Int
msg	''	String
version	v1.3	String

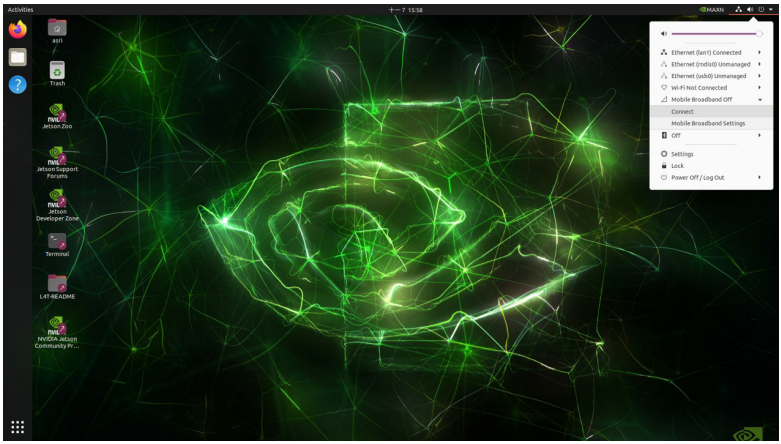
- Example

```
from AsriToolAPI import *
ret = getVersion()
if ret['status'] != 0:
    print('Get API version fail. ')
else:
    print(ret['version'])
```

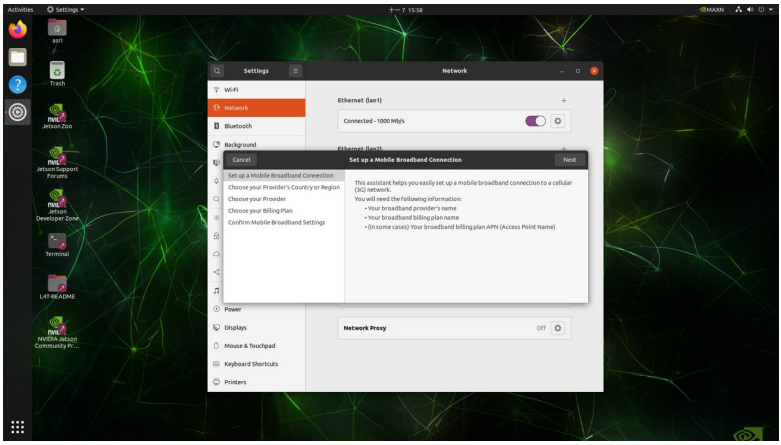
6.3 iEP-601XE-Series 4G/5G User Guide

6.3.1 Activate 4G Module

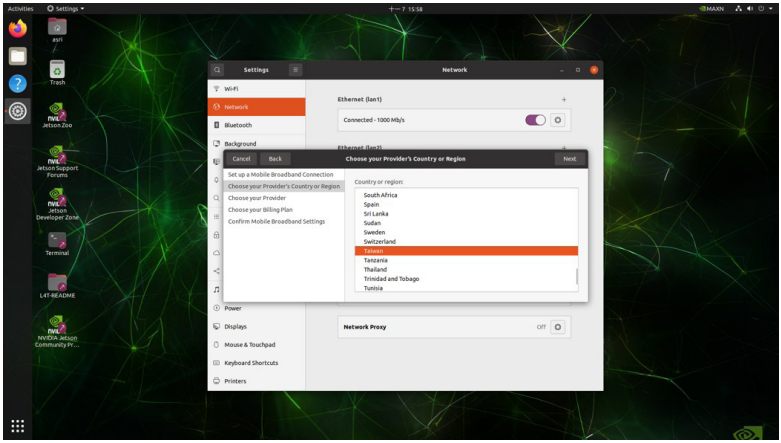
1. Turn on the computer, and click Internet Connection icon on the upper right corner. Select “Mobile Boardband Off” and click “Connect.”



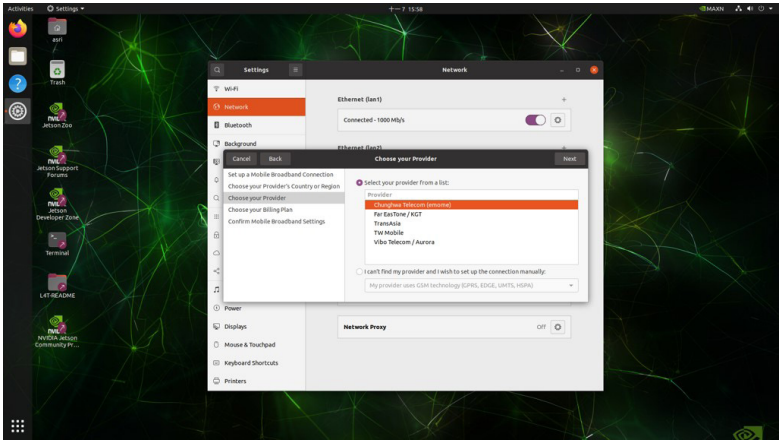
2. Enter the setting screen. Select “Set up a Mobile Broadband Connection” and click “Next.”



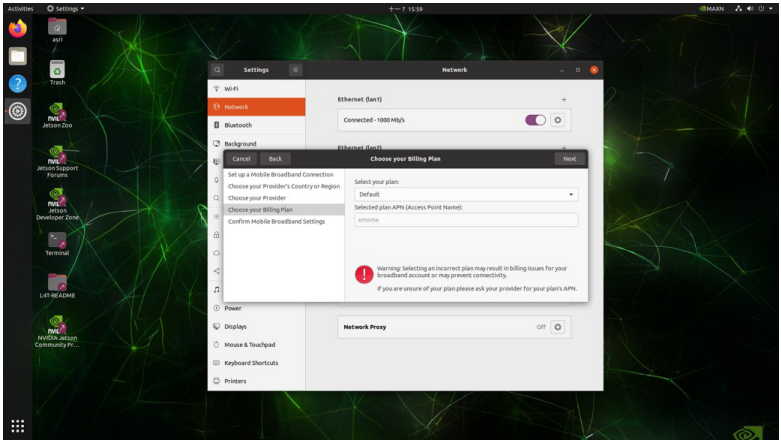
3. Choose your provider's Country or Region, and click "Next."



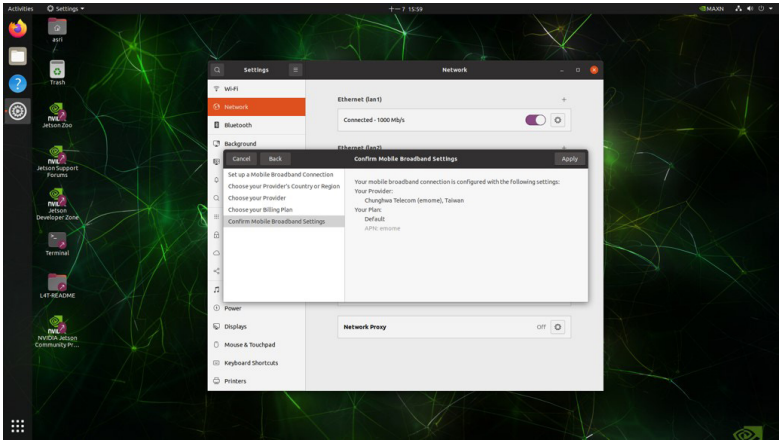
4. Choose your provider, and click "Next."



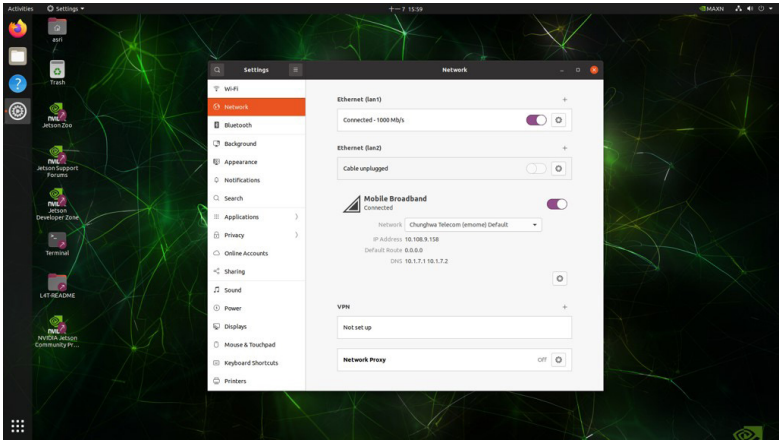
5. Choose your Billing Plan, and click “Next.”



6. Confirm Mobile Broadband Settings, and click “Apply.”

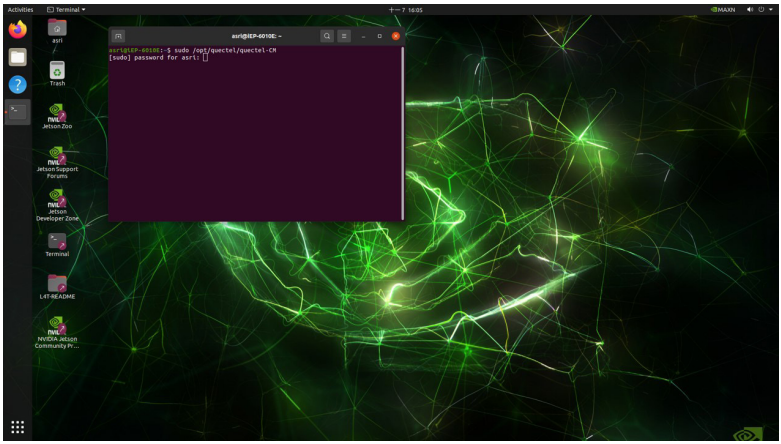


7. 4G Internet is successfully connected.

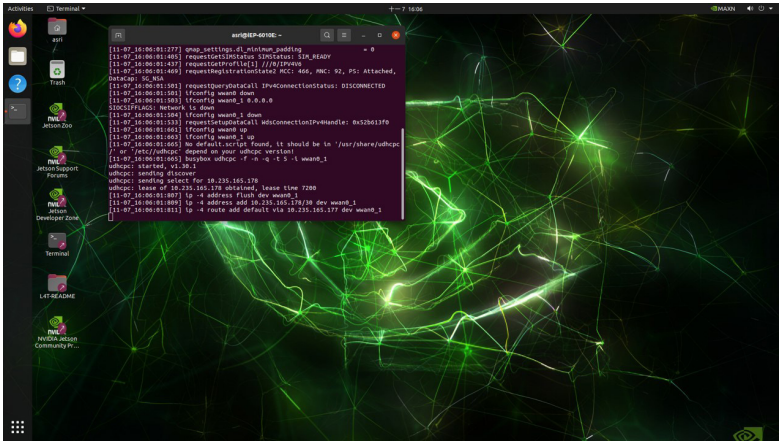


6.3.2 Activate 5G Module

1. Press Ctrl+Alt+T to open terminal and enter the following string.
   $ sudo /opt/quectel/quectel-CM
   To execute the command in the background, enter the following string.
   $ sudo /opt/quectel/quectel-CM &

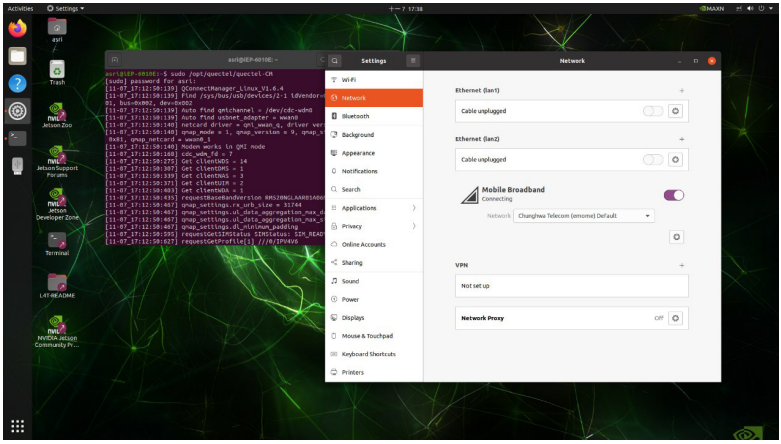


2. 5G Internet is successfully connected.

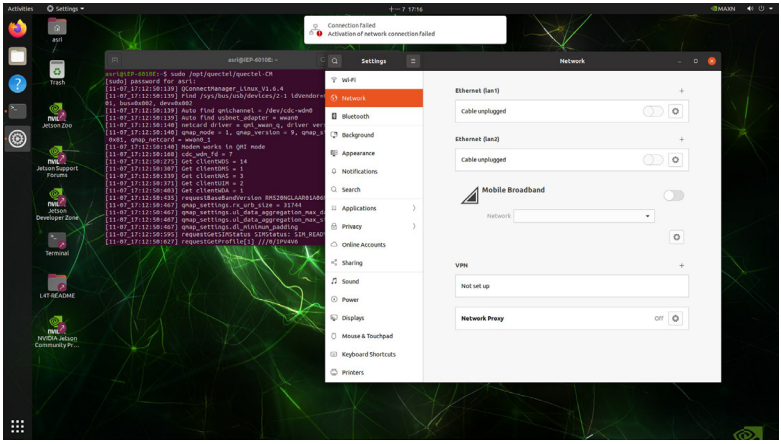


The iEP-601XE 5G Module can only connect to the network through quectel-CM tool. It is normal to see “Connection failed” when you select Ubuntu setting → Network, and activate Mobile Boardband.

The following picture is when you try to connect the Internet through Mobile Boardband.



Then you will see activation of network connection failed.



Chapter 7 UEFI Setup Utility

7.1 Navigation Keys

Use < ↑ > key or < ↓ > key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

Please check the following table for the descriptions of each navigation key.

Navigation Key(s)	Description
+ / -	To change option for the selected items
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the SETUP UTILITY
<ESC>	Jump to the Exit Screen or exit the current screen

7.2 Main Screen

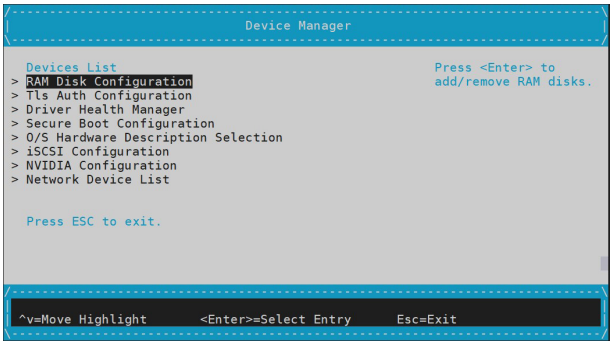
When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.



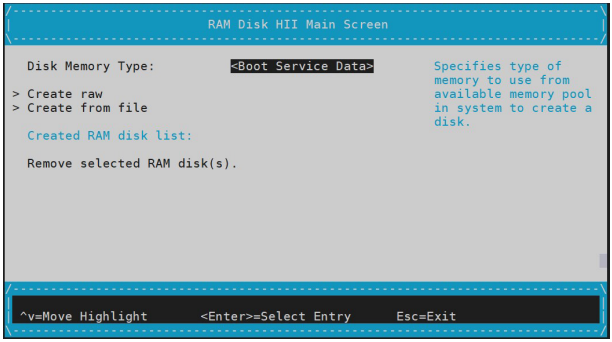
Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen. Options may also vary depending on the features of your motherboard.

7.3 Device Manager

In this section, you may set the configurations for the following items: RAM Disk Configuration, Tls Auth Configuration, Driver Health Manager, Secure Boot Configuration, O/S Hardware Description Selection, iSCSI Configuration, NVIDIA Configuration, and Network Device List.



7.3.1 RAM Disk Configuration



Disk Memory Type

Specifies type of memory to use from available memory pool in system to create a disk.

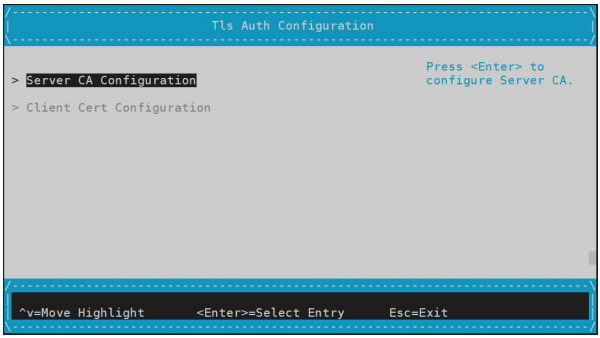
Create raw

Create a raw RAM disk.

Create from file

Create a RAM disk from a given file.

7.3.2 Tls Auth Configuration

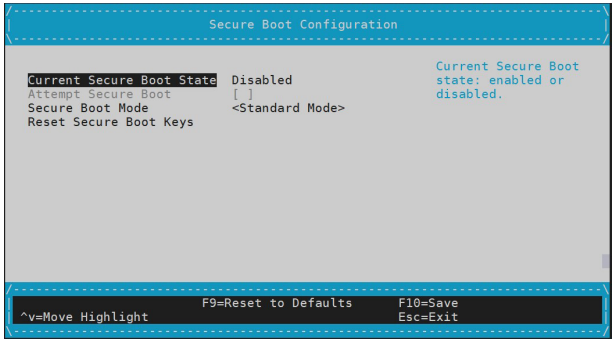


7.3.3 Driver Health Manager



List all the Driver Health instances to manage.

7.3.4 Secure Boot Configuration



Current Secure Boot State

Current Secure Boot State.

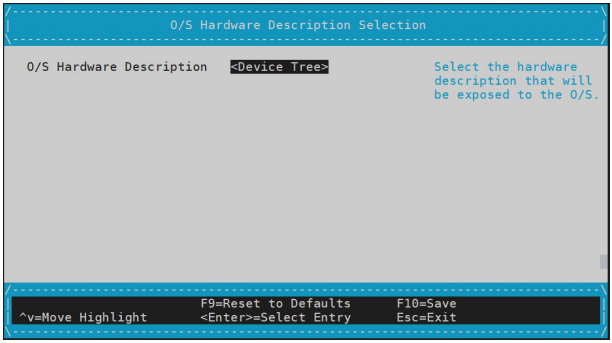
Secure Boot Mode

Secure Boot Mode: Custom Mode or Standard Mode.

Reset Secure Boot Keys

Enroll keys with data from default variables.

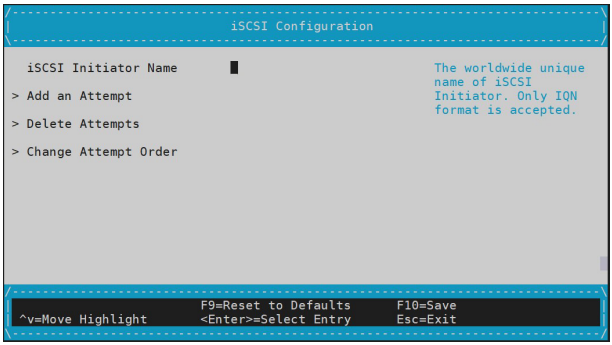
7.3.5 O/S Hardware Description Selection



O/S Hardware Description

Select the hardware description that will be exposed to the O/S.

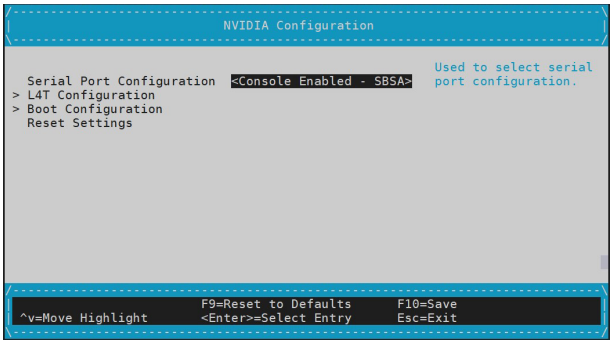
7.3.6 iSCSI Configuration



iSCSI Initiator Name

The worldwide unique name of iSCSI Initiator. Only IQN format is accepted.

7.3.7 NVIDIA Configuration



Serial Port Configuration

Used to select serial port configuration.

Append to Kernel Command Line

Used to append command line to default kernel command line.

OS chain A status

Used to set the status of OS chain A.

L4T Boot Mode

Used to override boot mode of l4t launcher.

dGPU EFIFB Support (DT Mode)

Enable to support dGPU EFIFB in device tree mode.

Enable UEFI Quick Boot

Enable/Disable UEFI full device enumeration.

Add new devices to top or bottom of boot order

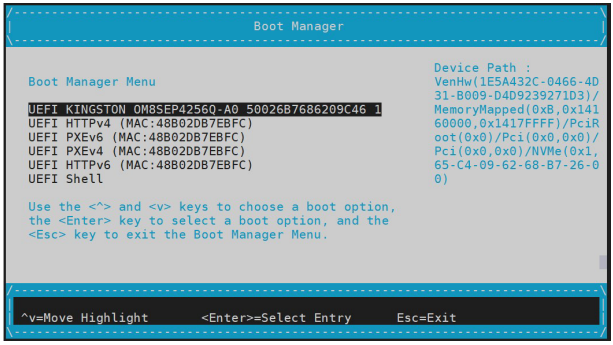
Used to decide whether a new boot option is added at the top or bottom of the list.

7.3.8 Network Device List

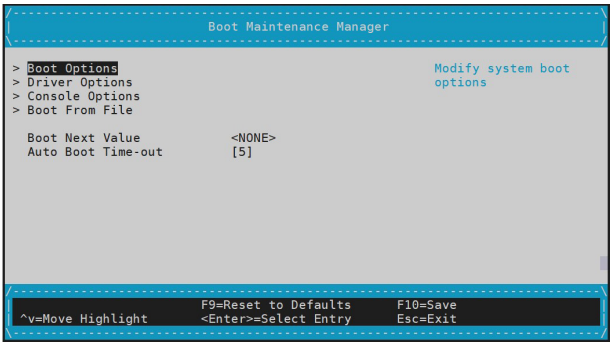


7.4 Device Manager

Use the < ↑ > and < ↓ > keys to choose a boot option, the <Enter> key to select a boot option, and the <Esc> key to exit the Boot Manager Menu.



7.5 Boot Maintenance Manager



Boot Options

Modify system boot options.

Driver Options

Modify boot driver options.

Console Options

Modify system console options.

Boot From File

Boot system from a file or device.

Boot Next Value

Next boot use this boot option.

Auto Boot Time-out

Range: 0 to 65535 seconds, 0 means no wait, 65535 means waiting for key.