

# **AIE510-ONX Series**

**Edge AI Embedded System**

**User's Manual**



# **USER'S MANUAL**

[www.axiomtek.com](http://www.axiomtek.com)

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**January 2024, Version A1**

**Printed in Taiwan**



## Safety Precautions

Before getting started, please read the following important safety precautions.

1. The AIE510-ONX does not come with an operating system which must be loaded first before installation of any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a wrist grounding strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the AIE510-ONX prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the AIE510-ONX is properly grounded.
4. Make sure the voltage of the power source is correct before connecting it to any power outlet.
5. Turn Off system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave equipment in an uncontrolled environment where the storage temperature is below  $-40^{\circ}\text{C}$  or above  $80^{\circ}\text{C}$  as it may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
  - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help discharge any static electricity on human body.
  - When handling boards and components, wear a wrist grounding strap available from most electronic component stores.
8. Note!! Caution with touch! AIE510-ONX will be hot when it's on.

## Classification

1. Degree of protection against electric shock: not classified
2. Degree of protection against ingress of water: IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
4. Mode of operation: Continuous



**Note:** All I/O connectors should be connected with corresponding cables when the system is operating with IP40 rated definition. If some of the I/O ports are not to be used or connected during operation, users must use I/O covers to plug the ports in order to meet the IP40 standard.

## General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

A piece of dry cloth is ideal to clean the device.

1. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
2. Turn the system off before clean up the computer or any components within.
3. Avoid dropping any components inside the computer or getting circuit board damp or wet.
4. For cleaning, be cautious of all kinds of cleaning solvents or chemicals which may cause allergy to certain individuals.
5. Keep foods, drinks or cigarettes away from the computer.

### Cleaning Tools:

Although many companies have created products to help improve the process of cleaning computer and peripherals, users can also use house hold items accordingly for cleaning. Listed below are items available for cleaning computer or computer peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Absorb dust, dirt, hair, cigarette and other particles outside of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are applicable to reach areas in keyboard, mouse and other areas.
- Foam swabs: If possible, it is better to use lint free swabs such as foam swabs.



**Note:** It is strongly recommended that customer should shut down the system before start to clean any single components.

### Please follow the steps below:

1. Close all application programs;
2. Close operating software;
3. Turn off power switch;
4. Remove all devices;
5. Pull out power cable.

### **Scrap Computer Recycling**

If the computer equipment's needs the maintenance or are beyond repair, we strongly recommended that you should inform your Axiomtek distributor as soon as possible for the suitable solution. For the computers that are no longer useful or no longer working well, please contact your Axiomtek distributor for recycling and we will make the proper arrangement.

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## SECTION 1 INTRODUCTION



This chapter contains general information and detailed specifications of the AIE510-ONX. The Chapter 1 includes the following sections:

- General Description
- System Specifications
- Dimensions
- I/O Outlets
- Packing List
- Model List
- Optional Accessories

### 1.1 General Description

The AIE510-ONX is a cutting-edge, fanless edge AI system powered by the NVIDIA® Jetson Orin™ NX Series supercomputer on a module. With a remarkable AI performance of up to 100 TOPS, this ready-to-use system is designed to meet the demands of advanced edge AI applications.

Featuring with two GbE/2.5 GbE PoE ports (30 Watts) and two USB3.2 Gen2 ports, the AIE510-ONX facilitates seamless integration with 3D LiDAR, IP cameras, and various vision navigation sensors. The system is E-Mark certified, supporting a broad power range of 9~36VDC with ignition power control. Additionally, it boasts 5G and Wi-Fi 6E connectivity through M.2 slots, ensuring uninterrupted and efficient communication.

Tailored for computer vision, service robots, robotics, AMRs, and other edge AI applications, the AIE510-ONX stands out as an exceptional platform. Its flexible features and high-performance capabilities establish it as an outstanding system suitable for a wide range of comprehensive edge AI applications across diverse industries.

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- **Features**

1. NVIDIA® Jetson Orin™ NX (100 TOPS)
2. Seamless speed: 5G, Wi-Fi 6E, and 2.5 GbE combined
3. Easily manage: USB and PoE device power control
4. Supports dual PoE for camera & sensor connectivity
5. -25°C to +60°C operating temperature range
6. Supports device management and optional OTA deployment powered by Allxon

- **Reliable and Stable Design**

The AIE510-ONX adopts the advanced fanless system and supporting the PCIe4 NVMe through M.2 interface, which makes it especially suitable for AI computing environments, best for smart city, GPU-accelerated processing, edge computing and smart retail applications.

- **JetPack SDK Supported**

The AIE510-ONX supports JetPack 5.1.2 or later. NVIDIA JetPack SDK is the most comprehensive solution for building end-to-end accelerated AI applications. JetPack provides a full development environment for hardware-accelerated AI-at-the-edge development on Nvidia Jetson modules.

JetPack includes Jetson Linux with bootloader, Linux kernel, Ubuntu desktop environment, and a complete set of libraries for acceleration of GPU computing, multimedia, graphics, and computer vision. It also includes samples, documentation, and developer tools for both host computer and developer kit, and supports higher level SDKs such as DeepStream for streaming video analytics, Isaac for robotics, and Riva for conversational AI.

- **Ideal for In-vehicle Usage**

AIE510-ONX is a compact solution for in-vehicle edge AI applications. With two 802.3at PoE+ ports, 4CH Fakra Z connector for GMSL automotive camera, and integrated wireless connectivity (5G, Wi-Fi 6E, LTE, GPS, Bluetooth), it caters to diverse needs. The inclusion of CAN bus for communication and isolated DIO for sensor/actuator control, along with ignition power control and wide-range DC input, ensures superior performance in a compact form factor.

- **OS Supported**

The AIE510-ONX supports Linux Ubuntu 20.04.

- **High-performance NVMe SSD Storage Supported**

The AIE510-ONX supports one M.2 Key M 2280 with PCI-Express 4.0 x4 interface.


- **Wide Range Power Input with Ignition Power Control Supported**

The AIE510-ONX supports 9 to 36 VDC (Typical 12/24 VDC) wide range power input with ignition power control.



## 1.2 System Specifications

### 1.2.1 Product & System Specification

Product Specification	
AI Accelerator	NVIDIA® Jetson Orin™ NX 16GB (100 TOPS) *NVIDIA® Jetson Orin™ NX 8GB (70 TOPS) or Orin™ Nano 8GB (40 TOPS) or Orin™ Nano 4GB (20 TOPS) (By Project)
CPU	8-core NVIDIA Arm® Cortex A78AE v8.2 64-bit CPU 2MB L2 + 4MB L3
GPU	1024-core NVIDIA Ampere GPU with 32 Tensor Cores
System Memory	16GB 128-bit LPDDR5 102.4 GB/s
Watchdog Timer	Built-in NVIDIA® Jetson Orin™ NX
Serial Port	1 x DB9 for COM & CAN 1 x DB9 for Debug port
USB	2 x USB 3.2 Gen2 Type A
Ethernet & PoE	1 x 10/100/1000 Mbps PoE (via Orin™ NX) 1 x 10/100/1000/2500 Mbps PoE (Intel® I226-IT) *IEEE 802.3at, Max. up to 30 Watts  <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;">  </div> <div> <p><b>Note:</b> AIE510 is a power supply device. Two PSE devices should not be connected together, which may cause the risk of power conflict. Correctly connect PD Device or switch without PoE. If you need PoE switch, please find the switch with uplink port.</p> </div> </div>
GMSL	4 x Fakra-Z connector for GMSL1/2 automotive cameras *Please refer to the validated camera list in Appendix A

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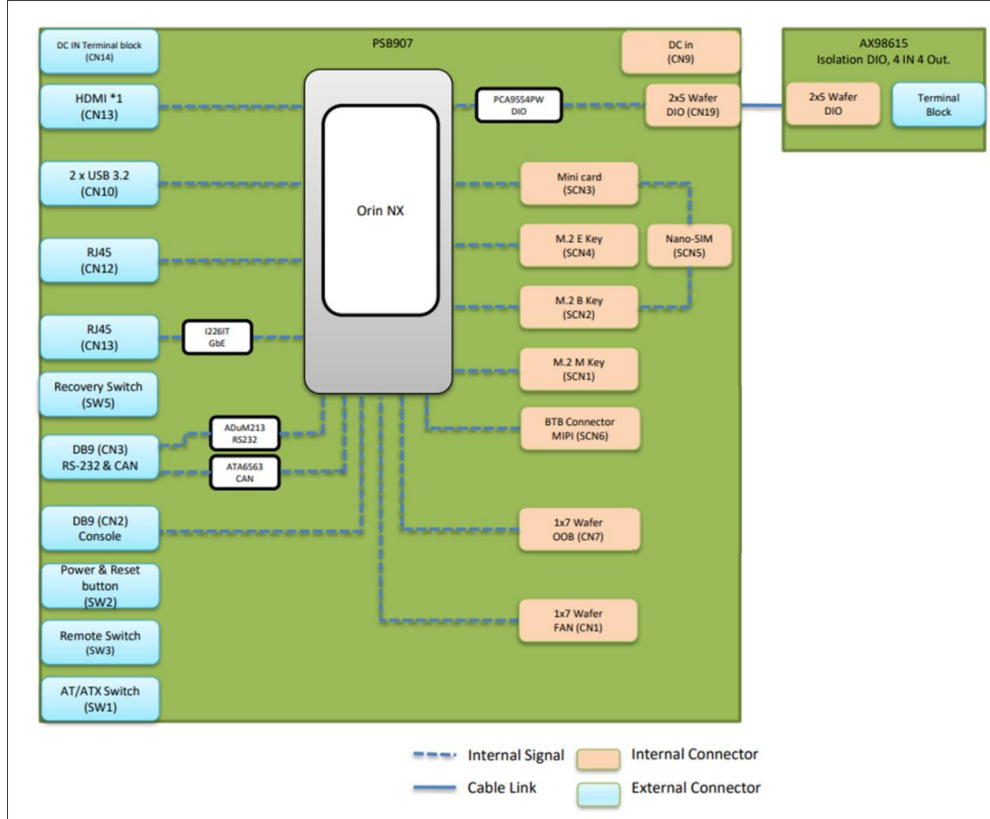
Display	1 x HDMI 2.1 Output (Resolution: up to 4096x2160 @60Hz)
Digital I/O	1 x Isolated Digital I/O (4-in / 4-out)
Storage	1 x M.2 Key M 2280 PCI-Express 4.0 x4 NVMe SSD slot *Orin NX no longer has built-in eMMC and only supports SSD for the bootable device.
Expansion	1 x M.2 Key E 2230 slot (USB +PCIe signal) for Wi-Fi 6E 1 x Full-size PCI Express Mini Card slot (USB + PCIe signal) for Wi-Fi/LTE 1 x M.2 Key B 3042/3052 slot (USB signal) for 5G/LTE 1 x Nano SIM slot for LTE/5G *Please refrain from using both the PCI Express Mini Card slot and the M.2 Key E slot at the same time.
Others	1 x Recovery switch (for image update) 1 x Remote power switch 1 x AT/ATX switch 1 x Power button & Reset button 1 x 9 to 36 VDC power input connector 1 x Ignition connector 5 x SMA-type antenna connector
System Indicator	1 x Yellow LED for M.2 SSD storage 1 x Green LED for system power-on

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System Specification	
Power Supply	Input : 9-36 VDC (Typical 12/24 VDC) with ignition power control Inrush Current : 0.69A / 3.08A
Construction	Aluminum extrusion and heavy-duty steel, IP40 <b>*Outdoor Usage:</b> IP67 rating by project
Operation Temperature	<b>25W Power Mode:</b> -25°C to +60°C (-13°F to +140°F)
Humidity	10% - 95%, non-condensing
Vibration	3 Grms with M.2 (5 to 500Hz, X, Y, Z directions)
Shock	IEC 60068-2-27 (w/ SSD: 50G, half-sine, 11 ms duration)
Dimensions (W x D x H)	<b>AIE510-ONX-16GB:</b> 180 x 106 x 71.7 mm (7.08" x 4.17" x 2.82") <b>AIE510-ONX-GMSL:</b> 180 x 106 x 80.7 mm (7.08" x 4.17" x 3.17")
Weight (Net / Gross)	<b>AIE510-ONX-16GB:</b> 1.3 kg(2.86 lbs) without package 2 kg(4.4 lbs) with package <b>AIE510-ONX-GMSL:</b> 1.5 kg(3.3 lbs) without package 2.2 kg(4.85 lbs) with package
Certifications	CE, FCC Class A, UKCA, E-Mark
OS Support	JetPack 5.1.2 or later (Linux Ubuntu 20.04 or later)

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**1.2.2 Block Diagram**

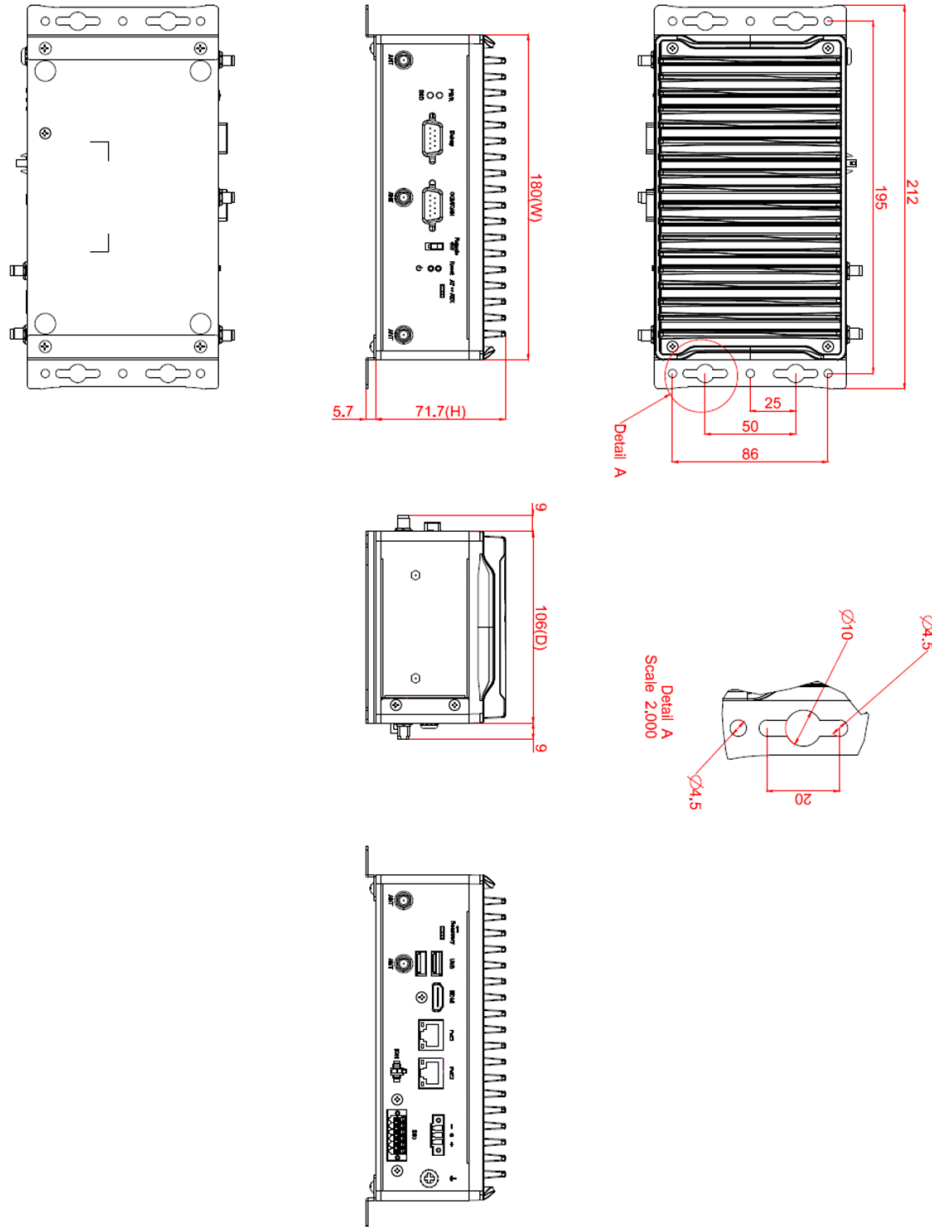


**Note:** All specifications and images are subject to change without notice.

### 1.3 Dimensions

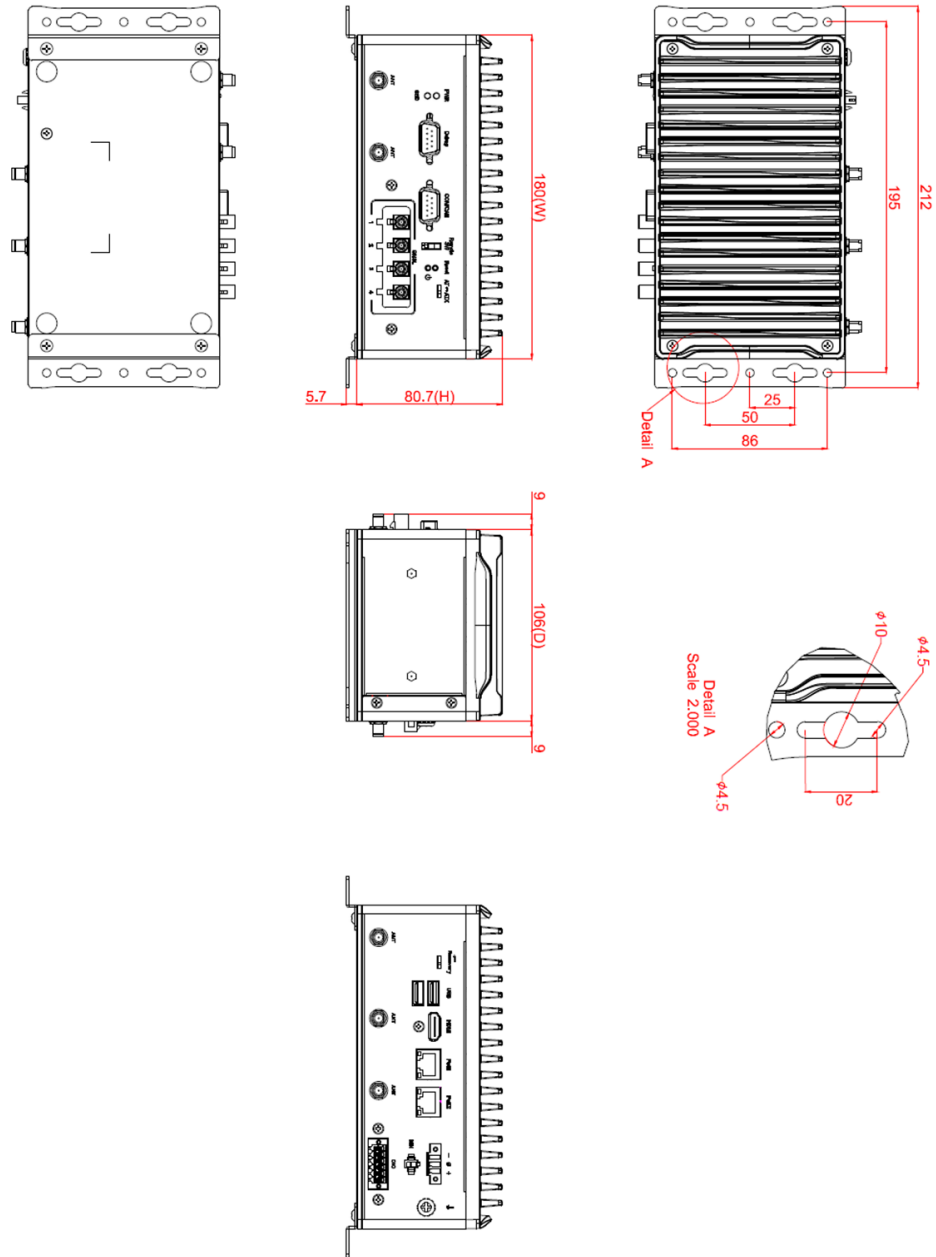
The following diagrams show you dimensions and outlines of the AIE510-ONX.

#### 1.3.1 System Dimension: AIE510-ONX-16GB



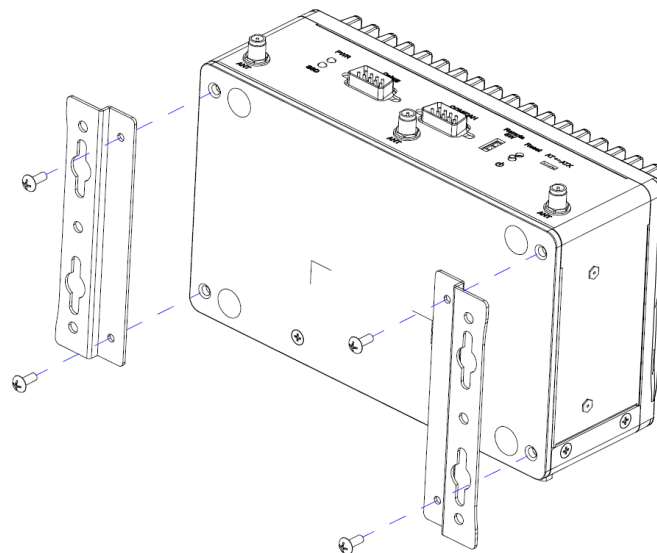
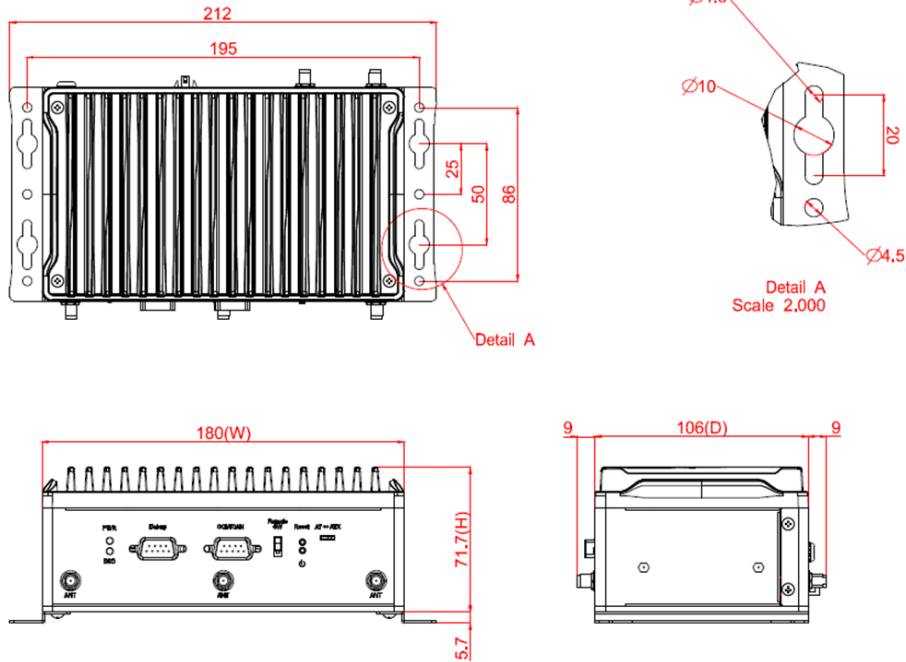
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**1.3.2 System Dimension: AIE510-ONX-GMSL**



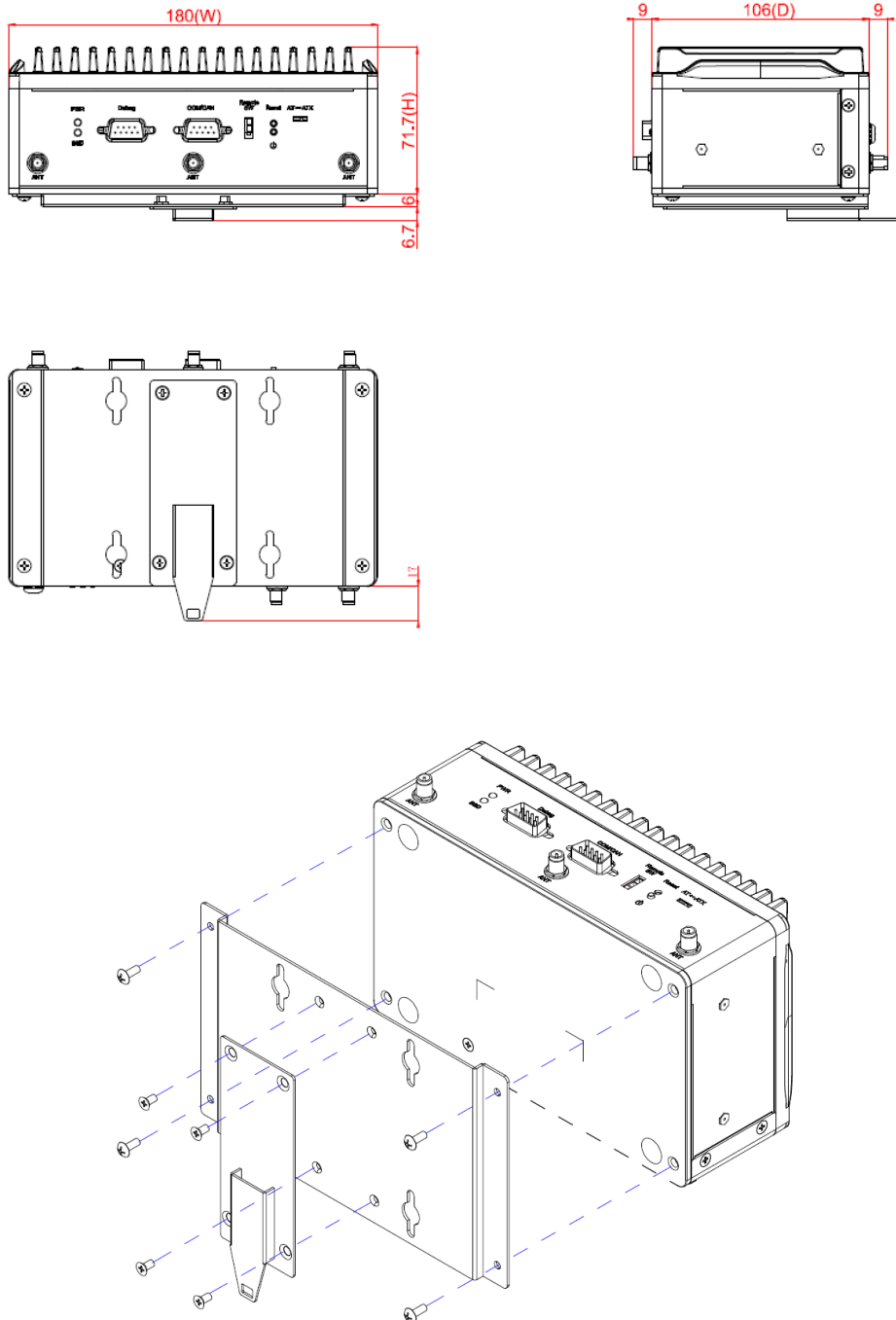
### 1.3.3 Wall Mount Bracket Dimension (Screw: M3 \*8L 4pcs)

 **Mount AIE on Drywall:** Minimum screw size: M4 x 6L (Depends on the thickness of drywall)



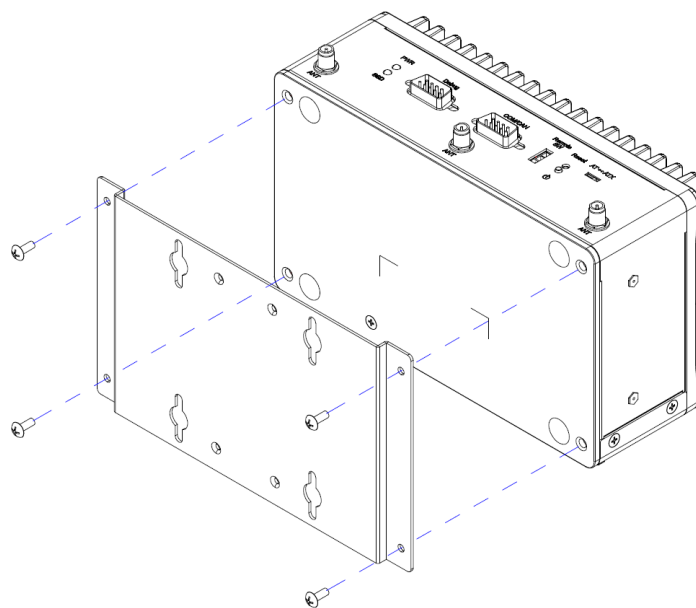
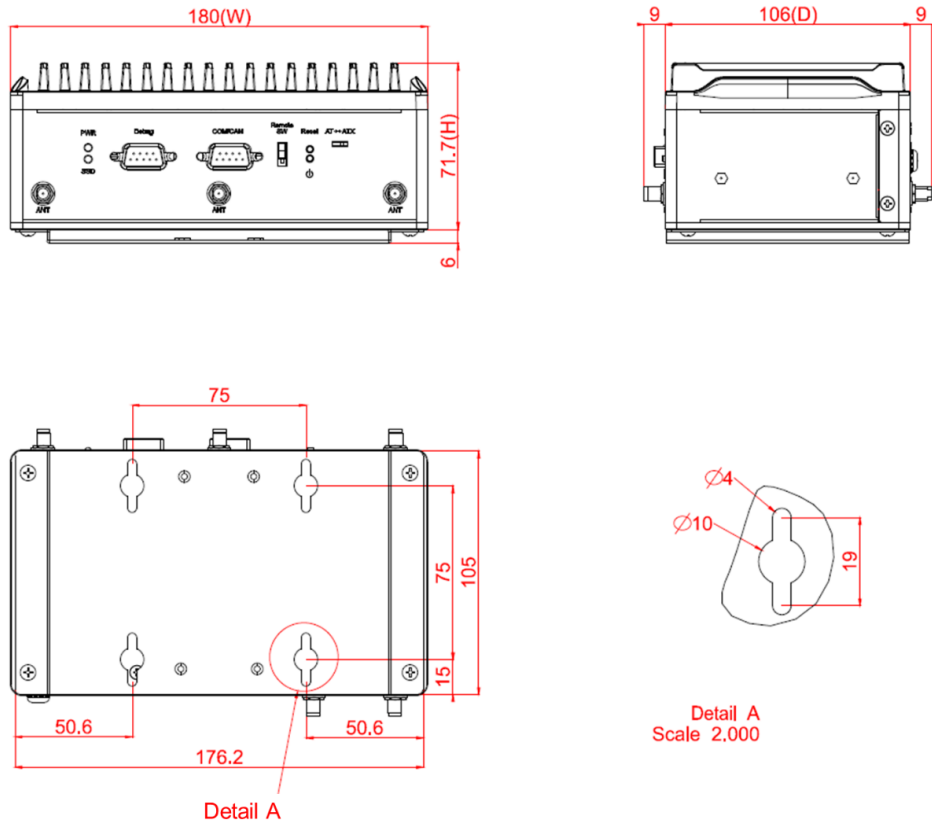
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**1.3.4 Din-rail Mount Bracket Dimension (Screw: M3 \*8L 4pcs & M3 \*4L 4pcs)**





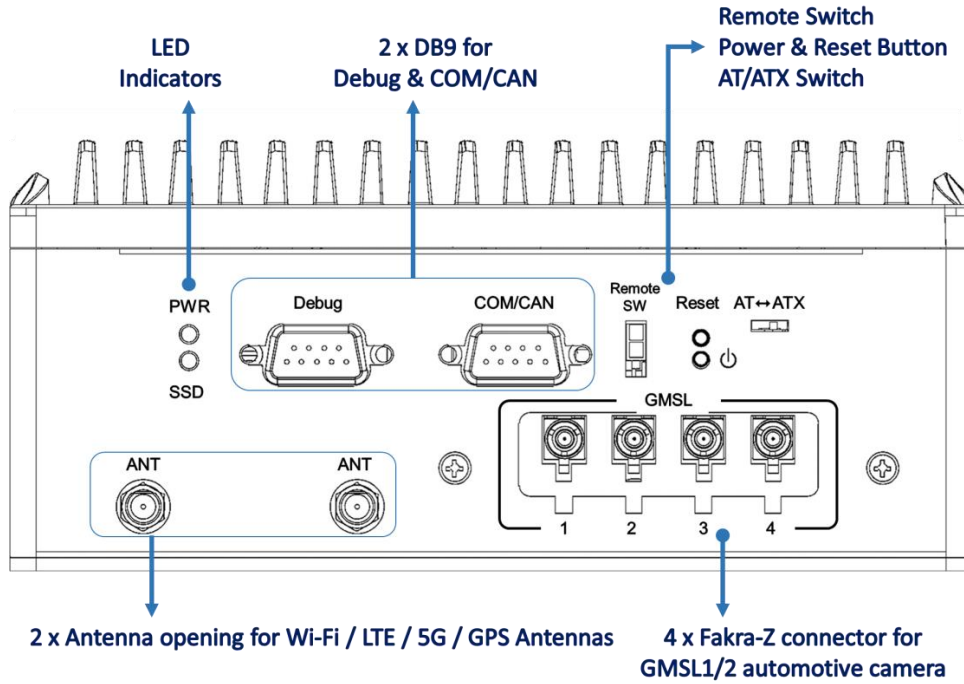
**1.3.5 VESA Arm Mount Bracket Dimension (Screw: M3 \*8L 4pcs)**



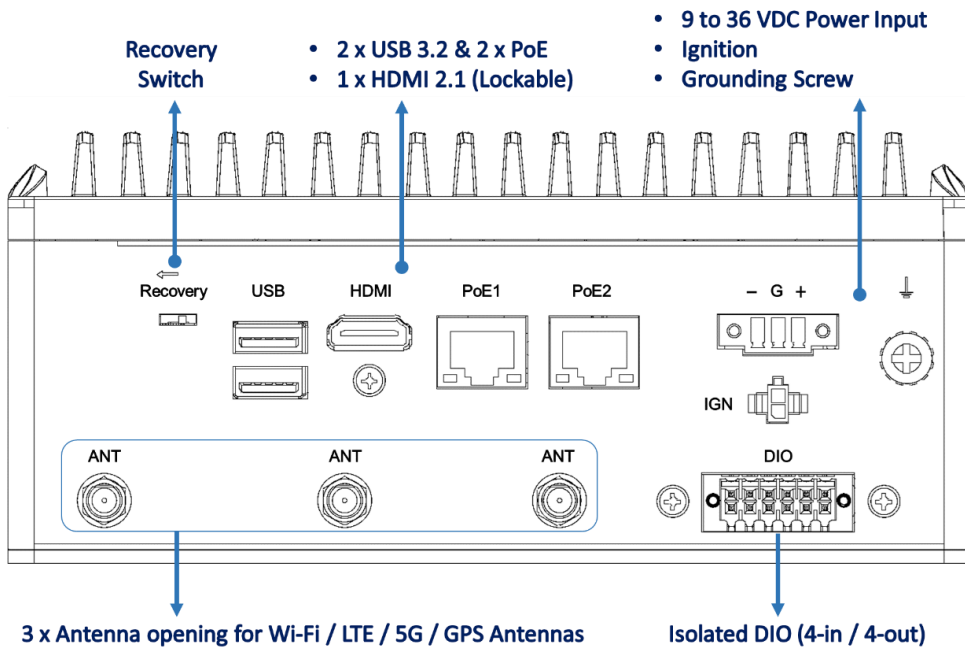


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• **Front View drawing: AIE510-ONX-GMSL**



• **Rear View drawing: AIE510-ONX-GMSL**



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## 1.5 Packing List

The package bundled with your AIE510-ONX should contain the following items:

- 1 x AIE510-ONX system unit
- 4 x Foot pad
- 1 x Screws pack
- 2 x 2 Pin cable for Remote power switch & Ignition connector
- 1 x 3 Pin terminal block connector for power
- 1 x 12 Pin terminal block connector for isolated DIO
- 1 x M.2 SSD thermal kit (for M.2 SSD drive)
- 1 x M.2 5G module thermal kit (for 5G module)

※ Regarding the latest product manual, please download them from Axiomtek official website.

## 1.6 Model List

<b>AIE510-ONX-16GB</b>	Fanless Edge AI System with NVIDIA® Jetson Orin™ NX 16GB, 1 HDMI, 1 GbE PoE, 1 2.5 GbE PoE, 2 USB, 1 COM/CAN, and Isolated DIO (4-in/4-out)
<b>AIE510-ONX-GMSL</b>	Fanless Edge AI System with NVIDIA® Jetson Orin™ NX 16GB, 1 HDMI, 1 GbE PoE, 1 2.5 GbE PoE, 2 USB, 1 COM/CAN, Isolated DIO (4-in/4-out) and 4CH GMSL

※ If you cannot find this package or any items are missing, please contact Axiomtek distributors immediately.

## 1.7 Optional Accessories

Part Number	Description
	Wall mount kit
	VESA mount kit
	DIN-rail mount kit
	M.2 NVMe SSD 128GB or above *The AIE510-ONX requires an SSD for image installation. Kindly order the SSD if you need image installation service.
	Wi-Fi module kit (M.2 or mPCIe) *Please refrain from using both the PCI Express Mini Card slot and the M.2 Key E slot at the same time.
	LTE module kit *Please refrain from using both the PCI Express Mini Card slot and the M.2 Key E slot at the same time.
	5G module kit
	GMSL Camera *Please refer to the validated camera list in Appendix A
	GMSL Camera Cables
509000001500	24V/120W Adapter
	Power Cord

 **Note:** The optional accessory list may be subject to change without notice.

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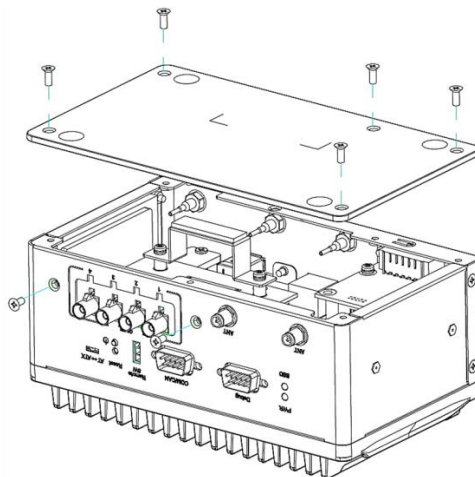
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## SECTION 2 HARDWARE INSTALLATION

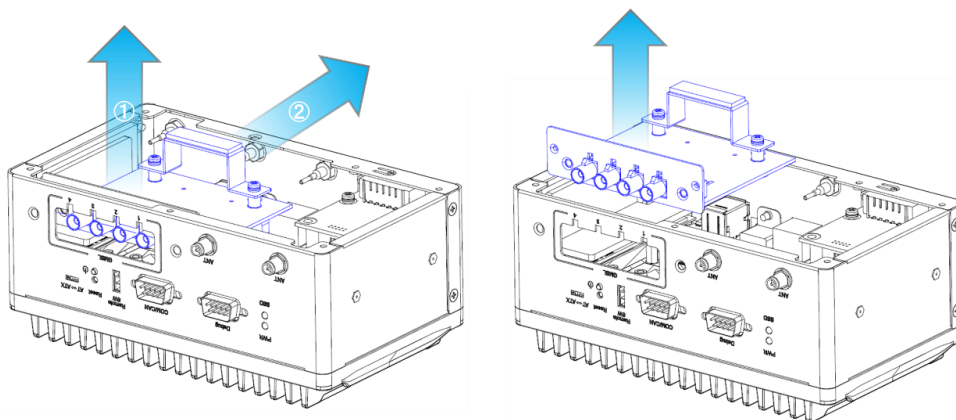
The AIE510-ONX is convenient for your various hardware configurations, such as SSD (Solid State Drive), M.2 Key E module, M.2 Key B module, and PCI Express Mini Card modules. Chapter 2 will show you how to install the hardware.

 **Note:** Before installing the SSD (Solid State Drive), M.2 Key E module, M.2 Key B module, and PCI Express Mini Card modules on the AIE510-ONX-GMSL, kindly ensure that the GMSL Module has been removed.

**Step 1** Turn the system upside down to locate screws at the bottom side and front panel, marked accordingly. Loosen all seven screws.



**Step 2** Gently lift the GMSL Module by 5mm initially and then pull it back 21mm. This action allows for the complete removal of the GMSL module.



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## 2.1 Installing the PCI Express Mini Card

**Step 1** Turn off the system, and unplug the power adapter.

**Step 2** Turn the system upside down to locate screws at the bottom side as red marked and loosen five screws.



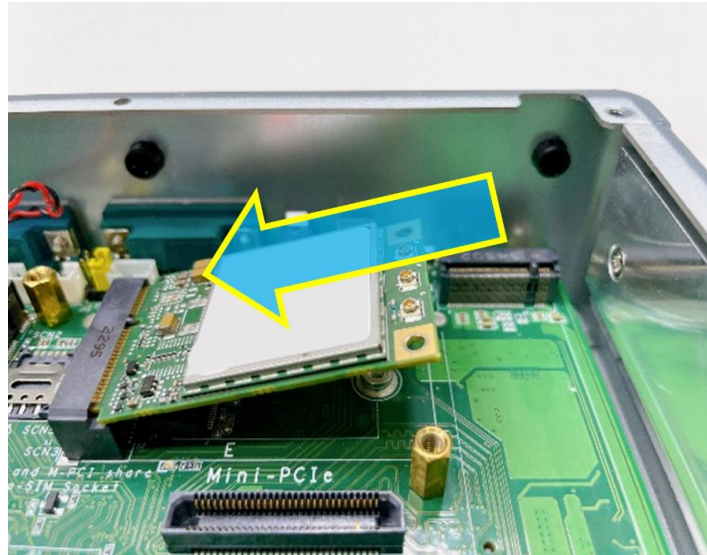
**Step 3** Remove the bottom cover, and locate PCI Express mini card slot on the board.



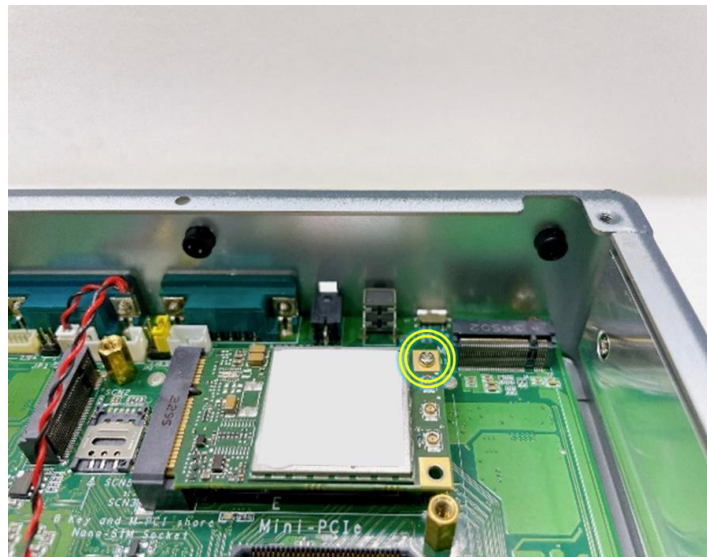


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- Step 4** Holding the PCI Express mini card at a 45 degree angle up from horizontal, slowly insert the golden fingers into the PCI Express slot until it is fully inserted in.



- Step 5** Press it down gently, but firmly, and then secure the PCI Express mini card to the carrier by tightening up the one M2 Phillips screw to the marked position.



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**Step 6 Connect the SMA cables to the PCI Express mini card.**



## 2.2 Installing the M.2 Key B 3042/3052 5G or LTE Module

**Step 1** Turn off the system, and unplug the power adapter.

**Step 2** Flip the system upside down and loosen five screws at the bottom side, as marked with red circles in the figure below.



**Step 3** Take off the bottom cover, and locate the M.2 3042/3052 Key B slot on the carrier board.

**Note:** To prevent mechanical interference, please remove the stand-off for the M.2 3042 Key B module before installing the M.2 3052 Key B module.



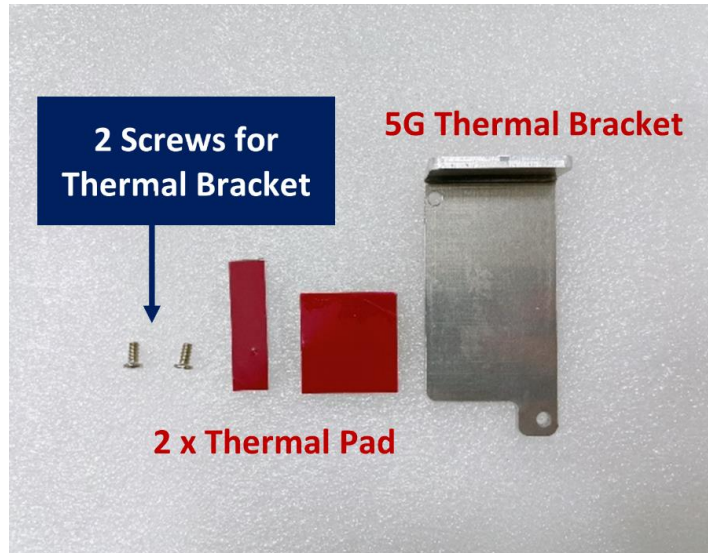
The circled stand-off is for M.2 3042 Key B module



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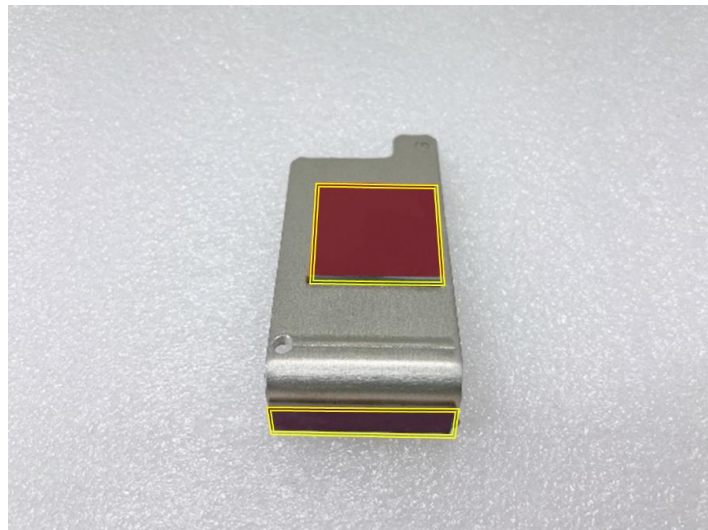
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**Step 4** Take the 5G thermal bracket, two thermal pads, and two M3 screws out of the package box.



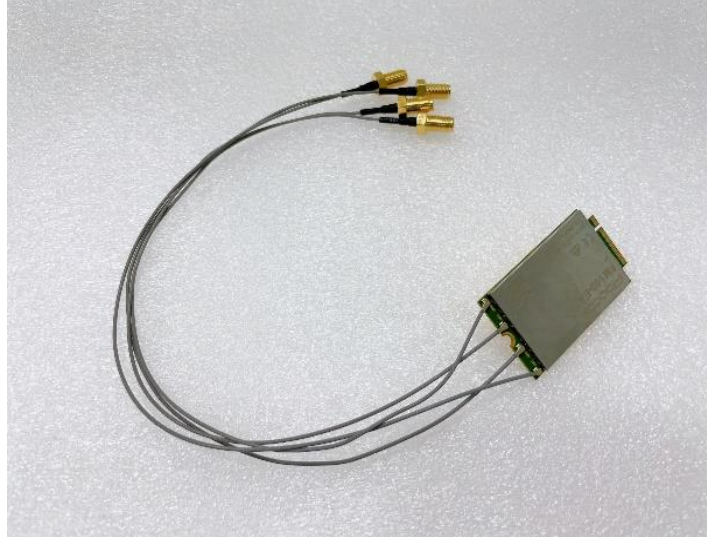
**Step 5** Attach the two thermal pads onto the 5G thermal bracket.

- Note:** Thermal Pad dimensions:
- 27mm (L) x 27mm (W) x 2mm (H)
  - 35mm (L) x 10mm (W) x 1mm (H)

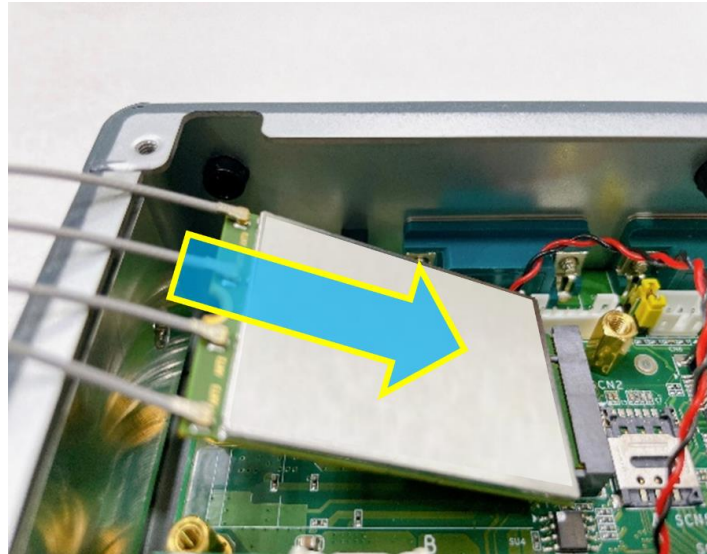




**Step 6** Connect the SMA cables to the M.2 Key B module.



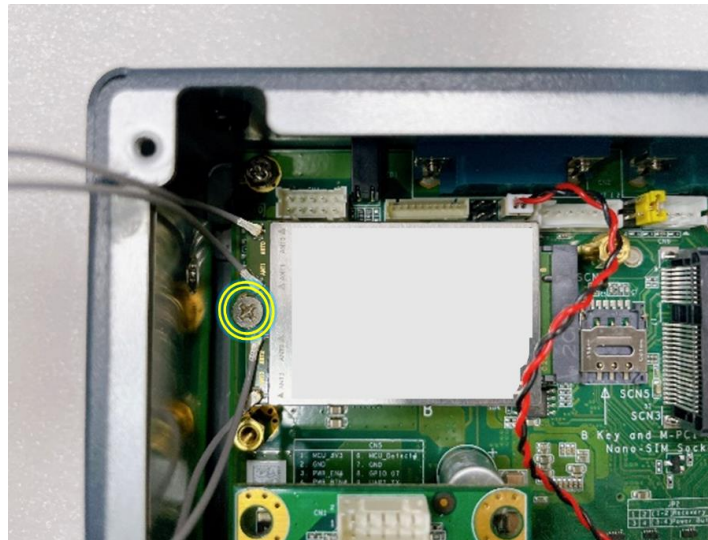
**Step 7** While holding the M.2 Key B 3052 module at a 30 degree angle up from the horizontal, slowly insert the golden fingers into the M.2 Key B 3042/3052 slot, until it is fully inserted in place.



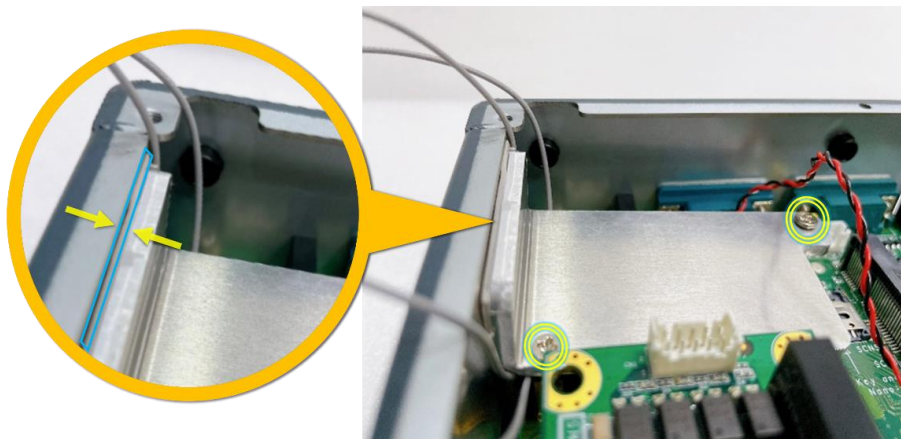
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**Step 8** Press the M.2 Key B 3052 module down gently, but firmly, and then secure the module to the carrier by tightening up one M3 screw to the marked position.

**Note:** M3 screw requires the tightening torque: 4.5~5.5Kgf-cm

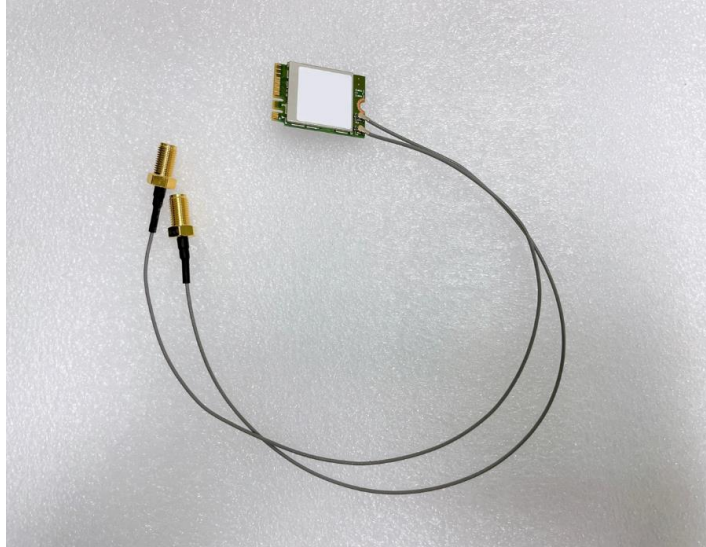


**Step 9** Place the 5G thermal bracket on the M.2 Key B 3052 module, then secure the bracket to the carrier by firmly tightening the two M3 screws to the marked positions. Ensure that the thermal pad on the side is securely attached to the chassis.



## 2.3 Installing the M.2 Key E 2230 Wi-Fi Module

**Step 1** Connect the SMA cables to the M.2 Key E module.



**Step 2** Turn off the system, and unplug the power adapter.

**Step 3** Flip the system upside down and loosen five screws at the bottom side, as marked with red circles in the figure below.





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**Step 4** Take off the bottom cover, and locate the M.2 2230 Key E slot on the carrier board.



**Step 5** While holding the M.2 Key E 2230 module at a 30 degree angle up from the horizontal, slowly insert the golden fingers into the M.2 Key E 2230 slot, until it is fully inserted in place.





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- Step 6** Press the M.2 Key E 2230 module down gently, but firmly, and then secure the module to the carrier by tightening up one M3 screw to the marked position.



## 2.4 Installing 5G or LTE or Wi-Fi Antenna Cable

**Step 1** Install the Mini PCIe card or M.2 Key E card or M.2 Key B module, securing it with a screw and connecting it using SMA cables. For more details, please refer to section 2.1 to 2.3.

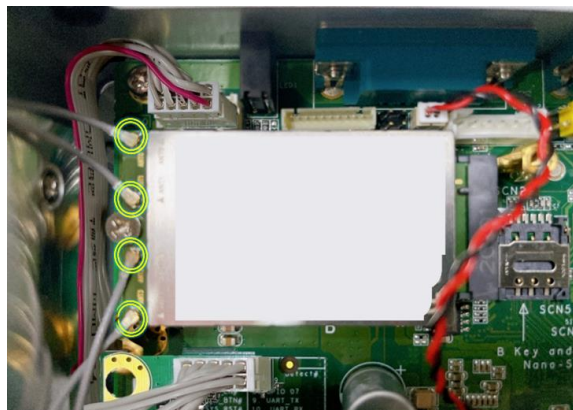
### ▼ PCI Express mini card



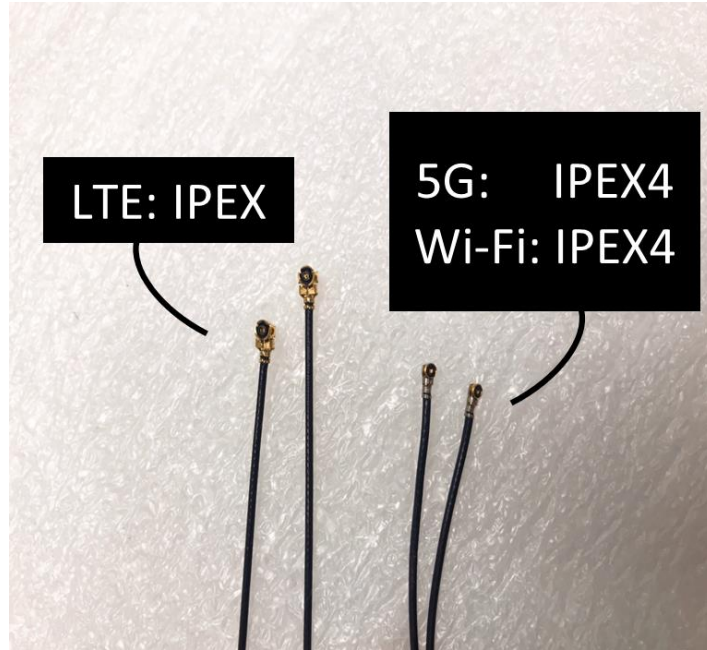
### ▼ M.2 2230 Key E module



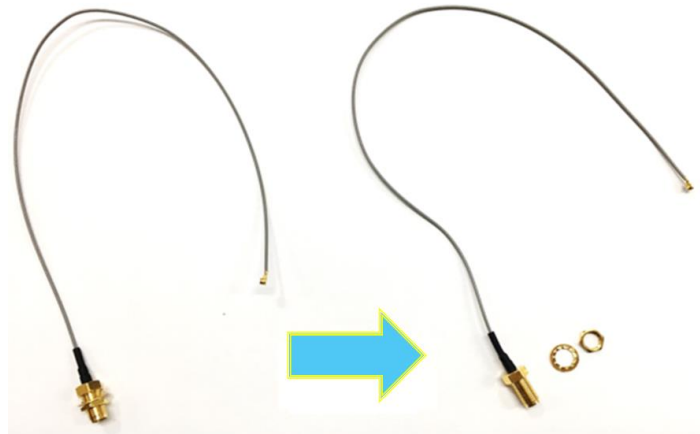
### ▼ M.2 3042/3052 Key B module



**Note:** The 5G, LTE and Wi-Fi modules come with a different type of SMA cable, one is IPEX, and another one is IPEX4. Please do not mix them up to avoid mismatch.



**Step 2** Before installing the antenna cable onto the chassis, kindly remove the hex nut and washer.



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**Step 3** Install the antenna cable connectors through the openings on the chassis, put the washer and Hex nut into the antenna cable connector, and then tighten them up.





## 2.5 Installing the M.2 2280 Key M SSD Drive

- Step 1** Turn off the system, and unplug the power adapter.
- Step 2** Flip the system upside down and loosen five screws at the bottom side, as marked with red circles in the figure below.



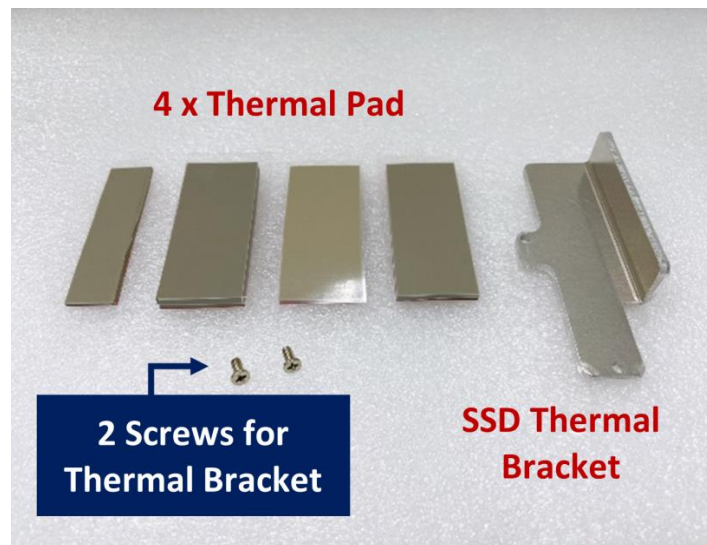
- Step 3** Take off the bottom cover, and locate the M.2 2280 Key M slot on the board.



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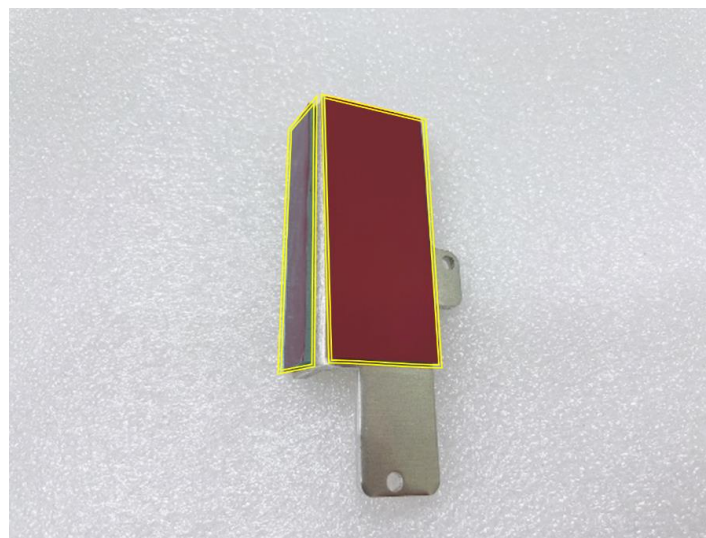
**Step 4** Take the SSD thermal bracket, four thermal pads, and two M3 screws out of the package box.

- Note:** Thermal Pad dimensions:
- 60mm (L) x 25mm (W) x 2mm (H)
  - 60mm (L) x 25mm (W) x 4.5mm (H)
  - 60mm (L) x 25mm (W) x 2.5mm (H)
  - 60mm (L) x 15mm (W) x 1.5mm (H)




**Step 5** Attach the two thermal pads onto the SSD thermal bracket.

- Note:** Thermal Pad dimensions:
- 60mm (L) x 25mm (W) x 2mm (H)
  - 60mm (L) x 15mm (W) x 1.5mm (H)

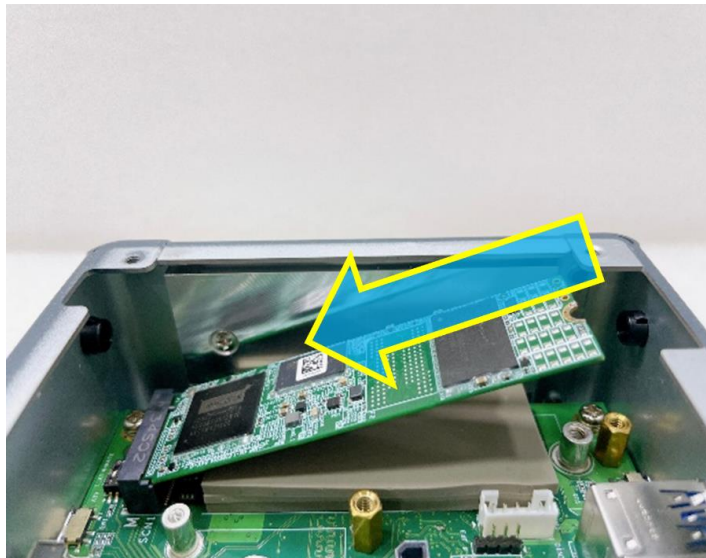


**Step 6** Apply two thermal pads onto the M.2 2280 Key M slot.

-  **Note:** Thermal Pad dimensions:
- 60mm (L) x 25mm (W) x 4.5mm (H)
  - 60mm (L) x 25mm (W) x 2.5mm (H)



**Step 7** While holding the M.2 2280 Key M SSD drive at a 30-degree angle up from the horizontal, slowly insert the golden fingers into the M.2 2280 Key M slot, until it is fully inserted in place.

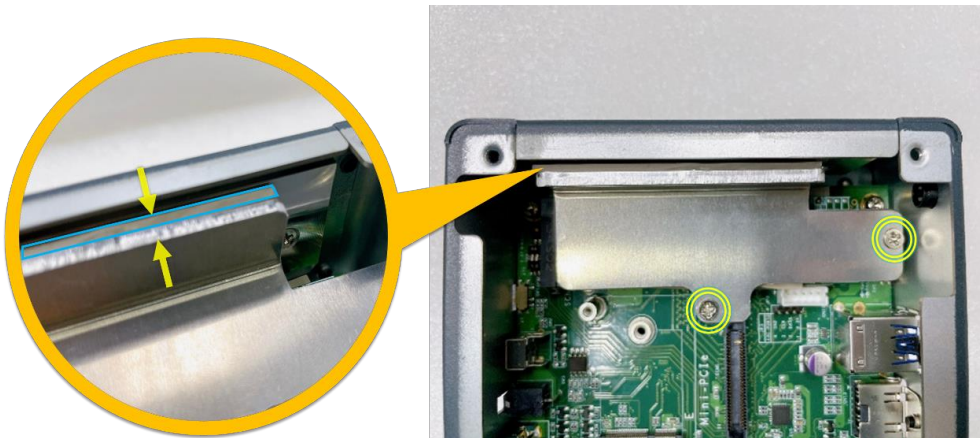


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- Step 8** Press the M.2 2280 Key M SSD drive down gently, but firmly, and then secure the M.2 2280 Key M SSD drive to the carrier by tightening up one M3 screw to the marked position.



- Step 9** Place the SSD thermal bracket on the M.2 2280 Key M SSD drive, then secure the bracket to the carrier by firmly tightening the two M3 screws to the marked positions. Ensure that the thermal pad on the side is securely attached to the chassis.



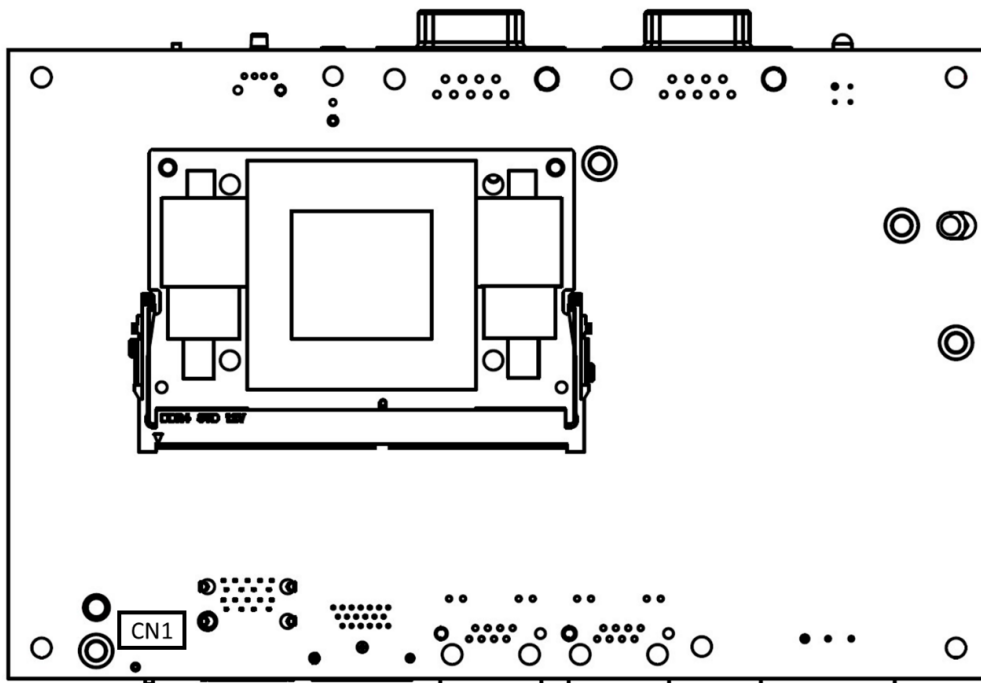


## SECTION 3 CONNECTOR & PIN DEFINE

This chapter contains connector information and detailed pin define of the AIE510-ONX.

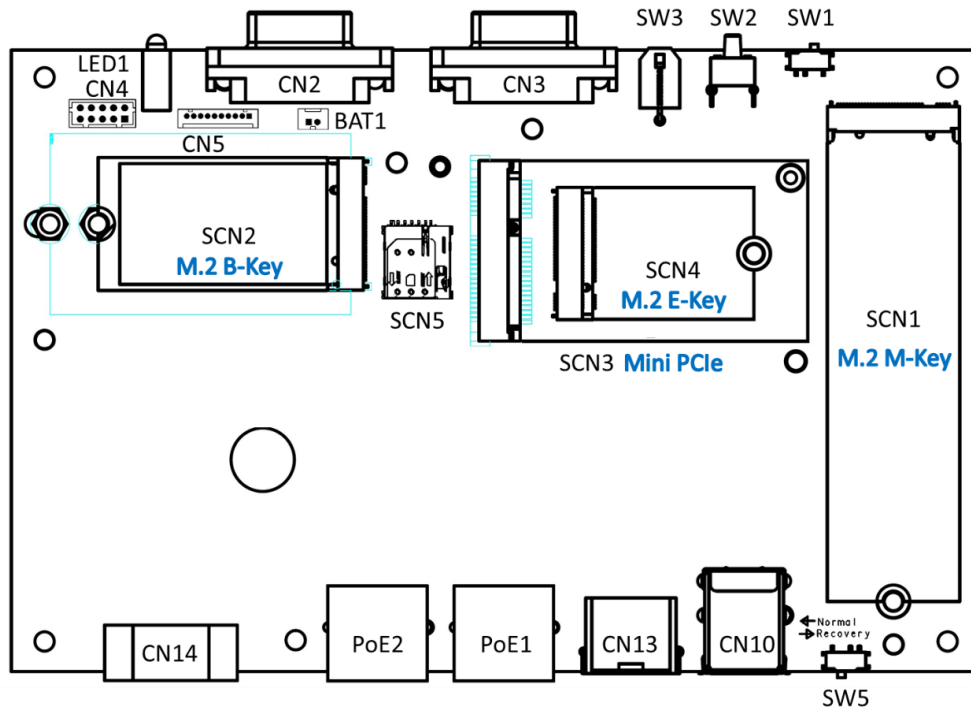
### 3.1 Connector Location

PSB907 Top View



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**PSB907 Bottom View**



**Note:** We strongly recommended that you should not modify any unmentioned jumper setting without Axiomtek FAE's instruction. Any modification without instruction might cause damage to the system.

### 3.2 Connectors

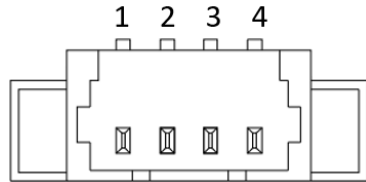
Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors, buttons and switches on the **AIE510-ONX** Series.

Connectors / Buttons / Switches	PCB Location	Section
Fan Connector	CN1	3.2.1
Debug Port & Serial & CAN Port Connector	CN2, CN3	3.2.2
Isolated 4-in / 4-out Digital Connector	CN3	3.2.3
USB3.2 Gen2 Type A Connector	CN10	3.2.4
Ethernet & PoE Port	PoE1, PoE2	3.2.5
HDMI Connector	CN13	3.2.6
DC Phoenix Power In Connector	CN14	3.2.7
Ignition Connector	IGN	3.2.8
GMSL Camera Connector	GMSL	3.2.9
M.2 2280 Key M PCIe x4 SSD slot	SCN1	3.2.10
M.2 3042/3052 Key B Slot	SCN2	3.2.11
PCI-Express Mini Card slot	SCN3	3.2.12
M.2 2230 Key E Slot	SCN4	3.2.13
Nano SIM Card Slot	SCN5	3.2.14
AT/ATX Switch	SW1	3.2.15
Power Button & Reset Button	SW2	3.2.16
Remote Power Switch Connector	SW3	3.2.17
Recovery Mode Switch	SW5	3.2.18
CMOS Battery Interface	BAT1	3.2.19
Power and Storage LED Indicator	LED1	3.2.20

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**3.2.1 Fan Connector (CN1)**

The AIE510-ONX reserves an fan connector (CN1) for fan kit.



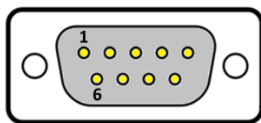
Pin	Signal
1	TACH
2	GND
3	12V
4	PWM

**3.2.2 Debug & Serial & CAN Port Connector (CN2, CN3)**

AIE510-ONX features two DB9 connector for debug port and serial port (RS-232) as well as one CAN-bus port.

**Note:**

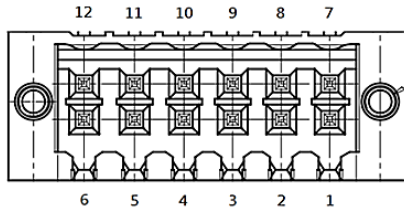
- The COM signals originate from UART signals on NVIDIA® Jetson Orin™ NX. NVIDIA's official mapping designates: COM port corresponds to "ttyTHS1", and Debug port corresponds to "ttyTCU0".
- Baud Rate: 50~115200



Pin	Debug (CN2) (3-wire)	RS-232 & CAN (CN3) (5-wire)
1	NC	NC
2	RXD	RXD
3	TXD	TXD
4	NC	NC
5	GND	GND
6	NC	CAN_H
7	NC	RTS
8	NC	CTS
9	NC	CAN_L

### 3.2.3 Isolated 4-in / 4-out Digital I/O Connector (CN4)

The AIE510-ONX supports one isolated 4-in / 4-out digital I/O (DIO).

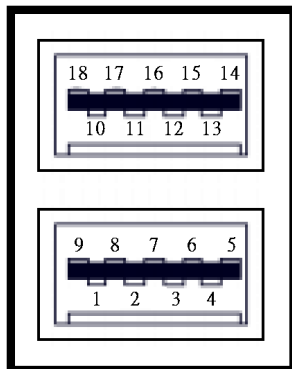


Pin	Signal	Pin	Signal
1	COM+	7	Ext. Power
2	OUT 0	8	IN 0
3	OUT 1	9	IN 1
4	OUT 2	10	IN 2
5	OUT 3	11	IN 3
6	COM-	12	GND

### 3.2.4 USB3.2 Gen2 Type A Connector (CN10)

The Universal Serial Bus connectors are compliant with USB 2.0 (480Mbps) and USB 3.2 Gen2 (10Gbps), and ideally for installing USB peripherals such as camera, sensor, keyboard, mouse, scanner, etc.

**Note:** The USB port located near the recovery switch is also utilized for JetPack flash purposes. For more details, please refer to **Section 4 JetPack BSP Flash Method**.



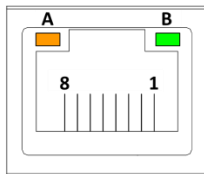
Pin	Signal	Pin	Signal
1	5V_USB	10	5V_USB
2	USB1_D-	11	USB2_D-
3	USB1_D+	12	USB2_D+
4	GND	13	GND
5	USB_SS1_RX-	14	USB_SS2_RX-
6	USB_SS1_RX+	15	USB_SS2_RX+
7	GND	16	GND
8	USB_SS1_TX-	17	USB_SS2_TX-
9	USB_SS1_TX+	18	USB_SS2_TX+

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**3.2.5 Ethernet & PoE Ports (PoE1, PoE2)**

The AIE510-ONX comes with two RJ-45 connectors: PoE1 (NVIDIA® Jetson Orin™ NX) and PoE2 (Intel® I226-IT). Both of PoE1 and PoE2 are non-isolated PoE ports, which are compliant IEEE 802.3at Type 1 & Type 2, and the total power budget is 30 Watts maximum.

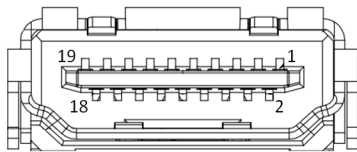
Pin	Signal	Pin	Signal
1	Tx+ (Data Transmission Positive)	5	RJ-1 (For 1000 base T-Only)
2	Tx- (Data Transmission Negative)	6	Rx- (Data Reception Negative)
3	Rx+ (Data Reception Positive)	7	RJ-1 (For 1000 base T-Only)
4	RJ-1 (For 1000 base T-Only)	8	RJ-1 (For 1000 base T-Only)
A	Active LED	B	Speed LED



LED	No Link	Link		Data Activity
Active Status (A)	OFF	Yellow		Blinking Yellow
LED	10 Mbps	100 Mbps	1 Gb/s	2.5 Gb/s
PoE1 Link Speed (B)	OFF	Green	Yellow	X
PoE2 Link Speed (B)	OFF	OFF	Orange	Green

### 3.2.6 HDMI Connector (CN13)

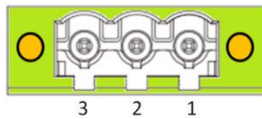
The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.



Pin	Signal	Pin	Signal
1	HDMI1_DATA2+	2	GND
3	HDMI1_DATA2-	4	HDMI1_DATA1+
5	GND	6	HDMI1_DATA1-
7	HDMI1_DATA0+	8	GND
9	HDMI1_DATA0-	10	HDMI1_CLK+
11	GND	12	HDMI1_CLK-
13	NC	14	NC
15	HDMI1_SCL	16	HDMI1_SDA
17	GND	18	+5V
19	HDMI_HTPLG		

### 3.2.7 DC Phoenix Power In Connector (CN14)

The AIE510-ONX supports a 9~36V Phoenix DC-in connector for system power input.

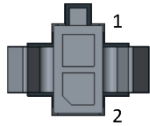


Pin	Function
1	GND
2	Chassis GND
3	DC IN

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### 3.2.8 Ignition Connector (IGN)

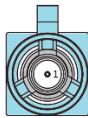
The AIE510-ONX supports a ignition connector for ignition power control.



Pin	Function
1	Ignition
2	GND

### 3.2.9 GMSL Camera Connector (GMSL)

The **AIE510-ONX-GMSL** features four FAKRA Z Code connectors located on the rear side. These connectors facilitate the GMSL1/2 (Gigabit Multimedia Serial Link) connections, enabling the seamless linkage of GMSL cameras to a two-port deserializer. The output signal from the deserializer is MIPI CSI-2.

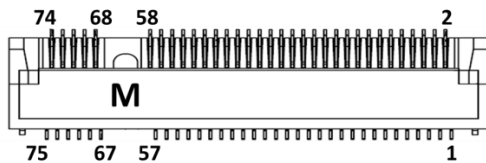


Pin	Function
1	GMSL



### 3.2.10 M.2 2280 Key M PCIe x4 SSD slot (SCN1)

The AIE510-ONX comes with one M.2 2280 Key M PCIe x4 NVMe SSD slot for storage.

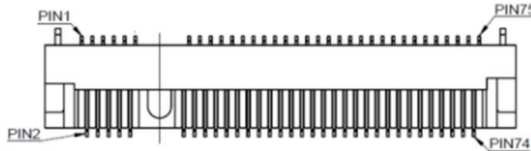


Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	+3.3V	3	GND	4	+3.3V
5	PEX3_RX-	6	NC	7	PEX3_RX+	8	NC
9	GND	10	LED_1#	11	PEX3_TX-	12	+3.3V
13	PEX3_TX+	14	+3.3V	15	GND	16	+3.3V
17	PEX2_RX-	18	+3.3V	19	PEX2_RX+	20	NC
21	GND	22	NC	23	PEX2_TX-	24	NC
25	PEX2_TX+	26	NC	27	GND	28	NC
29	PEX1_RX-	30	NC	31	PEX1_RX+	32	NC
33	GND	34	NC	35	PEX1_TX-	36	NC
37	PEX1_TX+	38	NC	39	GND	40	NC
41	PEX0_RX-	42	NC	43	PEX0_RX+	44	NC
45	GND	46	NC	47	PEX0_TX-	48	NC
49	PEX0_TX+	50	PERST#	51	GND	52	CLKREQ#
53	PEX0_REF CLK <sub>n</sub>	54	PEWAKE#	55	PEX0_REF CLK <sub>p</sub>	56	NC
57	GND	58	NC	59	CONNECTOR Key M	60	CONNECTOR Key M
61	CONNECTOR Key M	62	CONNECTOR Key M	63	CONNECTOR Key M	64	CONNECTOR Key M
65	CONNECTOR Key M	66	CONNECTOR Key M	67	NC	68	NC
69	NC	70	+3.3V	71	GND	72	+3.3V
73	GND	74	+3.3V	75	GND		

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**3.2.11 M.2 3042/3052 Key B 5G module slot (SCN2)**

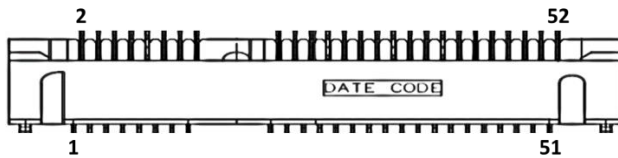
The AIE510-ONX comes with one M.2 3042/3052 Key B USB3.2 Gen2 (10Gbps) slot for 5G or LTE (CAT6 or above) module.



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	Config_3	2	+3.3V	3	GND	4	+3.3V
5	GND	6	Pull up 10K ohm to 3.3V	7	USB_D+	8	Pull up 100K ohm to 3.3V
9	USB_D-	10	NC	11	GND	12	CONNECTOR KEY B
13	CONNECTOR KEY B	14	CONNECTOR KEY B	15	CONNECTOR KEY B	16	CONNECTOR KEY B
17	CONNECTOR KEY B	18	CONNECTOR KEY B	19	CONNECTOR KEY B	20	NC
21	GND	22	NC	23	Pull up 10K ohm to 1.8V	24	NC
25	NC	26	NC	27	GND	28	NC
29	USB3_RX-	30	UIM_RESE T	31	USB3_RX+	32	UIM_CLK
33	GND	34	UIM_DATA	35	USB3_TX-	36	UIM_PWR
37	USB3_TX+	38	NC	39	GND	40	NC
41	NC	42	NC	43	NC	44	NC
45	GND	46	NC	47	NC	48	NC
49	NC	50	NC	51	GND	52	NC
53	NC	54	NC	55	NC	56	NC
57	GND	58	NC	59	NC	60	NC
61	NC	62	NC	63	NC	64	NC
65	NC	66	NC	67	Pull up 10K ohm to 1.8V	68	NC
69	GND	70	+3.3V	71	GND	72	+3.3V
73	NC	74	+3.3V	75	GND		

### 3.2.12 PCI-Express Mini Card Connector (SCN3)

The AIE510-ONX supports a full-size PCI-Express Mini Card slots. SCN3 is applying to either PCI-Express or USB 2.0 signal, and complies with PCI-Express Mini Card Spec. V1.2.

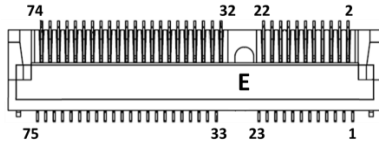


Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3V	3	NC	4	GND
5	NC	6	+1.5V	7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA	11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET	15	GND	16	UIM_VPP
17	NC	18	GND	19	NC	20	Pull up to +3.3V
21	GND	22	PERST#	23	PEX2_RX-	24	+3.3V
25	PEX2_RX+	26	GND	27	GND	28	+1.5V
29	GND	30	NC	31	PEX2_TX-	32	NC
33	PEX2_TX+	34	GND	35	GND	36	USB2.0_D-
37	GND	38	USB2.0_D+	39	+3.3V	40	GND
41	+3.3V	42	LED_WWAN#	43	GND	44	NC
45	NC	46	NC	47	NC	48	+1.5V
49	NC	50	GND	51	NC	52	+3.3V

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**3.2.13 M.2 2230 Key E slot (SCN4)**

The AIE510-ONX features one M.2 2230 Key E slot designed for Wi-Fi module usage.



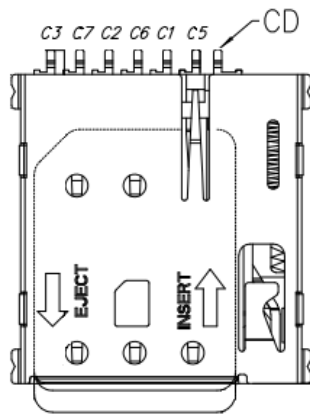
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	+3.3V	3	USB_D+	4	+3.3V
5	USB_D-	6	NC	7	GND	8	NC
9	NC	10	NC	11	NC	12	NC
13	NC	14	NC	15	NC	16	NC
17	NC	18	GND	19	NC	20	NC
21	NC	22	NC	23	NC	24	CONNECTOR KEY E
25	CONNECTOR KEY E	26	CONNECTOR KEY E	27	CONNECTOR KEY E	28	CONNECTOR KEY E
29	CONNECTOR KEY E	30	CONNECTOR KEY E	31	CONNECTOR KEY E	32	NC
33	GND	34	NC	35	PETp0	36	NC
37	PETn0	38	NC	39	GND	40	NC
41	PERp0	42	NC	43	PERn0	44	NC
45	GND	46	NC	47	REFCLKp0	48	NC
49	REFCLKn0	50	NC	51	GND	52	PERST0#
53	CLKREQ0#	54	W_DISABLE2#	55	PEWAKE0#	56	W_DISABLE1#
57	GND	58	I2C_DATA	59	NC	60	I2C_CLK
61	NC	62	Pull up 47K Ohm to 1.8V	63	GND	64	NC
65	NC	66	NC	67	NC	68	NC
69	GND	70	NC	71	NC	72	+3.3V
73	NC	74	+3.3V	75	GND		

\* W\_DISABLE2 is controlled from GPIO03 (Pin.126) of Orin NX.

\* W\_DISABLE1 is controlled from GPIO05 (Pin.128) of Orin NX.

### 3.2.14 Nano SIM Card Slot (SCN5)

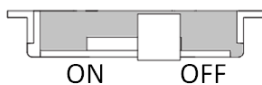
AIE510-ONX has a Nano SIM card slot (CN1). To make sure the system functions correctly, you need to use the Nano SIM card along with a 5G/LTE module. Please insert the LTE module into the PCI-Express Mini Card slot (SCN3) for LTE/3G networks. Additionally, for 5G/LTE(CAT6 or above) wireless networks, you can insert 5G/LTE module into the M.2 3042/3052 Key B slot (SCN5).



Pin	Signal
C1	UIM PWR
C2	UIM RST
C3	UIM CLK
C5	GND
C6	UIM VPP
C7	UIM DATA
CD	NC

### 3.2.15 AT/ATX Switch (External) (SW1)

If you switch OFF SW1, the system will automatically power on upon receiving power input, without requiring you to press the soft power button. This switch enables the system to be powered on automatically.



Setting	Function
ON	ATX Mode (Default)
OFF	AT Mode

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### 3.2.16 Power Button & Reset Button (SW2)

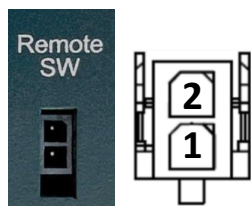
Power button can allow users to either turn on the AIE510-ONX or forcibly shut down the system, and the reset button can allow users to reset AIE510-ONX during system abnormal situation.



Setting	Function
Reset	Reset Button
	Power ON / OFF

### 3.2.17 Remote Power Switch Connector (SW3)

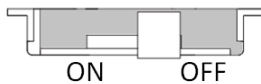
One 2-pin connector output for remote power on/off switch.



Setting	Function
Short (1-2)	Turn ON / OFF System
Open	Keep System Status

### 3.2.18 Recovery Mode Switch (SW5)

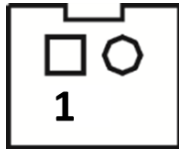
It will make NVIDIA® Jetson Orin™ NX force recovery mode when switching SW5 to ON before booting up the system.



Setting	Function
ON	Recovery Mode
OFF	Normal

### 3.2.19 CMOS Battery Connector (BAT1)

This connector is for CMOS battery interface.



Pin	Signal
1	+VBAT
2	GND

### 3.2.20 Power and Storage LED Indicator (LED1)

The Yellow LED is linked to Solid-state Drive (SSD) activity signal. LED flashes every time SSD is accessed. The power LED (Green) lights up and will remain steady while the system is powered on.



LED Color	Function
Yellow	M.2 SSD Activity
Green	Power ON /OFF

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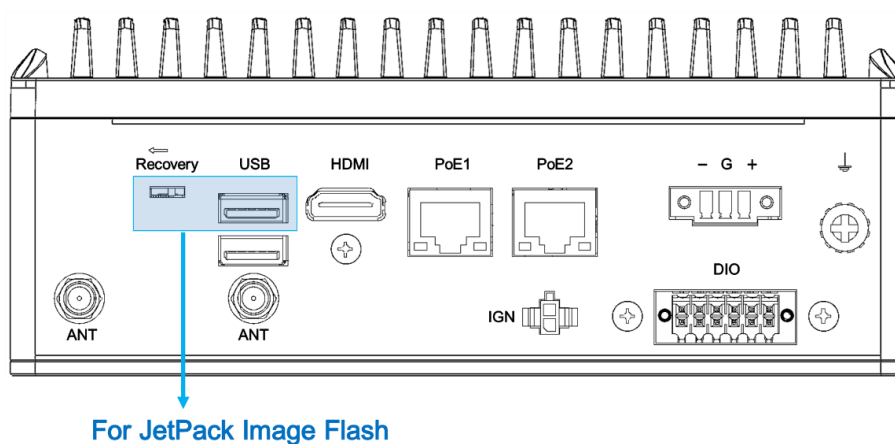


## SECTION 4 JETPACK SDK

This chapter provides users with a detailed description of how to flash NVIDIA Jetpack BSP for AIE510-ONX, the user could follow the below instruction to install or reinstall Jetpack BSP by themselves.

### 4.1 Jetpack SDK Flash Method

Please use the following instructions to flash the JetPack to the AIE510-ONX.



Please contact our sales or FAE for the latest Jetpack SDK, and prepare a Linux host system running x86\_64 Ubuntu v18.04 or later.

**Note:** If the Linux host system is running x86\_64 Ubuntu v18.04 or later, please follow the instructions below to install Python first.

Step 1. Connect the Linux host system to internet

Step 2. Install Python with the command below:

```
sudo apt-get update
```

```
sudo apt-get install python
```

Step1. AIE510-ONX connection as follows:

- Connect a USB cable from the Linux host system to the USB Type A port at AIE510-ONX, and switch the recovery switch to ON. For more details, please refer to **3.2.17 Recovery Mode Switch (SW5)**.
- Connect an HDMI monitor to AIE510-ONX.

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Step2. Open the terminal at the host system, and change the path to the image file directory, e.g., “~/Downloads”, and check image tarball data integrity with the following commands:

```
$ cd ~/Downloads
$ md5sum -c <image_tarball_file_name>.tbz2.md5sum
```

 **Command Example:**

```
$ md5sum -c mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0.tbz2.md5sum
```

```
axio@axio-desktop:~/Downloads$ md5sum -c mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0.tbz2.md5sum
mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0.tbz2: OK
axio@axio-desktop:~/Downloads$
```

Step3. If the check result returns OK, untar the image file with the command below:

```
$ tar jxvf <image_tarball_file_name>.tbz2
```

 **Command Example:**

```
$ tar jxvf mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0.tbz2
```

```
axio@axio-desktop:~/Downloads$ tar jxvf mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0.tbz2
```

Step4. Change the directory to the image package folder with the command below:

```
$ cd <image_file_name>
```

 **Command Example:**

```
$ cd mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0
```

```
axio@axio-desktop:~/Downloads$ cd mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$
```

Step5. Make sure the recovery switch(SW5) has been switched to ON, and run the command lsusb, then the command line “0955:7323 Nvidia Corp.” should be listed.

```
$ lsusb
```

```
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 067b:2303 Prolific Technology, Inc. PL2303 Serial Port
Bus 001 Device 002: ID 067b:23a3 Prolific Technology, Inc.
Bus 001 Device 042: ID 0955:7323 NVidia Corp.
Bus 001 Device 005: ID 05e3:0608 Genesys Logic, Inc. Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$
```

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Step6. Running the following command to flash the image.

```
$sudo ./tools/kernel_flash/l4t_initrd_flash.sh --flash-only --massflash 5
```

```
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$ sudo ./tools/kernel_flash/l4t_initrd_flash.sh --flash-only --massflash 5
/home/axio/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0/tools/kernel_flash/l4t_initrd_flash_internal.sh --usb-instance 1-4 --device-instance 0
--flash-only --external-device nvidia-nvme --c "/tools/kernel_flash/flash_l4t_external.xml" --network usb0 jetson-orin-nano-devkit internal
Start flashing device: 1-4, rcm instance: 0, PID: 21847
Log will be saved to Linux_for_Tegra/initrdlog/flash_1-4_0_20231208-155446.log
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
```

Step7. The flashing procedure takes approximately 8 minutes or more. Once finished, and AIE510-ONX will automatically reboot, and please switch the recovery switch(SW5) to OFF to return to standard mode.

[SUCCESS]:

```
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes: 21847
Ongoing processes:
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$
```

[FAIL]: If the flashing procedure fails, you will see a message "Flash complete (WITH FAILURES)" as shown below. In this case, the AIE510-ONX will not automatically reboot. Please press the reset button and repeat the flashing procedure.

```
Ongoing processes: 17739
Ongoing processes: 17739
Ongoing processes: 17739
Ongoing processes: 17739
Ongoing processes:
Flash complete (WITH FAILURES)
axio@axio-desktop:~/Downloads/mfi_jetson-orin-nx-16GB-JP5.1.2-AIE510-STD-V1.0.0$
```

**THE DEFAULT LOGIN CREDENTIALS:**

Username: nvidia      Password: nvidia

**⚠CAUTION:**



Running `$ sudo apt upgrade` command for NVIDIA JetPack OTA may overwrite the BSP of the AIE series platform, which can cause unexpected results including losing I/O ports. For regular JetPack updates or reflashing, please contact our sales or FAE to get the latest AIE Series JetPack image.

## 4.2 Image Information Inquiry Command

Running `axiomtek.sh` command to inquiry the current image information, image version, L4T version, Linux kernel version, and Ubuntu version.

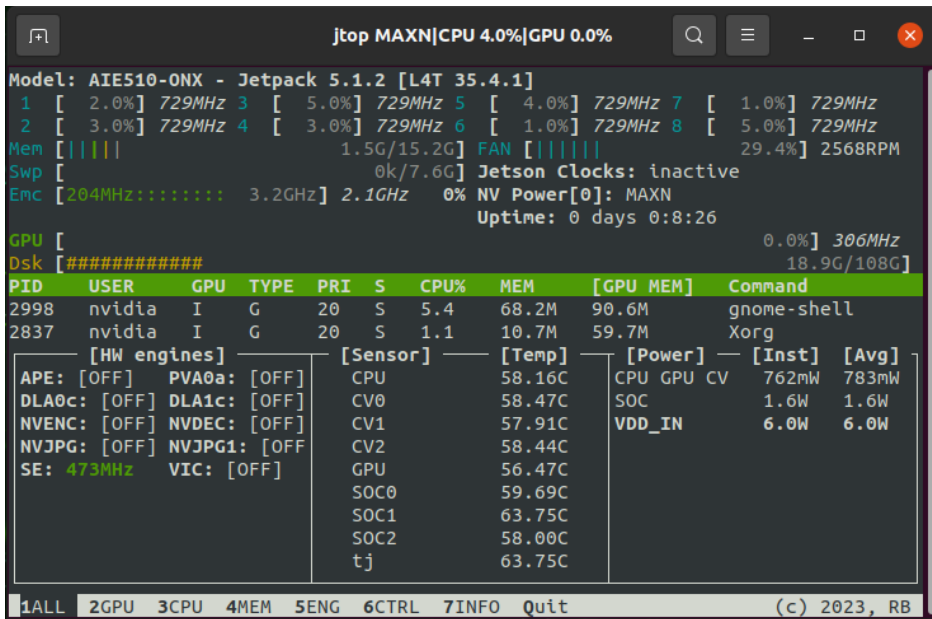
```
nvidia@nvidia-desktop:~$ axiomtek.sh
BUILD_MODEL=PSB907 + Jetson-ORIN_NX
BUILD_VERSION=JetPack-5.1.2_Linux
BSP_BUILD_VERSION=V1.0.0
BSP_BUILD_COMMIT_ID=master_457f79713
BUILD_DATE=2023/12/06 17:42:41
BUILD_ID=axio
L4T_VERSION=R35-4.1
LINUX_KERNEL_VERSION=5.10.120
UBUNTU_VERSION=Ubuntu 20.04.6 LTS
CUSTOMER_ID=Axiomtek
Libraries:
  CUDA: 11.4.315
  cuDNN: 8.6.0.166
  TensorRT: 8.5.2.2
  VPI: 2.3.9
  Vulkan: 1.3.204
  OpenCV: 4.5.4
  DEEPSTREAM: 6.3.0-1
nvidia@nvidia-desktop:~$
```

### 4.3 JTOP-Third-party Jetson Platform Monitor Tool

JTOP is a third-party system monitoring utility that runs on the terminal and see and control realtime the status of the AIE Series Platform. CPU, RAM, GPU status, power mode management, toolkits version and more.

JTOP is pre-installed in AIE510-ONX. To launch JTOP, please enter the following command in the terminal:

```
$ sudo jtop
```



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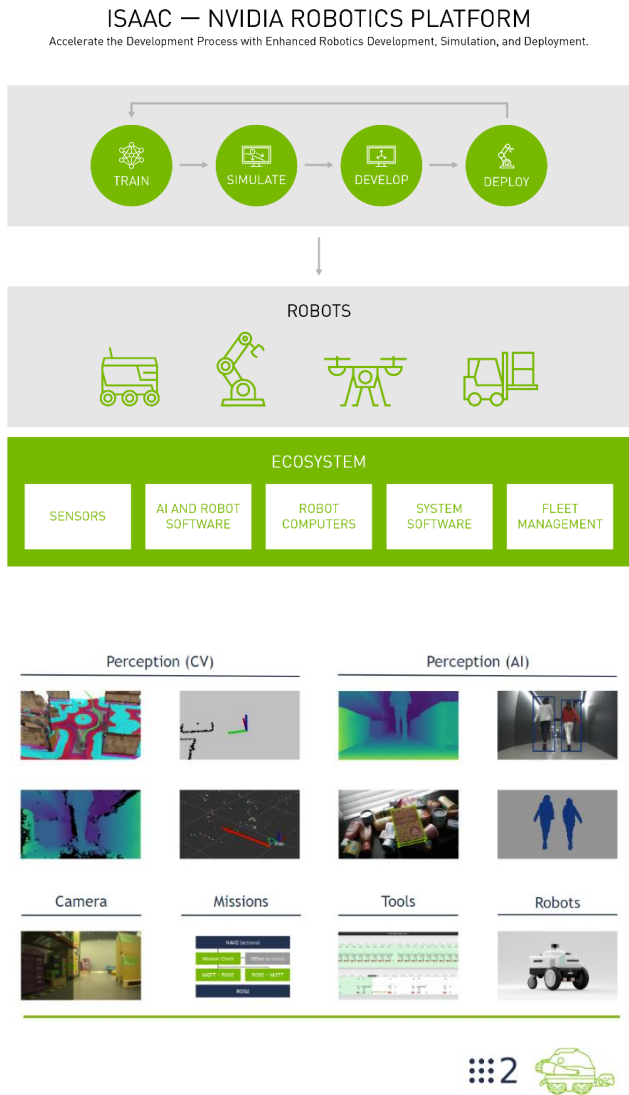
## 4.4 ISAAC — NVIDIA ROBOTICS PLATFORM

From smart automation in manufacturing to last-mile delivery, robots are becoming more ubiquitous in everyday life. However, industrial and commercial robotics development can be complex, time consuming, immensely challenging, and expensive. Unstructured environments across many use cases and scenarios are also common. The NVIDIA Isaac™ robotics platform addresses these challenges with an end-to-end solution to help decrease costs, simplify development, and accelerate time to market.

### Installation Guide:

Please refer to the following link:

<https://github.com/Axiomtek-AIE-SW/AIE510/tree/main/isaac>



\*Source: <https://www.nvidia.com/en-us/deep-learning-ai/industries/robotics/>

## APPENDIX A PROGRAMMABLE DIGITAL I/O

### About Programmable Digital I/O

The AIE510-ONX supports isolated 4-in / 4-out programmable digital I/O which allows user to program the DI or DO. For more details, please refer to the below sample code.

### A.1 Isolated DIO Specification

Digital Input	
Input Channels	4, sink/source type
Input Voltage	0 to 30VDC at 25Hz
Input Level For Dry Contacts	<ul style="list-style-type: none"> <li>• Logic Level 0: Close to ground</li> <li>• Logic Level 1: Open</li> </ul>
Input Level For Wet Contacts	<ul style="list-style-type: none"> <li>• Logic Level 1: +/-3VDC max.</li> <li>• Logic Level 0: +/- 10VDC min. to +/-30VDC max. (Source to digital input)</li> </ul>

Digital Output	
Output Channels	4, sink type
Output Current	200mA max. per channel
On-State Voltage	12~ 24VDC nominal
Max. Voltage on COM+	30VDC



## A.2 Default Setting & Command Format

### THE DEFAULT SETTING:

- DIO1 ~ 4 are all **INPUT**
- DIO5 ~ 8 are all **OUTPUT**

 **Note:** The DIO protocol will reset to the default setting after a cold boot.

Please refer to the below link for more information:

<https://github.com/Axiomtek-AIE-SW/AIE510/tree/main/dio>

### COMMAND FORMAT:

```
# i2cset -f -y <i2c_num> <device_addr> <reg_addr> <value>  
# i2cget -f -y <i2c_num> <device_addr> <reg_addr>
```

#### [For Example]

<i2c\_num>: 7

<device\_adrr>: 0x24

<reg\_addr>: 0x00~0x03 (as below Register Table)

<value>:

- Bit0 -> DIO1, Low: 0 High: 1
- Bit1 -> DIO2, Low: 0 High: 1
- ...
- Bit7 -> DIO8, Low: 0 High: 1

### A.3 Register Table

#### Register 0 - Input Port Register Bit Description

Bit	Symbol	Access	Value	Description
7	I7	read only	X	Determined by externally applied logic level
6	I6	read only	X	
5	I5	read only	X	
4	I4	read only	X	
3	I3	read only	X	
2	I2	read only	X	
1	I1	read only	X	
0	I0	read only	X	

#### Register 1 - Output Port Register Bit Description

This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, **not** the actual pin value.

Legend: \* default value

Bit	Symbol	Access	Value	Description
7	O7	R	1*	Reflects outgoing logic levels of pins defined as outputs by Register 3
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

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**Register 3 - Configuration Register Bit Description**

This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to  $V_{DD}$ .

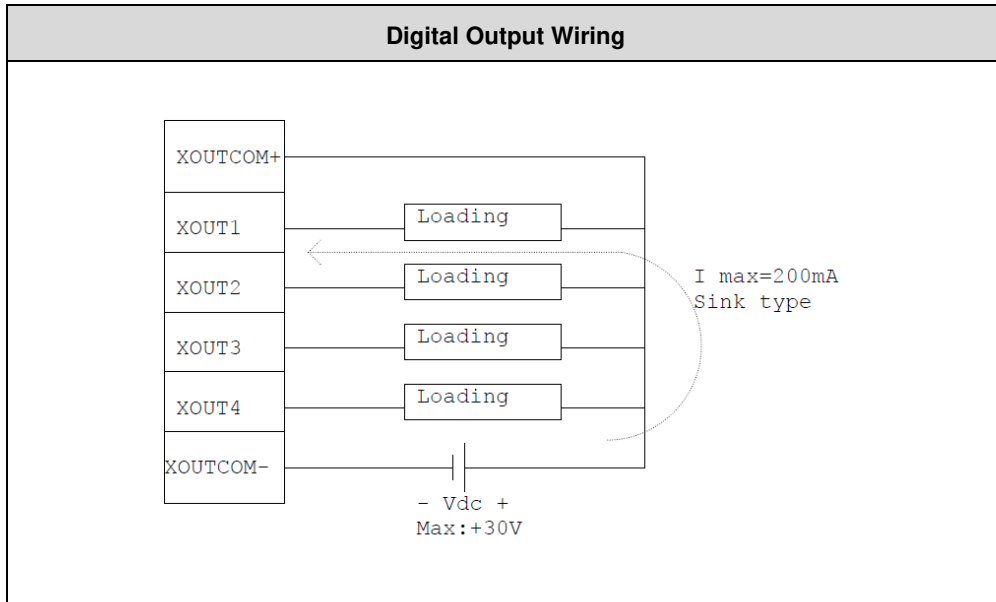
Legend: \* default value

Bit	Symbol	Access	Value	Description
7	C7	R / W	1*	Configures the directions of the I/O pins 0 = corresponding port pin enabled as an output 1 = corresponding port pin configured as input (default value)
6	C6	R / W	1*	
5	C5	R / W	1*	
4	C4	R / W	1*	
3	C3	R / W	1*	
2	C2	R / W	1*	
1	C1	R / W	1*	
0	C0	R / W	1*	

## A.4 Digital Input & Output Wiring

<b>Digital Input Wiring</b>	
<b>Input Level For Dry Contacts</b>	<ul style="list-style-type: none"> <li>• Logic Level 0: Close to ground</li> <li>• Logic Level 1: Open</li> </ul>
<b>Input Level For Wet Contacts</b>	<ul style="list-style-type: none"> <li>• Logic Level 1: +/-3VDC max.</li> <li>• Logic Level 0: +/- 10VDC min. to +/-30VDC max. (Source to digital input)</li> </ul>

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## APPENDIX B IGNITION POWER CONTROL

### About Ignition Power Control

Please refer to the below link for more information:

<https://github.com/Axiomtek-AIE-SW/AIE510/tree/main/ignition>

### THE DEFAULT SETTING:

#### [V<sub>in</sub> Voltage]

- VIN1: 237(mV)
- ADC Value: 153
- R1: 2000
- R2: 1818

#### [Current time sequence settings]

- T3 : IGN ON ready to standby power enable
- T8 : IGN inactive and system power button active delay time
- T9 : System status respond time
- T14: Low voltage event count

T#	EndTimeSetting	TimeUnit
T3	2	second
T8	2	second
T9	180	second
T14	180	second

#### [Function Support]

- [OSSDONM0] Mode0 S5 auto power on: Enable
- [OSSDONM1] Mode1 S5 auto power on: Disable
- [AUTOBT] G3 auto power on: Disable

#### [SW Mode Strap]

- Mode1 AT/ATX

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## **APPENDIX C**

### **GMSL Camera Guide (AIE510-ONX-GMSL Only)**

#### **Before You Start**

Please connect both of the GMSL camera and camera cable to GMSL port before power on the AIE510-ONX.

To initialize the GMSL camera, please refer to our github link for more details:

<https://github.com/Axiomtek-AIE-SW/AIE510/tree/main/camera>

#### **Validated Cameras List**

Only the validated cameras shown on the github are supported in default.

<https://github.com/Axiomtek-AIE-SW/AIE510/tree/main/camera>



**Note:** The validated cameras list may be subject to change without notice. For further support on GMSL cameras, please contact the Axiomtek FAE team.



## Assured Systems

Assured Systems is a leading technology company with over 1,500 regular clients in 80 countries, deploying over 85,000 systems to a diverse customer base in 12 years of business. We offer high-quality and innovative rugged computing, display, networking and data collection solutions to the embedded, industrial, and digital-out-of-home market sectors.

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