

EPC-R7300

Edge AI Barebone Box for NVIDIA Jetson
Orin NX and Nano Series Modules

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FM

This equipment has passed the FM certification. According to the National Fire Protection Association, work sites are classified into different classes, divisions and groups, based on hazard considerations. This equipment is compliant with the specifications of Class I, Division 2, Groups A, B, C and D indoor hazards.

Technical Support and Assistance

1. Visit the Advantech website at <http://support.advantech.com> where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customerservice center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- Item XXXXXXXX
- Box XXXXXXXX

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get 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 does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

- Box XXXXXXXXX

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
 - Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic component.

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Chapter 1

General Introduction

This chapter details background
Information on the EPC-R7300

Sections include:

- Introduction
- Specifications

1.1、 Introduction

Advantech EPC-R7300 industrial-grade barebone PC is equipped with a production carrier board that is fully compatible with three types of Jetson modules in terms of form-factor and pin configuration. Designed to serve as a complete industrial-grade system, EPC-R7300's high-quality aluminum housing with improved heat dissipation and ESD protection provides the optimum protection. Moreover, EPC-R7300's thermal solutions accommodate modular and module-specific heat spreaders. This enables developers to adopt thermal solutions based on the Jetson module they applied.

1.2、 Product Features

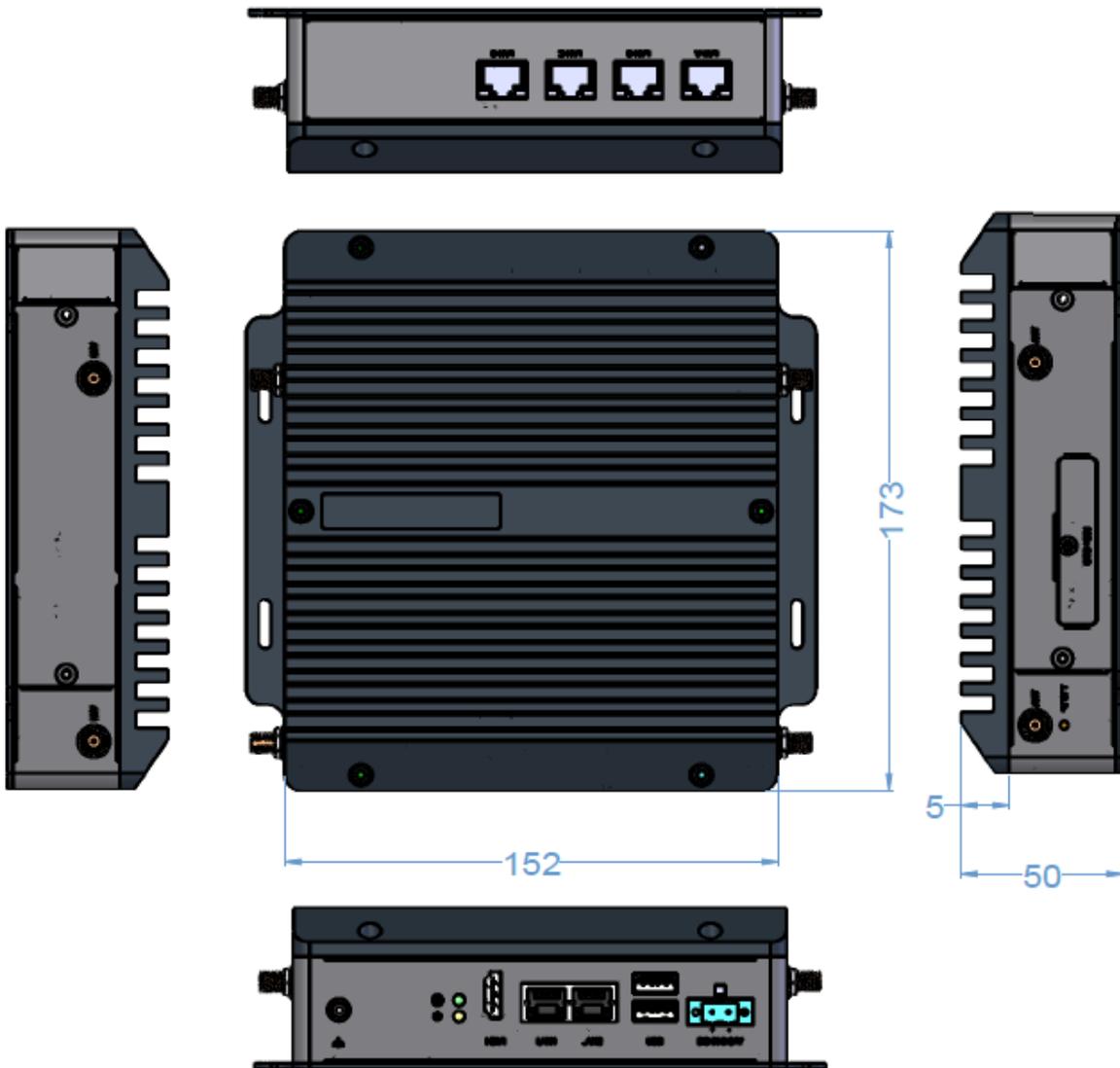
1.2.1 Specification

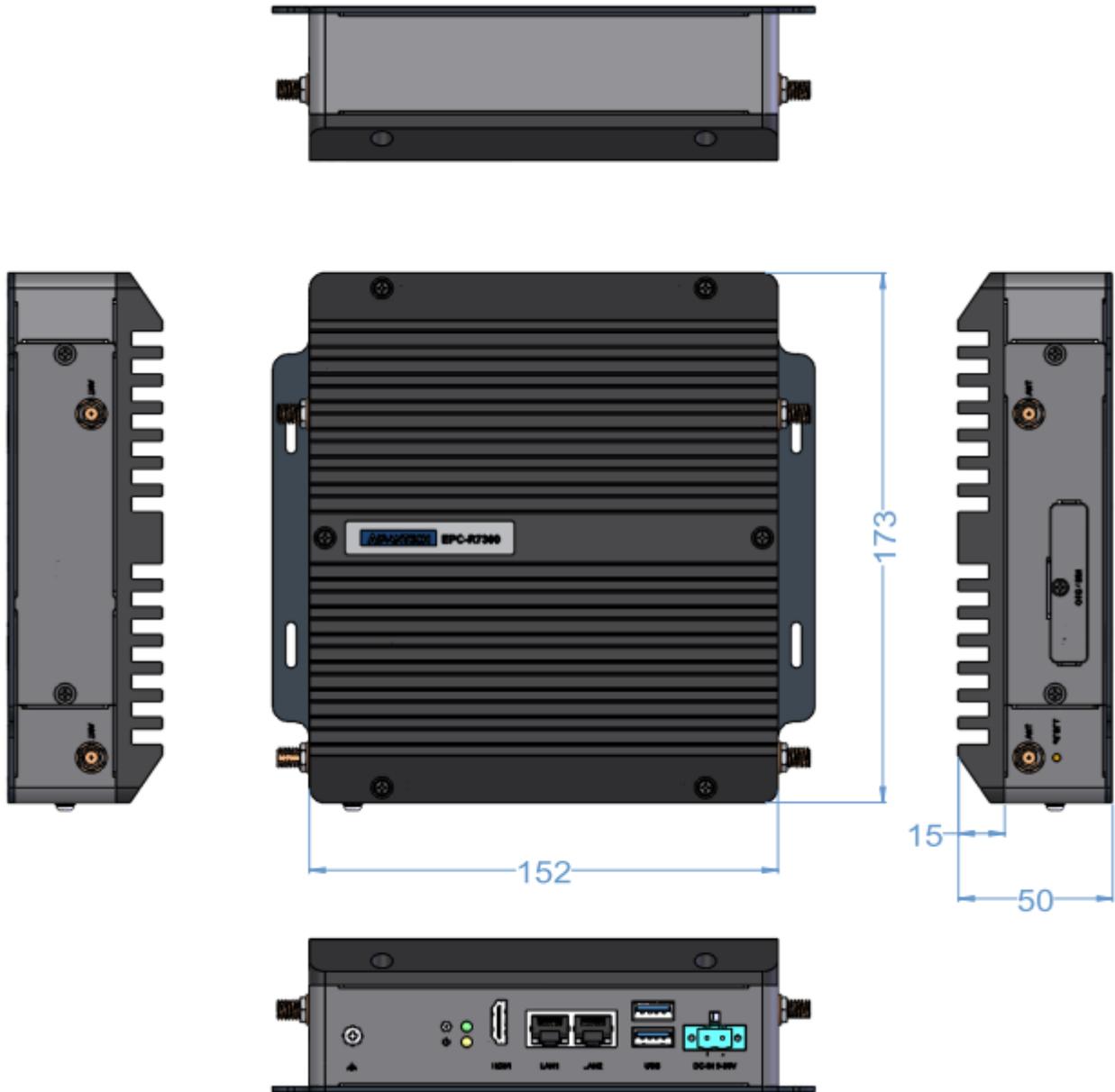
Model Name	EPC-R7300	
Compatible Modules	NVIDIA Jetson Orin	Nano / NX
Graphics	HDMI	1 x HDMI 2.0, Maximum Resolution 3840 x 2160 at 60Hz
	Engine	NVIDIA Ampere GPU on Jetson Orin Modules
	H/W Video Codec	Up to 2x4K60 encode/decode
Ethernet	Chipset	NVIDIA Jetson integrated RGMII and Intel 1GbE Controller
	Speed	2 10/100/1000 Mbps
Indicator	LED	1 x Power LED; 1 x programmable LED
Button		1 x Reset Button
Front I/O	USB	2 x USB3.2 Gen 2 Type A
	GbE	2 x RJ45 for GbE
Rear I/O		Depends on UIO Expansion Board
Expansion	M.2	1 M.2 3042/52 Key B Slot (PCIe/USB3.2 Gen2/I2C)
		1 M.2 2230 Key E Slot (USB2.0/PCIe/UART/I2S)
		1 M.2 2280 Key M Slot (x4 PCIe Gen3.0 for NVMe)
	SIM	1 Nano SIM Slot
	Antenna Holes	4
Power	Voltage	9-36V DC
	Type	2-pole lockable DC-in
	Consumption	15 ~ 35 W (Depends on Module Selection)

Environment	Operating Temp.	-20~60°C
	Operating RH	5% ~ 95% relative humidity, non-condensing
Mechanical	Dimensions	173 x 152 x 50 mm
	Mounting	Wall mount, DIN Rail mount (Option)
	Weight	1.25Kg
Operating System	Linux	LT Ubuntu support by NVIDIA
Certifications		CE/FCC Class B

Mechanical Specifications

- **Dimension: 173 x 152 x 50 mm**
- **Reference Weight: 1.25 kg**





1.3 、 Electrical Specifications

- **Power supply type:** DC-in 9-36 V.
- **RTC Battery:**
 - **Typical voltage:** 3 V
 - **Normal discharge capacity:** 210 mAh

1.4 、 Environmental Specifications

- **Operating temperature:** -20 ~ 60 °C
- **Operating humidity:** 5% ~ 95% relative humidity, non-condensing
- **Storage temperature:** -40 ~ 85 °C (-40 ~ 185 °F)
- **Storage humidity:** 60 °C/140 °F @ 95% RH Non-condensing

Chapter 2

Hardware Installation

This chapter details mechanical
And connector information
On the EPC-R7300

Sections include:

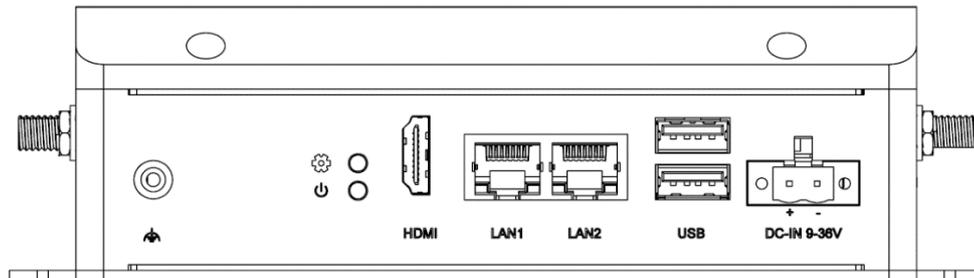
- Connector Information
- Mechanical Drawing
- Module Installation

2.1 、 Introduction

The following sections show the external connectors and pin assignments.

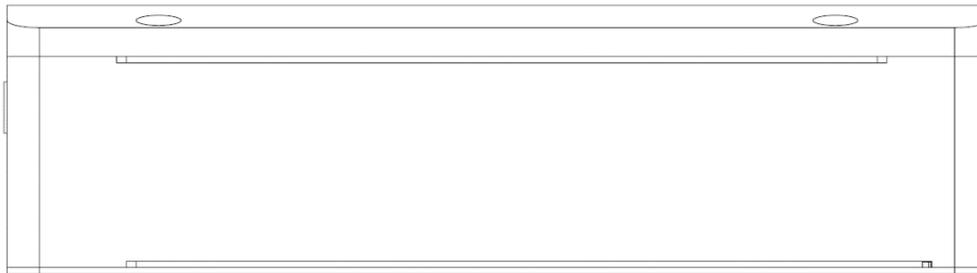
2.2 、 EPC-R7300 I/O Overview

■ Front I/O

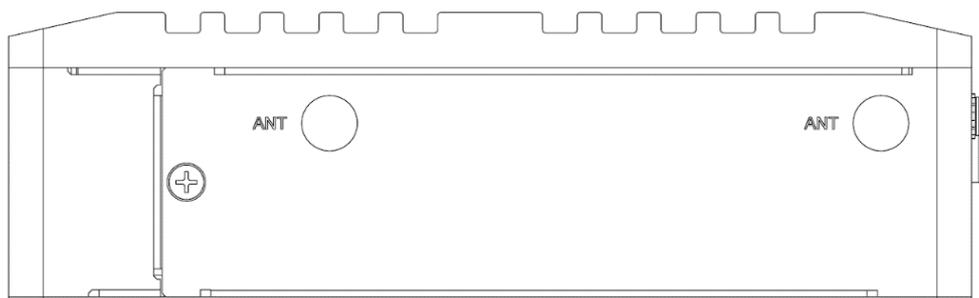


■ Real I/O

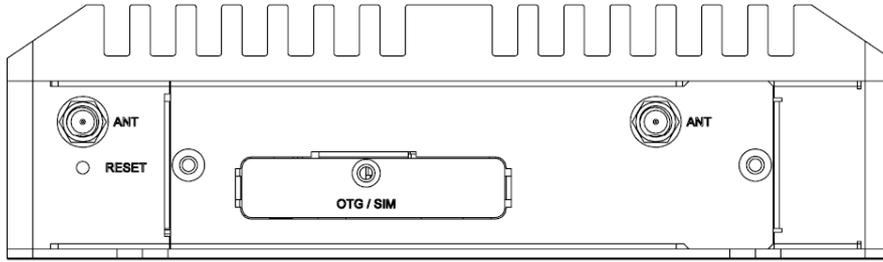
Depend On UIO Expansion Board You Chose.



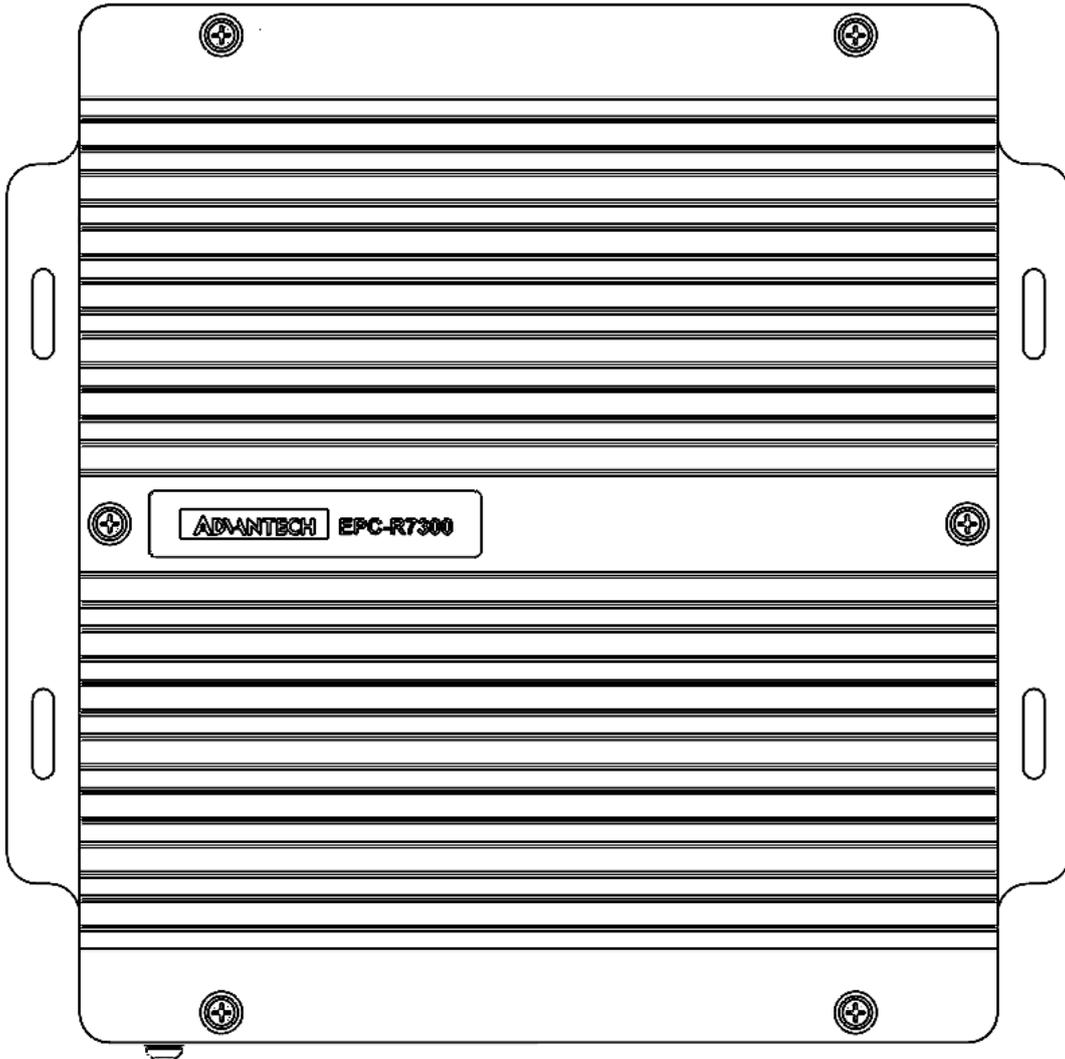
■ Left Side



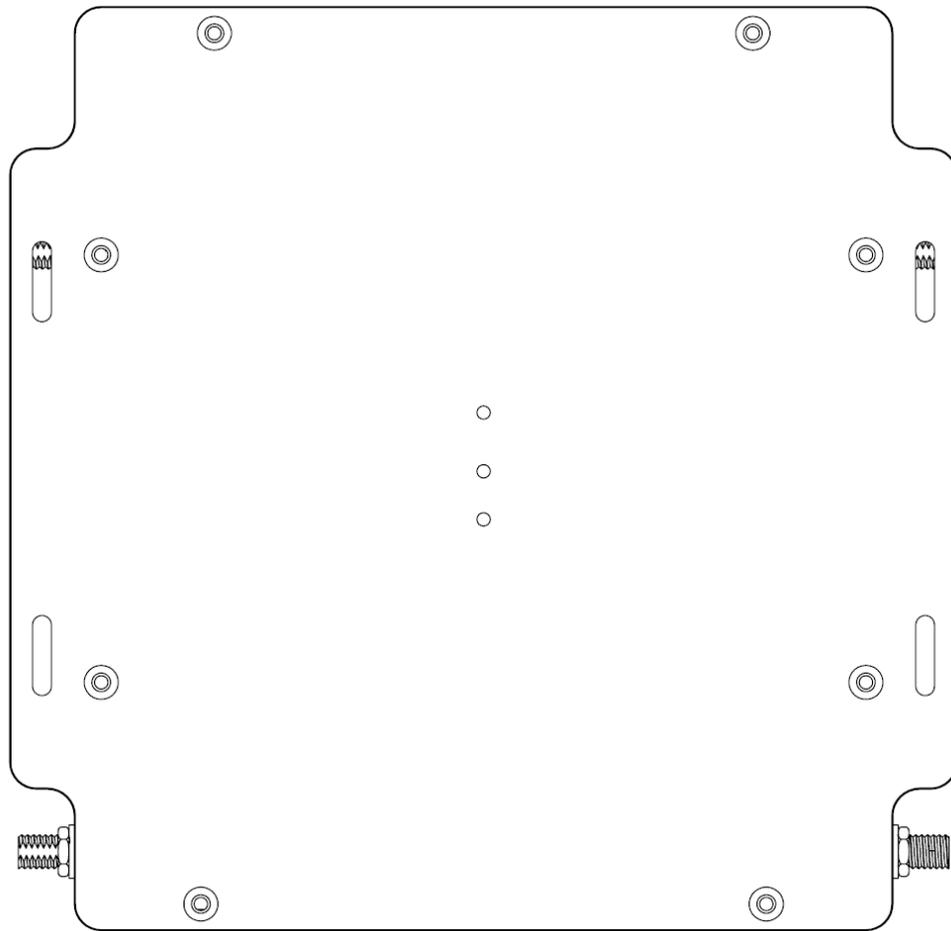
■ Right Side



■ Top



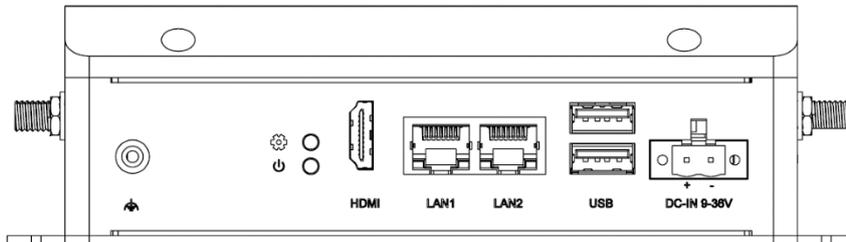
■ Bottom



2.3 、 EPC-R7300 Front Side I/O

2.3.1 DC in

EPC-R7300 supports a lockable DC two pole terminal block that can be connected 9-24 DC external power input.

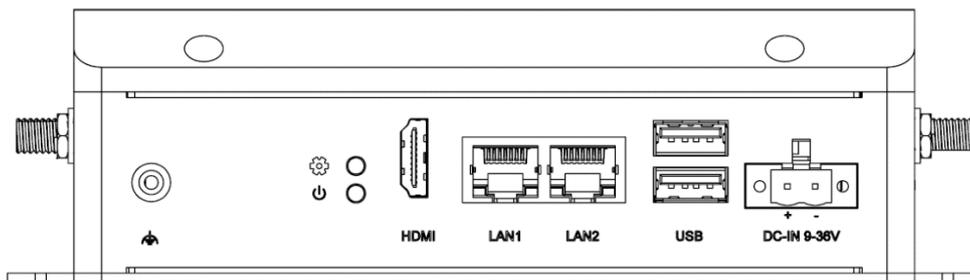


DC-IN:			
Pin	Pin Name	Pin	Pin Name
1	+ 9-36V DC	2	GND

2.3.2 USB Ports

EPC-R7300 supports 2 x USB3.2 Gen 2 by 2 Type A ports.

Type A ports on the front side, which are Host



USB 1 & 2			
Pin	Pin Name	Pin	Pin Name
1	+VBUS_1	2	USB1_D-
3	USB1_D+	4	GND

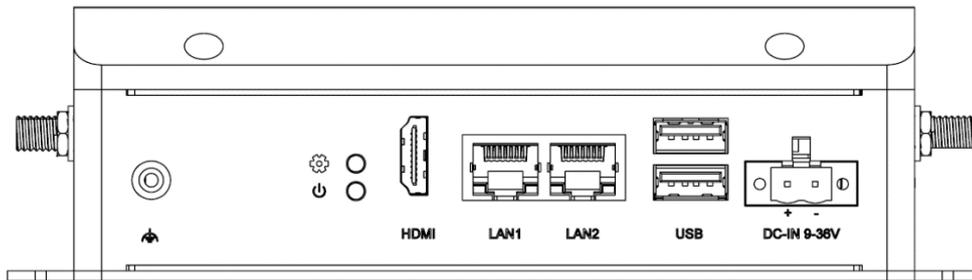
5	USB1_SSRX-	6	USB1_SSRX+
7	GND	8	USB1_SSTX-
9	USB1_SSTX+		
10	+VBUS_2	11	USB2_D-
12	USB2_D+	13	GND
14	USB2_SSRX-	15	USB2_SSRX+
16	GND	17	USB2_SSTX-
18	USB2_SSTX+		

2.3.3 LAN Posts

EPC-R7300 supports 2 x 10/100/1000Mbps LAN ports on the front side.

LAN 1 is the Ethernet function from Intel I225 PCIE to GbE

LAN2 is the Ethernet function from NVIDIA Jetson integrated RGMII

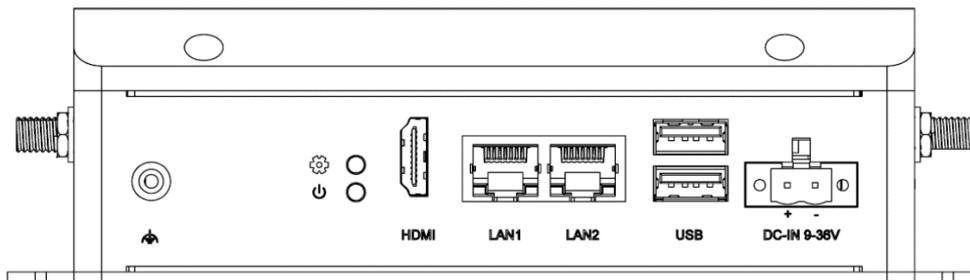


LAN1:			
Pin	Pin Name	Pin	Pin Name
1	LAN1_DA+	2	LAN1_DA-
3	LAN1_DB+	4	LAN1_DC+
5	LAN1_DC-	6	LAN1_DB-
7	LAN1_DD+	8	LAN1_DD-
LED-L	Green : Activity		
LED_R	GREEN: 1000M LINK AMBER: 100M LINK		

LAN2:			
Pin	Pin Name	Pin	Pin Name
1	LAN2_DA+	2	LAN2_DA-
3	LAN2_DB+	4	LAN2_DC+
5	LAN2_DC-	6	LAN2_DB-
7	LAN2_DD+	8	LAN2_DD-
LED-L	Green : Activity		
LED_R	GREEN: 1000M LINK AMBER: 100M LINK		

2.3.4 HDMI

EPC-R7300 supports 1 HDMI 2.0, for up to 3840 x 2160 resolution at 60Hz

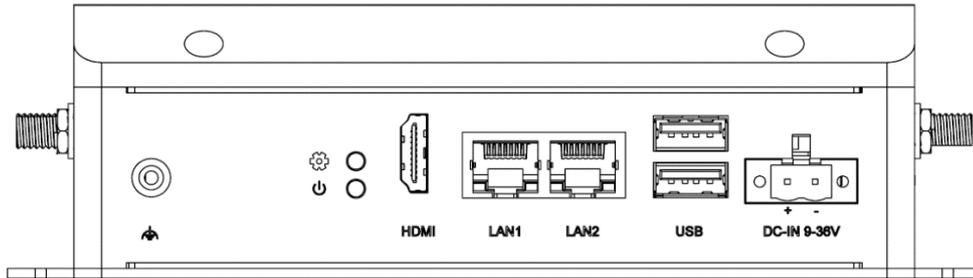


HDMI:			
Pin	Pin Name	Pin	Pin Name
1	HDMI_TD2+	2	GND
3	HDMI_TD2-	4	HDMI_TD1+
5	GND	6	HDMI_TD1-
7	HDMI_TDO+	8	GND
9	HDMI_TDO-	10	HDMI_CLK+
11	GND	12	HDMI_CLK-
13	HDMI_CEC	14	N/A
15	HDMI_DDC_SCL	16	HDMI_DDC_SDA

17	GND	18	+5V
19	HDMI_HPDP	-	-

2.3.5 LED Indicator

EPC-R7300 supports 2 LED indicators. One is for Power indicators; one is programmable indicator.

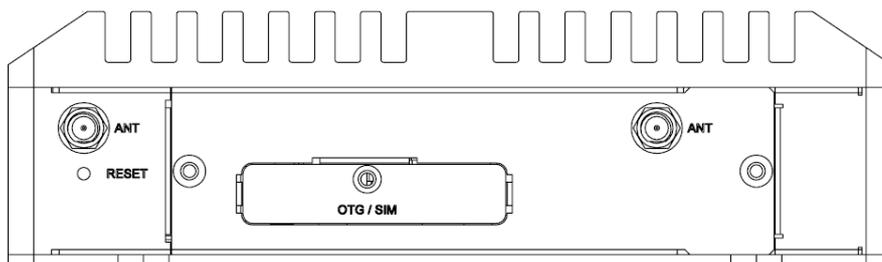


LEDs:			
	Function		Function
Up	Power LED	Down	Programmable LED

2.4 、 EPC-R7300 Side I/O

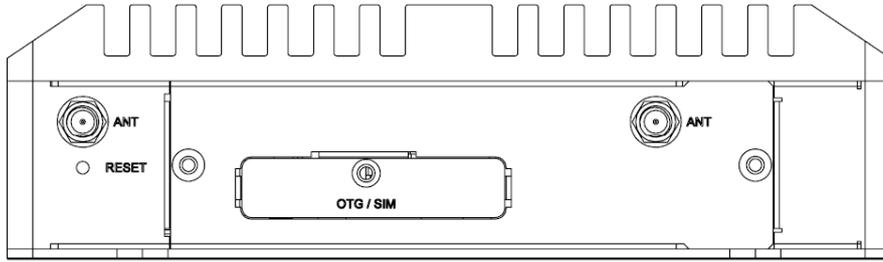
2.4.1 Side Door

Please use tool to unscrew the screw on the side door.



2.4.2 OTG port

EPC-R7300 supports 1 USB 2.0 OTG port (Device mode ONLY) for development purpose.

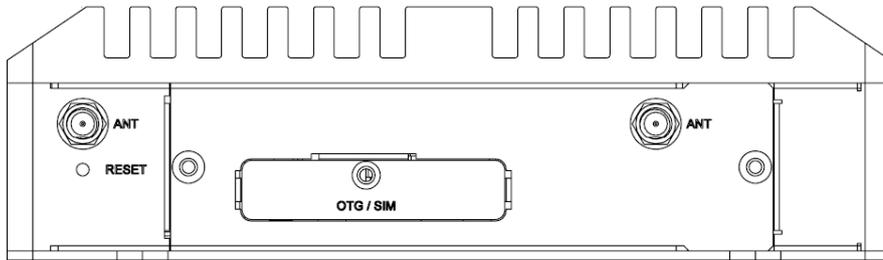


USB OTG:

Pin	Pin Name	Pin	Pin Name
1	+VBUS_5V	2	USB_D-
3	USB_D+	4	GND
5	GND		

2.4.3 Nano SIM

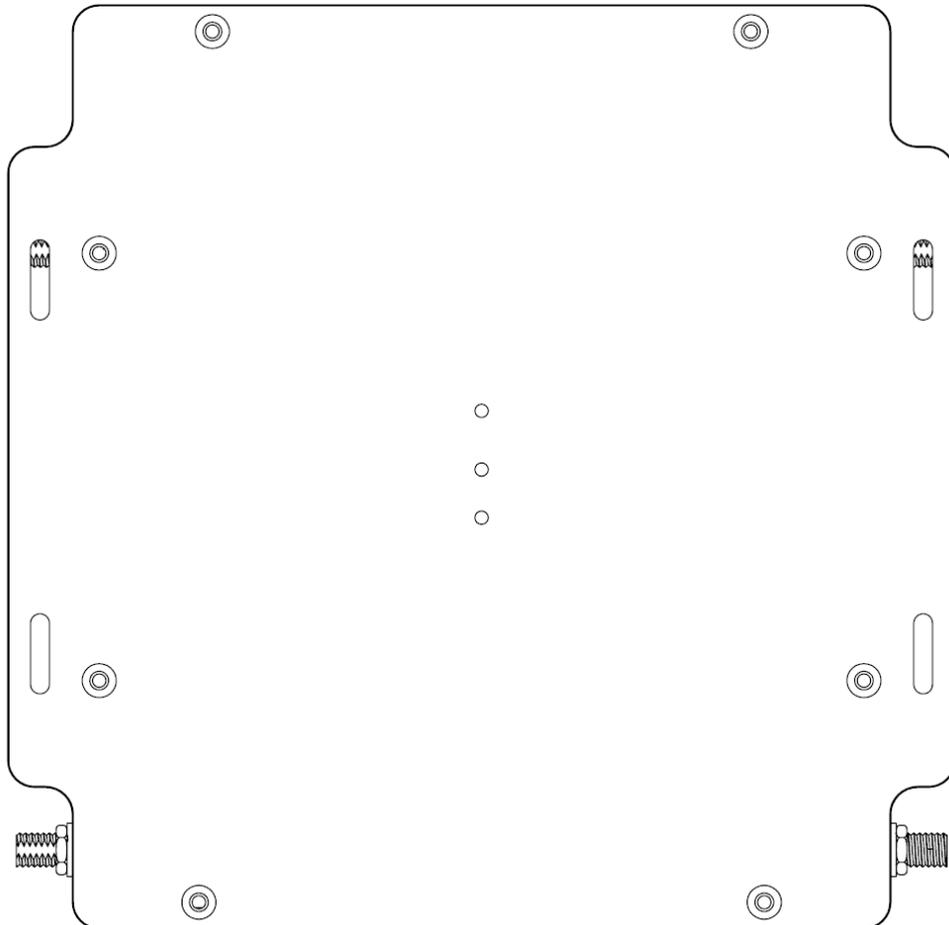
EPC-R7300 supports 1 Nano SIM socket



2.5 、 EPC-R7300 Bottom I/O

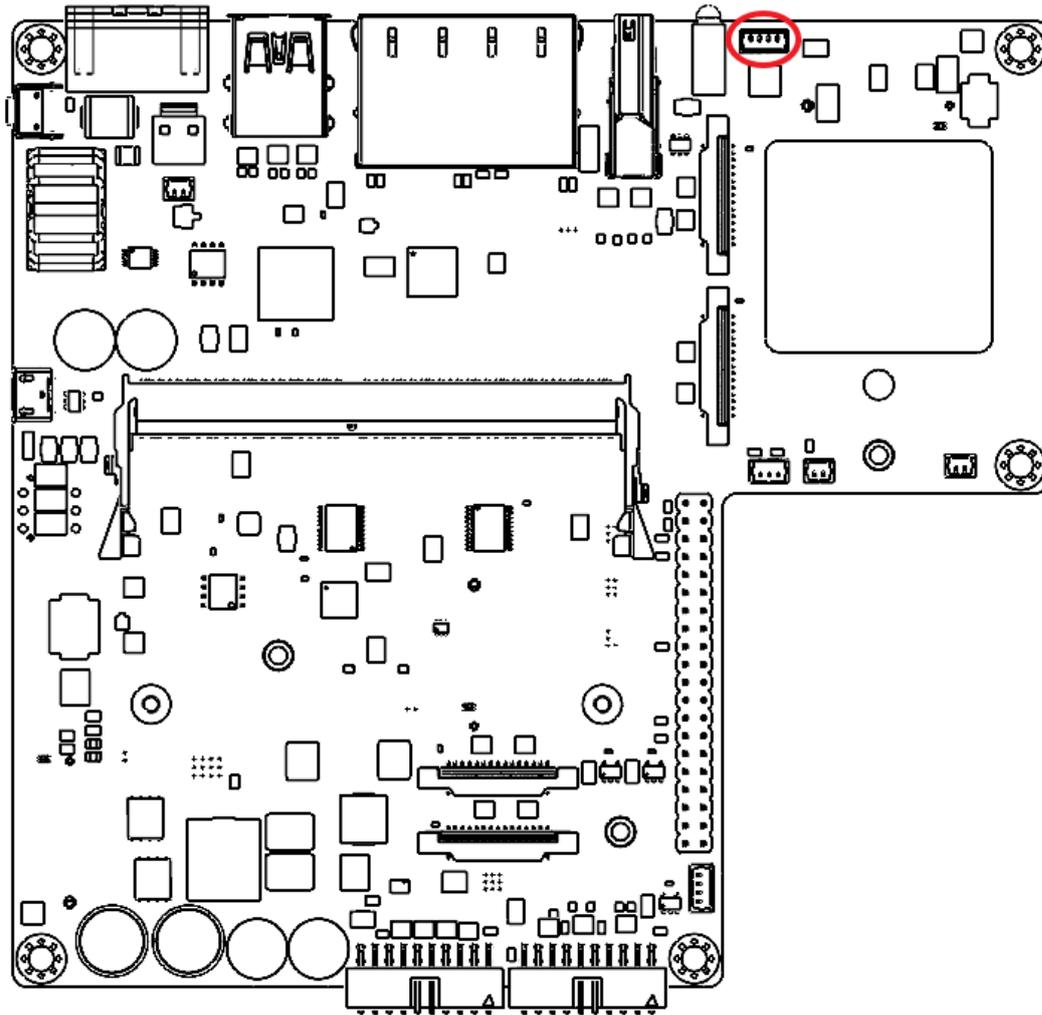
2.5.1 Bottom Door

Please use tool to unscrew the screw on the bottom door.



2.5.2 Debug Port

EPC-R7300 provides one Debug Port (CN3) for development used.

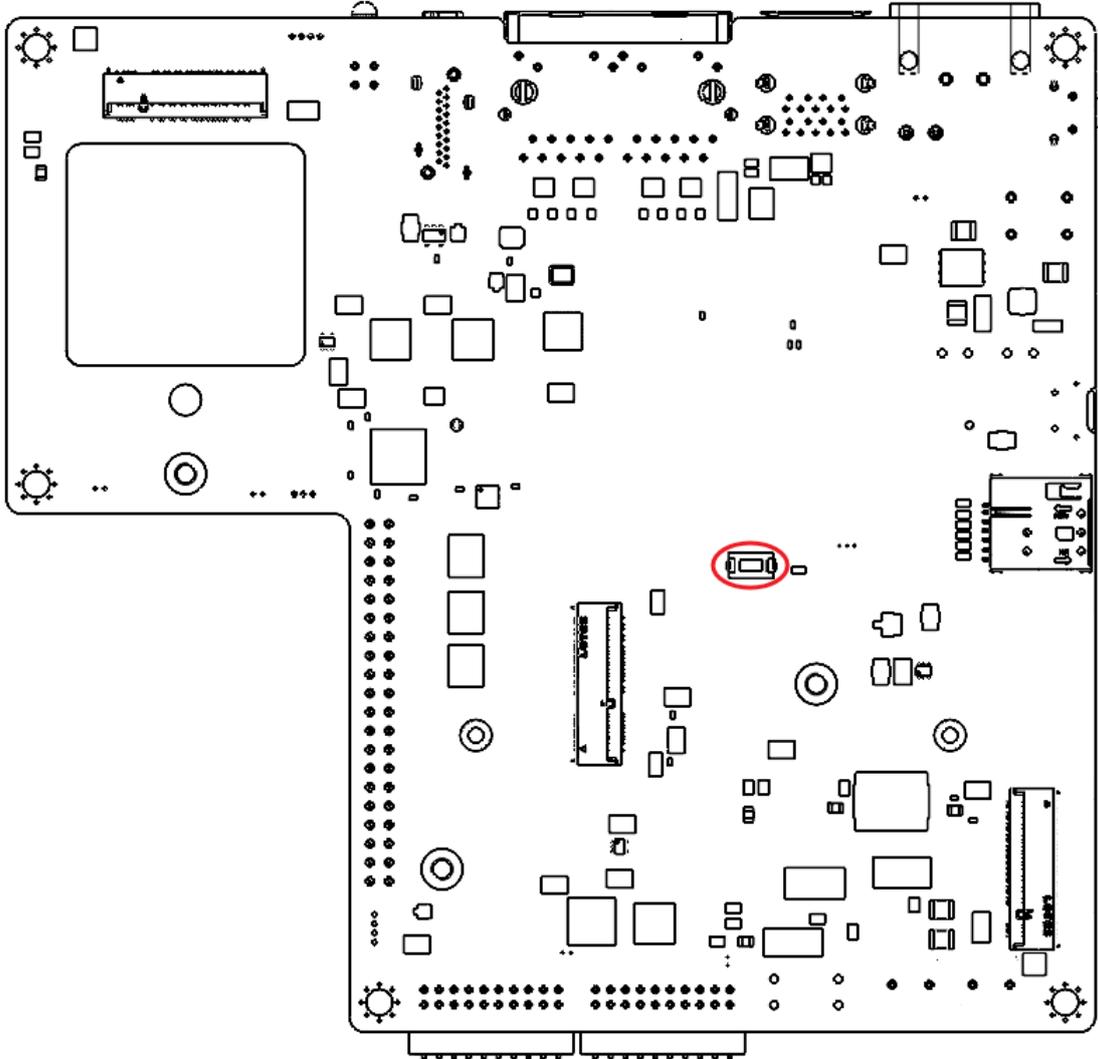


Debug cable P/N: **1700021565-01** 4P-1.25 to D-SUB 9P (F) 60cm

Debug Port:			
Pin	Pin Name	Pin	Pin Name
1	N/A	2	COM_TXD
3	COM_RXD	4	GND

2.5.3 Recovery Key

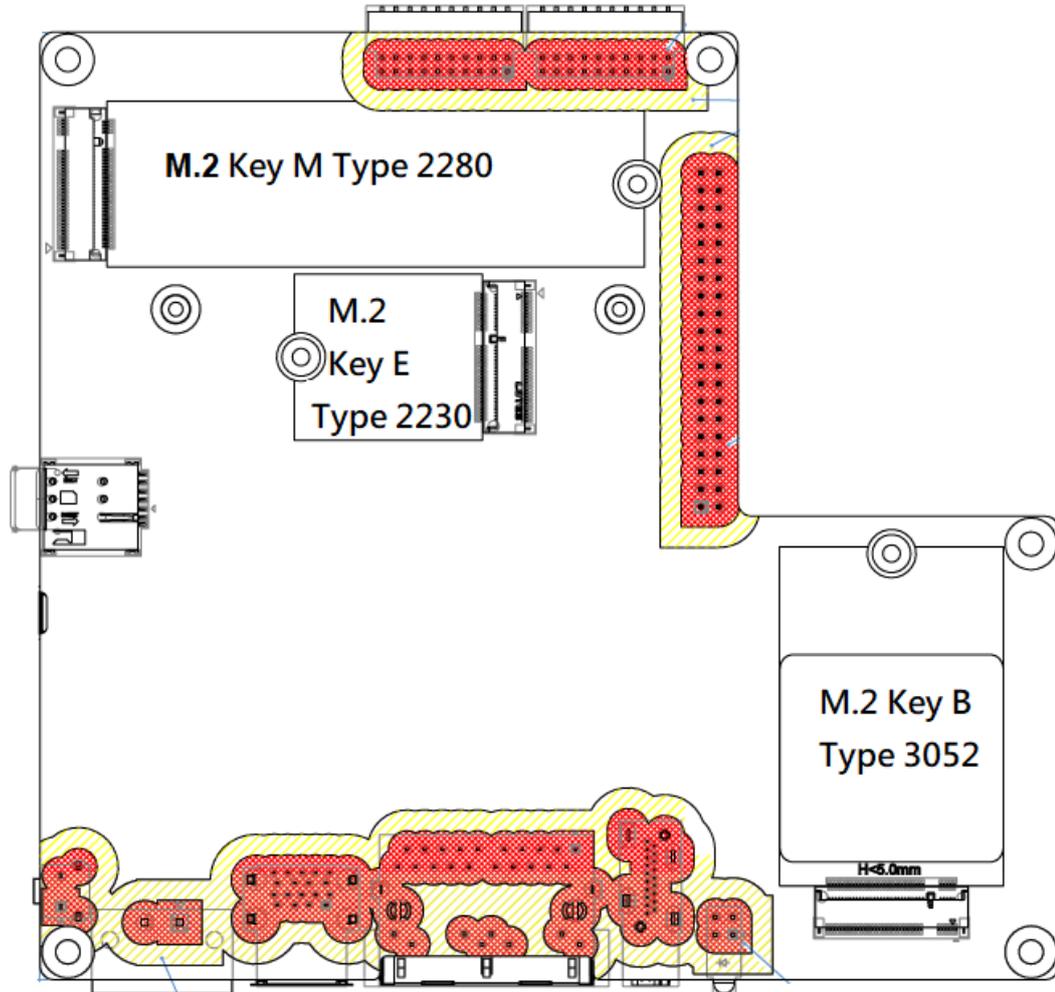
EPC-R7300 provides one recovery key (SW1) for image programming.



2.5.4 M.2 2230 Key E Slot

EPC-R7300 provides one M.2 2230 Key E Slot for WLAN card.

P/N: EWM-W159M201E WiFi5+BT5.0 M.2 2230 (E Key) Card



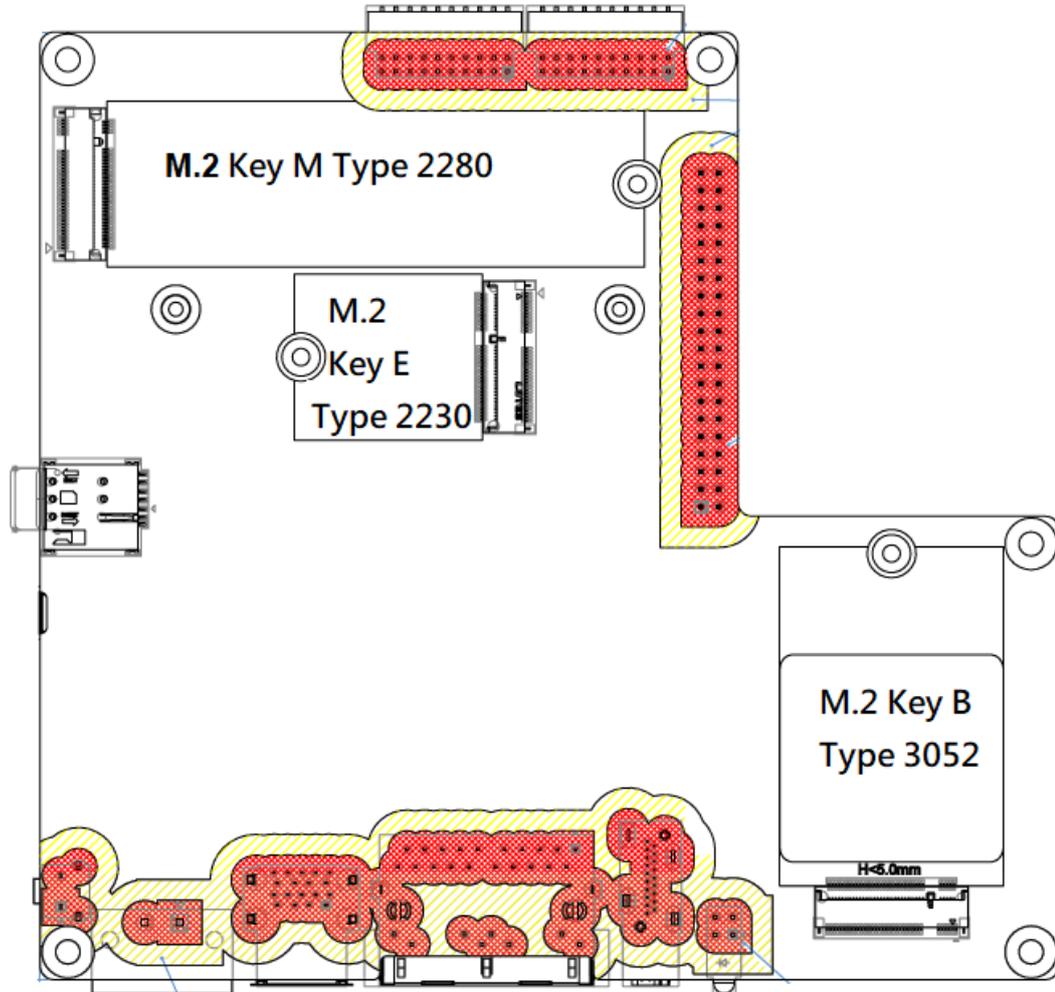
M.2 2230 Key E			
Pin	Pin Name	Pin	Pin Name
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	N/C
7	GND	8	N/C
9	N/C	10	N/C

11	N/C	12	N/C
13	N/C	14	N/C
15	N/C	16	N/C
17	N/C	18	GND
19	N/C	20	BT_WAKEUP
21	N/C	22	UART_RXD
23	N/C	24	Connector KEY
25	Connector KEY	26	Connector KEY
27	Connector KEY	28	Connector KEY
29	Connector KEY	30	Connector KEY
31	Connector KEY	32	UART_TXD
33	GND	34	UART_CTS
35	PCIE_TX0+	36	UART_RTS
37	PCIE_TX0_	38	N/C
39	GND	40	N/C
41	PCIE_RX0+	42	N/C
43	PCIE_RX0-	44	N/C
45	GND	46	N/C
47	PCIE_CLK+	48	N/C
49	PCIE_CLK-	50	SUCLOCK_32KHz
51	GND	52	PCIE_RESET
53	PCIE_CLKREQ	54	W_DISABLE #1
55	PCIE_WAKE	56	W_DISABLE #2
57	GND	58	I2C_SDA
59	N/C	60	I2C_SCL
61	N/C	62	ALERT#
63	GND	64	N/C
65	N/C	66	N/C
67	N/C	68	N/C
69	GND	70	N/C
71	N/C	72	+3.3V
73	N/C	74	+3.3V
75	GND		

2.5.5 M.2 3042/52 Key B Slot

EPC-R7300 provides one M.2 3042/52 Key B Slot for WWAN card.

P/N: AIW-355 DQ-E01 5G M.2 3052 (B Key) Card



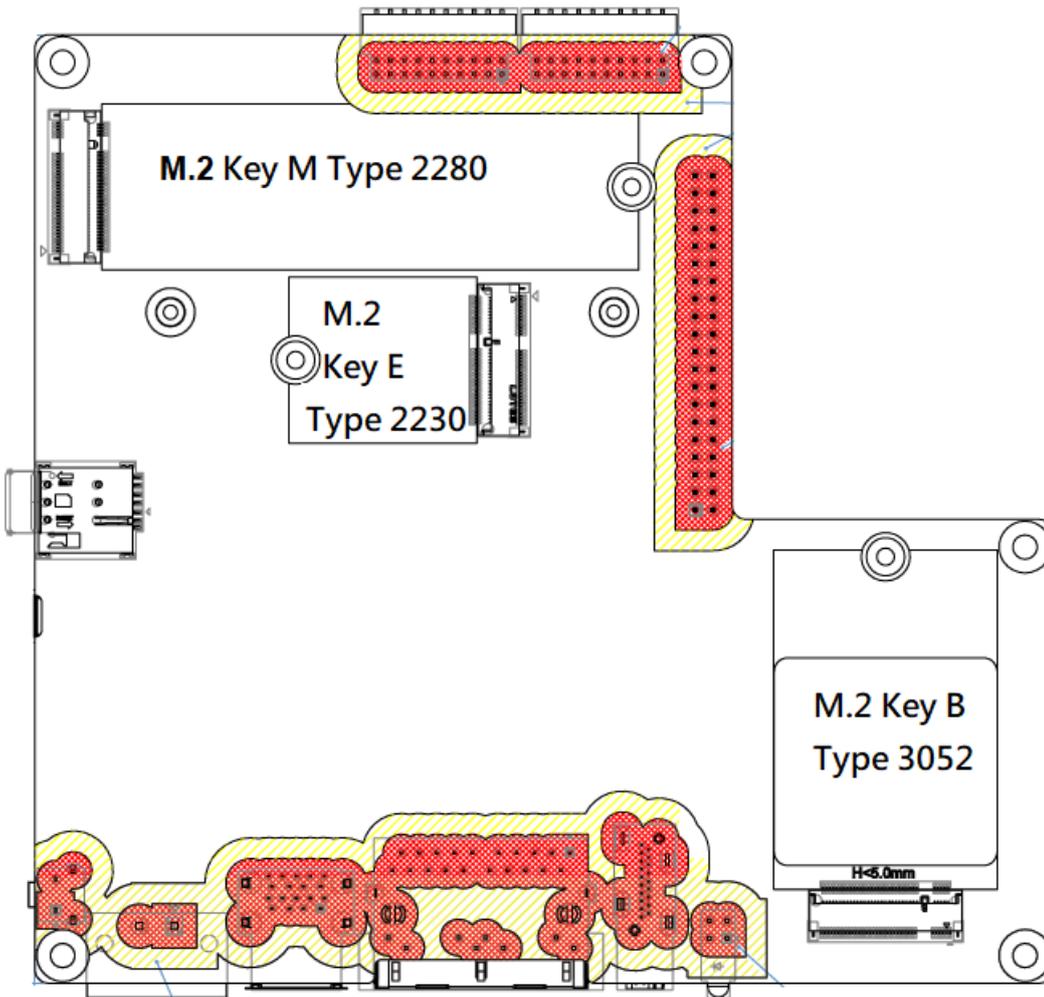
M.2 3042/52 Key B			
Pin	Pin Name	Pin	Pin Name
1	CONFIG_#3	2	+3.8V
3	GND	4	+3.8V
5	GND	6	POWER_OFF(1.8V)
7	USB_D+	8	WWAN DISABLE
9	USB_D-	10	N/C

11	GND	12	Connector KEY
13	Connector KEY	14	Connector KEY
15	Connector KEY	16	Connector KEY
17	Connector KEY	18	Connector KEY
19	Connector KEY	20	N/C
21	CONFIG_#0	22	N/C
23	N/C	24	N/C
25	N/C	26	N/C
27	GND	28	N/C
29	USB_SSRX-	30	SIM_RESET
31	USB_SSRX+	32	UIM_CLK
33	GND	34	UIM_DATA
35	USB_SSTX-	36	UIM_Power
37	USB_SSTX+	38	N/C
39	GND	40	N/C
41	N/C	42	N/C
43	N/C	44	N/C
45	GND	46	N/C
47	N/C	48	N/C
49	N/C	50	N/C
51	GND	52	N/C
53	N/C	54	N/C
55	N/C	56	N/C
57	GND	58	N/C
59	N/C	60	N/C
61	N/C	62	N/C
63	N/C	64	N/C
65	N/C	66	SIM_DETECT
67	PLTRST#_V1.8	68	N/C
69	CONFIG_#1	70	+3.8V
71	GND	72	+3.8V
73	GND	74	+3.8V
75	CONFIG_#2		

2.5.6 M.2 2280 Key M Slot

EPC-R7300 provides one M.2 2280 Key M Slot for NVMe card.

P/N: SQF-C8MV2-128G-EDE 128G M.2 2280 (M Key) Card



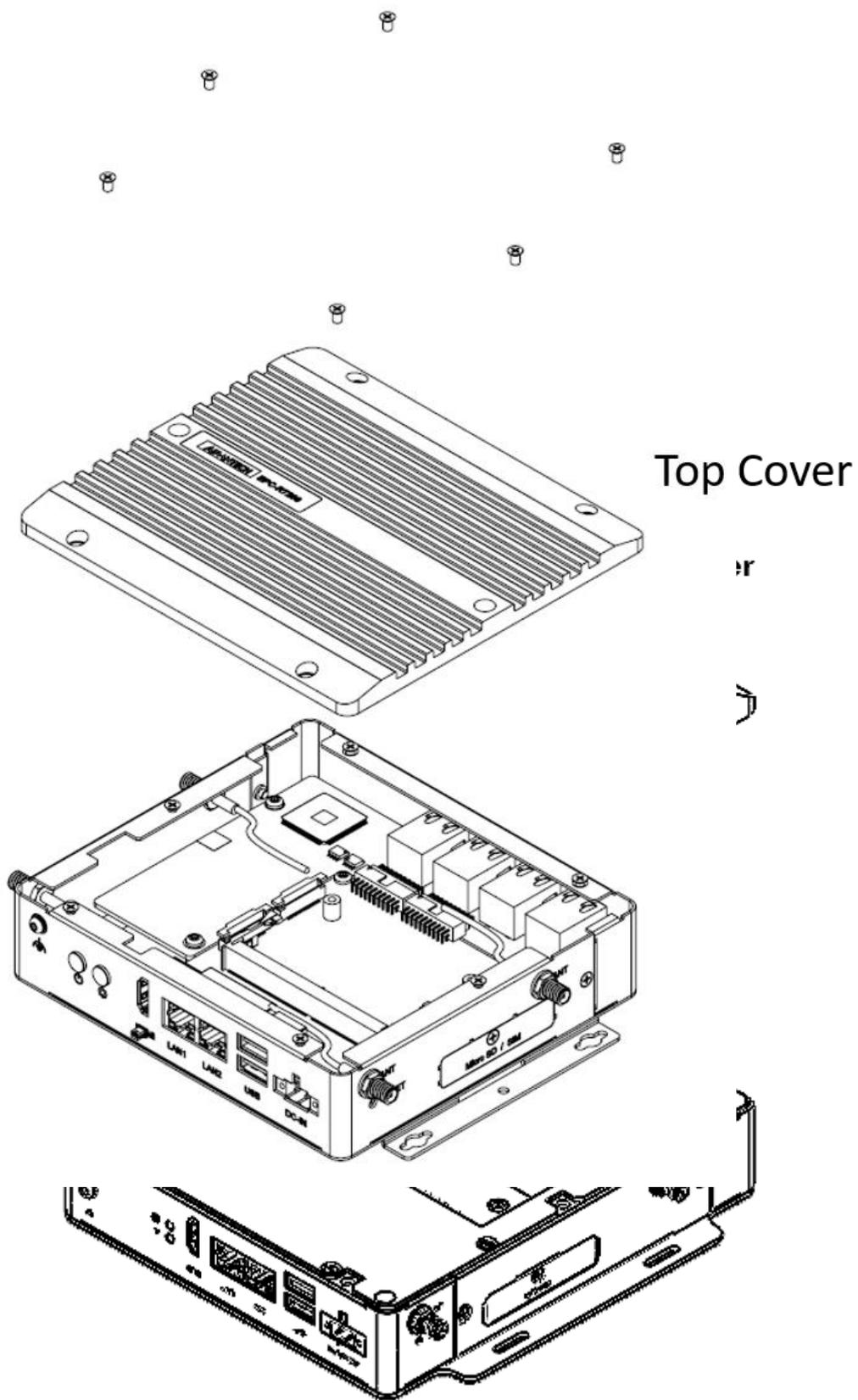
M.2 2280 Key M			
Pin	Pin Name	Pin	Pin Name
1	GND	2	+3.3V
3	GND	4	+3.3V

5	PETn3-	6	N/C
7	PETp3	8	N/C
9	GND	10	LED_1# (O)
11	PERn3	12	+3.3V
13	PERp3	14	+3.3V
15	GND	16	+3.3V
17	PETn2	18	+3.3V
19	PETp2	20	N/C
21	GND	22	N/C
23	PERn2	24	N/C
25	PERp2	26	N/C
27	GND	28	N/C
29	PETn1	30	N/C
31	PETp1	32	N/C
33	GND	34	N/C
35	PERn1	36	N/C
37	PERp1	38	N/C
39	GND	40	SMB_CLK (I/O)(0/1.8V)
41	PETn0	42	SMB_DATA (I/O)(0/1.8V)
43	PETp0	44	ALERT# (O)(0/1.8V)
45	GND	46	N/C
47	PERn0	48	N/C
49	PERp0	50	PERST# (I)(0/3.3V)
51	GND	52	CLKREQ# (I/O)(0/3.3V)
53	REFCLKn	54	PEWAKE# (I/O)(0/3.3V)
55	REFCLKp	56	Reserved for MFG_DATA
57	GND	58	Reserved for MFG_CLOCK
59	Add_IN Card Key M	60	Add_IN Card Key M
61	Add_IN Card Key M	62	Add_IN Card Key M
63	Add_IN Card Key M	64	Add_IN Card Key M
65	Add_IN Card Key M	66	Add_IN Card Key M
67	N/C	68	SUSCLK(32kHz) (I)(0/3.3V)
69	PEDET (NC-PCIe)	70	+3.3V

71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		

2.6 、 NVIDIA Jetson Orin Module Installation

Step1: Remove 6 screws on Top Cover and then lift up Top Cover

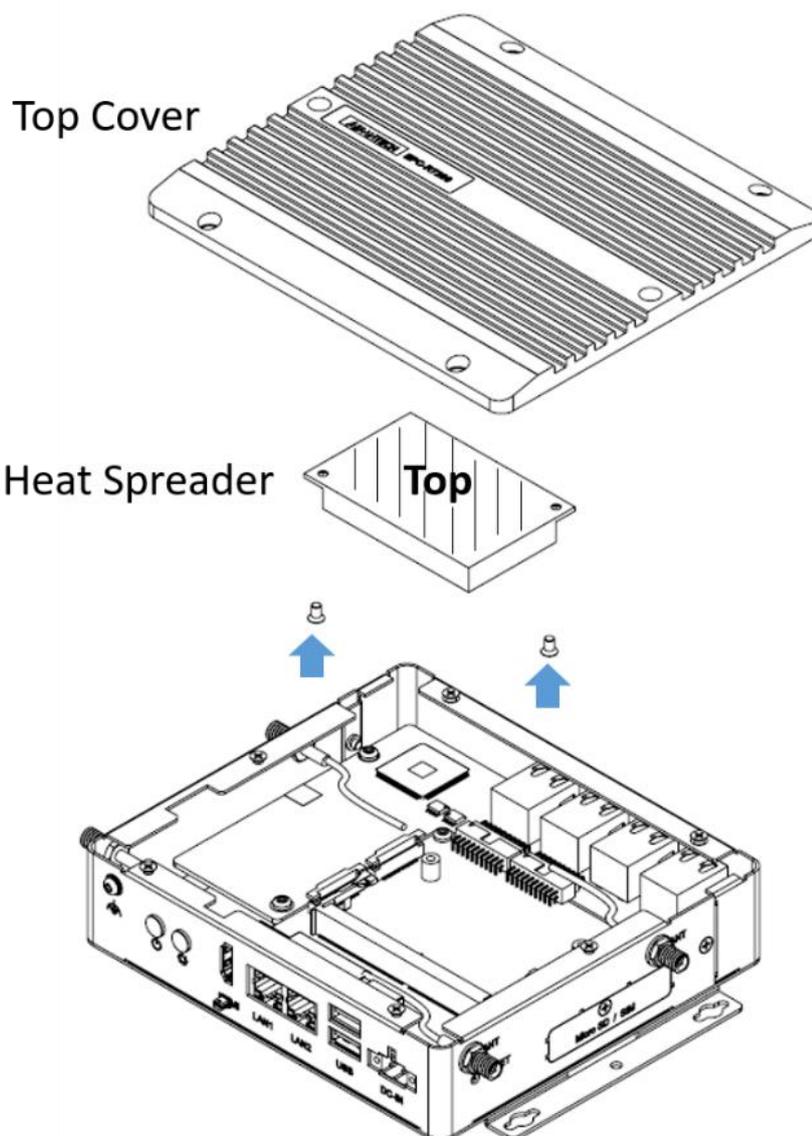


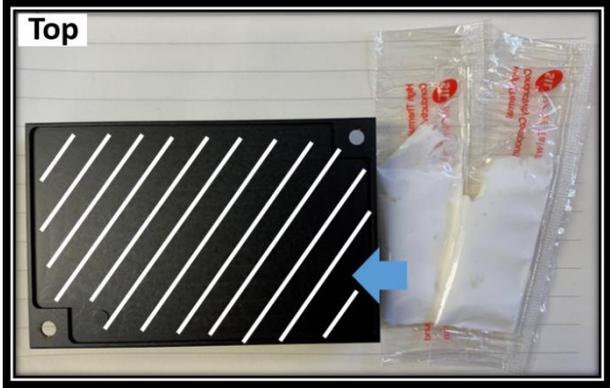
Step2: Choose the right heat spreader according the Jeston™ Orin module you used

Smear grease on heat spreader (Top)

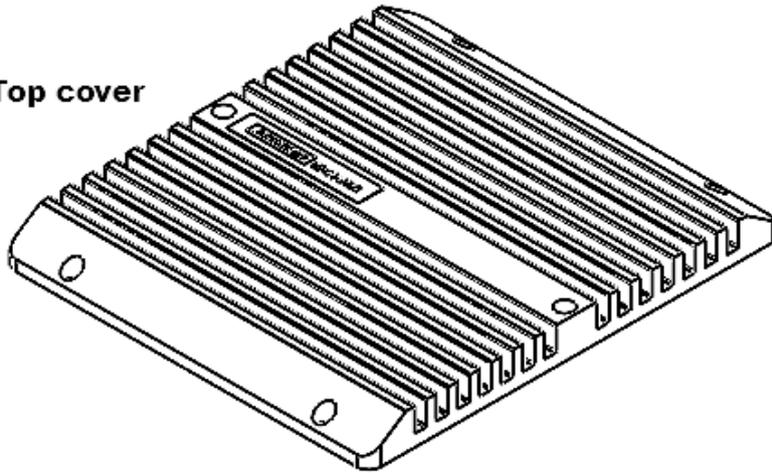
Remove blue tapes from thermal pad (Bottom)

Fix the heat spreader on Top Cover by two screws

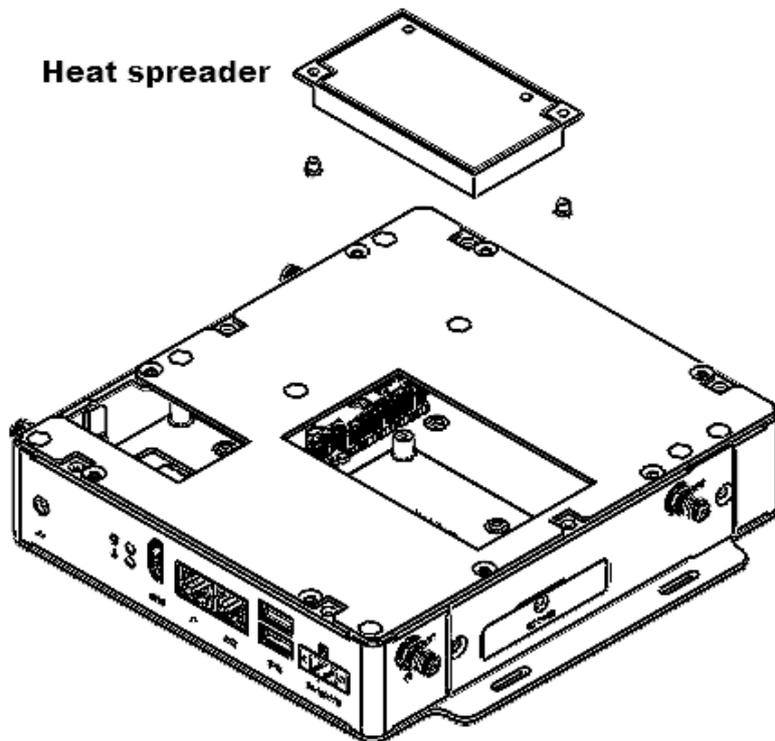




Top cover



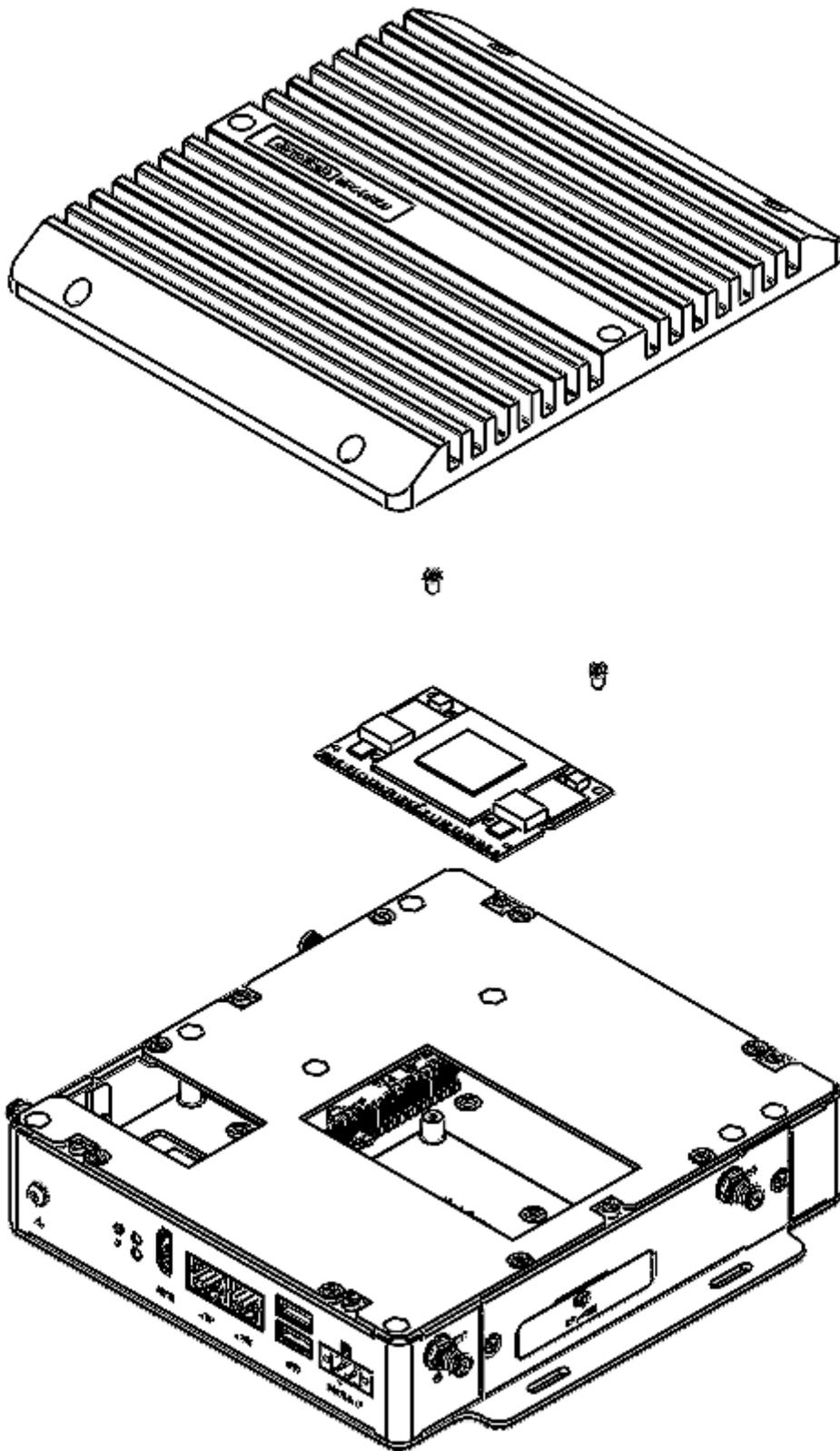
Heat spreader



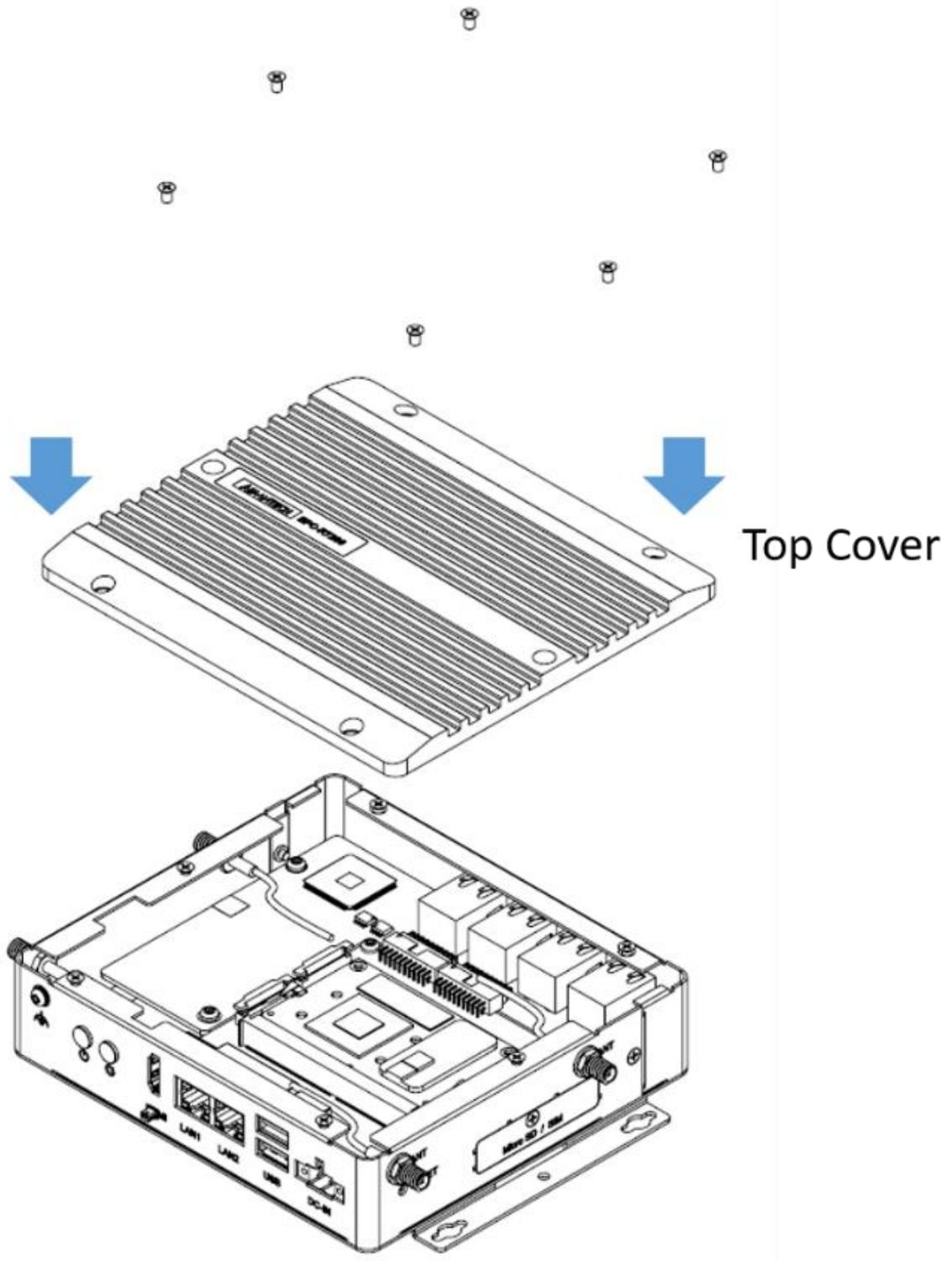
Step3:

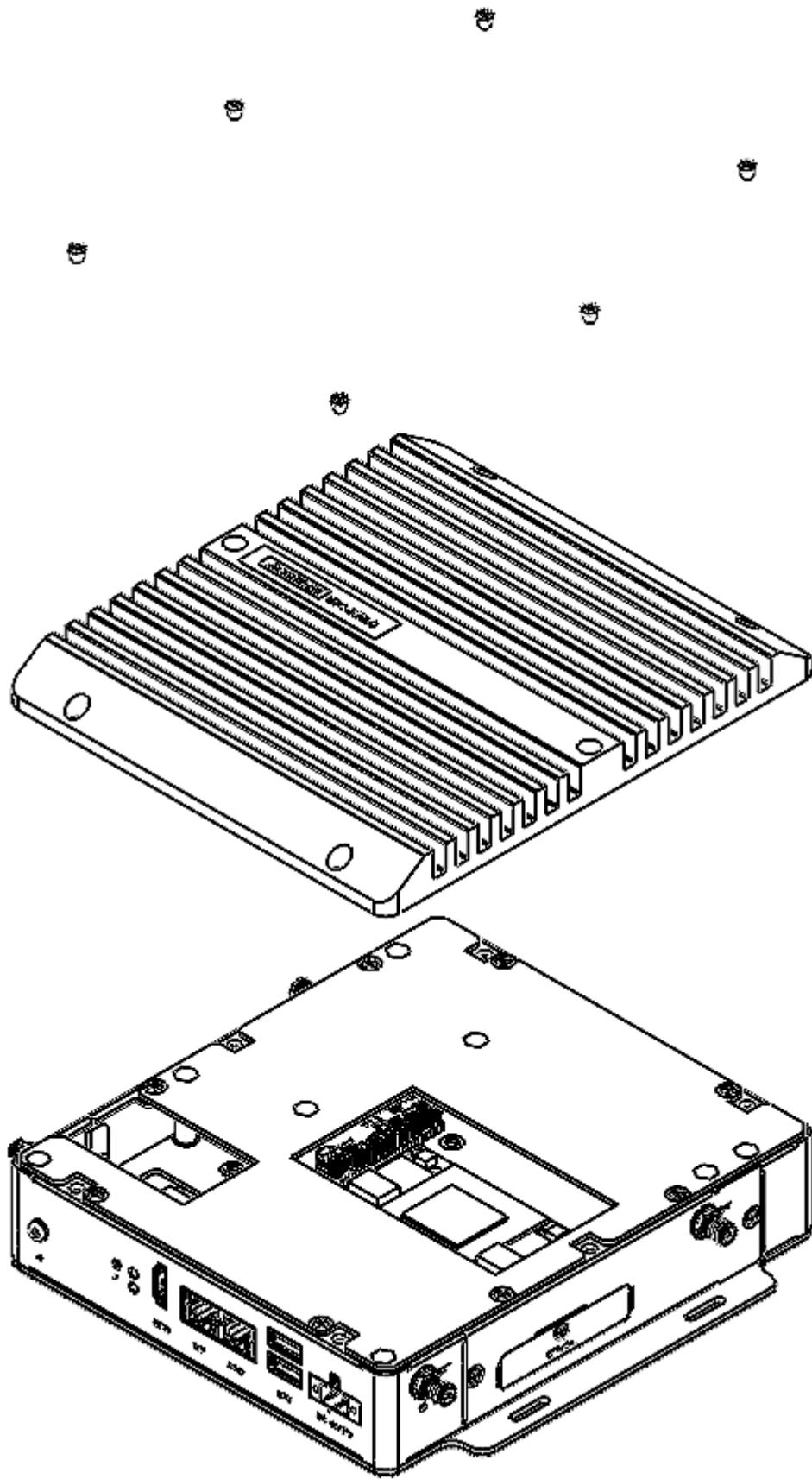
Plug Jeston™ Orin module into Sockets of carrier board.

Lock 2 screws to fix Jeston™ Orin module

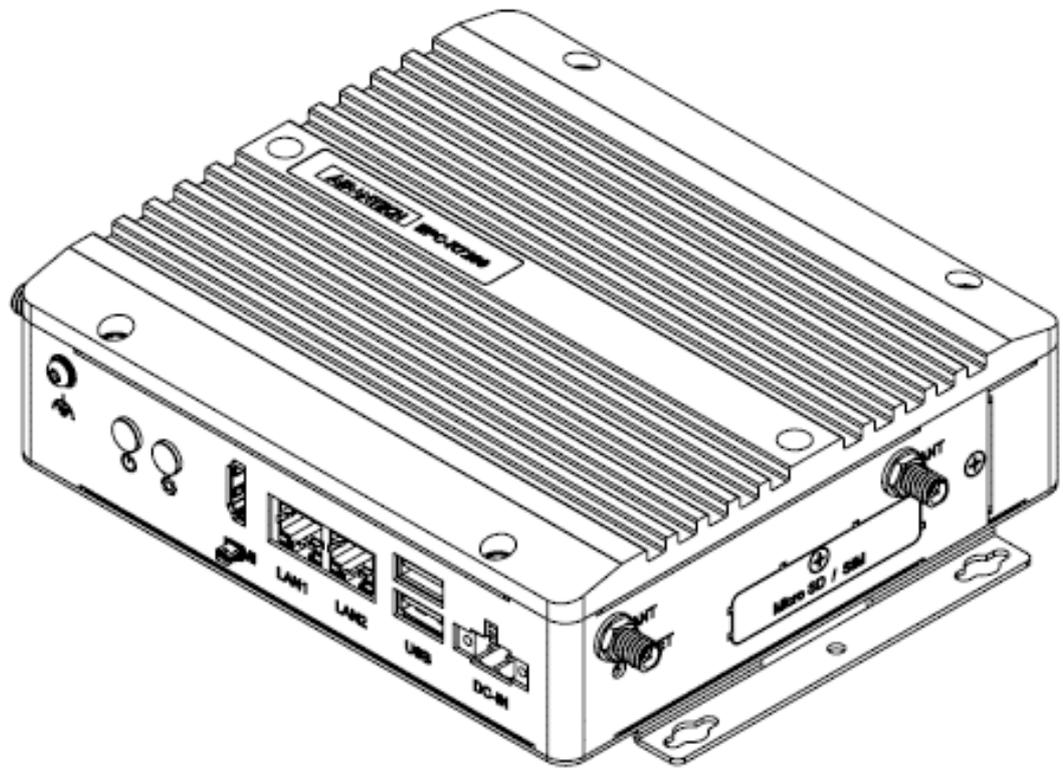


Step4: Put the Top Cover on and then lock 6 screws on top of it





Step5: Enjoy your AI journey



Chapter 3

Software Resource

This chapter lists the NVIDIA
On-line software resource
And Community

3.1 、 NVIDIA Jetson Software

- **Jetson Support Resource**

<https://developer.nvidia.com/embedded/community/support-resources>

- **Jetson Wiki**

<https://elinux.org/Jetson>

- **Jetson Jetpack SDK**

<https://developer.nvidia.com/embedded/jetpack>

- **Jetson FAQ**

<https://developer.nvidia.com/embedded/faq>

3.2 、 Software Forum

- **Jetson Developer Forum**

<https://forums.developer.nvidia.com/c/agx-autonomous-machines/jetson-embedded-systems/70>

- **AIM-Linux Developer Forum**

<https://forum.aim-linux.advantech.com/>

- **NVIDIA NVONLINE**

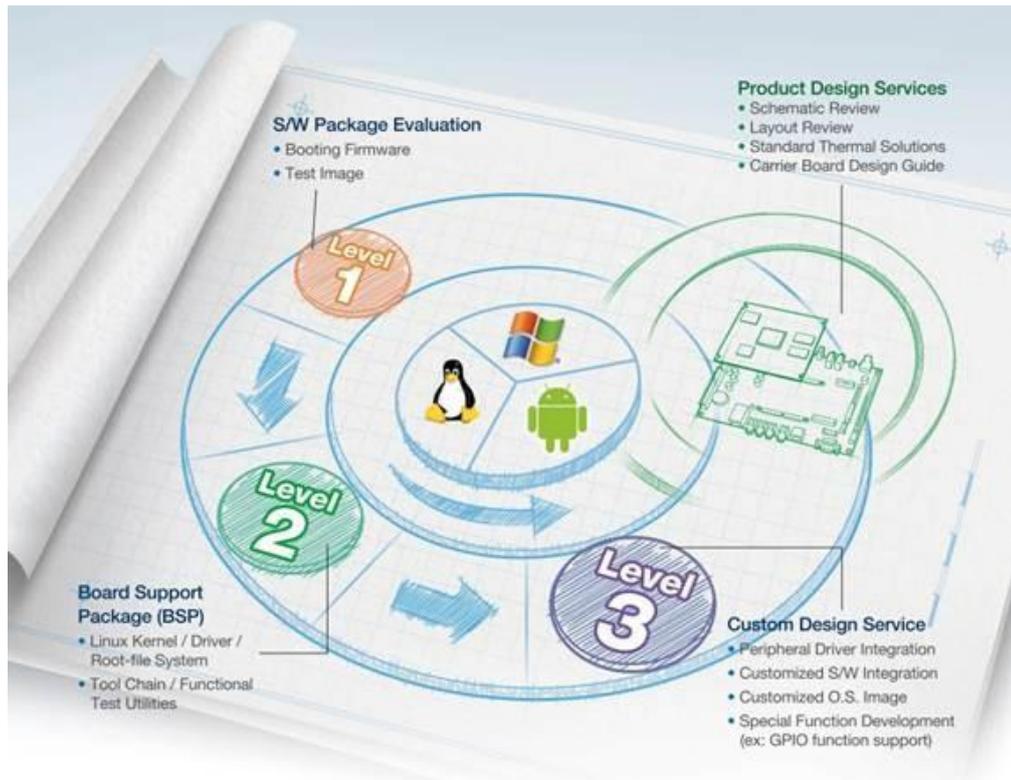
<https://partners.nvidia.com/>

Chapter 4

Advantech Services

This chapter outlines Advantech's
Design-In services, technical
Support and warranty policy
For EPC-R7300

4.1 、 Design-In Services



Advantech's RISC Design-In Services help customers reduce the time and work required to design new carrier boards. We handle the complexities of technical research, greatly minimizing the development risks associated with carrier boards.

Easy Development

Advantech offers support firmware, root file systems, board support packages, and other development tools that help customers easily develop unique carrier boards and differentiate their embedded products and applications.

- Full range of RISC-based product offerings
- Comprehensive document support

Design Assistance Service

Advantech provides a checklist for engineers to easily check their schematics as well as several services for reviewing customer carrier board schematics. These services aim to help identify design errors before implementation, which saves substantial development time and costs.

- **Schematic review**
- **Placement and layout review**
- **Debugging assistance services**
- **General/special reference design database**

Thermal Solution Services

To provide customers with more flexible thermal solutions and designs, Advantech offers thermal solution services that include consultations and customizations.

- **Standard thermal solutions**
- **Customized thermal solutions**

Embedded Software Services

Supports driver, software integration or customized firmware, root file-system and Linux image. Customer can save lot of time and focus on their core development.

- **Embedded Linux/ Android OS**
- **Advantech boot loader Customization**

With the spread of industrial computing, a whole range of new applications have been developed, resulting in a fundamental change in the IPC industry. In the past system integrators (SI) were used to completing projects without outside assistance but now such working models have moved on. Due to diverse market demands and intense competition, cooperation for (both upstream and downstream) vertical integration has become a much more effective way to create competitive advantages. As a result, ARM-based CPU modules were born out of this trend. Concentrating all necessary components on the CPU module and placing other parts on the carrier board in response to market requirements for specialization, provides greater flexibility while retaining its low power consumption credentials.

Advantech has been involved in the industrial computer industry for many years and found that customers usually have the following questions when implementing modular designs.

General I/O Design Capability

Although customers possess the ability for vertical integration and have sufficient knowledge and professional competence in the specific application field, a lack of expertise and experience in general power and I/O design can cause challenges, especially when integrating CPU modules with a carrier board.

Data Acquisition

Even if customers can obtain sufficient information to make the right decision for specialized vertical applications, some customers encounter difficulties with platform design in general and communicating with CPU or chipset manufacturers. This can increase the challenge and risks of designing carrier boards and impacting the product's time-to-market.

Software Development and Modification

Compared to x86 architectures, RISC architectures use simpler instruction sets; therefore, the software for x86 platforms cannot be used on RISC platforms. System integrators (SIs) must develop unique software for their system and integrate the hardware and software themselves. Unlike x86 platforms, RISC platforms have less support for board support packages (BSPs) and drivers. Although driver support is provided, SIs are still required to integrate them into the system core. Moreover, the BSPs provided by CPU manufacturers are typically aimed at carrier board design. Thus, they may not be an appropriate environment for software development. To address this issue, Advantech proposed the concept of streamlined Design-In support services for RISC-based computer-on modules (COMs). With a dedicated design-in services team, Advantech actively participates in carrier board design and problem solving. Our services not only enable customers to effectively distribute their resources, but also reduce R&D costs and hardware investment. Because of our close relationship with leading CPU and chipset manufacturers such as ARM, TI, and Freescale, Advantech helps solve communication and technical support difficulties, which also reduces the uncertainties of product development. Advantech's software team focuses on providing comprehensive BSPs and assists customers with establishing a software development environment for RISC platforms. Advantech's RISC Design-In services help

customers overcome challenges to achieve a faster time-to-market. Along with our multi-stage development process, which includes planning, design, integration, and validation, Advantech's RISC Design-In services provide comprehensive support during the following phases:

Planning Stage

Before deciding to adopt Advantech RISC COM, customers must go through a complete survey process, including product features, specification, and compatibility testing with software. Advantech offers a RISC customer solution board (CSB) as an evaluation tool for carrier boards, which are simultaneously designed during the development of RISC COMs. During the planning stage, customers can use the CSB evaluation board to assess RISC modules and test peripheral hardware. Moreover, Advantech provides standard software BSPs for RISC COMs to allow customers to define the product specifications and verify I/O and performance. We not only offer hardware planning and technology consultations, but also software evaluations and recommendations regarding peripheral modules (such as Wi-Fi, 3G, and Bluetooth modules). Resolving customer concerns is Advantech's main target at this stage. Because product evaluation is the key task in the planning stage, especially regarding performance and specifications, we try to help our customers conduct all the necessary tests for their RISC COM.

Design Stage

When a product moves into the design stage, Advantech will supply a carrier board design guide for reference. The carrier board design guide provides pin definitions of the COM connector with limitations and recommendations for carrier board design. This gives customers a clear guideline to follow during carrier board development. Regarding different form factors, Advantech offers a complete pin-out checklist for different form factors, such as Q7, ULP, and RTX2.0, to enable customers to examine the carrier board signals and layout design accordingly. In addition, our team is able to assist customers with reviewing the placement/layout and schematics to ensure the carrier board design meets all their requirements. For software development, Advantech's RISC software team can assist customers with establishing an environment for software development and evaluating the time and resources required. If customers outsource software development to a third party, Advantech can also cooperate with the third party and provide consultation services. With Advantech's expert support, the design process becomes much easier and the product quality is enhanced to meet all customer criteria.

Integration Stage

This phase comprises hardware and software integration, application development, and peripheral module implementation. Because they may lack the knowledge and experience of certain platforms, customers may need to spend some time analyzing integration problems. Additionally, the implementation of peripheral module depends a lot on the driver designs on carrier boards, and RISC platforms typically have less support for ready-made drivers on the carrier board. Thus, customers may have to figure out the best solution through trial and error. Advantech's team has years of support experience and extensive hardware/software development knowledge. Consequently, we can support customers by providing expert advice and information, which will shorten the development time and enable more effective product integration.

Validation Stage

After the customer's ES sample is completed, the next step is a series of verification steps. In addition to verifying the product's functionality, the product's efficiency must also be tested at this stage, particularly with RISC platforms. Advantech plays a supportive role in helping customers solve problems during the testing and verification process and will provide suggestions and tips as well. Through an efficient verification process backed by our technical support team, customers are able to optimize their applications with less hassle. Furthermore, Advantech's team can provide professional consultation services about further testing and equipment usage. This allows customers to find the appropriate tools to efficiently identify and solve problems and further enhance the quality and performance of their products.

4.2 、 Contact Information

Region/Country	Contact Information
America	1-888-576-9688
Brazil	0800-770-5355
Mexico	01-800-467-2415
Europe (toll free)	00800-2426-8080
Singapore & SAP	65-64421000

Malaysia	1800-88-1809
Australia (toll free)	1300-308-531
	800-810-0345
China (toll free)	800-810-8389 Sales@advantech.com.cn
India (toll free)	1-800-425-5071
Japan (toll free)	0800-500-1055
Korea (toll free)	080-363-9494 080-363-9495
Taiwan (toll free)	0800-777-111
Russia (toll free)	8-800-555-01-50

Alternatively, you can contact the Advantech service team via our website.

http://www.advantech.com.tw/contact/default.aspx?page=contact_form2&subject=Technical+Support

Our technical support engineers will provide a quick response to your queries.

4.3 、 Global Service Policy

4.3.1 Warranty Policy

The warranty policy for Advantech products is provided below.

Warranty Period

Advantech branded off-the-shelf products and third-party off-the-shelf products used to assemble Advantech's Configure-to-Order products are entitled to a two-year global warranty. Products defect in design, materials, or workmanship are covered from the date of shipment.

All customized products will have a 15-month regional warranty by default. The actual product warranty terms and conditions may vary based on the sales contract.

All third-party products purchased separately will be covered by the original manufacturer's warranty and time period, and shall not exceed one year of coverage through Advantech.

Repairs under Warranty

It is possible to obtain a replacement product (cross-shipment) within the first 30 days after purchase. Contact your original Advantech supplier to arrange a replacement if the product was purchased directly from Advantech and was DOA (dead-on-arrival). The DOA cross-shipment excludes any shipping damage, customized and/or build- to-order products.

For products that are not DOA, the return fee to an authorized Advantech repair facility will be at the customer's expense. The shipping fee for reconstructed products from Advantech back to the customer will be at Advantech's expense.

Exclusions from Warranty

The product is excluded from warranty if

- **The product has been found to be defective after expiry of the warranty period.**
- **Warranty has been voided by removal or alternation of the product or part identification labels.**
- **The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure from which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.**
- **The product is damaged beyond repair due to a natural disaster, such as a lighting strike, flood, earthquake, etc.**
- **The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.**

4.3.2 Repair Process

Obtaining an RMA Number

All returns from customers must be authorized with an Advantech RMA (return merchandise authorization) number. Any returns of defective units or parts without valid RMA numbers will not be accepted; they will be returned to the customer at the customer's cost without prior notice.

An RMA number is only an authorization for returning a product; it is not an approval for repair or replacement. To request an RMA number, visit Advantech's RMA web- site:

<http://erma.advantech.com.tw> and use an authorized user ID and password.

You must fill out basic product and customer information and describe the problems encountered in detail in "Problem Description". Vague entries such as "does not work" and "failure" are not acceptable.

If you are uncertain about the cause of the problem, please contact Advantech's application engineers. They may be able to find a solution that does not require send- ing the product in for repair.

The serial number of the entire product is required even if only a component is returned for repair. Otherwise, the case will be regarded as out-of-warranty.

Returning the Product for Repair

Customers may be able to save time and meet end-user requirements by returning defective products to any authorized Advantech repair facility without an extra cross- region charge. Customers are required to contact their local repair center before global repair service will be offered.

We recommend sending cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as the CPU, DRAM, and CF card. If you send all these parts back (because you believe they may be part of the prob- lem), please clearly state that they are included. Otherwise, Advantech will not be responsible for any items not listed. Ensure that the Problem Description is enclosed.

European customers who are located outside the European community are requested to use UPS as the shipping company. We strongly recommend adding a packing list to all shipments. Please

prepare a shipment invoice according to the following guidelines to minimize goods clearance time:

1. Give a low value to the product on the invoice, or additional charges will be levied by customs that will be borne by the sender.
2. Add information "Invoice for customs purposes only with no commercial value" on the shipment invoice.
3. List RMA numbers, product serial numbers, and warranty status on the shipment invoice.
4. Add information about the country of origin of the goods

In addition, attach an invoice with the RMA number to the carton, write the RMA number on the outside of the carton, and attach the packing slip to save handling time. Please also address the parts directly to the Service Department and mark the package "Attn. RMA Service Department".

All products must be returned in properly packed ESD material or anti-static bags. Advantech reserves the right to return unrepaired items at the customer's cost if inappropriately packed.

Door-to-Door transportation, such as speed post, is recommended for delivery. Otherwise, the sender should bear additional charges such as clearance fees if air cargo shipment methods are used.

Should DOA cases fail, Advantech will take full responsibility for the product and transportation charges. If the items are not DOA, but fail within warranty, the sender will bear the freight charges. For out-of-warranty cases, customers must cover the cost and take care of both outward and inward transportation.

Service Charges

The product is excluded from warranty if

- **The product is sent for repair after the warranty period is expired.**
- **The product is tested or calibrated after the warranty period is expired, and a**

NPF (no problem found) result is obtained.

- **The product, though repaired within the warranty period, has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Such conditions will be determined by Advantech at its sole discretion.**
- **The product is damaged beyond repair due to a natural disaster, such as a lightning strike, flood, earthquake, etc.**
- **The product is sent for updates, upgrades, or tests at the request of the customer who is without warranty.**

If a product has been repaired by Advantech, and within three months after such a repair the product requires another repair for the same problem, Advantech will conduct the repair free of charge. However, free repairs do not apply to products that have been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable environment; improperly maintained by the customer; or failure for which Advantech is not responsible whether by accident or other cause. Please contact your nearest regional service center for detailed service quotations.

Before beginning out-of-warranty repairs, we will send you a pro forma invoice (P/I) with the repair charges stated. When you remit the funds, reference the P/I number listed under "Our Ref". Advantech reserves the right to deny repair services to customers who do not return the DOA unit or sign the P/I. Additionally, Advantech will scrap defective products without prior notice if customers do not return the signed P/I within three months.

Repair Report

Advantech returns each product with a repair report that shows the result of the repair. A repair analysis report can also be provided upon request. If the defect is not caused by Advantech's design or manufacturing, customers will be charged US\$60 or US\$120 for in-warranty or out-of-warranty repair analysis reports, respectively.

Custody of Products Submitted for Repair

Advantech will retain custody of a product submitted for repair for one month while waiting for the return of a signed P/I or payment (A/R). If the customer fails to respond within this period, Advantech will close the case automatically. Advantech will take reasonable measures to contact

Shipping Back to Customer

The forwarding company for RMA returns from Advantech to customers is selected by Advantech. Other express services, such as UPS or FedEx, can be used upon request. However, the customer must bear the extra costs of alternative shipment methods. If you require any special arrangements, please specify this when shipping the product to us.