

AVA-7200

User's Manual

Fanless Scalable Railway Edge AI Platform



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Revision History

Revision	Description	Date
1.0	Initial release	2025-05-14
1.1	Getting started updated	2025-05-23
1.2	Connector pinouts and jumper settings updated	2025-11-05
1.3	Specifications updated	2025-11-19
1.4	Connecting a ground cable updated	2026-04-21

Preface

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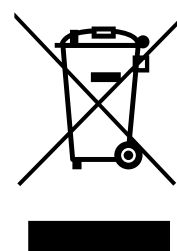
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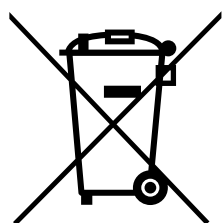
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Battery Labels (for products with battery)



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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE:

Additional information, aids, and tips that help users perform tasks.



CAUTION:

Information to prevent **minor** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.



WARNING:

Information to prevent **serious** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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1 Introduction

1.1 Overview

The AVA-7200 is a Fanless Scalable Railway Edge AI Platform equipped with Intel 13th Generation Core mobile processors and an NVIDIA GPGPU based on the Ampere architecture. This platform is intended for use in railway applications.

This user manual describes the specifications of this platform, along with installation and configuration instructions. Operators are suggested to read this user manual before installing the system in railway environments.

This EN50155 certified edge AI platform is designed for onboard deployment, featuring its wide range 16.8-137.5V DC input, isolated and rugged I/O interfaces, and an extended operating temperature range from -20°C to 70°C, making it suitable for real-time video/graphic analysis applications.

The target applications include, but are not limited to:

- Train Station Surveillance
- Onboard Video Security
- Passenger Information Systems
- Railroad Hazard/intrusion Detection

1.2 Features

Key features:

Computing Processor

- 13th Gen Intel® Core™ mobile processors (formerly Raptor Lake-P)
- Core™ i5-13600HRE 4P+8E Core/16T 18MB Cache, 45W(35W cTDP)
- Core™ i7-13800HRE 6P+8E Core 20T 24MB Cache, 45W(35W cTDP)

GPGPU

- EGX-MXM-A2000
- Embedded NVIDIA® RTX™ A2000, MXM 3.1 type A, 82 x 70mm, PCIe Gen4 x8
- EGX-MXM-A4500
- Embedded NVIDIA® RTX™ A4500, MXM 3.1 type B, 82 x 70mm, PCIe Gen4 x8

Memory

- Up to 64GB (2x 32GB) DDR5, IB ECC (selected SKUs), SO-DIMM memory, max. 4800MT/s

Front panel connectors

- 2x 10G M12 X-coded Female Ethernet ports
- 6x 2.5G M12 Ethernet Female ports
- 4x SATA trays with lock (by option)
- 4x Type A USB 3.1 Gen2 x1
- 1x Type A USB 2.0
- 1x DisplayPort
- 1x Mic-In and 1x Line-out
- 1x terminal block for digital In/digital out

Rear panel

- 7x QMA antenna for Wi-Fi, 5G and GNSS
- 2x Micro-SIM

Internal connectivity

- 1x M.2 Key B (PCIe Gen3/ USB 3) 3042//50/52 5G module
- 1x M.2 Key E (PCIe Gen3/ USB 2.0) Wi-Fi/BT module
- 1x M.2 Key M (PCIe Gen3 x4) NVME storage module
- 1x PCIe x1 mPCIe for expansion

System

- Passive cooling
- Wall mount, 19" rack mount and ceiling mount
- Input voltage:
- For AVA-7200 with A2000 MXM: Nominal Voltage: 24VDC-110VDC (EN50155 compliant)
- For AVA-7200 with A4500 MXM: 72VDC to 110VDC (EN50155 compliant)

1.3 Packing List

Please check that your package contains the items listed below. If you discover any damaged or missing items, please contact your vendor.

- AVA-7200
- 1x 12-pin DI/DO terminal block
- Wall-mount bracket and screw pack



WARNING:

DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

1.4 Optional Accessories

AVA-7200 Starter cable kit (P/N: 91-95364-000E)

- 1x M12 K-code to 5-pin terminal block cable
- 8x M12 X-code to RJ-45 cable

AVA-7200 24VDC IN AC-DC PSU & power cable (P/N: 91-95365-000E)

- 1x 24VAC 330W Power adapter and cable with 5-pin terminal block
- 1x M12 K-code to 5-pin terminal block cable

AVA-7200 19" Rack mount bracket kit (P/N: 91-95375-000E)

- 1x AVA-7200 rack mount bracket 448mm
- A pack of screws for rack mount bracket

AVA-7200 5G FN990 Thermal kit (P/N: 58-10642-600E)

- Heat spreader and thermal pads for FN990
- No Telit FN990 modem module is included

AVA-7200 Wi-Fi AX210 Thermal (P/N: 58-10642-500E)

- Heat spreader and thermal pads for Intel Wi-Fi AX210
- No Intel AX210 WIFI module is included

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2 Specifications

2.1 Product Specifications

AVA-7200 System		
Core	CPU	● Core™ i7-13800HRE 6P+8E/20T, 24MB Cache, 45W(35W cTDP), Iris Xe GPU ● Core™ i5-13600HRE 4P+8E/16T, 18MB Cache, 45W(35W cTDP), Iris Xe GPU ● Using Express-RLP (COM Express COM.0 R3.1 Type 6; 125mm x 95mm) ● Other CPU upon request
	GPU	● EGX-MXM-A2000 (Type A 82x70mm) PCIe Gen3 x8, 60W TGP ● EGX-MXM-A4500 (Type B 82x105mm) PCIe Gen3 x16, 80W TGP ● Using EGX-MXM based on NVIDIA Ampere architecture ● Other GPU upon request
	Memory	Up to 64GB/32GB DDR5, IB ECC (selected SKUs) in dual SO-DIMM memory channels, max. 4800MT/s
	Storage	● 1x M.2, Key M, PCIe Gen3 x4 2280 slot for NVMe SSD ● Up to 4x Removable SATA drive bay with external lock
Front Interfaces	Display	One DisplayPort Need adapter IC if DP to HDMI is needed.
	GbE	● 2x X-coded female M12 10 GbE ports ● 2x X-coded female M12 2.5 GbE ports ● 4x X-coded female M12 2.5 GbE ports, POE supported by BOM option. Contact ADLINK for POE support
	USB	● 4x Type A USB 3.2 Gen2 x1 ● 1x Type A USB 2.0
	Serial port	2 x DB-9 RS-485/422/232 port
	DIO	1x thermal block 4 input/4 output for 24-110VDC
	CAN	Optional support with mPCIe module Reserved cut out on the front panel
	Audio	Mic in/Line out
	Power inlet	1x 5-pin K-coded M12
Internal Interfaces	Wireless connectivity	● 1x M.2 Key B (PCIe Gen3/ USB 3.0) 3042/50/52 5G module ● 1x M.2 Key E (PCIe Gen3/ USB 2.0) Wifi/BT module
	Expansion	1x mPCIe PCIe x1 for expansion Options including: ● GNSS mPCIe module ● CAN bus mPCIe module ● Other modules upon request
Rear Interfaces	Antenna	2+4+1x QMA antenna reserved on rear side 2 for W-Fi connection

AVA-7200 System		
		4 for 5G connection 1 for GNSS connection
	SIM	Dual external accessible Micro-SIM
	TPM	Support TPM 2.0
	RTC	Real time clock (RTC) with rechargeable battery Gold cap available upon request
Power	Button	Power Button Reset Button
	Power input	+24/36/72/110VDC with M12 5-pin K-code connector (16.8V to 137.5V, EN50155 compliant) With ignition control
	Compliance	Compliant to Interruptions of voltage supply according EN50155 SEC. 5.1.1.4 Class S2 & C1
	Power Consumption	200W for AVA-7200 with A2000 230W for AVA-7200 with A4500
	GND	M6 threaded stainless steel stud for protective grounding on rear
Operating System	Operating System	Ubuntu 22.04
Mechanical	Mounting	Wall mount and rack mount
	Dimensions	360(W) x 255.7(D) x 105(H) mm
	IP	IP20
	Weight	Approx. 9.4 kg
Environmental Chamber/Shock/vibration	Operating temperature	- OT1: -25°C - 55°C (EN50155:2021 OT1 Class, ST1 +15C for 10mins) - OT3: -25°C - 70°C (EN50155:2021 OT3 Class, ST1 +15C for 10mins) - Depending on the CPU and GPU MXM module selection and combination, a minimum convection air flow of 1.0 m/s is required to dissipate heat. Otherwise, the CPU and GPU may throttle and could potentially be damaged.
	Storage temperature	-40°C to 85°C
	Humidity operating	10% to 95% relative humidity (non-condensing)
	Humidity storage	5% to 95% relative humidity (non-condensing)
	Environmental	EN50155:2021 Shock and Vibration test – EN50155 13.4.11(Ref. to IEC61373) Altitude test - EN50125-1:2014 (EN50125-1_4.2(Ref. to IEC 60068-2-13) RoHS 2.0 & REACH
Environmental	EMI/EMC	EN 50155:2021 Clause 13.4.9

AVA-7200 System		
EMC / Safety		With reference to EN 50121-1:2017; EN 50121-3-2:2016; EN 61000-4-2:2009; EN 61000-4-3:2006 + A1:2008 + A2:2010 EN 61000-4-4:2012; EN 61000-4-5:2014 + A1: 2017 EN 61000-4-6:2014 + AC: 2015
	Safety	EN 50124 Compliance
	Fire Protection	Compliant to EN45545-2:2013+A1:2015 (HL 1-3)
	Rolling stock	BS EN 50155:2021
Others	LEDs	1 x Power ON LED, 1 x HDD LED 1 x Watch Dog LED 1 x Reserved LED 8 x Ethernet LED for each M12 GbE
	MTBF	TBD Hours @40°C according to IEC/TR 62380 Calculation Model: Telcordia Issue4 Environment: GB, GC
	Conformal coating	All PCBs conformal coated both sides – type HumiSeal 1B73 Coating (AR) Acrylic.

2.2 Power Specifications

The following tables present the AVA-7200 Series power consumption data at room temperature under the following test conditions.

- AVA-7200 Core i7 and Core i5 with A2000 and A4500
- Power Module: PW-220 and PWP-301
- Project Version: ES1
- Chassis Heat Sink: 58-10770-000E & 58-10770-100E
- OS: Ubuntu_22.04.4_x64_IMG_1v3

Software:

- BurnInTest Professional edition V9.2
- MXM: GPU Burn stress tool
- Ethernet: Iperf3 with stress command
- BSP: AVA-7200_Ubuntu_22.04.4_x64_IMG_1v3.iso

Test Fixture:

- DI/Do Test Fixture
- COM Test Fixture*2
- CAN1 / CAN2 Pin to Pin
- PoE Test Fixture: 4 port total 15W
- USB Dummy Loading: 5W*5
- DC Power supply: 62006P-300-8

2.2.1 AVA-7200 Power Consumption

CPU	i5	i7
OS	Ubuntu_22.04.4_x64_IMG_1v1	Ubuntu_22.04.4_x64_IMG_1v3
MXM	A4500 (80W)	A2000 (60W)
Power capability	300W	PW-220 200W
Power input used	+110VDC	+24VDC
Ignition support	Optional	Yes
POE	No	No
Power consumption(W)	AC 222.2 W	DC 12V 175 W

2.3 Functional Block Diagram

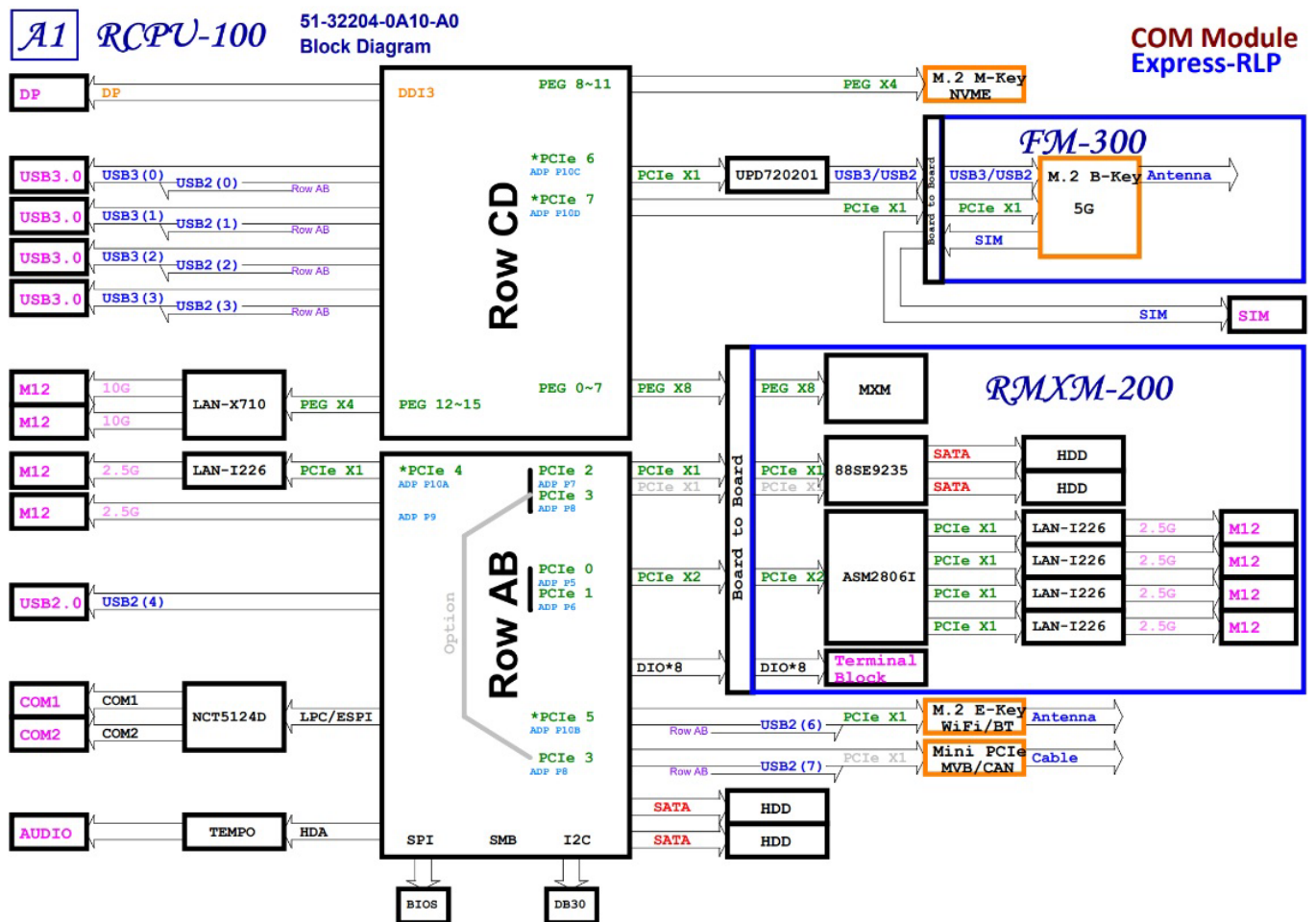


Figure 1: Functional block diagram

3 Mechanical Layout

3.1 Mechanical Dimensions



NOTE:

All dimensions are in millimeters, unless noted.

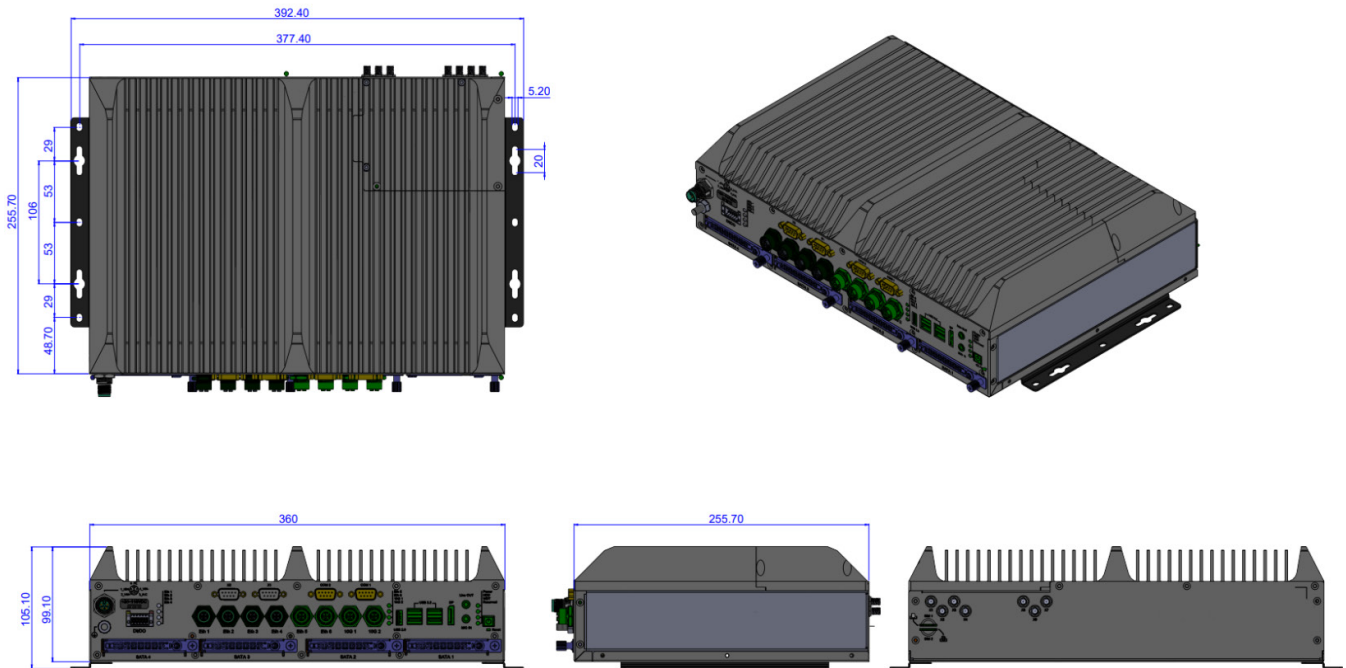


Figure 2: Mechanical dimensions

3.2 I/O Panel Connector Locations

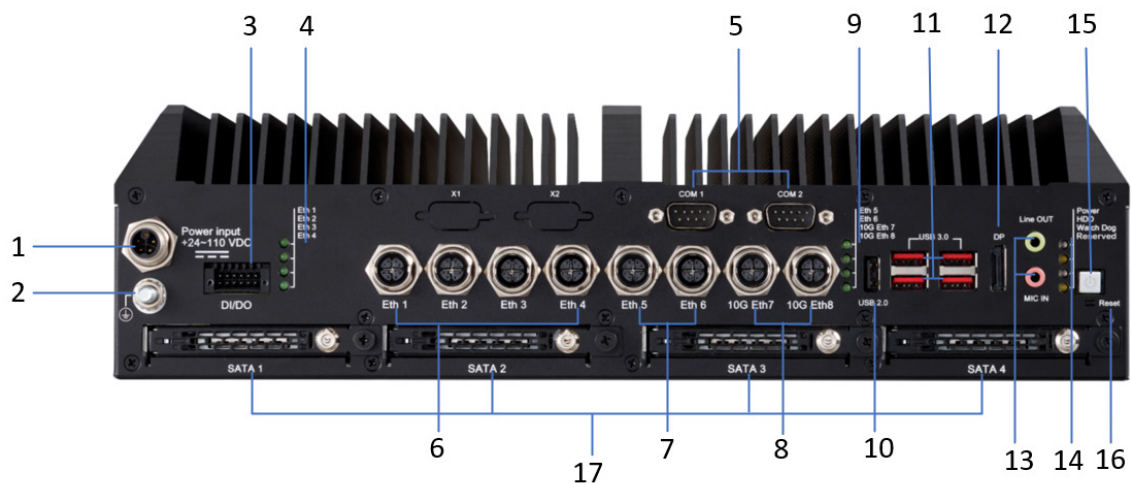
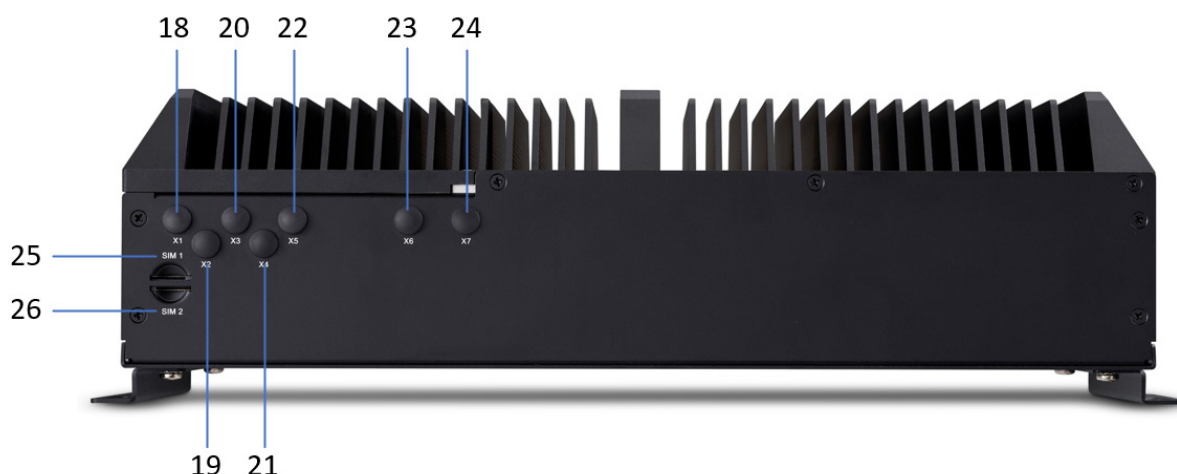


Figure 3: Front I/O panel connector locations

Table 1: Front I/O panel connector descriptions

No #	Function		
1	M12 K code 5P DC IN (24~110V)	10	USB2.0 Type A
2	M6 Stud GND	11	USB3.0 GEN2 Type A
3	DI*4/DO*4	12	DP++
4	ETH #1~ #4 Activity LED (G)	13	Line Out *1, Mic in *1
5	COM1 & COM2, DB9(Male)	14	Sys LED *4 Power (G), Storage(Y), Watch Dog (Y), Ignition(G)
6	ETH M12 X code 2.5GbE *4 With PoE 802.3AT	15	Power Button
7	ETH M12 X-code 2.5GbE *2	16	Reset Button
8	ETH M12 X-code 10 GbE *2	17	SSD 2.5" removable tray with Key Lock *4
9	ETH #5 ~ #8 Activity LED(G)		


Figure 4: Rear I/O panel connector locations
Table 2:Rear I/O panel connector descriptions

No #	Function
18	X1 QMA for Wifi Antenna
19	X2 QMA for Wifi Antenna
20	X3 QMA 5G/LTE Antenna
21	X4 QMA 5G/LTE Antenna
22	X5 QMA 5G/LTE Antenna
23	X6 QMA 5G/LTE Antenna
24	X7 QMA GNSS Antenna
25	Micro SIM 1
26	Micro SIM 2

4 Getting Started

Follow the instructions describing the installation of USIM cards, Wi-Fi, cellular and M.2 SATA modules; mounting brackets; 2.5" SATA drives; ground cable; and DC power supply.



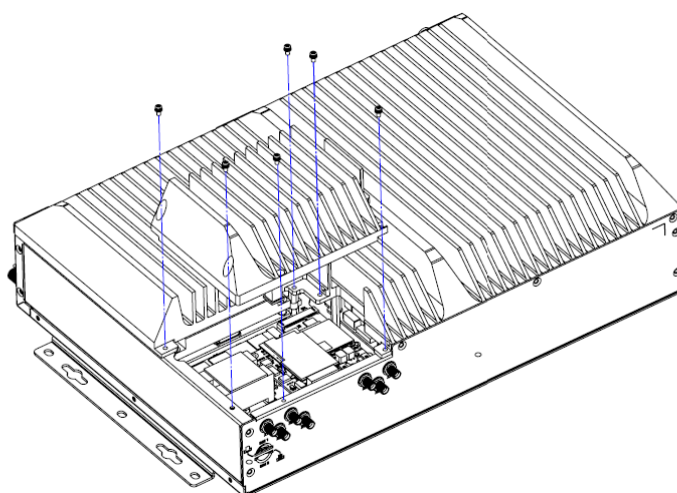
NOTE:

MXM and CAN bus modules must be installed at the factory. Please contact your local ADLINK representative for more information.

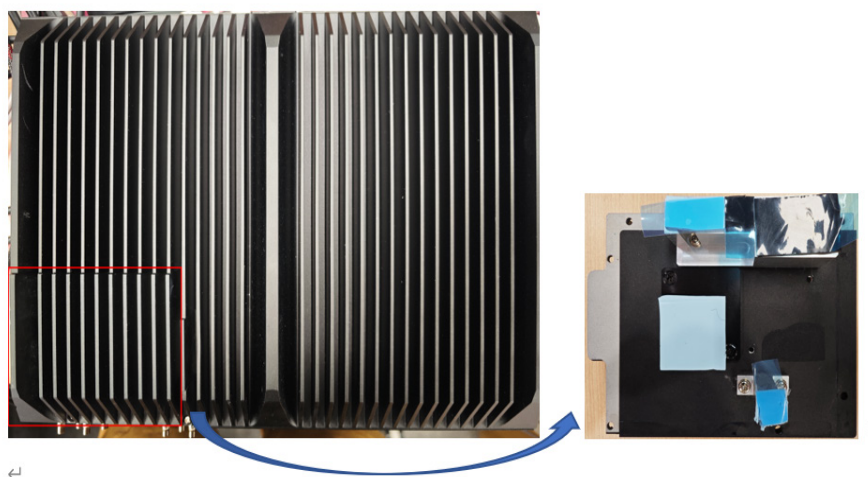
4.1 Removing the Movable Cover

To install the optional modules, first remove the movable cover as illustrated below:

1. Place the box PC on a suitable surface with the top side facing up. Remove the 6 screws from the top-right side as indicated below.
2. Lift the rear cover off of the box PC chassis.

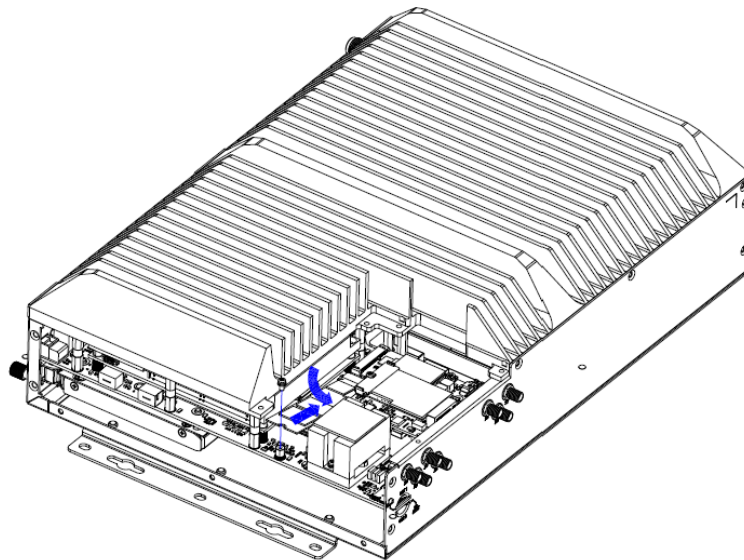


3. To reinstall the movable cover, place it back in its original location and tighten the 6 screws loosened in Step 1.



4.2 Installing the M.2 M-Key 2280 NVMe Storage Module

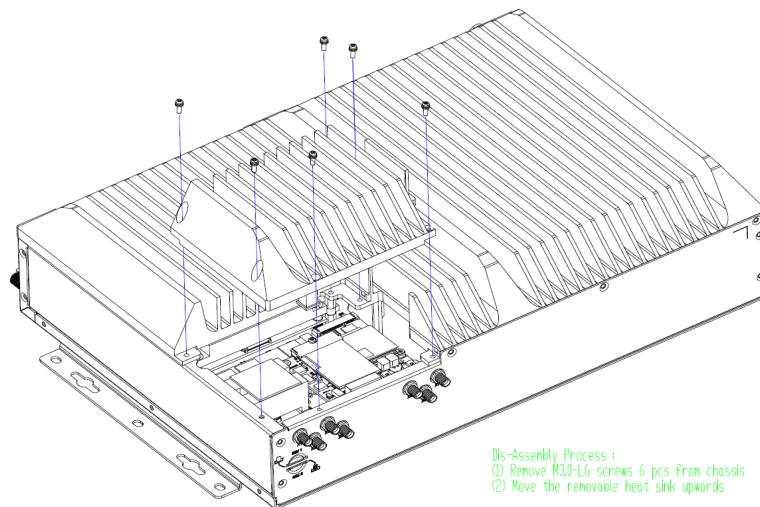
To install an M.2 M-Key 2280 NVMe module, insert the module into the slot and secure it with one M2.5 screw, as shown below.



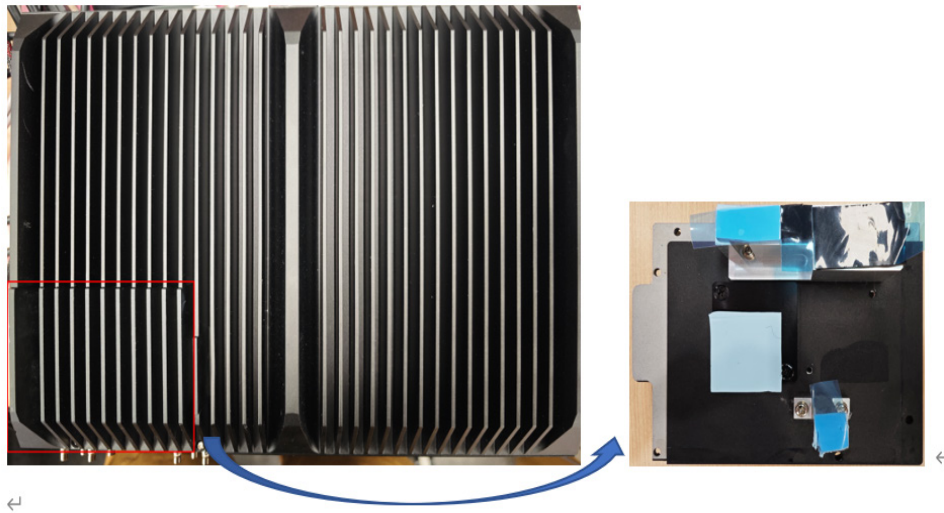
NOTE:

M.2 modules may require an additional thermal solution when operated above 60°C. Please contact your local ADLINK representative for more information.

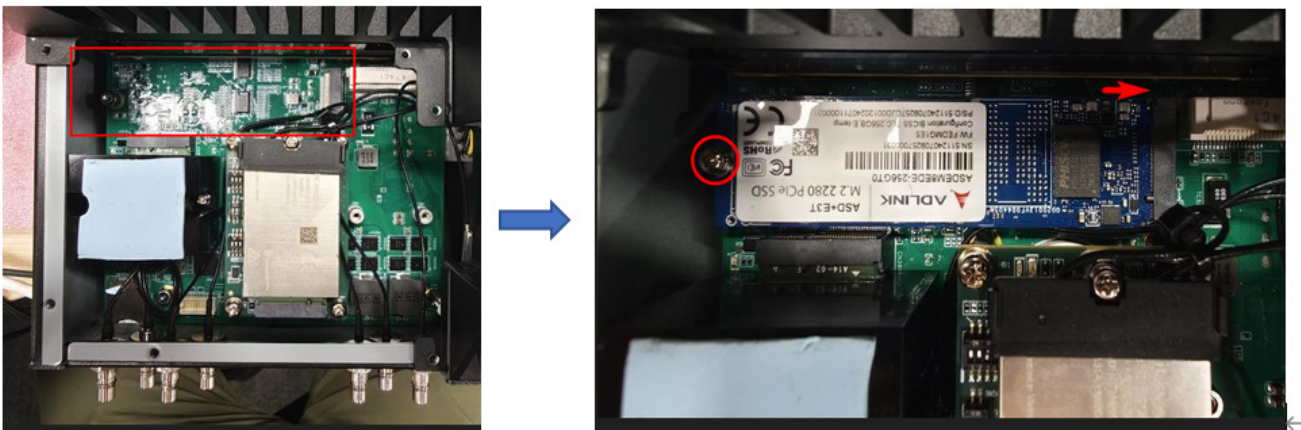
Remove screws: Loosen the 6 screws of the mechanism module.



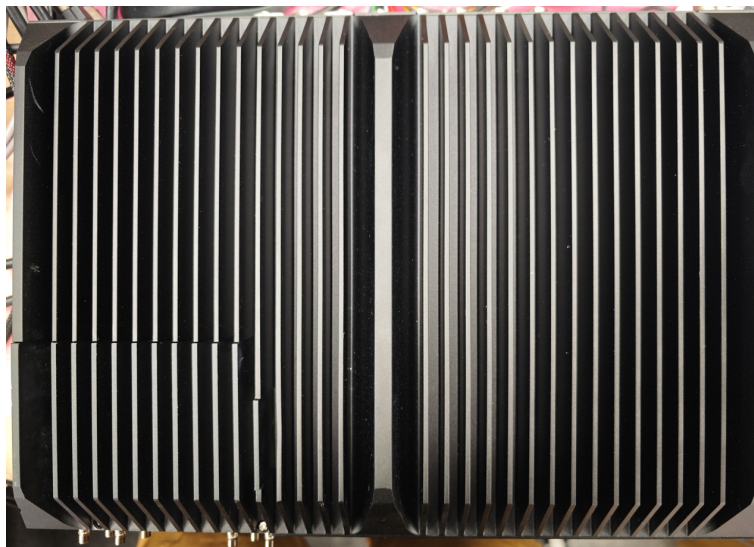
Dis-Assembly Process :
 (1) Remove M3.0-L6 screws 6 pcs from chassis
 (2) Move the removable heat sink upwards



1. Secure the NVME module: Insert the NVME module into the corresponding slot and fasten it with screws.

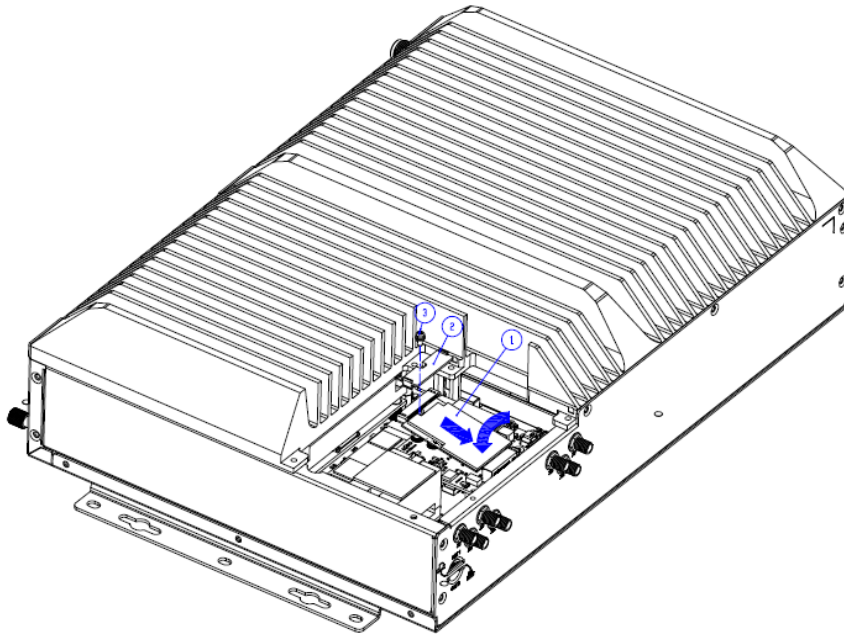


2. Reassemble: Screw the 6 screws back into the system.



4.3 Installing M.2 B-Key 2042 5G Modules

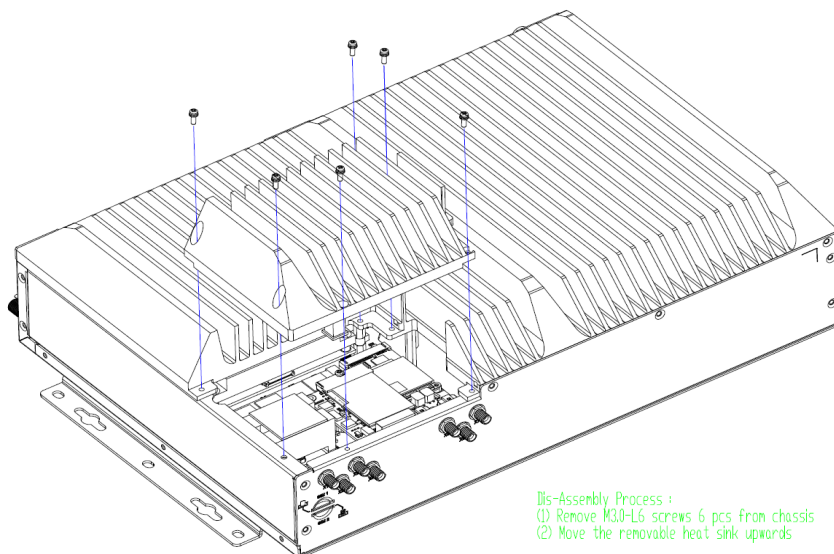
Follow the instructions below to install a M.2 B key 2042 5G module into the slot and secure it with one M2.5 screw as shown.

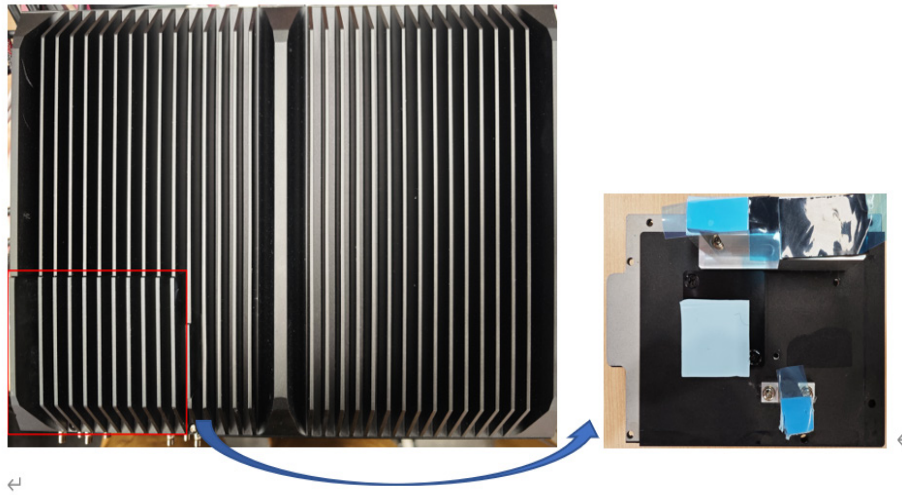


NOTE:

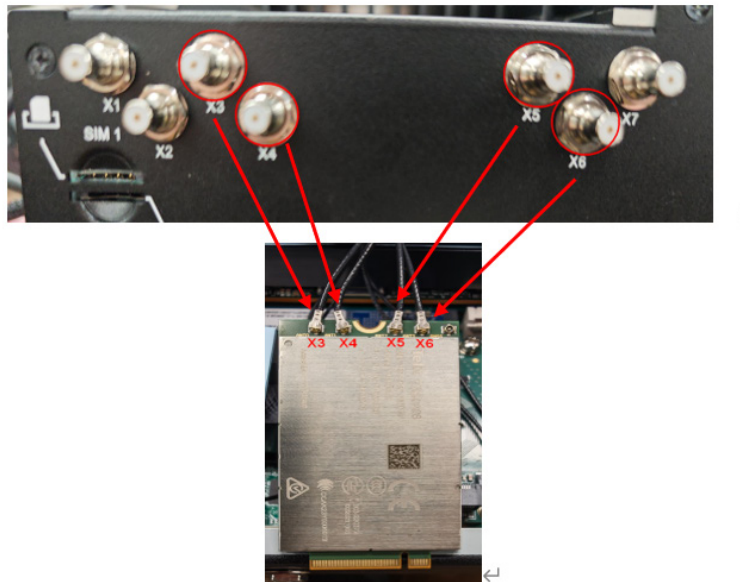
The Telit FN990A28 is the modem verified for use with AVA-7200. The modules may require an additional thermal solution when operating above 60 °C. Please contact your local ADLINK representative for more information.

Remove screws: Loosen the 6 screws of the mechanism module.

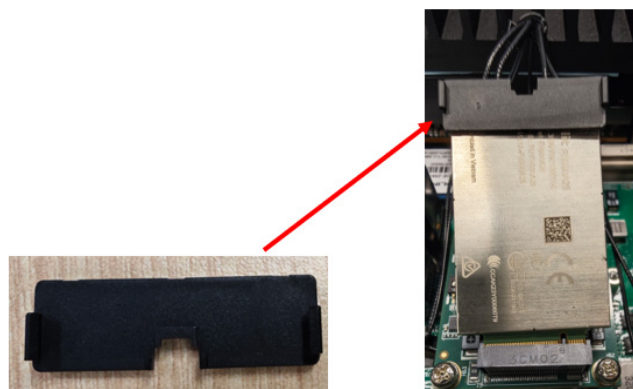




1. Connect the internal RF cables to the module and install the QMA connectors into the antenna openings labeled on the rear panel, X3, X4, X5, X6.



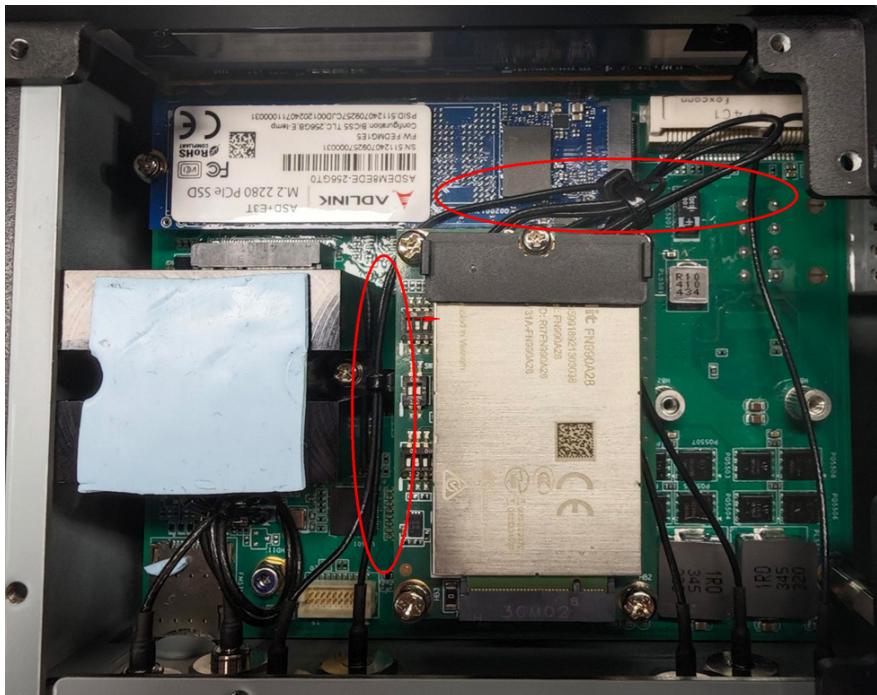
2. Install the protective cover: Place the protective cover in the designated position on the 5G module.



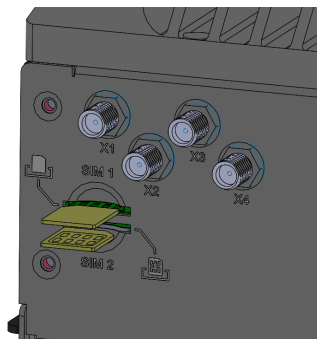
3. Insert the M.2 B-key 3042 5G module into one of the slots as shown and secure it using M2.5 screws.



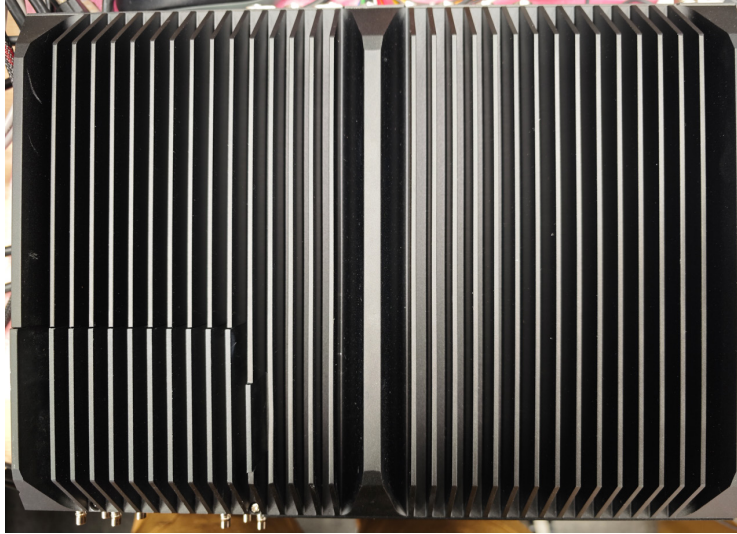
4. Cable management: Use cable ties to secure the red-circled area inward to prevent cable pressure and interference with the 2280 M.2 SSD during reassembly.



5. Installing SIM cards.

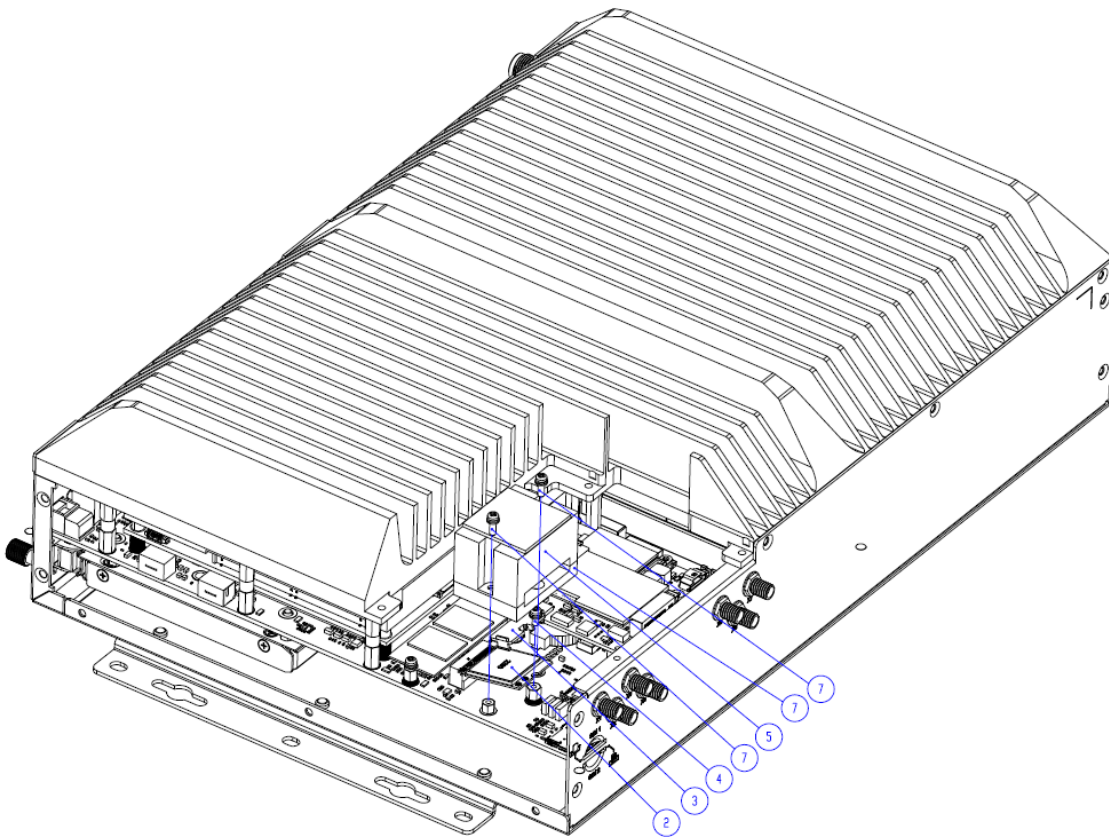


6. Reassemble: Screw the 6 screws back into the system.



4.4 Installing M.2 E-Key 2230 Wi-Fi Module

To install an M.2 E-Key 2230 Wi-Fi module, insert the module into the slot and secure it with one M2.5 screw as shown.

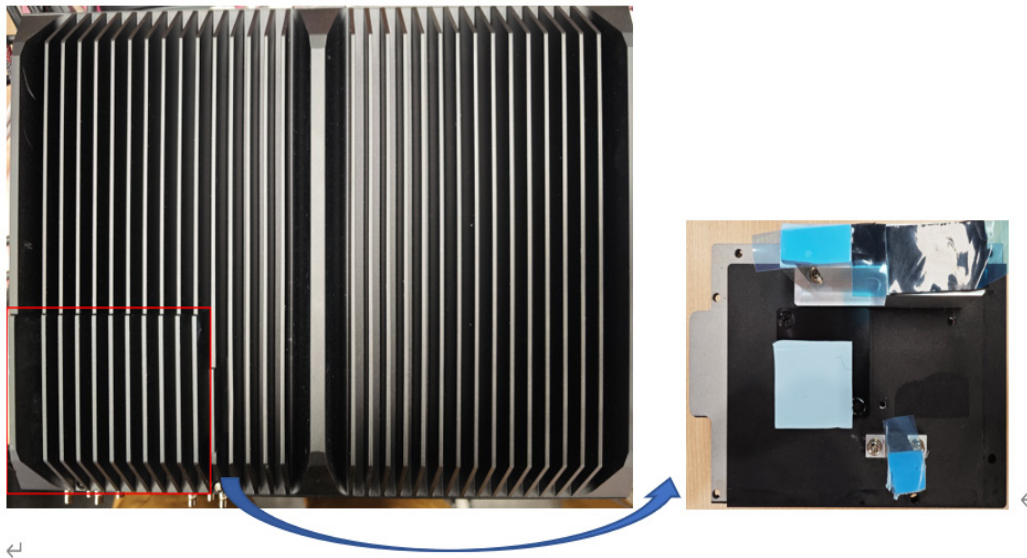
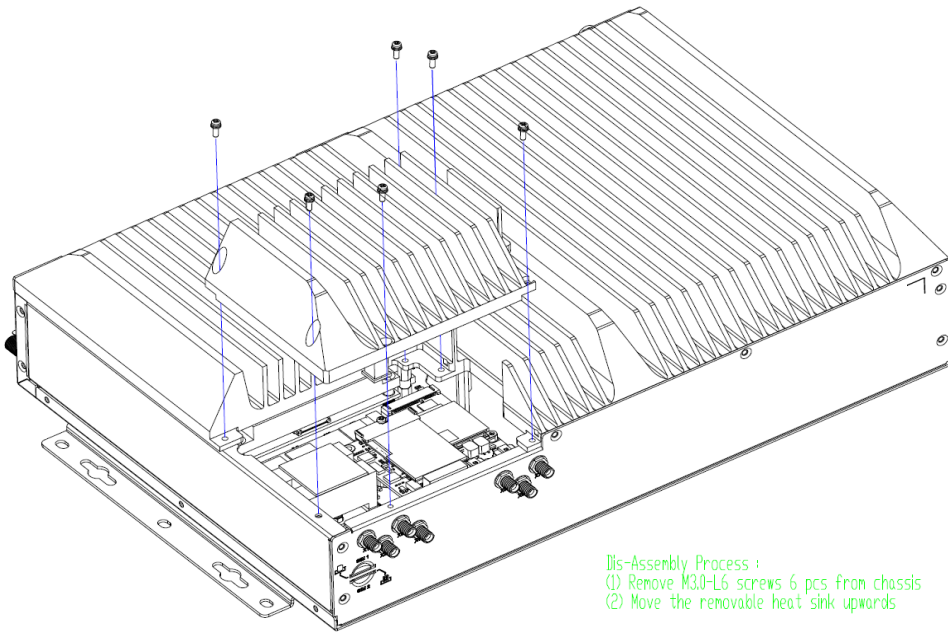




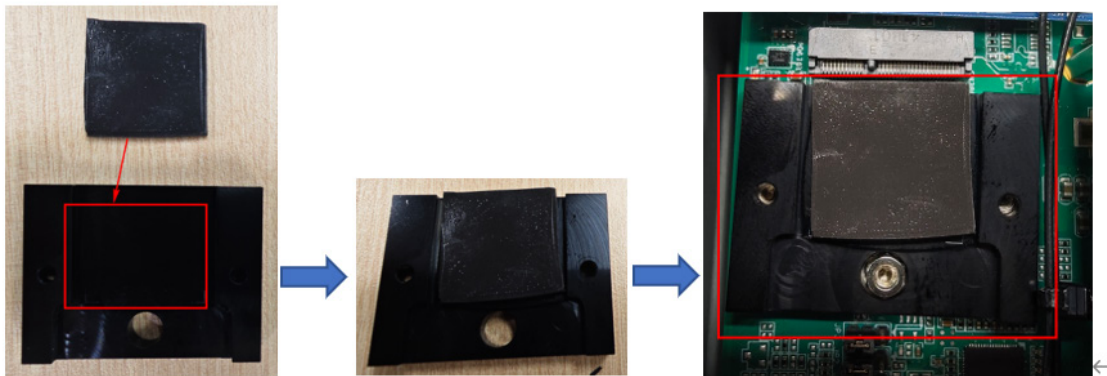
NOTE:

The Intel AX-210 is the M.2 module verified for use with AVA-7200. The modules may require an additional thermal solution when operated above 60°C. Please contact your local ADLINK representative for more information.

Remove screws: Loosen the 6 screws of the mechanism module.



1. Attach the thermal pad to the heat sink and install it in the corresponding position on the Wi-Fi module.



2. Route the antenna cables: Place the 2 Wi-Fi antenna cables (X1/X2) in their corresponding positions.



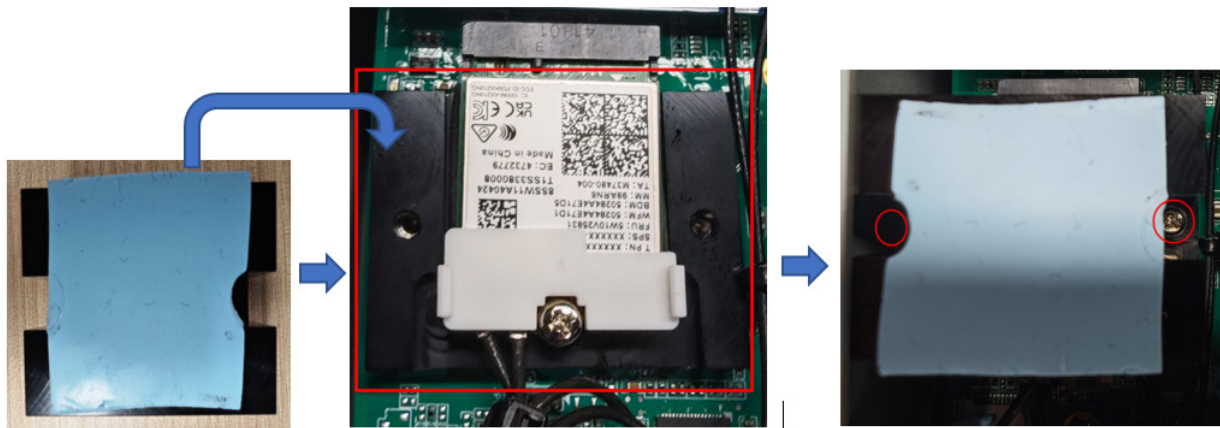
3. Install the protective cover: Place the protective cover in the designated position on the WIFI module.



4. Secure the 5G module: Insert the WIFI module into the corresponding slot and fasten it with screws.



5. Attach the thermal pad & heat dissipation module: Attach the thermal pad to the heat dissipation module, install it onto the WIFI module, and secure it with two screws.

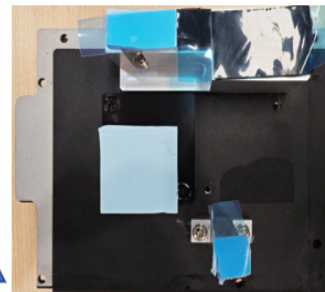
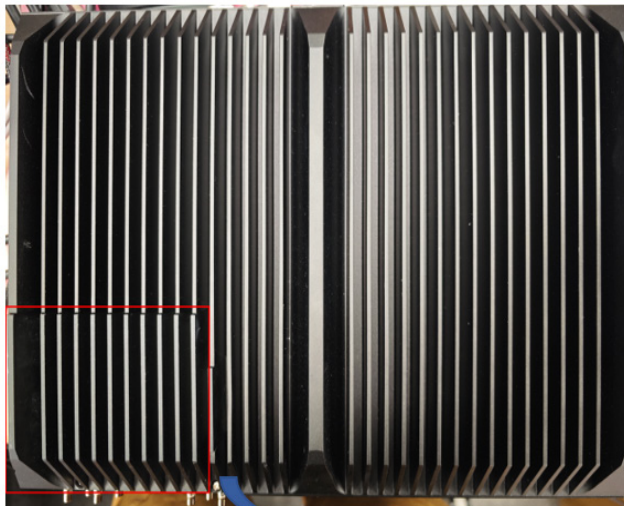
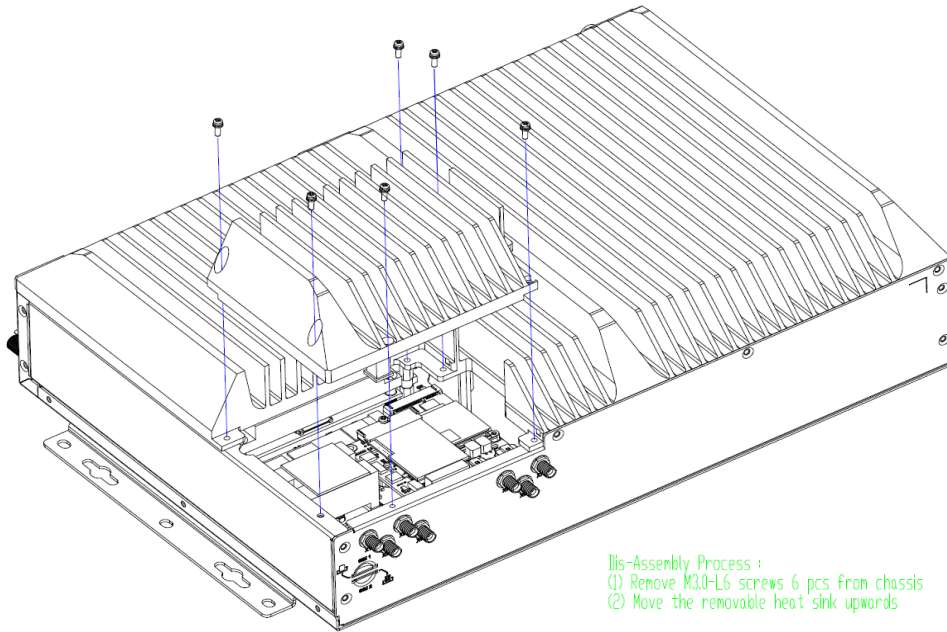


6. Reassembling: Screw the 6 screws back into the system.

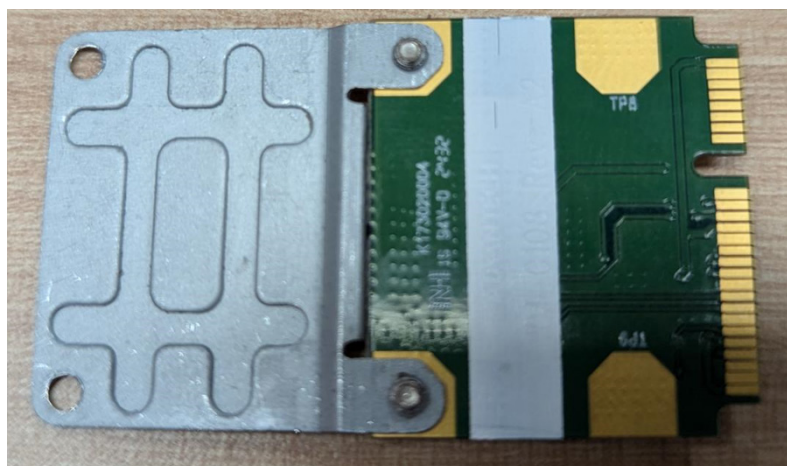


4.5 Installing Mini-PCIe GPS Module

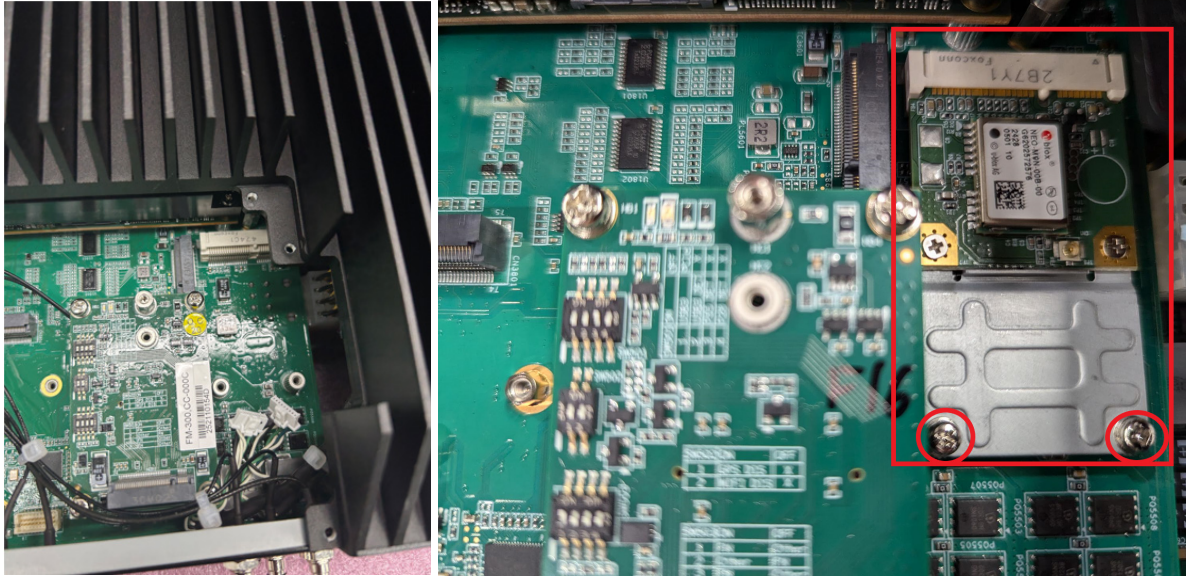
Remove screws: Loosen the 6 screws of the mechanism module



1. Get the GNSS module and the accessory. The accessory includes the extension plate and 2 screws. Assemble the extension plate to the GNSS module.



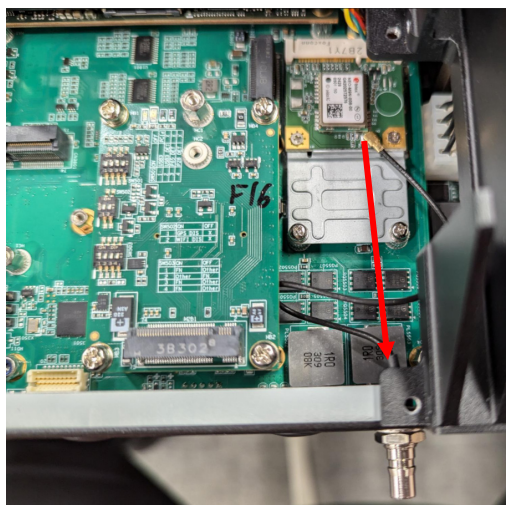
2. Insert the GNSS module inside the chassis at the mini-PCIe location. Tighten the 2x screws marked below.



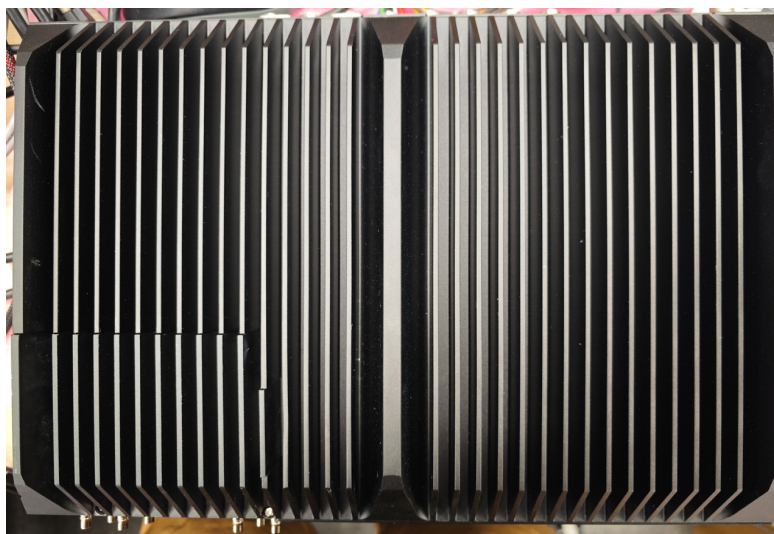
3. The AVA-7200 comes preinstalled with a QMA to IPEX-4 cable. Remove the QMA to IPEX-4 cable and replace it with the QMA to IPEX-1 cable for the GNSS module included in the package.



4. Assemble the cable onto the chassis. And then attach the IPEX-1 connector to the GNSS module.

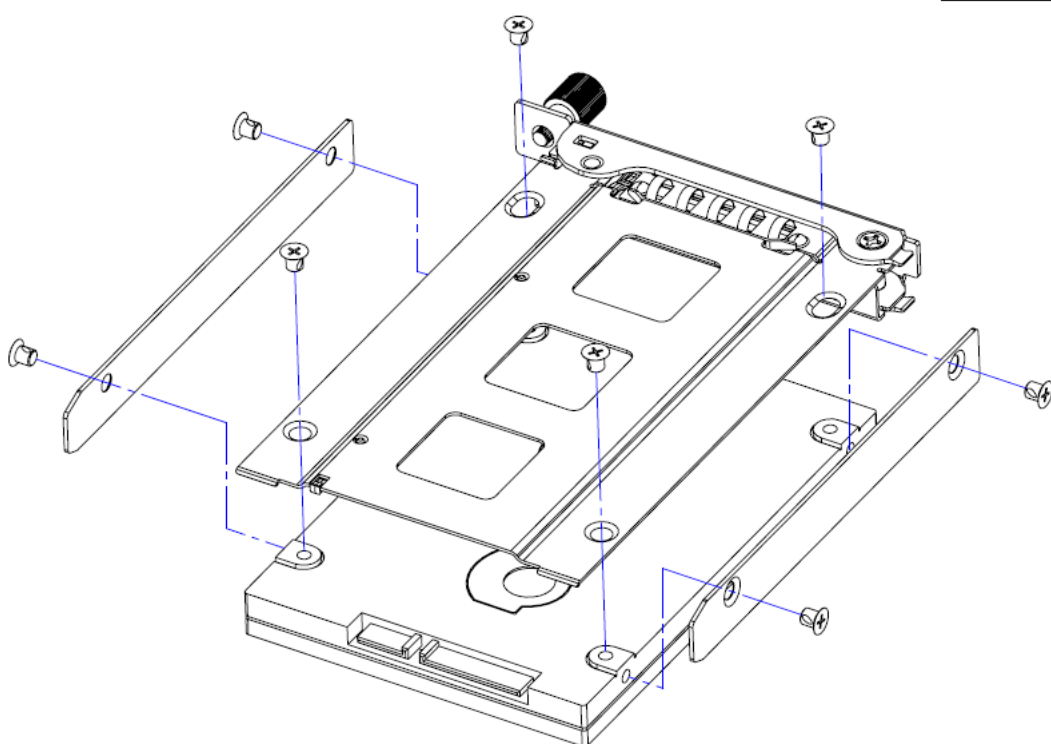


5. Organize the cable, make sure it does not interfere or overlap the 5G thermal pad. Then, close the cover.



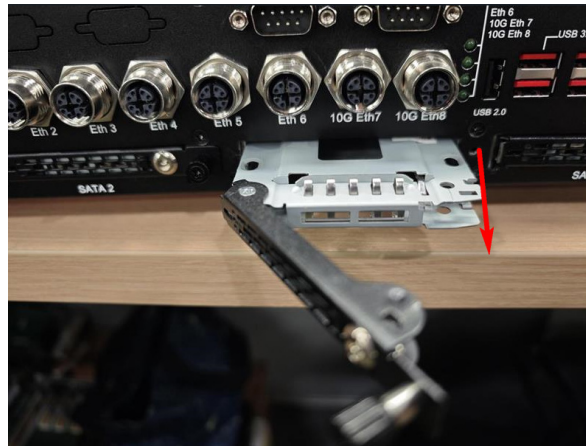
4.6 Installing 2.5" SATA SSD Storage

To install a 2.5" SATA storage, remove the 2.5" SATA tray from the AVA-7200. Then, assemble the 2.5" SATA SSD to the bracket shown below.

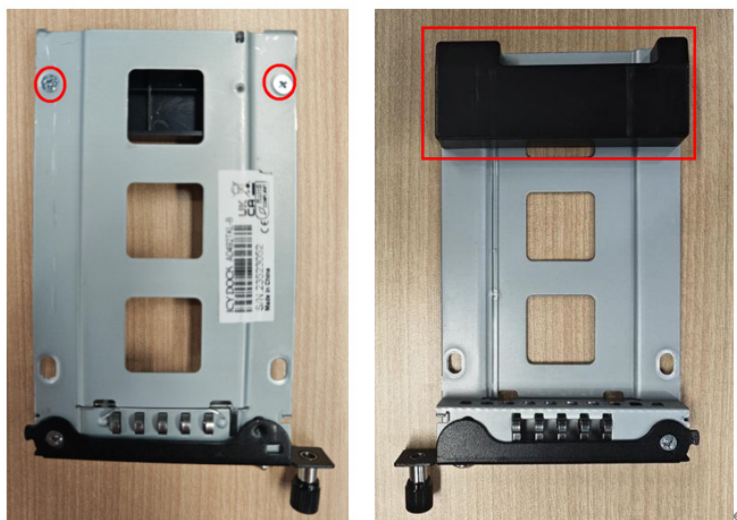


Then insert the assembled SSD into the AVA-7200. A resist force is expected when installing the SSD. Smoothly inset the SSD.

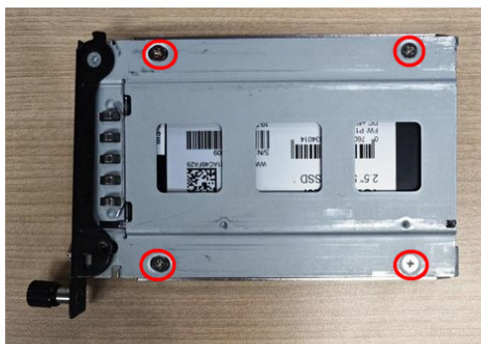
1. Pull out the HDD tray.



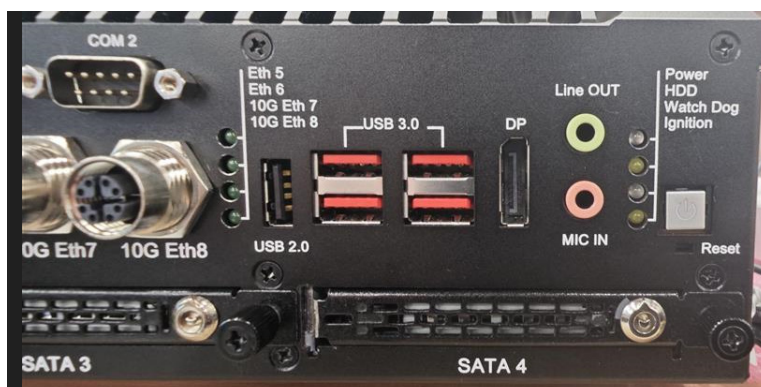
2. Loosen the COVER screws and remove them.



3. Secure the HDD module: Insert the HDD module and fasten it with screws.

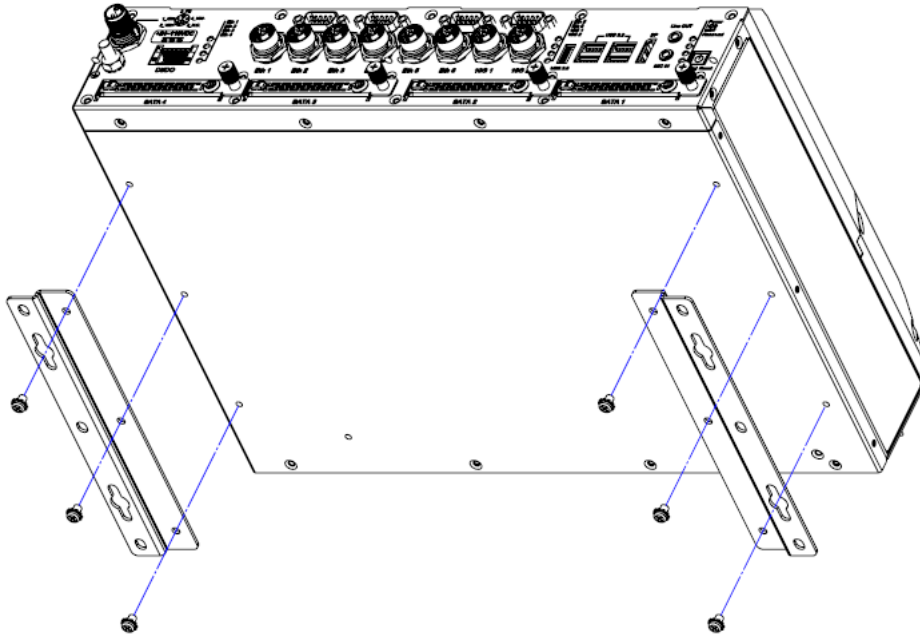


4. Slide the HDD tray back into the system.



4.7 Wall Mounting

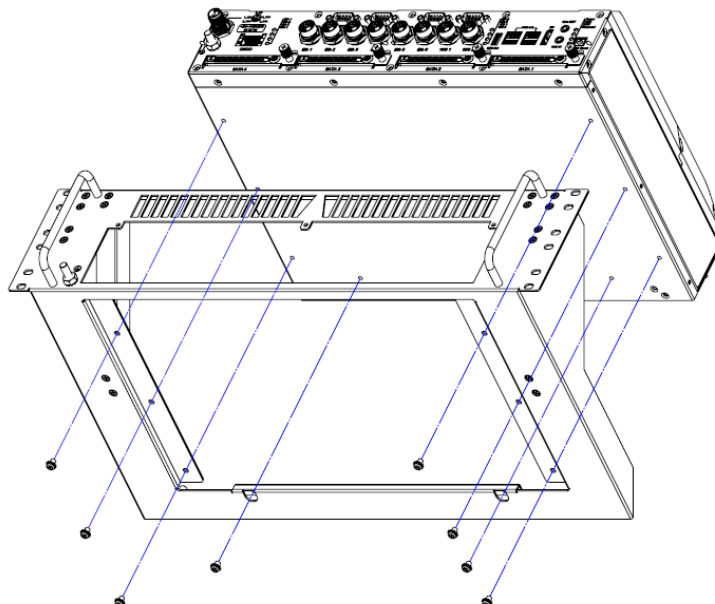
The AVA-7200 can be wall or surface mounted using the wall mount brackets and screws provided. If wall mounting, make sure the wall can support the weight of the device. Secure the brackets to the chassis using the 6 screws provided.



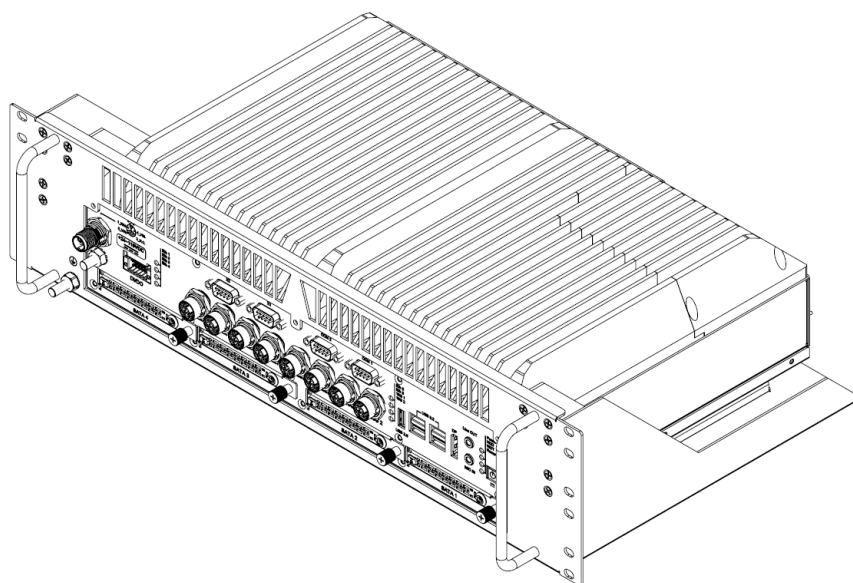
4.8 Rack Mounting

The AVA-7200 can be rack mounted using the rack mount brackets and screws provided. Secure the brackets to the chassis using the screws provided.

1. Secure the rack mount bracket as below.



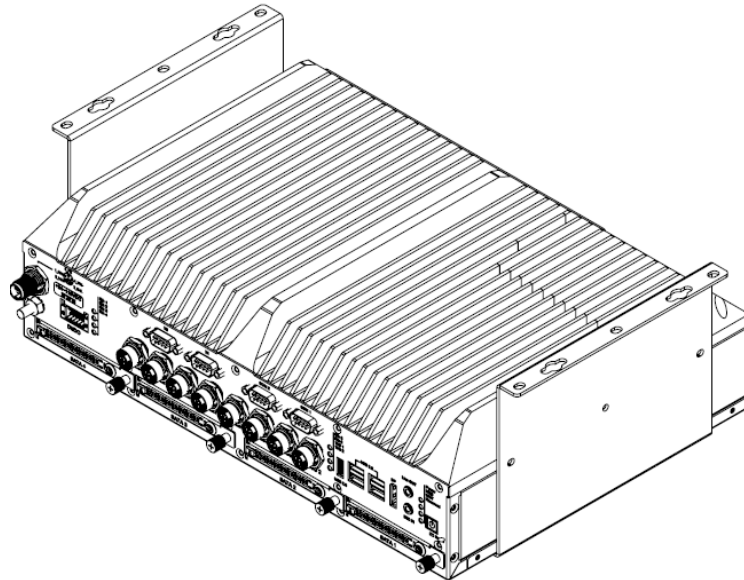
2. Secure the screws on the bracket.



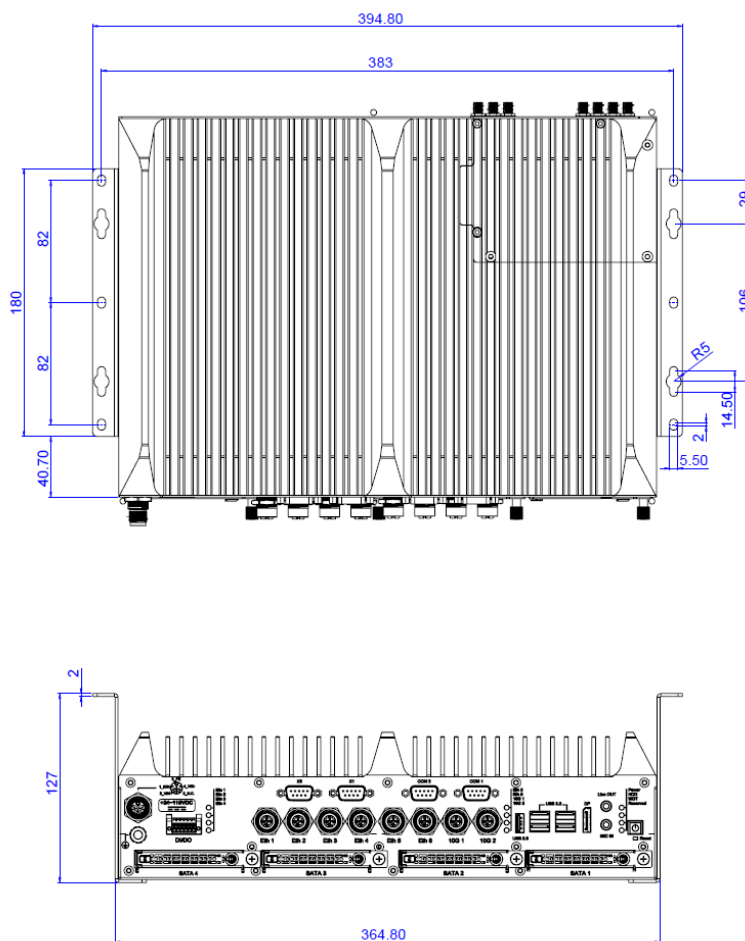
4.9 Ceiling Mounting

The AVA-7200 can be ceiling mounted using the ceiling mount brackets and screws provided. Secure the brackets to the chassis using the screws provided.

1. Secure the ceiling mount bracket as below.



The dimensions after the ceiling mount kit is assembled are as illustrated below.



4.10 Connecting a Ground Cable



CAUTION:

Connect the ground cable before making any other connections. When disassembling the system, always detach the ground cable last.

- Use a ground cable with a cross section of at least 0.823mm² (18AWG) and an M6 size ring terminal.
- Slide the ring terminal onto the ground stud and secure it with the locking M6 nut.



4.11 Connecting Peripherals

Connect all the peripheral devices needed for your system to function.

4.12 Connecting the Power Supply



CAUTION:

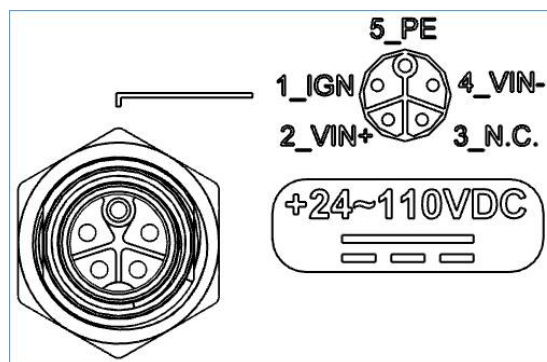
Connect the ground cable before making any other connections. When disassembling the system, always detach the ground cable last.



WARNING:

- Work on the computer system may only be carried out by personnel qualified for the specific task and who have the training and experience to identify risks and avoid potential hazards.
- Make sure that a ground cable has been connected to the system before connecting an external power supply and switching on the system.
- Make sure that the voltage supplied by the external power supply conforms to specifications of the system.

Connect the power supply to the 5-pin M12 K-coded connector on the front of the chassis. The device will power up when the power supply is turned on.

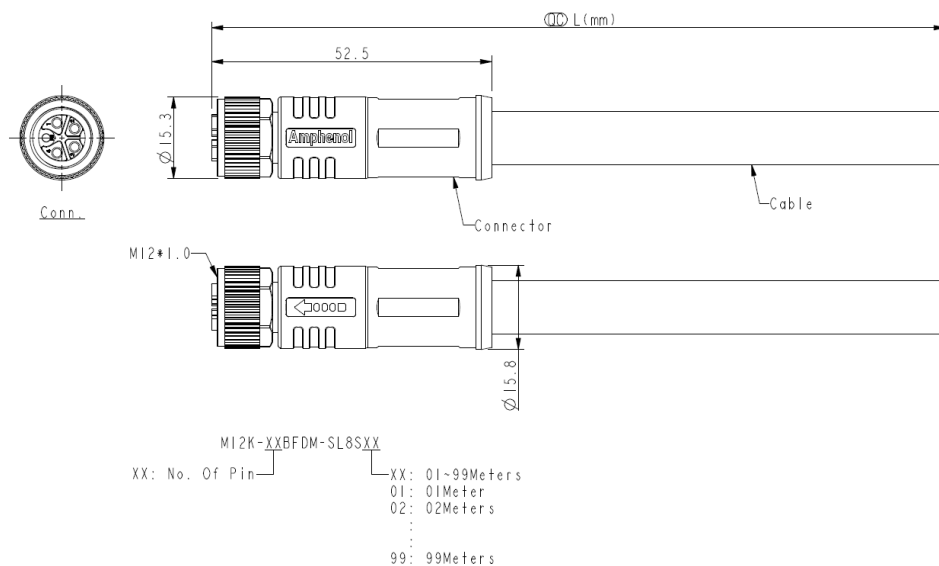


NOTE:

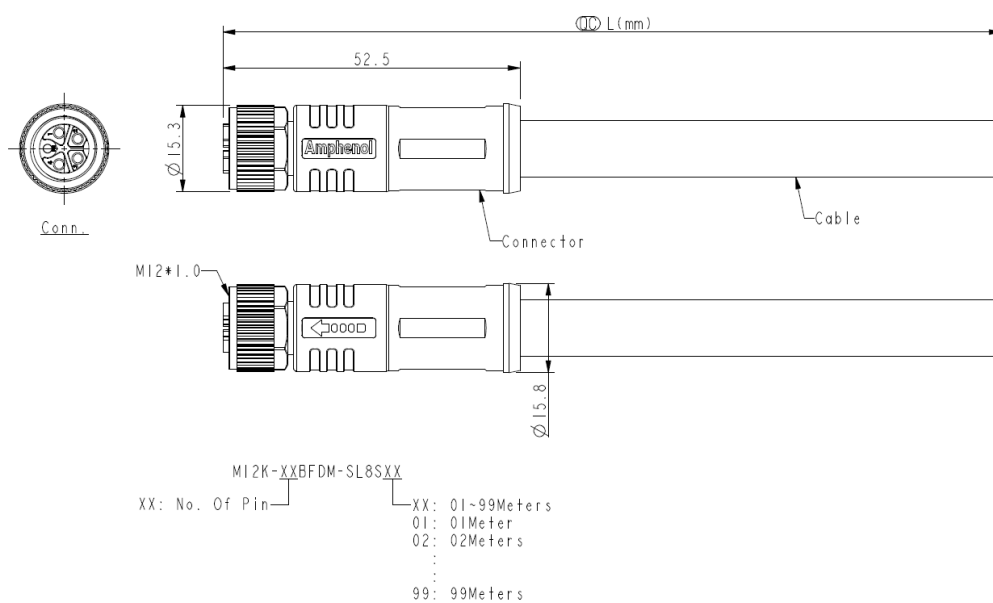
The user must provide the +24/36/72/110VDC to Pin 1 Ignition
For AVA-7200 with A2000, +24/36/72/110VDC can be applied.
For AVA-7200 with A4500, 72/110VDC can be applied.

For external connectors, there are 180° option and 90° right angle option, as shown below:

(1) 180 °:



(2) Right angle:



4.13 Starting the System

Upon starting up, the system will auto-detect storage devices and boot from the operating system, if found. To change the boot device order, press or <Esc> to enter BIOS setup menu and change the Boot Option settings. If no operating system is found, the system will enter the BIOS setup menu automatically.

The AVA-7200 is delivered without an operating system installed.

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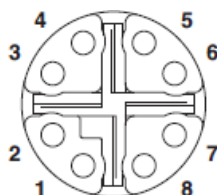
5 Connector Pinouts and Jumper Settings

5.1 External Connectors

Please refer to 3.2 Mechanical Layout Front View for connector locations.

5.1.1 GbE M12 X-Coded Connectors

Pin #	Signal Name
1	MDI_T_P0
2	MDI_T_N0
3	MDI_T_P1
4	MDI_T_N1
5	MDI_T_P3
6	MDI_T_N3
7	MDI_T_N2
8	MDI_T_P2

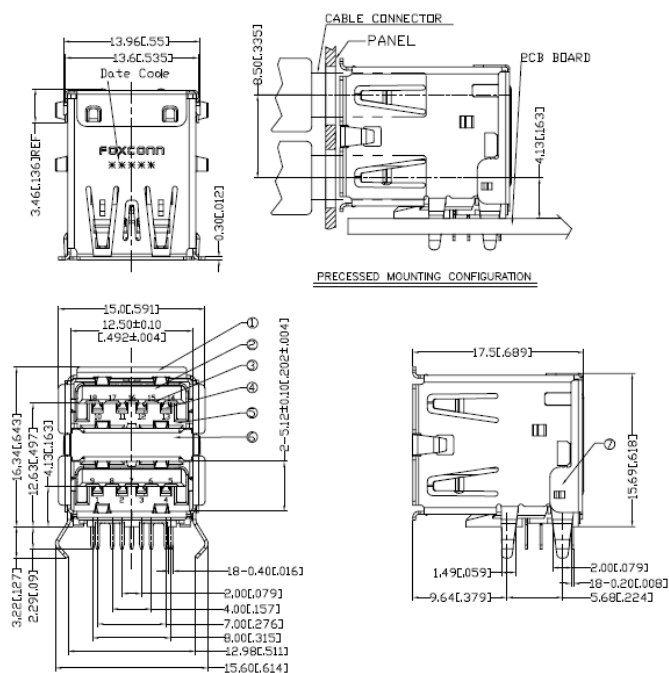


5.1.2 USB 3.0 Connector

All dimensions are in mm.

[Default tolerance]

Pin #	Signal Name
1	5V
2	USB2 DN
3	USB2 DP
4	GND
5	USB3 RXN
6	USB3 RXP
7	GND
8	USB3 TXN
9	USB3 TXP

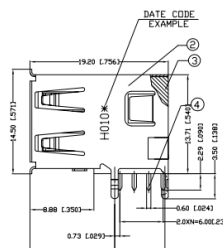
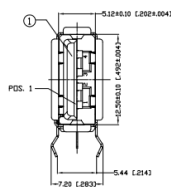


5.1.3 USB 2.0 Connector

All dimensions are in mm.

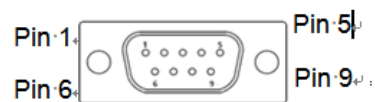
[Default tolerance]

Pin #	Signal Name
1	5V
2	USB2 DN
3	USB2 DP
4	GND

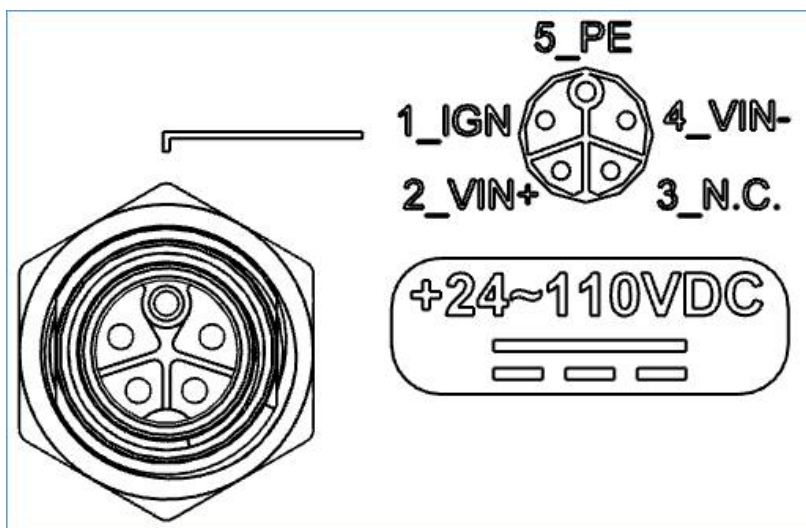


5.1.4 COM DB9 Connectors

Pin #	RS-232	RS-422	RS-485
Pin1	DCD	TXD-	D-
Pin2	RXD	TXD+	D+
Pin3	TXD	RXD+	NA
Pin4	DTR	RXD-	NA
Pin5	GND	GND	GND
Pin6	DSR	N/A	N/A
Pin7	RTS	N/A	N/A
Pin8	CTS	N/A	N/A
Pin9	RI	N/A	N/A



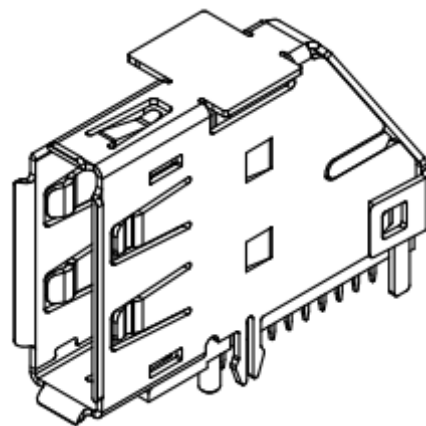
5.1.5 DC Power Input M12 K-code Connector



5.1.6 DP Connector

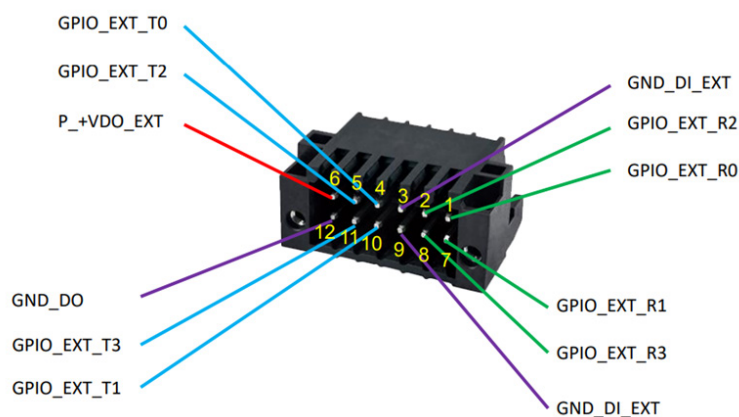
One DP connector on the front panel supports the HDMI2.0a/b (up to 6 Gbps) standard specification. It can connect to VGA, DVI, HDMI and DisplayPort monitors via DP to VGA adapter cable, DP-to-DVI adapter cable, and DP-to-HDMI cable. The DP connector supports HDMI2.0a/b, resolutions up to 4096 x 2160 at 60Hz

Pin #	Signal	Pin #	Signal
Pin1	DP LANE0 P	Pin 11	GND
Pin2	GND	Pin 12	DP LANE3 N
Pin3	DP LANE0 N	Pin13	DP AUX SEL
Pin4	DP LANE1 P	Pin 14	DP CFG2
Pin5	GND	Pin 15	DP AUX P
Pin6	DP LANE1 N	Pin 16	GND
Pin7	DP LANE2 P	Pin 17	DP AUX N
Pin8	GND	Pin 18	DP HPD
Pin9	DP LANE2 N	Pin 19	GND
Pin10	DP LANE3 P	Pin 20	VBUS



5.1.7 DIO Connectors

The location and pin definitions of the optional DIO connectors are as shown below.



Pin	Signal Name	Pin	Signal Name
1	GPI0	7	GPI1
2	GPI2	8	GPI3
3	GND DI	9	GND DI
4	GPO0	10	GPO1
5	GPO2	11	GPO3
6	VDO	12	GND DO

5.2 Internal Connectors

5.2.1 M.2 M Key 2280 PCIE Module Connector

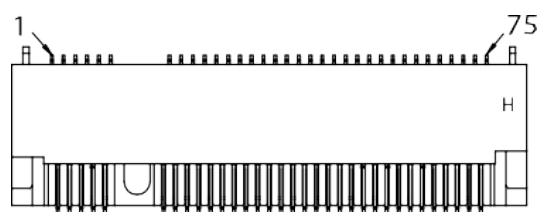
Pin	Signal Name	Pin	Signal Name
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIE RX3 N	6	NC
7	PCIE RX3 P	8	NC
9	GND	10	LED-L
11	PCIE TX3 N	12	3.3V
13	PCIE TX3 P	14	3.3V
15	GND	16	3.3V
17	PCIE RX2 N	18	3.3V
19	PCIE RX2 P	20	NC
21	GND	22	NC
23	PCIE TX2 N	24	NC
25	PCIE TX2 P	26	NC
27	GND	28	NC
29	PCIE RX1 N	30	NC
31	PCIE RX1 P	32	NC
33	GND	34	NC
35	PCIE TX1 N	36	NC
37	PCIE TX1 P	38	NC
39	GND	40	NC
41	PCIE RX0 N	42	NC
43	PCIE RX0 P	44	NC
45	GND	46	NC
47	PCIE TX0 N	48	NC
49	PCIE TX0 P	50	PERST-L
51	GND	52	CLKREQ-L
53	PCIE CLK N	54	NC
55	PCIE CLK P	56	NC
57	GND	58	NC
M-key			
67	NC	68	NC
69	NC	70	3.3V
71	GND	72	3.3V



73	GND	74	3.3V
75	GND		

5.2.2 M.2 B-key 3042 5G Module Connector

Pin	Signal Name	Pin	Signal Name
1	NC	2	3.3V
3	GND	4	3.3V
5	GND	6	FULL CARD OFF-L
7	USB2 DP	8	W DIS-L
9	USB2 DM	10	LED-L
11	GND		
KEY-B			
21	NC	20	NC
23	NC	22	NC
25	NC	24	NC
27	GND	26	NC
29	USB3 RX N	28	NC
31	USB3 RX P	30	SIM RST1
33	GND	32	SIM CLK1
35	USB3 TX N	34	SIM DAT1
37	USB3 TX P	36	SIM PWR1
39	GND	38	NC
41	PCIE RX N	40	SIM DET2
43	PCIE RX P	42	SIM DAT2
45	GND	44	SIM CLK2
47	PCIE TX N	46	SIM RST2
49	PCIE TX P	48	SIM PWR2
51	GND	50	PERST-L
53	PCIE CLK N	52	CLKREQ-L
55	PCIE CLK P	54	NC
57	GND	56	NC
59	NC	58	NC
61	NC	60	NC
63	NC	62	NC
65	NC	64	NC
67	NC	66	SIM DET1
69	NC	68	NC
71	GND	70	3.3V
73	GND	72	3.3V
75	NC	74	3.3V

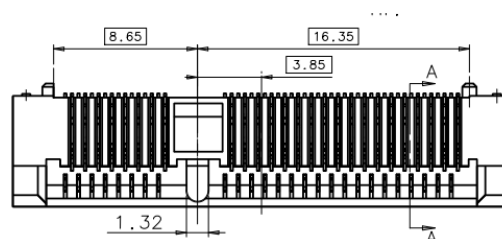


5.2.3 M.2 E Key 2230 Wi-Fi Module Connector

Pin	Signal Name	Pin	Signal Name
1	GND	2	3.3V
3	USB2_DP	4	3.3V
5	USB2_DM	6	WIFI_LED1
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	WIFI_LED2
17	NC	18	WIFI_VIO_CFG
19	NC	20	NC
21	NC	22	NC
23	N/C	24	N/C
Key E			
33	GND	32	NC
35	PCIE_TX_DP	34	NC
37	PCIE_TX_DN	36	NC
39	GND	38	NC
41	PCIE_RX_DP	40	NC
43	PCIE_RX_DN	42	NC
45	GND	44	NC
47	PCIE_CLK_DP	46	NC
49	PCIE_CLK_DN	48	NC
51	GND	50	NC
53	PCIE_CLKREQ-L	52	PCIE_RST-L
55	PEWAKE0-L	54	WIFI_BT_DIS-L
57	GND	56	WIFI_DIS-L
59	NC	58	NC
61	NC	60	NC
63	GND	62	NC
65	NC	64	NC
67	NC	66	NC
69	GND	68	NC
71	NC	70	NC
73	NC	72	3.3V
75	GND	74	3.3V

5.2.4 Mini PCIE for expansion

Pin	Signal Name	Pin	Signal Name
1	PCIE WAKE-L	2	3.3V
3	NC	4	GND
5	NC	6	1.5V
7	PCIE CLKREQ-L	8	NC
9	GND	10	NC
11	PCIE CLK N	12	NC
13	PCIE CLK P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	W_DIS_I-L
21	GND	22	PERST-L
23	PCIE RX N	24	3.3V
25	PCIE RX P	26	GND
27	GND	28	1.5V
29	GND	30	NC
31	PCIE TX N	32	NC
33	PCIE TX P	34	GND
35	GND	36	USB2 DM
37	GND	38	USB2 DP
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	1.5V
49	NC	50	GND
51	W_DIS2_I-L	52	3.3V
53	GND	54	GND



5.3 Buttons and LEDs

5.3.1 Power Button

The power button is non-latched and has a blue LED indicator. The system is turned on when the button is pressed, and the power LED lights up. If the system hangs, press the button for 5 seconds to turn off the system completely.

System status	Power Button LED
Power On	On
Power Off	Off

5.3.2 Reset Button

The reset button is a non-latched. The system is restarted when the button is pressed. If the system hangs, press the button to restart the system.

5.3.3 Status LEDs



LED indicator	Color	Description
Power	Green	LED on when power on. LED off when power off.
HDD	Yellow	When blinking, indicates the SATA drive is active.
Watchdog	Yellow	Indicates watchdog timer status. When watchdog timer starts, the LED flashes. When the timer is expired, the system will auto reboot.
Ignition/Reserved	Green	Reserved

5.4 DIO Test

5.4.1 Check GPIO numbers

- Platform: AVA-7200
- OS: Ubuntu 22.04.5 LTS (Kernel 6.8.0-51-generic)

Install tools & check SMBus

Install i2c-tools

```
$ sudo apt install i2c-tools
```

check smbus by i2ctool

```
$ sudo i2cdetect -l
```

```

adlink@adlink-ava-7x00-1v6: ~
adlink@adlink-ava-7x00-1v6:~$ sudo i2cdetect -l
[sudo] password for adlink:
i2c-0 i2c Synopsys DesignWare I2C adapter I2C adapter
i2c-1 i2c Synopsys DesignWare I2C adapter I2C adapter
i2c-2 smbus SMBus I801 adapter at efa0 SMBus adapter
i2c-3 i2c i915 gmbus dpa I2C adapter
i2c-4 i2c i915 gmbus dpb I2C adapter
i2c-5 i2c i915 gmbus dpc I2C adapter
i2c-6 i2c i915 gmbus tc1 I2C adapter
i2c-7 i2c i915 gmbus tc2 I2C adapter
i2c-8 i2c i915 gmbus tc3 I2C adapter
i2c-9 i2c i915 gmbus tc4 I2C adapter
i2c-10 i2c i915 gmbus tc5 I2C adapter
i2c-11 i2c i915 gmbus tc6 I2C adapter
i2c-12 i2c AUX B/DDI B/PHY B I2C adapter
i2c-13 i2c AUX USBC1/DDI TC1/PHY TC1 I2C adapter
i2c-14 i2c AUX USBC2/DDI TC2/PHY TC2 I2C adapter
i2c-15 i2c ADLINK BMC I2C adapter bus 1 I2C adapter
i2c-16 i2c ADLINK BMC I2C adapter bus 2 I2C adapter
i2c-17 i2c ADLINK BMC I2C adapter bus 3 I2C adapter
adlink@adlink-ava-7x00-1v6:~$

```

here We get smbus in i2c-2

Probe driver & check gpiochip

DIO control by PCA9555, i2c device 7bit address is "0x20".

Probe PCA9555 GPIO driver

\$ sudo modprobe gpio-pca953x

\$ sudo sh -c "echo ""pca9555 0x20"" > /sys/bus/i2c/devices/i2c-2/new_device"

Check gpiochip

\$ sudo cat /sys/kernel/debug/gpio

```

adlink@adlink-ava-7x00-1v6:~$ sudo cat /sys/kernel/debug/gpio
gpiochip0: GPIOs 512-871, parent: platform/INTC1055:00, INTC1055:00:
gpiochip1: GPIOs 872-887, parent: i2c/2-0020, 2-0020, can sleep:
adlink@adlink-ava-7x00-1v6:~$

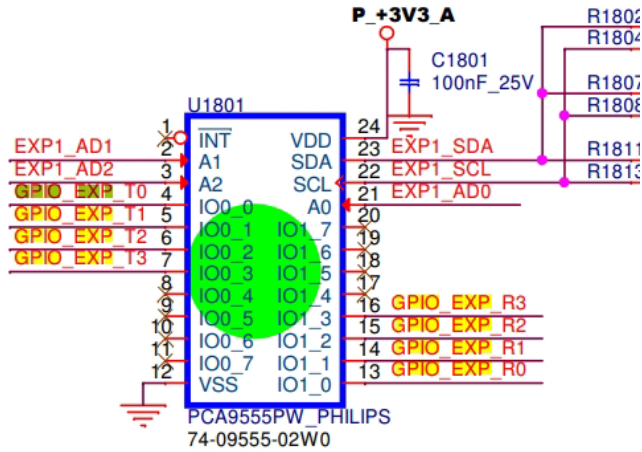
```

The gpiochip1 have GPIOs 872-887 include 16 pins

Find DIO GPIO number

Check GPIO function number in the platform schematic

Refer the platform schematic, there are 4 * DI(R0/R1/R2/R3) and 4 * DO(T0/T1/T2/T3).



T0 = IO0_0 = gpio872

T1 = IO0_1 = gpio873

T2 = IO0_2 = gpio874

T3 = IO0_3 = gpio875

R0 = IO1_0 = gpio880

R1 = IO1_1 = gpio881

R2 = IO1_2 = gpio882

R3 = IO1_3 = gpio883

5.4.2 Test GPIO function

DIO control by GPIO, add corresponding GPIO number to the system node

```
$ sudo echo 872 > /sys/class/gpio/export
```

```
$ sudo echo 873 > /sys/class/gpio/export
```

```
$ sudo echo 874 > /sys/class/gpio/export
```

```
$ sudo echo 875 > /sys/class/gpio/export
```

```
$ sudo echo 880 > /sys/class/gpio/export
```

```
$ sudo echo 881 > /sys/class/gpio/export
```

```
$ sudo echo 882 > /sys/class/gpio/export
```

```
$ sudo echo 883 > /sys/class/gpio/export
```

DI direction is input, DO direction is output

```
$ sudo echo out > /sys/class/gpio/gpio872/direction
```

```
$ sudo echo out > /sys/class/gpio/gpio873/direction
```

```
$ sudo echo out > /sys/class/gpio/gpio874/direction
```

```
$ sudo echo out > /sys/class/gpio/gpio875/direction
```

```
$ sudo echo in > /sys/class/gpio/gpio880/direction
```

```
$ sudo echo in > /sys/class/gpio/gpio881/direction
$ sudo echo in > /sys/class/gpio/gpio882/direction
$ sudo echo in > /sys/class/gpio/gpio883/direction
```

check DIO gpio state

```
$ sudo cat /sys/kernel/debug/gpio
```

```
gpiochip1: GPIOs 872-887, parent: i2c/2-0020, 2-0020, can sleep:
gpio-872 (                |sysfs          ) out lo
gpio-873 (                |sysfs          ) out lo
gpio-874 (                |sysfs          ) out lo
gpio-875 (                |sysfs          ) out lo
gpio-880 (                |sysfs          ) in  lo
gpio-881 (                |sysfs          ) in  lo
gpio-882 (                |sysfs          ) in  lo
gpio-883 (                |sysfs          ) in  lo
```

Get DI GPIO value

```
$ sudo cat /sys/class/gpio/gpio880/value
$ sudo cat /sys/class/gpio/gpio881/value
$ sudo cat /sys/class/gpio/gpio882/value
$ sudo cat /sys/class/gpio/gpio883/value
```

Set DO GPIO value "1" to output high level

```
$ sudo echo 1 > /sys/class/gpio/gpio872/value
$ sudo echo 1 > /sys/class/gpio/gpio873/value
$ sudo echo 1 > /sys/class/gpio/gpio874/value
$ sudo echo 1 > /sys/class/gpio/gpio875/value
```

Set DO GPIO value "0" to output low level

```
$ sudo echo 0 > /sys/class/gpio/gpio872/value
$ sudo echo 0 > /sys/class/gpio/gpio873/value
$ sudo echo 0 > /sys/class/gpio/gpio874/value
$ sudo echo 0 > /sys/class/gpio/gpio875/value
```

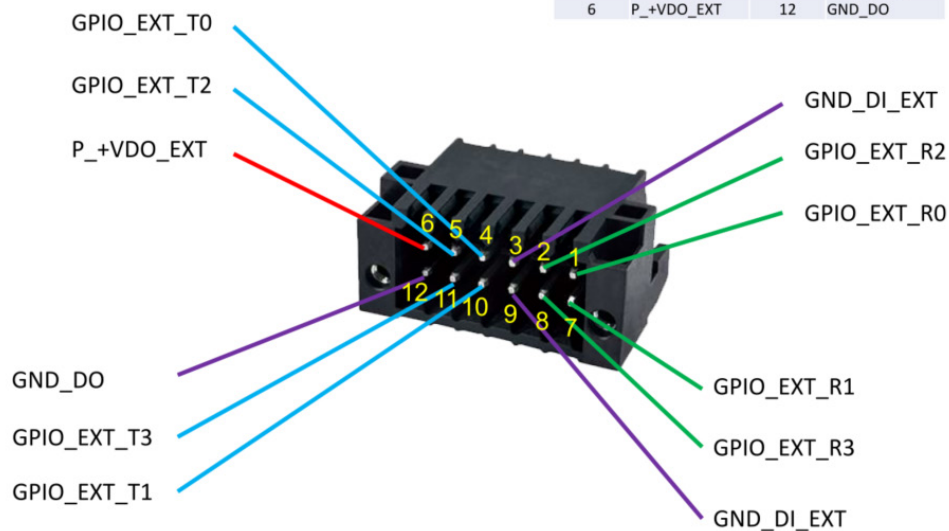
Remove DIO GPIO used, unregister corresponding GPIO number to the system node

```
$ sudo echo 872 > /sys/class/gpio/unexport
$ sudo echo 873 > /sys/class/gpio/unexport
$ sudo echo 874 > /sys/class/gpio/unexport
$ sudo echo 875 > /sys/class/gpio/unexport
$ sudo echo 880 > /sys/class/gpio/unexport
$ sudo echo 881 > /sys/class/gpio/unexport
$ sudo echo 882 > /sys/class/gpio/unexport
$ sudo echo 883 > /sys/class/gpio/unexport
```

5.4.3 DIO Loopback

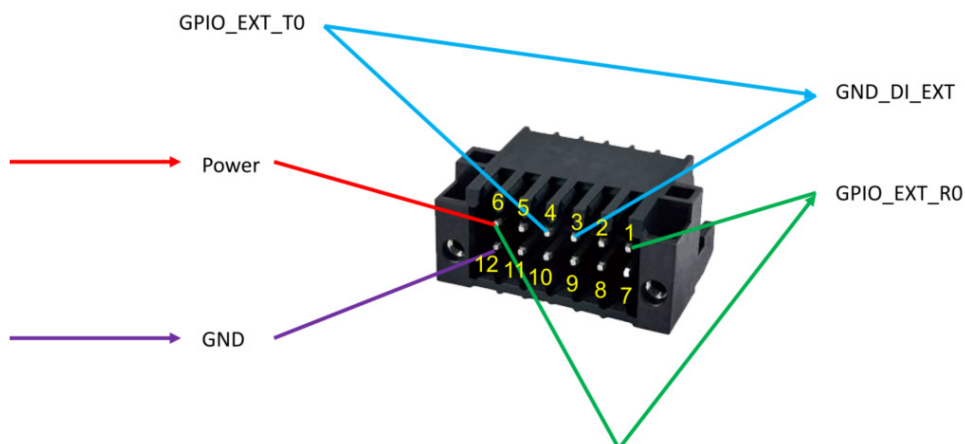
DIO Cable

RMXM-200 CN3401			
1	GPIO_EXT_R0	7	GPIO_EXT_R1
2	GPIO_EXT_R2	8	GPIO_EXT_R3
3	GND_DI_EXT	9	GND_DI_EXT
4	GPIO_EXT_T0	10	GPIO_EXT_T1
5	GPIO_EXT_T2	11	GPIO_EXT_T3
6	P_+VDO_EXT	12	GND_DO



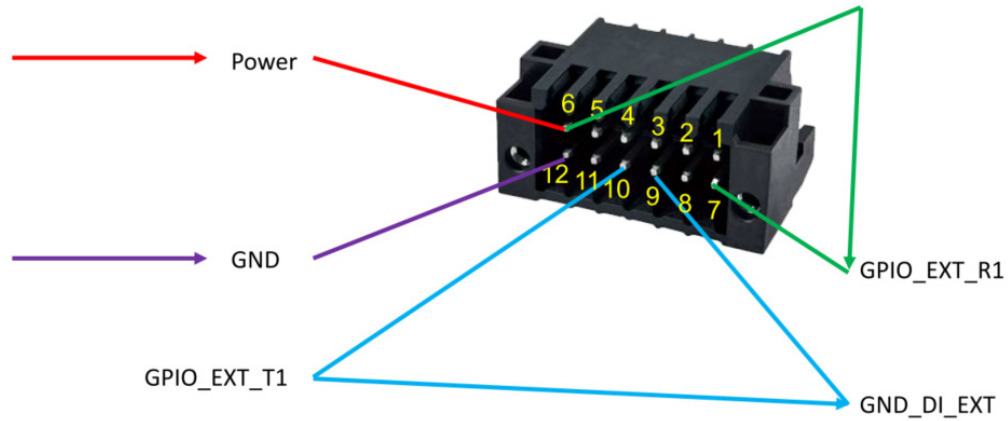
T0 -> R0

Power -> Pin6
GND -> Pin12
Pin1-> Pin6
Pin4 -> Pin3



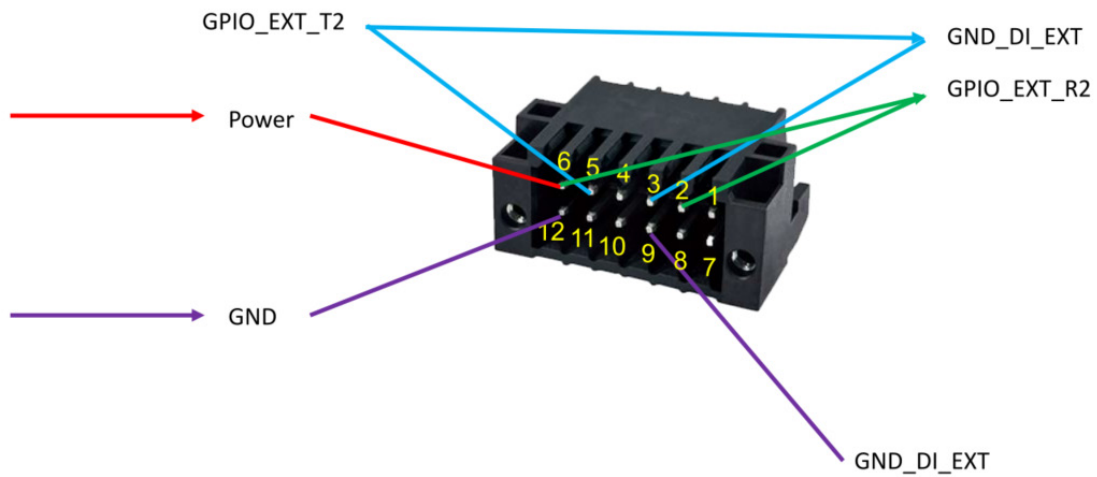
T1 -> R1

Power -> Pin6
GND -> Pin12
Pin7-> Pin6
Pin10 -> Pin9



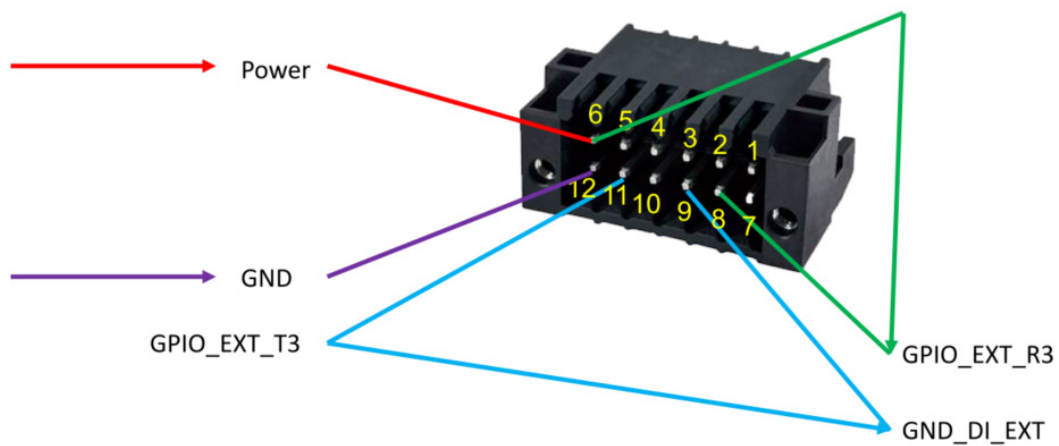
T2 -> R2

Power -> Pin6
GND -> Pin12
Pin2-> Pin6
Pin5 -> Pin3



T3 -> R3

Power -> Pin6
 GND -> Pin12
 Pin8-> Pin6
 Pin11 -> Pin9



Safety Instructions

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

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil, pour éviter des blessures ou des dommages.

- ▶ Read these safety instructions carefully.
- ▶ Keep the User's Manual for future reference.
- ▶ Read the Specifications section of this manual for detailed information on the recommended operating environment.
- ▶ When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing:
 - [> Turn off power and unplug any power cords/cables.
 - [> Reinstall all chassis covers before restoring power.
- ▶ To avoid electrical shock and/or damage to device:
 - [> Keep device away from water or liquid sources.
 - [> Keep device away from high heat or humidity.
 - [> Keep device properly ventilated (do not block or cover ventilation openings).
 - [> Always use recommended voltage and power source settings.
 - [> Always install and operate device near an easily accessible electrical outlet.
 - [> Secure the power cord (do not place any object on/over the power cord) and connect it to a socket-outlet with earthing connection.
 - [> Only install/attach and operate device on stable surfaces and/or recommended mountings.
- ▶ If the device will not be used for long periods of time, turn off and unplug from its power source.
- ▶ Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.
- ▶ A Lithium-type battery may be provided for uninterrupted backup or emergency power.

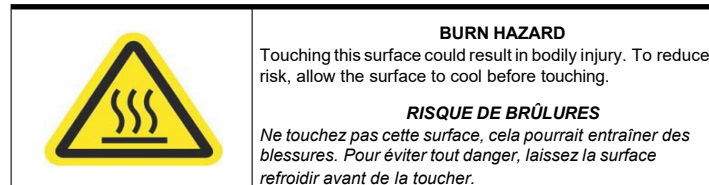


CAUTION:

Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- ▶ The device must be serviced by authorized technicians when:
 - [> The power cord or plug is damaged.
 - [> Liquid has entered the device interior.
 - [> The device has been exposed to high humidity and/or moisture.
 - [> The device is not functioning or does not function according to the User's Manual.
 - [> The device has been dropped and/or damaged and/or shows obvious signs of breakage.
- ▶ Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.
 - [> The equipment is not intended to be installed or used in a home, school, or public area accessible to the general population.
 - [> The knurled thumb screws with slotted heads for each Node module should be tightened with a tool after both initial installation and subsequent use.
- ▶ It is recommended that the device be installed only in a server room or computer room where access is:
 - [> Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefore, and any precautions required.
 - [> Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.
- ▶ Please use an approved power source certified by IEC or UL. If you need an adapter, optional accessories, or further assistance, please contact ADLINK for more information.



- ▶ Lisez attentivement ces consignes de sécurité
- ▶ Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement
- ▶ Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé
- ▶ Lors de l'installation/montage ou de la désinstallation/retrait de l'appareil ; ou lorsque le retrait d'un boîtier est nécessaire pour l'entretien par l'utilisateur (voir Mise en route) :
 - ▶ Éteignez l'alimentation et débranchez tous les cordons/câbles d'alimentation.
 - ▶ Réinstallez tous les panneaux du boîtier avant de remettre l'alimentation sous tension.
- ▶ Pour éviter les chocs électriques et/ou d'endommager l'appareil :
 - ▶ Tenez l'appareil à l'écart de toute source d'eau ou de liquide
 - ▶ Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée
 - ▶ Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation)
 - ▶ Utilisez toujours les réglages de tension et de source d'alimentation recommandés
 - ▶ Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible
 - ▶ Fixez le cordon d'alimentation (ne placez aucun objet sur/au-dessus du cordon d'alimentation) et connectez-le à une prise de courant avec mise à la terre
- ▶ N'essayez jamais de réparer l'appareil, qui doit être réparé uniquement par du personnel technique qualifié et utilisant des outils appropriés.
 - ▶ Lors de l'installation/montage ou de la désinstallation/retrait d'un périphérique, ou lorsque le retrait d'un couvercle de châssis est requis pour l'entretien par l'utilisateur :
 - ▶ Coupez l'alimentation et débranchez tous les cordons/câbles d'alimentation.
- ▶ Réinstallez tous les capots du châssis avant de rétablir l'alimentation. Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou des supports recommandés.
- ▶ Si l'appareil n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.
- ▶ Une batterie de type lithium peut être fournie pour une alimentation de secours ou de secours ininterrompue.
 - ▶ L'appareil doit être réparé par des techniciens agréés lorsque :
 - ▶ Le cordon d'alimentation ou la fiche est endommagé.
 - ▶ Du liquide est entré dans l'appareil. € L'appareil a été exposé à une humidité élevée et/ou à l'humidité.
 - ▶ L'appareil ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur.
- ▶ L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de casse.
- ▶ Débranchez le cordon d'alimentation avant de desserrer les vis moletées et fixez toujours les vis moletées avec un tournevis avant de démarrer le système.
 - ▶ L'équipement n'est pas destiné à être installé ou utilisé dans une maison, une école ou une zone publique accessible au grand public.
 - ▶ Les vis à molette avec têtes fendue pour chaque module Node doivent être serrées avec un outil après l'installation initiale et lors de l'utilisation suivante.
- ▶ Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique dont l'accès est :
 - ▶ Réservé au personnel de service qualifié ou aux utilisateurs familiers avec les restrictions appliquées à l'emplacement, les raisons de celles-ci et les précautions requises.
 - ▶ Autorisé uniquement par l'utilisation d'un outil ou d'une serrure et d'une clé, ou d'autres moyens de sécurité, et contrôlé par l'autorité responsable du lieu.

Veuillez utiliser une source d'alimentation approuvée et certifiée par la norme IEC ou UL. Si vous avez besoin d'un adaptateur, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.

Getting Services

Ask an Expert: <https://www.adlinktech.com/en/Askanexpert>

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