

# EPS-RPS

Intel® 13th Fanless Rugged Embedded System

## Quick Reference Guide

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## Document Amendment History

Revision	Date	By	Comment
1 <sup>st</sup>	March 2024	Avalue	Initial Release

## Declaration of Conformity



This device complies with part 15 fcc rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received including interference that may cause undesired operation.

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.

### CE statement

The product(s) described in this manual complies with all application European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

## Notice

This guide is designed for experienced users to setup the system within the shortest time. For detailed information, please always refer to the electronic user's manual.

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## Disclaimer

This manual is intended to be used as a practical and informative guide only and is subject to change without notice. It does not represent a commitment on the part of Avalue. This

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product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

## A Message to the Customer

### *Avalue Customer Services*

Each and every Avalue's product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Avalue device is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Avalue has come to be known.

Your satisfaction is our primary concern. Here is a guide to Avalue's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

### *Technical Support and Assistance*

1. Visit the Avalue website at <https://www.avalu.com.tw/> where you can find the latest information about the product.
2. Contact your distributor or our technical support team or sales representative for technical support if you need additional assistance. Please have 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

To receive the latest version of the user's manual; please visit our Web site at:

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

## ***Product Warranty (Returns & Warranties policy)***

### **1. Purpose**

Avalue establishes the following maintenance specifications and operation procedures for providing the best quality of service and shortened repair time to our customers.

### **2. Warranty**

#### **2.1 Warranty Period**

Avalue endeavors to offer customers the most comprehensive post-sales services and protection; besides offering a 2-year warranty for standard Avalue products, an extended warranty service can also be provided based on additional request from the customer. Within the warranty period, customers are entitled to receive comprehensive and prompt repair and warranty.

Standard products manufactured by Avalue are offered a 2-year warranty, from the date of delivery from Avalue. For ODM/OEM products manufactured by Avalue or PCBA with conformal coating, will follow up the define warranty of the agreement, otherwise will be offered 1-year warranty for ODM/OEM products but non-warranty for PCBA with conformal coating. For outsourcing parts kit by Avalue (ex: Motherboard, LCD touch panel, CPU, RAM, HDD) are offered a 6-month warranty, and Mobile/Tablet PC battery are offered a warranty of the half year, from the date of delivery by Avalue. Products before the mass production stage, i.e. engineering samples are not applied in this warranty or service policy. For extended warranty and cross-territory services, product defects resulting from design, production process or material are covered by the pre-set warranty period after the date of delivery from Avalue. For non-Avalue products, the product warranty and repair time shall be based on the service standards provided by the original manufacturer; in principle Avalue will provide these products a warranty service for no more than one year.

#### **2.2 Maintenance services within the warranty period**

In the case of Avalue product DOA (Defect-on-Arrival) when the customer finds any defect within 1 month after the delivery, Avalue will replace it with a new product in a soonest way. Except for custom products, once the customer is approved of a Cross-Shipment Agreement, which allows for delivery a new product to the customer before receiving the defective one, Avalue will immediately proceed with new product replacement for the said DOA case. On validation of the confirmed defect, Avalue is entitled to reserve the right whether to provide a new product for replacement. For the returned defective new product, it is necessary to verify that there shall be no bruise, alteration, scratch or marking to the appearance, and that none of the delivered accessories missing; otherwise, the customer will be requested to pay a processing fee. On the other hand, if the new product defect is resulting from incorrect configuration or erroneous use by the user instead of any problem of the hardware itself, the customer will also be requested to pay for relevant handling fees.

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As for other conditions, Avalue will handle defects by way of repair. The customer will be requested to send the defective product to an Avalue authorized service center, and Avalue will return the repaired product back to the customer as soon as possible.

### 2.3 Ruling of an out-of-warranty defect

The following situations are not included in the warranty:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident or other causes. Avalue reserves the right for the ruling of the aforementioned situations.
- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules of non-Avalue products and accessories shall be in accordance with standards set up by the original manufacturer. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiration of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number.
- Products before the mass production stage, i.e. engineering samples.

## 3. Procedure for sending for repair

### 3.1 Attain a RMA number

A customer's rejected product returned for repair shall have a RMA (Return Merchandise Authorization) number. Without a RMA number, Avalue will not provide any repair service for the rejected product, and the product will be returned to the customer at customer's cost. Avalue will not issue any notice for the return of the product.

Each returned product for repair shall have a RMA number, which is simply the authorization of the return for repair; it is not a guarantee that the returned goods can be repaired or replaced. For applying for a RMA number, the customer may enter the eRMA webpage of Avalue <https://myavalue.avalue.com.tw/> and log-in with an account number and a password authorized by Avalue. The system will then automatically issue a RMA number.

When applying for the RMA number, it is essential to fill in basic information of the customer and the product, together with detailed description of the problem encountered. If possible, avoid using ambiguous words such as "does not work" or "problematic". Without a substantial description of the problem, it is hard to start the repair and will cause prolonged repair time. Lacking detailed statement of fault steps also makes the problem hard to be identified, sometimes resulting in second-time repairs.

In case the customer can't define the cause of problem, please contact Avalue application engineers. Sometimes when the problem can be resolved even before the customer sends back the product.

On the other hand, if the customer only returns the key parts to Avalue for repair, it is necessary that the serial number of the entire unit is given in the "Problem Description" field, so that warranty period can be ruled accordingly; or Avalue will handle the case as an Out-of-warranty case.

### 3.2 Return of faulty product for repair

It is recommended that the customer not to return the accessories (manual, connection cables, etc.) with the products for repair, devices such as CPU, DRAM, CF memory card, etc., shall also be removed from the faulty goods before return for repair. If these devices are relevant to described repair problems and necessary to be returned with the goods; please clearly indicate the items included in the eRMA application form. Avalue shall not be responsible for any item that is not itemized. Moreover, make sure the problem(s) are detailed in the "Problem Description" field.

In the list of delivery, the customer may fill-in a value which is lower than the actual value, to prevent customs levying a higher tax over the excessive value of the return goods. The customer shall be held responsible for extra fees caused by this. We strongly recommend that "Invoice for customs purpose only with no commercial value" be indicated on the delivery note. Also for the purpose of expedited handling, please printout the RMA number and put it in the carton, also indicate the number outside of the carton, with the recipient addressing to Avalue RMA Department.

When returning the defective product, please use an anti-static bag or ESD material to pack it properly. In case of improper packing resulting in damages in the transportation process, Avalue reserves the right to reject the un-repaired faulty good at the customer's costs. Furthermore, it is suggested that the faulty goods shall be sent via a door-to-door courier service. The customer shall be held responsible for any customs clearance fee or extra expenses if Air-Cargo is used for the delivery.

In case of a DOA situation of a new product, Avalue will be responsible for the product and the freight. If the faulty goods are within the warranty period, the sender will take responsibility for the freight. For an out-of-warranty case, the customer shall be responsible for the freight of both trips.

### 3.3 Maintenance Charge

Avalue will charge a moderate repair fee for the following conditions:

- The warranty period has expired.
- Product has been altered or its label of the serial number has been torn off.
- Product functionality issues resulting from improper use by the user, unauthorized dismantle or alteration, unfit operation environment, improper maintenance, accident

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or other causes. Avalue reserves the right for the ruling of the aforementioned situations.

- Product damage resulting from lightning, flood, earthquake or other calamities.
- The warranty rules for non-Avalue products and accessories shall be in accordance with standards set up by the original supplier. These products and accessories include RAM, HDD, FDD, CD-ROM, CPU, FAN, etc.
- Product upgrade request or test request submitted by the customer after expiry of the warranty.
- PCBA with conformal coating.
- Avalue semi-product and outsourced products without Avalue serial number
- Products before the mass production stage, i.e. engineering samples.
- In case the products received are examined as NPF (No Problem Found) within the warranty period, the customer shall be responsible for the freight of both trips.
- Please contact your local distributor to examine in advance to prevent unnecessary freight cost.

For system failure of out-of-warranty products, Avalue will provide a quotation prior to repair service. When the customer applies for the cost, please refer to the Quotation number. In case the customer does not return the DOA product that has already been replaced by a new one, or the customer does not sign back the quotation of the out-of-warranty maintenance, Avalue reserves the right of whether or not to provide the repair service. In case the customer does not reply in 3 months, Avalue shall directly scrap or return the product back to customer at customer's cost without further notice to the customer.

### **3.4 Maintenance service of phased-out products**

For servicing phased-out products, Avalue provides an extended period, starting the date of phase-out, as a guaranteed maintenance period of such products, for continuance of the maintenance service to meet customer's requirements. In case of unexpected factors causing Avalue to be unable to repair/replace a warranted but phased-out product, Avalue will, depending on the availability, upgrade the product (free of charge with continued warranty period as of the original product), or, give partial refund (based on the length of the remaining warranty period) to solve this kind of problem.

### **3.5 Maintenance Report**

On completion of repair of a defective product, a Maintenance Report indicating the maintenance result and part(s) replaced (if any) will be sent to the customer together with the product. If the customer demands an additional maintenance analysis report, a service fee of various level will be charged depending on the warranty status. In case the analysis result shows that the defect attributes to Avalue's faulty design or process, the analysis fee will be exempted.



### 4. Service Products

Avalue provides service products to manage with different customer needs. Should you have any need, please consult to Avalue Sales Department.

#### **Defect Analysis Report (DAR)**

Avalue provides DAR (Defect Analysis Report) services aiming to elevating customer satisfaction. A DAR includes defect cause identification/verification/suggestion and improvement precautions, with instructions on correct usage for the avoidance of any reoccurrence.

#### **Upgrade Service**

Avalue is capable to provide system upgrade service for customization requirements. This upgrade service is applicable for main parts, such as CPU, memory, HDD, SSD, storage devices; also replacements motherboards of systems. Please contact Avalue sales for details to evaluate the possibility of system upgrade service and obtain information of lead time and price.

## Safety Instructions

### Safety Precautions

Before installing and using this device, please note the following precautions.

1. Read these safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Disconnected this equipment from any AC outlet before 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. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Use a power cord that has been approved for using with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
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

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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. 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 work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.






14. CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

15. Equipment intended only for use in a RESTRICTED ACCESS AREA.

## Explanation of Graphical Symbols

	Warning	A WARNING statement provides important information about a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Caution	A CAUTION statement provides important information about a potentially hazardous situation which, if not avoided, may result in minor or moderate injury to the user or patient or in damage to the equipment or other property.
	Note	A NOTE provides additional information intended to avoid inconveniences during operation.
		Direct current.
		Alternating current
		Stand-by, Power on
		FCC Certification
		CE Certification
		Follow the national requirements for disposal of equipment.
		Stacking layer limit
		This side up

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		Fragile Packaging
		Beware of water damage, moisture-proof
		Carton recyclable
		Handle with care
		Follow operating instructions of consult instructions for use.

## Disposing of your old product

### **WARNING:**

There is danger of explosion if the battery is mishandled or incorrectly replaced. Replace only with the same type of battery. Do not disassemble it or attempt to recharge it outside the system. Do not crush, puncture, dispose of in fire, short the external contacts, or expose to water or other liquids. Dispose of the battery in accordance with local regulations and instructions from your service provider.

### **CAUTION:**

- Lithium Battery Caution: Danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type. Dispose batteries according to manufacturer's instructions.
- Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY, that can result in an EXPLOSION
- Leaving a BATTERY in an extremely high temperature surrounding environment that can result in an EXPLOSION or the leakage of flammable liquid or gas.
- A BATTERY subjected to extremely low air pressure that may result in an EXPLOSION or the leakage of flammable liquid or gas.

### **Mise en garde!**

AVERTISSEMENT : Il existe un risque d'explosion si la batterie est mal manipulée ou remplacée de manière incorrecte. Remplacez uniquement par le même type de batterie. Ne le démontez pas et ne tentez pas de le recharger en dehors du système. Ne pas écraser, percer, jeter au feu, court-circuiter les contacts externes ou exposer à l'eau ou à d'autres liquides. Jetez la batterie conformément aux réglementations locales et aux instructions de votre fournisseur de services.

### **MISE EN GARDE:**

- Pile au lithium Attention : Danger d'explosion si la pile n'est pas remplacée correctement. Remplacer uniquement par un type identique ou équivalent. Jetez les piles conformément aux instructions du fabricant.
- L'élimination d'une BATTERIE dans le feu ou dans un four chaud, ou l'écrasement ou le découpage mécanique d'une BATTERIE, pouvant entraîner une EXPLOSION
- Laisser une BATTERIE dans un environnement à température extrêmement élevée pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.
- UNE BATTERIE soumise à une pression d'air extrêmement basse pouvant entraîner une EXPLOSION ou une fuite de liquide ou de gaz inflammable.

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# 1. Getting Started

## 1.1 Safety Precautions

### Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

### Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

## 1.2 Packing List

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	EPS-RPS Intel® 13th Fanless Rugged Embedded System	1
2	Din Rail Kit	1
3	Component Kits (Screws for M.2 & Din Rail, 4x Rubber Feet)	1



If any of the above items is damaged or missing, contact your retailer.

# Unpacking

**Note:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the Avalue reseller or vendor the product was purchased from or contact an Avalue sales representative directly by sending an email to [sales@avalue.com.tw](mailto:sales@avalue.com.tw).

To unpack the flat bezel panel PC, follow the steps below.

**WARNING!**

The front side LCD screen has a protective plastic cover stuck to the screen. Only remove the plastic cover after the fiat bezel panel PC has been properly installed. This ensures the screen is protected during the installation process.

Step 1: Carefully cut the tape sealing the box. Only cut deep enough to break the tape.

Step 2: Open the outside box.

Step 3: Carefully cut the tape sealing the box. Only cut deep enough to break the tape.

Step 4: Open the inside box.

Step 5: Lift the panel PC out of the boxes.

Step 6: Remove the peripheral parts box from the main box.

## 1.3 System Specifications

System Information	
<b>Processor</b>	Intel® Core™ I9-13900TE Processor (24-Core, 6P+16E, 36M, 35W) Intel® Core™ I7-13700TE Processor (16-Core, 8P+8E, 30M, 35W) Intel® Core™ i5-13500TE Processor (14-Core, 6P+8E, 24M, 35W) Intel® Core™ i3-13100TE Processor (4-Core, 4P, 12M, 35W)  -Project Based Intel® Core™ i5-13500E Processor (14-Core, 6P+8E, 24M, 65W)
<b>Platform Controller Hub</b>	Intel® Q670E/H610E Chipset
<b>System Memory</b>	2x262P SO-DIMM Socket (Capacity Max. Up to 64GB DDR5 4800/5600)
<b>I/O Chipset</b>	NuvoTon NCT6126D
<b>BIOS Information</b>	AMI 256Mb UEFI BIOS
<b>Watchdog Timer</b>	H/W Reset, 1sec. ~ 65535sec and 1sec. or 1min./step
<b>H/W Status Monitor</b>	Monitoring CPU Temperature, Voltage with Auto Throttling Control
<b>RAID</b>	RAID 0/1 (w/Q670E sku, SATA SSD)
<b>TPM</b>	dTPM 2.0
<b>iAMT</b>	iAMT (w/Q670E, Above i5 CPU)
<b>SBC</b>	EBM-ADS
Expansion	
<b>M.2 (Signal)</b>	1xM.2 Key-E 2230 (PCIe, USB 2.0) 1xM.2 Key-B 2242/3042/3052 with Internal SIM Slot (PCIe, USB 3.2, USB 2.0) 1xM.2 Key-M 2280 (PCIe Gen 4x4)(Q670E sku only)
<b>mPCIe</b>	1xmPCIe (PCIe, USB 2.0)
Storage	
<b>M.2 (Signal)</b>	1xM.2 Key-M 2242/2280 NVMe (PCIe Gen 4x4) (Q670E sku only) 1xM.2 Key-B 2242 SSD (SATA3)
<b>2.5" Drive Bay (Height)</b>	1xInternal 2.5" Drive Bay (12.5mm)
Front I/O	
<b>USB Port</b>	4xUSB 3.2 Gen 1
<b>COM Port</b>	2xRS-232 4xRS-232/422/485 (Select via BIOS, jumper control, auto flow control via HW)(2 on

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	board with 5V/12V RI supported)
<b>Audio</b>	1xMic-In 1xLine-Out
<b>Power Button</b>	1xPWR BTN w/LED
<b>Reset Button</b>	1xRST Hidden BTN
<b>Wire-Control Power On/Off</b>	1xWire-Control PWR On/Off (2P Terminal Block)
<b>LED Indicator</b>	1xData Access LED (Yellow) 1xWWAN LED (Green, M.2 Key-B) 1xWAN LED (Green, M.2 Key-E)
<b>Rear I/O</b>	
<b>USB Port</b>	2xUSB 2.0 2xUSB 3.2 Gen 2
<b>HDMI</b>	2xHDMI
<b>DP</b>	2xDP
<b>LAN Port</b>	2xRJ45
<b>AC/DC Input</b>	1xDC Input
<b>Antenna</b>	2xAntenna w/cover
<b>System Fan</b>	1xExternal Smart Fan (Option)
<b>Left I/O (View on front side)</b>	
<b>Antenna</b>	2xAntenna w/cover
<b>Right I/O (View on front side)</b>	
<b>Antenna</b>	2xAntenna w/cover
<b>Display</b>	
<b>Graphic Chipset</b>	Intel® UHD Graphics 770 (i9,i7,i5) Intel® UHD Graphics 730 (i3)
<b>Resolution</b>	HDMI 2.0b: 4096x2304@60Hz DP++ 1.4b: 4096x2304@60Hz
<b>Audio</b>	
<b>Audio Codec</b>	RealTek ALC888S
<b>Ethernet</b>	
<b>LAN Chipset</b>	Intel® Ethernet Connection I219-LM Intel® Ethernet Controller I226-LM
<b>Data Rate Per Port</b>	1GbE (I219-LM) 2.5GbE (I226-LM)

<b>LED Indicator</b>	Max. 1G LAN Port			
	ACT/LINK		SPEED	
	LED	Definition	LED	Definition
	Light Off	No Link	Solid Orange	1G
	Solid Yellow	Connection	Solid Green	100M
	Yellow Flashing	Activity	Light Off	10M
	Max. 2.5G LAN Port			
	ACT/LINK		SPEED	
		Definition	LED	Definition
	Light Off	No Link	Solid Orange	2.5G
	Solid Yellow	Connection	Solid Green	1G/100M
	Yellow Flashing	Activity	Light Off	10M
<b>Power Requirement</b>				
<b>Voltage Input Spec.</b>	Typical 12/24Vdc			
<b>Voltage Input Conn.</b>	5P Terminal Block			
<b>ACPI</b>	Single power ATX Support S0, S3, S4, S5 ACPI 5.0 Compliant			
<b>Power Mode</b>	AT/ATX (ATX is default setting)			
<b>Adapter</b>	AC to DC Adapter 12V/12.5A for i5/i3 (35W) 24V/10A for i9/i7 (35W) & i5 (65W)			
<b>Mechanical &amp; Environment</b>				
<b>Operating Temp.</b>	-10°C ~ 55°C (14°F ~ 131°F) with 0.5m/s air flow (35W) -10°C ~ 50°C (14°F ~ 122°F) with 0.5m/s air flow (65W w/ External Fan kit)			
<b>Storage Temp.</b>	-30~70C° (-22°F ~ 158°F)			
<b>Operating Humidity</b>	40°C @ 95% Relative Humidity, Non-condensing			
<b>Dimension (W*L*H)</b>	216x203x75mm (8.5" x 8" x 3")			
<b>Weight</b>	3.2kg			
<b>Vibration Test</b>	Random Vibration Operation 1 Test PSD : 0.00454G <sup>2</sup> /Hz , 5 Grms 2 System condition : operation mode 3 Test frequency : 5~500 Hz 4 Test axis : X,Y and Z axis 5 Test time : 30 minutes per each axis 6 IEC60068-2-64 Test Fh			

## EPS-RPS

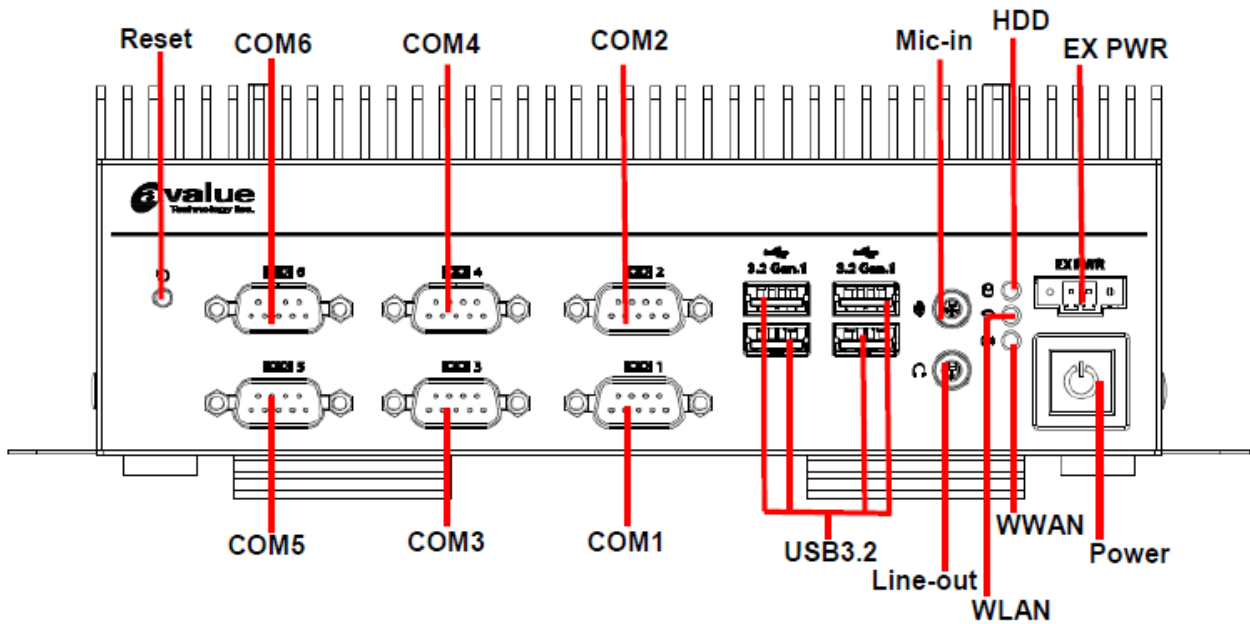
	<p>6 Storage : SSD</p> <p>Sine Vibration test (Non-operation)</p> <p>1 Test Acceleration : 2G</p> <p>2 Test frequency : 5~500 Hz</p> <p>3 Sweep : 1 Oct/ per one minute. (logarithmic)</p> <p>4 Test Axis : X,Y and Z axis</p> <p>5 Test time :30 min. each axis</p> <p>6 System condition : Non-Operating mode</p> <p>7. Reference IEC 60068-2-6 Testing procedures</p> <p>Package Vibration Test:</p> <p>1 Test PSD : 0.026G<sup>2</sup>/Hz , 2.16 Grms</p> <p>2 Test frequency : 5~500 Hz</p> <p>3 Test axis : X,Y and Z axis</p> <p>4 Test time : 30 minutes per each axis</p> <p>5 IEC 60068-2-64 Test Fh</p>
<b>Shock Test</b>	<p>1 Wave from : Half Sine wave</p> <p>2 Acceleration Rate : 50G</p> <p>3 Duration Time : 11ms</p> <p>4 No. of shock : 3 times</p> <p>5 Test Axis : +/- X, +/-Y, +/-Z axis</p> <p>6 operation mode</p> <p>7 Reference IEC 60068-2-27 testing procedures</p> <p>Test Eb : SSD Shock Test</p>
<b>Drop Test</b>	<p>Package drop test</p> <p>Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed</p> <p>Test Ea : Drop Test</p> <p>Test phase : One corner, three edges, six faces</p>
<b>IP Rating</b>	IP50
<b>Mounting Kit</b>	Default Wall Mount, Din-Rail Kit
<b>Software Support</b>	
<b>OS Information</b>	Win10, Win11, Linux



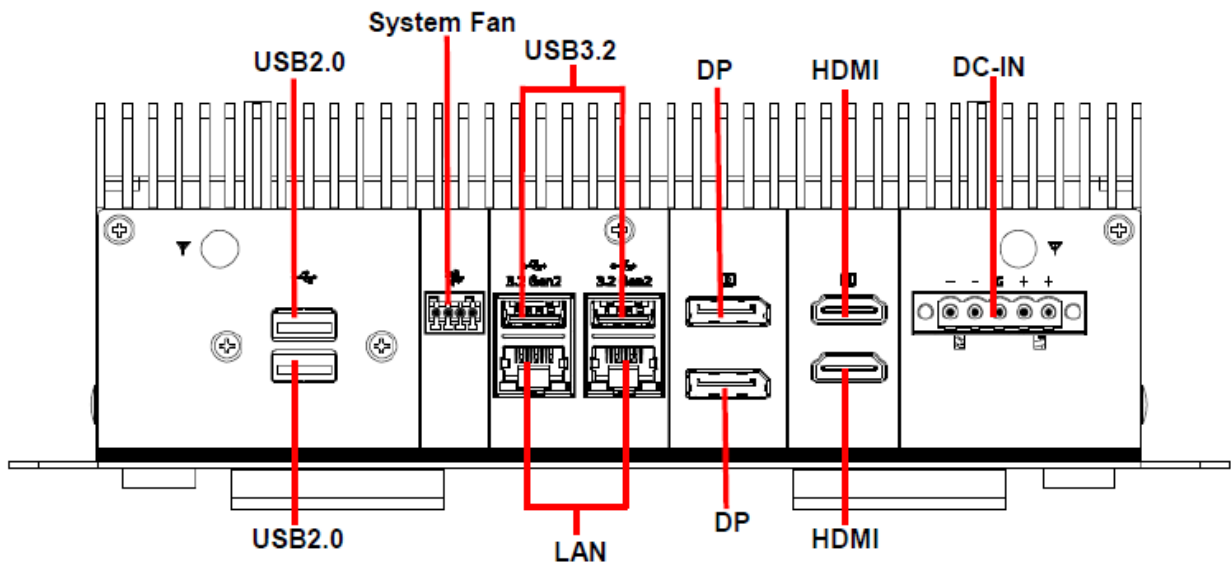
**Note:** Specifications are subject to change without notice.

## 1.4 System Overview

### 1.4.1 Front View



### 1.4.2 Rear View



## Connectors

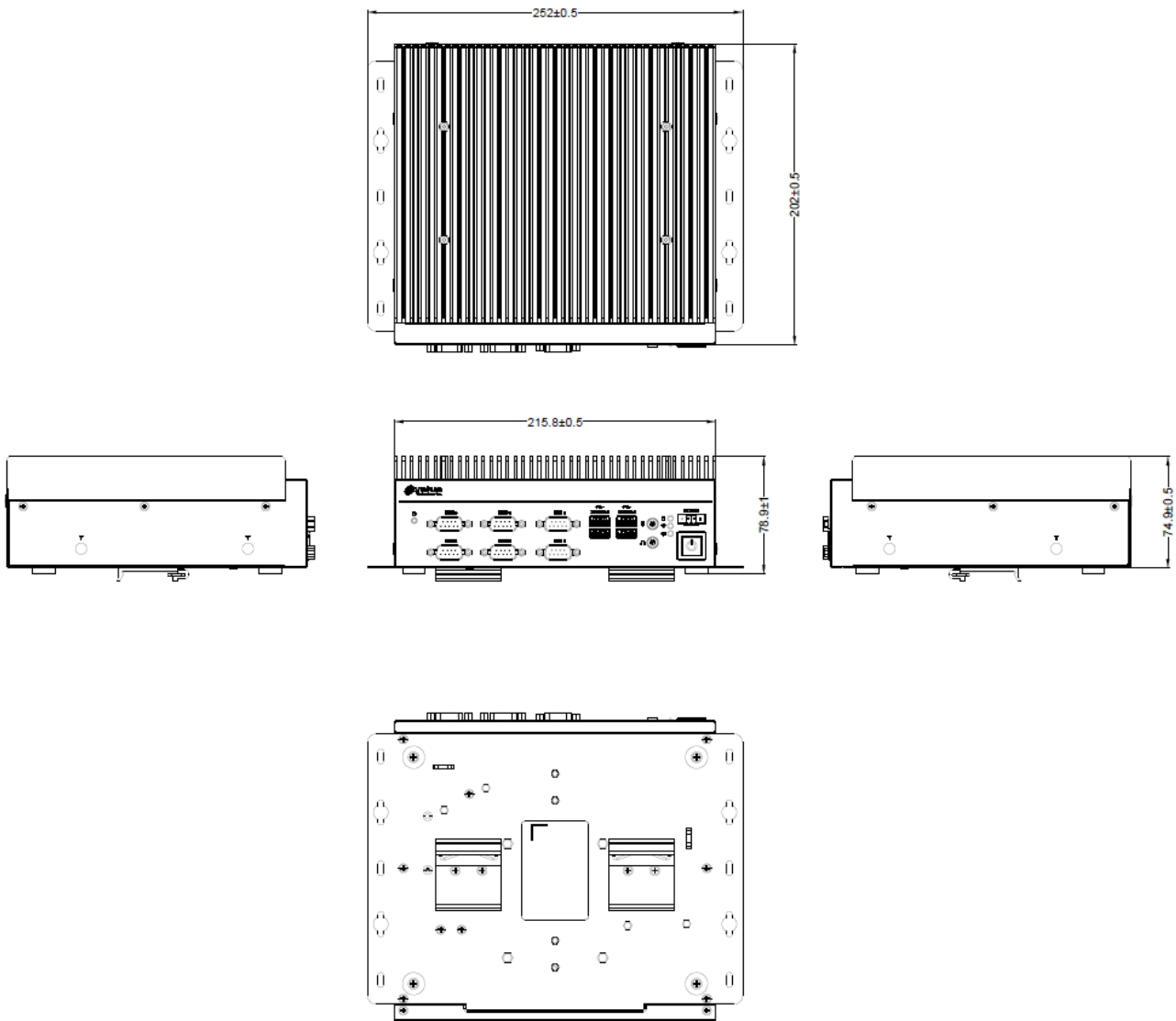
Label	Function	Note
Power	Power on button	
EX PWR	Power button	2-Pin Terminal Block
Reset	Reset button	
HDD	HDD indicator	
WWAN	WWAN Indicator	
WLAN	WLAN Indicator	

## EPS-RPS

<b>Mic-in</b>	Mic-in audio jack
<b>Line-out</b>	Line-out audio jack
<b>USB3.2</b>	USB 3.2 connector x 6
<b>COM1~6</b>	Serial Port 1~6 connector
<b>DC-IN</b>	DC Input connector                      5-pin Phoenix type (default onboard)
<b>HDMI</b>	HDMI connector x 2
<b>DP</b>	DP connector x 2
<b>LAN</b>	RJ-45 Ethernet x 2
<b>USB2.0</b>	USB 2.0 connector x 2
<b>System Fan</b>	Smart Fan connector



## 1.5 System Dimensions



(Unit: mm)

### 1.6 Operating Principle

#### (a) Installation:

- Take the device and accessories from package and put in the suitable place.
- Check the packing list (accessories).
- Connect the power cord to the device.
- Put the plug of power cord into receptacle of power source.
- Press power button "Power Icon" on the device to start the device.

#### (b) Installation for monitor:

- Plug in the monitor cable (HDMI or DP).

#### (c) Installation keyboard and mouse.

- Plug in mouse and keyboard.

#### (d) Operation for Turn ON the system

- Turn ON the system.
- Press the power ON/OFF icon firmly to turn power ON/OFF.
- The power ON/OFF LED will turn blue to indicate power is on.
- Check with the Icon behavior for power status.

# 2. Hardware Configuration

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For advanced information, please refer to:

- 1- EBM-ADS included in this manual.

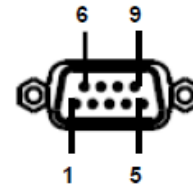
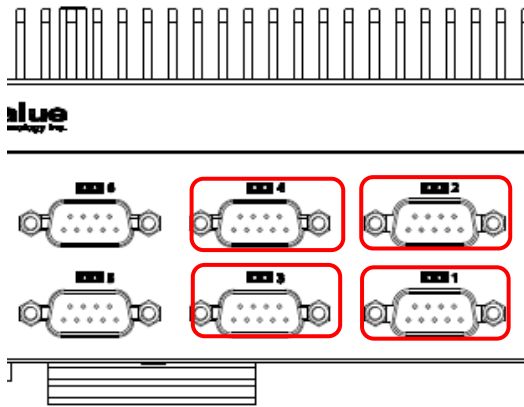


**Note:** If you need more information, please visit our website:

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

## 2.1 EPS-RPS connector mapping

### 2.1.1 Serial Port 1~4 connector (COM1~4)



In RS-232 Mode

Signal	PIN	PIN	Signal
NDCD#	1	6	NDSR#
NRXD	2	7	NRTS#
NTXD	3	8	NCTS#
NDTR#	4	9	NRI#
GND	5		

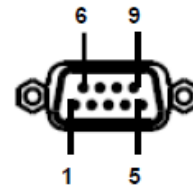
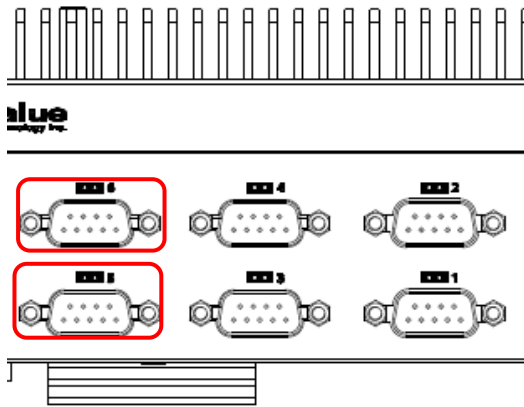
In RS-422 Mode

Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

In RS-485 Mode

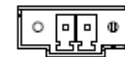
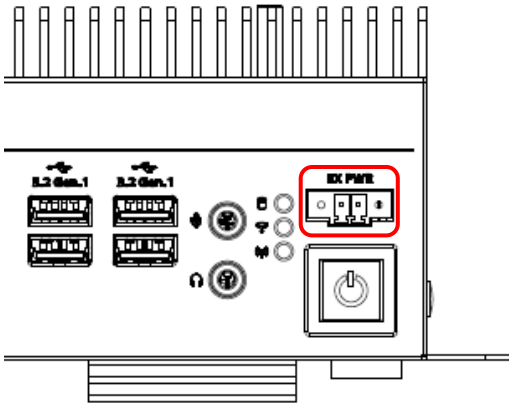
Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

2.1.2 Serial Port 5~6 connector (COM5~6)



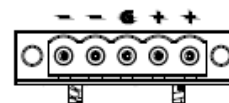
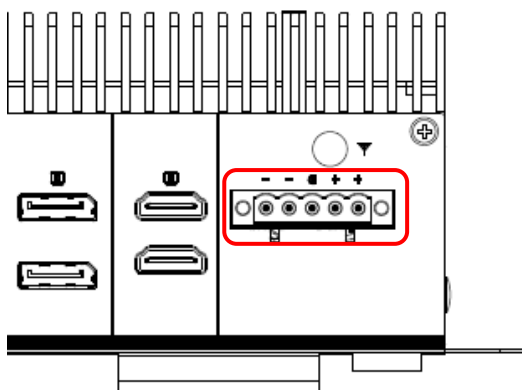
Signal	PIN	PIN	Signal
DCD#	1	6	DSR#
RXD	2	7	RTS#
TXD	3	8	CTS#
DTR#	4	9	RI#
GND	5		

2.1.3 Power button (EX PWR)



Signal	PIN
PWR_BTN_IN	1
GND	2

2.1.4 DC Input connector (DC-IN)



Signal	PIN
VIN+	1
VIN+	2
CHASSIS_GND	3
VIN-	4
VIN-	5

## 2.2 Powering On the System

**WARNING:**

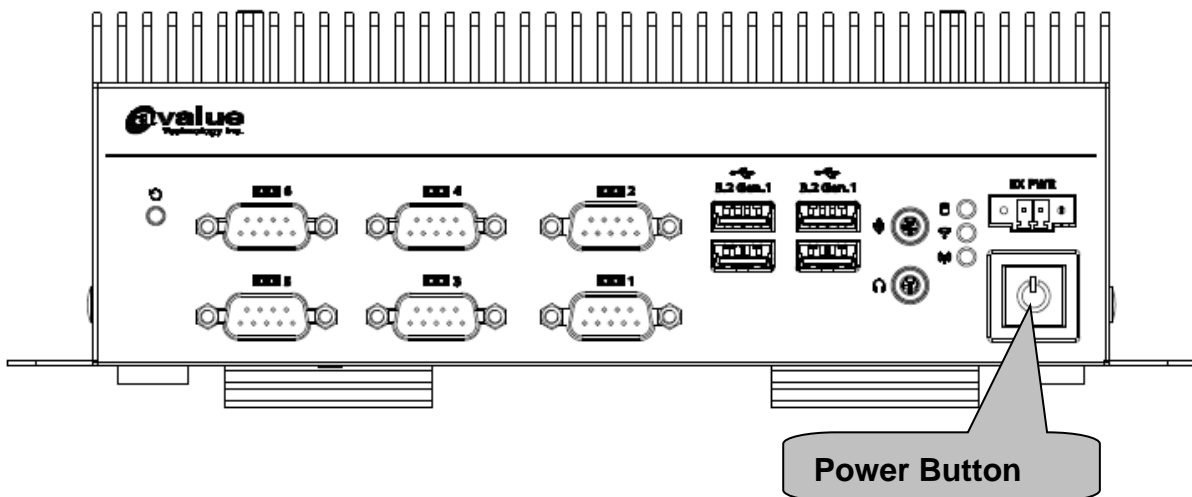
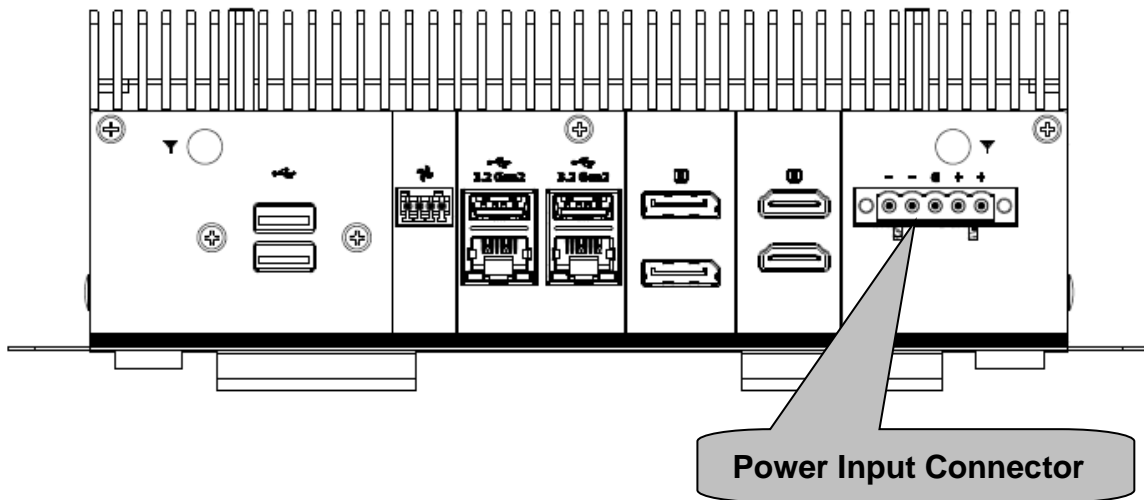
Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

- Power on the system: press the power button for 3 seconds.
- Power off the system: press the power button for 6 seconds.
- The power of this system can be less than 250w 20A.

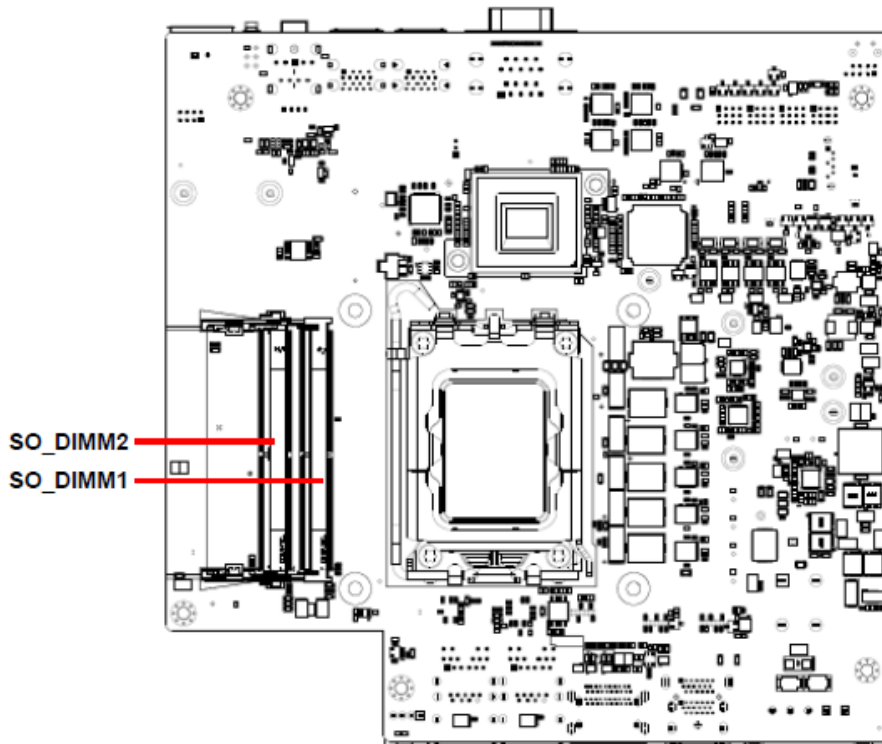
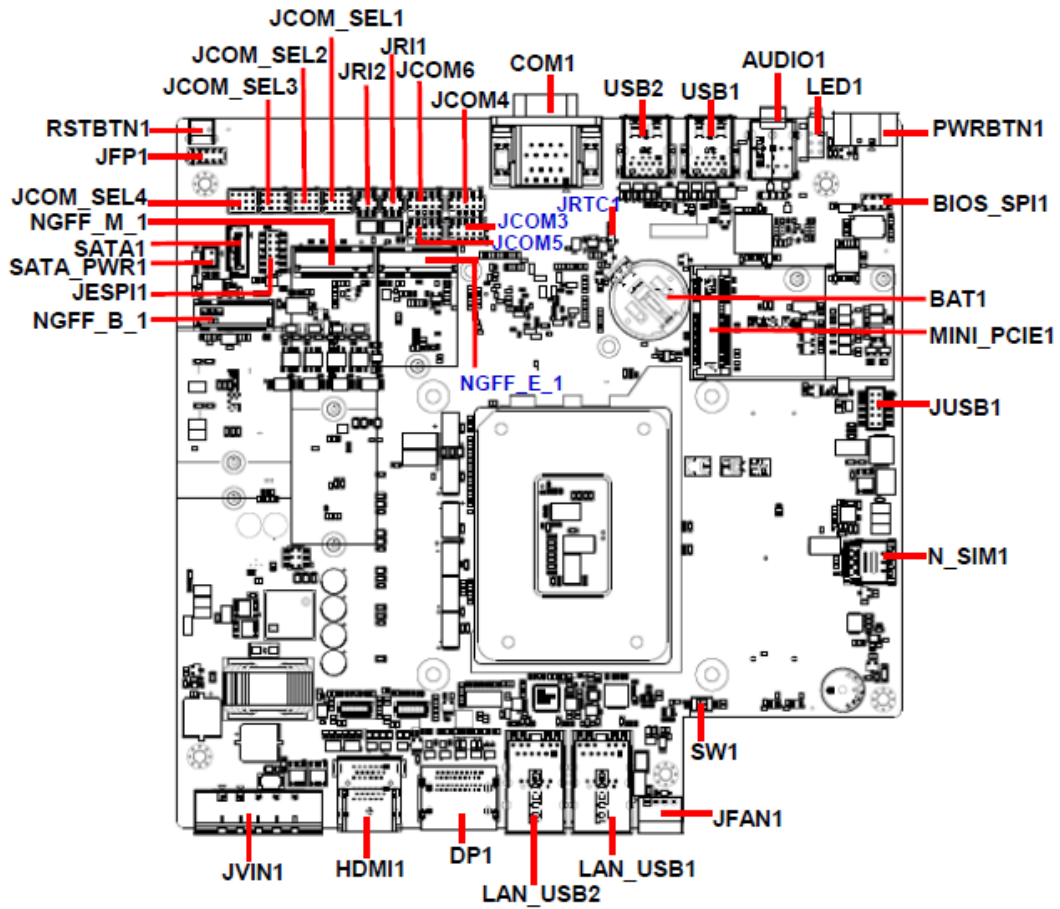
## 2.3 Connecting to Power Supply

There are two power connectors on the rear panel. Power 1 connector is a DIN connector block that supports ACC On signal. Power 2 connector is a 4-pin terminal that can directly connect to a power adapter. The supported power input voltages are:

- Power 1 (DIN connector): 12 V ~ 28 V
- Power 2 (terminal block): 12 V ~ 28 V



## 2.4 EBM-ADS Overviews



## 2.5 EBM-ADS Jumper & Connector list

### Jumpers

Label	Function	Note
JRTC1	Clear CMOS	3 x 1 header, pitch 2.00 mm
SW1	Multi-function select	
JRI1/2	Serial port 1/2 pin9 signal select	3 x 2 header, pitch 2.00 mm
JCOM_SEL1~4	Serial port 1~4 – RS232/422/485 mode select	4 x 3 header, pitch 2.00 mm

### Connectors

Label	Function	Note
BAT1	Battery connector	2 x 1 wafer, pitch 1.25 mm
JFAN1	Fan connector	4 x 1 wafer, pitch 2.50 mm
AUDIO1	Audio connector	
COM1	Serial port 1 connector	D-sub 9-pin, male
JCOM3/4/5/6	Serial port 3/4/5/6 connector	5 x 2 header, pitch 2.00 mm
N_SIM1	nano SIM slot	
JFP1	Front Panel connector	5 x 2 header, pitch 2.00 mm
JESPI1	ESPI connector	6 x 2 header, pitch 2.00 mm
BIOS_SPI1	BIOS SPI connector	4 x 2 header, pitch 2.00 mm
USB1/2	USB 3.2 connector x 4	
JUSB1	On-board header for USB2.0	5 x 2 wafer, pitch 2.00 mm
HDMI1	HDMI connector x 2	
LAN_USB1/2	RJ-45 Ethernet x 2 USB 3.2 connector x 2	
LED1	HDD/WLAN/WWAN indicator	
PWRBTN1	Power button	1 x 3 terminal block, pitch 3.50 mm
RSTBTN1	Reset button	
JVIN1	DC Input connector	1 x 5 terminal block, pitch 5.08 mm
SATA_PWR1	SATA power connector	2 x 1 wafer, pitch 2.00 mm
DP1	DP connector	
SATA1	Serial ATA connector 1	
NGFF_B_1	M.2 KEY-B connector	
NGFF_E_1	M.2 KEY-E connector	
NGFF_M_1	M.2 KEY-M connector	



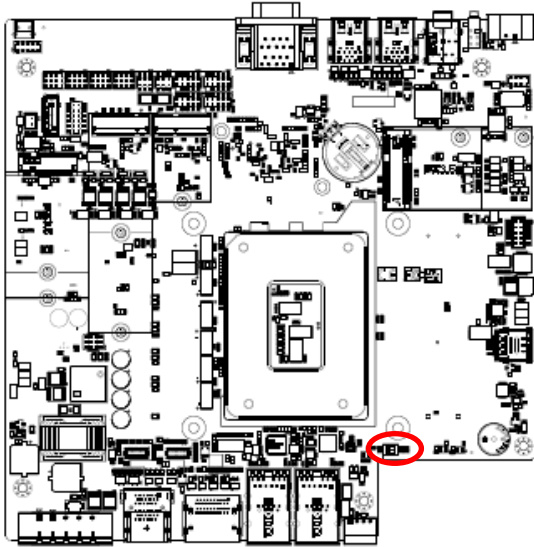
---

<b>MINI_PCIE1</b>	Full size Mini-PCI-e connector
<b>SO_DIMM1/2</b>	DDR5 SODIMM socket 1/2

---

## 2.6 Setting Jumpers & Connectors

### 2.6.1 Multi-function select (SW1)



\*Default



**SW1.1**  
**AT mode**

OFF	1		⇌	ON
	2			

**ATX mode\***

OFF	1	⇐		ON
	2			

**SW1.2**

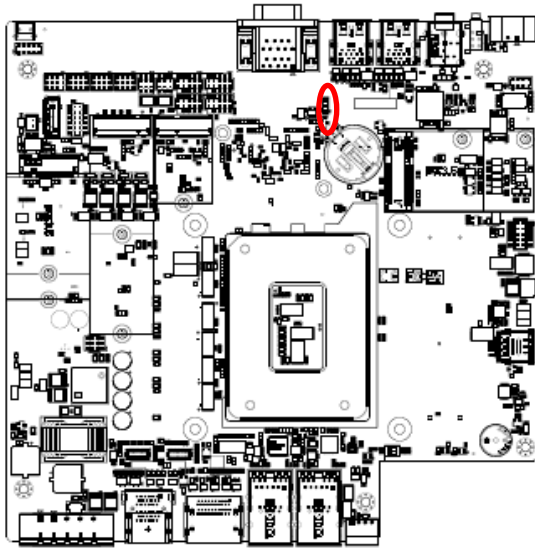
**M.2 keyB 3.8V**

OFF	1		⇌	ON
	2			

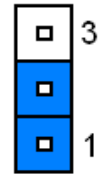
**M.2 keyB 3.3V\***

OFF	1	⇐		ON
	2			

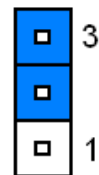
### 2.6.2 Clear CMOS (JRTC1)



Normal\*

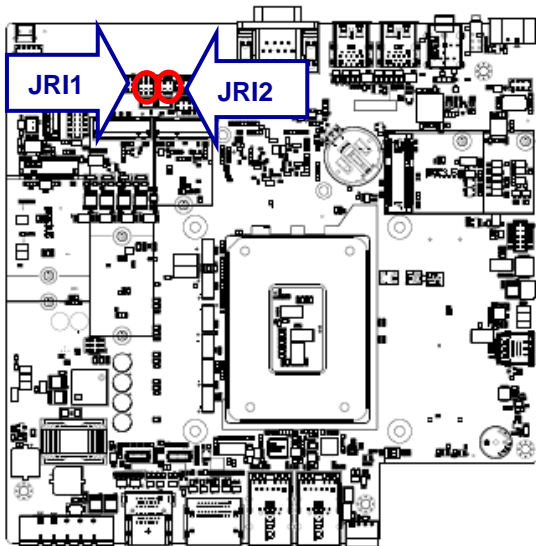


Clear CMOS

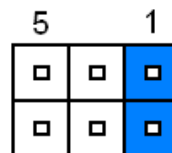


\* Default

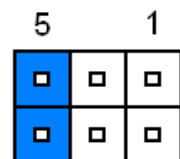
### 2.6.3 Serial port 1/2 pin9 signal select (JRI1/2)



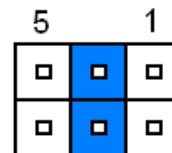
Ring\*



+12V



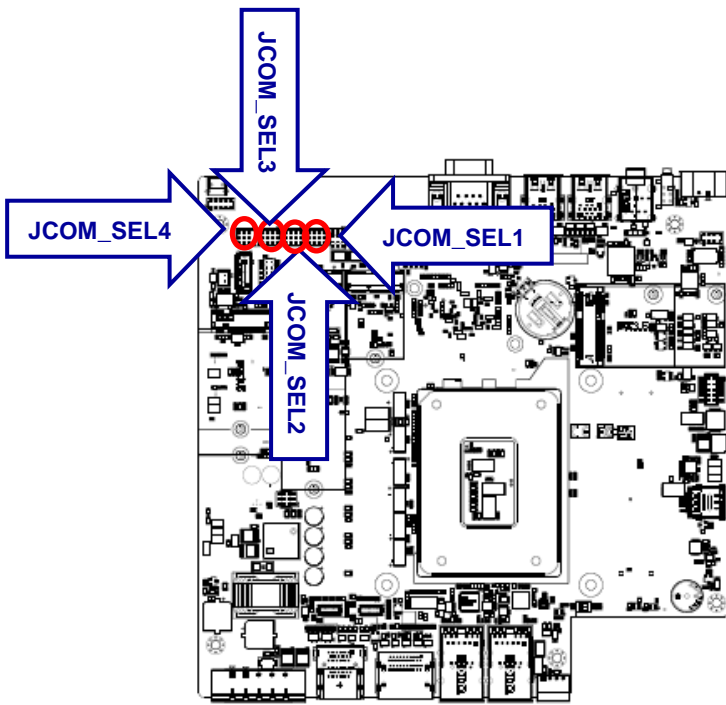
+5V



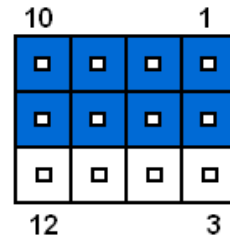
\* Default

# EPS-RPS

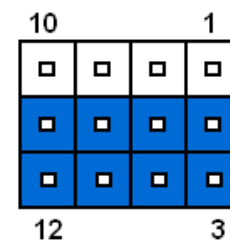
## 2.6.4 Serial port 1~4 – RS232/422/485 mode select (JCOM\_SEL1~4)



RS232\*

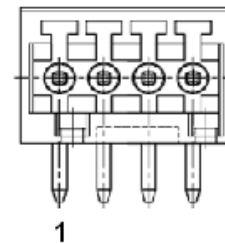
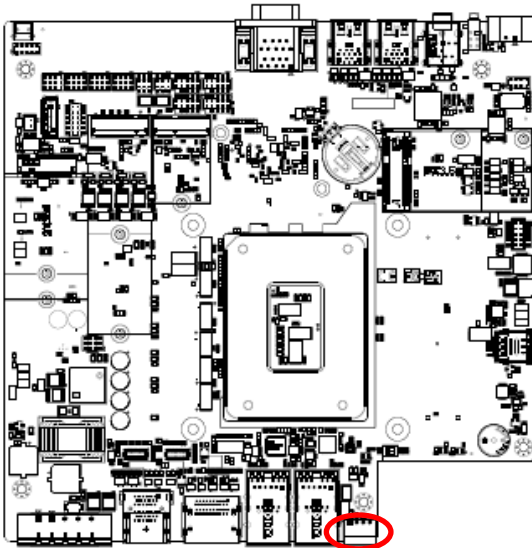


RS422, RS485



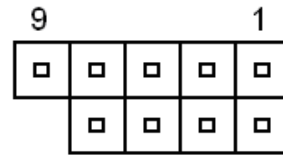
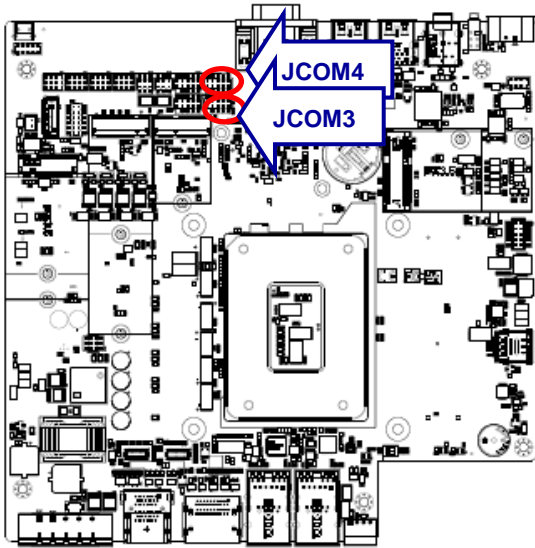
\* Default

## 2.6.5 Fan connector (JFAN1)



Signal	PIN
GND	1
+12V	2
TACH_FAN0	3
PWM_FAN0	4

2.6.6 Serial port 3/4/5/6 connector (JCOM3/4)



In RS-232 Mode

Signal	PIN	PIN	Signal
NDSD#	1	6	NDSR#
NRXD	2	7	NRTS#
NTXD	3	8	NCTS#
NDTR#	4	9	NRI#
GND	5		

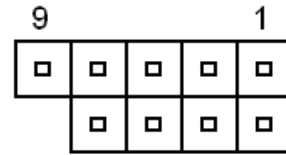
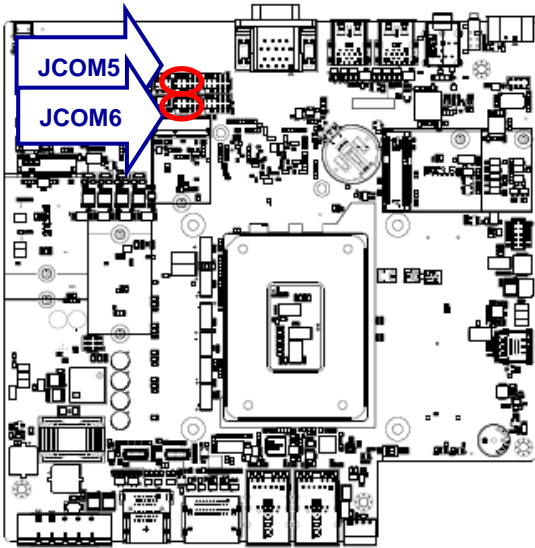
In RS-422 Mode

Signal	PIN	PIN	Signal
TxD1-	1	6	NC
TxD1+	2	7	NC
RxD1+	3	8	NC
RxD1-	4	9	NC
GND	5		

In RS-485 Mode

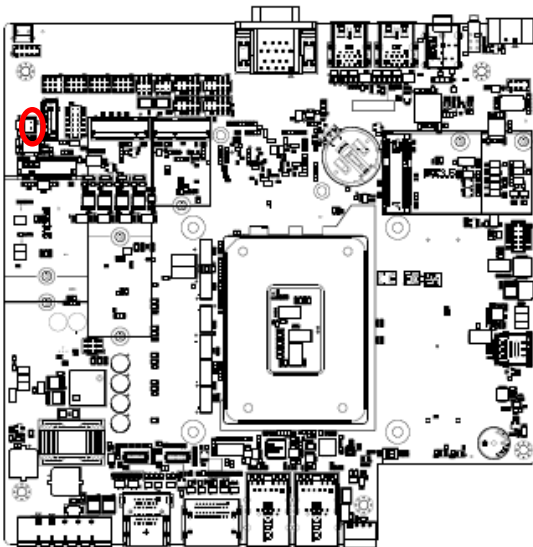
Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

2.6.7 Serial port 3/4/5/6 connector (JCOM5/6)



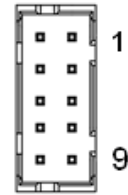
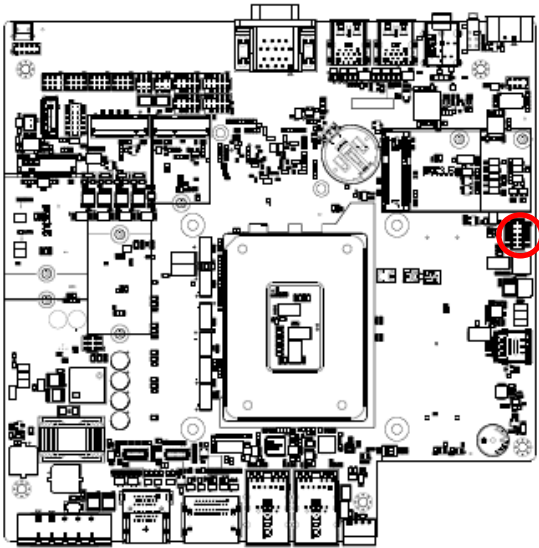
Signal	PIN	PIN	Signal
COM_DCD#	1	2	COM_RXD
COM_TXD	3	4	COM_DTR#
GND	5	6	COM_DSR#
COM_RTS#	7	8	COM_CTS#
COM_RI#	9		

2.6.8 SATA power connector (SATA\_PWR1)



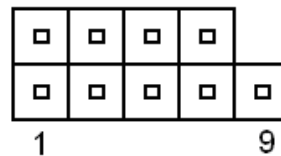
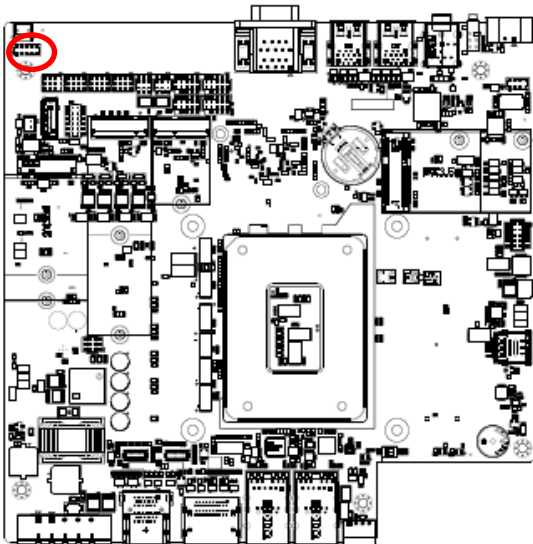
Signal	PIN
GND	1
+5V	2

2.6.9 On-board header for USB2.0 (JUSB1)



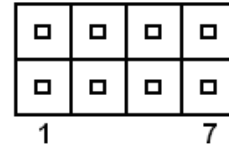
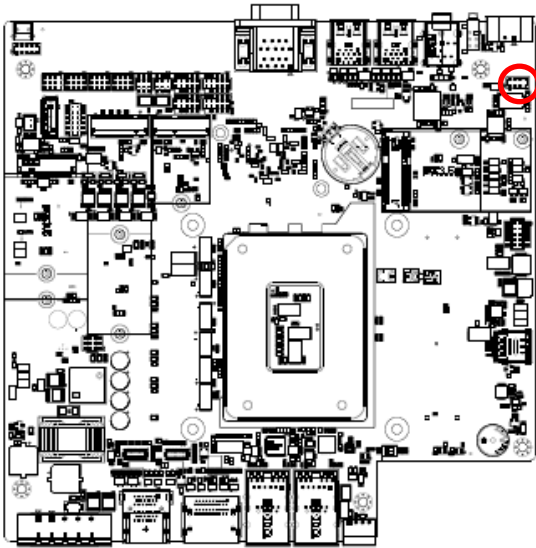
Signal	PIN	PIN	Signal
+5VSB	2	1	+5VSB
USB_R_DN5	4	3	USB_R_DN4
USB_R_DP5	6	5	USB_R_DP4
GND	8	7	GND
GND	10	9	GND

2.6.10 Front Panel connector (JFP1)



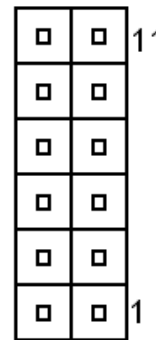
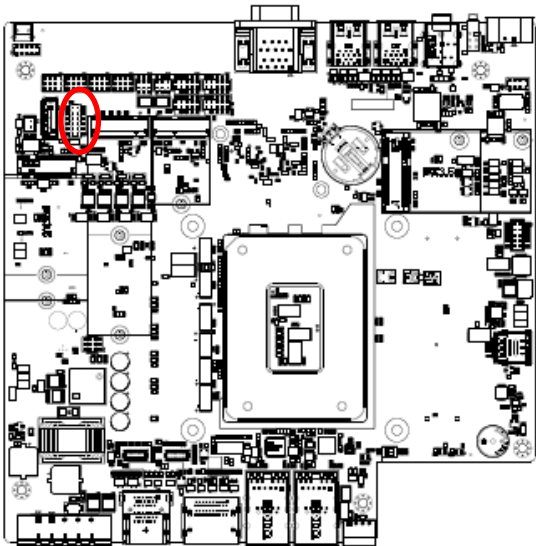
Signal	PIN	PIN	Signal
+5V	1	2	FP_PWR_LED+
HDD_LED#	3	4	PWR_LED#
PM_SYSRST#	5	6	PWRBTN_TO_EC#
GND	7	8	GND
NC	9		

2.6.11 BIOS SPI connector (BIOS\_SPI1)



Signal	PIN	PIN	Signal
+3.3VSB	1	2	GND
SPI_CS0#	3	4	SPI_CLK
SPI_MISO	5	6	SPI_MOSI
BIOS_HOLD#	7	8	BIOS_WP#

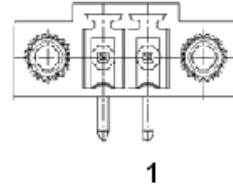
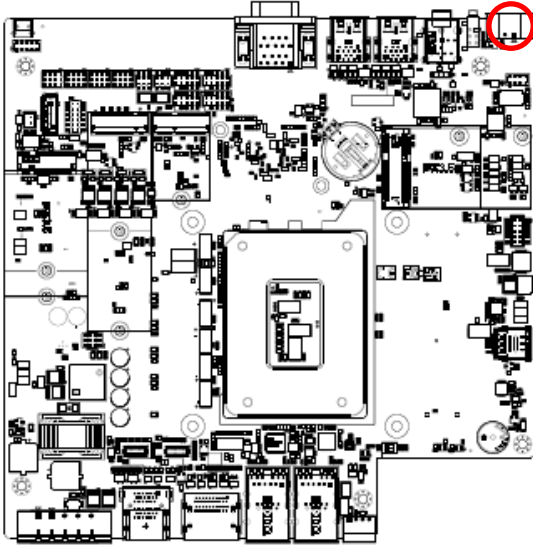
2.6.12 ESPI connector (JESPI1)



Signal	PIN	PIN	Signal
+3.3VSB	2	1	ESPI_IO0
PLT_RST#	4	3	ESPI_IO1
ESPI_CS0#	6	5	ESPI_IO2
ESPI_CLK	8	7	ESPI_IO3
GND	10	9	NC
ESPI_ALEAT#	12	3	ESPI_RST

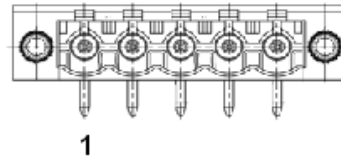
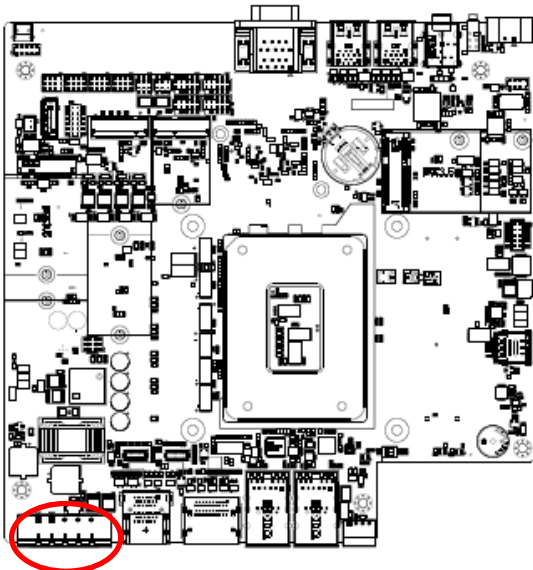


2.6.13 Power button (PWRBTN1)



Signal	PIN
PWR_BTN_IN	1
GND	2

2.6.14 DC Input connector (JVIN1)



Signal	PIN
+VIN	1
+VIN	2
GND_CHASSIS	3
GND	4
GND	5

# 3. Installation



## Removing the Top Cover Warning

To prevent electric shock or system damage, before removing the chassis cover, must turn off power and disconnect the unit from power source.

Electrostatic discharge (ESD) can cause serious damage to electronic components. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the product is accessed internally, or any other electrical component is handled, the following anti-static precautions are strictly adhered to:

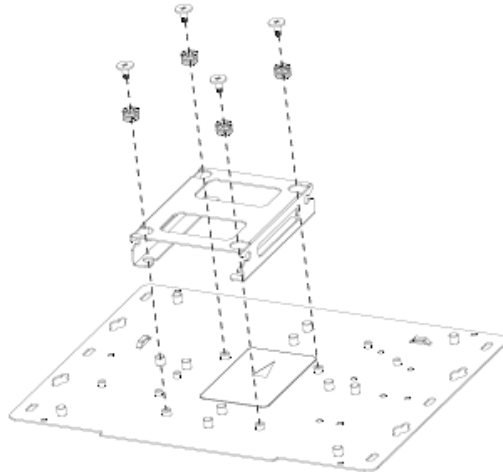
- Wear an anti-static wristband: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- Self-grounding: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- Use an anti-static pad: When configuring the product, place it on an anti-static pad. This reduces the possibility of ESD damaging the product.
- Only handle the edges of the PCB: When handling the PCB, hold the PCB by the edges.

## Installation Precautions

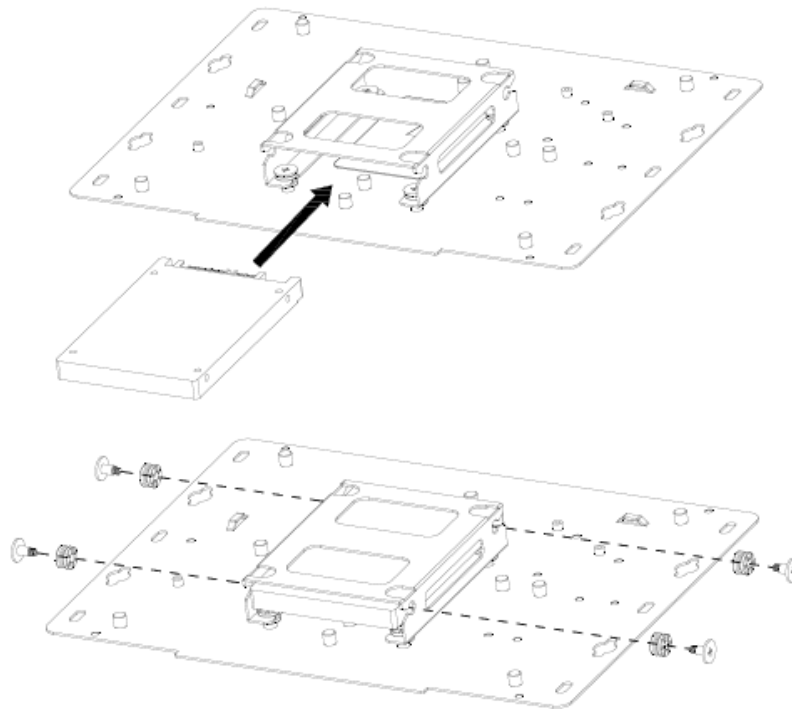
When installing the flat bezel panel PC, please follow the precautions listed below:

- Power turned off: When installing the flat bezel panel PC, make sure the power is off. Failing to turn off the power may cause severe injury to the body and/or damage to the system.
- Certified Engineers: Never open the equipment. For safety reasons, the equipment should be opened only by qualified skilled person.
- Anti-static Discharge: If a user open the rear panel of the flat bezel panel PC, to configure the jumpers or plug in added peripheral devices, ground themselves first and wear an anti-static wristband.

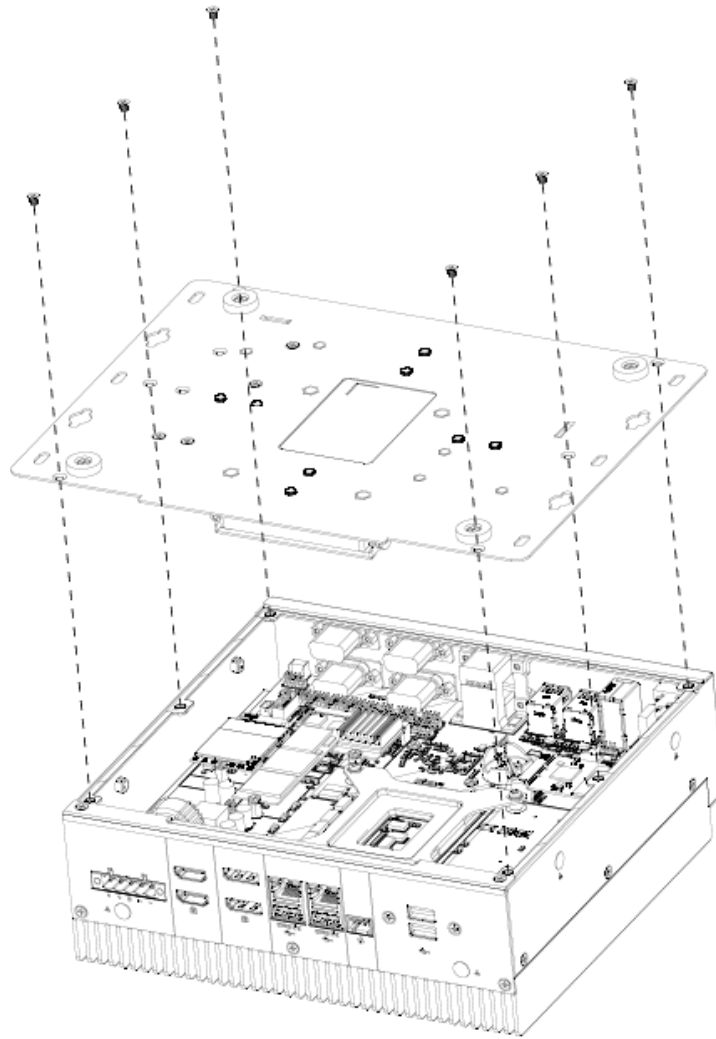
### 3.1 Installing Hard Disk (EPS-RPS)



**Step1.** Insert and fasten 4 screws on each side of the system to secure brackets.

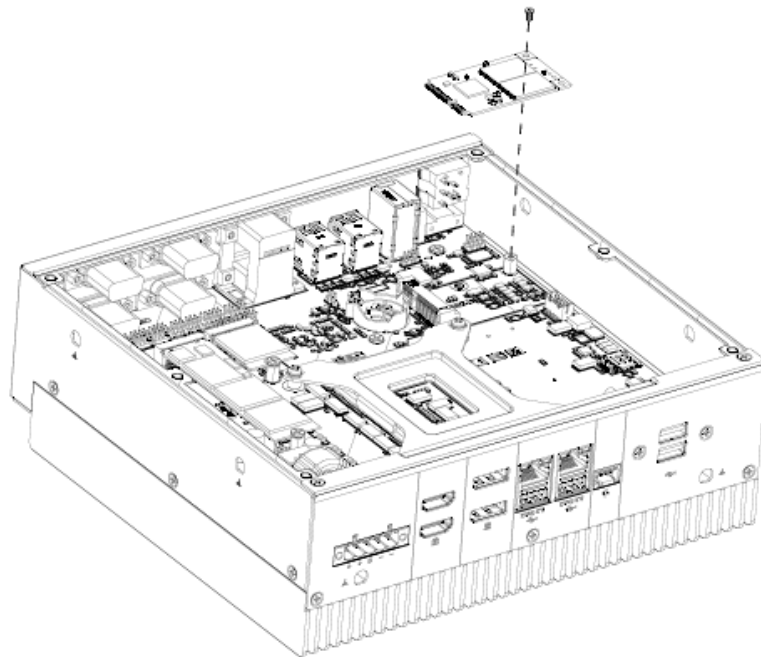


**Step2.** Fix HDD using the 4 screws in the Accessory Kit.

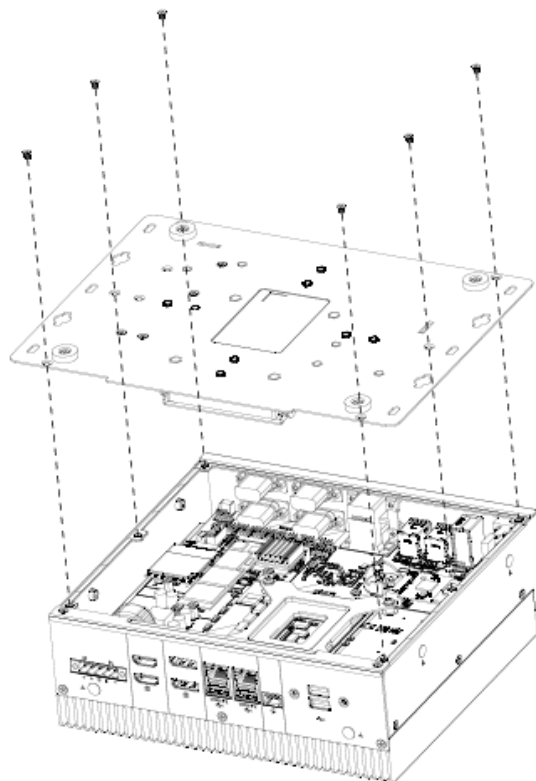


**Step3.** Place back the cover and fasten 6 screws back to complete.

### 3.2 Installing PCIE card (EPS-RPS)

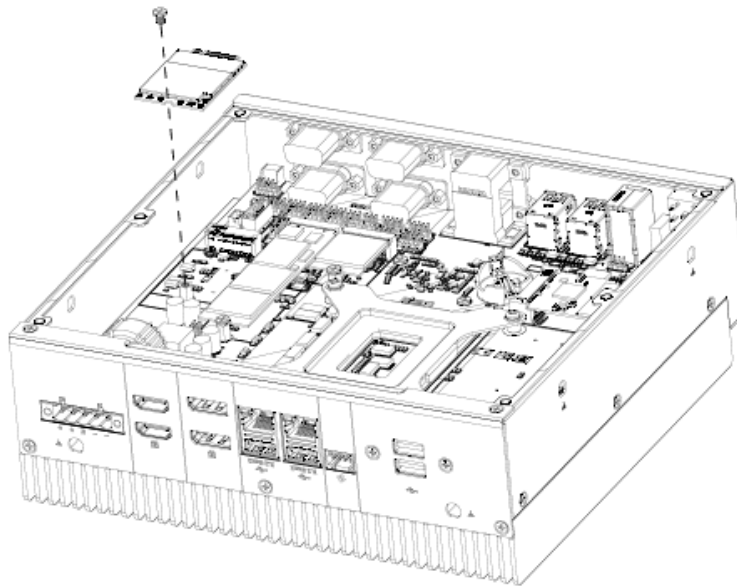


**Step1.** Fasten screw to secure PCIE card.



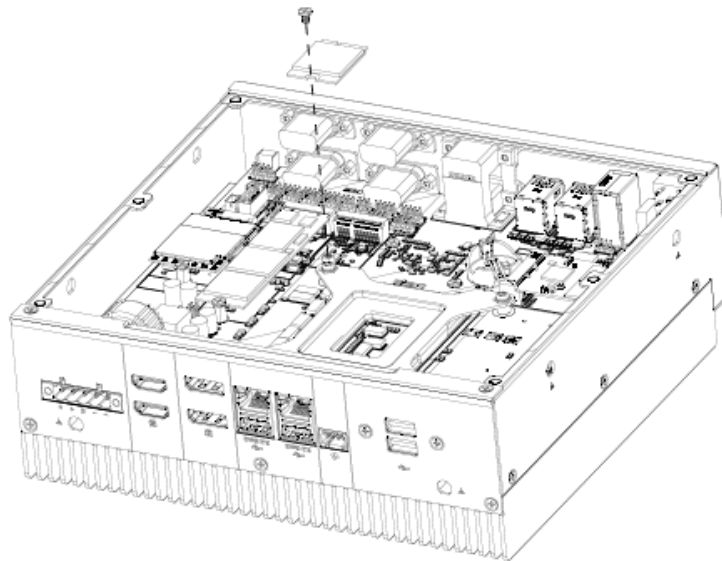
**Step2.** Place back the cover and fasten 6 screws back to complete.

### 3.3 Installing M.2 Key-B card (EPS-RPS)

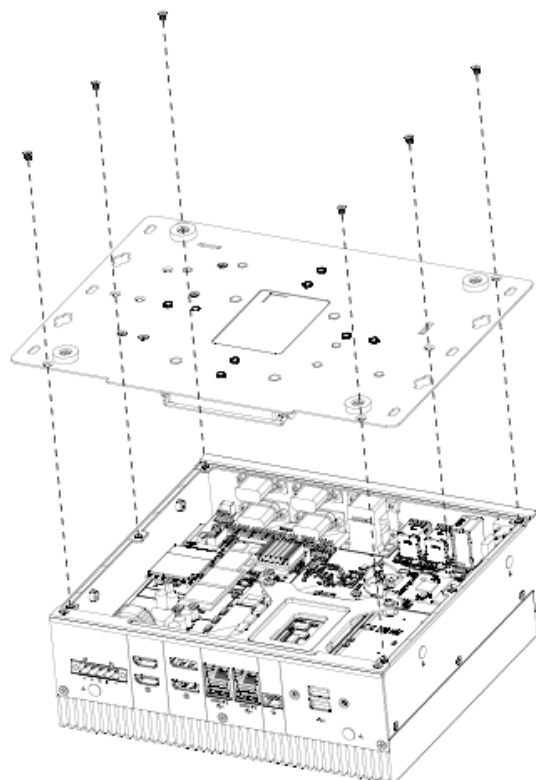


**Step1.** Insert M.2 Key-B card into designated locations and fasten with the screw to complete installation.

### 3.4 Installing M.2 Key-E card (EPS-RPS)



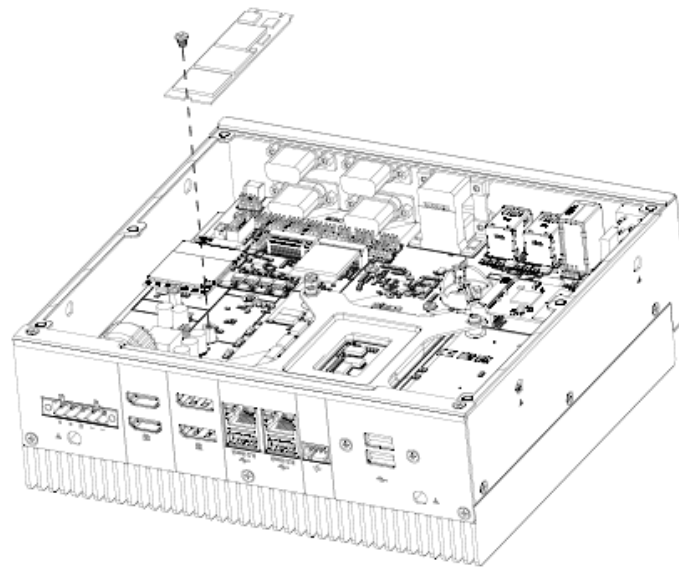
**Step1.** Insert M.2 Key-E card into designated locations and fasten with the screw to complete installation.



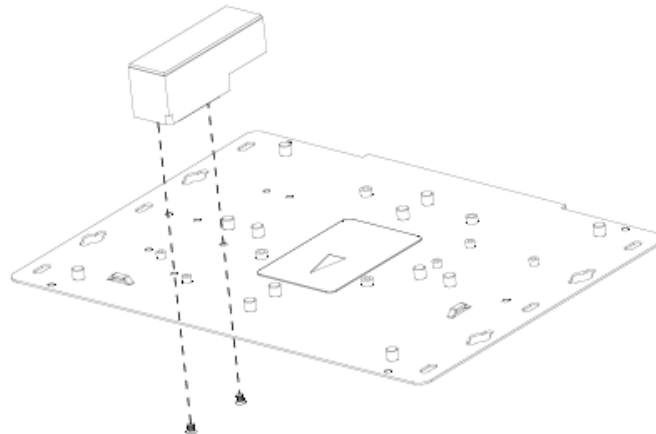
**Step2.** Place back the cover and fasten 6 screws back to complete.



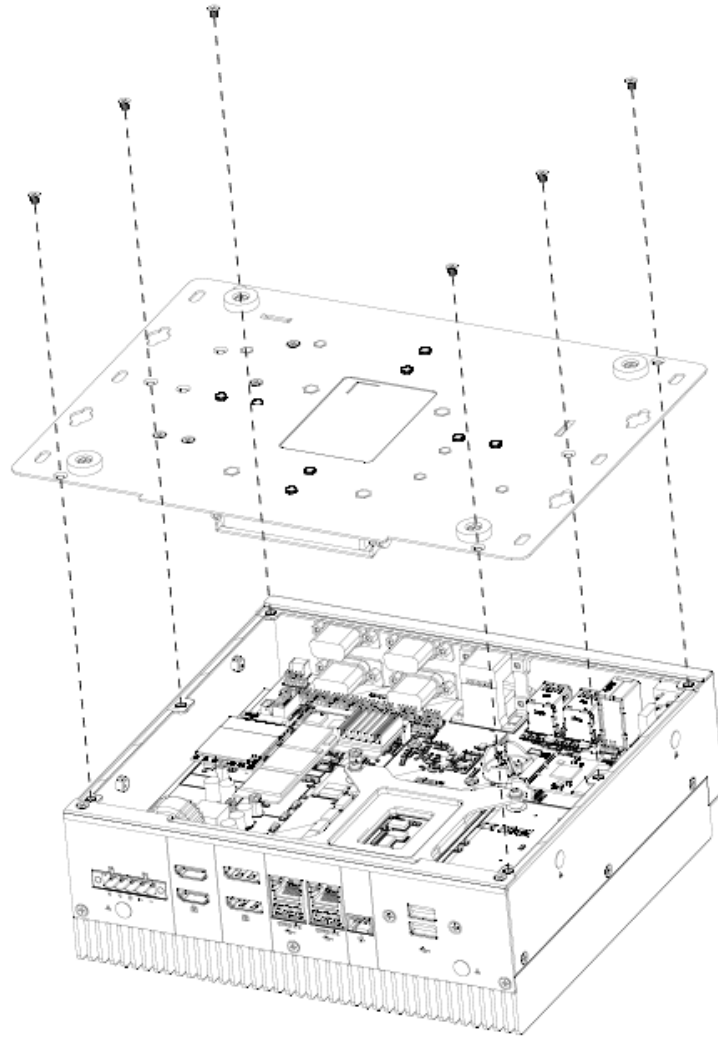
### 3.5 Installing M.2 Key-M card (EPS-RPS)



**Step1.** Insert M.2 Key-M card into designated locations and fasten with the screw to complete installation.

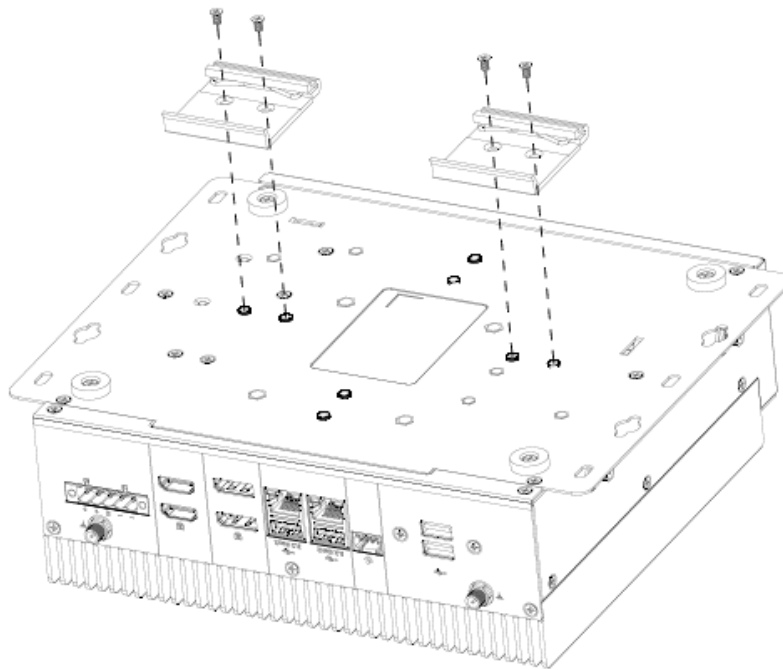


**Step2.** Fix M.2 M-Key card using the 2 screws in the Accessory Kit.

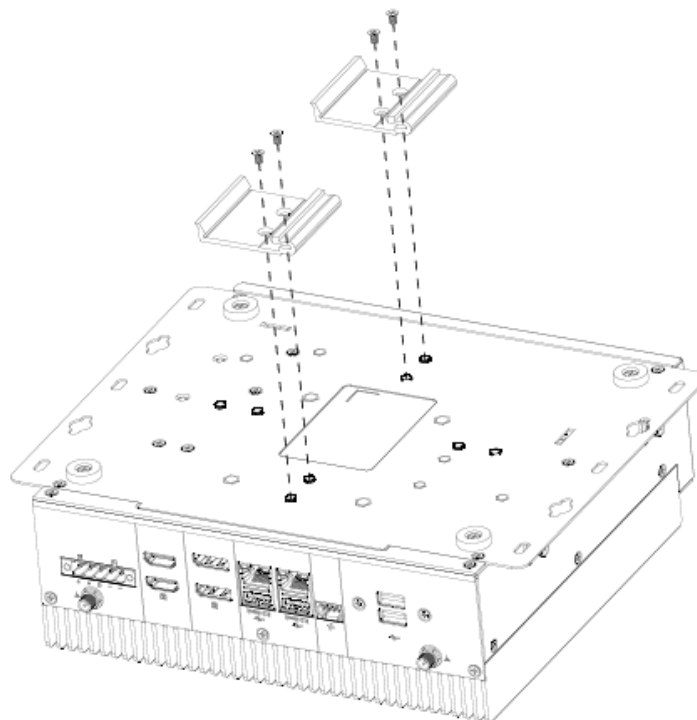


**Step3.** Place back the cover and fasten 6 screws back to complete.

### 3.6 Installing Din Rail Mounting (EPS-RPS)



(Horizontal Din Rail)



(Vertical Din Rail)

**Step1.** Insert Din Rail into designated locations and fasten with the 4 screws to complete installation.

### 3.7 System Mounting

**Warning!** *More than one person should participate in mounting the panel PC to prevent accidental damage to the panel or personal injury.*



#### Safety Precautions

Observe the following common safety precautions before installing any electronic device:

- Use separate, non-intersecting paths to route power and networking wires. If power wiring and device wiring paths must be crossed make sure the wires are perpendicular at the intersection point.
- Keep the wires separated according to the interface. Wires that share similar electrical characteristics must be bundled together.
- Do not bundle input wiring with output wiring. Keep them separate.
- When necessary, it is strongly advised that you label wiring to all devices in the system.

# 4. Drivers Installation

All the drivers are available on Avalue Downloads Area (<https://www.avaluetech.com/en/support/download>). Type the model name and press Enter to find all the relevant software, utilities, and documentation.


## Note:

The panel PC with projected capacitive type touchscreen and Windows 7 (or later) OS does not require touch driver installation. This is because there is a HID touch digitizer built-in driver in Windows 7 or later.

Chipset 1 Audio 1 Graphics 1 LAN 1 Other 1


### Chipset

Total **1** Files

No.	Release Date	Title	Description	Download
01	2023-09-20	Intel Chipset Driver for Win10 x64	Windows 10 64bit	

### Audio

Total **1** Files

No.	Release Date	Title	Description	Download
01	2023-09-20	Realtek Audio Driver for Win10 x64	Windows 10 64bit	



**Note:** Installation procedures and screen shots in this section are for your reference and may not be exactly the same as shown on your screen.

## 4.1 Install Chipset Driver

All drivers can be found on the Avalue Official Website:

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



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system. If the warning message appears while the installation process, click Continue to go on.



**Step 3. Click Install.**



**Step1. Click Next.**



**Step 4. Click Finish to complete setup.**



**Step 2. Click Accept.**

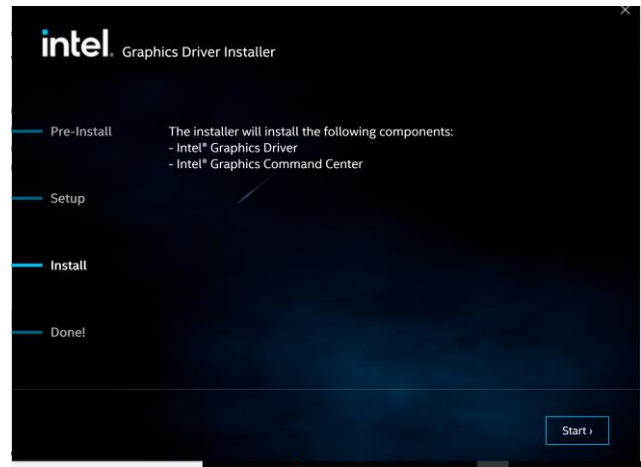
## 4.2 Install VGA Driver

All drivers can be found on the Avalue Official Website:

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



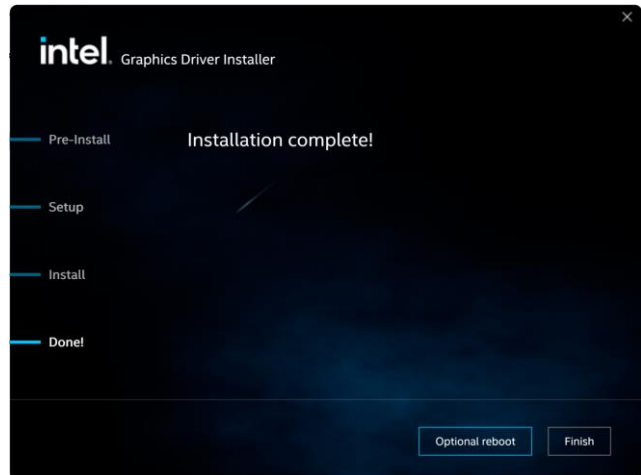
**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



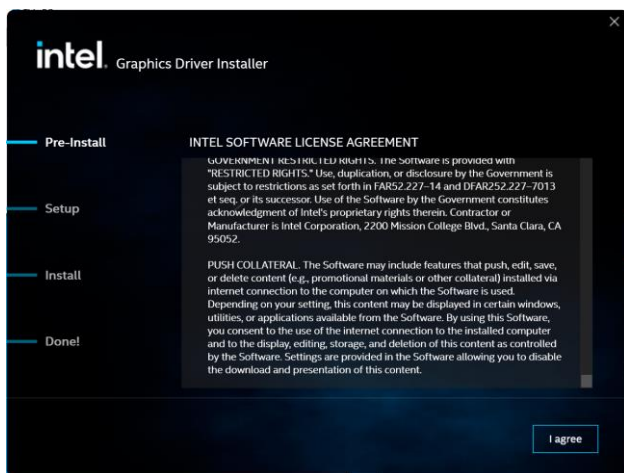
**Step 3. Click Start.**



**Step 1. Click Begin installation to continue installation.**



**Step 4. Click Finish to complete setup.**



**Step 2. Click I agree.**

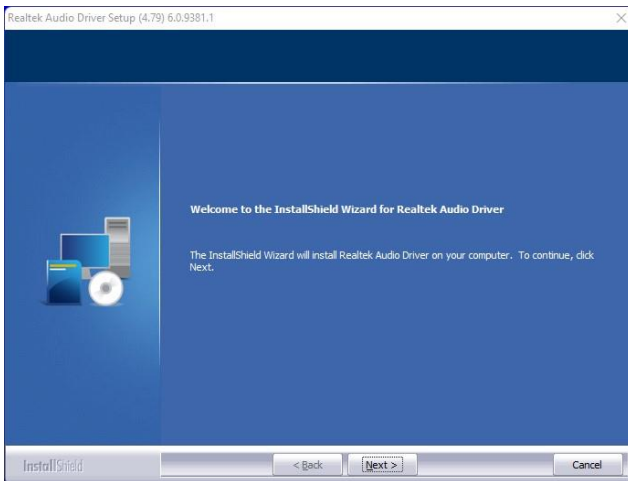
## 4.3 Install Audio Driver (For Realtek ALC888S HD Audio)

All drivers can be found on the Avalue Official Website:

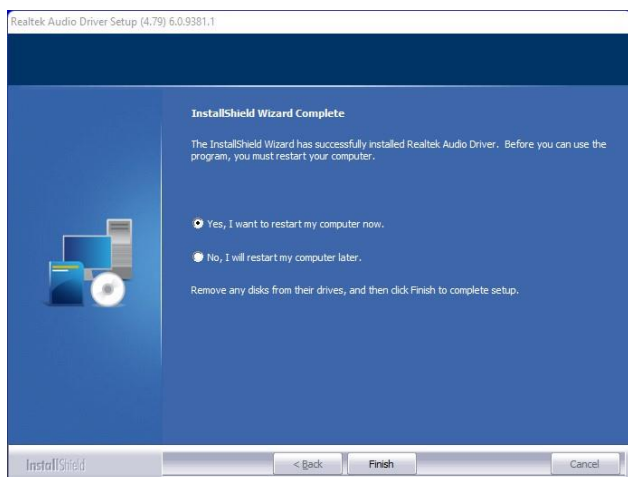
[www.avalue.com](http://www.avalue.com).



**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system. If the warning message appears while the installation process, click Continue to go on.



**Step 1.** Click **Next** to Install.



**Step 2.** Select **Finish** to complete Installation.

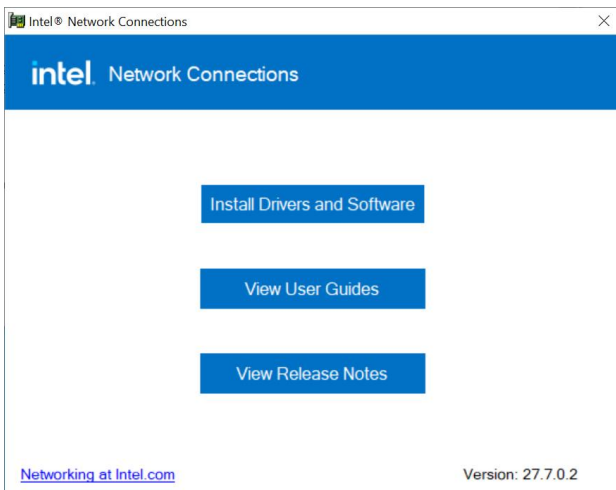


## 4.4 Install LAN Driver

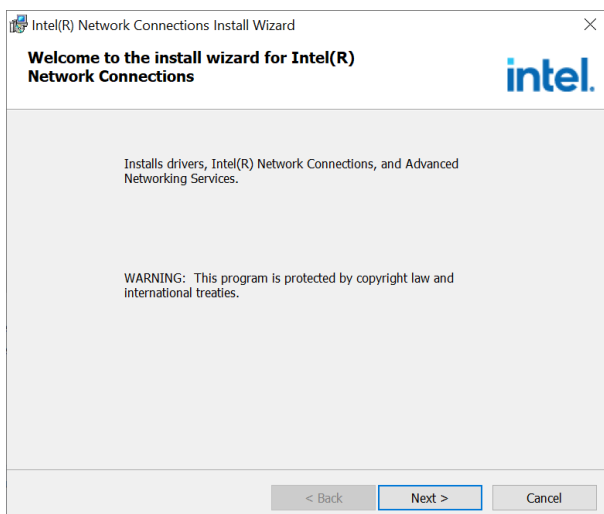
All drivers can be found on the Avalue Official Website:  
[www.avalue.com](http://www.avalue.com).



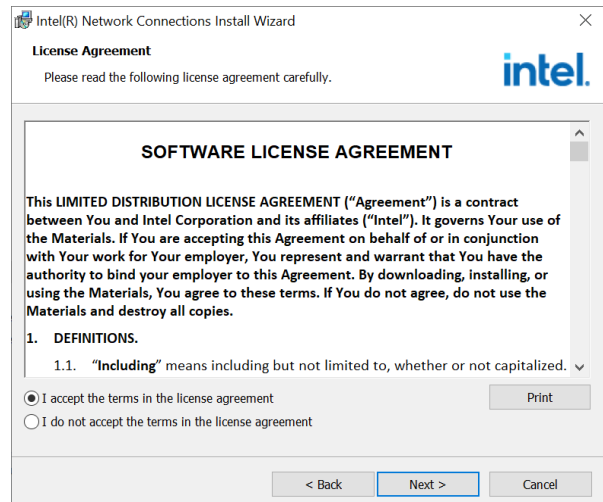
**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



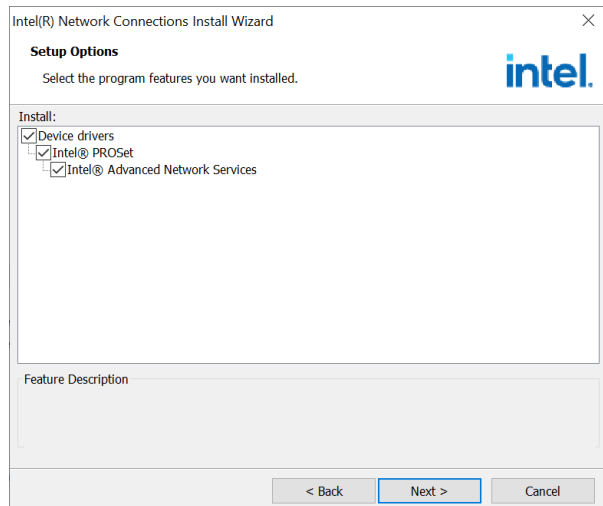
**Step 1. Click Install Drivers and Software** to continue installation.



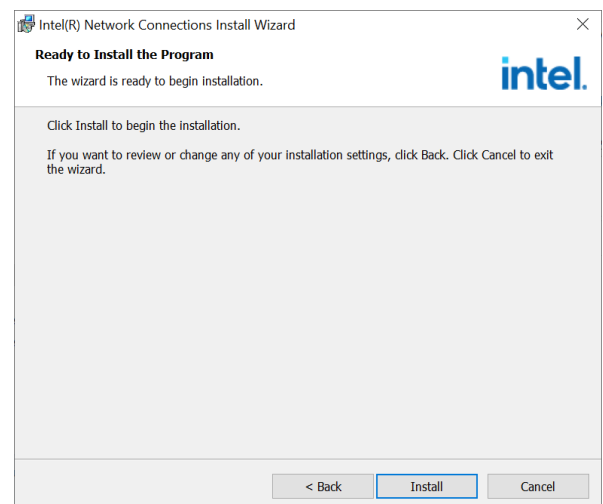
**Step 2. Click Next.**



**Step 3. Click Next.**

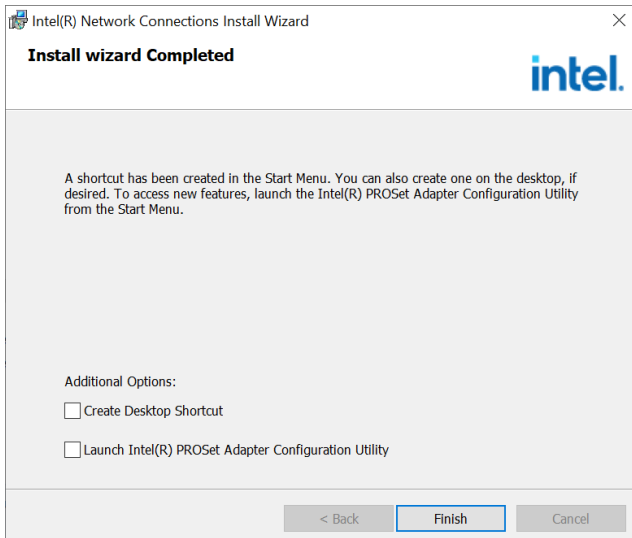


**Step 4. Click Next.**



**Step 5. Click Install.**

## EPS-RPS



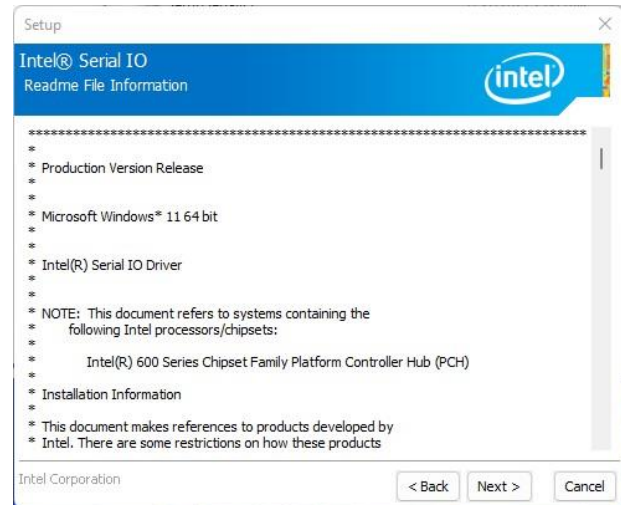
**Step 6.** Click **Finish** to complete setup.

## 4.5 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:  
[www.avalue.com](http://www.avalue.com).



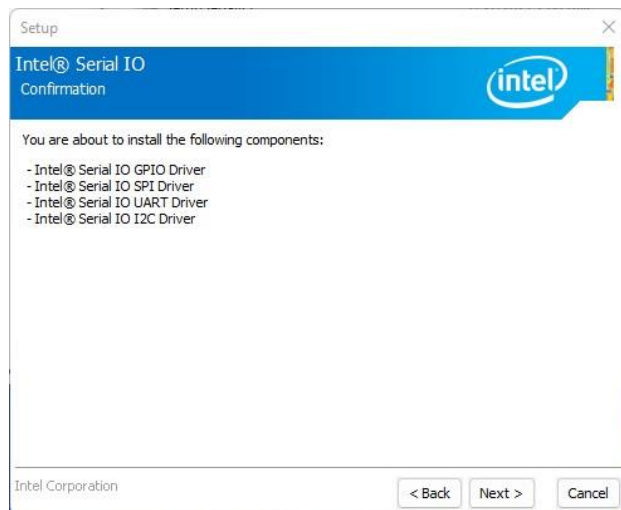
**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



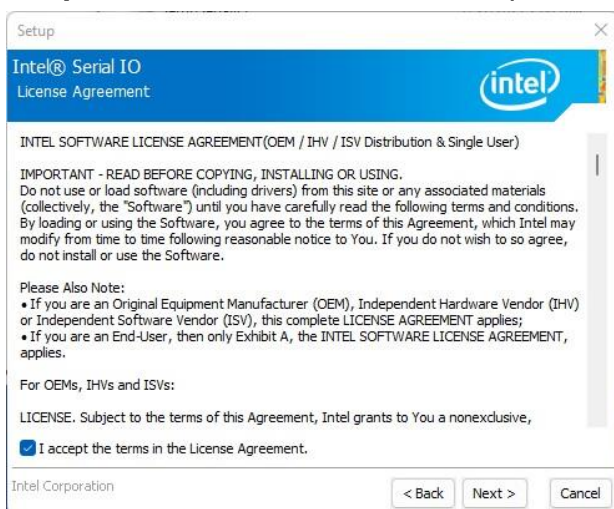
**Step 3. Click Next.**



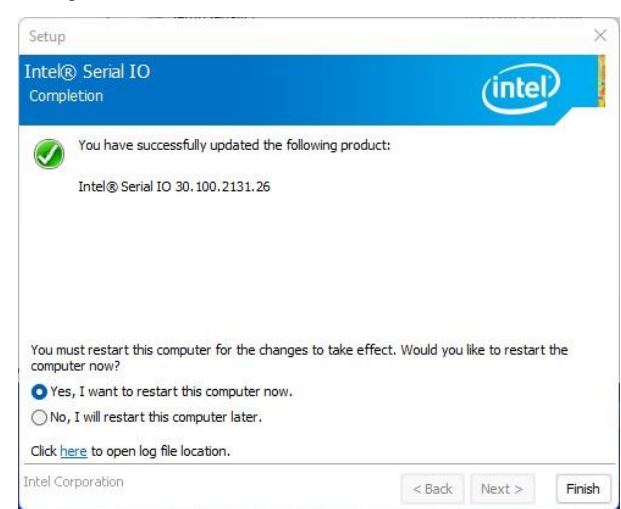
**Step 1. Click Next** to continue setup.



**Step 4. Click Next.**



**Step 2. Click Next.**



**Step 5. Click Finish** to complete the setup.

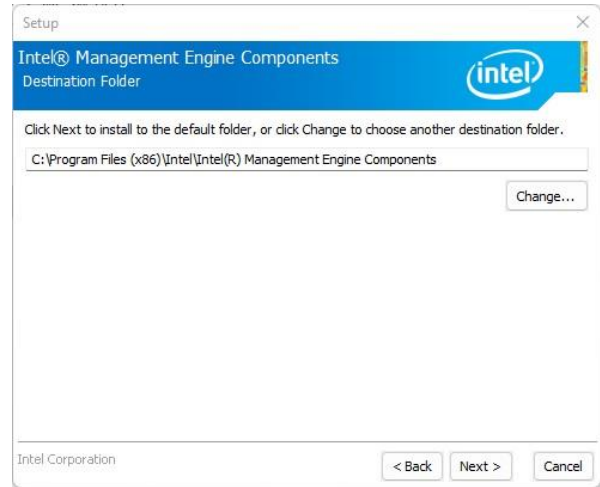
## 4.6 Install ME Driver

All drivers can be found on the Avalue Official Website:

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



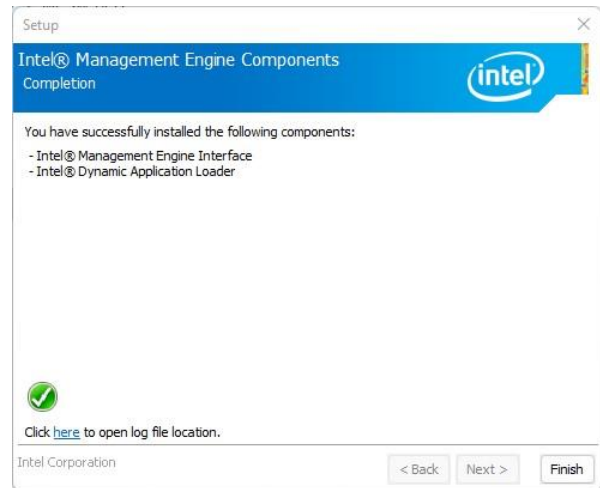
**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



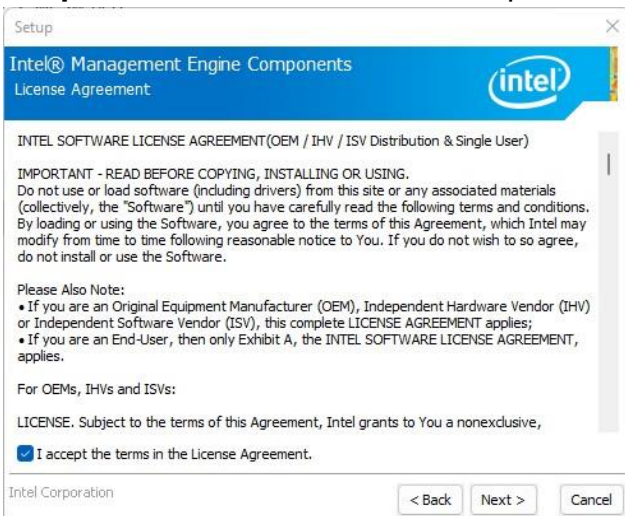
**Step 3. Click Next**



**Step 1. Click Next** to continue setup.



**Step 4. Click Finish** to complete the setup



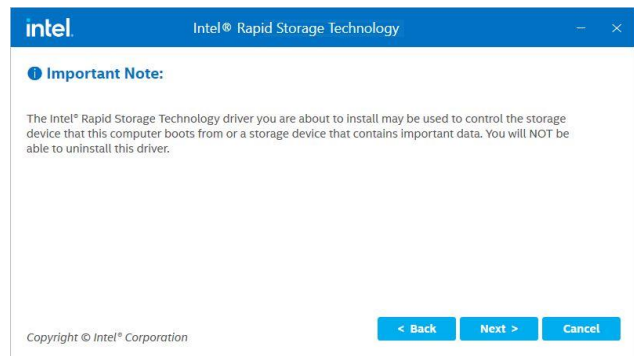
**Step 2. Click Next.**

## 4.7 Install IRST Driver

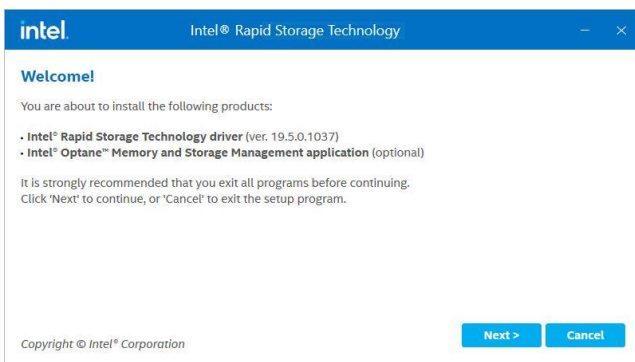
All drivers can be found on the Avalue Official Website:  
[www.avalu.com](http://www.avalu.com).



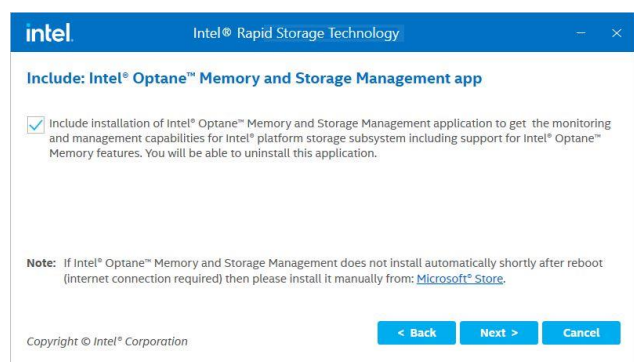
**Note:** The installation procedures and screen shots in this section are based on Windows 11 operation system.



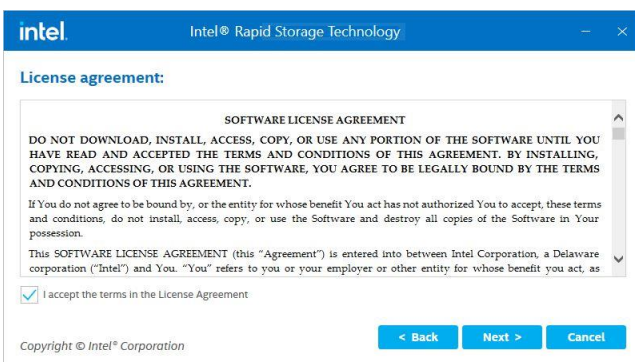
**Step 3. Click Next.**



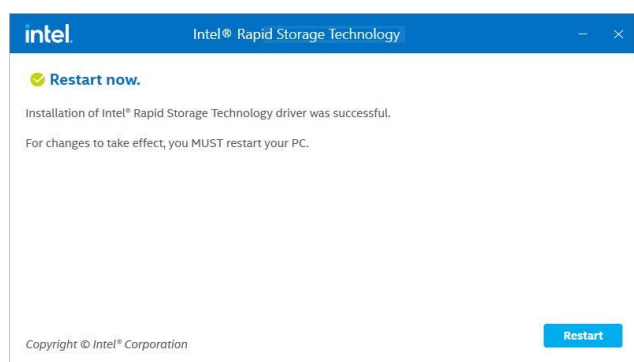
**Step 1. Click Next to continue installation.**



**Step 4. Click Next.**



**Step 2. Click Next.**



**Step 5. Complete setup.**

# 5. BIOS Setup

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## 5.1 Introduction

The BIOS setup program allows users to modify the basic system configuration. In this following chapter will describe how to access the BIOS setup program and the configuration options that may be changed.

## 5.2 Starting Setup

The AMI BIOS™ is immediately activated when you first power on the computer. The BIOS reads the system information contained in the NVRAM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

By pressing <Del> or <F2> immediately after switching the system on, or

By pressing the <Del> or <F2> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

**Press <Del> or <F2> to enter SETUP**

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

**Press F1 to Continue, DEL to enter SETUP**

## 5.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Button	Description
↑	Move to previous item
↓	Move to next item
←	Move to the item in the left hand
→	Move to the item in the right hand
Esc key	Main Menu -- Quit and not save changes into NVRAM Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Previous Values.
F3 key	Optimized defaults
F4 key	Save & Exit Setup

- **Navigating Through The Menu Bar**

Use the left and right arrow keys to choose the menu you want to be in.



**Note:** Some of the navigation keys differ from one screen to another.

- **To Display a Sub Menu**

Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>. A “>” pointer marks all sub menus.



## 5.4 Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the F1 key again.

## 5.5 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the NVRAM settings which resets your system to its defaults.

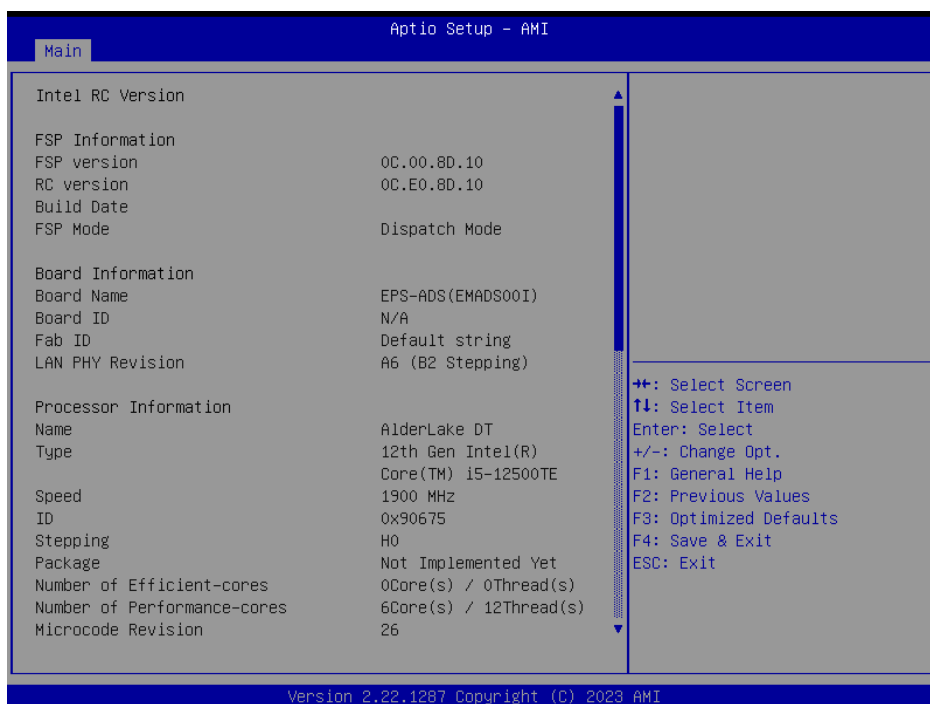
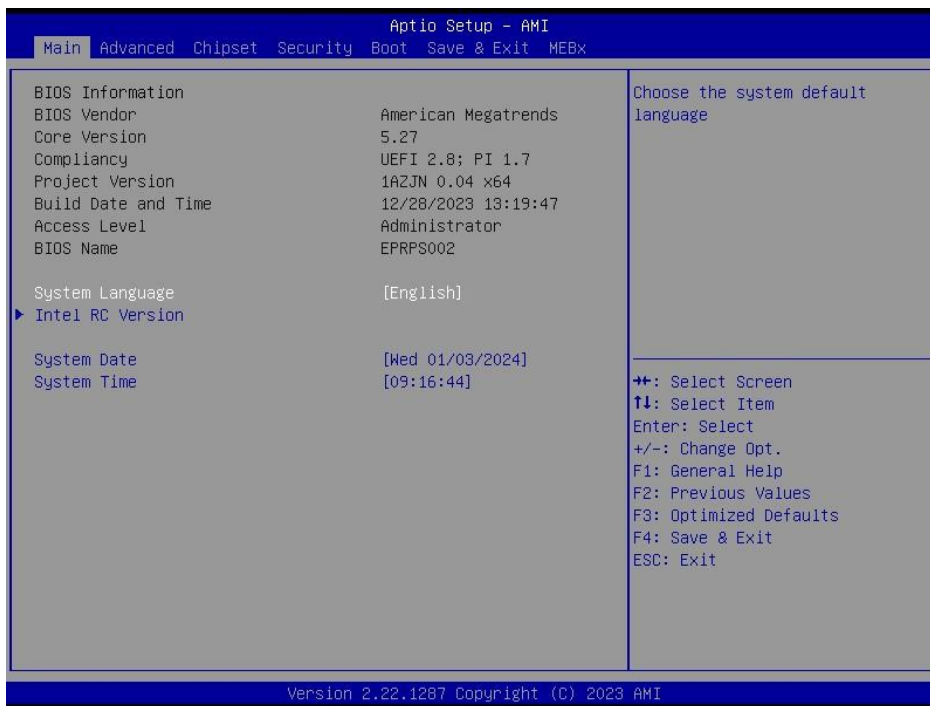
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

## 5.6 BIOS setup

Once you enter the Aptio Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

### 5.6.1 Main Menu

This section allows you to record some basic hardware configurations in your computer and set the system clock.



### 5.6.1.1 System Language

This option allows choosing the system default language.

### 5.6.1.2 System Date

Use the system date option to set the system date. Manually enter the month, day and year.

### 5.6.1.3 System Time

Use the system time option to set the system time. Manually enter the hours, minutes and seconds.

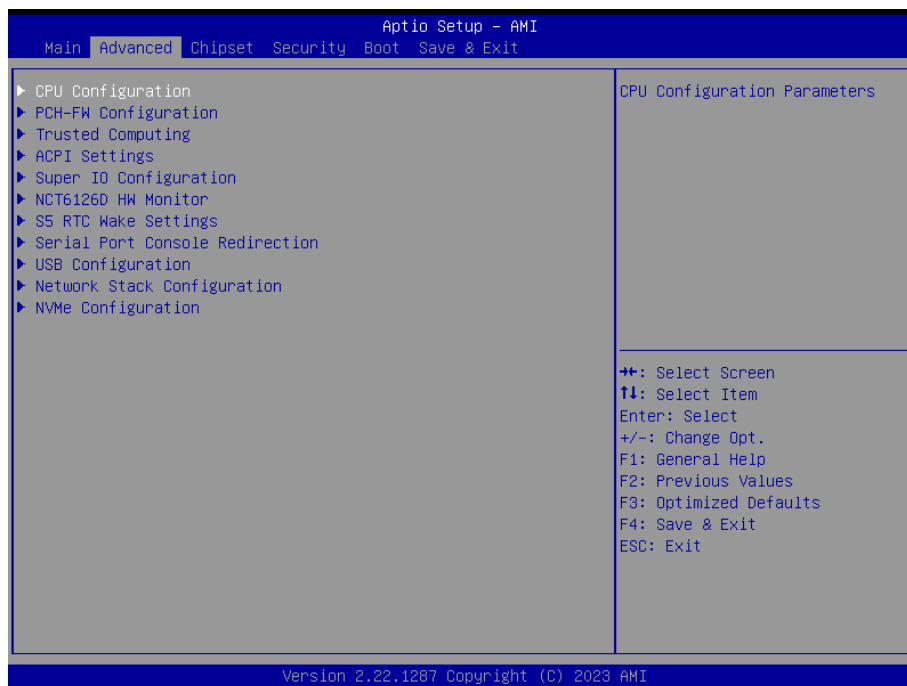


**Note:** The BIOS setup screens shown in this chapter are for reference purposes only, and may not exactly match what you see on your screen.

Visit the Avalue website ([www.avalu.com](http://www.avalu.com)) to download the latest product and BIOS information.

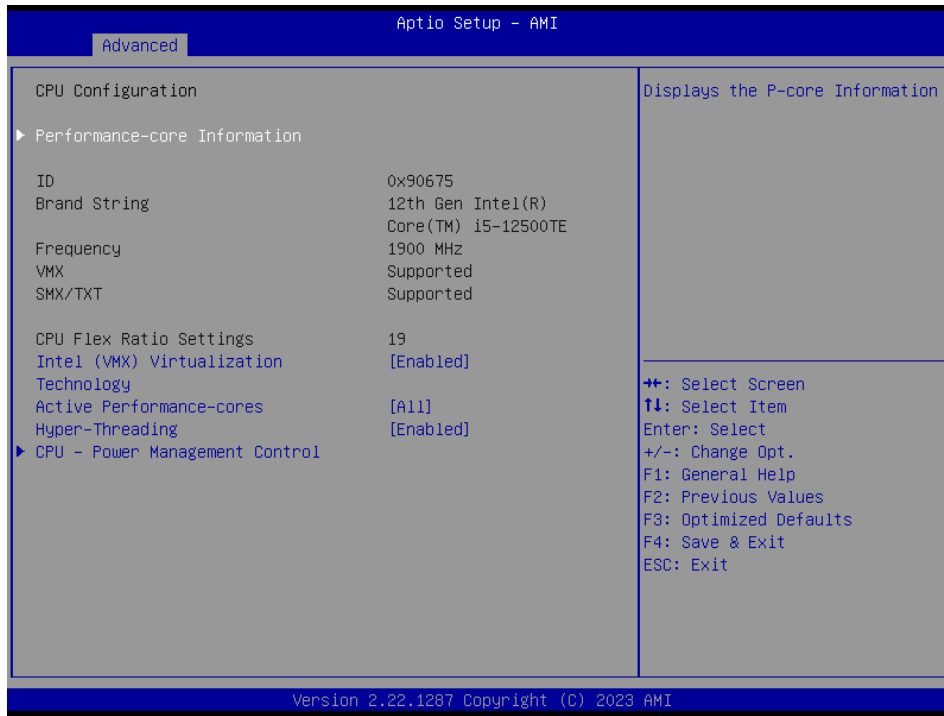
## 5.6.2 Advanced Menu

This section allows you to configure your CPU and other system devices for basic operation through the following sub-menus.



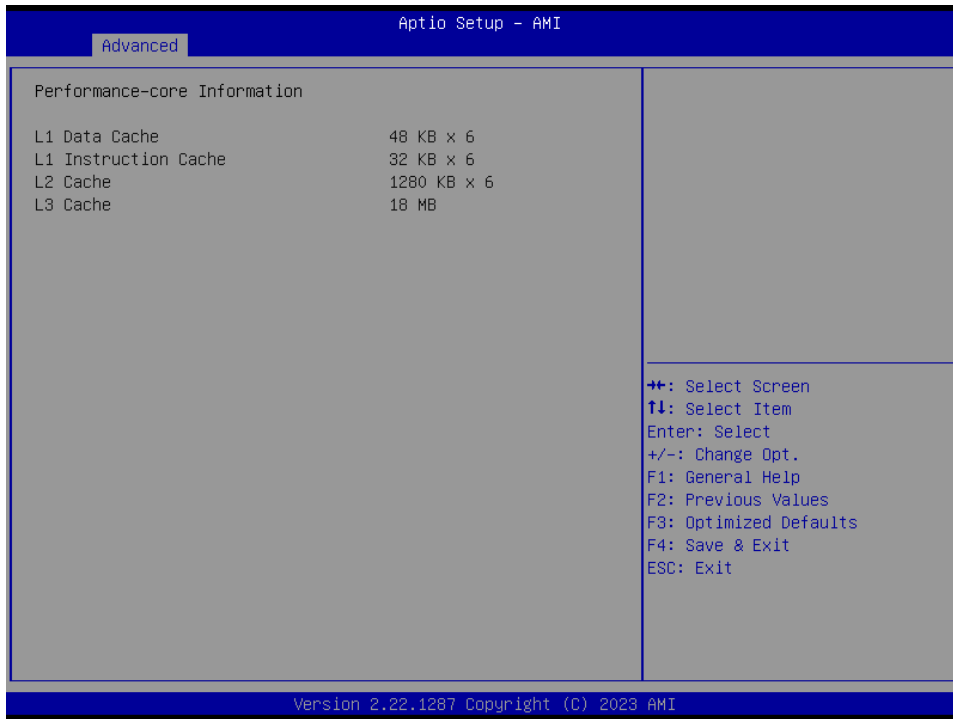
### 5.6.2.1 CPU Configuration

Use the CPU configuration menu to view detailed CPU specification and configure the CPU.

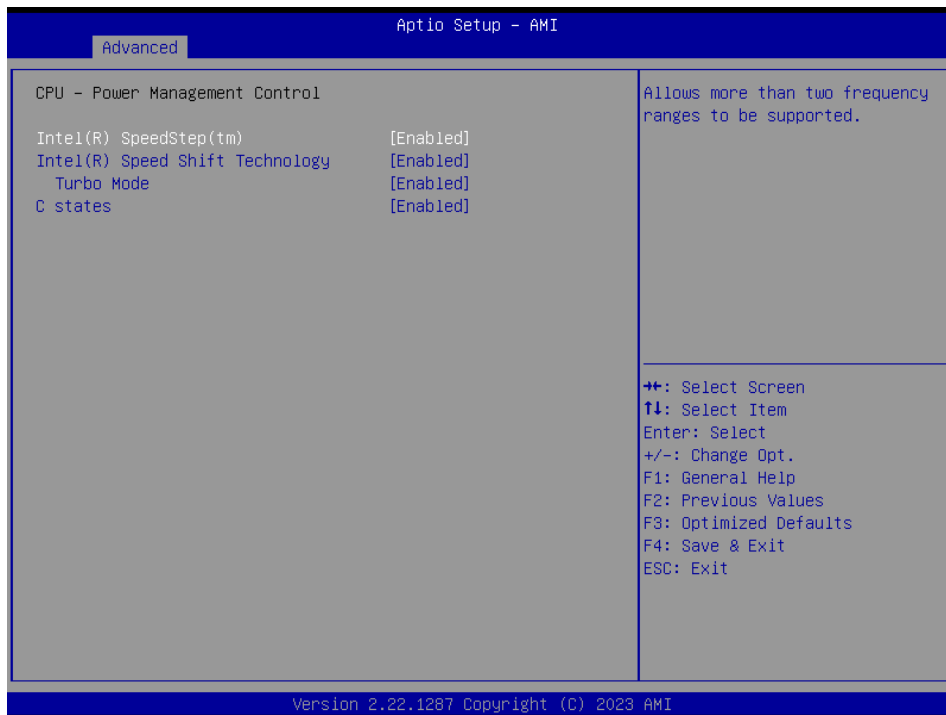


Item	Options	Description
<b>Intel (VMX) Virtualization Technology</b>	Disabled Enabled[Default]	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
<b>Active Performance-cores</b>	All[Default] 7 6 5 4 3 2 1	Number of cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.
<b>Hyper-Threading</b>	Disabled Enabled[Default]	Enable or Disable Hyper-Threading Technology.

5.6.2.1.1 Performance-core Information



5.6.2.1.2 CPU – Power Management Control

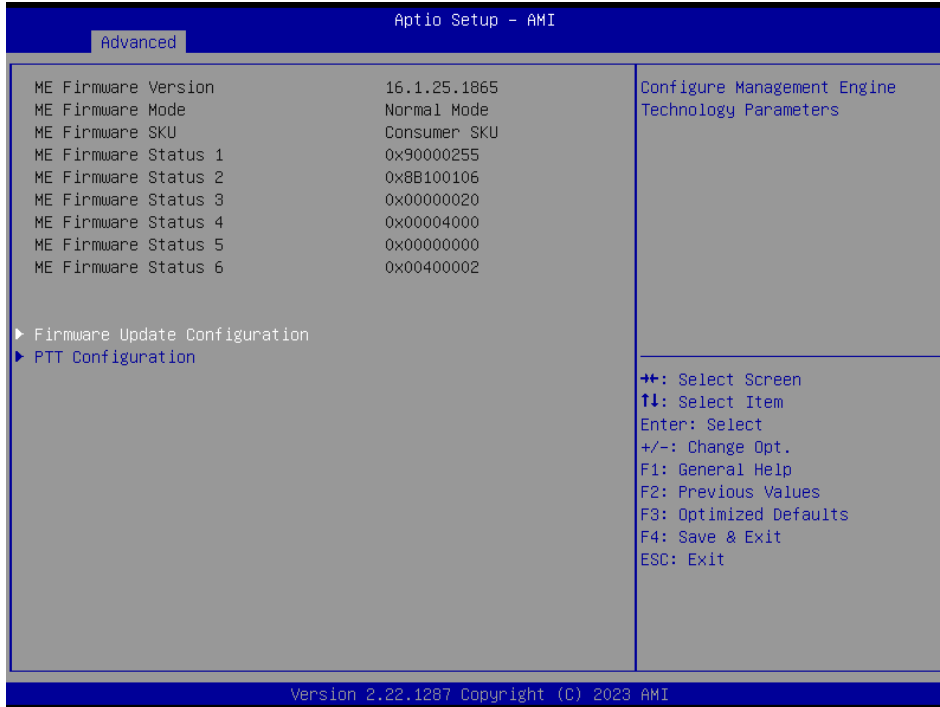


Item	Option	Description
Intel® SpeedStep™	Disabled Enabled[Default]	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Disabled Enabled[Default]	Enable/Disable intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.

## EPS-RPS

<b>Turbo Mode</b>	Enabled[ <b>Default</b> ], Disabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
<b>C States</b>	Enabled[ <b>Default</b> ], Disabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized

### 5.6.2.2 PCH-FW Configuration

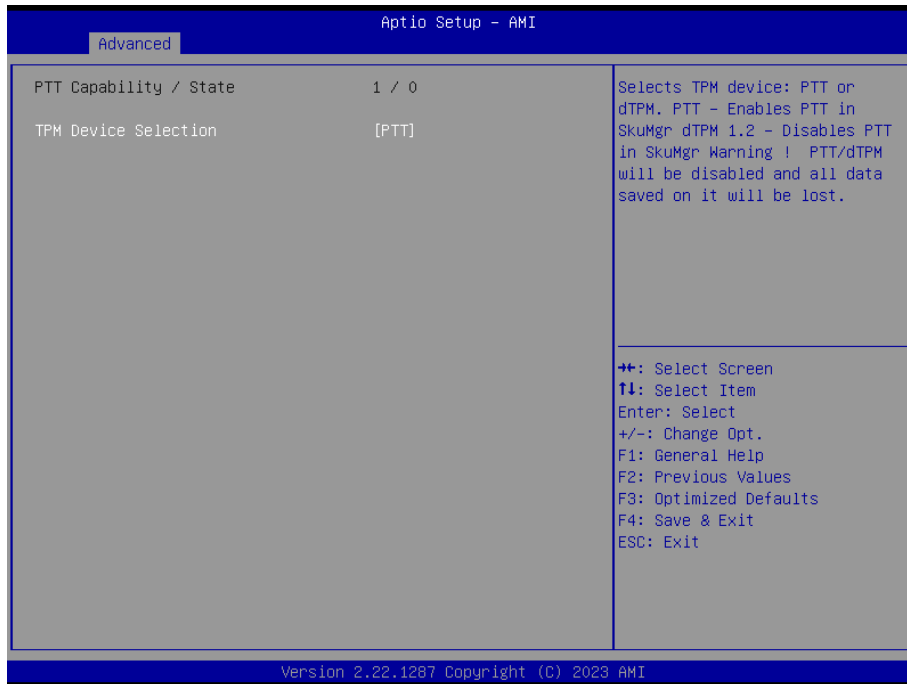


#### 5.6.2.2.1 Firmware Update Configuration



Item	Option	Description
<b>Me FW Image Re-Flash</b>	Disabled[ <b>Default</b> ], Enabled	Enable/Disable Me FW Image Re-Flash function.

### 5.6.2.2 PTT Configuration



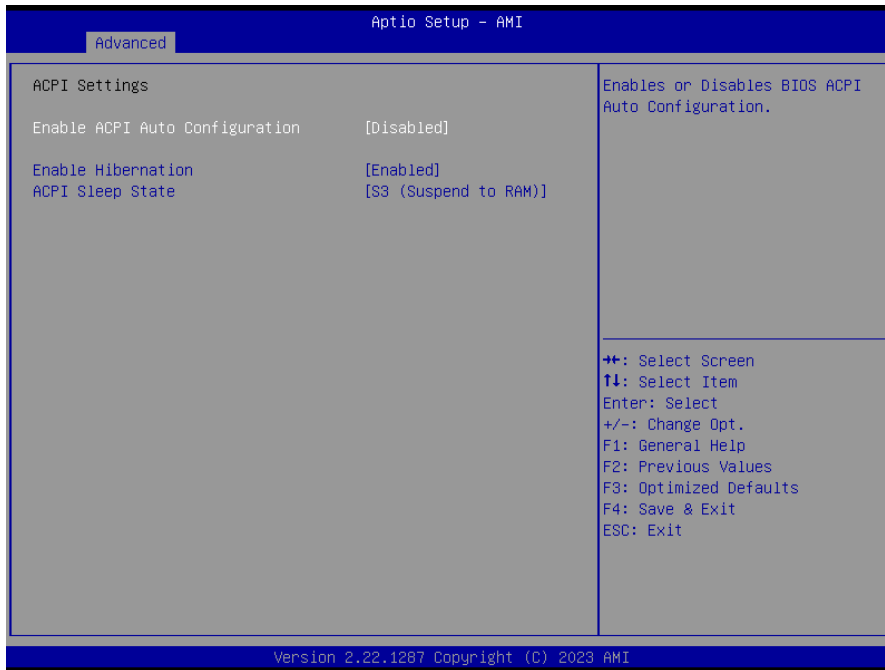
Item	Option	Description
<b>TPM Device Selection</b>	dTPM PTT[Default],	Selects TPM device: PTT or dTPM. PTT-Enables PTT in SKuMgr dTPM 1.2-Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.

### 5.6.2.3 Trusted Computing



Item	Options	Description
<b>Security Device Support</b>	Disable, Enable[Default]	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

5.6.2.4 APCI Settings

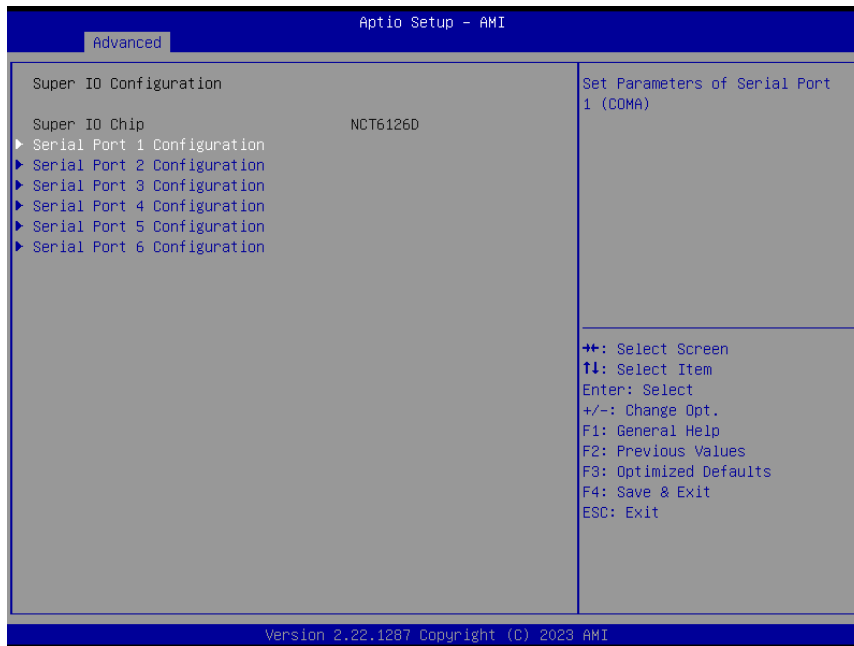


Item	Options	Description
<b>Enable ACPI Auto Configuration</b>	Disabled[ <b>Default</b> ], Enabled	Enables or Disables BIOS ACPI Auto Configuration.
<b>Enable Hibernation</b>	Disabled Enabled[ <b>Default</b> ],	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
<b>ACPI Sleep State</b>	Suspend Disabled, S3 (Suspend to RAM)[ <b>Default</b> ]	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.



### 5.6.2.5 Super IO Configuration

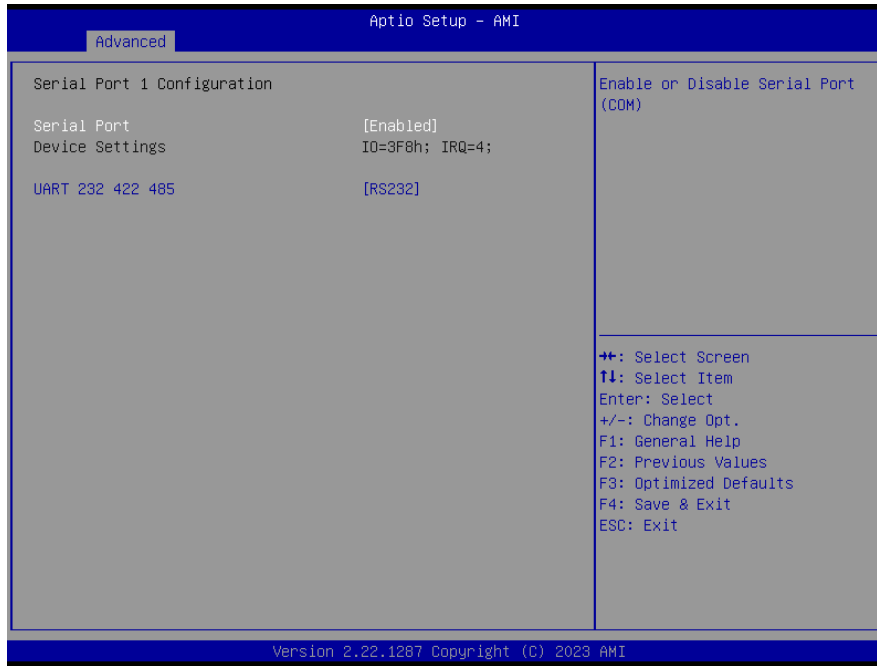
You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 5.6.2.5.1~ 5.6.2.5.2 for more information.



Item	Description
<b>Serial Port 1 Configuration</b>	Set Parameters of Serial Port 1 (COMA).
<b>Serial Port 2 Configuration</b>	Set Parameters of Serial Port 2 (COMB).
<b>Serial Port 3 Configuration</b>	Set Parameters of Serial Port 3 (COMC).
<b>Serial Port 4 Configuration</b>	Set Parameters of Serial Port 4 (COMD).
<b>Serial Port 5 Configuration</b>	Set Parameters of Serial Port 5 (COME).
<b>Serial Port 6 Configuration</b>	Set Parameters of Serial Port 6 (COMF).

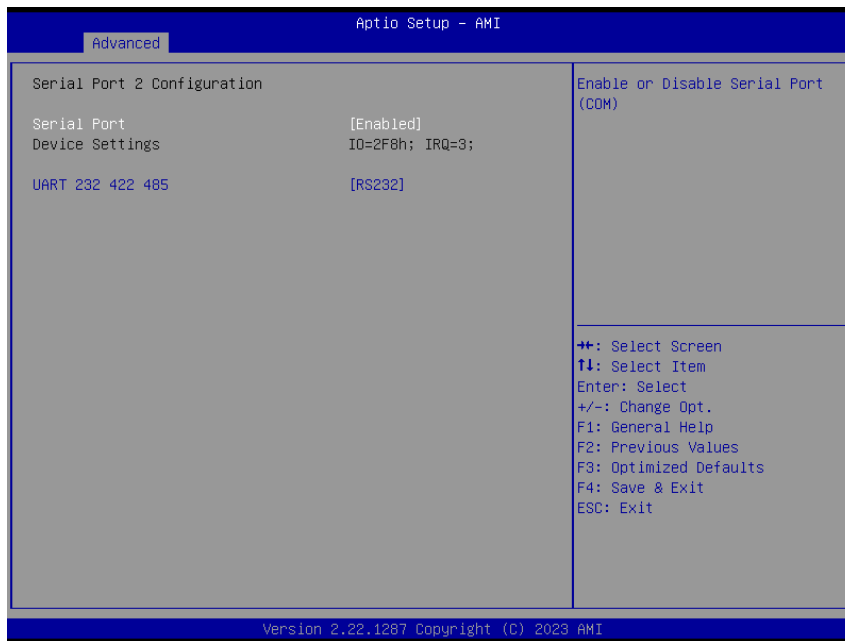
# EPS-RPS

## 5.6.2.5.1 Serial Port 1 Configuration



Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	RS232[Default], RS422 RS485	Set COM Port as RS232, RS422 or RS485 mode.

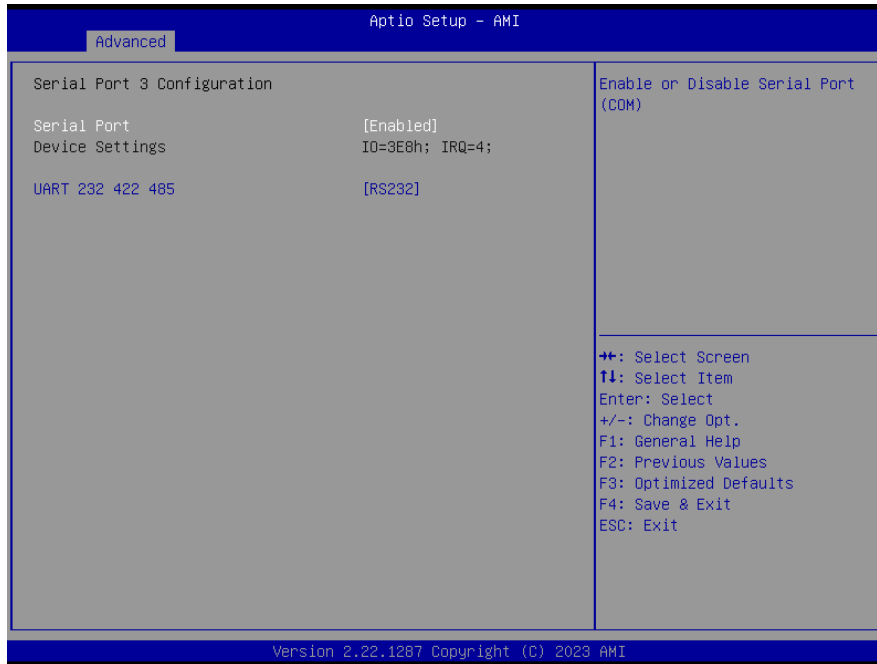
## 5.6.2.5.2 Serial Port 2 Configuration



Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

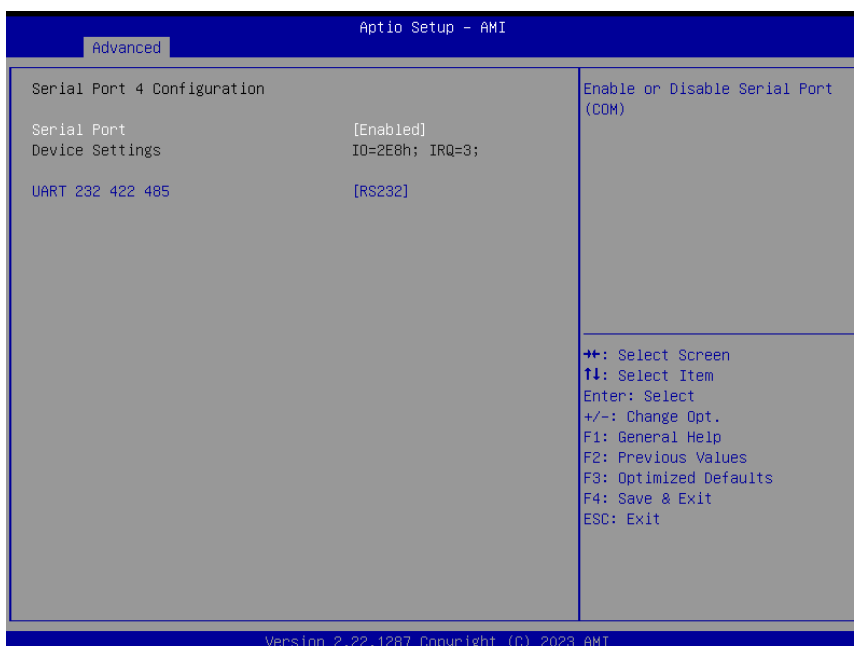
<b>UART 232 422 485</b>	<b>RS232[Default], RS422 RS485</b>	Set COM Port as RS232, RS422 or RS485 mode.
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### 5.6.2.5.3 Serial Port 3 Configuration



Item	Option	Description
<b>Serial Port</b>	<b>Enabled[Default], Disabled</b>	Enable or Disable Serial Port (COM).
<b>UART 232 422 485</b>	<b>RS232[Default], RS422 RS485</b>	Set COM Port as RS232, RS422 or RS485 mode.

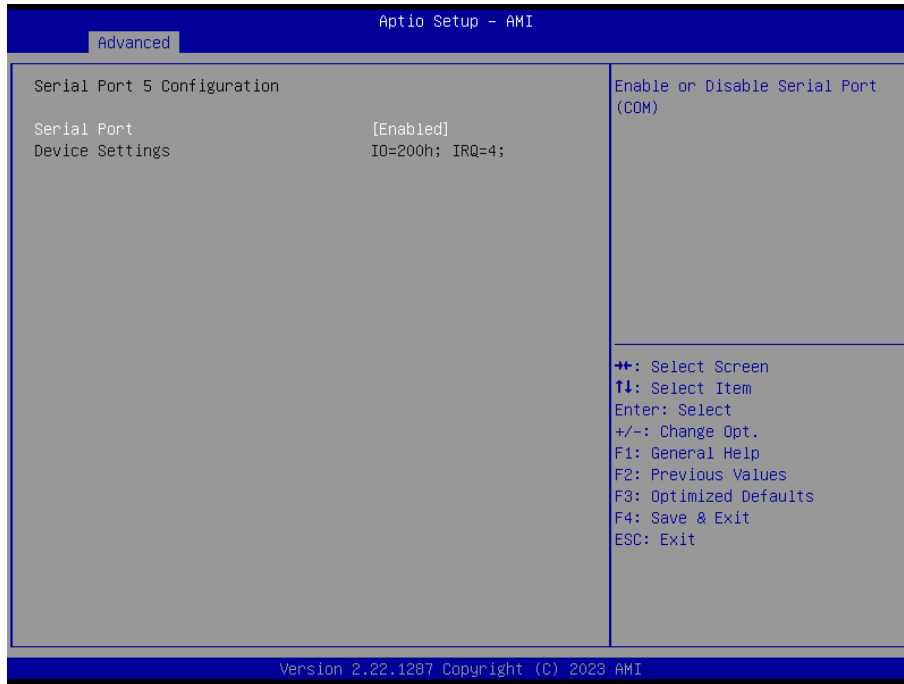
### 5.6.2.5.4 Serial Port 4 Configuration



## EPS-RPS

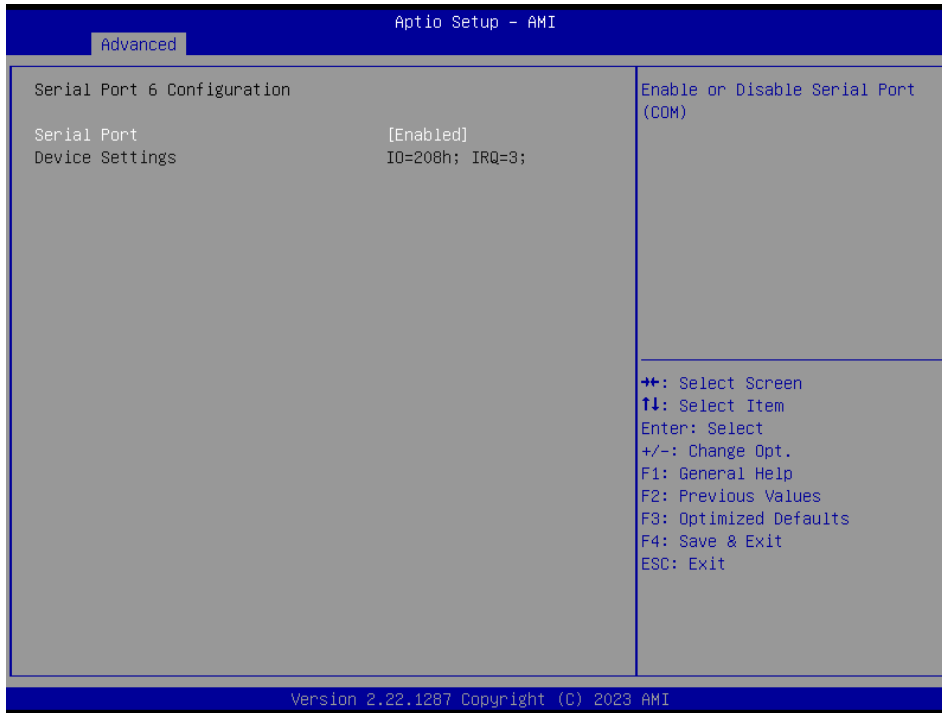
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	RS232[Default], RS422 RS485	Set COM Port as RS232, RS422 or RS485 mode.

### 5.6.2.5.5 Serial Port 5 Configuration



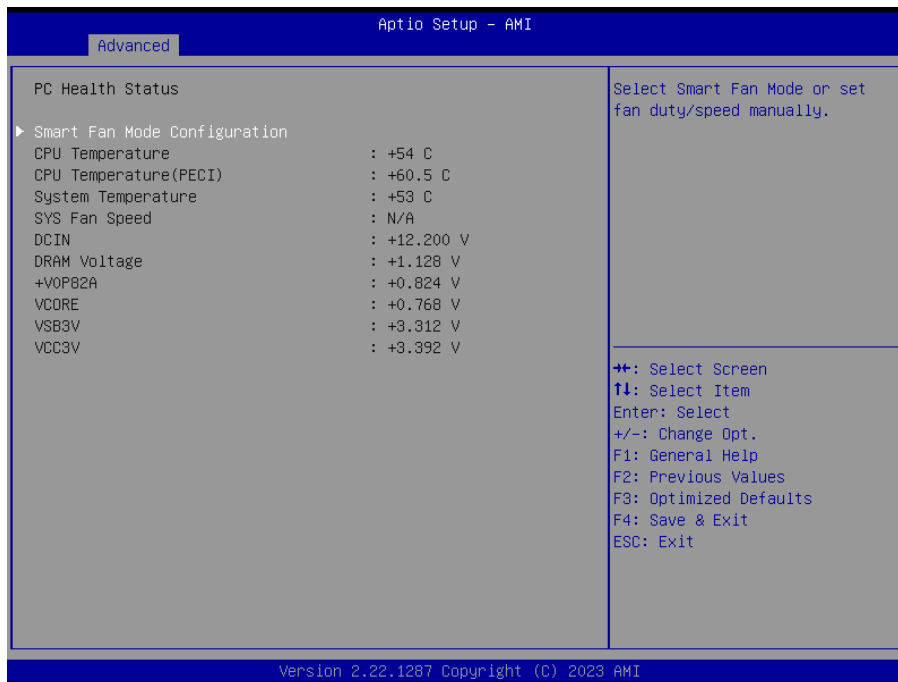
Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

### 5.6.2.5.6 Serial Port 6 Configuration



Item	Option	Description
Serial Port	Enabled[Default], Disabled	Enable or Disable Serial Port (COM).

### 5.6.2.6 NCT6126D HW Monitor



5.6.2.6.1 Smart Fan Mode Configuration



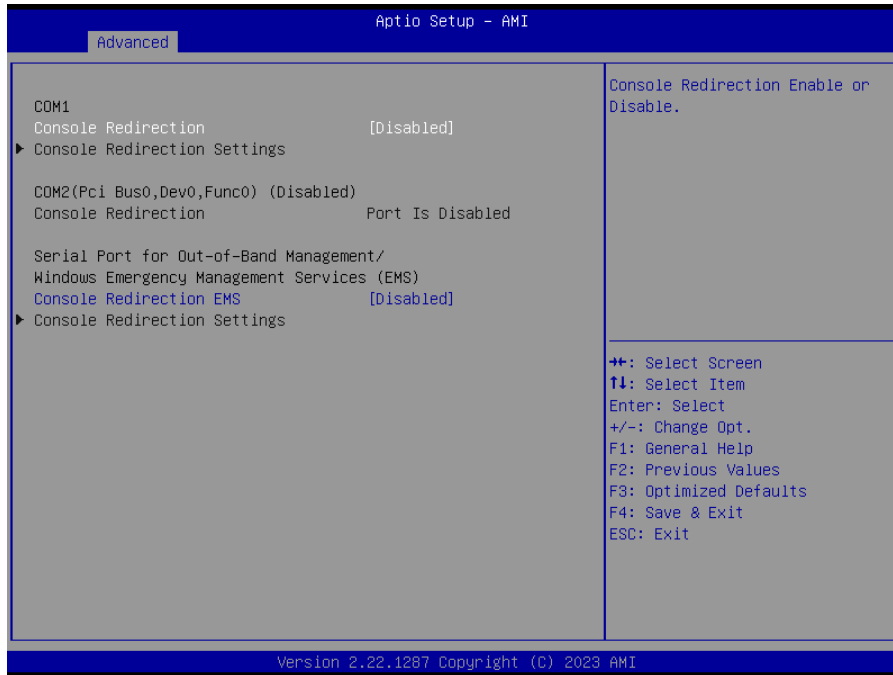
Item	Option	Description
<b>SYS Fan Mode</b>	Manual Mode[Default]/Mode 01/Mode 02/Mode 03/Mode 04/Mode 05/Mode 06/Mode 07/Mode 08/Mode 09/Mode 10/Mode 11/Mode 12/Mode 13/Mode 14/Mode 15/Mode 16/Mode 17/Mode 18/Mode 19/Mode 20	Avalue Smart Fan Mode Select: Mode 01 to Mode 20 Or Manual(No Smart Fan).
<b>SYS Fan Manual Mode Duty</b>	255	Set Fan Duty Manually(1~255).

5.6.2.7 S5 RTC Wake Settings



Item	Options	Description
<b>Wake system from S5</b>	Disabled[Default], Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

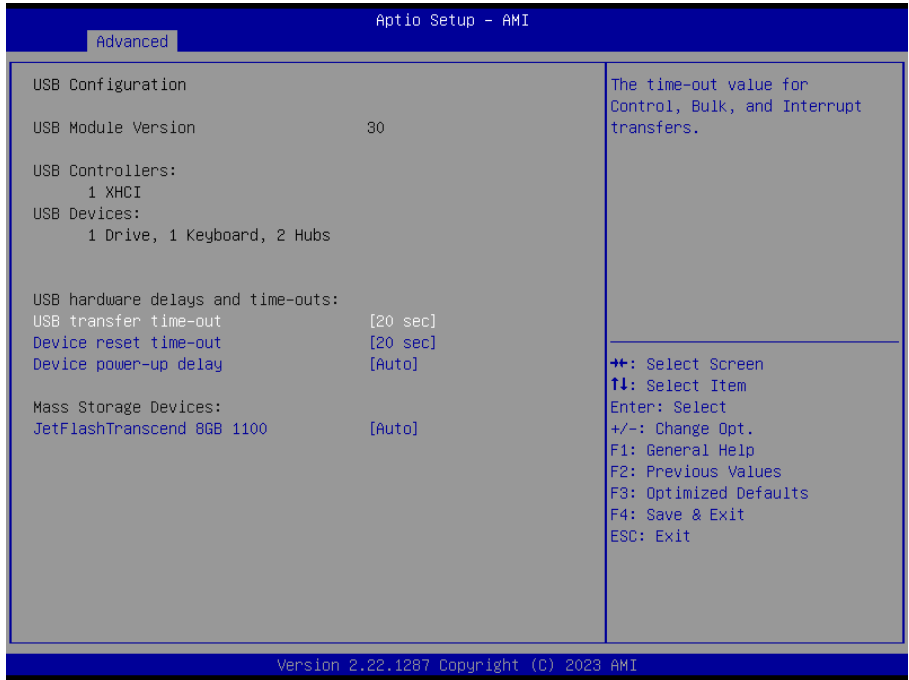
### 5.6.2.8 Serial Port Console Redirection



Item	Options	Description
<b>Console Redirection</b>	Disabled[Default], Enabled	Console Redirection Enable or Disable.

5.6.2.9 USB Configuration

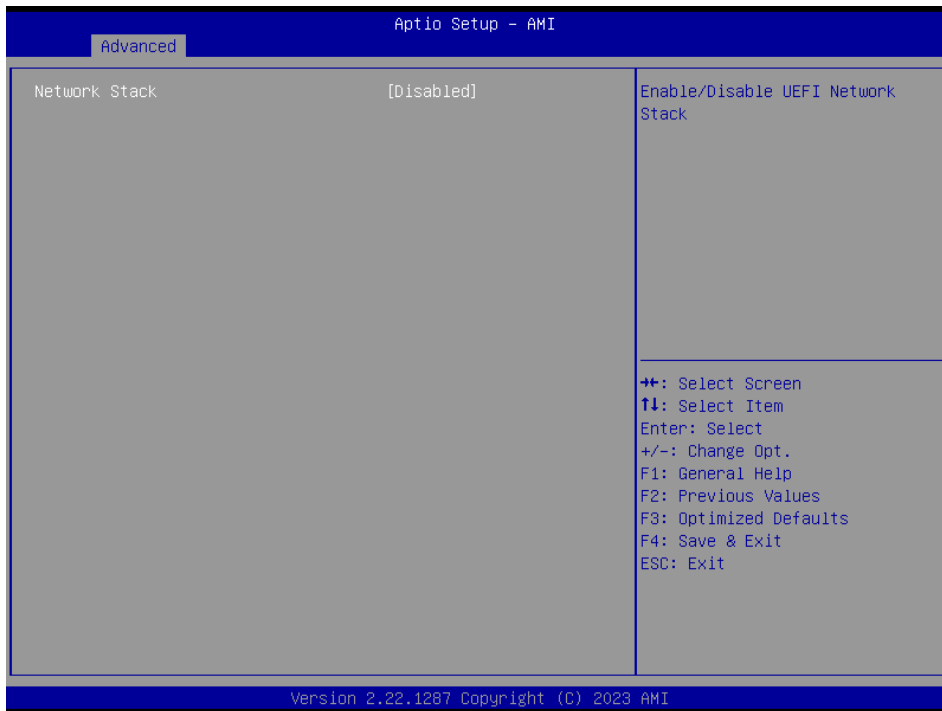
The USB Configuration menu helps read USB information and configures USB settings.



Item	Options	Description
<b>USB transfer time-out</b>	1 sec 5 sec 10 sec 20 sec[Default]	The time-out value for Control, Bulk, and Interrupt transfers.
<b>Device reset time-out</b>	10 sec 20 sec[Default] 30 sec 40 sec	USB mass storage device Start Unit command time-out.
<b>Device power-up delay</b>	Auto[Default] Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken form Hub descriptor.
<b>Mass Storage Devices</b>	Auto[Default] Floppy Forced FDD Hard Disk CD-ROM	Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.

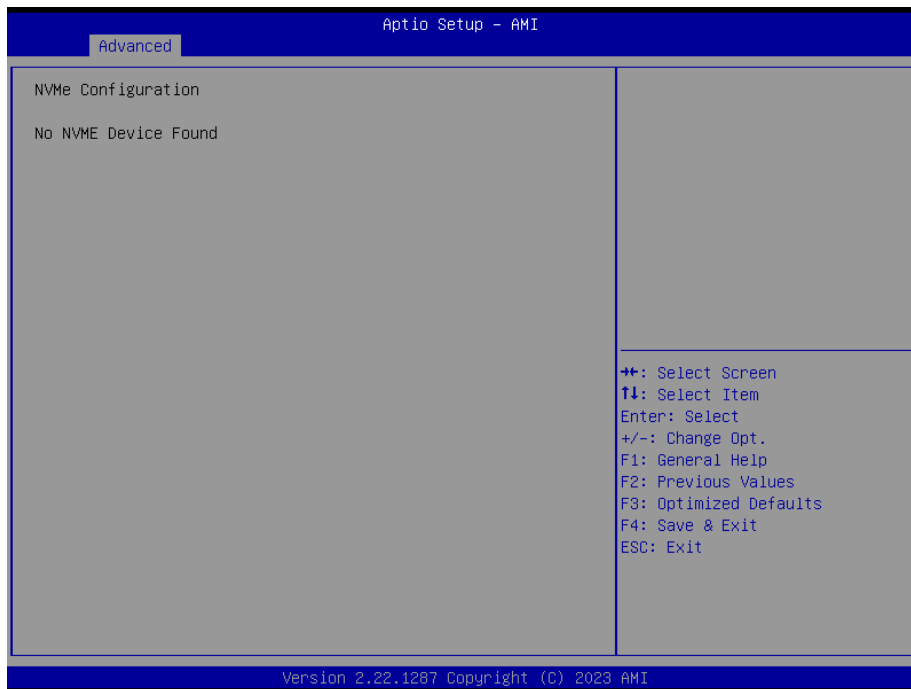


### 5.6.2.10 Network Stack Configuration

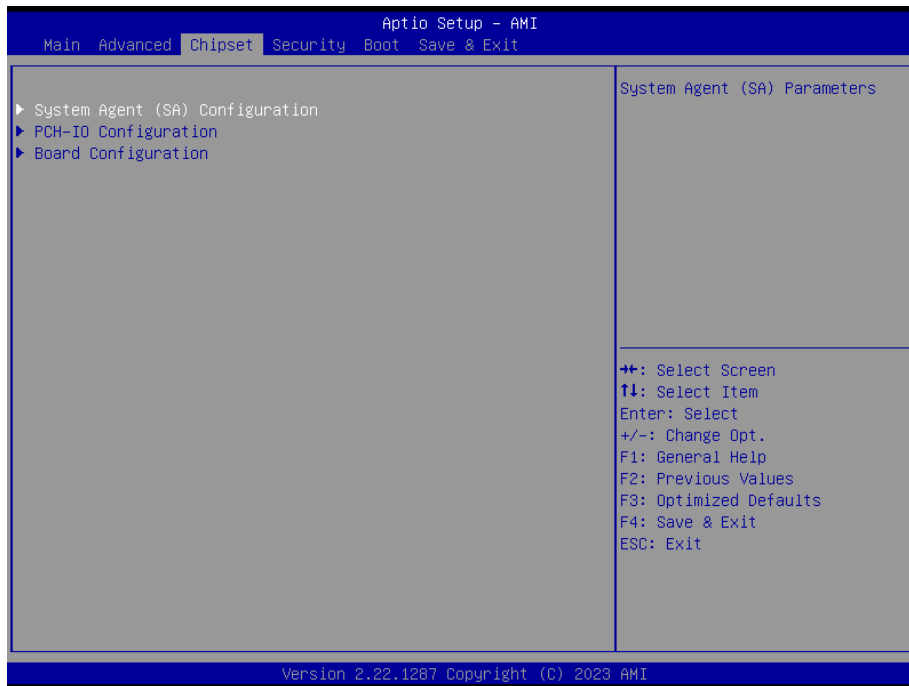


Item	Options	Description
Network Stack	Enabled Disabled[Default]	Enable/Disable UEFI Network Stack.

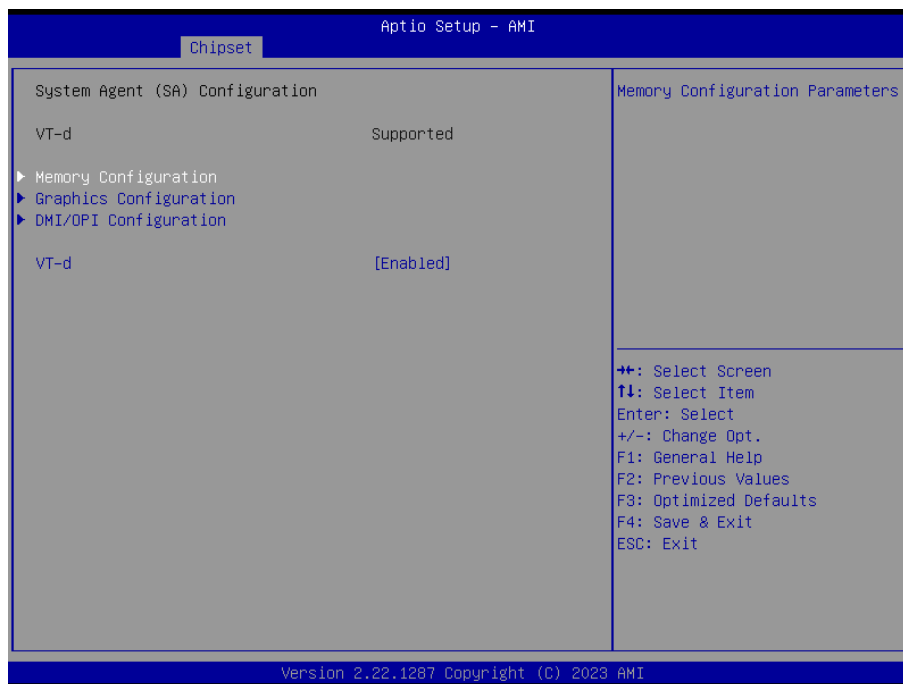
### 5.6.2.11 NVMe Configuration



### 5.6.3 Chipset

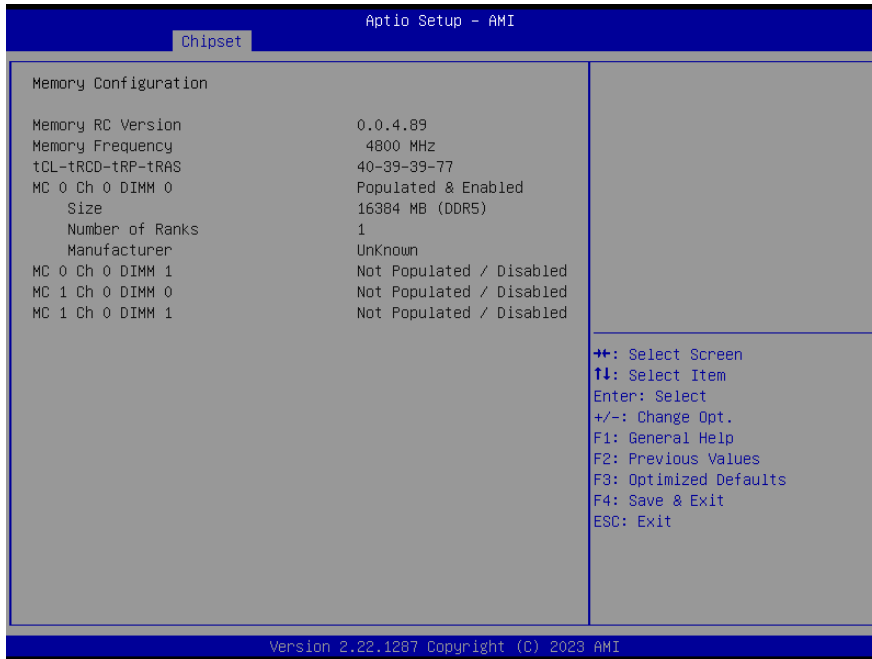


#### 5.6.3.1 System Agent (SA) Configuration



Item	Option	Description
VT-d	Enabled[Default] Disabled	VT-d capability.

### 5.6.3.1.1 Memory Configuration



### 5.6.3.1.2 Graphics Configuration



Item	Option	Description
Primary Display	Auto[Default] IGFX	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
GTT Size	2MB 4MB 8MB[Default]	Select the GTT Size.

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### 5.6.3.1.3 DMI/OPI Configuration

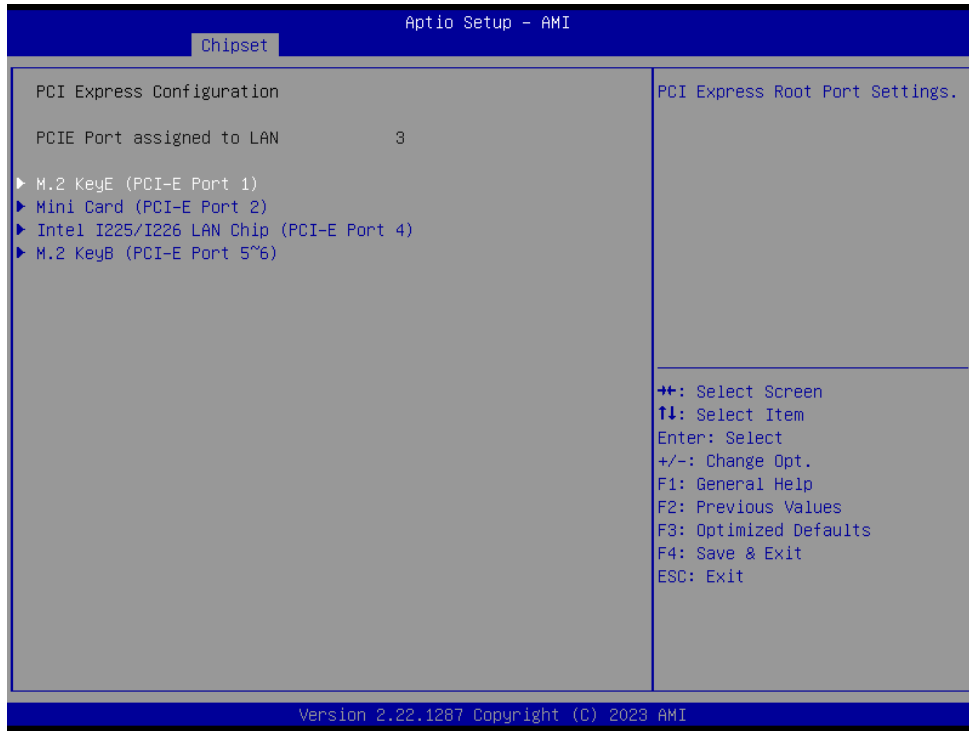


### 5.6.3.2 PCH-IO Configuration

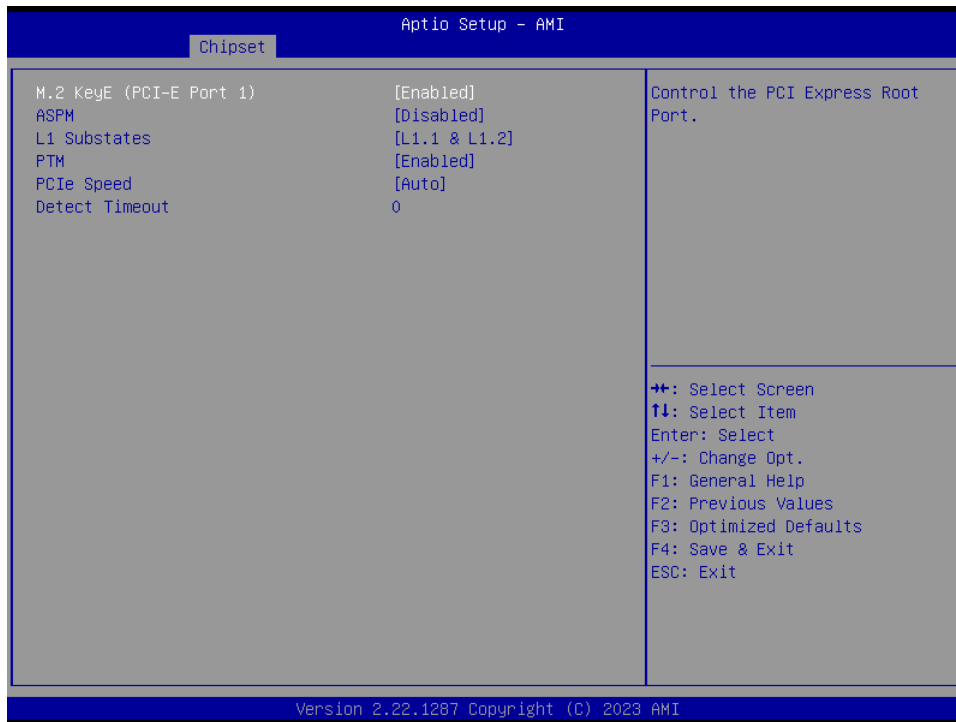


Item	Option	Description
PCH LAN Controller	Disabled Enabled[Default]	Enable/Disable onboard NIC.

### 5.6.3.2.1 PCI Express Configuration



#### 5.6.3.2.1.1 M.2 KeyE (PCI-E Port 1)



Item	Option	Description
<b>M.2 KeyE (PCI-E Port 1)</b>	Enabled[Default], Disabled	Control the PCI Express Root Port.
<b>ASPM</b>	Disabled[Default] L1	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto

## EPS-RPS

	Auto	configure DISABLE – Disables ASPM.
<b>L1 Substates</b>	Disabled, L1.1 L1.1 & L1.2[Default]	PCI Express L1 Substates settings.
<b>PTM</b>	Disabled Enabled[Default]	Enable/Disable Precision Time Measurement.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Configure PCIe Speed.
<b>Detect Timeout</b>	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

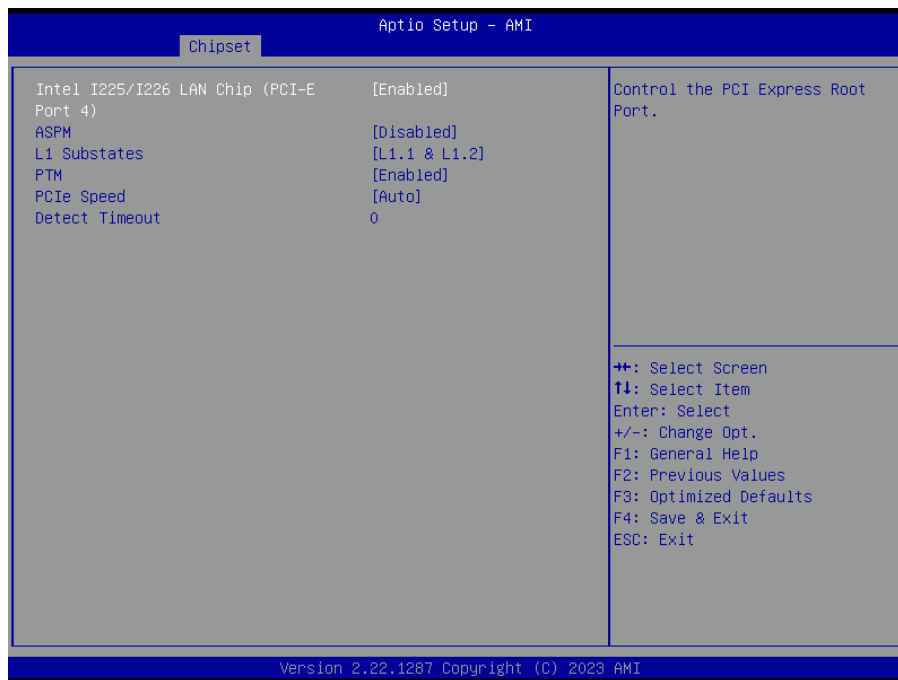
### 5.6.3.2.1.2 Mini Card (PCI-E Port 2)



Item	Option	Description
<b>Mini Card (PCI-E Port 2)</b>	Enabled[Default], Disabled	Control the PCI Express Root Port.
<b>ASPM</b>	Disabled[Default] L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
<b>L1 Substates</b>	Disabled, L1.1 L1.1 & L1.2[Default]	PCI Express L1 Substates settings.
<b>PTM</b>	Disabled Enabled[Default]	Enable/Disable Precision Time Measurement.

<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Configure PCIe Speed.
<b>Detect Timeout</b>	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

### 5.6.3.2.1.3 Intel I225/I226 LAN Chip (PCI-E Port 4)



Item	Option	Description
<b>Intel I225/I226 LAN Chip (PCI-E Port 4)</b>	Enabled[Default], Disabled	Control the PCI Express Root Port.
<b>ASPM</b>	Disabled[Default] L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
<b>L1 Substates</b>	Disabled, L1.1 L1.1 & L1.2[Default]	PCI Express L1 Substates settings.
<b>PTM</b>	Disabled Enabled[Default]	Enable/Disable Precision Time Measurement.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Configure PCIe Speed.
<b>Detect Timeout</b>	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

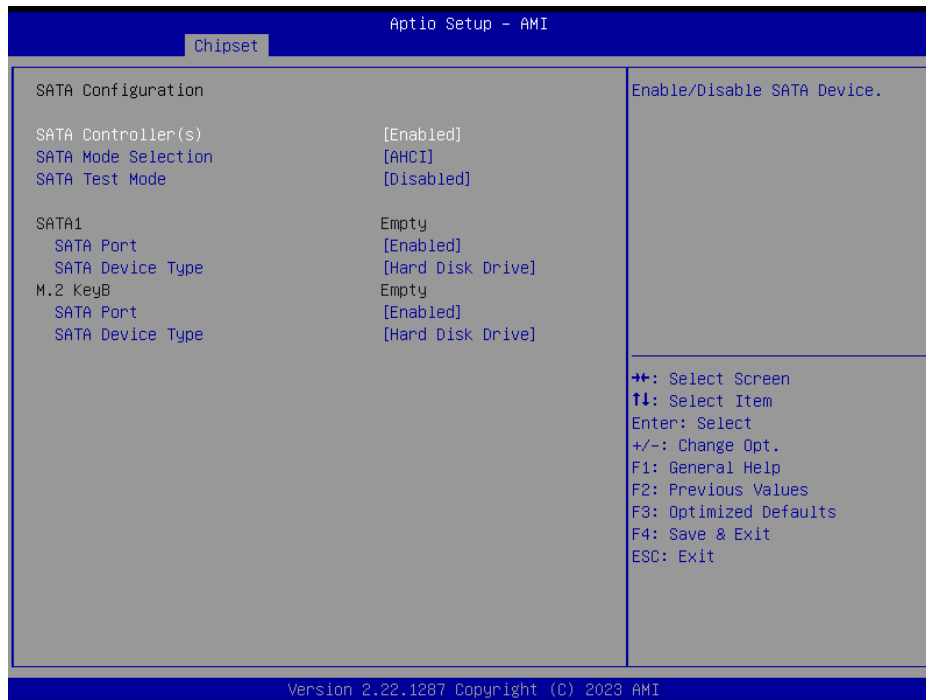
5.6.3.2.1.4 M.2 KeyB (PCI-E Port 5~6)



Item	Option	Description
<b>M.2 KeyB (PEI-E Port 5~6)</b>	Enabled[Default], Disabled	Control the PCI Express Root Port.
<b>ASPM</b>	Disabled[Default] L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
<b>L1 Substates</b>	Disabled, L1.1 L1.1 & L1.2[Default]	PCI Express L1 Substates settings.
<b>PTM</b>	Disabled Enabled[Default]	Enable/Disable Precision Time Measurement.
<b>PCIe Speed</b>	Auto[Default] Gen1 Gen2 Gen3	Configure PCIe Speed.
<b>Detect Timeout</b>	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.



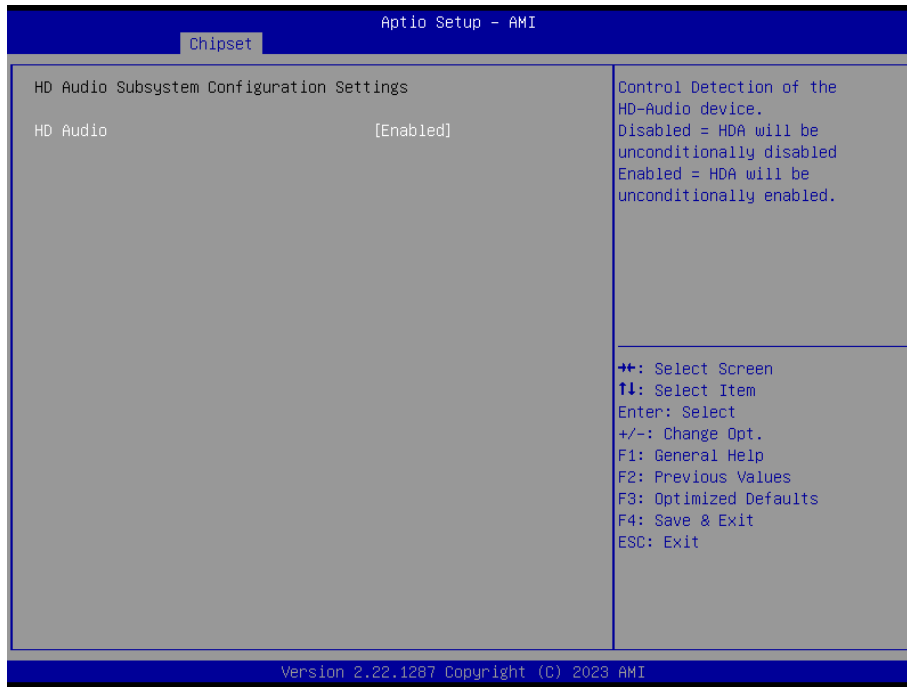
### 5.6.3.2.2 SATA Configuration



Item	Options	Description
<b>SATA Controller(s)</b>	Enabled[ <b>Default</b> ] Disabled,	Enable/Disable SATA Device.
<b>SATA Mode Selection</b>	AHCI[ <b>Default</b> ], RAID	Determines how SATA controller(s) operate.
<b>SATA Test Mode</b>	Enabled Disabled[ <b>Default</b> ]	The Mode Enable/Disable (Loop Back).
<b>SATA Port</b>	Enabled[ <b>Default</b> ] Disabled	Enable or Disable SATA Port.
<b>SATA Device Type</b>	Hard Disk Drive[ <b>Default</b> ] Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

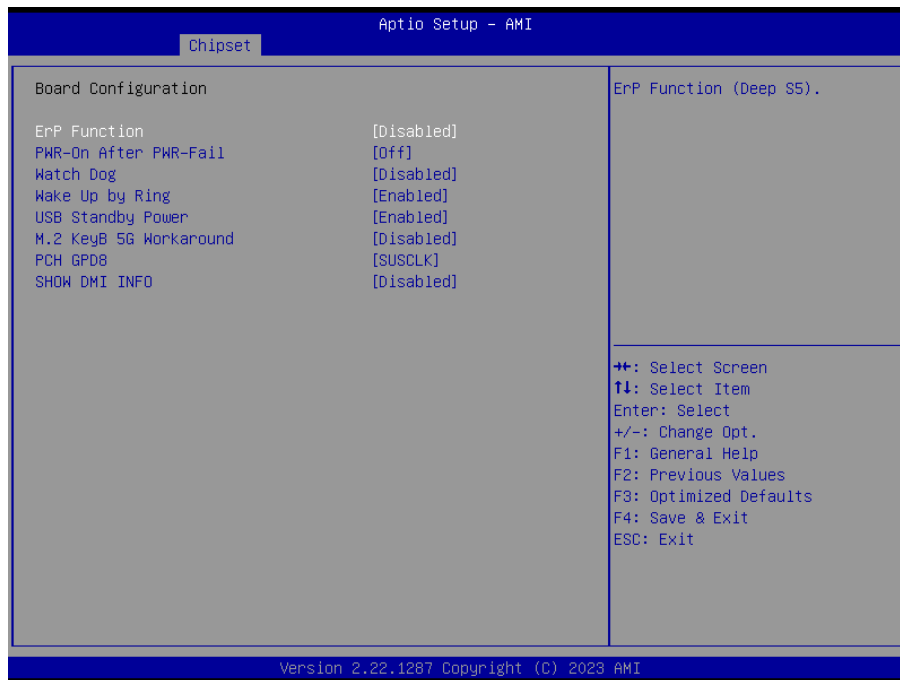
# EPS-RPS

## 5.6.3.2.3 HD Audio Configuration



Item	Option	Description
HD Audio	Disabled Enabled[Default]	Control Detection of the HD-Audio device. Disable = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled

## 5.6.3.3 Board & Panel Configuration



Item	Option	Description
ErP Function	Disabled[Default] Enabled	ErP Function (Deep S5).
PWR-On After PWR-Fail	Off[Default] On Last state	AC loss resume.
Watch Dog	Disabled[Default] 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
Wake Up by Ring	Disabled Enabled[Default]	Wake Up by Ring from S3/S4/S5.
USB Standby Power	Disabled Enabled[Default]	Enable/Disabled USB Standby Power during S3/S4/S5.
M.2 KeyB 5G Workaround	Disabled[Default] Enabled	Enabled/Disabled M.2 KeyB 5G Card Workaround.
PCH GPD8	SUSCLK[Default] Output low	Set PCH GPD8 function for some 5G card.
SHOW DMI INFO	Disabled[Default] Enabled	SHOW DMI INFO.

### 5.6.4 Security



## EPS-RPS

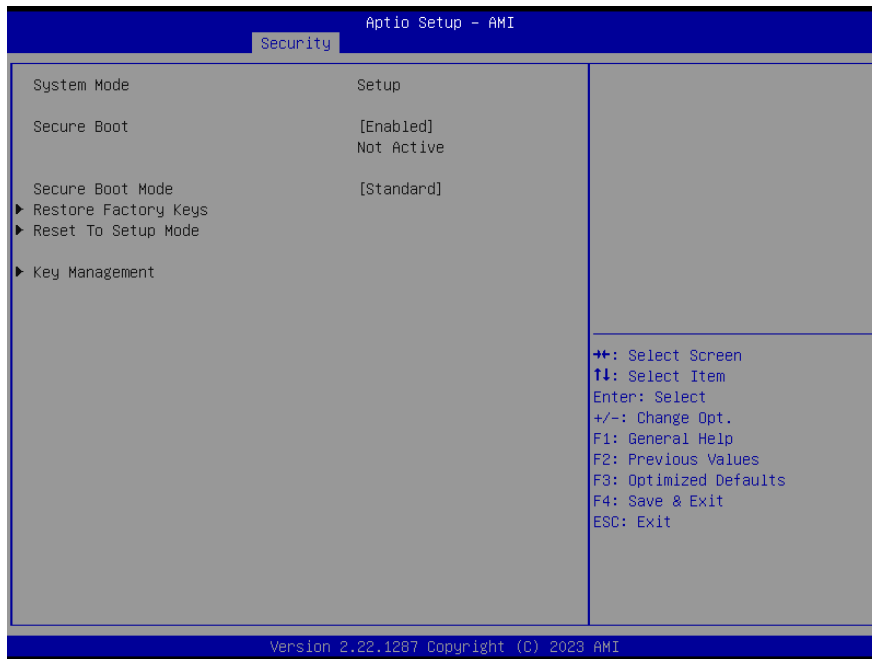
- **Administrator Password**

Set setup Administrator Password

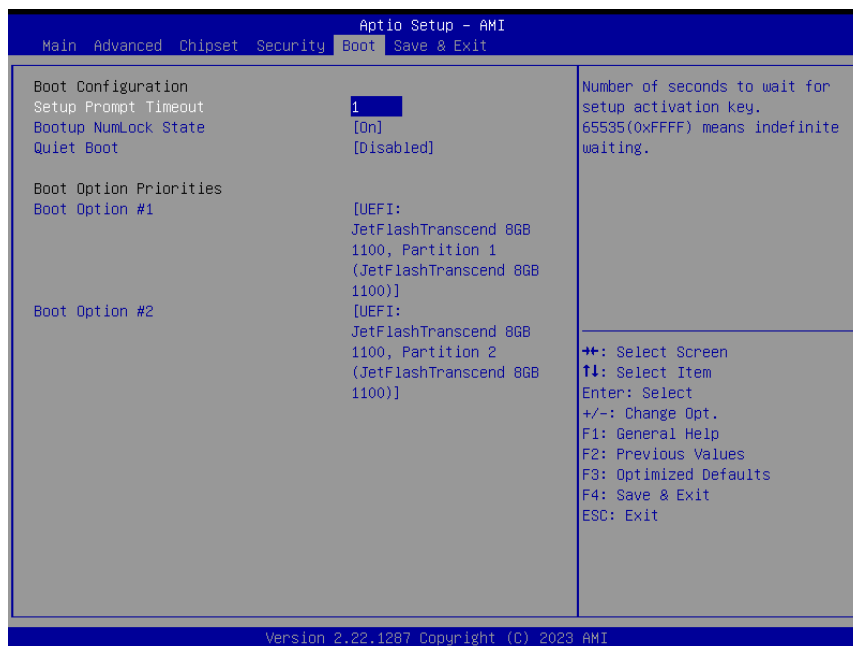
- **User Password**

Set User Password

### 5.6.4.1 Secure Boot

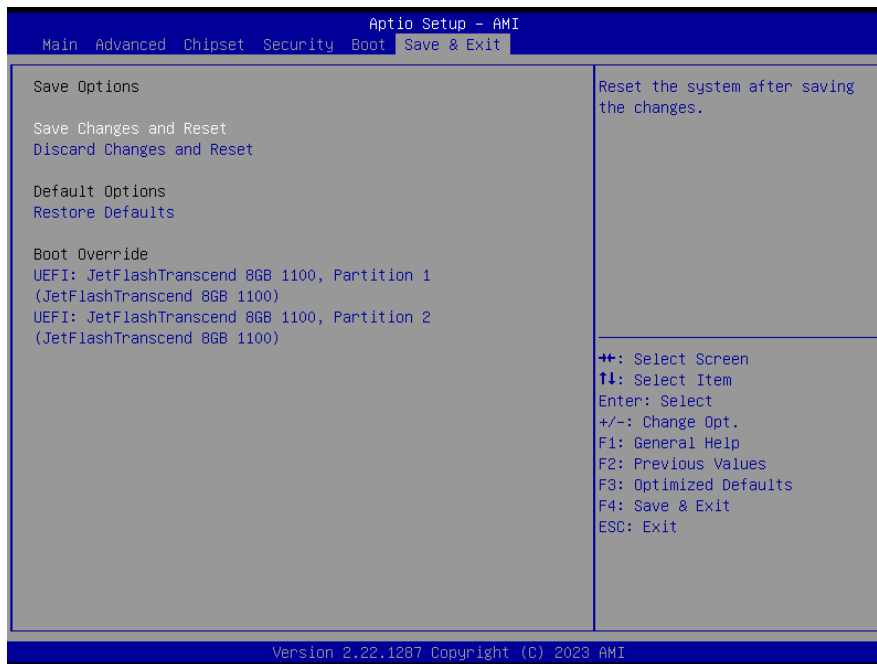


### 5.6.5 Boot



Item	Option	Description
Setup Prompt Timeout	1~ 65535	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	On[Default] Off	Select the Keyboard NumLock state
Quiet Boot	Disabled[Default] Enabled	Enables or disables Quiet Boot option
Boot Option #1/2	Set the system boot order.	

### 5.6.6 Save and exit



#### 5.6.6.1 Save Changes and Reset

Reset the system after saving the changes.

#### 5.6.6.2 Discard Changes and Reset

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The setup program then exits and reboots the controller.

#### 5.6.6.3 Restore Defaults

This option restores all BIOS settings to the factory default. This option is useful if the controller exhibits unpredictable behavior due to an incorrect or inappropriate BIOS setting.

#### 5.6.6.4 Launch EFI Shell from filesystem device

Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

# 6. Maintenance & Troubleshooting

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## System Maintenance Introduction

If the components of the product fail they must be replaced.

Please contact the system reseller or vendor to purchase the replacement parts. Please follow the safety precautions outlined in the sections that follow

## General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

1. Follow the electrostatic precautions outlined below whenever the device is opened.
2. Make sure the power is turned off and the power cord is disconnected whenever the product is being installed, moved or modified.
3. To prevent the risk of electric shock, make sure power cord is unplugged from wall socket. To fully disengage the power to the unit, please disconnect the power cord from the AC outlet. Refer servicing to qualified service personnel. The AC outlet shall be readily available and accessible.
4. Do not apply voltage levels that exceed the specified voltage range. Doing so may cause fire and/or an electrical shock. Use a power cord that matches the voltage of the power outlet, which has been approved and complies with the safety standard of your particular country.
5. Electric shocks can occur if the product chassis is opened when it is running. To avoid risk of electric shock, this device must only be connected to a supply mains with protective earth.
6. Do not drop or insert any objects into the ventilation openings of the product.
7. If considerable amounts of dust, water, or fluids enter the device, turn off the power supply immediately, unplug the power cord, and contact your dealer or the nearest service center.
8. This equipment is not suitable for use in locations where children are likely to be present.
9. DO NOT:
  - Drop the device against a hard surface.
  - Strike or exert excessive force onto the LCD panel.
  - Touch any of the LCD panels with a sharp object.
  - In a site where the ambient temperature exceeds the rated temperature.

## Anti-Static Precautions

**WARNING:**

Failure to take ESD precautions during the installation of the product may result in permanent damage to the product and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the product. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the product is opened and any of the electrical components are handled, the following anti-static precautions are strictly adhered to.

- Wear an anti-static wristband: Wearing a simple anti-static wristband can help to prevent ESD from damaging any electrical component.
- Self-grounding: Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.
- Use an anti-static pad: When configuring or working with an electrical component, place it on an anti-static pad. This reduces the possibility of ESD damage.
- Only handle the edges of the electrical component. When handling the electrical component, hold the electrical component by its edges. Please ensure the following safety precautions are adhered to at all times.



## Maintenance and Cleaning

When maintaining or cleaning the product, please follow the guidelines below.

### **WARNING:**

- For safety reasons, turn-off the power and unplug the panel PC before cleaning.
- If you dropped any material or liquid such as water onto the panel PC when cleaning, unplug the power cable immediately and contact your dealer or the nearest service center. Always make sure your hands are dry when unplugging the power cable.

### Maintenance and Cleaning

Prior to cleaning any part or component of the product, please read the details below.

- Except for the LCD panel, never spray or squirt liquids directly onto any other components. To clean the LCD panel, gently wipe it with a piece of soft dry cloth or a slightly moistened cloth.
- The interior of the device does not require cleaning. Keep fluids away from the device interior.
- Be cautious of all small removable components when vacuuming the device.
- Never drop any objects or liquids through the openings of the device.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the device.
- Avoid eating, drinking and smoking within vicinity of the device.

### Cleaning Tools

Some components in the panel PC may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the panel PC.

- Cloth: Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the device.
- Water or rubbing alcohol: A cloth moistened with water or rubbing alcohol can be used to clean the device.
- Using solvents: The use of solvents is not recommended when cleaning the device as they may damage the plastic parts.
- Vacuum cleaner: Using a vacuum specifically designed for computers is one of the best methods of cleaning the device. Dust and dirt can restrict the airflow in the device and cause its circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- Foam swabs: Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

## Basic Troubleshooting

### PEI Beep Codes

# of Beeps	Description
1	Memory not Installed
2	Recovery started
3	Typically for development use. The beep code is generated when DXE IPL PPI or DXE Core is not found.
4	Recovery failed
4	S3 Resume failed
7	Typically for development use. The beep code is generated when platform cannot be reset because reset PPI is not available.

### DXE Beep Codes

# of Beeps	Description
1	Invalid password
4	Typically for development use. The beep code is generated when some of the Architectural Protocols are not available.
5	No Console Input or Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Typically for development use. The beep code is generated when platform cannot be reset because reset protocol is not available.
8	Platform PCI resource requirements cannot be met

# 7. Product Application

For detailed instructions on the operation of the Watchdog Timer and Digital I/O (DIO) features of this Panel PC, please refer to the comprehensive guide available in the "AvalueIOAPI" manual. Please reaching out to your respective distributors, Avalue technical support team, or Avalue customer service representatives for further information. Feel free to inquire about this supplementary resource to enhance your understanding of the Watchdog Timer and Digital I/O (DIO) Application for optimal utilization of your Panel PC.

# 8. Operating the Device

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The Multi-Touch mode was pre-installed on the Panel PC and need tools for any customizations. Should you have specific requirements or encounter scenarios where a customized touch mode is necessary, we recommend reaching out to your local distributors, Avalue technical support team, or Avalue customer service representatives. These professionals can provide tailored guidance and assistance to address any unique needs related to Multi-Touch mode adjustments.