VMS-RPPS

Intel® 13th Rugged Fanless Vehicle Telematics System

Quick Reference Guide

1st Ed –03 January 2025

Part No. E2017HAS1A0R

Document Amendment History

Revision	Date	By	Comment
1st	January 2025	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.

Copyright Notice

Acknowledgements

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows is registered trademark of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

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

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.avalue.com/ 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.avalue.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.

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://www.avalue.com/en/member 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

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

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

		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.

Content

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	VMS-RPPS	1
2	DP to VGA Adapter	1
3	Screwdriver for chassis	2
4	Wire tie for HDMI	2
5	Thermal pad for M.2 NVMe SSD	1
6	Thermal pad for Memory	1
7	Accessory kit (Rubber foot and Screws)	1
8	Terminal block to lockable DC Jack cable (optional)	
9	120W adapter (optional)	
10	Power cord (optional)	

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

To unpack the box PC, follow the steps below.

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: Take out the box pc from the boxes.
Step 6: Remove the peripheral parts from the box.

1.3 System Specifications

System Information	
Processor	Intel® Core™ Raptor Lake-PS Core i7/i5/i3/Celeron Processor (15W) Intel® Core™ 7-160UL Processor (12M Cache, up to 5.2 GHz, vPro) Intel® Core™ 7-150UL Processor (12M Cache, up to 5.0 GHz) Intel® Core™ 5-130UL Processor (12M Cache, up to 4.7 GHz, vPro) Intel® Core™ 5-120UL Processor (12M Cache, up to 4.6 GHz) Intel® Core™ 3-100UL Processor (10M Cache, up to 4.5 GHz) Intel® U300L Processor (8M Cache, up to 4.4 GHz)
System Memory	2 x 262-Pin SODIMM Socket Max. Up to 64GB DDR5 5200 MHz (non ECC only)
I/O Chipset	EC ITE_IT5782VG-I
BIOS Information	AMI UEFI BIOS, 256Mbit SPI Flash ROM
Watchdog Timer	H/W Reset, 1sec. ~ 65535sec.
H/W Status Monitor	CPU & System Temperature monitoring Voltage monitoring
RAID	RAID 0/1 supported
TPM	TPM 2.0
iAMT	iAMT 12.0 (selected sku)
Expansion	
mPCIe (Size, Signal)	1 x Full Size Mini PCIe (1 x PCIex1 + USB2.0) w/ SIM slot1 (External)
M.2 (Signal)	1 x M.2 Key-E 2230 (1 x PCIex1 + USB2.0) supports Wi-Fi & BT Module 1 x M.2 Key-B 2242/3042/3052 (1 x PCIex1 + USB3.2) w/ SIM slot2 (External)
Storage	
M.2 (Signal)	1 x M.2 Key-M 2280 (1 x PCIex4) supports NVMe
2.5” Drive Bay (Height)	2 x 2.5” Drive Bay (SATA III, Max. up to 15mm Height Storage), RAID 0/1 supported
Front I/O	
USB Port	2 x USB 2.0
Power Button	1 x Push Button for Power on/off w/ LED(Blue)
Reset Button	1 x Push Button for Reset in hiding
LED Indicator	1 x LED indicators for Storage (Yellow) - M.2 M-key PCIe Storage & SATA SSD 1 x LED indicators for LTE (Green) - M.2 B-key 1 x LED indicators for Wi-Fi (Green) - M.2 E-key
COM Port	1 x RS232/422/485(BIOS), support auto-flow
Digital I/O	1 x 10-bits GPIO

<table>
<tr><td></td><td>
<table>
<tr><th>Input (DI)</th><th>Output (DO)</th></tr>
<tr><td>Input Channels: source or sink type
Voltage Range: 0~60Vdc input
Logic Level 0: 0V~5V
Logic Level 1: 9V~60V</td><td>Output Channels: sink or source type.
Output Current: Max 200 mA Per channel
Voltage rating: 30V</td></tr>
</table>
SW control
</td></tr>
<tr><td>SIM Slot</td><td>2 x SIM Card Slot (External Accessible w/Dust Protection Cover)</td></tr>
<tr><td colspan="2">Rear I/O</td></tr>
<tr><td>USB Port</td><td>2 x USB 3.2 Gen.2</td></tr>
<tr><td>COM Port</td><td>2 x RS232/422/485(BIOS), support auto-flow (COM2/3 via Cable)</td></tr>
<tr><td>HDMI</td><td>2 x HDMI</td></tr>
<tr><td>DP</td><td>2 x DP++</td></tr>
<tr><td>Audio</td><td>1 x Line-Out
1 x Mic-In</td></tr>
<tr><td>RJ-45</td><td>4 x RJ-45 (4 x PoE Available for BOM option, support IEEE 802.3af, total 60W)</td></tr>
<tr><td>Antenna</td><td>2 x Antenna Mounting w/Dust Protection Cover</td></tr>
<tr><td>GND</td><td>1 x GND</td></tr>
<tr><td colspan="2">Left I/O (View on front side)</td></tr>
<tr><td>Antenna</td><td>3 x Antenna Mounting w/Dust Protection Cover</td></tr>
<tr><td colspan="2">Right I/O (View on front side)</td></tr>
<tr><td>Antenna</td><td>3 x Antenna Mounting w/Dust Protection Cover</td></tr>
<tr><td colspan="2">Display</td></tr>
<tr><td>Graphic Chipset</td><td>Intel® Iris® Xe Graphics (i7/ i5)
Intel® UHD Graphics (i3/Celeron)</td></tr>
<tr><td>Resolution</td><td>HDMI: Max. resolution 4096 x 2304 @ 60Hz
DP++: Max. resolution 4096 x 2160 @ 60Hz (DP to HDMI cable can’t support 4K @ 60Hz, Max. up to 1920x1080 (60Hz))</td></tr>
<tr><td colspan="2">Audio</td></tr>
<tr><td>Audio Codec</td><td>Realtek ALC888S</td></tr>
<tr><td colspan="2">Ethernet</td></tr>
<tr><td>LAN Chipset</td><td>4 x Intel® I226IT 2.5 Gigabit Ethernet</td></tr>
<tr><td>Specification</td><td>4 x 10/100/1000/2.5G Base-Tx GbE compatible</td></tr>
<tr><td>LED Indicator</td><td>2.5G LAN Port (I226IT) LED indicator (LAN for active, speed)
<table>
<tr><th colspan="2">ACT/LINK</th><th colspan="2">SPEED</th></tr>
<tr><th>LED</th><th>Definition</th><th>LED</th><th>Definition</th></tr>
<tr><td>Light Off</td><td>No Link</td><td>Solid Orange</td><td>2.5G</td></tr>
<tr><td>Solid Yellow</td><td>Connection</td><td>Solid Green</td><td>1G/100M</td></tr>
<tr><td>Flashing</td><td>Activity</td><td>Light Off</td><td>10M</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th colspan="2">Power Requirement</th></tr>
<tr><td>DC Input</td><td>Typical 12/24/48 Vdc (+9 ~ 60Vdc)</td></tr>
<tr><td>DC Input Connector</td><td>1 x 3-Pin Terminal Block for DC Power Input</td></tr>
<tr><td>ACPI</td><td>Single Power ATX Support S0, S3, S4, S5
ACPI 5.0 Compliant</td></tr>
<tr><td>Power Mode</td><td>Vehicle Power Mode (Default Setting)/Industrial PC Power Mode
AT / ATX mode Switchable Through Jumper</td></tr>
<tr><td>Power Management</td><td>
■ Vehicle Power Mode
BIOS sets up as Vehicle PC
ACC Function (JACC1) sets up as Enable
AT/ATX Jumper (JAT1) sets up as AT
■ Industrial PC Power Mode
BIOS sets up as Industrial PC
ACC Function (JACC1) sets up as Disable
AT/ATX Jumper (JAT1) sets up as AT or ATX
■ ACC Function (JACC1)
It is Vehicle PC power mode (Power on/off controlled by Ignition or Power button) if ACC Function sets up as Enable.
It is Industrial PC power mode (Power on/off controlled by Power button) if ACC Function sets up as Disable.
■ AT/ATX Jumper(JAT1)
This function will be active if ACC Function (JACC1) sets up Disable (Industrial PC power mode).
■ Power Input Selection (JBAT1)
To set up the DC input voltage is +12Vdc, +24Vdc, +48Vdc or wide range from +9~60Vdc.
Vin Work/Shutdown (BIOS)
To set up the startup/shutdown voltage in accordance with DC input voltage as +12Vdc, +24Vdc, +48Vdc or wide range from +9~60Vdc.
<table>
<tr><td rowspan="2">Mode</td><td colspan="2">+12Vdc</td><td colspan="2">+24Vdc</td><td colspan="2">+48Vdc</td></tr>
<tr><td>Startup</td><td>Shutdown</td><td>Startup</td><td>Shutdown</td><td>Startup</td><td>Shutdown</td></tr>
<tr><td>1</td><td>11.5V</td><td>10.5V</td><td>23V</td><td>21V</td><td>46V</td><td>42V</td></tr>
<tr><td>2</td><td>12.0V</td><td>11.0V</td><td>24V</td><td>22V</td><td>47V</td><td>43V</td></tr>
<tr><td>3</td><td>12.5V</td><td>11.0V</td><td>25V</td><td>22V</td><td>48V</td><td>44V</td></tr>
<tr><td>4</td><td>12.5V</td><td>11.5V</td><td>25V</td><td>23V</td><td>49V</td><td>45V</td></tr>
</table>
■ The following behaviors happen if ACC Function (JACC1) sets up as Enable: VMS-RPPS won’t power on if the DC Input voltage is lower than the startup voltage.
</td></tr>
</table>

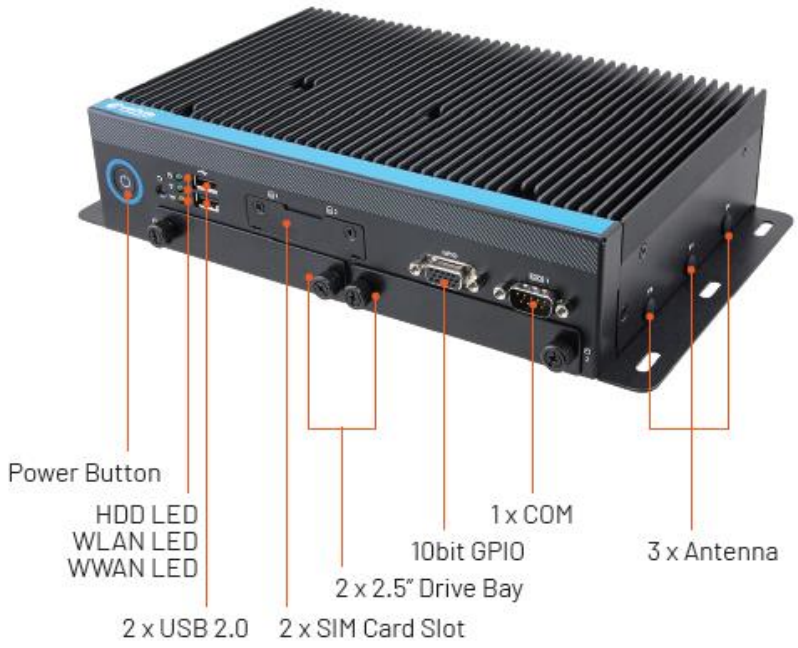
	VMS-RPPS will automatically power on, if the DC input voltage reaches the startup voltage. VMS-RPPS will automatically power on, if the DC input voltage reaches the startup voltage and power on delay ends up (the power on delay is Enable in BIOS). VMS-RPPS will automatically power off, if the DC input voltage is lower than shutdown voltage, and the time exceeds 60sec. If it still doesn't power off and the time exceeds 6min, VMS-RPPS will be forced power off immediately. ■ **Power on delay time is selectable by BIOS in following hierarchies** 10sec / 30sec / 1min / 5min / 10 min / 15min / 30min / 1hr. The delay time starts to count if ignition turns on. User can skip the delay time to turn on VMS-RPPS if pressing power button. VMS-RPPS will automatically power on if the delay time ends up. ■ **Power off delay time is selectable by BIOS in following hierarchies** 20sec / 1min / 5min / 10min / 30min / 1hr / 6hr / 18hr. The delay time starts to count if ignition turns off. User can skip the delay time to turn off VMS-RPPS if pressing power button. VMS-RPPS will automatically power off, if the delay time ends up. If it still doesn't power off and the time exceeds 60sec, VMS-RPPS will be forced power off immediately. ■ **S3, S4 suspend mode** In the vehicle power mode, the S3/S4 is only able to resume from power button. ■ The status of Ignition On/Off is detectable by SW ■ The status of Low battery is detectable by SW ■ VMS-RPPS will shut down automatically when internal temperature is reach the setting (it is selectable by BIOS). ■ VMS-RPPS will cancel the delay function, and then continue to operate normally, if the ignition is turned on again and the power off delay is in process. ■ VMS-RPPS will shut down completely, and then power on again automatically, if the ignition is turned on again and the power off delay ended. ■ VMS-RPPS will cancel the delay and stayed in power off status, if the ignition is turned off again and power on delay is in process. ■ VMS-RPPS is only 10mA if it is off.
Mechanical & Environment	
Operating Temp.	Standard System: -40°C ~ 65°C (-40°F ~ 149°F) with 0.5m/S air flow, extended temperature peripherals System with PoE: -40°C ~ 60°C (-40°F ~ 140°F) with 0.5m/S air flow, extended temperature peripherals

Storage Temp.	-30~70C° (-22°F ~ 185°F)
Operating Humidity	5% ~ 90% Relative Humidity, Non-condensing
Dimension (W*L*H)	239 x 160 x 56 mm
Weight	2.6 kg
Vibration Test	Operating with SSD : MIL-STD-810H, Method 514.8, Category 4, common carrier US highway truck vibration exposure Storage with SSD : MIL-STD-810H, Method 514.8, Category 24, minimum integrity test
Shock Test	Operating with SSD : MIL-STD-810H, Method 516.8, Procedure I, functional shock=20G Non-Operating with SSD : MIL-STD-810H, Method 516.8, Procedure V, crash hazard shock test=75G
Drop Test	Package drop test Reference ISTA 2A, Method : IEC-60068-2-32 Test : Ed Test phase : One corner, three edges, six faces
IP Rating	IP50
Mounting Kit	Wall mount kit (Standard)
Software Support	
OS Information	Win10, Win11, Linux

Note: Specifications are subject to change without notice.

1.4 System Overview

1.4.1 Front View

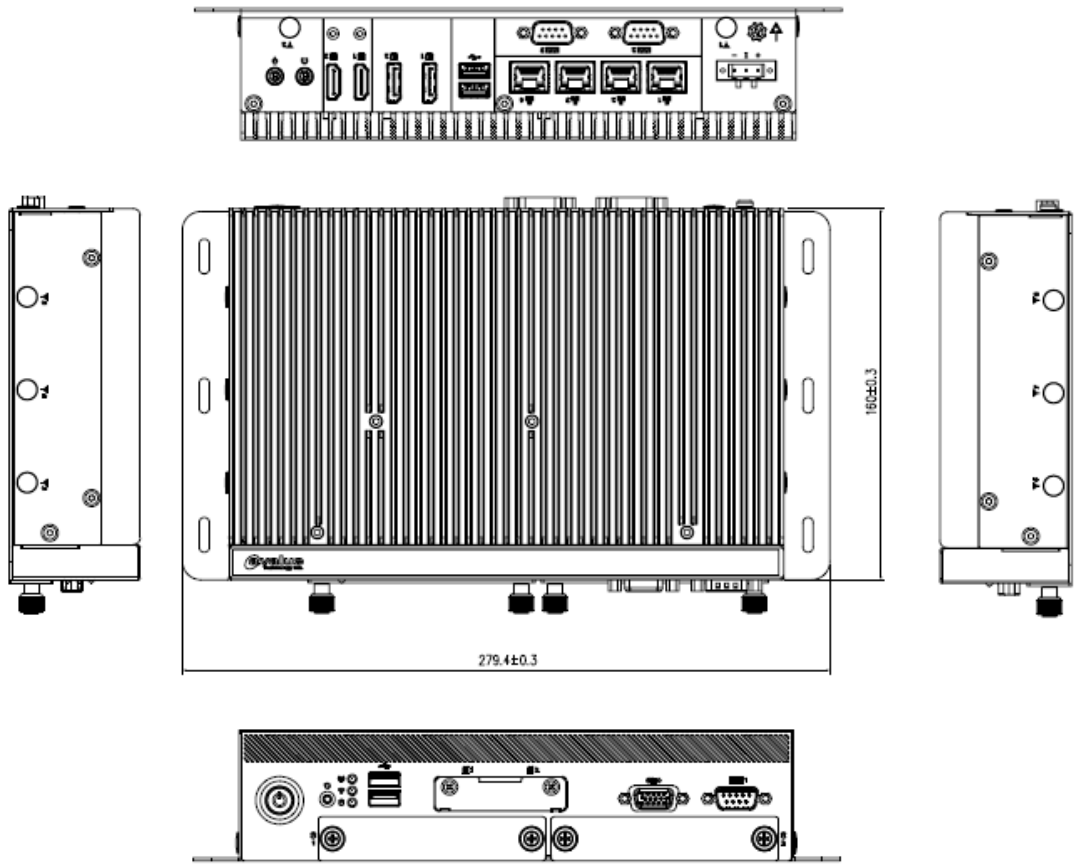


1.4.2 Rear View

Connectors

Label	Function	Note
Power Button	Power on button	
HDD LED	HDD LED indicator	
WLAN LED	WLAN Indicator	
WWAN LED	WWAN Indicator	
SIM card slot	2 x SIM card slot	
USB2.0	2 x USB 2.0 connector	
USB3.2	2 x USB 3.2 connector	
2.5” Drive Bay	2 x 2.5” Driver Bay socket	
10bit GPIO	General purpose I/O connector	
COM1/2/3	Serial port 1/2/3 connector	
9-60V DC-in	9-60V DC power-in connector	
HDMI	2 x HDMI connector	
DP++	2 x DP connector	
RJ-45	4 x RJ-45 Ethernet	
Mic-in & Line-out	Mic-in audio jack Line-out audio jack	
Antenna	3 x Antenna w/cover	

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. *Note
- Check with the Icon behavior for power status.

*Note: Power LED.

S0: On

S3: Blinking

S4/S5: Off

BIOS P.O.S.T: Blinking.

2. Hardware Configuration

For advanced information, please refer to:

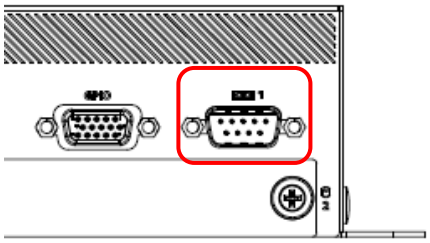
1- VMS-RPPS main board included in this manual.

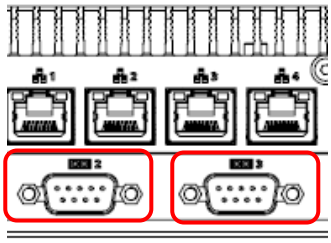
Note: If you need more information, please visit our website:

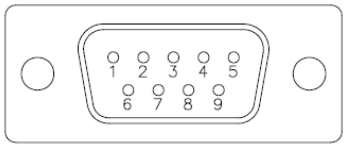
www.avalue.com

2.1 VMS-RPPS connector mapping

2.1.1 Serial port 1/2/3 connector (COM1/2/3)







RS-232

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

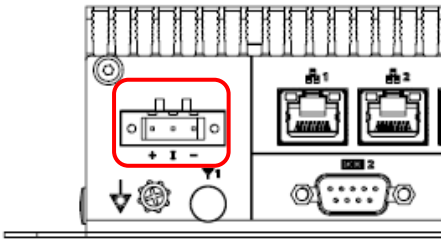
RS-485

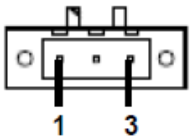
Signal	PIN	PIN	Signal
DATA1-	1	6	NC
DATA1+	2	7	NC
NC	3	8	NC
NC	4	9	NC
GND	5		

RS-422

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

2.1.2 9-60V DC power-in connector (9-60V DC-in)



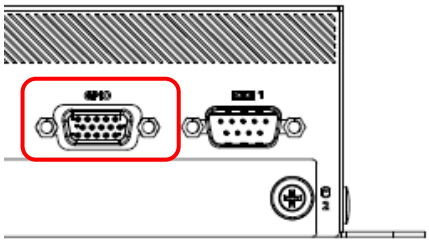


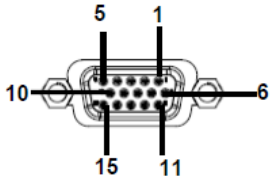
Signal	PIN
VIN + (BAT+)	1
ACC (IGN)	2
VIN- (BAT-)	3

Note:

Please refer to JVIN1 for PSU connection.

2.1.3 General purpose I/O connector (GPIO)

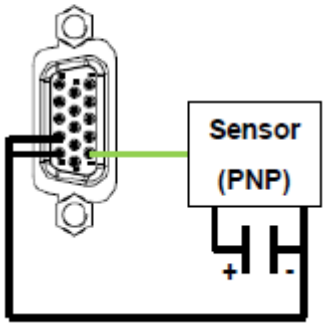




PIN	Signal	PIN	Signal	PIN	Signal
1	DIO_GPI0	6	DIO_GPO0	11	GPI_COM
2	DIO_GPI1	7	DIO_GPO1	12	GND
3	DIO_GPI2	8	DIO_GPO2	13	NC
4	DIO_GPI3	9	DIO_GPO3	14	GND
5	DIO_GPI4	10	DIO_GPO4	15	+V30_GPO

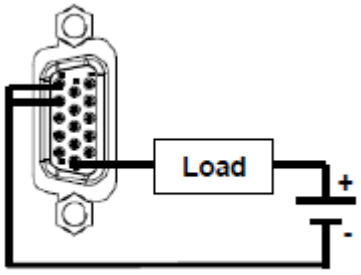
DI

Sink Type



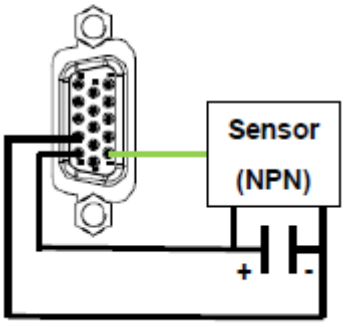
DO

Sink Type



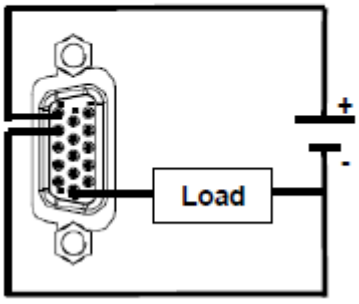
DI

Source Type

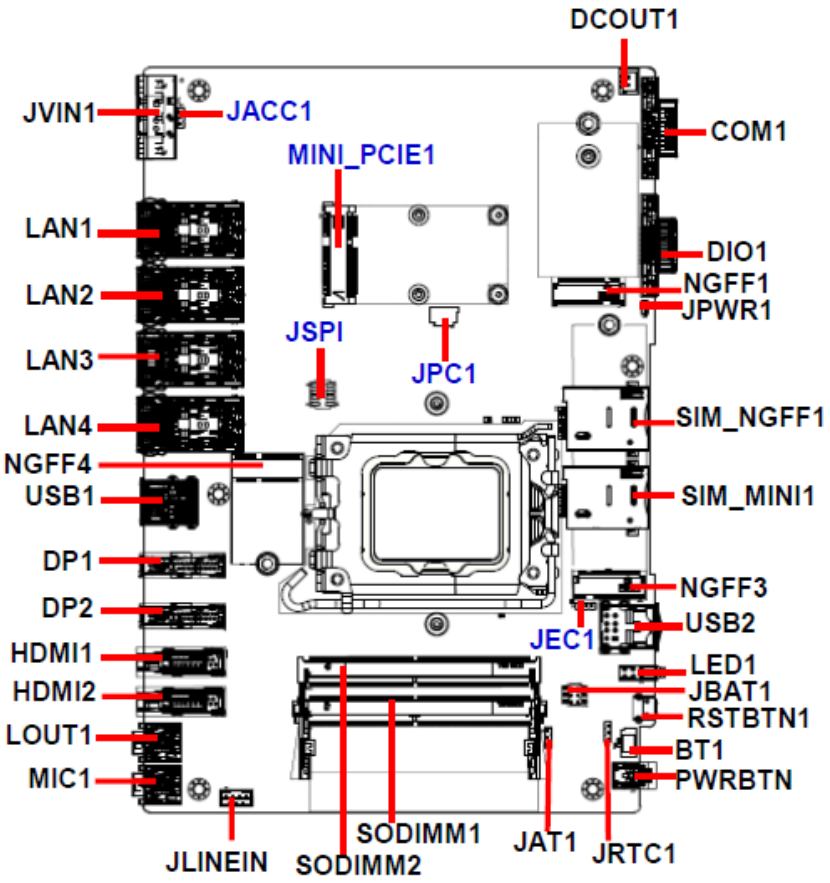


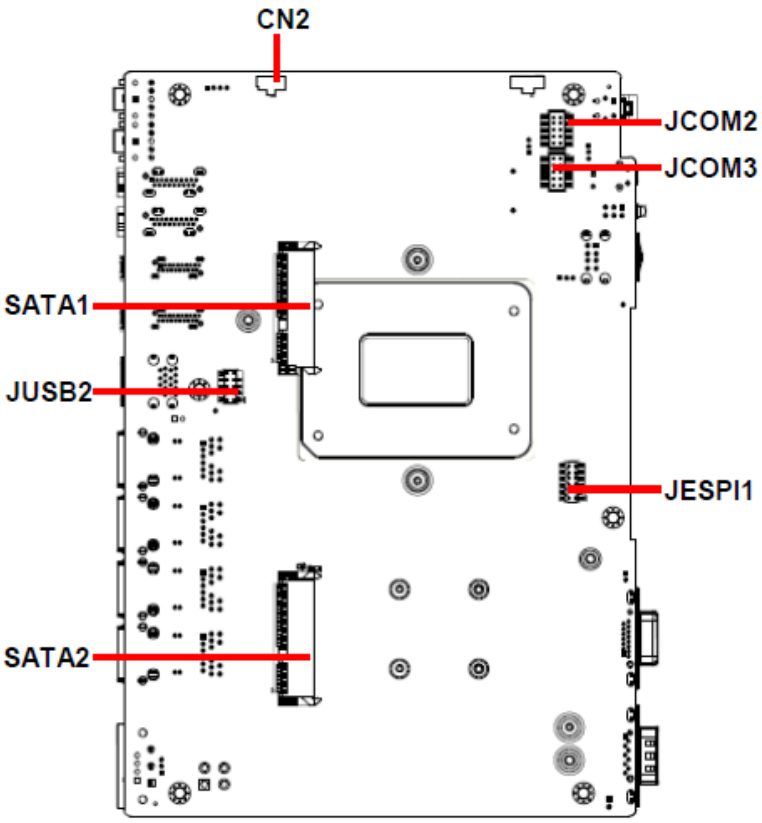
DO

Source Type



2.2 VMS-RPPS Product Overview

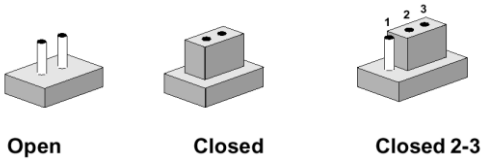




2.3 VMS-RPPS Jumper and Connector List

You can configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch.

It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case, you would connect either two pins.



The jumper settings are schematically depicted in this manual as follows:

A pair of needle-nose pliers may be helpful when working with jumpers.

Connectors on the board are linked to external devices such as hard disk drives, a keyboard, or floppy drives. In addition, the board has a number of jumpers that allow you to configure your system to suit your application.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The following tables list the function of each of the board’s jumpers and connectors.

Jumpers

Label	Function	Note
JAT1	AT/ATX Input power select	3 x 1 header, pitch 2.00mm
JRTC1	Clear CMOS	3 x 1 header, pitch 2.00mm
JACC1	Vehicle/Industrial PC power mode selector	3 x 1 header, pitch 2.00 mm
JBAT1	Power Input Selection	3 x 2 header, pitch 2.00 mm
JPWR1	M.2 KEY-B power mode setting	2 x 1 header, pitch 2.00 mm

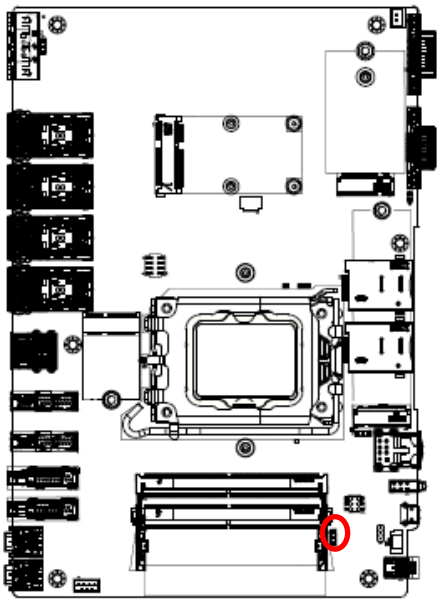
Connectors

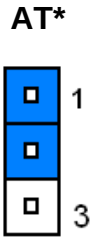
Label	Function	Note
USB1	2 x USB 3.2 connector	
USB2	2 x USB 2.0 connector	
JUSB2	USB connector	5 x 2 header, pitch 2.00 mm

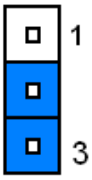
BT1	Battery connector	2 x 1 wafer, pitch 1.25 mm
LAN1/2/3/4	RJ-45 Ethernet 1/2/3/4	
JVIN1	DC-Input connector	1 x 3 terminal block, pitch 5.08 mm
DIO1	General purpose I/O connector	
COM1	Serial port connector 1	
JCOM2	Serial port 2 connector	5 x 2 wafer, pitch 2.00 mm
JCOM3	Serial port 3 connector	5 x 2 wafer, pitch 2.00 mm
DP1/2	DP connector 1/2	
MINI_PCIE1	Mini PCI Express connector	
RSTBTN1	Reset button	
PWRBTN	Power button	
LED1	LED Power HDD	
NGFF1/3/4	1 x M.2 KEY-E 2230 connector 2 x M.2 KEY-B 2242/3042/3052 connector 1 x M.2 Key-M 2280 connector	
SIM_NGFF1	SIM card slot 1 x M.2 Key-B 2242/3042/3052 connector	
SIM_MINI1	SIM card slot	
LOUT1	Audio line-out connector	
MIC1	Audio mic-in connector	
SODIMM1/2	DDR5 SODIMM connector 1/2	
JPC1	PC connector	6 x 1 wafer, pitch 1.00 mm
JSPI	SPI connector	4 x 2 header, pitch 2.00 mm
CN2	GPS connector	2 x 1 wafer, pitch 1.25 mm
SATA1/2	Serial ATA connector 1/2	
JESPI1	ESPI connector	6 x 2 header, pitch 2.00 mm
DCOUT1	DC Output connector	2 x 1 wafer, pitch 2.50 mm
JEC1	EC connector	3 x 1 header, pitch 2.00 mm
JLINEIN	Audio connector	4 x 1 wafer, pitch 2.00 mm
HDMI1/2	HDMI connector 1/2	

2.4 VMS-RPPS Setting Jumpers & Connectors

2.4.1 AT/ATX Input power select (JAT1)

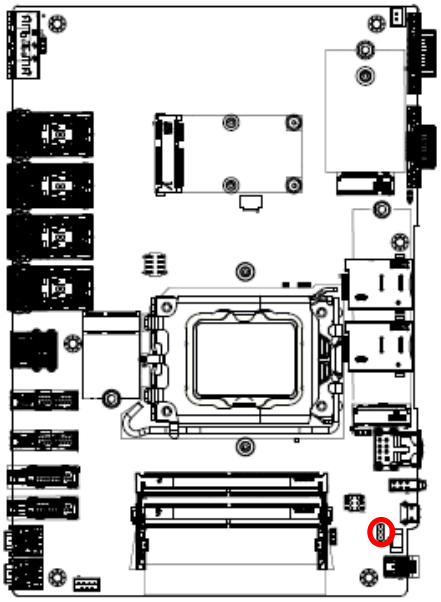


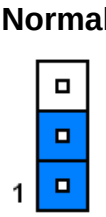


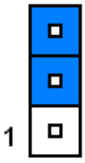


*** Default**

2.4.2 Clear CMOS (JRTC1)

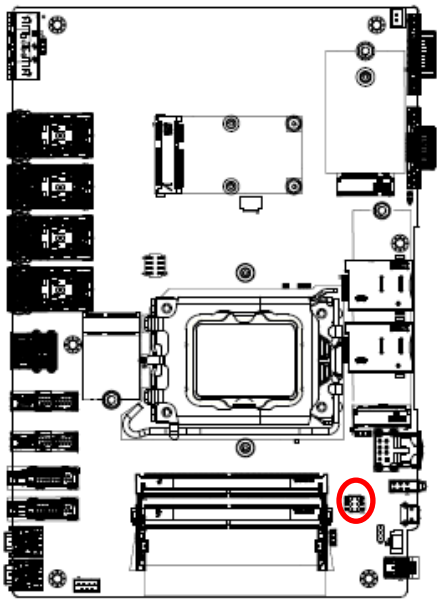




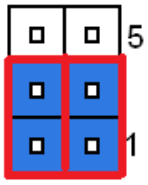


*** Default**

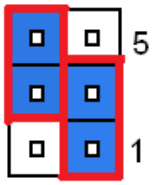
2.4.3 Power Input Selection (JBAT1)



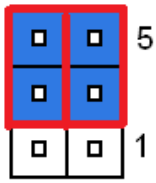
+9V ~ +60V*



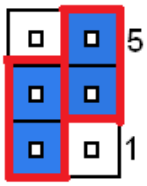
+12V



+24V

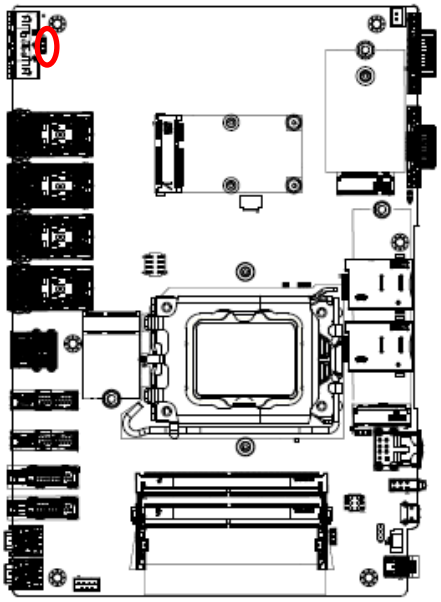


+48V

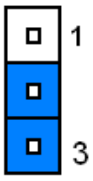


*** Default**

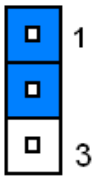
2.4.4 Vehicle/Industrial PC power mode selector (JACC1)



Enable*

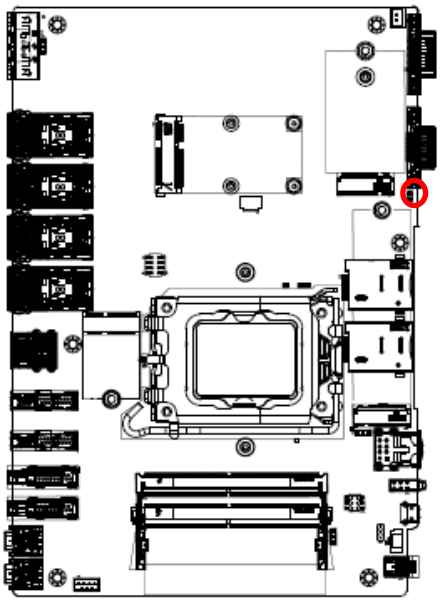


Disable



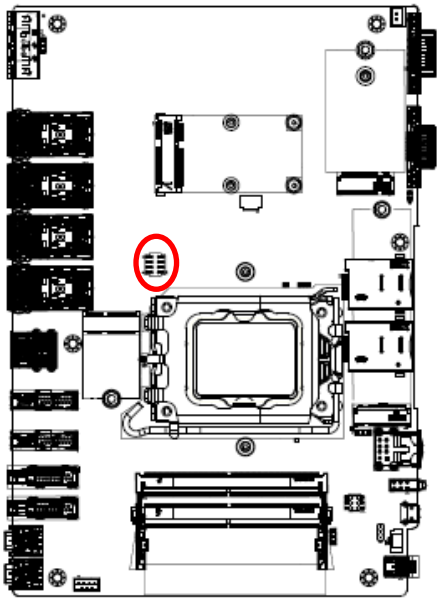
*** Default**

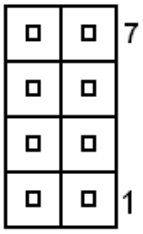
2.4.5 M.2 KEY-B power mode setting (JPWR1)



*** Default**

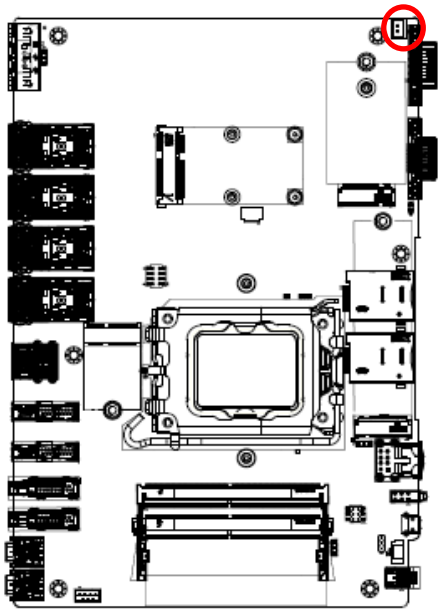
2.4.6 SPI connector (JSPI)





Signal	PIN	PIN	Signal
BIOS_WP#	8	7	SPI0_HOLD#
SPI0_BIOS_MOSI	6	5	SPI0_BIOS_MISO
SPI0_BIOS_CLK	4	3	SPI0_R_CS0#
+3.3VSB	2	1	+3.3VSB

2.4.7 DC Output connector (DCOUT1)

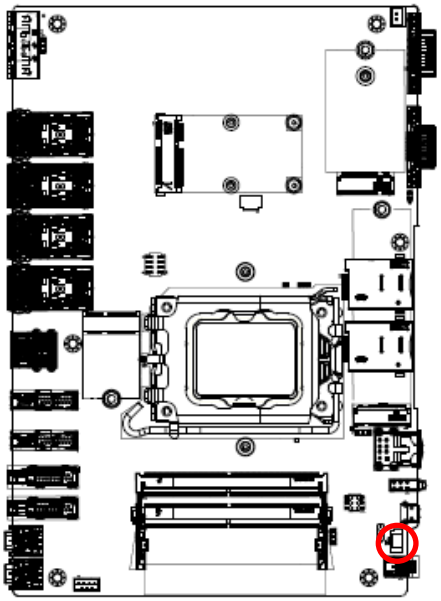


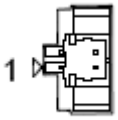
Signal	PIN
GND	2
+12VSB	1

Note:

Max. Current Value: 3A

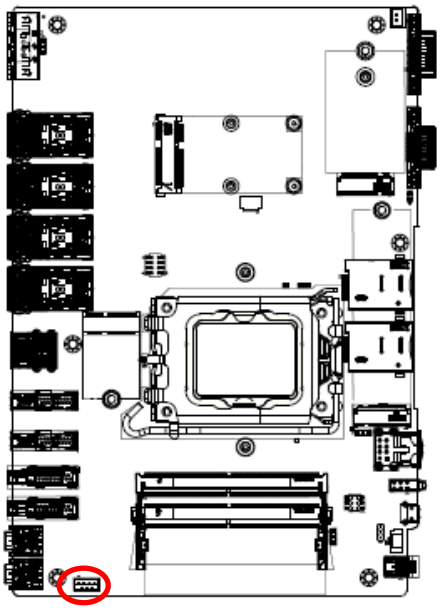
2.4.8 Battery connector (BT1)

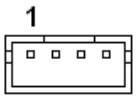




Signal	PIN
GND	2
+RTCBATT	1

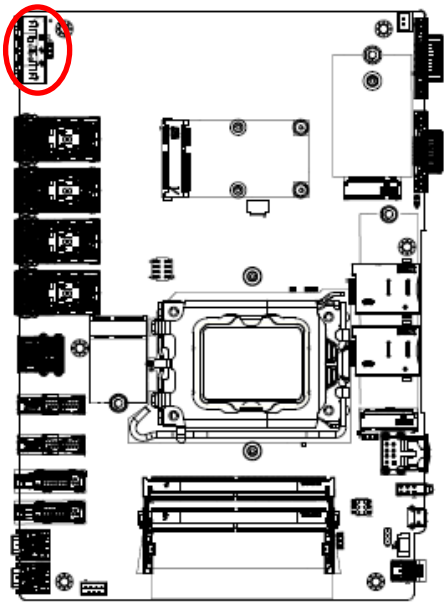
2.4.9 Audio connector (JLINEIN)

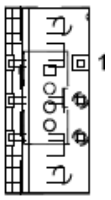




Signal	PIN
LINEIN_R	1
LINEIN_L	2
LINE1-JD	3
GND	4

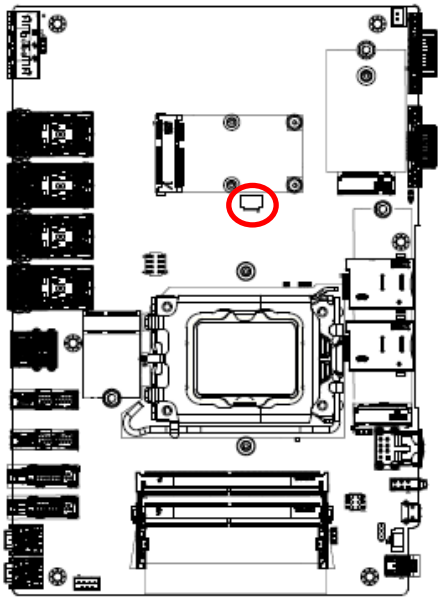
2.4.10 DC-Input connector (JVIN1)

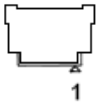




Signal	PIN
+VIN_BAT	1
ACC_ON	2
GND	3

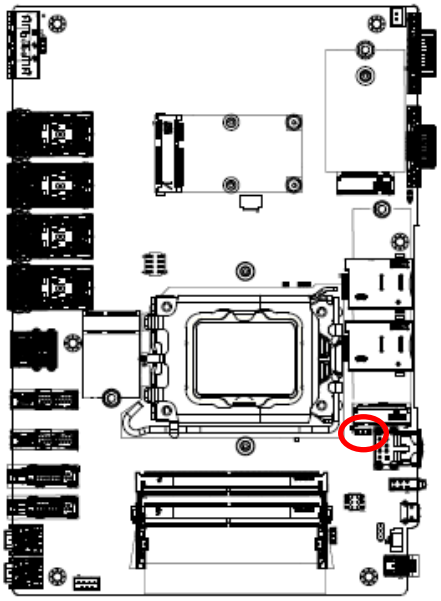
2.4.11 PC connector (JPC1)

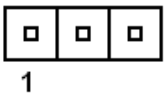




Signal	PIN
VCCCORE_nPMALERT	1
VCCCORE_PMSDA	2
GND	3
VCCCORE_PMSCL	4
+3.3VSB	5
NC	6

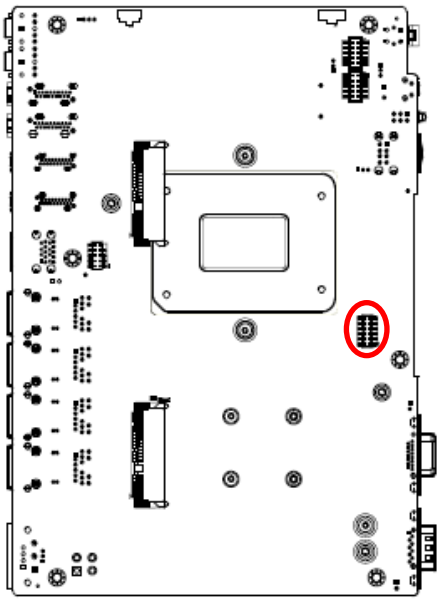
2.4.12 EC connector (JEC1)

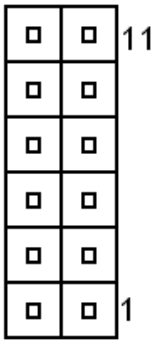




Signal	PIN
EC_SMDAT_DEBUG	1
EC_SMCLK_DEBUG	2
GND	3

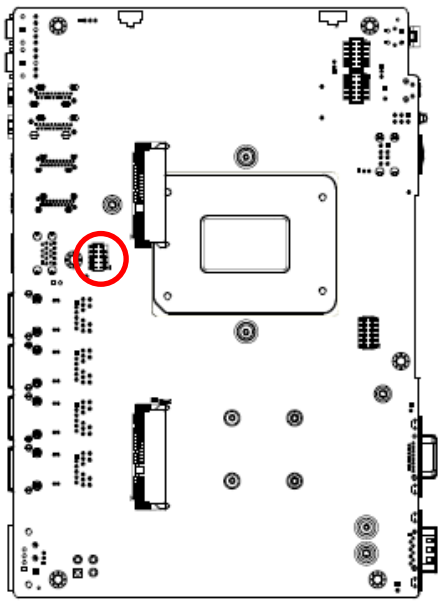
2.4.13 ESPI connector (JESPI1)

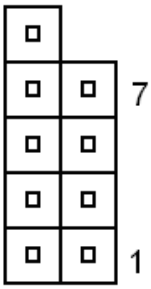




Signal	PIN	PIN	Signal
ESPI_ALER1#	12	11	ESPI_RST#
GND	10	9	ESPI_CS1#
ESPI_CLK_80P	8	7	ESPI_IO3_80P
ESPI_CS#	6	5	ESPI_IO2_80P
RST_SOCKET#	4	3	ESPI_IO1_80P
+3.3VSB	2	1	ESPI_IO0_80P

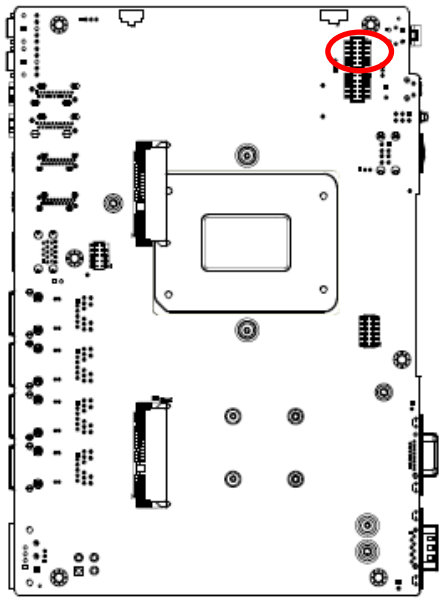
2.4.14 USB connector (JUSB2)

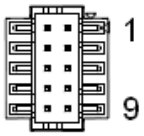




Signal	PIN	PIN	Signal
GND	10		
GND	8	7	GND
USB_DP_6	6	5	USB_DP_5
USB_DN_6	4	3	USB_DN_5
+5VSB	2	1	+5VSB

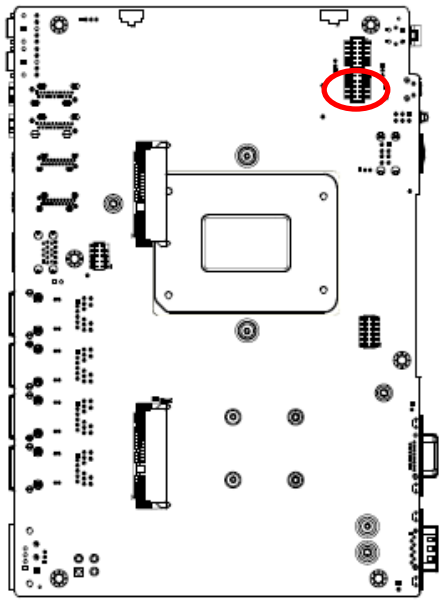
2.4.15 Serial port 2 connector (JCOM2)

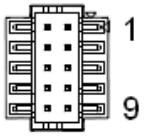




Signal	PIN	PIN	Signal
COM_RXD_TXP_2	2	1	COM_DCD#_TXN_2
COM_DTR#_RXN_2	4	3	COM_TXD_RXP_2
COM_DSR#_2	6	5	GND
COM_CTS#_2	8	7	COM_RTS#_2
		9	COM_RI#_2

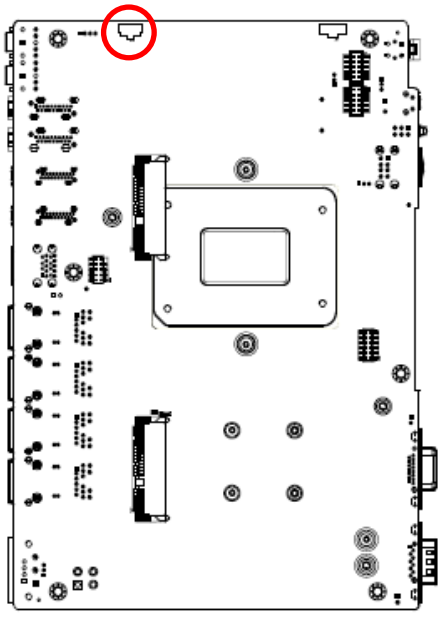
2.4.16 Serial port 3 connector (JCOM3)

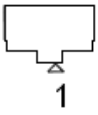




Signal	PIN	PIN	Signal
COM_RXD_TXP_3	2	1	COM_DCD#_TXN_3
COM_DTR#_RXN_3	4	3	COM_TXD_RXP_3
COM_DSR#_3	6	5	GND
COM_CTS#_3	8	7	COM_RTS#_3
		9	COM_RI#_3

2.4.17 GPS connector (CN2)





Signal	PIN
GPS_TIMEPULSE	1
GND	2

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:

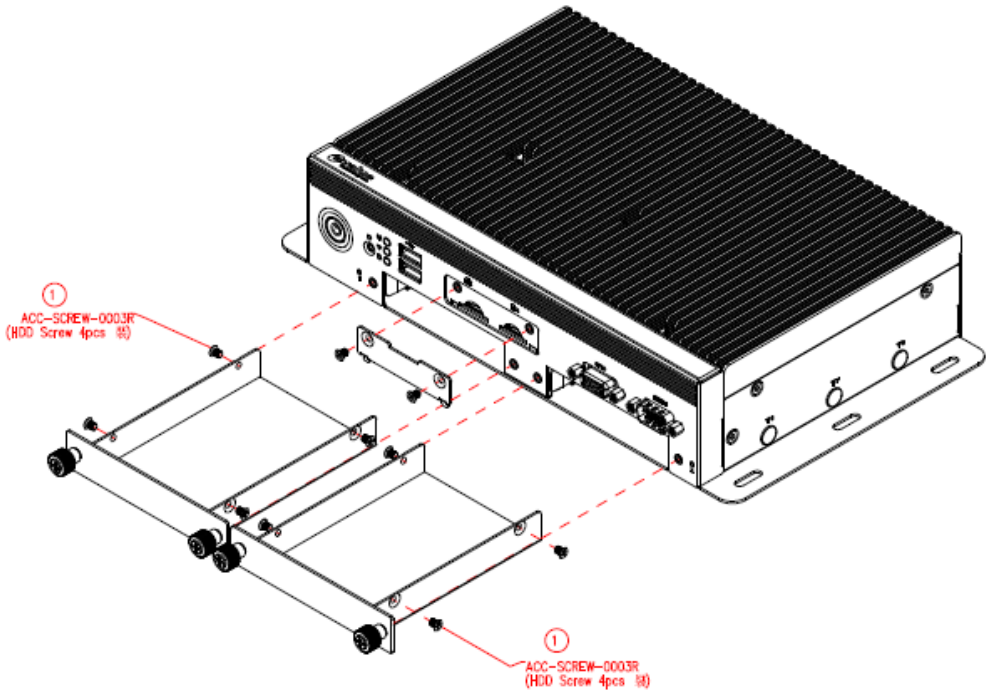
- Wear an anti-static wristband: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- Self-grounding: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected 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 box PC, please follow the precautions listed below:

- Power turned off: When installing the box 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 of the box 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 & SIM card (VMS-RPPS)



Step 1. Unfasten 6 screws from the HDD brackets/SIM card slot and take it off.

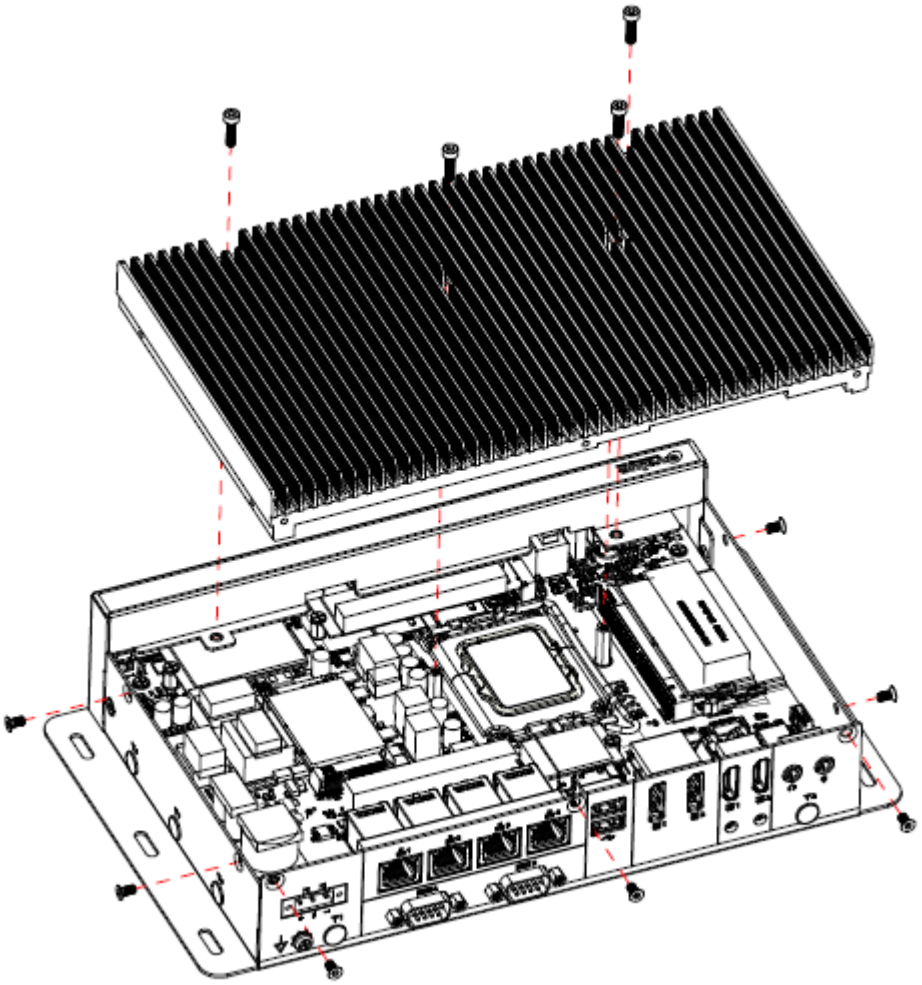
Step 2. Remove 8 screws to release the HDD brackets.

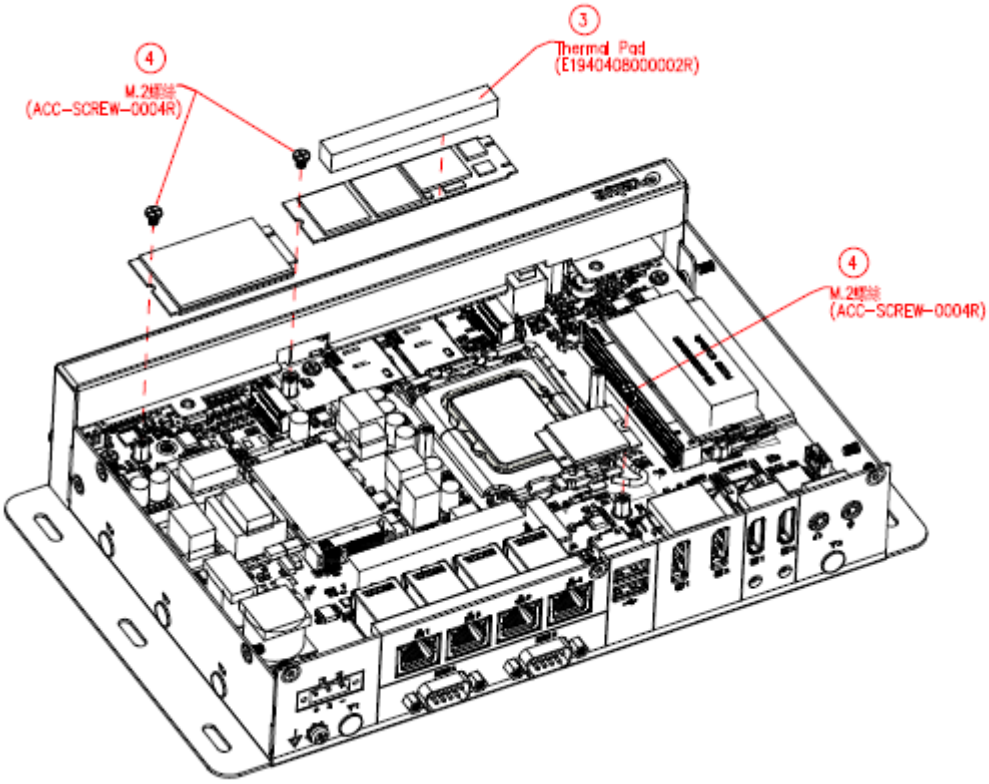
Step 3. Slide HDD/SIM card into its brackets until properly seated.

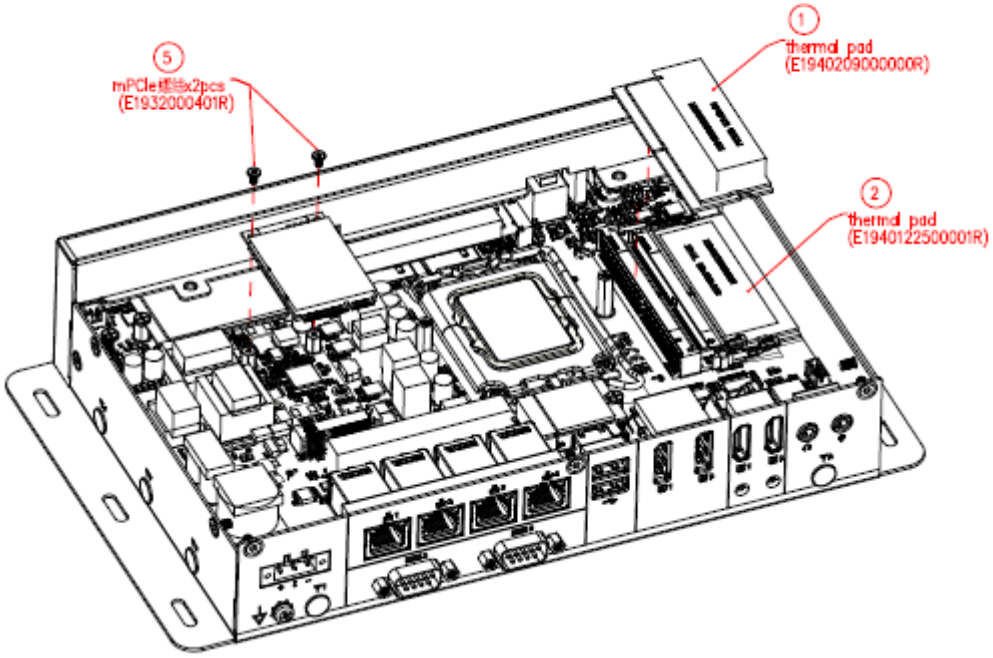
Step 4. Secure HDD by means of 8 screws.

Step 5. Insert HDD brackets into designated locations and fasten with 4 screws to complete HDD installation.

3.2 Installing Hard Disk & SIM card (VMS-RPPS)







Step1&2. Remove 11 screws from the bottom of your system and take it off.
Apply the thermal pad (PN: E1940122500001R, black) to the lower DDR5, placing it between the two DDR5 modules. Apply the thermal pad (PN: E1940209000000R, white) to the upper DDR5, placing it between the DDR5 and the heatsink. Next, slide the DDR5 SODIMM into the memory socket and press it down firmly until it is properly seated.
Step3. Insert the M.2 M-Key card with the thermal pad (PN: E1940408000002R, blue) into its designated slot, then fasten it with screws to complete the installation.
Step4. Insert the M.2 B-Key and M.2 E-Key cards into their designated slots, then fasten them with screws to complete the installation.
Step5. Insert the MPCIE card into its designated slot and fasten it with two screws to complete the installation.

3.3 System Mounting

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

Safety Precautions

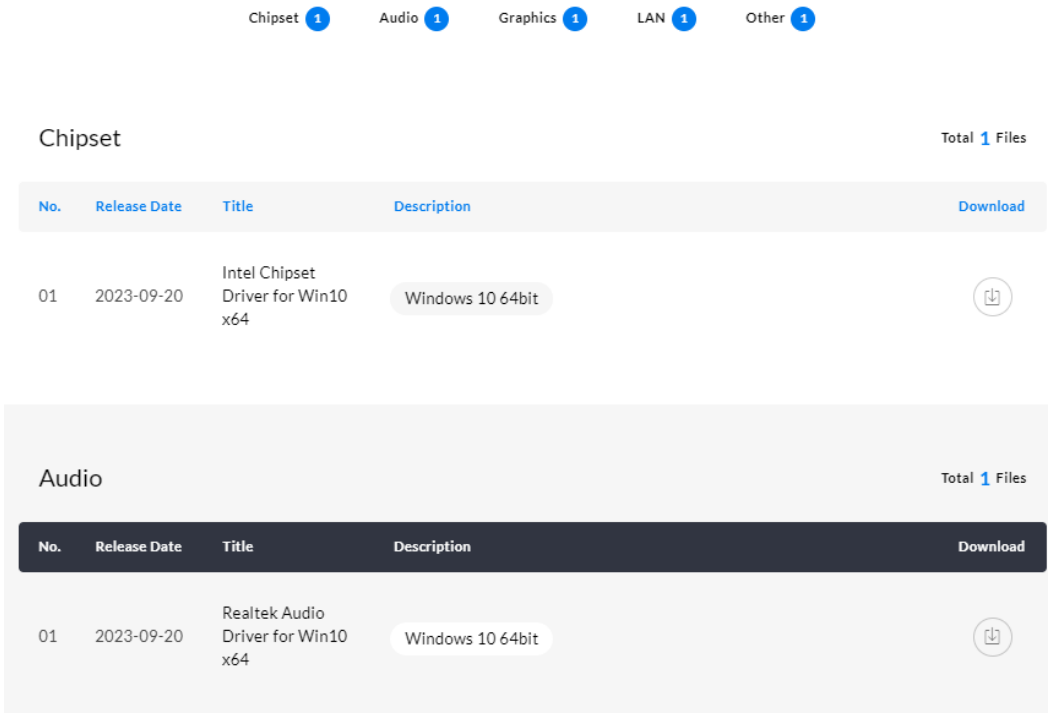
Observe the following common safety precautions before installing any electronic device:

- 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.avalue.com/en/support/download). Type the model name and press Enter to find all the relevant software, utilities, and documentation.

Note:
The box 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.



(For reference only)

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.

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**.

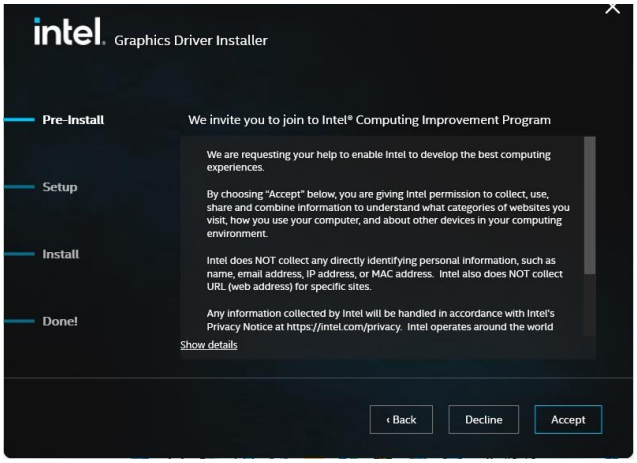
Step 4. Click Finish to complete setup.

Step 2. Click **Accept**.

4.2 Install VGA Driver

All drivers can be found on the Avalue Official Website: www.avalue.com.

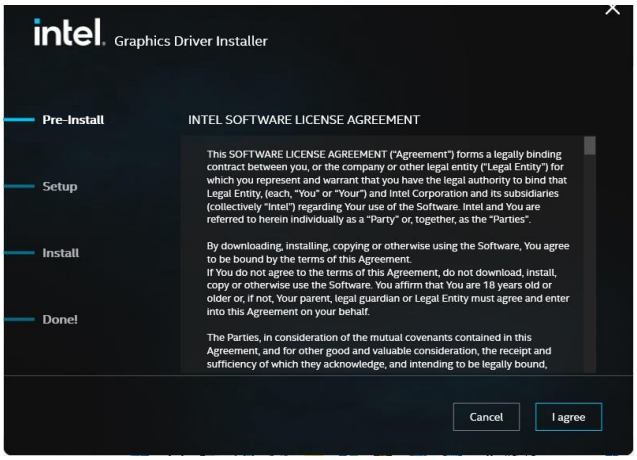
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



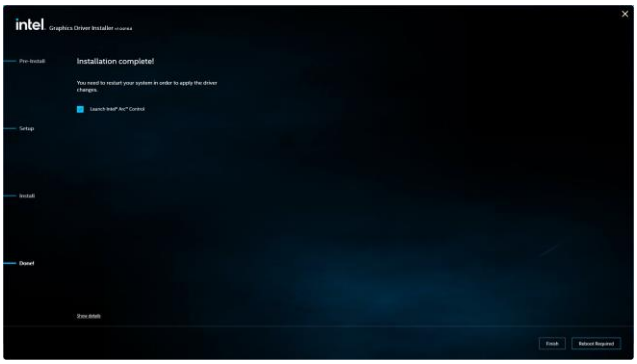
Step 3. Click **Accept**.

Step 1. Click **Begin installation**.

Step 4. Click **Start**.



Step 2. Click **I agree**.

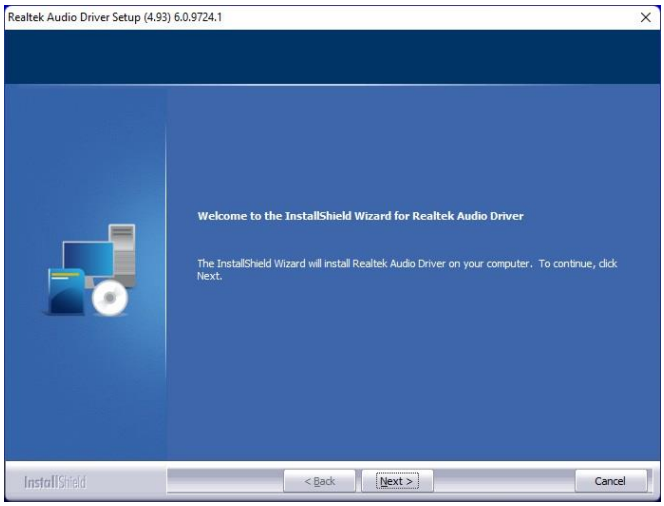


Step 5. Click **Finish** to complete setup.

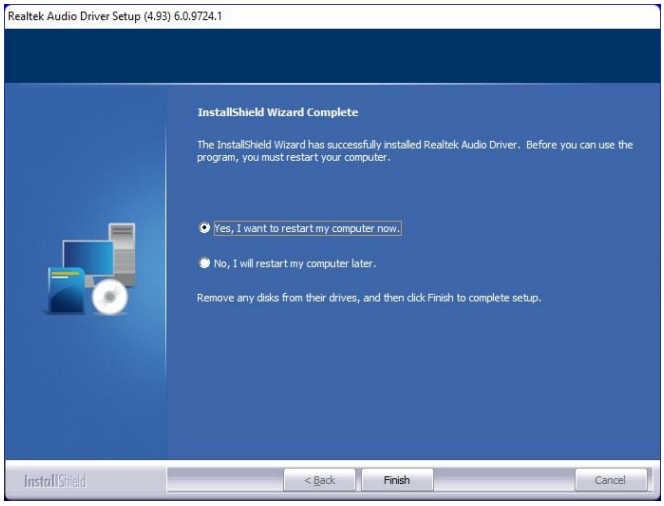
4.3 Install Audio Driver

All drivers can be found on the Avalue Official Website:
www.avalue.com.

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



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

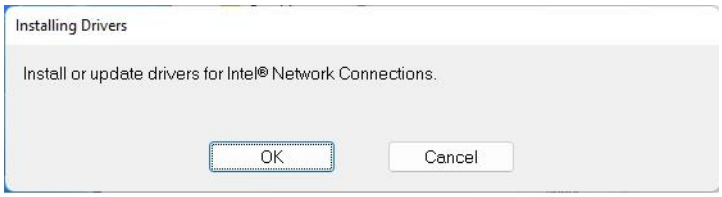


Step 2. Click **Finish** to complete setup.

4.4 Install Ethernet Driver

All drivers can be found on the Avalue Official Website:
www.avalue.com.

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



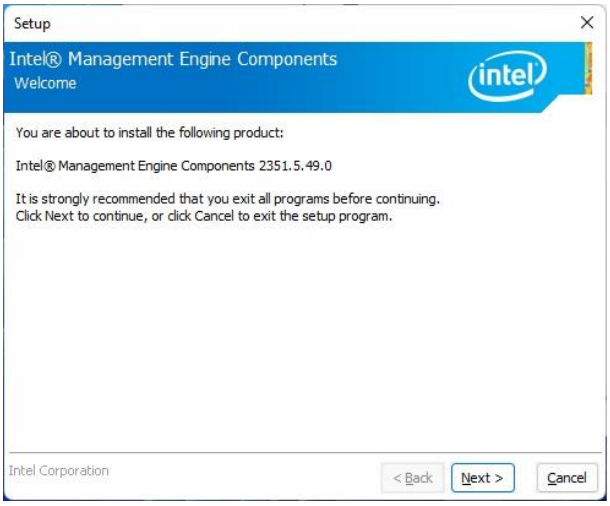
Step 1. Click **OK** to continue installation.

Step 2. Setup completed.

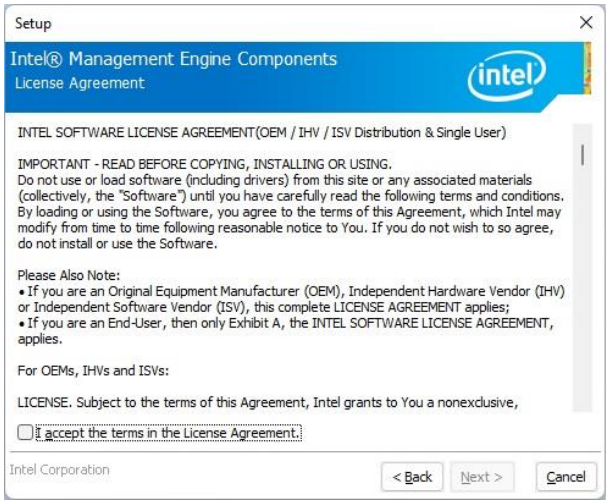
4.5 Install ME Driver

All drivers can be found on the Avalue Official Website:
www.avalue.com.

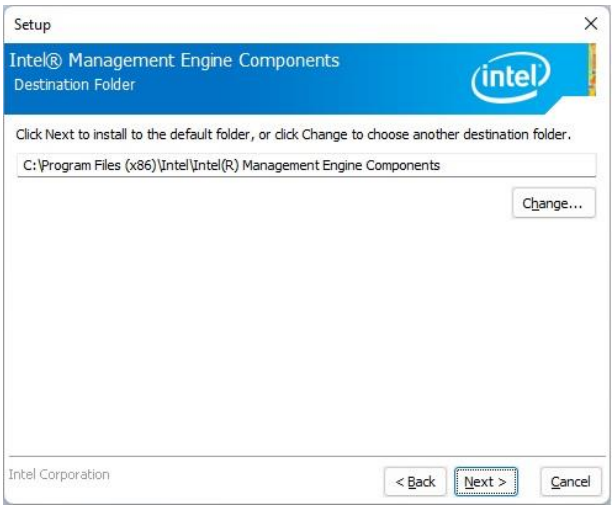
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



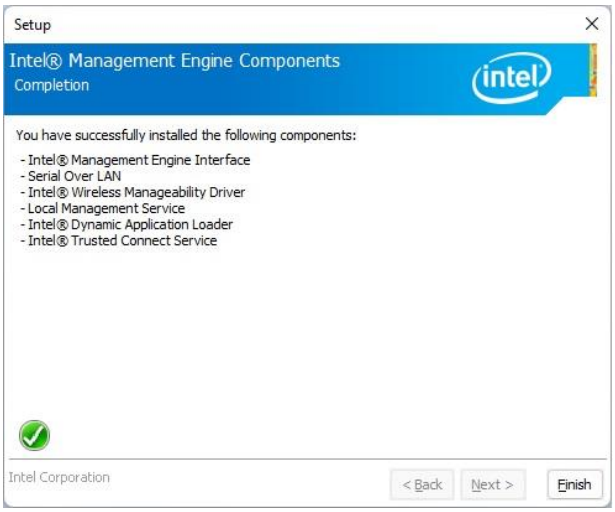
Step 1. Click **Next** to continue installation.



Step 2. Click **Next**.



Step 3. Click **Next**.

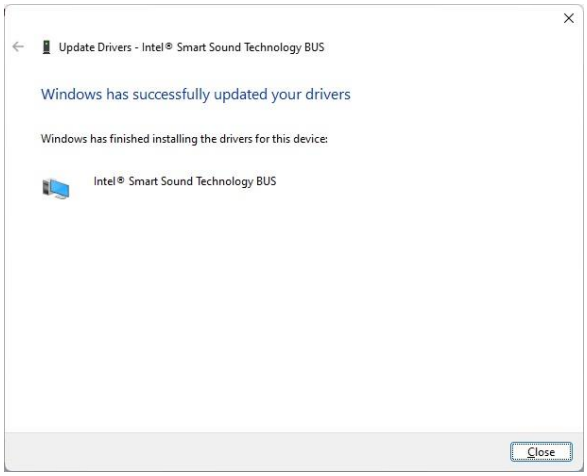


Step 4. Click **Finish** to complete setup.

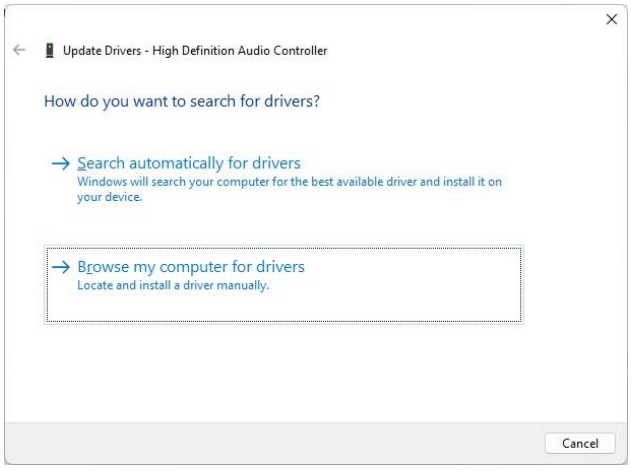
4.6 Install Intel SST Driver

All drivers can be found on the Avalue Official Website:
www.avalue.com.

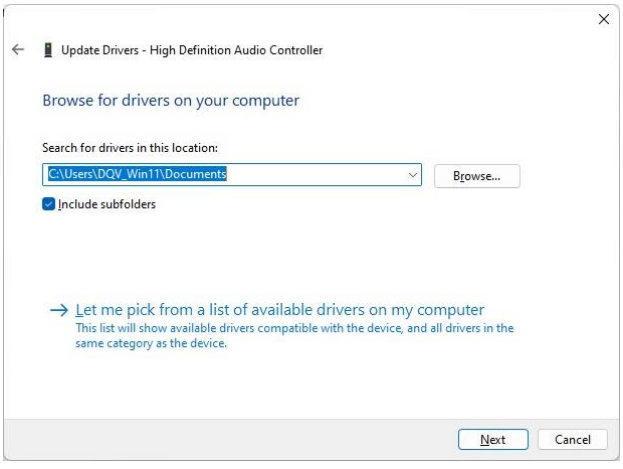
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



Step 3. Setup completed.



Step 1. Click **Browse my computer for drivers** to continue installation.

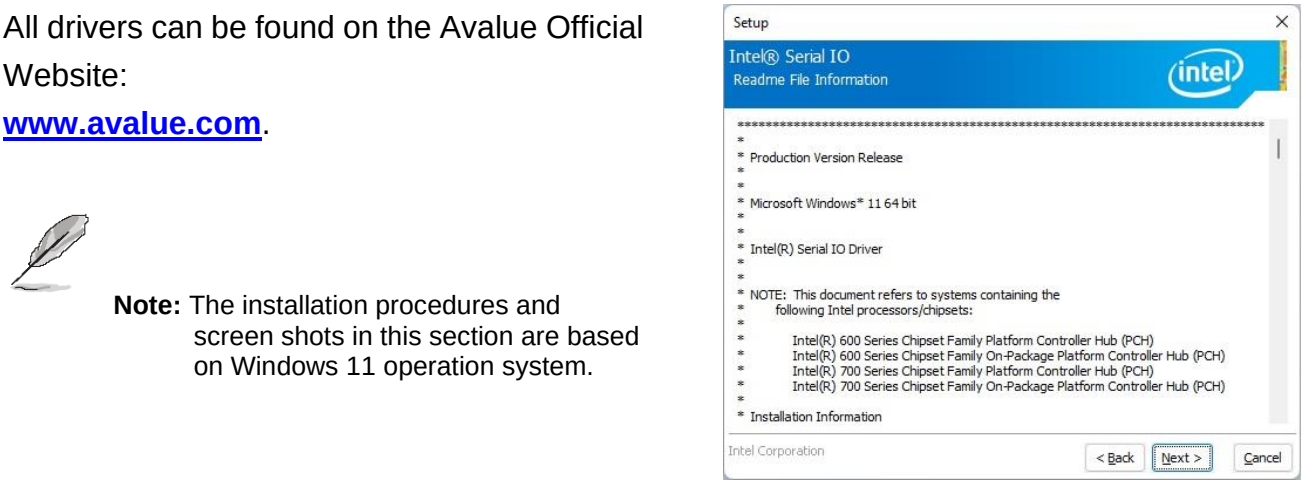


Step 2. Click **Next**.

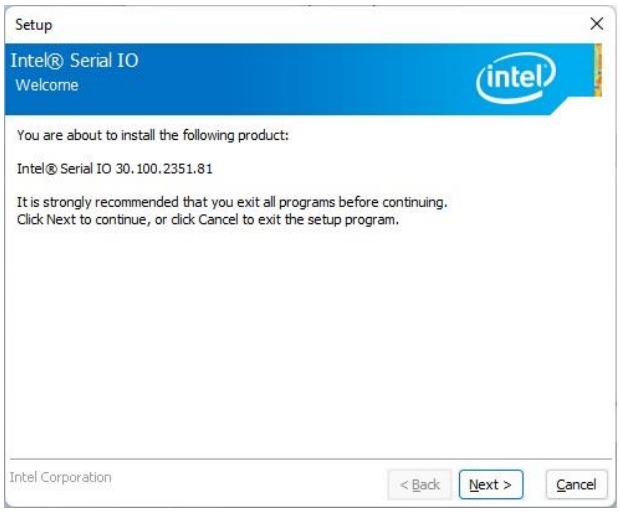
4.7 Install Serial IO Driver

All drivers can be found on the Avalue Official Website:
www.avalue.com.

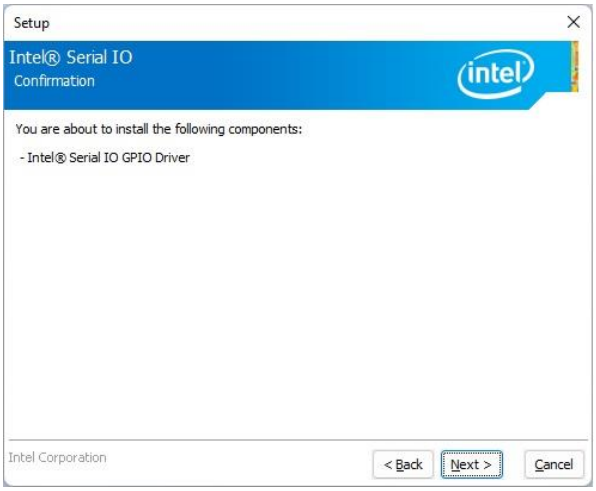
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



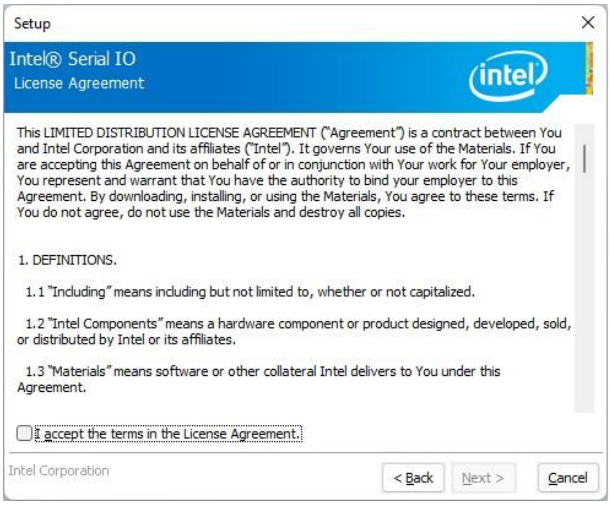
Step 3. Click **Next**.



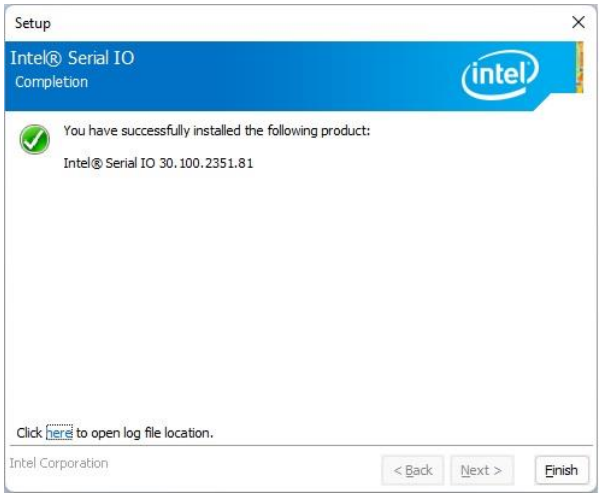
Step 1. Click **Next** to continue installation.



Step 4. Click **Next**.



Step 2. Click **Next**.



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

5.BIOS Setup

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.

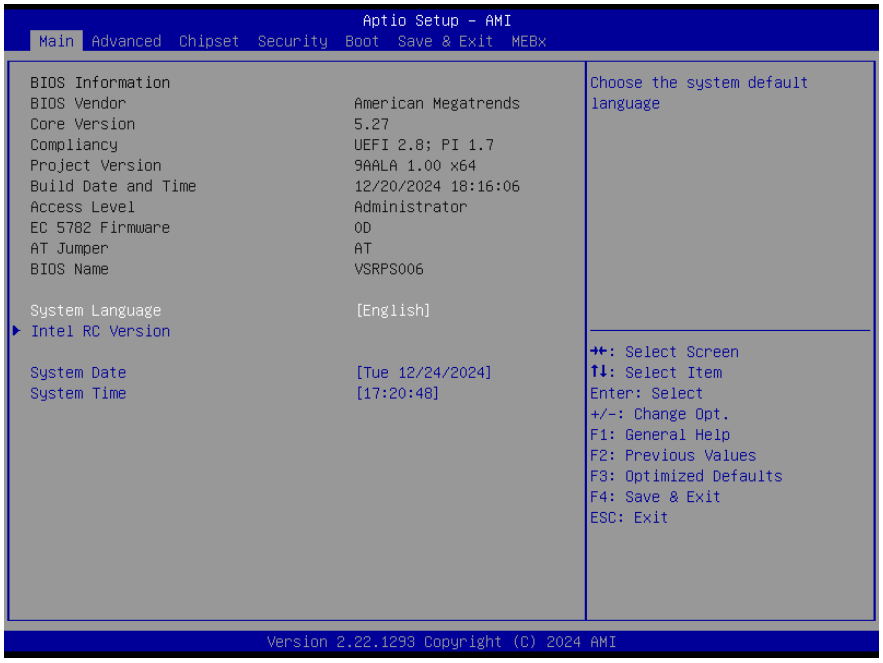
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

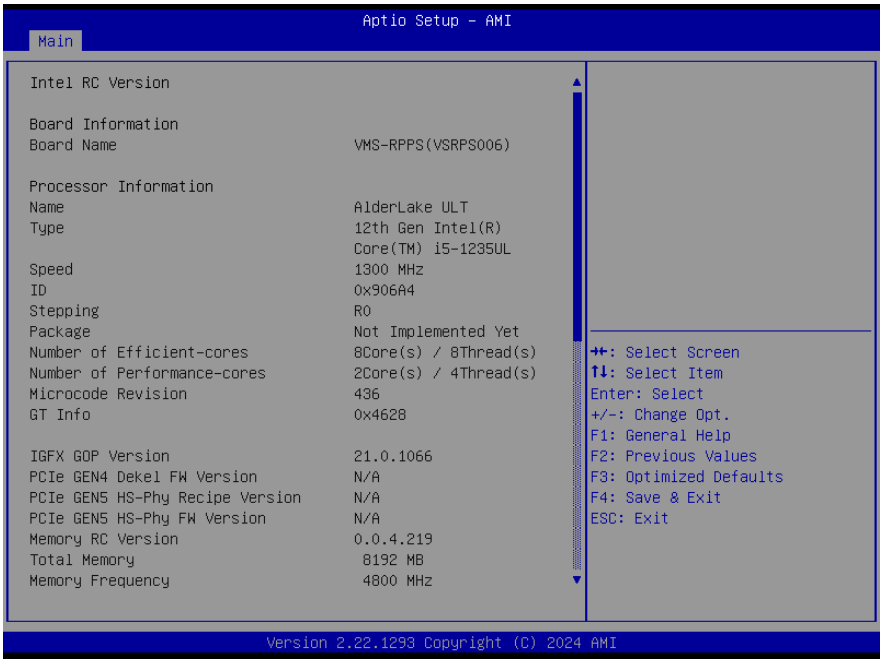
5.6 BIOS setup

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.

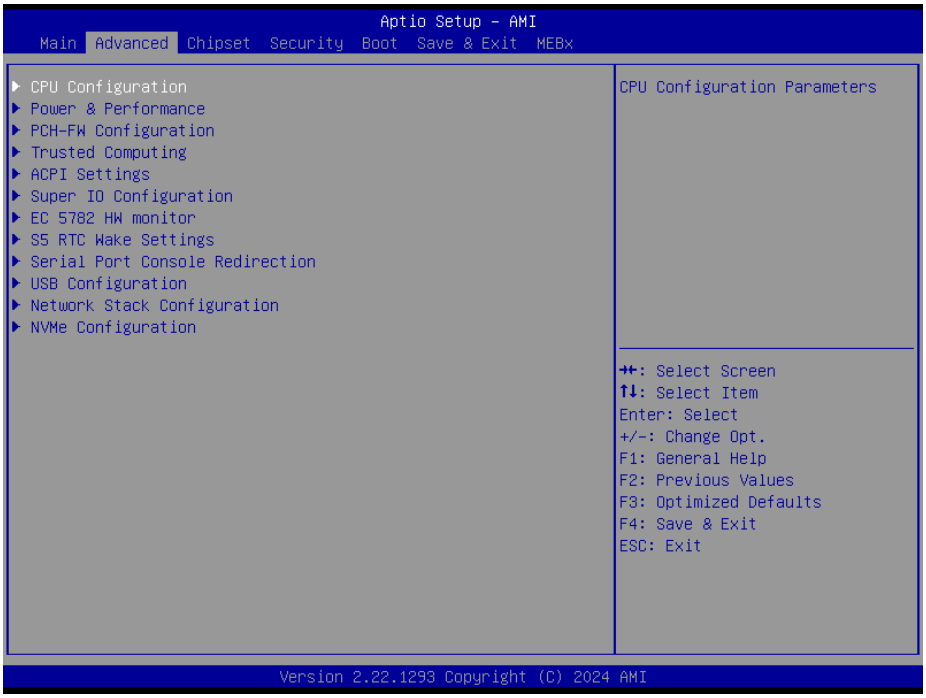
5.6.1.3 System Time

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.avalue.com) to download the latest product and BIOS information.

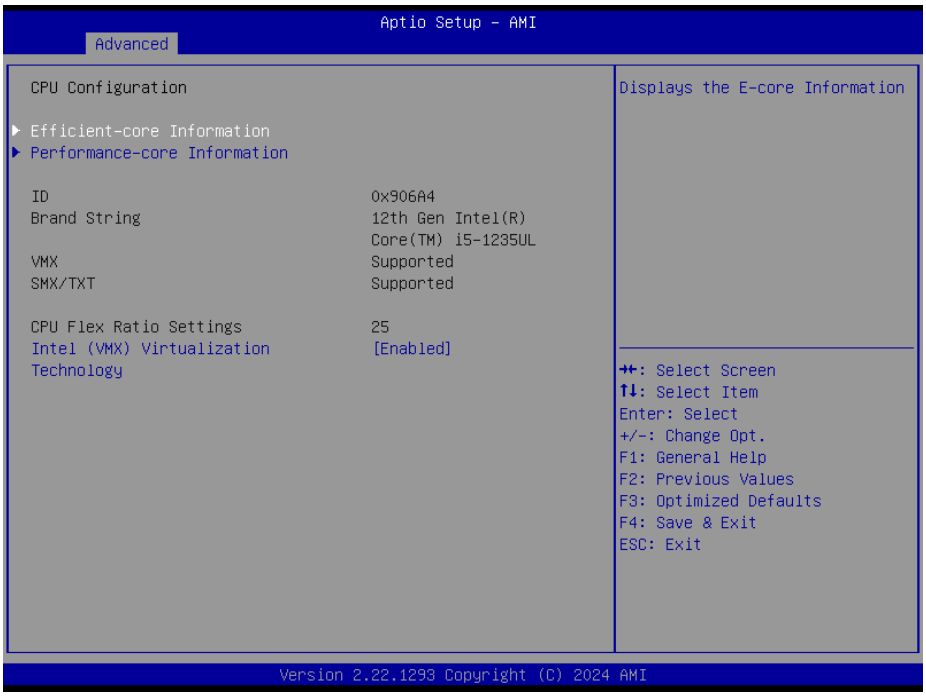
5.6.2 Advanced Menu

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



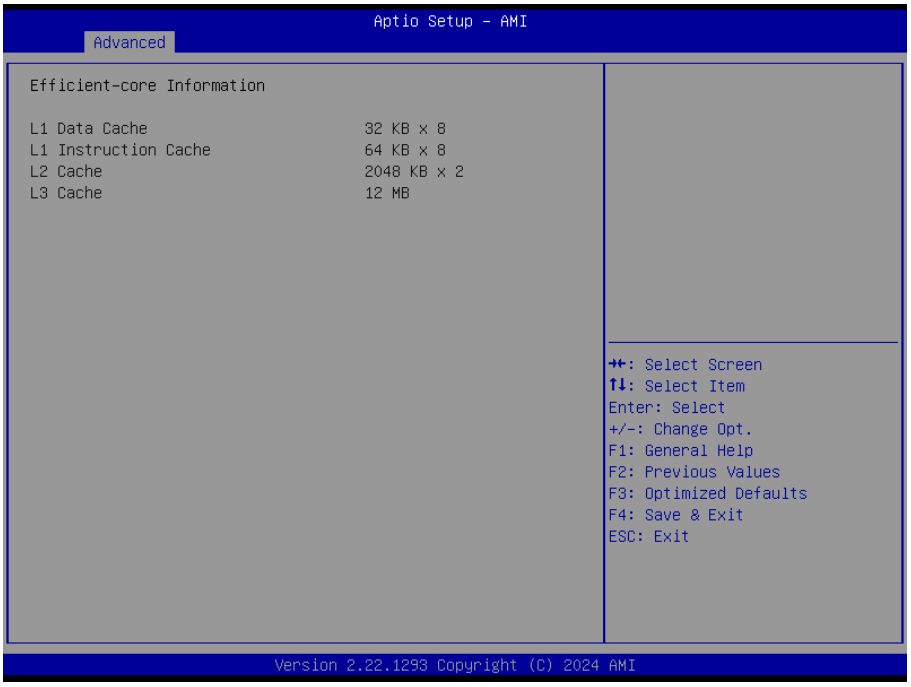
5.6.2.1 CPU Configuration

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

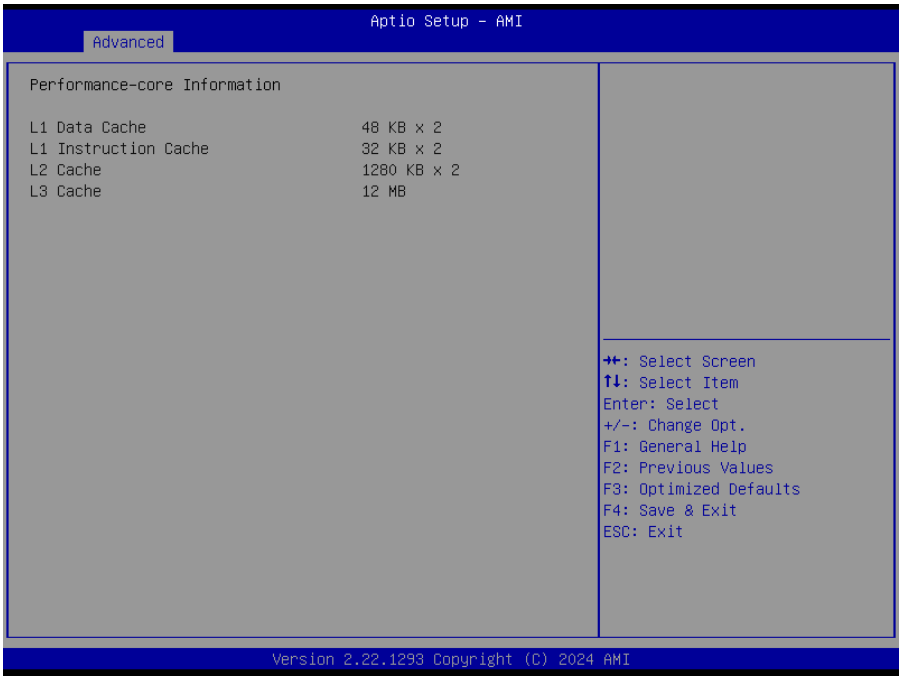


Item	Options	Description
Intel (VMX) Virtualization Technology	Disabled Enabled**[Default]**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

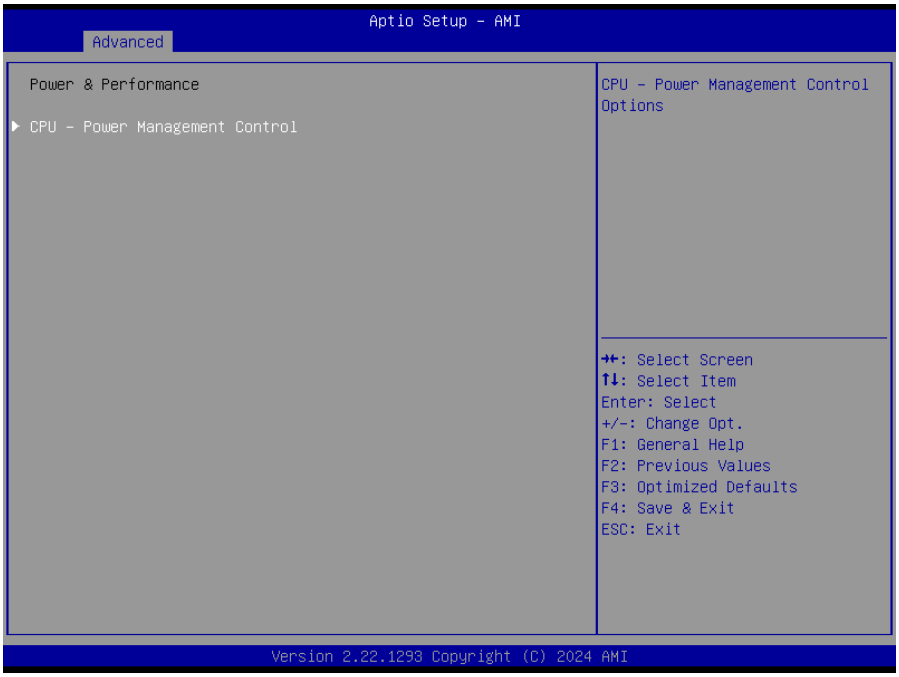
5.6.2.1.1 Efficient-core Information



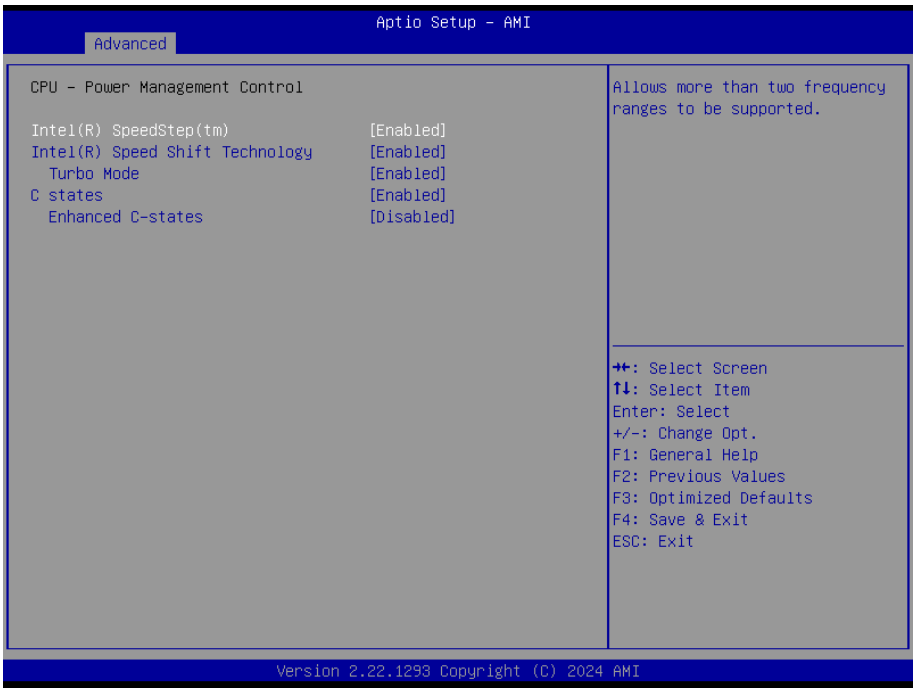
5.6.2.1.2 Performance-core Information



5.6.2.2 Power & Performance

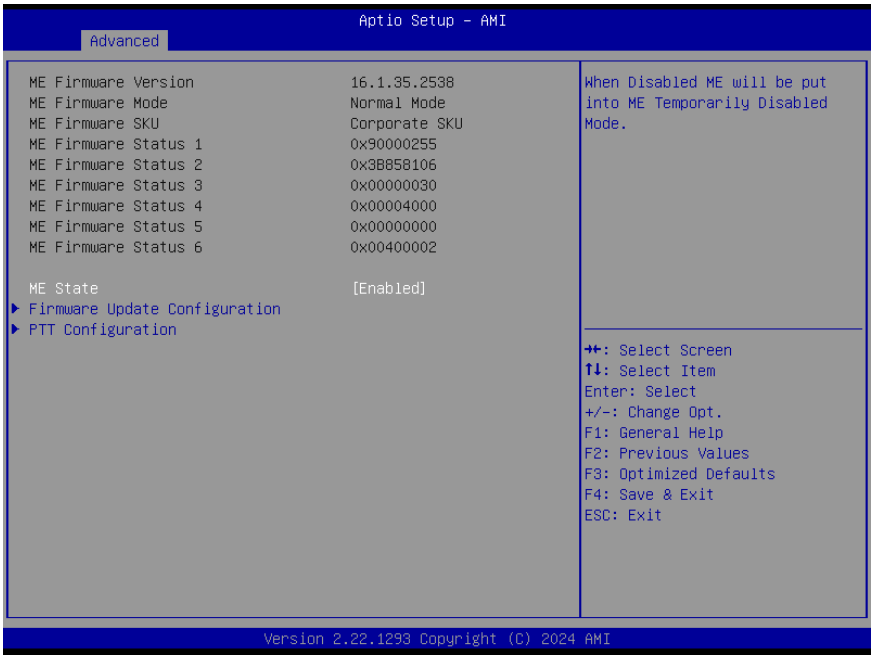


5.6.2.2.1 CPU – Power Management Control



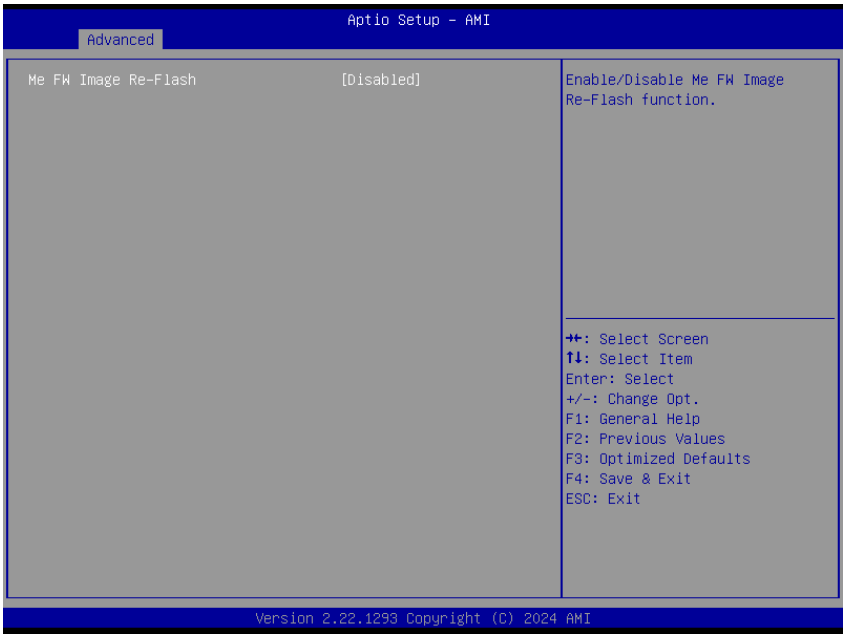
Item	Option	Description
Intel® SpeedStep™	Enabled**[Default]**, Disabled	Allows more than two frequency ranges to be supported.
Intel® Speed Shift Technology	Enabled**[Default]**, Disabled	Eanble/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enabled**[Default]**, Disabled	Enable/Disable processor Turbo Mode (requires Intel Speed Step or Intel Speed Shift to be available and enabled).
C States	Enabled**[Default]**, Disabled	Enable/Disable CPU Power Management.
Enhanced C-States	Enabled, Disabled**[Default]**	Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

5.6.2.3 PCH-FW Configuration



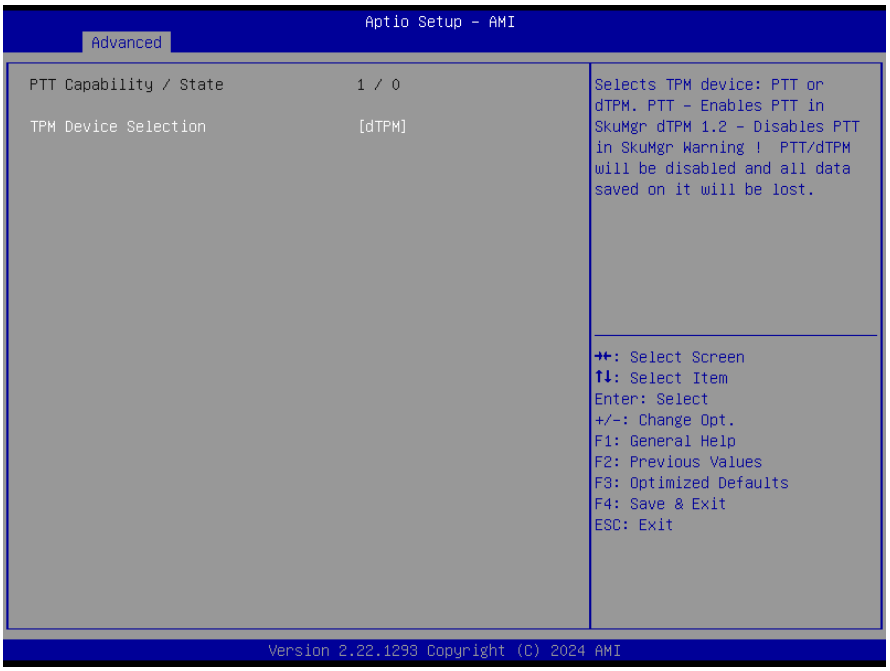
Item	Option	Description
ME State	Disabled Enabled**[Default]**,	When Disabled ME will be put into ME Temporarily Disabled Mode.

5.6.2.3.1 Firmware Update Configuration



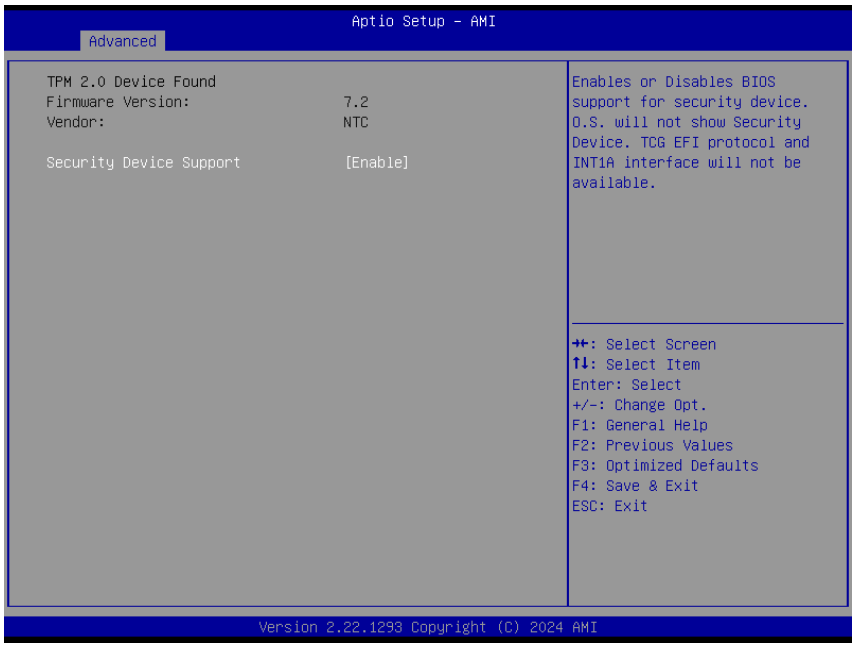
Item	Option	Description
ME FW Image Re-Flash	Disabled**[Default]**, Enabled	Enable/Disable Me FW Image Re-Flash function.

5.6.2.3.2 PTT Configuration



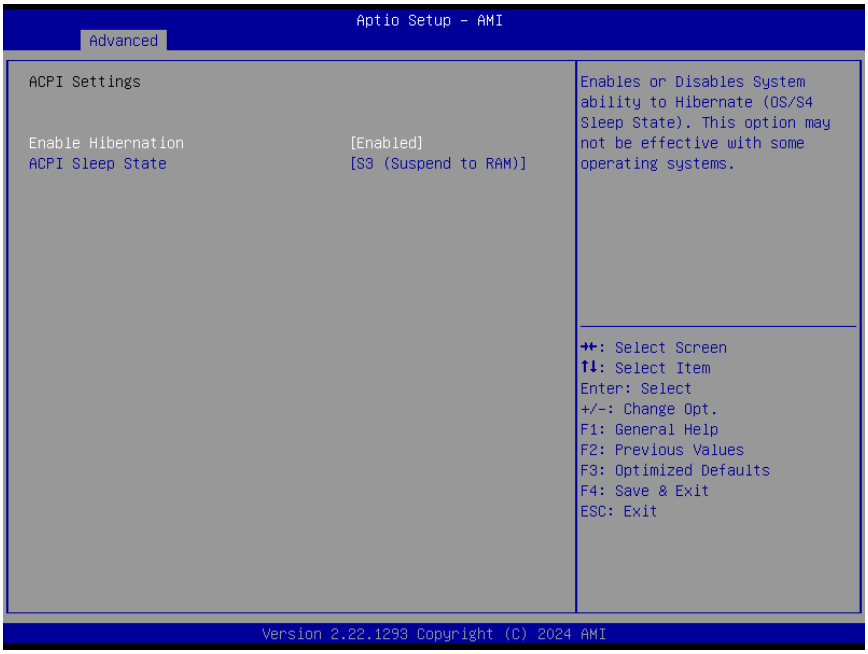
Item	Option	Description
TPM Device Selection	dTPM**[Default]**, PTT	Selects TPM device: PTT or dTPM. PTT-Enables PTT in SkuMgr dTPM1.2 – Disables PTT in SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.

5.6.2.4 Trusted Computing



Item	Options	Description
Security Device Support	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.

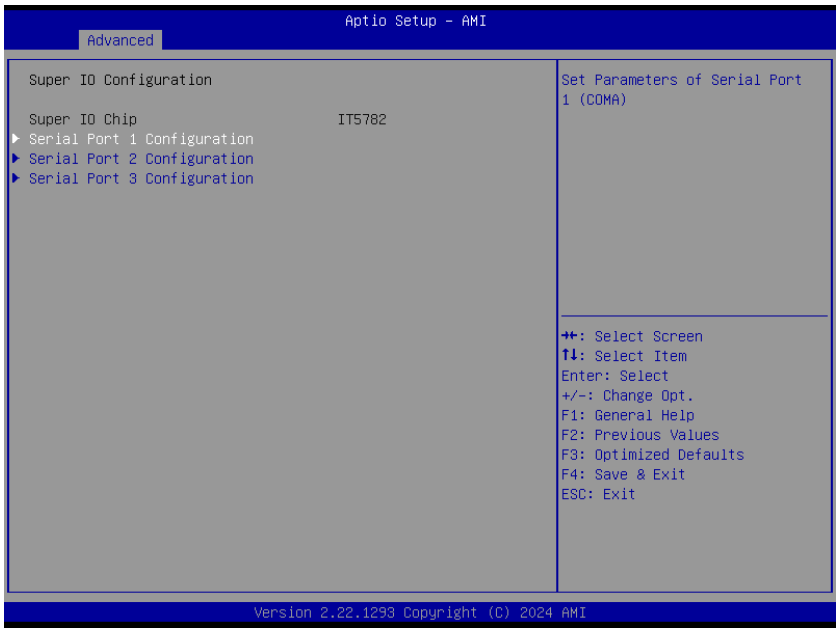
5.6.2.5 APCI Settings



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

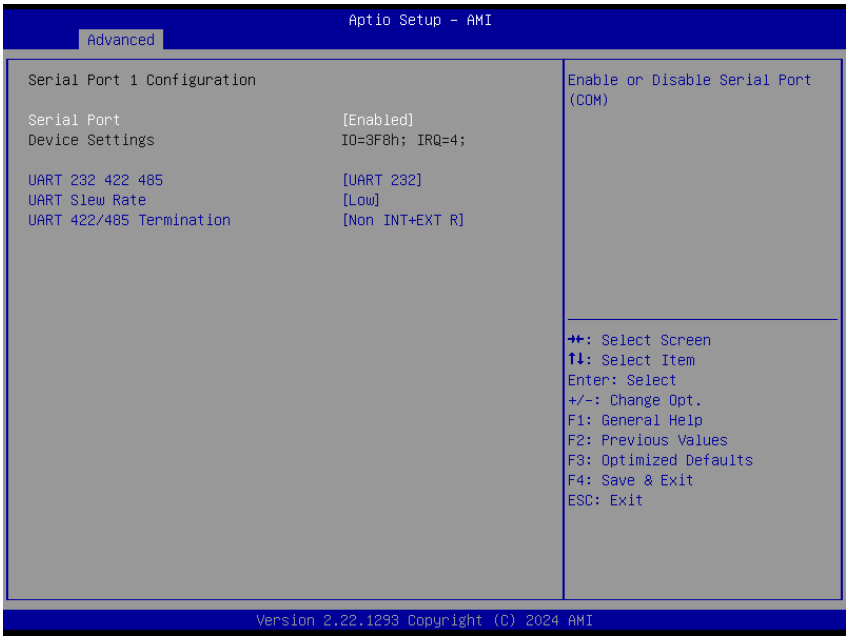
5.6.2.6 Super IO Configuration

You can use this item to set up or change the Super IO configuration for serial ports. Please refer to 5.6.2.6.1 ~ 5.6.2.6.3 for more information.



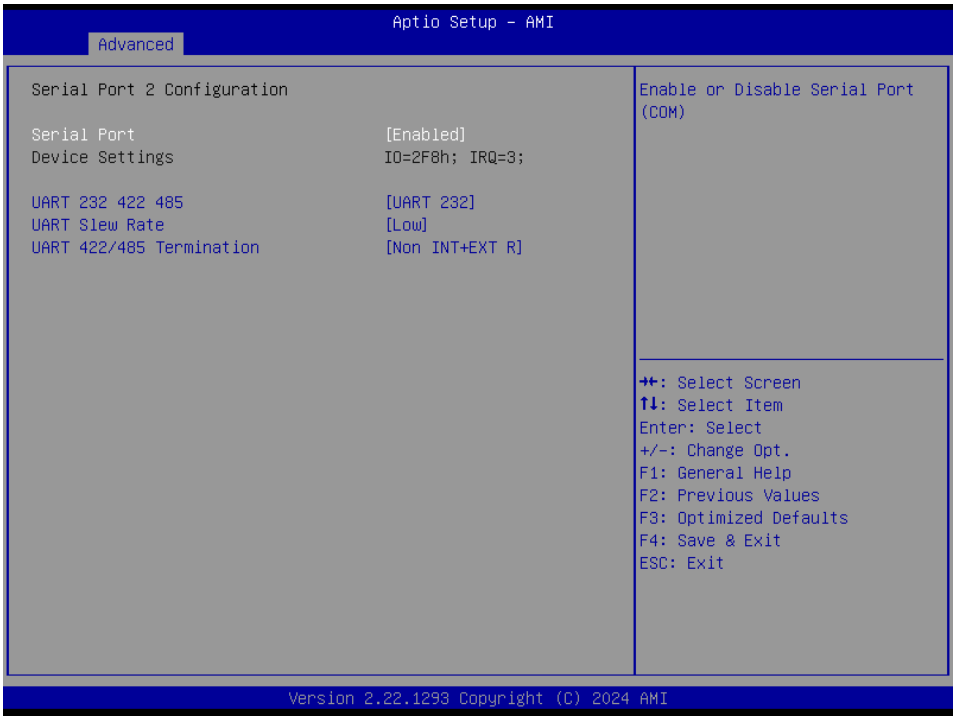
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).
Serial Port 2 Configuration	Set Parameters of Serial Port 2 (COMB).
Serial Port 3 Configuration	Set Parameters of Serial Port 3 (COMC).

5.6.2.6.1 Serial Port 1 Configuration



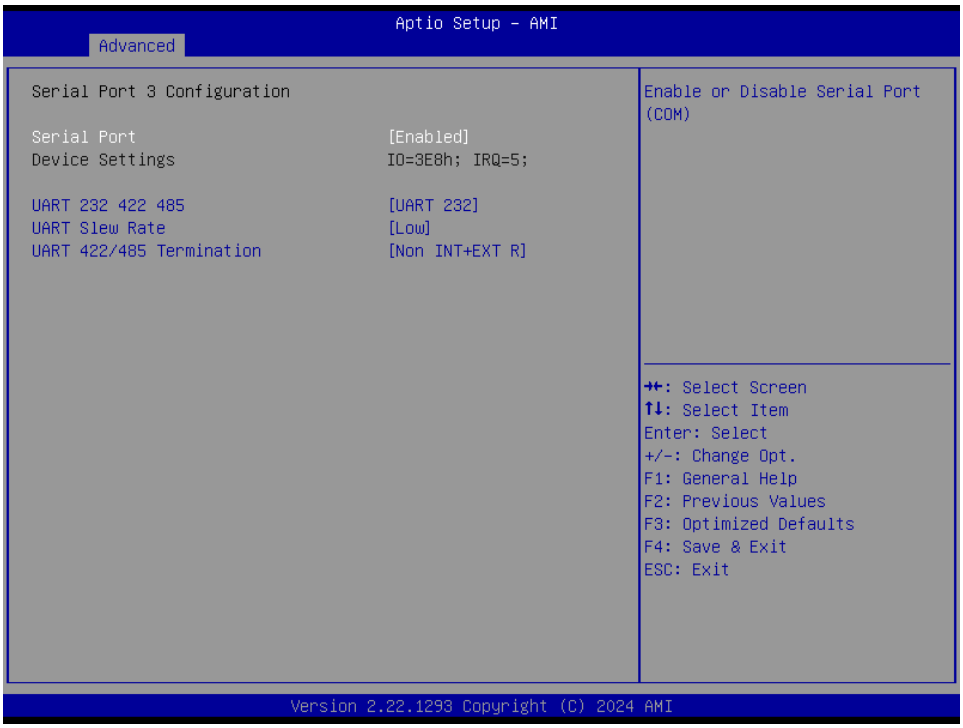
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.
UART Slew Rate	Low**[Default]** High	Low: RS232/422/485 = 250Kbps High: RS232 = 3Mbps, RS422/485 = 20Mbps.
UART 422/485 Termination	Non INT+EXT R**[Default]** EXT R INT R INT+EXT R	Adjust the Serial Port with internal or external termination resistors.

5.6.2.6.2 Serial Port 2 Configuration



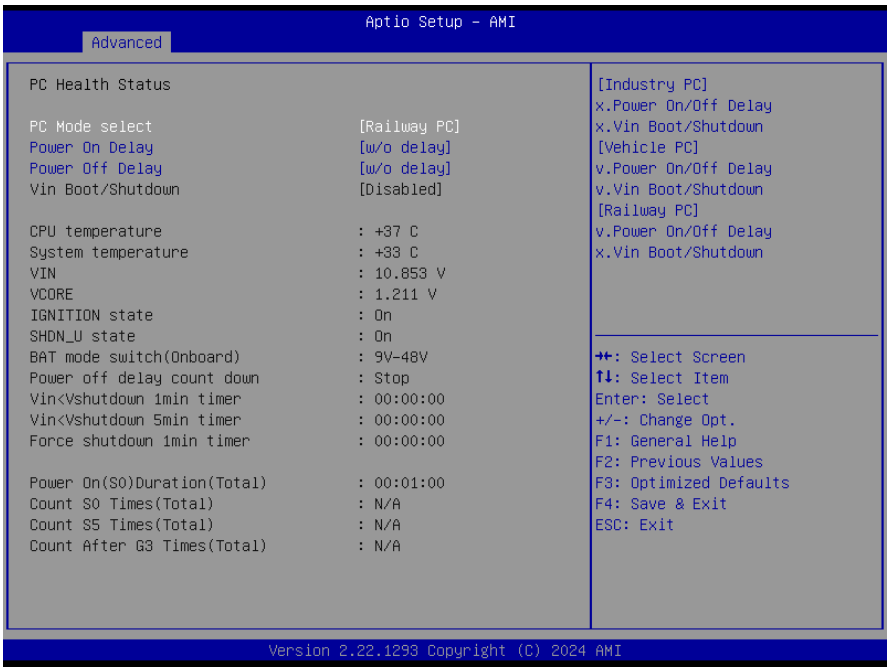
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.
UART Slew Rate	Low**[Default]** High	Low: RS232/422/485 = 250Kbps High: RS232 = 3Mbps, RS422/485 = 20Mbps.
UART 422/485 Termination	Non INT+EXT R**[Default]** EXT R INT R INT+EXT R	Adjust the Serial Port with internal or external termination resistors.

5.6.2.6.3 Serial Port 3 Configuration



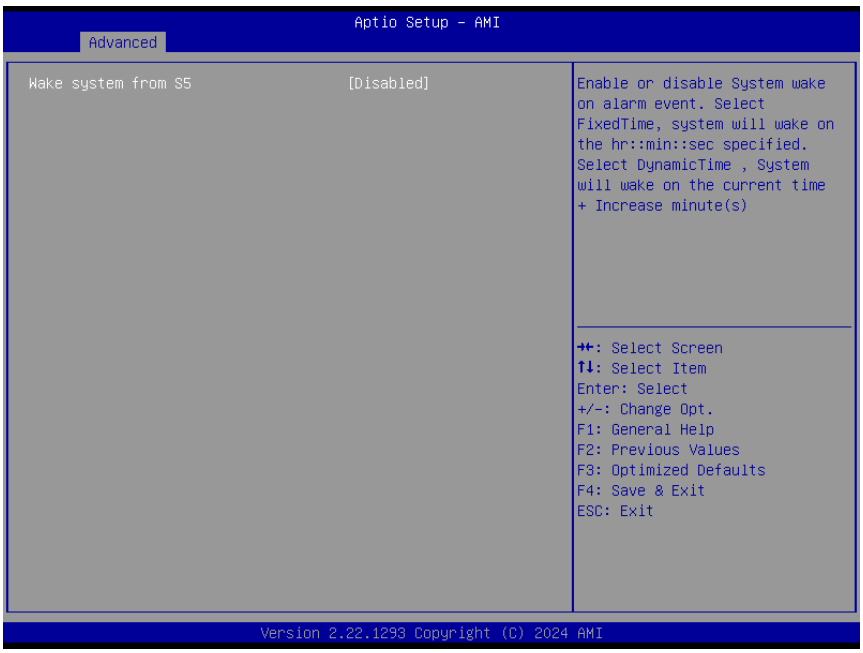
Item	Option	Description
Serial Port	Enabled**[Default]**, Disabled	Enable or Disable Serial Port (COM).
UART 232 422 485	UART 232**[Default]** UART 422 UART 485	Change the Serial Port as RS232/422/485.
UART Slew Rate	Low**[Default]** High	Low: RS232/422/485 = 250Kbps High: RS232 = 3Mbps, RS422/485 = 20Mbps.
UART 422/485 Termination	Non INT+EXT R**[Default]** EXT R INT R INT+EXT R	Adjust the Serial Port with internal or external termination resistors.

5.6.2.7 EC 5782 HW Monitor



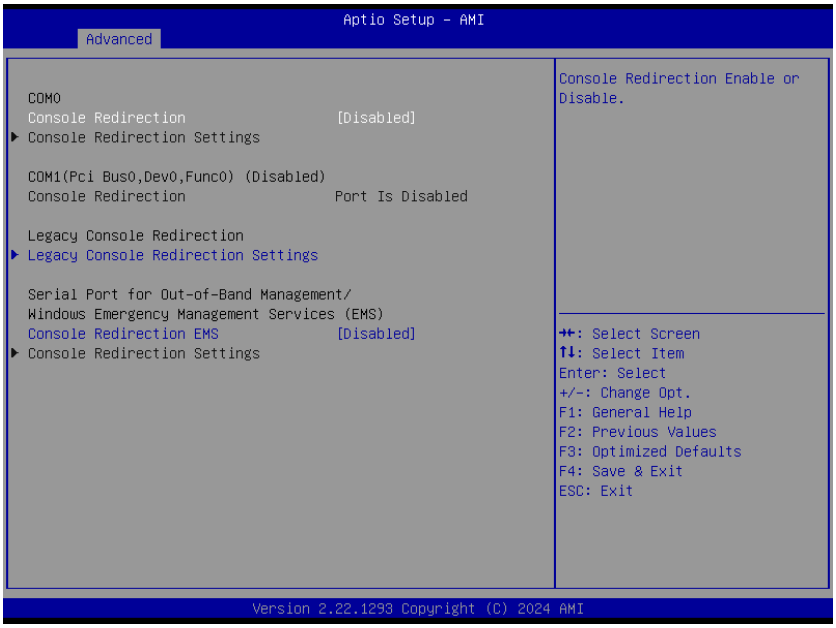
Item	Options	Description
PC Mode select	Industry PC Vehicle PC Railway PC**[Default]**	[Industry PC] x.Power On/Off Delay x.Vin Boot/Shutdown [Vehicle PC] v.Power On/Off Delay v.Vin Boot/Shutdown [Railway PC] v.Power On/Off Delay x.Vin Boot/Shutdown.
Power On Delay	w/o delay**[Default]** 10 Sec 30 Sec 1 Min 5 Min 10 Min 15 Min 30 Min 1 Hour	Power On Delay while Ignition turn on.
Power Off Delay	w/o delay**[Default]** 20 Sec 1 Min 5 Min 10 Min 30 Min 1 Hour 6 Hour 18 Hour	Power Off Delay while Ignition turn off.

5.6.2.8 S5 RTC Wake Settings



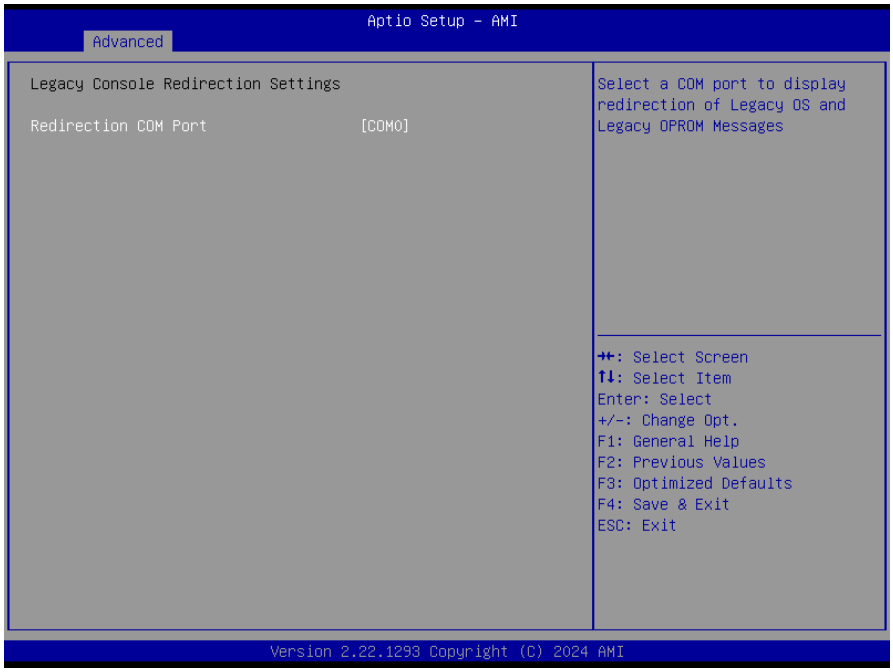
Item	Options	Description
Wake system from S5	Disabled**[Default]**, Fixed Time Dynamic Time	Enable or disable System wake on alarm event. Select Fixed Time, system will wake on the hr::min::sec specified. Select Dynamic Time, System will wake on the current time + Increase minute(s).

5.6.2.9 Serial Port Console Redirection



Item	Options	Description
Console Redirection	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.
Console Redirection EMS	Disabled**[Default]**, Enabled	Console Redirection Enable or Disable.

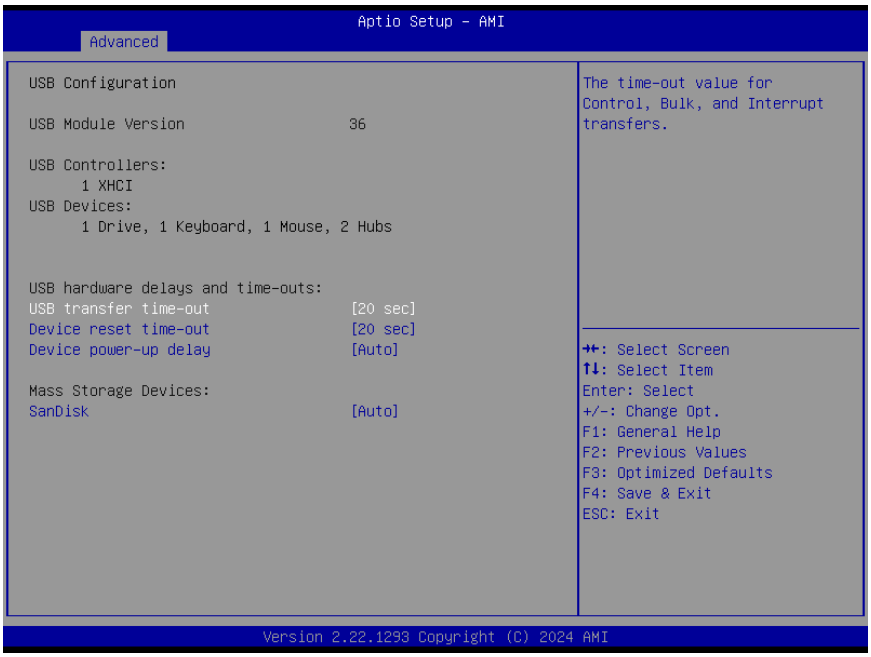
5.6.2.9.1 Legacy Console Redirection Settings



Item	Option	Description
Redirection COM Port	COM0**[Default]**	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

5.6.2.10 USB Configuration

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



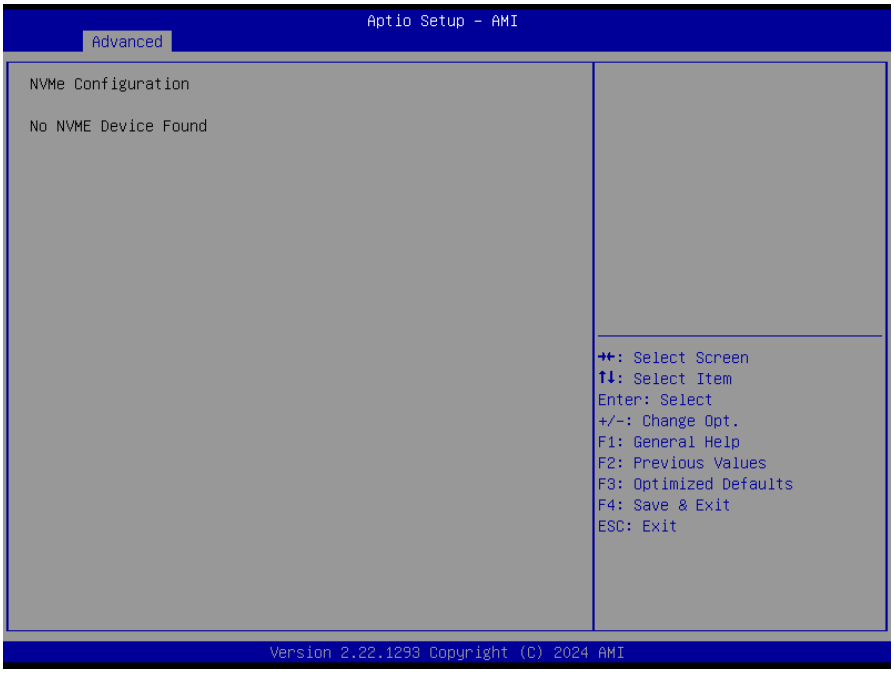
Item	Options	Description
USB transfer time-out	1 sec 5 sec	The time-out value for Control, Bulk, and Interrupt transfers.

	10 sec 20 sec**[Default]**	
Device reset time-out	10 sec 20 sec**[Default]** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	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.
Mass Storage Devices	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.

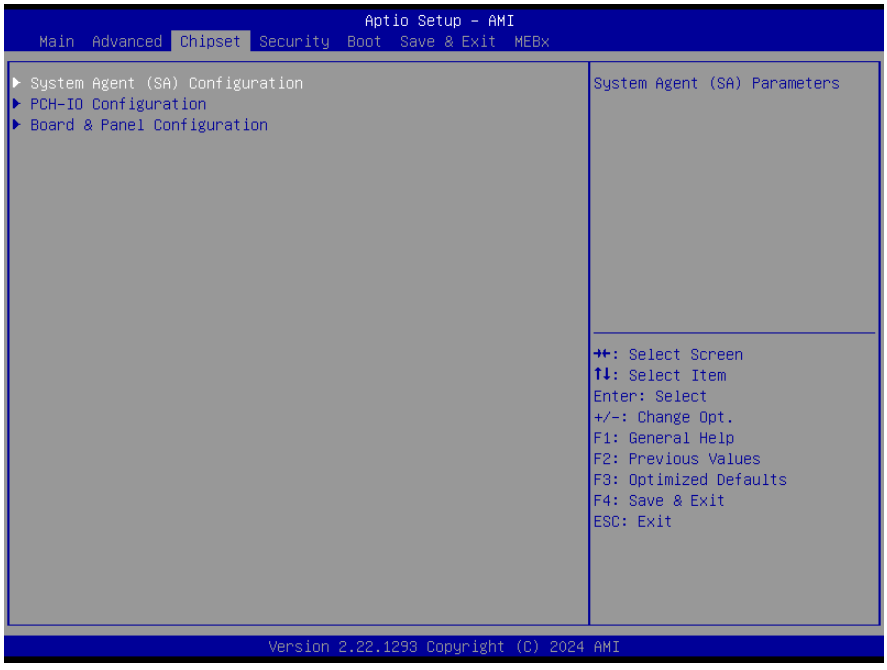
5.6.2.11 Network Stack Configuration

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

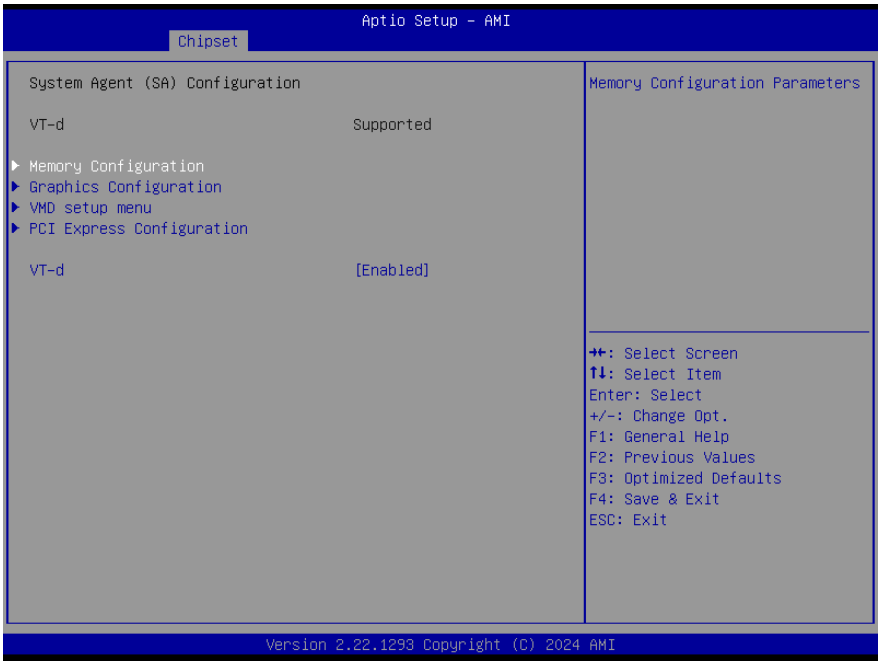
5.6.2.12 NVMe Configuration



5.6.3 Chipset

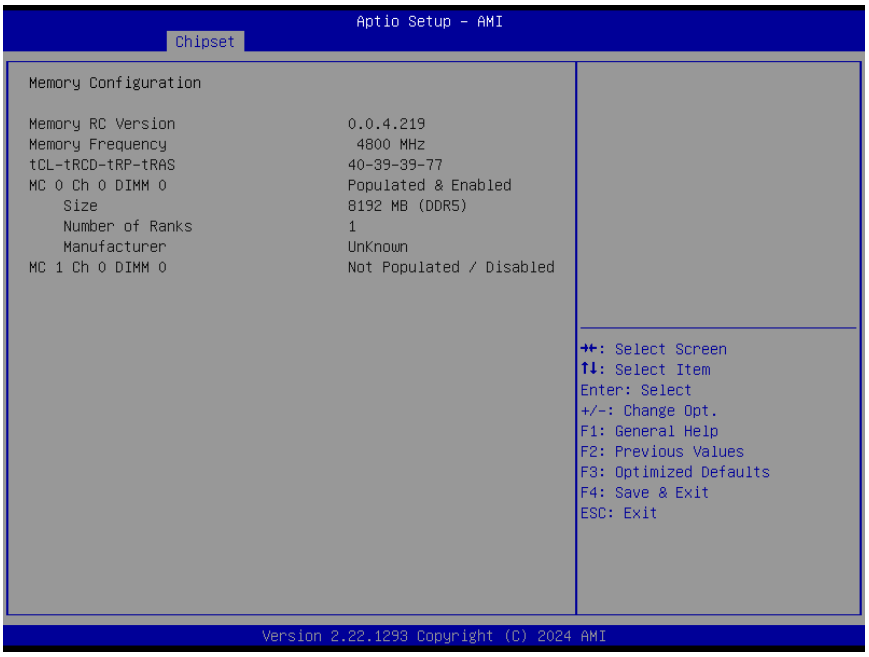


5.6.3.1 System Agent (SA) Configuration

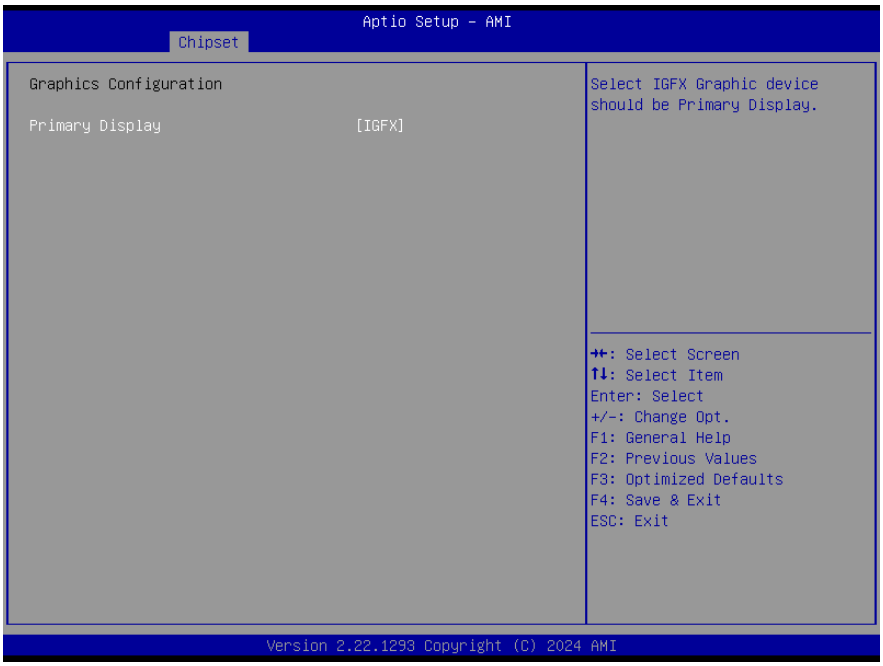


Item	Option	Description
VT-d	Enabled**[Default]** Disabled	VT-d capability.

5.6.3.1.1 Memory Configuration

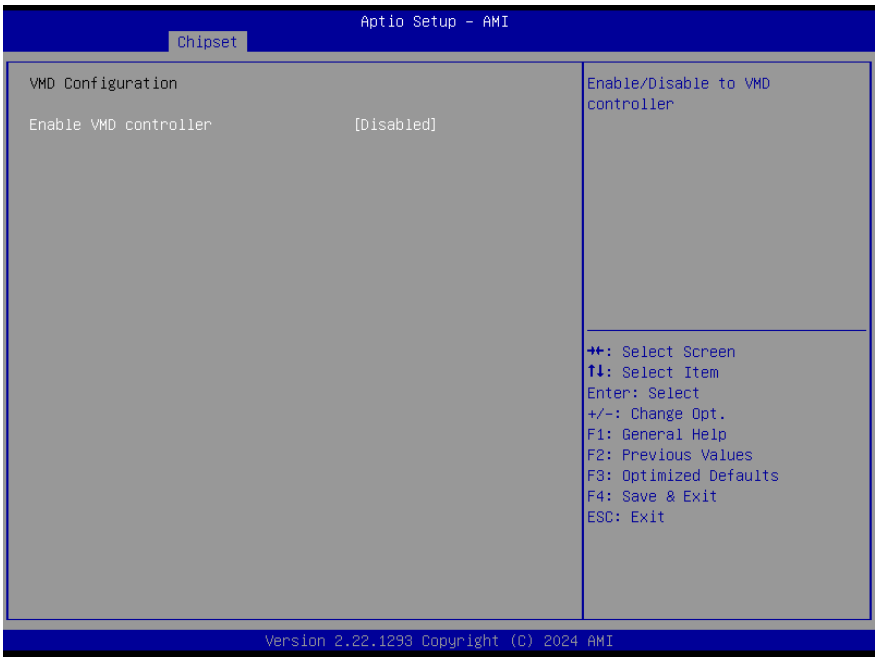


5.6.3.1.2 Graphics Configuration



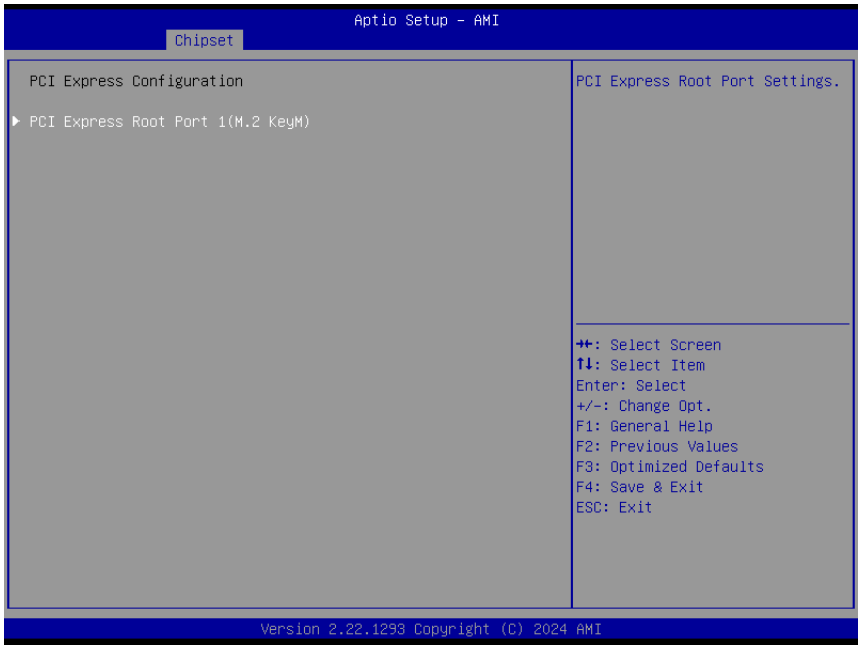
Item	Option	Description
Primary Display	Auto IGFX**[Default]**	Select IGFX Graphic device should be Primary Display.

5.6.3.1.3 VMD setup menu



Item	Option	Description
Enable VMD controller	Enabled Disabled**[Default]**	Enable/Disable VMD controller.

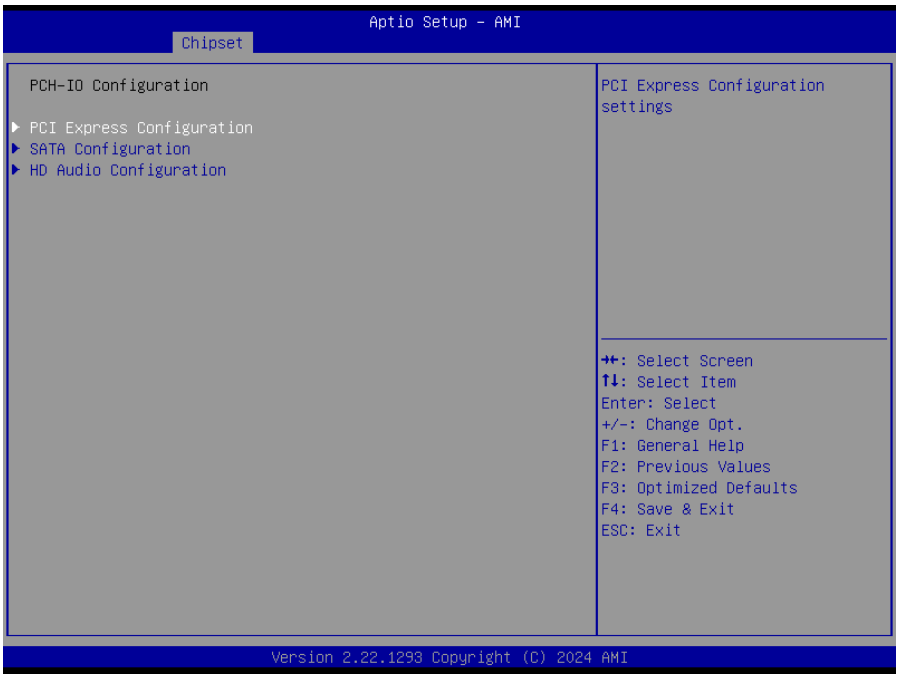
5.6.3.1.4 PCI Express Configuration



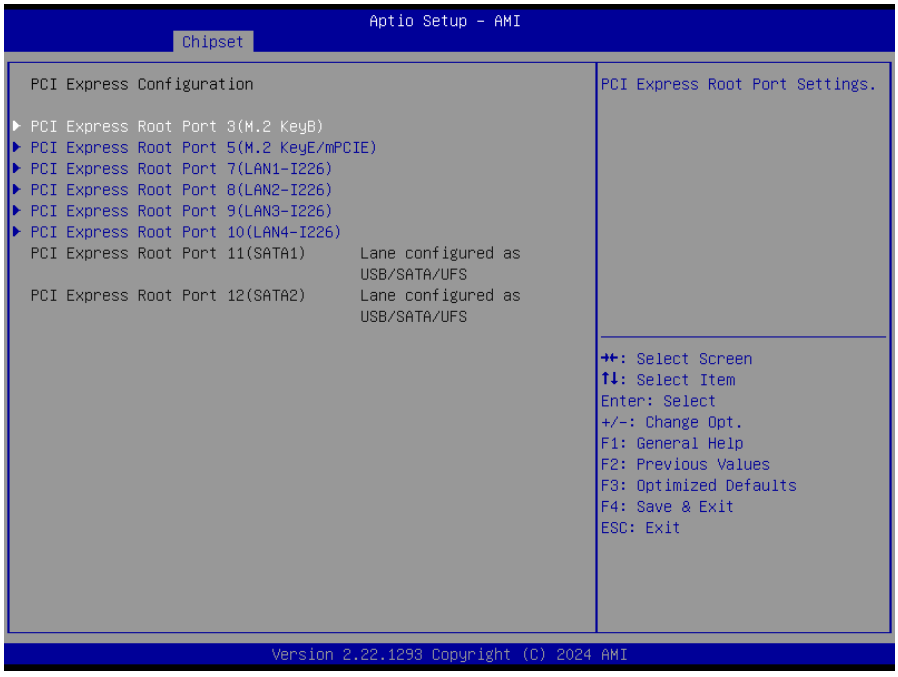
5.6.3.1.4.1 PCI Express Root Port 6(LAN2-I211)

Item	Option	Description
PCI Express Root Port 1	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.

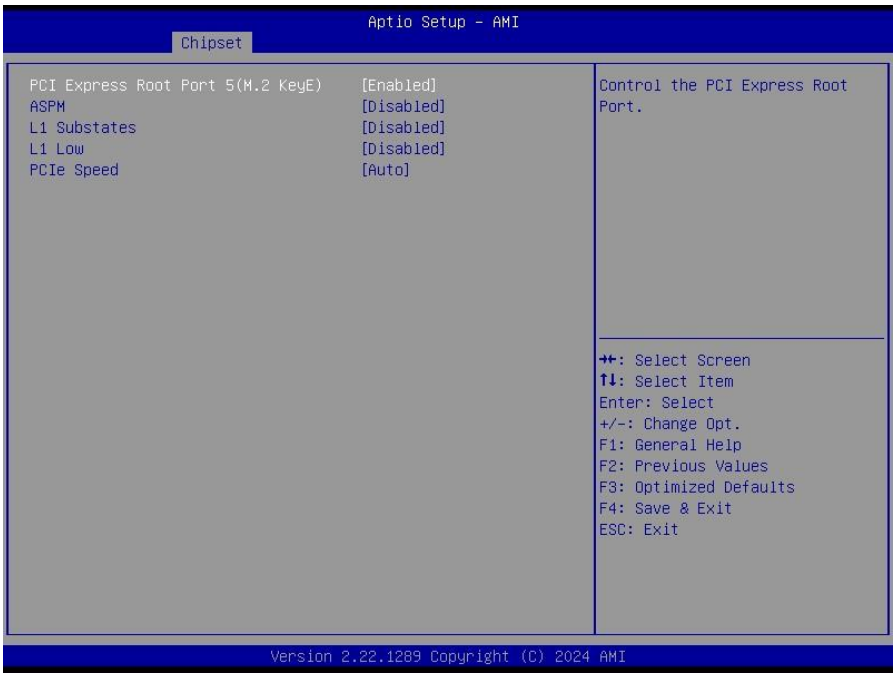
5.6.3.2 PCH-IO Configuration



5.6.3.2.1 PCI Express Configuration

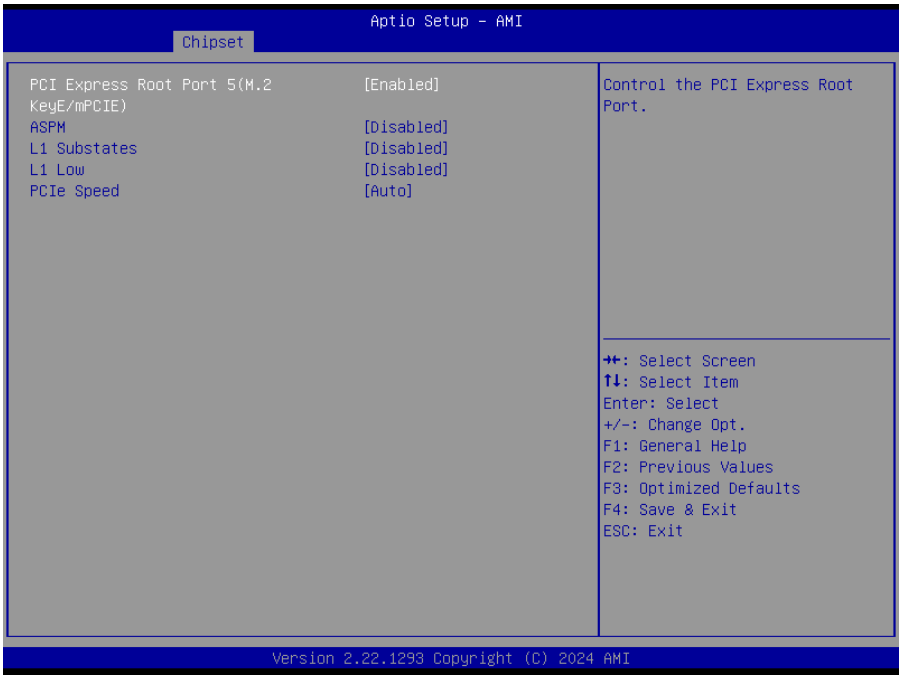


5.6.3.2.1.1 PCI Express Root Port 3(M.2 KeyB)



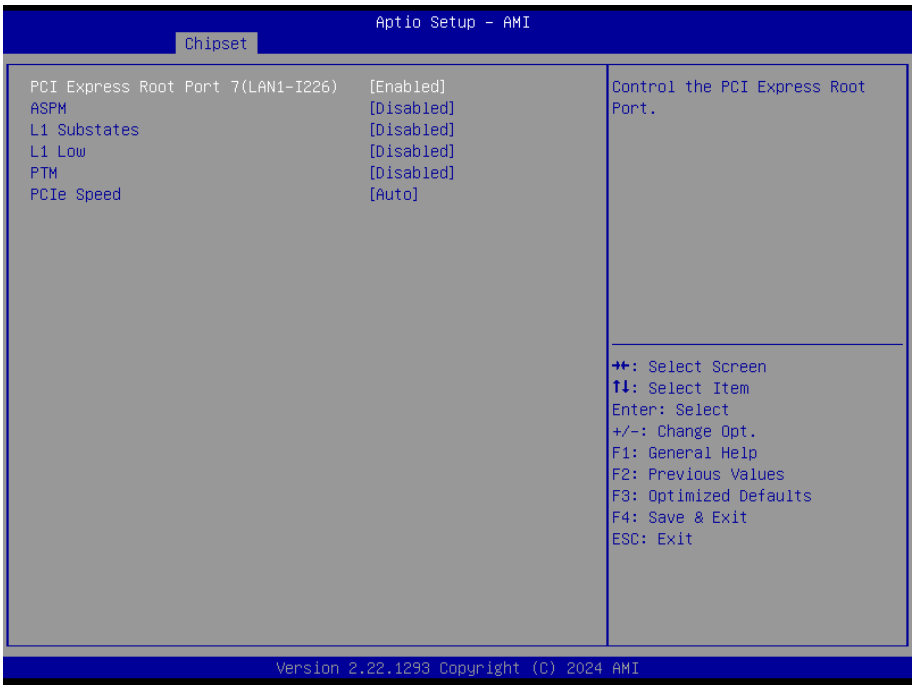
Item	Option	Description
PCI Express Root Port 3(M.2 KeyB)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.1.2 PCI Express Root Port 5(M.2 KeyE/mPCIE)



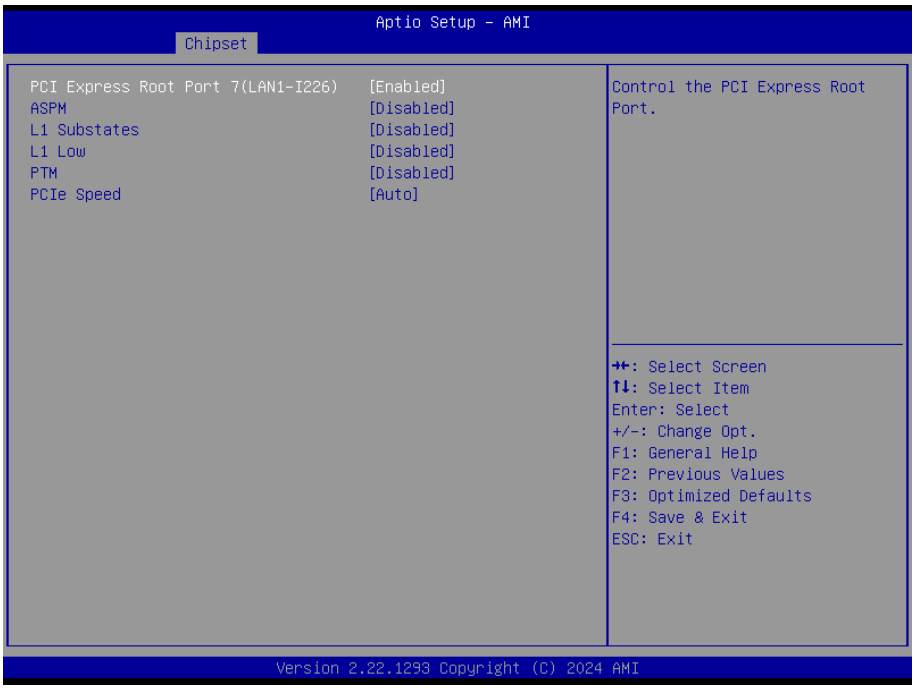
Item	Option	Description
PCI Express Root Port 5(M.2 KeyE/mPCIE)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.1.3 PCI Express Root Port 7(LAN1-I226)



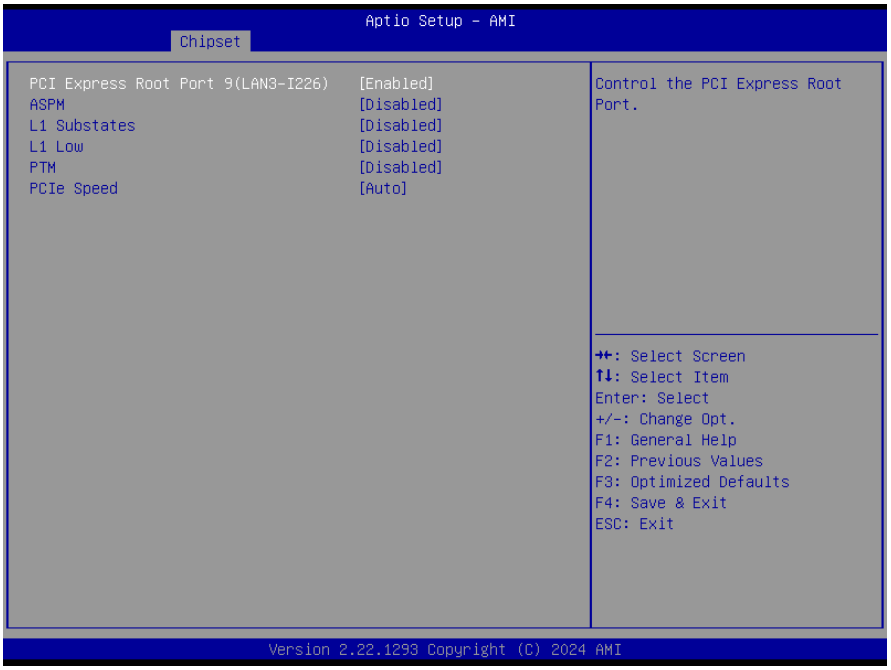
Item	Option	Description
PCI Express Root Port 7(LAN1-I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.1.4 PCI Express Root Port 8(LAN2-I226)



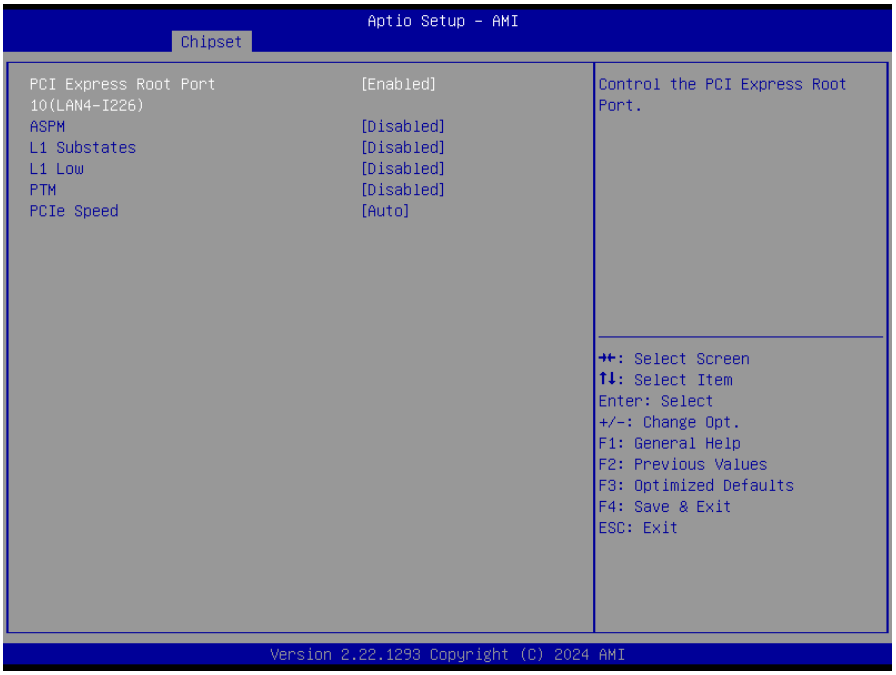
Item	Option	Description
PCI Express Root Port 8(LAN2-I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.1.5 PCI Express Root Port 9(LAN3-I226)



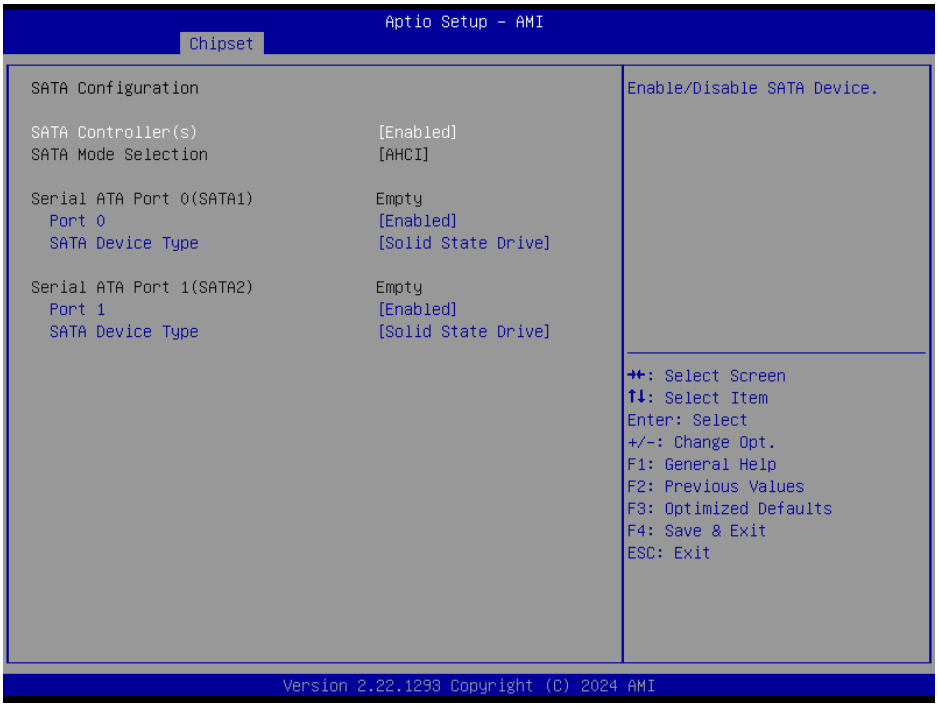
Item	Option	Description
PCI Express Root Port 9(LAN3-I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.1.6 PCI Express Root Port 10(LAN4-I226)



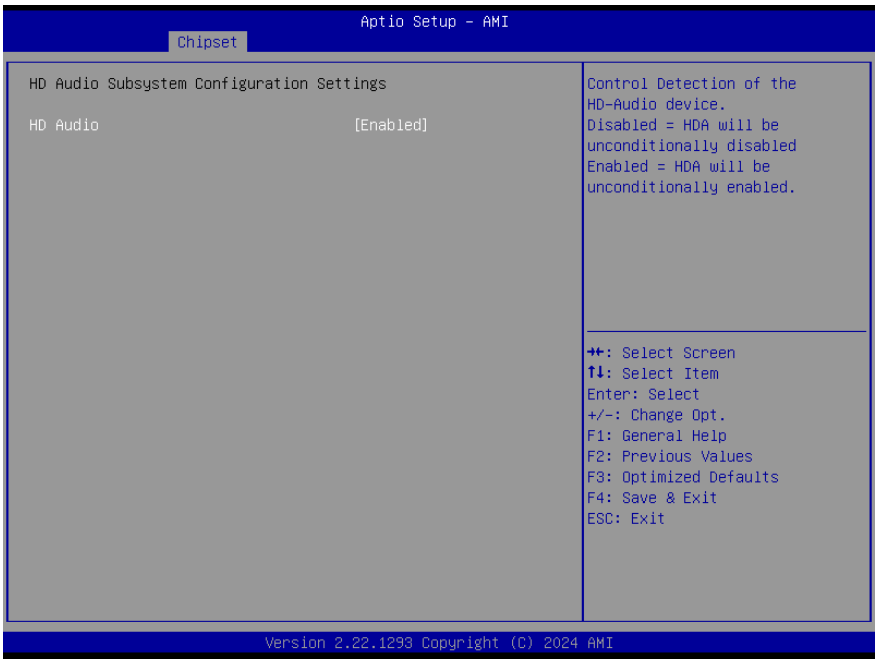
Item	Option	Description
PCI Express Root Port 10(LAN4-I226)	Enabled**[Default]**, Disabled	Control the PCI Express Root Port.
ASPM	Disabled**[Default]**, L1 Auto	Set the ASPM Level: Force L0s – Force all links to L0s State AUTO – BIOS auto configure DISABLE – Disables ASPM.
L1 Substates	Disabled**[Default]** L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
L1 Low	Disabled**[Default]**, Enabled	PCI Express L1 Low Substates Enable/Disable.
PTM	Disabled**[Default]**, Enabled	Enable/Disable Precision Time Measurement.
PCIe Speed	Auto**[Default]** Gen1 Gen2 Gen3	Configure PCIe Speed.

5.6.3.2.2 SATA Configuration



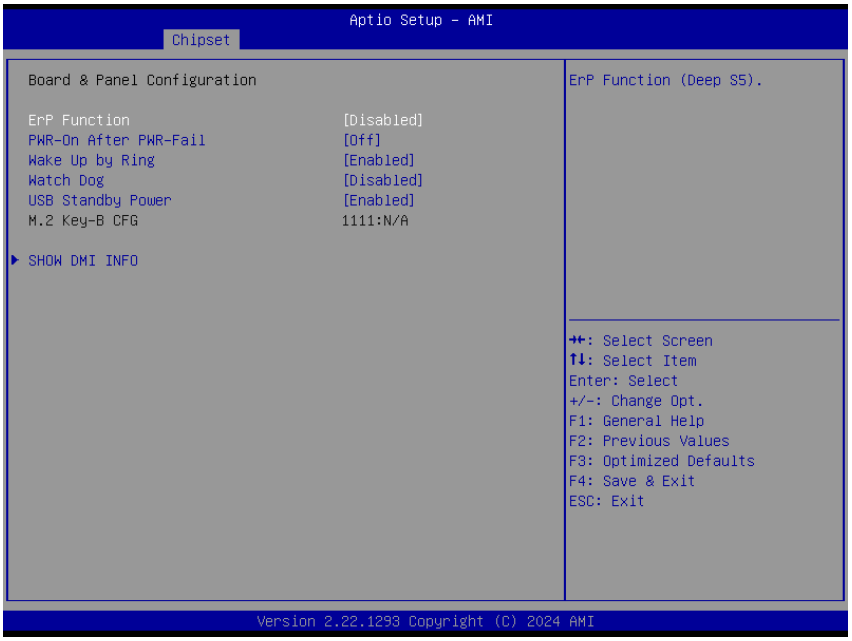
Item	Options	Description
SATA Controller(s)	Enabled**[Default]** Disabled,	Enable/Disable SATA Device.
Port 0	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive**[Default]**	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Port 1	Enabled**[Default]** Disabled	Enable or Disable SATA Port.
SATA Device Type	Hard Disk Drive Solid State Drive**[Default]**	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

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.

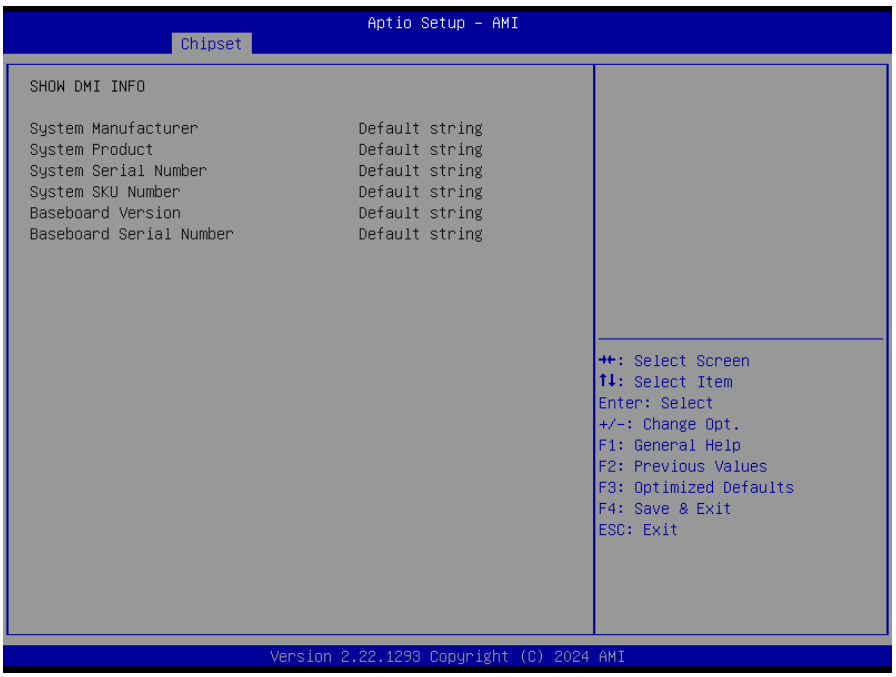
5.6.3.3 Board & Panel Configuration



Item	Option	Description
ErP Function	Disabled**[Default]** Enabled	ErP Function (Deep S5).
PWR-On After PWR-Fail	Off**[Default]**	AC loss resume.

	On Last state	
Wake Up by Ring	Disabled Enabled**[Default]**	Wake Up by Ring from S3/S4/S5.
Watch Dog	Disabled**[Default]** 30 sec 40 sec 50 sec 1 min 2 min 10 min 30 min	Select WatchDog.
USB Standby Power	Disabled Enabled**[Default]**	Enable/Disabled USB Standby Power during S3/S4/S5.

5.6.3.3.1 SHOW DMI INFO



5.6.4 Security

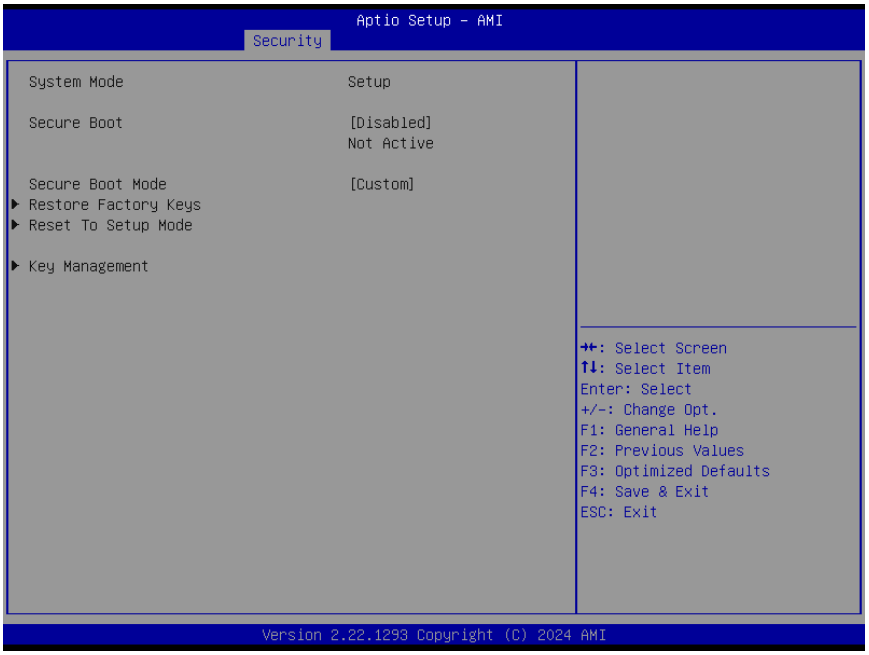
- **Administrator Password**

Set setup Administrator Password

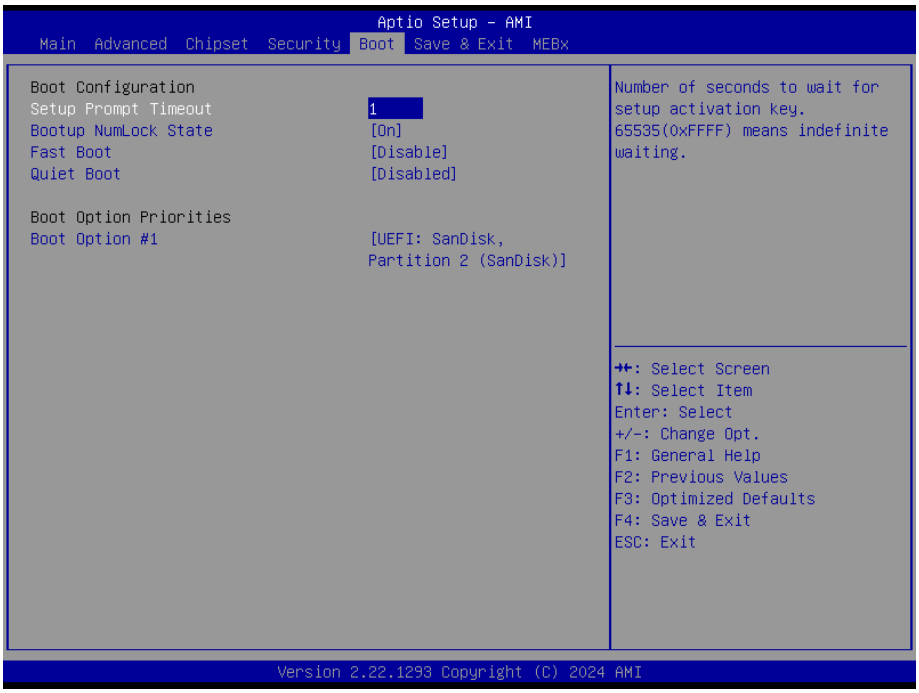
- **User Password**

Set User Password

5.6.4.1 Secure Boot

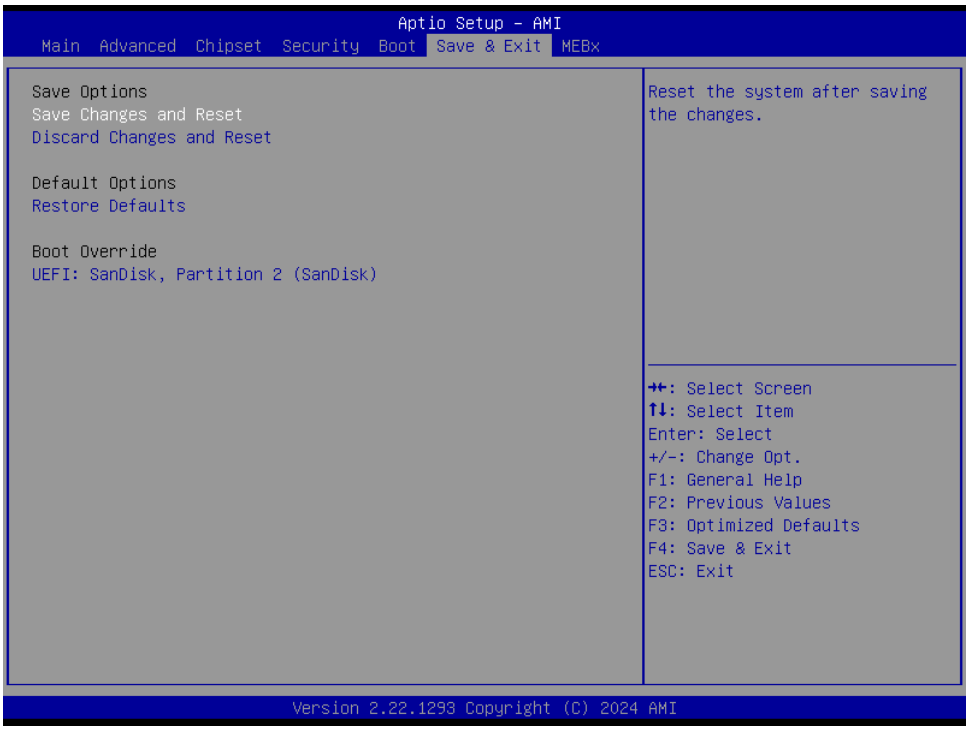


5.6.5 Boot



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
Fast Boot	Disabled**[Default]** Enabled	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot optios.
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	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.

5.6.7 MEBx

- **Intel® ME Password**

MEBx Login

6. Maintenance & Troubleshooting

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.
- 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 box PC before cleaning.
- If you dropped any material or liquid such as water onto the box 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 box PC, never spray or squirt liquids directly onto any other components. To clean the box PC, 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 box 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 box 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 swaps 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.

7. Product Application

For detailed instructions on the operation of the Watchdog Timer and Digital I/O (DIO) features of this box 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 box PC.