HPM-GNRUA

Single Intel® Xeon® 6 Processor ATX Server Board with IPMI2.0. Processor supports up to 350W TDP

User's Manual

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1st	June 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.

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Disclaimer

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

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.

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.
		WARNING • **INGESTION HAZARD**: This product contains a button cell or coin battery. • **DEATH** or serious injury can occur if ingested. • A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**. • **KEEP** new and used batteries **OUT OF REACH of CHILDREN**. • **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.

Disposing of your old product

WARNING:
There is danger of explosion if the battery is mishandled or incorretly 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 ther liquids. Dispose of the battery in accordance with local regulations and instructions from your service provider.

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

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

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

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1. Getting Started

1.1 Safety Precautions

Warning!

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

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.
Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

Français:

Attention!

Débranchez le câble d'alimentation de votre châssis chaque fois que vous travaillez avec le matériel. Ne faites pas de connexion lorsque le système est allumé. Les composants électroniques sensibles peuvent être endommagés par les surtensions soudaines. Seule les personnels expérimentés de l'électronique peuvent ouvrir le châssis du PC.

Précaution!

Il faut toujours mettre à la masse pour éliminer l'électricité statique avant de toucher la carte CPU. Les appareils électroniques modernes sont très sensibles aux électricité statique. Pour des raisons de sécurité, utilisez un bracelet électrostatique. Placez tous les composants électroniques sur une surface antistatique ou dans un sac antistatique quand ils ne sont pas dans le châssis.
Risque d'explosion si la batterie est remplacée par un type incorrect. Jetez les piles usagées selon les instructions

Warning!

Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

Warning!

IT Room

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

Warning!

RAL

The device can only be used in a fixed location such as a lab or a machine room. When you install the device, ensure that the protective earthing connection of the socket-outlet is verified by a skilled person.

Warning!

For RTC battery, current statement in the manual is acceptable.

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.

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	HPM-GNRUA motherboard	1
2	I/O Shield	1
3	LGA4710 CPU carrier-E2B	1

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

1.3 Manual Objectives

This manual describes in details Avalue Technology HPM-GNRUA Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up HPM-GNRUA or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.4 System Specifications

System	
CPU	Single Intel LGA4710 Sockets support 6th Gen. Intel Xeon Scalable Processor (Max. TDP at 350W)
BIOS	AMI UEFI BIOS
System Memory	8x DDR5 6400MT/s RDIMM & 8000MT/s MRDIMM Up to 2TB
Watchdog Timer	System reset event 0~6553 second.
H/W Status Monitor	Temperature. Fan. Voltage. Case open. (1 x 2.5mm pitch Box Wafer, Pinrex 753-71-02TW07 or equivalent)
RAID	Intel VMD and Virtual RAID on CPU(VROC) 1 x Intel VROC header (Note: RAID key for CPU PCIe NVME only)
TPM	TPM 2.0 NuvoTon_NPCT760AABYX or equivalent TCM Nationz Z32H330TC or equivalent (Optional)
Other	IPMI 2.0 with AST 2600 BMC controller onboard.
Expansion Slot	
PCIe	4 x PCIe Gen5 x16 Slot 1, PCIe Gen5 x16 Slot 2, NA Slot 3, PCIe Gen5 x16 Slot 4, NA Slot 5, PCIe Gen5 x16 Slot 6, NA Slot 7, PCIe Gen5 x16(This Slot is closest to the CPU)
Storage	
M.2	2 x M.2 M-Key Slot to support 1 x PCIe 5.0 x4 NVMe SSD 2260/2280/22110 form factor
SATA	1 x Jmicro JMB585-QHBA0A 5x SATA III Supports up to 6.0 Gb/s(From PCIe Gen3 x2) 1 x Mini-SAS HD 4i (for 4 x SATA Only) 1 x 7pin SATA connector
Other	1 x Slim SAS 4i (SFF-8654) connector
Edge I/O	
COM	1 x DB-9 male connector (Connector : DB-9(male) and DB-15(female) dual port right angle)

<table>
<tr><td>LAN</td><td>4 x RJ45 (Including MGMT, LAN1, 2, and 3)
MGMT port : Dedicated IPMI function access
LAN 1 : 1GbE Ethernet port, LAN1 shared with IPMI function access
(Connector : 1 x 1G Base-T RJ45 module jack over 2 x USB 3.1 Gen1 stacked receptacle)
LAN 2 and 3 : 2 x 10GbE Ethernet ports
(Connector : 1 x 2X1 10G Base-T RJ45 module jack)</td></tr>
<tr><td>USB</td><td>2 x USB 3.1 Gen1 ports by Renesas UPD720201K8-701-BAC-A(From PCIe Gen2 x1)
(Connector : 1 x 1G Base-T RJ45 module jack over 2 x USB 3.1 Gen1 stacked receptacle)</td></tr>
<tr><td>VGA</td><td>1 x DB-15 female connector (Connector : DB-9(male) and DB-15(female) dual port right angle)</td></tr>
<tr><td>Onboard I/O</td><td></td></tr>
<tr><td>COM</td><td>1 x RS232 ports (1 x 2.0mm pitch Box Header) reserved
*(S/W disable, only supported Ubuntu 24.02 if enable function)
Pin definition: Follow Avalue standard.</td></tr>
<tr><td>USB</td><td>4 x USB 3.1 Gen1 ports by Renesas UPD720201K8-701-BAC-A(From PCIe Gen2 x1)
(1 x USB Hub to 4 x USB (2 x Onboard for system front USB + 2 x Internal vertical conn.)Pin definition :</td></tr>
<tr><td>CPU/System FAN</td><td>2 x 4 Pin CPU Fan Header (4 Pin PWM)
6 x 4 Pin Chassis Fan Header (4 Pin PWM, 2 for front fans and 4 for rear fans)</td></tr>
<tr><td>Buzzer</td><td>1 x onboard buzzer</td></tr>
<tr><td>Front Panel</td><td>1 x front panel connector (2.54 mm Pitch)
<table>
<tr><td>Pin</td><td>Function</td><td>Pin</td><td>Function</td></tr>
<tr><td>1-3</td><td>HDD LED</td><td>2-4</td><td>POWER LED</td></tr>
<tr><td>5-7</td><td>RESET BUTTON</td><td>6-8</td><td>POWER BUTTON</td></tr>
<tr><td>9-11</td><td>STATUS LED</td><td>10-12</td><td>LAN1 ACT LED</td></tr>
<tr><td>13-15</td><td>UID LED</td><td>14-16</td><td>STBY POWER LED</td></tr>
<tr><td>17-19</td><td>UID BUTTON</td><td>18-20</td><td>LAN2-X ACT LED</td></tr>
</table>
Notes: LAN2-X ACT LED, “X” means the max number of Ethernet ports.
1 x 24-pin SSI front panel connector</td></tr>
</table>

FRONTPANEL, BOX HEADER 2X12 WO/ PIN3

Signal	Pin	Pin	Signal
P3V3_STBY	1	2	P3V3_STBY
key	3	4	UID_LED+
PWR_LED-	5	6	UID_LED-
HDD_LED+	7	8	STATUS_LED-
HDD_LED-	9	10	STATUS_LED+
PWRON_BTN	11	12	LAN1_ACTIVE_LED+
GND	13	14	LAN1_ACTIVE_LED-
RESET_BTN	15	16	SMB_SDA
GND	17	18	SMB_SCL
UID_BTN	19	20	INTRUSION
NC	21	22	LAN2_ACTIVE_LED+
NMI_BTN	23	24	LAN2_ACTIVE_LED-

RTC Battery	1 x Horizontal Socket Type CMOS Battery Holder with CR2450 + NXP/PCF85053ATKJ
Clear CMOS	1 x Clear CMOS header (1 x 2.0 mm pitch Header)
Other	1 x Inlet sensor onboard TI TMP75AIDGKT VSSOP-8 1 x Outlet sensor onboard TI TMP75AIDGKT VSSOP-8 1 x Inlet sensor header 1 x Outlet sensor header (The onboard and external sensors will co-exist)
Display	
Graphic Chipset	1 x VGA port (DB15 on rear I/O) AST2600 BMC controller
Spec. & Resolution	1920x1200@60Hz 32bpp
Ethernet	
LAN Chipset	1 x Intel I210AT 1GbE controller 1 x Intel E610-XAT2 10GbE controller supports 2 x 10GbE Ethernet ports
LAN Spec.	1 x 1G Base-T Ethernet Controller 1 x Dual 10G Base-T Ethernet controller
LED Indicator	1G LAN:

WOL	Status	Right	Left	
		Yellow	Green	Orange
Don't care	No Link	●	●	●
Off	S3/S4/S5	●	●	●
On	10Mb Inactive	●	●	●
On	10Mb Active	B	●	●
On	100Mb Inactive	●	●	●
On	100Mb Active	B	●	●
On	1Gb Inactive	●	●	●
On	1Gb Active	B	●	●

10G LAN:

WOL	Status	Right	Left	
		Yellow	Green	Orange
Don't care	No Link			
On	100Mb Inactive			
On	100Mb Active	B		
On	1Gb Inactive			
On	1Gb Active	B		
On	10Gb Inactive			
On	10Gb Active	B		

Power Indicator: To identify whether the system is ready or dead.

1. Power button ON
2. Power indicator ON
3. BIOS initialization, Power indicator from ON to blinking
4. Power indicator to always on means: A. ON. B. System Error.

Power Indicator	Condition	Memo	FAN status
OFF	S5	Power off	OFF
ON	System always Failed	System boot failed/VGA is not ready	ON
ON	BIOS ready to boot	VGA is ready. (Informed by BIOS)	ON
Blinking	BIOS initializing	Blinking (BMC to implement)	ON

Mechanical & Environmental	
Power Requirement	1 x Std. 24 pin ATX Connector 3 x 8 Pin SSI 12V Connectors
ACPI	Yes, S0 and S5
Power Mode	H/W: ATX power well design only BMC: AT (Default)
Operating Temp.	0 ~ 55°C (32 ~ 131°F)to support up to 350W TDP CPU 0 ~ 55°C (32 ~ 131°F)to support up to 270W TDP CPU
Storage Temp.	-40 °C to 85 °C
Operating Humidity	40°C 95% non-condensing
Size (L x W) **(Please consult product engineers for the**	ATX form factor 12" x9.6" (304.8mm x 243.84mm) PCB thickness is 2.59mm

production feasibility if the size is larger than 410x360mm or smaller than 80x70mm)	
Weight	1.9 kg
Vibration Test	Follow Avalue standard test. Random Vibration Operation Reference IEC60068-2-64 Testing procedures 1. Test PSD : 0.00454G²/Hz , 1.5 Grms 2. System condition : operation mode 3. Test frequency : 5~500 Hz 4. Test axis : X,Y and Z axis 5. Test time : 30 minutes per each axis 6. System condition : Operation mode 7. IEC60068-2-64 Test Fh Storage : mSATA Random vibration test (Non-operation) Reference IEC60068-2-64 Testing procedures 1. PSD: 0.00808G²/Hz , 2.0 Grms 2. Non-Operation mode 3. Test Frequency : 5-500Hz 4. Test Axis : X,Y and Z axis 5. 30 min. per each axis 6. System condition : Non-Operation mode 7. IEC 60068-2-64 Test:Fh Package Vibration Test: Reference IEC60068-2-64 Testing procedures 1. Test PSD : 0.026G²/Hz , 2.16 Grms 2. Non-operation mode 3. Test frequency : 5~500 Hz 4. Test axis : X,Y and Z axis 5. Test time : 30 minutes per each axis IEC 60068-2-64 Test Fh
Drop Test	Follow Avalue standard test. Reference ISTA 2A, Method : IEC-60068-2-32 Test:Ed Test Ea : Drop Test 1 Test phase : One corner, three edges, six faces 2 Test high : 96.5cm 3 Package weight : 5Kg 4 Test drawing

OS Information	Windows 11 SAC and LTSC Windows Server 2025 Ubuntu 24.04 Red Hat Enterprise Linux (RHEL) 8.0 or above

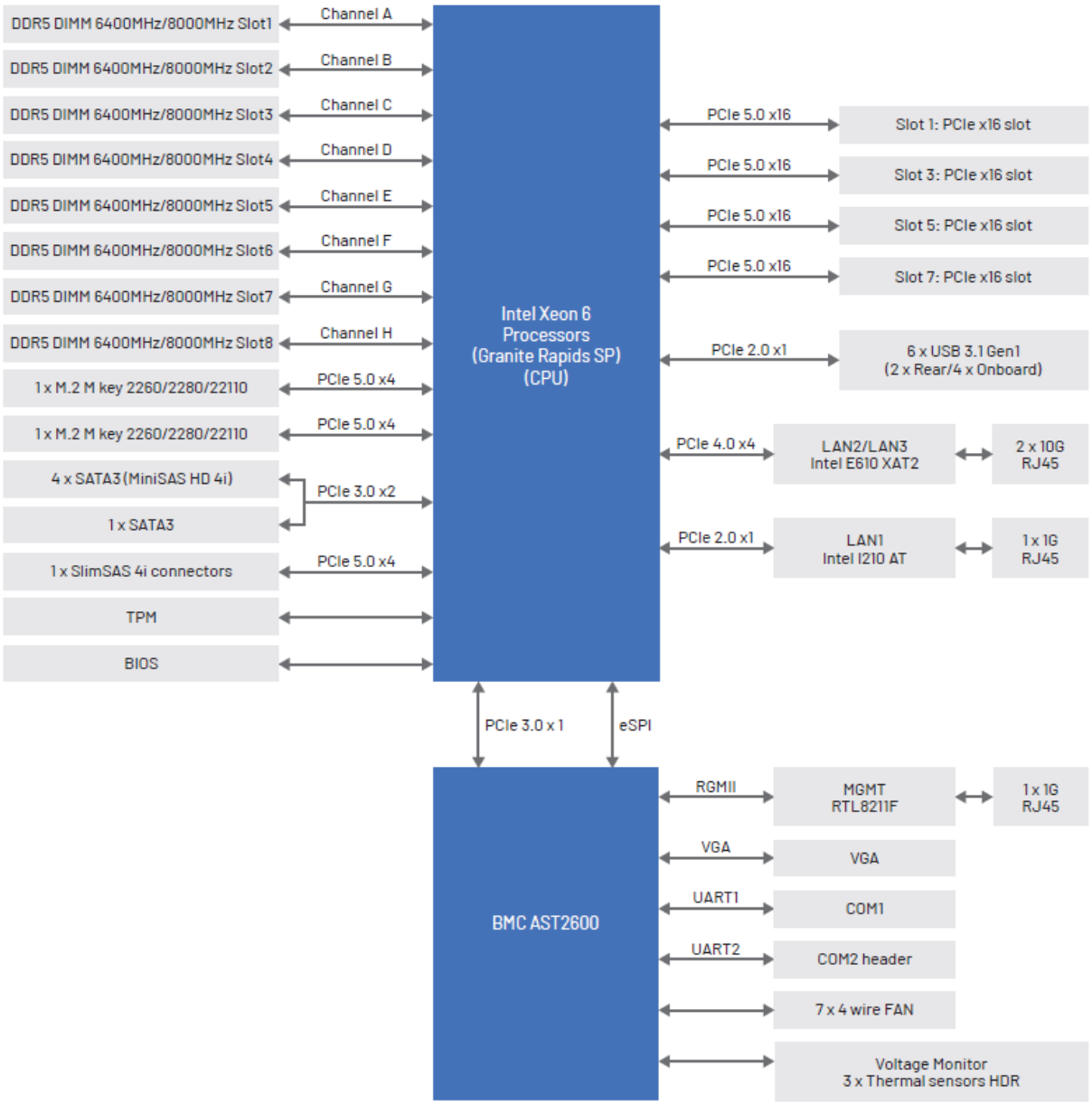
Note: Specifications are subject to change without notice.

DIMM population requirements

		Install DIMM Qty:			
DIMM No.	CPU MEM Ch.	1	4	4	8
DIMM1	CPU1 CH-A DIMM0	V	V		V
DIMM2	CPU1 CH-B DIMM0			V	V
DIMM3	CPU1 CH-C DIMM0		V		V
DIMM4	CPU1 CH-D DIMM0			V	V
DIMM5	CPU1 CH-E DIMM0		V		V
DIMM6	CPU1 CH-F DIMM0			V	V
DIMM7	CPU1 CH-G DIMM0		V		V
DIMM8	CPU1 CH-H DIMM0			V	V

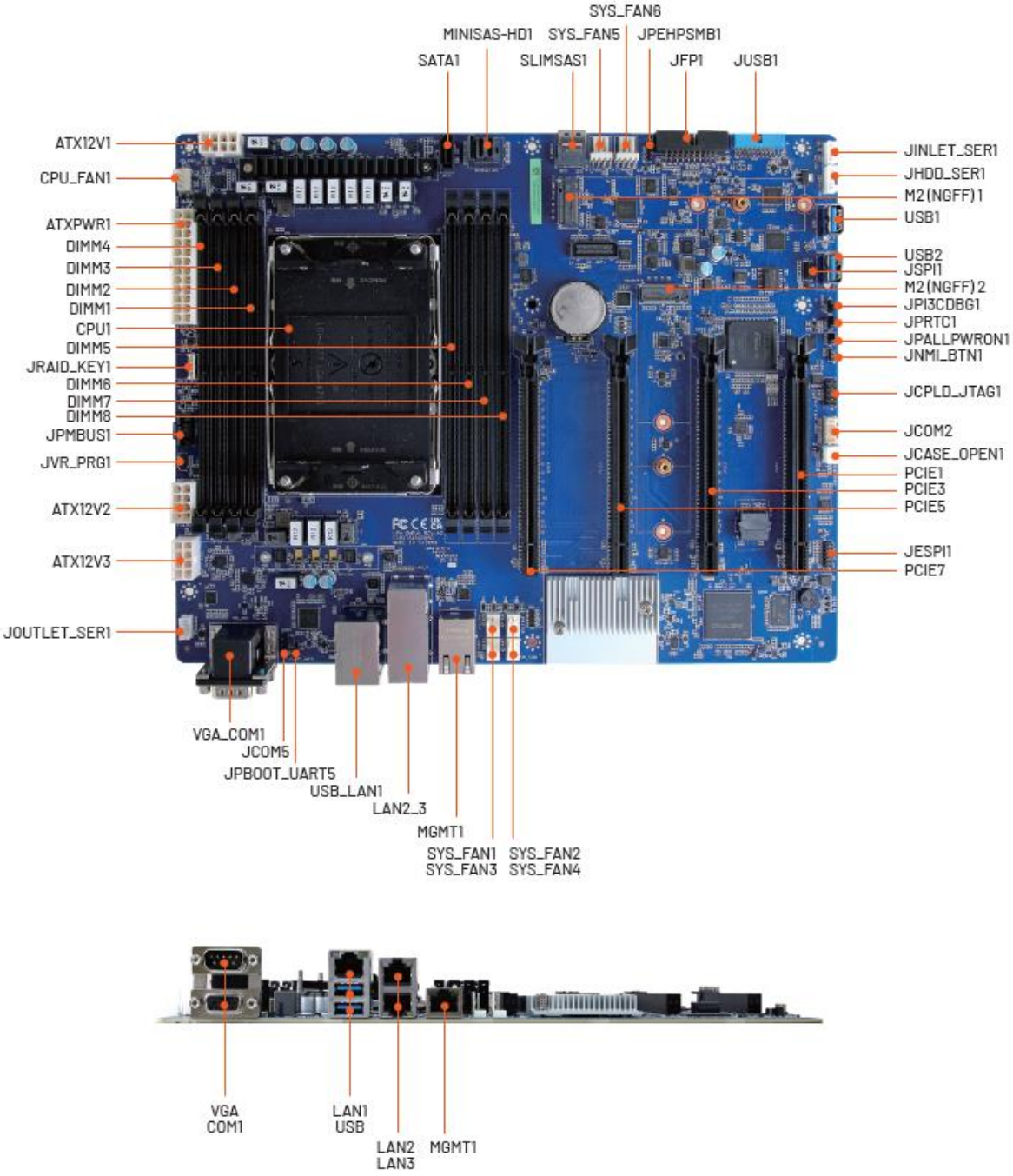
1.5 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of HPM-GNRUA.



2. Hardware Configuration

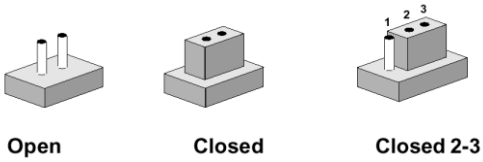
2.1 Product Overview



2.2 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
JPBOOT_UART5	Boot UART5 setting	3 x 1 header, pitch 2.00mm
JPALLPWRON1	Force PWRON setting	3 x 1 header, pitch 2.00mm
JPRTC1	Clear CMOS	3 x 1 header, pitch 2.00mm
JPI3CDBG1	CPU I3C Debug setting	3 x 1 header, pitch 2.00mm

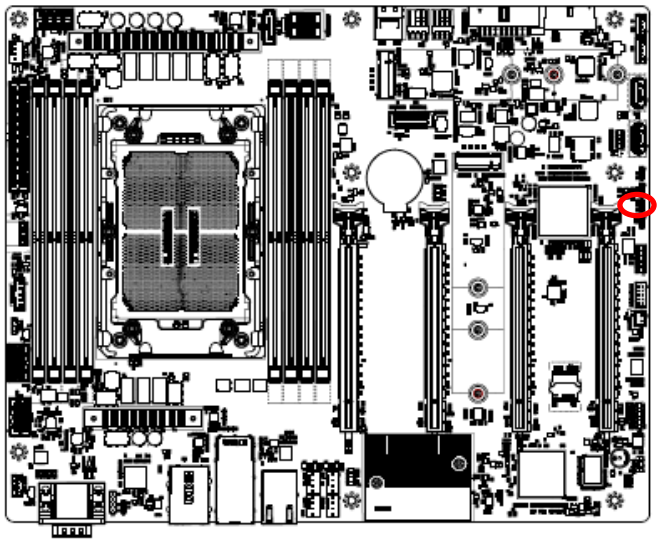
Connectors

Label	Function	Note
SYS_FAN1-6	System fan connector 1-6	4 x 1 wafer, pitch 2.54mm
CPU_FAN1	CPU fan connector	4 x 1 wafer, pitch 2.54mm
VGA_COM1	Serial port 1 connector VGA connector	
JCOM2	Serial port 2 connector	5 x 2 wafer, pitch 2.00mm

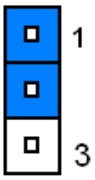
JCOM5	BMC_UART5 debug connector	4 x 1 header, pitch 2.54mm
MGMT1	MGMT port	
PCIE1	PCIe Gen5 x16	
PCIE3	PCIe Gen5 x16	
PCIE5	PCIe Gen5 x16	
PCIE7	PCIe Gen5 x16 (The slot closest to CPU)	
JFP1	Front Panel connector	10 x 2 wafer, pitch 2.54mm
USB_LAN1	2 x USB3.2 Gen1 connector 1 x RJ-45 Ethernet (LAN1 Share IPMI Port)	
LAN2_3	2 x RJ-45 Ethernet	
USB1/2	2 x USB3.2 Gen1 connector	
JUSB1	USB3.2 Gen1 connector	10 x 2 wafer, pitch 2.00mm
JSPI1	SPI connector	4 x 2 header, pitch 2.00mm
JESPI1	ESPI connector	6 x 2 header, pitch 2.00mm
SATA1	Serial ATA connector	
MINISAS-HD1	Mini-SAS HD 4i (for 4x SATA Only)	
SLIMSAS1	Slim SAS 4i (SFF-8654) connector	
JRAID_KEY1	VROC RAID KEY connector	4 x 1 wafer, pitch 2.00mm
DIMM1-8	8 x DDR5 RDIMM socket	
JCASE_OPEN1	CASE OPEN connector	2 x 1 wafer, pitch 2.50mm
ATX12V1	ATX 12V power connector 1	4 x 2 wafer, pitch 4.20mm
ATX12V2	ATX 12V power connector 2	4 x 2 wafer, pitch 4.20mm
ATX12V3	ATX 12V power connector 3	4 x 2 wafer, pitch 4.20mm
ATXPWR1	ATX power connector	12 x 2 wafer, pitch 4.20mm
JPMBUS1	Power supply PMBus connector	5 x 1 wafer, pitch 2.54mm
JINLET_SER1	Inlet Thermal Sensor	4 x 1 wafer, pitch 2.00mm
JOUTLET_SER1	Outlet Thermal Sensor	4 x 1 wafer, pitch 2.00mm
JHDD_SER1	HDD Backplane thermal Sensor	5 x 1 wafer, pitch 2.00mm
JPEHPSMB1	CPU PCIE HP SMB connector	5 x 1 header, pitch 2.00mm
JNMI_BTN1	NMI button	3 x 1 header, pitch 2.00mm
M2(NGFF)1/2	2 x M.2 M-Key PCIe 5.0 x4 NVMe SSD	
JCPLD_JTAG1	CPLD JTAG header	5 x 2 header, pitch 2.54mm
JVR_PRG1	SMBUS VR connector	3 x 1 header, pitch 2.54mm

2.3 Setting Jumpers & Connectors

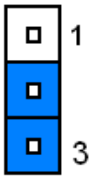
2.3.1 Force PWRON setting (JPALLPWRON1)



Disable*

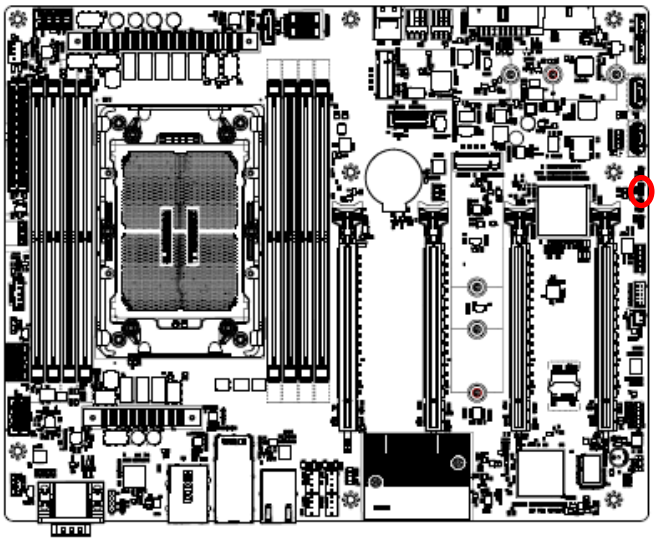


Enable

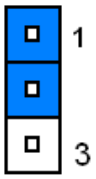


*** Default**

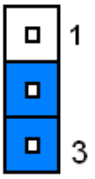
2.3.2 Clear CMOS (JPRTC1)



Normal RTC Reset*

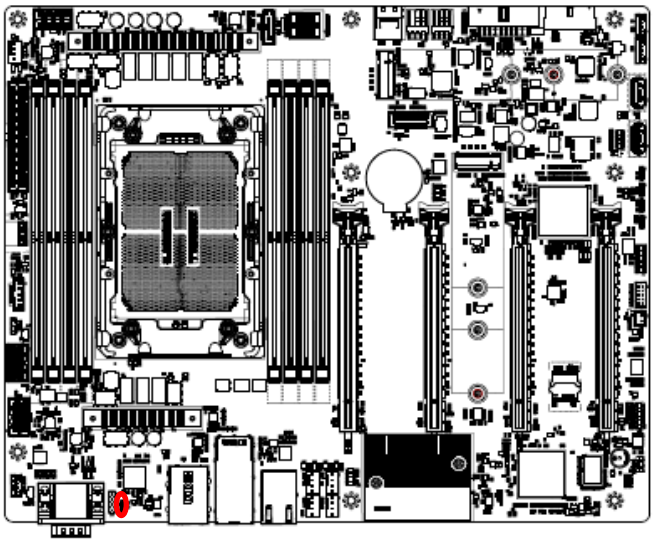


Clear RTC REGISTERS

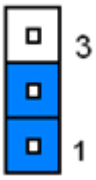


*** Default**

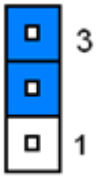
2.3.3 Boot UART5 setting (JPBOOT_UART5)



Disable*

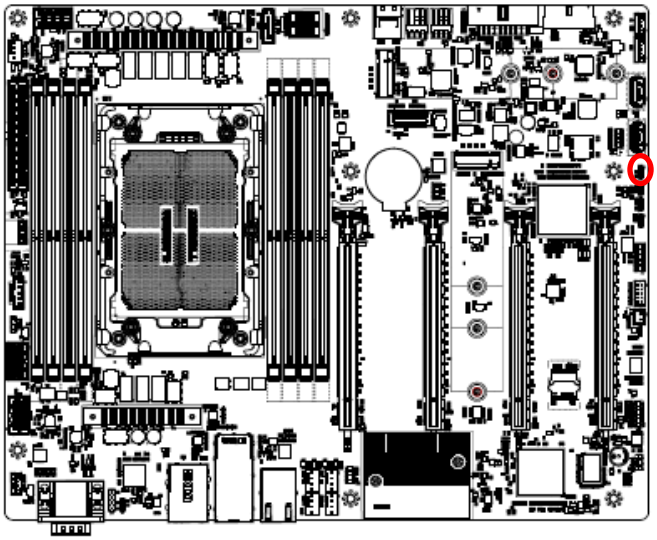


Enable BOOT FROM UART5

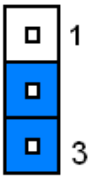


*** Default**

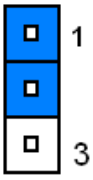
2.3.4 CPU I3C Debug setting (JPI3CDBG1)



MBP Functionality*

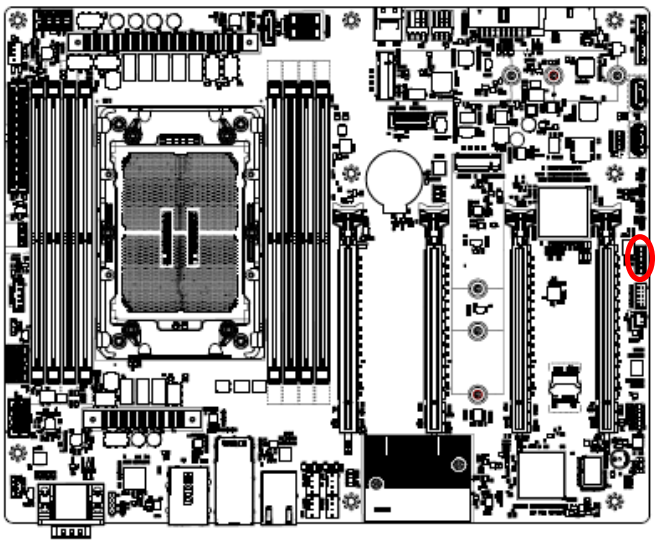


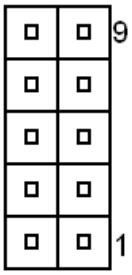
I3C Functionality



*** Default**

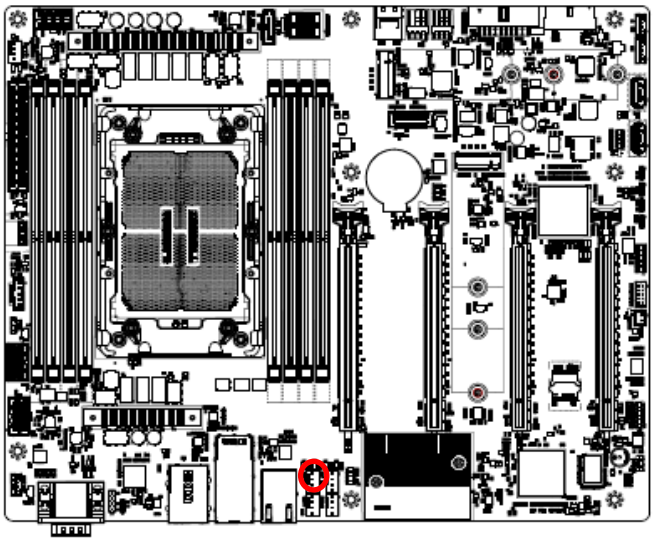
2.3.5 CPLD JTAG header (JCPLD_JTAG1)

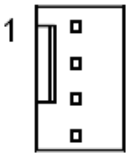




Signal	PIN	PIN	Signal
GND	10	9	JTAG_TDI
NC	8	7	NC
NC	6	5	JTAG_TMS
+3.3VSB	4	3	JTAG_TDO
GND	2	1	JTAG_TCK

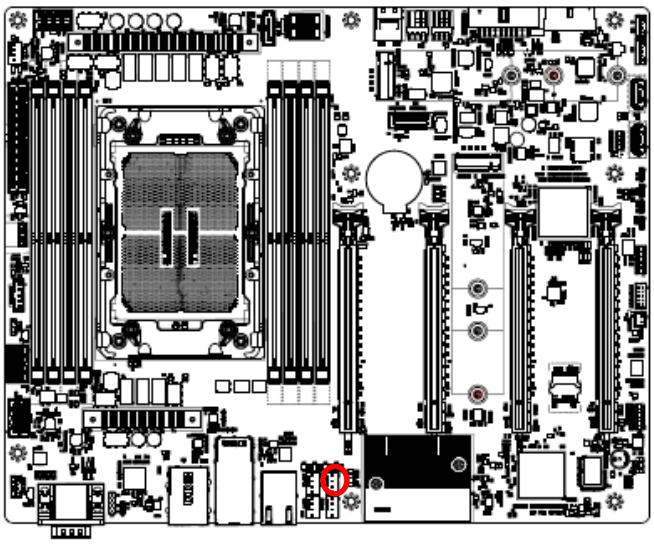
2.3.6 System fan connector 1 (SYS_FAN1)

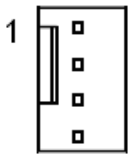




Signal	PIN
GND	1
+12V	2
FAN_TACH1	3
SYS_PWM1	4

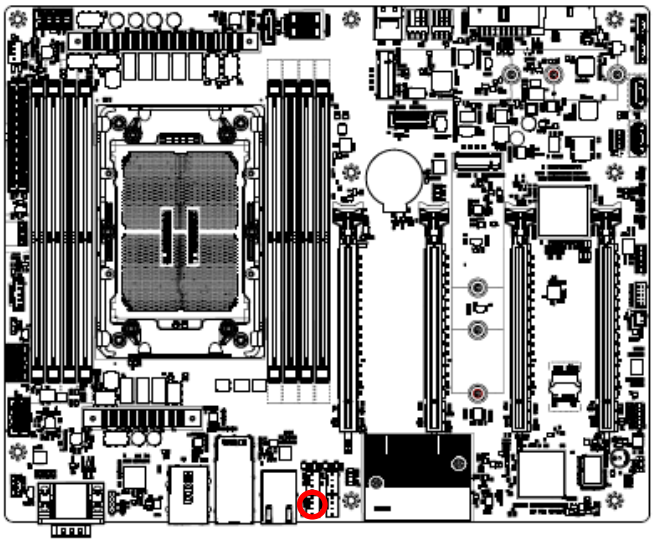
2.3.7 System fan connector 2 (SYS_FAN2)

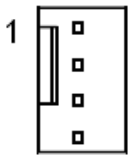




Signal	PIN
GND	1
+12V	2
FAN_TACH2	3
SYS_PWM2	4

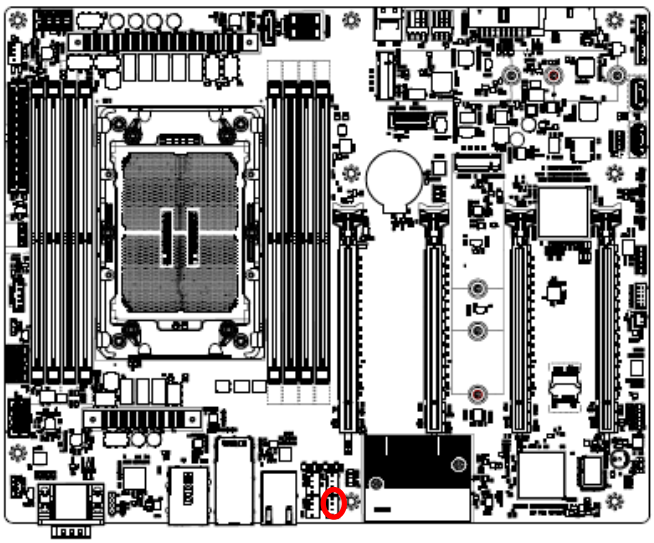
2.3.8 System fan connector 3 (SYS_FAN3)

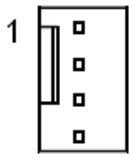




Signal	PIN
GND	1
+12V	2
FAN_TACH3	3
SYS_PWM3	4

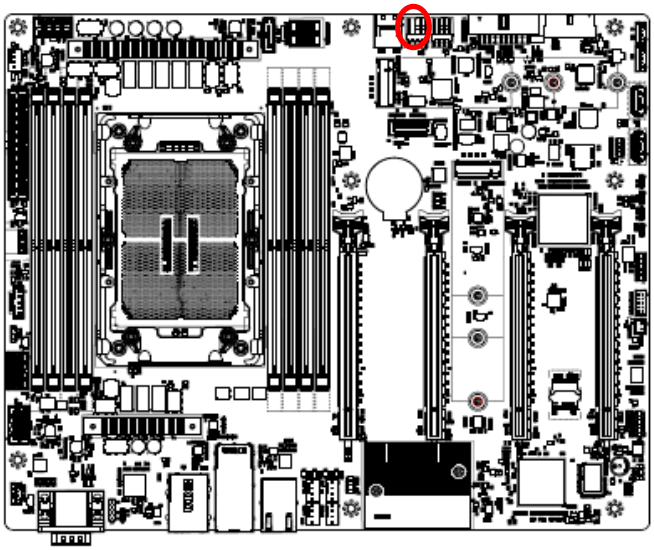
2.3.9 System fan connector 4 (SYS_FAN4)

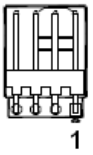




Signal	PIN
GND	1
+12V	2
FAN_TACH4	3
SYS_PWM4	4

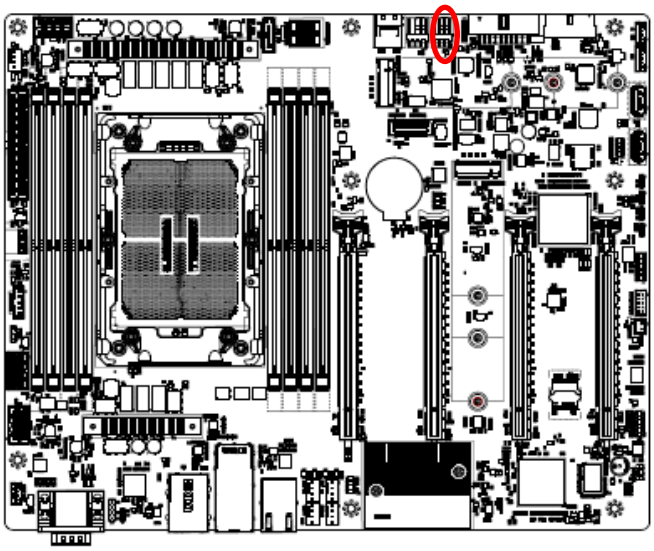
2.3.10 System fan connector 5 (SYS_FAN5)

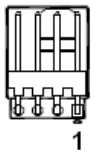




Signal	PIN
GND	1
+12V	2
FAN_TACH5	3
SYS_PWM5	4

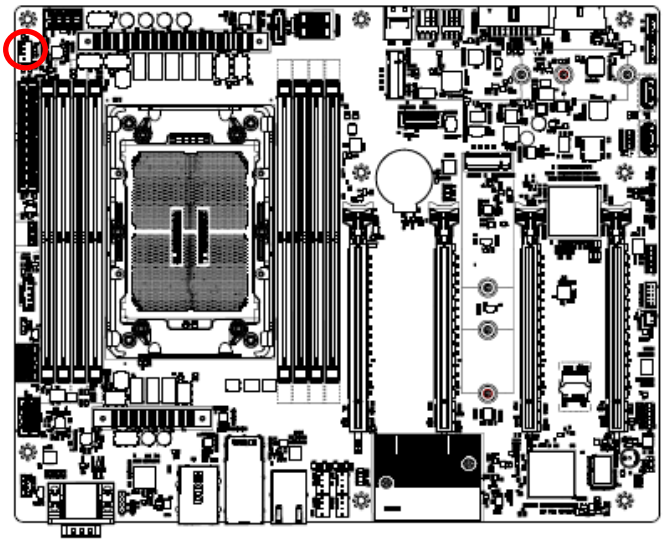
2.3.11 System fan connector 6 (SYS_FAN6)

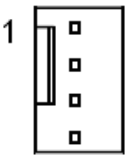




Signal	PIN
GND	1
+12V	2
FAN_TACH6	3
SYS_PWM6	4

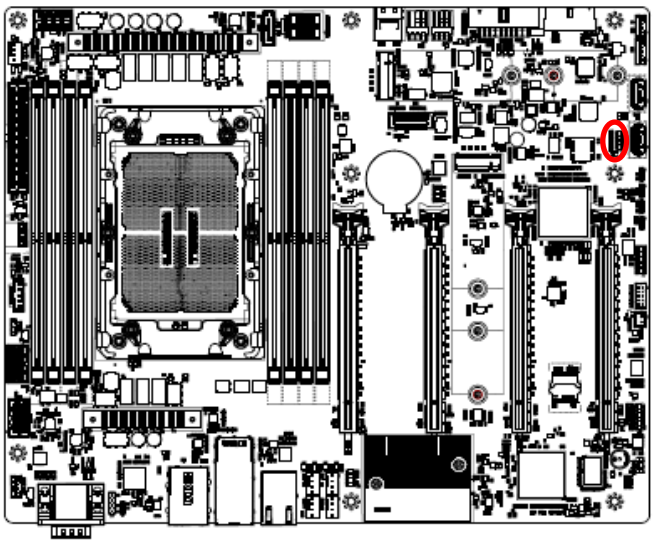
2.3.12 CPU fan connector 1 (CPU_FAN1)

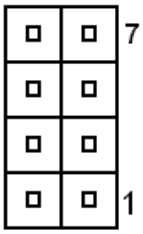




Signal	PIN
GND	1
+12V	2
FAN_TACH0	3
CPU0_PWM	4

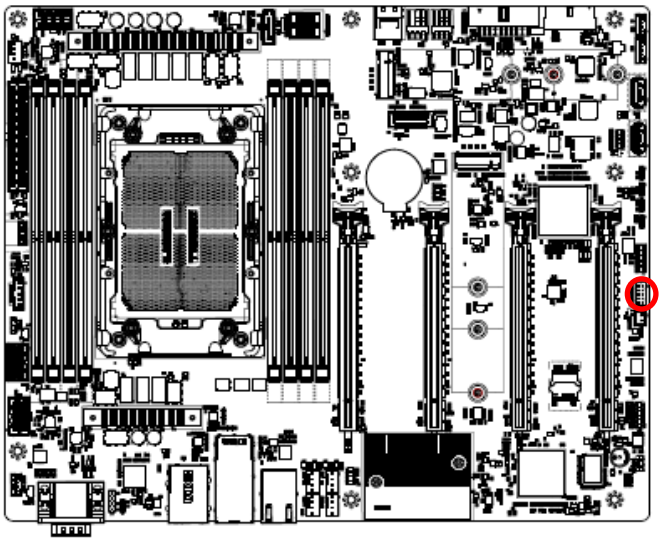
2.3.13 SPI connector (JSPI1)

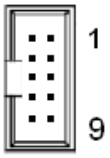




Signal	PIN	PIN	Signal
SPI_IO2	8	7	SPI_IO3
SPI_MOSI	6	5	SPI_MISO
SPI_CLK	4	3	SPI_CS0_N
GND	2	1	+1.8VSB

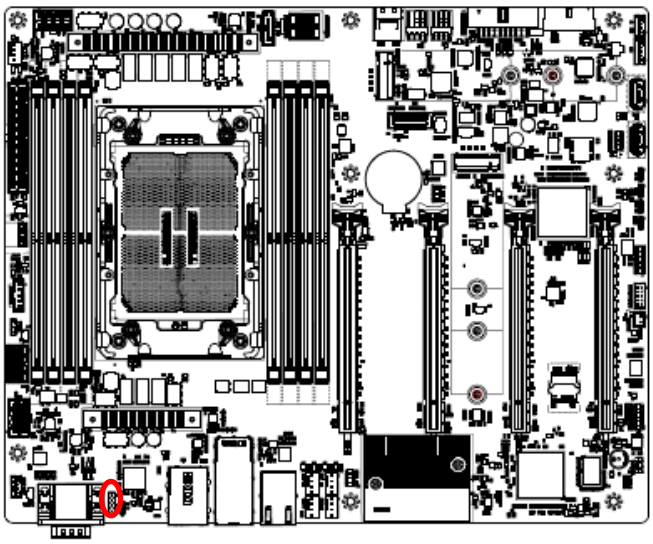
2.3.14 Serial port 2 connector (JCOM2)





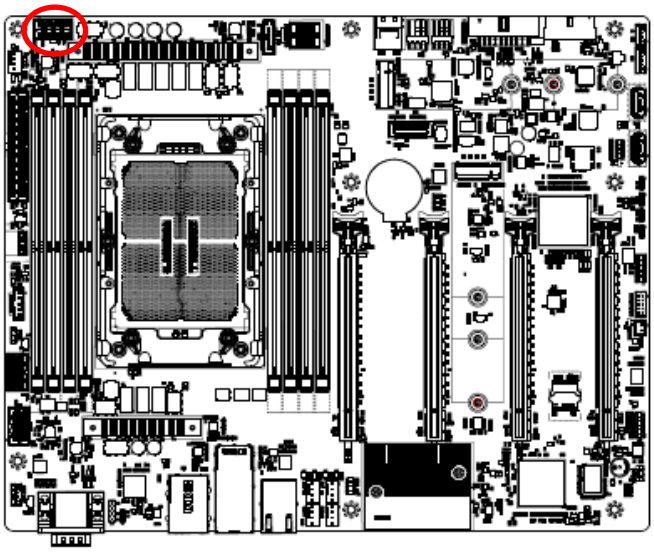
Signal	PIN	PIN	Signal
COM_RXD2	2	1	COM_DCD#2
COM_DTR#2	4	3	COM_TXD2
COM_DSR#2	6	5	GND
COM_CTS#2	8	7	COM_RTS#2
NC	10	9	COM_RI#2

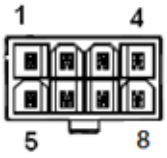
2.3.15 BMC_UART5 debug connector (JCOM5)



Signal	PIN
+3.3VSB	4
GND	3
UART5_RX	2
UART5_TX	1

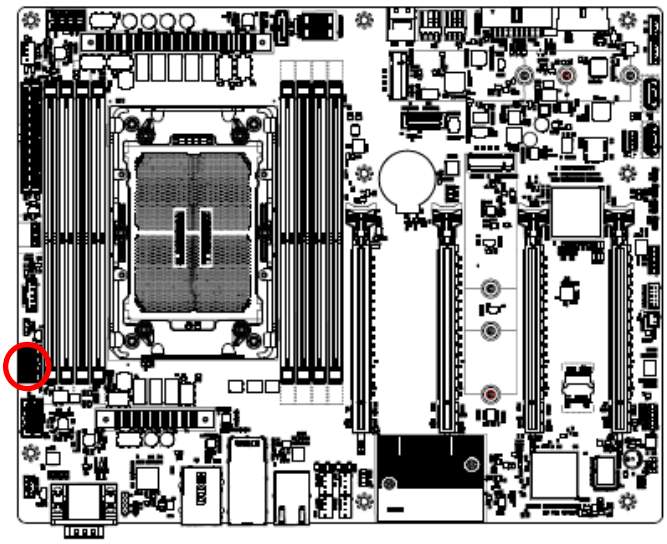
2.3.16 ATX 12V power connector 1 (ATX12V1)

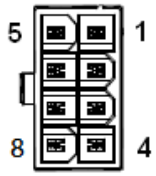




Signal	PIN	PIN	Signal
+12V	5	1	GND
+12V	6	2	GND
+12V	7	3	GND
+12V	8	4	GND

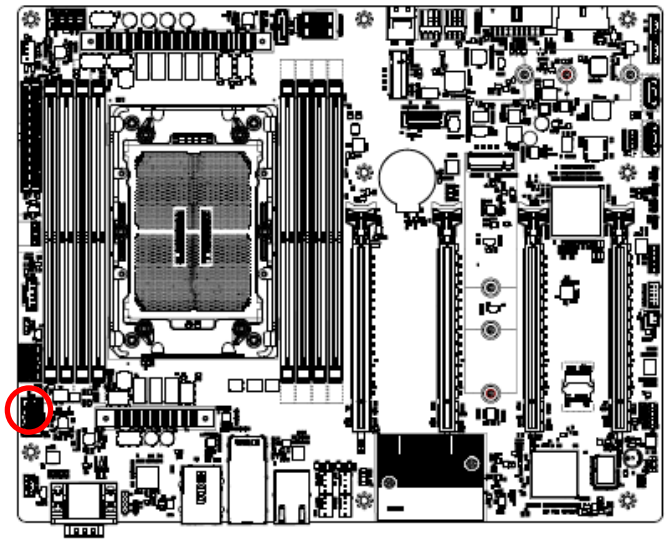
2.3.17 ATX 12V power connector 2 (ATX12V2)

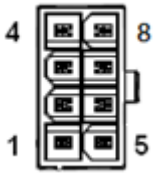




Signal	PIN	PIN	Signal
+12V	5	1	GND
+12V	6	2	GND
+12V	7	3	GND
+12V	8	4	GND

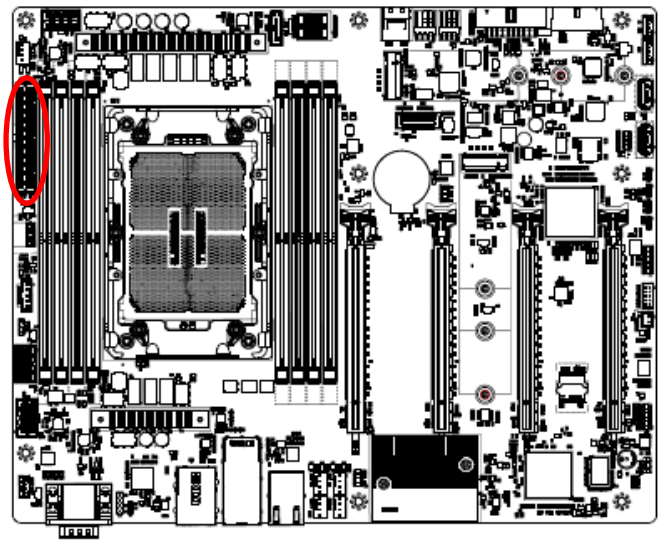
2.3.18 ATX 12V power connector 3 (ATX12V3)

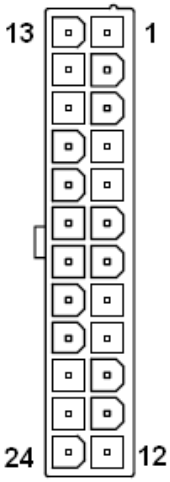




Signal	PIN	PIN	Signal
GND	4	8	+12V
GND	3	7	+12V
GND	2	6	+12V
GND	1	5	+12V

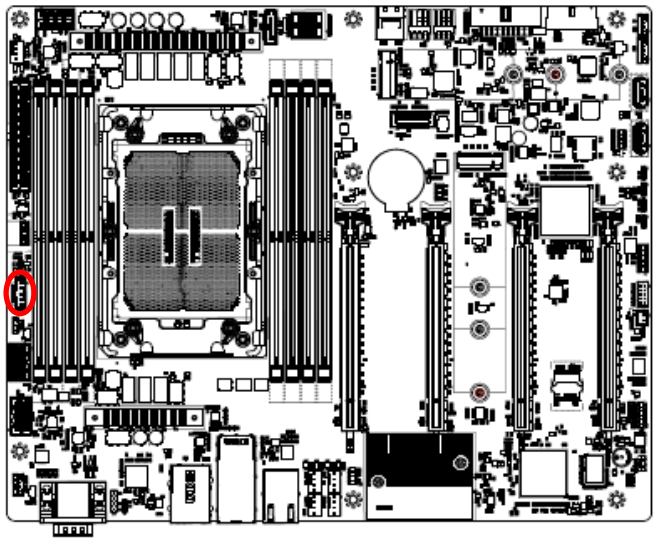
2.3.19 ATX power connector (ATXPWR1)

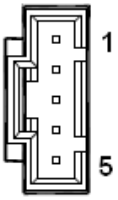




Signal	PIN	PIN	Signal
+3.3V	13	1	+3.3V
-12V	14	2	+3.3V
GND	15	3	GND
PSON#	16	4	+5V
GND	17	5	GND
GND	18	6	+5V
GND	19	7	GND
NC	20	8	PSU_PWRGD
+5V	21	9	+V5SB
+5V	22	10	+12V
+5V	23	11	+12V
GND	24	12	+3.3V

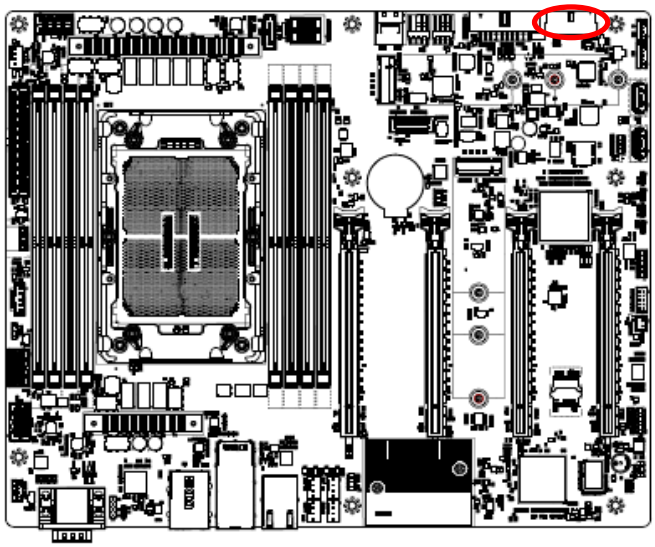
2.3.20 Power supply PMBus connector (JPMBUS1)

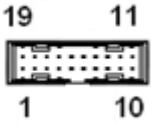




Signal	PIN
SMB_PSU_SCL	1
SMB_SPU_SDA	2
SMB_PSU_ALERT#	3
GND	4
NC	5

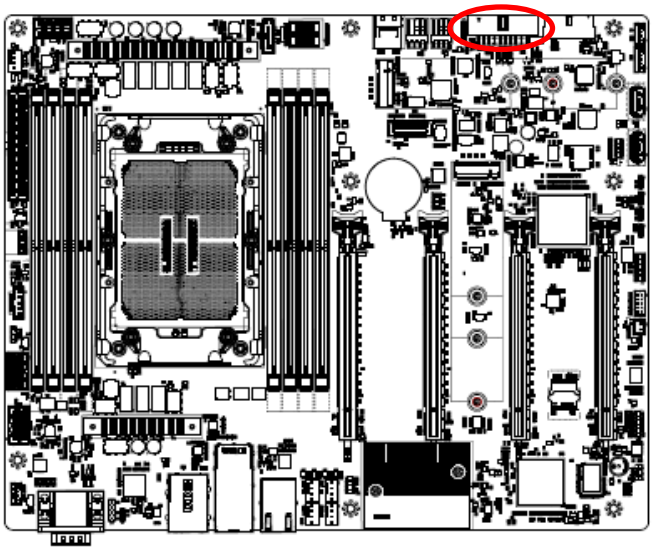
2.3.21 USB3.2 Gen1 connector (JUSB1)

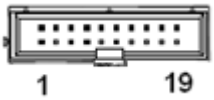




Signal	PIN	PIN	Signal
		1	+5V
+5V	19	2	USB3_RN5
USB3_RN6	18	3	USB3_RP5
USB3_RP6	17	4	GND
GND	16	5	USB3_TN5
USB3_TN6	15	6	USB3_TP5
USB3_TP6	14	7	GND
GND	13	8	USB_PN5
USB_PN6	12	9	USB_PP5
USB_PP6	11	10	FRONTUSB3_OC1_N

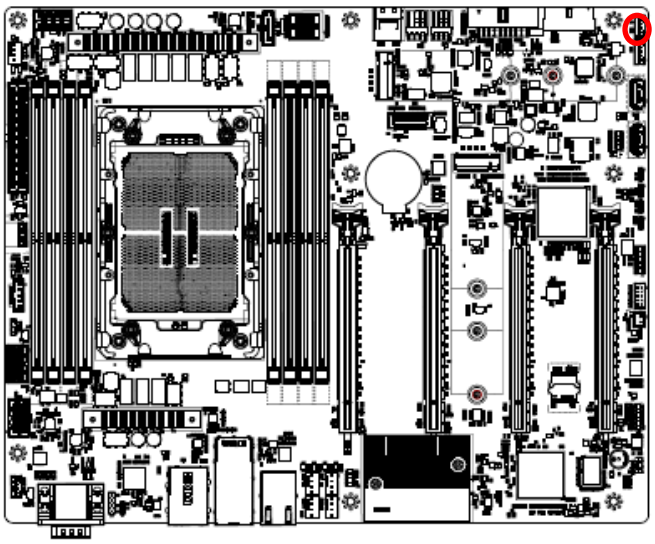
2.3.22 Front Panel connector (JFP1)





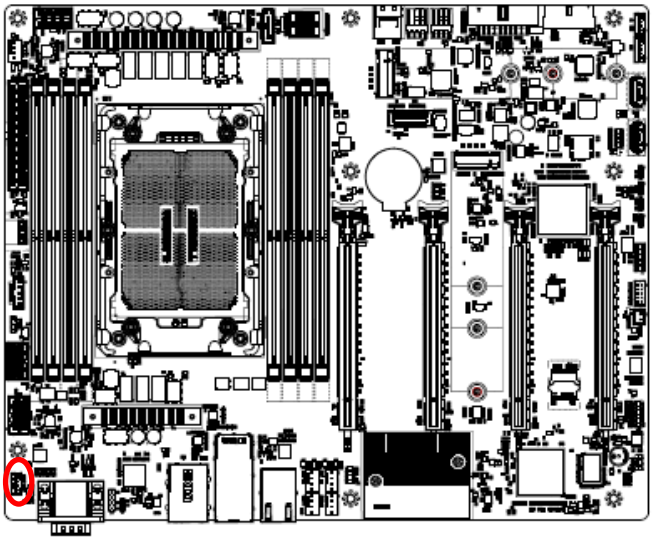
Signal	PIN	PIN	Signal
HDD_LED_P	1	2	+3.3VSB
HDD_LED#	3	4	PWR_LED#
RESET_BUTTON#	5	6	PWRON_BUTTON#
GND	7	8	GND
STATUS_LED_P	9	10	LAN1_LED_P
STATUS_LED#	11	12	LAN1_LED#
UID_LED#	13	14	SBPWRLED_P
UID_LED_P	15	16	GND
UID_BUTTON#	17	18	LAN2-X_LED_P
GND	19	20	LAN2-X_LED#

2.3.23 Inlet Thermal Sensor (JINLET_SER1)



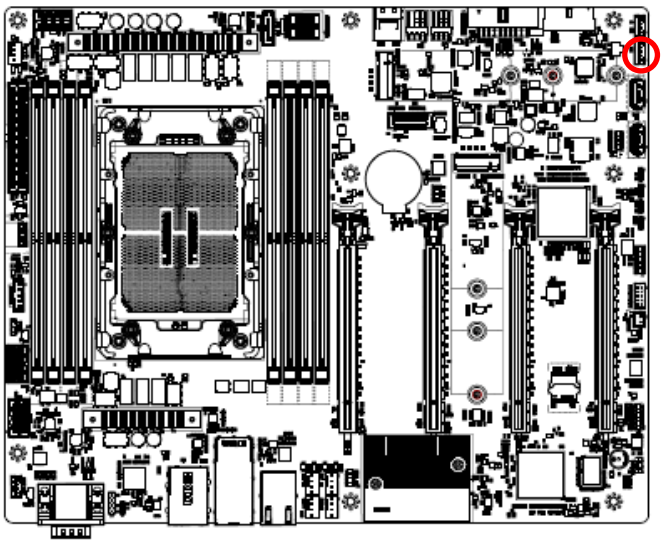
Signal	PIN
+3.3VSB	4
SMB_INLET_TEMPSENSOR_SDA	3
SMB_INLET_TEMPSENSOR_SCL	2
GND	1

2.3.24 Outlet Thermal Sensor (JOUTLET_SER1)



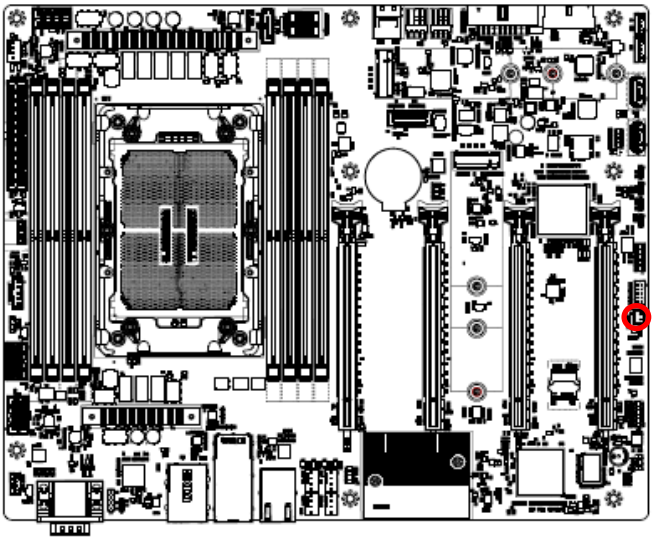
Signal	PIN
+3.3VSB	4
SMB_OUTLET_TEMPSENSOR_SDA	3
SMB_OUTLET_TEMPSENSOR_SCL	2
GND	1

2.3.25 HDD Backplane thermal Sensor (JHDD_SER1)



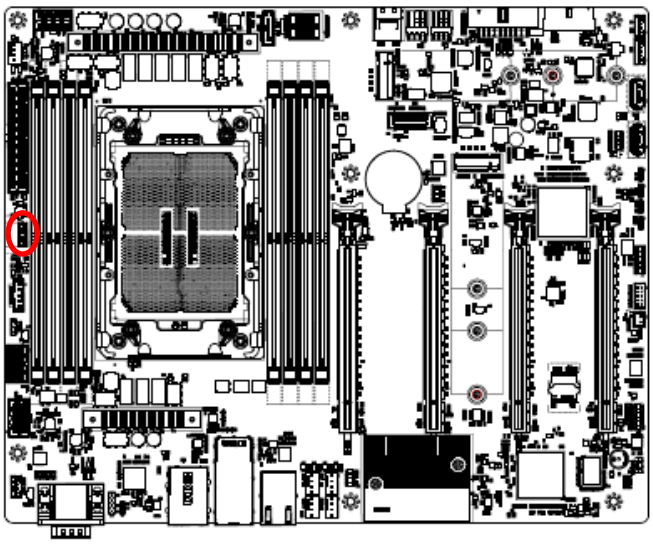
Signal	PIN
+3.3VSB	5
SMB_HDBP_TEMPSENSOR_SDA	4
SMB_HDBP_TEMPSENSOR_SCL	3
GND	2
SSD_LED#	1

2.3.26 CASE OPEN connector (JCASE_OPEN1)



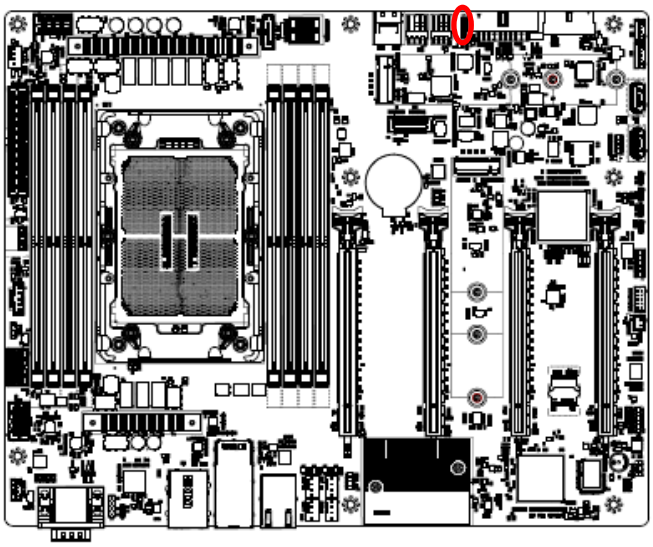
Signal	PIN
CHASSIS_INTRUSION	1
GND	2

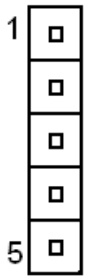
2.3.27 VROC RAID KEY connector (JRAID_KEY1)



Signal	PIN
GND	1
PU_VROC_RAIDKEY	2
GND	3
VROC_RAIDKEY	4

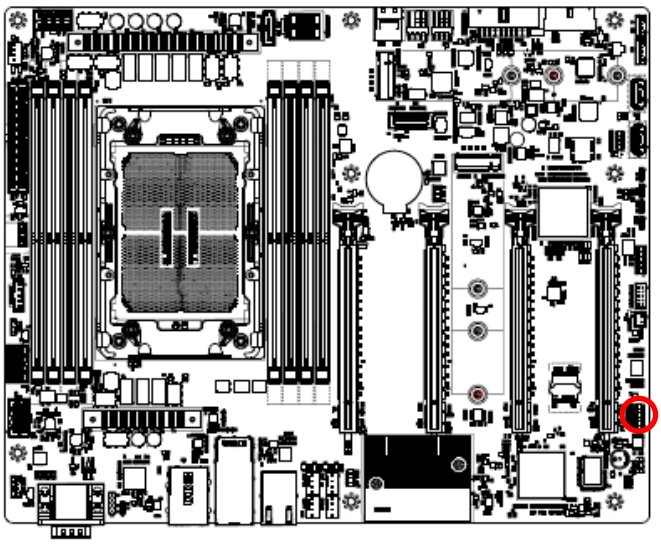
2.3.28 CPU PCIE HP SMB connector (JPEHPSMB1)

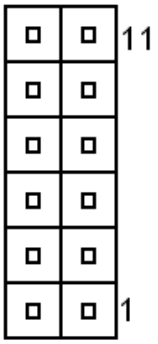




Signal	PIN
SMB_CPUHP_SCL	1
GND	2
SMB_CPUHP_SDA	3
GND	4
SMB_CPUHP_ALERT#	5

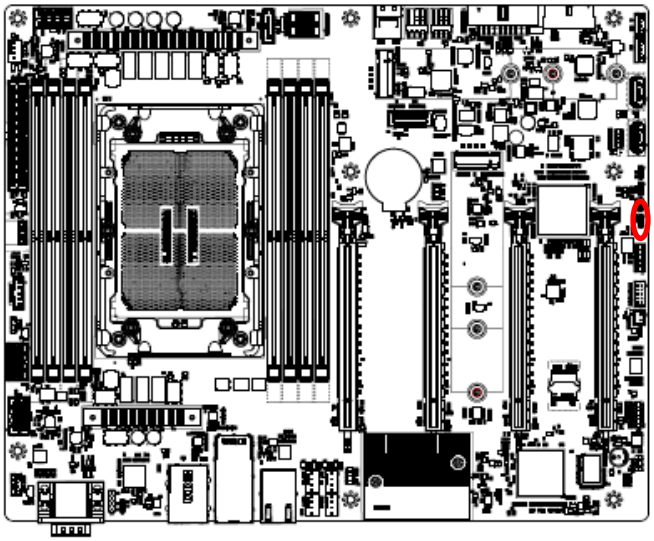
2.3.29 ESPI connector (JESPI1)

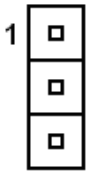




Signal	PIN	PIN	Signal
ESPI_ALERT_N	12	11	ESPI_RESET_N
GND	10	9	NC
ESPI_CLK	8	7	ESPI_D3
ESPI_CS_N	6	5	ESPI_D2
PLTRST#	4	3	ESPI_D1
+3.3VSB	2	1	ESPI_D0

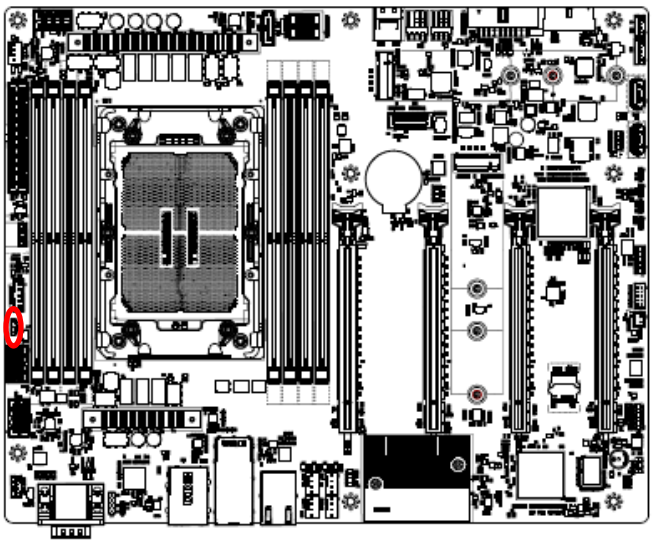
2.3.30 NMI button (JNMI_BTN1)

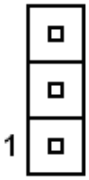




Signal	PIN
NC	1
NMI#	2
GND	3

2.3.31 SMBUS VR connector (JVR_PRG1)

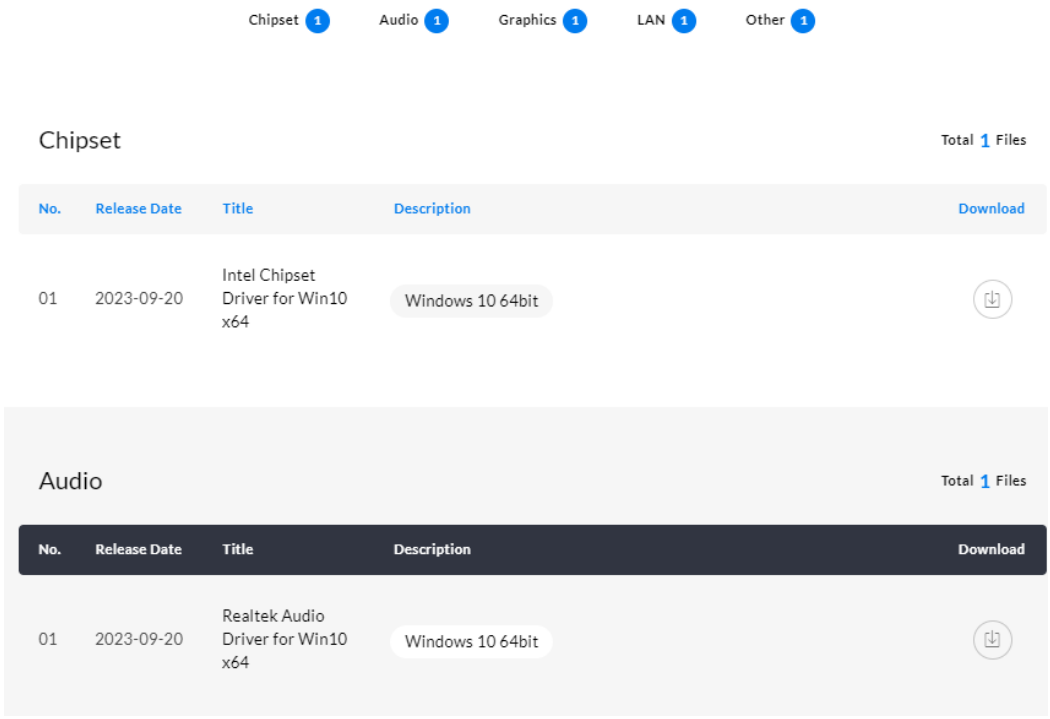




Signal	PIN
SMB_VR_SCL	3
GND	2
SMB_VR_SDA	1

3. 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.



(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.

3.1 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.

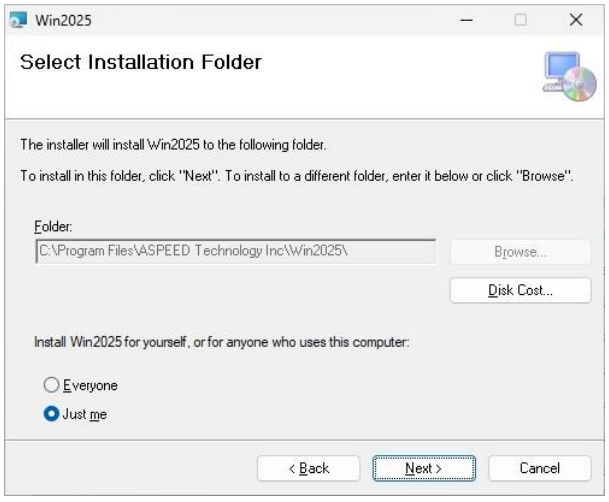
Step 2. Click **Accept**.

3.2 Install VGA Driver

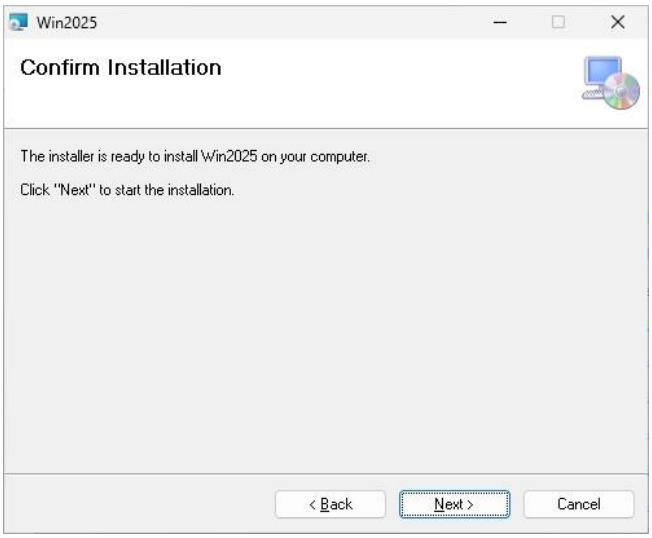
All drivers can be found on the Avalue Official Website: www.avalue.com.

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

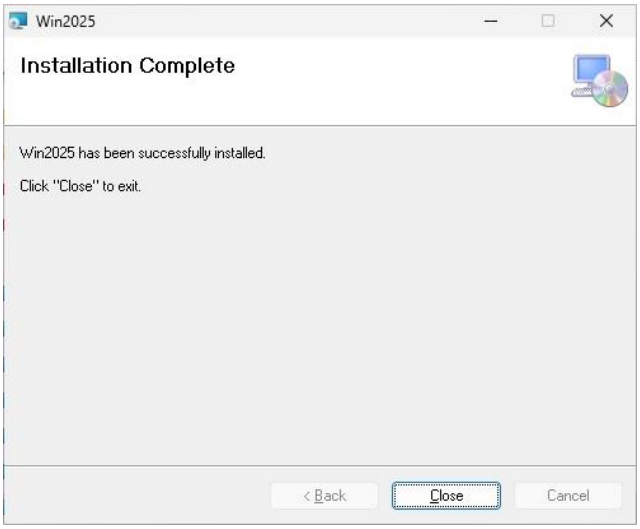
Step 1. Click **Next** to continue installation.



Step 2. Click **Next**.



Step 3. Click **Next.**



Step 4. Setup completed.

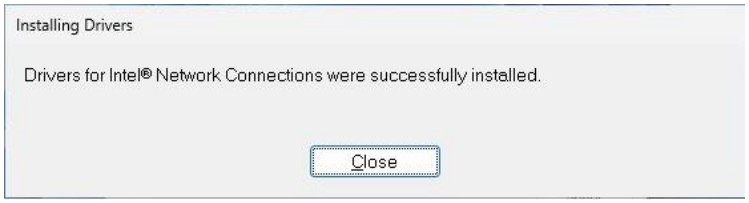
3.3 Install Ethernet Driver

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.



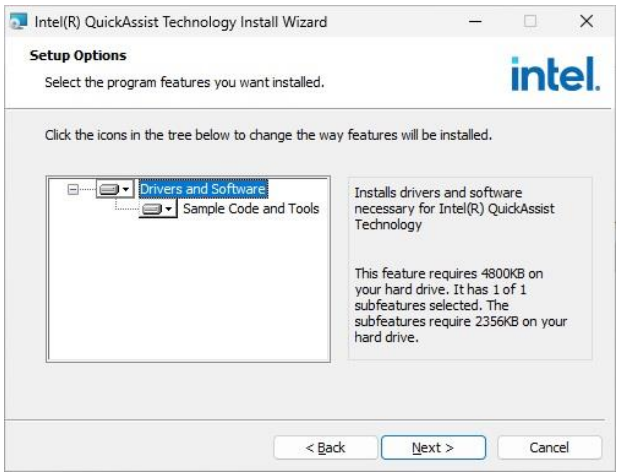
Step 2. Setup completed.

3.4 Install QuickAssist Technology Driver

All drivers can be found on the Avalue Official Website:

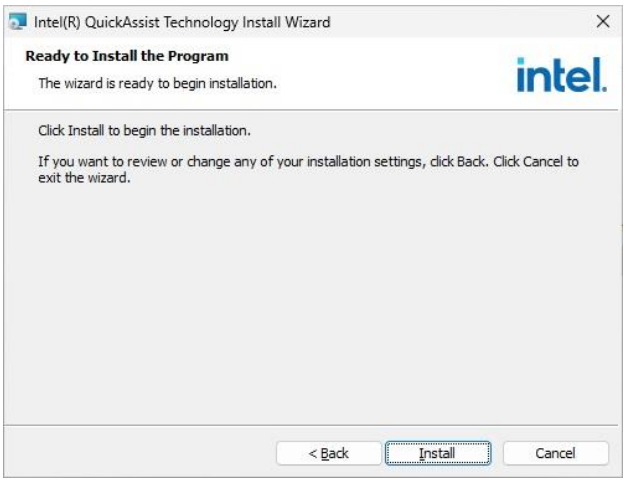
www.avalue.com.

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



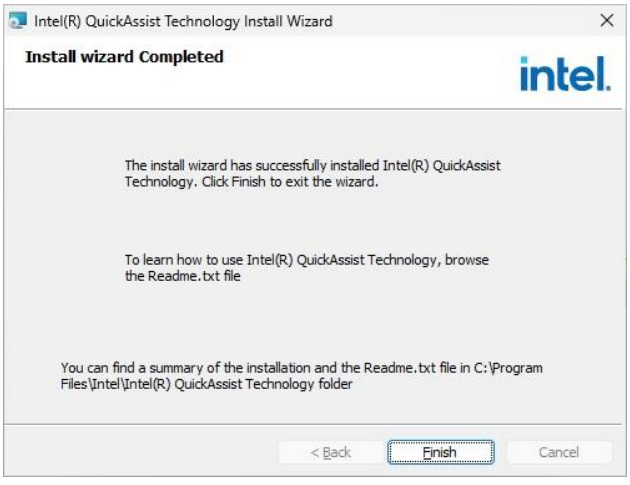
Step 3. Click **Next**.

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



Step 4. Click **Install**.

Step 2. Click **Next**.



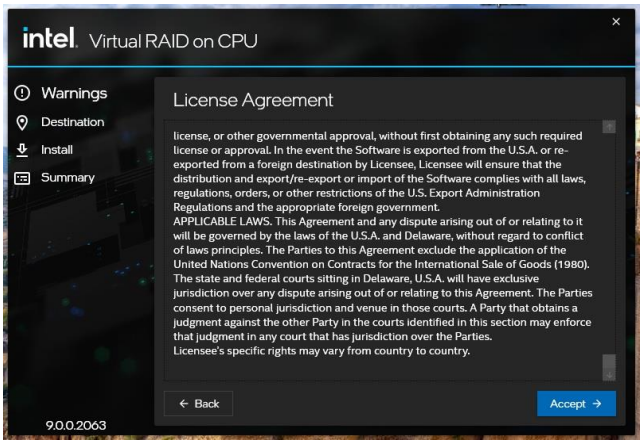
Step 5. Click **Finish** to complete setup.

3.5 Install VROC Driver

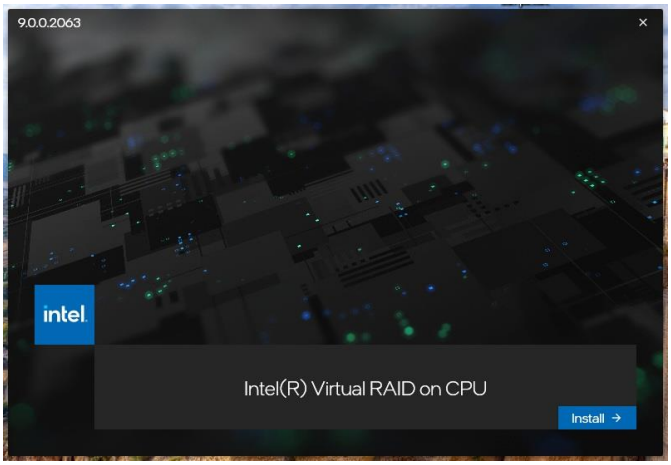
All drivers can be found on the Avalue Official Website:

www.avalue.com.

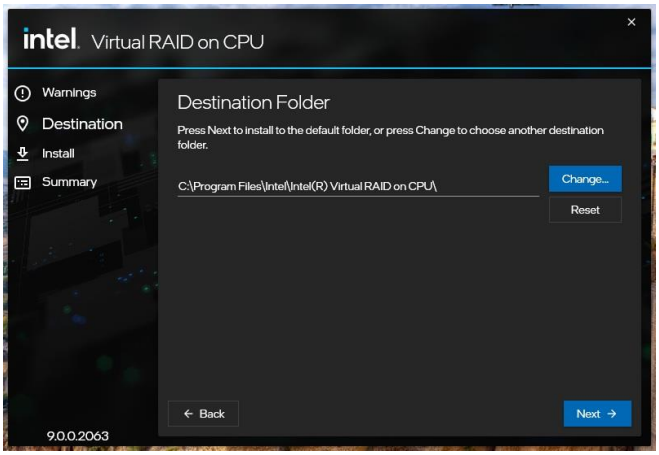
Note: The installation procedures and screen shots in this section are based on Windows 11 operation system.



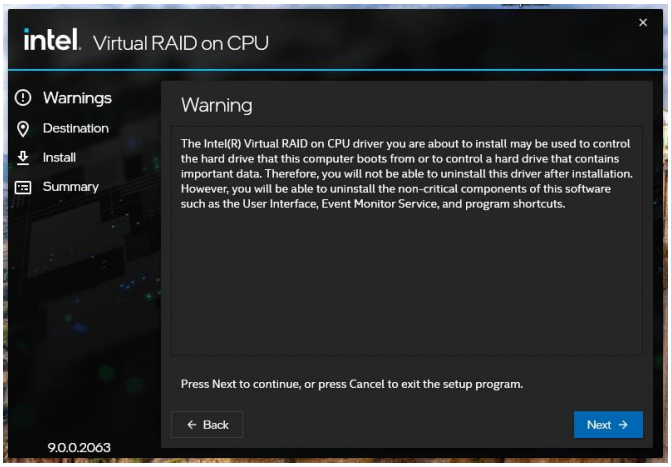
Step 3. Click **Accept**.



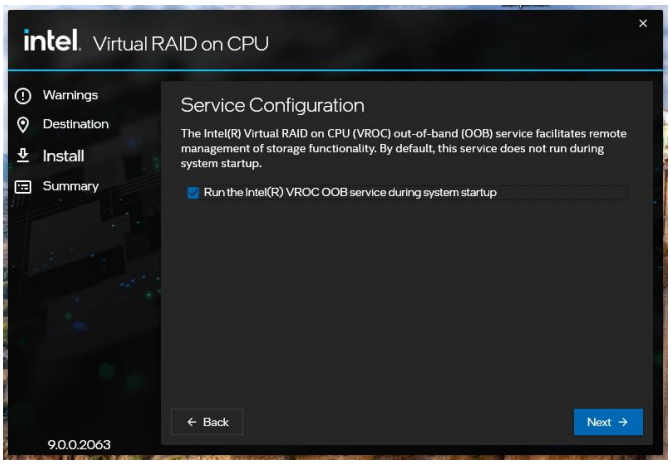
Step 1. Click **Install** to continue installation.



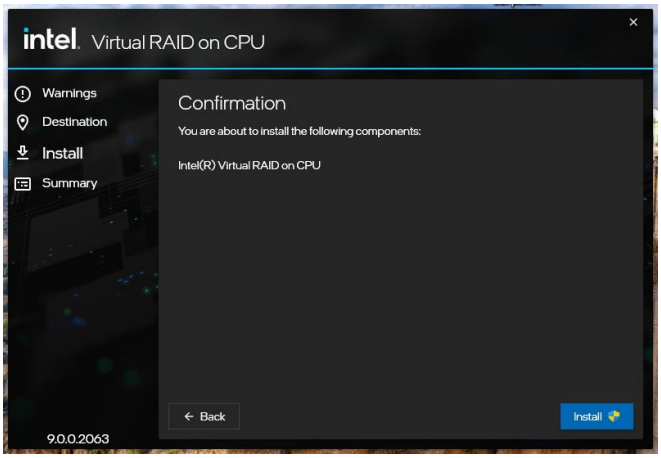
Step 4. Click **Next**.



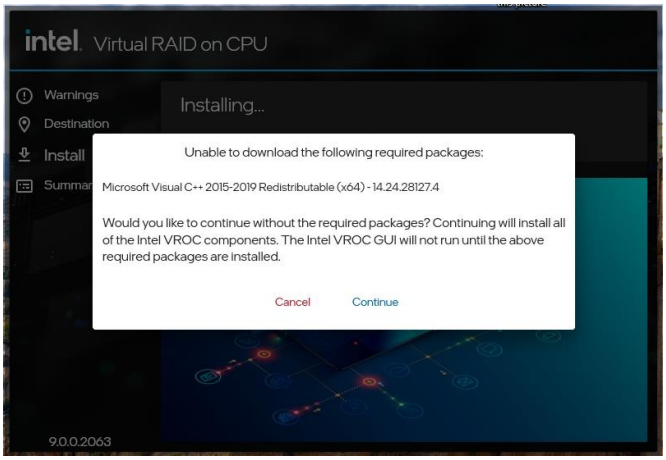
Step 2. Click **Next**.



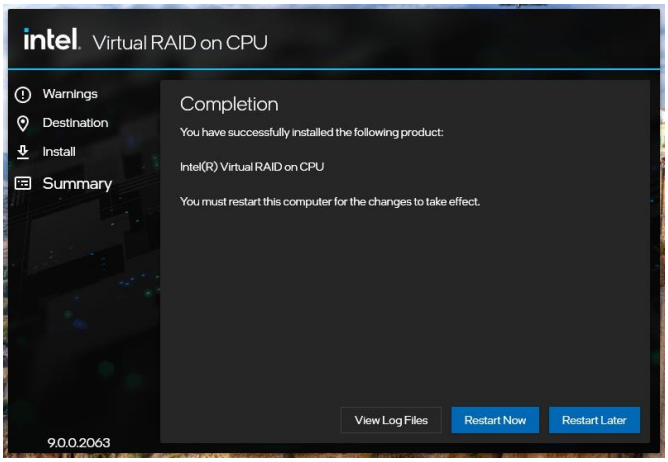
Step 5. Click **Next**.



Step 6. Click **Install**.



Step 7. Click **Continue**.



Step 8. Setup completed.

4.BIOS Setup

4.1 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.

4.2 Starting Setup

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 <ESC> or <Del> immediately after switching the system on, or
By pressing the < ESC> or <Del> key when the following message appears briefly at the left-top of the screen during the POST (Power On Self Test).

Press <ESC> or <Del> 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.

4.3 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.

4.4 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 <Enter> key again.

4.5 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.

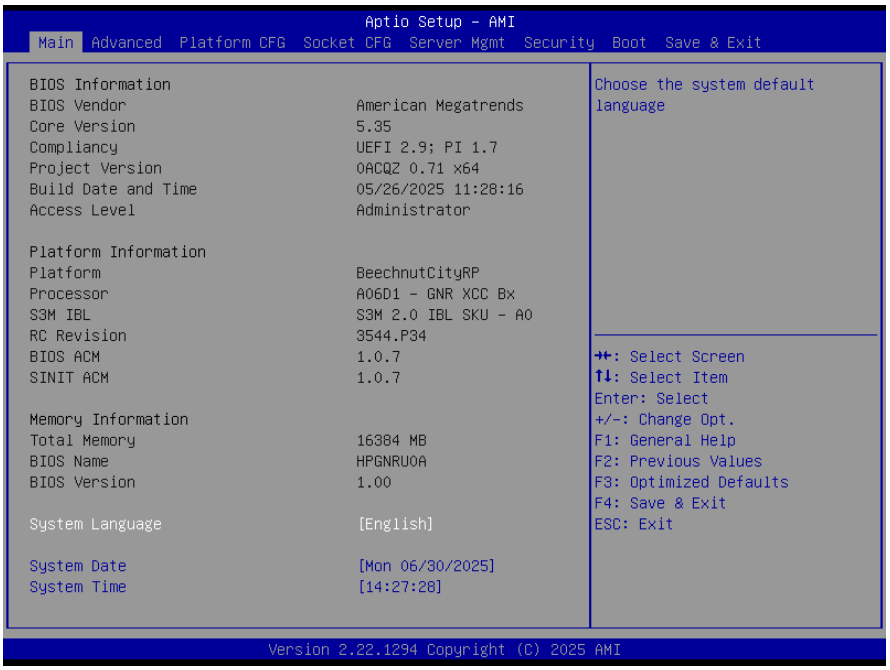
The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both BIOS Vendor and your systems manufacturer to provide the absolute maximum performance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

4.6 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.

4.6.1 Main Menu

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



4.6.1.1 System Language

This option allows choosing the system default language.

4.6.1.2 System Date

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

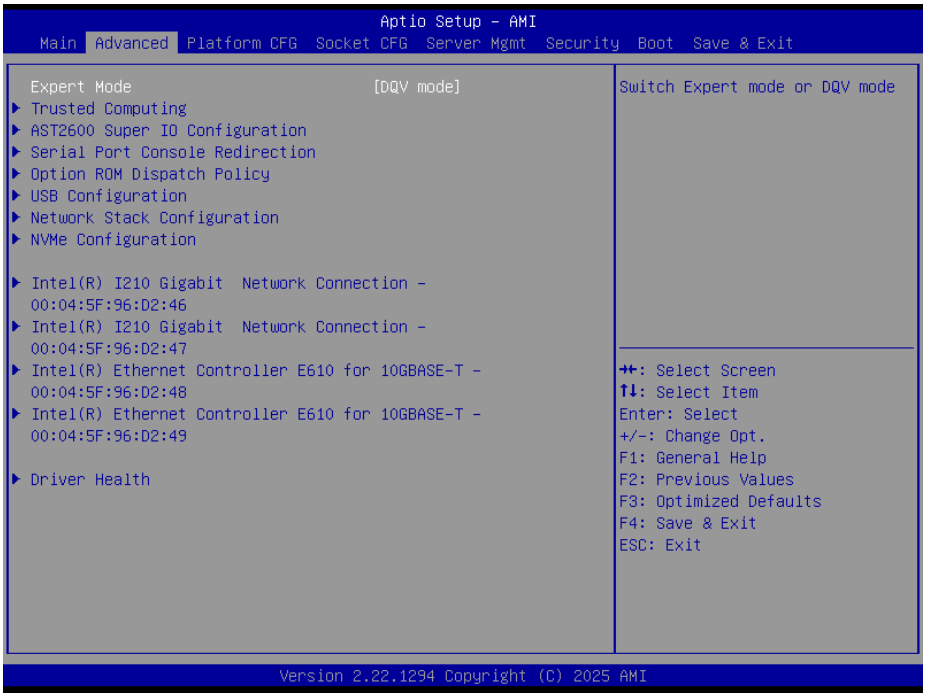
4.6.1.3 System Time

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.

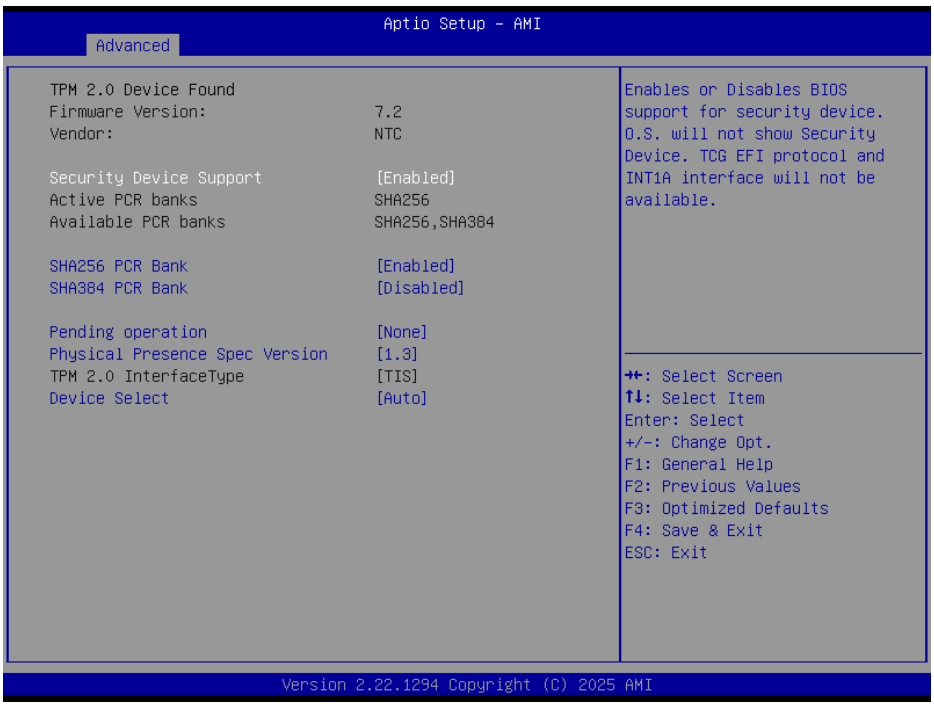
4.6.2 Advanced Menu

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



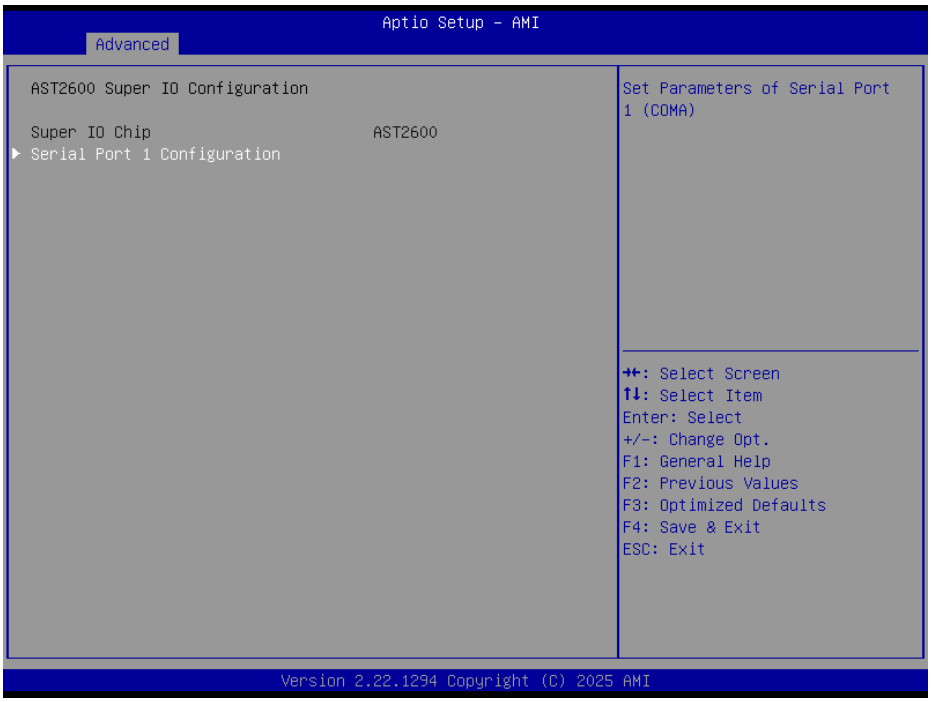
	Options	Description
Expert mode	DQV mode**[Default]** Expert mode	Switch Expert mode or DQV mode.

4.6.2.1 Trusted Computing



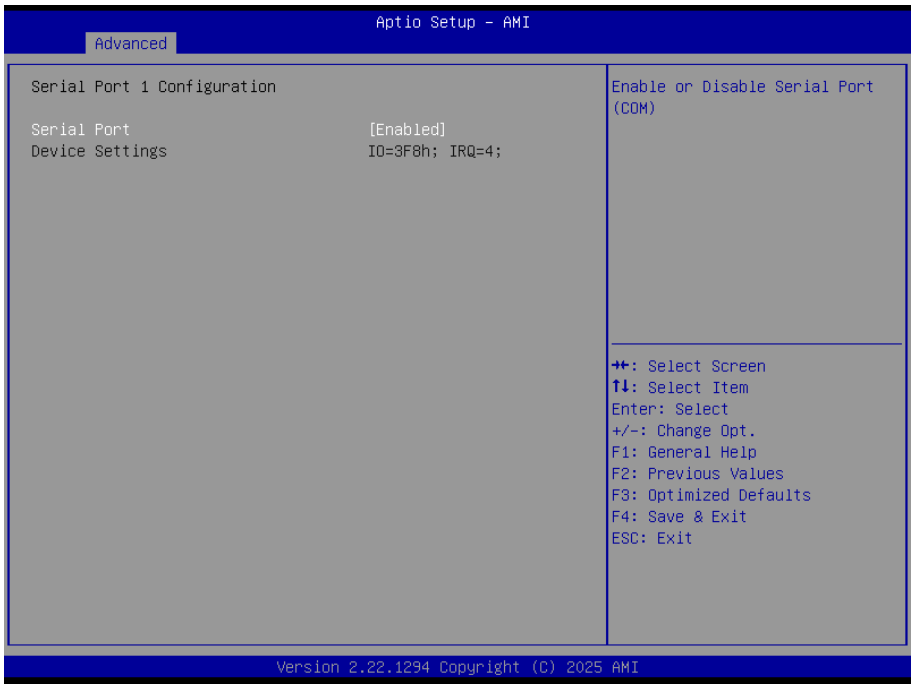
	Options	Description
Security Device Support	Disable, Enable**[Default]**	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Disabled, Enabled**[Default]**	Enables or Disables SHA256 PCR Bank.
SHA384 PCR Bank	Disabled**[Default]**, Enabled	Enables or Disables SHA384 PCR Bank.
Pending operation	None**[Default]** TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Physical Presence Spec Version	1.2 1.3**[Default]**	Select to Tell O.S. to support PPI Spec Version 1.2 or1.3 Note some HCK tests might not support 1.3.
Device Select	TPM 2.0 Auto**[Default]**	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

4.6.2.2 AST2600 Super IO Configuration



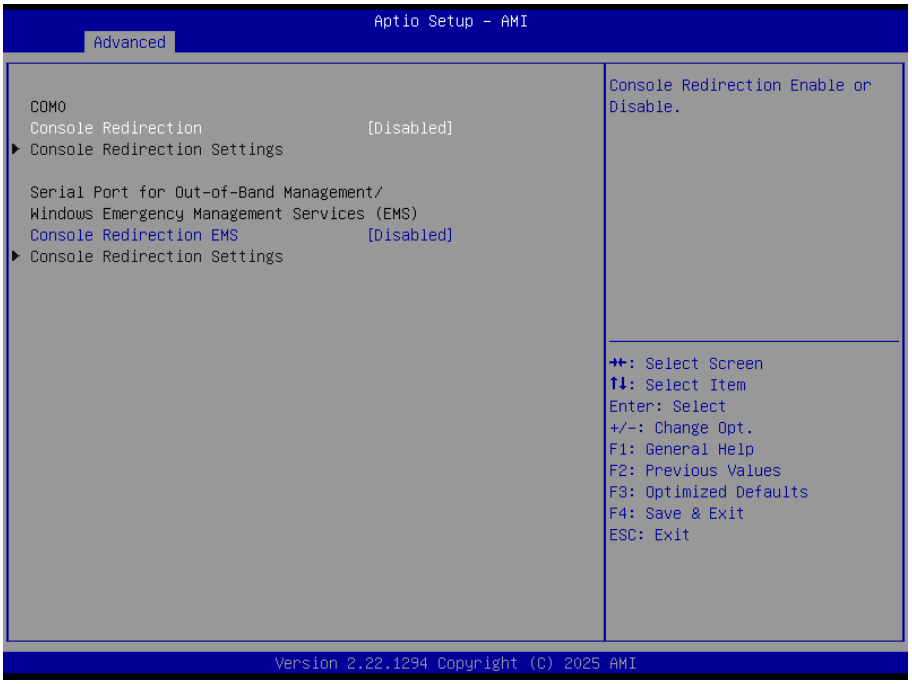
Item	Description
Serial Port 1 Configuration	Set Parameters of Serial Port 1 (COMA).

4.6.2.2.1 Serial Port 1 Configuration



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

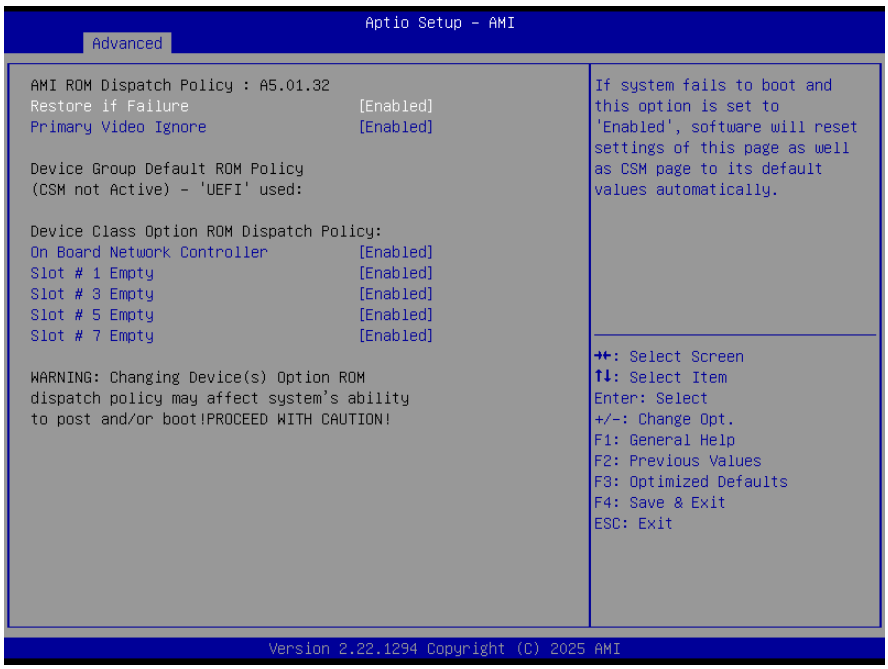
4.6.2.3 Serial Port Console Redirection



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

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

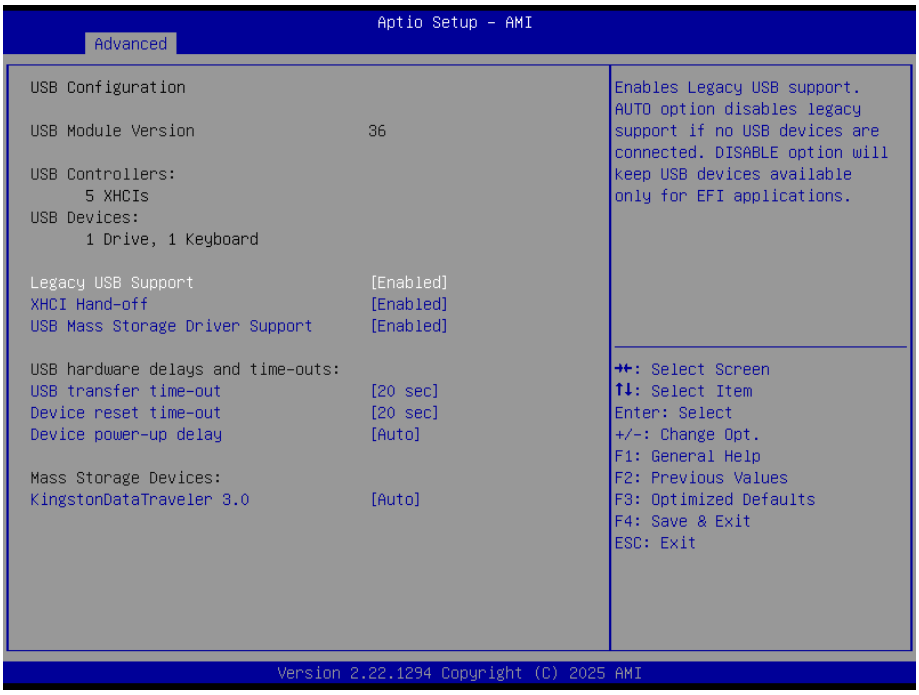
4.6.2.4 Option ROM Dispatch Policy



Item	Options	Description
Restore if Failure	Disabled Enabled**[Default]**,	If system fails to boot and this option is set to 'Enabled', software will reset settings of this page as well as CSM page to its default values automatically.
Primary Video Ignore	Disabled Enabled**[Default]**,	If software will detect that due to the Policy settings. Option ROM of Primary Video Device will not dispatch, it will ignore this device policy settings, and restore it to 'Enable' automatically.
Slot#1 Empty	Enabled**[Default],** Disabled	Enable or Disable Option ROM execution for selected Slot.
Slot#3 Empty	Enabled**[Default],** Disabled	Enable or Disable Option ROM execution for selected Slot.
Slot#5 Empty	Enabled**[Default],** Disabled	Enable or Disable Option ROM execution for selected Slot.
Slot#7 Empty	Enabled**[Default],** Disabled	Enable or Disable Option ROM execution for selected Slot.

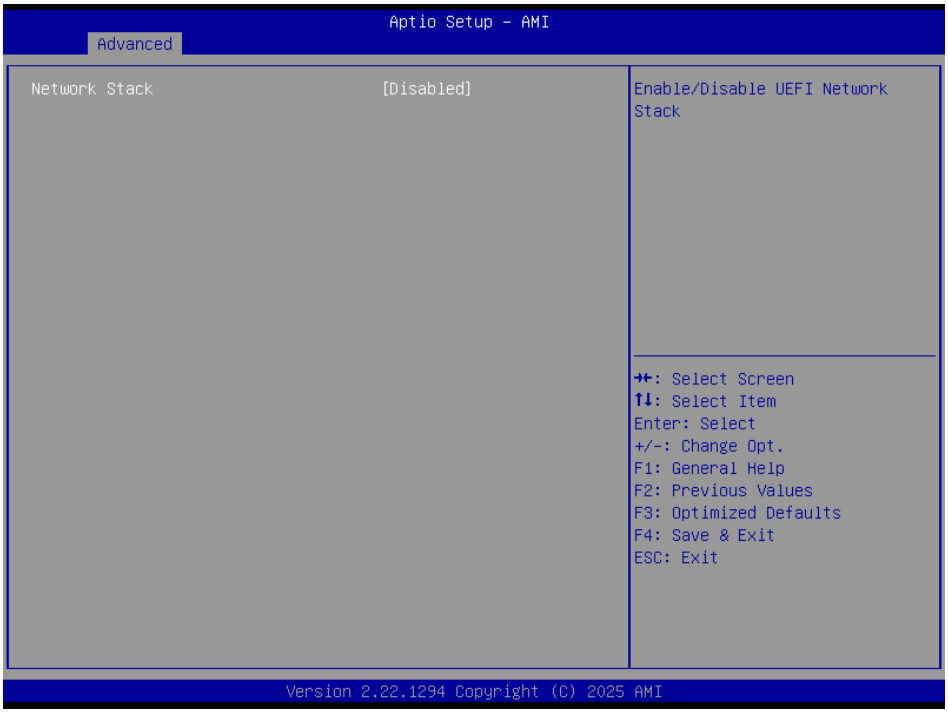
4.6.2.5 USB Configuration

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



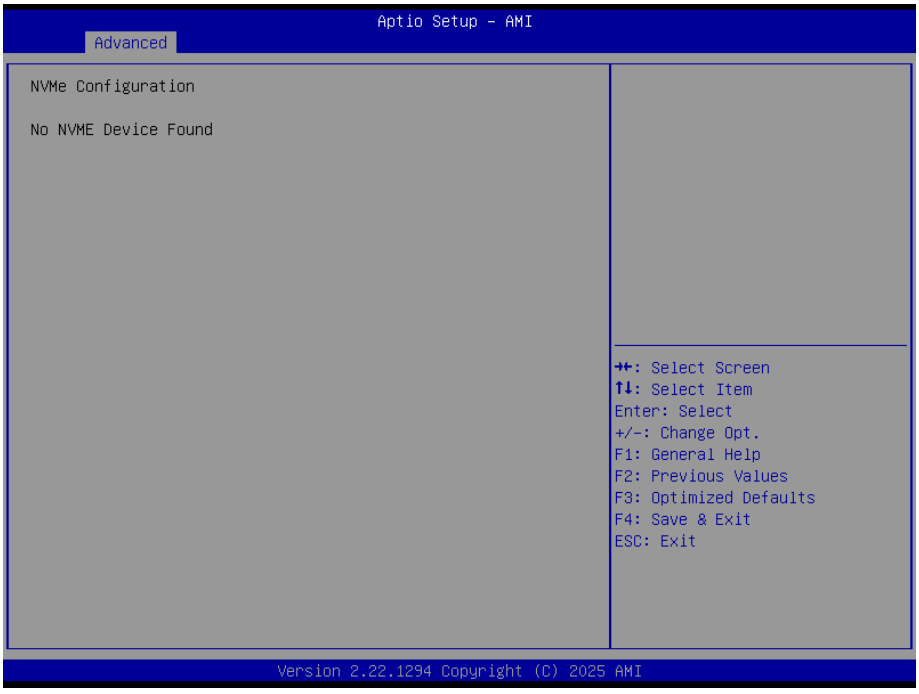
Item	Options	Description
Legacy USB Support	Enabled**[Default]**, Disabled Auto	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled**[Default]**, Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled**[Default]**,	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec**[Default]**	The time-out value for Control, Bulk, and Interrupt transfers.
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 100 ms, for a Hub port the delay is taken from 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.

4.6.2.6 Network Stack Configuration

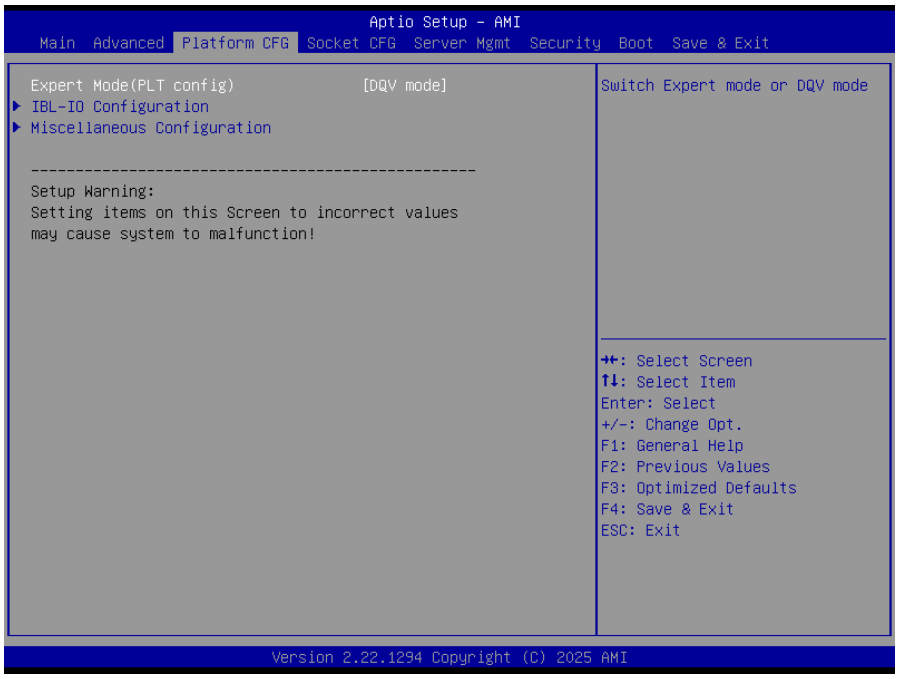


Item	Option	Description
Network stack	Enabled Disabled**[Default]**	Enable/Disable UEFI Network Stack.

4.6.2.7 NVMe Configuration

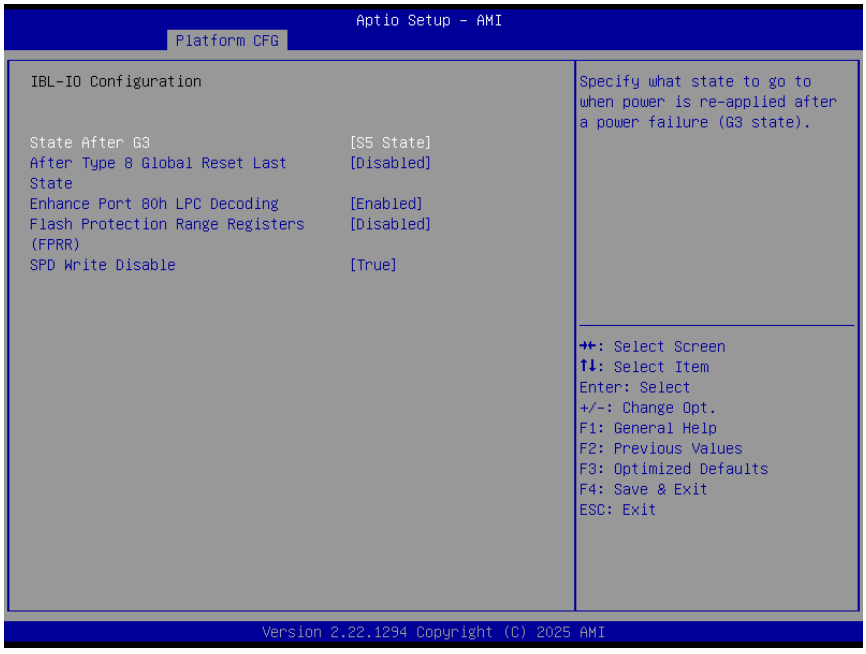


4.6.3 Platform Config



Item	Option	Description
Expert Mode(PLT config)	DQV mode**[Default]** Expert mode	Switch Expert mode or DQV mode.

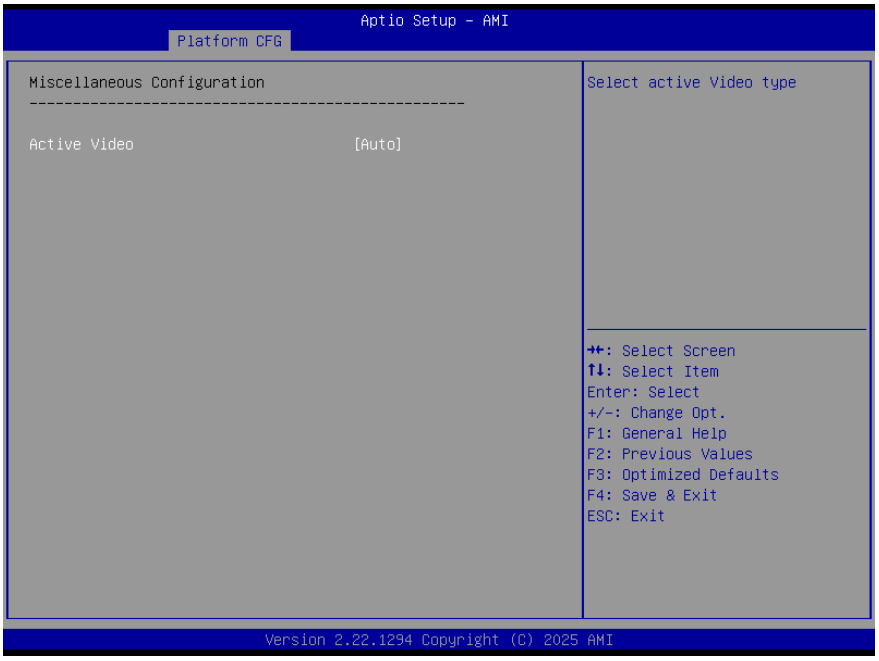
4.6.3.1 IBL-IO Configuration



Item	Option	Description
State After G3	S0 State S5 State**[Default]**	Specify what state to go to when power is re-applied after a power failure (G3 state).
After Type 8 Global Reset Last State	Disabled**[Default]** Enabled	Specify whether platform's previous state will be considered when deternining

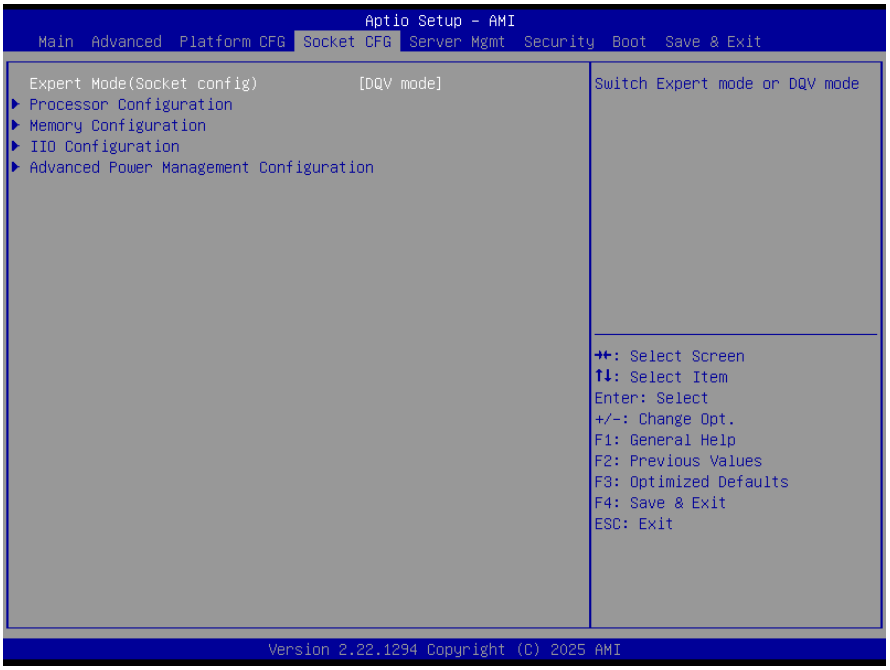
		whether to power-up after non-thernal and non-explicitly requested type 8 globeal resets.
Enhance Port 80h LPC Decoding	Disabled Enabled**[Default]**	Support the word/dword decoding of port 80h behind LPC.
Flash Protection Range Registers(FRRR)	Disabled**[Default]** Enabled	Enable Flash Protection Range Registers.
SPD Write Disable	Ture**[Default]** False	Enable/Disable setting SPD Write Disable.

4.6.3.2 Miscellaneous Configuration



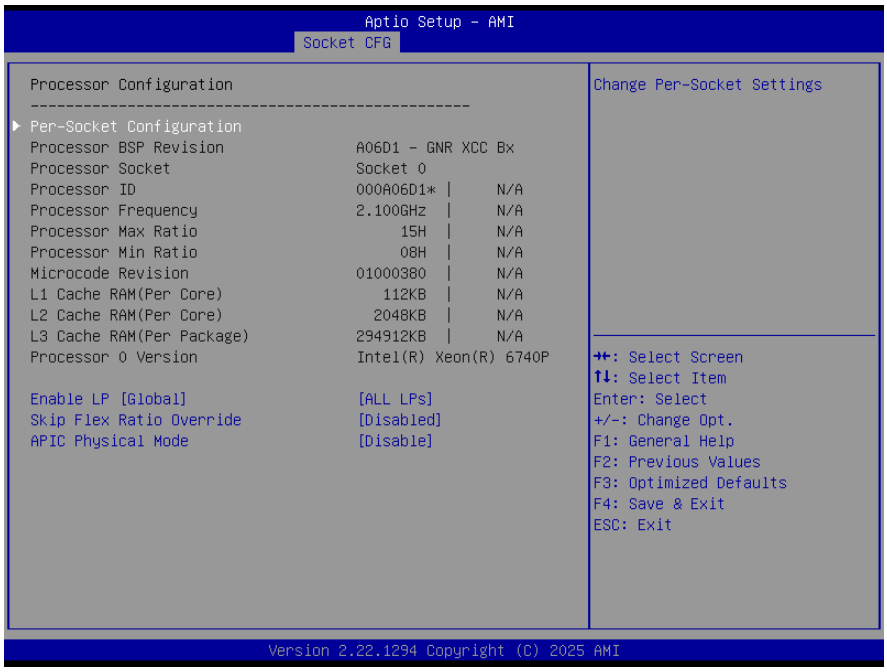
Item	Option	Description
Active Video	Auto**[Default]** Onboard Device(BMC VGA) PCIE Device	Select active Video type. Early display always output to BMC-VGA. BIOS P.O.S.T display output to PCIe if system have discrete GPU with Option Auto/PCIe-Device.

4.6.4 Socket Config



Item	Options	Description
Expert Mode (Socket config)	DQV mode**[Default]** Expert mode	Switch Expert mode or DQV mode.

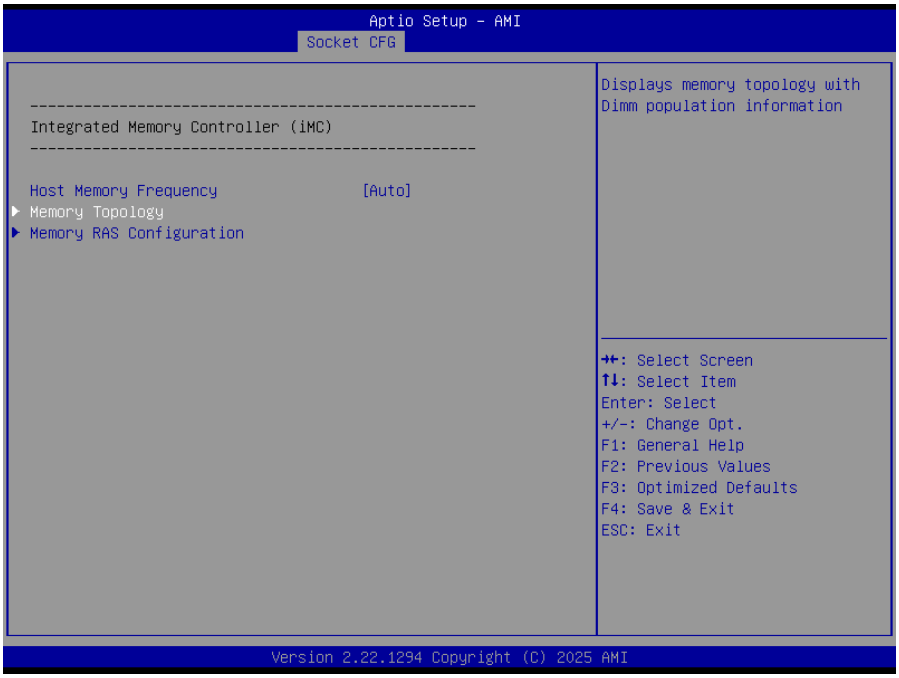
4.6.4.1 Processor Configuration



Item	Option	Description
Enable LP [Global]	All LPs**[Default]** Single LP Two LPs	Enables Logical processor (Software Method o Enable/Disable Logical Processor threads).
Skip Flex Ratio Override	Disabled**[Default]** Enabled	Skip Flex Ratio override to use power-on default Flex Ratio values. In multi-socket systems, this will

		allow mixed flex ratio limits.
APIC Physical Mode	Disabled**[Default]** Enabled	Enable/Disable the APIC physical destination mode.

4.6.4.2 Memory Configuration



Item	Option	Description
Memory Frequency	Auto**[Default]** 3200 3600 4000 4400 4800 5200 5600	Maximum Memory Frequency Selections in MT/s. If Enforce POR is disabled, user will be able to run at higher frequencies than the memory suppot (limited by processor support). Do not select Reserved.

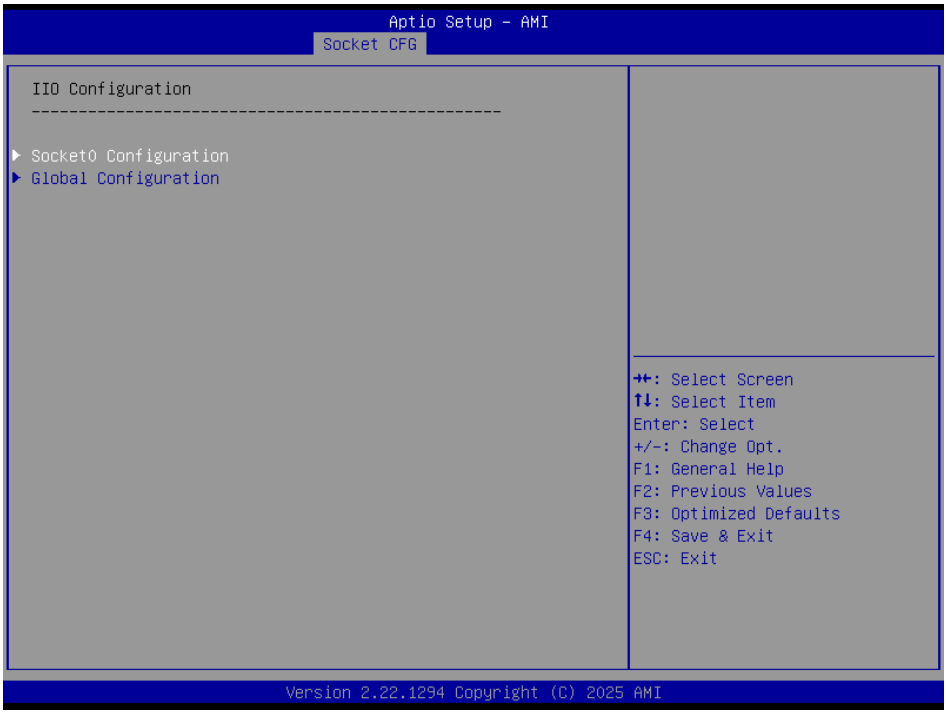
4.6.4.2.1 Memory Topology

4.6.4.2.2 Memory RAS Configuration

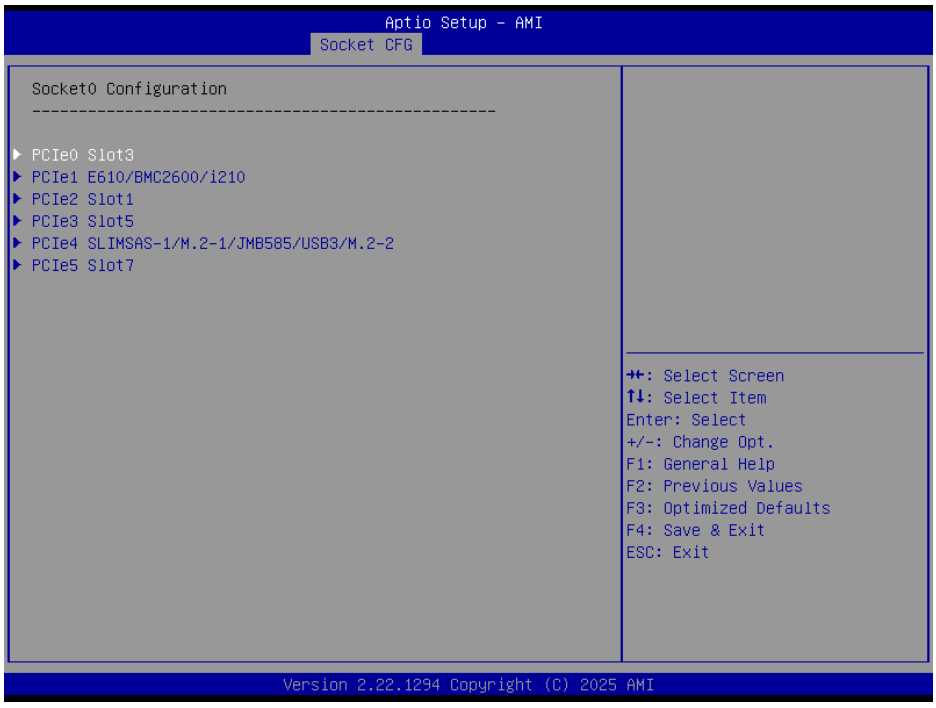
Item	Option	Description
Mirror Mode	Disabled**[Default]** Full Mirror Mode	Full Mirror Mode will set entire 1LM memory in system to be mirrored, consequently reducing the memory capacity by half, Partial Mirror Mode will enable the required size of memory to be mirrored. If rank sparing is enabled partial mirroring will not take effect. Enabling any type of Mirror Mode will disable XPT Prefetch.

UEFI ARM Mirror	Disabled**[Default]** Enabled	Imitate behavior of UEFI based Address Range Mirror with setup option.
Mirror TAD0	Disabled**[Default]** Enabled	Enable Mirror on entire memory for TAD0.

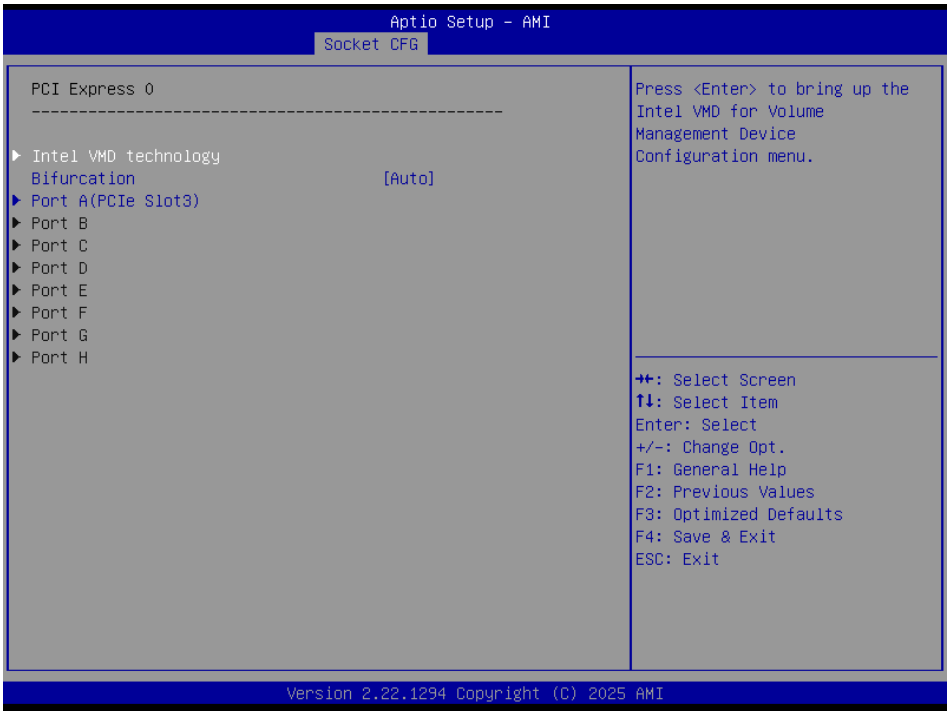
4.6.4.3 IIO Configuration



4.6.4.3.1 Socket0 Configuration

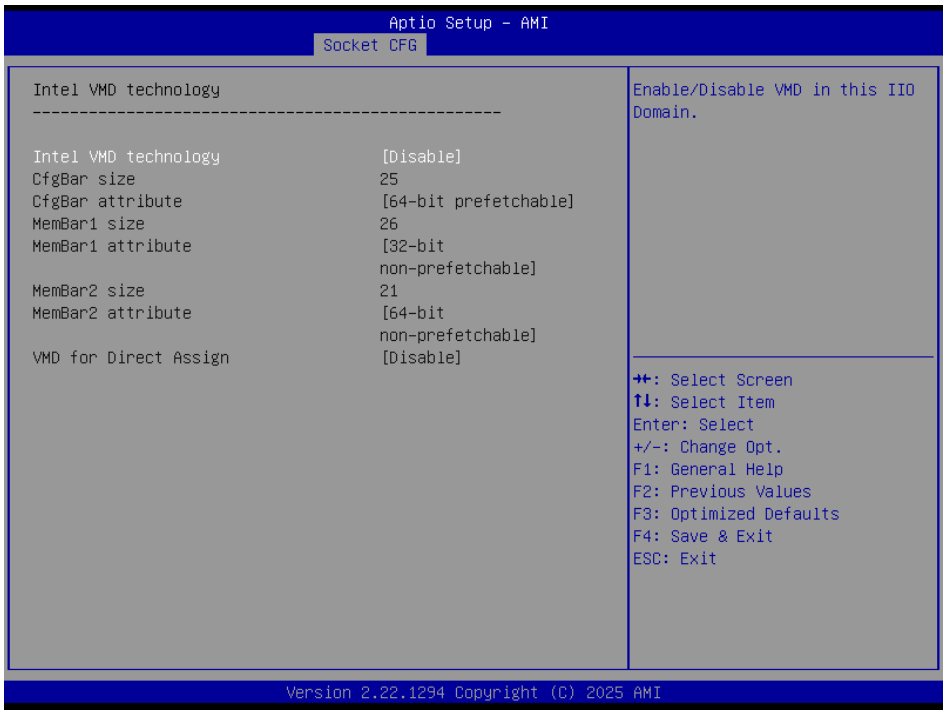


4.6.4.3.1.1 PCI Express 0



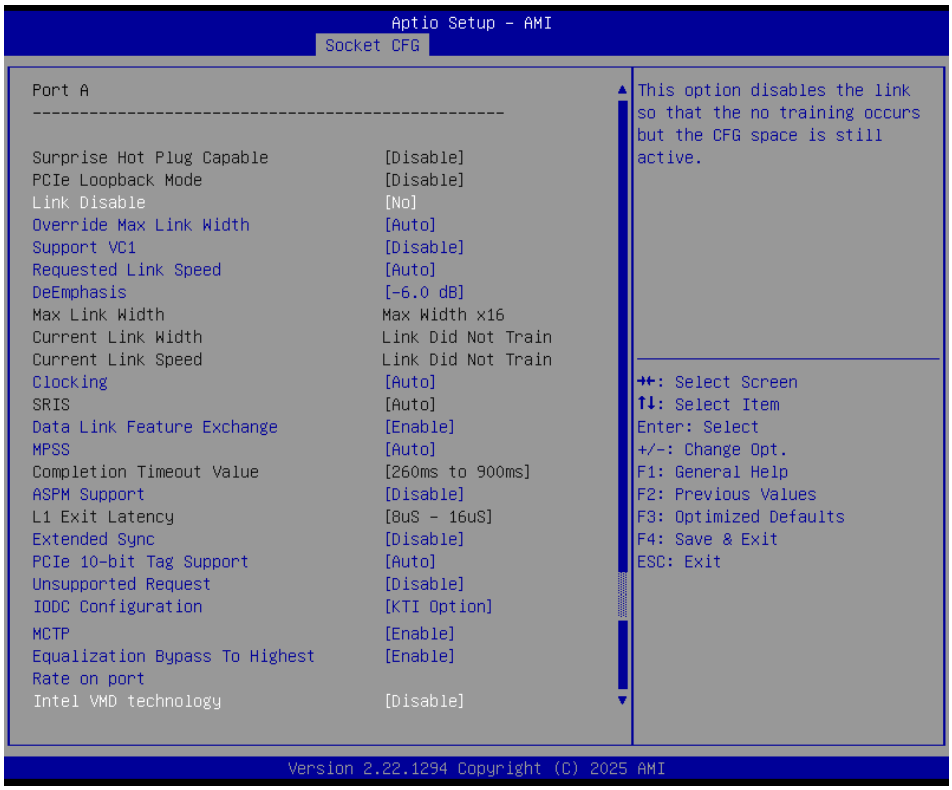
Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8 x_x8x4x4 x_x8x_x8 x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the controller.

4.6.4.3.1.1.1 Intel VMD technology



Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

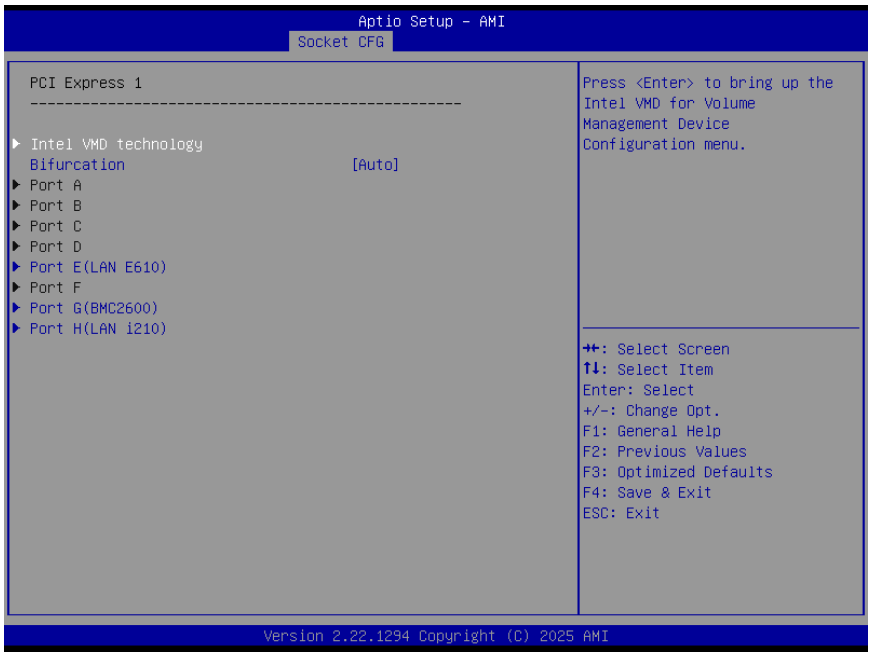
4.6.4.3.1.1.2 Port A ~ Port H



Item	Option	Description
Link Disable	No**[Default]** Yes	This option disables the link so that the no training occurs but the CFG space is still active.
Override Max Link Width	Auto**[Default]** x1 x2 x4 x8 x16	Override the max link width that was set by bifurcation.
Support VC1	Disable**[Default]** Enable	Enable/Disable PCIe Port VC1 support. x2 ports share the same VC1 channel.
Requested Link Speed	Auto**[Default]** Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s) Gen 4 (16 GT/s) Gen 5 (32 GT/s)	Choose Link Speed for this PCIe port.
DeEmphasis	-6.0 dB**[Default]** -3.5 dB	DeEmphais control (LNKCON2[6]) for this PCIe port.
Clocking	Distinct Common Auto**[Default]**	Configure port clocking via LNKCON[6]. This refers to this components and the down stream component. ;Auto' keeps board default.
Data Link Feature Exchange	Disable Enable**[Default]**	Enable/Disable data link feature negotiation in the Data Link Feature Capabilities (DLFCAP) register.
MPSS	128B 256B 512B Auto**[Default]**	Configure Max Payload Size Supported in PCIe Device Capabilities register. 'Auto' keeps hardware default.
ASPM Support	Disabled**[Default]** Auto	This option can disable ASPM support in a PCIe root port. 'Auto' keeps hardware default.
Extended Sync	Disable**[Default]** Enable	Enable/disable the Extended Sync Mode (D:x F:0 O:7Ch B:7) where x is 0-9.
PCIe 10-bit Tag Support	Disable Auto**[Default]** Force Enable	'Disable' option can disable PCIe 10-bit Tag Requester (not Completer) supoort in a PCIe Root Port. 'Auto' keeps hardware default. When disabled system FW does not configure 10-bit Tag in hierarchy under Root Port, however OS could reconfigure and enable it . Advanced user may use 'Force Enable' option to enforce enabling 10-bit Tag in a hierarchy wherer Root Port is 10-bit Tag Completer capable, but not all nodes support 10-bit Tag Completer. The user

		assures, there will be no peer-to-peer traffic from node with 10-bit Tag Requester capability to a node without 10-bit Tag Completer capability, In such hierarchy 10-bit Tag Requester is not enabled in Root Port regardless of Root Port capability.
Unsupported Request	Disable**[Default]** Enable	Controls the reporting of unsupported requests that IIO itself detects on requests its receives from a PCI Express/DMI port.
IODC Configuration	KTI Option**[Default]**/Auto/ Enable for Remote InvItoM Hybrid Push/InvItoM AllocFlow/ Enable for Remote InvItoM Hybrid AllocNonAllow/Enable for Remote InvItoM and Remote WViLF	Enable/Disable IODC (IO Direct Cashe): Generate snoops instead of memory lookups, for remote InvItoM(IIO) and/or WCiLF(cores).
MCTP	Disable Enable**[Default]**	Enable/Disable MCTP.
Equalization Bypass To Highest Rate on port	Disable Enable**[Default]**	Equalization Bypass To Highest Rate Support Enable/Disable.
Intel VMD Technology	Disable**[Default]** Enable	Enable/Disable Intel Volume Management Device Technology on specific root port.

4.6.4.3.1.2 PCI Express 1

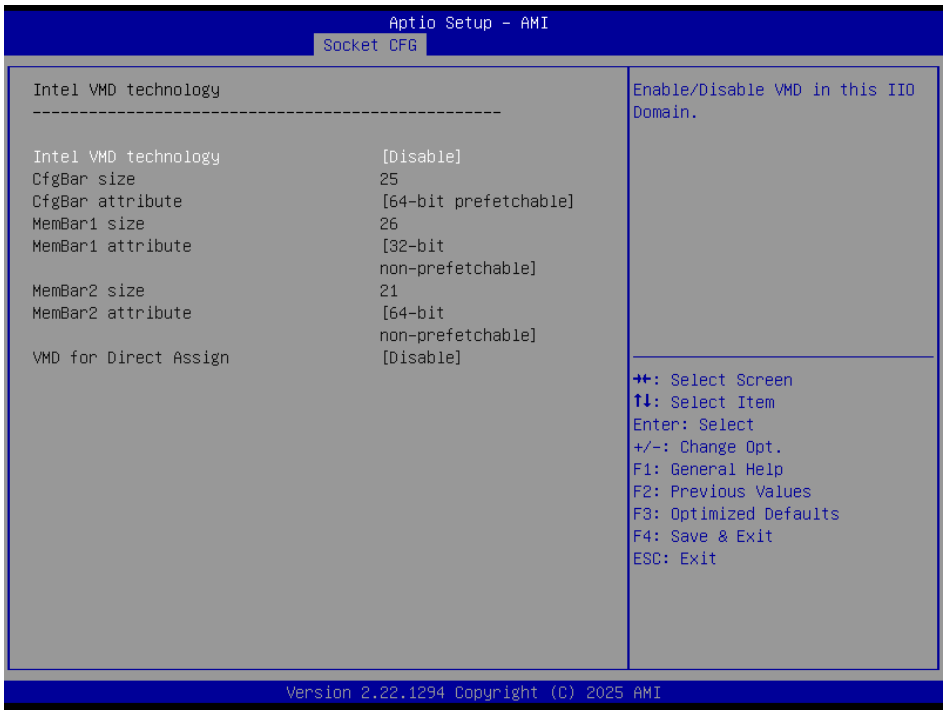


Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8 x_x8x4x4 x_x8x_x8	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the controller.

	x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	

4.6.4.3.1.2.1 Intel VMD technology

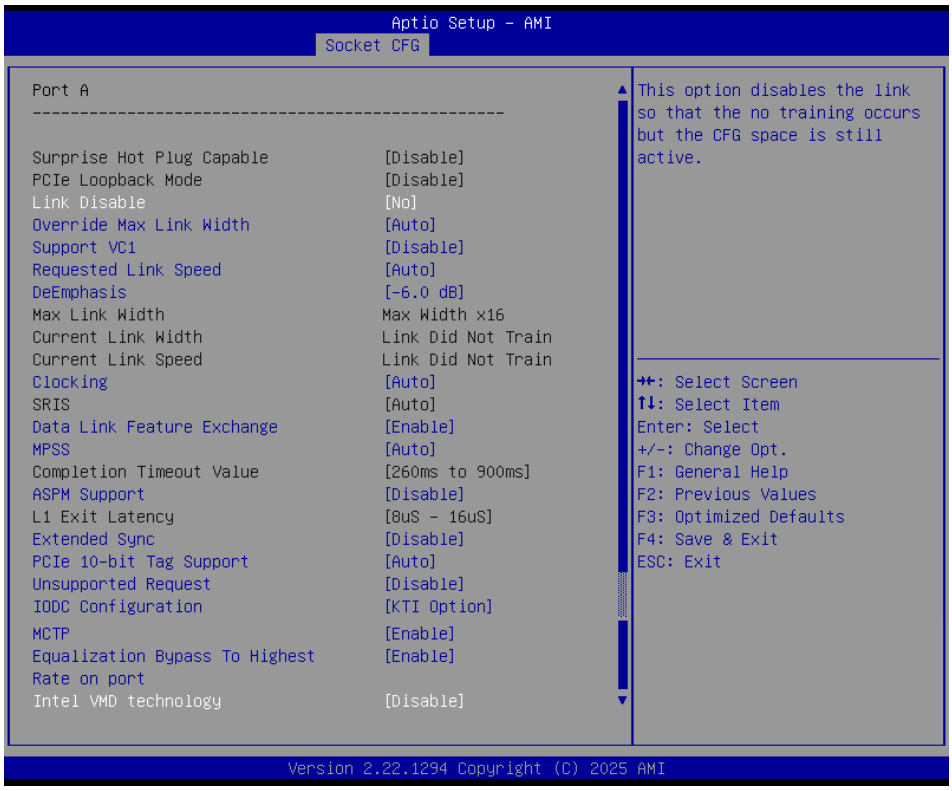
Please refer to 4.6.4.3.1.1.1 for more information.



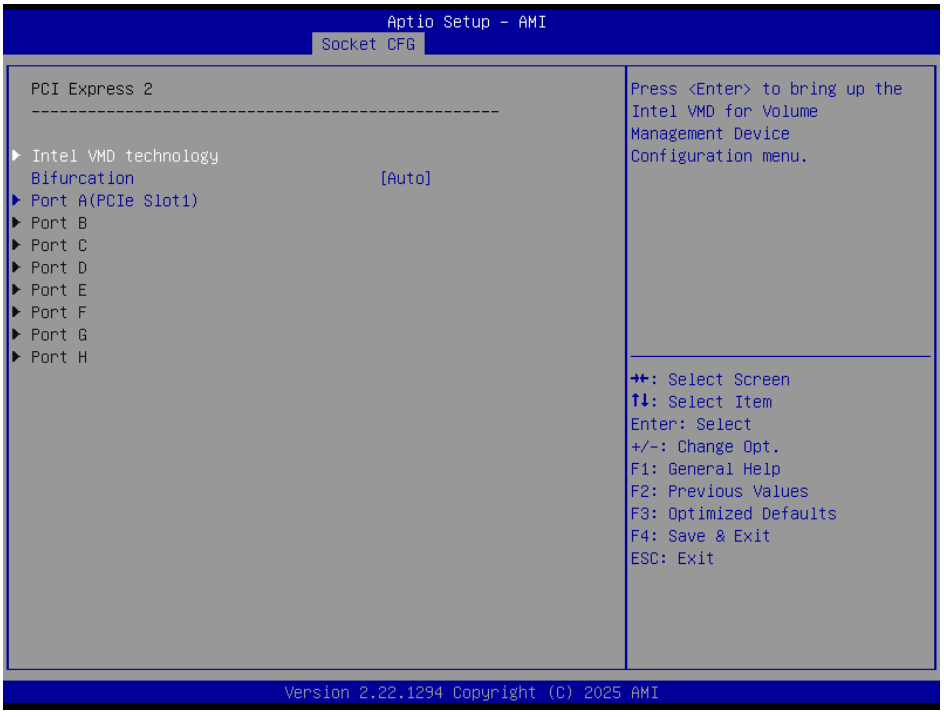
Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

4.6.4.3.1.2.2 Port A ~ Port H

Please refer to 4.6.4.3.1.1.2 for more information.



4.6.4.3.1.3 PCI Express 2

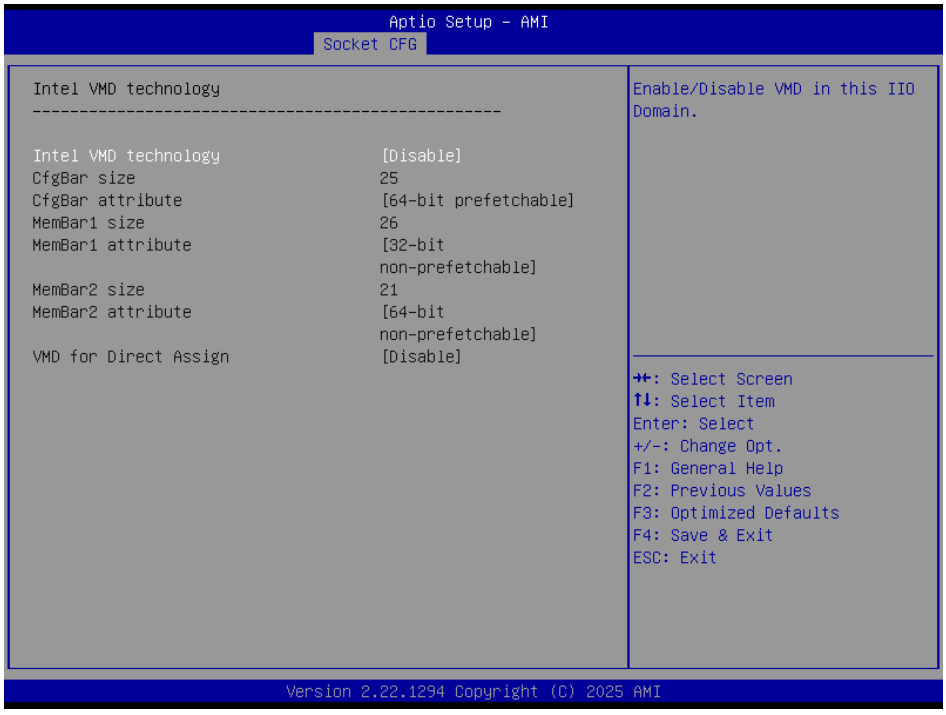


Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the

	x_x8x4x4 x_x8x_x8 x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	controller.

4.6.4.3.1.3.1 Intel VMD technology

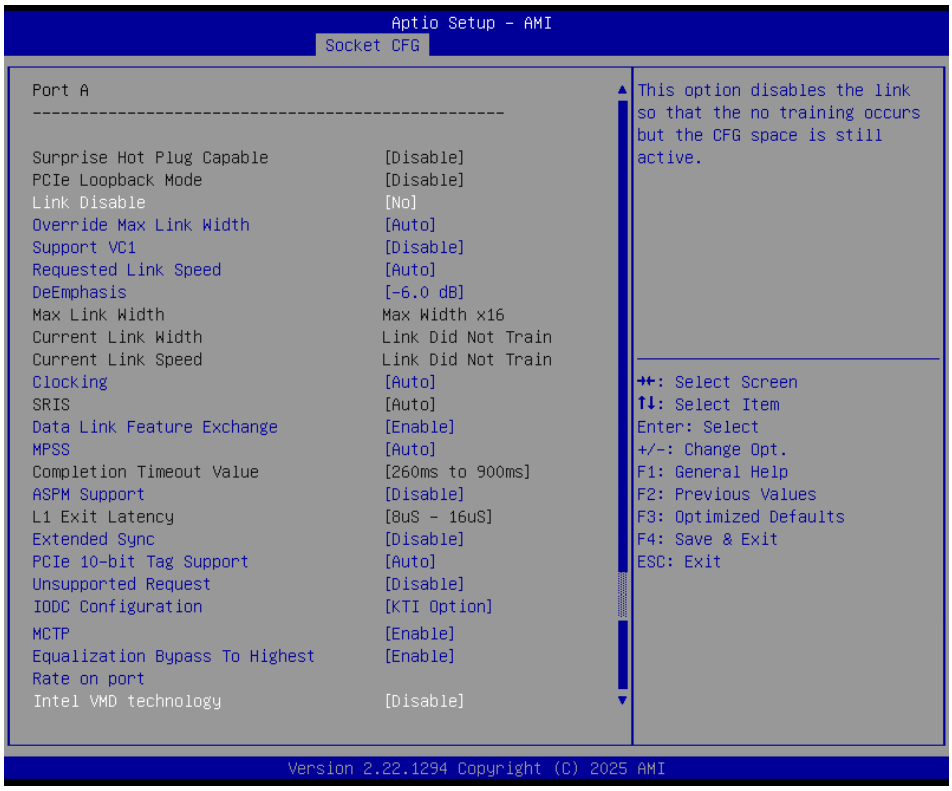
Please refer to 4.6.4.3.1.1.1 for more information.



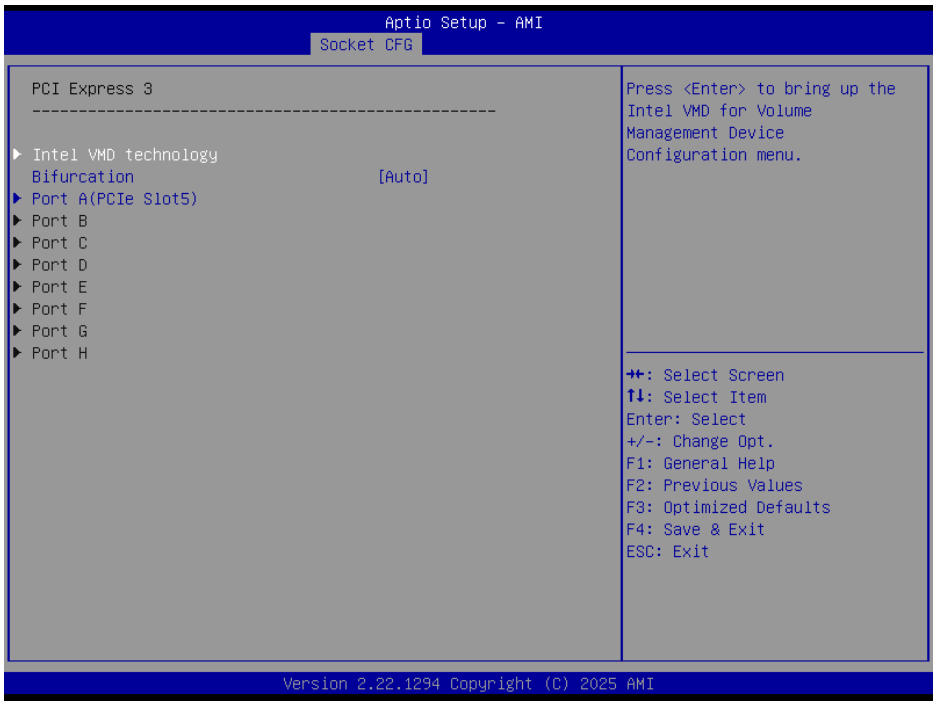
Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

4.6.4.3.1.3.2 Port A ~ Port H

Please refer to 4.6.4.3.1.1.2 for more information.



4.6.4.3.1.4 PCI Express 3

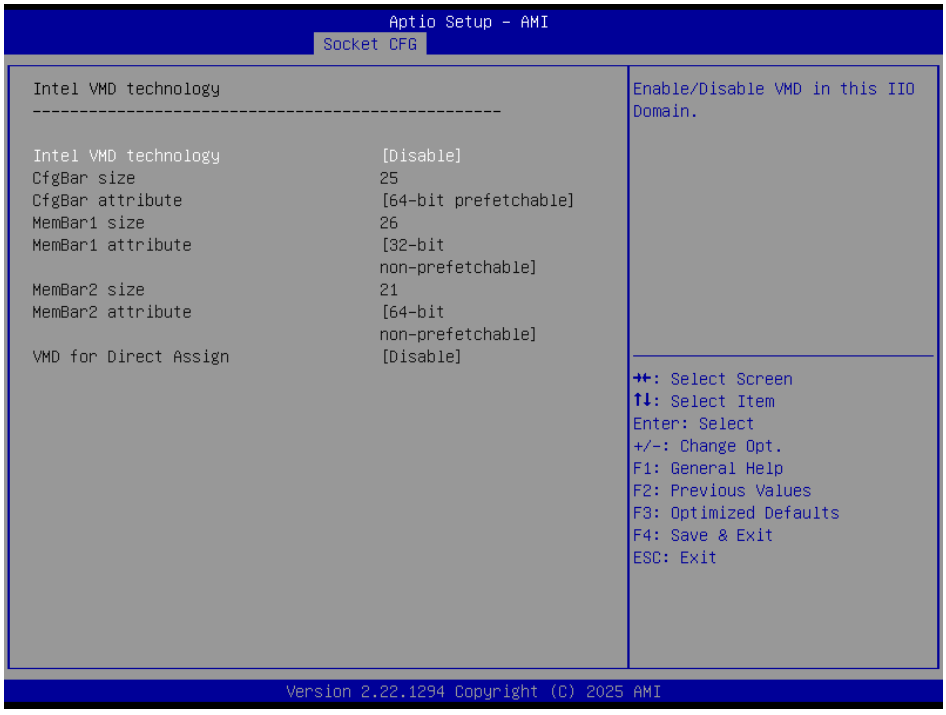


Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the

	x_x8x4x4 x_x8x_x8 x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	controller.

4.6.4.3.1.4.1 Intel VMD technology

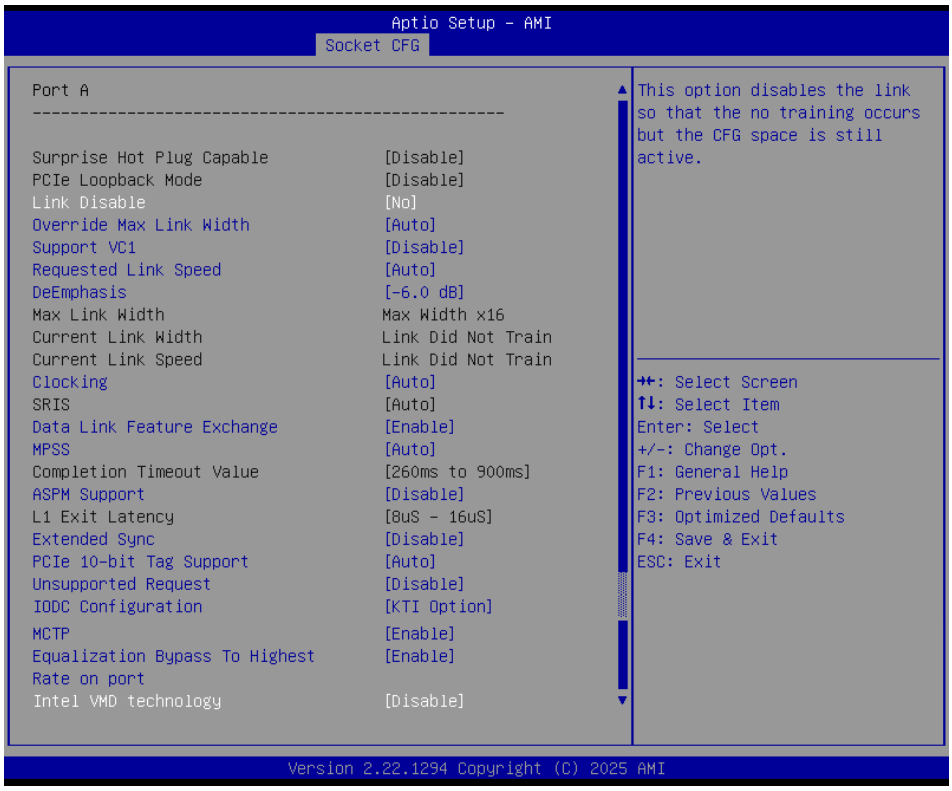
Please refer to 4.6.4.3.1.1.1 for more information.



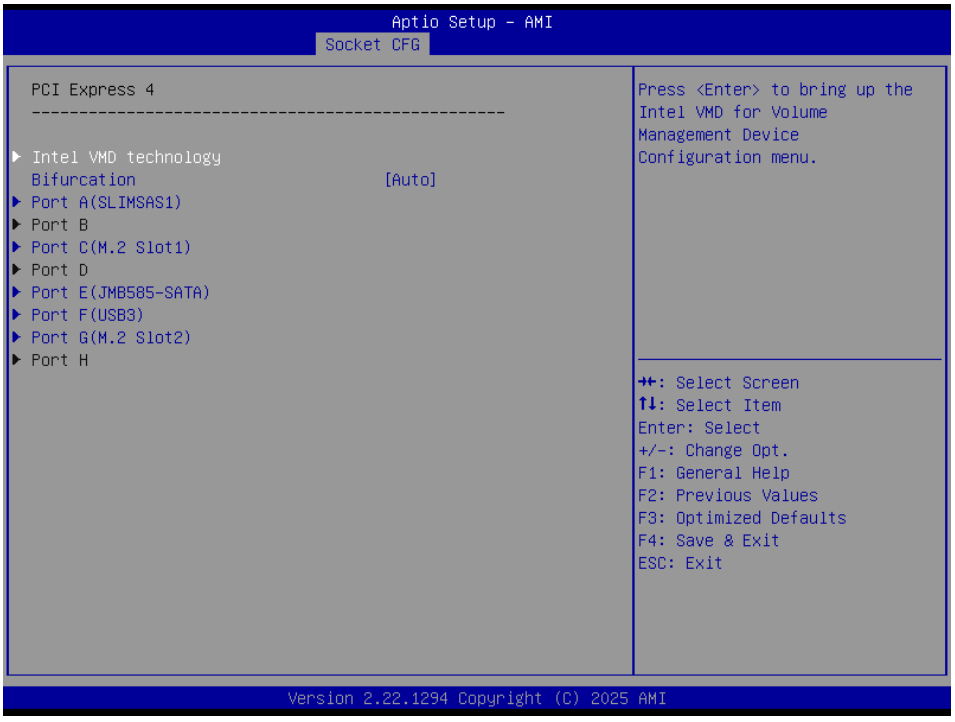
Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

4.6.4.3.1.4.2 Port A ~ Port H

Please refer to 4.6.4.3.1.1.2 for more information.



4.6.4.3.1.5 PCI Express 4

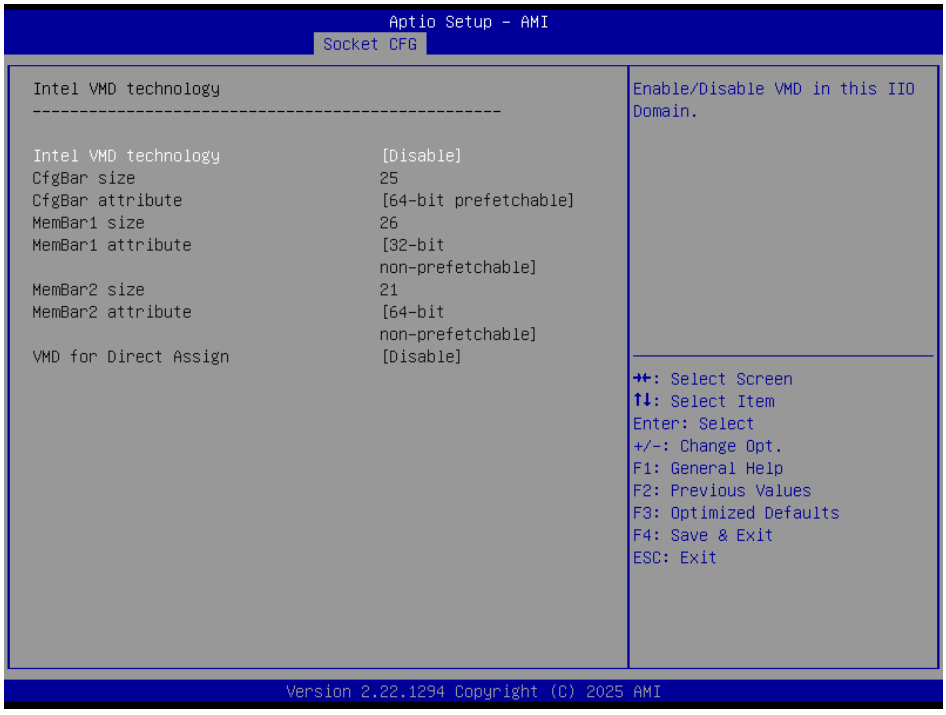


Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the

	x_x8x4x4 x_x8x_x8 x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	controller.

4.6.4.3.1.5.1 Intel VMD technology

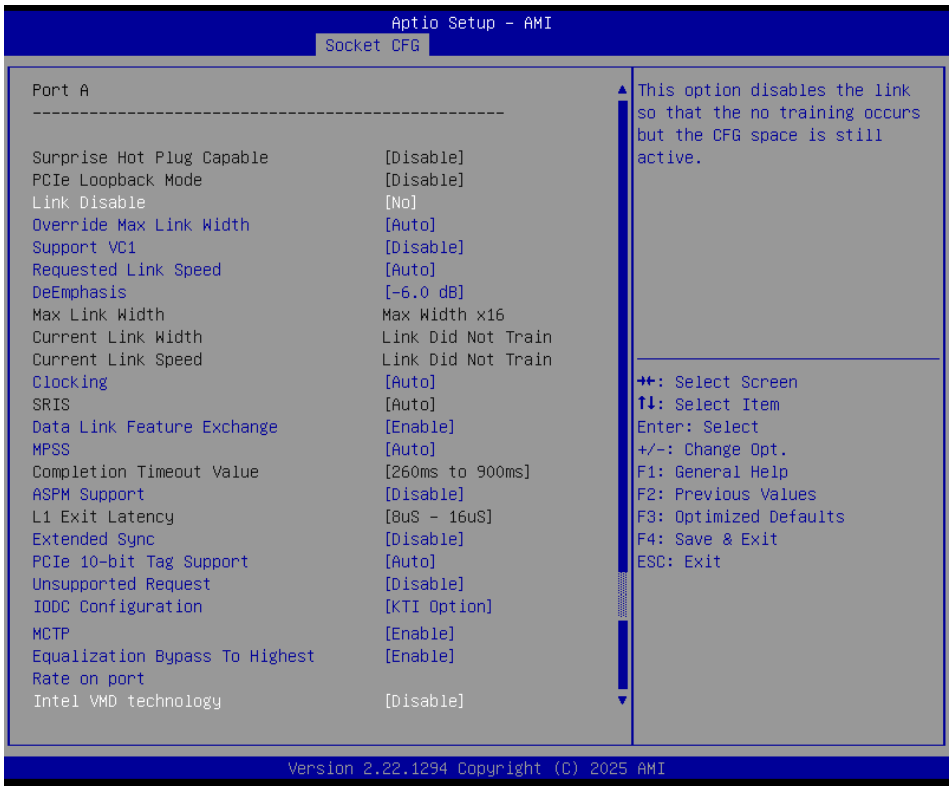
Please refer to 4.6.4.3.1.1.1 for more information.



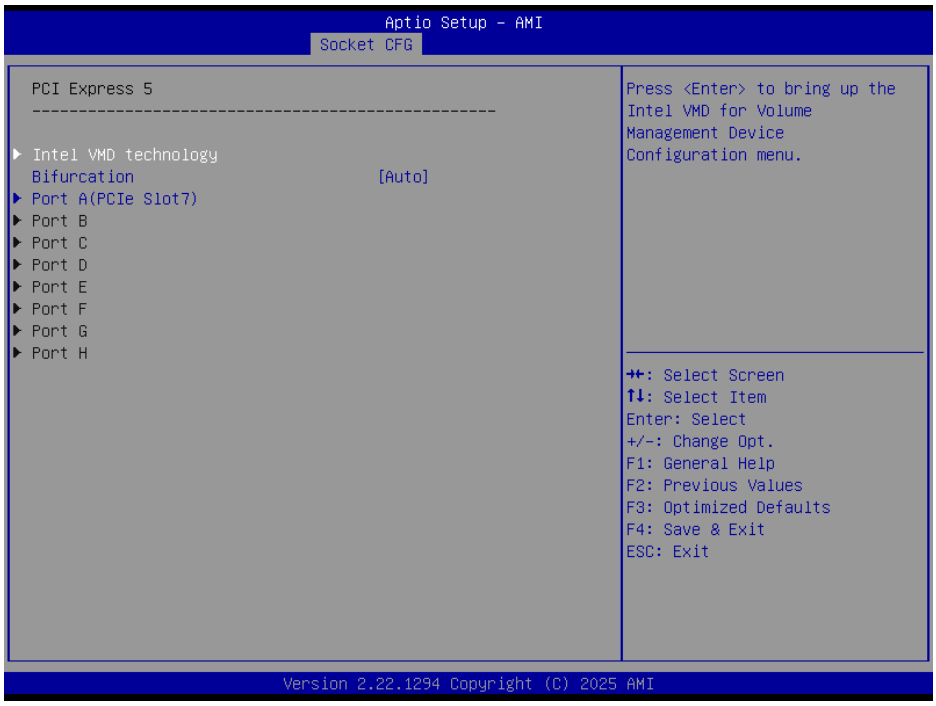
Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

4.6.4.3.1.5.2 Port A ~ Port H

Please refer to 4.6.4.3.1.1.2 for more information.



4.6.4.3.1.6 PCI Express 5

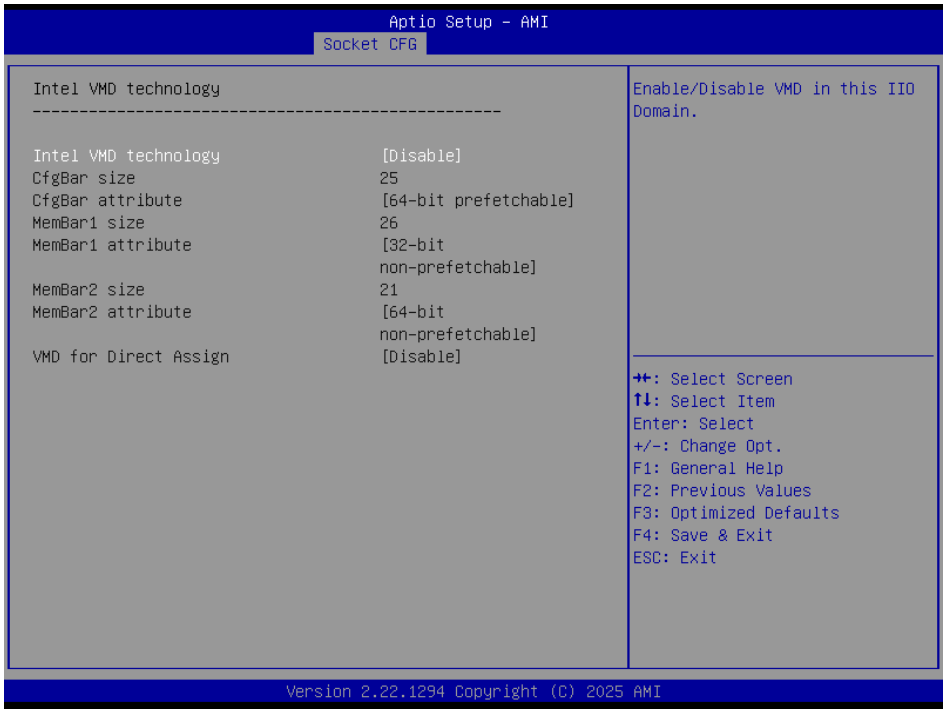


Item	Option	Description
Bifurcation	Auto**[Default]** x4x4x4x4 x4x4x_x8	Select PCIe port Bifurcation for selected slot(s) Port Format: xGxExCxA The port can further be x2x2 Disable-disable all PCIe Lanes and the

	x_x8x4x4 x_x8x_x8 x_x_x_x16 x2x2x4x_x8 x4x2x2x_x8 x_x8x2x2x4 x2x2x4x4x4 x4x2x2x4x4 x4x4x2x2x4 x2x2x2x2x_x8 x2x2x2x2x4x4 x2x2x4x2x2x4 x4x2x2x2x2x4 x2x2x2x2x2x2x4 x_x8x4x2x2 x4x4x4x2x2 x_x8x2x2x2x2 x2x2x4x4x2x2 x4x2x2x4x2x2 x4x4x2x2x2x2 x2x2x2x2x4x2x2 x2x2x4x2x2x2x2 x4x2x2x2x2x2x2 x2x2x2x2x2x2x2x2	controller.

4.6.4.3.1.6.1 Intel VMD technology

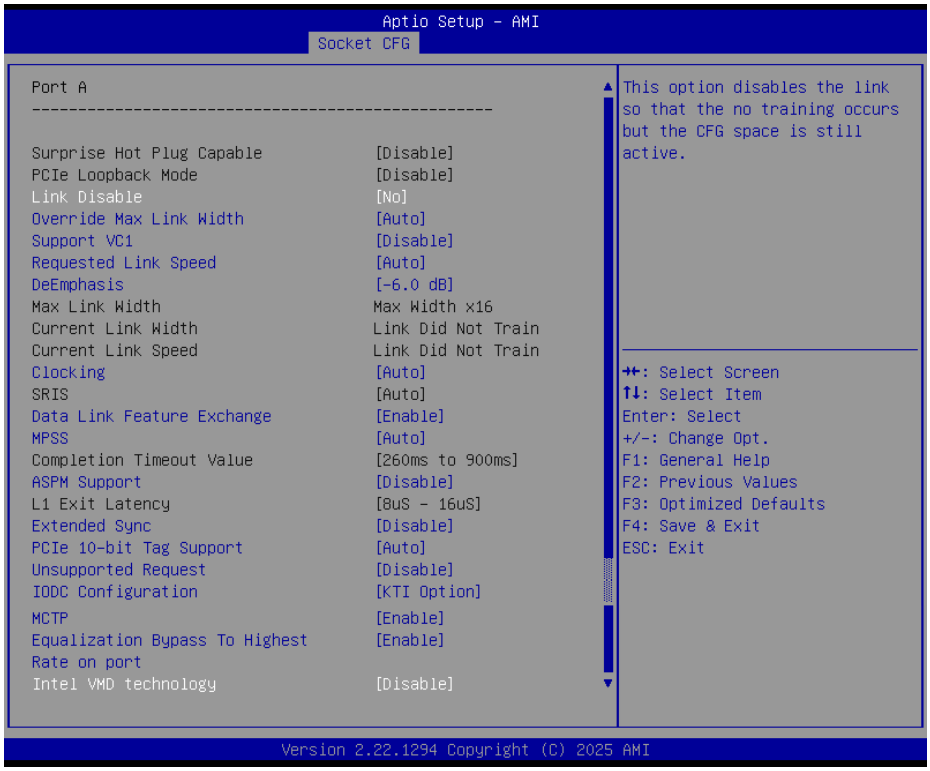
Please refer to 4.6.4.3.1.1.1 for more information.



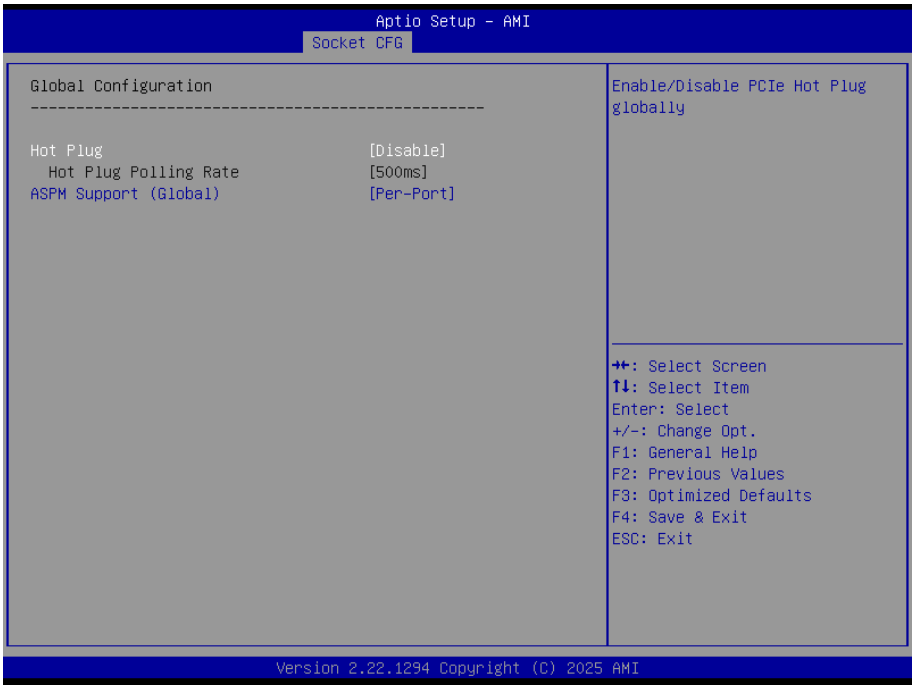
Item	Option	Description
Intel VMD technology	Disabled**[Default]** Enabled	Intel VMD technology

4.6.4.3.1.6.2 Port A ~ Port H

Please refer to 4.6.4.3.1.1.2 for more information.

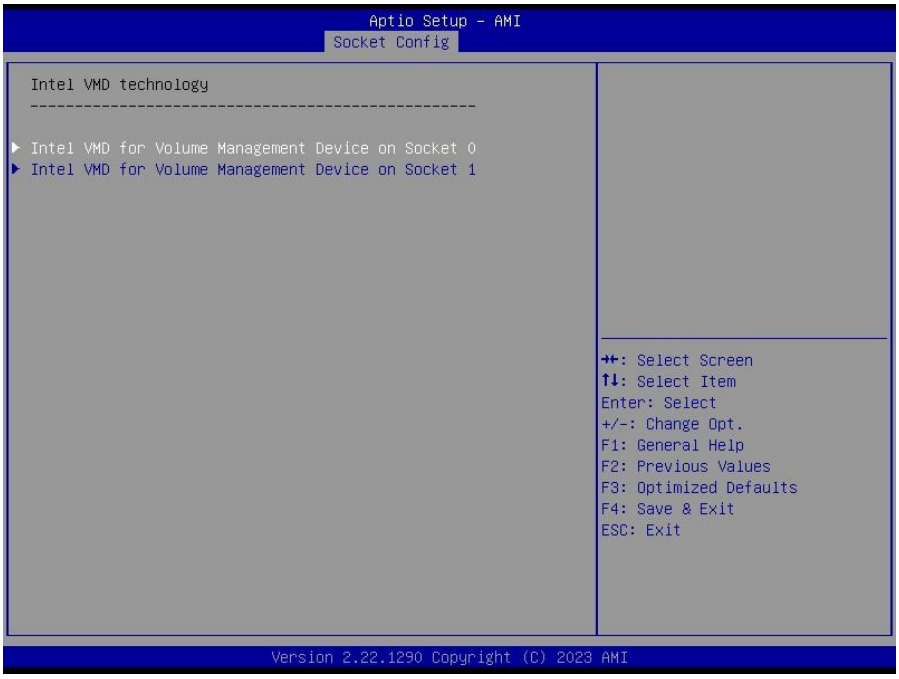


4.6.4.3.2 Global Configuration

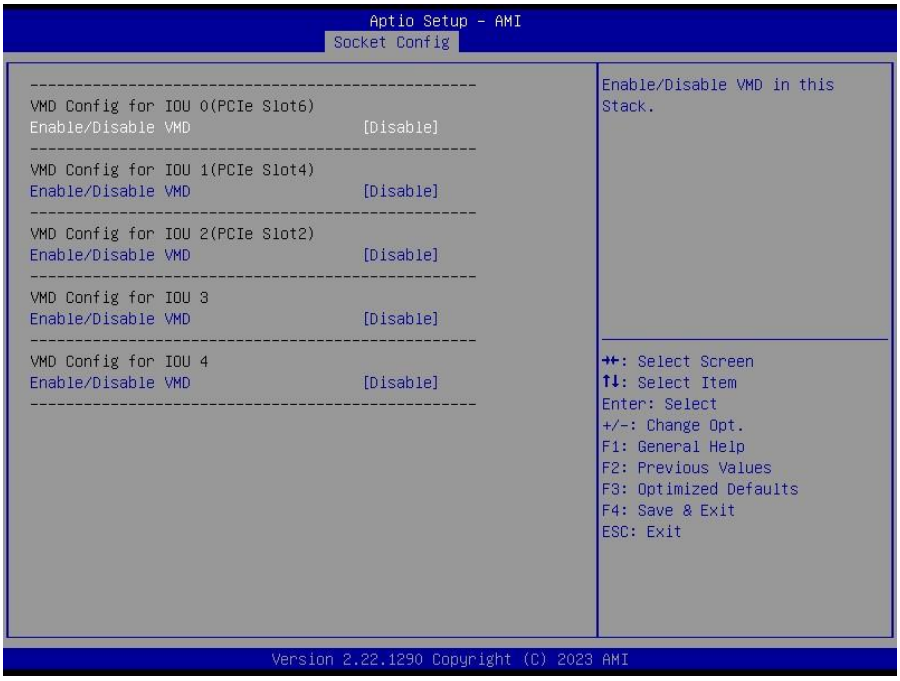


Item	Options	Description
Hot Plug	Enable Disable**[Default]**	Hot Plug.
ASPM Support (Global)	Disable Per-Port**[Default]**	This option can disable ASPM support for all PCIe root ports.

4.6.4.3.3 Intel VMD technology

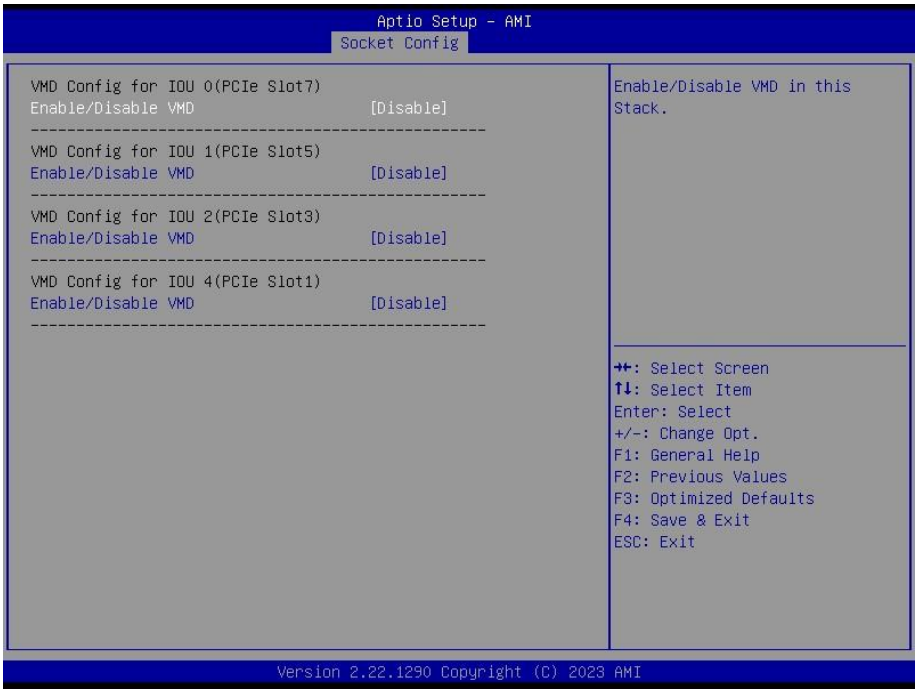


4.6.4.3.3.1 Intel VMD for Volume Management Device on Socket 0



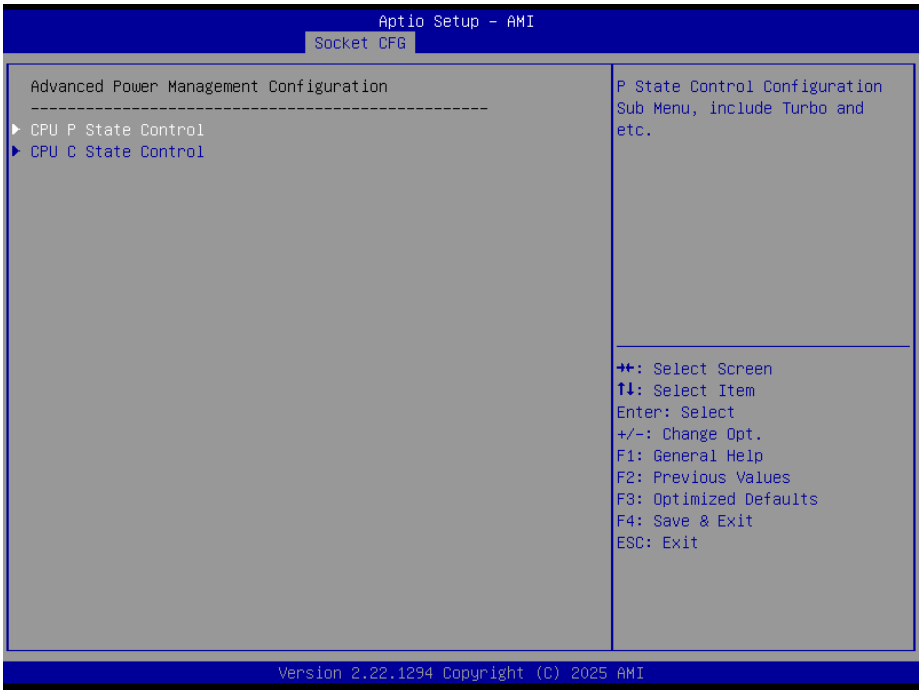
Item	Option	Description
Enable/Disable VMD	Disable**[Default]** Enable	Enable/Disable VMD in this Stack.

4.6.4.3.3.2 Intel VMD for Volume Management Device on Socket 1

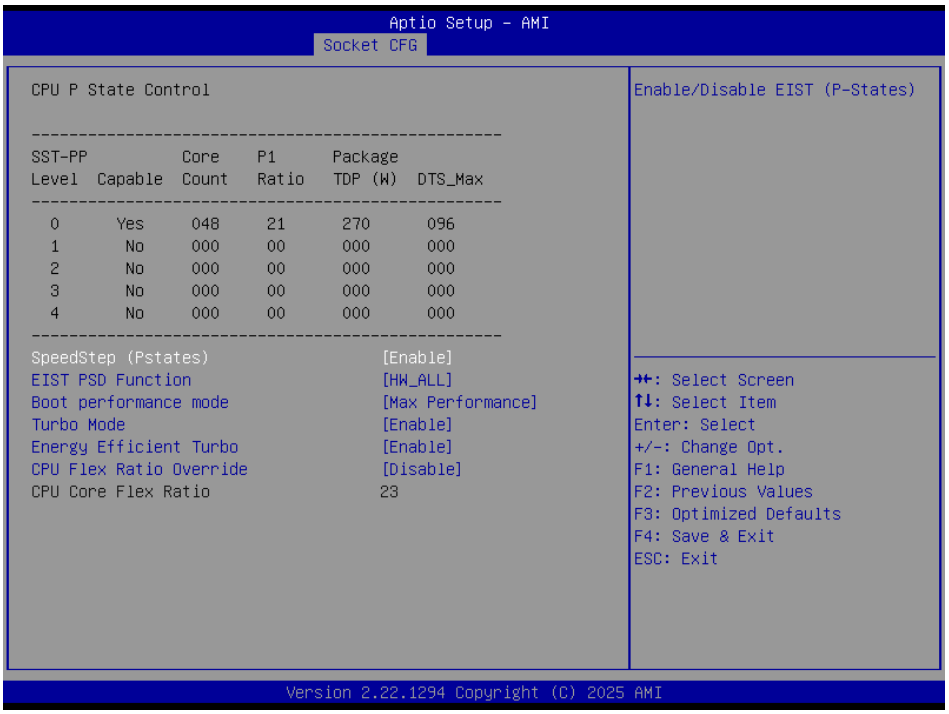


Item	Option	Description
Enable/Disable VMD	Disable**[Default]** Enable	Enable/Disable VMD in this Stack.

4.6.4.4 Advanced Power Management Configuration

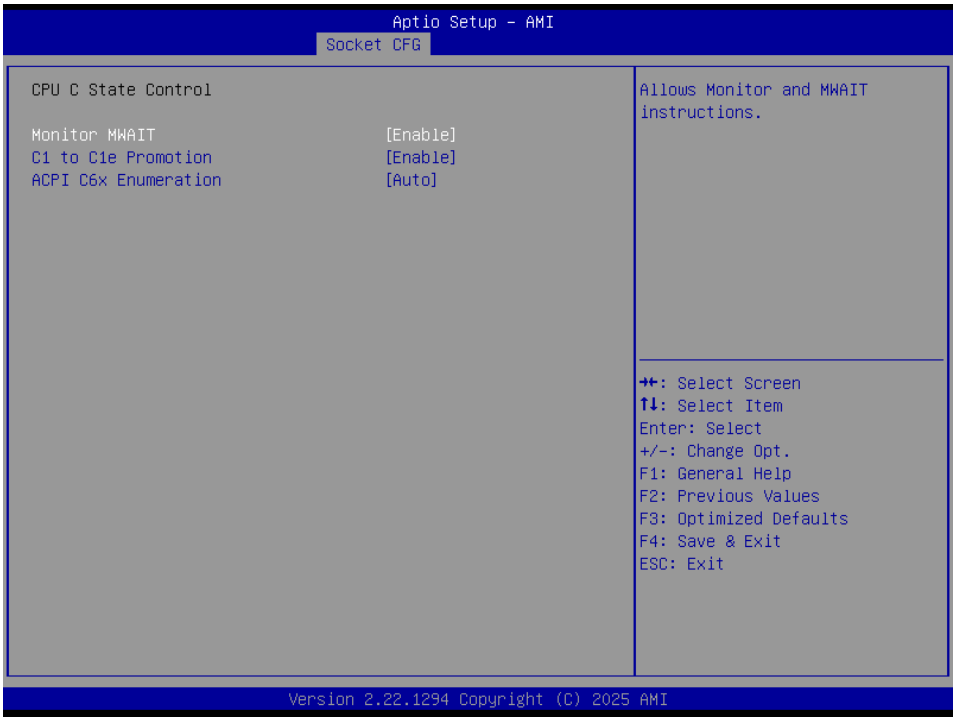


4.6.4.4.1 CPU P State Control



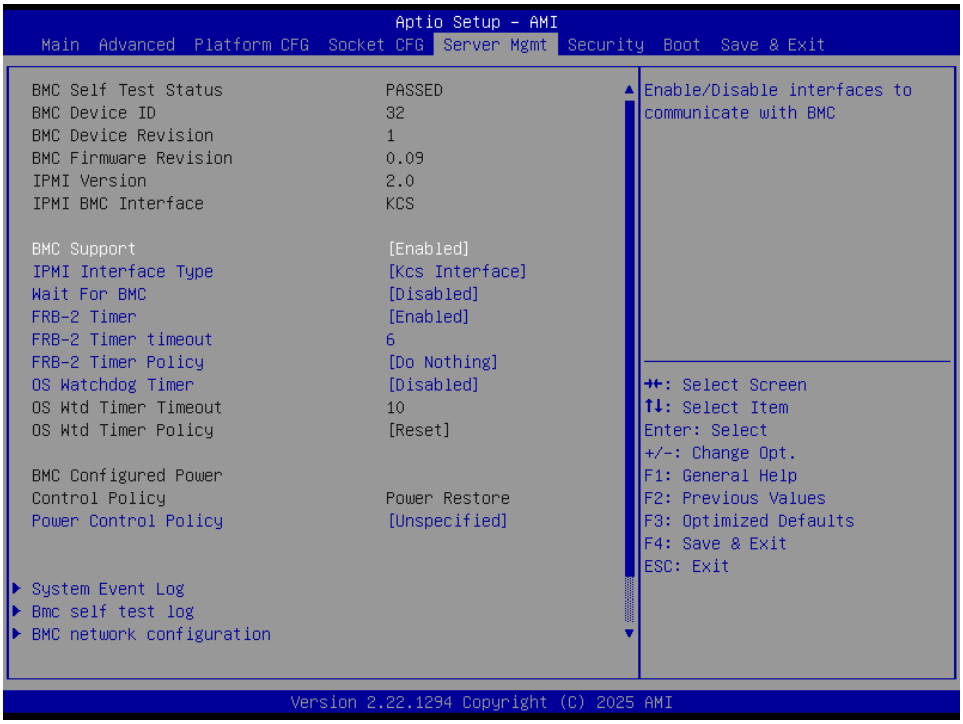
Item	Option	Description
SpeedStep (Pstates)	Disable Enable**[Default]**	Enable/Disable EIST (P-States).
EIST PSD Function	HW_ALL**[Default]** SW_ALL	Choose HW_ALL/SW_ALL in _PSD return.
Boot performance mode	Max Performance**[Default]** Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
Turbo Mode	Disable Enable**[Default]**	Enable/Disable processor Turbo Mode (requires EMTTM enabled too).
Energy Efficient Turbo	Enable**[Default]** Disable	Energy Efficient Turbo Disable, MSR 0x1FC[19].
CPU Flex Ratio Override	Disable**[Default]** Enable	Enable/Disable CPU Flex Ratio Programming.

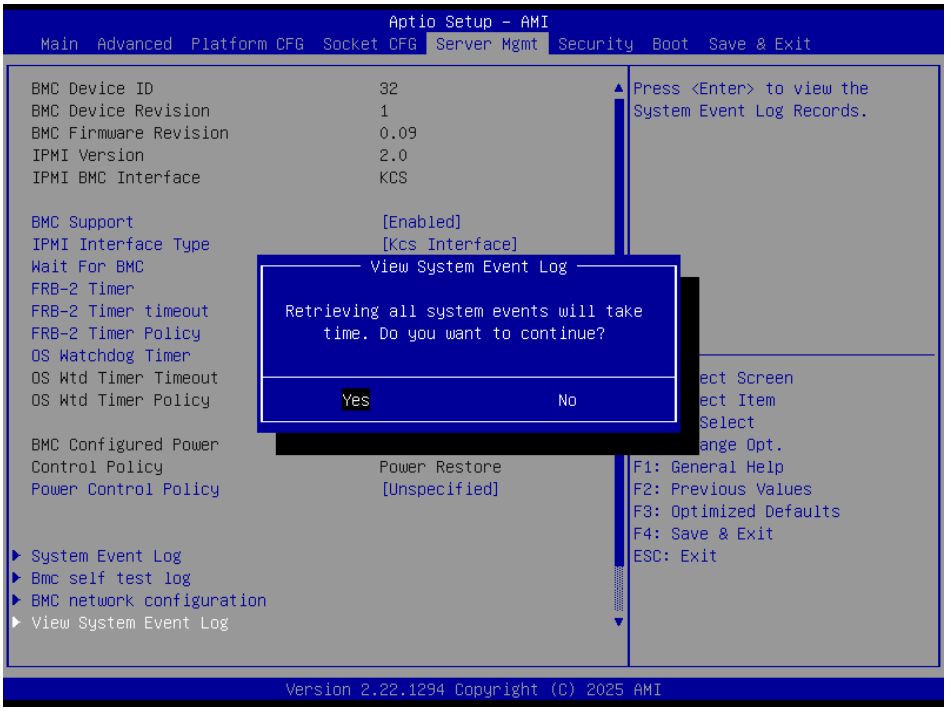
4.6.4.4.2 CPU C State Control

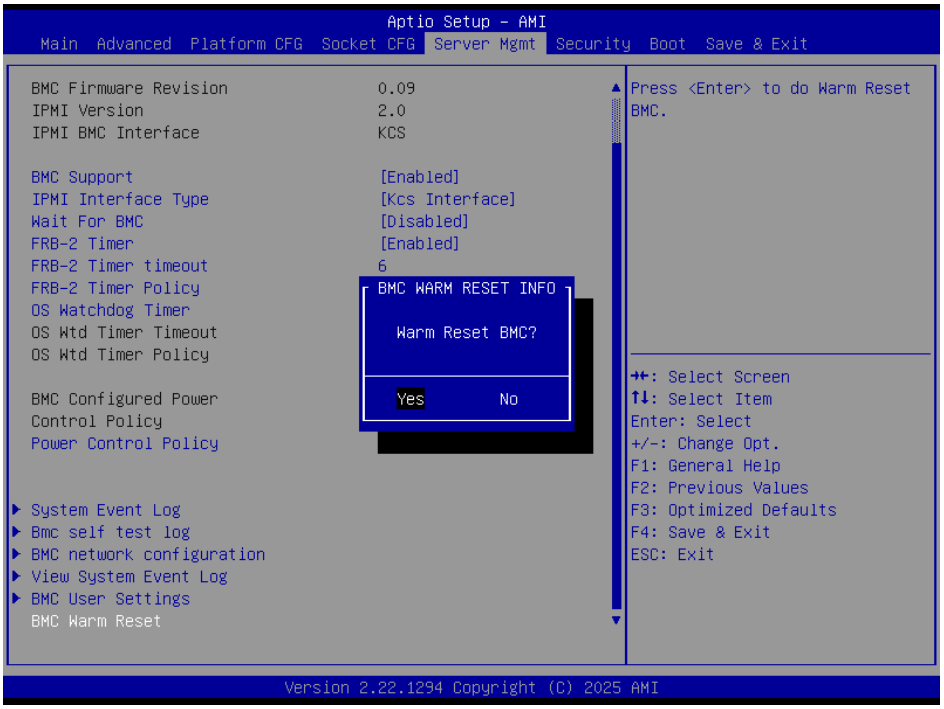


Item	Option	Description
Monitor MWAIT	Disable Enable**[Default]**	Allows Monitor and MWAIT instructions.
C1 to C1e Promotion	Disable Enable**[Default]**	Allows CPU to automatically demote to C1. Takes effect after reboot.
ACPI C6x Enumeration	Disable Auto**[Default]**	ACPI C6x Enumeration.

4.6.5 Server Mgmt



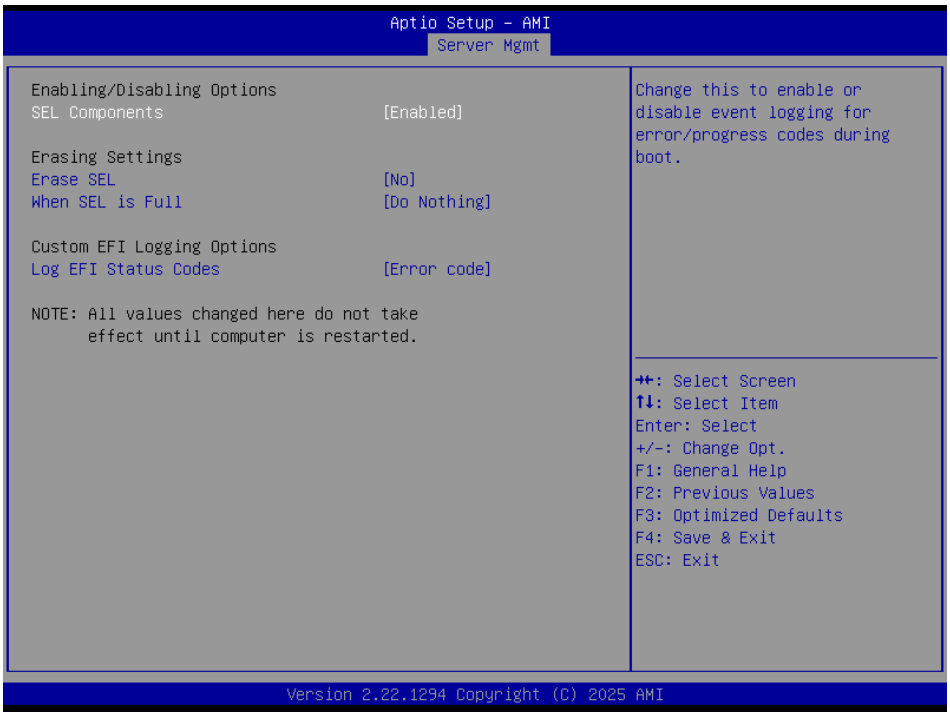




Item	Options	Description
BMC Support	Enabled**[Default]** Disabled	Enable/Disable interfaces to communicate with BMC.
IPMI Interface Type	Kcs Interface**[Default]** Ssif Interface Ipmb Interface Usb Interface Oem1 Interface Oem2 Interface	Type of Interface to communicate BMC from HOST.
Wait For BMC	Enabled Disabled**[Default]**	Wait For BMC response for specified time out. BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize

		Host to BMC interfaces.
FRB-2 Timer	Enabled**[Default]** Disabled	Enable or Disable FRB-2 time (POST timer).
FRB-2 Timer timeout	6	Enter value Between 3 to 6 min for FRB-2 Timer Expiration value.
FRB-2 Timer Policy	Do Nothing**[Default]** Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	Enabled Disabled**[Default]**	If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.
Power Control Policy	Do Not PowerUp Last Power State Power Restore Unspecified**[Default]**	Configure how the system should respond if AC Power is lost, Reset not required as selected Power policy will be set in BMC when policy is saved.

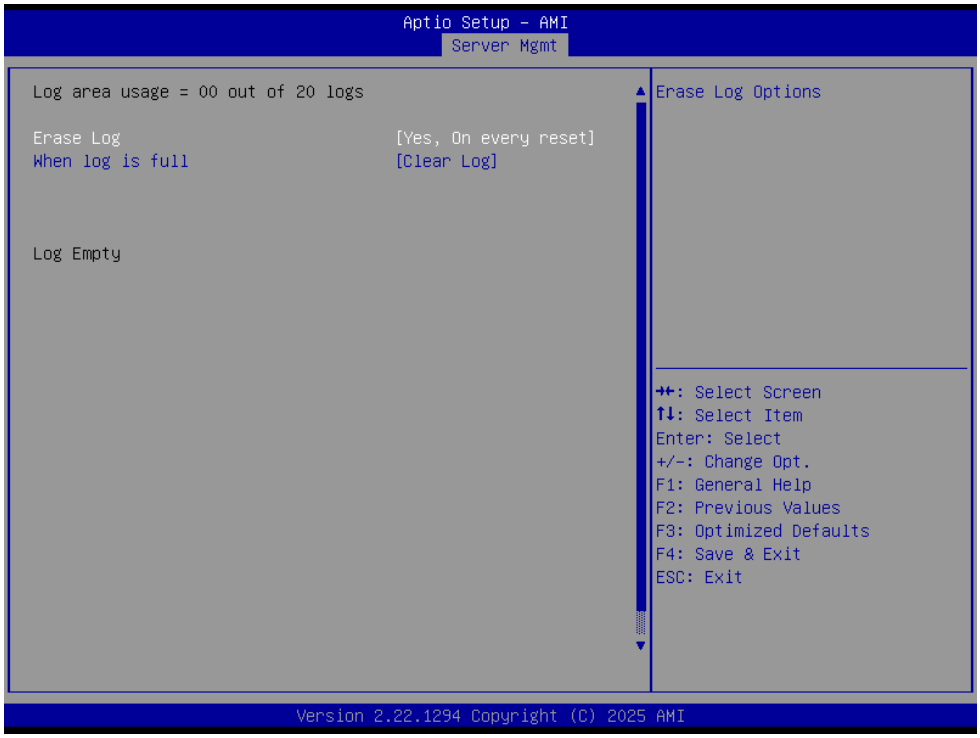
4.6.5.1 System Event Log



Item	Option	Description
SEL Components	Enabled**[Default]** Disabled	Change this to enable or disable event logging for error/progress codes during boot.
Erase SEL	No**[Default]** Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing**[Default]** Erase Immediately Delete Oldest Record	Choose options for reactions to a full SEL.
Log EFI Status Codes	Disabled	Disable the logging of EFI Status Codes or log

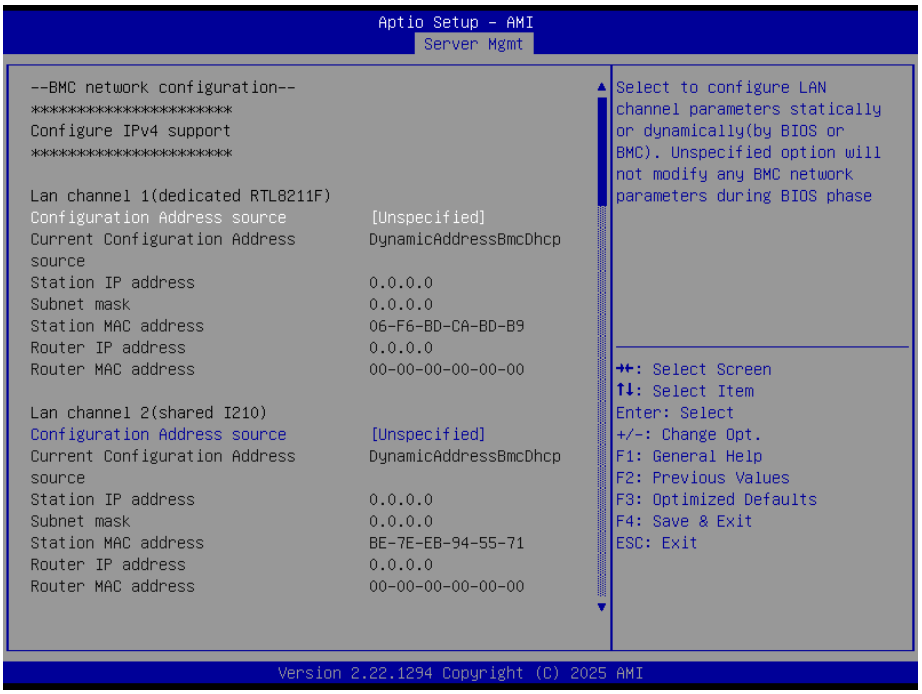
	Both Error code**[Default]** Progress code	only error code or only progress code or both.

4.6.5.2 Bmc self test log



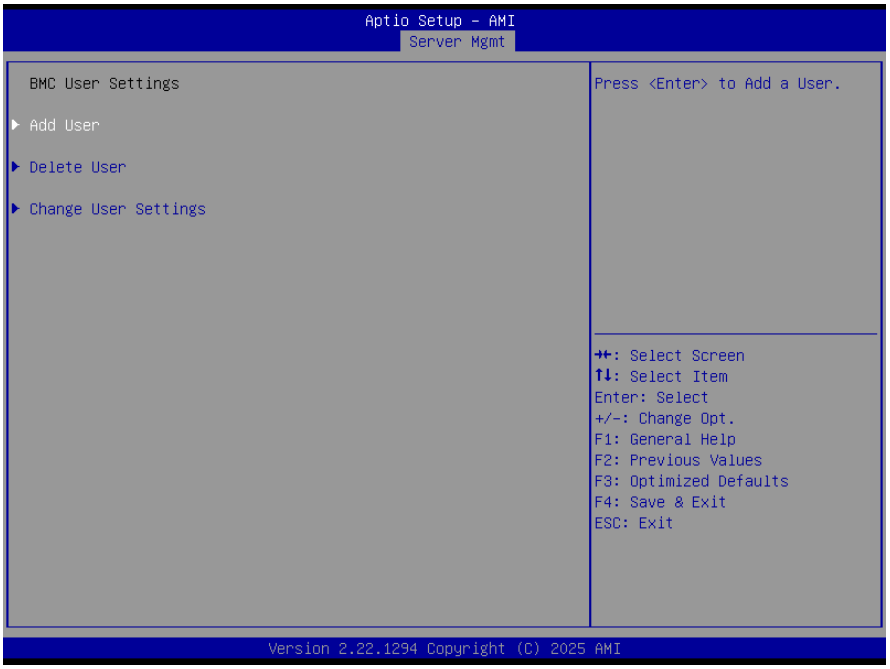
Item	Option	Description
Erase Log	Yes, On every reset**[Default]** No	Erase Log Options.
When log is full	Clear Log**[Default]** Do not log any more	Select the action to be taken when log is full.

4.6.5.3 BMC network configuration

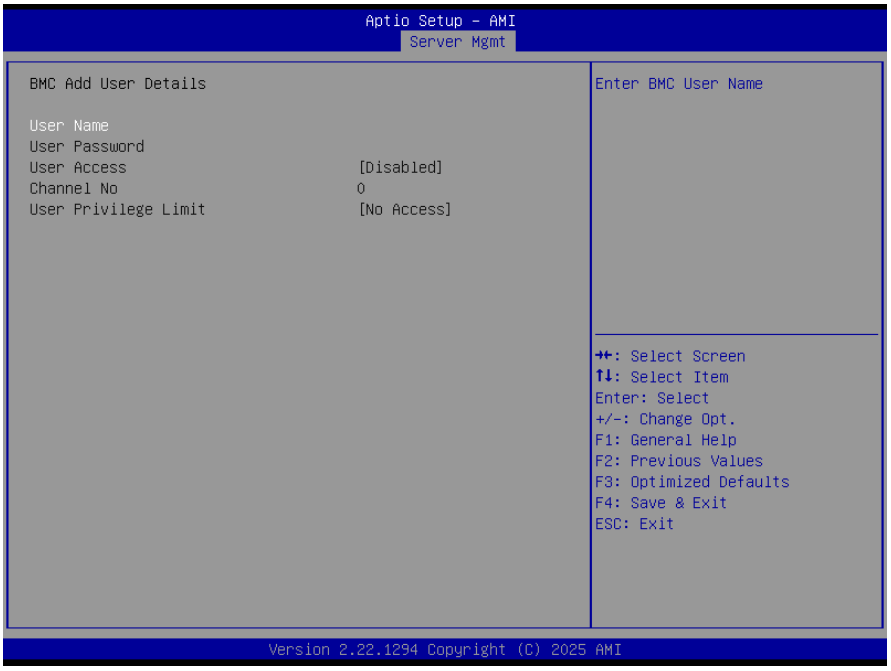


Item	Option	Description
Configuration Address source	Unspecified**[Default]** Static DynamicBmcDhcp DynamicBmcNonDhcp	Select configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.
Configuration Address source	Unspecified**[Default]** Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). Unspecified option will not modify any BMC network parameters during BIOS phase.

4.6.5.4 BMC User Settings

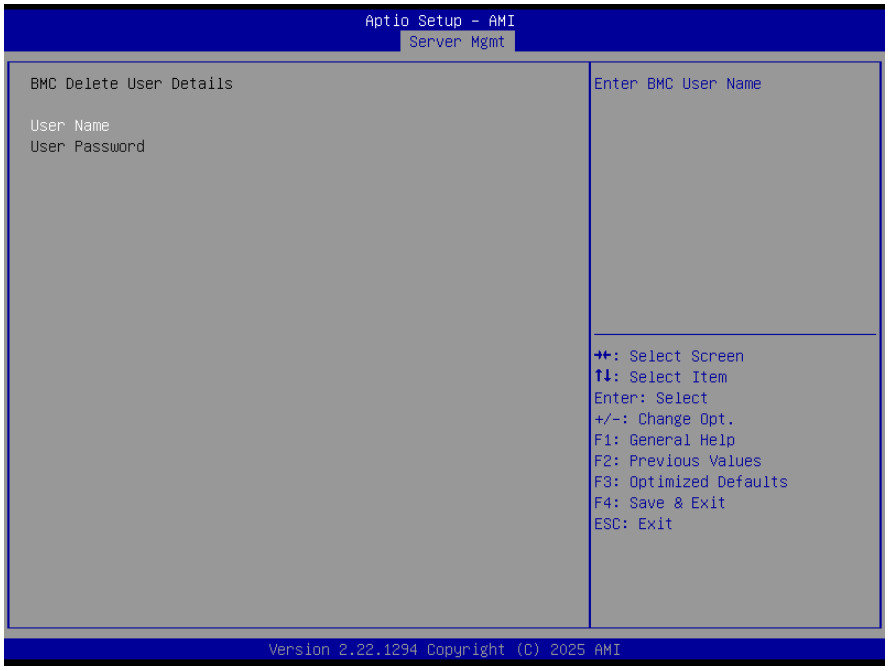


4.6.5.4.1 BMC Add User Details



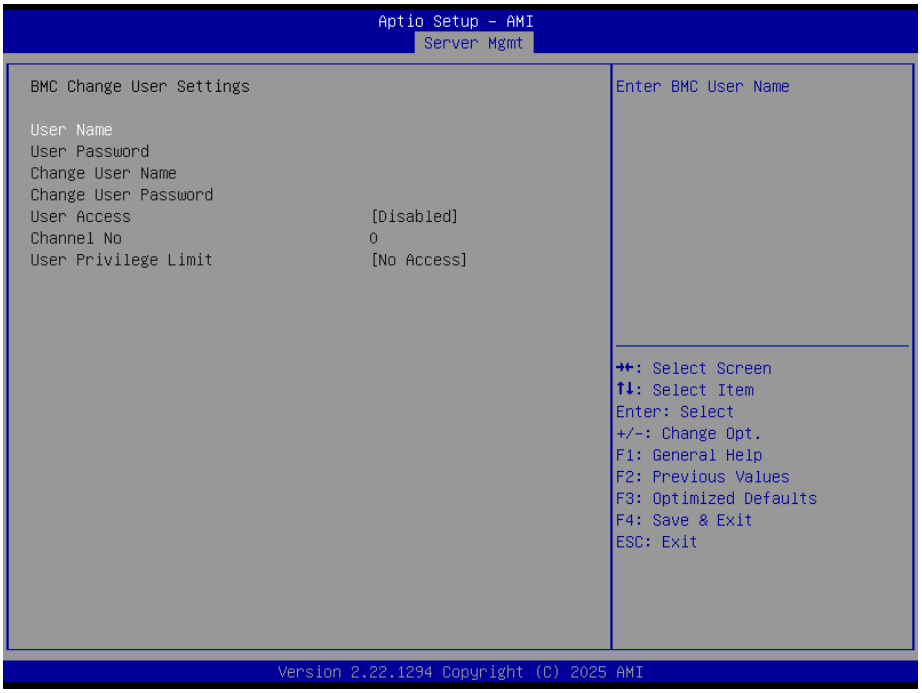
Item	Description
User Name	Enter BMC User Name.

4.6.5.4.2 BMC Delete User Details



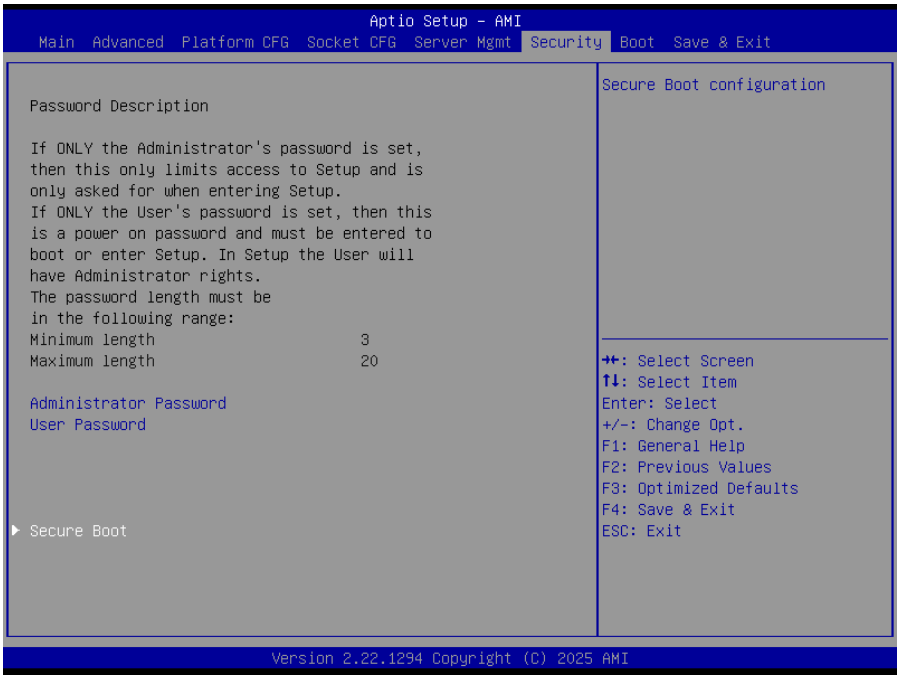
Item	Description
User Name	Enter BMC User Name.

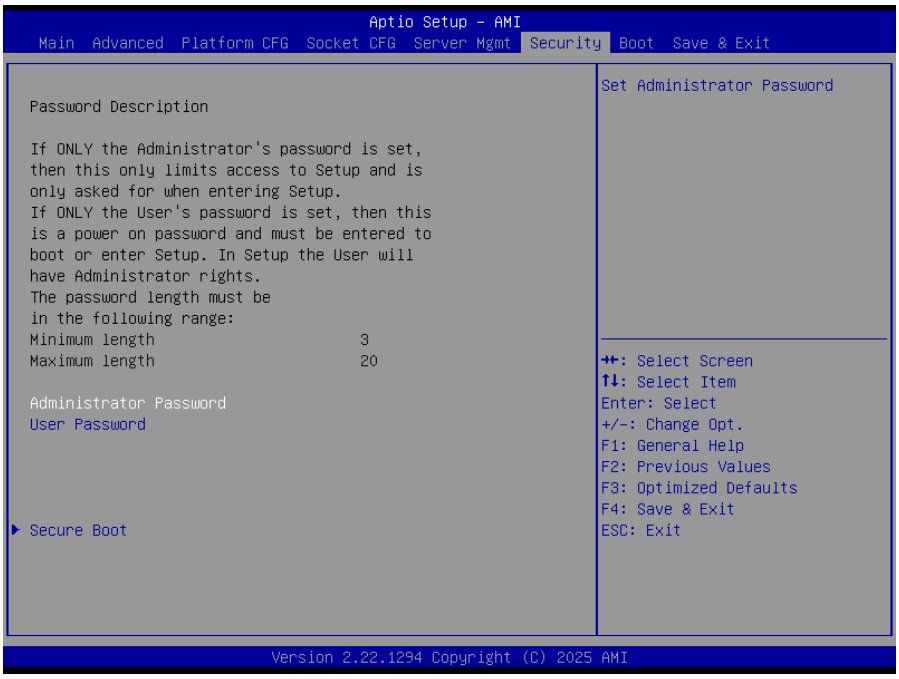
4.6.5.4.3 BMC Change User Settings



Item	Description
User Name	Enter BMC User Name.

4.6.6 Security





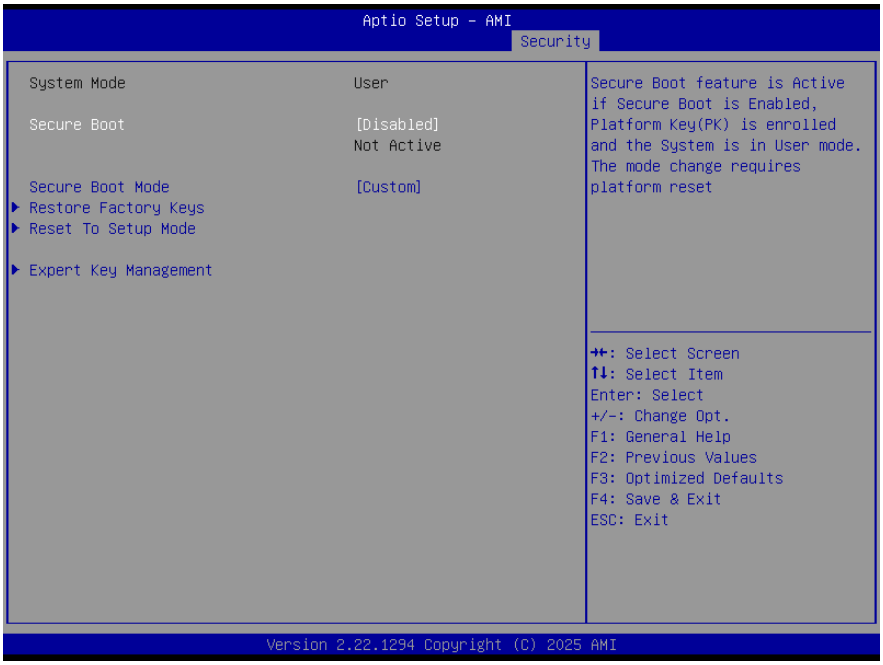
- **Administrator Password**

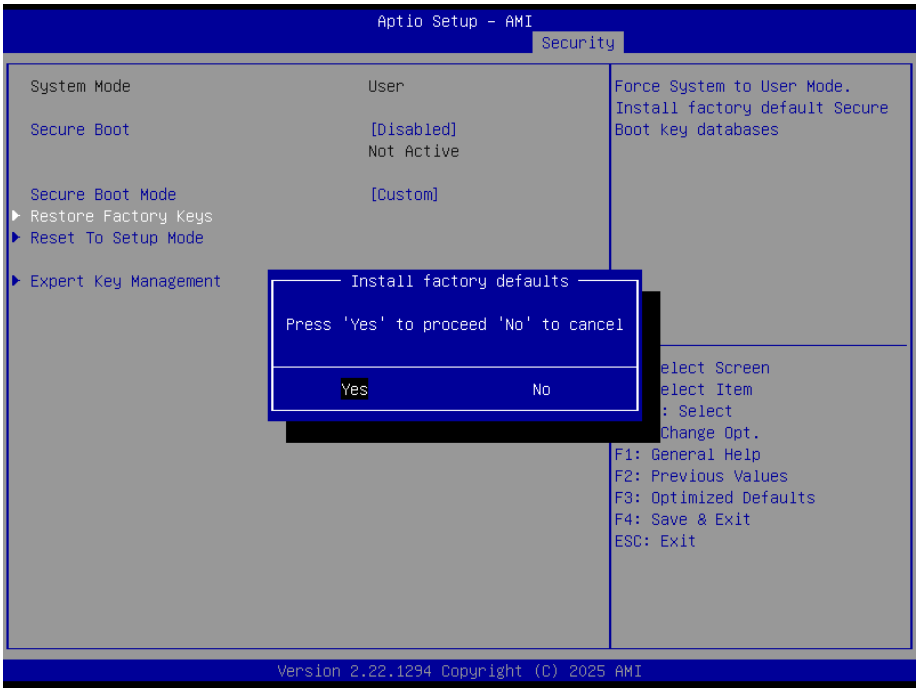
Set setup Administrator Password

- **User Password**

Set User Password

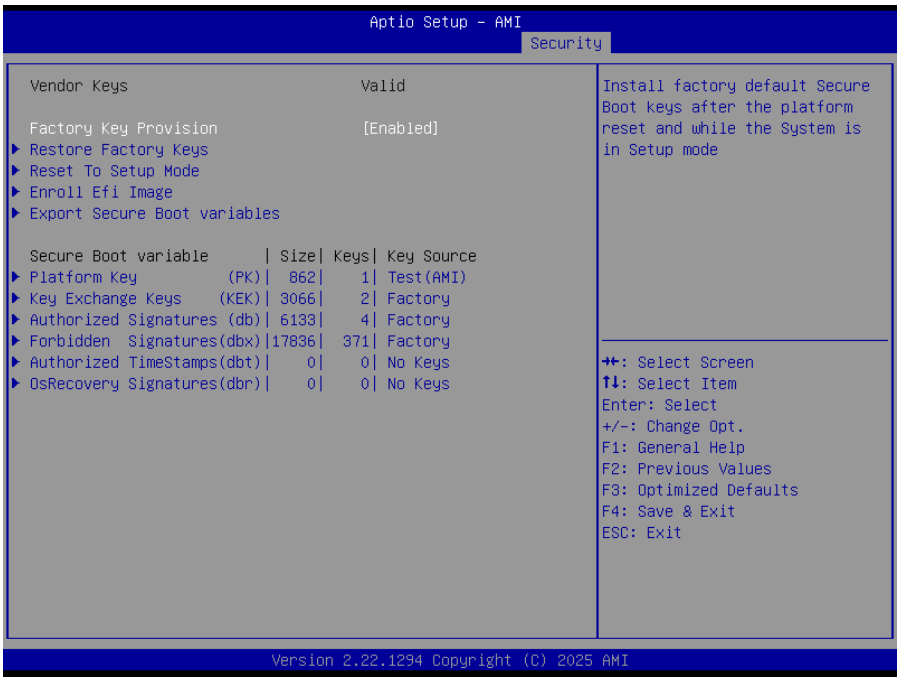
4.6.6.1 Secure Boot

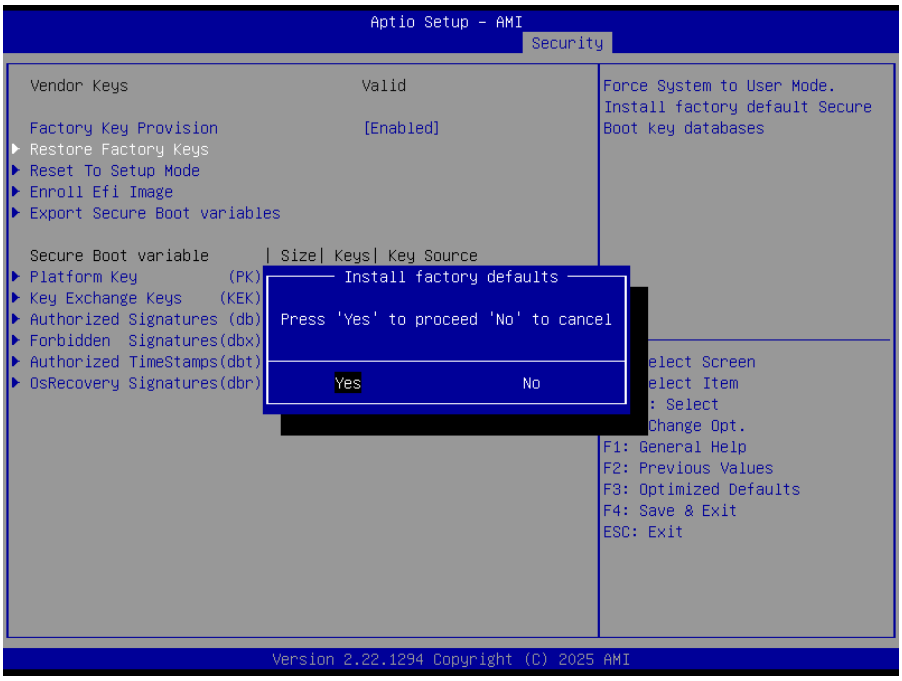


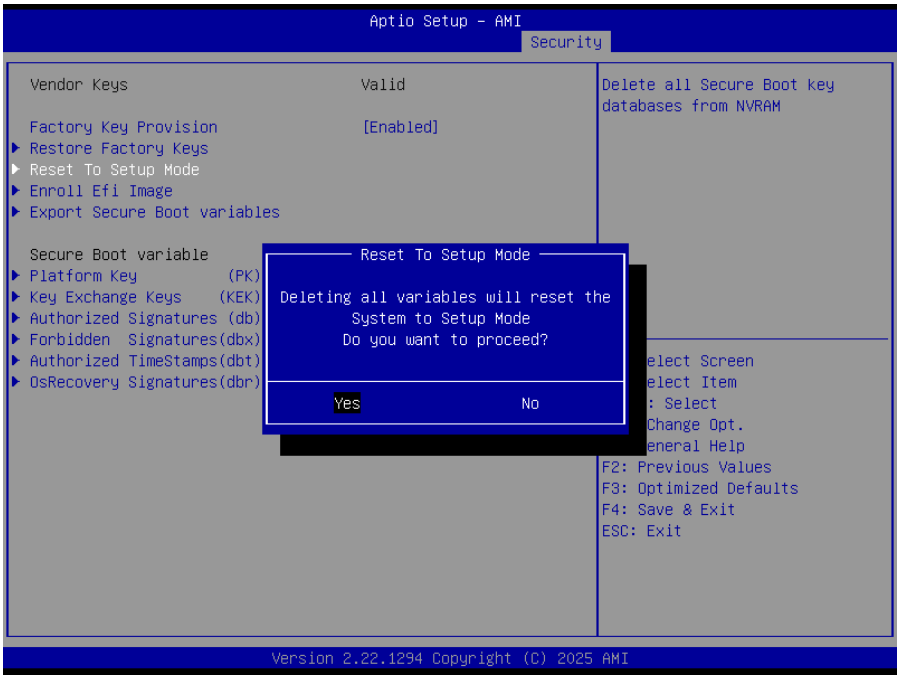


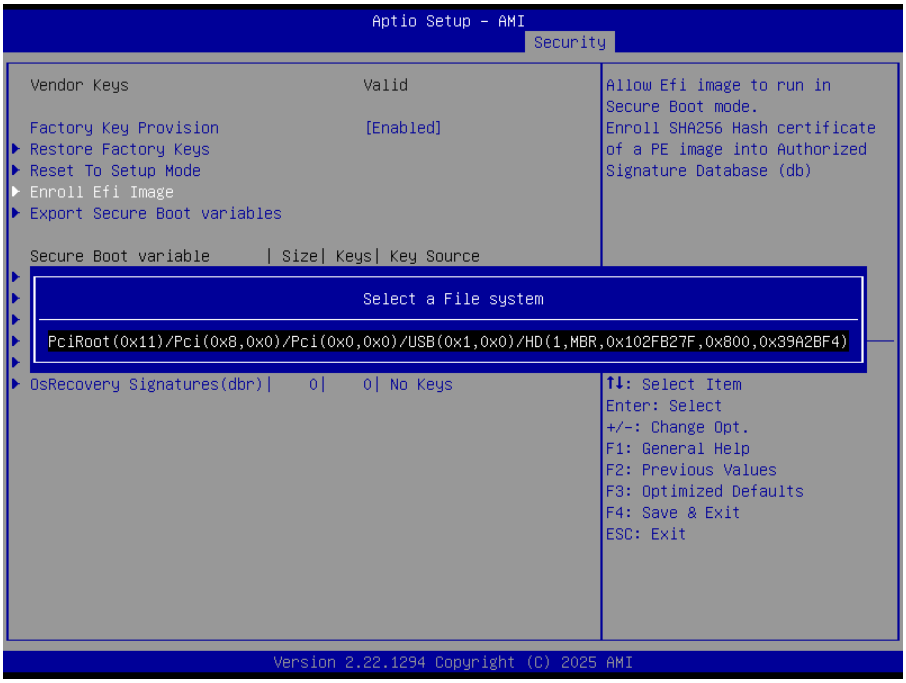
Item	Option	Description
Secure Boot	Disabled**[Default]** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.
Secure Boot Mode	Standard**[Default]** Custom	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

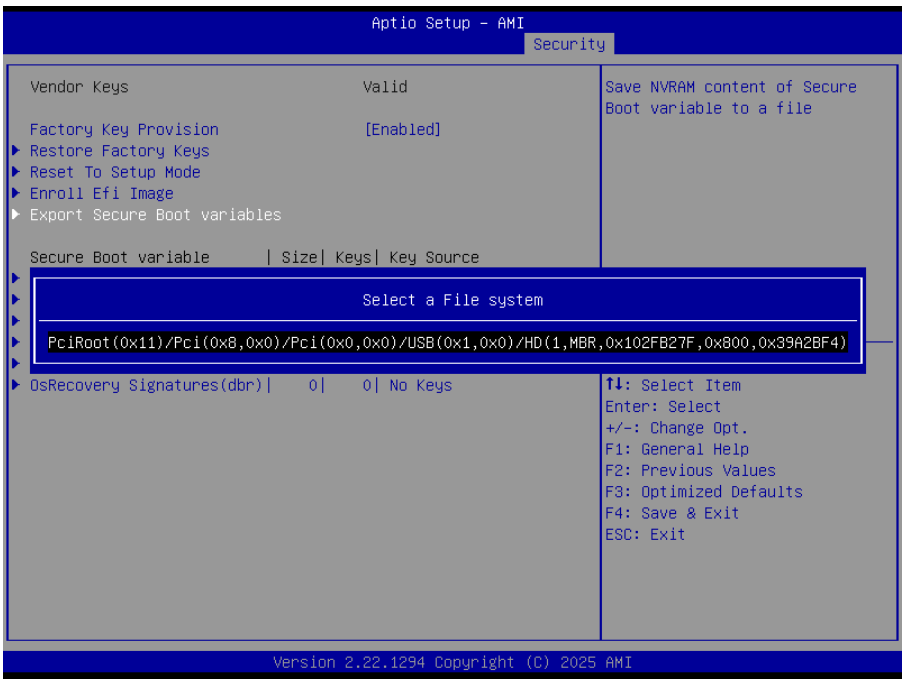
4.6.6.1.1 Expert Key Management





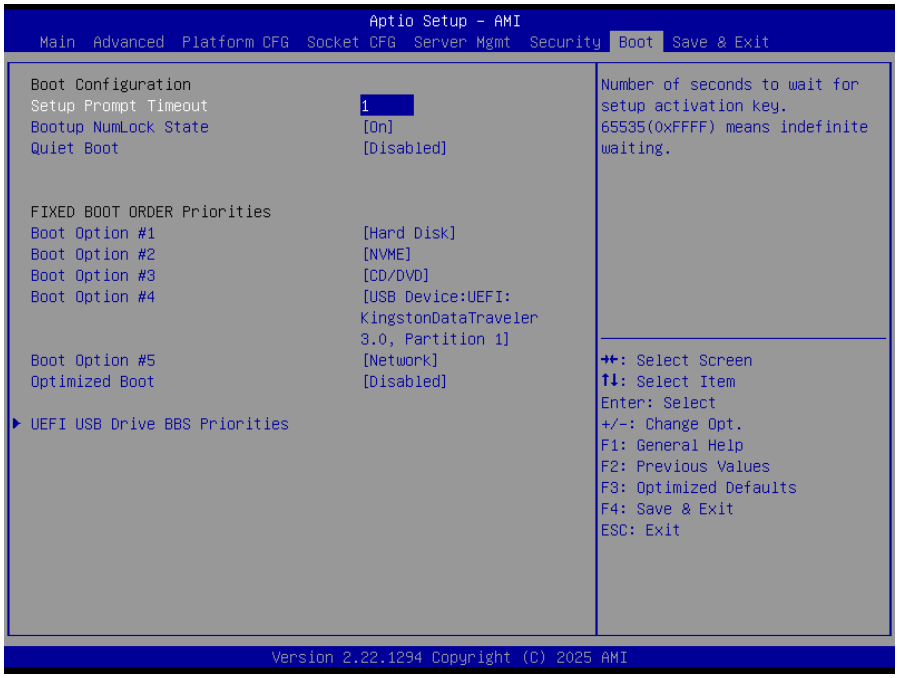

Aptio Setup – AMI
Security
Vendor Keys
Valid
Factory Key Provision
[Enabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable
Platform Key (PK)
Key Exchange Keys (KEK)
Authorized Signatures (db)
Forbidden Signatures(dbx)
Authorized TimeStamps(dbt)
OsRecovery Signatures(dbr)
Reset To Setup Mode
Deleting all variables will reset the System to Setup Mode
Do you want to proceed?
Yes
No
Delete all Secure Boot key databases from NVRAM
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1294 Copyright (C) 2025 AMI

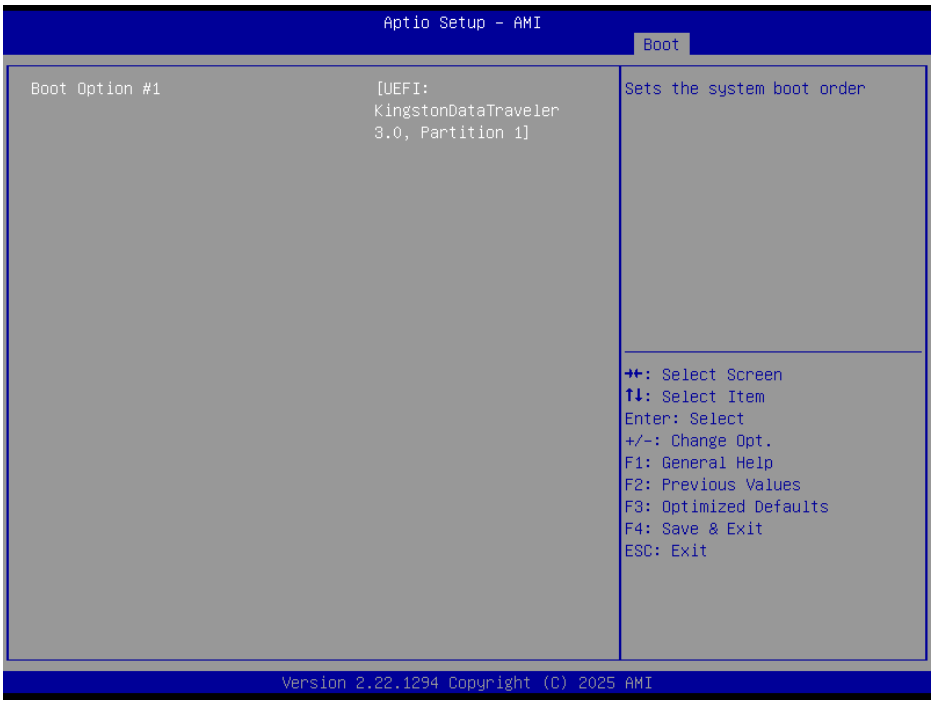

Aptio Setup – AMI
Security
Vendor Keys
Valid
Factory Key Provision
[Enabled]
Restore Factory Keys
Reset To Setup Mode
Enroll Efi Image
Export Secure Boot variables
Secure Boot variable | Size| Keys| Key Source
Select a File system
PciRoot(0x11)/Pci(0x8,0x0)/Pci(0x0,0x0)/USB(0x1,0x0)/HD(1,MBR,0x102FB27F,0x800,0x39A2BF4)
OsRecovery Signatures(dbr)| 0| 0| No Keys
Allow Efi image to run in Secure Boot mode.
Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1294 Copyright (C) 2025 AMI



Item	Option	Description
Factory Key Provision	Disabled**[Default]** Enabled	Install factory default Secure Boot keys after the platform reset and while the Sysstem is in Setup mode.

4.6.7 Boot

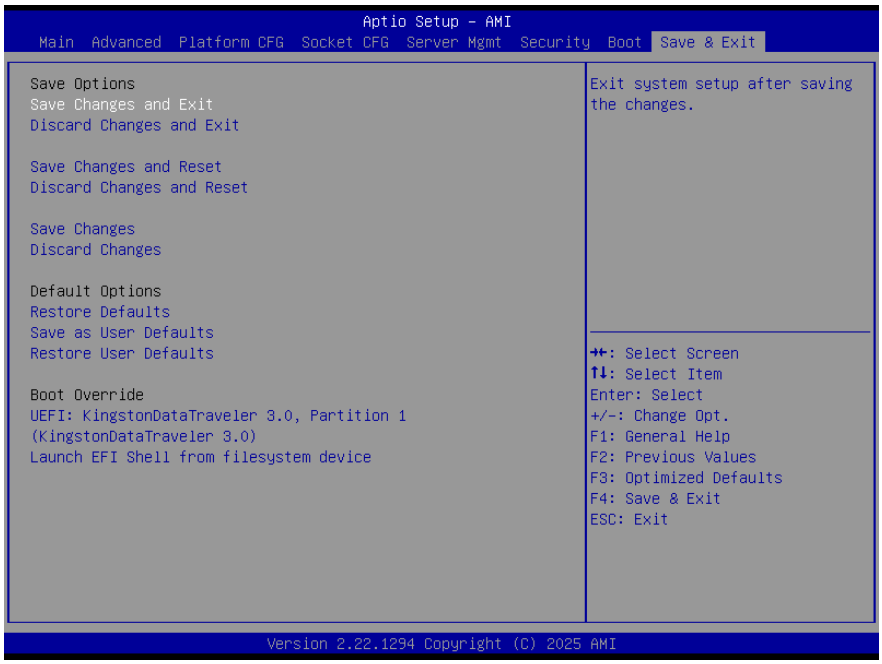


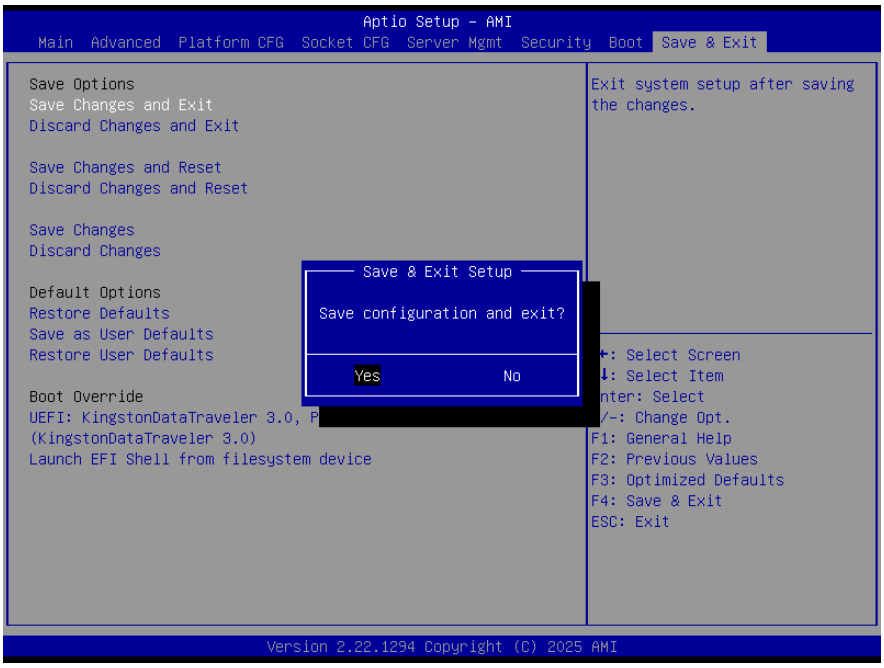


Item	Option	Description
Setup Prompt Timeout	1~ 65535	Set the default timeout before system boot. A value of 65535 will disable the timeout completely.
Bootup NumLock State	On**[Default]** Off	Select the keyboard NumLock state
Quiet Boot	Disabled**[Default]** Enabled	Enables or disables Quiet Boot option
Boot Option #1	Hard Disk**[Default]** NVME CD/DVD SD USB Device Network	Set the system boot order.
Boot Option #2	Hard Disk NVME**[Default]** CD/DVD SD USB Device Network	Set the system boot order.
Boot Option #3	Hard Disk NVME CD/DVD**[Default]** SD USB Device Network	Set the system boot order.
Boot Option #4	Hard Disk NVME CD/DVD SD**[Default]** USB Device	Set the system boot order.

	Network	
Boot Option #5	Hard Disk NVME CD/DVD SD USB Device Network**[Default]**	Set the system boot order.
Optimized Boot	Disabled**[Default]** Enabled	Enables or disables Optimized Boot. Enabling Optimized Boot will disable Csm support and disable connecting Network devices to decrease boot time. While disabling Optimized Boot, make sure to restore Csm Support option to previous value before enabling Optimized Boot.

4.6.8 Save and exit





4.6.8.1 Save Changes and Exit

Use the save changes and reset option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

4.6.8.2 Discard Changes and Exit

Use the Discard changes and Exit option to exit the system without saving the changes made to the BIOS configuration setup program.

4.6.8.3 Save Changes and Reset

Reset the system after saving the changes.

4.6.8.4 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.

4.6.8.5 Save Changes

Changes made to BIOS settings during this session are committed to NVRAM. The setup program remains active, allowing further changes.

4.6.8.6 Discard Changes

Any changes made to BIOS settings during this session of the BIOS setup program are discarded. The BIOS setup continues to be active.

4.6.8.7 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.

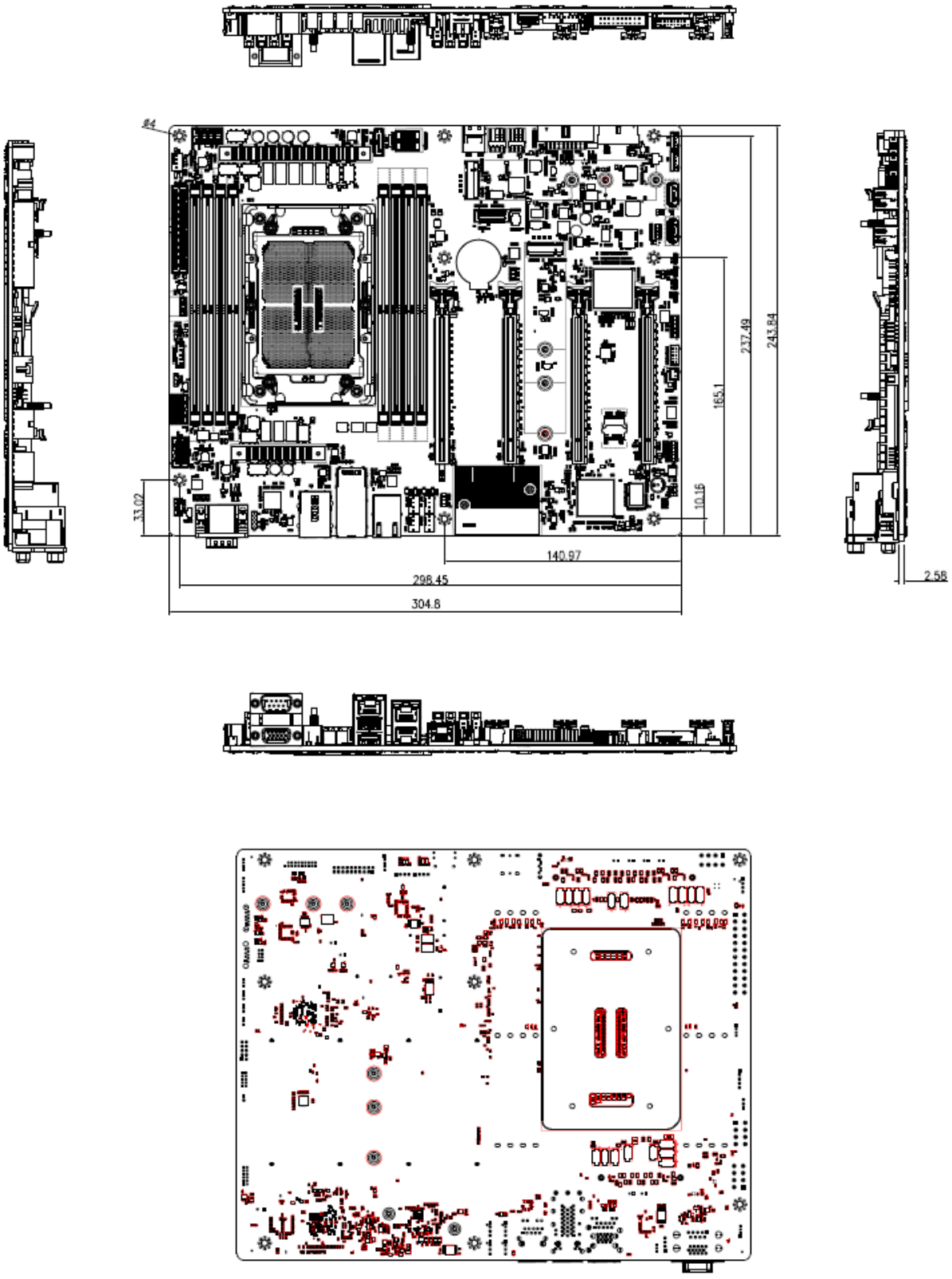
4.6.8.8 Save as User Defaults

This option saves a copy of the current BIOS settings as the User Defaults. This option is useful for preserving custom BIOS setup configurations.

4.6.8.9 Restore User Defaults

This option restores all BIOS settings to the user defaults. This option is useful for restoring previously preserved custom BIOS setup configurations.

5. Mechanical Drawing



Unit: mm

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.
- 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 PC before cleaning.
- If you dropped any material or liquid such as water onto the 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.

- Never spray or squirt liquids directly onto any other components.
- 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.

Basic Troubleshooting

PEI Beep Codes

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

DXE Beep Codes

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