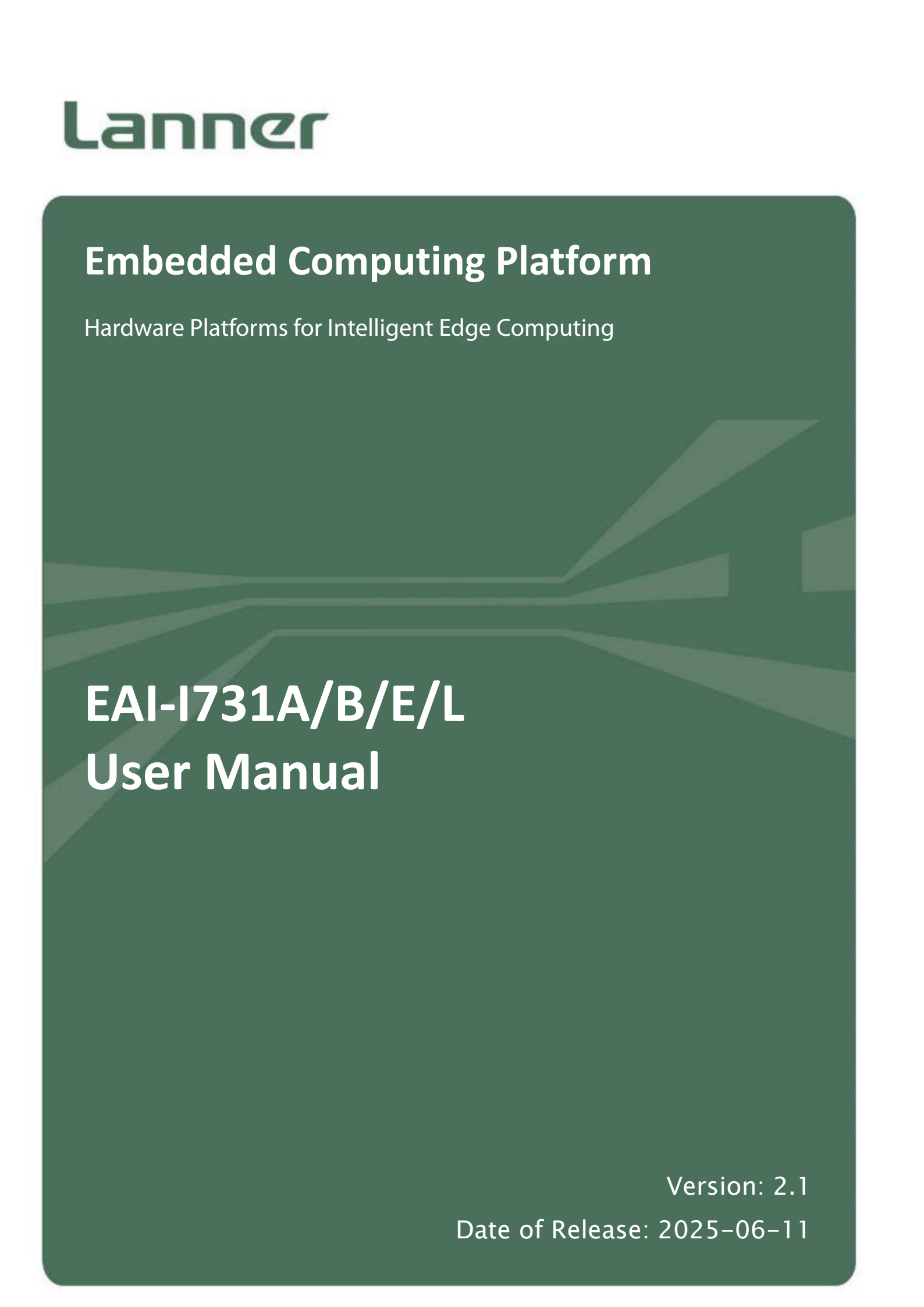




Lanner

Embedded Computing Platform

Hardware Platforms for Intelligent Edge Computing

EAI-I731A/B/E/L User Manual

Version: 2.1

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About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:

- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

The latest version of this document can be found on Lanner's official website, available either through the product page or through the [Lanner Download Center](#) page with a login account and password.

Icons Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:



Note: This mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.



Warning: This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

To obtain additional documentation resources and software updates for your system, please visit the [Lanner Download Center](#). As certain categories of documents are only available to users who are logged in, please register for a Lanner Account at <http://www.lannerinc.com/> to access published documents and downloadable resources.

Technical Support

In addition to contacting your distributor or sales representative, you could submit a request to our **Lanner Technical Support** at <http://www.lannerinc.com/technical-support> where you can fill in a support ticket to our technical support department.

Documentation Feedback

Your feedback is valuable to us, as it will help us continue to provide you with more accurate and relevant documentation. To provide any feedback, comments or to report an error, please email to contact@lannerinc.com. Thank you for your time.

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Federal Communication Commission Interference Statement

CE

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

FCC Class A

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

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

FCC Caution

- ▶ Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
- ▶ This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



Note

1. An unshielded-type power cord is required in order to meet FCC emission limits and also to prevent interference to the nearby radio and television reception. It is essential that only the supplied power cord be used.
2. Use only shielded cables to connect I/O devices to this equipment.
3. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



Important

1. Operations in the 5.15-5.25GHz band are restricted to indoor usage only.
2. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Safety Guidelines

Follow these guidelines to ensure general safety:

- ▶ Keep the chassis area clear and dust-free during and after installation.
- ▶ Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ▶ Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ▶ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ▶ Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ▶ Do not work alone if potentially hazardous conditions exist.
- ▶ Never assume that power is disconnected from a circuit; always check the circuit.
- ▶ This product is intended to be supplied by an UL Listed Power Adapter rated 24 Vdc, min. 9.17A, min. 40 degree C, 5000 m.
- ▶ The PoE networks without routing to the outside of plant that installation instructions clearly states; therefore, these circuits are not considered external circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

- ▶ Laissez la zone du châssis propre et sans poussière pendant et après l'installation.
- ▶ Ne portez pas de vêtements amples ou de bijoux qui pourraient être pris dans le châssis. Attachez votre cravate ou écharpe et remontez vos manches.
- ▶ Portez des lunettes de sécurité pour protéger vos yeux.
- ▶ N'effectuez aucune action qui pourrait créer un danger pour d'autres ou rendre l'équipement dangereux.
- ▶ Coupez complètement l'alimentation en éteignant l'alimentation et en débranchant le cordon d'alimentation avant d'installer ou de retirer un châssis ou de travailler à proximité de sources d'alimentation.
- ▶ Ne travaillez pas seul si des conditions dangereuses sont présentes.
- ▶ Ne considérez jamais que l'alimentation est coupée d'un circuit, vérifiez toujours le circuit. Cet appareil génère, utilise et émet une énergie radiofréquence et, s'il n'est pas installé et utilisé conformément aux instructions des fournisseurs de composants sans fil, il risque de provoquer des interférences dans les communications radio.

Lithium Battery Caution

- ▶ There is risk of explosion if Battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation only by a skilled person who knows all Installation and Device Specifications which are to be applied.
- ▶ Do not carry the handle of power supplies when moving to another place.
- ▶ Please conform to your local laws and regulations regarding safe disposal of lithium BATTERY.
- ▶ Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery can result in an explosion.
- ▶ Leaving a battery in an extremely high temperature surrounding environment 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.

Avertissement concernant la pile au lithium

- ▶ Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- ▶ Jetez les piles usagées conformément aux instructions.
- ▶ L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- ▶ Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- ▶ Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ▶ Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.

- ▶ Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- ▶ Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- ▶ L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- ▶ Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- ▶ Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- ▶ Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- ▶ Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precaution

The following should be put into consideration for rack-mount or similar mounting installations:

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- ▶ Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- ▶ Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- ▶ Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation & Operation:

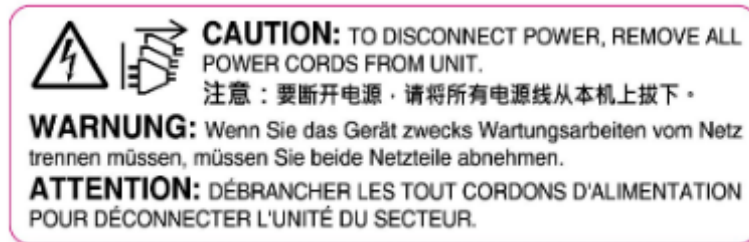
- ▶ This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée
- ▶ Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- ▶ The machine can only be used in a restricted access location and must be installed by a skilled person.
Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Warning

- ▶ This equipment must be grounded. The power cord for product should be connected to a socket-outlet with 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.
- ▶ Product shall be used with Class 1 laser device modules.

Avertissement

- ▶ Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.
- ▶ Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.



This equipment is for INDOOR USE ONLY

Electrical Safety Instructions

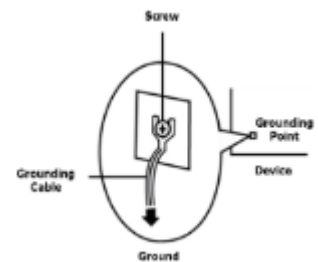
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm² or 10 AWG.

Consignes de sécurité électrique

- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- ▶ Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- ▶ Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm² ou 10 AWG.

Grounding Procedure for Power Source

- ▶ Loosen the screw of the earthing point.
- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before power.
- ▶ The cable should be 16 AWG



Procédure de mise à la terre pour source d'alimentation

- ▶ Desserrez la vis du terminal de mise à la terre.
- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation.
- ▶ Le câble doit être 16 AWG

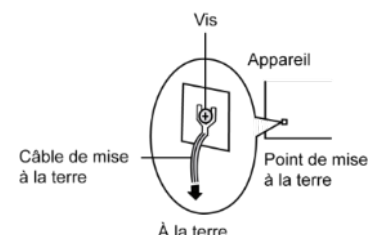


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CHAPTER 1: PRODUCT OVERVIEW

The EAI-I731, a standard product from Lanner, harnesses the power of the 12th/13th/14th Gen. Intel® i9/i7/i5/i3 Processor platform, offering optimized performance for industrial workstations' control systems. Packed with features, it includes DDR5 SO-DIMM slots, along with connectivity options like 1x HDMI and 1x DP 1.4 for displays, 2x 2.5GbE LAN ports for fast networking, and 1x PCIe x16 slot and 1x PCIe x4 slot for expansion.

The EAI-I731E, a GPU intelligent edge computing appliance with NVIDIA® A2 GPU support, harnesses the power of the 13th Gen. Intel® i7-13700TE Processor platform, offering optimized performance for industrial workstations' control systems.

The EAI-I731L, a GPU intelligent edge computing appliance with NVIDIA® L4 GPU support, harnesses the power of the 13th Gen. Intel® i7-13700TE Processor platform, offering optimized performance for industrial workstations' control systems.

Key Features

- ▶ 12th/13th/14th Gen. Intel® Core i9/i7/i5/i3 Processors
- ▶ DDR5 SODIMM, up to 96GB
- ▶ 2x 2.5GbE RJ45, 1x RJ45 Console, 1x RJ45 LOM (By SKU)
- ▶ 2x COM Ports, 8x USB 3.2 (Gen2, Type A) Ports, 1x HDMI, 1x DP, 4x DI & DO
- ▶ 2x 2.5" Removable HDD/SSD, 1x M.2 2280 M-Key for NVMe, 2x M.2 2242 M-Key for SATA
- ▶ 1x PCIe*16 Gen4; 1x PCIe*4 Gen3; 1x M.2 2242/2280 E-Key for Wi-Fi, 1x M.2 3042/3052 B-Key for LTE/5G, 1x Nano-SIM

Package Content

Your package contains the following items:

- ▶ 1x EAI-I731 AI Platform
- ▶ 1x Terminal Block for Power (4-Pin*1); 1x Terminal Block for DIO
- ▶ 1x Mount Bracket Set

Ordering Information

SKU	CPU	Memory	Storage	Ethernet	IPMI	Console
EAI-I731A	12th/13th/14th Gen. Intel® Core i9/i7/i5/i3	2x DDR5 SODIMM, 5600MHz	2x 2.5" Removable HDD/SSD 1x M.2 M-Key for NVMe 2x M.2 B-Key for SATA	2x 2.5GbE RJ45	Yes (AST2600)	1x RJ45
EAI-I731B					N/A	N/A

SKU	CPU	GPU	Memory	Storage	Ethernet	SDK
EAI-I731E	13th Gen. Intel® i7-13700TE	NVIDIA® A2 60W	2x DDR5 5600MHz SODIMM, (1x 32GB Default)	2x M.2 M-Key for SATA, 1x M.2 M-Key for NVMe, 2x 25" SATA Drive Bay	2x 2.5GbE RJ45	Intel® Open VINO, NVIDIA® AI Stacks
EAI-I731L	13th Gen. Intel® Core i7-13700TE	NVIDIA® L4 72W	2x DDR5 5600MHz SODIMM, (1x 48GB Default)	2x M.2 M-Key for SATA, 1x M.2 M-Key for NVMe, 2x 25" SATA Drive Bay	2x 2.5GbE RJ45	Intel® Open VINO, NVIDIA® AI Stacks

Additional Accessories

Model	Description
Wi-Fi Antenna Kit	Antenna kit with cables, antennas, washer/nuts (without Wi-Fi Module Card)
LTE/5G Antenna Kit	Antenna kit with cables, antennas, washer/nuts (without LTE Module Card)

AVL List: GPU Modules (Intake Fan)

	Model No.
1	NVIDIA RTX 4000 SFF Ada
2	NVIDIA RTX 2000 Ada
3	NVIDIA RTX A1000
4	NVIDIA A400
5	NVIDIA A380E ATX
6	NVIDIA A380E LP

Specifications

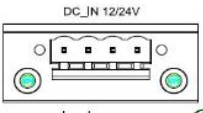
Processor System	CPU	12th/13th/14th Gen Intel® Core i9/i7/i5/i3
	CPU TDP	35W / 45W / 60W / 65W
	CPU Socket	FCLGA1700
	Chipset	Intel® R680E
	BIOS	AMI SPI Flash BIOS
Memory	Technology	DDR5 5600Mhz ECC/Non-ECC SODIMM
	Max. Capacity	Up to 96GB
	Socket	2x 262-Pin SODIMM
Networking	Controller	Intel® i226IT
	Speed	100M/1G/2.5GbE
	Interface	2x 2.5GbE RJ45 Ports
	LOM	1x GbE RJ45 MGMT Port (By SKU)
Storage	HDD/SSD Support	2x 2.5" Removable HDD/SSD Trays
	M.2 Slot	1x M.2 2280 M-Key for NVMe; 2x M.2 2242 B-Key for SATA
I/O Interface	Reset Button	1x Reset Button
	Power Button	1x Power ON/OFF Button
	LED Indicator	COM Status/Programmable/ Storage Status LED (SKU A ONLY)
	Console Port	1x GbE RJ45 MGMT Port (SKU A ONLY)
	Serial Port	2x DB9 Male RS-232/422/485 (COM1/COM2)
	DIO	1x 2x6-Pin Terminal Block for 4x DI & 4x DO
	Audio Port	1x Mic-In; 1x Line-Out
	USB Port	8x USB 3.2 Gen1 Type A
	Display Port	1x HDMI 2.0 Port; 1x DP 1.4 Port
	Antenna	6x Antenna Holes for Wi-Fi & LTE/5G
Expansion Interface	M.2 Slot	1x M.2 2230 E-Key for Wi-Fi 6/6E (BT); 1x M.2 3042/3052 B-Key for LTE/5G
	PCIe Slot	1x PCIe*16 Gen4; 1x PCIe*4 Gen3
	SIM Card Slot	1x Nano-SIM (each for LTE/5G Module)
Cooling	Processor	Passive CPU Heatsink
	Fan	2x Smart Fans for PCIe Expansion
Power	Type/Watts	300W
	Connector	1x 1x4 Terminal Block (No Adapter Included)
	Input	12/24 VDC, 27.7A / 13.89A
Miscellaneous	Watchdog Timer	Yes
	Internal RTC w/ Li Battery	Yes
	TPM	TPM 2.0 Onboard
Environment Parameters	Operating Temperature	-25°C~65°C with 35W CPU & without PCIe Expansion Card; -25°C~45°C with 65W CPU & without PCIe Expansion Card
	Storage Temperature	-40°C~85°C
	Relative Humidity (RH)	5%~90% Operating; 5%~95% Non-Operating;
System Dimensions	Dimension (WxDxH)	190mm x 286mm x 250mm
	Weight	8 KG
Package Dimensions	Dimension (WxDxH)	TBD
	Weight	TBD

Software Support	Linux OS	Debian 11 Pre-installed; Ubuntu 20.04
	Windows OS	Windows 10 IoT
Certification	EMC	RoHS, UKCA, CE/FCC Class A, UL, CB

NOTE: When the OS is installed on a 2.5" SSD, Intel® RAID is NOT supported.

Front Panel



No.	Description	
F1	Power Button	1x ON/OFF Power Button
F2	Reset Button	1x Reset Button
F3	LED Indicators	LED Indicators, refer to Appendix A
F4	Audio Port	1x Mic-In & 1x Line-Out
F5	COM Port	2x DB9 for RS-232/422/485
F6	LAN Port	2x GbE Ethernet Ports
F7	USB Port	8x USB 3.2 Ports
F8	Display Port	1x DP 1.4 Port
F9	HDMI Port	1x HDMI Type A Port
F10	LOM Port	1x LOM Port for IPMI (SKU A Only)
F11	Console Port	1x Console Port (SKU A Only)
F12	DIO	1x 2x6-Pin Terminal Block for 4x DI & 4x DO
F13	HDD/SSD Bay	2x 2.5" Removable HDD/SSD Trays
F14	PCIe Expansion	1x PCIe*16 Gen4; 1x PCIe*4 Gen3
F15	Power Input	1x 1x4 Terminal Block 

Rear & Side Panel



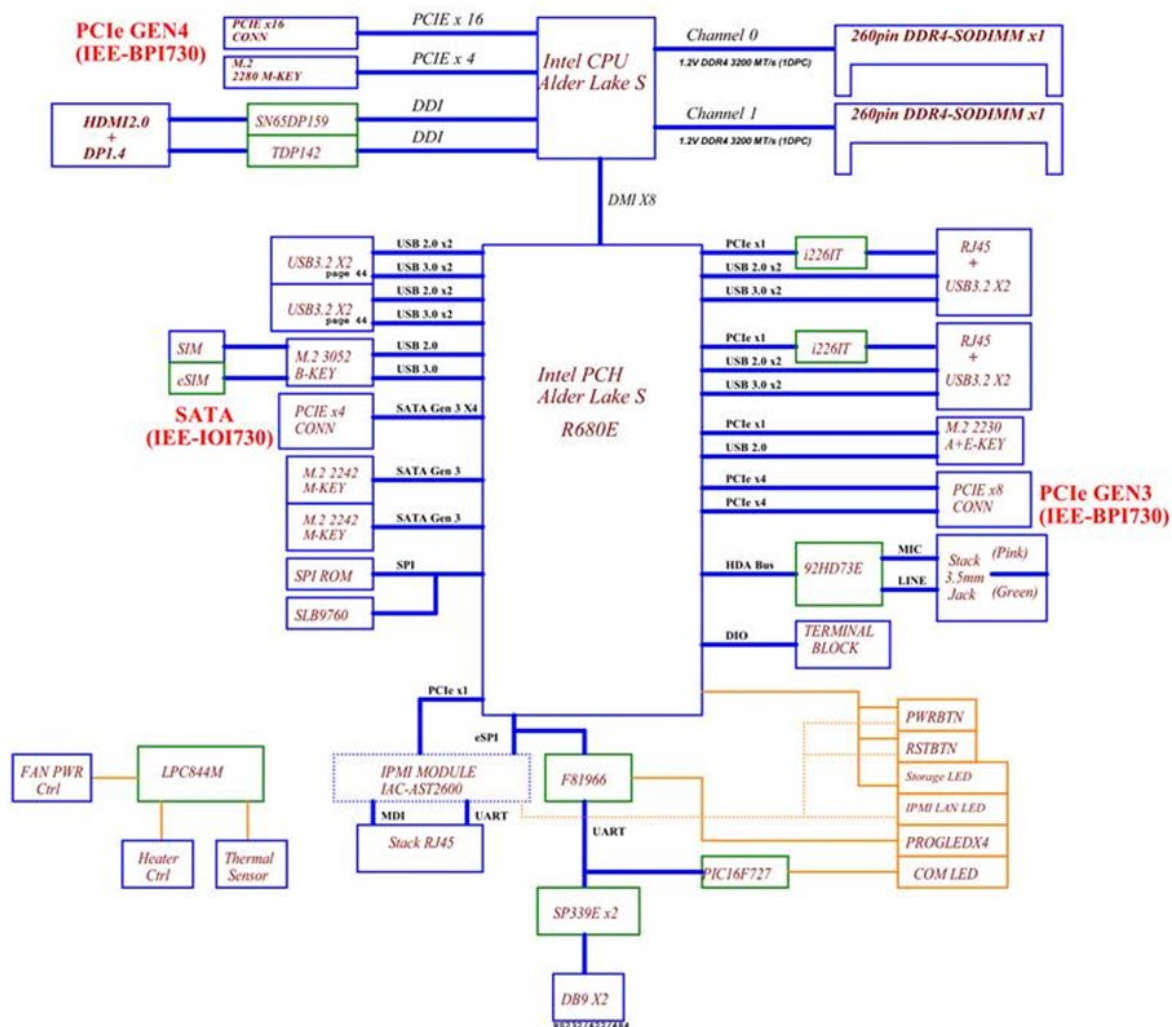
No.	Description	
R1	Fan	2x Smart Cooling Fans

No.	Description	
S1	Antenna Hole	6x Antennas Holes for Wi-Fi & LTE/ 5G Modules

Motherboard Information

Block Diagram

The block diagram indicates how data flows among components on the motherboard.



Internal Jumpers and Connector

The pin headers on the motherboard are often associated with important functions. With the shunt (Jumper) pushed down on the designated pins (the pin numbers are printed on the circuit board, surrounding the pin header), certain feature can be enabled or disabled. When changing the jumpers, make sure your system is completely turned off.

JRTC1: RTC Reset (1x3, 2.54mm, DIP)

Pin	Description
1-2 (Default)	Normal
2-3	Clear RTC



JMOS1: CMOS Clear (1x3, 2.54mm, DIP)

Pin	Description
1-2 (Default)	Normal
2-3	Clear CMOS



JRST1: HW/SW Reset Selection (1x3, 2.54mm, DIP)

Pin	Description
1-2 (Default)	HW reset
2-3	SW reset



JSPKR1: Buzzer & HW Strap Selection (1x3, 2.54mm, DIP)

Pin	Description
1-2 (Default)	Buzzer
2-3	HW Strap



J13: Power Sequence Control (1x3, 2.00mm, DIP)

Pin	Description
1-2 (Default)	Force enable +P5V_A
2-3	+P5V_A control by MCU

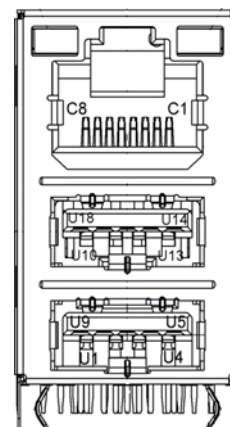


ATX1: 8-Pin Power Connector (4.2mm)

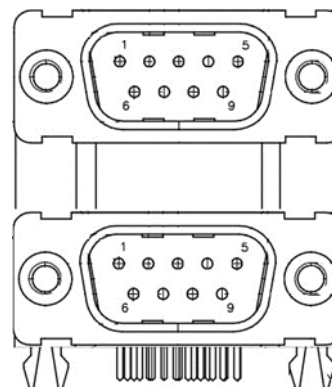
Pin	Description	Pin	Description
1	GND	2	+P12V_A
3	GND	4	+P12V_A
5	GND	6	+P12V_A
7	GND	8	+P12V_A

COMBO1/2: 2.5G RJ45 w/ Xformer & Dual USB 3.0

Pin	Signal	In/Out
C1	LAN*_MDI0P	
C2	LAN*_MDI0N	
C3	LAN*_MDI1P	
C4	LAN*_MDI1N	
C5	LAN*_MDI2P	
C6	LAN*_MDI2N	
C7	LAN*_MDI3P	
C8	LAN*_MDI3N	
U10	+USB*_PW	
U11	USB2_*-	
U12	USB2_*+	
U13	GND	
U14	USB3_R(*+1)-	
U15	USB3_R(*+1)+	
U16	GND	
U17	USB3_T(*+1)-	
U18	USB3_T(*+1)+	
U1	USB2_*-	
U2	USB2_*+	
U3	GND	
U4	USB3_R*-	
U5	USB3_R*+	
U6	GND	
U7	USB3_T*-	
U8	USB3_T*+	
U9	USB2_*-	

**COM2: Male Stack DB9 CONN**

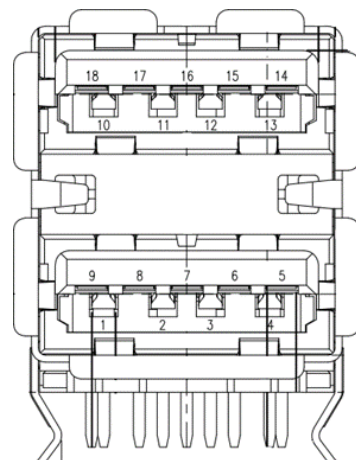
Pin	Pin RS-232	Pin RS-422	Pin RS-485
1	COM_DCD#x	TX-	RTX-
2	COM_RXDx	TX+	RTX+
3	COM_TXDx	RX+	
4	COM_DTR#x	RX-	
5	GND		
6	COM_DSR#x		
7	COM_RTS#x		



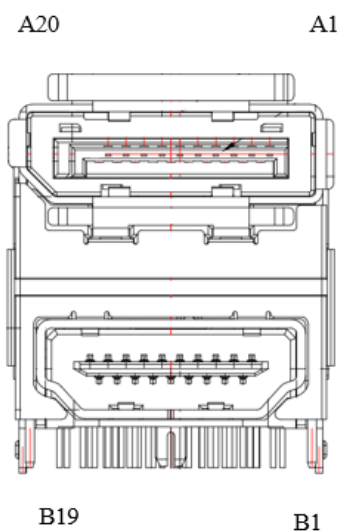
8	COM_CTS#x		
9	COM_RI#x		

USB1/2: USB 3.0 Dual CONN

Pin	Description	Pin	Description
1	+USB*_PW	10	+USB(*+1)_PW
2	USB2_*-	11	USB2_(*+1)-
3	USB2_*+	12	USB2_(*+1)+
4	GND	13	GND
5	USB3_R*-	14	USB3_R(*+1)-
6	USB3_R*+	15	USB3_R(*+1)+
7	GND	16	GND
8	USB3_T*-	17	USB3_T(*+1)-
9	USB3_T*+	18	USB3_T(*+1)+

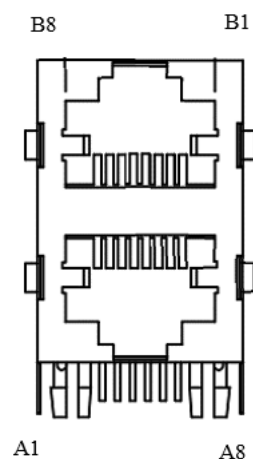
**CN1: DIP HDMI CONN**

Pin	Description	Pin	Description
A1	DP_TXP0	B1	HDMI_DATA2_DP
A2	GND	B2	GND
A3	DP_TXN0	B3	HDMI_DATA2_DN
A4	DP_TXP1	B4	HDMI_DATA1_DP
A5	GND	B5	GND
A6	DP_TXN1	B6	HDMI_DATA1_DN
A7	DP_TXP2	B7	HDMI_DATA0_DP
A8	GND	B8	GND
A9	DP_TXN2	B9	HDMI_DATA0_DN
A10	DP_TXP3	B10	HDMI_CLK_DP
A11	GND	B11	GND
A12	DP_TXN3	B12	HDMI_CLK_DN
A13	AUX_DDC_EN_N	B13	NC
A14	CONFIG2	B14	NC
A15	CTRLCLK_AUXP	B15	HDMI_SCL
A16	GND	B16	HDMI_SDA
A17	CTRLDATA_AUXN	B17	GND
A18	DP_HPD	B18	P5V
A19	GND	B19	HDMI_HPD
A20	P3V		

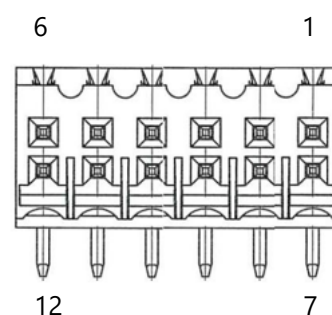


RJ1: Dual RJ45 without LED & Xformer

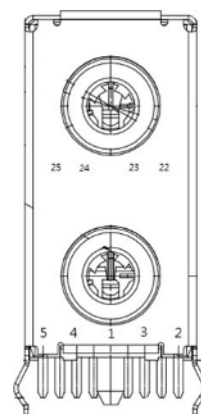
Pin	Description	Pin	Description
A1	RS_RTS#	B1	BMC_MDX_P0
A2	NC	B2	BMC_MDX_N0
A3	RS_SOUT	B3	BMC_MDX_P1
A4	GND	B4	BMC_MDX_P2
A5	GND	B5	BMC_MDX_N2
A6	RS_SIN	B6	BMC_MDX_N1
A7	NC	B7	BMC_MDX_P3
A8	RS_CTS#	B8	BMC_MDX_N3

**CN2: Terminal Block (3.5mm, 2x6mm Pitch)**

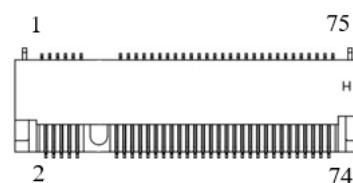
Pin	Description	Pin	Description
1	GND	7	GND
2	GND	8	GND
3	DI_3	9	DO_3
4	DI_2	10	DO_2
5	DI_1	11	DO_1
6	DI_0	12	DO_0

**AUDIO1: Dual Audio Phone Jack (3.5mm)**

Pin	Description	Pin	Description
1	GND	22	FRONT_L
2	MIC_L	23	GND
3	GND	24	FRONT_JD
4	MIC_JD	25	FRONT_R
5	MIC_R		

**NGFF5: M.2 B-Key for 5G/LTE**

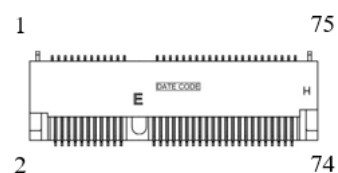
Pin	Description	Pin	Description
1	M2_CFG3	2	P3V3
3	GND	4	P3V3
5	GND	6	PWROFF#
7	USB2_D+	8	NC
9	USB2_D-	10	LED#
11	GND	20	PCIE_DIS
21	M2_CFG0	22	VBUS_SENSE
23	NC	24	NC



25	NC	26	NC
27	GND	28	UIM_VPP
29	USB3_RX-	30	UIM_RST
31	USB3_RX+	32	UIM_CLK
33	GND	34	UIM_DATA
35	USB3_TX-	36	UIM_PWR
37	USB3_TX+	38	NC
39	GND	40	NC
41	NC	42	NC
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	M2_PESSET#(RSVD)	68	NC
69	M2_CFG1	70	P3V3
71	GND	74	P3V3
73	GND		
75	M2_CFG2		

NGFF3: M.2 E-Key for Wi-Fi

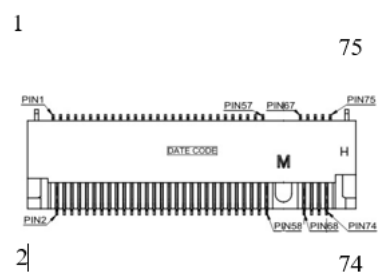
Pin	Description	Pin	Description
1	GND	2	P3V3
3	USB2_D+	4	P3V3
5	USB2_D-	6	LED#
7	GND	8	NC
9	NC	10	NC
11	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	GND



27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	PCIE_TXP	36	NC
37	PCIE_TXN	38	NC
39	GND	40	NC
41	PCIE_RXP	42	NC
43	PCIE_RXN	44	NC
45	GND	46	NC
47	REF_CLKP	48	NC
49	REF_CLKN	50	SUSCLK
51	GND	52	PERST#
53	CLKREQ0#	54	BT_RF_KILL_N
55	PCIE_WAKE#	56	WIFI_RF_KILL_N
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	74	P3V3
73	NC		
75	GND		

NGFF2/4: M.2 M-Key for SATA Storage

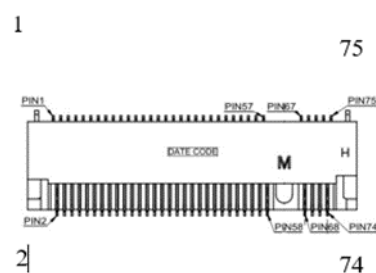
Pin	Description	Pin	Description
1	GND	2	+P3V3_S
3	GND	4	+P3V3_S
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	20	+P3V3_S
21	NC	22	+P3V3_S
23	GND	24	+P3V3_S
25	NC	26	+P3V3_S
27	NC	28	NC



29	GND	30	NC
31	NC	32	NC
33	NC	34	NC
35	GND	36	NC
37	NC	38	NC
39	NC	40	NC
41	GND	42	NC
43	NC	44	NC
45	NC	46	NC
47	GND	48	NC
49	SATA_RXP	50	NC
51	SATA_RXN	52	NC
53	GND	54	NC
55	SATA_TXN	56	NC
57	SATA_TXP	58	NC
59	GND	60	NC
61	NC	62	NC
63	NC	64	NC
65	GND	66	NC
67	NC	68	NC
69	GND	70	+P3V3_S
71	GND	74	+P3V3_S
73	GND		
75	GND		

NGFF1: M.2 M-Key for PCIe NVMe Storage

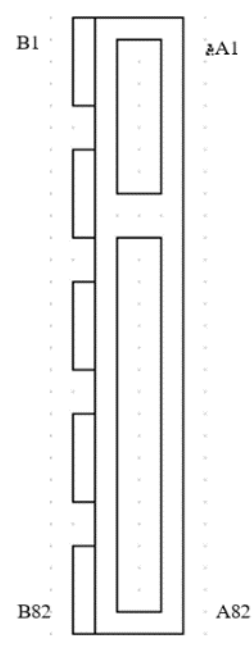
Pin	Description	Pin	Description
1	GND	2	+P3V3_S
3	GND	4	+P3V3_S
5	PCIE_RXN3	6	NC
7	PCIE_RXP3	8	NC
9	GND	10	LED_N
11	PCIE_TXN3	20	+P3V3_S
21	PCIE_TXP3	22	+P3V3_S
23	GND	24	+P3V3_S
25	PCIE_RXN2	26	+P3V3_S
27	PCIE_RXP2	28	NC
29	GND	30	NC



31	PCIE_TXN2	32	NC
33	PCIE_TXP2	34	NC
35	GND	36	NC
37	PCIE_RXN1	38	NC
39	PCIE_RXP1	40	NC
41	GND	42	NC
43	PCIE_TXN1	44	NC
45	PCIE_TXP1	46	NC
47	GND	48	NC
49	PCIE_RXN0	50	NC
51	PCIE_RXP0	52	NC
53	GND	54	NC
55	PCIE_TXN0	56	NC
57	PCIE_TXP0	58	PLTRST_N
59	GND	60	CLKREQ(PU)
61	PCIE_CLKN	62	NC(WAKE)
63	PCIE_CLKP	64	NC
65	GND	66	NC
67	NC	68	CLK32K_M2
69	PEDET(PU)	70	+P3V3_S
71	GND	74	+P3V3_S
73	GND		
75	GND		

PCIE1: 180 PCIe x16 Connector SMD for B2B

Pin	Side B	Side A
1	+P12V_A	+P12V_A
2	+P12V_A	+P12V_A
3	+P12V_A	+P12V_A
4	+P12V_A	+P12V_A
5	+P12V_A	+P12V_A
6	+P12V_A	+P12V_A
7	+P12V_A	+P12V_A
8	+P12V_A	GND
9	GND	+P3V3_A_MCU
10	SMB_CLK	+P3V3_A
11	SMB_DAT	+P3V3_A
12	NC	GND
13	GND	CLK_DP
14	PCIE_RX_N0	CLK_DN
15	PCIE_RX_P0	GND
16	GND	PCIE_TX_N0

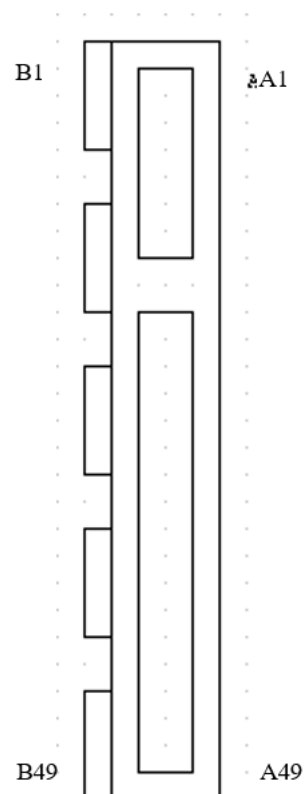


17	NC	PCIE_TX_P0
18	GND	GND
19	PCIE_RX_N1	NC
20	PCIE_RX_P1	GND
21	GND	PCIE_TX_N1
22	GND	PCIE_TX_P1
23	PCIE_RX_N2	GND
24	PCIE_RX_P2	GND
25	GND	PCIE_TX_N2
26	GND	PCIE_TX_P2
27	PCIE_RX_N3	GND
28	PCIE_RX_P3	GND
29	GND	PCIE_TX_N3
30	NC	PCIE_TX_P3
31	NC	GND
32	GND	BP_ID0
33	PCIE_RX_N4	BP_ID1
34	PCIE_RX_P4	GND
35	GND	PCIE_TX_N4
36	GND	PCIE_TX_P4
37	PCIE_RX_N5	GND
38	PCIE_RX_P5	GND
39	GND	PCIE_TX_N5
40	GND	PCIE_TX_P5
41	PCIE_RX_N6	GND
42	PCIE_RX_P6	GND
43	GND	PCIE_TX_N6
44	GND	PCIE_TX_P6
45	PCIE_RX_N7	GND
46	PCIE_RX_P7	GND
47	GND	PCIE_TX_N7
48	NC	PCIE_TX_P7
49	GND	GND
50	PCIE_RX_N8	BP_ID2
51	PCIE_RX_P8	GND
52	GND	PCIE_TX_N8
53	GND	PCIE_TX_P8
54	PCIE_RX_N9	GND
55	PCIE_RX_P9	GND
56	GND	PCIE_TX_N9
57	GND	PCIE_TX_P9
58	PCIE_RX_N10	GND
59	PCIE_RX_P10	GND
60	GND	PCIE_TX_N10
61	GND	PCIE_TX_P10
62	PCIE_RX_N11	GND
63	PCIE_RX_P11	GND
64	GND	PCIE_TX_N11
65	GND	PCIE_TX_P11
66	PCIE_RX_N12	GND
67	PCIE_RX_P12	GND

68	GND	PCIE_TX_N12
69	GND	PCIE_TX_P12
70	PCIE_RX_N13	GND
71	PCIE_RX_P13	GND
72	GND	PCIE_TX_N13
73	GND	PCIE_TX_P13
74	PCIE_RX_N14	GND
75	PCIE_RX_P14	GND
76	GND	PCIE_TX_N14
77	GND	PCIE_TX_P14
78	PCIE_RX_N15	GND
79	PCIE_RX_P15	GND
80	GND	PCIE_TX_N15
81	NC	PCIE_TX_P15
82	NC	GND

PCIE2: 180 PCIe x8 Connector SMD for B2B

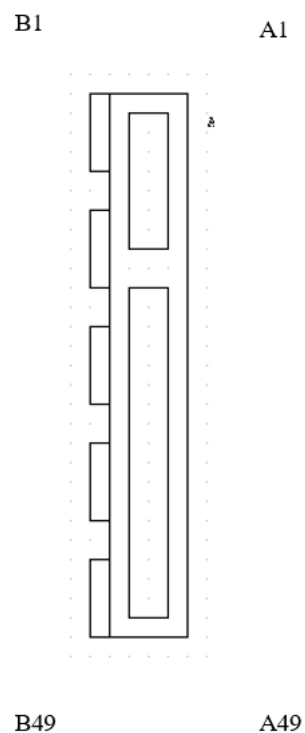
Pin	Side B	Side A
1	+P12V_A	+P12V_A
2	+P12V_A	+P12V_A
3	+P12V_A	+P12V_A
4	GND	GND
5	THERM_SMB_1_CLK_R	MCU_FAN_PWREN3
6	THERM_SMB_1_DAT_R	MCU_FAN_PWREN4
7	GND	MCU_HEAT_PWREN3
8	S0_PWR_EN	MCU_HEAT_PWREN4
9	MCU_HEAT_PWREN1	PSU_1_PG
10	+P3V3_A	PSU_2_PG
11	WAKE_N	PLTRST_PCIE1_N
12	PWRMON1_ALERT_N	GND
13	GND	CLK_DP
14	PCIE_RXN_28	CLK_DN
15	PCIE_RXP_28	GND
16	GND	PCIE_TXP_28
17	PWRMON2_ALERT_N	PCIE_TXN_28
18	GND	GND
19	PCIE_RXN_27	NC
20	PCIE_RXP_27	GND
21	GND	PCIE_TXP_27
22	GND	PCIE_TXN_27
23	PCIE_RXN_26	GND
24	PCIE_RXP_26	GND
25	GND	PCIE_TXP_26
26	GND	PCIE_TXN_26
27	PCIE_RXN_25	GND
28	PCIE_RXP_25	GND
29	GND	PCIE_TXP_25
30	I2C_SDA1	PCIE_TXN_25
31	I2C_SCL1	GND



32	GND	I2C_SCL4
33	PCIE_RXN_24	I2C_SDA4
34	PCIE_RXP_24	GND
35	GND	PCIE_TXP_24
36	GND	PCIE_TXN_24
37	PCIE_RXN_23	GND
38	PCIE_RXP_23	GND
39	GND	PCIE_TXP_23
40	GND	PCIE_TXN_23
41	PCIE_RXN_22	GND
42	PCIE_RXP_22	GND
43	GND	PCIE_TXP_22
44	GND	PCIE_TXN_22
45	PCIE_RXN_21	GND
46	PCIE_RXP_21	GND
47	GND	PCIE_TXP_21
48	NC	PCIE_TXN_21
49	GND	GND

PCIE3: 180 PCIe x4 Connector SMD for B2B

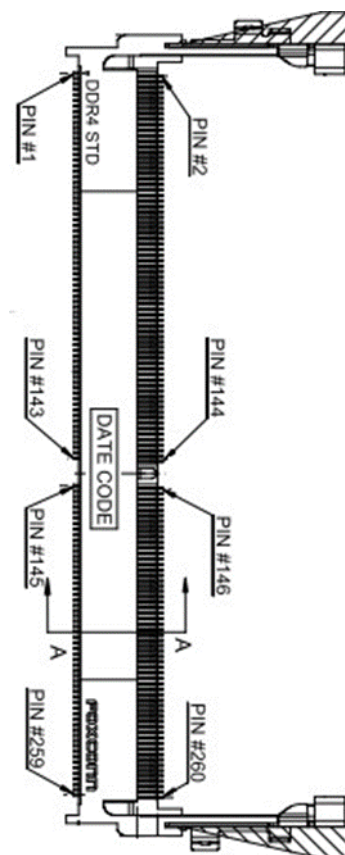
Pin	Side B	Side A
1	+P5V_S	+P5V_S
2	+P5V_S	+P5V_S
3	+P5V_S	+P5V_S
4	GND	GND
5	NC	NC
6	NC	NC
7	GND	NC
8	NC	NC
9	+P3V3_S	+P3V3_S
10	+P3V3_S	+P3V3_S
11	+P3V3_S	+P3V3_S
12	NC	GND
13	GND	IO_ID0
14	SATA_TXP_1	IO_ID1
15	SATA_TXN_1	GND
16	GND	SATA_TXP_2
17	NC	SATA_TXN_2
18	GND	GND
19	SATA_RXN_1	NC
20	SATA_RXP_1	GND
21	GND	SATA_RXN_2
22	GND	SATA_RXP_2
23	SATA_TXP_3	GND
24	SATA_TXN_3	GND
25	GND	SATA_TXP_0
26	GND	SATA_TXN_0
27	SATA_RXN_3	GND
28	SATA_RXP_3	GND
29	GND	SATA_RXN_0
30	NC	SATA_RXP_0



31	NC	GND
32	GND	NC

CON1: DDR4 SODIMM for IPMI

Pin	Description	Pin	Description
1	GND	2	+P12V_S
3	GND	4	NC
5	NC	6	NC
7	NC	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	GND
15	NC	16	NC
17	NC	18	+P5V_S
19	NC	20	NC
21	+P3V3_S	22	UART_RXD5
23	NC	24	UART_TXD5
25	GND	26	GND
27	I2C_SDA6	28	NC
29	I2C_SCL6	30	NC
31	GND	32	NC
33	NC	34	GND
35	NC	36	NC
37	GND	38	NC
39	NC	40	NC
41	NC	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	GND
49	NC	50	NC
51	NC	52	NC
53	GND	54	NC
55	NC	56	NC
57	NC	58	NC
59	NC	60	NC
61	GND	62	NC
63	NC	64	NC
65	NC	66	GND
67	NC	68	NC
69	NC	70	NC
71	GND	72	GND
73	NC	74	NC
75	GND	76	NC
77	NC	78	GND
79	NC	80	NC
81	NC	82	+VCC1P05_PROC
83	NC	84	H_PECI
85	NC	86	GND
87	NC	88	NC
89	GND	90	NC
91	NC	92	NC

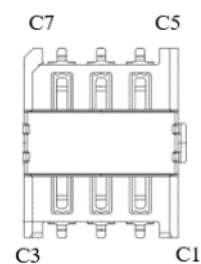


93	GND	94	NC
95	NC	96	GND
97	NC	98	NC
99	NC	100	NC
101	NC	102	NC
103	NC	104	NC
105	NC	106	NC
107	SLP_S5_PCH_N	108	NC
109	PM_SLP_S3_N	110	BMC_EXTRST#
111	NC	112	PCH_WAKE_N
113	NC	114	GND
115	NC	116	I2C_SDA1
117	NC	118	I2C_SCL1
119	GND	120	GND
121	PCIE_TXP	122	I2C_SCL2
123	PCIE_TXN	124	I2C_SDA2
125	GND	126	GND
127	PCIE_RXP	128	PLTRST_IPMI_N
129	PCIE_RXN	130	GND
131	GND	132	NC
133	CLK_DP	134	NC
135	CLK_DN	136	GND
137	GND	138	NC
139	NC	140	NC
141	NC	142	NC
143	GND	144	GND
145	NC	146	SYS_UART_SWITCH_OUT
147	NC	148	BIOS_READY_IN
149	NC	150	BMC_PWRBTN_OUT
151	NC	152	BMC_READY_OUT
153	GND	154	SYS_NMI_IN_N
155	GND	156	GND
157	BMC_SMI_N	158	BMC_SMI_OUT
159	NC	160	CPU_CATERR_IN
161	NC	162	BMC_UART_SWITCH_OUT
163	PCH_RSMRST_N	164	GND
165	GND	166	CPU_THERMTRIP_IN
167	NC	168	BMC_RSTBTN_OUT
169	ESPI_ALERT1_BMC	170	PCH_SYSPWROK
171	NC	172	CPU0_PROCHOT_IN
173	GND	174	NC
175	ESPI_RST_R_N	176	BMC_SPKR_OUT
177	ESPI_CS_BMC_N	178	NC
179	ESPI_BMC_IO1	180	GND
181	ESPI_IO0_R	182	NC
183	ESPI_IO3_R	184	NC
185	ESPI_IO2_R	186	GND
187	ESPI_CLK_R	188	I2C_SDA3
189	GND	190	I2C_SCL3
191	NC	192	GND
193	NC	194	I2C_SCL4

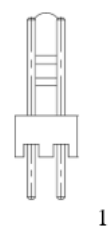
195	NC	196	I2C_SDA4
197	GND	198	GND
199	USB2_P	200	BMC_NMI_OUT
201	USB_N	202	NC
203	GND	204	GND
205	NC	206	LAN_LINK_100M#
207	NC	208	LAN_ACTLED#
209	GND	210	LAN_LINK_1G#
211	NC	212	GND
213	UART_TXD3	214	NC
215	UART_RXD3	216	NC
217	GND	218	NC
219	MDI0_P	220	NC
221	MDI0_N	222	NC
223	GND	224	NC
225	MDI1_P	226	NC
227	MDI1_N	228	GND
229	GND	230	NC
231	MDI2_P	232	NC
233	MDI2_N	234	NC
235	GND	236	NC
237	MDI3_P	238	NC
239	MDI3_N	240	NC
241	GND	242	NC
243	NC	244	GND
245	NC	246	NC
247	NC	248	+V1P8A
249	NC	250	NC
251	NC	252	+P3V3_A
253	GND	254	+P3V3_A
255	NC	256	+P3V3_A
257	NC	258	NC
259	GND	260	+P5V_A

SIM1: NANO SIM 6-Pin

Pin	Description	Pin	Description
1	PWR	22	GND
2	RST	23	NC
3	CLK	24	DAT

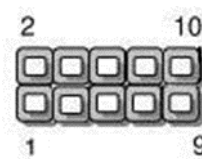
**CONN1/2: Heater Header (1x2, 2.54mm with Wafer DIP)**

Pin	Description
1	12V PWR
2	GND

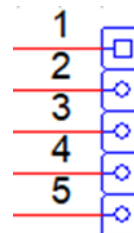


SPI1: 2.0mm SMD Pin Header SMD (2x5)

Pin	Description	Pin	Description
1	NC	2	NC
3	SPI_CS0#	4	P3V3
5	SPI_MISO	6	HOLD#
7	NC	8	SPI_CLK
9	GND	10	SPI_MOSI

**J11: UART LED Programming Header (2.54mm DIP, 1x5)**

Pin	Description
1	PIC_VPP2
2	+P5V_S
3	GND
4	PIC_ICSPDAT2
5	PIC_ICSPCLK2

**JSIMSEL: Manual SIM Selection (1x3, 2.54mm DIP (RSVD))**

Pin	Description
1-2	SW control or e-SIM
2-3	SIM Socket

**JOPEN1: Case Open, 2-Pin DIP Header (2.54mm with Wafer (RSVD))**

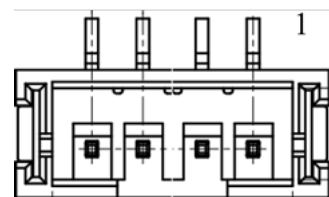
Pin	Description
1	GND
2	PCH_INTRUDER_HDR_N

**J3: MCU Programming Selection (1x3, 2.00mm DIP)**

Pin	Description
1-2 (Default)	Normal
2-3	Debug/Burning Code

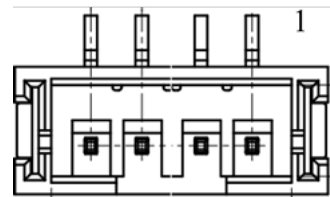
**CON3: MCU Programming (1x4, 2.00mm SMD with Wafer)**

Pin	Description
1	+P3V3_MCU
2	UART_RX
3	GND
4	UART_TX

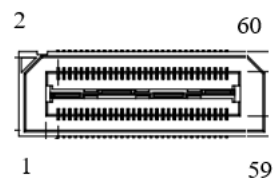


CON4: MCU Debug (1x4, 2.00mm SMD with Wafer)

Pin	Description
1	+P3V3_MCU
2	GND
3	SWCLK
4	SWDIO

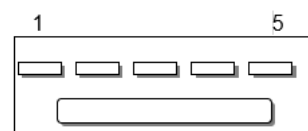
**JXDP1: Intel MIPI60 Debug Header**

Pin	Description	Pin	Description
1	VREF_DEBUG	2	MIPI60_TMS
3	MIPI60_TCLK	4	MIPI60_TDO
5	MIPI60_TDI	6	FP_RST_N
7	MIPI60_HOOK6	8	MERGED_TRST_PD
9	MIPI60_TRST_N	10	MIPI60_PREQ_N
11	MIPI60_PRDY_N	12	VREF_TRACE
13	CPU_CFG_16	14	GND
15	SPI_PCH_WP_N	16	GND
17	+P3V3_A	18	NC
19	CPU_CFG_0	20	NC
21	CPU_CFG_1	22	NC
23	CPU_CFG_2	24	NC
25	CPU_CFG_3	26	NC
27	CPU_CFG_4	28	NC
29	CPU_CFG_5	30	NC
31	CPU_CFG_6	32	NC
33	CPU_CFG_7	34	NC
35	CPU_CFG_8	36	SPI_PCH_MOSI
37	CPU_CFG_9	38	H_EAR_N
39	CPU_CFG_10	40	PWRBTN_N
41	CPU_CFG_11	42	PCH_RSMRST_N
43	CPU_CFG_12	44	NC
45	CPU_CFG_13	46	NC
47	CPU_CFG_14	48	SMB_CLK
49	CPU_CFG_15	50	SMB_DATA
51	MIPI60_TCLK1	52	+V3P3A_VAL
53	MIPI60_HOOK9	54	NC
55	MIPI60_HOOK8	56	NC
57	GND	58	GND
59	CPU_CFG_17	60	GND

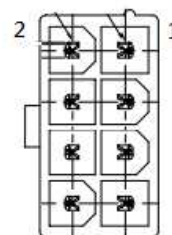


FAN1: 5-Pin Fan Connector (Debug Only)

Pin	Description
1	GND
2	+P12V_S
3	FANIN1
4	NC
5	FANOUT

**ATX1: 8-Pin Power Connector (4.2mm)**

Pin	Description	Pin	Description
1	GND	2	+P12V
3	GND	4	+P12V
5	GND	6	+P12V
7	GND	8	+P12V

**MH1~MH2: 4-Pin Metal Lock Power (Tin Plated Brass)**

Pin	Description	Pin	Description
1	DC_IN	2	DC_IN
3	DC_IN	4	DC_IN

MH3~MH4: 4-Pin Metal Lock Power (Tin Plated Brass)

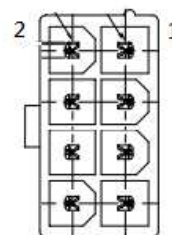
Pin	Description	Pin	Description
1	GND	2	GND
3	GND	4	GND

JPMB1: Wafer 4-P Male 180° 2.0mm for DC PWRGD

Pin	Description
1	DC2DC_PWROK
2	GND
3	NC
4	NC

ATX3: 8-Pin Power Connector (4.2mm)

Pin	Description	Pin	Description
1	GND	2	+P12V
3	GND	4	+P12V
5	GND	6	+P12V
7	GND	8	+P12V



GF1: PCIe x16 Gold Finger for B2B

Pin	Side B	Side A
1	+P12V_STBY	+P12V_STBY
2	+P12V_STBY	+P12V_STBY
3	+P12V_STBY	+P12V_STBY
4	+P12V_STBY	+P12V_STBY
5	+P12V_STBY	+P12V_STBY
6	+P12V_STBY	+P12V_STBY
7	+P12V_STBY	+P12V_STBY
8	+P12V_STBY	GND
9	GND	+P3V3_STBY_MCU
10	SMB_CLK_EXP	+P3V3_STBY
11	SMB_DATA_EXP	+P3V3_STBY
12	NC	GND
13	GND	CLK_DP
14	PCIE_RX_N0	CLK_DN
15	PCIE_RX_P0	GND
16	GND	PCIE_TX_N0
17	NC	PCIE_TX_P0
18	GND	GND
19	PCIE_RX_N1	NC
20	PCIE_RX_P1	GND
21	GND	PCIE_TX_N1
22	GND	PCIE_TX_P1
23	PCIE_RX_N2	GND
24	PCIE_RX_P2	GND
25	GND	PCIE_TX_N2
26	GND	PCIE_TX_P2
27	PCIE_RX_N3	GND
28	PCIE_RX_P3	GND
29	GND	PCIE_TX_N3
30	NC	PCIE_TX_P3
31	NC	GND
32	GND	BP_ID0
33	PCIE_RX_N4	BP_ID1
34	PCIE_RX_P4	GND
35	GND	PCIE_TX_N4
36	GND	PCIE_TX_P4
37	PCIE_RX_N5	GND
38	PCIE_RX_P5	GND
39	GND	PCIE_TX_N5
40	GND	PCIE_TX_P5
41	PCIE_RX_N6	GND
42	PCIE_RX_P6	GND
43	GND	PCIE_TX_N6
44	GND	PCIE_TX_P6
45	PCIE_RX_N7	GND
46	PCIE_RX_P7	GND
47	GND	PCIE_TX_N7
48	NC	PCIE_TX_P7
49	GND	GND

50	PCIE_RX_N8	BP_ID2
51	PCIE_RX_P8	GND
52	GND	PCIE_TX_N8
53	GND	PCIE_TX_P8
54	PCIE_RX_N9	GND
55	PCIE_RX_P9	GND
56	GND	PCIE_TX_N9
57	GND	PCIE_TX_P9
58	PCIE_RX_N10	GND
59	PCIE_RX_P10	GND
60	GND	PCIE_TX_N10
61	GND	PCIE_TX_P10
62	PCIE_RX_N11	GND
63	PCIE_RX_P11	GND
64	GND	PCIE_TX_N11
65	GND	PCIE_TX_P11
66	PCIE_RX_N12	GND
67	PCIE_RX_P12	GND
68	GND	PCIE_TX_N12
69	GND	PCIE_TX_P12
70	PCIE_RX_N13	GND
71	PCIE_RX_P13	GND
72	GND	PCIE_TX_N13
73	GND	PCIE_TX_P13
74	PCIE_RX_N14	GND
75	PCIE_RX_P14	GND
76	GND	PCIE_TX_N14
77	GND	PCIE_TX_P14
78	PCIE_RX_N15	GND
79	PCIE_RX_P15	GND
80	GND	PCIE_TX_N15
81	NC	PCIE_TX_P15
82	NC	GND

GF2: PCIe x8 Gold Finger for B2B

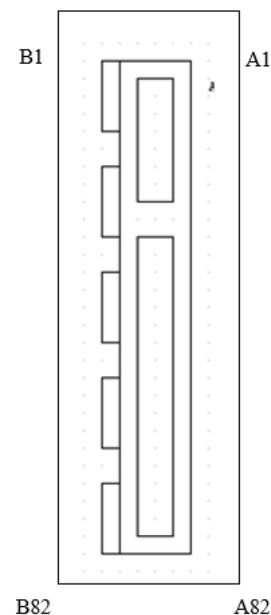
Pin	Side B	Side A
1	+P12V_STBY	+P12V_STBY
2	+P12V_STBY	+P12V_STBY
3	+P12V_STBY	+P12V_STBY
4	GND	GND
5	MCU_I2C2_SCL	MCU_SYS_FAN_EN
6	MCU_I2C2_SDA	PWR_FAN_EN
7	GND	MCU_HEAT_EN
8	S0_PWR_EN	NC
9	MCU_HEAT_EN	PSU_1_PG
10	+P3V3_A	PSU_2_PG
11	PCH_WAKE_N	PLTRST_PCIE_N
12	PWRMON1_ALERT_N	GND
13	GND	EXP8_PCIE_CLK_P
14	PCIE_RXN_28	EXP8_PCIE_CLK_N
15	PCIE_RXP_28	GND

16	GND	EXP8_PCIE_HTX_DRX_P7
17	PWRMON2_ALERT_N	EXP8_PCIE_HTX_DRX_N7
18	GND	GND
19	EXP8_PCIE_HRX_DTX_N7	NC
20	EXP8_PCIE_HRX_DTX_P7	GND
21	GND	EXP8_PCIE_HTX_DRX_P6
22	GND	EXP8_PCIE_HTX_DRX_N6
23	EXP8_PCIE_HRX_DTX_N6	GND
24	EXP8_PCIE_HRX_DTX_P6	GND
25	GND	EXP8_PCIE_HTX_DRX_P5
26	GND	EXP8_PCIE_HTX_DRX_N5
27	EXP8_PCIE_HRX_DTX_N5	GND
28	EXP8_PCIE_HRX_DTX_P5	GND
29	GND	EXP8_PCIE_HTX_DRX_P4
30	EXP8_PCIE_HRX_DTX_N4	EXP8_PCIE_HTX_DRX_N4
31	EXP8_PCIE_HRX_DTX_P4	GND
32	GND	SMB_CLK_PSU
33	EXP8_PCIE_HRX_DTX_N3	SMB_DATA_PSU
34	EXP8_PCIE_HRX_DTX_P3	GND
35	GND	EXP8_PCIE_HTX_DRX_P3
36	GND	EXP8_PCIE_HTX_DRX_N3
37	EXP8_PCIE_HRX_DTX_N2	GND
38	EXP8_PCIE_HRX_DTX_P2	GND
39	GND	EXP8_PCIE_HTX_DRX_P2
40	GND	EXP8_PCIE_HTX_DRX_N2
41	EXP8_PCIE_HRX_DTX_N1	GND
42	EXP8_PCIE_HRX_DTX_P1	GND
43	GND	EXP8_PCIE_HTX_DRX_P1
44	GND	EXP8_PCIE_HTX_DRX_N1
45	EXP8_PCIE_HRX_DTX_N0	GND
46	EXP8_PCIE_HRX_DTX_P0	GND
47	GND	EXP8_PCIE_HTX_DRX_P0
48	NC	EXP8_PCIE_HTX_DRX_N0
49	GND	GND

PCIE1: 180° PCIe x16 Connector

Pin	Side B	Side A
1	+P12V	NC
2	+P12V	+P12V
3	+P12V	+P12V
4	GND	GND
5	PCIEx_SCK	NC
6	PCIEx_SDA	NC
7	GND	NC
8	+P3V3	NC
9	NC	+P3V3
10	+P3V3_STBY	+P3V3
11	PCH_WAKE_N	PLTRST_PCIEx_N
12	NC	GND

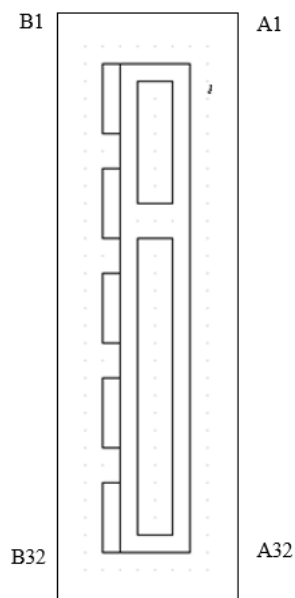
13	GND	PCIEx_CLK_P
14	PCIEx_STX_DRX_P15	PCIEx_CLK_N
15	PCIEx_STX_DRX_N15	GND
16	GND	PCIEx_SRX_DTX_P15
17	NC	PCIEx_SRX_DTX_N15
18	GND	GND
19	PCIEx_STX_DRX_P14	NC
20	PCIEx_STX_DRX_N14	GND
21	GND	PCIEx_SRX_DTX_P14
22	GND	PCIEx_SRX_DTX_N14
23	PCIEx_STX_DRX_P13	GND
24	PCIEx_STX_DRX_N13	GND
25	GND	PCIEx_SRX_DTX_P13
26	GND	PCIEx_SRX_DTX_N13
27	PCIEx_STX_DRX_P12	GND
28	PCIEx_STX_DRX_N12	GND
29	GND	PCIEx_SRX_DTX_P12
30	NC	PCIEx_SRX_DTX_N12
31	NC	GND
32	GND	NC
33	PCIEx_STX_DRX_P11	NC
34	PCIEx_STX_DRX_N11	GND
35	GND	PCIEx_SRX_DTX_P11
36	GND	PCIEx_SRX_DTX_N11
37	PCIEx_STX_DRX_P10	GND
38	PCIEx_STX_DRX_N10	GND
39	GND	PCIEx_SRX_DTX_P10
40	GND	PCIEx_SRX_DTX_N10
41	PCIEx_STX_DRX_P9	GND
42	PCIEx_STX_DRX_N9	GND
43	GND	PCIEx_SRX_DTX_P9
44	GND	PCIEx_SRX_DTX_N9
45	PCIEx_STX_DRX_P8	GND
46	PCIEx_STX_DRX_N8	GND
47	GND	PCIEx_SRX_DTX_P8
48	NC	PCIEx_SRX_DTX_N8
49	GND	NC
50	PCIEx_STX_DRX_P7	GND
51	PCIEx_STX_DRX_N7	GND
52	GND	PCIEx_SRX_DTX_P7
53	GND	PCIEx_SRX_DTX_N7
54	PCIEx_STX_DRX_P6	GND
55	PCIEx_STX_DRX_N6	GND
56	GND	PCIEx_SRX_DTX_P6
57	GND	PCIEx_SRX_DTX_N6
58	PCIEx_STX_DRX_P5	GND
59	PCIEx_STX_DRX_N5	GND
60	GND	PCIEx_SRX_DTX_P5
61	GND	PCIEx_SRX_DTX_N5
62	PCIEx_STX_DRX_P4	GND
63	PCIEx_STX_DRX_N4	GND



64	GND	PCIE _{Ex} _SRX_DTX_P4
65	GND	PCIE _{Ex} _SRX_DTX_N4
66	PCIE _{Ex} _STX_DRX_P3	GND
67	PCIE _{Ex} _STX_DRX_N3	GND
68	GND	PCIE _{Ex} _SRX_DTX_P3
69	GND	PCIE _{Ex} _SRX_DTX_N3
70	PCIE _{Ex} _STX_DRX_P2	GND
71	PCIE _{Ex} _STX_DRX_N2	GND
72	GND	PCIE _{Ex} _SRX_DTX_P2
73	GND	PCIE _{Ex} _SRX_DTX_N2
74	PCIE _{Ex} _STX_DRX_P1	GND
75	PCIE _{Ex} _STX_DRX_N1	GND
76	GND	PCIE _{Ex} _SRX_DTX_P1
77	GND	PCIE _{Ex} _SRX_DTX_N1
78	PCIE _{Ex} _STX_DRX_P0	GND
79	PCIE _{Ex} _STX_DRX_N0	GND
80	GND	PCIE _{Ex} _SRX_DTX_P0
81	NC	PCIE _{Ex} _SRX_DTX_N0
82	NC	GND

PCIE3: 180° PCIe x4 Connector

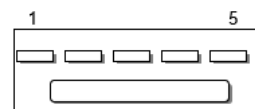
Pin	Side B	Side A
1	+P12V	NC
2	+P12V	+P12V
3	+P12V	+P12V
4	GND	GND
5	PCIE _{Ex} _SCK	NC
6	PCIE _{Ex} _SDA	NC
7	GND	NC
8	+P3V3	NC
9	NC	+P3V3
10	+P3V3_STBY	+P3V3
11	PCH_WAKE_N	PLTRST_PCIE _{Ex} _N
12	NC	GND
13	GND	PCIE _{Ex} _CLK_P
14	RD_PCIE _{Ex} _HTX_DRX_P0	PCIE _{Ex} _CLK_N
15	RD_PCIE _{Ex} _HTX_DRX_N0	GND
16	GND	RD_PCIE3_HRX_DTX_P0
17	NC	RD_PCIE3_HRX_DTX_N0
18	GND	GND
19	RD_PCIE _{Ex} _HTX_DRX_P1	NC
20	RD_PCIE _{Ex} _HTX_DRX_N1	GND
21	GND	RD_PCIE3_HRX_DTX_P1
22	GND	RD_PCIE3_HRX_DTX_N1
23	RD_PCIE _{Ex} _HTX_DRX_P2	GND
24	RD_PCIE _{Ex} _HTX_DRX_N2	GND
25	GND	RD_PCIE3_HRX_DTX_P2
26	GND	RD_PCIE3_HRX_DTX_N2
27	RD_PCIE _{Ex} _HTX_DRX_P3	GND
28	RD_PCIE _{Ex} _HTX_DRX_N3	GND



29	GND	RD_PCIE3_HRX_DTX_P3
30	NC	RD_PCIE3_HRX_DTX_N3
31	NC	GND
32	GND	NC

FAN1~2: 5-Pin Fan Connector

Pin	Description
1	GND
2	+P12V_FAN
3	HM_FAN_TECH_Inx(2)
4	HM_FAN_TECH_Inx(1)
5	HM_PWMOUT1

**JPMB1: Wafer 4P Male 180° 2.0mm for DC PWRGD**

Pin	Description
1	DC2DC_PWROK
2	GND
3	NC
4	NC

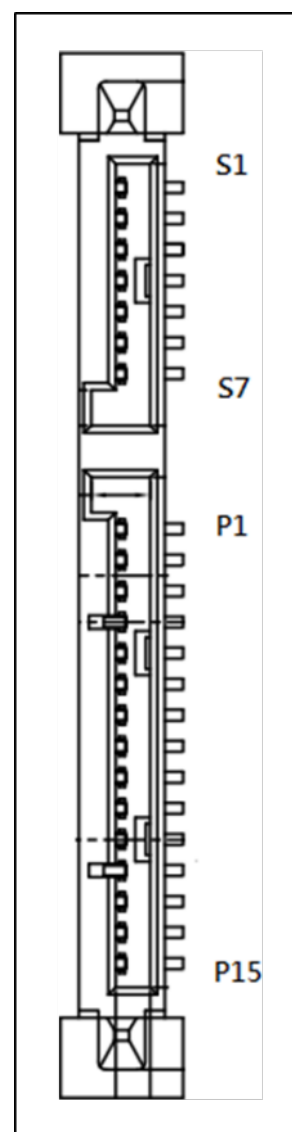
GF1: 180° PCIe x4 Gold Finger

Pin	Side B	Side A
1	+P5V	+P5V
2	+P5V	+P5V
3	+P5V	+P5V
4	GND	GND
5	NC	LED_HDD_N1
6	NC	LED_HDD_N3
7	GND	LED_HDD_N2
8	NC	LED_HDD_N0
9	+P3V3	+P3V3
10	+P3V3	+P3V3
11	+P3V3	+P3V3
12	NC	GND
13	GND	IO_ID0
14	SATA_HTX_DRX_P1	IO_ID1
15	SATA_HTX_DRX_N1	GND
16	GND	SATA_HTX_DRX_P2
17	NC	SATA_HTX_DRX_N2
18	GND	GND
19	SATA_HRX_DTX_N1	NC
20	SATA_HRX_DTX_P1	GND
21	GND	SATA_HRX_DTX_N2
22	GND	SATA_HRX_DTX_P2

23	SATA_HTX_DRX_P3	GND
24	SATA_HTX_DRX_N3	GND
25	GND	SATA_HTX_DRX_P0
26	GND	SATA_HTX_DRX_N0
27	SATA_HRX_DTX_N3	GND
28	SATA_HRX_DTX_P3	GND
29	GND	SATA_HRX_DTX_N0
30	NC	SATA_HRX_DTX_P0
31	NC	GND
32	GND	NC

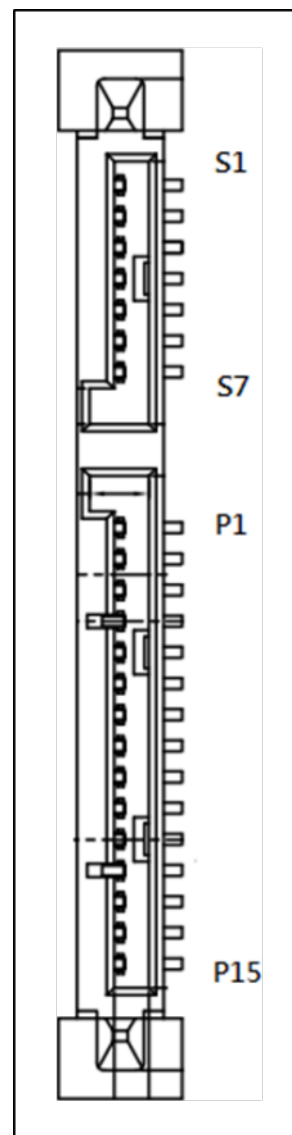
SATA1: 180° SATA CONN 22P

Pin	Pin Signal	In/Out
S1	GND	
S2	SATA_HTX_DRX_Px	
S3	SATA_HTX_DRX_Nx	
S4	GND	
S5	SATA_HRX_DTX_Nx	
S6	SATA_HRX_DTX_Px	
S7	GND	
P1	NC	
P2	NC	
P3	NC	
P4	GND	
P5	GND	
P6	GND	
P7	+P5V_Sx	
P8	+P5V_Sx	
P9	+P5V_Sx	
P10	GND	
P11	LED_HDD_N1	
P12	SATAx_DET_N	
P13	NC	
P14	NC	
P15	NC	



SATA2: 180° SATA CONN 22P

Pin	Pin Signal	In/Out
S1	GND	
S2	SATA_HTX_DRX_Px	
S3	SATA_HTX_DRX_Nx	
S4	GND	
S5	SATA_HRX_DTX_Nx	
S6	SATA_HRX_DTX_Px	
S7	GND	
P1	NC	
P2	NC	
P3	NC	
P4	GND	
P5	GND	
P6	GND	
P7	+P5V_Sx	
P8	+P5V_Sx	
P9	+P5V_Sx	
P10	GND	
P11	LED_HDD_N1	
P12	SATAx_DET_N	
P13	NC	
P14	NC	
P15	NC	



CHAPTER 2: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the unit, please remove all power connections to completely shut down the device and wear ESD protection gloves when handling the installation steps.

Open the Chassis

1. Power off the system and disconnect the power cord. Unscrew the six (6) screws securing the top chassis cover.



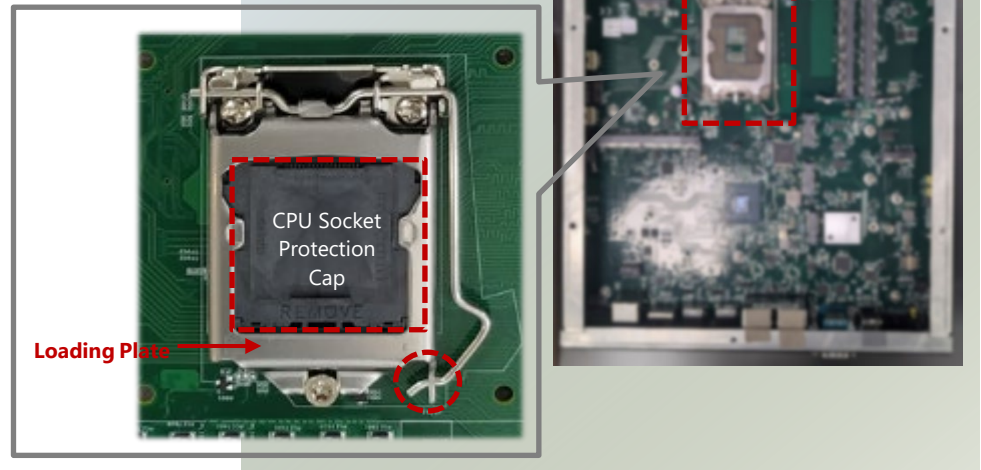
2. Lift and open the top chassis cover.



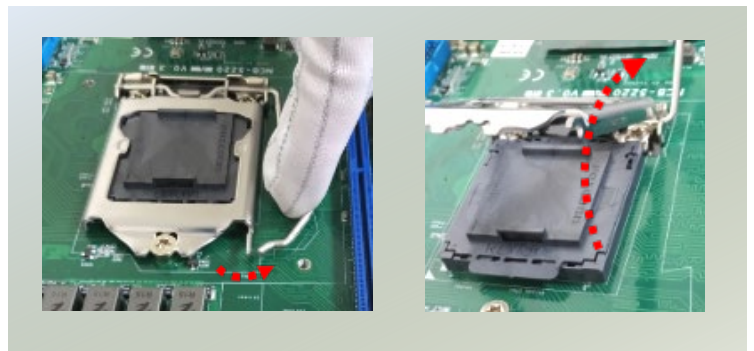
Installing the CPU

The system supports Intel® Core™ i7 CPU Processor. Follow the instructions to install the processor.

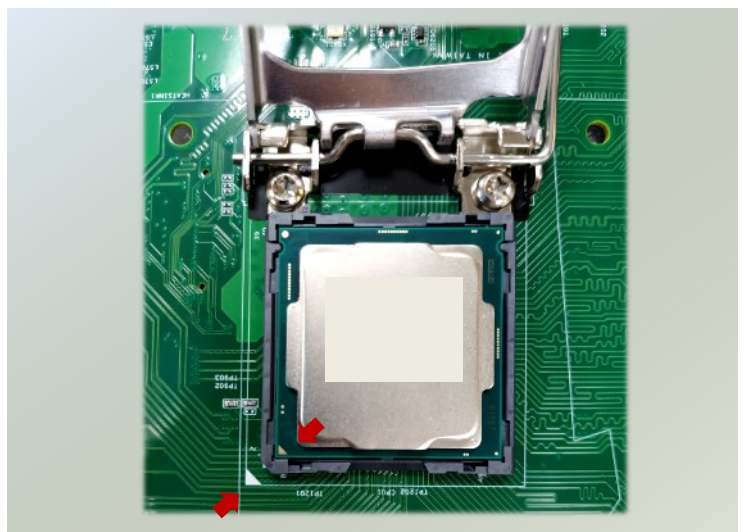
1. Locate the CPU on the motherboard. Remove the plastic socket protection cap.



2. Release the socket lever by pushing down and sliding it under the load plate notch and lift open the processor load plate.



3. Gently extract the processor from its packaging, carefully hold it by its edges and taking care not to touch any processor contacts. Make sure the golden triangular mark is aligned with the white one marked on the motherboard and then insert it into the socket.

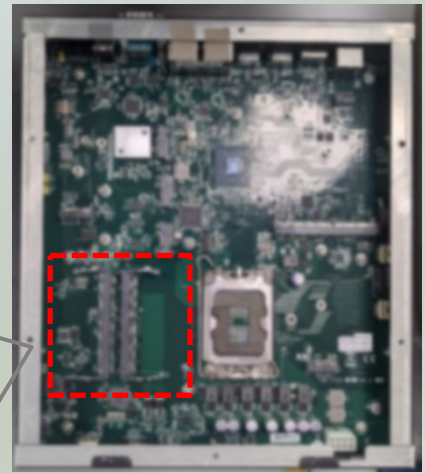


4. After the processor is correctly seated in the socket, lower the load plate over the processor, and lock down the load plate by sliding it under the notch.

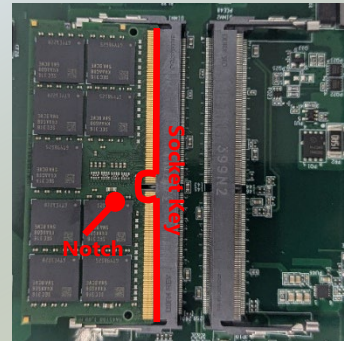
Installing System Memory (Optional)

The motherboard supports two system memory slots, please follow the steps for installation.

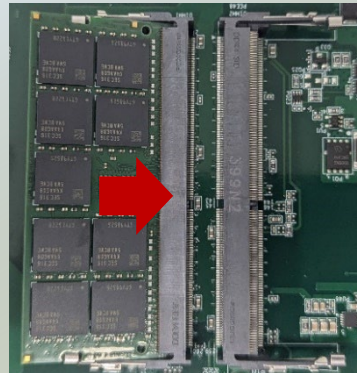
1. Power off the system, and open the top chassis cover.
2. Locate the DIMM socket area on the motherboard.



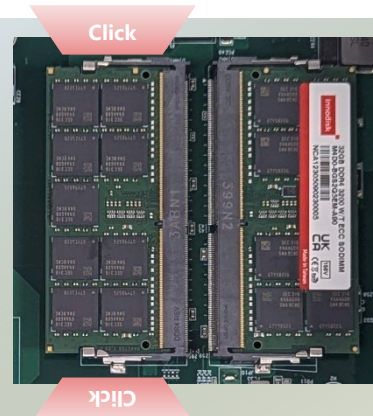
3. Align the notches of the DIMM module with the socket key in the pin slot.



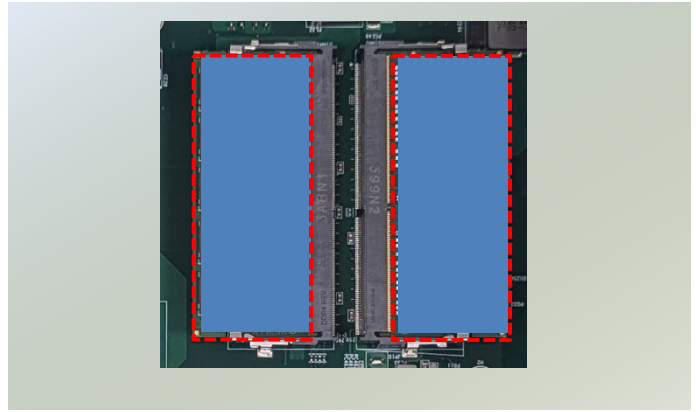
4. Insert the module into the slot at a diagonal angle and gently press down until it is firmly seated by the clips on both sides.



5. Repeat steps if a second memory module will be inserted.



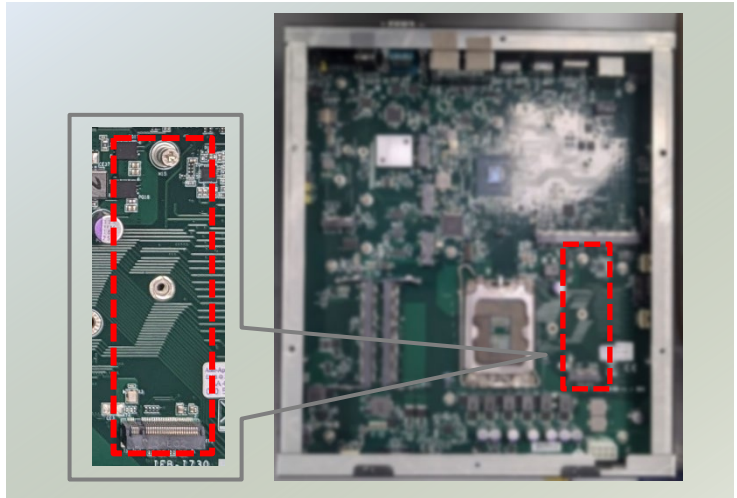
6. Lastly, thermal pad placement. Position the thermal pad (included in the accessory pack) gently on the top side of the memory module.



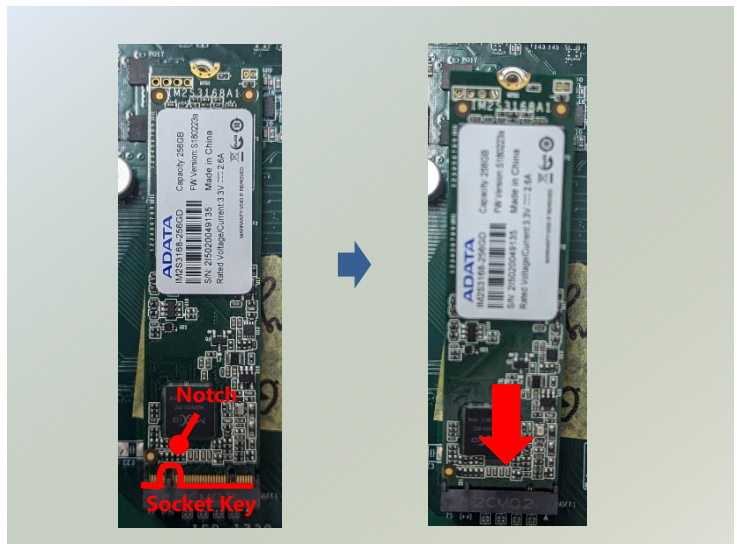
Installing M.2 NVMe Storage Card (Optional)

The system supports one M.2 M-Key for NVMe storage module expansion. Please follow the steps for installation.

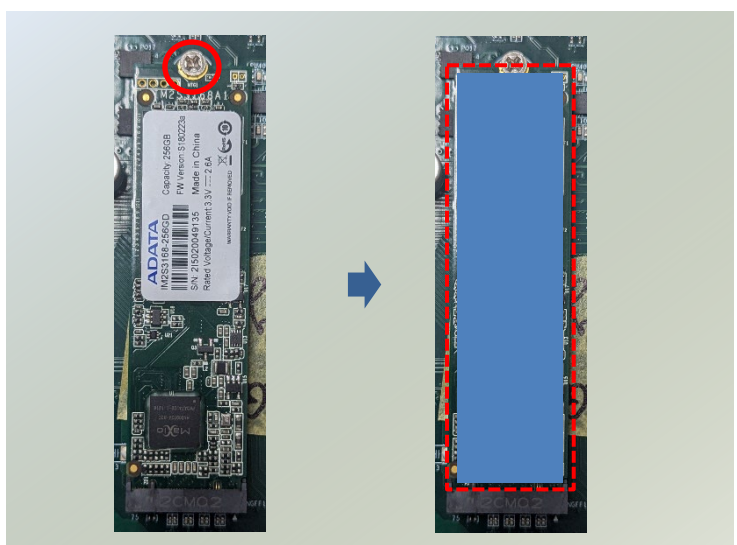
1. Power off the system, and open the top chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the NVMe module with the socket key in the pin slot.
4. Insert the NVMe module pins at 30 degrees into the socket until it is fully seated.



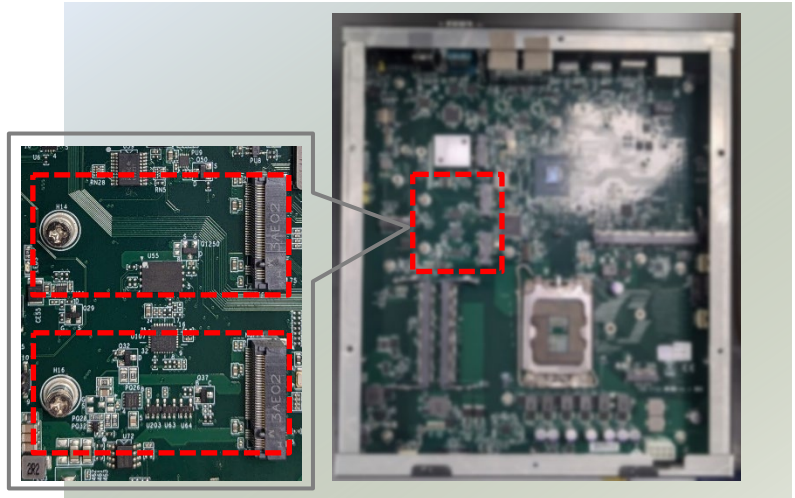
5. Push down on the module card and secure it with one (1) screw.
6. Lastly, thermal pad placement. Position the thermal pad (included in the accessory pack) gently on the top side of the storage module.



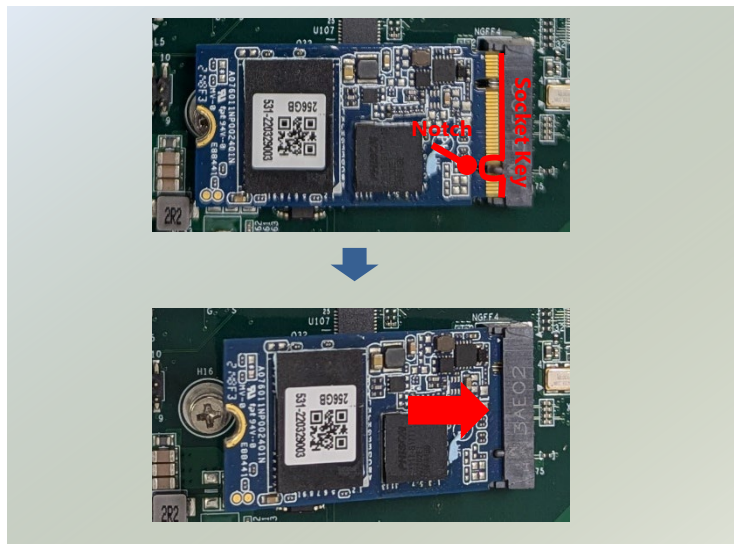
Installing M.2 SATA Storage Card (Optional)

The system supports two M.2 M-Key for SATA storage module expansion. Please follow the steps for installation.

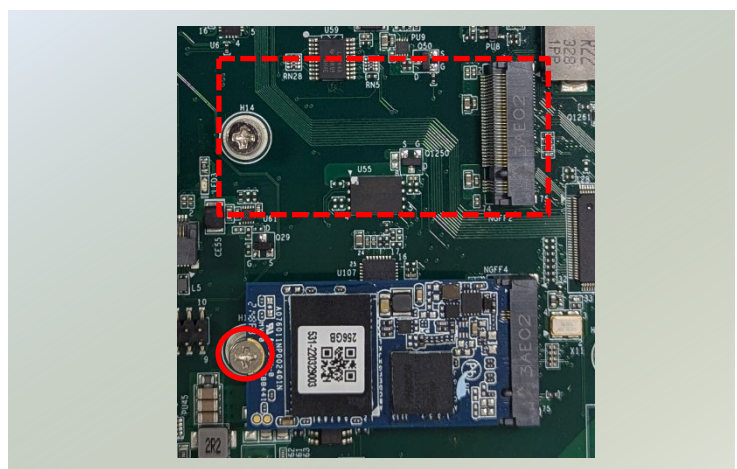
1. Power off the system, and open the top chassis cover.
2. Locate the M.2 slot on the motherboard.



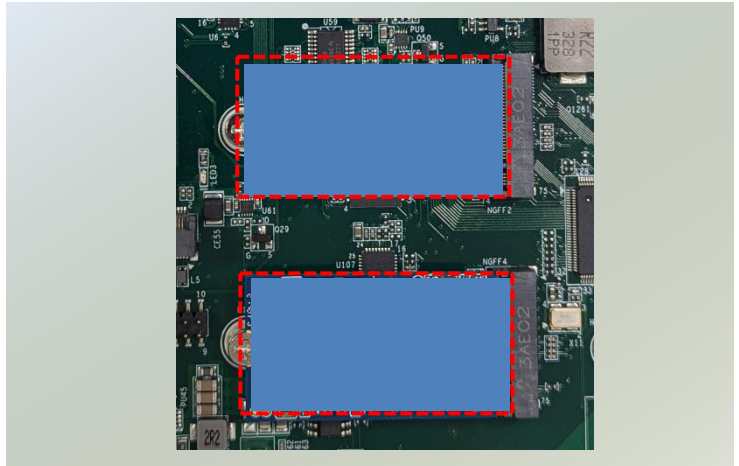
3. Align the notch of the SATA module with the socket key in the pin slot.
4. Insert the SATA module pins at 30 degrees into the socket until it is fully seated.



5. Push down on the module card and secure it with one (1) screw.
6. Repeat steps to insert a second module card.



7. Lastly, thermal pad placement. Position the thermal pad (included in the accessory pack) on the top side of the storage module.

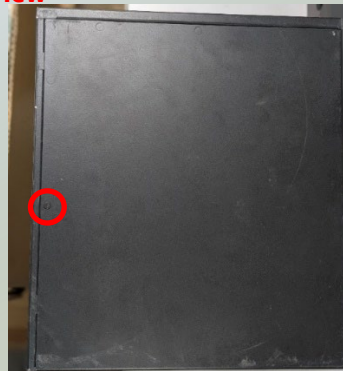


Installing the GPU Graphics Card (Optional)

EAI-I731 system supports one PCIe*16 Gen4 FHFL dual slots for GPU module expansion, such as the NVIDIA A2 or NVIDIA L4. GPU installation is complex and must be handled carefully. Review the instructions in this section to ensure you have the required knowledge and meet all the necessary requirements.

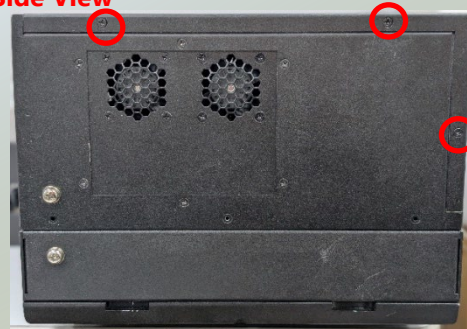
1. Power off the system. Turn over the system onto its top side and unscrew the one (1) screw on the right side of the system, securing the side chassis cover.

Right Side View



2. Then, unscrew the three (3) screws on the rear side.

Rear Side View



3. Then, turn the system back on its side and remove the one screw on the top side.

Top Side View



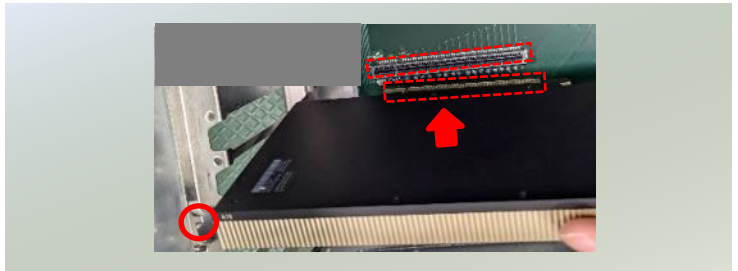
4. Gently slide, lift, and open the side chassis cover.



5. Locate the PCIe Slot on the board.



6. Hold the GPU module horizontally, align it with the PCIe slot ensuring the socket keys match, and gently insert it until firmly seated. Then secure with one (1) screw.



Installing Intake Fan Flow (for GPU Modules with Fans, Optional)

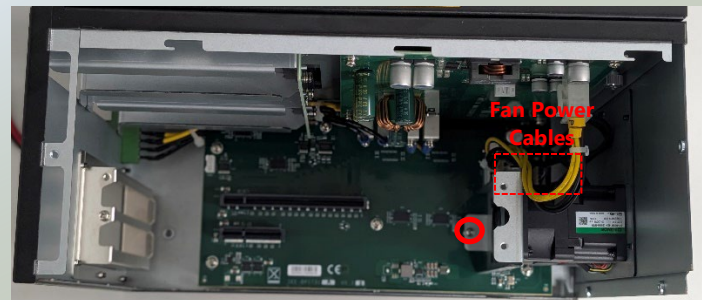
Passively cooled GPU modules require sufficient airflow to prevent overheating. Therefore, the system fans need to be reoriented to redirect intake airflow. Approved GPU modules are listed on the [AVL List: GPU Modules \(Intake Fan\)](#). Follow these steps.

1. **Power Down and Access:** Power off the system and open the side chassis cover.
2. **Fan Cover Removal:** Rotate the system to its back and locate the two (2) fans. Remove the six (6) screws securing the fan cover.

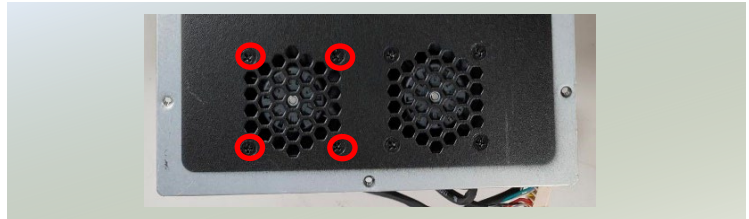


3. Disconnect the fan power cables from the motherboard, remove the one (1) screw securing the fan bracket. Then, lift and remove the fan cover (with the two (2) fans attached).

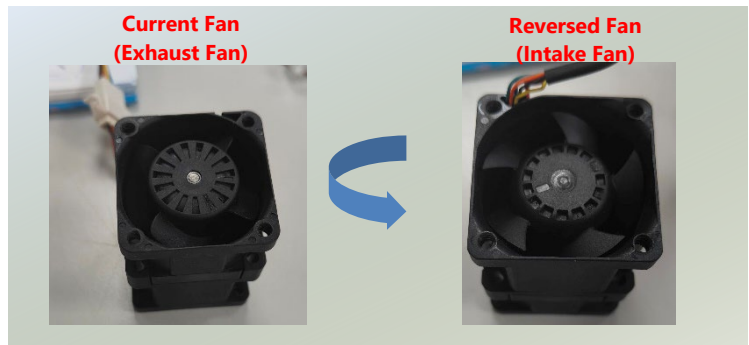
Side Chassis Cover View



4. **Fan Reversal:** Unscrew the four (4) screws securing each fan and remove the fan from the cover and bracket. Repeat for second fan.



5. Flip the fan cover and reorient each fan accordingly. Secure each fan back onto the reversed fan cover using the original screws.

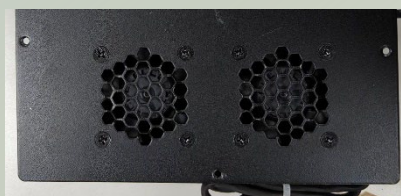


6. **Reassembly:** Reconnect the fan power cables to the motherboard, then secure the fan cover (with the two (2) fans) back onto the system using the original six (6) screws.

Back Side Fan View After Fan Reversal



Final Product (Fan Cover and Fans Reversed)

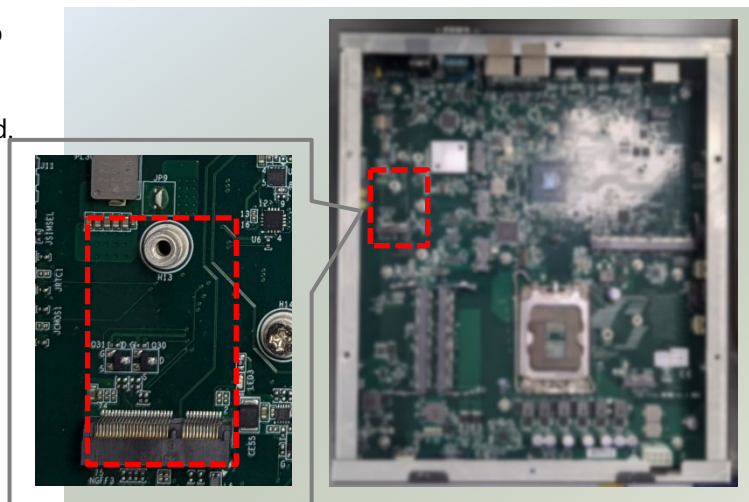


7. The fans now provide the necessary intake airflow for proper cooling of the passively cooled GPU modules.

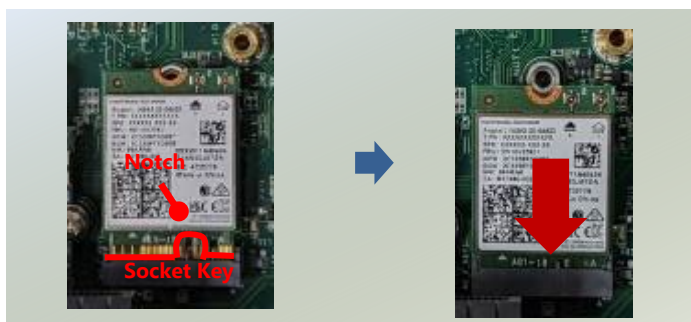
Installing Wi-Fi Module (Optional)

The system supports one M.2 E-key slot for a Wi-Fi module card, which requires two antennas. Please follow these steps to install the Wi-Fi module.

1. Power off the system, and open the top chassis cover.
2. Locate the M.2 slot on the motherboard.



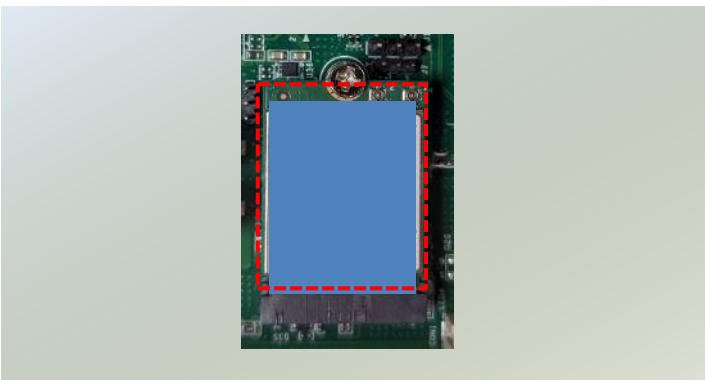
3. Align the notch of the Wi-Fi module with the socket key in the pin slot.
4. Insert the Wi-Fi module pins at 30 degrees into the socket until it is fully seated.



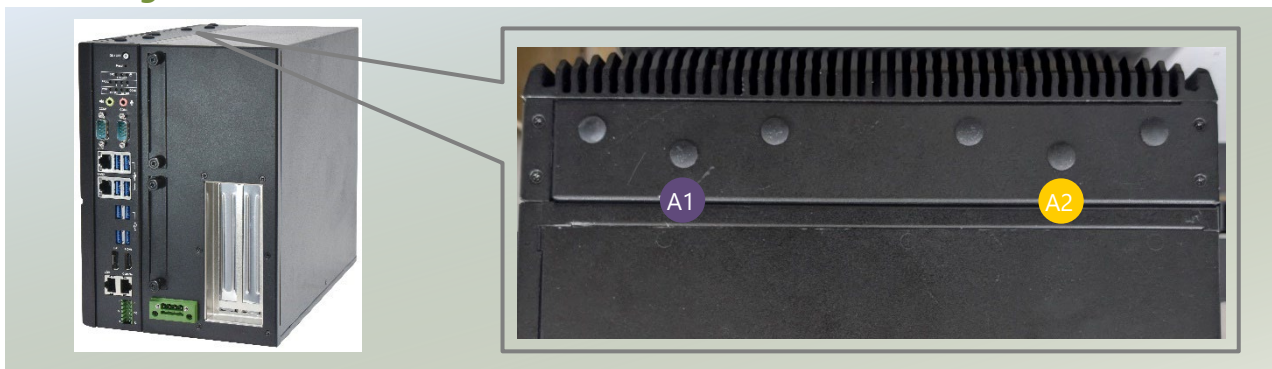
5. Push down on the module card and secure it with a screw.



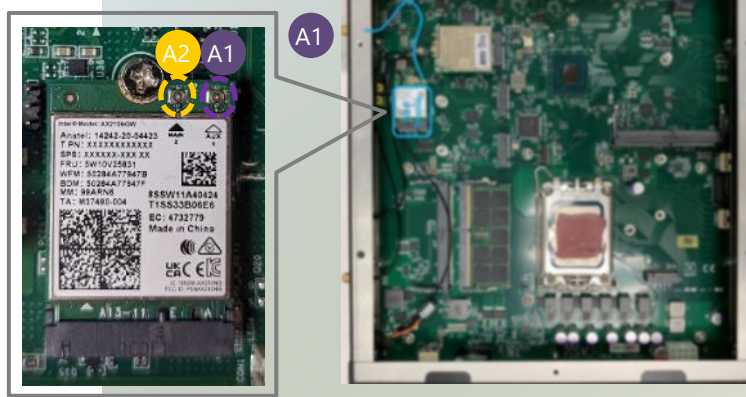
6. Lastly, thermal pad placement. Position the thermal pad (included in the accessory pack) gently on the top side of the Wi-Fi module.



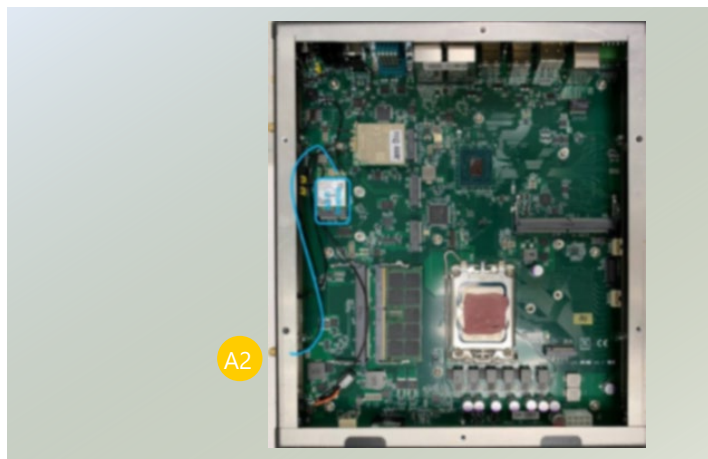
Installing Wi-Fi Antennas



1. Locate the two (2) antenna hole placement (A2, A3). Locate the two (2) IPEX connectors on the Wi-Fi module.



2. Connect RF cables to the IPEX connectors on the Wi-Fi module and screw the other end of the cables in the antenna holes.



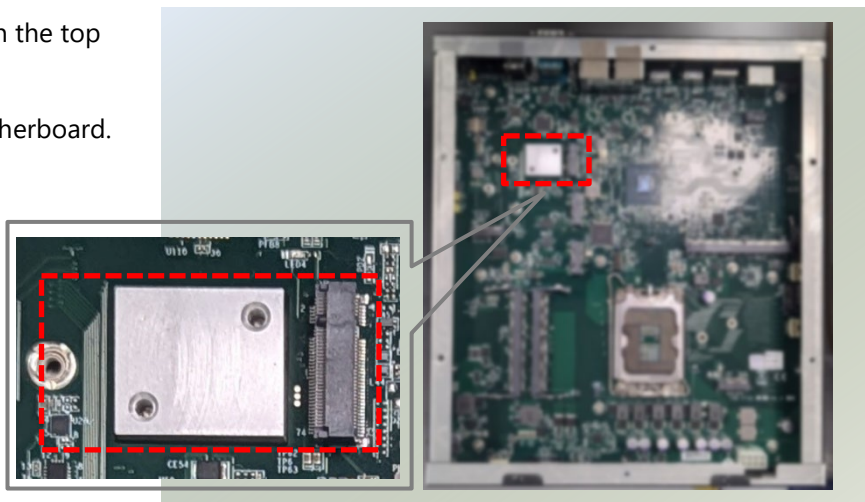
3. Then, screw the two (2) antennas on the front panel of the system.



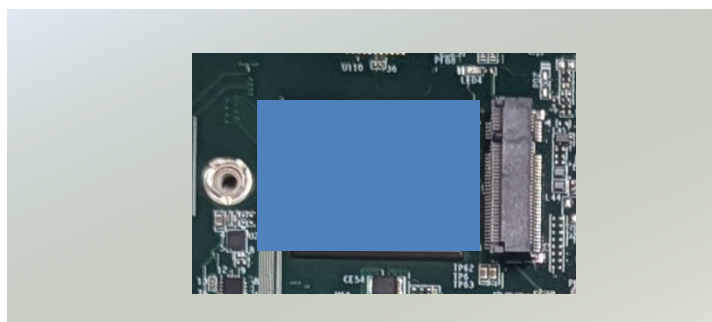
Installing LTE/5G Module (Optional)

The motherboard provides one M.2 M-Key slot for an LTE or 5G module card. The LTE module requires two antennas, while the 5G module requires four antennas. Please follow these steps to install the LTE/5G module.

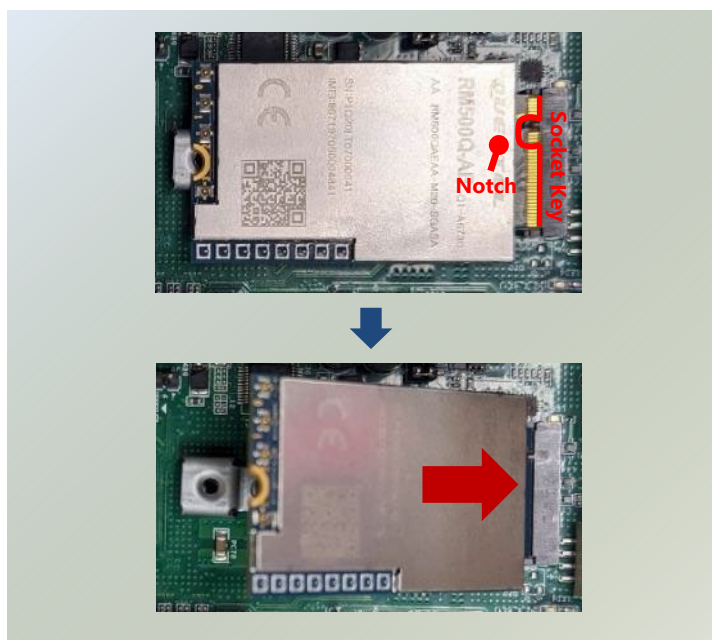
1. Power off the system, and open the top chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Then, position the thermal pad (included in the accessory pack) gently over the M.2 slot.



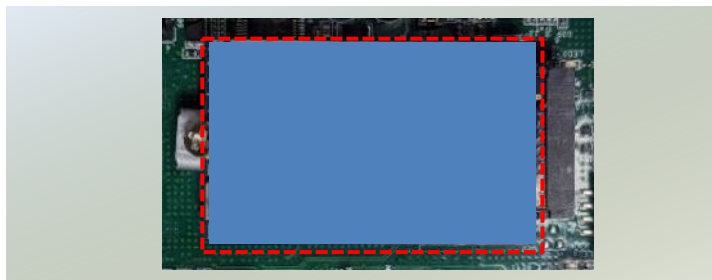
4. Align the notch of the LTE/5G module with the socket key in the pin slot.
5. Insert the LTE/5G module card pins at 30 degrees into the socket until it is fully seated.



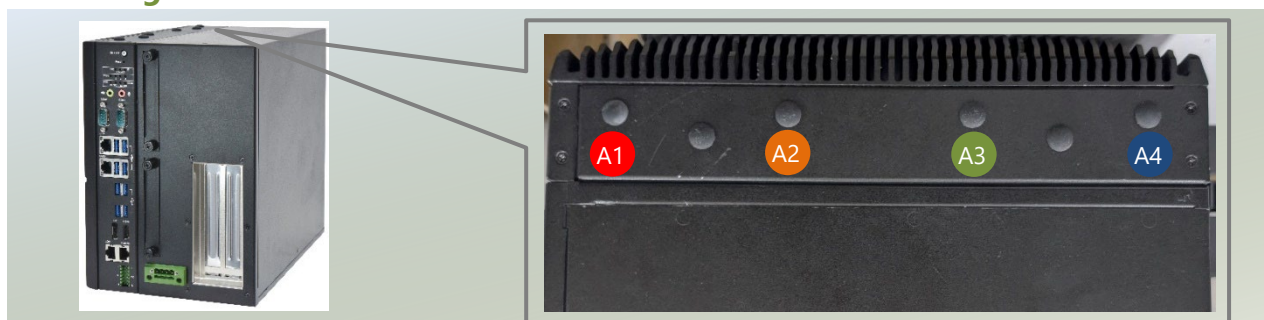
6. Push down on the module card and secure it with one (1) screw.



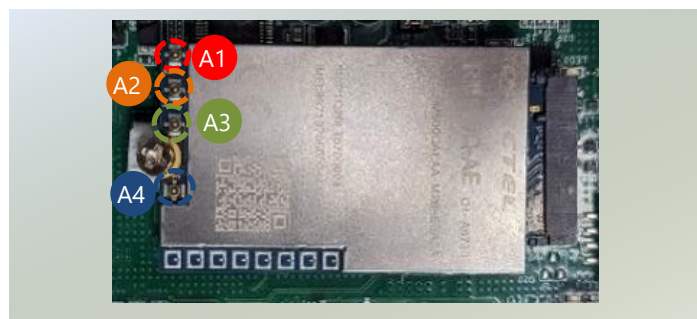
7. Next, thermal pad placement. Position a second thermal pad on the top side of the LTE/5G module.



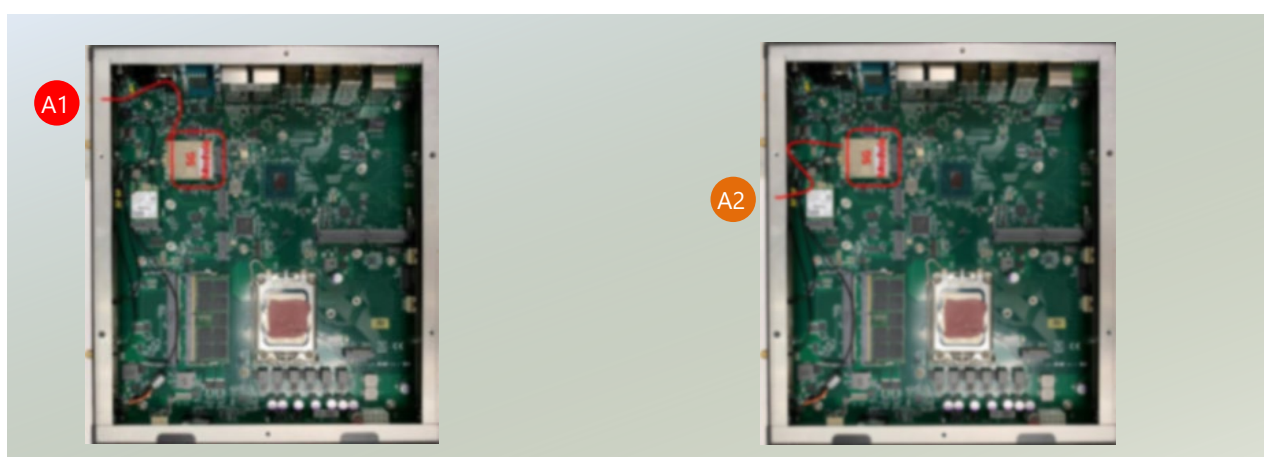
Installing 5G Antennas

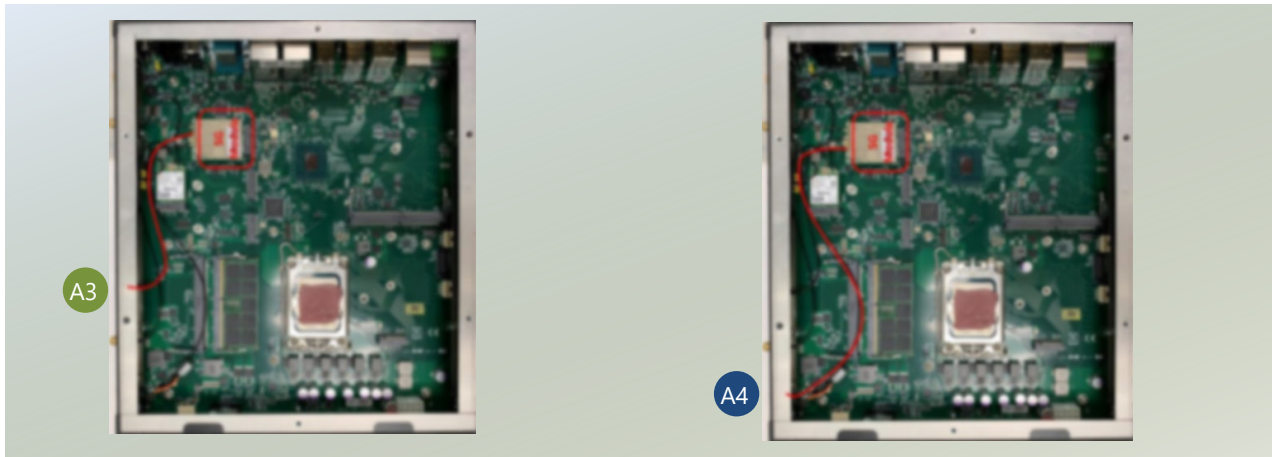


1. Locate the four (4) antenna hole placement (A1, A4, A5, A6). Locate the four (4) IPEX connectors on the 5G module card.

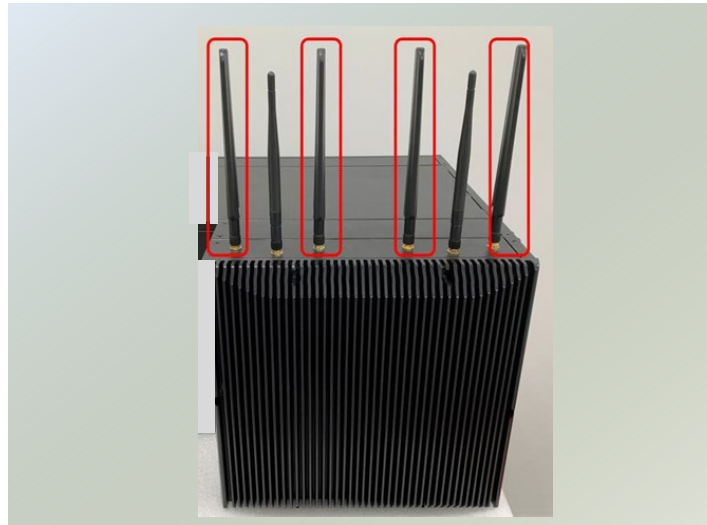


2. Connect the RF cables to the IPEX connectors on the 5G module and screw the other end of the cables in the antenna holes.





3. Then, screw on the four (4) antennas on the front and rear panel of the system.



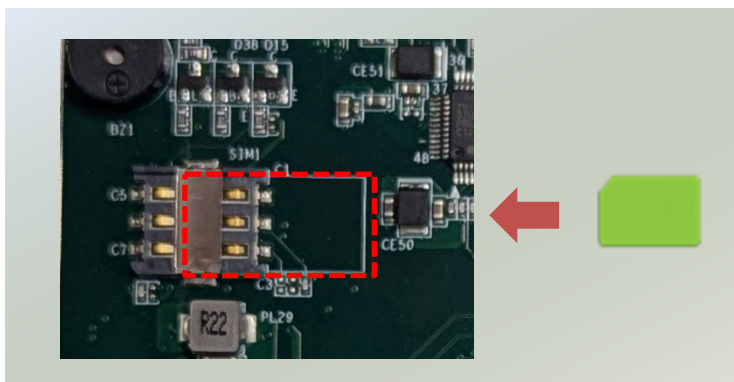
Installing SIM Cards (Optional)

The system supports one Nano-SIM card. Please follow the steps for installation.

1. Power off the system, and open the top chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Insert and push a Nano-SIM card, gold contacts facing upwards, all the way until the card clicks into place.



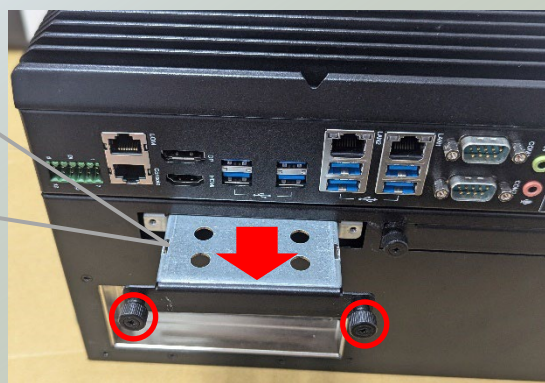
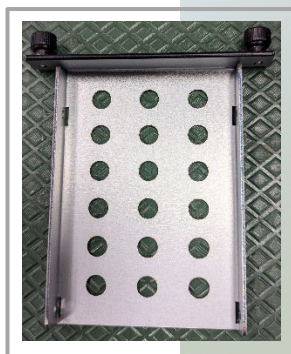
Installing Disk Drive (Optional)

EAI-I731 is built with two 2.5" HDD/SSD drive trays. Please follow the steps for installation.

1. Power off the system. Locate the 2.5" HDD/SSD drive placement on the front panel of the system.



2. Unscrew the two thumbscrews securing the drive tray. Pull the drive tray out.



3. Install the disk onto the tray and secure with four (4) screws, two (2) on each side. Make sure the SATA connector faces outwards as shown in the image.



4. Slide the tray into the drive socket and fasten the two thumbscrews that secures the tray onto the system.

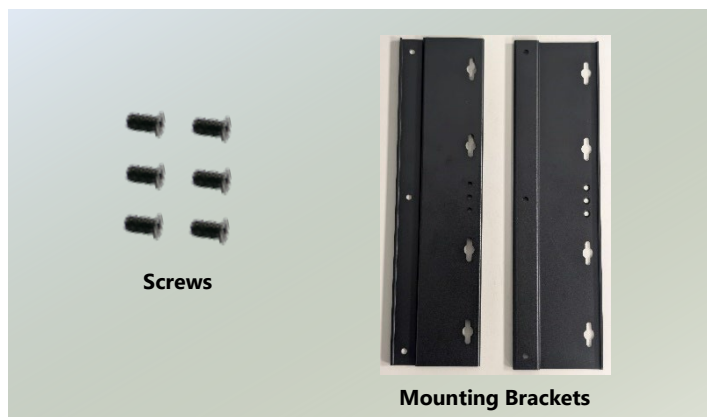


Mounting the System (Optional)

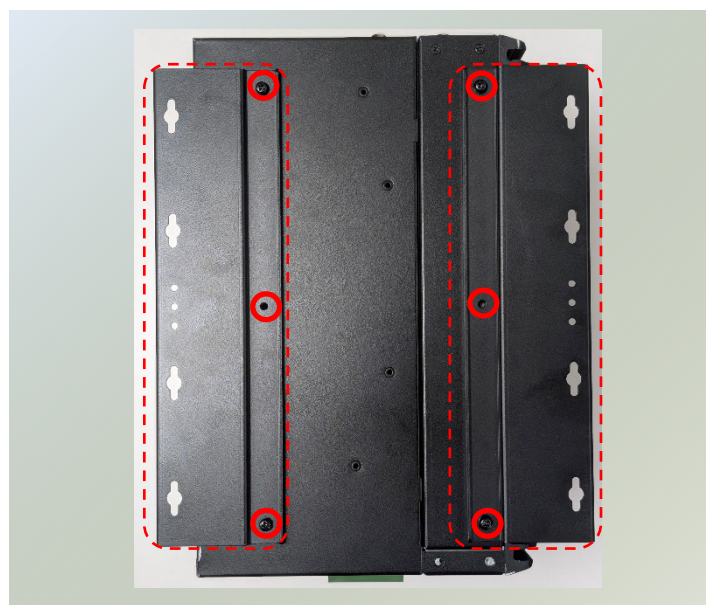
The package includes a pair of mounting brackets to provide additional support when moFunting the system on a movable flat surface or rack. Please consider the following when installing the mounting brackets.

1. The mount bracket kit contains the following items:

- ▶ 1x pair of Mounting Brackets
- ▶ 6x Screws



2. Invert the system to expose the bottom side. Secure the two mounting brackets to the system base using six screws, three (3) per bracket.



3. The mounting brackets have been installed on the bottom side of the system to provide additional support.



CHAPTER 3: SOFTWARE SETUP

BIOS Setup

The system has AMI BIOS built-in, with a SETUP utility that allows users to configure required settings or to activate certain system features. Pressing the **<Tab>** or **** key immediately allows you to enter the Setup utility.

Control Keys	Description
→←	select a setup screen, for instance, [Main], [Advanced], [Chipset], [Security], [Boot], and [Save & Exit]
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	to adjust values for the selected setup item/option
F1	to display General Help screen
F2	to retrieve previous values, such as the parameters configured the last time you had entered BIOS.
F3	to load optimized default values
F4	to save configurations and exit BIOS
<Esc>	to exit the current screen

Main Page

Setup main page contains BIOS information and project version information.

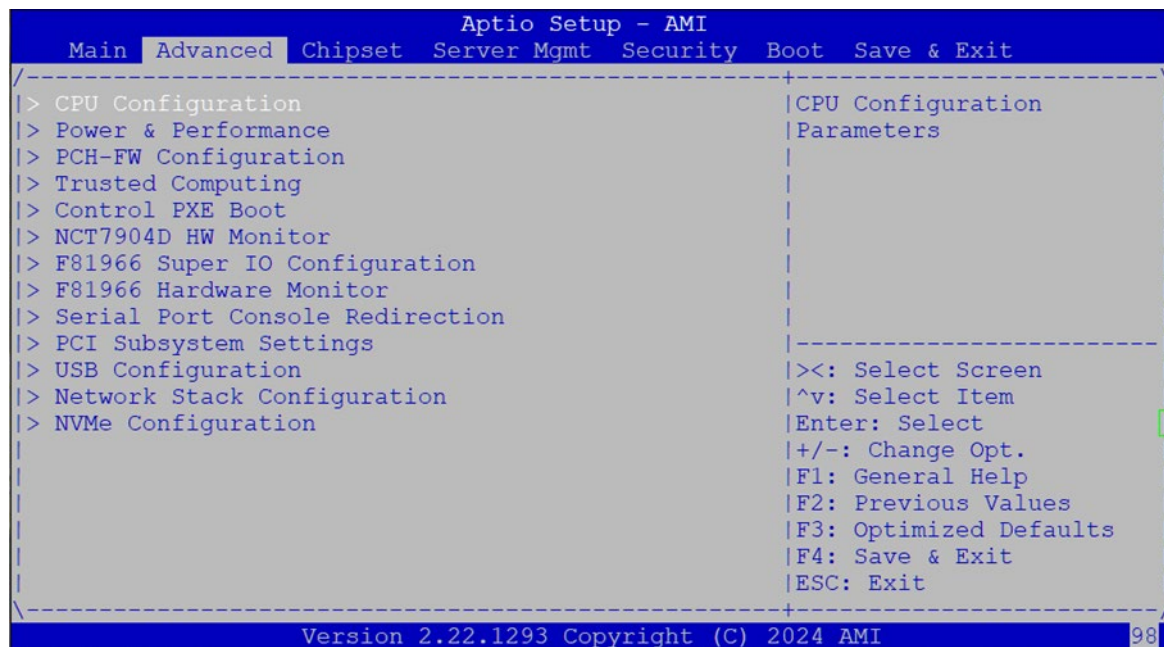
Aptio Setup - AMI		
Main	Advanced	Chipset
Server Mgmt	Security	Boot
Save & Exit		
BIOS Information		
BIOS Vendor	American Megatrends	^
Core Version	5.27	*
Compliance	UEFI 2.8; PI 1.7	*
Project Version	FIEBI730A00006T007	*
Build Date and Time	01/02/2024 15:55:49	*
Access Level	Administrator	*
Processor Information		
Name	AlderLake DT	*
Type	12th Gen Intel(R)	* ><: Select Screen
	Core(TM) i5-12500E	* ^v: Select Item
Speed	2900 MHz	* Enter: Select
Memory Information		
Total Memory	8192 MB	+ +/-: Change Opt.
Memory Frequency	2667 MHz	+ F1: General Help
		+ F2: Previous Values
		+ F3: Optimized Defaults
		v F4: Save & Exit
		ESC: Exit
Version 2.22.1292 Copyright (C) 2024 AMI		

PCH Information		
Name	PCH-S	* Enter: Select
PCH SKU	R680E	* +/-: Change Opt.
System Date		
System Time	[Thu 08/31/2023]	* F1: General Help
	[05:16:58]	* F2: Previous Values
		* F3: Optimized Defaults
		v F4: Save & Exit
		ESC: Exit
Version 2.22.1288 Copyright (C) 2023 AMI		

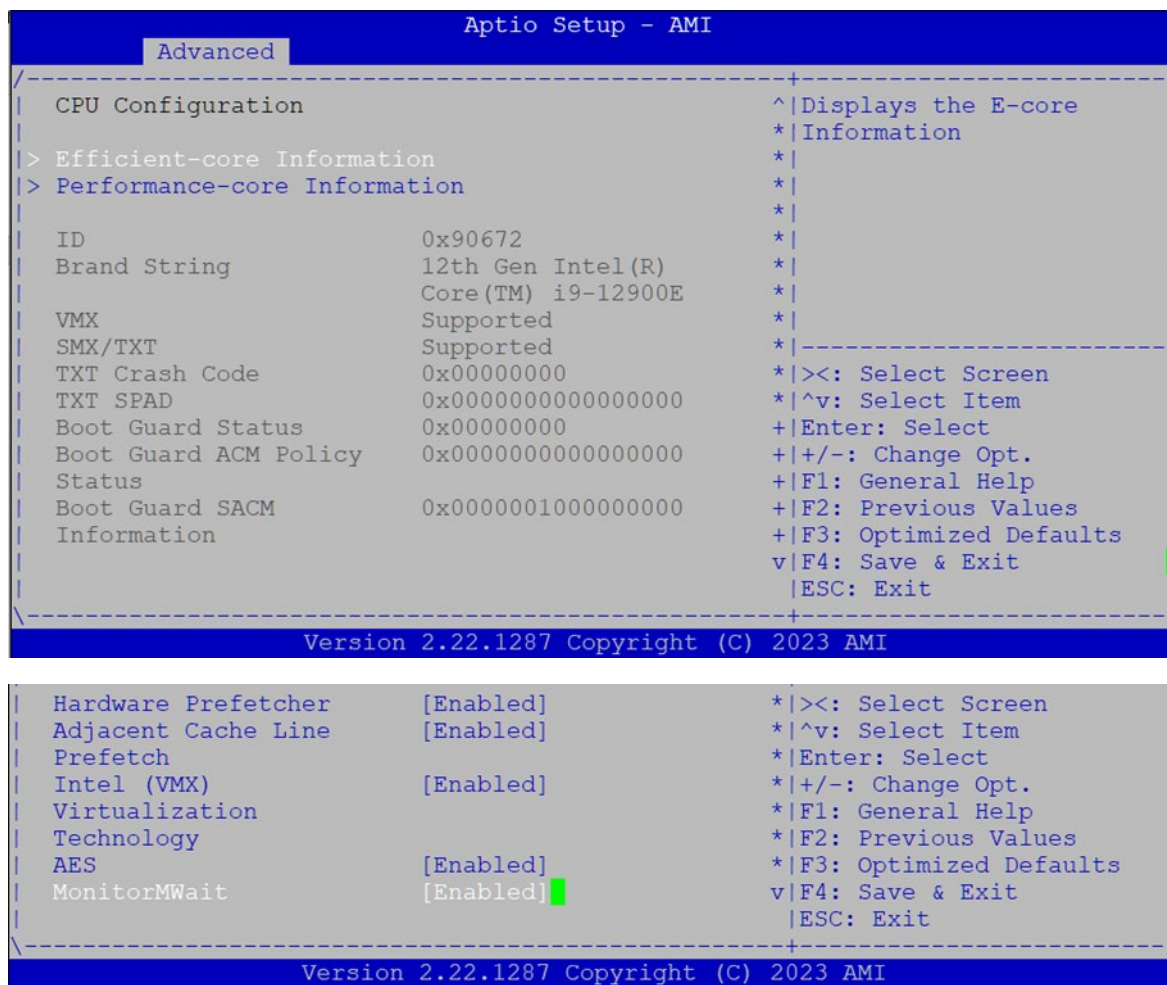
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliance: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
Processor Information	Information of platform processor
Memory Information	Information of memory
PCH Information	Information of platform pch
System Date	To set the Date, use <Tab> to switch between Date elements. Default Range of Year: 1998-9999 Default Range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use <Tab> to switch between Date elements.

Advanced Page

Select the **Advanced** menu item from the BIOS setup screen to enter the “Advanced” setup screen. Users can select any of the items in the left frame of the screen.

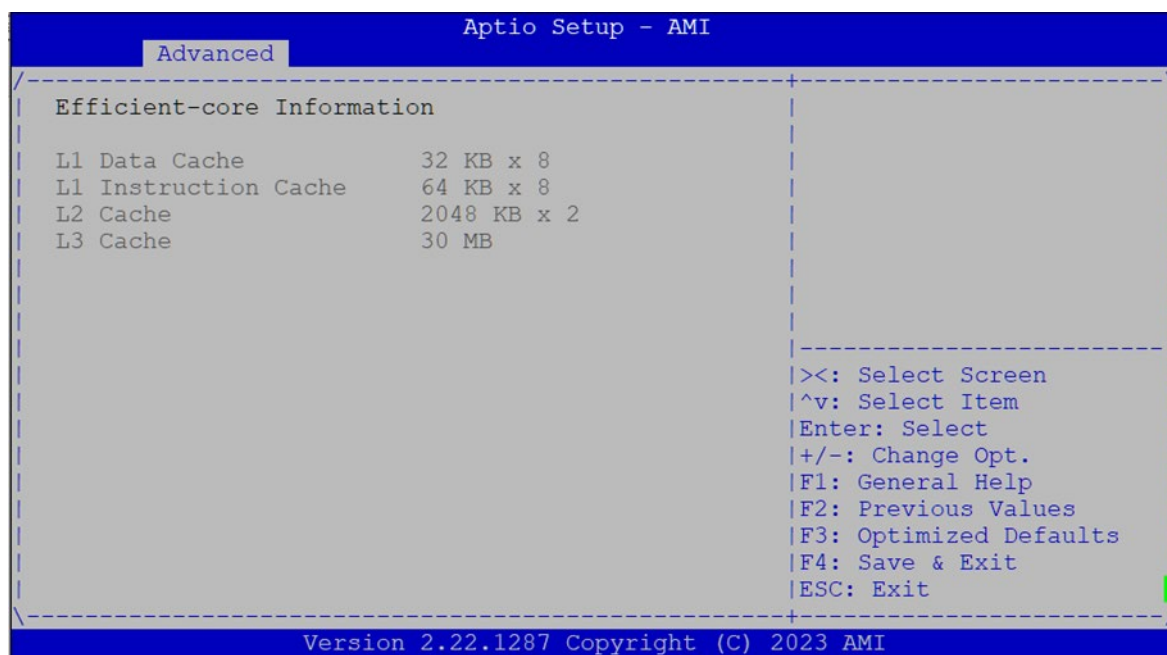


CPU Configuration

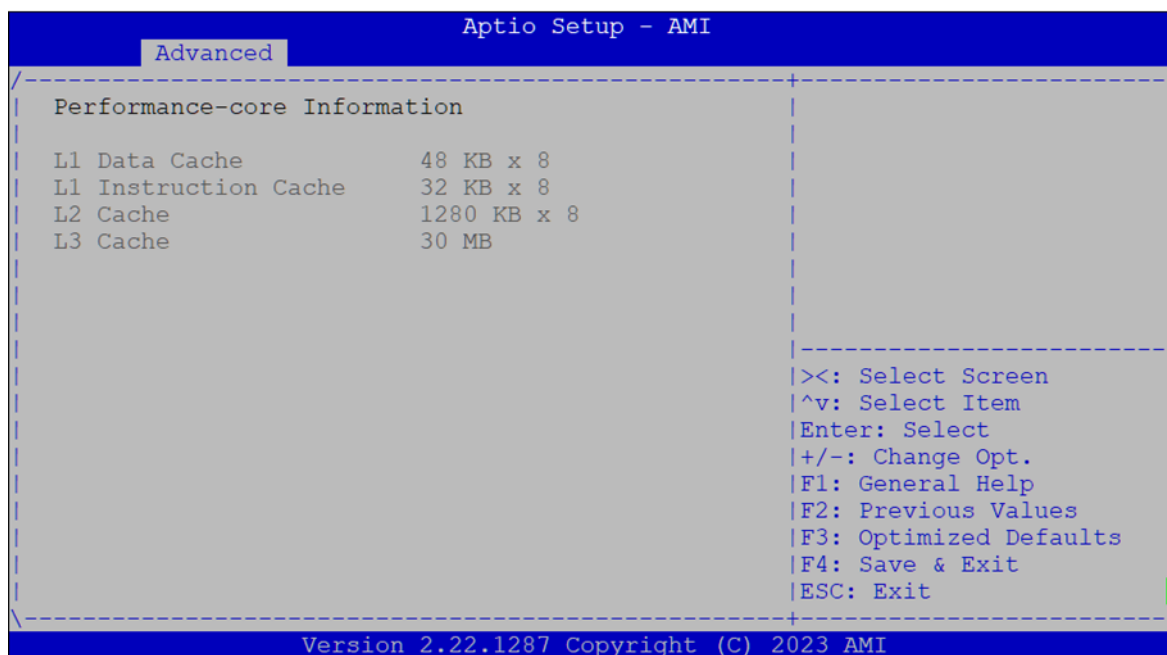


Feature	Options	Description
Hardware Prefetcher	Disabled Enabled	To turn on/off the MLC streamer prefetcher.
Adjacent Cache Line Prefetch	Disabled Enabled	To turn on/off prefetching of adjacent cache lines.
Intel (VMX) Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
AES	Disabled Enabled	Enable/Disable AES (Advanced Encryption Standard)
MonitorMWait	Disabled Enabled	Enable/Disable MonitorMWait, if Disable MonitorMwait, the AP threads Idle Manner should not set in MWAIT Loop

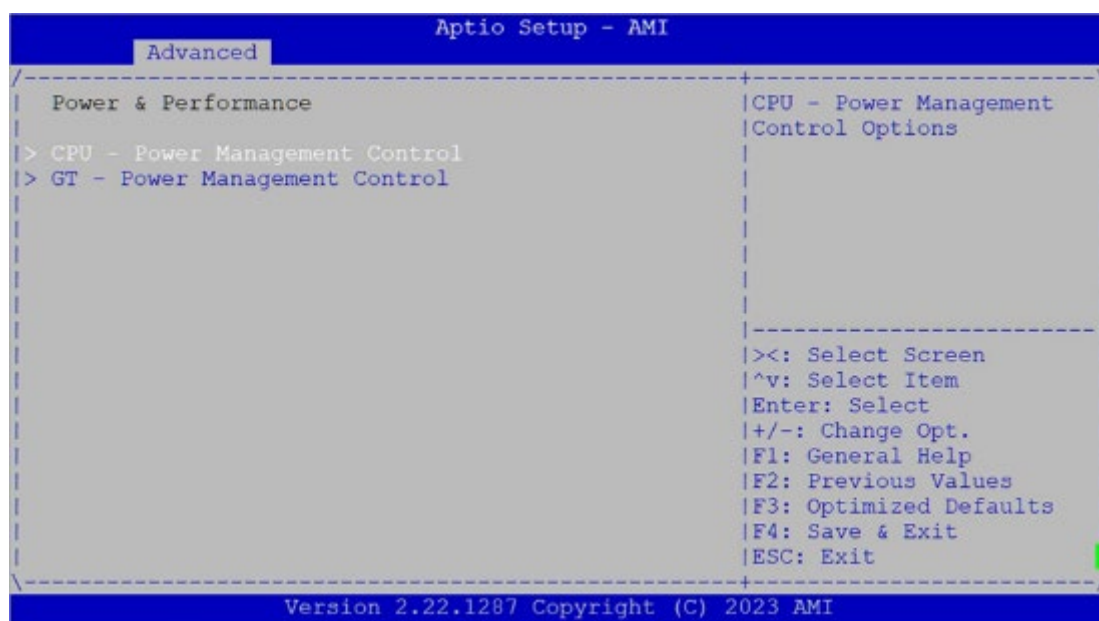
Efficient-Core Information



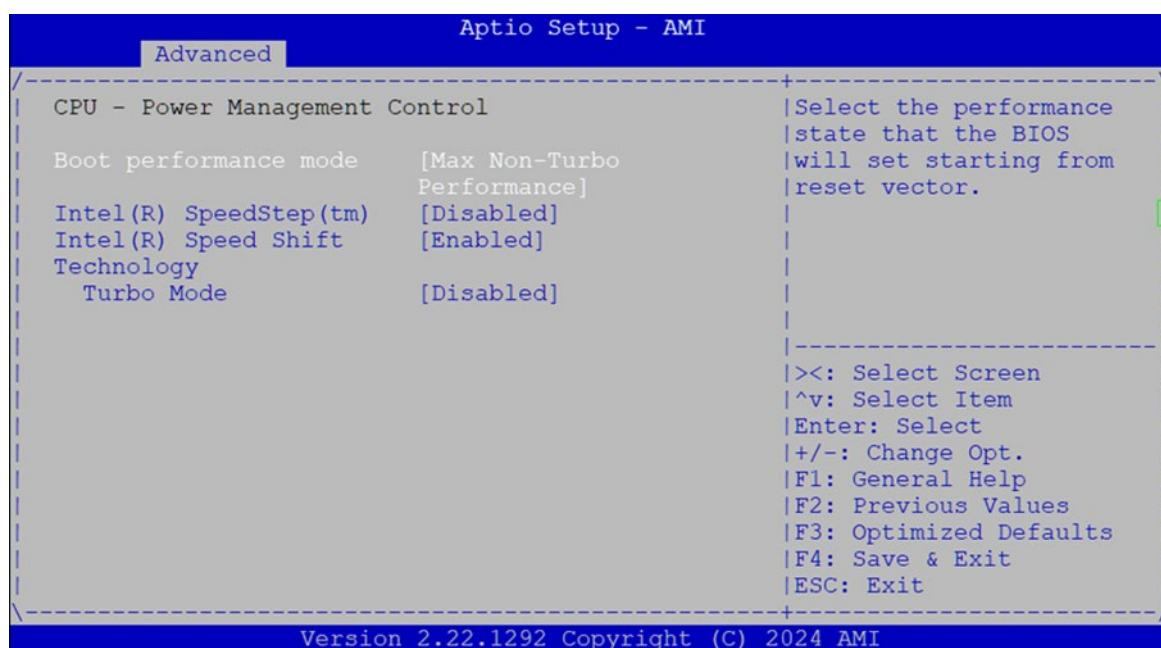
Performance-Core Information



Power & Performance

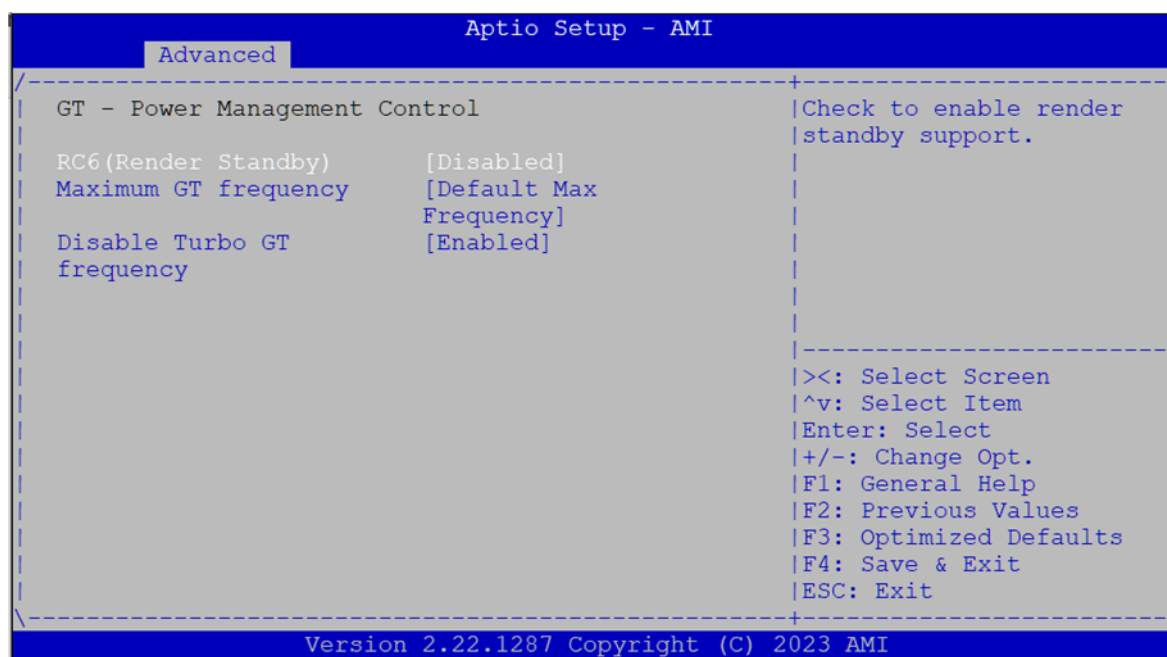


CPU – Power Management Control



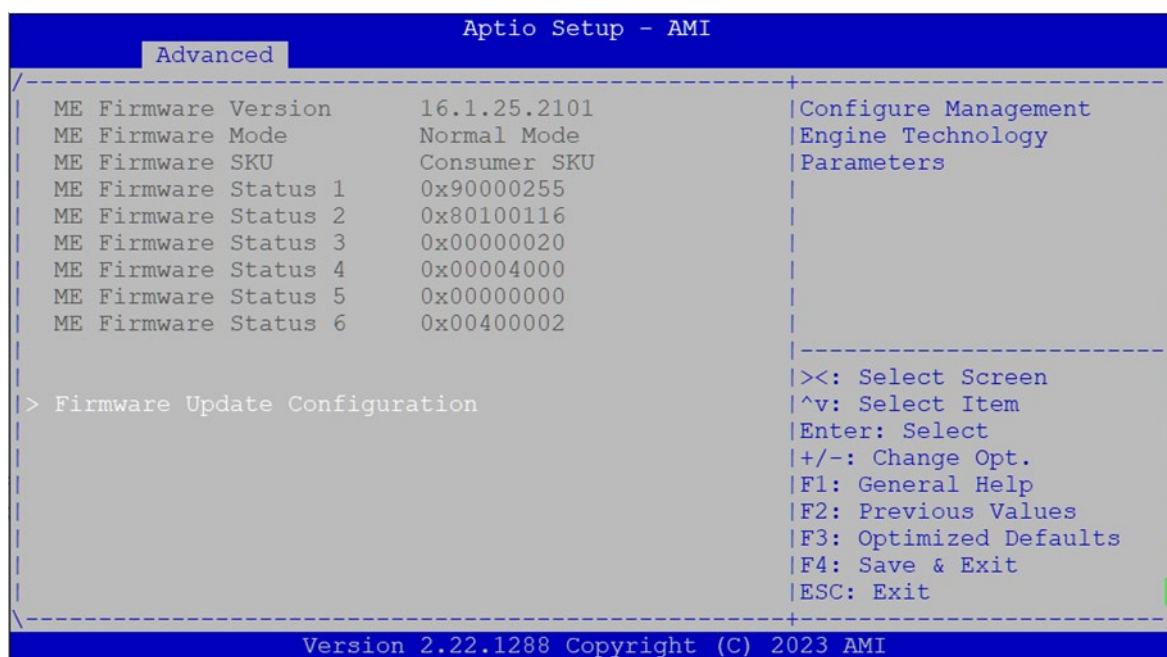
Feature	Options	Description
Boot performance mode	Max Battery Max Non-Turbo Performance Turbo Performance	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Disabled Enabled	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Disabled Enabled	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware-controlled P-states.
Turbo Mode	Disabled Enabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.

GT-Power Management Control

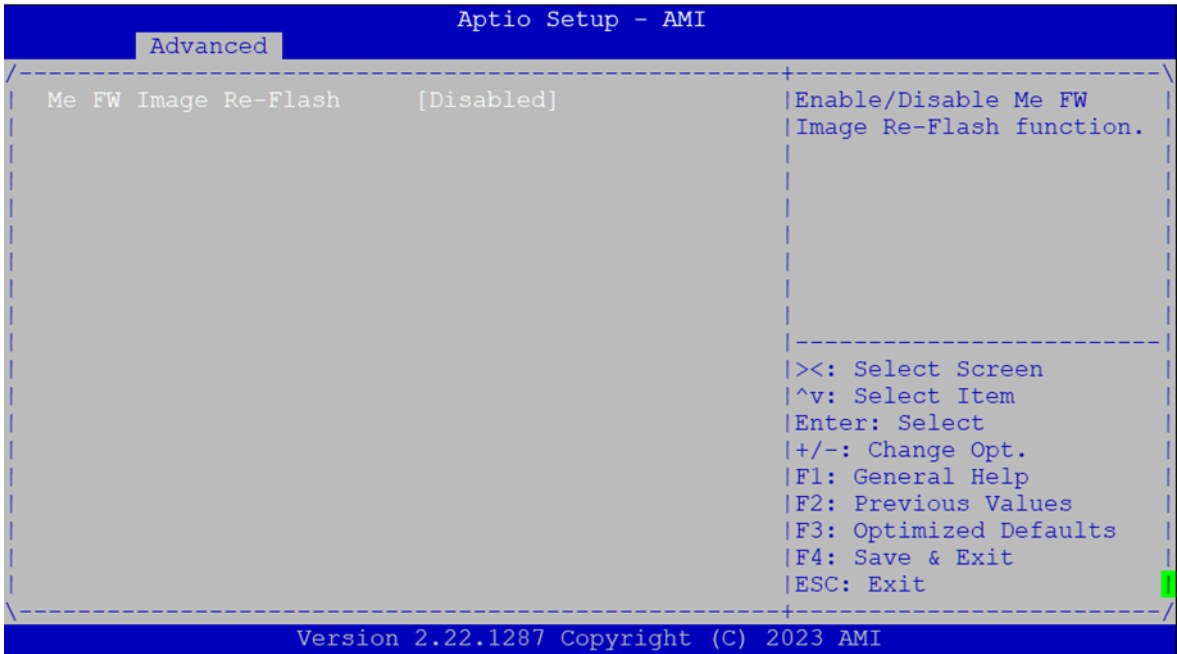


Feature	Options	Description
RC6 (Render Standby)	Disabled Enabled	Check to enable render standby support.
Maximum GT frequency	Default Max Frequency	Maximum GT frequency limited by the user. Choose between 300MHz (RPN) and 1550MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU
Disable Turbo GT frequency	Enabled Disabled	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

PCH-FW Configuration

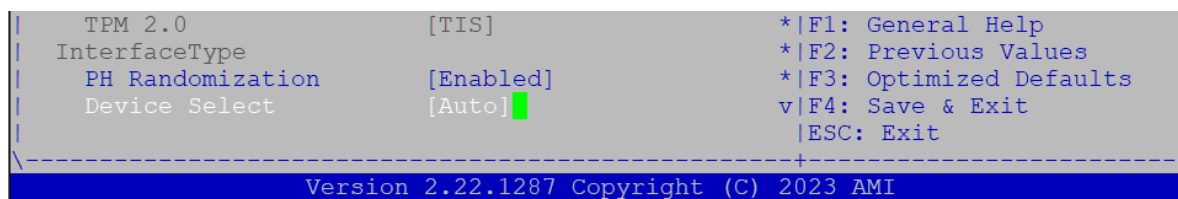
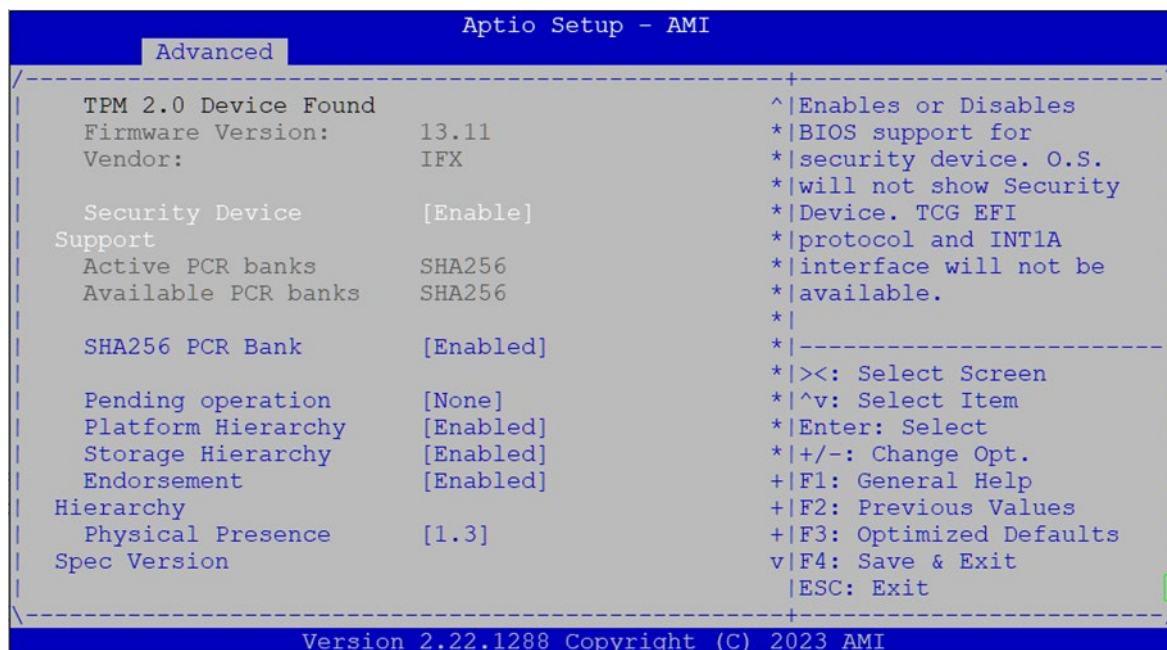


Firmware Update Configuration



Feature	Options	Description
Me Fw Image Re-Flash	Disabled Enabled	Enable/Disable Me FW Image Re-Flash function.

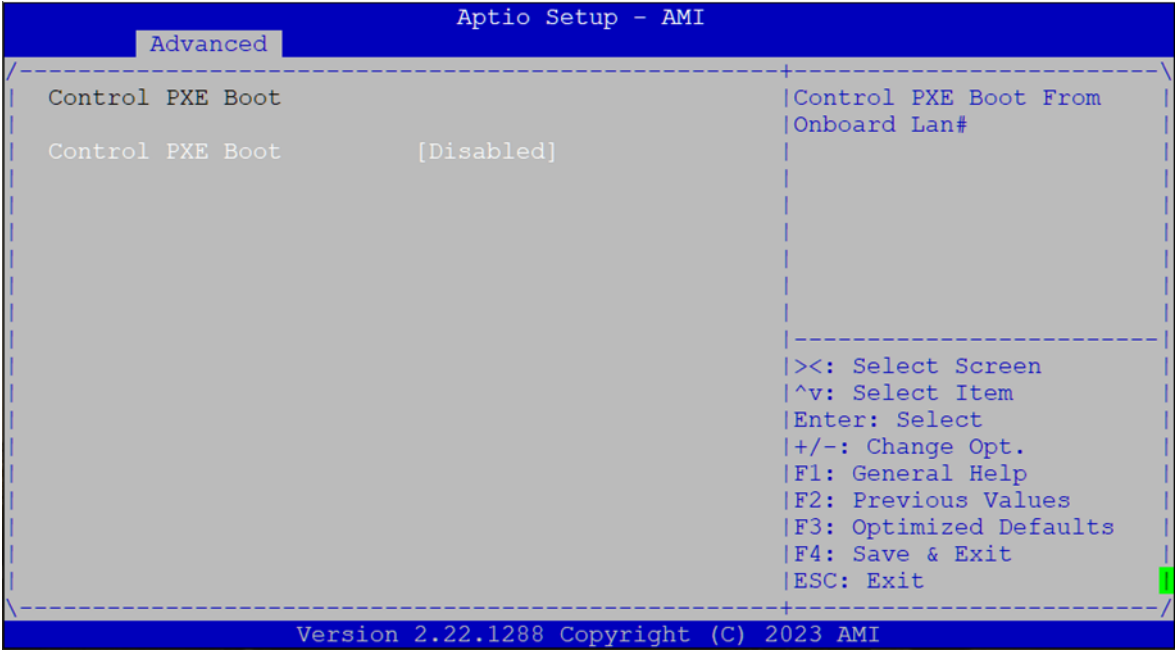
Trusted Computing



Feature	Options	Description
Security Device Support	Disable Enable	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	Enable or Disable SHA256 PCR Bank
Pending operation	None TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disabled Enabled	Enable or Disable Platform Hierarchy
Storage Hierarchy	Disabled Enabled	Enable or Disable Storage Hierarchy
Endorsement Hierarchy	Disabled Enabled	Enable or Disable Endorsement Hierarchy
Physical Presence Spec Version	1.2 1.3	Select to Tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.

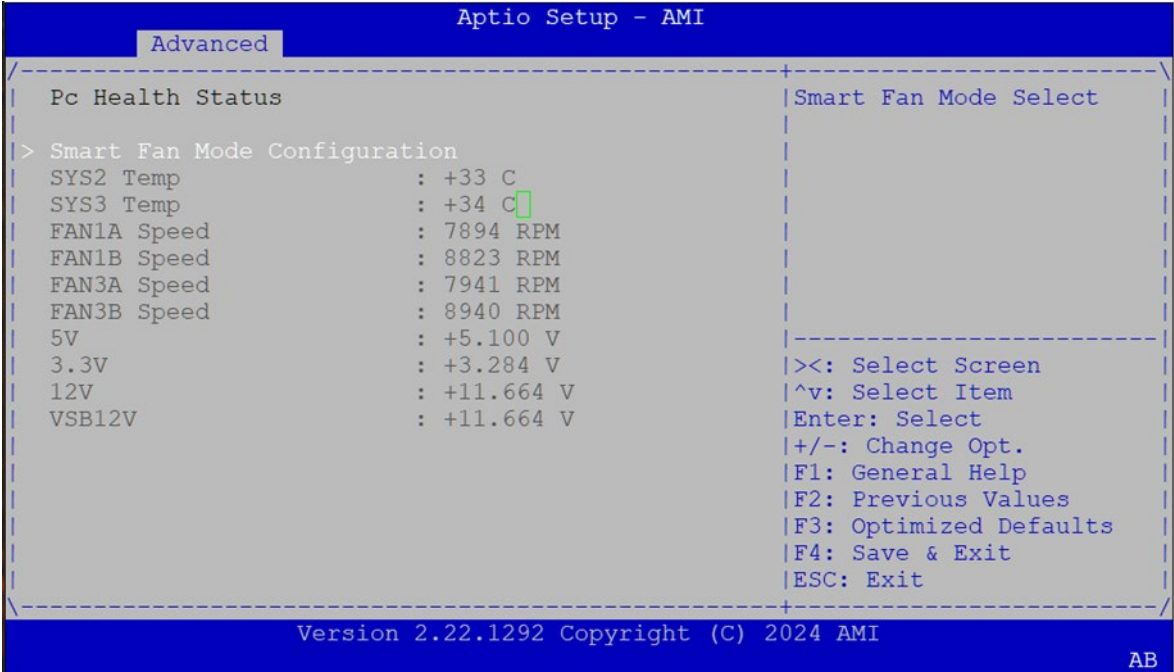
PH Randomization	Disabled Enabled	Enables or Disables Platform Hierarchy randomization. DO NOT ENABLE THIS QUESTION IN PRODUCTION PLATFORMS. THIS IS FOR DEVELOPMENT TESTING. OVERRIDE ChangePlatformAuth ELINK for production platforms supporting TXT.
Device Select	TPM 1.2 TPM 2.0 Auto	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated

Control PXE Boot



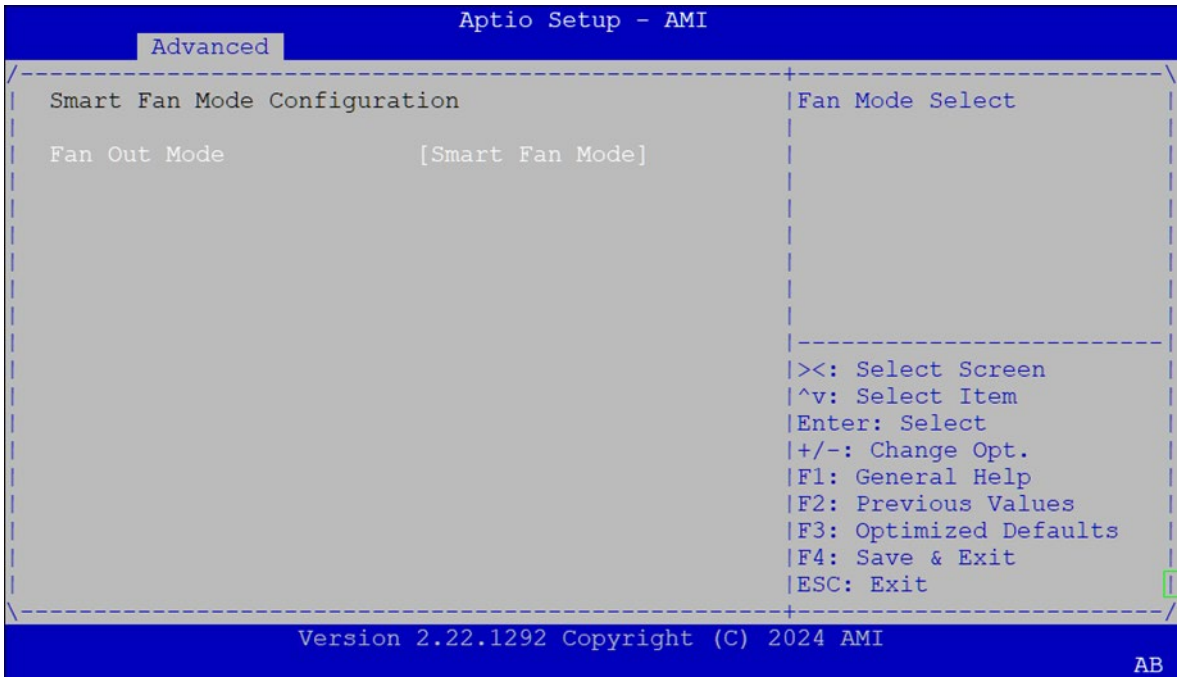
Feature	Options	Description
Control PXE Boot	Disabled	
	Lan1	Control PXE Boot From Onboard Lan#
	Lan2	

NCT7904D HW Monitor



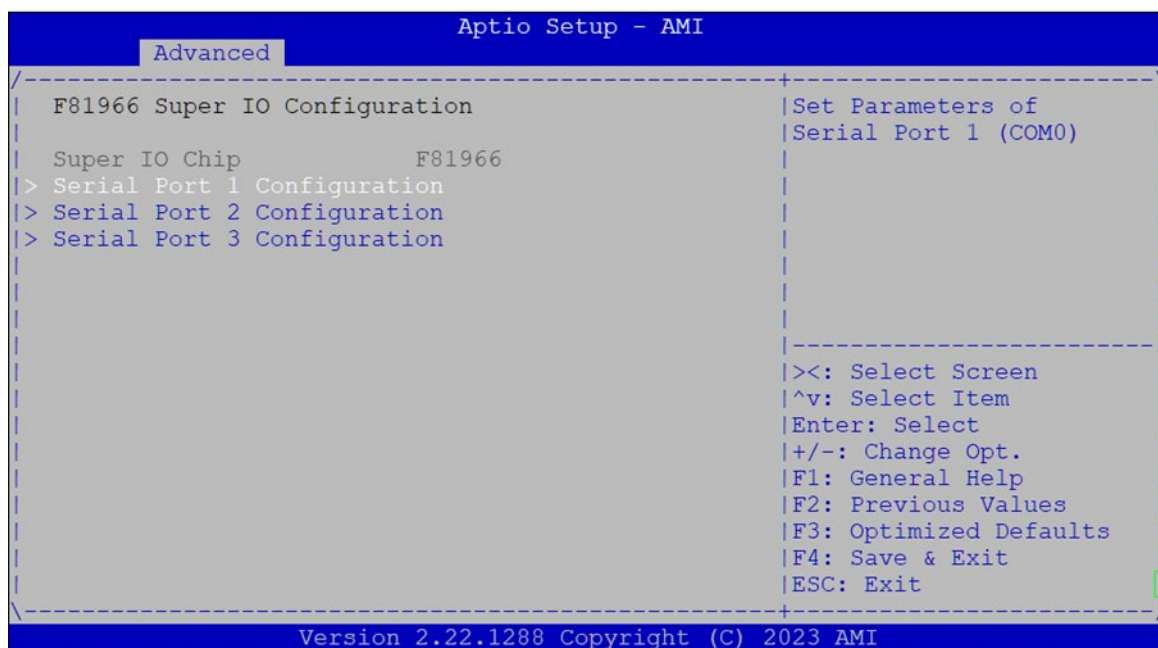
Feature	Description
SYS2 Temp	This value reports the System temperature
SYS3 Temp	This value reports the System temperature
FAN Speed	This value reports the Fan speed
5V	This value reports the 5V Input voltage
3.3V	This value reports the 3.3V Input voltage
12V	This value reports the 12V Input voltage
VSB12V	This value reports the VSB12V Input voltage

Smart Fan Mode Configuration

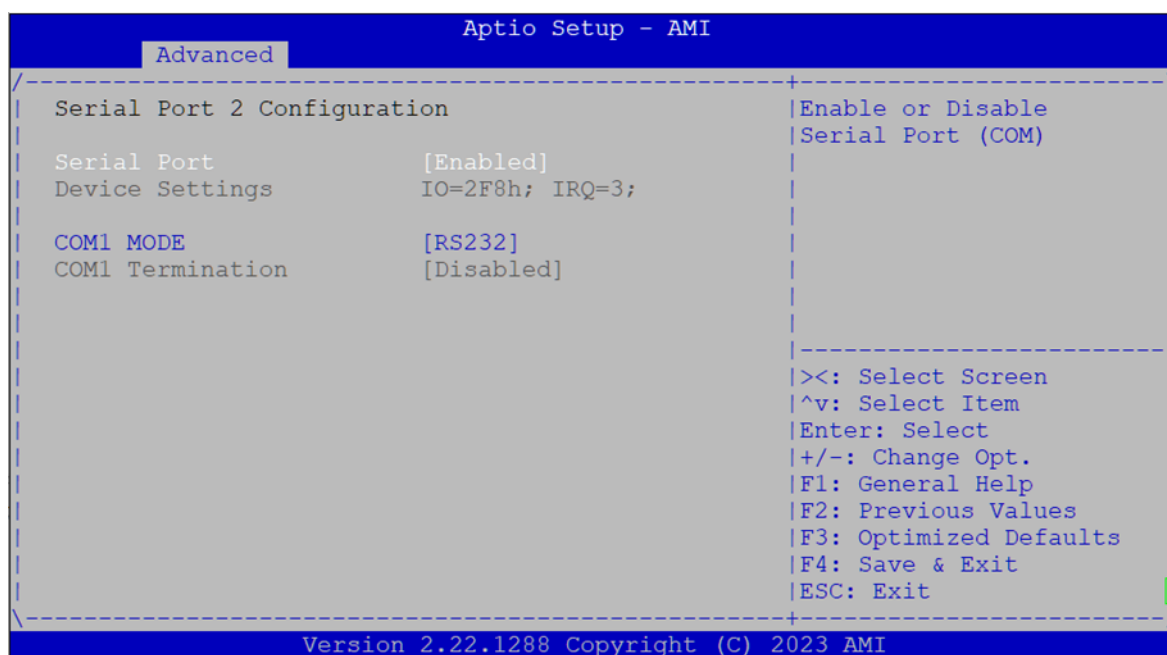


Feature	Options	Description
Fan Out Mode	Full Speed Mode Smart Fan Mode	Fan Mode Select

F81966 Super IO Configuration

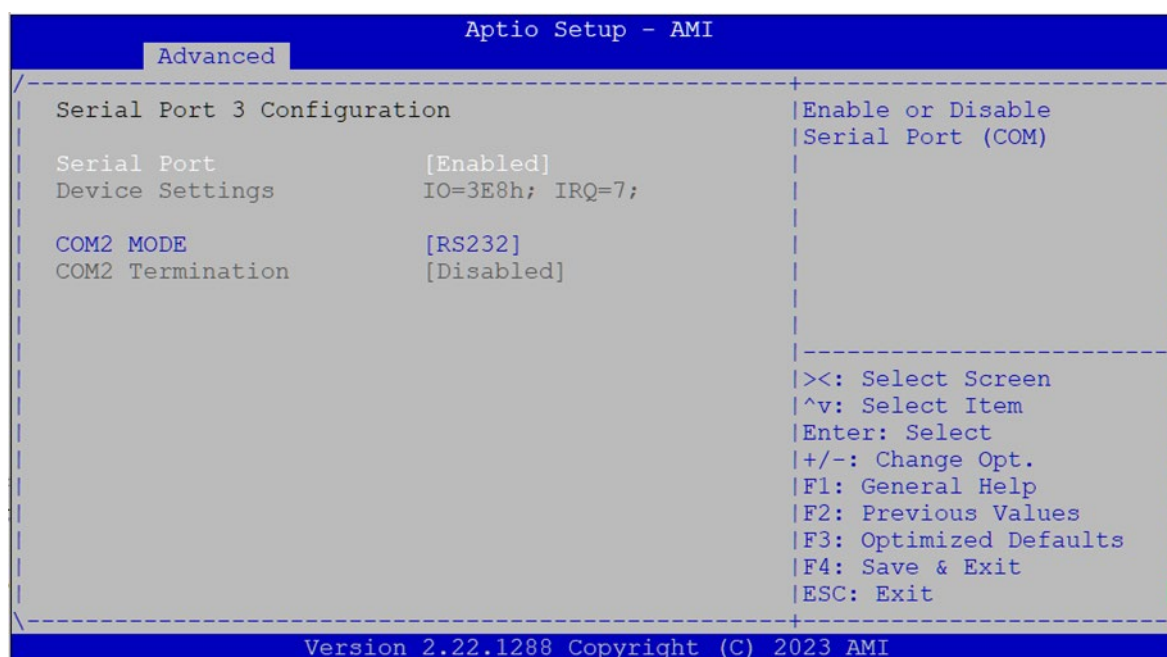


Serial Port 2 Configuration



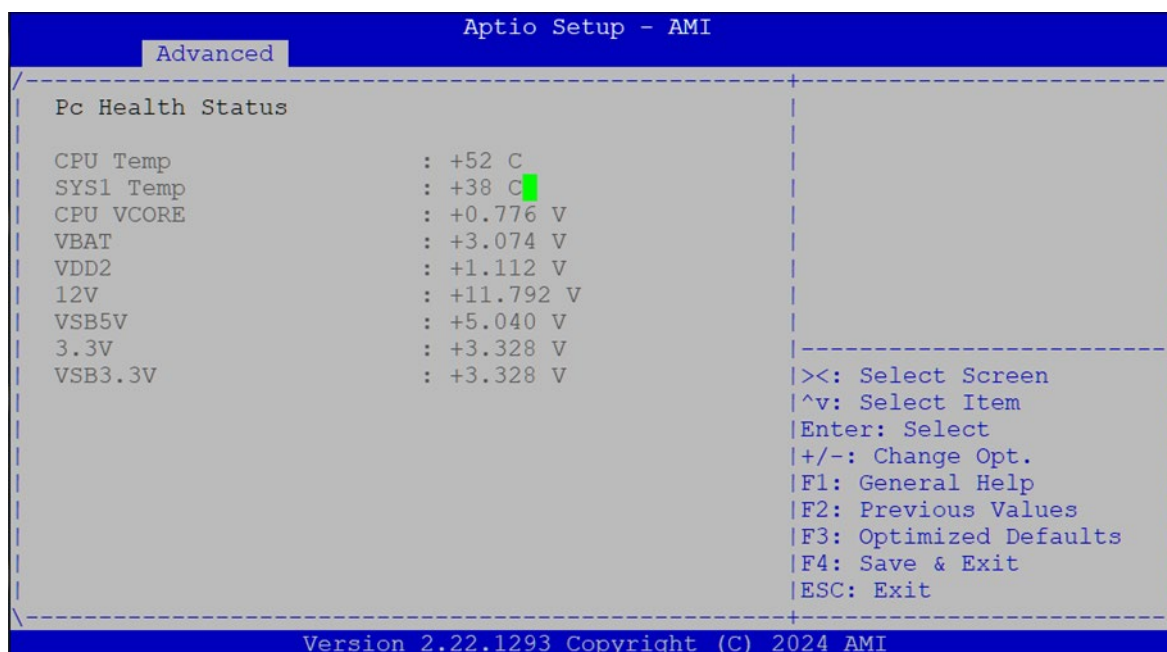
Feature	Options	Description
Serial Port	Disabled Enabled	Enable or Disable Serial Port (COM)
Device Settings	N/A	IO=2F8h; IRQ=3;
COM1 MODE	Loopback RS232 RS485 Half Duplex RS422 Full Duplex	Select Com Mode as RS232/RS485
COM1 Termination	Disabled Enabled	COM RS-422/485 Receiver Termination

Serial Port 3 Configuration



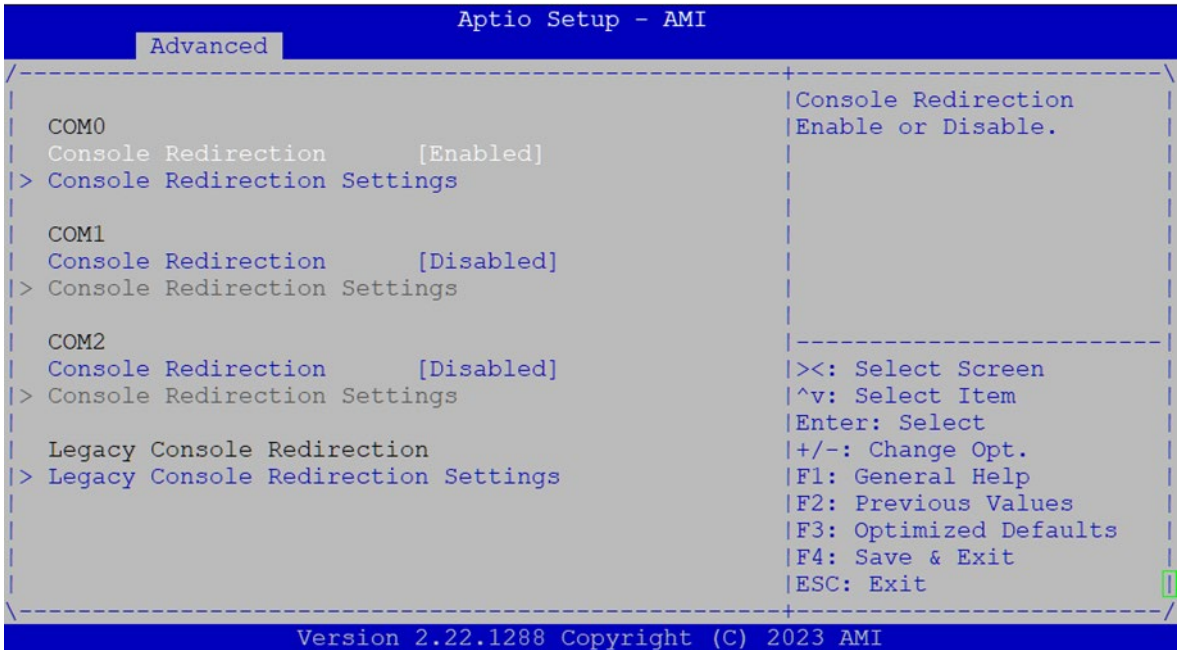
Feature	Options	Description
Serial Port	Disabled Enabled	Enable or Disable Serial Port (COM)
Device Settings	N/A	IO=3E8h; IRQ=7;
COM2 MODE	Loopback RS232 RS485 Half Duplex RS422 Full Duplex	Select Com Mode as RS232/RS485
COM2 Termination	Disabled Enabled	COM RS-422/485 Receiver Termination

F81966 Hardware Monitor



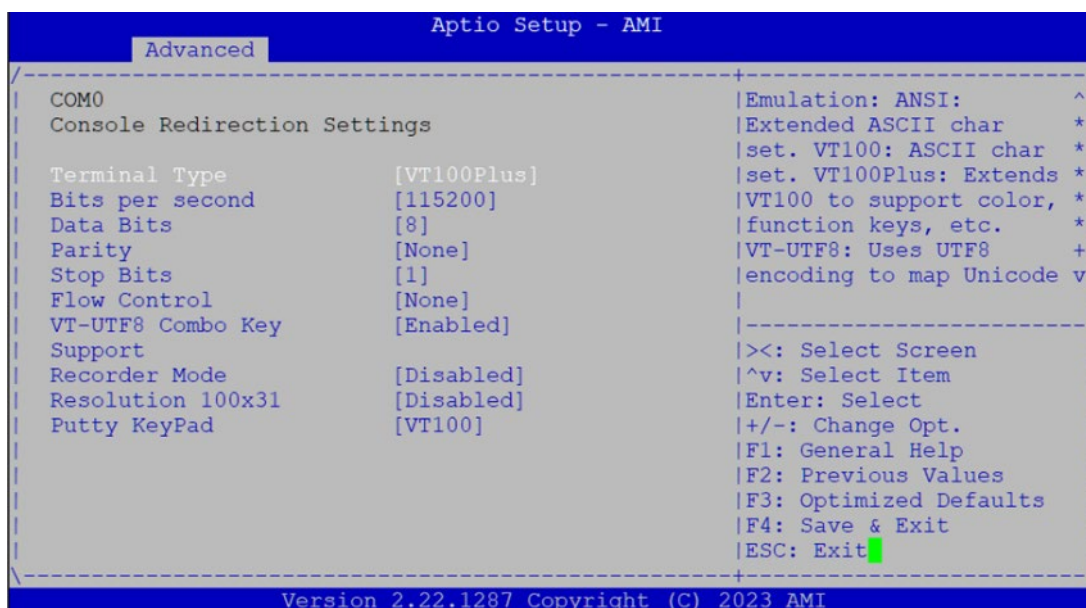
Feature	Description
CPU Temp	This value reports the CPU temperature
SYS1 Temp	This value reports the System temperature
CPU VCORE	This value reports the CPU VCORE Input voltage
VBAT	This value reports the VBAT Input voltage
VDD2	This value reports the VDD2 Input voltage
12V	This value reports the 12V Input voltage
VSB5V	This value reports the VSB5V Input voltage
3.3V	This value reports the 3.3V Input voltage
VSB3.3V	This value reports the VSB3.3V Input voltage

Serial Port Console Redirection



Feature	Options	Description
Console Redirection	Disabled Enabled	Console Redirection Enable or Disable.

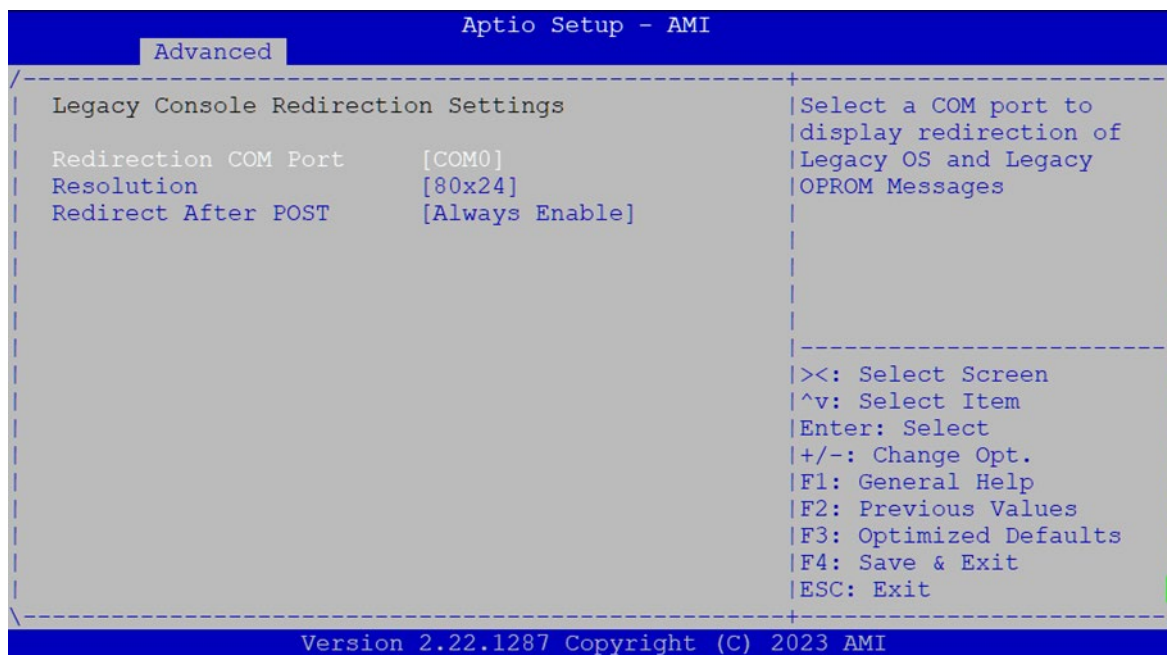
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Stop bits indicate the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.

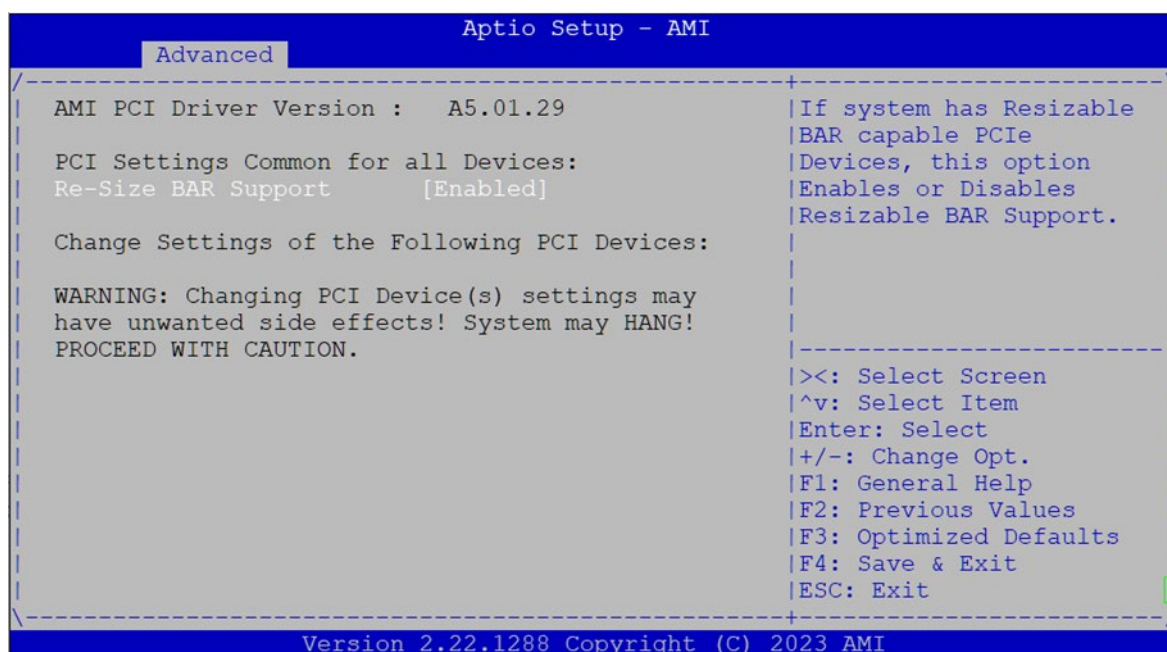
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution.
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

Legacy Console Redirection Settings



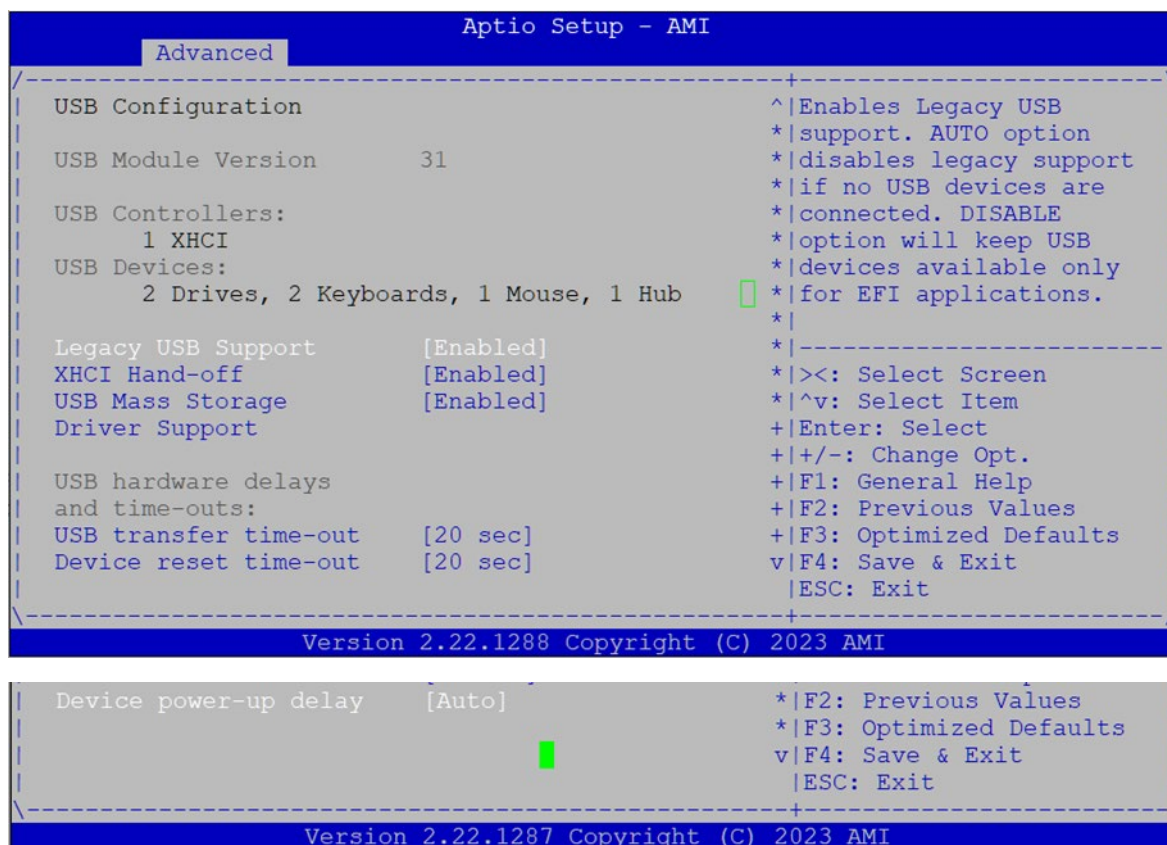
Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPRom Messages
Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection
Redirect After POST	Always Enable BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

PCI Subsystem Settings



Feature	Options	Description
Re-Size BAR Support	Disabled Enabled	If system has Resizable BAR capable PCIe Devices, this option Enables or Disables Resizable BAR Support.

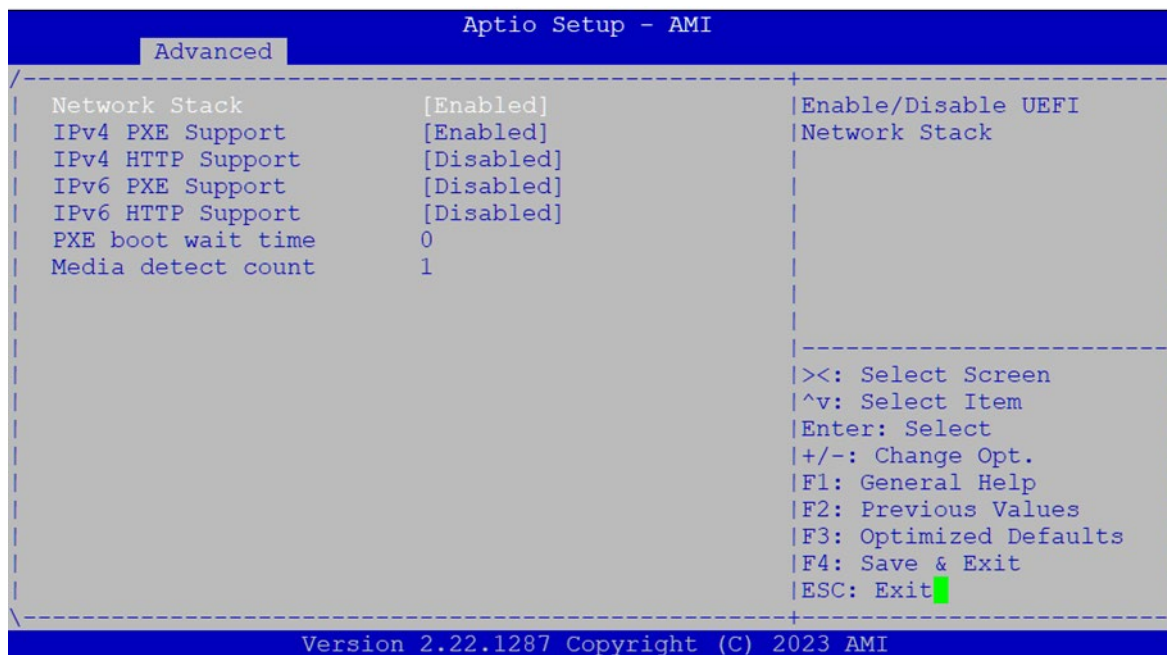
USB Configuration



Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected. Disabled option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled 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	Enable/Disable USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device Start Unit command time-out

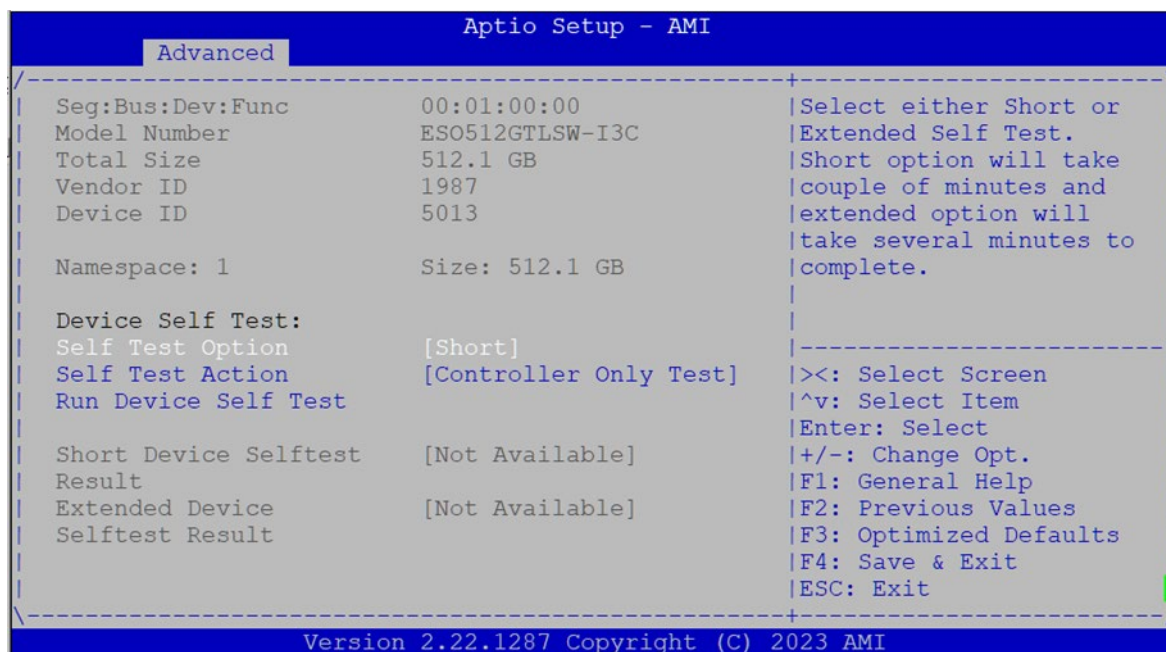
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.
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Network Stack Configuration



Feature	Options	Description
Network Stack	Disabled Enabled	Enable/Disable UEFI Network Stack
IPv4 PXE Support	Disabled Enabled	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	Disabled Enabled	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	Disabled Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	Disabled Enabled	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	0	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	1	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

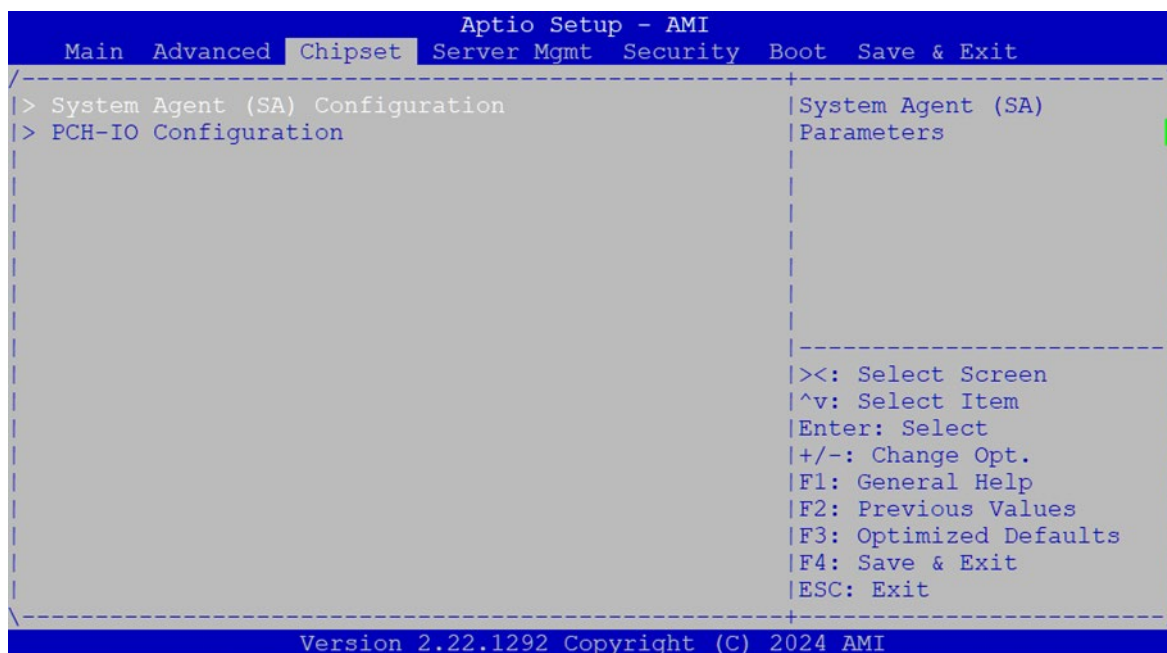
NVMe Configuration



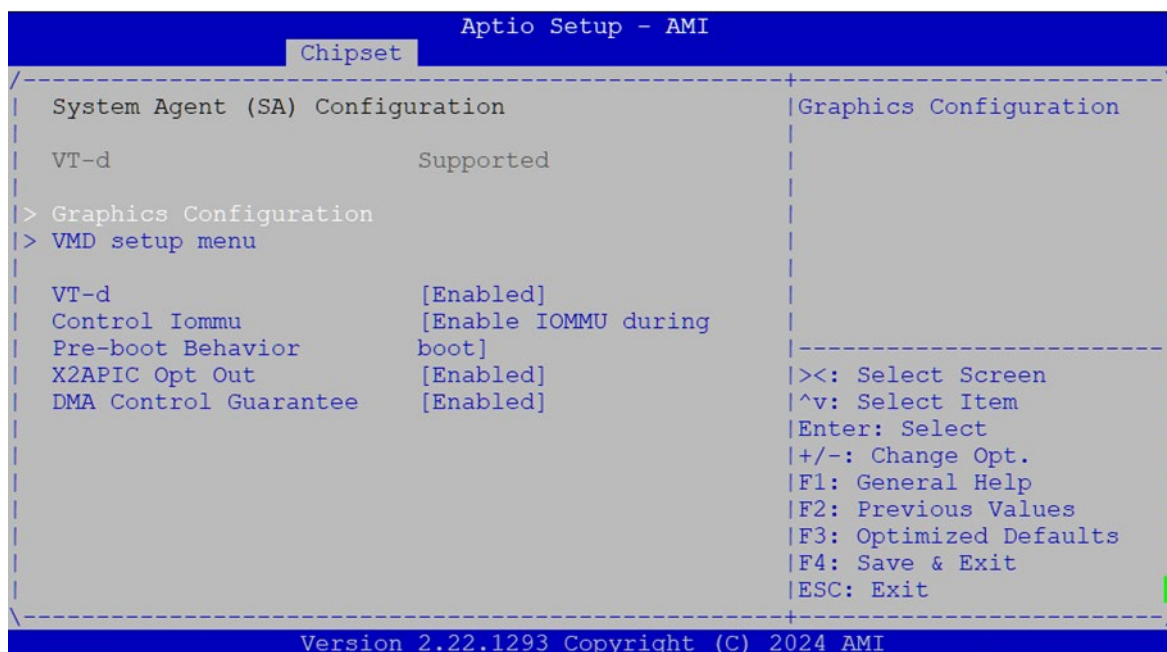
Feature	Options	Description
Self Test Option	Short Extended	Select either Short or Extended Self-Test. Short option will take couple of minutes and extended option will take several minutes to complete.
Self Test Action	Controller Only Test Controller and NameSpace Test	Select either to test Controller alone or Controller and NameSpace. Selecting Controller and NameSpace option will take lot longer to complete the test.
Run Device Self Test	N/A	Perform device self-test for the corresponding Option and Action selected by user. Pressing 'Esc' key will abort the test. Result shown below is the recent result logged in the device.

Chipset Page

Select the Security item from the BIOS setup screen to enter the Security page. Users can select any of the items in the left frame of the screen.

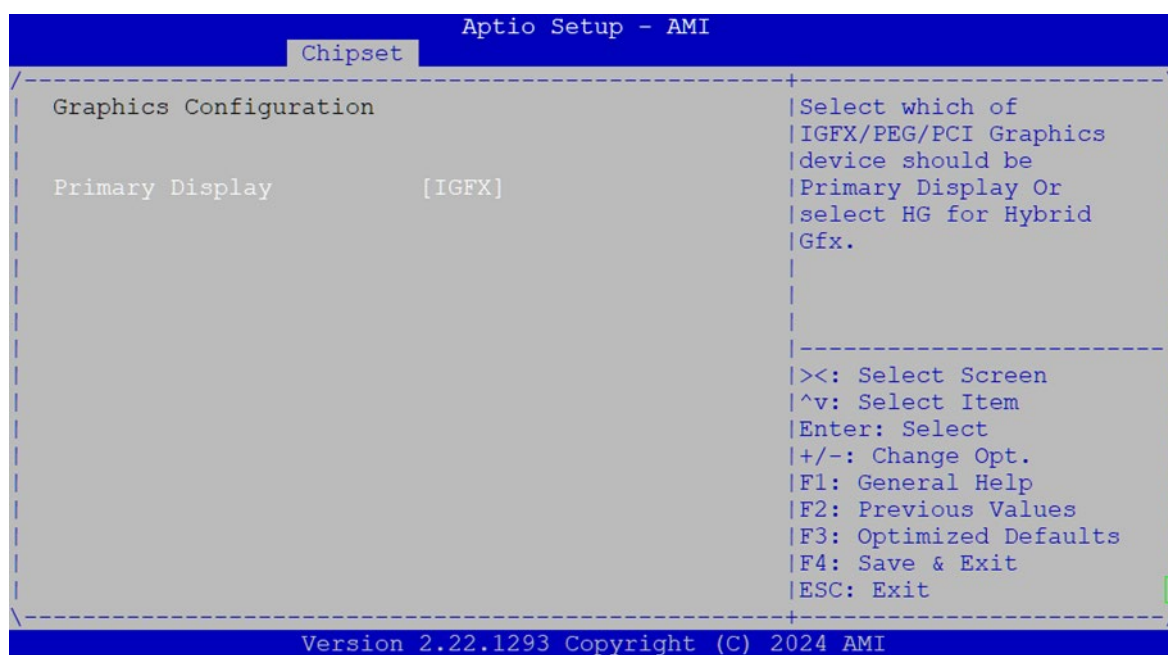


System Agent (SA) Configuration



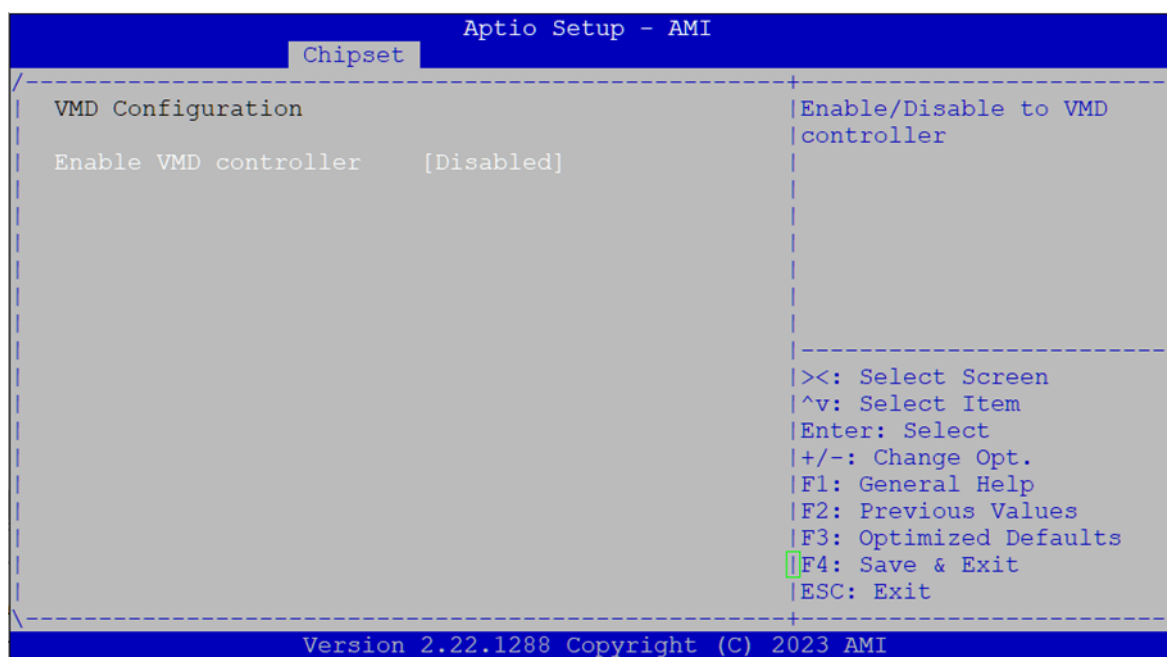
Feature	Options	Description
VT-d	Disabled Enabled	VT-d capability
Control Iommu	Disable IOMMU Enable IOMMU during boot	Enable IOMMU in Pre-boot environment (If DMAR table is installed in DXE and If VTD_INFO_PPI is installed in PEI.)
X2APIC Opt Out	Enabled Disabled	Enable/Disable X2APIC_OPT_OUT bit
DMA Control Guarantee	Enabled Disabled	Enable/Disable DMA_CONTROL_GUARANTEE bit

Graphics Configuration



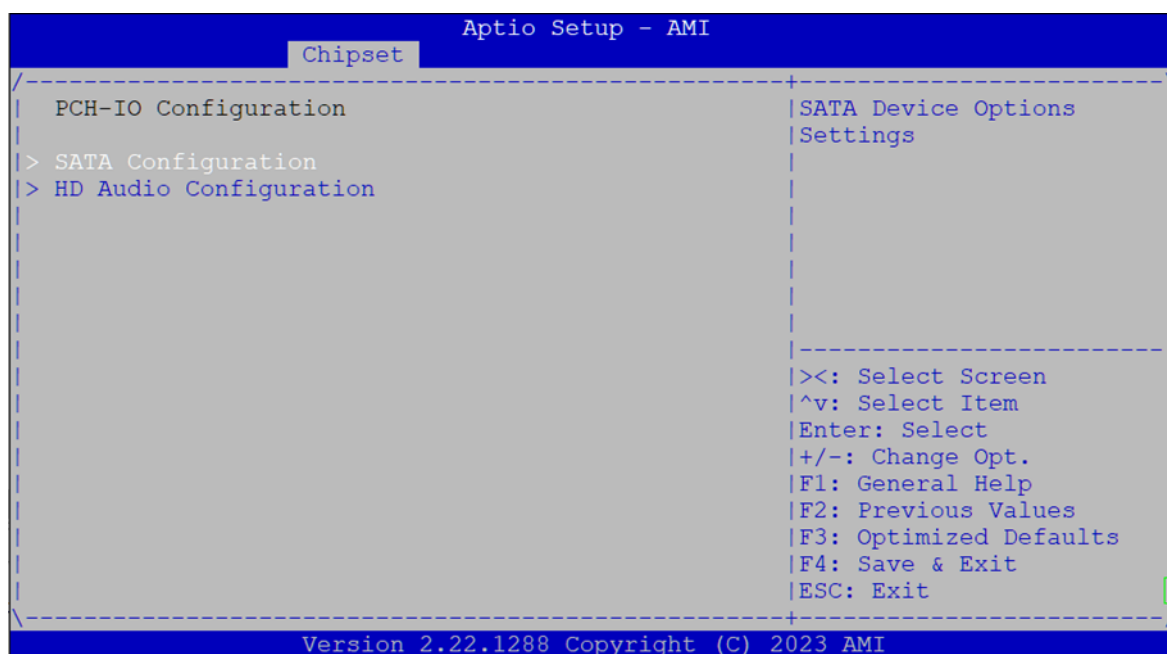
Feature	Options	Description
Primary Display	Auto IGFX PEG Slot PCH PCI HG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select HG for Hybrid Gfx.

VMD Setup Menu

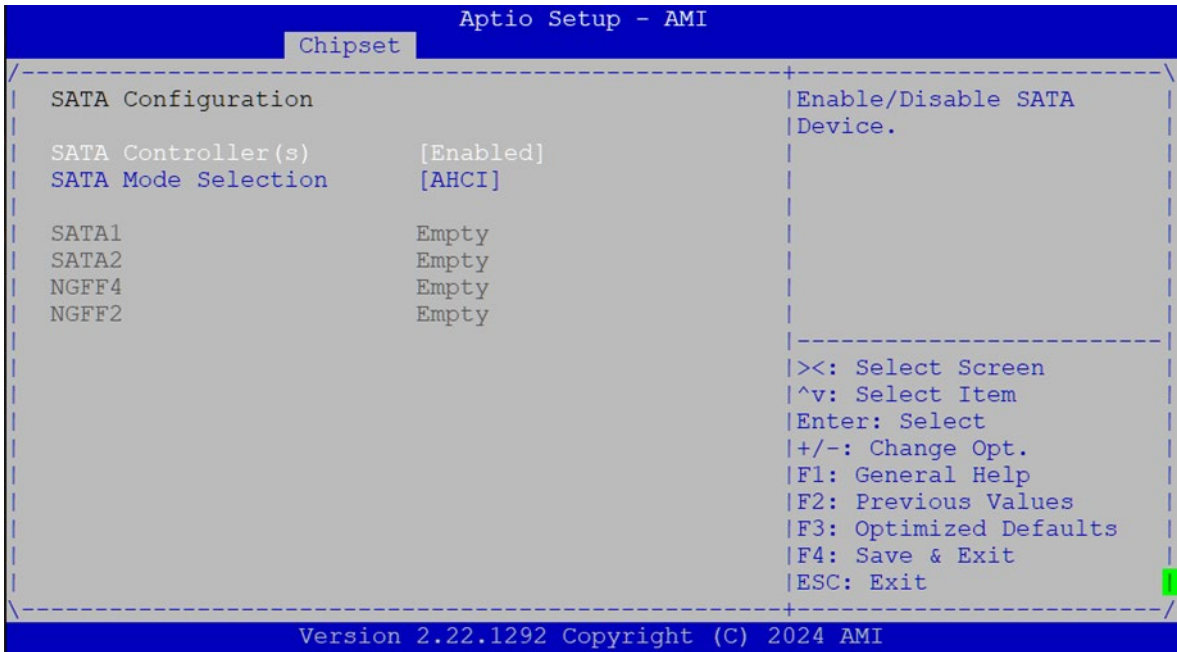


Feature	Options	Description
Enable VMD controller	Disabled Enabled	Enable/Disable to VMD controller

PCH-IO Configuration

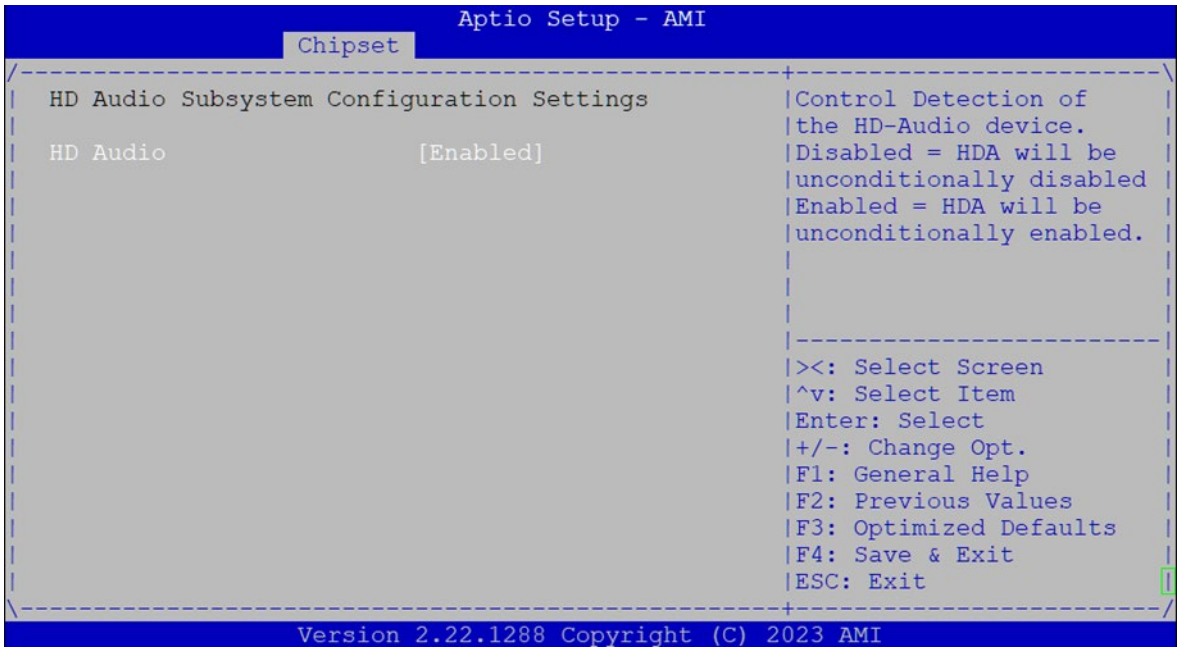


SATA Configuration



Feature	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.

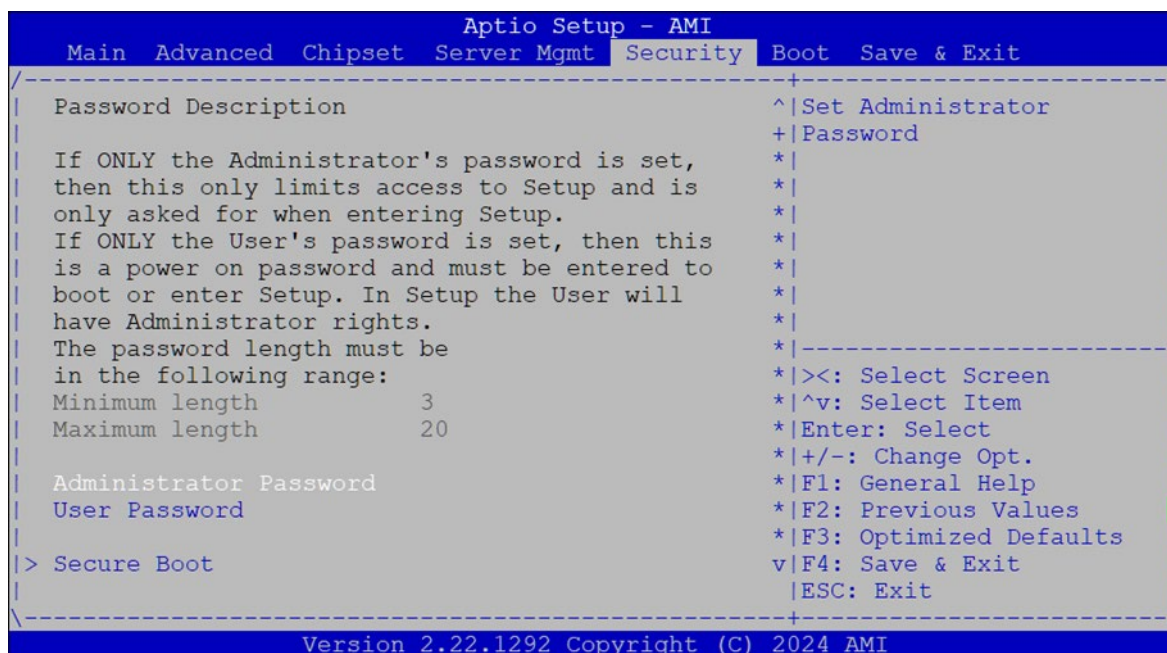
HD Audio Configuration



Feature	Options	Description
HD Audio	Disabled Enabled	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

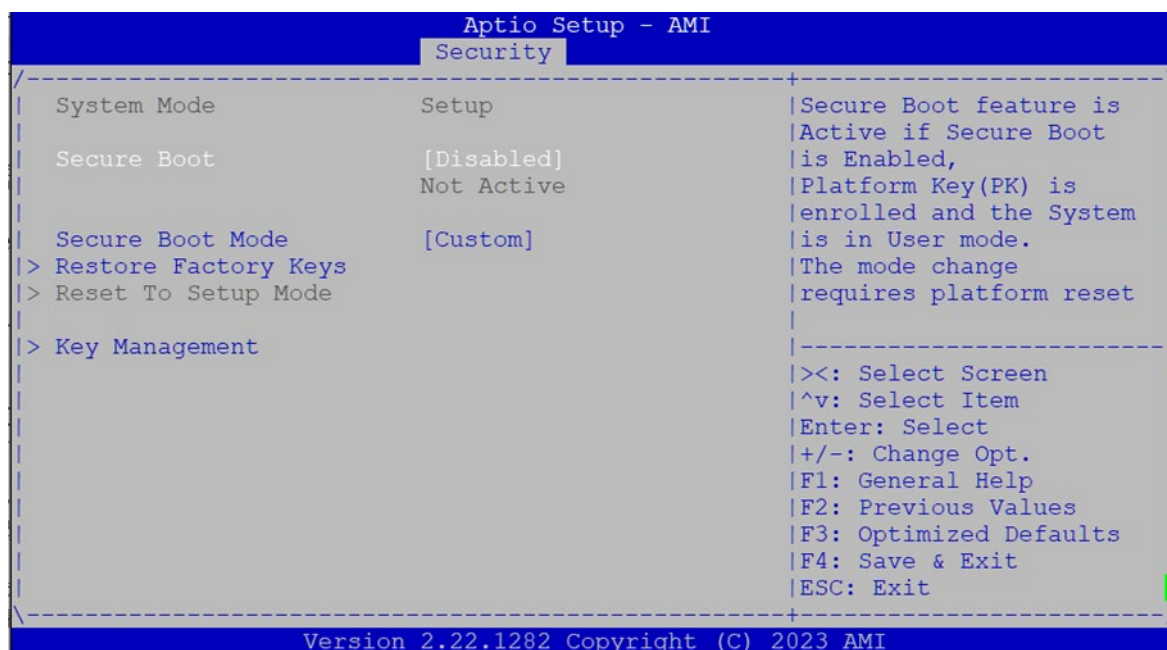
Security Page

Select the **Security** item from the BIOS set up screen to enter the Security page. Users can select any of the items in the left frame of the screen.



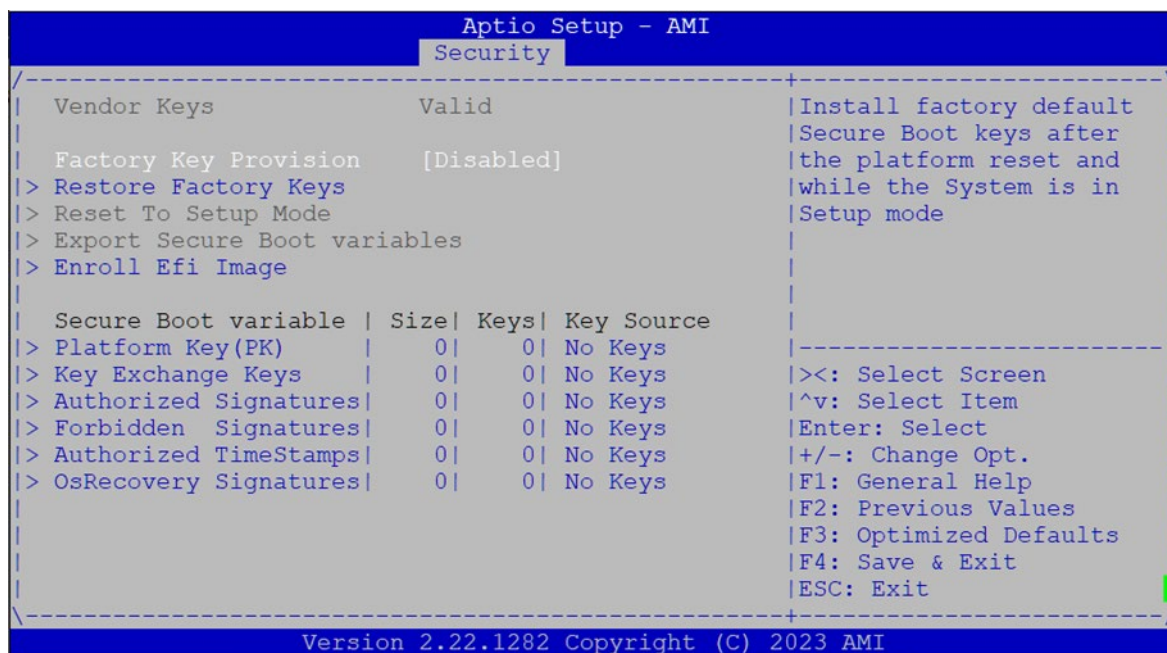
Feature	Description
Setup Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the User will have Administrator rights.

Secure Boot



Feature	Options	Description
Secure Boot	Disabled 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 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

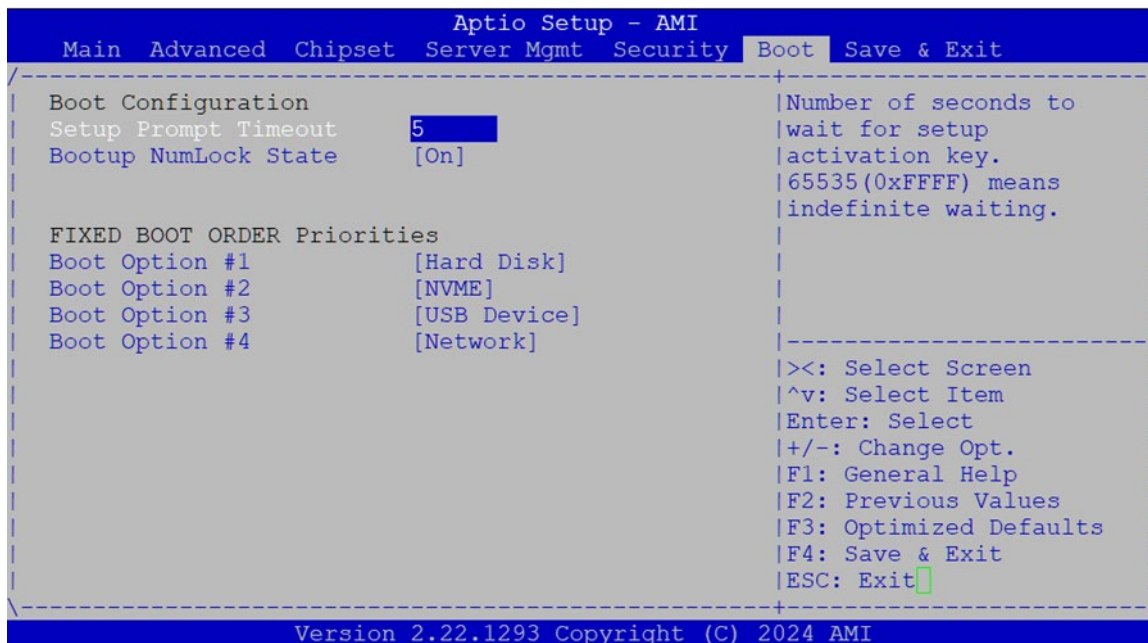
Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
Restore Factory Keys	None	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	None	Delete all Secure Boot key databases from NVRAM
Export Secure Boot variables	None	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device
Enroll Efi Image	None	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)

Boot Page

Select the **Boot** item from the BIOS set up screen to enter the Boot page. Users can select any of the items in the left frame of the screen.

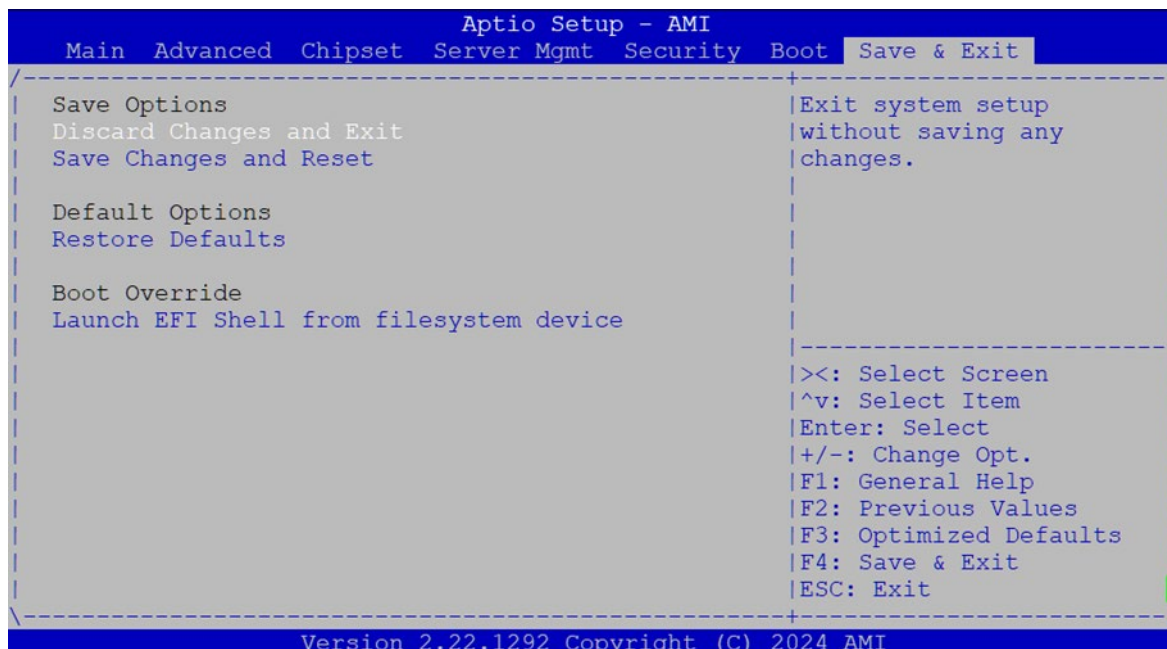


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state

- Default Boot Priority: **Hard Disk → NVMe → USB → Network**
- Choose specifies boot device priority sequence from available Group device.
- Choose boot priority from boot option group.

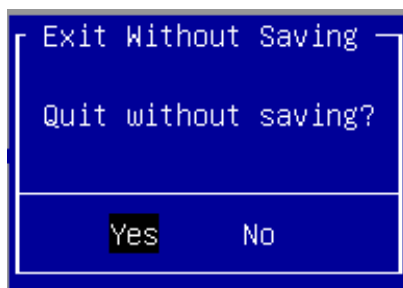
Save and Exit Page

Select the **Save and Exit** menu item from the BIOS setup screen to enter the "Save and Exit" page. Users can select any of the items in the left frame of the screen.



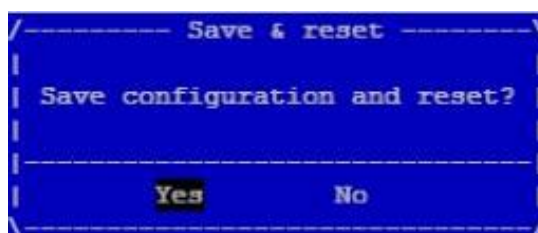
■ Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after the "**Discard Changes and Exit**" option is selected. Select "**Yes**" to Discard changes and Exit Setup.



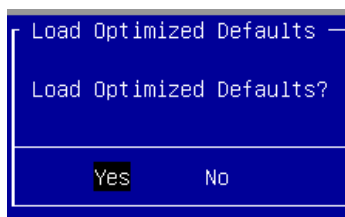
■ Save Changes and Reset

When Users have completed the system configuration changes, select this option to save the changes and reset from BIOS Setup in order for the new system configuration parameters to take effect. The following window will appear after selecting the "**Save Changes and Reset**" option is selected. Select "**Yes**" to Save Changes and reset.



■ Restore Defaults

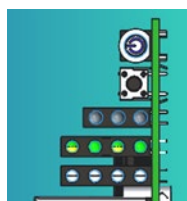
Restore default values for all setup options. Select **“Yes”** to load Optimized defaults.

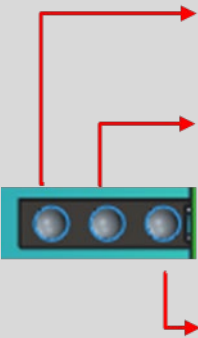
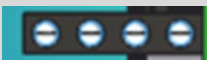


Note: The items under Boot Override may not be the same as image above, as it would depend on the actual devices connected on the system.

APPENDIX A: LED INDICATOR EXPLANATIONS

► LED Indicator: System Power / Status / Storage Activity



Button	Color	Description
Power 	Green/Red	Green: Power ON Red: Power OFF (Standby)
LED 	IPMI Green / Yellow (Speed)	1. When cable is plugged-in and network is linked. Both LED lights will be bright. The behavior is as defined. 2. Without the cable plugged-in, the LED should be off. 3. If LAN Driver controls the LED, the behavior will follow the driver. 4. Speed: Yellow / 1G ; Green / 100M
	IPMI Yellow (Link/Active)	
	HDD/SSD Yellow	
COM 	Yellow / Green	COM1_TX: Yellow COM1_RX: Green
	Yellow / Green	COM2_TX: Yellow COM2_RX: Green
Programmable LED 	Green / Red	Programmable by GPIO

► RJ45 LAN LED



2.5Gb RJ45 LAN LED Define:

Speed	Green (Link/Active)	Green/Amber (Speed)
100M	ON / Blinking (Data Access)	OFF
1G	ON / Blinking (Data Access)	ON (Amber)
2.5G	ON / Blinking (Data access)	ON (Green)

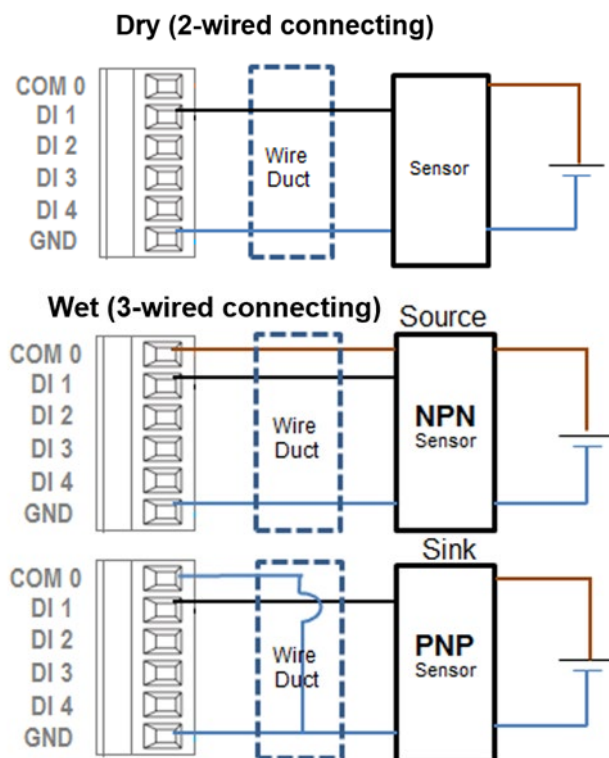
1. When cable is plugged-in and network is linked. Both LED lights will be bright. The behavior is as defined.
2. Without the cable plugged-in, the LED should be off.
3. If LAN Driver controls the LED, the behavior will follow the driver.

APPENDIX B: DI / DO SPECIFICATION

Follow IEC61131-2

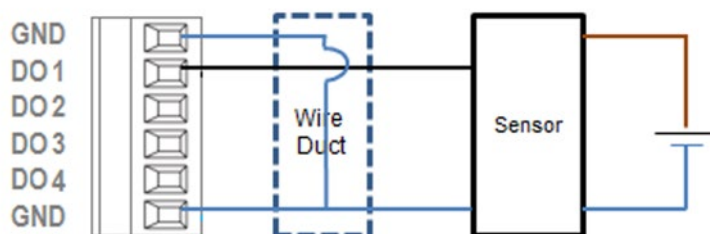
DI Specification:

- DI with -3~5V @ 7mA, Logical Value 0; 13~30V @ 7mA, Logical Value 1
- Support Dry and Wet by BIOS setting, default as Dry; Wet contact support Sink (PNP) and Source (NPN) mode

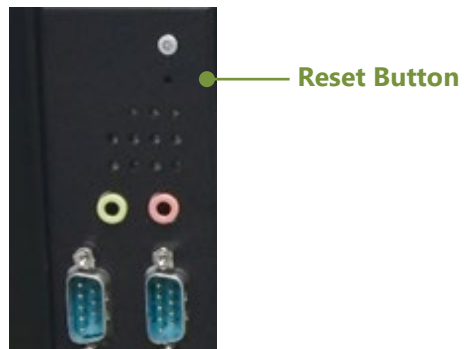


DO Specification:

Sink DO voltage typical 24V (up to 30V) @ 200mA



APPENDIX C: POWER RESET BUTTON



Reset Button Behavior: Press ONE <0.5 sec pre-times for HW Reset but default support software reset.

APPENDIX D: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after-service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
 - ▶ Improper or inadequate maintenance by the customer
 - ▶ Unauthorized modification, misuse, or reversed engineering of the product
 - ▶ Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form," to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.

Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out the following form. Without this form enclosed, your RMA cannot be processed.

RMA No:		Reasons to Return: ☐ Repair(Please include failure details)	
		☐ Testing Purpose	
Company:		Contact Person:	
Phone No.		Purchased Date:	
Fax No.:		Applied Date:	
Return Shipping Address: _____			
Shipping by: ☐ Air Freight ☐ Sea ☐ Express_____			
☐ Others:_____			
Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
R.M.A.	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date