Lanner

Edge Computing Appliance Platform

Hardware Platforms for Edge Computing

ECA-4025
User Manual

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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.

Icon Description

The icons are used in the manual to serve as an indication of interest topics or important messages.

Icon Descriptions

Icon	Usage
Note or Information	This mark indicates that there is something you should pay special attention to while using the product.
Warning or Important	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 be registered for a Lanner Account at http://www.lannerinc.com/ to access published documents and downloadable resources.

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In addition to contacting your distributor or sales representative, you could submit a request at our **Lanner Technical Support** and fill in a support ticket to our technical support department.

Documentation Feedback

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Federal Communication Commission Interference Statement

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.

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 the battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.
- Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures 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 environment can result in an explosion or the leakage of flammable liquid or gas.

- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.
- CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions."

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.

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- ATTENTION: Risque d'explosion si la batterie est remplacée par un type incorrect. Mettre au rebus les batteries usagées selon les instructions."

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).
- Product shall be used with Class 1 laser device modules.
- The unit is only for Skilled person to install and maintenance
- The device can only be used in a fixed location such as a lab or a machine room. When you install the device, ensure that the protective earthing connection of the socket-outlet is verified by a skilled person.

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).
- Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.
- Cette machine est réservée aux techniciens à installer et à entretenir
- L'appareil ne peut être utilisé que dans un lieu fixe, tel qu'un laboratoire ou une salle de machines. Lorsque vous installez l'appareil, assurez-vous que le raccordement à la terre de protection de la prise de courant a fait l'objet d'une vérification par une personne qualifiée.

Mounting Installation Precautions

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.

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- 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 (Tma) 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. Particular 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

- 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.

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 DC Power Source

- Connect the grounding cable to the ground.
- The protection device for the DC power source must provide 30 A current.
- This protection device must be connected to the power source before DC power.
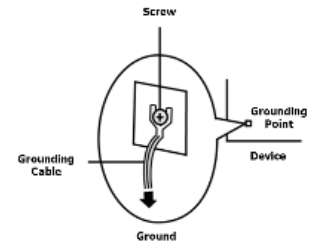
Procédure de mise à la terre pour source d'alimentation CC

- Branchez le câble de mise à la terre à la terre.
- L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.
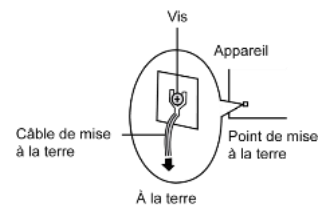
Instruction for the installation of the conductor to building earth by a skilled person.

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CHAPTER 1: PRODUCT OVERVIEW

The ECA-4025, a short depth chassis edge computing appliance, powered by 8~16 cores Intel® Xeon® D-2100 series processor (codenamed Skylake-D), for 5G Open RAN, Edge Cloud, and AI edge-focused applications with extensive configuration options. ECA-4025 is a high-performance appliance designed to leverage edge computing for accelerating 5G Edge Cloud deployment. ECA-4025 supports a PCI-E slot, designed to support FPGA, GPU or Time Sync cards, making it suitable as Edge AI server for smart city applications, Multi-access Edge Computing (MEC) server for 5G Edge Cloud, and Open RAN platform for Distributed Units.

Main Features

• Intel® Xeon D-2100 8/12/14/16 Cores Processor, Intel® QuickAssist Technology

• 30cm Short Dept Chassis

• Wide Operating Temperature -40~65°C

• 2x DDR4 2667MHz REG, ECC RDIMM, Max. 64GB

• 1x GbE RJ45 IPMI,

• 8x 10G SFP+, 1x RJ45 Console, 1x USB 3.0

• 1x PCIe by 16 FH/HL slot for FPGA or GPU cards (By Project)

• 4x 2.5" Internal 2.5" HDD/SSD Drive Bays, 1x M.2 NVMe 2280 M-Key

Package Content

Your package contains the following items:

▶ 1x ECA-4025 Edge Computing Platform

▶ 1x Console Cable (RJ45)

▶ 1x Short Ear Rack Mount Kit with screws

▶ 16x HDD Screws

Ordering Information

SKU No.	Description
ECA-4025A	Intel Xeon 16C D-2187NT w/QAT, 1x GbE RJ45 + 8x 10G SFP+, 1x PCIe card extension support
ECA-4025B	Intel Xeon 14C D-2177NT w/QAT, 1x GbE RJ45 + 8x 10G SFP+, 1x PCIe card extension support
ECA-4025C	Intel Xeon 12C D-2166NT w/QAT, 1x GbE RJ45 + 8x 10G SFP+, 1x PCIe card extension support
ECA-4025D	Intel Xeon 8C D-2145NT w/QAT, 1x GbE RJ45 + 8x 10G SFP+, 1x PCIe card extension support

Optional Accessories

Model	Description
IAC-TPM04A	TPM module
097W000081000	Swappable Fan Module
097W000075000	Swappable Fan Module (Wide Temperature Range: -40°C~+85°C)

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	Intel® Xeon D-2100 8/12/14/16 Cores series (Skylake-D)
	CPU TDP	Up to 110W per CPU
	CPU Socket	Onboard
	Chipset	SoC
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 2667MHz REG, RDIMM
	Max. Capacity	64GB
	Socket	2x 288pin DIMM
Networking	Ethernet Ports	1x GbE RJ45 Intel® i210-IT 8x GbE 10G SFP+
	Bypass	N/A
	NIC Module Slot	N/A
LOM	IO Interface	1x GbE RJ45 via NCSI
	OPMA slot	N/A, onboard BMC chip
I/O Interface	Reset Button	Yes
	LED	Power / Status / Storage, refer to **Appendix A**
	Power Button	N/A
	Console	1 x RJ45 (Default Bard Rate: 115200)
	USB	1 x USB 3.0
	LCD Module	N/A
	Display	N/A
	Power input	Dual DC power inlet
Storage	HDD/SSD Support	4x 2.5" Internal
	Onboard Slots	1 x M.2 NVMe 2280 M Key
Expansion	PCIe	1x PCIe*16 FH 3/4L, support up to 75W
	mini-PCIe	N/A
	SIM card Slot	N/A
Miscellaneous	Watchdog	Yes
	Internal RTC w/ Li Battery	Yes
	TPM	No (Default); Yes (Optional)
Cooling	Processor	Passive CPU heat sink
	System	5x smart fans
	FAN Specification	Yes
Environmental Parameters	Temperature	Operating Temperature -40~65°C Storage Temperature -40~70°C
	Humidity (RH)	Operating 5 ~ 90% RH Storage 5~95% RH
System Dimensions	(WxDxH)	438x300x44mm
	Weight	5kg
Package Dimensions	(WxDxH)	555x479x179mm
	Weight	TBD
Power	Type/Watts	400W
	Input	-57VDC ~ -40VDC dual input feed (EMC -48)
Approvals and Compliance		RoHS Directive (EU) 2015/863, CE/FCC Class A, UL

Front Panel
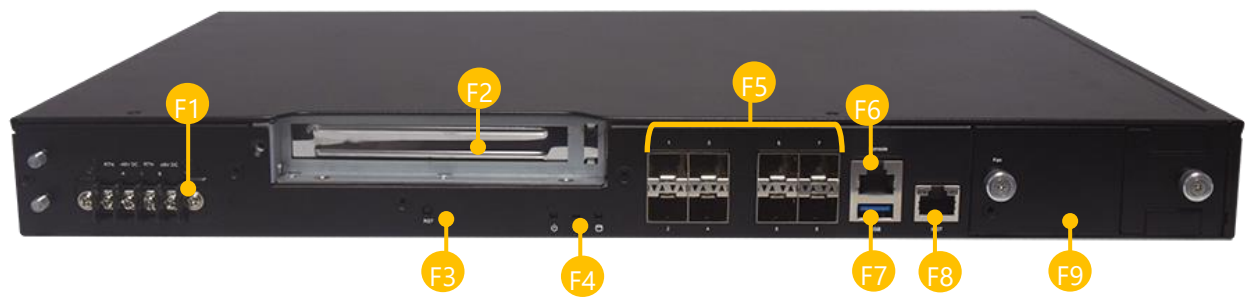
No.	Description	
F1	Power Supply	Dual DC Input
F2	PCIe Expansion	PCIe *16 Expansion Slot (FH/HL), support up to 75W
F3	Reset Button	For software reset
F4	LED Indicators	System Status System Power HDD Activity
F5	LAN Ports	8x 10G SFP+
F6	Console Port	1x RJ45 console port
F7	USB Ports	1x USB 3.0 port
F8	Management	1x RJ45 for IPMI
F9	Fan Tray + Fans	5x Cooling Fans

Rear Panel

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Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for the motherboard layout design.
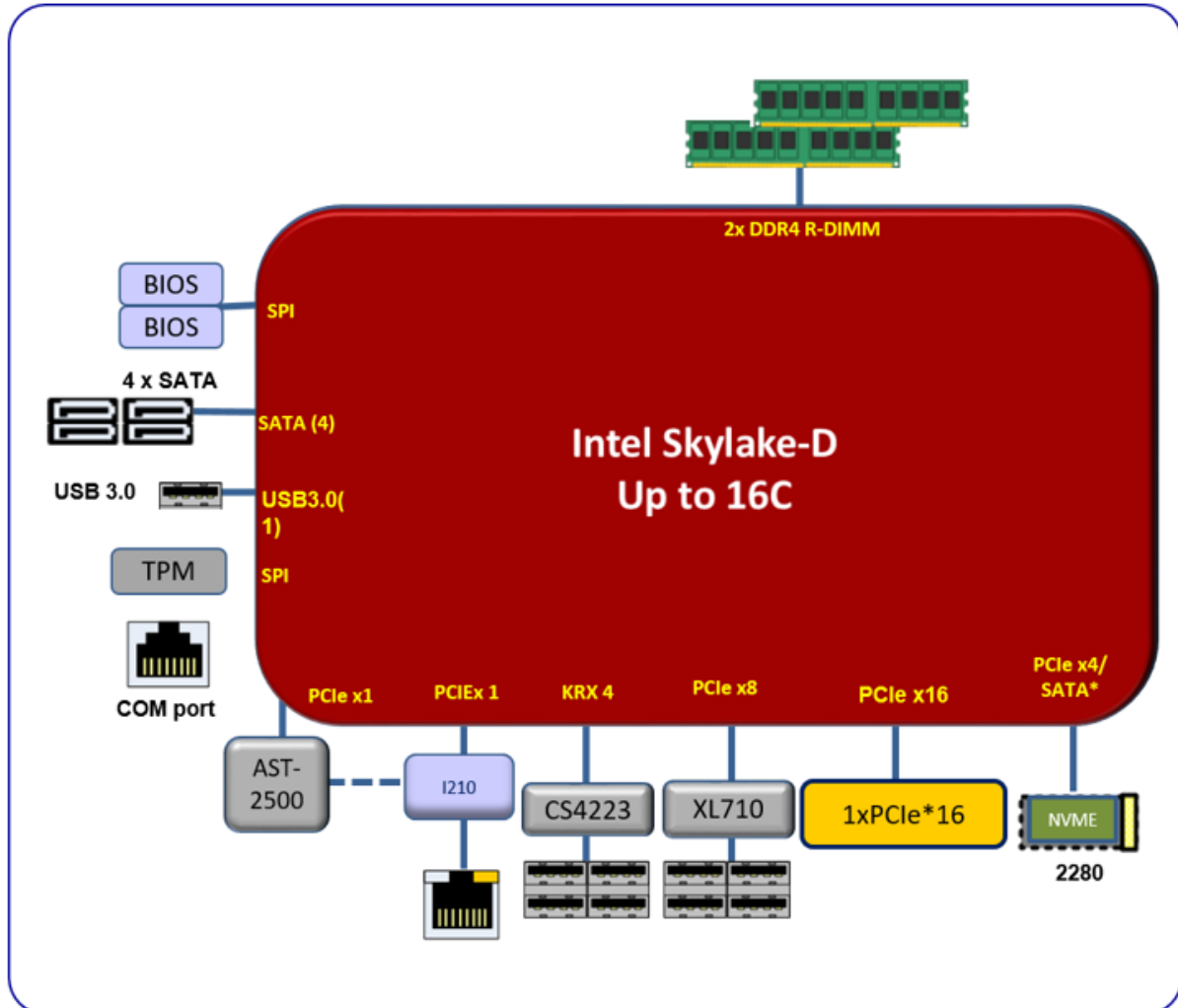
Motherboard Layout
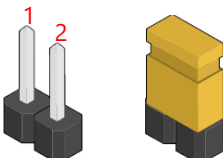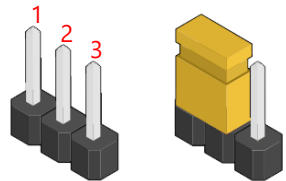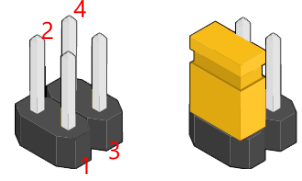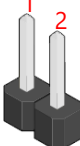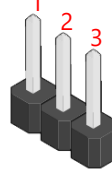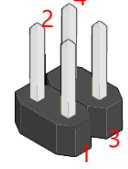
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.
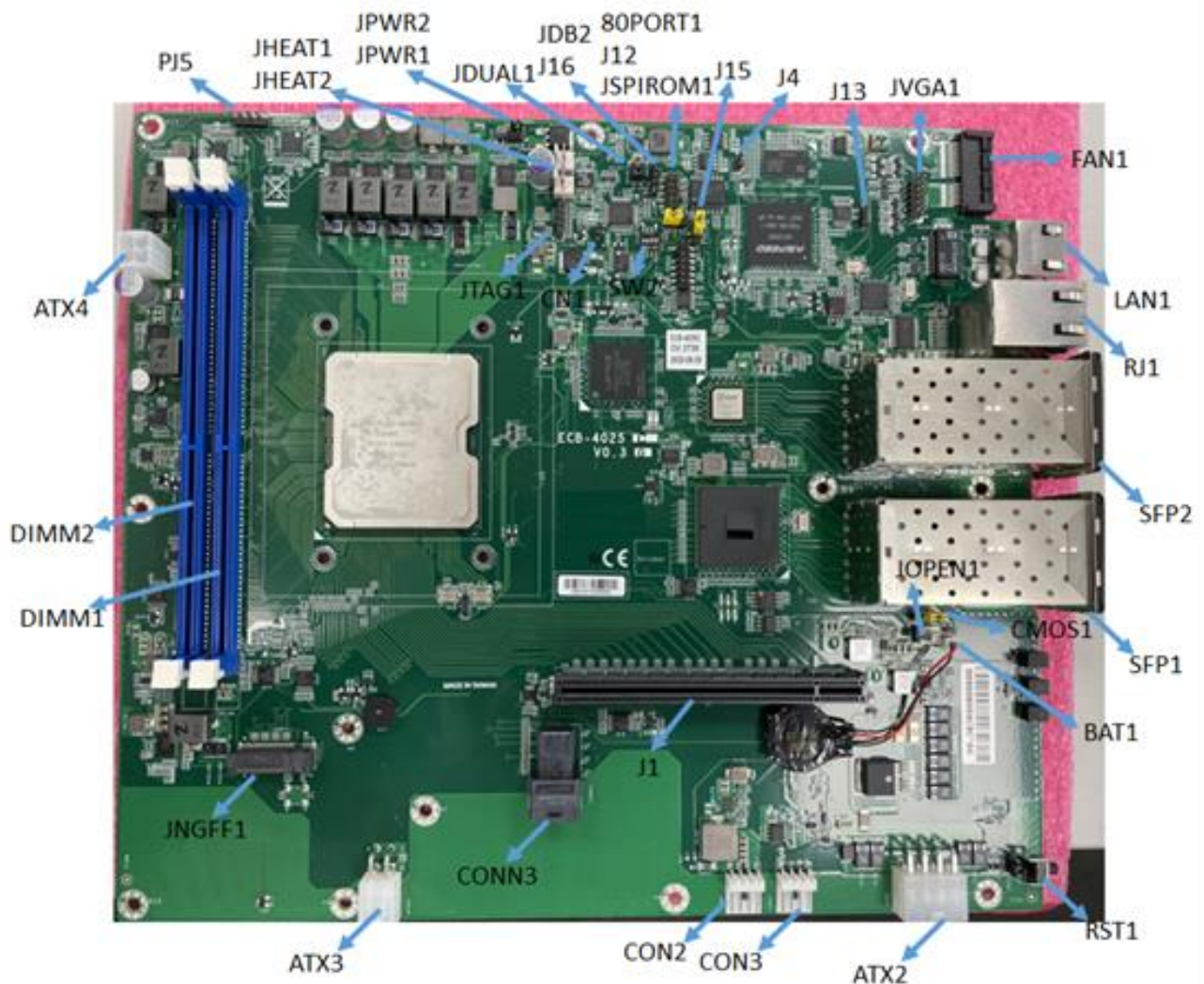
Internal Jumpers and Connectors

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. While changing the jumpers, make sure your system is turned off.

To short the designated pins, push the jumper down on them so that they become **SHORT**. To make the pins setting **OPEN**, simply remove the jumper cap.

2-pin Header		3-pin Header		4-pin Header	
Open	Short	Open	(1-2) Jumped	Open	(1-2) Jumped

Jumper/ Connector	Description
ATX2	Power in connector
ATX2/ATX4	12V power connector
J1	Gen 3 PCI Express x16 SLOT
JSPIROM1	2x7 2.0mm SPI ROM programming & TPM module pin header
CMOS1	1x3 2.54mm pin header Clear CMOS Data
80PORT1	2x5 2.0mm BIOS DEBUG PORT pin header
JOPEN1	1x2 2.54mm CASE OPEN WAFER
JVGA1	2X6 2.0mm VGA Output Header
CON2	SATA Power Connector
CON3	Power Board Temp Connector
RST1	Reset Button
BAT1	Battery Connector
J13	IPMI Debug COM Port header
J4	IPMI EXT Reset Header
J15	BIOS Boot Up Select Header
J12	Disable Dual BIOS Function Header
JDB2	CPLD Debug header
J16	PROGRAM MCU Header
JDUAL1	Select CS for Flash Fixture header
JPWR1/2	MCU SW PWR Header / PWR Header
JHEAT1/2	Heater PWR Header
PJ5	CPU PWR solution PROGRAM Header

JTAG1	CPLD PROGRAM Header
CN1	MCU PROGRAM Header
SW2	Setting MCU PROGRAM Mode Header
JNGFF1	NVME Connector
CONN3	SATA Connector
LAN1	1G LAN Port Connector
RJ1	COM Port + USB Port Connector
SFP1/2	10G Fiber Connector
DIMM1/2	DDR4 CONNECTOR

Connectors Pin Assignment

1. **ATX2**: Power IN Connector

Pin #	Description	Pin #	Description
1	GND	5	12V
2	GND	6	12V
3	GND	7	12V
4	GND	8	12V
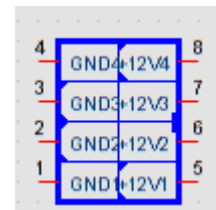
2. **ATX2/ATX4**: 12V Power Connector

Pin #	Description	Pin #	Description
1	GND	3	12V
2	GND	4	12V
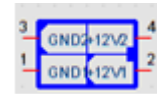
3. **J1**: Gen 3 PCI Express x16 Slot

Pin #	Description	Pin #	Description
B1	+12V	A1	NC
B2	+12V	A2	+12V
B3	+12V	A3	+12V
B4	GND	A4	NC
B5	SMCLK	A5	NC
B6	SMDAT	A6	NC
B7	GND	A7	NC
B8	+3.3V	A8	NC
B9	NC	A9	+3.3V
B10	3.3VAUX	A10	+3.3V
B11	WAKE#	A11	PERST#
B12	NC	A12	GND
B13	GND	A13	REFCLK+
B14	CPUPETP15	A14	REFCLK-
B15	CPUPETN15	A15	GND
B16	GND	A16	CPUPERP15

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B17	NC	A17	CPUPERN15
B18	GND	A18	GND
B19	CPUPETP14	A19	NC
B20	CPUPETN14	A20	GND
B21	GND	A21	CPUPERP14
B22	GND	A22	CPUPERN14
B23	CPUPETP13	A23	GND
B24	CPUPETN13	A24	GND
B25	GND	A25	CPUPERP13
B26	GND	A26	CPUPERN13
B27	CPUPETP12	A27	GND
B28	CPUPETN12	A28	GND
B29	GND	A29	CPUPERP12
B30	NC	A30	CPUPERN12
B31	NC	A31	GND
B32	GND	A32	NC
B33	CPUPETP11	A33	NC
B34	CPUPETH11	A34	GND
B35	GND	A35	CPUPERP11
B36	GND	A36	CPUPERN11
B37	CPUPETP10	A37	GND
B38	CPUPETN10	A38	GND
B39	GND	A39	CPUPERP10
B40	GND	A40	CPUPERN10
B41	CPUPETP9	A41	GND
B42	CPUPETN9	A42	GND
B43	GND	A43	CPUPERP9
B44	GND	A44	CPUPERN9
B45	CPUPETP8	A45	GND
B46	CPUPETN8	A46	GND
B47	GND	A47	CPUPERP8
B48	NC	A48	CPUPERN8
B49	GND	A49	GND
B50	CPUPETP7	A50	NC
B51	CPUPETN7	A51	GND
B52	GND	A52	CPUPERP7
B53	GND	A53	CPUPERN7
B54	CPUPETP6	A54	GND
B55	CPUPETN6	A55	GND
B56	GND	A56	CPUPERP6
B57	GND	A57	CPUPERN6

18

B58	CPUPETP5	A58	GND
B59	CPUPETN5	A59	GND
B60	GND	A60	CPUPERP5
B61	GND	A61	CPUPERN5
B62	CPUPETP4	A62	GND
B63	CPUPETN4	A63	GND
B64	GND	A64	CPUPERP4
B65	GND	A65	CPUPERN4
B66	CPUPETP3	A66	GND
B67	CPUPETN3	A67	GND
B68	GND	A68	CPUPERP3
B69	GND	A69	CPUPERN3
B70	CPUPETP2	A70	GND
B71	CPUPETN2	A71	GND
B72	GND	A72	CPUPERP2
B73	GND	A73	CPUPERN2
B74	CPUPETP1	A74	GND
B75	CPUPETN1	A75	GND
B76	GND	A76	CPUPERP1
B77	GND	A77	CPUPERN1
B78	CPUPETP0	A78	GND
B79	CPUPETN0	A79	GND
B80	GND	A80	CPUPERP0
B81	NC	A81	CPUPERN0
B82	GND	A82	GND

4. JSPIROM1: 2x7 2.0mm SPI ROM Programming & TPM Module Pin Header

Pin #	Description	Pin #	Description
1	3.3V ME POWER	2	SPI_CS1#
3	SPI_CS0#	4	3.3V ME POWER
5	SPI_MISO_TPM	6	SPI_PCH_IO3
7	NC	8	SPI_CLK_TPM
9	GND	10	SPI_MOSI_TPM
11	IRQ_TPM_SPI#_R	12	NC
13	SPI_TPM_CS0#	14	RESET

JSPIROM1

2X7P_N12
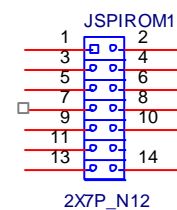
5. CMOS1: 1x3 2.54mm Pin Header
Clear CMOS Data

Pin #	Description
1-2 (Default)	Normal
2-3	Clear CMOS
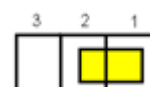
6. 80PORT1: 2x5 2.0mm BIOS Debug Port Pin Header

Pin #	Description	Pin #	Description
1	CLK_24M_P80	2	LPC_LAD_1
3	RST_PORT80_N	4	LPC_LAD_0
5	LPC_FRAME_N	6	3.3V
7	LPC_LAD_3	X	X
9	LPC_LAD_2	10	GND
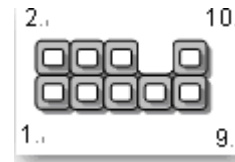
7. JOPEN1: 1x2 2.54mm Case Open Wafer

Pin #	Description
1	GND
2	Intruder#

8. JVGA1: 2x6 2.0mm VGA Output Header

Pin #	Description	Pin #	Description
1	RED	2	GND
3	GREEN	4	GND
5	BLUE	6	GND
7	HSYNC	8	NC
9	VSYNC	10	GND
11	DDC_DATA_CONT	12	DDC_CLK_CONT
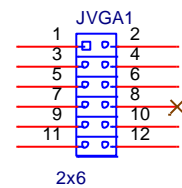
9. CON2: SATA Power Connector

Pin #	Description
1	5V
2	5V
3	GND
4	GND
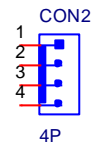
10. CON3: Power Board Temp Connector

Pin #	Description
1	3.3V
2	PWRB_TEMP_SCL
3	PWRB_TEMP_SDA
4	GND
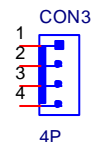
11. RST1: Reset Button

Pin #	Description
1	FP_RST_SEL
2	GND
3	GND
4	GND
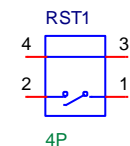
12. BAT1: Battery Connector

Pin #	Description
1	VBAT
2	GND

20
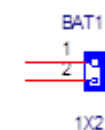
13. J13: IPMI Debug COM Port Header

Pin #	Description
1	COM5_RX
2	COM5_TX
3	GND

J13

1x3
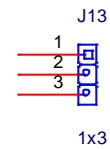
14. J4: IPMI EXT Reset Header

Pin #	Description
1	IPMI_RST
2	GND

J4

1X2

15. J15: BIOS Boot Up Select Header

Pin #	Description
1	3.3V AUX
2	BIOS_BOOT_SEL
3	GND

J15

1X3
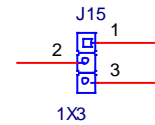
16. J12: Disable Dual BIOS Function Header

Pin #	Description
1	3.3V AUX
2	DUAL_BIOS_DIS
3	GND

J15

1X3
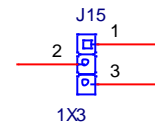
17. JDB2: CPLD Debug Header

Pin #	Description
1	FM_DEBUG_ENGINE_TX
2	GND
3	FM_FORCE_PWR_ON_N

J15

1X3
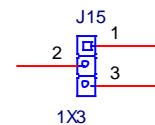
18. J16: Program MCU Header

Pin #	Description
1	PIO0_1
2	GND

J16

1X2

19. JDUAL1: Select CS for Flash Fixture Header

Pin #	Description
1	SPI_CS0#
2	SPI_CS0#_DUAL
3	SPI_CS1#_DUAL
4	SPI_CS1#

JDUAL1

2x2
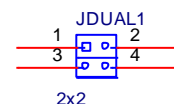
20. JPWR1/2: MCU SW PWR Header / PWR Header

JPWR1

Pin #	Description
1	PWR_BTN_IGN
2	PWRON#

JPWR2

1X2
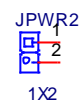
JPWR2

Pin #	Description
1	PWRON#
2	GND

21

21. JHEAT 1/2: Heater PWR Header

Pin #	Description
1	12V AUX
2	GND

JHEAT1
2P

2
1

22. PJ5: CPU PWR Solution Program Header

Pin #	Description
1	NC
2	SMB_VR_DAT
3	SMB_VR_CLK
4	GND

PJ5
1
2
3
4
1x4
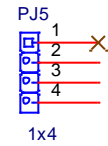
23. JTAG1: CPLD Program Header

Pin #	Description
1	3.3V AUX
2	JTAG_PLD_TDO
3	JTAG_PLD_TDI
4	JTAG_PLD_TMS
5	GND
6	JTAG_PLD_TCK

JTAG1
1
2
3
4
5
6
1x6
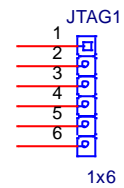
24. CN1: MCU Program Header

Pin #	Description
1	EXT_RXD
2	GND
3	EXT_TXD

CN1
3
2
1
1x3
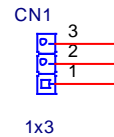
25. SW2: Setting MCU Program Mode Header

Pin #	Description	Pin #	Description
1	PIO1_6_RXD	2	PIO1_7_TXD
3	PIO1_6_RXD	4	PIO1_7_TXD
5	NXP_TXD	6	NXP_RXD
7	MCU_SIN	8	MCU_SOUT

SW2
1   8
2   7
3   6
4   5
4P SLIDE SW
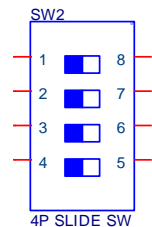
26. JNGFF1: NVME Connector

Pin #	Description	Pin #	Description
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIE_N1TX_C_CRX_N7	6	NC
7	PCIE_N1TX_C_CRX_P7	8	NC
9	GND	10	NC
11	PCIE_CTX_C_N1RX_N7	12	3.3V
13	PCIE_CTX_C_N1RX_P7	14	3.3V
15	GND	16	3.3V
17	PCIE_N1TX_C_CRX_N6	18	3.3V
19	PCIE_N1TX_C_CRX_P6	20	NC
21	GND	22	NC
23	PCIE_CTX_C_N1RX_N6	24	NC
25	PCIE_CTX_C_N1RX_P6	26	NC
27	GND	28	NC
29	PCIE_N1TX_C_CRX_N5	30	NC

22
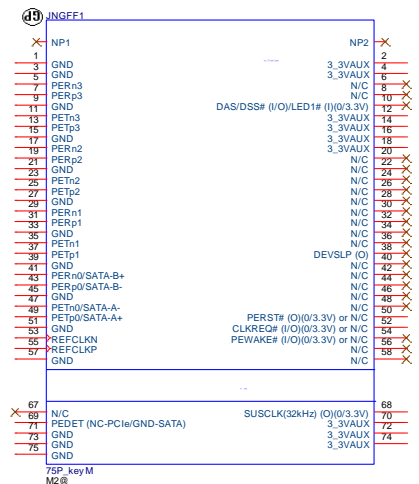
31	PCIE_N1TX_C_CRX_P5	32	NC
33	GND	34	NC
35	PCIE_CTX_C_N1RX_N5	36	NC
37	PCIE_CTX_C_N1RX_P5	38	NC
39	GND	40	NC
41	PCIE_N1TX_C_CRX_N4	42	NC
43	PCIE_N1TX_C_CRX_P4	44	NC
45	GND	46	NC
47	PCIE_CTX_C_N1RX_N4	48	NC
49	PCIE_CTX_C_N1RX_P4	50	CPU0_PCIE_RST1#
51	GND	52	NGFF_CLKREQ_1N
53	CLK_PCIE_NVME_N	54	NC
55	CLK_PCIE_NVME_P	56	NC
57	GND	58	NC
67	NC	68	NGFF_32K_CLK_1
69	GND	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

27. CONN3: SATA Connector

Pin #	Description	Pin #	Description
A1	NC	B1	NC
A2	NC	B2	NC
A3	GND	B3	GND
A4	SATA_HRX_DTX_P1	B4	SATA_HRX_DTX_P0
A5	SATA_HRX_DTX_N1	B5	SATA_HRX_DTX_N0
A6	GND	B6	GND
A7	SATA_HRX_DTX_P3	B7	SATA_HRX_DTX_P2
A8	SATA_HRX_DTX_N3	B8	SATA_HRX_DTX_N2
A9	GND	B9	GND
C1	NC	D1	NC
C2	NC	D2	NC
C3	GND	D3	GND
C4	SATA_HTX_C_DRX_P1	D4	SATA_HTX_C_DRX_P0
C5	SATA_HTX_C_DRX_N1	D5	SATA_HTX_C_DRX_N0
C6	GND	D6	GND
C7	SATA_HTX_C_DRX_P3	D7	SATA_HTX_C_DRX_P2
C8	SATA_HTX_C_DRX_N3	D8	SATA_HTX_C_DRX_N2
C9	GND	D9	GND

CONN3
SAS_RA_36P

23
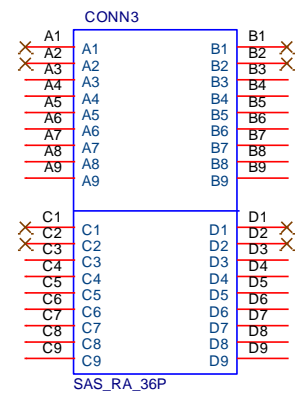
28. LAN1: 1G LAN Port Connector

Pin #	Description	Pin #	Description
1	LAN1_MDX0P	2	LAN1_MDX0N
3	LAN1_MDX1P	4	LAN1_MDX2P
5	LAN1_MDX2N	6	LAN1_MDX1N
7	LAN1_MDX3P	8	LAN1_MDX3N
9	LAN1_LINK_ACT_N	10	3.3V AUX
11	LAN1_LINK_1000_N	12	LAN1_LINK_100_N
PAD1	GND	PAD2	GND
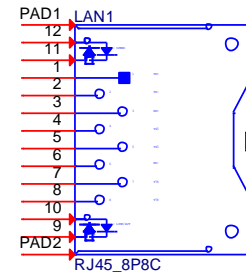
29. RJ1: COM Port & USB Port Connector

Pin #	Description	Pin #	Description
1	NRTS2-	2	NDTR2-
3	NSOUT2	4	GND
5	GND	6	NSIN2
7	NDSR2-	8	NCTS2-
U1	5V	U2	USB20_N2_L
U3	USB20_P2_L	U4	GND
U5	USB3_HRX_L_DTX_N1	U6	USB3_HRX_L_DTX_P1
U7	GND	U8	USB3_HTX_L_DRX_N1
U9	USB3_HTX_L_DRX_P1		
PAD1	GND	PAD2	GND
PAD3	GND	PAD4	GND
PAD5	GND	PAD6	GND

24
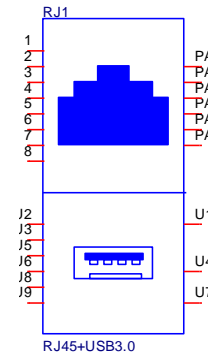
CHAPTER 2: HARDWARE SETUP

To reduce the risk of personal injury, electric shock, or damage to the system, please <u>remove all power connections to shut down the device completely</u>. Also, please <u>wear ESD protection gloves when conducting the steps</u> in this chapter.

Opening the Chassis

1. Power off the system.

2. Unscrew the two (2) screws on the top cover

3. Gently slide the cover forward a bit.

4. Lift the cover up to remove it.

Installing the System Memory

The motherboard supports 2 memory slots for DDR4 registered DIMM.

Supported System Memory Summary

Total Slots	2
Number of Channels	2 (Channel 0~1, 1 DIMM per channel)
Supported DIMM Capacity	8GB, 16GB
Memory Size	Maximum 32 GB RDIMM (16GB*4)
Memory Type	DDR4 ECC RDIMM 2400MHZ
Minimum DIMM Installed	At least 1 memory module to boot and run from.
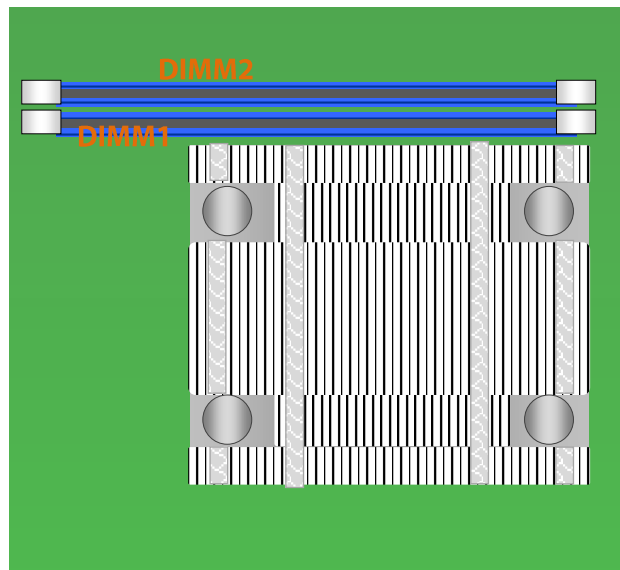
Memory Module Installation Instructions

Please follow the steps below to install the DIMM memory modules.

1. Power off the system and open the chassis.
2. Locate the memory modules.
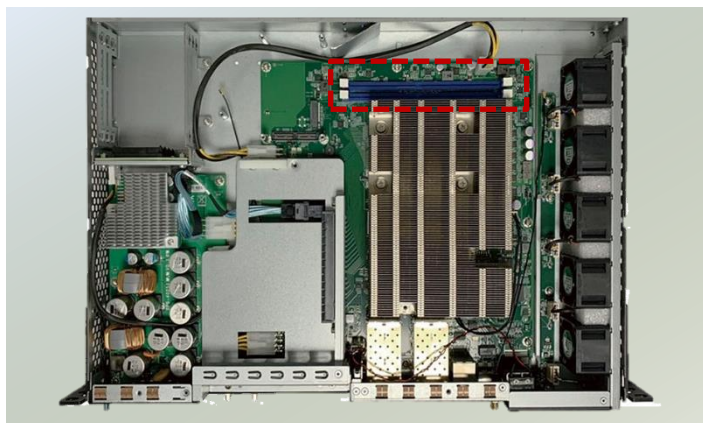
3. Pull open the white DIMM slot latches.
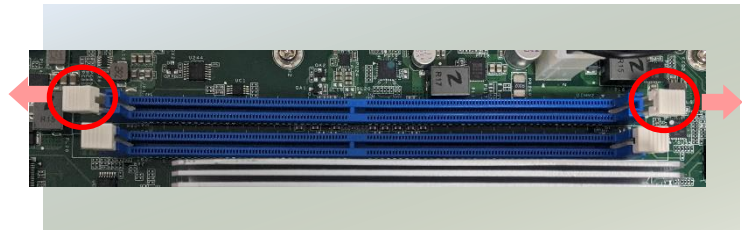
4. Align the notch of the memory module with the socket key in the slot.

Socket Key
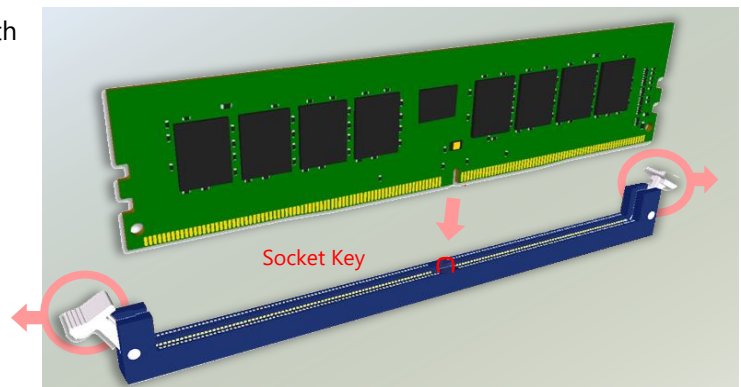
5. Push the module down into the slot until it is firmly seated and clicks into place.

Click

Click
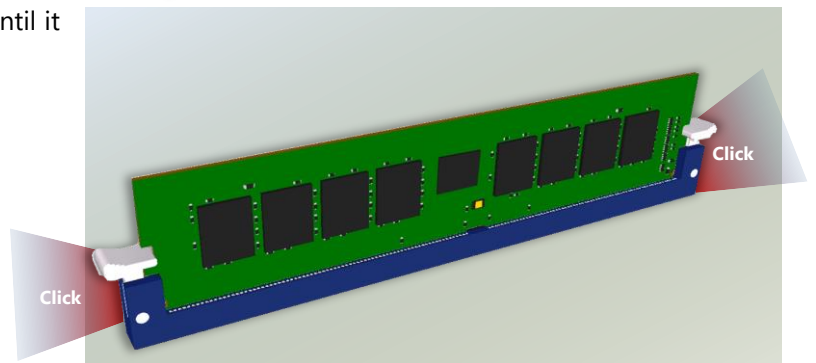
6. The memory modules have been installed.

27
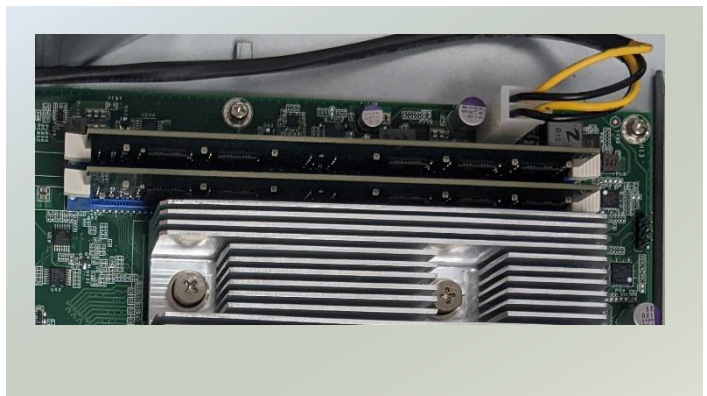
Installing M.2 Modules (Optional)

This system supports one M.2 NVMe 2280 M Key module slot. Please follow the instructions below to install.

1. Power down the system and open the chassis.

2. Locate the M.2 module slot on the motherboard.
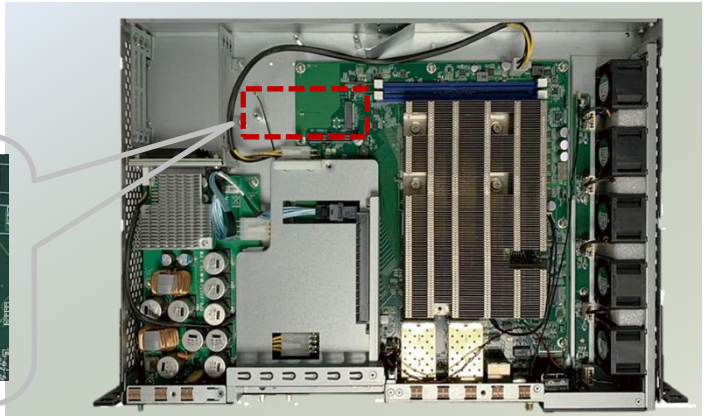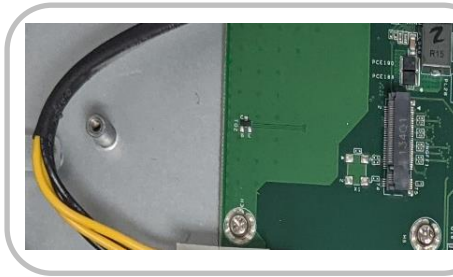
3. Align the notch of the M.2 module with the socket key in the pin slot.
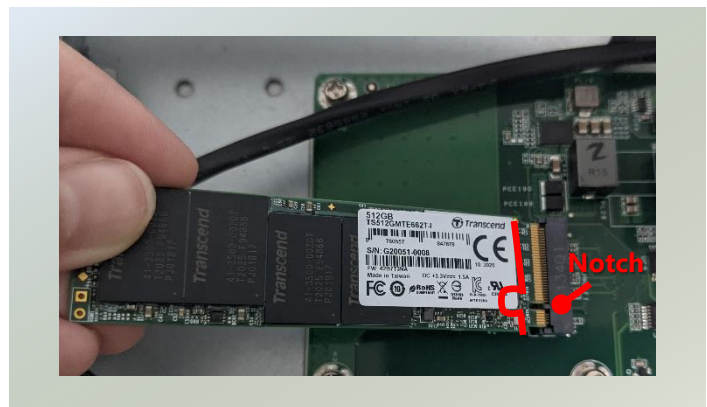
4. Insert the module card pins at 30 degrees into the socket until it is fully seated.

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

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Installing the TPM Module

The motherboard provides one TPM module slot. TPM is designed to support discrete cryptographic on-board processors. Follow the procedures below for installing a TMP module.

1. Power down the system and open the chassis.
2. Locate the TPM module (SPIROM1) connector slot on the motherboard.
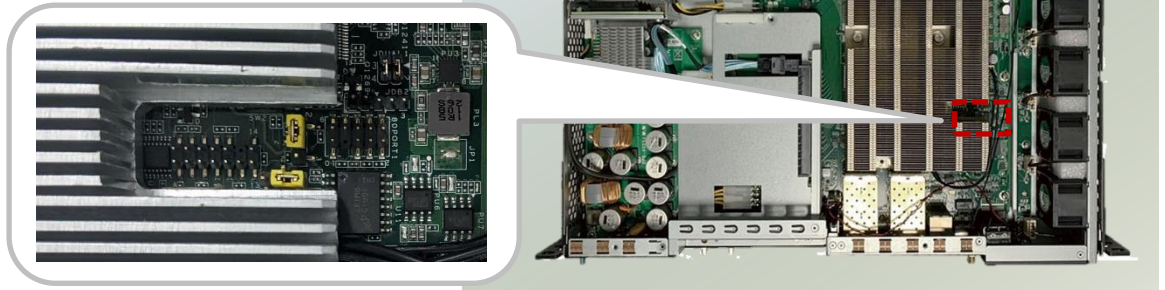
3. Align the white arrow on the TPM module and connector.
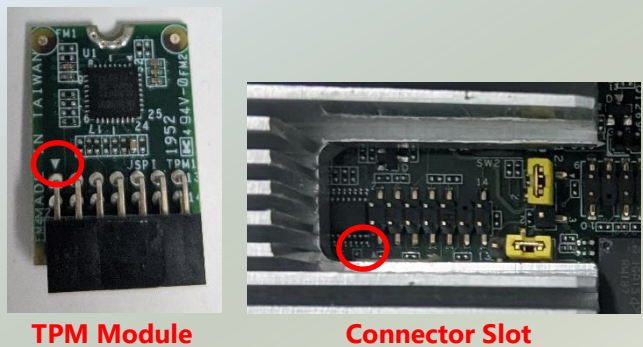
TPM Module   **Connector Slot**

4. Insert the module into the pins until it is fully seated.

29
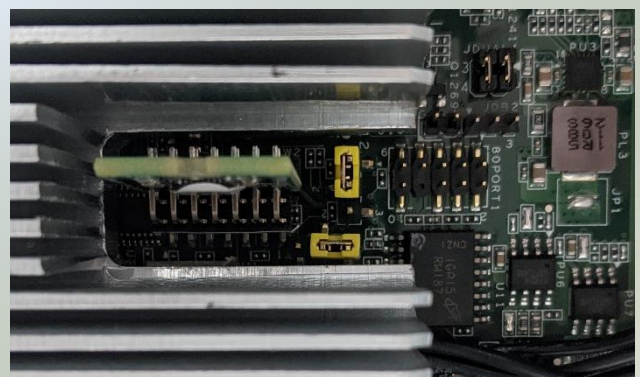
Installing the Disk Drives (Optional)

This system is built with four (4) 2.5″ HDD/SSD slot drive bay. Please follow the instructions to install the disk drives.

1. Power off the system and open the chassis cover.

2. Locate the 2.5″ drive bay. The drive tray should be secured to the motherboard.
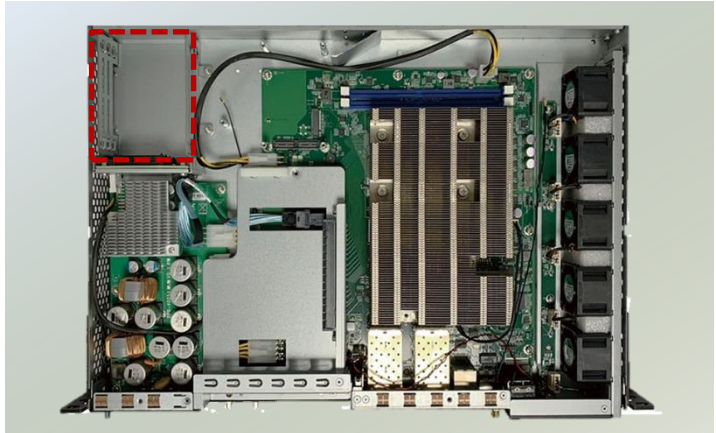
3. Loosen the two (2) screws that fixes the drive tray. Gently pull out the disk tray.
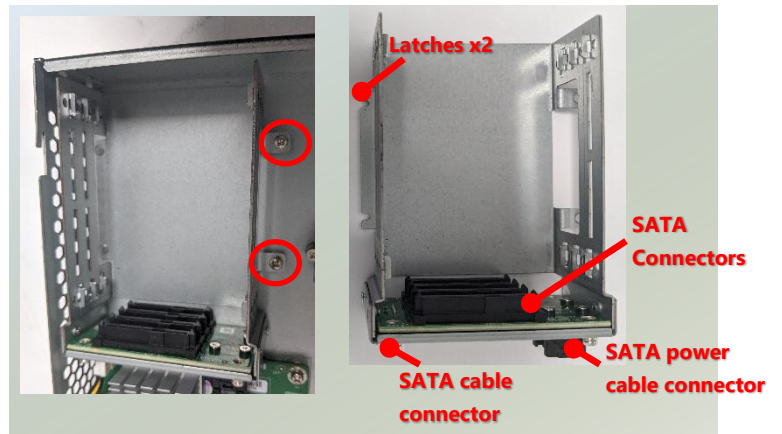
4. Slide a 2.5″ HDD/SSD into the drive tray. Push in until the SATA Connector is firmly seated.
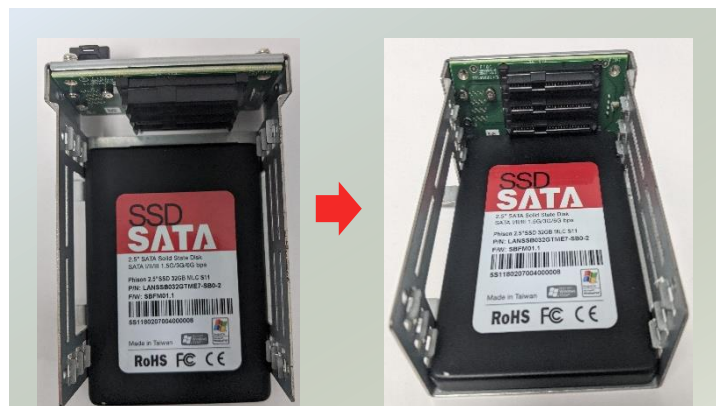
5. Secure the disk with two (2) screws on each side (four screws total).

6. Repeat steps above for each additional drive.

30
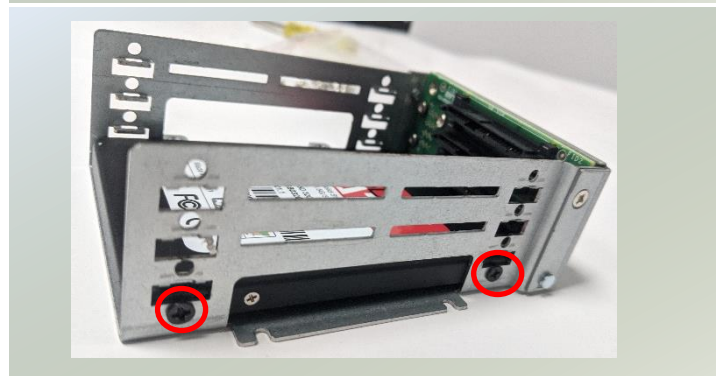
7. Connect the SATA cable and SATA power cable to the disk tray.
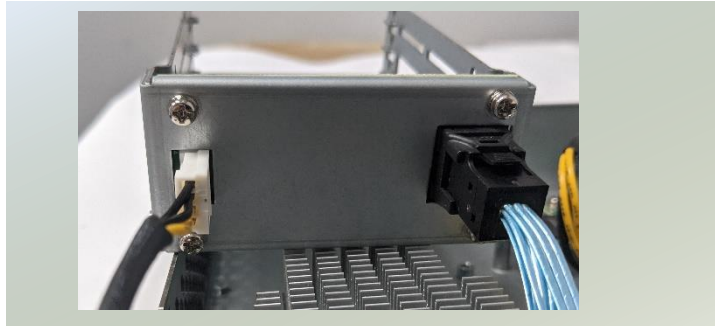
8. Install the tray back to the original position on the motherboard. Watch out for the embedded latch on the other side of the screws. Secure with the two (2) screws.

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Installing Graphics Card (Optional)

ECA-4025 comes with an optional PCIe expansion slot for GPU graphics card (by project), FPGA, or time sync card. Please follow the instructions for installation.

1. Power off the system and open the chassis cover.

2. Locate the PCIe slot. The slot bracket should be secured to the motherboard.
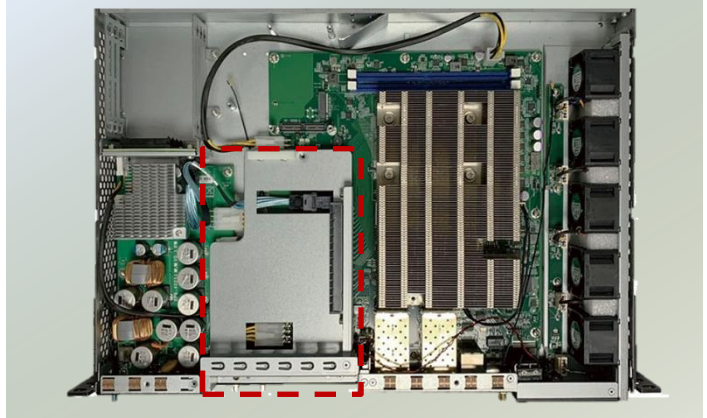
3. Remove the three (3) screws securing the slot bracket to the motherboard. Lift up the bracket.
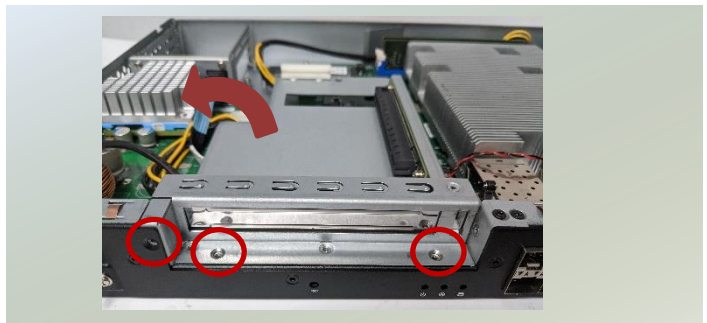
4. Next, remove the one (1) screw securing the bracket plate piece.
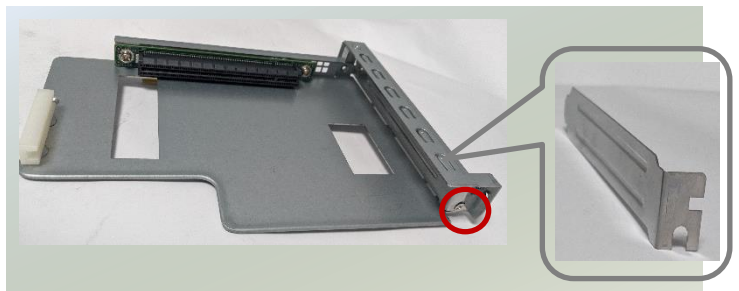
5. Slowly slide the GPU into the bracket. Make sure to align the bottom and top parts.

Top

Bottom

32
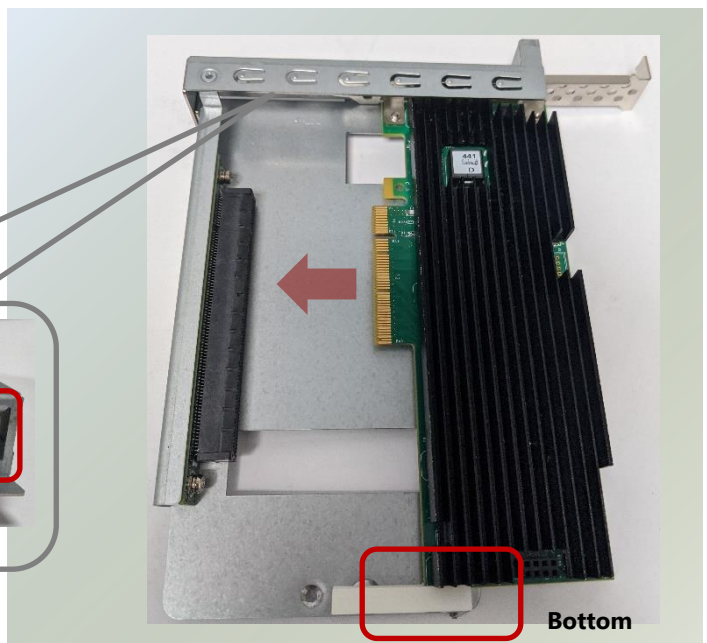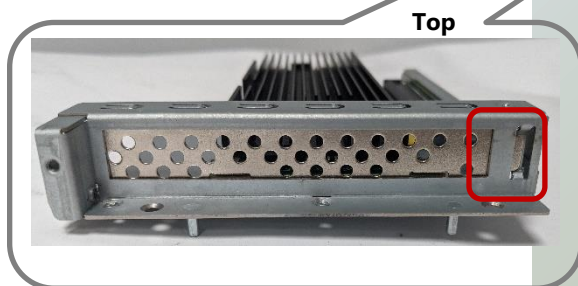
6. Align the notch of the socket key in the pin slot, insert the pins until it is fully seated.

7. Secure the GPU to the bracket with one (1) screw.
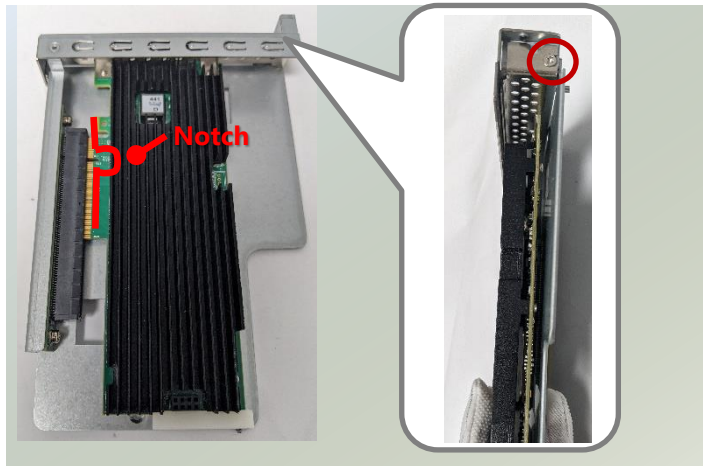
8. Install the bracket back onto the motherboard. Make sure to align the pins on the bottom, and the two pillars on the front.

9. Secure with three (3) screws. The installation is complete.

Pins

Pillar Studs

33
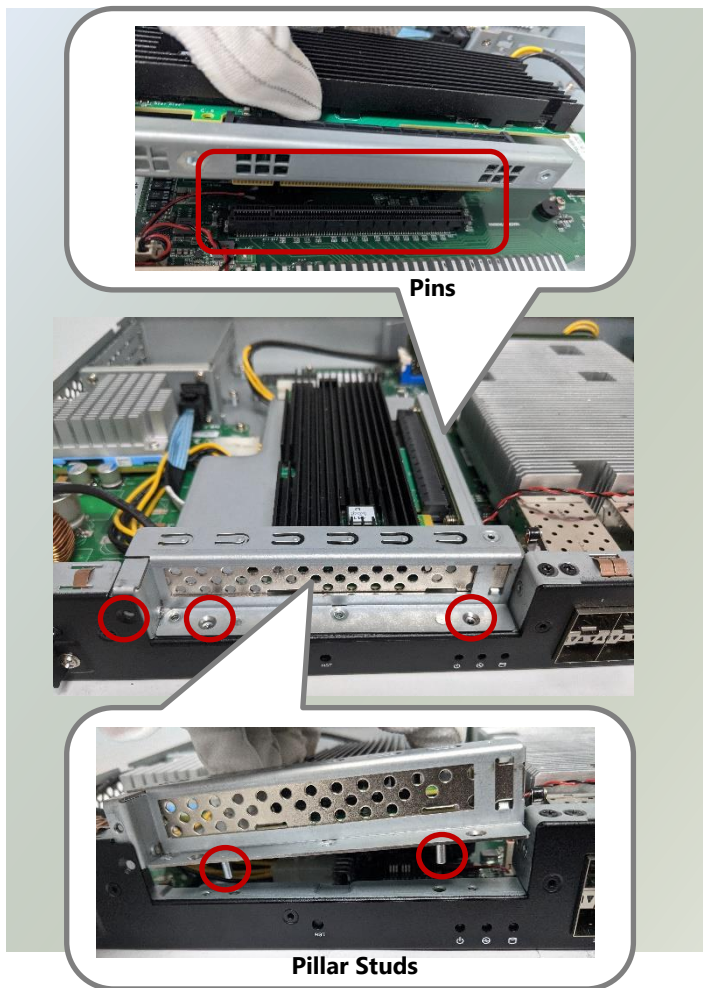
Replacing the Fan Tray

Cooling fans may eventually wear out. Please refer to the steps below for replacing cooling fan tray.

1. Power off the system and locate the Fan Tray.
2. Loosen the two thumbscrews (clock-wise direction) that secures the fan tray to the system.

3. Pull the fan tray out.

4. Open the side opening, and pull out the fan screen (if any).
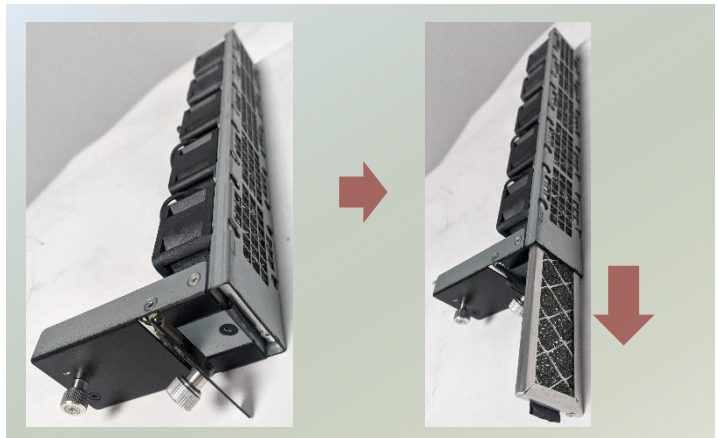
5. Remove the four (4) screws securing the fan.
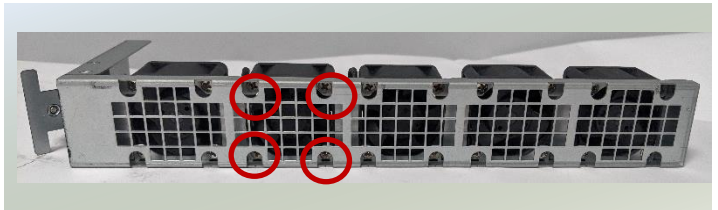
6. Remove the pins connecting the fan to the motherboard.

7. Remove the fan. Repeat the steps above to remove the other four fans

8. Reverse the steps and install a new fan onto the fan tray.

CHAPTER 3: SOFTWARE SETUP

BIOS is a firmware embedded on an exclusive chip on the system's motherboard. Lanner's BIOS firmware offering including market-proven technologies such as Secure Boot and Intel Boot Guard technology deliver solid commitments for the shield protection against malware, uncertified sequences and other named cyber threats.

BIOS Setup

To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Pressing the **<Esc>** or **<Del>** key immediately allows you to enter the Setup utility, and then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

Control Keys	Description
→←	select a setup screen
↑↓	select an item/option on a setup screen
<Enter>	select an item/option or enter a sub-menu
+/-	adjust values for the selected setup item/option
F1	display General Help screen
F2	retrieve previous values, such as the last configured parameters during the last time you entered BIOS
F3	load optimized default values
F4	save configurations and exit BIOS
<Esc>	exit the current screen

Main Page

Setup main page contains BIOS information and project version information.

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
    Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  Security  Boot

   BIOS Information                                              Set the Date. Use Tab to
   BIOS Vendor                    American Megatrends           switch between Date elements.
   Core Version                   5.0.1.4   0.35 x64            Default Ranges:
   Compliancy                     UEFI 2.6; PI 1.4              Year: 1900-9999
   Project Version                FECB4025A00006T010            Months: 1-12
   Build Date and Time            09/01/2021 15:19:20           Days: dependent on month
   Access Level                   Administrator


   System Date                    [Fri 09/10/2021]
   System Time                    [14:39:11]


                                                                ++: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit




                Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default Range of Year: 2005-2099 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

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.

Trusted Computing

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
            Advanced

  Configuration                                          Enables or Disables
    Security Device        [Enable]                      BIOS support for
  Support                                                security device. O.S.
    NO Security Device                                   will not show Security
  Found                                                  Device. TCG EFI
                                                         protocol and INT1A
                                                         interface will not be
                                                         available.
                                                         _____

                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit

          Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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Trusted Computing (TPM1.2)

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Advanced

Configuration                                    Enables or Disables
  Security Device        [Enable]                BIOS support for
Support                                          security device. O.S.
  TPM State              [Enabled]               will not show Security
Pending operation        [None]                  Device. TCG EFI
  Device Select          [Auto]                  protocol and INT1A
                                                 interface will not be
                                                 available.
Current Status Information
  TPM Enabled Status:    Enable
  TPM Active Status:     Activated
  TPM Owner Status:      Owned              ─────────────────────────
                                            ++: Select Screen
                                            ↑↓: Select Item
                                            Enter: Select
                                            +/-: Change Opt.
                                            F1: General Help
                                            F2: Previous Values
                                            F3: Optimized Defaults
                                            F4: Save & Exit
                                            ESC: Exit

      Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
                                                                    AB
```

Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
TPM State	Enabled Disabled	Enables or disables Security Device. NOTE: Your computer will reboot during restart in order to change State of the Device.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **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.

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Trusted Computing (TPM2.0)

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Advanced

   TPM20 Device Found                          Enables or Disables
   Vendor: NTC                                 BIOS support for
   Firmware Version: 1.3                       security device. O.S.
                                               will not show Security
   Security Device       [Enable]              Device. TCG EFI
Support                                        protocol and INT1A
   Active PCR banks      SHA-1,SHA256          interface will not be
   Available PCR banks   SHA-1,SHA256          available.

   SHA-1 PCR Bank        [Enabled]             →←: Select Screen
   SHA256 PCR Bank       [Enabled]             ↑↓: Select Item
                                               Enter: Select
   Pending operation     [None]                +/-: Change Opt.
   Platform Hierarchy    [Enabled]             F1: General Help
   Storage Hierarchy     [Enabled]             F2: Previous Values
   Endorsement           [Enabled]             F3: Optimized Defaults
Hierarchy                                      F4: Save & Exit
                                               ESC: Exit

        Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
                                                                         AB
```

```
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Advanced

   Active PCR banks      SHA-1,SHA256          TPM 1.2 will restrict
   Available PCR banks   SHA-1,SHA256          support to TPM 1.2
                                               devices, TPM 2.0 will
   SHA-1 PCR Bank        [Enabled]             restrict support to TPM
   SHA256 PCR Bank       [Enabled]             2.0 devices, Auto will
                                               support both with the
   Pending operation     [None]                default set to TPM 2.0
   Platform Hierarchy    [Enabled]             devices if not found,
   Storage Hierarchy     [Enabled]
   Endorsement           [Enabled]
Hierarchy
   TPM2.0 UEFI Spec      [TCG_2]               →←: Select Screen
Version                                        ↑↓: Select Item
   Physical Presence     [1.3]                 Enter: Select
Spec Version                                   +/-: Change Opt.
   TPM 20                [TIS]                  F1: General Help
InterfaceType                                  F2: Previous Values
   Device Select         [Auto]                F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit

        Version 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
                                                                         AB
```

Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, **TCG_1_2**: Supports the Compatible mode for Win8/Win10 **TCG_2**: Supports new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select **TPM 20 Device** for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **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.

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AST2500 Super IO Configuration

```
          Aptio Setup Utility – Copyright (C) 2021 American Megatrends, Inc.
   Advanced

  AST2500 Super IO Configuration                        Set Parameters of Serial Port
                                                        1 (COMA)
  Super IO Chip                    AST2500
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration




                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



          Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```
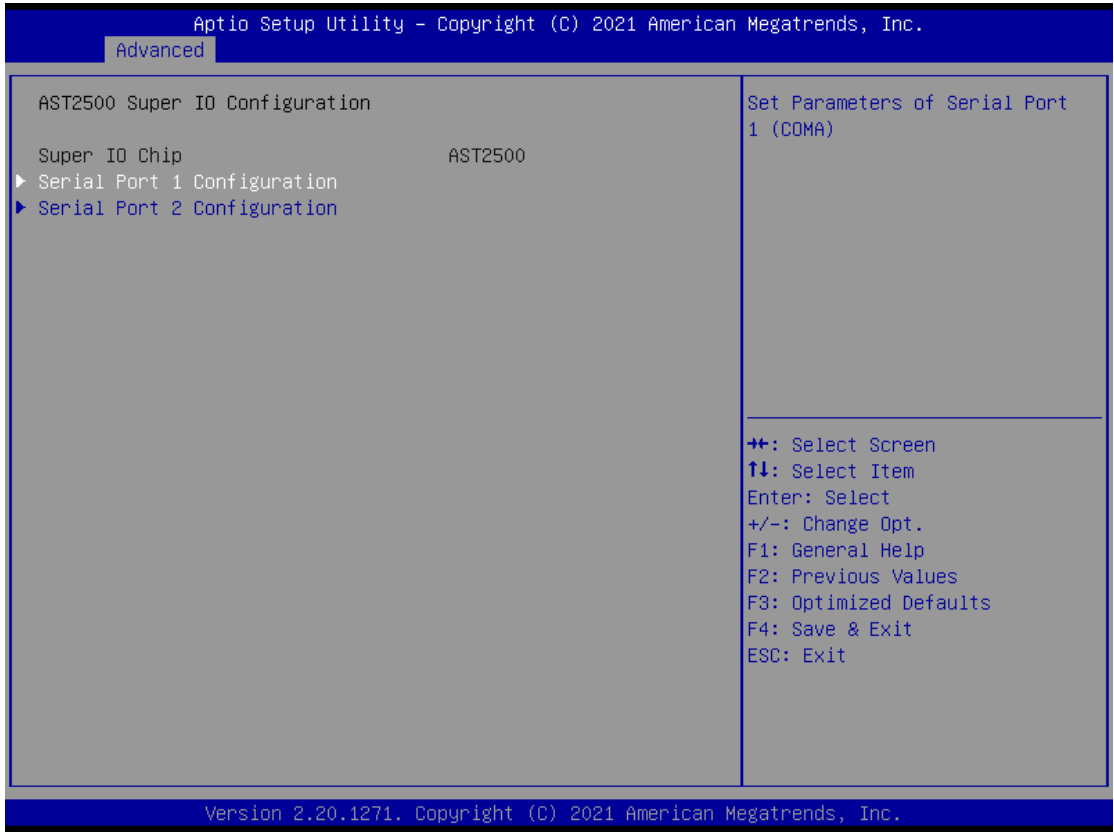
Serial port 1 Configuration

```
Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
 Advanced

Serial Port 1 Configuration                              Enable or Disable Serial Port
                                                         (COM)
Serial Port                        [Enabled]
Device Settings                    IO=3F8h; IRQ=4;

Change Settings                    [Auto]



                                                         ++: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit



         Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=3F8h; IRQ = 4

Serial port 2 Configuration

```
          Aptio Setup Utility – Copyright (C) 2021 American Megatrends, Inc.
          Advanced

   Serial Port 2 Configuration                              Enable or Disable Serial Port
                                                            (COM)
   Serial Port                          [Enabled]
   Device Settings                      IO=3E8h; IRQ=3;

   Change Settings                      [Auto]




                                                            ←→: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit




          Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=2F8h; IRQ = 3

Case Open Configuration

```
          Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
            Advanced

    Case Open Configuration                        Enabled or Disabled
                                                   Case Open function
    Case Open                 [Disabled]




                                                   ↔: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

          Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Case Open	Enabled Disabled	Enables or disables Case Open function

Watch Dog Timer Configuration

```
       Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
         Advanced

     Watch Dog Timer Configuration                    Enabled or Disabled
                                                      Watch Dog Timer function
     Watch Dog Timer          [Disabled]




                                                      ++: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F3: Optimized Defaults
                                                      F4: Save & Exit
                                                      ESC: Exit

       Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```
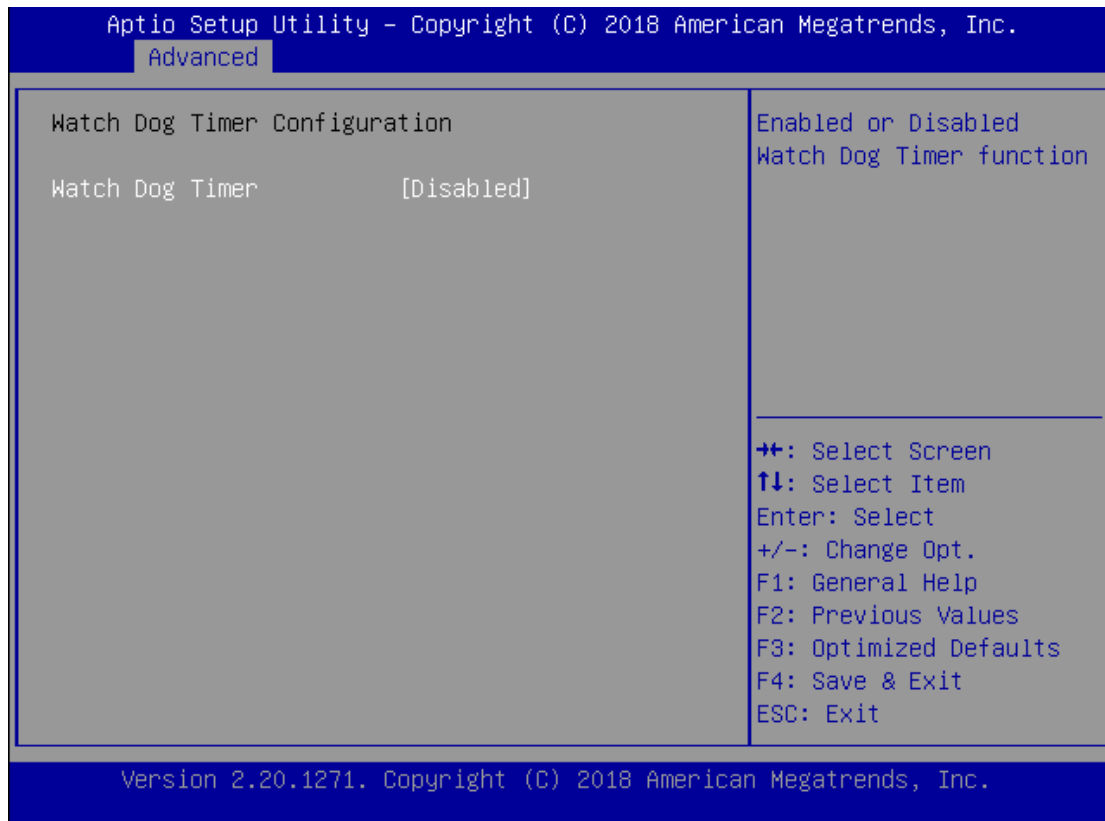
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Status LED Configuration

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
   Advanced

 Status LED Configuration                          Configure Status LED.

 Status LED                   [OFF]




                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit

      Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```
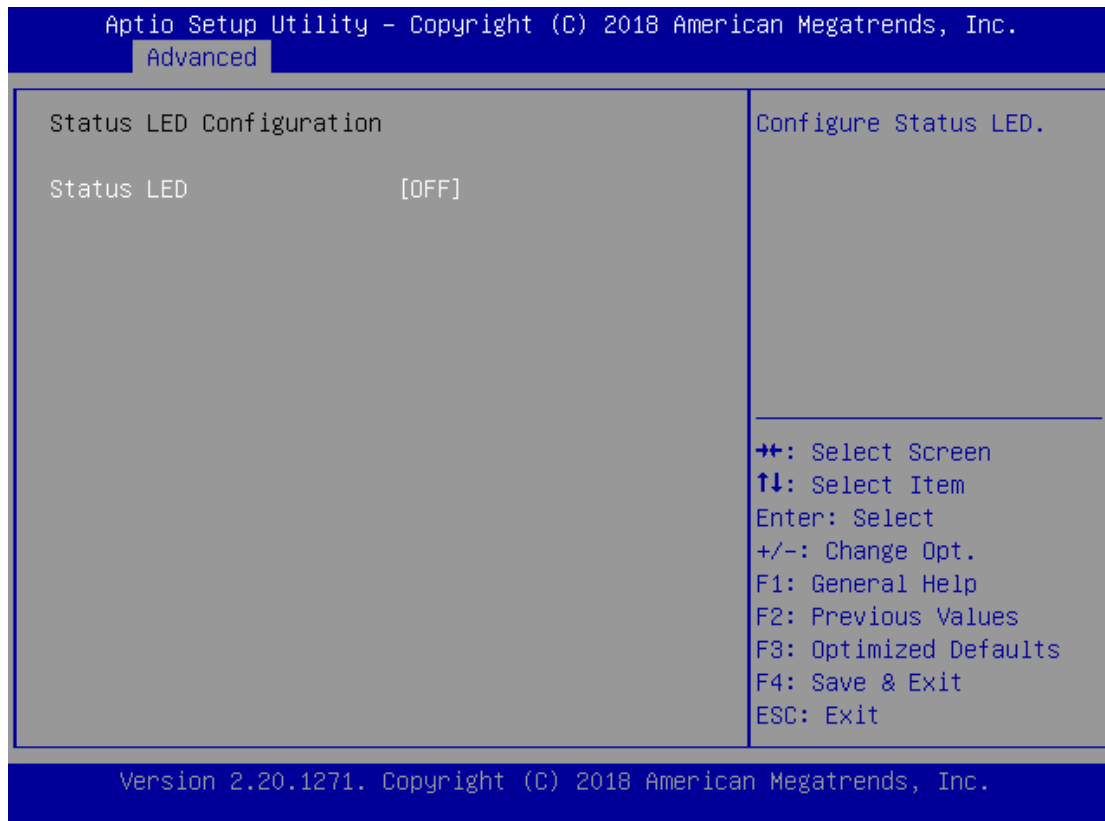
Feature	Options	Description
Status LED	OFF AMBER GREEN	Configures Status LED color

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Serial Port Console Redirection

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
           Advanced

                                                    Console Redirection
                                                    Enable or Disable.
        COM0
        Console Redirection      [Enabled]
      ▶ Console Redirection Settings

        Legacy Console Redirection
      ▶ Legacy Console Redirection Settings




                                                    ─────────────────
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


         Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection

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Console Redirection Settings

```
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  Advanced

COM0                                          Emulation: ANSI:      ▲
Console Redirection Settings                  Extended ASCII char
                                              set. VT100: ASCII char
Terminal Type           [VT100]               set. VT100+: Extends
Bits per second         [115200]              VT100 to support color,
Data Bits               [8]                   function keys, etc.
Parity                  [None]                VT-UTF8: Uses UTF8
Stop Bits               [1]                    encoding to map Unicode ▼
Flow Control            [None]
VT-UTF8 Combo Key       [Enabled]            ────────────────────────
Support                                       ◄►: Select Screen
Recorder Mode           [Disabled]            ▲▼: Select Item
Resolution 100x31       [Disabled]            Enter: Select
Putty KeyPad            [VT100]               +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit

      Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**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 **ANSI**: Extended ASCII char set
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	Indicates the end of a serial data packet.
Flow Control	None Hardware	Flow Control can prevent data loss from buffer overflow.

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	RTS/CTS	
VT-UTF8 Combo Key Support	Disabled Enabled	Enables 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 XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

Console Redirection Settings

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

Legacy Console Redirection Settings          Select a COM port to
                                             display redirection of
  Redirection COM Port      [COM0]           Legacy OS and Legacy
                                             OPROM Messages



                                             →←: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Defaults
                                             F4: Save & Exit
                                             ESC: Exit

        Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

PCI Subsystem Settings

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Advanced

PCI Bus Driver Version    A5.01.16                    Enables or Disables
                                                       64bit capable Devices
PCI Devices Common Settings:                           to be Decoded in Above
Above 4G Decoding         [Disabled]                   4G Address Space (Only
SR-IOV Support            [Disabled]                   if System Supports 64
                                                       bit PCI Decoding).


                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

         Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

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USB Configuration

```
           Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
       Advanced

   USB Devices:                                    ▲ Mass storage device        ▲
         1 Drive, 1 Keyboard, 1 Hub                  emulation type. 'AUTO'
                                                     enumerates devices
   Legacy USB Support          [Enabled]             according to their
   XHCI Hand-off               [Enabled]             media format. Optical
   USB Mass Storage            [Enabled]             drives are emulated as
   Driver Support                                    'CDROM', drives with no
   Port 60/64 Emulation        [Enabled]             media will be emulated   ▼

   USB hardware delays                              _____
   and time-outs:
   USB transfer time-out       [20 sec]            ↦↤: Select Screen
   Device reset time-out       [20 sec]            ↑↓: Select Item
   Device power-up delay       [Auto]               Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
   Mass Storage Devices:                            F2: Previous Values
   USB DISK 2.0 1100           [Auto]               F3: Optimized Defaults
                                                  ▼ F4: Save & Exit
                                                    ESC: Exit

           Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

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	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
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	1 sec 5 sec	USB mass storage device Start Unit command time-out

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	10 sec 20 sec	
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.

Network Stack Configuration

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

Network Stack            [Disabled]              Enable/Disable UEFI
                                                 Network Stack

                                                 ───────────────────
                                                 ↔: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

       Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```
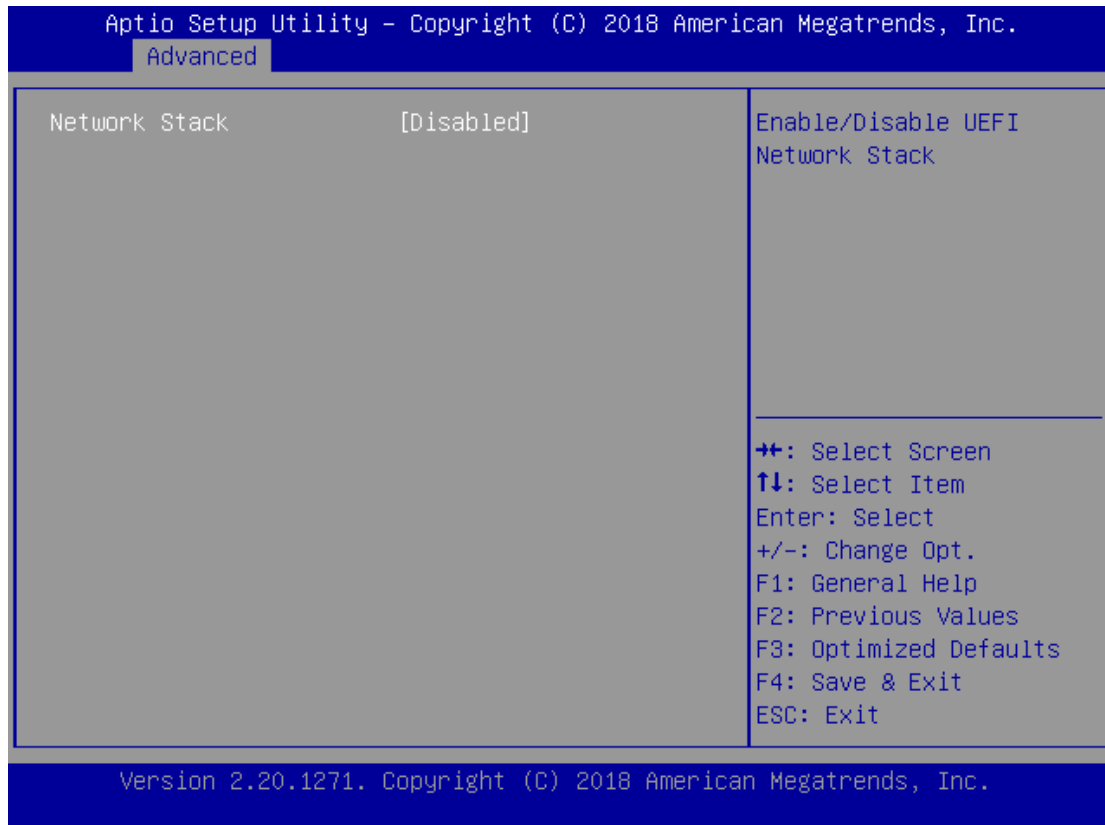
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, HTTP boot option will not be created.
Ipv6 PXE Support	Disabled Enabled	Enables Ipv6 PXE Boot Support. If IPV6 is disabled, PXE boot option will not be created.
Ipv6 HTTP Support	Disabled Enabled	Enables Ipv6 HTTP Boot Support. If IPV6 is disabled, HTTP boot option will not be created.
PXE boot wait time	0	Wait time to press **\<ESC\>** key to abort the PXE boot
Media detect count	1	Number of times the presence of media will be checked

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CSM Configuration

```
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
  Advanced

Compatibility Support Module Configuration          Enable/Disable CSM
                                                    Support.
CSM Support                [Enabled]

CSM16 Module Version       07.82

Option ROM execution

Network                    [Legacy]
Storage                    [Legacy]
Video                      [Legacy]            ─────────────────────────
Other PCI devices          [Legacy]            ↔: Select Screen
                                               ↑↓: Select Item
                                               Enter: Select
                                               +/-: Change Opt.
                                               F1: General Help
                                               F2: Previous Values
                                               F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit

         Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.
```

Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Video OpROM
Other PCI device	Do Not Launch UEFI Legacy	Determines OpROM execution policy for devices other than Network, Storage, or Video

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Control Legacy PXE Boot

```
        Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
        Advanced

   Control Legacy PXE Boot                        Control Legacy PXE Boot
                                                  from which Lan
   Control Legacy PXE        [Disabled]
   Boot from



                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```
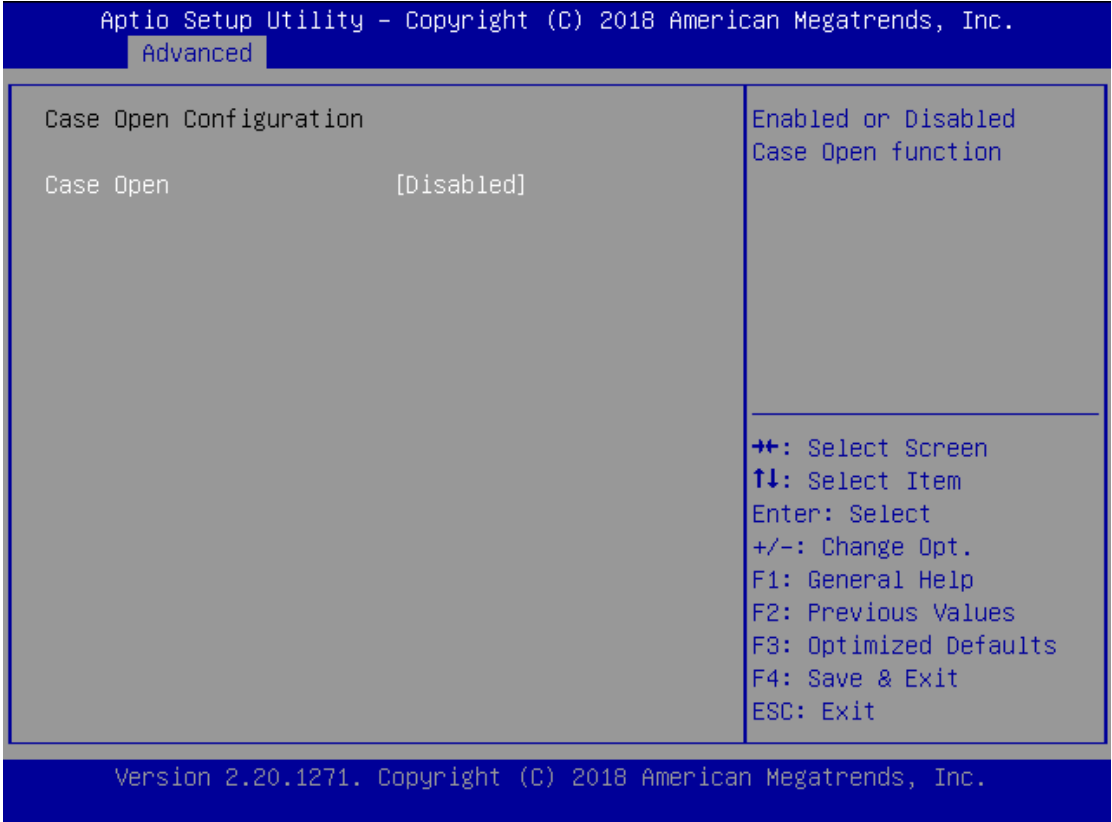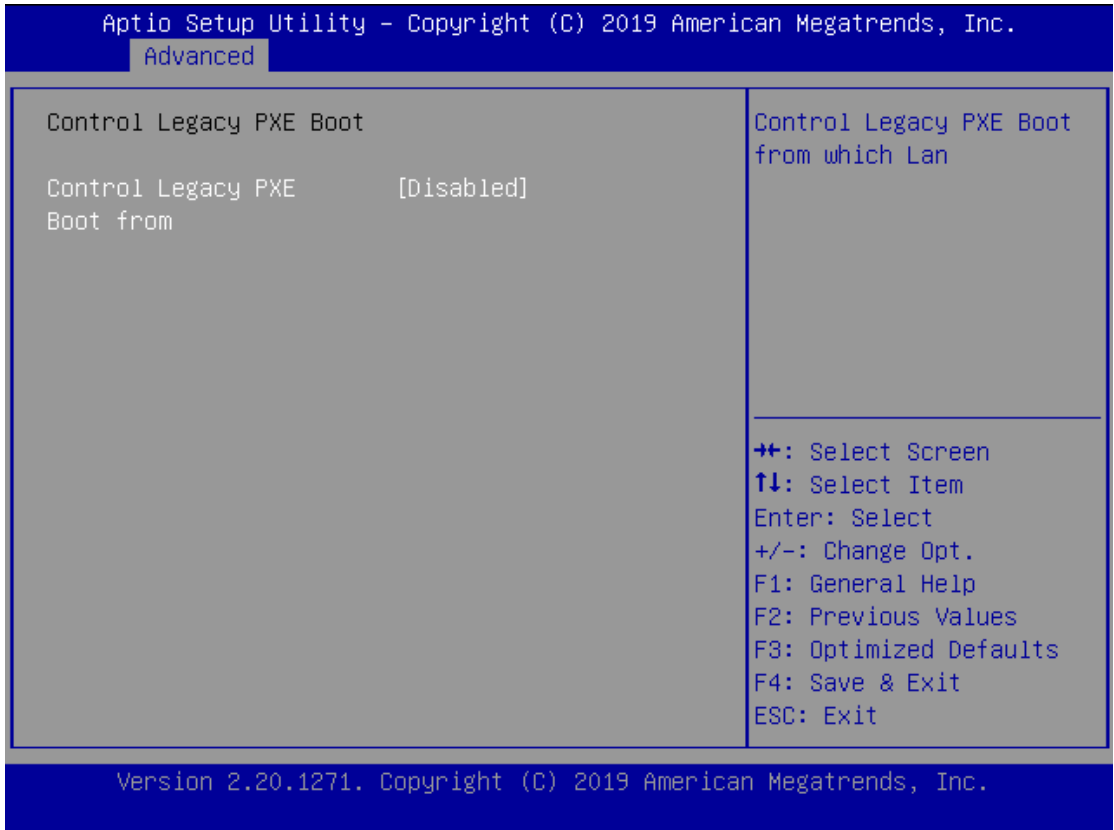
Feature	Options	Description
Control Legacy PXE Boot from	Disabled	Control Legacy PXE Boot from which LAN
	MGT Lan1	

Platform Configuration

Select the Platform menu item from the BIOS setup screen to enter the Platform Setup screen. Users can select any of the items in the left frame of the screen.

Feature	Options	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
Runtime Error Logging	None	Press <Enter> to view or change the runtime error log configuration.

PCH Configuration

```
                Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
                    Platform Configuration

   PCH Configuration                                        PCI Express Configuration
   ------------------------------------------------         settings

 ▶ PCI Express Configuration
 ▶ PCH sSATA Configuration
 ▶ Security Configuration
   Restore AC Power Loss              [Power On]
   Serial IRQ Mode                    [Continuous]
   RTC Lock                           [Enable]
   BIOS Lock                          [Enable]

                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


                Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```
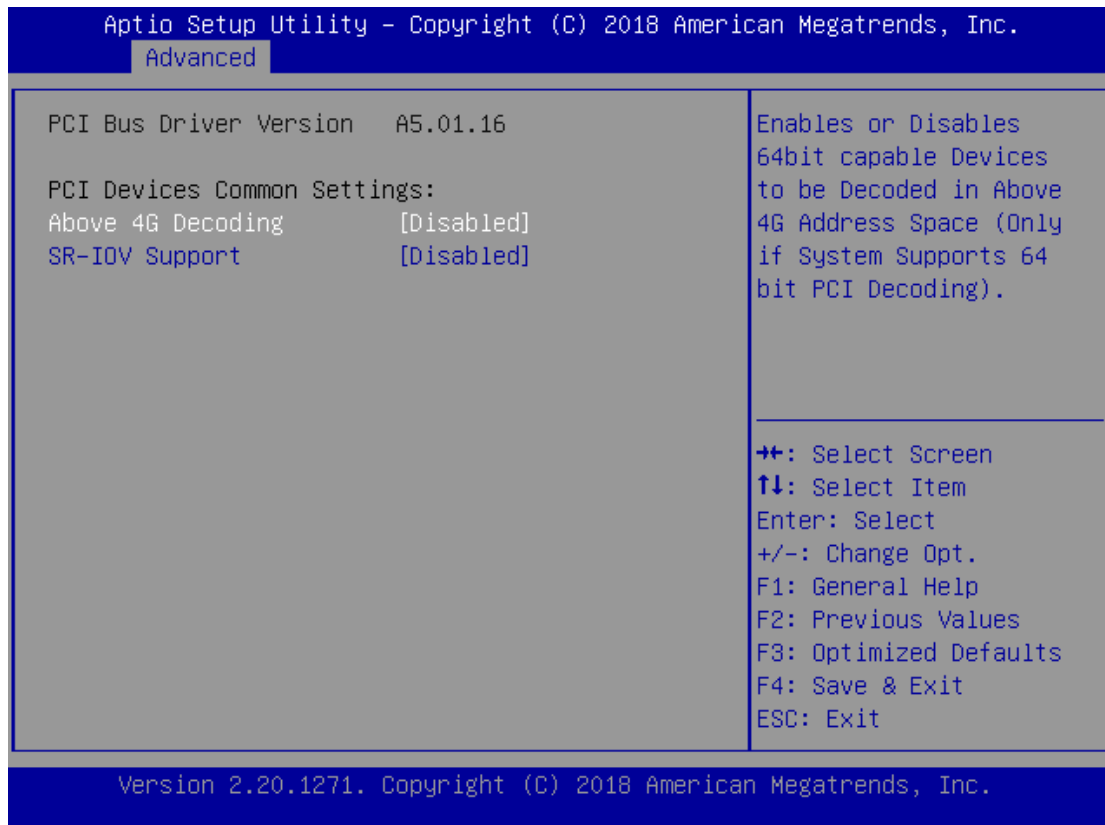
Feature	Options	Description
PCI Express Configuration	None	PCI Express Configuration settings
PCH SATA Configuration	None	SATA devices and settings
PCH sSATA Configuration	None	sSATA devices and settings
Security Configuration	None	Security Configuration settings
Restore AC Power Loss	Power ON Power Off Last State	Select S0/S5 for ACPI state after a G3
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.
RTC Lock	Disabled Enabled	Enabling this feature will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	Disabled Enabled	Enables or disables the PCH BIOS Lock Enable feature.

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PCI Express Configuration

```
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                    Platform Configuration

                                                    Enable PCIe root port
                                                    function swapping
   PCIe Root Port          [Enable]                 feature to dynamically
   Function Swapping                                 assign function 0 to
   Max Read Request Size   [MRRS 512B]              enabled root port.



                                                    ↔: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit


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```

Feature	Options	Description
PCIe Root Port Function Swapping	Disabled Enabled	Enable PCIe root port function swapping feature to dynamically assign function 0 to enabled root port.
Max Read Request Size	MRRS 128B MRRS 256B MRRS 512B MRRS 1024B MRRS 2048B MRRS 4096B	PCIE Max Read Request Size Selection.

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PCH sSATA Configuration

```
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                    Platform Configuration

PCH sSATA Configuration                            ▲  Enable or Disable SATA
---------------------------------------------         Controller
---

sSATA Controller          [Enable]
Configure sSATA as        [AHCI]
Support Aggressive        [Disable]
Link Power Management

sSATA Port 0              [Not Installed]
  Port 0                  [Enable]            →←: Select Screen
  Hot Plug                [Disable]           ↑↓: Select Item
  Configure as eSATA      [Disable]           Enter: Select
  Spin Up Device          [Disable]           +/-: Change Opt.
  sSATA Device Type       [Hard Disk Drive]   F1: General Help
SATA Topology             [Unknown]           F2: Previous Values
sSATA Port 1              [Not Installed]      F3: Optimized Defaults
  Port 1                  [Enable]          ▼ F4: Save & Exit
                                              ESC: Exit

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```

Feature	Options	Description
sSATA Controller	Disabled Enabled	Enables or disables sSATA Controller
Configure SATA as	AHCI RAID	This will configure sSATA as **RAID** or **AHCI**.
Support Aggressive Link Power Management	Disabled Enabled	Enables or disables SALP
Port 0/1/2/3/4/5	Disabled Enabled	Enable or Disable sSATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configure as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)
Mechanical Presence Switch	Disabled Enabled	Controls reporting if this port has a Mechanical Presence Switch. Note: Requires hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives switch have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive	Identify the SATA port is connected to Solid State

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	Solid State Drive	Drive or Hard Disk Drive
SATA Topology	Unknown ISATA Direct Connect Flex M2	Identify the SATA Topology if it is Default or ISATA or Flex or Direct Connect or M2

Unknown

Security Configuration

```
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                       Platform Configuration

Security Configuration                            Enable/Disable SMM BIOS
                                                  Write-Protect feature

SMM BIOS Write Protect    [Enable]




                                                  ↔: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```
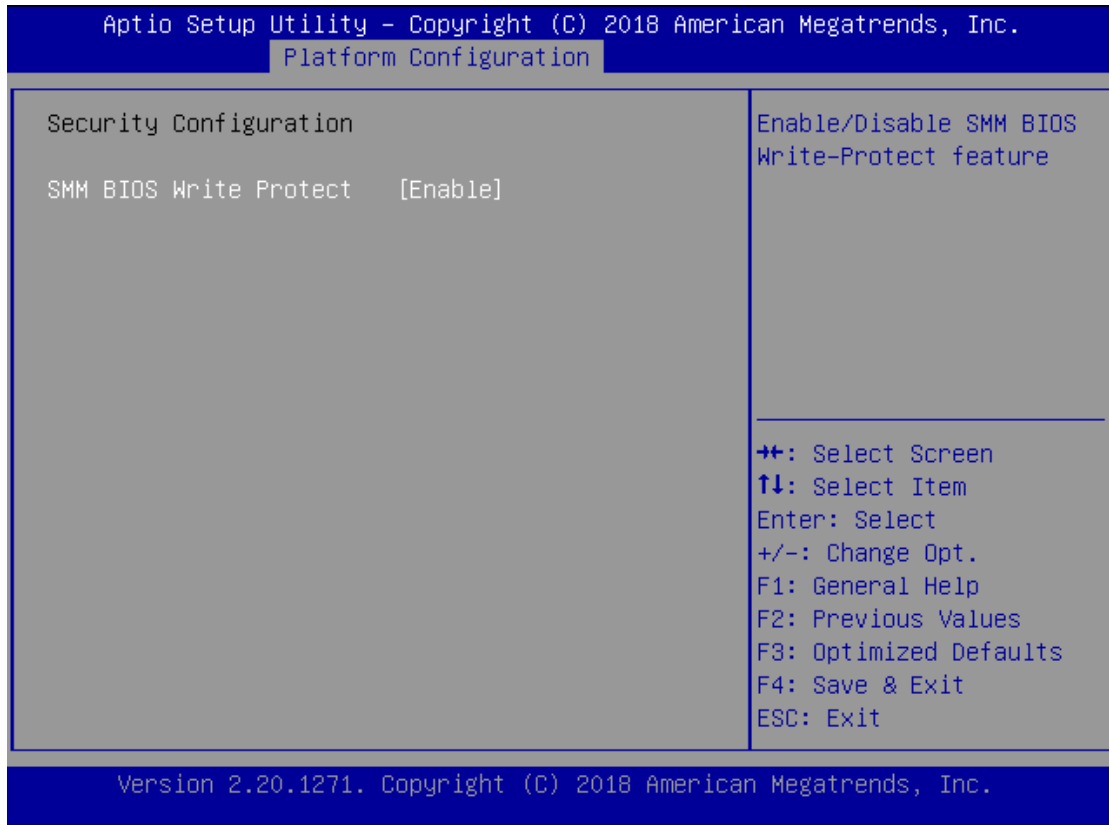
Feature	Options	Description
SMM BIOS Write Protect	Disabled	Enable/Disable SMM BIOS Write-Protect feature
	Enabled	

Server ME Configuration

```
          Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
              Platform Configuration

   General ME Configuration
   Oper. Firmware Version              0E:4.0.4.128
   Recovery Firmware Version           0E:4.0.4.128
   ME Firmware Status #1               0x000F0255
   ME Firmware Status #2               0x88110026
     Current State                     Operational
     Error Code                        No Error
     Recovery Cause                    N/A

                                                        ++: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit



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```

Runtime Error Logging

```
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                      Platform Configuration

  Runtime Error Logging                            System Error
  ----------------------------------------------   Enable/Disable setup
  ---                                              options.
  System Errors            [Disable]
  Viral Status             [Enable]
► eMCA Settings
► Whea Settings
► Error Injection Settings
► Memory Error Enabling
► IIO Error Enabling
► PCIe Error Enabling                            ←→: Select Screen
► Platform Level Error Enabling                  ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

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```

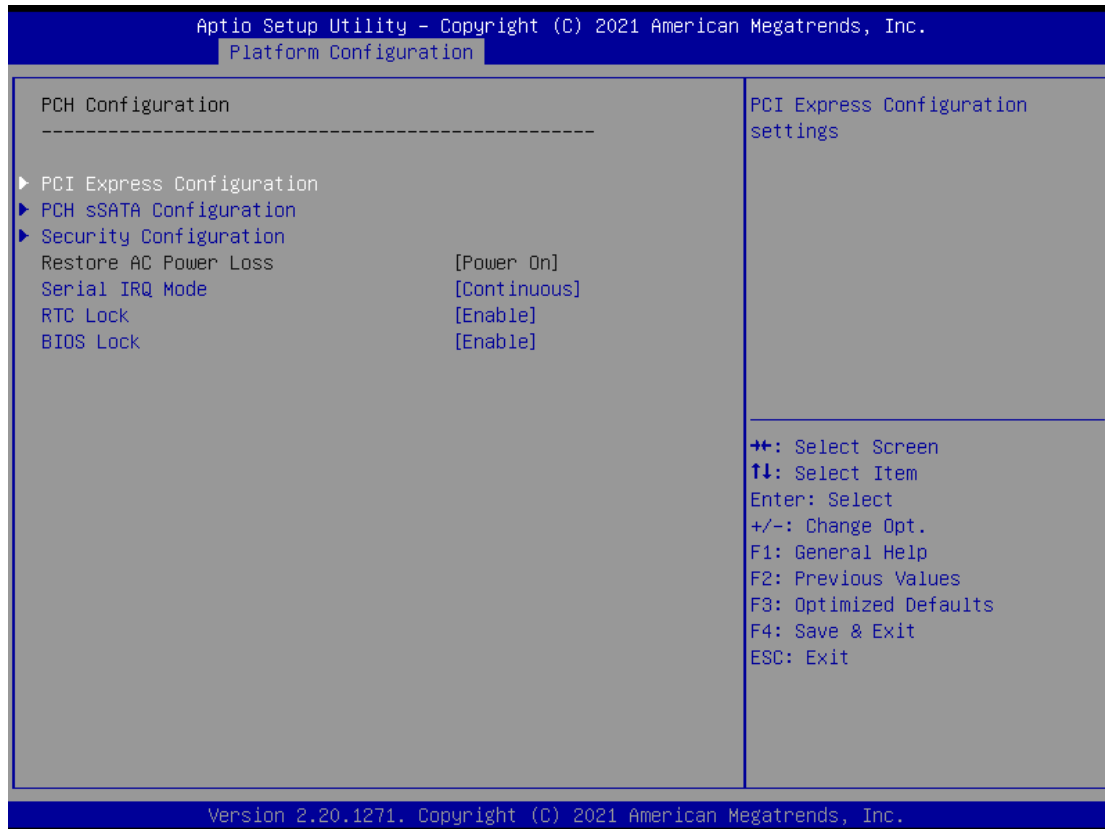| Feature	Options	Description
System Errors	Disabled Enabled	System Error Enable/Disable setup options.

Socket Configuration

Select the Socket menu item from the BIOS setup screen to enter the Socket Setup screen. Users can select any of the items in the left frame of the screen.
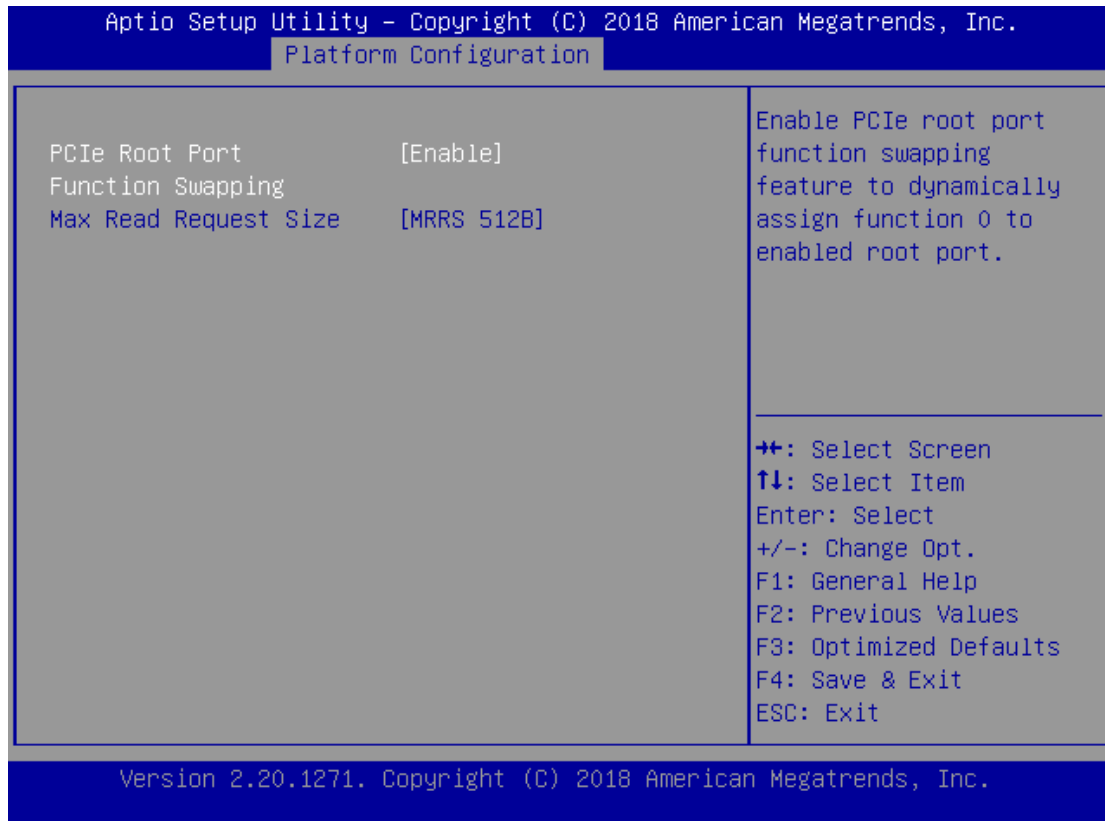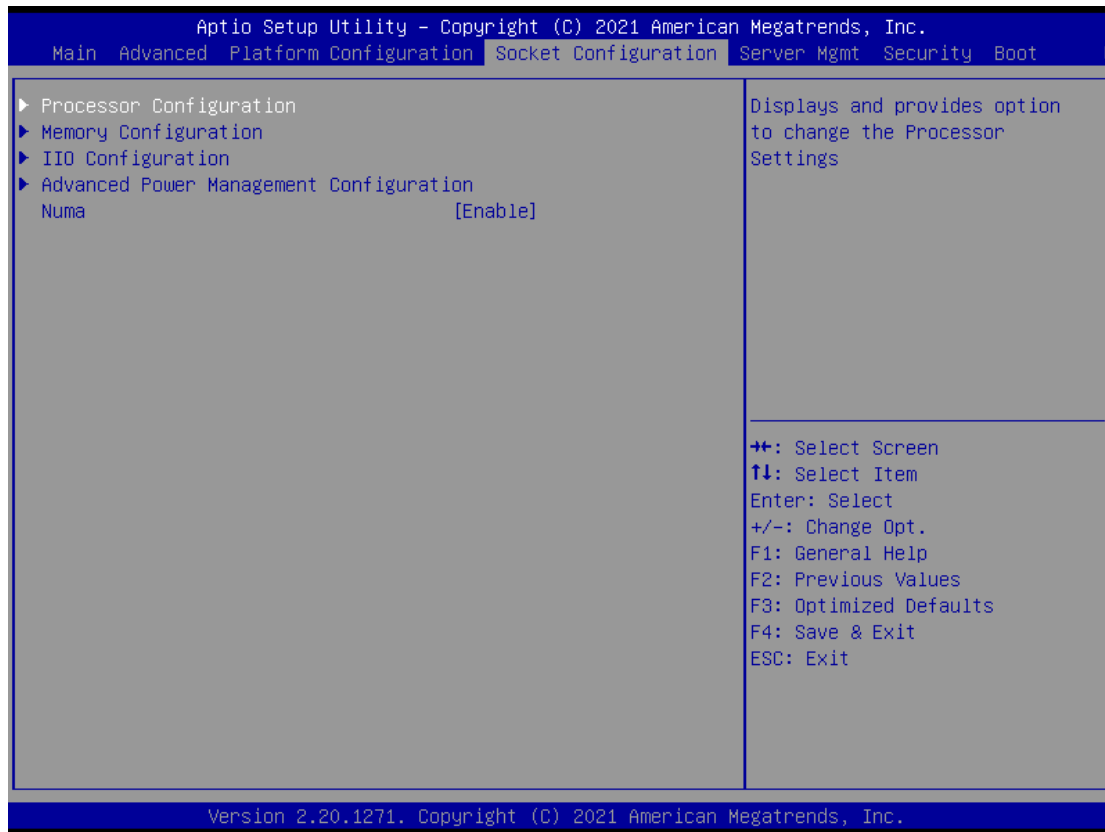

Feature	Options	Description
Processor Configuration	None	Displays and provides option to change the Processor Settings
Memory Configuration	None	Displays and provides option to change the Memory Settings
IIO Configuration	None	Displays and provides option to change the IIO Settings
Advanced Power Management Configuration	None	Displays and provides option to change the Power Management Settings
Numa	Disabled Enabled	Displays and provides option to change the Power Management Settings

Processor Configuration

```
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                                 Socket Configuration

   Processor Configuration                           ▲  Change Per-Socket Settings
   ------------------------------------------------
 ▶ Per-Socket Configuration
   Processor BSP Revision          50654 - SKX M0
   Processor Socket                Socket 0
   Processor ID                    00050654*
   Processor Frequency             2.000GHz
   Processor Max Ratio                    14H
   Processor Min Ratio                    0AH
   Microcode Revision              02006906
   L1 Cache RAM                        64KB
   L2 Cache RAM                      1024KB
   L3 Cache RAM                     22528KB
   Processor 0 Version             Intel(R) Xeon(R) D-2187    ↔: Select Screen
                                   NT CPU @ 2.00GHz           ↑↓: Select Item
                                                              Enter: Select
   Hyper-Threading [ALL]           [Enable]                   +/-: Change Opt.
   Machine Check                   [Enable]                   F1: General Help
   Execute Disable Bit             [Enable]                   F2: Previous Values
   Enable Intel(R) TXT             [Disable]                  F3: Optimized Defaults
   VMX                             [Enable]                   F4: Save & Exit
   Enable SMX                      [Disable]                  ESC: Exit
   Hardware Prefetcher             [Enable]
   Adjacent Cache Prefetch         [Enable]
   Extended APIC                   [Disable]                ▼

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```

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                 Socket Configuration

   Microcode Revision       0200004D               ▲  Enable/disable AES-NI
   L1 Cache RAM                 64KB                   support
   L2 Cache RAM               1024KB
   L3 Cache RAM              22528KB
   Processor 0 Version      Intel(R) Xeon(R) D-2183
                            IT CPU @ 2.20GHz

   Hyper-Threading [ALL]    [Enable]
   Machine Check            [Enable]
   Execute Disable Bit      [Enable]
   Enable Intel(R) TXT      [Disable]                  ↔: Select Screen
   VMX                      [Enable]                   ↑↓: Select Item
   Enable SMX               [Disable]                  Enter: Select
   Hardware Prefetcher      [Enable]                   +/-: Change Opt.
   Adjacent Cache           [Enable]                   F1: General Help
   Prefetch                                            F2: Previous Values
   Extended APIC            [Disable]                  F3: Optimized Defaults
   AES-NI                   [Enable]               ▼  F4: Save & Exit
                                                      ESC: Exit

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```

Feature	Options	Description
Hyper-Threading [ALL]	Disabled Enabled	Enables Hyper Threading (Software Method to Enable/Disable Logical Processor threads.
Machine Check	Disabled Enabled	Enable or Disable the Machine Check
Execute Disable Bit	Disabled Enabled	When disabled, it forces the XD feature flag to always return 0.
Enable Intel® TXT	Disabled Enabled	Enables Intel(R) TXT
VMX	Disabled Enabled	Enables the Vanderpool Technology, which takes effect after reboot.
Enable SMX	Disabled Enabled	Enables Safer Mode Extensions
Hardware Prefetcher	Disabled Enabled	= MLC Streamer Prefetcher (MSR 1A4h Bit[0])
Adjacent Cache Prefetcher	Disabled Enabled	= MLC Spatial Prefetcher (MSR 1A4h Bit[1])
Extended APIC	Disabled Enabled	Enables or disables extended APIC support
AES-NI	Disabled Enabled	Enables or disables AES-NI support

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Per-Socket Configuration

Feature	Options	Description
CPU Socket0 Configuration	None	None

CPU Socket0 Configuration
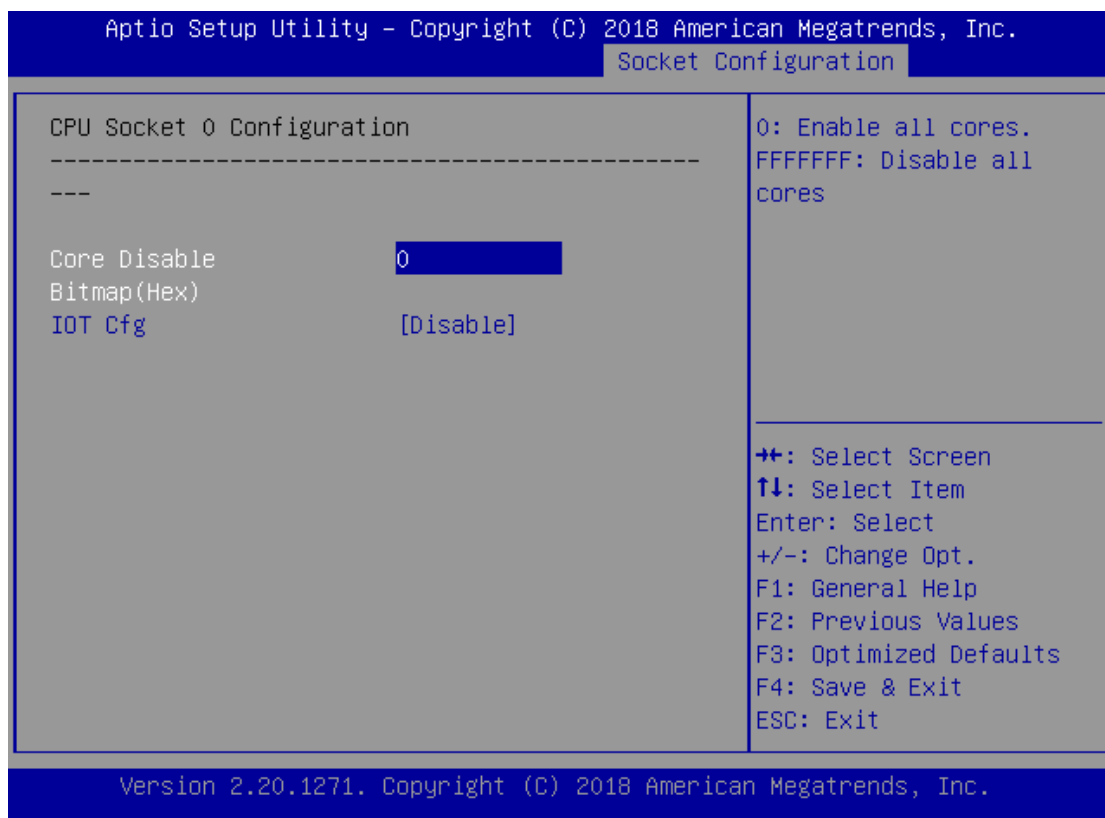
Feature	Options	Description
Core Disable Bitmap (Hex)	0	0: Enable all cores. 3fff: Disable all cores
IOT Cfg	Disabled Enabled	None

Memory Configuration

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                Socket Configuration

    Memory Frequency           [Auto]                  Maximum Memory
  ▶ Memory Topology                                    Frequency Selections in
                                                       Mhz. Do not select
                                                       Reserved




                                                       ↔: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit

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```
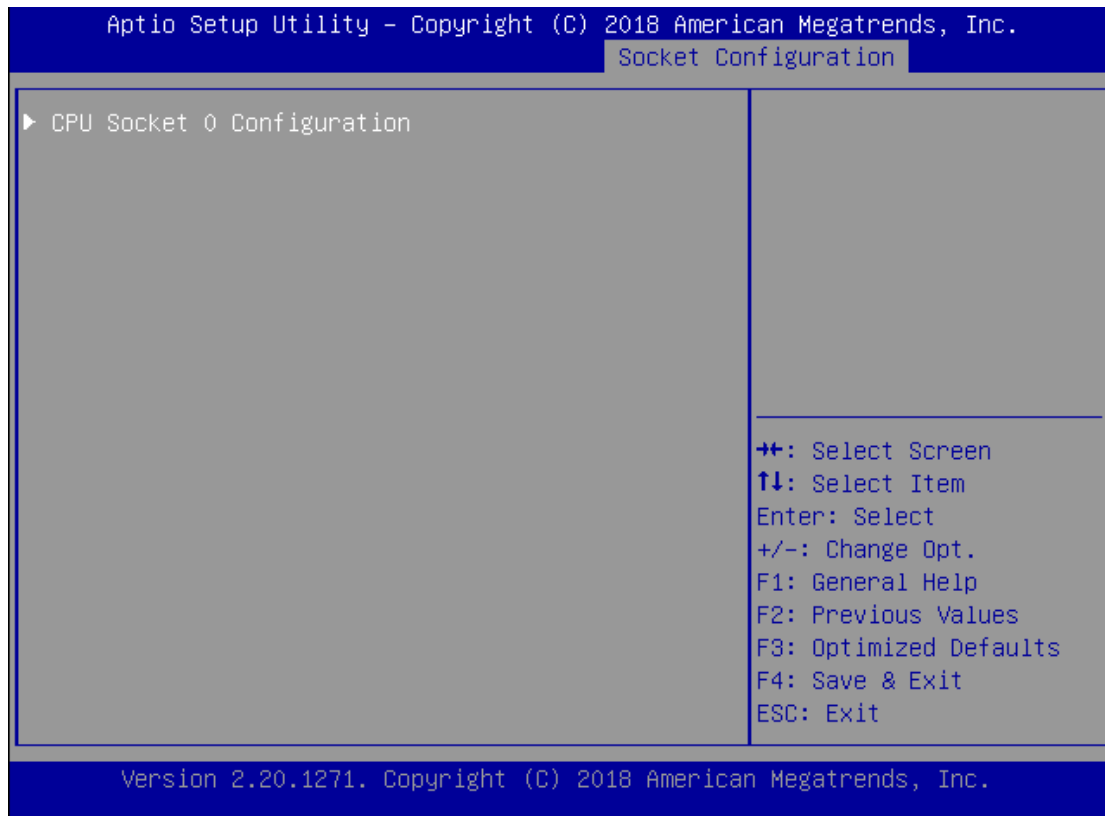
Feature	Options	Description
Memory Frequency	Auto 800 1000 1066 1200 1333 1400 1600 1800 1866 2000 2133 2200 2400 2600 2666 2800-OvrClk 2933-OvrClk 3000-OvrClk 3200-OvrClk 3400-OvrClk 3600-OvrClk	Maximum Memory Frequency Selections in Mhz. Do not select Reserved

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	3733-OvrClk	
	3800-OvrClk	
	4000-OvrClk	
	4200-OvrClk	
	4266-OvrClk	
	4400-OvrClk	
Memory Topology	None	Displays memory topology with Dimm population information

```
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                                        Socket Configuration

    --------------------------------------------------
    Socket0.ChA.Dimm0:  DIMM is Present. DIMM Status:Enabled
    DIMM Details: 2666MT/s UNKNOWN DRx8 16GB RDIMM
    Socket0.ChB.Dimm0:  DIMM is Present. DIMM Status:Enabled
    DIMM Details: 2666MT/s UNKNOWN DRx8 16GB RDIMM




                                                        ++: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit




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```

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IIO Configuration

```
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                                        Socket Configuration

   IIO Configuration
   -----------------------------------------------
   ---

 ▶ Socket0 Configuration
 ▶ IOAT Configuration
 ▶ Intel® VT for Directed I/O (VT-d)
   PCI-E ASPM Support         [Disable]
   (Global)
   PCIe Extended Tag          [Enable]          ┌─────────────────────────┐
   Enable                                       →←: Select Screen
   PCIe Max Read Request      [Auto]            ↑↓: Select Item
   Size                                         Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit

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```

Feature	Options	Description
Socket0 Configuration	None	None
IOAT Configuration	None	All IOAT configuration options
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel? VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	Disabled Per-Port L1 Only	This option enables / disables the ASPM support for all downstream devices.
PCIe Extended Tag Enable	Auto Disabled Enabled	Auto/Enable - BIOS sets 8-bit Tag Field for PCIe Root Port/EndPoint. Disable - BIOS sets 5-bit Tag Field for PCIe Root Port/EndPoint
PCIe Max Read Request Size	Auto 128B 256B 512B 1024B 2048B 4096B	Set Max Read Request Size in EndPoints

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Socket0 Configuration

```
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                               Socket Configuration

   IOU0 (IIO PCIe Br1)              [x16]              Selects PCIe port Bifurcation
   IOU1 (IIO PCIe Br2)              [x8x8]             for selected slot(s)
 ▶ Socket 0 PcieBr1D00F0 - Port 1A
 ▶ Socket 0 PcieBr2D00F0 - Port 2A
 ▶ Socket 0 PcieBr2D02F0 - Port 2C


                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

Feature	Options	Description
Socket 0 PcieBr1D00F0	None	Settings related to PCI Express Port 1A
Socket 0 PcieBr2D00F0	None	Settings related to PCI Express Port 2A
Socket 0 PcieBr2D02F0	None	Settings related to PCI Express Port 2C

IOAT Configuration

```
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                                      Socket Configuration

▶ Sck0 IOAT Config
  Disable TPH            [No]
  Prioritize TPH         [Disable]
  Relaxed Ordering       [Disable]




                                              →←: Select Screen
                                              ↑↓: Select Item
                                              Enter: Select
                                              +/-: Change Opt.
                                              F1: General Help
                                              F2: Previous Values
                                              F3: Optimized Defaults
                                              F4: Save & Exit
                                              ESC: Exit


       Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```
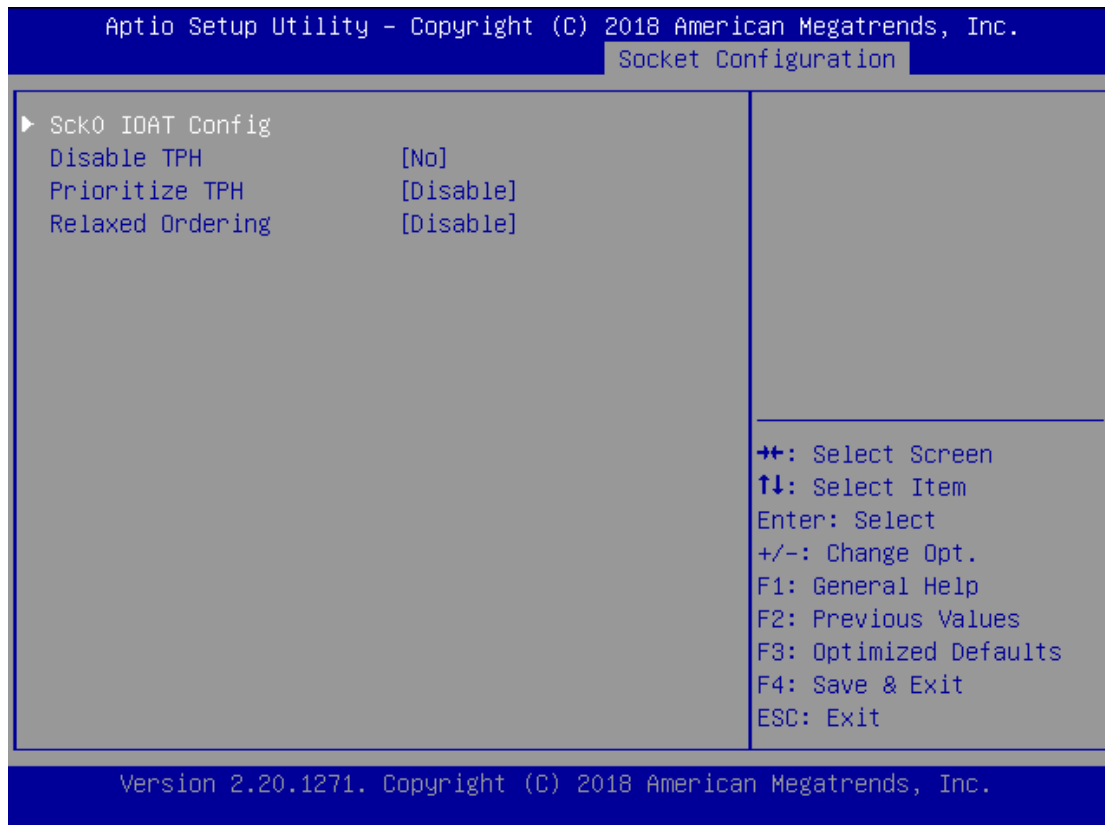
Feature	Options	Description
Sck0 IOAT Config	None	None
Disable TPH	No Yes	TLP Processing Hint disable
Prioritize TPH	Disabled Enabled	Prioritize TPH
Relaxed Ordering	Disabled Enabled	Relaxed Ordering Enable/Disable

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Intel® VT for Directed I/O (VT-d)
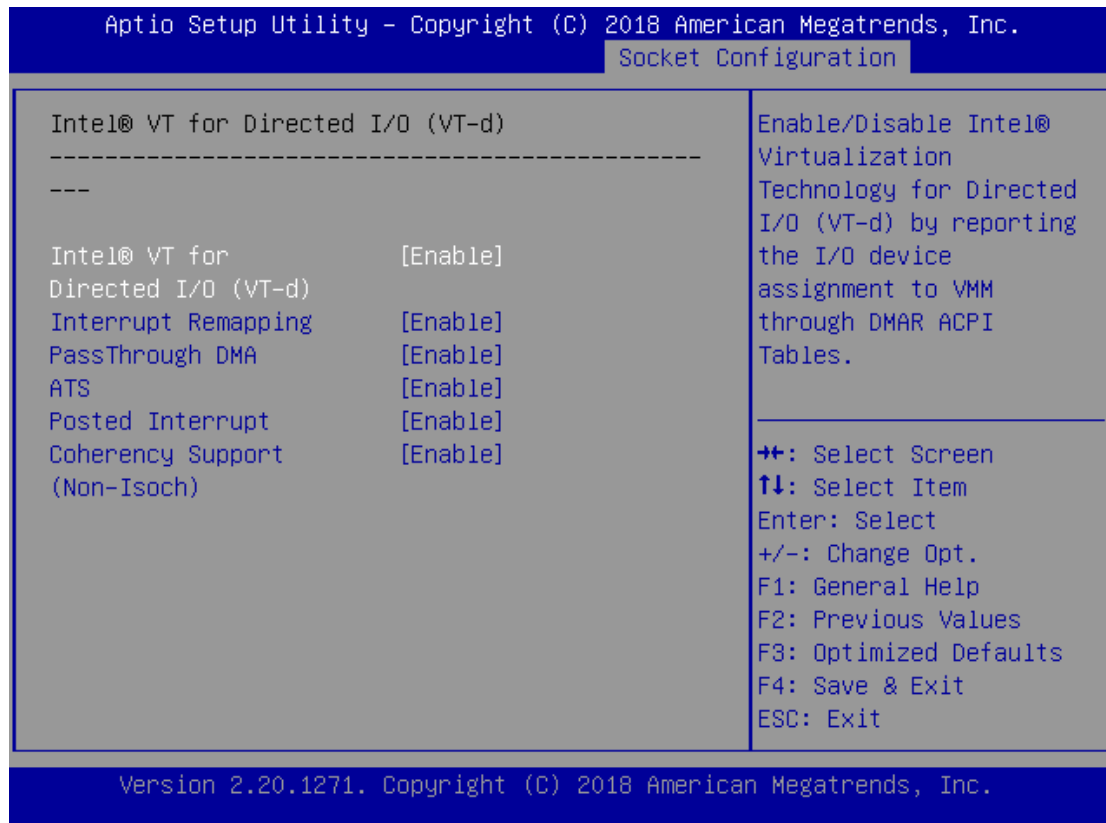
Feature	Options	Description
Intel® VT for Directed I/O (VT-d)	Disabled Enabled	Press **<Enter>** to bring up the Intel? VT for Directed I/O (VT-d) Configuration menu.
Interrupt Remapping	Disabled Enabled	Enable/Disable VT_D Interrupt Remapping Support
PassThrough DMA	Disabled Enabled	Enable/Disable Non-Isoch VT_D Engine Pass Through DMA support
ATS	Disabled Enabled	Enable/Disable Non-Isoch VT_D Engine ATS support
Posted Interrupt	Disabled Enabled	Enable/Disable VT_D posted interrupt
Coherency Support (Non-Isoch)	Disabled Enabled	Enable/Disable Non-Isoch VT_D Engine Coherency support

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Advanced Power Management Configuration

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                              Socket Configuration

 Advanced Power Management Configuration          P State Control
 ---------------------------------------------    Configuration Sub Menu,
 ---                                              include Turbo, XE and
 ▶ CPU P State Control                            etc.
 ▶ CPU C State Control



                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```

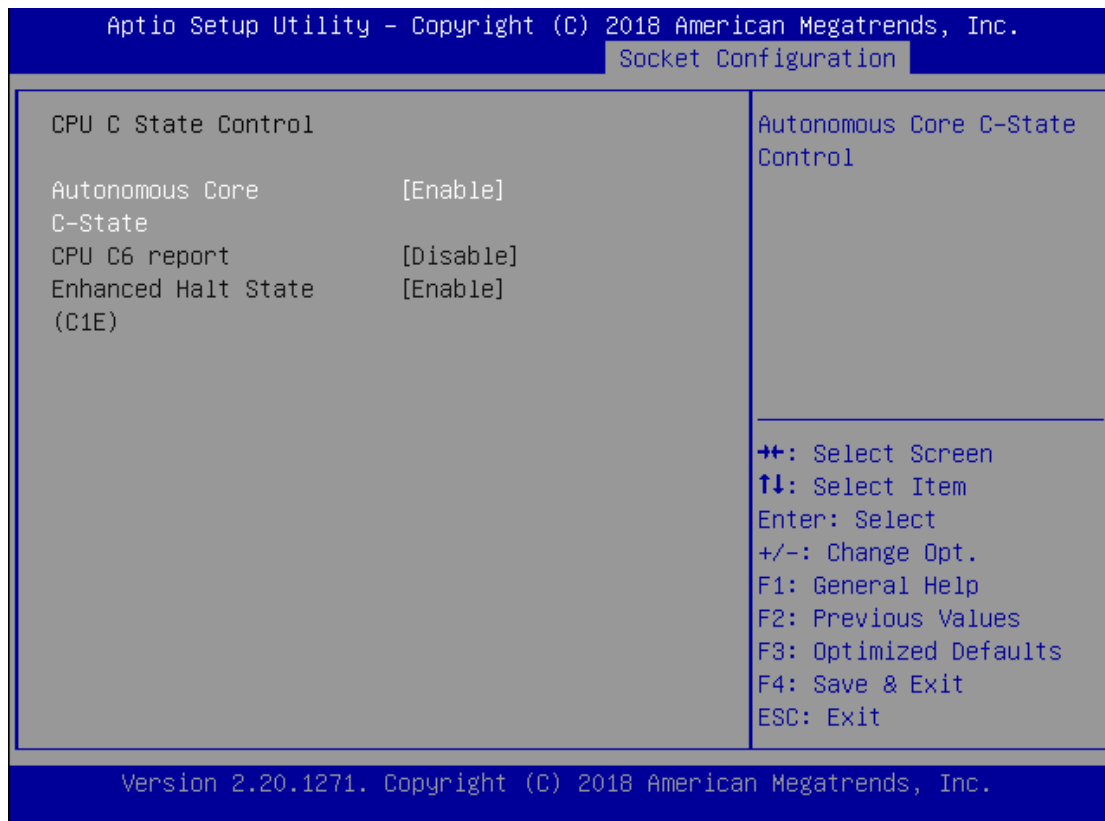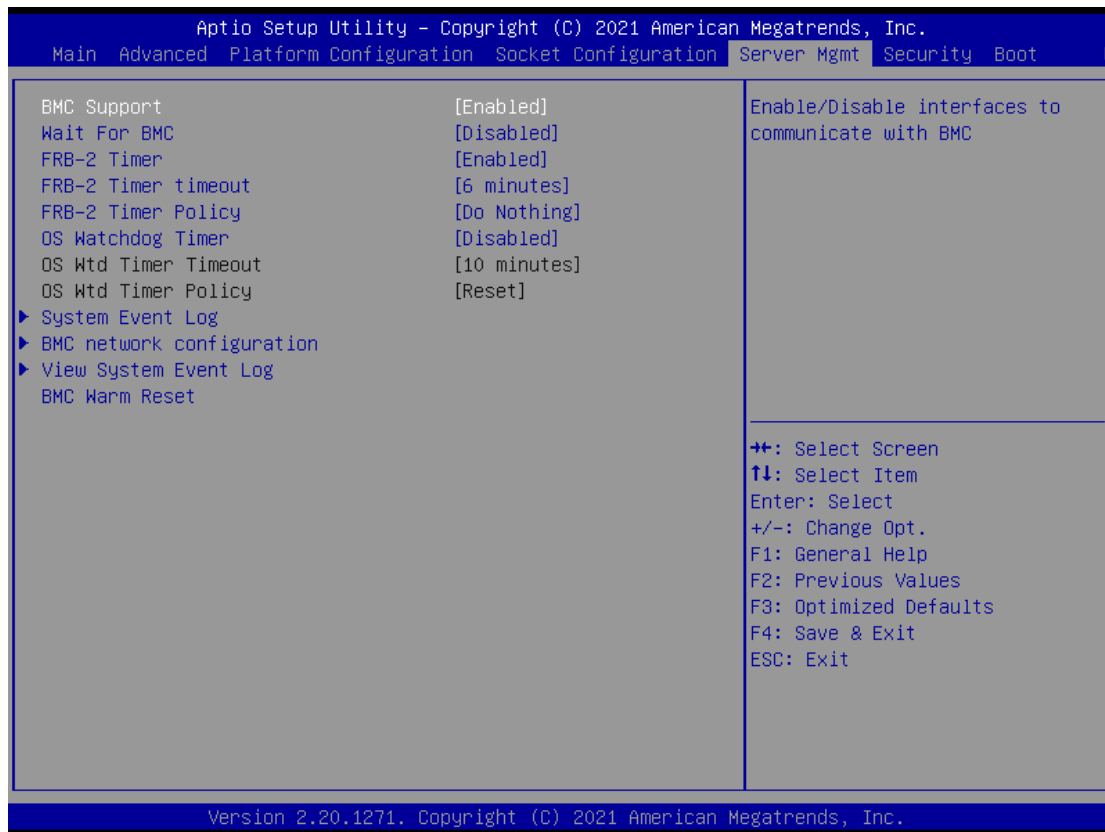| Feature	Options	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU C State setting

CPU P State Control

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
                                       Socket Configuration

CPU P State Control                              Enable/Disable EIST
                                                 (P-States)
SpeedStep (Pstates)        [Enable]
Boot performance mode      [Max Performance]
Energy Efficient Turbo     [Disable]
Turbo Mode                 [Enable]
CPU Flex Ratio             [Disable]
Override
CPU Core Flex Ratio        23

                                                 ++: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit


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```

Feature	Options	Description
SpeedStep (Pstates)	Disabled Enabled	Enables or disables EIST (P-States)
Boot performance mode	Max Performance Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
Energy Efficient Turbo	Disabled Enabled	Energy Efficient Turbo Disable, MSR 0x1FC [19]
Turbo Mode	Disabled Enabled	Enable/Disable processor Turbo Mode (requires EMTTM enabled too).
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable CPU Flex Ratio Programming
CPU Core Flex Ratio	23	Non-Turbo Mode Processor Core Ratio Multiplier

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CPU C State Control

```
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                                        Socket Configuration

 CPU C State Control                          Autonomous Core C-State
                                             Control
 Autonomous Core          [Enable]
 C-State
 CPU C6 report            [Disable]
 Enhanced Halt State      [Enable]
 (C1E)



                                             ↔: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Defaults
                                             F4: Save & Exit
                                             ESC: Exit


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```

Feature	Options	Description
Autonomous Core C-State	Disabled / Enabled	Autonomous Core C-State Control
CPU C6 report	Disabled / Enabled	Enables or disables CPU C6 (ACPI C3) report to OS
Enhanced Halt State (C1E)	Disabled / Enabled	Core C1E auto promotion Control. Takes effect after reboot.

Server Mgmt

Feature	Options	Description
BMC Support	Enabled Disabled	Enable or disables interfaces to communicate with BMC.
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enabled Disabled	Enables or disables FRB-2 timer (POST timer).
FRB-2 Timer timeout	3 minutes 4 minutes 5 minutes 6 minutes	Enter value Between 3 to 6 min for FRB-2 Timer Expiration value.
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	Enabled Disabled	If enabled, it starts a BIOS timer which can only be shut off by Management Software after the OS loads. It also helps verify that the OS is

		successfully loaded or follows the OS Boot Watchdog Timer policy.
OS Wtd Timer Timeout	5 minutes 10 minutes 15 minutes 20 minutes	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
System Event Log	NA	Press **<Enter>** to change the SEL event log configuration.
BMC network configuration	NA	Configure BMC network parameters.
View System Event Log	NA	Press **<Enter>** to view the System Event Log Records.
BMC Warm Reset	NA	Press **<Enter>** to do Warm Reset BMC.
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.

System Event Log

```
                 Aptio Setup – American Megatrends International, LLC.
                                                   Server Mgmt

  Enabling/Disabling Options                        Change this to enable or
  SEL Components                 [Enabled]           disable event logging for
                                                    error/progress codes during
  Erasing Settings                                  boot.
  Erase SEL                      [No]
  When SEL is Full               [Do Nothing]

  NOTE: All values changed here do not take
        effect until computer is restarted.




                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```

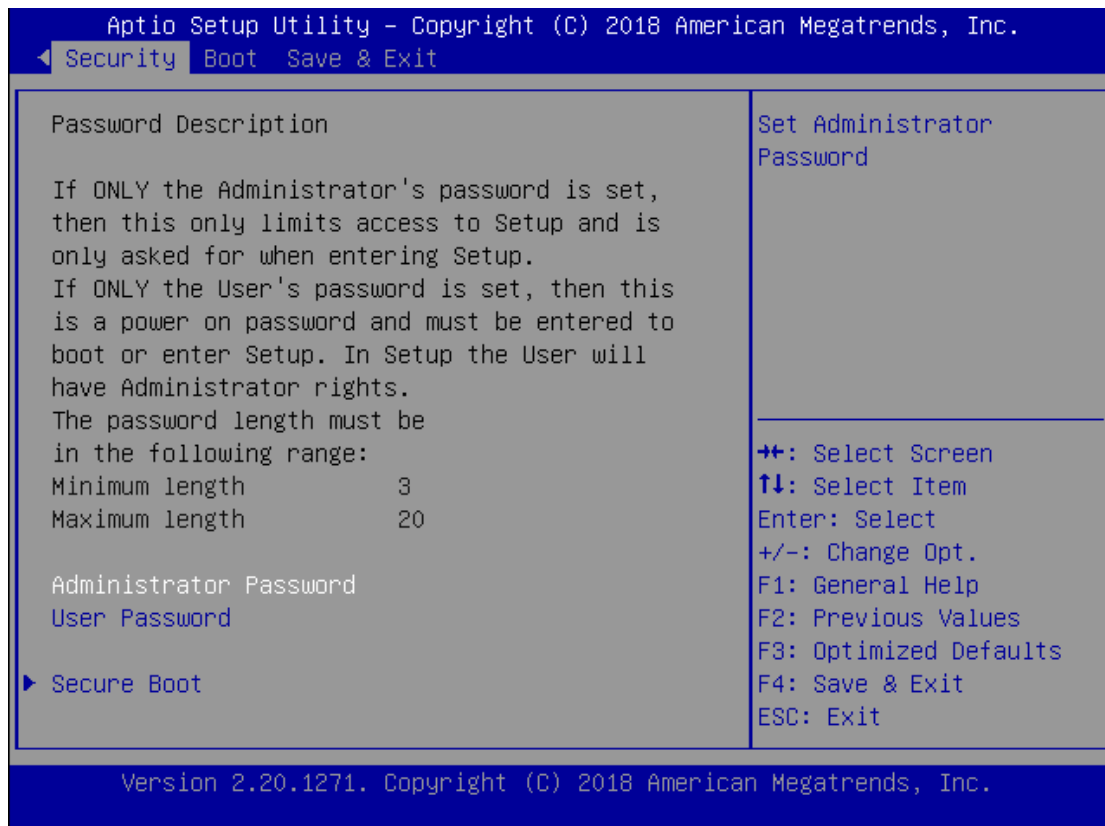| Feature	Options	Description
SEL Components	Disabled Enabled	Enables or disables all features of System Event Logging during boot.
Erase SEL	NO Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately Delete Oldest Record	Choose options for reactions to a full SEL.

BMC Network Configuration

```
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                                                    Server Mgmt

--BMC network configuration--                  Select to configure LAN
******************                             channel parameters statically
Configure IPV4 support                        or dynamically(by BIOS or
******************                             BMC). Unspecified option will
                                              not modify any BMC network
Lan channel 1                                 parameters during BIOS phase
Configuration Address source   [Unspecified]
Current Configuration Address  StaticAddress
source
Station IP address             192.168.0.100
Subnet mask                    255.255.255.0
Station MAC address            00-90-0b-a5-8c-81
Router IP address              0.0.0.0
Router MAC address             00-00-00-00-00-00  ++: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

          Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

Feature	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). The **unspecified** option will not modify any BMC network parameters during BIOS phase.

View System Event Log

```
            Aptio Setup Utility - Copyright (C) 2021 American Megatrends, Inc.
        Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  Security  Boot

     BMC Support                      [Enabled]                Press <Enter> to view the
     Wait For BMC                     [Disabled]               System Event Log Records.
     FRB-2 Timer                      [Enabled]
     FRB-2 Timer timeout              [6 minutes]
     FRB-2 Timer Policy               [Do Nothing]
     OS Watchdog Timer                [Disabled]
     OS Wtd Timer Timeout             [10 minutes]
     OS Wtd Timer Policy              [Reset]
   ▶ System Event Log          ┌──── View System Event Log ─────┐
   ▶ BMC network configuratio  │                                │
   ▶ View System Event Log     │ Retrieving all system events will take
     BMC Warm Reset            │       time. Do you want to continue?
                               │                                │
                               │                                │      ect Screen
                               │    Yes                No       │      ect Item
                               └────────────────────────────────┘      Select
                                                                      ange Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit



            Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

Security

Select the Security menu item from the BIOS setup screen to enter the Security Setup screen. Users can select any of the items in the left frame of the screen.
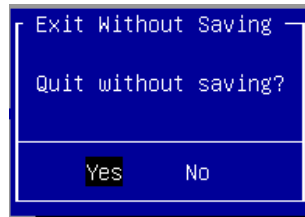
```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
 ◀ Security  Boot  Save & Exit

   Password Description                          Set Administrator
                                                 Password
   If ONLY the Administrator's password is set,
   then this only limits access to Setup and is
   only asked for when entering Setup.
   If ONLY the User's password is set, then this
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will
   have Administrator rights.
   The password length must be
   in the following range:                      →←: Select Screen
   Minimum length        3                      ↑↓: Select Item
   Maximum length        20                     Enter: Select
                                                 +/-: Change Opt.
   Administrator Password                        F1: General Help
   User Password                                 F2: Previous Values
                                                 F3: Optimized Defaults
 ▶ Secure Boot                                   F4: Save & Exit
                                                 ESC: Exit

        Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Description
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.

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Secure Boot

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
 Security

 System Mode            Setup                    Secure Boot feature is
                                                 Active if Secure Boot
 Secure Boot            [Disabled]               is Enabled,
                        Not Active               Platform Key(PK) is
                                                 enrolled and the System
 Secure Boot Mode       [Custom]                 is in User mode.
 ▶ Restore Factory Keys                          The mode change
 ▶ Reset To Setup Mode                           requires platform reset

 ▶ Key Management
                                                 ─────────────────────────
                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

         Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

Feature	Options	Description
Secure Boot Enable	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

Key Management

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Security

  Vendor Keys              Valid                      ▲ Install factory default
                                                        Secure Boot keys after
  Factory Key Provision    [Disabled]                   the platform reset and
▶ Restore Factory Keys                                  while the System is in
▶ Reset To Setup Mode                                   Setup mode
▶ Export Secure Boot variables
▶ Enroll Efi Image

  Device Guard Ready
▶ Remove 'UEFI CA' from DB                             ────────────────────
▶ Restore DB defaults                                  ↔: Select Screen
                                                       ↑↓: Select Item
  Secure Boot variable | Size| Keys| Key Source       Enter: Select
▶ Platform Key(PK)      |    0|    0| No Keys          +/-: Change Opt.
▶ Key Exchange Keys     |    0|    0| No Keys          F1: General Help
▶ Authorized Signatures|    0|    0| No Keys          F2: Previous Values
▶ Forbidden  Signatures|    0|    0| No Keys          F3: Optimized Defaults
▶ Authorized TimeStamps|    0|    0| No Keys        ▼ F4: Save & Exit
                                                       ESC: Exit

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```

Feature	Options	Description
Factory Key Provision	Disabled / Enabled	Provision factory default keys on next re-boot only when System in Setup Mode.
Restore Factory keys	None	Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys.
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)

Boot Menu

Select the Boot menu item from the BIOS setup screen to enter the Boot Setup screen. Users can select any of the items in the left frame of the screen.

```
            Aptio Setup Utility – Copyright (C) 2021 American Megatrends, Inc.
     Main  Advanced  Platform Configuration  Socket Configuration  Server Mgmt  Security  Boot       ▶

  Boot Configuration                                      Number of seconds to wait for
  Setup Prompt Timeout              5                     setup activation key.
  Bootup NumLock State              [On]                  65535(0xFFFF) means indefinite
  Quiet Boot                        [Disabled]            waiting.
  Optimized Boot                    [Disabled]

  Boot mode select                  [LEGACY]

  FIXED BOOT ORDER Priorities
  Boot Option #1                    [Hard Disk]
  Boot Option #2                    [USB Device:LNR
                                    Virtual CDROM0 1.00]
  Boot Option #3                    [CD/DVD]
  Boot Option #4                    [Network]            →←: Select Screen
                                                         ↑↓: Select Item
  ▶ USB Drive BBS Priorities                             Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit




            Version 2.20.1271. Copyright (C) 2021 American Megatrends, Inc.
```

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
Optimized Boot	Disabled Enabled	Enables or disables Optimized Boot. Enabling Optimized Boot will disable Csm support ad disable connecting Network devices to decrease boot time. While disabling Optimized Boot, make sure to restore Csm Support option to previous value before enabling Optimized Boot.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL	Select boot mode for LEGACY or UEFI.

- Choose boot priority from boot option group.
- Choose specifies boot device priority sequence from available Group device.

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Save and Exit Menu

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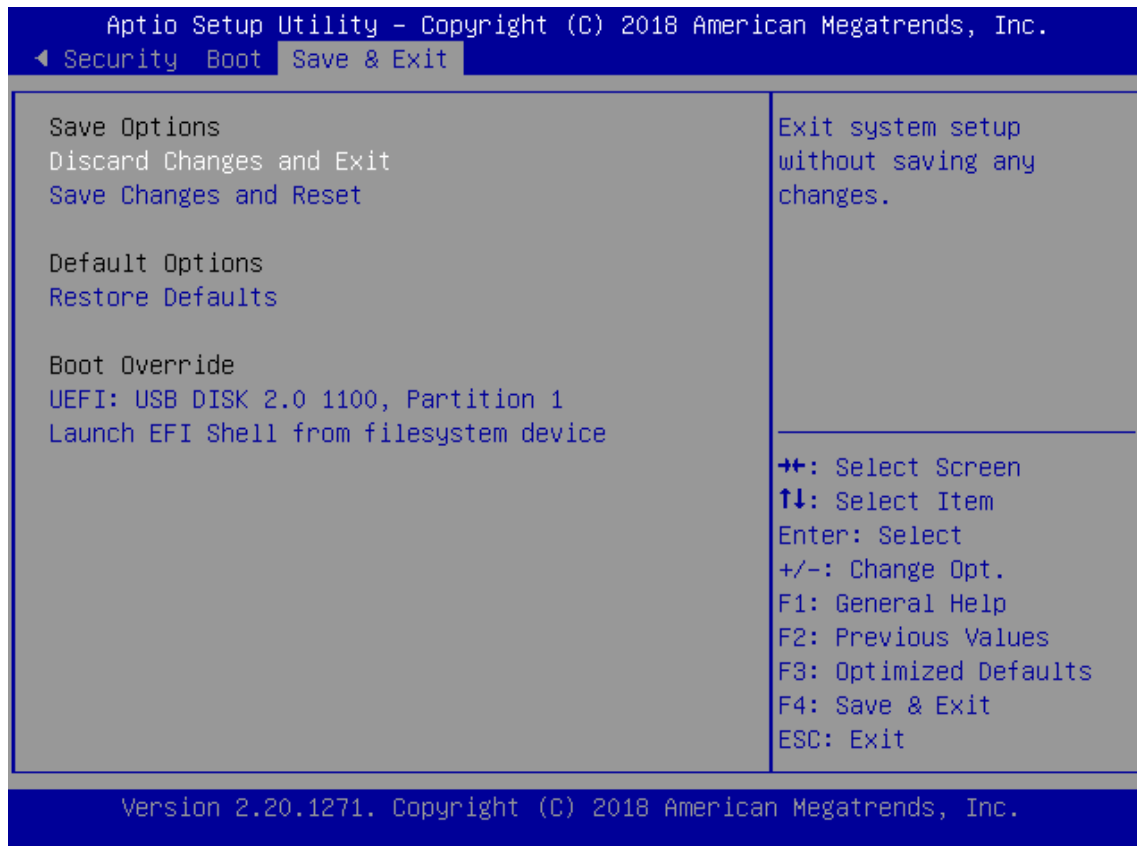
■ **Save Changes and Reset**

When Users have completed the system configuration changes, select this option to save the changes and exit 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 Exit**" option is selected. Select "**Yes**" to Save Changes and Exit Setup.
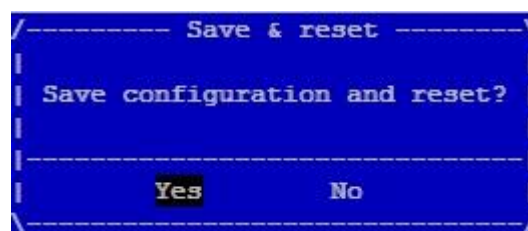
■ **Discard Changes and Exit**

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.

```
┌─ Exit Without Saving ─┐
│                       │
│  Quit without saving? │
│                       │
├───────────────────────┤
│       Yes      No     │
│                       │
└───────────────────────┘
```

■ **Restore Defaults**

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

```
┌─ Load Optimized Defaults ─┐
│                           │
│  Load Optimized Defaults? │
│                           │
├───────────────────────────┤
│        Yes      No        │
│                           │
└───────────────────────────┘
```
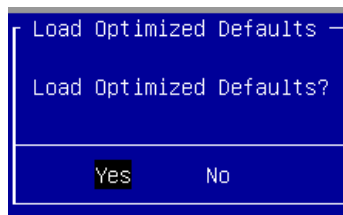
📝Note
The items under Boot Override may not have the same image. It would depend on devices connected on system.

APPENDIX A: LED INDICATOR EXPLANATIONS

▶ **System Power / Status / HDD Activity**

Green: Power
Green/Amber: Status
Amber: HDD

LED	COLOR ON LCM	COLOR ON BOARD	LED ACTION	DESCRIPTION
POWER	**Green**	**Green**	Steady	When system power on
	Off	Off	N/A	No power on
STATUS	**Green**	**Green**	Steady	control by GPIO
	Amber	**Red**	Steady	control by GPIO
	Off	Off	N/A	control by GPIO (Default) or No power on
HDD	**Amber**	**Amber**	**Blinking**	Blinking indicates HDD activity Include SATA / NVME
	Off	Off	N/A	No data access or No power on

▶ **RJ-45 LAN LED**

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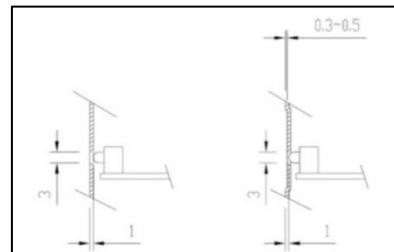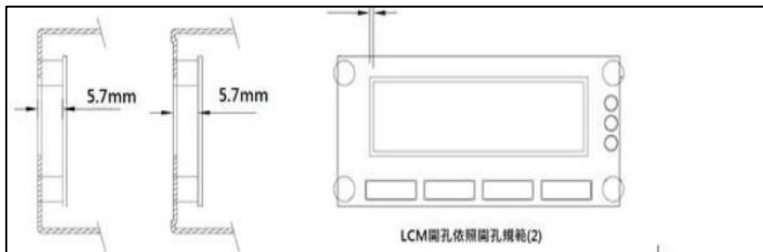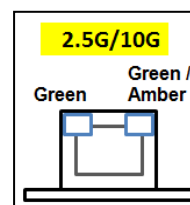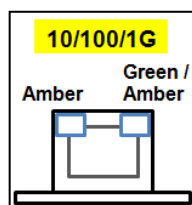
1Gb RJ-45 Define:

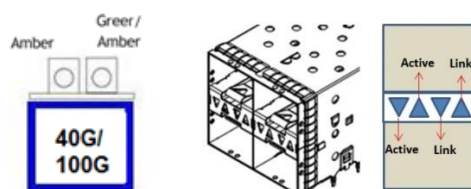| Speed	Amber (Active)	Green/Amber (Link)
10M	Blinking / Data access	OFF
100M	Blinking / Data access	ON (Green)
1G	Blinking / Data access	ON (Amber)
1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined. 2. Without the Cable plug-in, the LED should be off 3. If LAN Driver controls the LED, the behavior will follow the driver		

2.5Gb RJ-45 Define:

Speed	Green (Active)	Green/Amber (Link)
10/100M	Blinking / Data access	OFF
1G	Blinking / Data access	ON (Amber)
2.5G	Blinking / Data access	ON (Green)
1. When cable is plug-in and network is linked. Both LED lights will be bright. The behavior is as defined. 2. Without the Cable plug-in, the LED should be off 3. If LAN Driver controls the LED, the behavior will follow the driver		

10Gb RJ-45 Define:

| Speed	Green (Active)	Green/Amber (Link)
10/100M	Blinking / Data access	OFF
1G	Blinking / Data access	ON (Amber)
10G	Blinking / Data access	ON (Green)
1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined. 2. Without the Cable plug-in, the LED should be off 3. If LAN Driver controls the LED, the behavior will follow the driver		
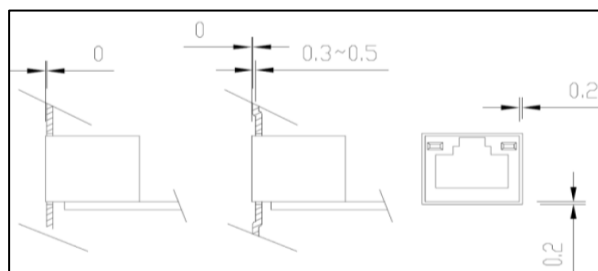
LAN Sequence Define:

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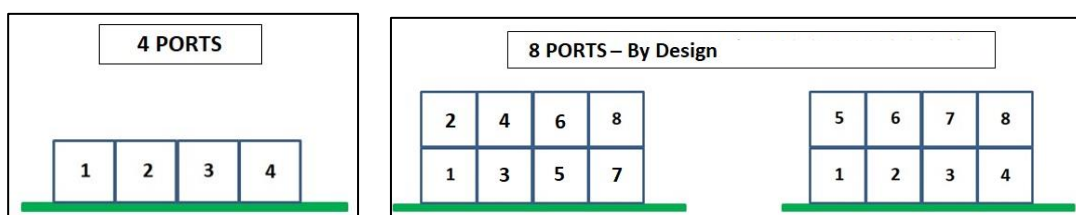
▶ **Fiber LAN LED – SFP, SFP+, SFP28, QSFP+, QSFP28**

Fiber LED: RX or TX cable status (By Project)

On board LED:
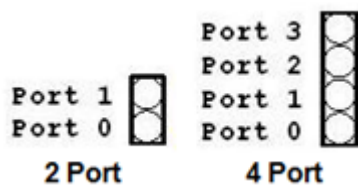
Status	SFP 1G (Amber)	SFP+ 10G (Green)
Link	ON (Amber)	ON (Green)
Active	Blinking / Data access	Blinking / Data access
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off.

3. If LAN Driver controls the LED, the behavior will follow the driver.

(1Gb) SFP Light pipe LED (top location)

Speed	Amber (Active)	Amber / Green (Link)
1G	Blinking / Data access	ON (Amber)
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off.

3. If LAN Driver controls the LED, the behavior will follow the driver.

(10Gb) SFP+ Light pipe LED (top location)
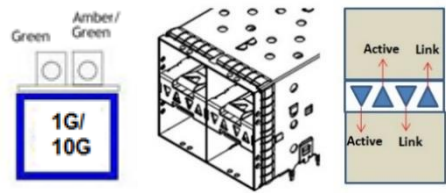
Speed	Amber (Active)	Amber / Green (Link)
1G	Blinking / Data access	ON (Amber)
10G	Blinking / Steady	ON (Green)
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

(10Gb) SFP+ Light pipe LED (when GPIO insufficient)
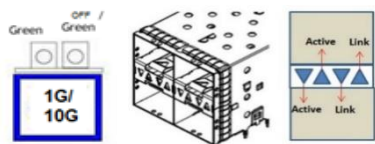
Speed	Green (Active)	Green (Link)
1G	Blinking / Data access	OFF
10G	Blinking / Data access	ON (Green)
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

(25Gb) SFP28 Light pipe LED (top location)
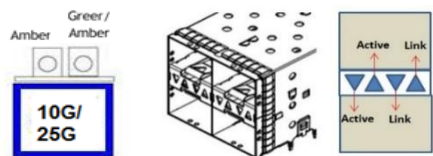
Speed	Green (Active)	Amber / Green (Link)
10G	Blinking / Data access	ON (Green)

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

(40Gb) QSFP+ Light pipe LED (top location)
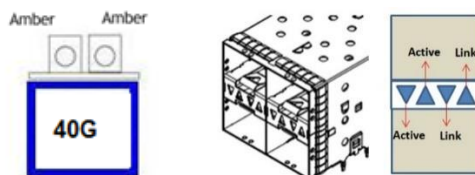
Speed	Amber (Active)	Amber (Link)
40G	Blinking / Data access	ON (**Amber**)
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

(100Gb) QSFP28 Light pipe LED (top location)

Speed	Green (Active)	Amber / Green (Link)
40G	Blinking / Data access	ON (**Green**)
100G	Blinking / Data access	ON (**Amber**)
Non-Link	OFF	OFF

1. When cable is plug-in and network is linked. Both LED will be bright. The behavior is as defined.

2. Without the Cable plug-in, the LED should be off

3. If LAN Driver controls the LED, the behavior will follow the driver

▶ **LAN Bypass LED Define and Default Configuration**

Define Bypass LED

1 LED per pair, reserve on board 1x2 pin header per port.

(Standard device does NOT include the LED as default)

(**I**f Standard device require LED, when Bypass is Enable, the LED will be **Green**)

Bypass 1
Bypass 0   Green
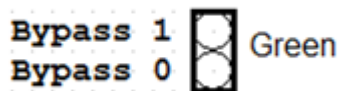
Bypass Default Configuration:

Item	Power ON	Run Time	Power OFF
Bypass (Default)	Disable	Disable	Enable
Remove the Power Cord	Return to default state		
System Reboot	Maintain current conditions & status		

APPENDIX B: DUAL BIOS INTRODUCTION

Why Dual BIOS?

Failure of booting up BIOS is not uncommon to most experienced users, yet it can be the worst nightmare. This occurs mostly during a power failure or a mishandled BIOS update, after a malware's attack that corrupted the data on the chip, or, at worst, due to physical damage that caused the BIOS not to function. When it happens, not merely will the recovering procedures consume considerable time and effort, but all you work might also be to no avail. Eventually, you are left with no choice but to ship the board back to the manufacturer.

Lanner understands this pain and has empowered our products with the Dual BIOS feature. Normally, the Primary BIOS is used to boot the OS during powering up; when Primary BIOS is down, the Recovery BIOS automatically jumps in to boot up the OS for the User to take further steps such as performing data backup and BIOS upgrade.

Primary BIOS is used to boot the OS during powering up.

When Primary BIOS is down, **Recovery BIOS** will automatically kicks in.
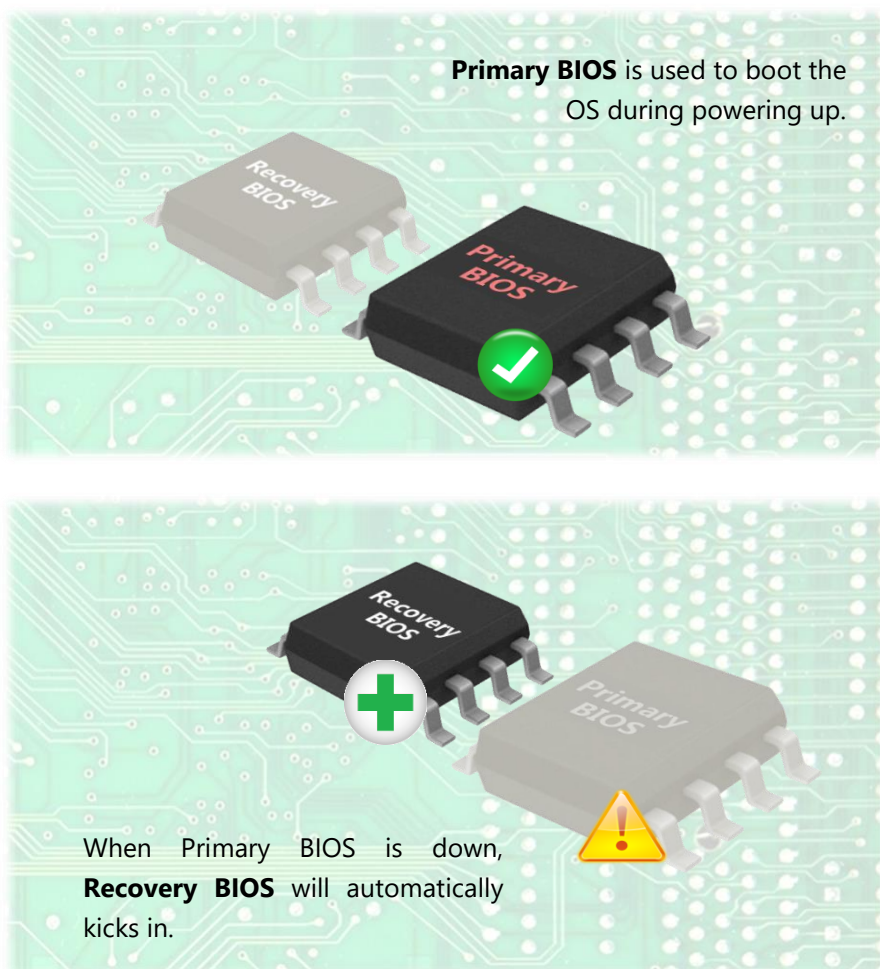
Addressing BIOS Start-up Failure with Dual BIOS

Few things can shut down a computer as completely as a corrupted BIOS. With Dual BIOS feature, you will be guaranteed to enter a healthy OS to perform thorough troubleshooting before the situation is irreparable.

How Dual BIOS Works

Dual BIOS features two physical BIOS ROMs soldered onto the motherboard, carrying two separate BIOS images. If the Primary BIOS (default) is not functioning correctly and fails to respond within seconds (~25 seconds to 2 minutes, depend upon appliance), the system will invoke a bootup from the Secondary BIOS, automatically restarting the system and launch the operating system.
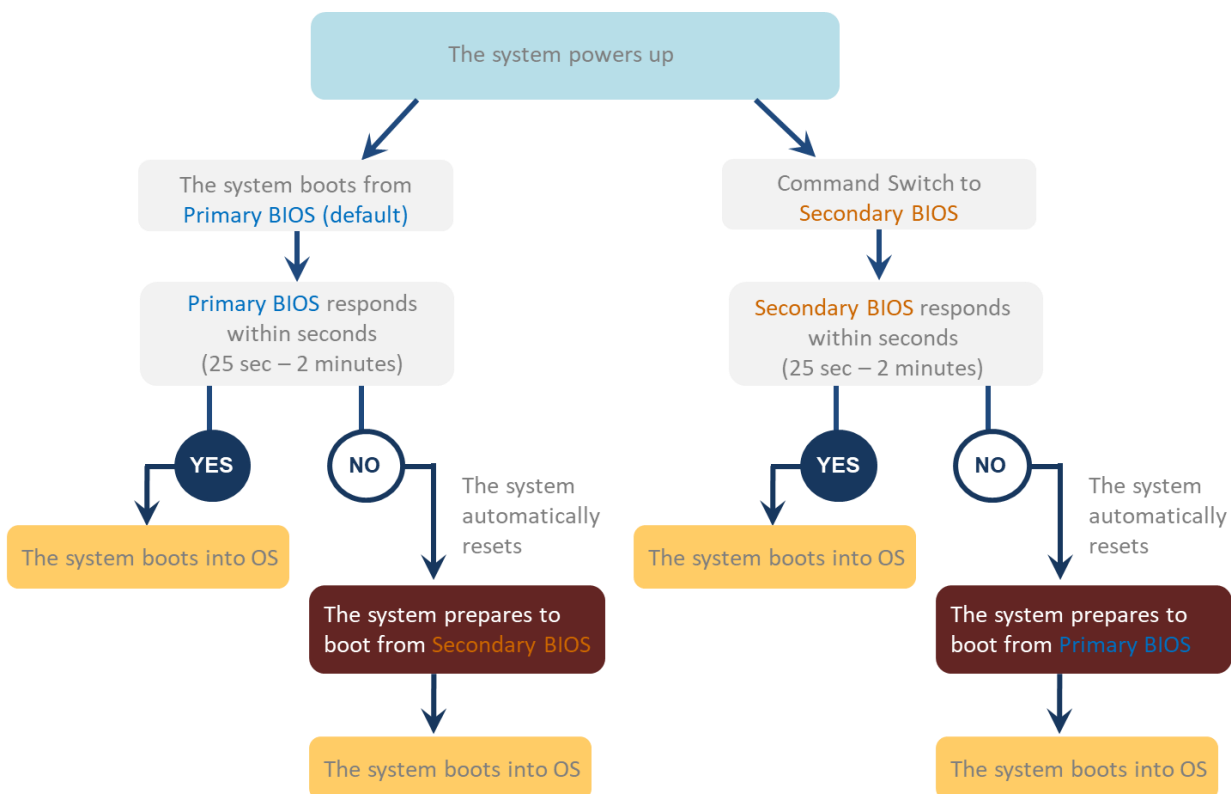
2nd Gen Dual BIOS

To provide increased flexibility and usage protection, Lanner has released the 2nd Gen Dual BIOS function on Lanner appliances. With 2nd Gen Dual BIOS, both the primary BIOS and secondary BIOS can be updated and flashed using the BIOS Tool to run different versions of BIOS ROMS independently for maximum compatibility. This additionally allow users to switch BIOS ROMS for booting up, toggling between primary BIOS and secondary BIOS.

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	Gen1 Dual BIOS	Gen 2 Dual BIOS
Function	**Master/Slaver** 2ND BIOS for recovery purpose	**Peer to Peer** Both BIOS can let the system work
Detection Time	7 min	Seconds (By platform design)
2nd BIOS updated	Only using the SPI facility	By BIOS tool command or SPI facility
MAC/DMI	Only for BIOS1	For both BIOS
CPLD Interface	GPIO	LPC or eSPI (By Platform)

The system booted from Secondary BIOS, what's next?

If the system switched to Secondary BIOS to boot up, it can be asserted that the Primary BIOS is having a severe problem that it failed to function. Before users determine that the BIOS chip is completely corrupted and unusable, it would be advisable to try to update the Primary BIOS.

Get Ready for BIOS Update

Flashing a BIOS needs to be carefully completed, especially pertaining to a corrupted BIOS, which can lead to an unusable system if done incorrectly. To get ready for a BIOS update, acquire the following BIOS resources from Lanner technical support:

- Firmware and Flash Tool
- BIOS Engineering Spec

Before you start, make sure you select the correct firmware version, correct BIOS (Primary or Secondary) and go through the instructions for BIOS update in *BIOS Engineering Spec* thoroughly. If you cannot be certain if this version is correct for your system, please contact Lanner Technical Support.

Note:

1. When the system enters the BIOS menu, BIOS will disable the watchdog function. In another words, even over the set time limit in the BIOS menu, the system will not reboot automatically.
2. Dual BIOS feature cannot work with the BIOS BOOT Guard function.
3. To update and reflash BIOS, it is mandatory that both BIOS will need to be updated. This action is to avoid ME code variations on both of the BIOS, which can lead to unexpected risks and errors.

Disclaimer
Under no circumstances will Lanner accept responsibility or liability for damages of any kind whatsoever resulting or arising directly or indirectly from a BIOS update.

⚠️ **Warning**
DO NOT power off or reset the system during BIOS updating process.

APPENDIX C: REDUNDANT POWER MODULE BEHAVIOR

Define Alarm and Mute behavior

	Power Module Fail	Power Module Remove	Power Cord Remove
Buzzer	Alarm	Alarm	Alarm
Mute	Change back the Good PSU Module or Press the Mute Button	Put back the PSU Module or Press the Mute Button	Plug-in the Power cord or Press the Mute Button

Define the Sequence of the Power Module

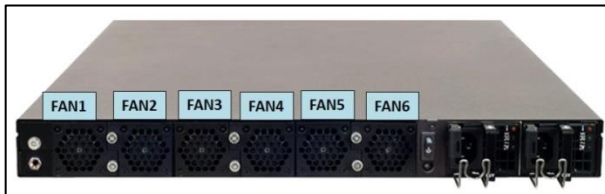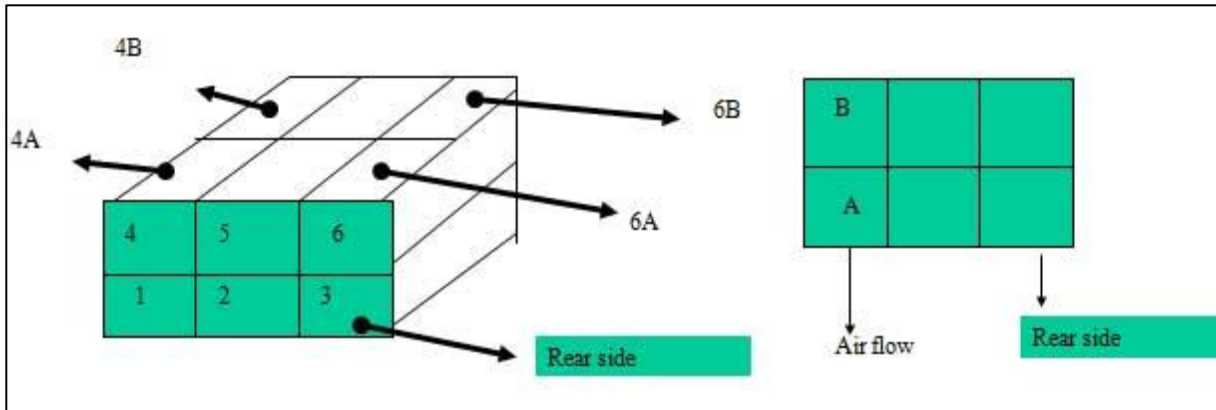PSU Sequence – The detection is from the left to the right side, from the bottom to the top.

Example:

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APPENDIX D: FAN SEQUENCE

Define the Sequence of the Fan

Fan Sequence – The detection is from the left to the right side, from the bottom to the top side.

Example:

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APPENDIX E: SMART POWER AND RESET BUTTON

Smart Power and Reset Button – Control by CPLD

www.lannerinc.com
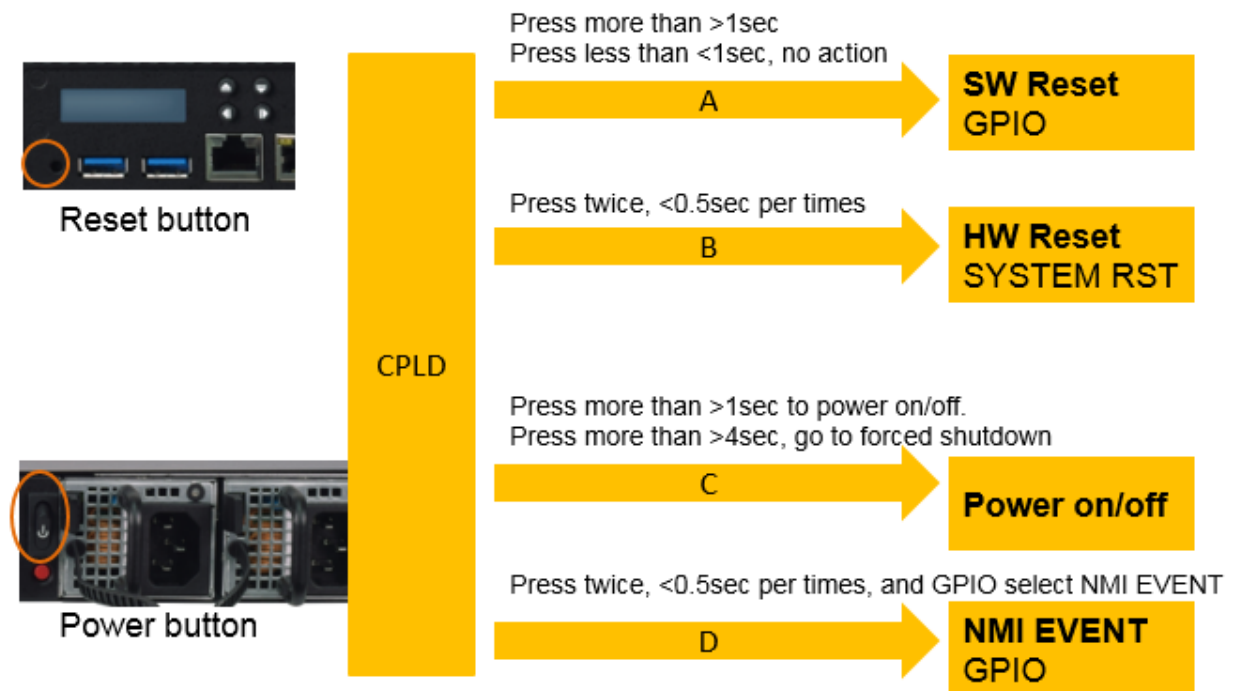
APPENDIX F: ESD/SURGE ENHANCEMENT

Electrostatic Discharge (ESD): IEC-61000-4-2	Contact discharge	Air discharge	STD
Level 1	±2 kV	±2 kV	
Level 2	±4 kV	±4 kV	**4K Contact (Default)**
Level 3	±6 kV	±8 kV	**8K Air (Default)**
Level 4 (By Requirement)	±8 kV	±15 kV	

Surge Immunity (LAN) IEC-61000-4-5	Test Level		STD
Level 0	25V		
Level 1	500V		
Level 2	1kV		**V (Default for Power CM (L+PE,N+PE), LAN)**
Level 3	2kV		**V (Default for Power DM (L+N)**
Level 4	4kV		

Electrical Fast Transient (EFT): IEC-61000-4-4			STD
Level 1	0.5kV		**V (Default for LAN)**
Level 2	1kV		**V (Default for Power)**
Level 3	2kV		
Level 4	4kV		

APPENDIX G: 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 R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
	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**