Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-5710
User Manual

Version: 2.1

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About this Document

This manual describes the overview of the various functionalities of this product, and the information you need to get it ready for operation. It is intended for those who are:
- responsible for installing, administering and troubleshooting this system or Information Technology professionals.
- assumed to be qualified in the servicing of computer equipment, such as professional system integrators, or service personnel and technicians.

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

Icon Description

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

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.

Technical Support

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.

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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.

Avertissement concernant la pile au lithium

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

Operating Safety

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

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

Sécurité de fonctionnement

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

Mounting Installation 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.
- 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).

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

- ▶ Loosen the screw of the earthing point.
- ▶ 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.
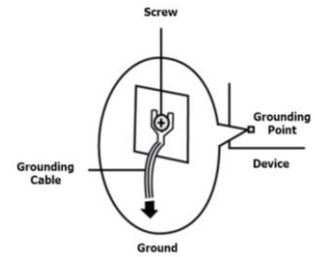
Procédure de mise à la terre pour source d'alimentation CC

- ▶ Desserrez la vis du terminal de mise à la terre.
- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.
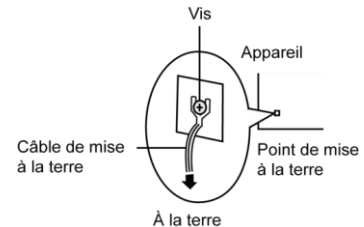
CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.
注意：要断开电源，请将所有电源线从本机上拔下。
WARNUNG: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.
ATTENTION: DÉBRANCHER LES TOUT CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

- ▶ 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 has installation instructions by a skilled person (for Fan side).
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

Thank you for choosing NCA-5710. The NCA-5710, powered by 2nd gen Intel® Xeon® Processor Scalable Family and Intel® C627 or C621 chipset, features optimized computing power and virtualization capacity in a compact 1U form factor with dual LGA3647 CPU sockets, 4x NIC module slots and up to 768GB DDR4 system memory. It delivers a multitude of advanced networking features for maximizing packet processing efficiency and cryptography acceleration.

Package Content

Your package contains the following items:

▶ 1x NCA-5710 Network Security Platform

▶ 2x Power Cable

▶ 1x Short Ear Rack Mount Kit with screws

▶ 1x Console Cable

▶ 1x LAN Cable (Grey)

Optional Accessories

Model No.	Description
850W DC PSU	850W DC Power Module
IAC-TPM01C	TPM 2.0 module
RC-5710A	Riser Card Kit for the rear slot (by Project)
NCS2-LCM5710A	LCM module for NCS2 (by ODM/OEM)
098W000300014	Slide Rail Kit, Chassis Width: 438mm; Load: 27kg (packaged with system)

Ordering Information

SKU No.	Main Features
NCA-5710A	2x Skylake SP/Cascade Lake SP (165W) C621, 4x RJ45 MGMT, 4x NIC Module Slots, Redundant PSUs
NCA-5710B	2x Skylake SP/Cascade Lake SP (165W) C621, 4x RJ45 MGMT + BMC, 4x NIC Module Slots, Redundant PSUs
NCA-5710C	2x Skylake SP /Cascade Lake SP (165W) C627, 4x 10G SFP+ with LED + BMC, 4x NIC Module Slots, Redundant PSUs

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	2nd Gen Intel® Xeon® Processor Scalable Family (Skylake-SP/Cascade Lake-SP)
	CPU Socket	2x LGA3647
	Chipset	Intel® C621/627
	Security Acceleration	Intel® QuickAssist Technology (By SKU)
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 2933/2666/2400/2133 MHz REG DIMM (By CPU)
	Max. Capacity	768GB
	Socket	12x 288-pin DIMM
Networking	Ethernet Ports	4x GbE RJ45 or 4x 10G SFP+ Lewisburg Internal MAC (By SKU)
	Bypass	Depends on NIC module specifications
	NIC Module Slot	4
LOM	IO Interface	1x RJ45 (Optional)
	OPMA slot	IPMI Onboard (SKU B & C)
I/O Interface	Reset Button	1x Reset Button
	LED Indicator	Power/Status/Storage LED Indicator
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45, 1x mini USB
	USB Port	2x USB 3.0 Port
	LCD Module	N/A (Optional)
	Display Port	1x VGA Port (Internal Pin Header)
	Power input	AC Power Inlet on PSU
Storage	HDD/SSD Support	2x 2.5" Internal Bays
	Onboard Slots	1x M.2 2242 B-Key
Expansion	PCIe	1x Hot-swappable PCI-E*16 FH/HL (Optional)
	mini-PCIe	N/A
	SIM card Slot	N/A
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes (Optional)
Cooling	Processor	Passive CPU Heatsink
	System	6x Individual Hot-swappable Cooling Smart Fans
Environmental Parameters	Temperature	0~40ºC Operating -20~70ºC Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	438mm x 650mm x 44mm
	Weight	19kg
Package Dimensions	(WxDxH)	841mm x 588mm x 215mm
	Weight	26kg
Power	Type/Watts	850W 1+1 ATX Redundant PSUs
	Input	AC 100~240V @47~63 Hz
Approvals and Compliance		CE/FCC Class A, UL, RoHS

Front Panel

No.		Description
F1	Reset Button	For hardware /software reset, default is software reset. The setting is configurable by changing the JRST1 jumper on motherboard.
F2	LED Indicators	System Power System Status HDD Activity
F3	Console Port	1x RJ45 console port
F4	USB Ports	2x USB 3.0 port
F5	RJ45/SFP+ Ports	4x RJ45 port with LED or 4x 10G SFP+ port (by model)
F6	MGMT/LOM Port	1x RJ45 for MGMT or LOM share port (by model)
F7	Micro USB	1x console port
F8	NCS2 Module	4x STD NIC Module

> **Note**
> Please refer to Appendix A: LED Indicator Explanations for descriptions of the LED Indicators.

Rear Panel

No.		Description
R1	Grounding Stud	1x grounding stud for connecting the grounding wire
R2	ESD Jack	1x ESD Jack
R3	Fans	6 x hot-swappable cooling fans with smart fan
R4	Power Switch	1x Power Button
R5	Alarm Off Button	1x Alarm Off Button to disable the system alarm
R6	Power Supply	2x 850W 1+1 ATX Redundant PSUs

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Motherboard Information

Block Diagram

The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.

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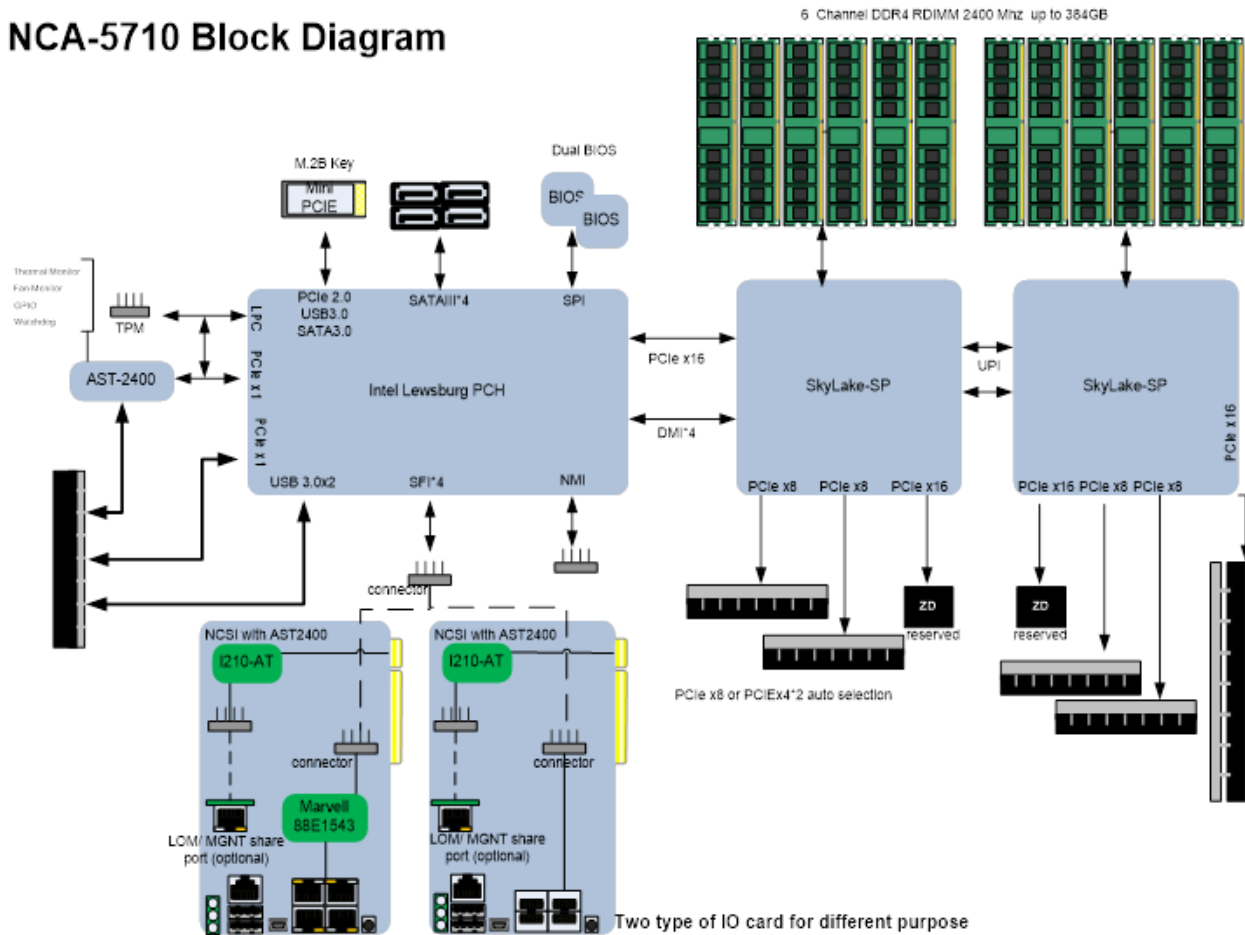
Motherboard Layout

This layout shows the connectors and jumpers on the board, as a reference of the pin assignments and the internal connectors.
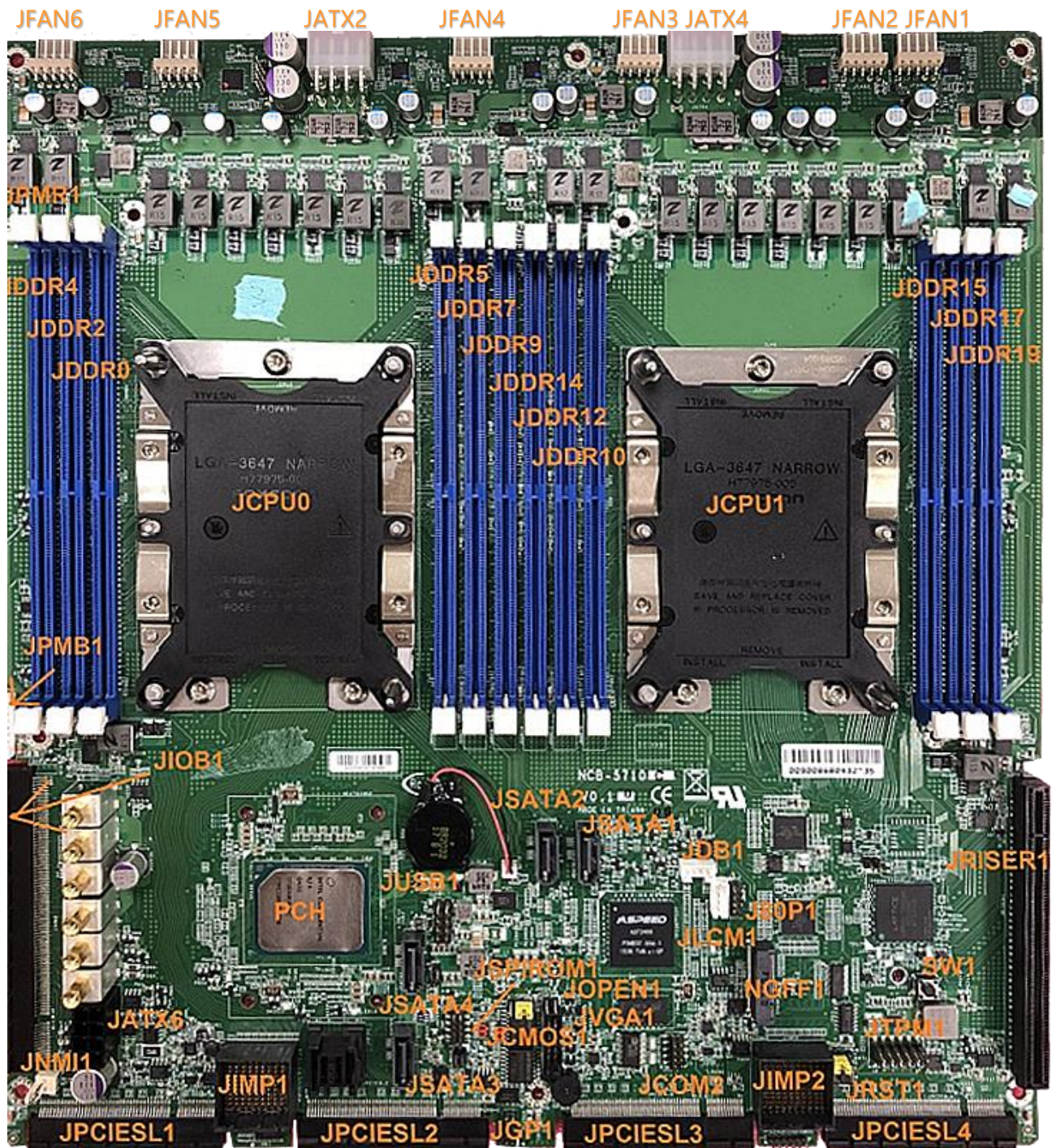
Internal Jumper & Connectors

JUSB1: USB2.0

Pin No.	Description	Pin No.	Description
1	+P5V_USB1	2	+P5V_USB1
3	USB20_L_N3	4	USB20_L_N4
5	USB20_L_P3	6	USB20_L_P4
7	USBGND1	8	USBGND1
9	USBGND1	10	USBGND1
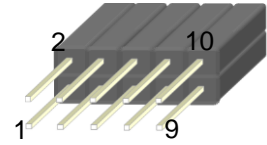
JTPM1

Pin No.	Description	Pin No.	Description
1	IRQ_SERIAL	2	LPC_LFRAME#
3	LPC_LAD0	4	CLK_24M_LPC
5	LPC_LAD1	6	+P3V3_AUX
7	LPC_LAD2	8	
9	LPC_LAD3	10	+P3V3
11	TPM_RST#	12	GND
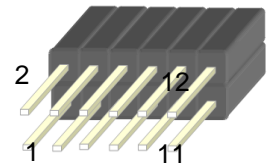
JVGA1

Pin No.	Description	Pin No.	Description
1	DAC_RO	2	GND
3	DAC_GO	4	GND
5	DAC_BO	6	GND
7	HSYNC_O	8	
9	VSYNC_O	10	GND
11	DDC_DATA	12	DDC_CLK
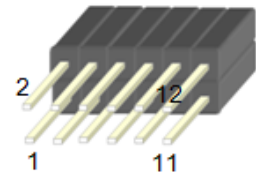
JATX6: 8 Pin Power Connector

Pin No.	Description	Pin No.	Description
1	GND	2	+P5V
3	GND	4	+P5V_SB
5	GND	6	+P12V_STBY_PSU
7	GND	8	+P12V_STBY_PSU
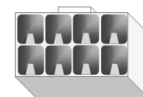
JNMI1

Pin No.	Description	Pin No.	Description
1	GND	2	NMIBTN#

JATX2 & JATX4: 8 pin Power Connector

Pin No.	Description
1	GND
2	GND
3	GND
4	GND
5	+12V
6	+12V
7	+12V
8	+12V
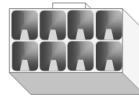
JSATA1~JSATA4: SATA

Pin No.	Description
1	GND
2	TX_P
3	TX_N
4	GND
5	RX_N
6	RX_P
7	GND

JFAN1~6: FAN Connector

Pin No.	Description
1	PWM Status
2	RPM Sense
3	RPM Sense
4	12V
5	Ground

JRST1: Controls the software reset method of the Reset button on front panel.

Pin	Description	Pin	Description
1.2	HW reset	2.3	SW reset (Default)
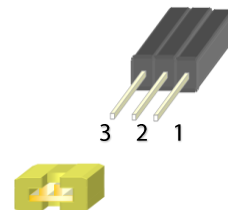
NGFF1: M.2 Connector B Key
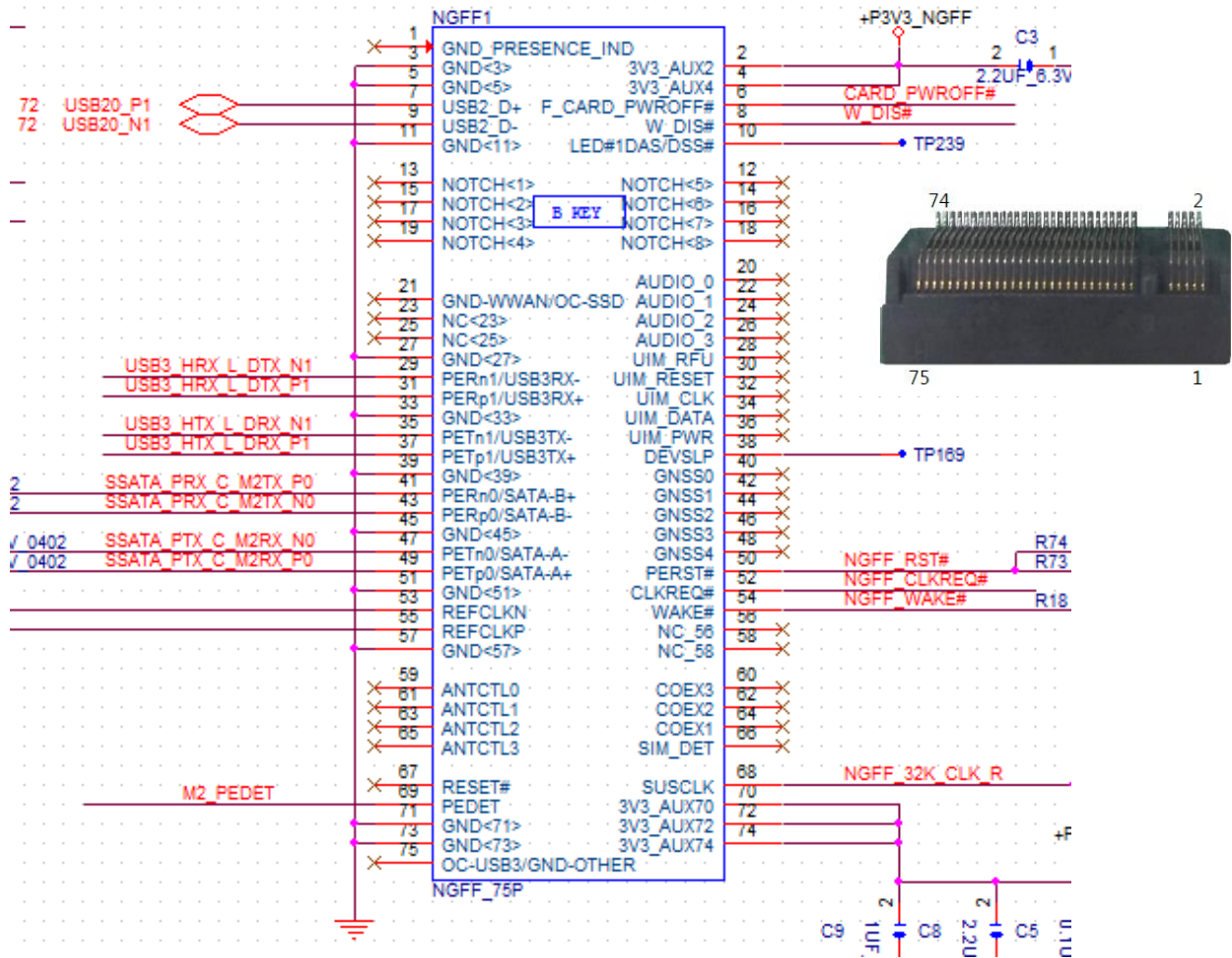
JCOMA2: COM PORT

Pin No.	Description	Pin No.	Description
1	BMC_COM2_DCD#	2	BMC_COM2_DSR#
3	BMC_COM2_RX	4	BMC_COM2_RTS
5	BMC_COM2_TX	6	BMC_COM2_CTS#
7	BMC_COM2_DTR	8	
9	COM2_GND2	10	
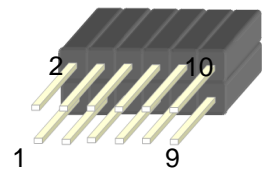
JPMB1: PMBUS

Pin No.	Description	Pin No.	Description
1	PSU_TTL1	2	PSU_TTL2
3	ATX_PSON#	4	GND
5	ATXPWGD	6	PMBUS_CLK
7	PMBUS_DAT	8	PMBUS_ALERT#
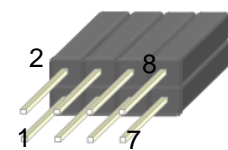
JOPEN1: Case open

Pin No.	Description	Pin No.	Description
1	GND	2	FM_INTRUDER#

JCMOS1: Clear CMOS

Pin No.	Description	Pin No.	Description
1	VRTC	2	PCH_RTCRST#
3	GND		

Pin	Description	Pin	Description
1.2	Normal (Default)	2.3	Clear CMOS
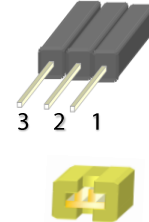
JSPIROM1: Flash BIOS

Pin No.	Description	Pin No.	Description
1	SPI_HD1#	2	SPI_CS1#_DUAL
3	SPI_CS0#_DUAL	4	+P3V3_SPI_ME
5	SPI_MISO	6	SPI_PCH_IO3
7		8	SPI_CLK
9	GND	10	SPI_MOSI
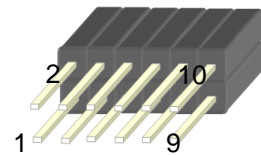
JGP1: EXT GPIO header

Pin No.	Description	Pin No.	Description
1	GPO_B_1	2	GPI_B_1
3	GPO_B_2	4	GPI_B_2
5	GPO_B_3	6	GPI_B_3
7	GPO_B_4	8	GPI_B_4
9	GND	10	GND

JPWR1: Power on

Pin No.	Description	Pin No.	Description
1	GND	2	ATX_PSON#

19
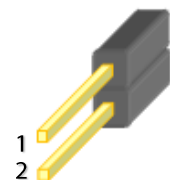
CHAPTER 2: HARDWARE INSTALLATION

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

Installing the CPU

Please note that the system delivered to you is already installed with the processor and that this processor, LGA3647, comes with rather sophisticated design; therefore, the assembly of which must be handled with exclusive tools and extreme care by professionals. It is strongly recommended that you not make any adjustments to, remove or even re-install the processor on your own. If handling the processor on your own is inevitable, please read through the instructions in this section and refer to the official tutorial released by Intel® to make sure you have acquired the necessary knowledge and comply with the requirements.

Installing the processor onto the motherboard involves two stages:

1. Mount the processor onto the heat sink to make a PHM (Processor + Heat Sink Module)
2. Install the PHM onto the motherboard.

Tools Required
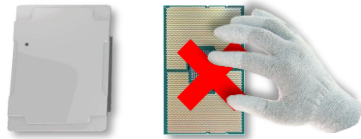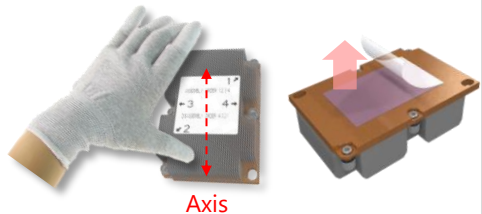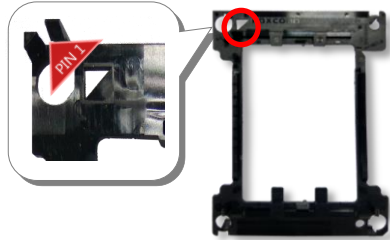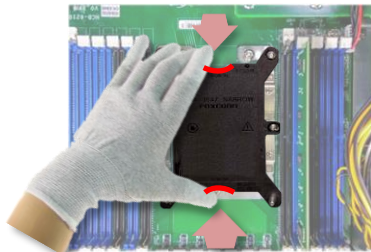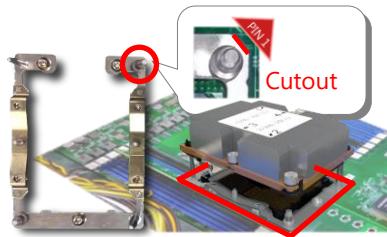
Tool	Description	
Torque screwdriver (Star T30)	Set to 1.36 N.m. or 12 in-lbf for tightening the nuts which fasten the PHM on the bolster plate.	
ESD Protection (ESD gloves, ESD-safe work surface, etc.)	During the entire assembly process, at least wear a pair of ESD gloves to avoid damaging or contaminating the electronic parts while enhancing your own safety.	

> 📝 Note
> The images of tools shown in this document are merely for reference; the actual tools you use might differ.

Parts Explanation

Item	Description	
Processor	Please avoid touching the gold fingers or package lands of the processor even if you are wearing ESD gloves.	
Heat Sink	If a TIM (Thermal Interface Material) protective film is already attached to the base of the heat sink, remove it before you mount the processor on it. When holding it, please grip it along the axis of its fins with your thumb and your index finger.	Axis
Processor Carrier	This is packed along with the processor. Before performing any assembly involving this part, please locate PIN1 on one of the corners, an important indicator used to align this carrier with the processor and the bolster plate correctly.	
Dust Cover	This cover is used to protect the package land surface of the processor from contamination. To remove it from the processor, grasp the holding features with your thumb and your index finger while pulling the cover off vertically.	
Bolster Plate	A robust bolster plate is used to assist in PHM alignment for installation, while effectively helping eliminate PCB bowing during compression. Please locate the Cutout on one of the four corners before starting PHM installation.	Cutout

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Mounting the CPU onto the Heat Sink

1. Align the PIN1 indicator on the processor with that on the carrier.

2. Gently insert one side of the processor into the carrier and make sure the alignment feature is aligned with the latch of the carrier.
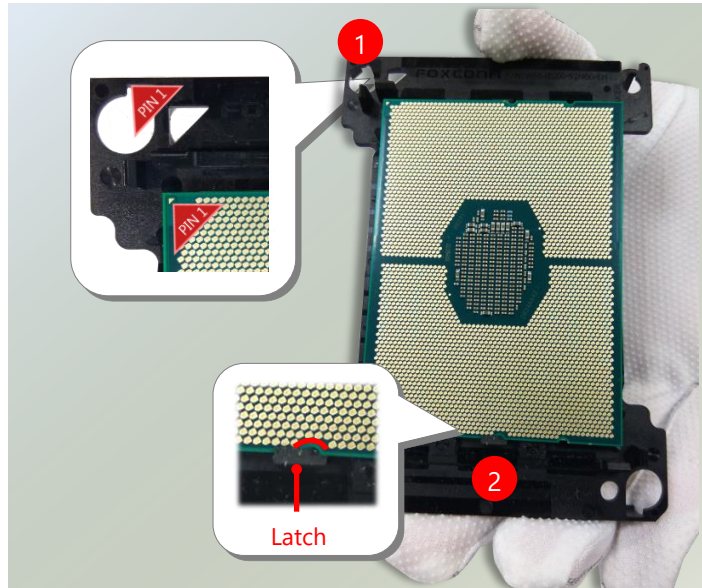
Latch

> **Note**
>
> During assembly, it is essential to have (1) PIN1 on the processor aligned with that on the carrier, and (2) the alignment features on the top and the bottom of the CPU aligned with the corresponding carrier latches.

3. For the other end of the carrier, align the alignment feature of the processor with the carrier latch, and then gently bend over the carrier end to have the latch secured on the processor.

Latch

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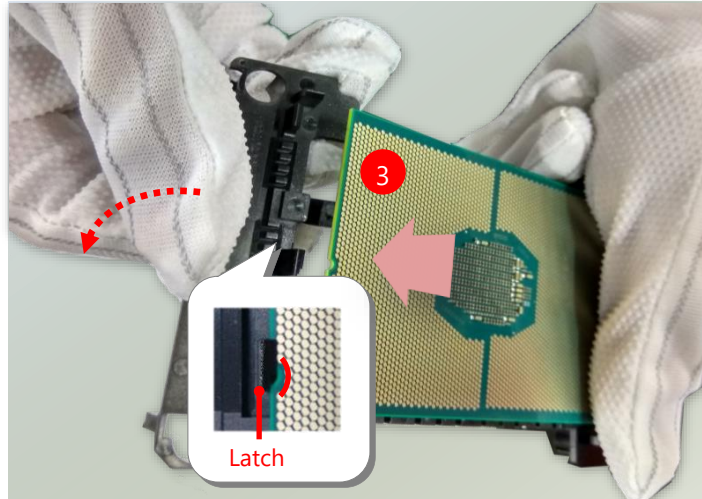
4. Align PIN1 of the processor with the corner cutout of the heat sink (if there are two corner cutouts on one heat sink, either will do).
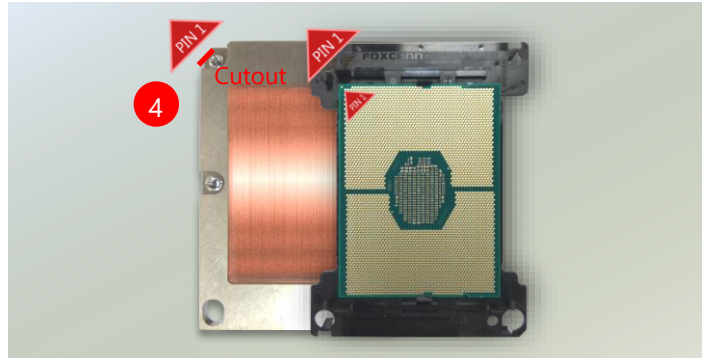
5. With a little pressure, push the four corners of the carrier down to engage their latching features with the corresponding corners of the heat sink. You might hear a clicking sound when the latch clicks into place.
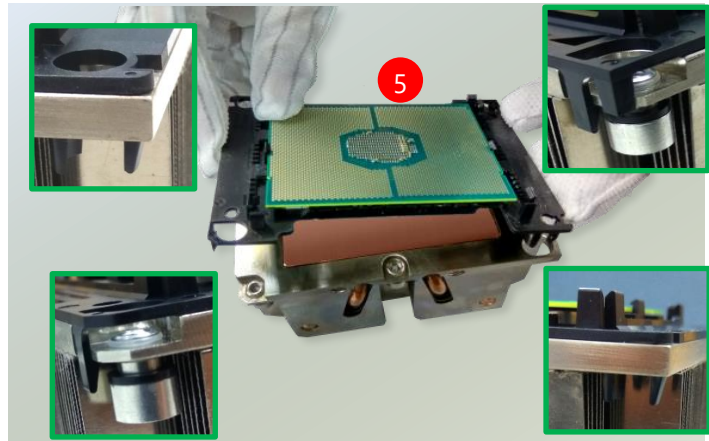
6. Inspect the four corners to make sure the latches are all engaged. If correctly latched, the corners of the carrier should be tightly attached to the heat sink, with no gap in-between observed.
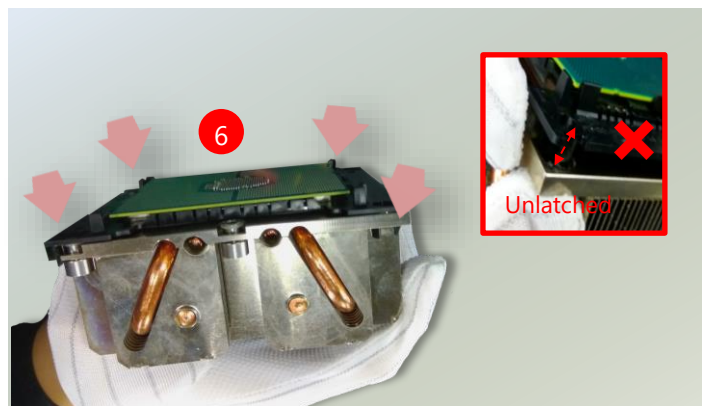
Installing the PHM onto the Motherboard

1. Remove the dust cover from the socket contacts of the motherboard.

📝 **Note**

Inspect the surface of the socket under sufficient light to ensure there is no contamination or damage prior to the PHM installation.

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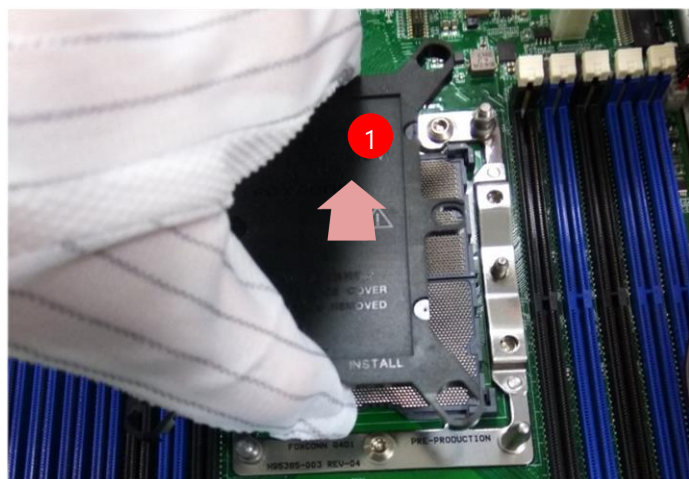
2. Flip the PHM over to align PIN1 of the carrier with the Cutout of the bolster plate.
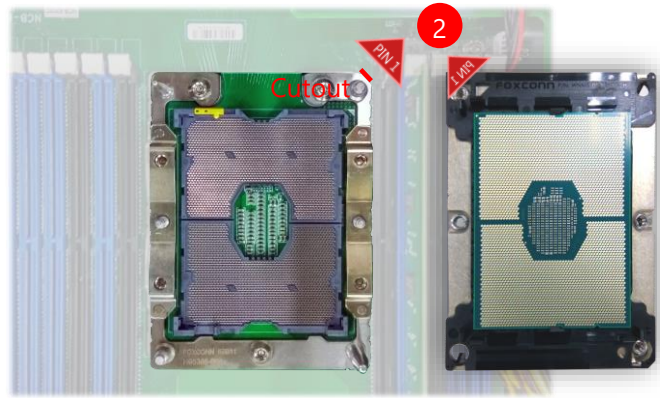
3. Flip the PHM over, so the package land of the processor will face the socket. Lower the PHM vertically to engage it to the alignment pins of the bolster plate.
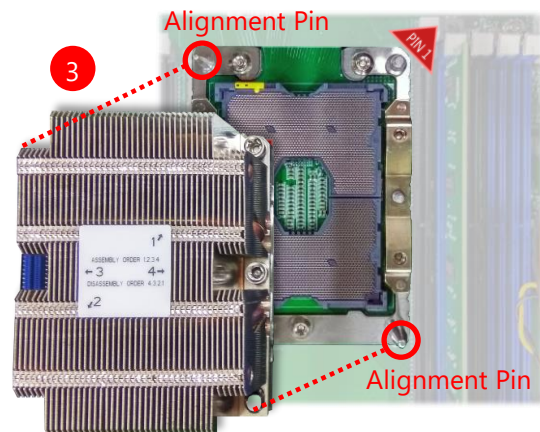
4. Make sure the PHM is sitting horizontally on the bolster plate.
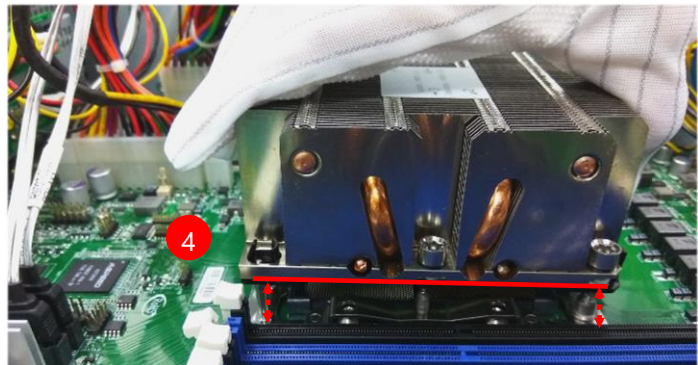
5. Use a torque driver to tighten the four nuts to 12 in-lbf into the bolster plate following the sequence indicated on the heat sink (#1→#2→#3→#4).

> **Note**
>
> When fastening #3 and #4 nuts, the gap between the metal spring leaf of the bolster plate and the PHM will gradually diminish as you drive the nuts.
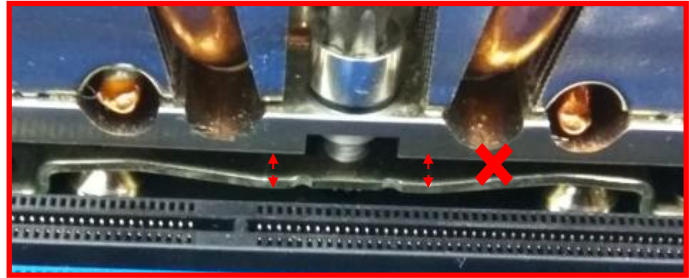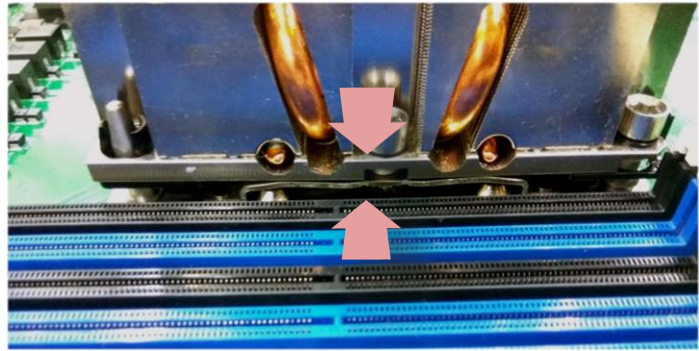
Installing the Disk Drive(s)

NCA-5710 is built with two 2.5" HDD/SSD slot (HDD preferred) drive bay. The following will discuss disk drive installation procedures based on their HDD/SSD designs.

1. Power off the system.

2. Loosen the screw that fixes the tray onto the motherboard.
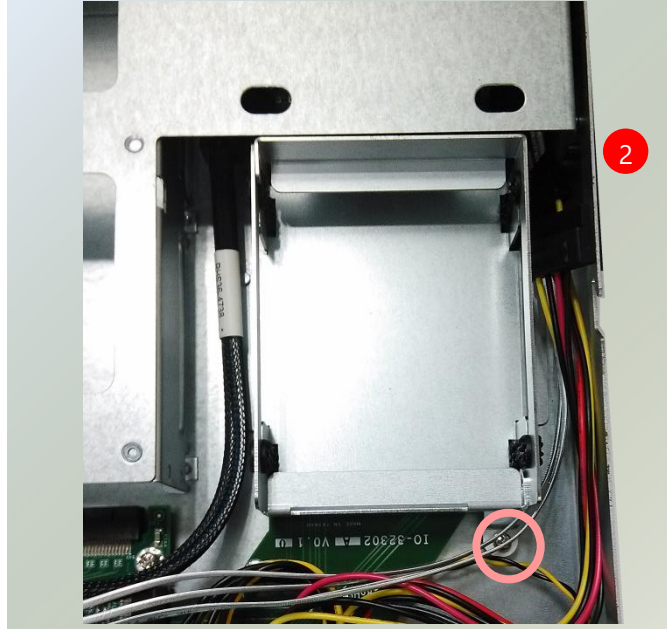
3. Mount the disk onto the empty tray. Make sure the disk connector faces towards the SATA contacts inside the system.

4. Install the tray back to the original position with the screw. Make sure the notch of the tray's side engages properly into the pin as shown in the picture.
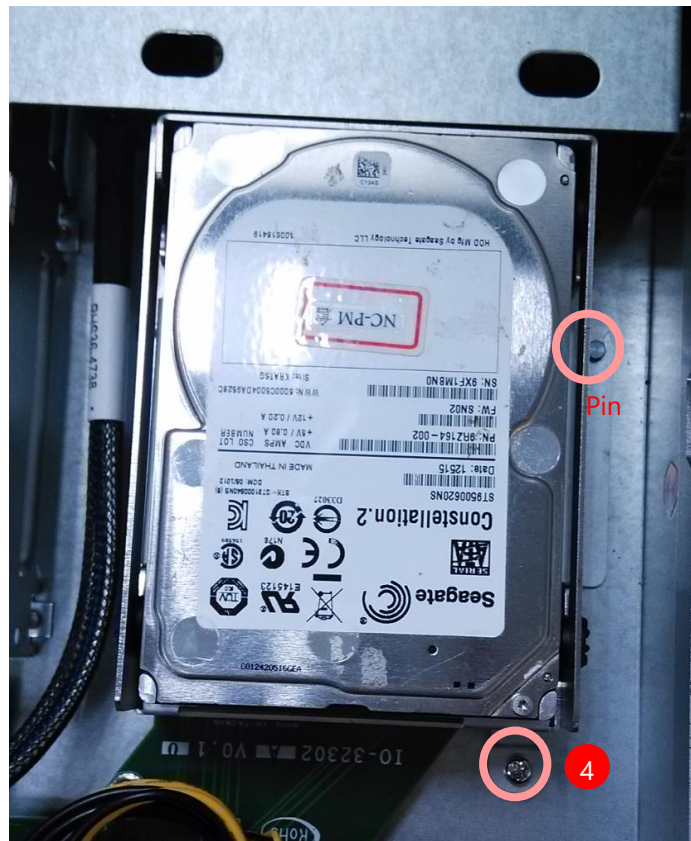
5. Connect the SATA cable and SATA power cable to the hard disk.
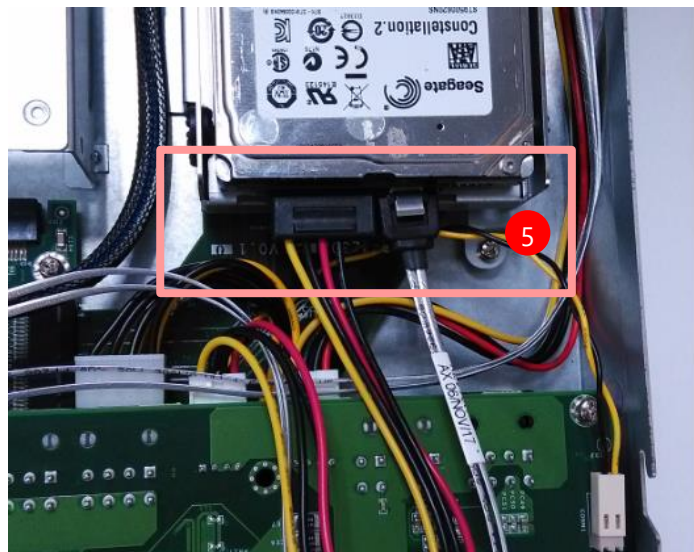
Installing the NIC Modules

NCA-5710 comes with 4 NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

1. On the front panel, select a NIC Ethernet module slot.

2. Loosen the two lock-screws.

3. Remove the door and locate the socket for module insertion.

Socket

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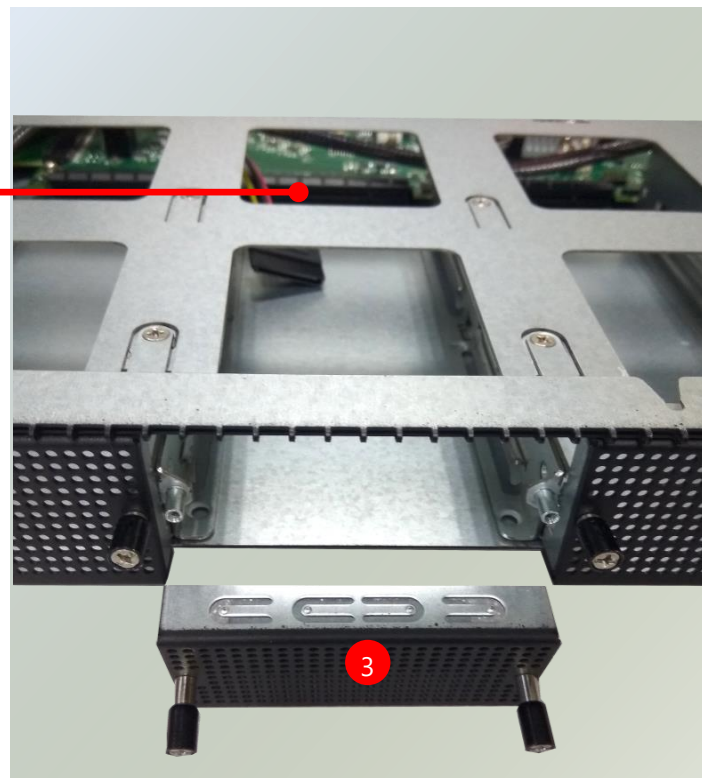
4. Insert your NIC module. (The module shown in the image below is for reference only).
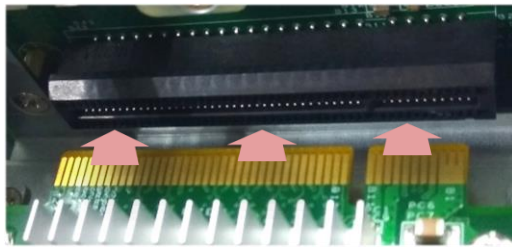
Align the golden fingers to the socket on the motherboard carefully while inserting this module.
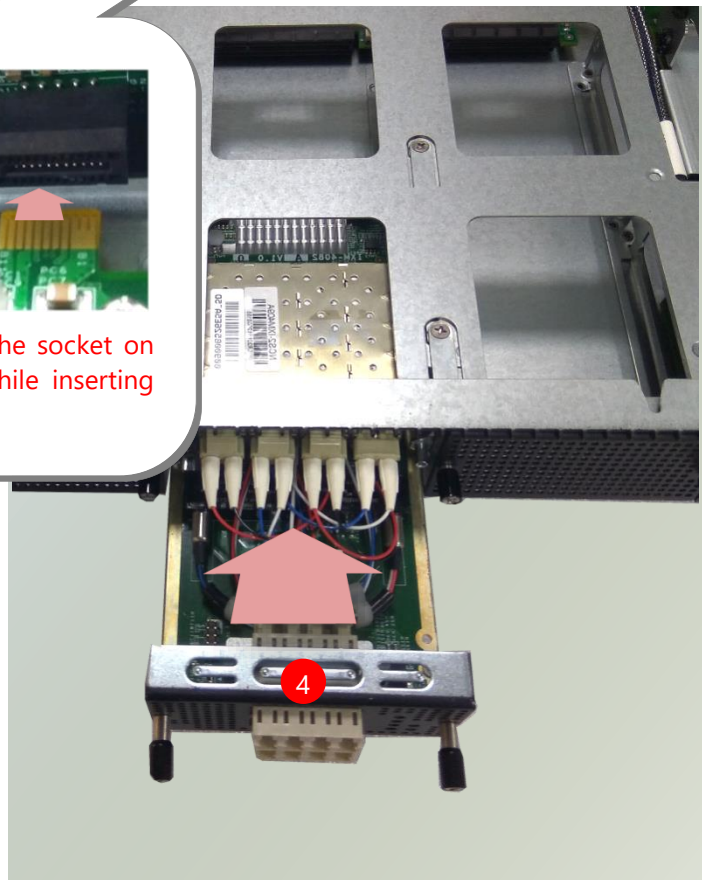
5. Once the module is firmly seated, tighten the two lock-screws.
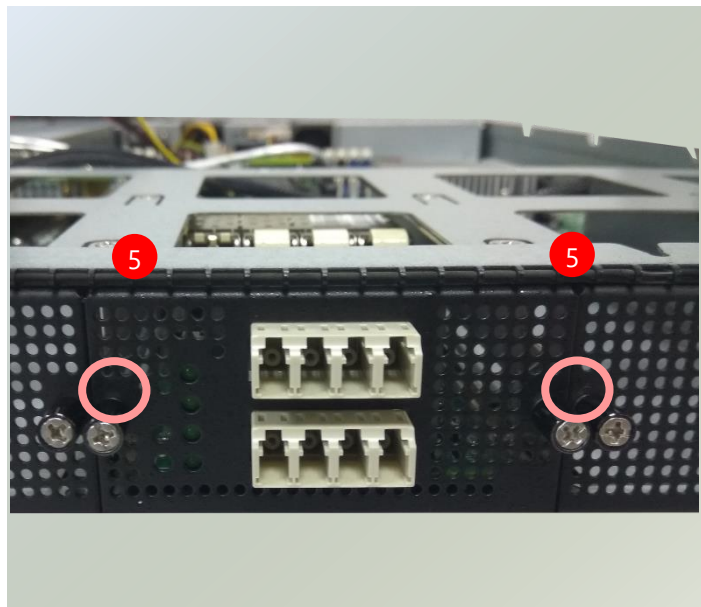
Installing the LCM Module

NCA-5710 comes with 4 module slots for expansion. Please follow the steps for LCM Module installation.

1. Open the LCM module package.
   The package kit will include:

▶ 1x LCM Panel,

▶ 1x LCM connector cable

▶ 2x screws

2. On the front panel of NCA-5710, select a module slot for LCM Module placement.
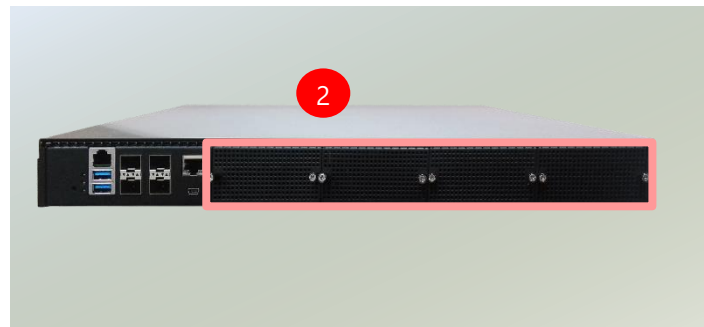
3. **Loosen** the two lock-screws, and remove the door.

4. Locate the connector for LCM module cable insertion.

Top-entry connector
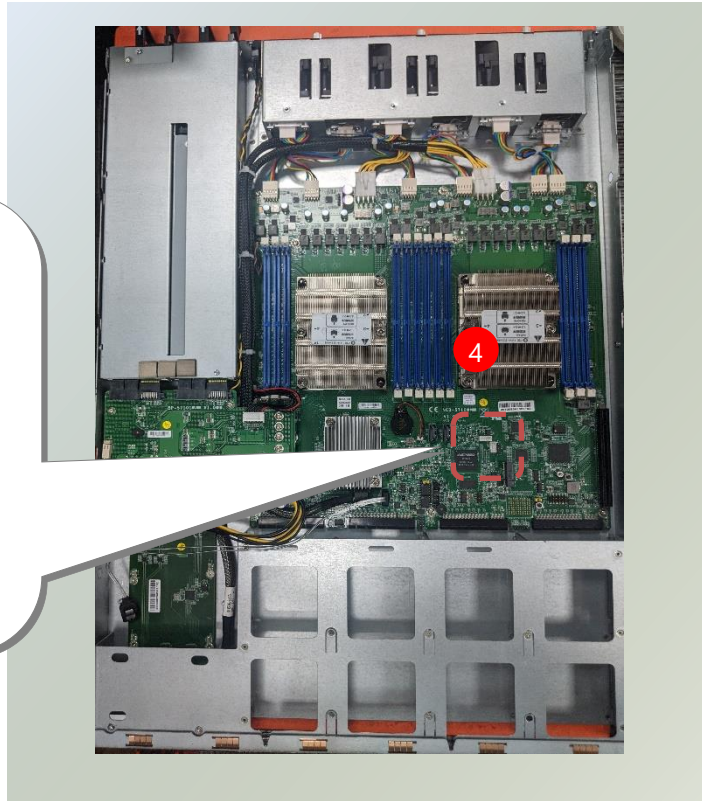
5. Install the LCM module into the module slot.

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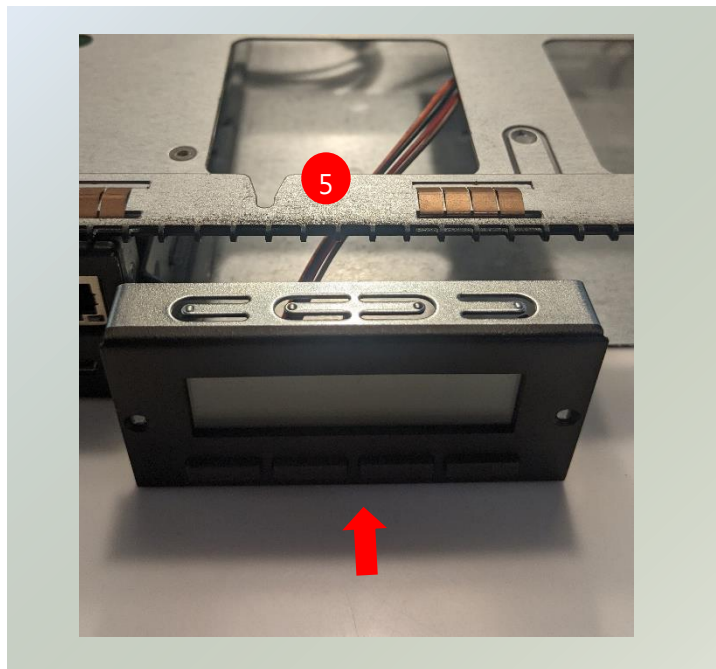
6. Insert the connector cable into the connector.
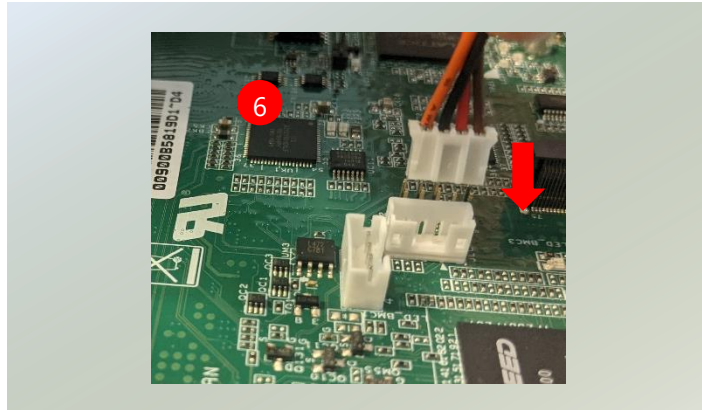
7. Rotate and screw in the two lock screws. The LCM module has been successfully installed.

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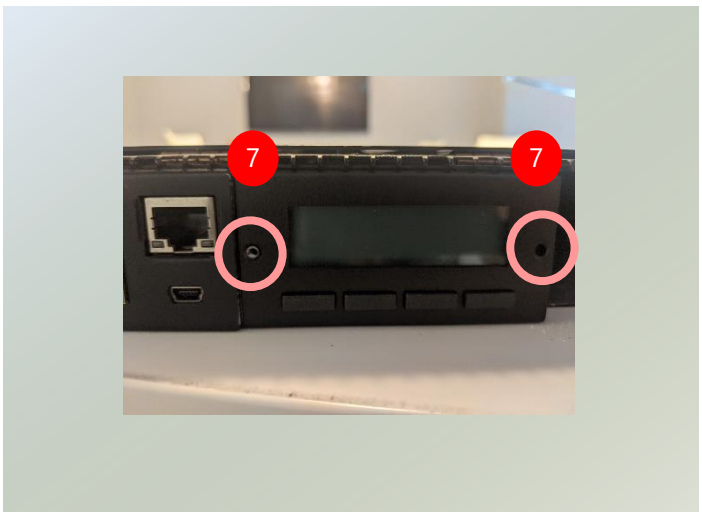
Replacing the Cooling Fans

Cooling fans may wear down eventually. Please refer to the steps below for replacing cooling fans. When using a new cooling fan, simply reverse the steps to install the fan back onto the enclosure and the system.
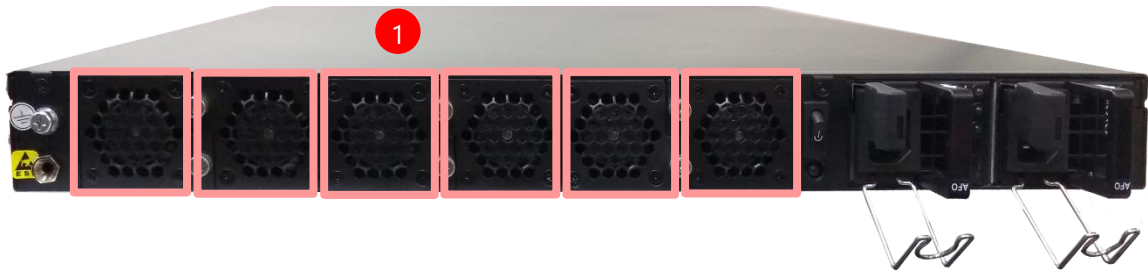
1. Locate the cooling fans at the rear panel.

2. Loosen the lock-screw that secures the fan on the rear panel.

3. Take out the worn fan and disconnect its power cable connector from the motherboard.

4. Install a new fan by reversing the above steps.

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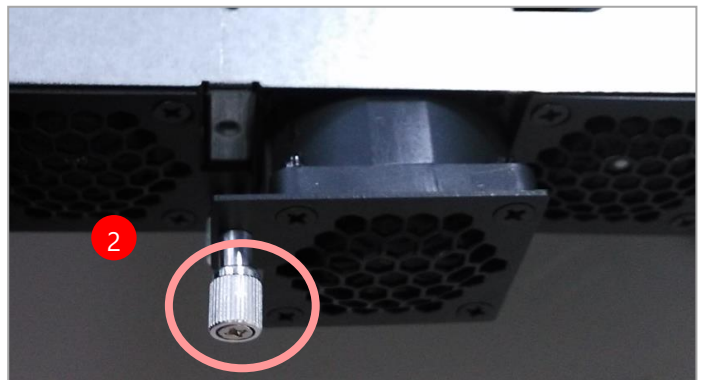
Installing the System Memory

The motherboard supports 12 memory slots for DDR4 registered DIMM. **JCPU0** requires at least 1 memory module to boot and run from.

Supported System Memory Summary

Total Slots	12 (6 slots per processor)
Number of Channels	6 (Channel 0~5, 1 DIMM per channel) per processor
Supported DIMM Capacity	4GB, 8GB, 16GB, 32GB, 64GB
Memory Size	Maximum 768GB RDIMM (64GB*12)
Memory Type	DDR4 1.2 V ECC RDIMM 2933/2666/2400/2133 MHz
Minimum DIMM Installed	**JCPU0** requires at least 1 memory module to boot and run from.

JDDR0~JDDR9 are assigned to **JCPU0**.

JDDR10~JDDR19 are assigned to **JCPU1**.
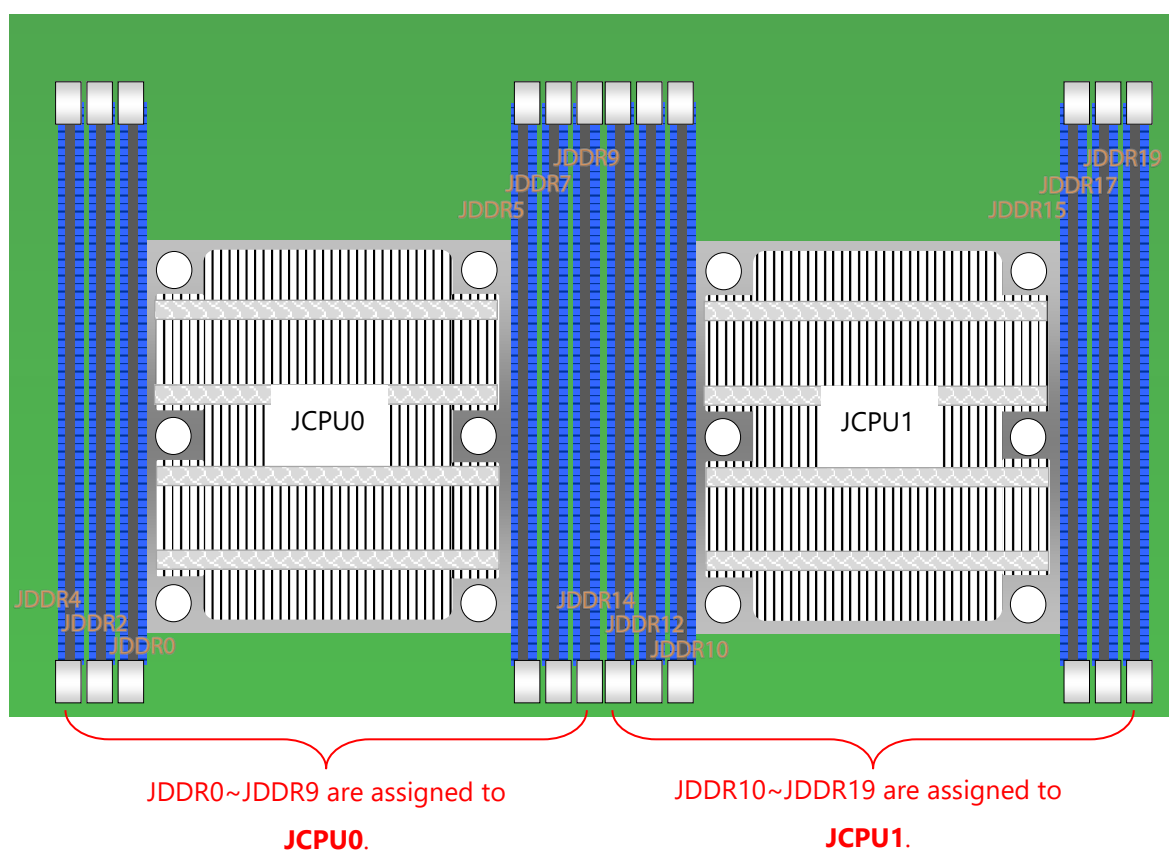
DIMM Population Guidelines

Please do follow the memory module installation instructions to install the DIMMs, and make sure

- At least one CPU is installed
- If two CPUs are installed, install at least 1 DIMM for **JCPU0**.
- Try to split the DIMMs evenly across the CPUs.
- Please use memory modules of the same capacity, speed and from the same manufacturer to avoid compatibility issues.

Recommended DIMM Population Scheme

The table below shows the recommended schemes for DIMM population. To guarantee balanced system performance, please install identical DIMMs of the same capacity, speed, number of ranks, and from the same manufacturer.

	Processor	JCPU0						JCPU1					
	JDDR #	4	2	0	5	7	9	14	12	10	15	17	19
Number of DIMMs Installed for 1 CPU	1 DIMM			○									
	2 DIMMs		○	○									
	3 DIMMs	○	○	○									
	4 DIMMs		○	○	○	○							
	6 DIMMs	○	○	○	○	○	○						
Number of DIMMs Installed for 2 CPUs	2 DIMMs			○						○			
	4 DIMMs		○	○					○	○			
	6 DIMMs	○	○	○				○	○	○			
	8 DIMMs		○	○	○	○			○	○	○	○	
	10 DIMMs	○	○	○	○	○	○		○	○	○	○	
	12 DIMMs	○	○	○	○	○	○	○	○	○	○	○	○

DDR4 Memory Support vs. System Memory Speed

The table below lists the supported DDR4 types and the theoretical overall system memory speed. For optimal system speed, please install identical DIMMs of the same capacity, speed, number of ranks, and from the same manufacturer.

Type	DIMM Rank	Data Width	DIMM Capacity (GB)		Speed (MT/s)
			DRAM Density		Voltage (V): 1.2V 1 DIMM per Channel
			4Gb	8Gb	
RDIMM	SR	x4	8GB	16GB	2666 MT/s
		x8	4GB	8GB	
	DR	x8	8GB	16GB	
		x4	16GB	32GB	

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Memory Module Installation Instructions

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

1. Power off the system.
2. Pull open the DIMM slot latches.
3. Align the notch of the module with the socket key in the slot and carefully insert the card into the slot.
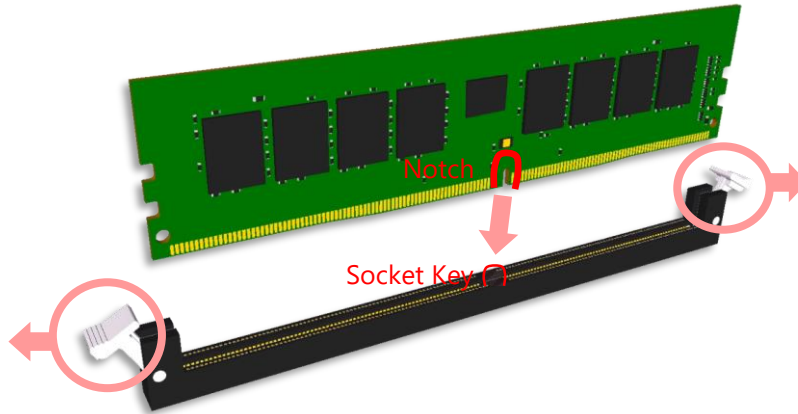
4. Push the module down into the slot until it is firmly seated. Press vertically on both corners of the card until it clicks into place.

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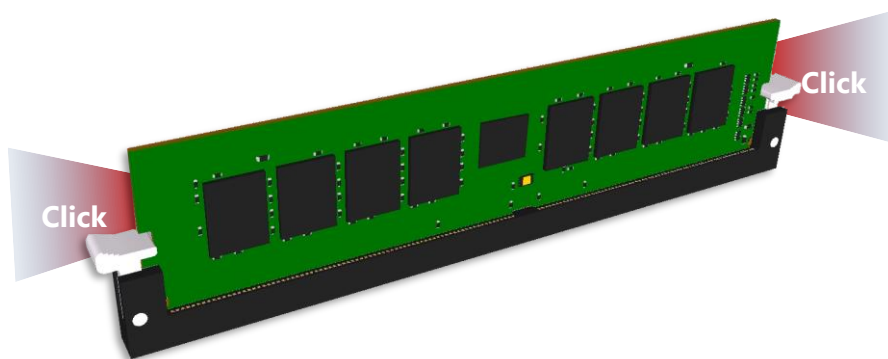
Mounting the System

▶ With **Slide Rail Kit** + **Short Ear Brackets**
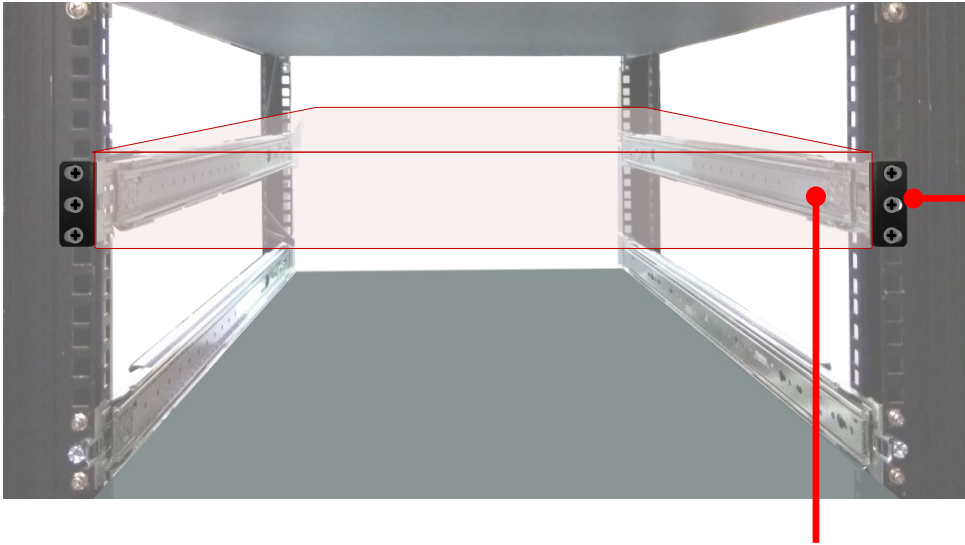
The Ear Brackets fix the system onto the front rack posts.

The Slide Rails can secure the system while making the equipment more easily accessible.

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Installing the System Using the Slide Rail Kit (with Short Mounting Ear Brackets)

1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:

   ▶ 1x pack of M4X4L screws (for securing the sliding rail on the system)

   ▶ 2 x Slide Rails

The rail consists of the following parts:

Rail Lock   Release Tab

Rail Bracket

Inner Channel   Outer Channel

Attaching the Rail Brackets

2. Unpack a slide rail and slide the Inner Channel all the way to the end.

3. Stretch the Rail Bracket to the fullest.

   Release Tab

4. Remove the Rail Bracket from the Inner Channel by pushing the Release Tab on the Rail Bracket outwards while sliding it out.

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5. Align the Rail Bracket to the side of the chassis and make sure the screw-holes on it match and properly engage the **four** buttons on the side panel as shown in the picture.

Rear

Front

Buttons

Aligning

6. Carefully pull the Rail Bracket backward to have the buttons locked into the **four** screw holes as shown in the picture.

7. Repeat Steps 5-6 to attach the Rail Bracket to the other side of the chassis.

Left Bracket

Right Bracket

Locked

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Assembling the Ear Brackets

1. Check the package contents, which shall include the items below:
   ▶ 1x pack of screws
   ▶ 2x Ear Brackets

For securing the Ear Brackets on the unit

2. Install the Ear Brackets on both sides of the system using the provided screws.

Right Ear

Installing the Slide Rails

Now, you shall install the slide rail assemblies onto the rack.

1. This slide-rail kit does NOT require screw-fixing. Simply aim at **3** available screw holes on the rack front and snap the rail front into the rack post as shown in the image. You should hear a "click" sound once it is firmly attached.

Use this clamp to fix the front end of the rail onto the post.
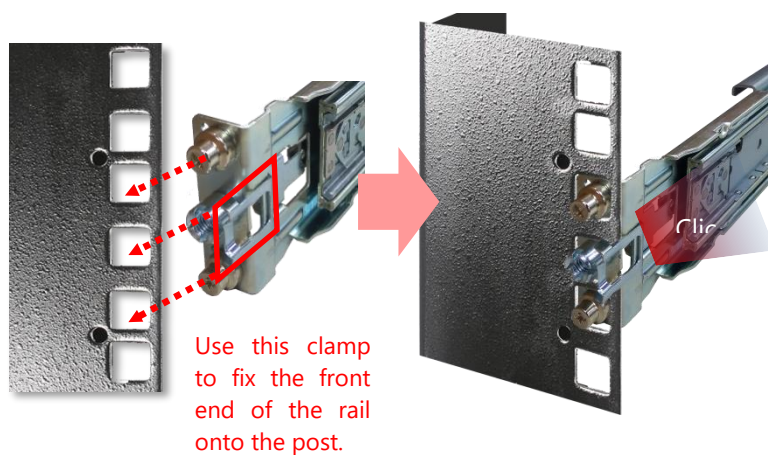
2. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the 2 available holes on the post, and the rail assembly will click into place.

40
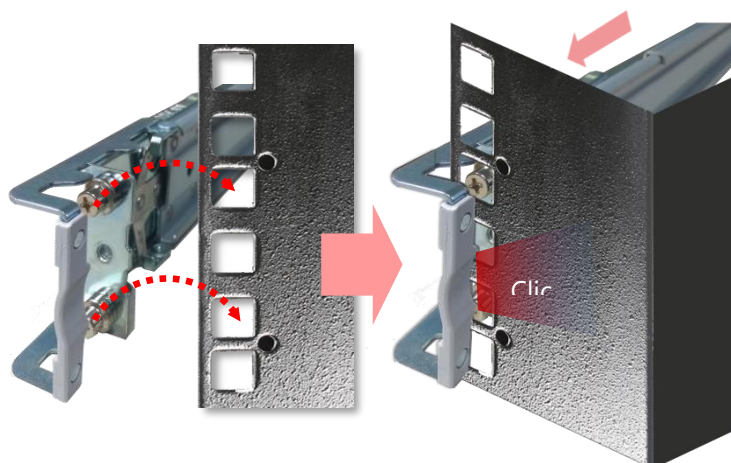
Installing the System into the Rack

1. Stretch both of the Inner Channels out to their fullest extent. You will hear a click sound when they are fully stretched and stop.

The inner rail will click when it is fully stretched.
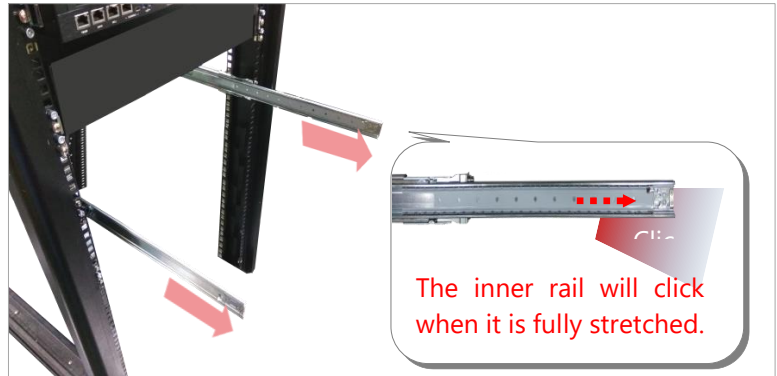
2. Hold the system with its front facing you, lift the chassis and gently engage the Rail Brackets on the model while aligning them with the slide-rail assemblies as shown in the image, and then push the system into the cabinet.

While pushing in the system, please also push and hold the Rail Lock tab on both Rail Brackets.

Rail Lock

3. Secure the Ear Brackets onto both front posts with provided screws.

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Connecting the Grounding Cable

Before connecting any other cable to this system, you should first attach the grounding cable to the system's grounding stud.

1. Obtain a proper grounding cable.

2. Position the grounding cable against the grounding stud on the system's rear panel, and then tighten the nut to secure the cable.

3. Secure the other end of the grounding cable to the earth ground in your site (through a grounding point on the rack if necessary).

42
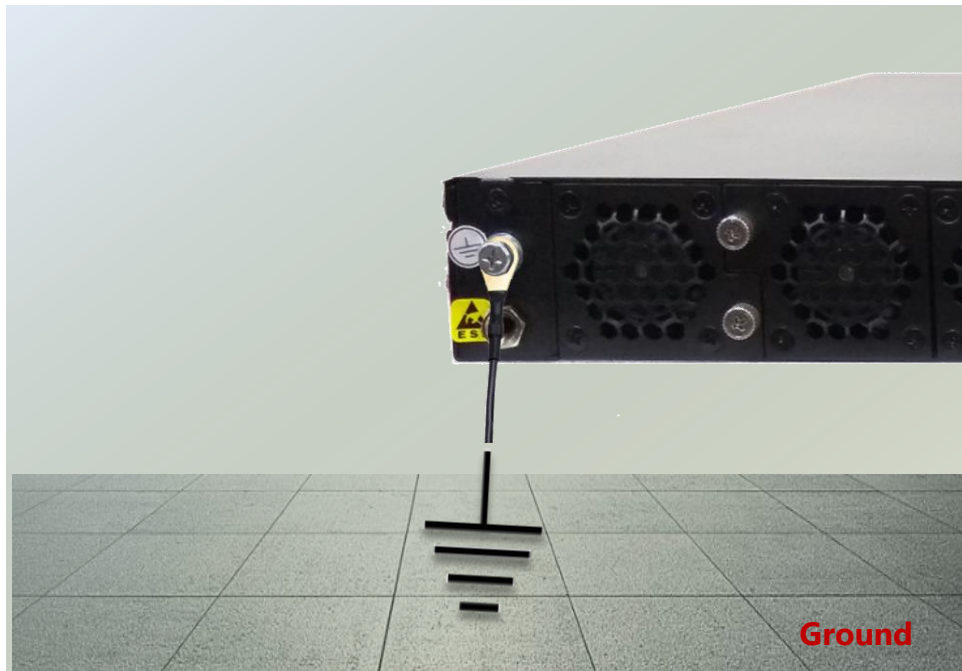
Replacing the Power Supply Units

Power supply units may wear down eventually. Please be noted that NCA-5710 series supports 850W PSU. Please prepare the power supply units matching this capacity.

1. On the rear panel, locate the power supply units and disconnect the power cords.

2. Pull the original unit out and replace it with the new one.
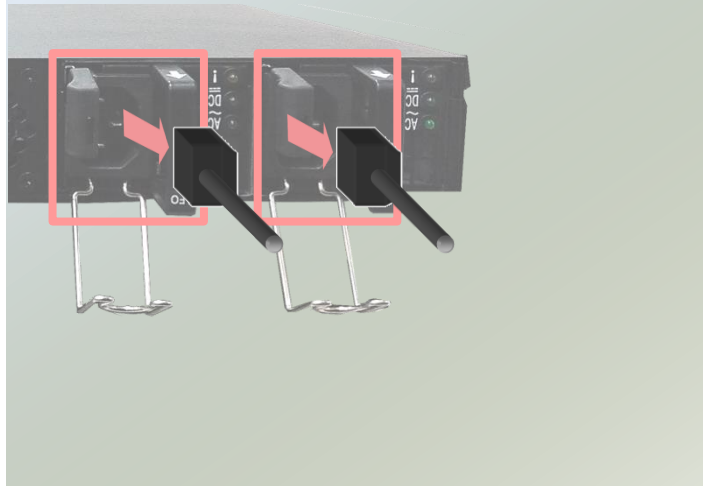
DC Power Supply Installation

Follow the instructions below to connect the DC power cord to the connector on the PSU. This instruction is for the installation of the conductor to build earthing by a skilled person.

1. Loosen the + and - screws.
2. Respectively attach the two cables to the connectors: the red cable to the right (Positive Pole) and the black cable to the left (Negative Pole).
3. Fasten the screws.
4. Connect the power cables to the power source.
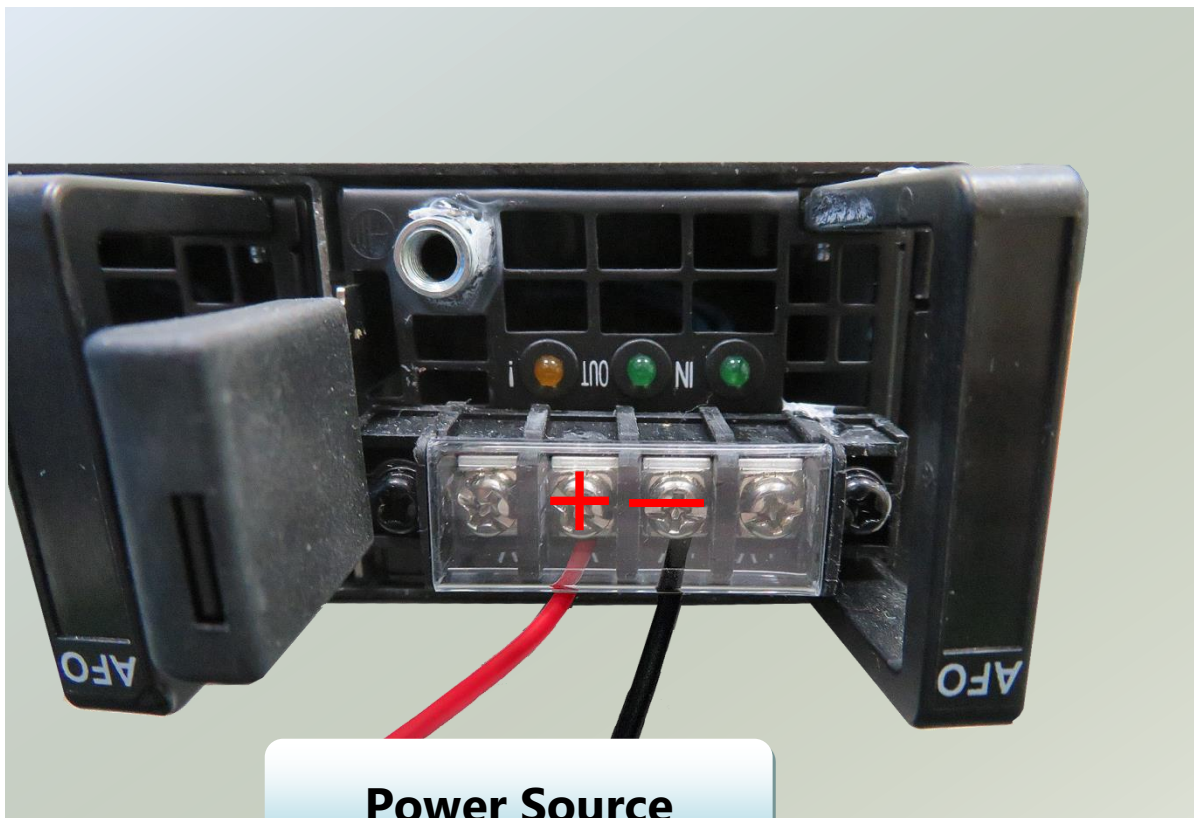
► This product is intended to be supplied by a UL Listed DC power source, rated **-48- -60Vdc**, **21A** minimum, Tma = **40 degrees C**, and the altitude of operation = **5000m**.

► The cable should be **12AWG** (**21A** minimum, **60V** minimum).

If you need further assistance with purchasing the power source, please contact to Lanner Electronics Inc. for further information.

CHAPTER 3: SOFTWARE SETUP

Remote Server Management

Overview

This chapter will introduce the features of Lanner's BMC firmware and how to perform server remote management through it. Lanner has implements IPMI 2.0 based on ASPEED service processor, performing all the BMC defined by IPMI 2.0. In addition, Lanner's BMC firmware runs an embedded web-server for full configuration using Web UI, which has a low learning curve.

BMC Main Features

Feature		Description
IPMI 2.0 Standard Features	System Interface support	• KCS (System Interface Support)
		• LAN (RMCP+)
	IPMI 2.0 based Management	• BMC stack with an IPMI 2.0 implementation
		• Sensor monitoring
		• System power management
	System Management	• Watchdog timer
		• Fan speed monitor and control
		• FRU information
	Event Log	• System Event Log (SEL)
	Text Console Redirection: SOL	• Support in IPMI stack for SOL to remotely access BIOS and text console before OS booting
	User Management	• IPMI based user management
		• Multiple user permission level
Non-IPMI functions	Web User Interfaces	• BMC management via web user interface
		• Integrated KVM and Virtual Media
	User authorization	• RADIUS support
		• LDAP support
	Security	• SSL and HTTPS support
		• Auto sync time with NTP server
	Maintenance	• Remote firmware update by Web UI or Linux tool

Firmware Function Description

System health monitoring

The BMC implements system sensor monitoring feature. It could monitor voltage, temperature, and current of critical components.

System Power Management

The BMC implements chassis power and resets functions for system administrators to control and manage the system power behavior. These functions can be activated by sending the IPMI 2.0 compatible chassis commands to the BMC over messaging interfaces. The following list summaries the supported functions.

- Chassis power on
- Chassis power off
- Chassis power cycle
- Chassis power reset
- Chassis power soft
- Server's power status report

Watchdog Timer

The BMC provides an IPMI 2.0 compatible watchdog timer which can prevent the system from system hanging.

Fan Speed Control

BMC is in charge of fan speed control. The fan speed can be modified by varying the duty cycle of PWM signal. The fan speed control algorithm mainly refers to the readings of on-board temperature sensors.

Field Replaceable Unit (FRU)

The BMC implements an interface for logical FRU inventory devices as specified in IPMI 2.0 specification. This functionality provides commands for system administrators to access and management the FRU inventory information.

System Event Log (SEL)

A non-volatile storage space is allocated to store system events for system status tracking.

Serial over LAN (SOL)

IPMI 2.0 SOL is implemented to redirect the system serial controller traffic over an IPMI session. System administrators are able to establish a SOL connection with a standard IPMI client, like IPMITOOL, to remotely interact with serial text-based interfaces such as OS command-line and serial redirected BIOS interfaces.

User Management

The BMC supports 9 IDs for IPMI user accounts. The maximum length of the username and password are 16 and 20 respectively, and the possible privilege levels are Callback, User, Operator, and Administrator. Moreover, the account creator is allowed to enable/disable the user account at any time. If not specified, the default user accounts are listed follows:

User Name	Password	User Access	Characteristics
admin	admin	Enabled	Password can be changed

Keyboard, Video, Mouse (KVM) Redirection

- The BMC provides keyboard, video, and mouse (KVM) redirection over LAN. This application is available remotely from the embedded web server.
- Support video recording, recorded videos to be downloaded & playable.

Virtual Media Redirection

- The BMC provides remote virtual CD, HD and FD redirection. CD image could be mounted directly in KVM window.
- Efficient USB 2.0 based CD/DVD redirection with a typical speed of 20XCD.
- Completely secured transmission.

IPMI Commands Support List

COMMANDS	NETFN	CMD
IPM Device "Global" Commands		
Get Device ID	APP (06h)	00h
Cold Reset	APP (06h)	02h
Warm Reset	APP (06h)	03h
Get Device GUID	APP (06h)	08h
BMC Watchdog Timer Commands		
Reset Watchdog Timer	APP (06h)	22h
Set Watchdog Timer	APP (06h)	24h
Get Watchdog Timer	APP (06h)	25h
BMC Device and Messaging Commands		
Get System GUID	APP (06h)	37h
Get Channel Info	APP (06h)	42h
Set User Access	APP (06h)	43h
Get User Access	APP (06h)	44h
Set User Name	APP (06h)	45h
Get User Name	APP (06h)	46h
Set User Password	APP (06h)	47h
Chassis Device Commands		
Get Chassis Capabilities	Chassis (00h)	00h
Get Chassis Status	Chassis (00h)	01h
Chassis Control	Chassis (00h)	02h
Chassis Reset	Chassis (00h)	03h
Sensor Device Commands		
Get Sensor Reading Factors	S/E (04h)	23h
Get Sensor Hysteresis	S/E (04h)	25h
Get Sensor Threshold	S/E (04h)	27h
Get Sensor Event Enable	S/E (04h)	29h
Get Sensor Event Status	S/E (04h)	2Bh
Get Sensor Reading	S/E (04h)	2Dh
Get Sensor Type	S/E (04h)	2Fh
FRU Device Commands		
Get FRU Inventory Area Info	Storage (0Ah)	10h
Read FRU Data	Storage (0Ah)	11h
Write FRU Data	Storage (0Ah)	12h
SDR Device Commands		
Get SDR Repository Info	Storage (0Ah)	20h
Get SDR Repository Allocation Info	Storage (0Ah)	21h
Get SDR	Storage (0Ah)	23h
Get SDR Repository Time	Storage (0Ah)	28h
SEL Device Commands		
Get SEL Info	Storage (0Ah)	40h
Get SEL Allocation Info	Storage (0Ah)	41h
Get SEL Entry	Storage (0Ah)	43h
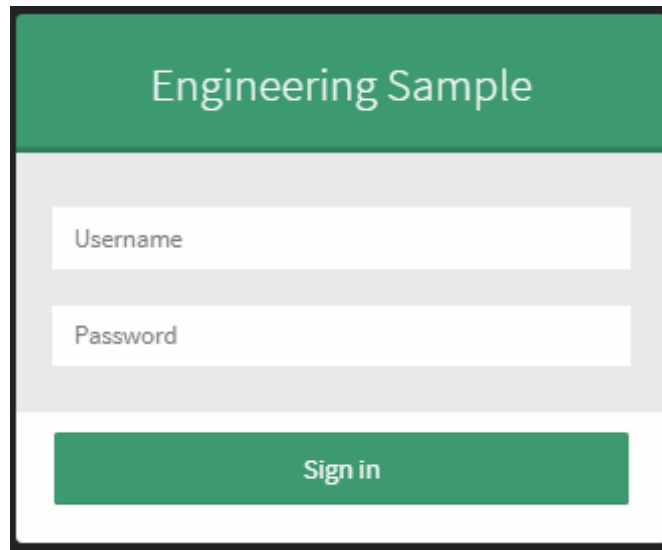
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (0Ch)	01h
Get LAN Configuration Parameters	Transport (0Ch)	02h
Serial/Modem Device Commands		
Set User Callback Options	Transport (0Ch)	1Ah
Get User Callback Options	Transport (0Ch)	1Bh
SOL Activating	Transport (0Ch)	20h
Set SOL Configuration Parameters	Transport (0Ch)	21h
Get SOL Configuration Parameters	Transport (0Ch)	22h

Using BMC Web UI

In the address bar of your Internet browser, input the IP address of the remote server to access the BMC interface of that server.

Initial access of BMC prompts you to enter username and password. A screenshot of the login screen is given below:

Login Page

▶ **Username**: Enter your username in this field.

▶ **Password**: Enter your password in this field.

▶ **Sign me in**: After entering the required credentials, click the **Sign me in** to log in to Web UI.

> Note: (1) If not specified, the default IP to access BMC is https://192.168.0.100.
>
> (2) Please use **https** to access Web UI.

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Default User Name and Password

▶ **Username:** admin

▶ **Password**: admin

The default username and password are in lower-case characters. When you log in using the default username and password, you will get full administrative rights, and it will ask you to change the default password once you log in. The dialog is shown below:
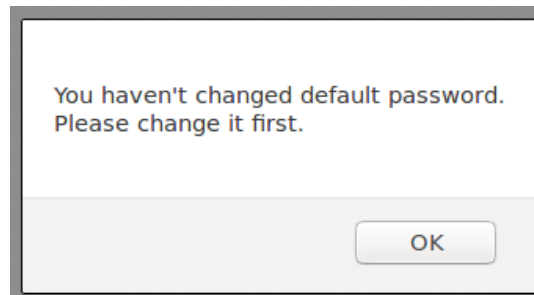
Change the default password - Dialog

Clicking **OK** will take you to the User Management Configuration page to set a password.
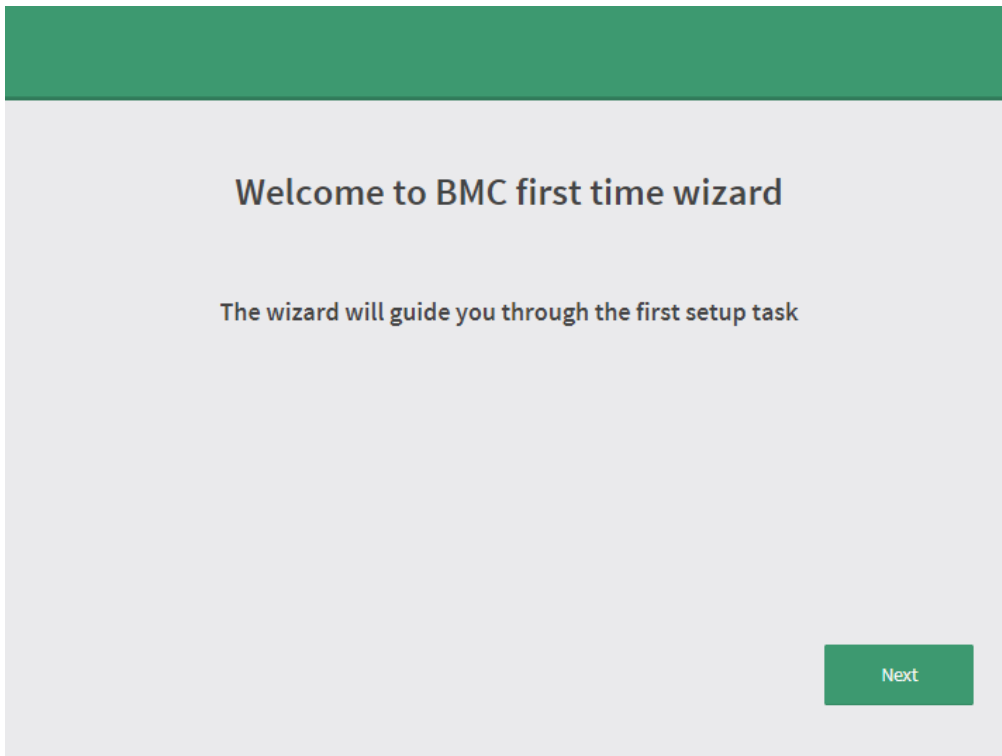
Change the default password – Set password

📝 **Note**: Duplicate usernames shouldn't exist across various authentication methods like LDAP, RADIUS or IPMI since the privilege of one Authentication method is overwritten by another authentication method during logging in, and hence the correct privilege cannot be returned properly.
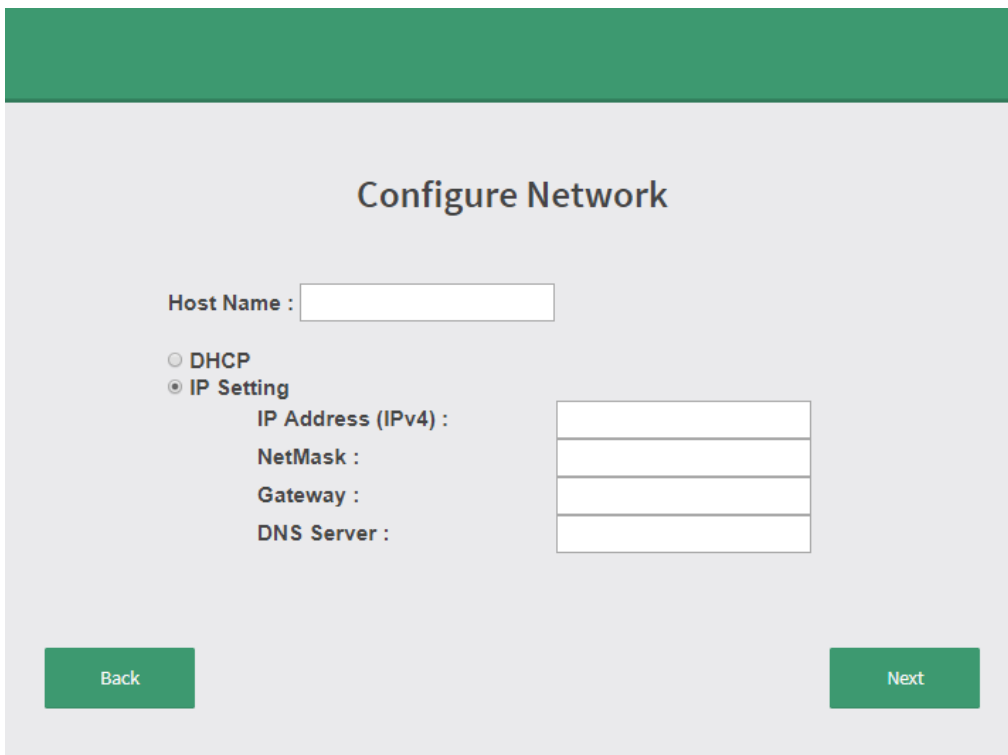
First Time Wizard

After the first time login, you will see first time wizard welcome page as the following picture. Please press the "Next" button and configure your BMC step by step.

Welcome to BMC first time wizard

The wizard will guide you through the first setup task

Next
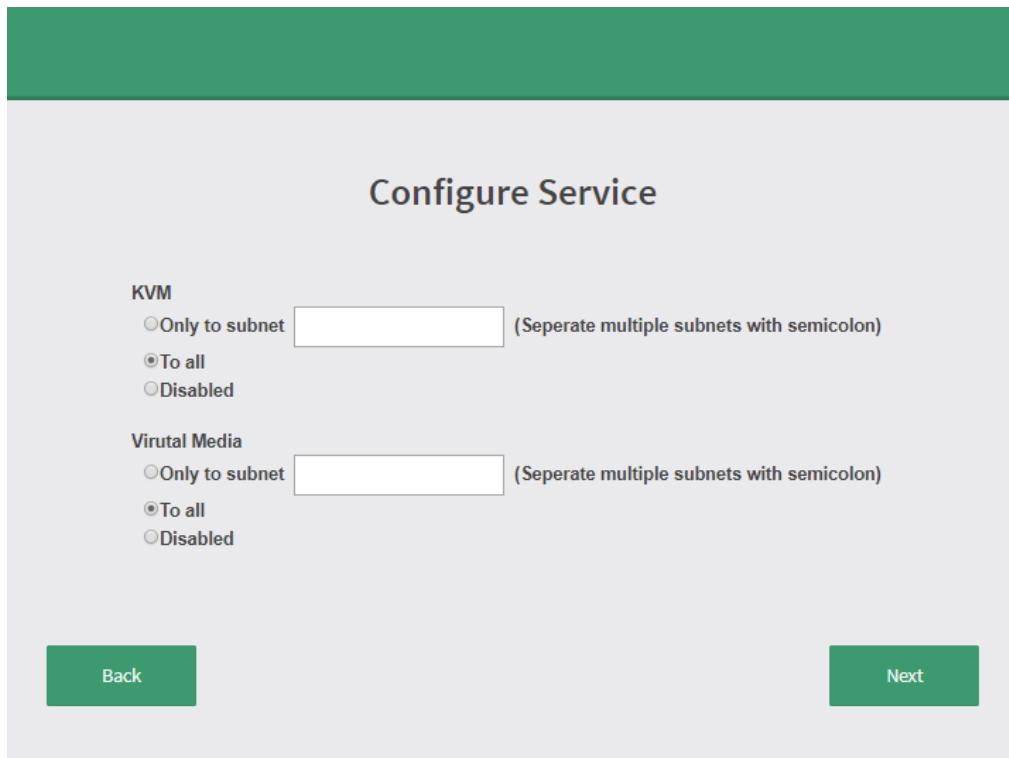
In the "Configure Network" page, you could specify the hostname and network settings of BMC.

Configure Network

Host Name :

○ DHCP
⦿ IP Setting
    IP Address (IPv4) :
    NetMask :
    Gateway :
    DNS Server :

Back   Next

In the "Configure Service" page, you could specify allowed IP region which could access KVM and Vmedia web pages.

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In the final page, please press "Finish" button to complete the first time wizard. BMC will be rebooted and apply new settings. You could reconnect to the WebUI after a few minutes.

Web UI Layout

The BMC Web UI consists of various menu items:

Menu Bar

The menu bar displays the following:

- ▶ Dashboard
- ▶ Sensor
- ▶ FRU Information
- ▶ Event Log
- ▶ Settings
- ▶ Remote Control
- ▶ Image Redirection
- ▶ Power Control
- ▶ Maintenance
- ▶ Sign out

A screenshot of the menu bar is shown below:

Menu Bar

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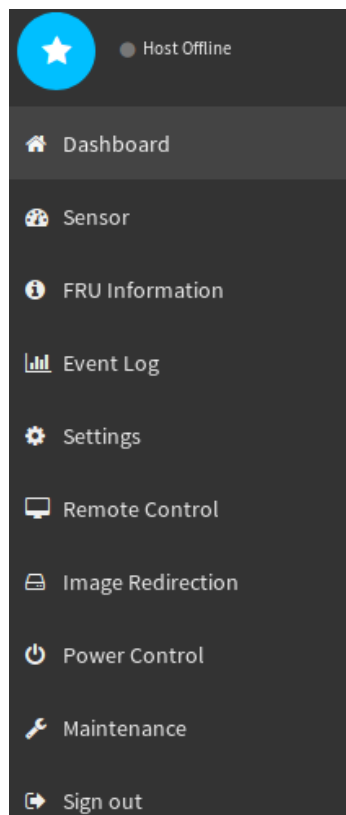
Quick Button and Logged-in User

The user information and quick buttons are located at the top right of the Web UI.
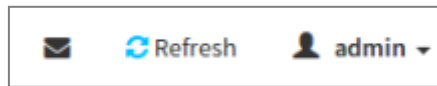
User Information
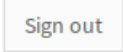
Logged-in user information: Click the icon ![admin icon] to view the logged-in user information.

A screenshot of the logged-in user information is shown below:
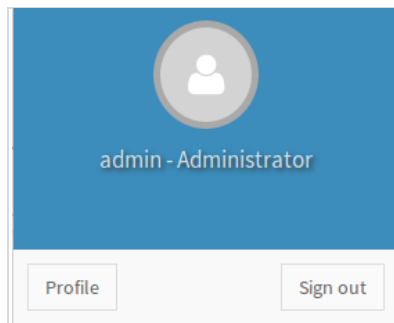
Logged-in User Information

The logged-in user information shows the logged-in user's username, privilege, with the quick buttons allowing you to perform the following functions:

▶ **Notification**: Click the icon ![envelope] to view the notification messages.
▶ **Refresh**: Click the icon ![Refresh] to reload the current page.
▶ **Sign out**: Click the icon ![Sign out] to log out of the Web UI.

Logged-in User and Its Privilege Level

This option shows the logged-in username and privilege. There are four kinds of privileges:

▶ **User**: Only valid commands are allowed.
▶ **Operator**: All BMC commands are allowed except for the configuration commands that can change the behavior of the out-of-hand interfaces.
▶ **Administrator**: All BMC commands are allowed.
▶ **No Access:** Login access denied.

Help

Help: The **Help** icon ![help icon] is located at the top right of each page in Web UI. Click this help icon to view more detailed field descriptions.

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Installing Operating System

If your system is shipped without an operating system, install the supported operating system using the following resources.

Via IPMI Interface

1. Download the ISO image and make a bootable DVD from it.

2. Connect a DVD player or other type of readers (floppy disk, or a drive) to a computer.

3. Connect to your target system from this computer. (Refer to *Using BMC Web UI* for instructions on how to access the target system through Web UI.

4. After entering the main screen, select "Remote Control">"Console Redirection," and then click on "Java Console."
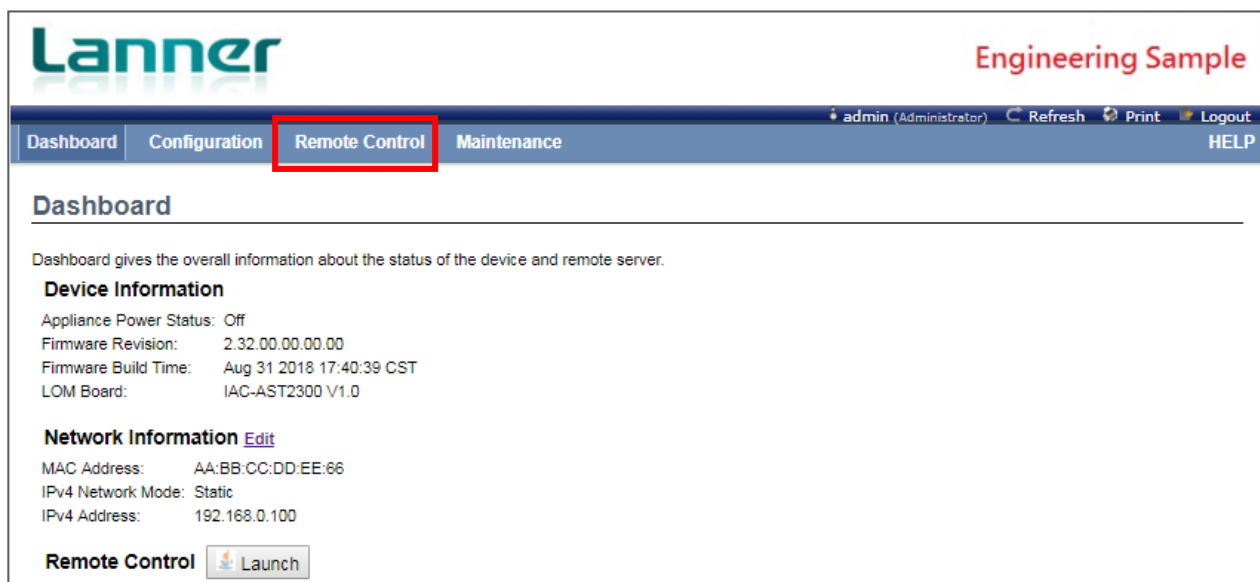
5. After a JViewer screen pops up, select "Media" and then "Virtual Media Wizard" from the toolbar.
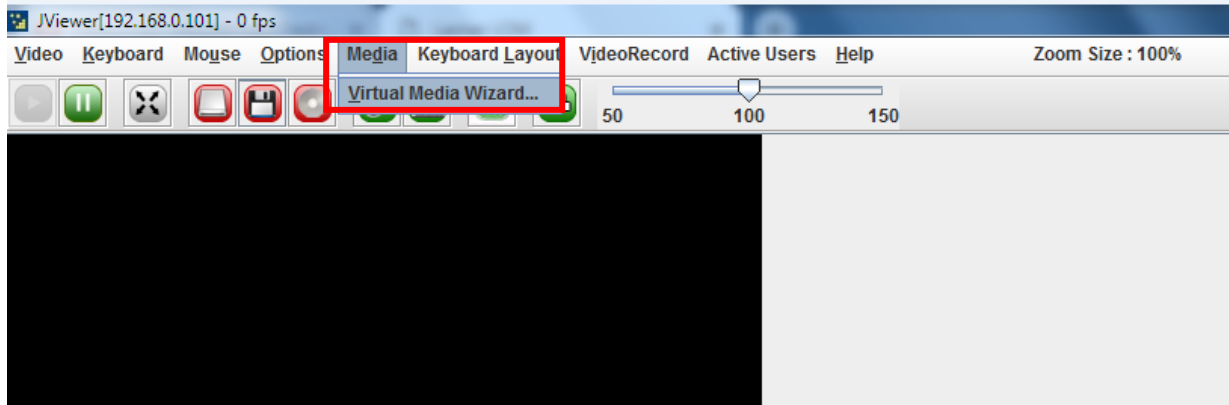
6. On **Virtual Media** screen, select your media type to load the image. For example, click on "Browse" of **CD/DVD Media 1** and then "Connect CD/DVD."

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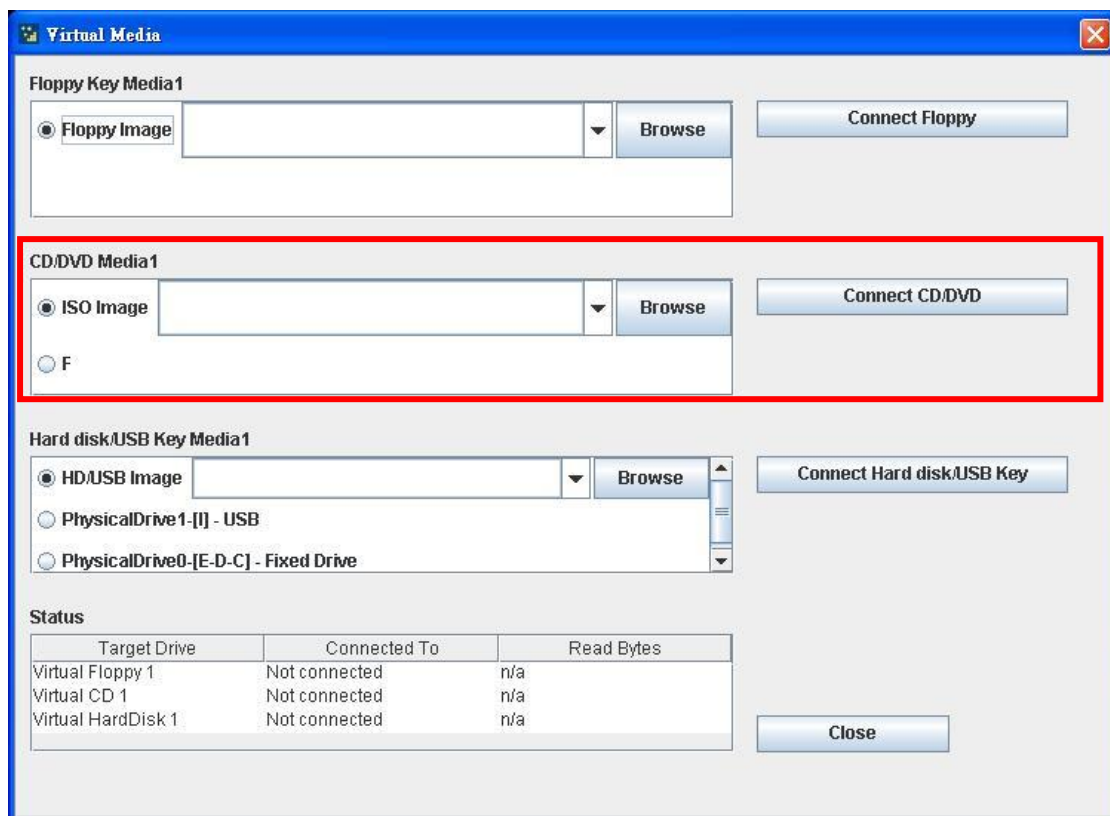
7. The **Status** window will display the connection status.
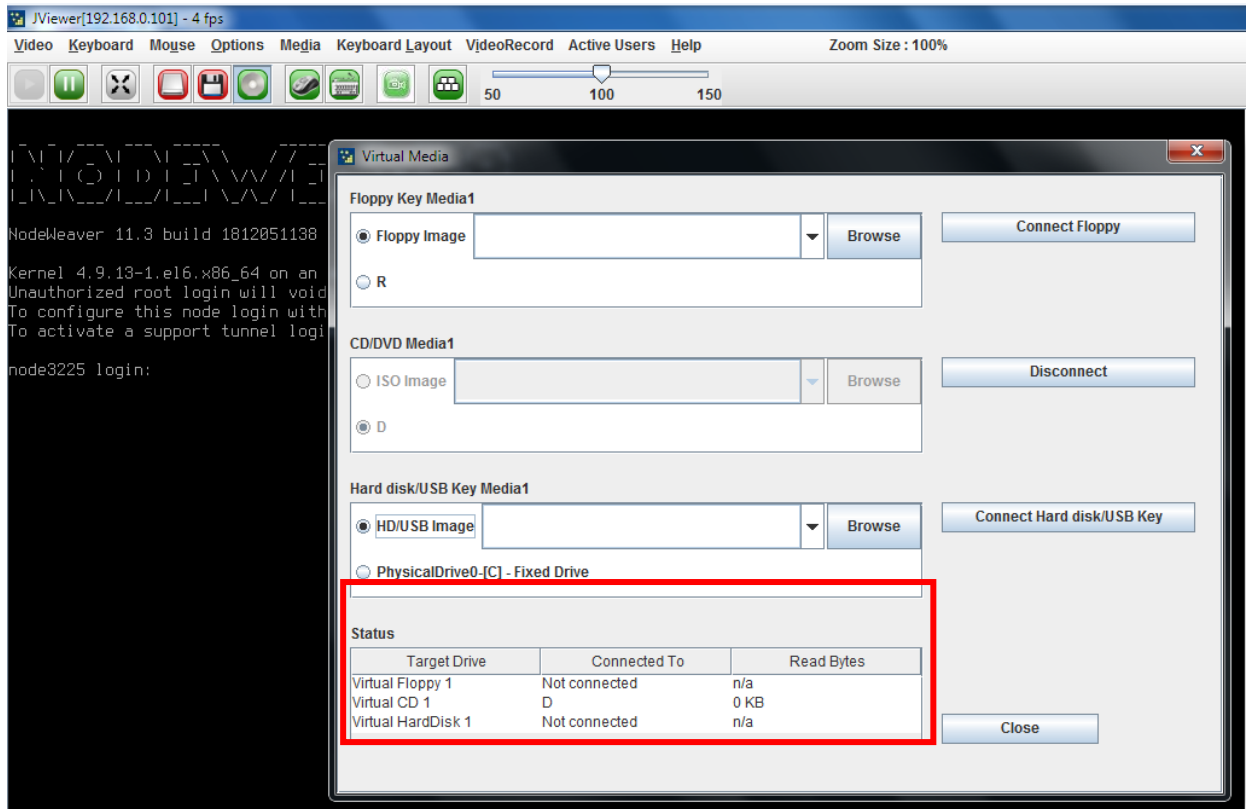
8. The installation process will automatically start. Please follow the onscreen instruction to complete the rest of the steps and restart the target system manually.

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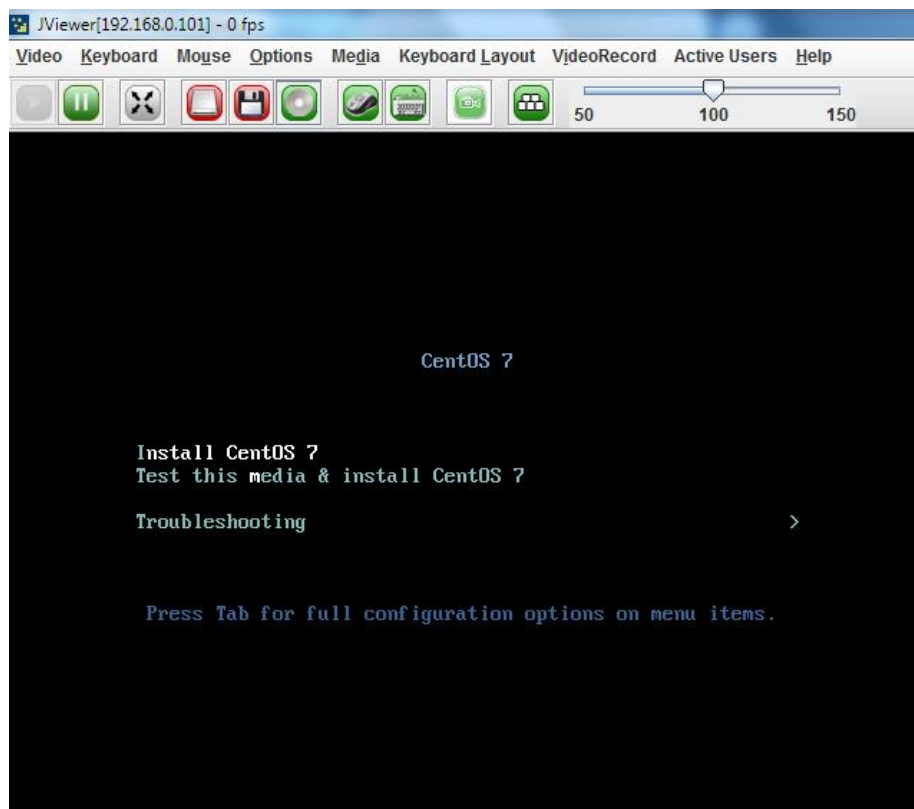
BIOS Setup

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.

Main Setup

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

1. Boot up the system.
2. Pressing the **<Tab>** 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

Setup page contains BIOS information and project version information.

```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
        Main  Advanced  Platform  Socket  Security  Boot  Save & Exit

        BIOS Information                             Set the Date. Use Tab
        BIOS Vendor           American Megatrends    to switch between Date
        Core Version          5.12   0.83 x64        elements.
        Compliancy            UEFI 2.5; PI 1.4       Default Ranges:
        BIOS Version          FNCA5710A00006T020     Year: 2005-2099
        Build Date and Time   06/28/2018 17:51:17    Months: 1-12
        Access Level          Administrator          Days: dependent on month


        System Date           [Sun 01/01/2017]       ------------------------
        System Time           [18:51:48]             →←: 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	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.

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Advanced Page

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
          Main  Advanced  Platform  Socket  Security  Boot  Save & Exit

    ▶ Trusted Computing                          Trusted Computing
    ▶ Super IO Configuration                     Settings
    ▶ Case Open Configuration
    ▶ Control Legacy PXE Boot
    ▶ Status LED Configuration
    ▶ Digital I/O Configuration
    ▶ Watch Dog Timer Configuration
    ▶ Serial Port Console Redirection
    ▶ PCI Subsystem Settings
    ▶ Network Stack Configuration
    ▶ CSM Configuration                          ↔: Select Screen
    ▶ NVMe Configuration                         ↑↓: Select Item
    ▶ USB Configuration                          Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

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```

Trusted Computing

```
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  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

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```

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.

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

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                                                              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 the 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)

```
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 Advanced

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

   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

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                                                                      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                                    ▸←: Select Screen
   TPM2.0 UEFI Spec       [TCG_2]             ↑↓: Select Item
 Version                                      Enter: Select
   Physical Presence      [1.3]               +/-: Change Opt.
 Spec Version                                 F1: General Help
   TPM 20                 [TIS]               F2: Previous Values
 InterfaceType                                F3: Optimized Defaults
   Device Select          [Auto]           ▼  F4: Save & Exit
                                              ESC: Exit

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                                                                      AB
```

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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 the 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.

Trusted Computing (PTT Enable)

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

                                                          ▲ Enables or Disables
   TPM20 Device Found                                       BIOS support for
   Vendor: INTC                                             security device. O.S.
   Firmware Version: 4.0                                    will not show Security
                                                            Device. TCG EFI
   Security Device          [Enable]                        protocol and INT1A
Support                                                     interface will not be
   Active PCR banks         SHA-1,SHA256                    available.
   Available PCR banks      SHA-1,SHA256

                                                          ─────────────────────
   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

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                                                                              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                   [CRB]                       F1: General Help
InterfaceType                                          F2: Previous Values
   Device Select            [Auto]                      F3: Optimized Defaults
                                                     ▼ F4: Save & Exit
                                                       ESC: Exit

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                                                                              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 the 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	CRB	Select the **CRB** (Communication Interface) for TPM 20 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.

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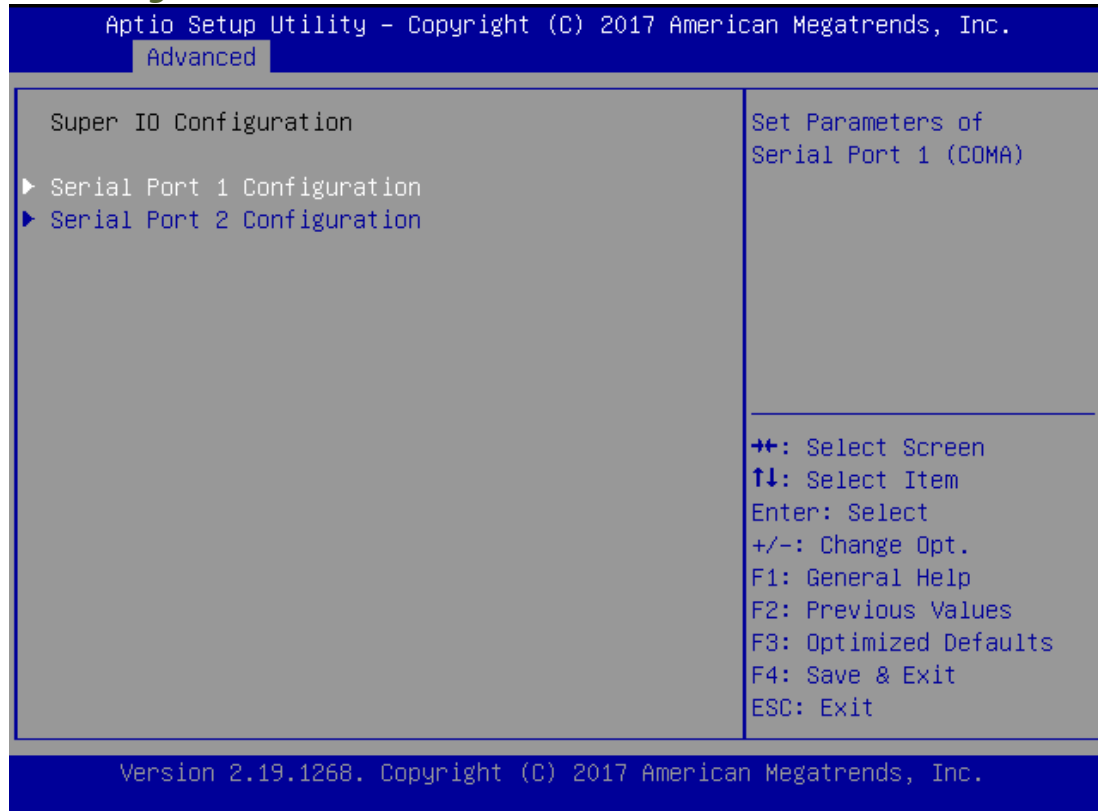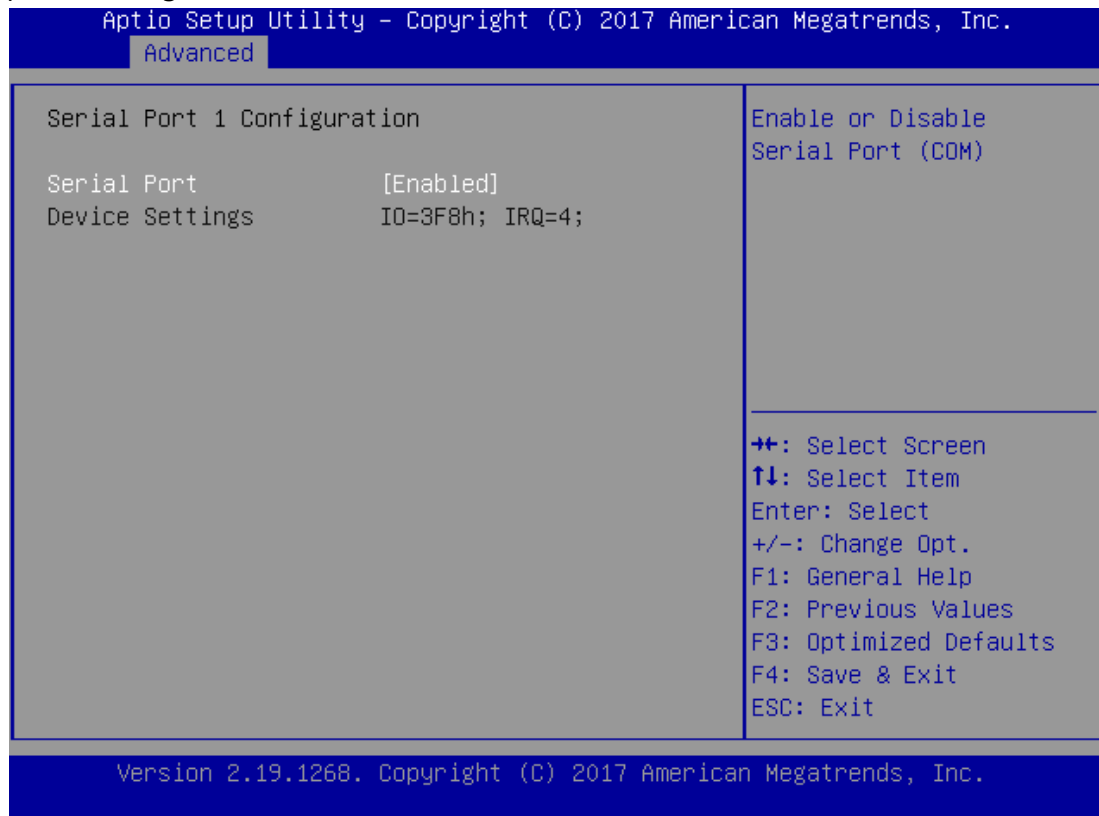
```
        Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
           Advanced

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

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```

Serial port 1 Configuration

Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1
Device Settings	NA	IO=3F8h; IRQ = 4

Serial Port 1
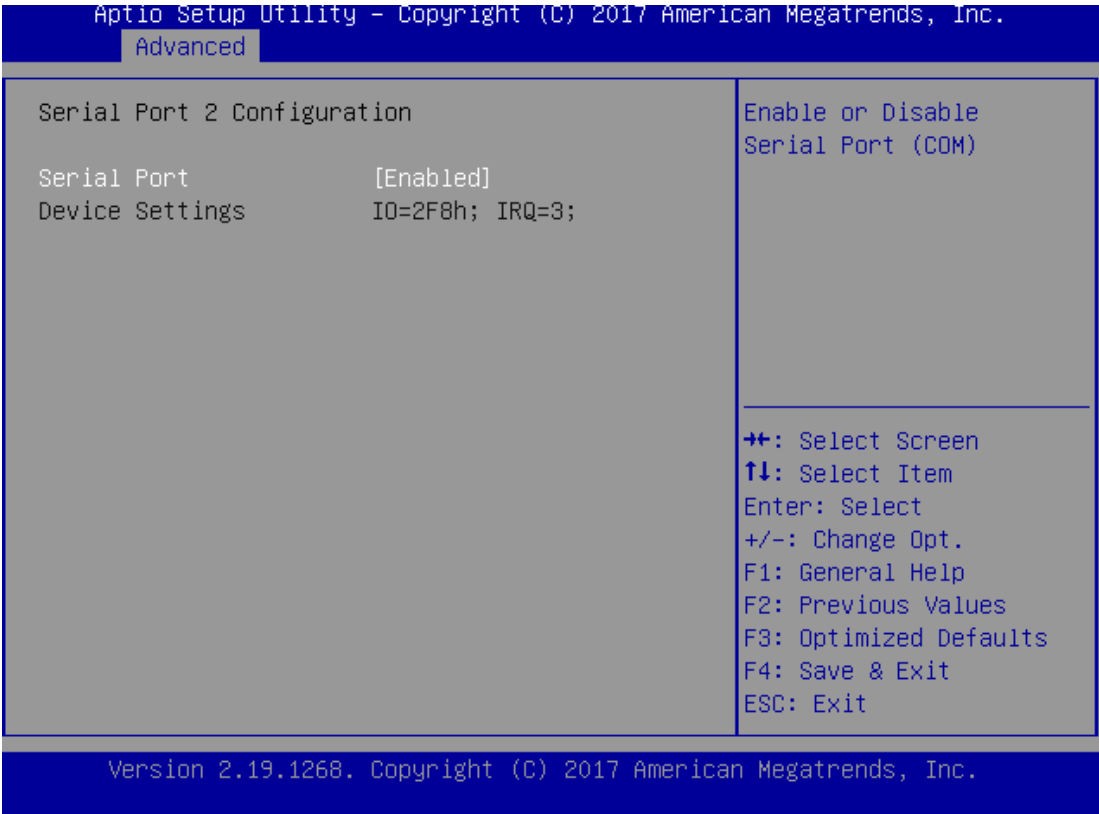
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Serial port 2 Configuration

```
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 Advanced

 Serial Port 2 Configuration                         Enable or Disable
                                                     Serial Port (COM)
 Serial Port              [Enabled]
 Device Settings          IO=2F8h; IRQ=3;




                                                     →←: 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
Serial Port	Enabled Disabled	Enables or disables Serial Port 2
Device Settings	NA	IO=2F8h; IRQ = 3

Case Open Configuration

```
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    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

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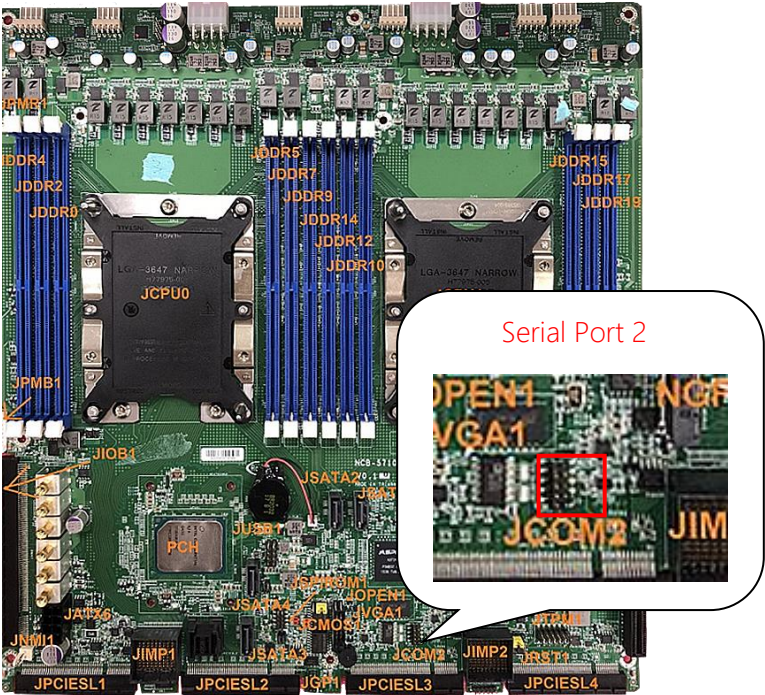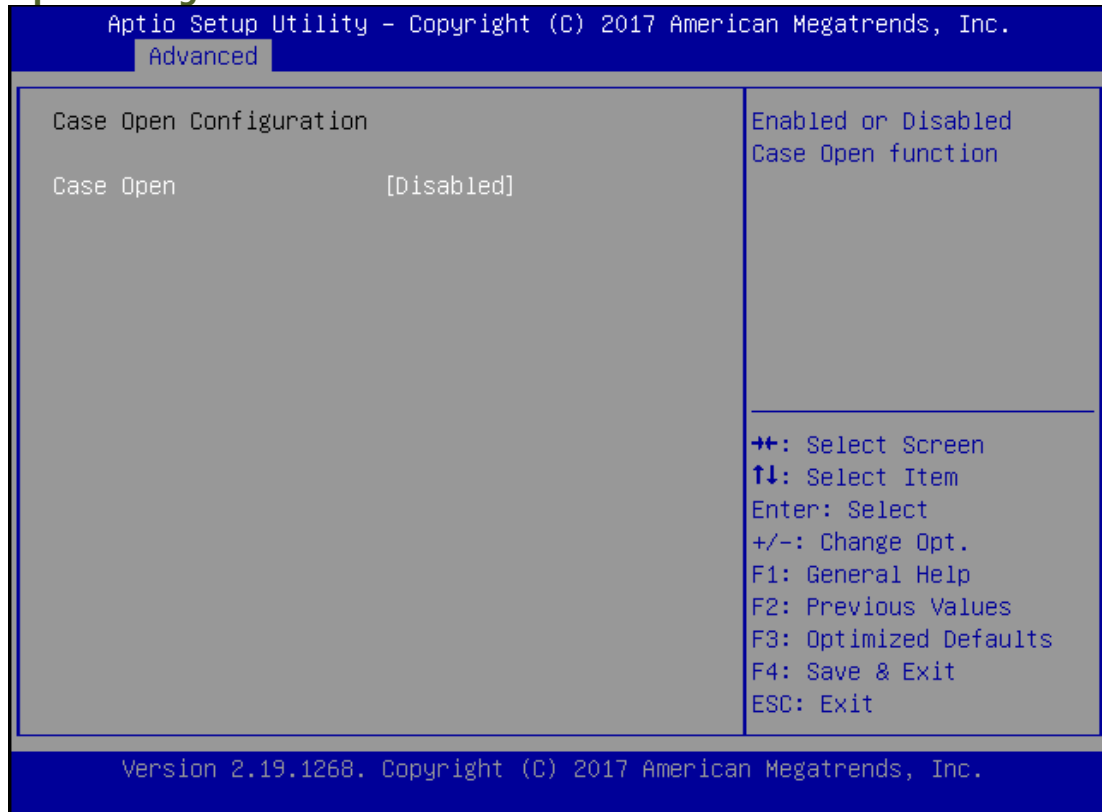
Feature	Options	Description
Case Open	Enabled Disabled	Enables or disables Case Open function

Control Legacy PXE Boot


```
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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


         Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```
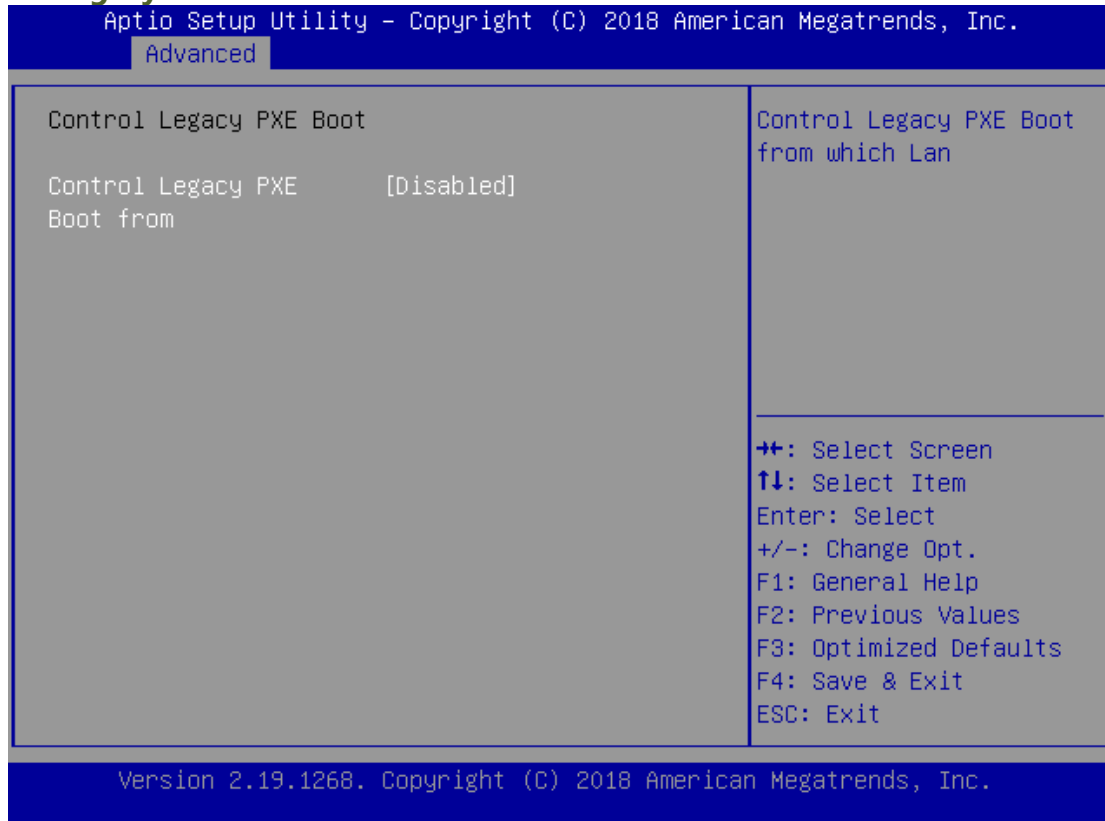
Feature	Options	Description
Control Legacy PXE Boot	Disabled MGT LAN1	Select On Board LAN# Boot

MGT LAN Port

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Status LED Configuration

```
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  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

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```
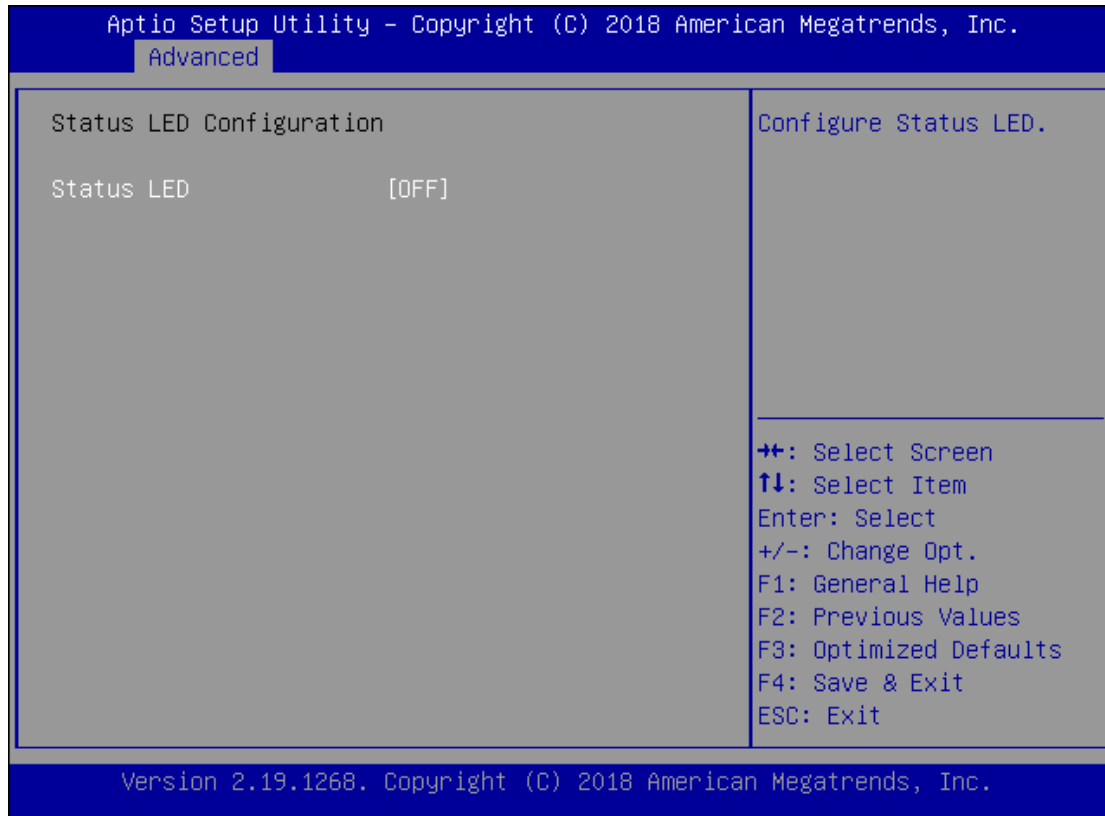
Feature	Options	Description
Status LED	OFF	Configures Status LED color
	GREEN	
	RED	

Digital I/O Configuration

```
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         Advanced

  Digital I/O Configuration                        Configure Digital I/O
                                                   Pin 5.
  Digital I/O Output 1     [Output Low]
  Digital I/O Output 2     [Output Low]
  Digital I/O Output 3     [Output Low]
  Digital I/O Output 4     [Output Low]



                                                   ++: 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
Digital I/O Output 1	Output High Output Low	Configure Digital I/O Pin5
Digital I/O Output 2	Output High Output Low	Configure Digital I/O Pin6
Digital I/O Output 3	Output High Output Low	Configure Digital I/O Pin7
Digital I/O Output 4	Output High Output Low	Configure Digital I/O Pin8

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Watch Dog Timer Configuration

```
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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 2.19.1268. Copyright (C) 2017 American Megatrends, Inc.
                                                                  B4
```
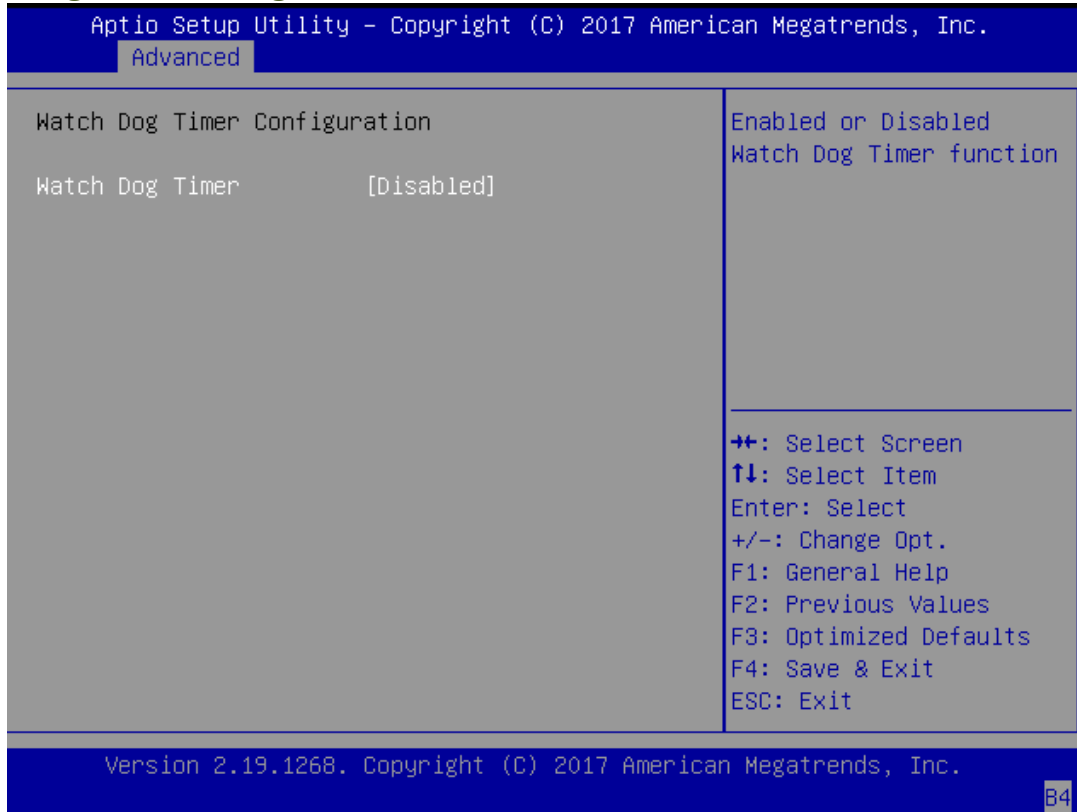
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Serial Port Console Redirection

```
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         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


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```

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

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                                            ─────────────────────
 Recorder Mode              [Disabled]             ➜←: Select Screen
 Resolution 100x31          [Disabled]             ↑↓: Select Item
 Legacy OS                  [80x24]                 Enter: Select
 Redirection                                        +/-: Change Opt.
 Resolution                                         F1: General Help
 Putty KeyPad               [VT100]                 F2: Previous Values
                                                  ▼ F3: Optimized Defaults
                                                    F4: Save & Exit
                                                    ESC: Exit

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```

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	Flow Control can prevent data loss from buffer

	Hardware RTS/CTS	overflow.
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
Legacy OS Redirection Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.
Redirection After BIOS POST	Always Enable BootLoader	When **Bootloader** is selected, Legacy Console Redirection is disabled before booting to legacy OS. When **Always Enable** is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to **Always Enable**.

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Legacy Console Redirection Settings

```
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  Advanced

  Legacy Serial            [COM0]              Select a COM port to
  Redirection Port                             display redirection of
                                               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 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```
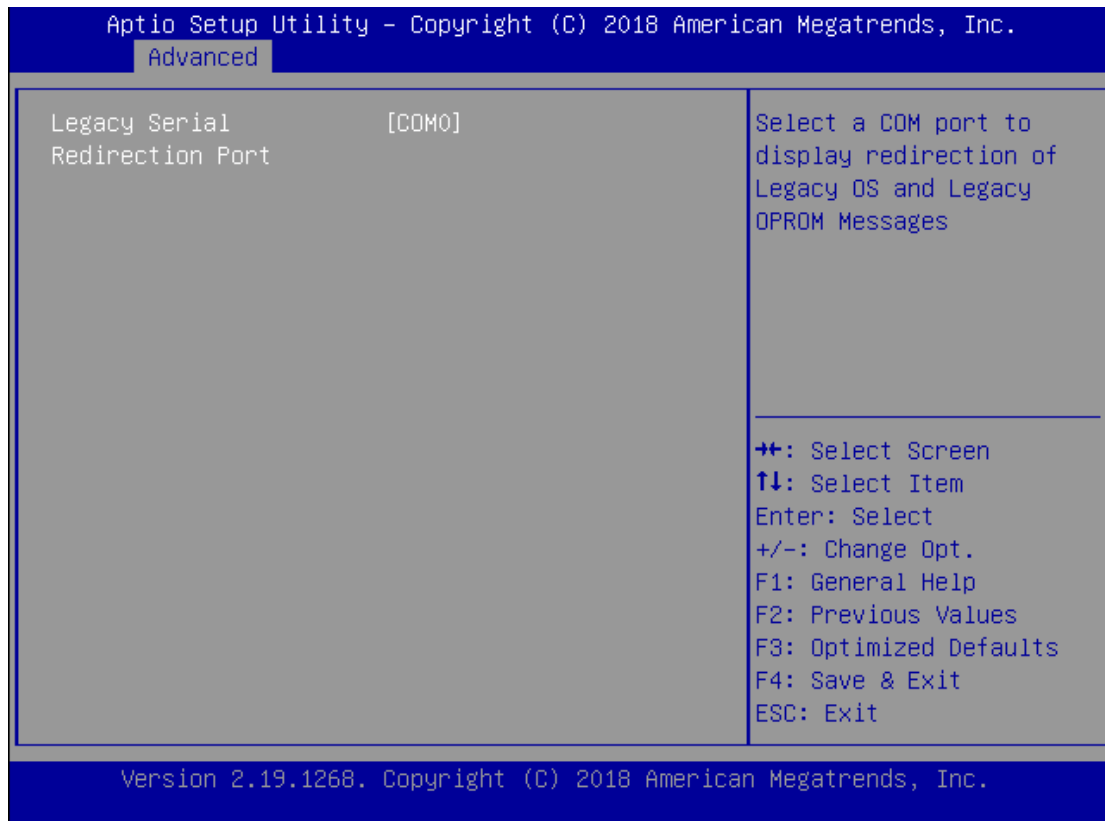
Feature	Options	Description
Legacy Serial Redirection Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages

Legacy Serial Redirection Port

PCI Subsystem Settings

```
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            Advanced

    PCI Bus Driver        A5.01.12              Enables or Disables
    Version                                     64bit capable Devices
                                                to be Decoded in Above
    PCI Devices Common Settings:                4G Address Space (Only
    Above 4G Decoding       [Disable]           if System Supports 64
    SR-IOV Support          [Disable]           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


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```

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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Network Stack Configuration
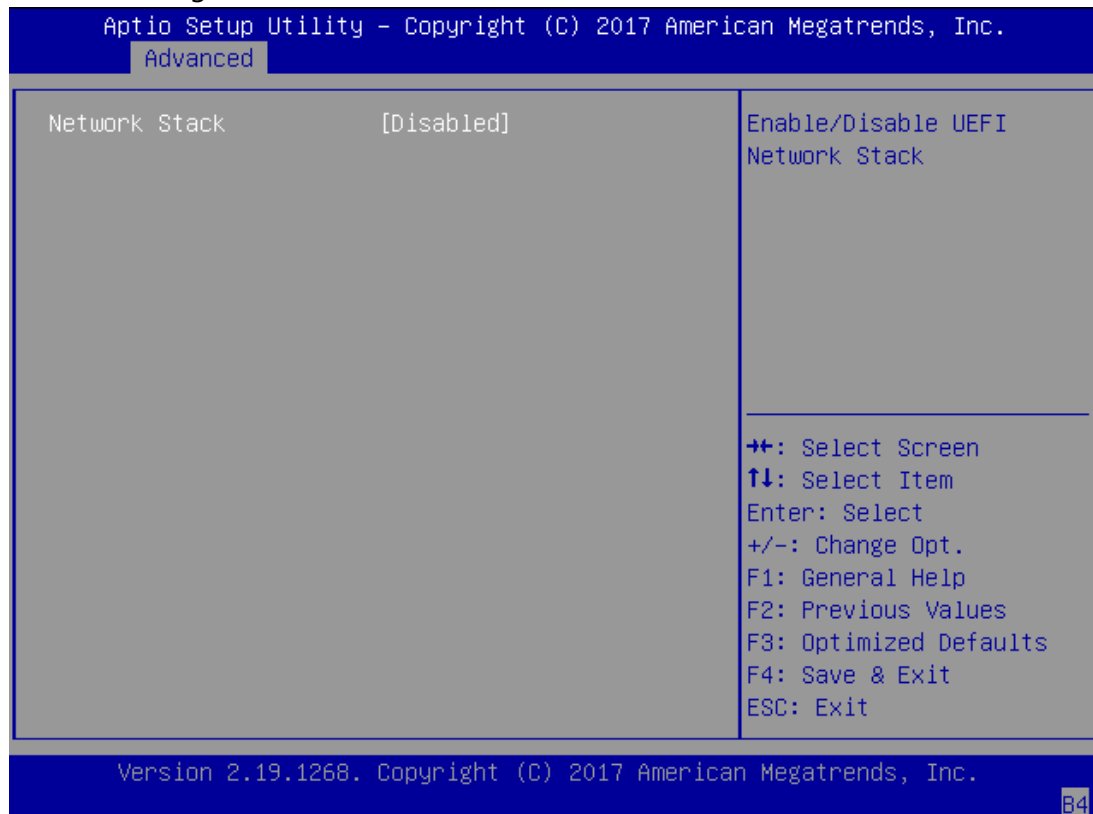
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, 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

CSM Configuration

```
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           Advanced

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

     CSM16 Module Version       07.81

     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


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                                                                          B4
```

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

NVMe Configuration

```
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          Advanced

     NVMe Configuration

     No NVME Device Found

                                                              ↔: 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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```

USB Configuration

```
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          Advanced

     USB Configuration                            ▲  Enables Legacy USB
                                                     support. AUTO option
     USB Module Version      17                      disables legacy support
                                                     if no USB devices are
     USB Controllers:                                connected. DISABLE
          1 XHCI                                     option will keep USB
     USB Devices:                                    devices available only
          1 Drive, 1 Keyboard                        for EFI applications.

     Legacy USB Support          [Enabled]
     XHCI Hand-off               [Enabled]           ↔: Select Screen
     USB Mass Storage            [Enabled]           ↑↓: Select Item
     Driver Support                                  Enter: Select
                                                     +/-: Change Opt.
     USB hardware delays                             F1: General Help
     and time-outs:                                  F2: Previous Values
     USB transfer time-out    [20 sec]               F3: Optimized Defaults
     Device reset time-out    [20 sec]            ▼  F4: Save & Exit
                                                     ESC: Exit

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                                                                          B4
```

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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.
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 10 sec 20 sec	USB mass storage device Start Unit command time-out
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

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Platform

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.

```
         Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
         Main  Advanced  Platform  Socket  Server Mgmt  Security  Boot          ▶

      ▶ PCH Configuration                            Displays and provides
      ▶ Server ME Configuration                      option to change the
      ▶ Runtime Error Logging                        PCH Settings




                                                     ───────────────────────

                                                     ↔: 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
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

```
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                  Platform

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

▶ PCI Express Configuration
▶ PCH SATA Configuration
▶ PCH sSATA Configuration
▶ Security Configuration
  Restore AC Power Loss    [Last State]
  Serial IRQ Mode          [Continuous]
  RTC Lock                 [Enable]               ▸◂: Select Screen
  BIOS Lock                [Enable]               ↑↓: 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
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.

PCI Express Configuration

```
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                    Platform

                                                       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.

PCH SATA Configuration

```
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                        Platform

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

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

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

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```

Feature	Options	Description
SATA Controller	Disabled Enabled	Enables or disables SATA Controller
Configure SATA as	AHCI RAID	This will configure SATA as **RAID** or **AHCI**.
Support Aggressive Link Power Management	Disabled Enabled	Enables or disables SALP
Port 0/1/2/3/4	Disabled Enabled	Enable or Disable SATA 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; requires hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives which

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		have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State 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 DirectConnect or M2

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PCH SATA Configuration

```
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                        Platform

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
                                               F3: Optimized Defaults
                                               F4: Save & Exit
                                               ESC: Exit

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```

Feature	Options	Description
sSATA Controller	Disabled Enabled	Enables or disables SATA Controller
Configure SATA as	AHCI RAID	This will configure SATA as **RAID** or **AHCI**.
Support Aggressive Link Power Management	Disabled Enabled	Enables or disables SALP
Port 0	Disabled Enabled	Enable or Disable SATA 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; requires hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives

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		which have this option enabled will spin up at boot. Otherwise, all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State 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 DirectConnect or M2

Security Configuration

```
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            Platform

  Security Configuration                        Enable/Disable SMM BIOS
                                                Write-Protect feature
  SMM BIOS Write          [Enable]
  Protect





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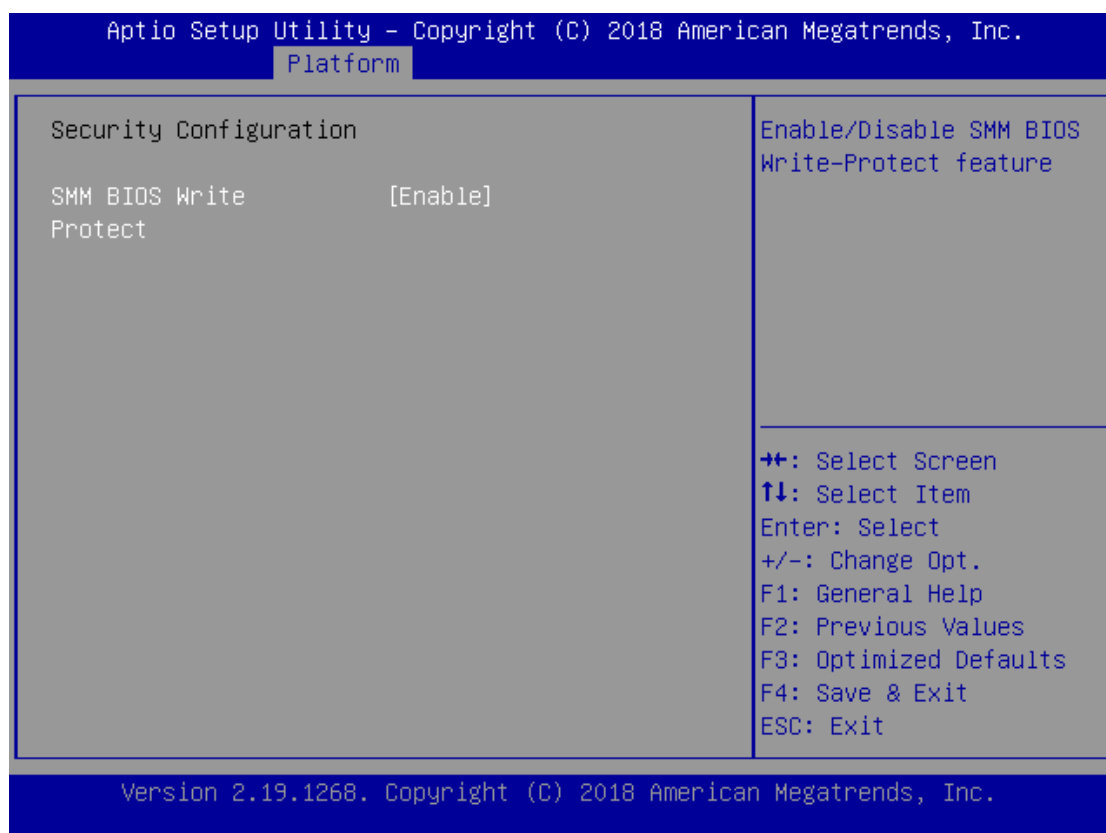
Feature	Options	Description
SMM BIOS Write Protect	Disabled Enabled	Enable/Disable SMM BIOS Write-Protect feature

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Server ME Configuration

```
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                   Platform

 General ME Configuration
 Oper. Firmware              0A:4.0.4.288
 Version
 Recovery Firmware           0A:4.0.4.288
 Version
 ME Firmware Status #1       0x000F0255
 ME Firmware Status #2       0x88114826
   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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```

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Runtime Error Logging

```
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                    Platform

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


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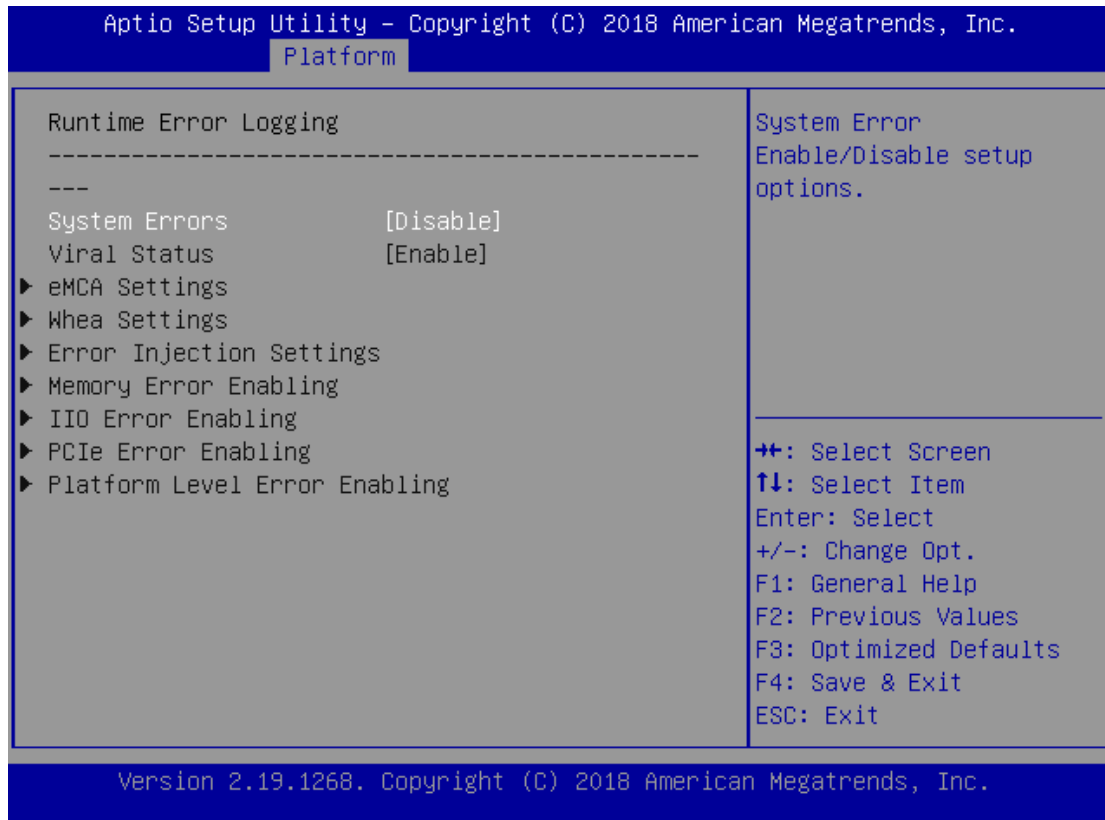
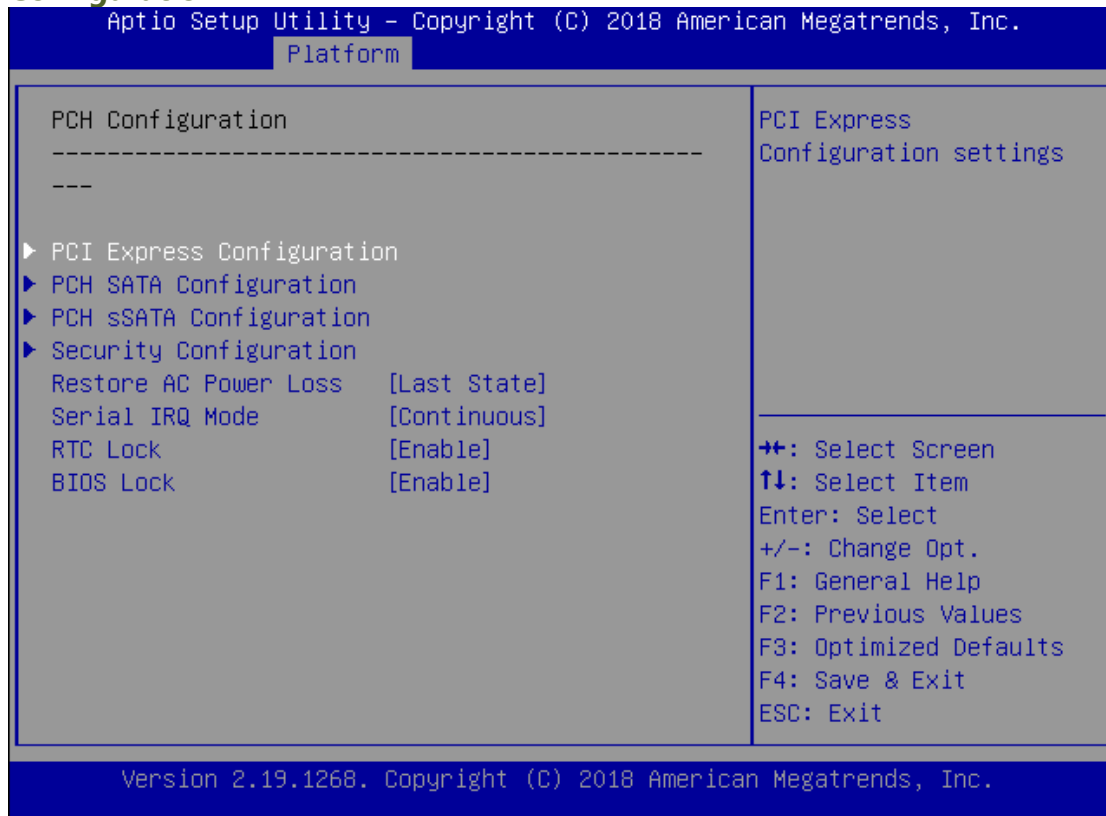| Feature	Options	Description
System Errors	Disabled Enabled	System Error Enable/Disable setup options.

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Socket

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.
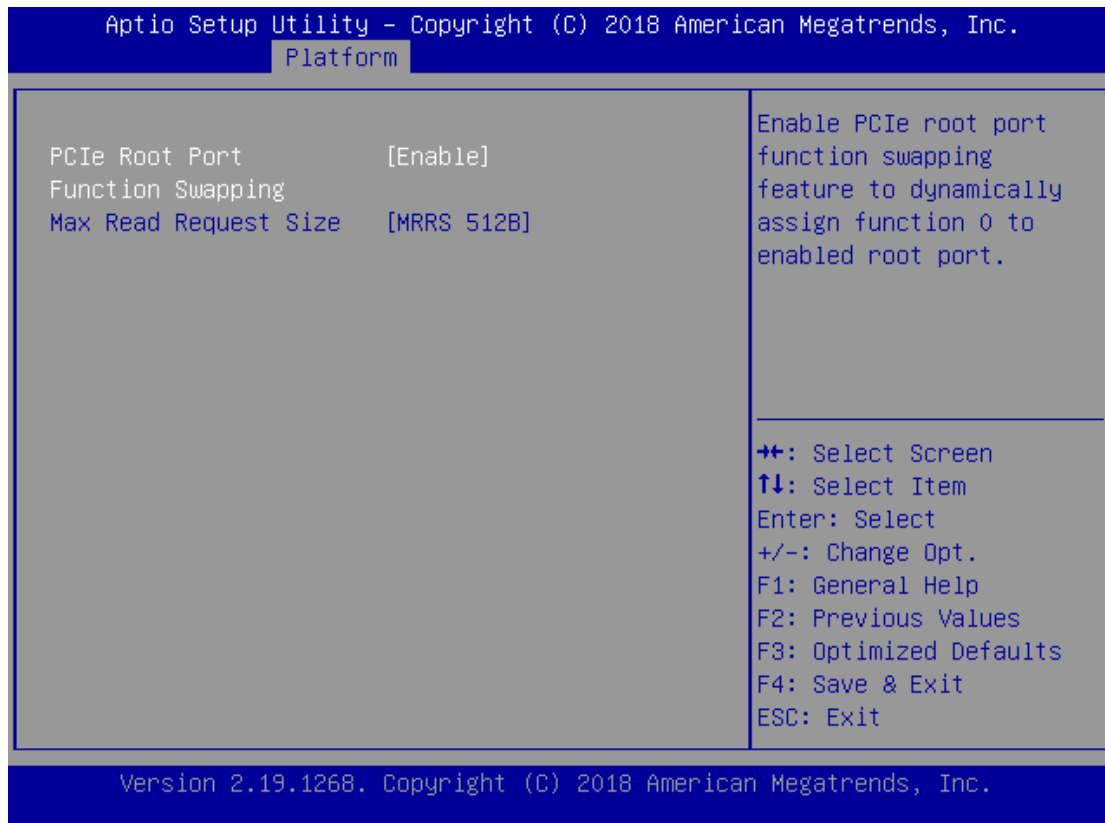
```
        Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Platform  Socket  Server Mgmt  Security  Boot

  ▶ Processor Configuration                    Displays and provides
  ▶ Memory Configuration                       option to change the
  ▶ IIO Configuration                          Processor Settings
  ▶ Advanced Power Management Configuration
    Numa                      [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
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

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

   Processor Configuration                           ▲ Change Per-Socket
   -----------------------------------------------     Settings
   ---
 ▶ Per-Socket Configuration
   Processor BSP              50654 - SKX M0
   Revision
   Processor Socket          Socket 0    Socket 1
   Processor ID              00050654* | 00050654
   Processor Frequency       2.300GHz  | 2.300GHz
   Processor Max Ratio            17H  | 17H
   Processor Min Ratio            0AH  | 0AH         ++: Select Screen
   Microcode Revision        0200004D                ↑↓: Select Item
   L1 Cache RAM                   64KB |      64KB    Enter: Select
   L2 Cache RAM                 1024KB |    1024KB    +/-: Change Opt.
   L3 Cache RAM                16896KB |   16896KB    F1: General Help
   Processor 0 Version       Intel(R) Xeon(R) Gold 5  F2: Previous Values
                             118 CPU @ 2.30GHz        F3: Optimized Defaults
   Processor 1 Version       Intel(R) Xeon(R) Gold 5 ▼ F4: Save & Exit
                                                      ESC: Exit

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```

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

   L2 Cache RAM                 1024KB |    1024KB  ▲ Enable/disable AES-NI
   L3 Cache RAM                16896KB |   16896KB    support
   Processor 0 Version       Intel(R) Xeon(R) Gold 5
                             118 CPU @ 2.30GHz
   Processor 1 Version       Intel(R) Xeon(R) Gold 5
                             118 CPU @ 2.30GHz

   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

Per-Socket Configuration
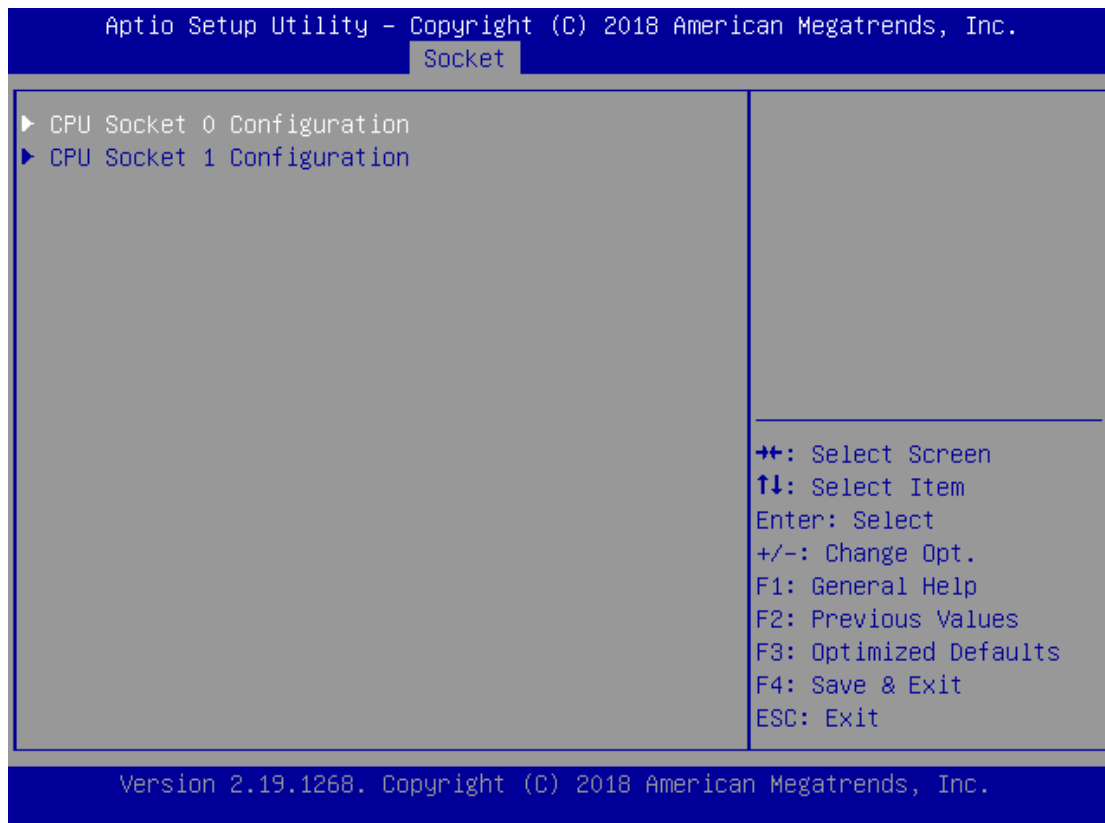
Feature	Options	Description
CPU Socket0 Configuration	None	None
CPU Socket1 Configuration	None	None

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CPU Socket0 Configuration

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

 CPU Socket 0 Configuration                            0: Enable all cores.
 ----------------------------------------------        FFFFFFF: Disable all
 ---                                                   cores


 Core Disable                  0
 Bitmap(Hex)
 IOT Cfg                       [Disable]


                                                       →←: 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
Core Disable Bitmap(Hex)	0	**0**: Enable all cores. **3fff**: Disable all cores
IOT Cfg	Disabled Enabled	None

CPU Socket1 Configuration

```
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                            Socket

CPU Socket 1 Configuration                          0: Enable all cores.
-------------------------------------------------   FFFFFFF: Disable all
---                                                 cores


Core Disable                  0
Bitmap(Hex)
IOT Cfg                       [Disable]


                                                    �↔: 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
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

    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	Maximum Memory Frequency Selections in Mhz. Do not select Reserved

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	3600-OvrClk	
	3733-OvrClk	
	3800-OvrClk	
	4000-OvrClk	
	4200-OvrClk	
	4266-OvrClk	
	4400-OvrClk	
Memory Topology	None	Displays memory topology with DIMM population information

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

        ------------------------------------------------
        ---
        Socket0.ChA.Dimm0:  DIMM is Present. DIMM
        Status:Enabled  DIMM Details: 2400MT/s UNKNOWN
        SRx8 8GB RDIMM
        Socket0.ChE.Dimm0:  DIMM is Present. DIMM
        Status:Enabled  DIMM Details: 2400MT/s UNKNOWN
        SRx8 8GB RDIMM

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

            Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```

IIO Configuration

```
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                                  Socket

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

 ▶ Socket0 Configuration
 ▶ Socket1 Configuration
 ▶ IOAT Configuration
 ▶ Intel® VT for Directed I/O (VT-d)
   PCI-E ASPM Support        [Disable]
   (Global)
   PCIe Extended Tag         [Enable]            ↔: Select Screen
   Enable                                        ↑↓: Select Item
   PCIe Max Read             [Auto]              Enter: Select
   Request Size                                  +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit

            Version 2.19.1268. Copyright (C) 2018 American Megatrends, Inc.
```
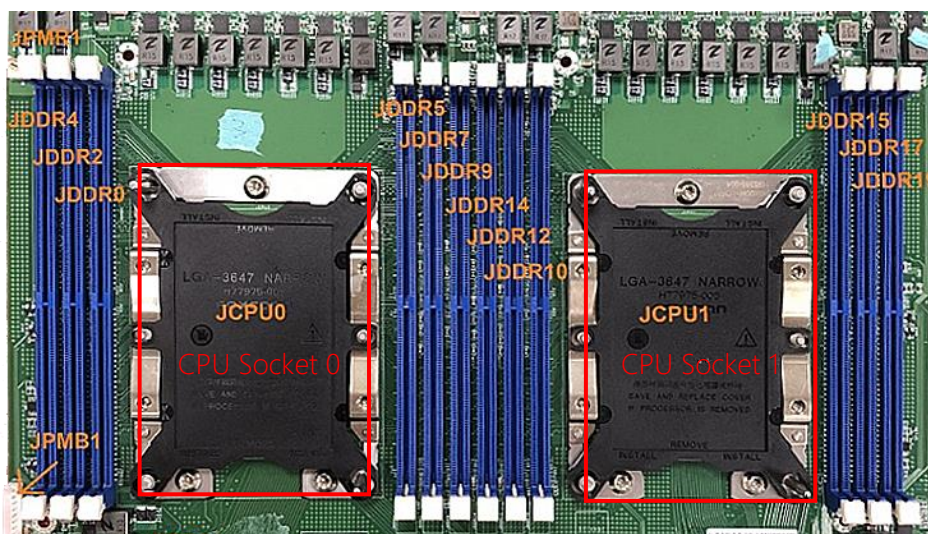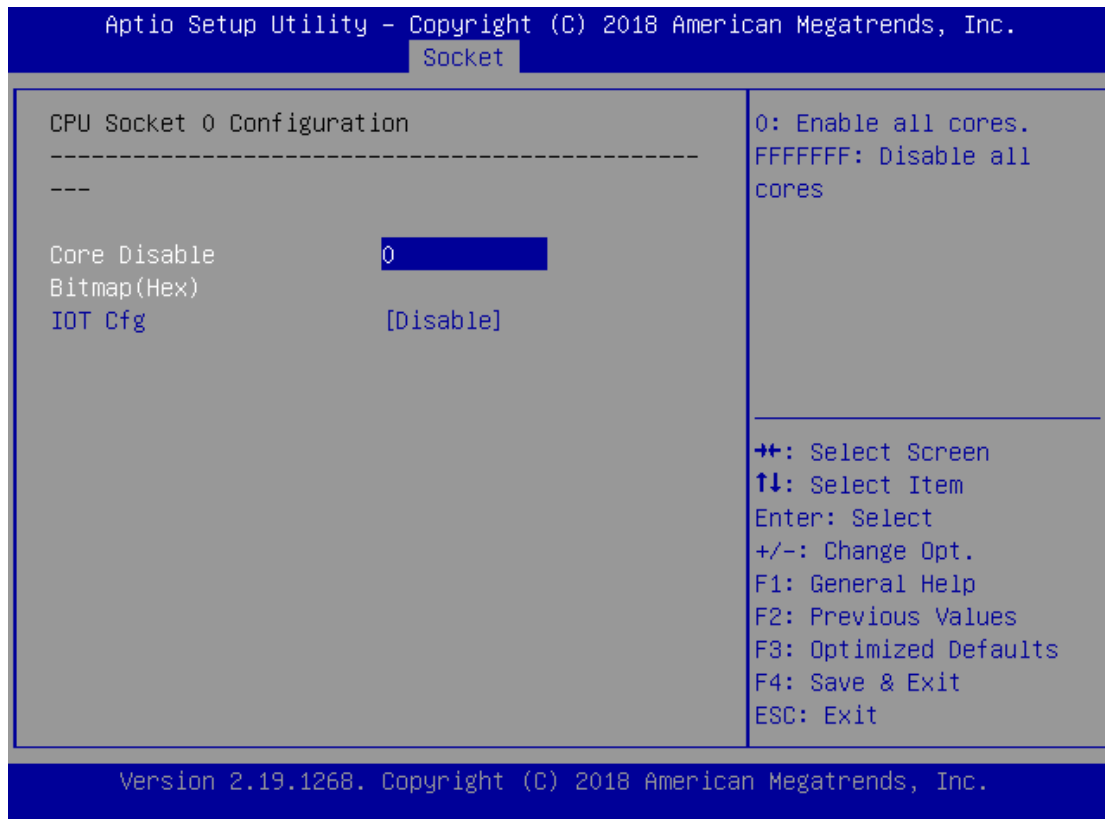
Feature	Options	Description
Socket0 Configuration	None	None
Socket1 Configuration	None	None
IOAT Configuration	None	All IOAT configuration options
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel? VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	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

Socket0 Configuration
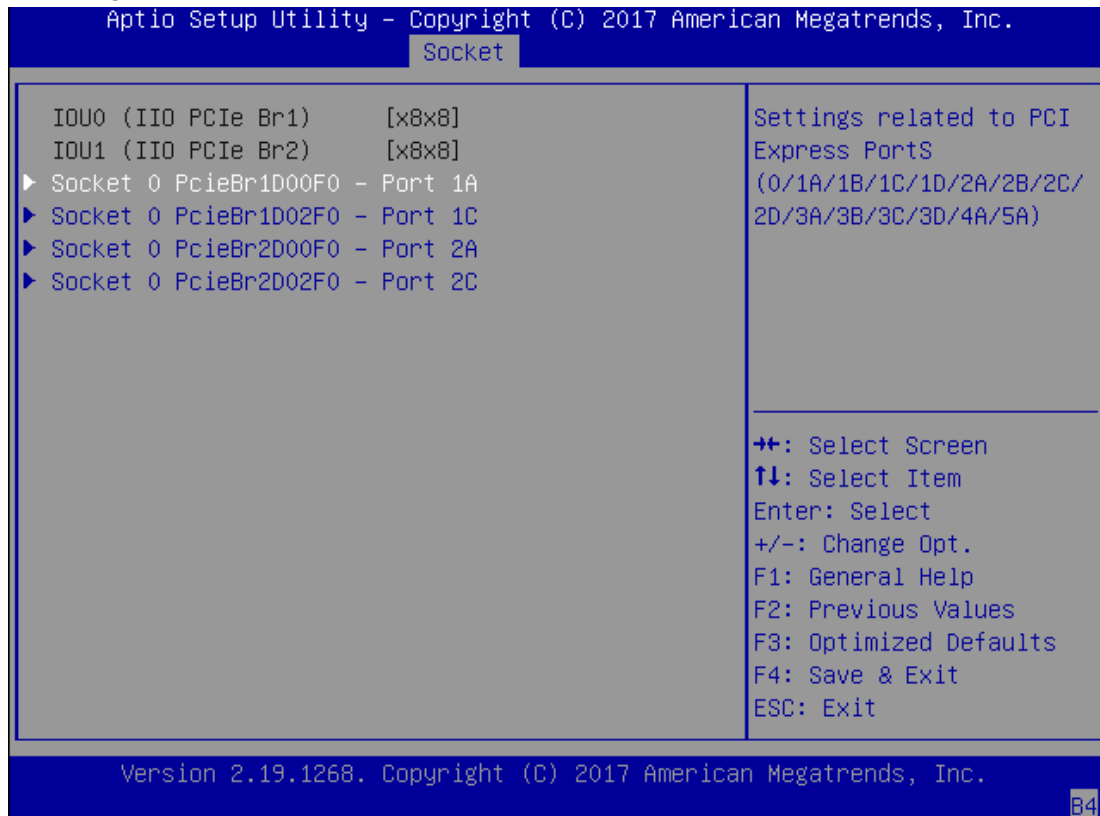
Feature	Options	Description
Socket 0 PcieBr1D00F0	None	Settings related to PCI Express Port 1A
Socket 0 PcieBr1D02F0	None	Settings related to PCI Express Port 1C
Socket 0 PcieBr2D00F0	None	Settings related to PCI Express Port 2A
Socket 0 PcieBr2D02F0	None	Settings related to PCI Express Port 2C

PCIe Slot 1
(1A~1D)

PCIe Slot 2
(2A~2D)

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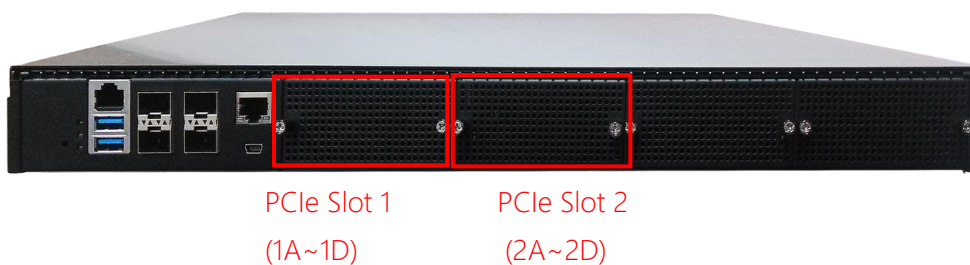
Socket0 PcieBr1D00F0 – Port 1A/1C/2A/2C

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

  Socket 0 PcieBr1D00F0 - Port 1A          ▲  In auto mode the BIOS
  ---------------------------------------      will remove the EXP
  ---                                          port if there is no
                                               device or errors on
  PCI-E Port              [Auto]               that device and the
  Hot Plug Capable        [Disable]            device is not HP
  Surprise Hot Plug       [Disable]            capable.  Disable is
  Capable                                      used to disable the
  Link Speed              [Auto]
  PCI-E Port DeEmphasis   [-6.0 dB]         ─────────────────────────
  PCI-E Port Link         Link Did Not Train
  Status                                    ↔: Select Screen
  PCI-E Port Link Max     Max Width x8      ↑↓: Select Item
  PCI-E Port Link Speed   Link Did Not Train Enter: Select
  PCI-E Port Max          [Auto]            +/-: Change Opt.
  Payload Size                              F1: General Help
  PCI-E ASPM Support      [Disable]         F2: Previous Values
  Compliance Mode         [Disable]       ▼ F3: Optimized Defaults
                                            F4: Save & Exit
                                            ESC: Exit

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```

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

  PCI-E ASPM Support      [Disable]         ▲ Reserved I/O
  Compliance Mode         [Disable]           (4K/8K/12K/16K/20K)
  Extra Bus Reserved      0                   Range for this Root
  Reserved Memory         40                  Bridge.
  Reserved Memory         1
  Alignment
  Reserved                40
  Prefetchable Memory
  Reserved                1
  Prefetchable Memory
  Alignment                                ─────────────────────────
  64 bit Reserved         40                ↔: Select Screen
  Prefetchable Memory                        ↑↓: Select Item
  64 bit Reserved         1                  Enter: Select
  Prefetchable Memory                        +/-: Change Opt.
  Alignment                                  F1: General Help
  Reserved I/O            4                  F2: Previous Values
                                             F3: Optimized Defaults
                                           ▼ F4: Save & Exit
                                             ESC: Exit

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```

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Feature	Options	Description
PCI-E Port	Auto Enable Disable	In auto mode the BIOS will remove the EXP port if there is no device or errors on that device and the device is not HP capable. Disable is used to disable the port and hide its CFG space.
Hot Plug Capable	Enable Disable	This option specifies if the link is considered Hot Plug capable.
Surprise Hot Plug Capable	Enable Disable	This option specifies if the link is considered Surprise Hot Plug capable.
Link Speed	Auto Gen 1 (2.5 GT/s) Gen 2 (5 GT/s) Gen 3 (8 GT/s)	Choose Link Speed for this PCIe port
PCI-E Port DeEmphasis	-6.0 dB -3.5 dB	De-Emphasis control (LNKCON2[6]) for this PCIe port.
PCI-E Port Max Payload Size	Auto 128B 256B	Set Maxpayload size to 256B if possible
PCI-E ASPM Support	Auto L1 Only Disable	This option enables / disables the ASPM (L1) support for the downstream devices.
Compliance Mode	Enable Disable	Disable/Enable Compliance Mode for this PCIe port
Extra Bus Reserved	0	Extra Bus Reserved for bridges behind this Root Bridge.
Reserved Memory	40	Reserved Memory Range for this Root Bridge.
Reserved Memory Alignment	1	Reserved Memory Alignment (0 - 31 bits)
Reserved Prefetchable Memory	40	Reserved Prefetchable Memory Range for this Root Bridge.
Reserved Prefetchable Memory Alignment	1	Reserved Prefetchable Memory Alignment (0 - 31 bits)
64 bit Reserved Prefetchable Memory	40	64 bit Reserved Prefetchable Memory Range for this Root Bridge.
64 bit Reserved Prefetchable Memory Alignment	1	64 bit Reserved Prefetchable Memory Alignment (0 - 31 bits)
Reserved I/O	4	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

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Socket1 Configuration

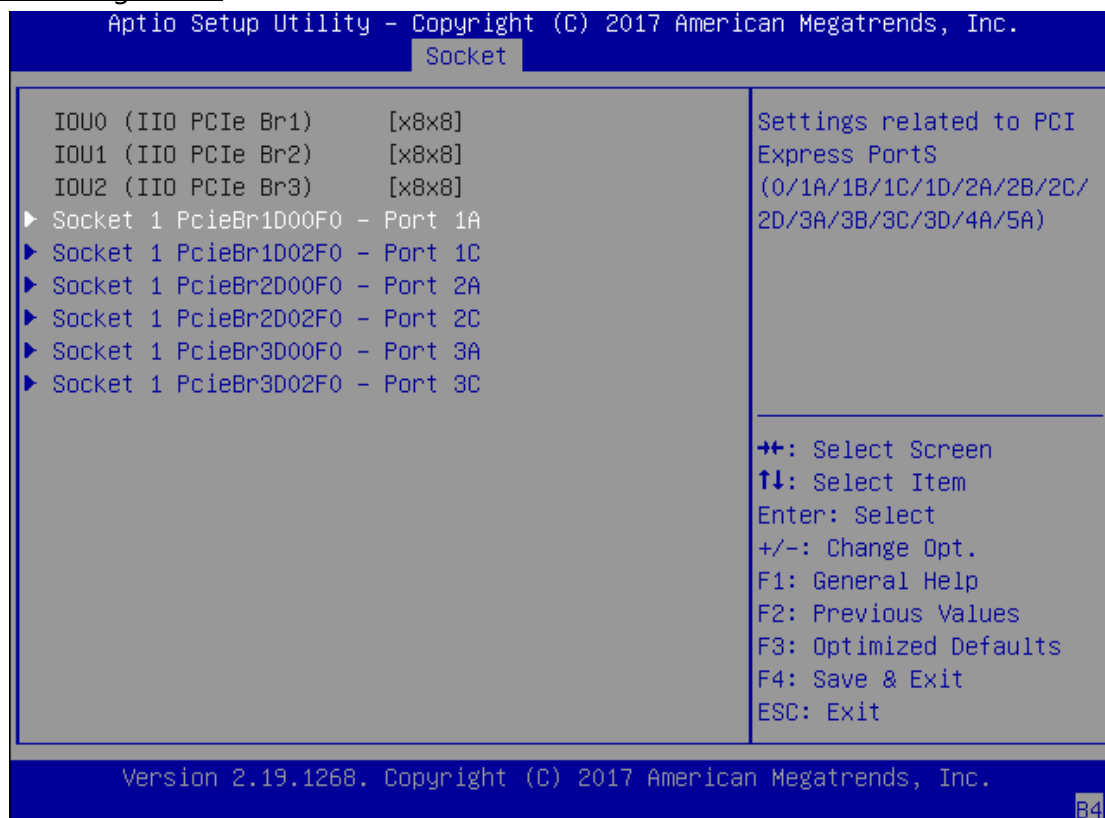| Feature	Options	Description
Socket 1 PcieBr1D00F0	None	Settings related to PCI Express Port 1A
Socket 1 PcieBr1D02F0	None	Settings related to PCI Express Port 1C
Socket 1 PcieBr2D00F0	None	Settings related to PCI Express Port 2A
Socket 1 PcieBr2D02F0	None	Settings related to PCI Express Port 2C
Socket 1 PcieBr3D00F0	None	Settings related to PCI Express Port 3A
Socket 1 PcieBr3D02F0	None	Settings related to PCI Express Port 3C

PCIe Slot 3
(1A~1D)

PCIe Slot 4
(2A~2D)

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IOAT Configuration

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

  ▶ Sck0 IOAT Config
  ▶ Sck1 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

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```

Feature	Options	Description
Sck0 IOAT Config	None	None
Sck1 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

Intel® VT for Directed I/O (VT-d)

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

 Intel® VT for Directed I/O (VT-d)             Enable/Disable Intel®
 -----------------------------------------     Virtualization
 ---                                           Technology for Directed
                                               I/O (VT-d) by reporting
 Intel® VT for           [Disable]             the I/O device
 Directed I/O (VT-d)                           assignment to VMM
                                               through DMAR ACPI
                                               Tables.

                                               _____

                                               →←: 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
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.

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Advanced Power Management Configuration

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

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




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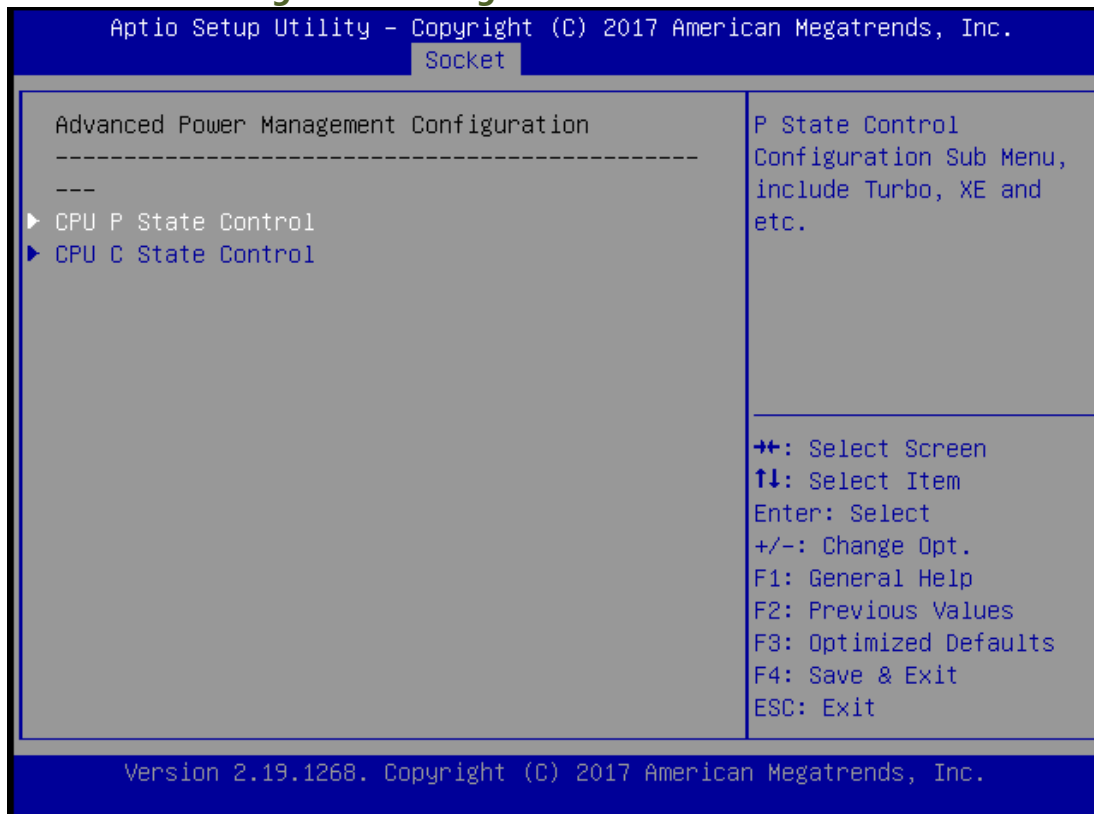
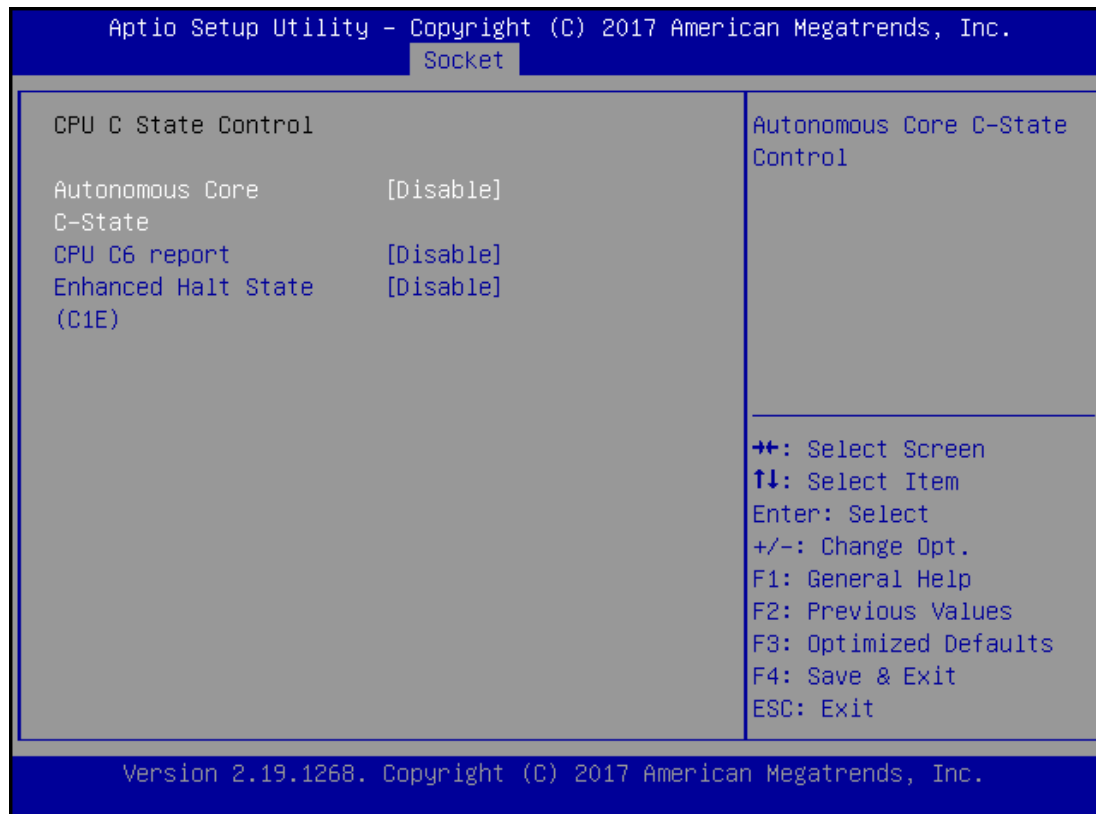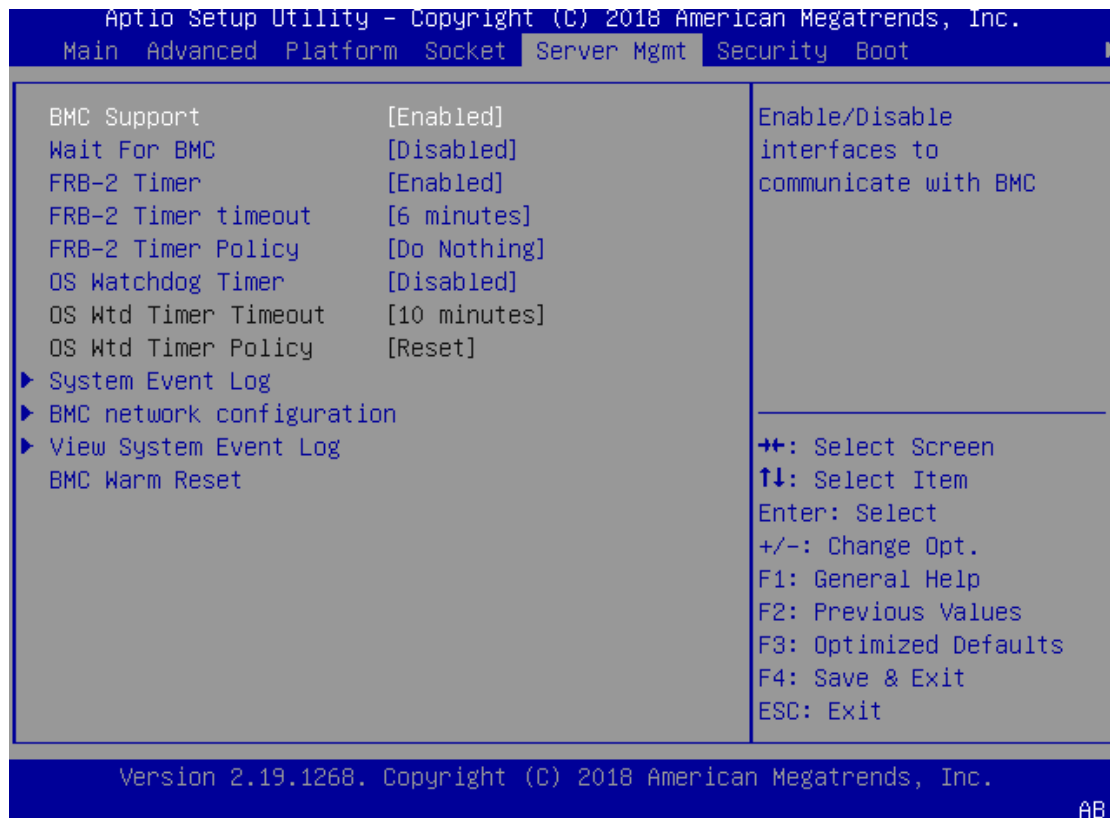| Feature	Options	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU C State setting

CPU P State Control

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

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

CPU C State Control

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

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

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Server Mgmt(SKU B and C Only)

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Main  Advanced  Platform  Socket  Server Mgmt  Security  Boot

  BMC Support                [Enabled]              Enable/Disable
  Wait For BMC               [Disabled]             interfaces to
  FRB-2 Timer                [Enabled]              communicate with BMC
  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
▶ BMC network configuration
▶ View System Event Log                             ──────────────────
  BMC Warm Reset                                    →←: 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) 2018 American Megatrends, Inc.
                                                                          AB
```

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.

System Event Log

```
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                              Server Mgmt

  Enabling/Disabling Options                          Change this to enable
  SEL Components            [Enabled]                 or disable all features
                                                      of System Event Logging
  Erasing Settings                                    during 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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                                                                         AB
```

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	Choose options for reactions to a full SEL.

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BMC network configuration

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

  --BMC network configuration--                      Select to configure LAN
  ***********************                             channel parameters
  Configure IPV4 support                             statically or
  ***********************                             dynamically(by BIOS or
                                                      BMC). Unspecified
  Lan channel 1                                       option will not modify
  Configuration          [Unspecified]               any BMC network
  Address source                                     parameters during BIOS
  Current                StaticAddress
  Configuration                                      _____
  Address source
  Station IP address     192.168.0.100               →←: Select Screen
  Subnet mask            255.255.255.0               ↑↓: Select Item
  Station MAC address    02-0c-63-77-de-98           Enter: Select
  Router IP address      192.168.0.1                 +/-: Change Opt.
  Router MAC address     00-00-00-00-00-00           F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

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```

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.

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View System Event Log

```
           Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
     Main   Advanced   Platform   Socket   Server Mgmt   Security   Boot              ▶

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

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                                                                            AB
```

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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) 2017 American Megatrends, Inc.
 Main  Advanced  Platform  Socket  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 2.19.1268. Copyright (C) 2017 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.

Secure Boot

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

     System Mode              Setup                    Secure Boot activated
     Secure Boot              Not Active               when
     Vendor Keys              Active                    Platform Key(PK) is
                                                       enrolled,
     Attempt Secure Boot      [Disable]                 System mode is
     Secure Boot Mode         [Custom]                 User/Deployed,
   ▶ Key Management                                     and CSM function is
                                                       disabled


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

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

Feature	Options	Description
Attempt Secure Boot	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	Secure Boot mode selector: In **Custom** mode, Secure Boot Variables can be configured without authentication

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Key Management
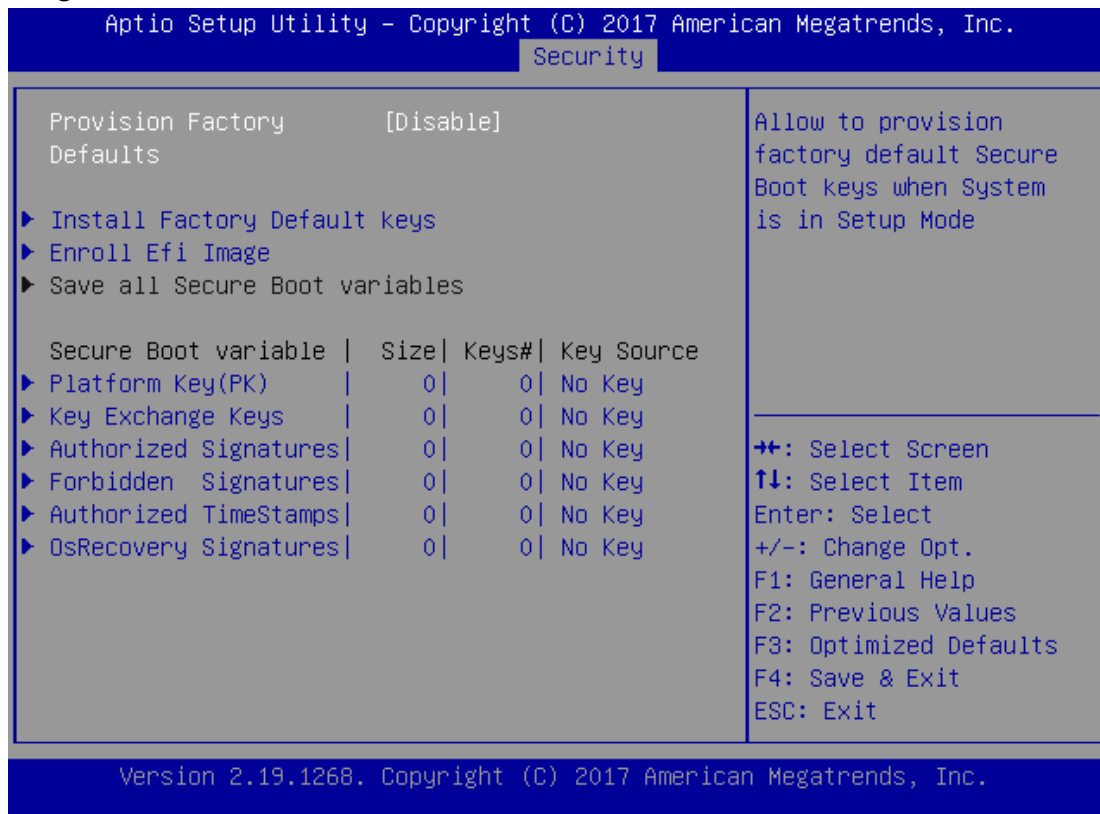
Feature	Options	Description
Provision Factory Defaults	Disabled Enabled	Allows User to provision factory default Secure Boot keys when System is in Setup Mode.
Install Factory Default keys	None	Forces System to User Mode - install all Factory Default keys
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)

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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.
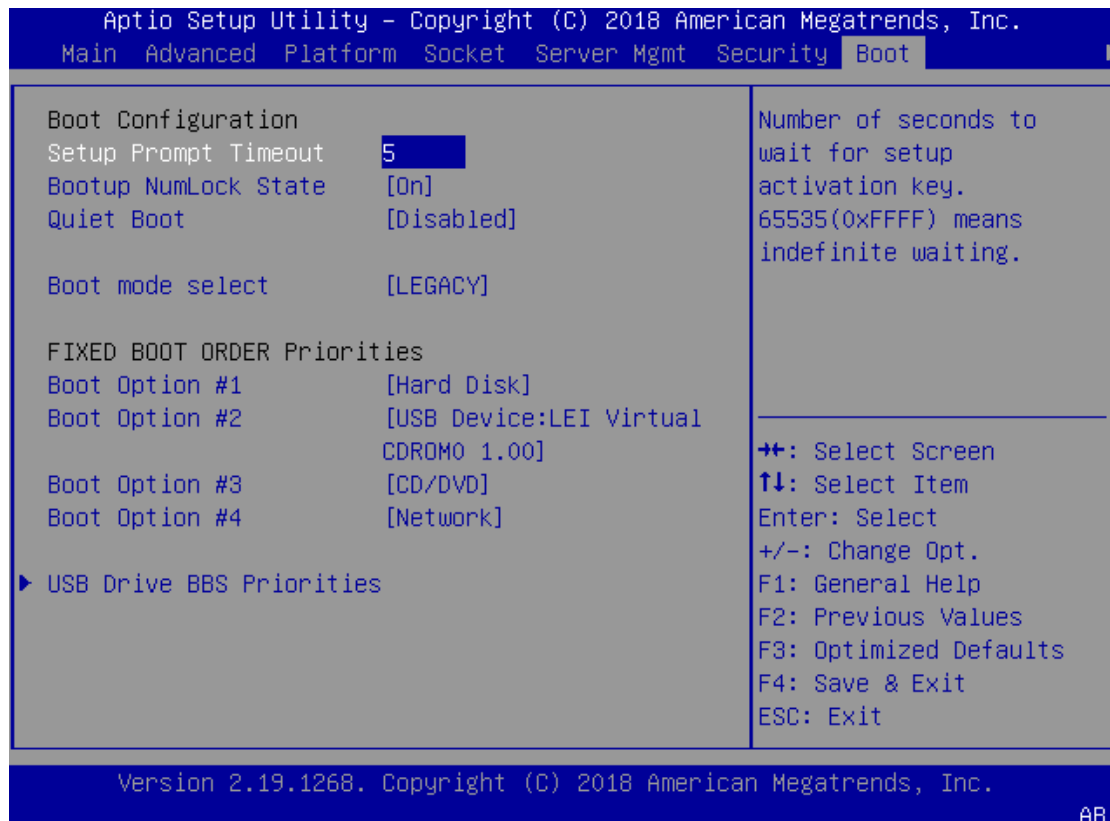
Feature	Options	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL	Select boot mode for LEGACY or UEFI.

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

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.

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Save & Exit

Save Options                                    Exit system setup
Discard Changes and Exit                        without saving any
Save Changes and Reset                          changes.

Default Options
Restore Defaults

Boot Override
LEI Virtual CDROM0 1.00
LEI Virtual Floppy0 1.00
LEI Virtual HDisk0 1.00                         →←: Select Screen
LEI Virtual CDROM1 1.00                         ↑↓: Select Item
LEI Virtual CDROM2 1.00                         Enter: Select
SRT USB 1100                                    +/-: Change Opt.
Launch EFI Shell from filesystem device         F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit

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                                                               AB
```

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
```
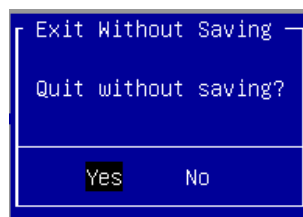
Save Changes and Reset

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

```
/---------- Save & reset ----------\
|                                   |
|  Save configuration and reset?    |
|                                   |
|-----------------------------------|
|       Yes           No            |
\-----------------------------------/
```

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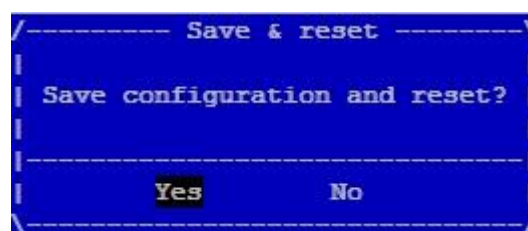
Restore Defaults

Restore default values for all setup options. Select "Yes" to load Optimized defaults.
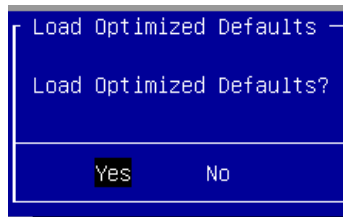
Note: The items listed under Boot Override depend on devices connected to system.

Firmware Update

This wizard takes you through the process of firmware upgrade. A reset of the box will automatically follow if the upgrade is completed or canceled. An option to Preserve All Configuration is available. Enable it, if you wish to preserve configured settings through the upgrade.

Warning: Please note that after entering update mode widgets, other web pages and services will not work. All open widgets will be closed automatically. If upgrade process is canceled in the middle of the wizard, the device will be reset.

Note:The firmware upgrade process is a crucial operation. Make sure that the chances of a power or connectivity loss are minimal when performing this operation. Once you enter into Update Mode and choose to cancel the firmware flash operation, the BMC must be reset. This means that you must close the Internet browser and log back onto the BMC before you can perform any other types of operations. Once Firmware upgrade using web is started, the regular IPMI command will not be allowed for safety concern.

To configure, choose '**Firmware Image Location**' under **Maintenance**. To open Firmware Update page, click **Maintenance > Firmware Update** from the menu bar. A sample screenshot of Firmware Update Page is shown below.

Firmware Update

The protocol information to be used for firmware image transfer during this update is as follows.

Protocol Type: HTTP/HTTPS

☐   Preserve all Configuration. This will preserve all the configuration settings during the firmware update - irrespective of the individual items marked as preserve/overwrite in the table below.

All configuration items below will be preserved as default during the restore configuration operation. Click "Edit Preserve Configuration" to modify the Preserve status settings.

Edit Preserve Configuration

S.No	Preserve Configuration Item	Preserve Status
1	SDR	Overwrite
2	SEL	Overwrite
3	IPMI	Overwrite
4	NETWORK	Overwrite
5	NTP	Overwrite
6	KVM	Overwrite
7	AUTHENTICATION	Overwrite

Select Firmware Image

選擇檔案 未選擇任何檔案

Start firmware update

Firmware Update Page

The various fields of Firmware Update are as follows.

▶ **Preserve all Configuration**: To preserve all configuration.

▶ **Edit Preserve Configuration**: To modify the Preserve status settings.

▶ **Select Firmware Image**: To Select the Firmware image to be uploaded.

▶ **Start Firmware Update**: To Start the Firmware Update.

This wizard takes you through the process of firmware upgrade. The protocol information to be used for firmware image transfer during this update is as follows.

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> **Note:** All configuration items will be preserved/overwrite as default during the restore configuration operation.

Procedure:

1. Click **Preserve all Configuration** to preserve all configurations.

2. Click **Browse** to select firmware image. The Firmware update undergoes the following steps:

    A. Closing all active client requests
    B. Preparing Device for Firmware Upgrade
    C. Uploading Firmware Image
    D. Browse and select the Firmware image to flash and click Upload.
    E. Click Start firmware update start the Firmware Update. A warning message will be prompted you to proceed further, which is shown below.
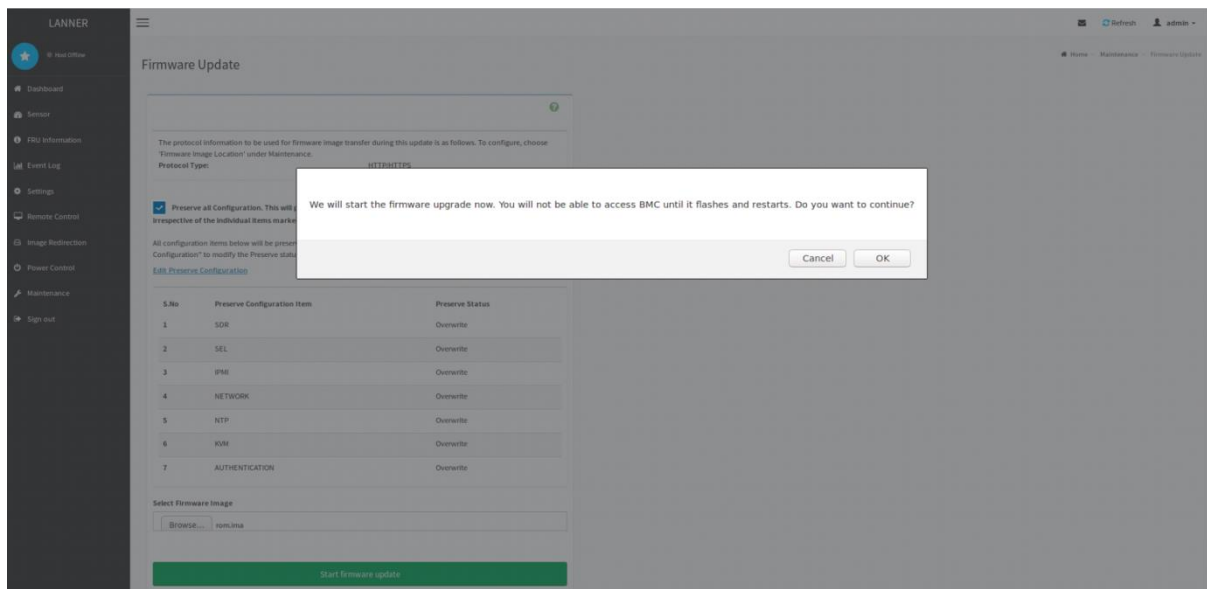
Firmware Update - Warning

F. Click **OK** to start the Firmware Update. The sample screenshot is shown below:

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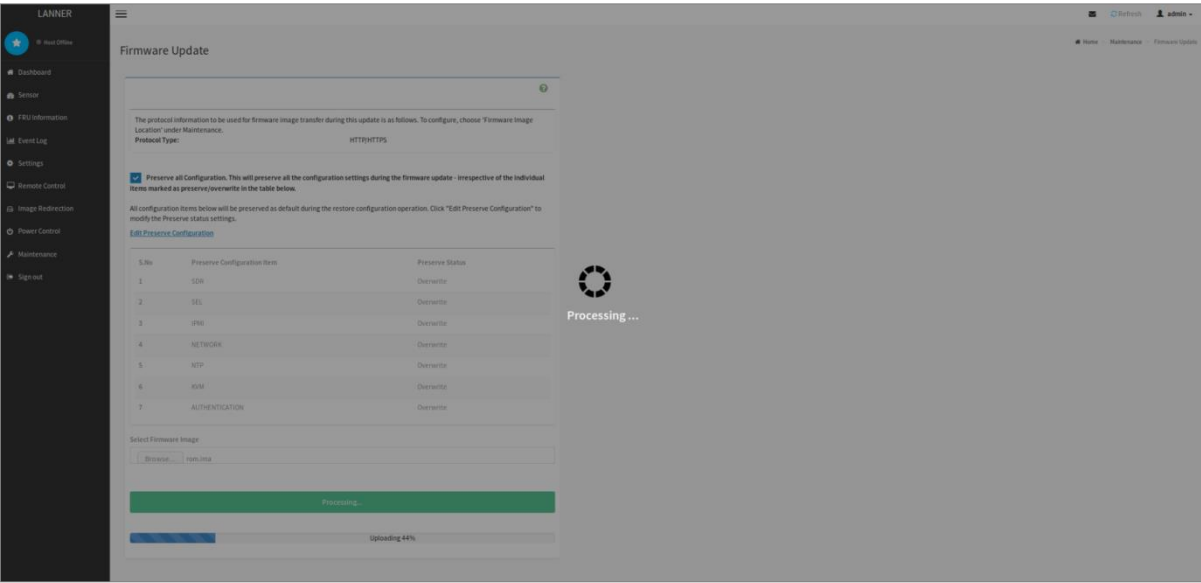
Firmware Update - Image Upload

G. Verifying and Flashing Firmware Image
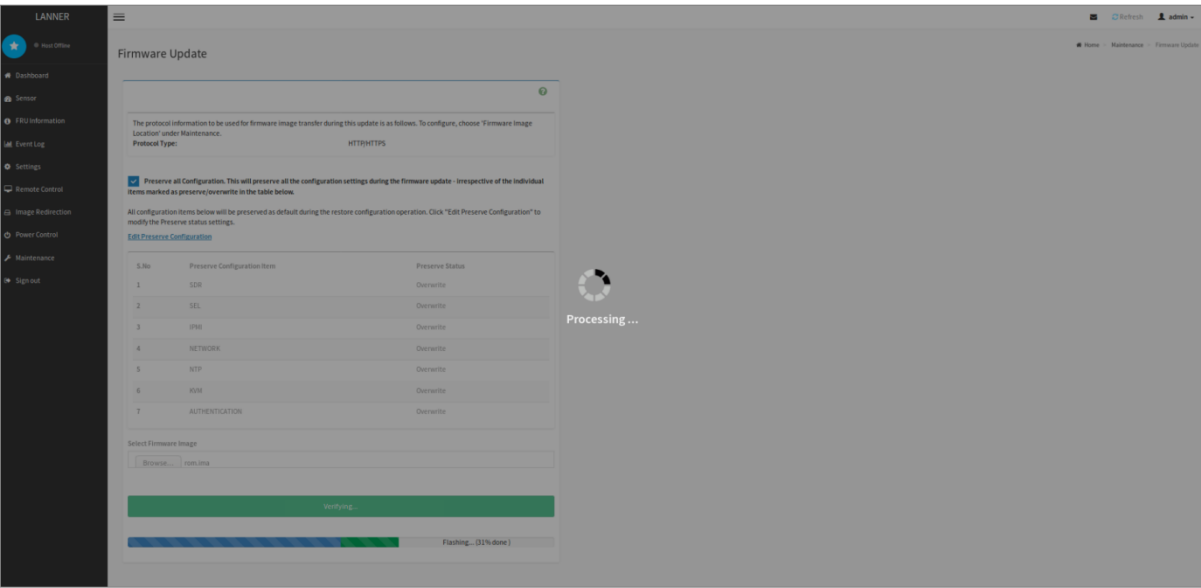
Firmware Update - Image Flashing

H. Resetting the image. The screenshot of Firmware update is as shown below.

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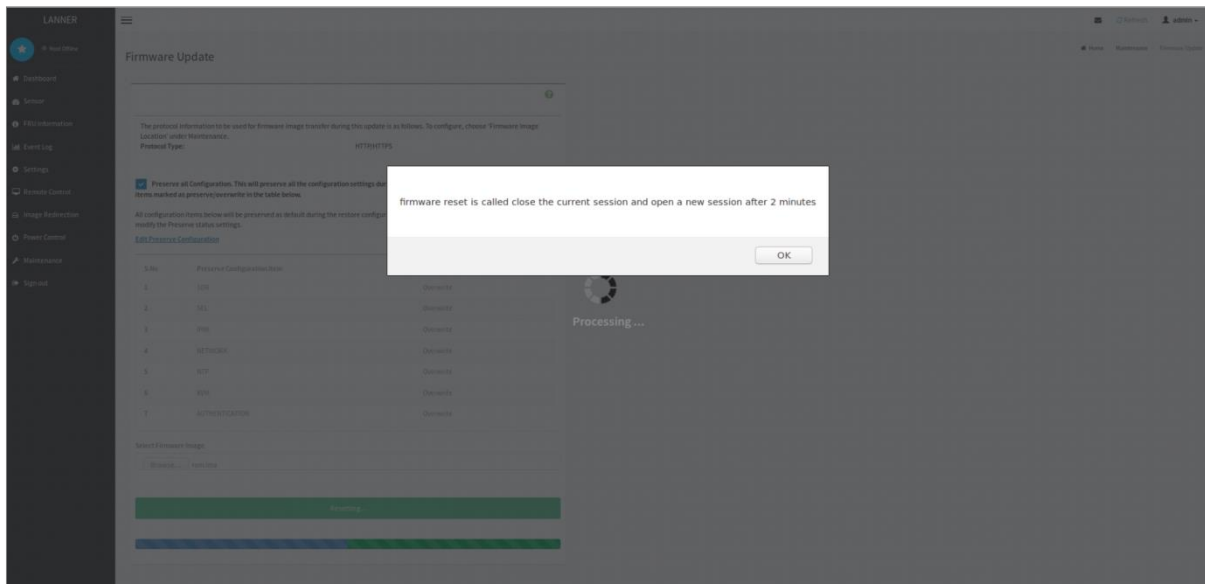
Firmware Update - Resetting

Note: The Firmware Update page will be disabled and you will not be able to perform any other tasks until firmware upgrade is completed and the device is rebooted. You can now follow the instructions presented in the subsequent pages to successfully update the BMC firmware. The device will reset if update is canceled. The device will also reset upon successful completion of firmware update.

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BIOS Firmware Update

This wizard takes you through the process of BIOS firmware upgrade. *Make sure that the chances of a power or connectivity loss are minimal when performing this operation.*

Note: The BIOS firmware update only supports HPM (Hardware Platform Management) file format.

BIOS Firmware Update Page

After uploading, please check the **Uploaded Version** and press **Proceed**. The host system will auto power on after update.

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APPENDIX A: LED INDICATOR EXPLANATIONS

The status explanations of LED indicators on the Front Panel are as follows:

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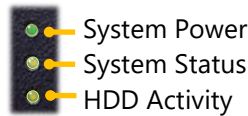
▶ **System Power**

Solid Green	*The system is powered on*
Off	*The system is powered off*

▶ **System Status**

This LED indicator is <u>programmable</u>. You could program it to display the operating status of the behaviors described below:

Solid Green	*Defined by GPIO*
Solid Red	*Defined by GPIO*
Off	*Defined by GPIO*

▶ **HDD Activity**

If this LED blinks, it indicates data access activities; otherwise, it remains off.

Blinking Amber	*Data access activity*
Off	*No data access activity*

Link Activity   Speed

RJ45 Port

▶ **Link Activity**

Blinking Amber	*Link has been established and there is activity on this port*
Solid Amber	*Link has been established and there is no activity on this port*
Off	*No link is established*

▶ **Speed**

Solid Amber	*Operating as a Gigabit connection (1000 Mbps)*
Solid Green	*Operating as a 100-Mbps connection*
Off	*Operating as a 10-Mbps connection*

Link Activity   Speed

SPF+ Port

▶ **Link Activity**

Blinking Green	*Link has been established and there is activity on this port*
Solid Green	*Link has been established and there is no activity on this port*
Off	*No link is established*

▶ **Speed**

Solid Green	*Operating as 10 Gigabit connection*
Solid Amber	*Operating as a Gigabit connection*
Off	*Operating as a 100 Mbps connection*

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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.

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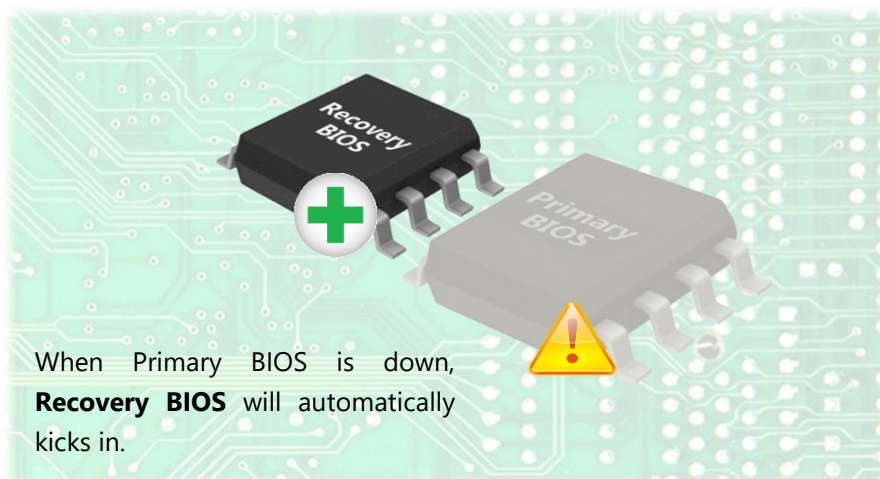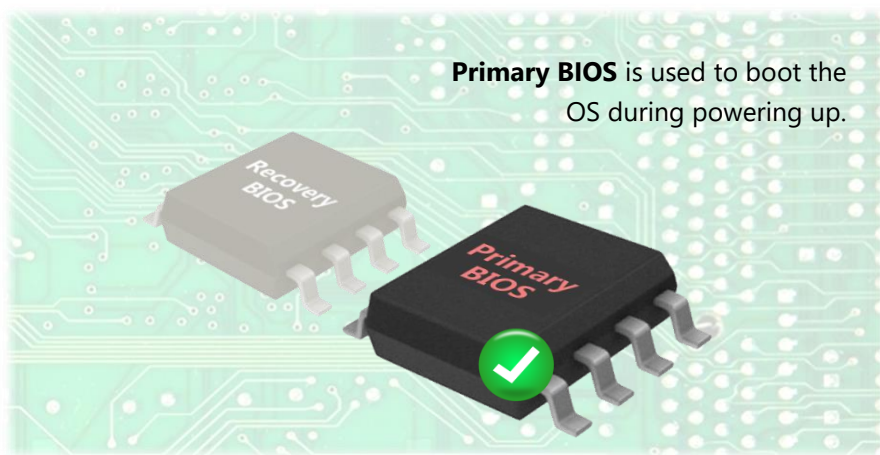
Addressing BIOS Start-up Failure with Dual BIOS

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. The Primary BIOS carries the image for system bootup, the parameters of which can be overwritten, while the Recovery BIOS carries the image locked to the factory default, which guarantees a safe and successful system bootup. If the Primary BIOS is not functioning correctly and fails to respond within 7 minutes, the system will invoke a bootup from the Recovery BIOS, automatically restart the system and launch the operating system.

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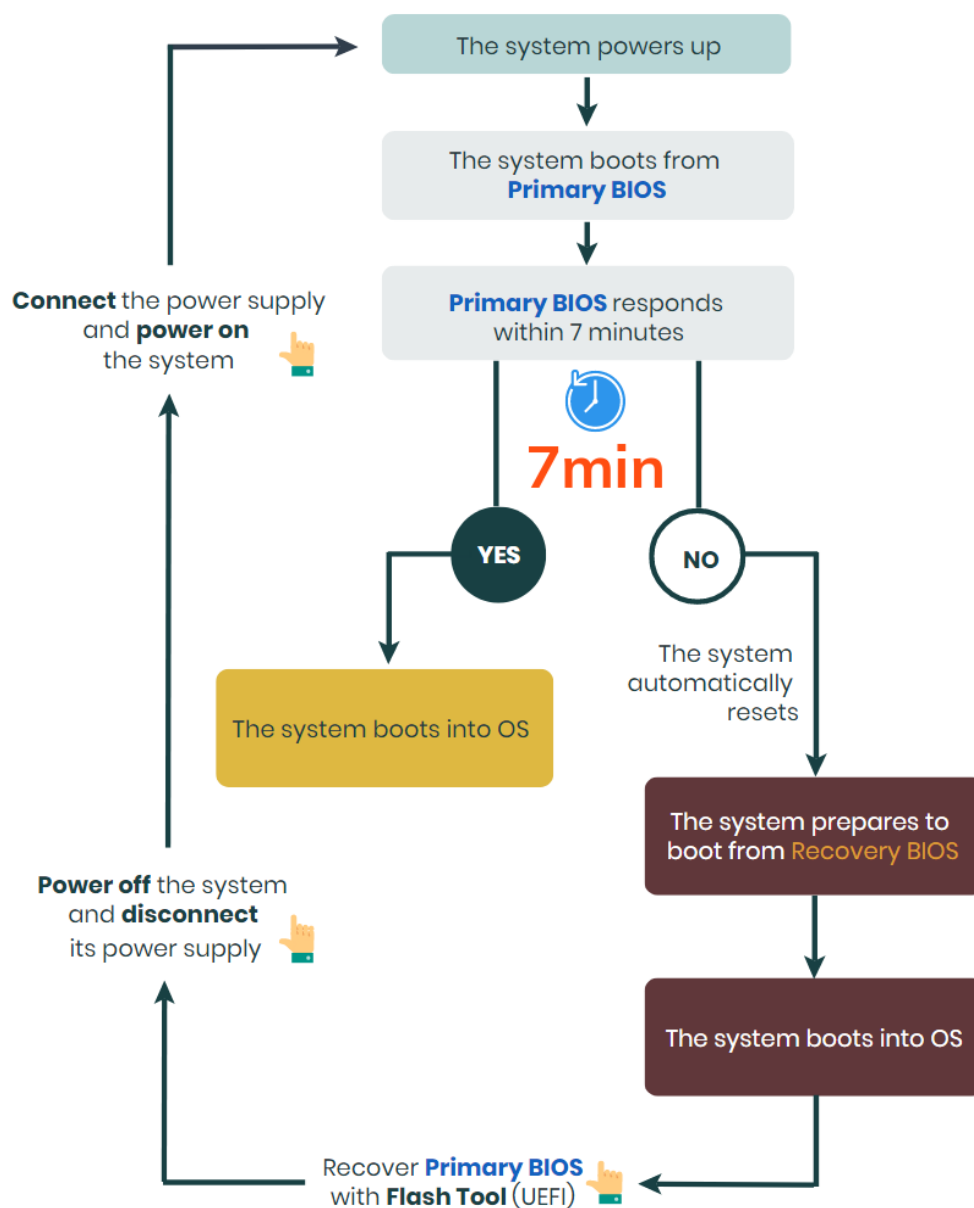
How do I know which BIOS the system is booting from?

On POST screen, the **Boot Bios** information will display the BIOS used for this bootup.

I just found the system being booted from the Recovery BIOS, what's next?

With the Recovery BIOS at work, it can be asserted that the Primary BIOS is having such severe problem that it failed to function. Before you make certain the BIOS chip is completely corrupted, it is definitely sensible to try the last resort—updating BIOS.

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Get Ready for BIOS Update

Flashing a corrupted BOS can never be taken lightly, for once done wrongly, it is almost certain to lead to an unusable system. To get ready for a BIOS update, acquire the following BIOS resources from Lanner technical support:

- Firmware and Flash Tool
- BIOS Engineering Spec
- Release Note

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

> **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.

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APPENDIX C: PCIE HOT-SWAP

Introduction

With the extensive use of PCIe technology, PCIe Hot-plug has now become a widely-required capability for server systems across various industries. This functionality allows a PCIe end-point device to be removed from or added to a running system without compromising the operational state of the other PCIe devices in the system or even the motherboard itself. Despite the fact that Hot-plug is already a native PCIe feature in its own design, it requires the full support from the operating system to "treat a PCIe end-point device as a Hot-pluggable one." To achieve this functionality, Lanner has implemented a methodology that involves in both hardware (Hot-plug controller IC) and software implementation (both BIOS and kernel) support, not only successfully utilizing this functionality in NCA-5710's architecture but allowing for combined operation of a hot-removal followed by a hot-insertion – Lanner in-band Hot-Swap capability. Benefiting from this feature, users can switch NIC modules (e.g., replacing a malfunctioned one or changing the Ethernet interface from RJ45 to SFP) without powering off the system in one go, safety-guarantee and with ease.

Pre-requisites

Before you actually start performing a Hot-swap, make sure you have completed the following configurations on your system.

BIOS Configuration

By default, the Hot-plug capability is disabled for this system to reserve as many resources as possible for critical applications, and hence it requires User's manual enabling.

1. Locate the PCIe slot the hot-plug capability of which is to be enabled. As separately controlled by different CPUs (Sockets), the PCIe slots are recognized as **Socket 0 Port 1A**, **Socket 0 Port 1C**, **Socket 1 Port 1A** and **Socket 1 Port 1C** in BIOS interface.
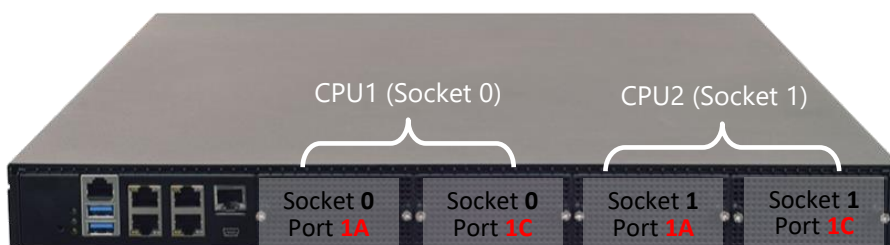
> 📝 **Note**
>
> It is suggested that the hot-plug capability of a PCIe port remain "Disabled" until you literally need to replace the module in it. This serves the same purpose of disabling this function by factory default—to reserve CPU resources to allocate for more critical tasks.

2. Turn on the computer and immediately press the **<Delete>** or **<Tab>** repeatedly until a **BIOS Setup** screen opens. Access **Socket** page→**IIO Configuration** page and choose between "Socket0 Configuration" and "Socket1 Configuration".
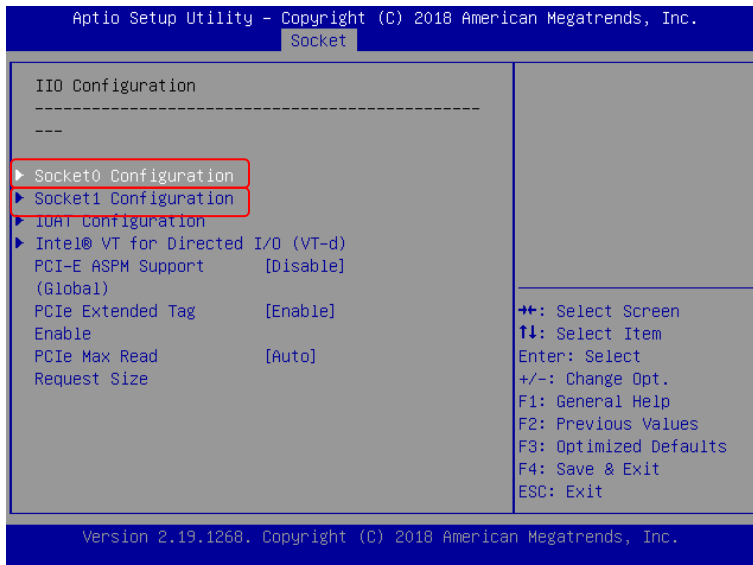
3. Select the port (PCIe slot) the Hot-plug function of which is to be enabled.

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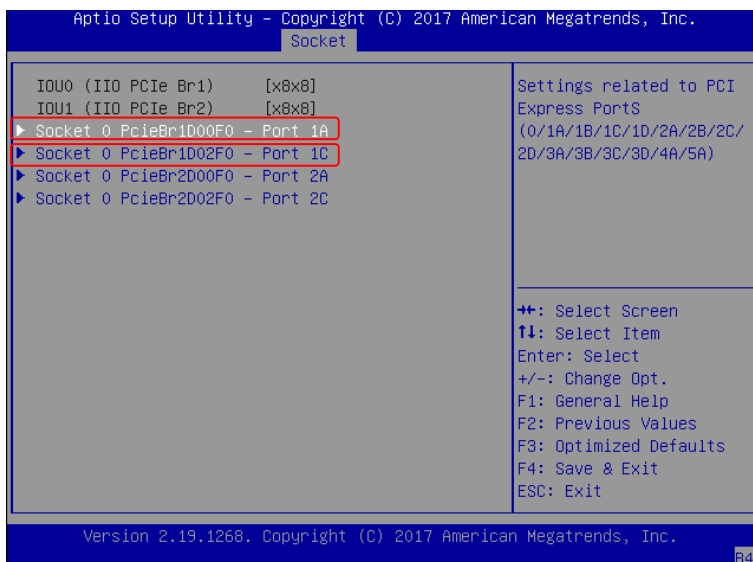
4. Enter the configuration page to enable these two capabilities: "Hot Plug Capable" and "Surprise Plug Capable."
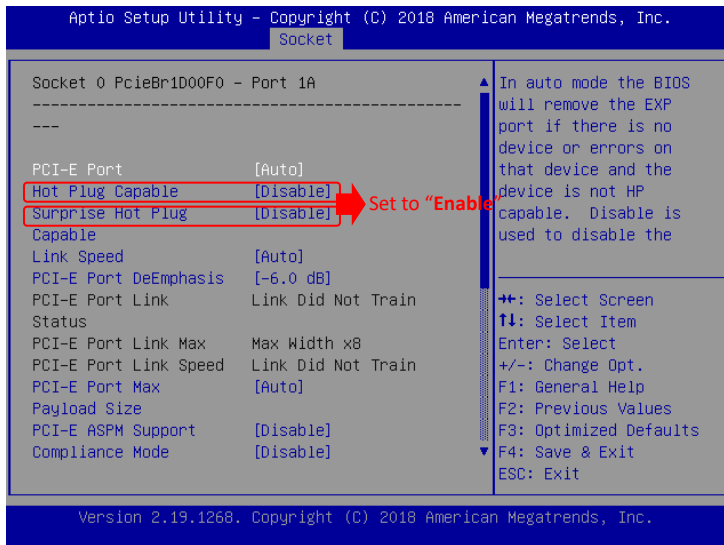
Hop-Swap Utility Installation

The **Hot-swap Utility** is a Linux application, acting as a handy tool for User to place command to directly "power-on" or "power-off "the PCIe slot.

1. On your system, download the compressed **Hot-swap Utility** installation package (zip file) from(?)

2. Unzip this package, which contains the following three files:

3. To execute this utility, type the following command in the command window:

```
hot_swap.sh
```

After the utility is initialized, it will display the available commands you could use to manage the PCIe slots:

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Procedures for Replacing a PCIe Module

1. In the command window, execute this utility with the following command:

   ```
   hot_swap.sh
   ```

2. Input the power-off command to disconnect the power supply of the target PCIe slot.

   ```
   hot_swap.sh 1 off
   ```
   [Slot No.][Command]

   The slot names map to the physical slots as shown below:

3. After the confirmation message of disconnection is returned, remove the target PCIe module from its slot.

4. Insert the new PCIe module into the slot and secure the slot cover.

5. Input the power-on command to power-on f the target PCIe slot.

   ```
   hot_swap.sh 1 on
   ```
   [Slot No.][Command]

6. After the confirmation message of connection is returned, the physical link is established and the new PCIe module should already be in service.

> 📝 **Note**
> Only one module can be removed at a time.

Replacement PCIe Module

In a typical PCIe-based system, the enumeration and resource allocation algorithms performed by the CPU during the very first initialization will fix the PCIe topology, meaning that the configuration of the PCIe modules first installed in the slot is locked down and not allowed for alternation. Considering this limitation, for hot-swapping, it is strongly advised that you always replace a PCIe module with one of the same link width. The table below shows other possible choices of link width of a replacement PCIe module.

The PCIe Module(s) First-installed in the slot	Replacement PCIe Module(s)		
	One x4 module	**Two** x4 modules	**One** x8 module
No modules installed	O	X	O
One x8 module installed	O	X	O
One x4 module installed	O	X	X
Two x4 modules installed	O	O	X

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APPENDIX D: SETTING UP CONSOLE REDIRECTIONS

Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to the serial port of the Remote Client System.

2. Configure the following settings in the BIOS Setup menu:

    BIOS > **Advanced** > **Serial Port Console Redirection** > **Console Redirection Settings**, select **115200** for the Baud Rate, **None**. for Flow control, **8** for the Data Bit, **None** for Parity Check, and **1** for the Stop Bit.

3. Configure console redirection related settings on the client system. You can use a terminal emulation program that features communication with serial COM ports such as *TeraTerm* or *Putty*. Make sure the serial connection properties of the client conform to those for the server.

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APPENDIX E: 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 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.

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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**