Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-5220 User Manual

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About this Document

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

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

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

Conventions & Icons

This document utilizes different font types and icons in order to make the selected text more transparent and explicable to users. Please note that this document contains the following conventions:

Font Conventions

Example	Convention	Usage
`iptables -F`	Monospace, shaded	A command to be entered at a shell command-line
Setup page	Bold	A title of a dialog box or a page
<Enter>	Between a pair of inequality signs	A physical keyboard button
"Menu"	Between a pair of quotation marks	A menu option or a software button to be clicked
Readme.txt	In Italic	A filename or a file path
IPMI User Guide	Underlined	The name of another document or a chapter in this document

Icon Descriptions

Icon	Usage
Note or Information	This mark indicates that there is something you should pay special attention to while using the product.
Warning or Important	This mark indicates that there is a caution or warning, and it is something that could damage your property or product.

Online Resources

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

For troubleshooting the issues with your system, please check the Lanner Q&A page for a diagnostic procedure and troubleshooting steps.

Technical Support

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

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Federal Communication Commission Interference Statement

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

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

FCC Caution

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

Note

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

Important

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

Safety Guidelines

Follow these guidelines to ensure general safety:

- Keep the chassis area clear and dust-free during and after installation.
- Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Never assume that power is disconnected from a circuit; always check the circuit.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Lithium Battery Caution

- There is risk of explosion if the battery is replaced by an incorrect type.
- Dispose of used batteries according to the instructions.
- Installation should be conducted only by a trained electrician or only by an electrically trained person who knows all installation procedures and device specifications which are to be applied.
- Do not carry the handle of power supplies when moving to another place.
- Please conform to your local laws and regulations regarding safe disposal of lithium batteries.
- 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

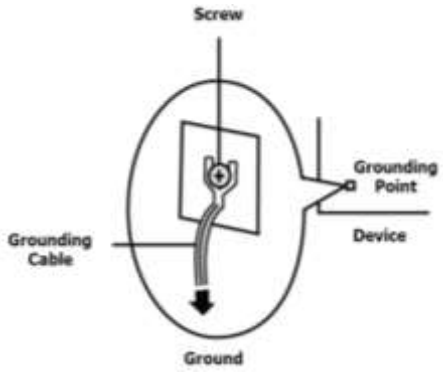
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect 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.

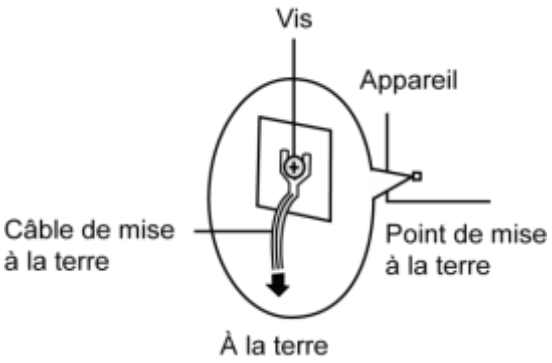
Grounding Procedure for DC Power Source

- 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.



- This equipment must be grounded. The power cord for the 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.
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

The product is only to be connected to PoE network without routing to outside plant.

Instruction for the installation of the conductor to building earth by a skilled person.

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CHAPTER 1: PRODUCT OVERVIEW

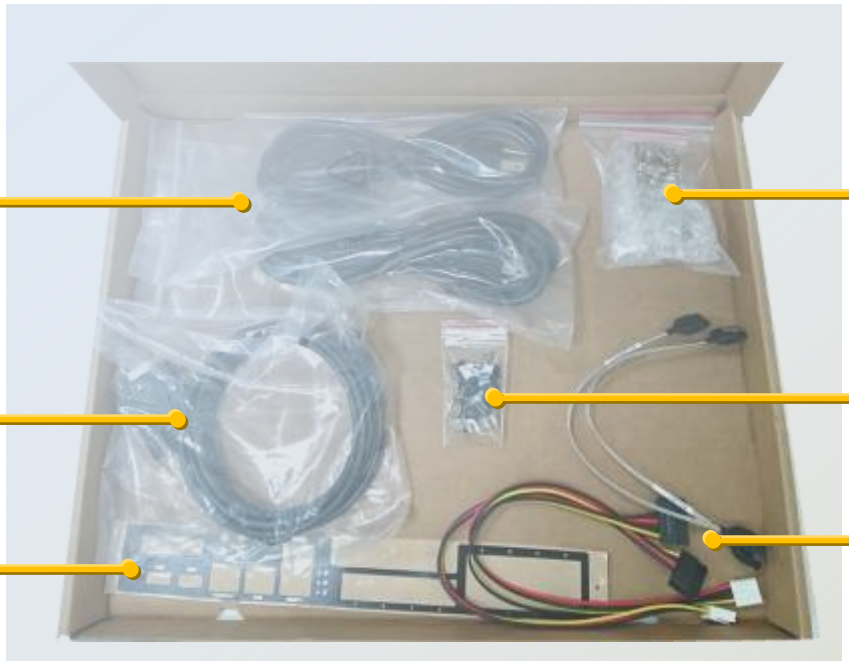
The NCA-5220, a 1U rackmount network appliance that can be customized with Intel® Xeon® E3-2100 processor and Intel® C246 chipset (codenamed Coffee Lake), comes with generous and flexible configurations for LAN ports, NIC expansion, storage and management, delivering advanced networking prowess for network traffic security, cloud computing and data centers.

Main Features

- Intel Coffee Lake-S Processor Family Xeon® E, Core™ i3, Pentium®, and Celeron® Processor (up to 6cores)
- 4 x 288pin DDR4 2666MHz Memory, Max. 128GB
- 12x RJ45 LAN, 2x RJ45 MGMT, 2x NIC Module Slots, 5x Pairs of Gen3 Bypass
- 1x RJ45 Console, 1x RJ45 LOM, 2x USB 3.0, 4x Keypads
- 2x 2.5" Drive Bays, 1x M.2 2242, B+M Key (Optional)
- 2x PCI-E*4 FH/HL (Optional)
- 2x System Fans, 300W 1+1 ATX Redundant PSUs

Package Content

- 1x NCA-5220 Network Security Platform
- Accessories Box: 2x Power Cord (Default US Type), 1x Short Ear Rackmount Kit, 1x Console Cable (RJ45), 2 pair x SATA and Power Cable for HDD, 1x Screw Pack (Hard Disk Rubber Washers, Hard Disk Screws and Fan Mylar Screws), 1x Name Plate
- 1x CPU Heatsink



Optional Kits

- Riser Card RC-52204A / Riser Card RC-52205A
- IPMI module
- TPM module
- 1U Slide Kit
- Swappable 2.5" HDD Kits
- Single AC PSU kit (By project)
- DC power module

Ordering Information

SKU No.	Main Features
NCA-5220A	Intel Coffee Lake-S Processor Family Xeon® E, CoreTM i3, Pentium®, and Celeron® Processor (up to 6cores), 12x Gbe RJ45, with 5 Pairs of Bypass, 2x RJ45 MGMT, 2x NIC Module Slots, LCM, Redundant PSUs

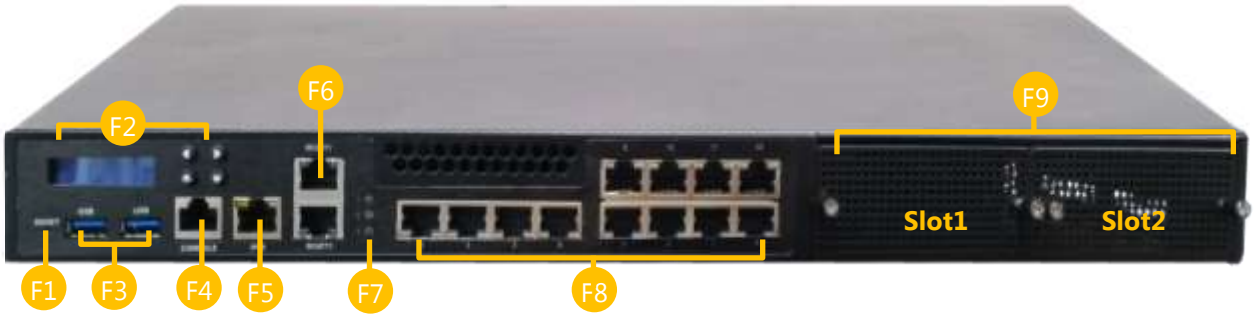
Optional Accessories

Type	Description
CPU	Xeon® E, CoreTM i3, Pentium®, and Celeron® Processor (upto 6cores)
Memory	DDR4 2133/2400/2666 ECC and U DIMM 2/4/8/16/32G (R DIMM not supported
M.2 storage	M.2 2242 size
2x 2.5"HDD	HDD/SSD
NIC	NIC Module Note: It is strongly recommended to use Lanner Slim type NIC modules on this system; please consult Lanner for product compatibility if you consider adopting modules manufactured by other vendors.
RJ45 cable	L=180cm, Cat.5e UTP Cable Grey
USB3.0 cable	USB Cable Conn 2*10 USB 3.0, 9p 45cm, 180°-270° Amphenol Rub30-0539
VGA cable(35cm) (plus with IPMI card)	VGA Cable, 2*6 D-sub 15p, 35cm, P=2.0, Ho-Base Fd-1512-35mo
IAC-AST2500	IPMI card
IAC-TPM01C	TPM2.0 module
Rail Kit	Chassis Width: standard 19"
RC-52204 Riser card kit	Switch riser card (by project)
RC-52205A Riser card kit	Rear PCIE(2*PCI-Ex4)
HDD tray	2x 2.5'' HDD swappable (by project)
DC PSU	DC 300W

System Specifications

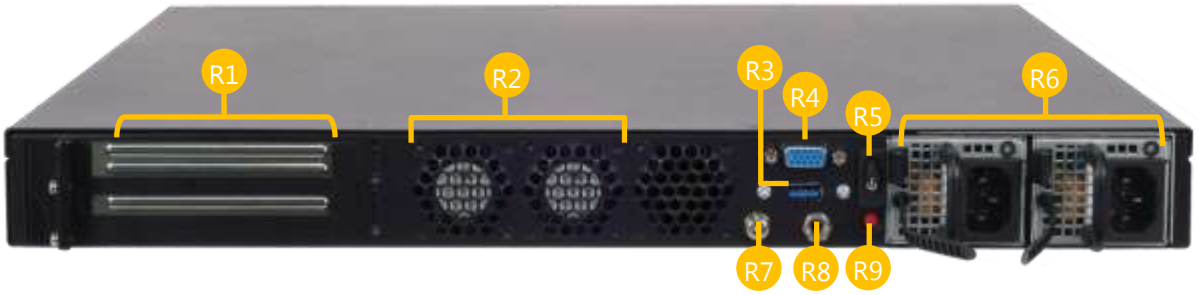
Form Factor		1U 19" Rackmount
Platform	Processor Options	Intel® Coffee Lake-S Processor Family
	CPU Socket	1x LGA1151 socket
	Chipset	C246
	Security Acceleration	N/A
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 2666 MHz ECC or U DIMM
	Max. Capacity	128GB
	Socket	4x 288pin DIMM
Networking	Ethernet Ports	14x GbE RJ45
	Bypass	5 pair bypass
	NIC Module Slot	2 slot
LOM	IO Interface	1x RJ45
	OPMA slot	From OPMA Slot (Optional)
I/O Interface	Reset Button	1
	LED	Power/Status/Storage
	Power Button	1x ATX Power Switch
	Console	1x RJ45
	USB	2x USB 3.0
	LCD Module	1x LCM panel
	Display	1x Internal Pin Header
	Power input	AC /DC power inlet on PSU
Storage	HDD/SSD Support	2x 2.5" Internal Bays
	Onboard Slots	1x M.2 2242
Expansion	PCIe	1x PCI-E*8 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 heat sink
	System	2x cooling fans with smart fan
Environmental Parameters	Temperature	0~40ºC Operating -40~70ºC Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	438mm x 500mm x 44mm
	Weight	7.1kg
Package Dimensions	(WxDxH)	739mm x 582mm x215mm
	Weight	13 kg
Power	Type/Watts	300W 1+1 ATX Redundant PSUs
	Input	AC 90V~264V @47~63Hz
Approvals and Compliance		RoHS, CE/FCC Class A, UL

Front Panel



No.	Description	
F1	Reset Button	● Press **once** to enter software reset ● Press **twice** to enter hardware reset
F2	Control Panel	1x LCM + 4x control keys
F3	USB Ports	2x USB 3.0 port
F4	Console Port	1x RJ45 Console Port
F5	LOM Port	1x IPMI port
F6	MGM Port	2x RJ45 Port for Dual MGMT (support PXE)
F7	LED Indicators	
F8	LAN Slot	4x RJ45 Port on ®i350-AM4 + 8x RJ45 Port on ®i210
F9	PCIe Slot	1x PCIe x8 For Front Slim Type NIC module (Slot1) 1x PCIe x8 (or x4x4) For Front Slim Type NIC module (Slot 2)

Rear Panel

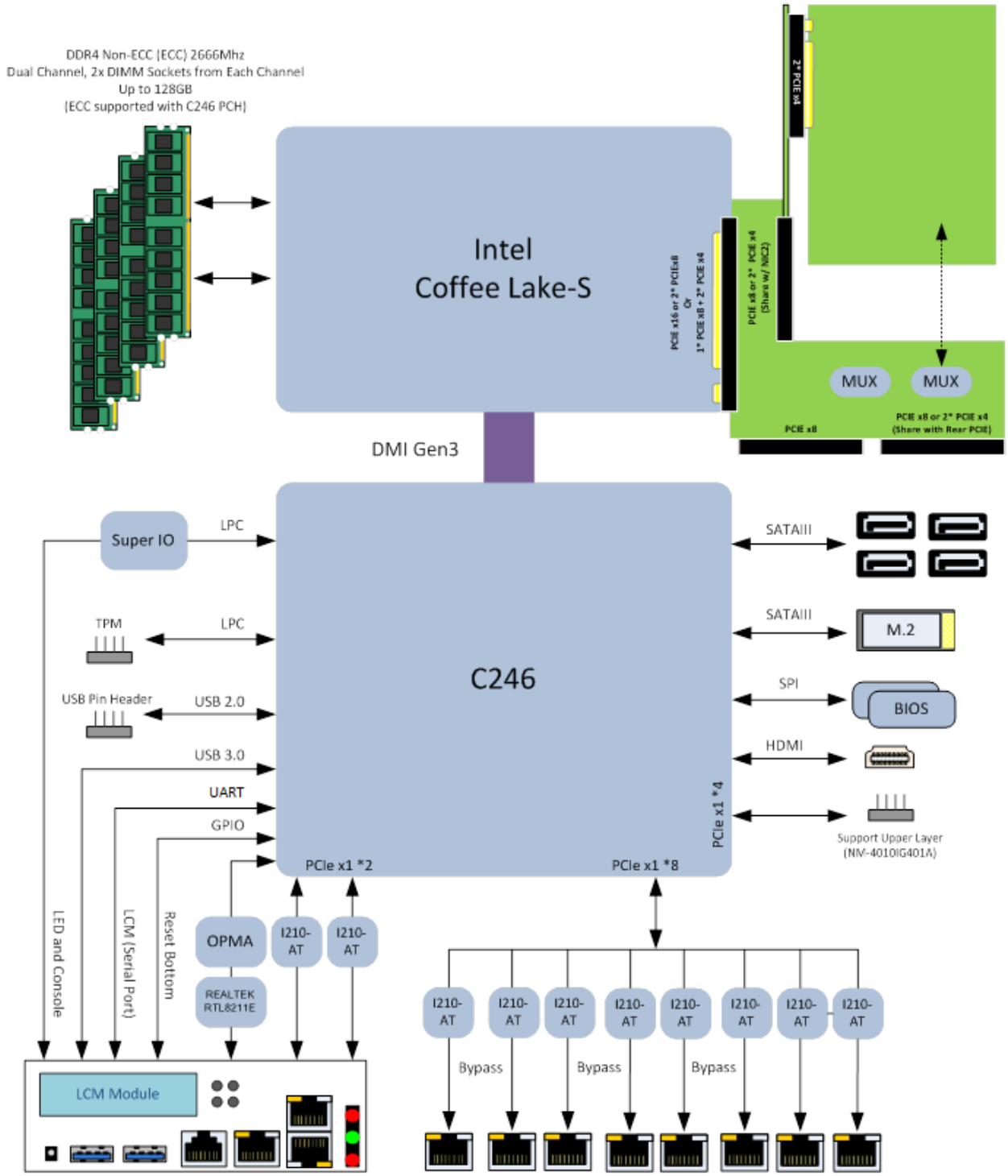


No.	Description	
R1	PCIe Expansion Slot	Optional FH/HL Size PCIe Slot for 1x PCIex8 or 2x PCIE4 (Slot3) **Or** Reserved 2x 2.5" SSD swappable Cage (By project)
R2	Cooling Fan	2x cooling fans with SMART function
R3	USB Port	USB 3.0 (Optional)
R4	VGA Port	DB15 VGA Port
R5	Power Switch	● Short press (1-3 sec) to power on/off the system ● Long press (>4 sec) to force the system shutdown
R6	Redundant PSU	1+1 300W AC Redundant PSU (Default)
R7	Grounding Point	
R8	ESD Jack	
R9	Alarm Reset Button	

Motherboard Information

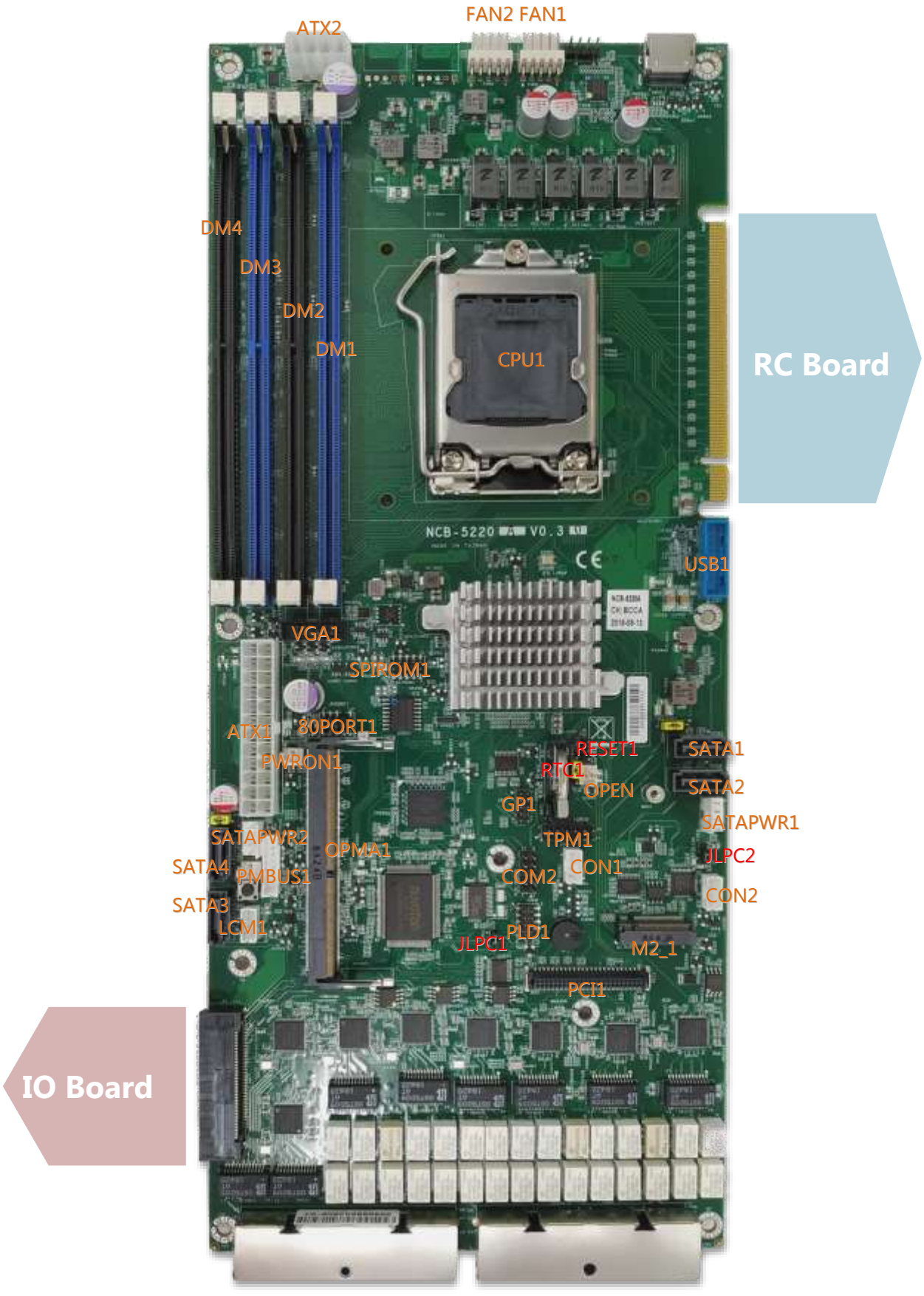
Block Diagram

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



Motherboard Layout

The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference for the pin assignments and the internal connectors.

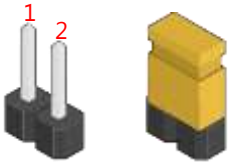
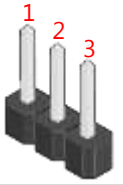
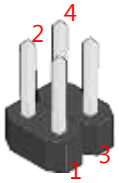


Internal Jumpers

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

Jumper Setting

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

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

RTC1: Clear RTC (Default 1-2)

Pin No.	Description
1	NC
2	RTC_RST_N
3	GND

RESET1: Reset (Default 1-2)

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

Pin No.	Description
1-2	HW Reset
2-3	SW Reset

JLPC1 / JLPC2: Flash bypass MCU(Default 1-2)

Pin No.	Description
1	P3V3_STBY
2	PIO0_1
3	GND

Internal Connectors

OPEN1: Enable / Disable CASE OPEN#

Pin No.	Description
1	GND
2-3	INTRUDER_N

FAN1~4: FAN Connector

Pin No.	Description
1	FAN OUT
2	NC
3	FAN IN
4	12V
5	GND

GP1: 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

80PORT1: Debug Connector

Pin No.	Description	Pin No.	Description
1	LPC_CLKOUT0	2	LPC_LAD1
3	80PORT_RST#	4	LPC_LAD0
5	LPC_FRAME_N	6	P3V3_S
7	LPC_LAD3	8	
9	LPC_LAD2	10	GND

TPM1

Pin No.	Description	Pin No.	Description
1	SERIRQ	2	LFRAME_N
3	LAD0	4	TPM_CLK
5	LAD1	6	P3V3_STBY
7	LAD2	8	
9	LAD3	10	P3V3_S
11	TPM_RST_N	12	GND

COM2: COM Port

Pin No.	Description	Pin No.	Description
1	NDCD2-	2	NDSR2-
3	NRXD2	4	NRTS2-
5	NTXD2	6	NCTS2-
7	NDTR2-	8	NRI2-
9	GND	10	

SATA1~SATA4

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

SATAPW1 & 2

Pin No.	Description
1	NC
2	GND
3	GND
4	5V

SPIROM1: Flash BIOS

Pin No.	Description	Pin No.	Description
1	SPI_HD1#	2	SPI_CS1#_DUAL
3	SPI_CS0#_DUAL	4	P3V3_SPI
5	SPI_MISO_R	6	SPI_IO3_R
7		8	SPI_CLK_R
9	GND	10	SPI_MOSI_R

VGA1

Pin No.	Description	Pin No.	Description
1	CRT_RED	2	GND
3	CRT_GREEN	4	GND
5	CRT_BLUE	6	GND
7	HSYNC	8	
9	VSYNC	10	GND
11	DDC_DATA	12	DDC_CLK

CON1 / CON2:

Pin No.	Description
1	P3V3_STBY
2	PIO1_6_RXD
3	GND
4	PIO1_7_TXD

LCM1

Pin No.	Description
1	TX
2	RX
3	GND
4	5V

PWRON1: Force Power ON

Pin No.	Description
1	GND
2	ATX_PSON_N

PMBUS1

Pin No.	Description
1	TTL1
2	TTL2
3	NC
4	GND
5	NC
6	PMBUS_CLK
7	PMBUS_DATA
8	PWR_ALERT

PLD1: Flash CPLD

Pin No.	Description	Pin No.	Description
1	JTAG_TCK	2	GND
3	JTAG_TDO	4	P3V3_STBY
5	CRT_BLUE	6	NC
7	NC	8	NC
9	JTAG_TDI	10	GND

ATX1

Pin No.	Description	Pin No.	Description
1	P3V3_S	2	P3V3_S
3	P3V3_S	4	NC
5	GND	6	GND
7	P5V0	8	ATX_PSON_N
9	GND	10	GND
11	P5V0	12	GND
13	GND	14	GND
15	PS_PWROK	16	NC
17	P5V0_STBY	18	P5V0
19	P12V0	20	P5V0
21	P12V0	22	P5V0
23	P3V3_S	24	GND

ATX2

Pin No.	Description	Pin No.	Description
1	GND	2	P12V0
3	GND	4	P12V0
5	GND	6	P12V0
7	GND	8	P12V0

PWRBT1: Power Button

Pin No.	Description
1	GND
2	PSBT_IN

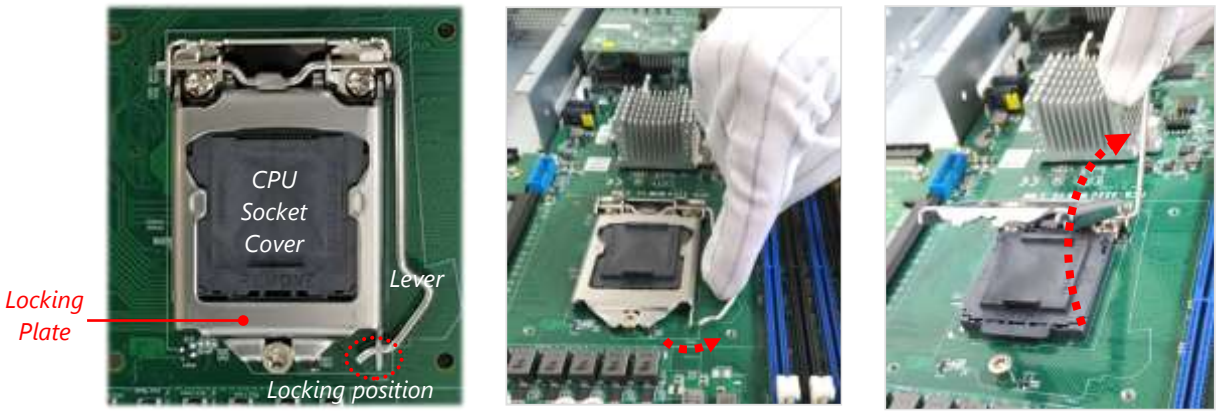
CHAPTER 2: HARDWARE SETUP

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

Installing the CPU

1. Loosen the screws that secure the fan duct to the chassis and then remove it.

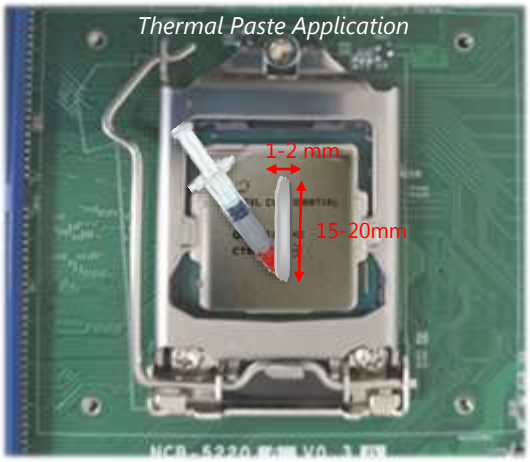
2. To install the CPU, remove the CPU socket Cover first. Lift the lever away from the locking position. The metal locking plate will automatically pop up, allowing you to remove the CPU socket cover.



3. When you extract the processor from its package, carefully hold it by its edges and avoid touching its golden contacts side. Make sure the golden triangular mark is aligned with the white one marked on the motherboard and then insert it into the socket, as indicated in the picture.

4. After the processor is correctly seated in the socket, lower the lever along with the plate, slide the end of the lever into the locking position.

5. Apply a thermal pad or proper amount of thermal paste on the CPU surface. For thermal paste application, avoid excessive amounts of grease in case it spills onto the motherboard and cause electrical damage to other components.



6. Install the heatsink onto the motherboard by fastening its four screws onto the corresponding mounting holes on the motherboard fasteners. To apply equal pressure, please tighten the screws **diagonally** no matter you start from which corner.

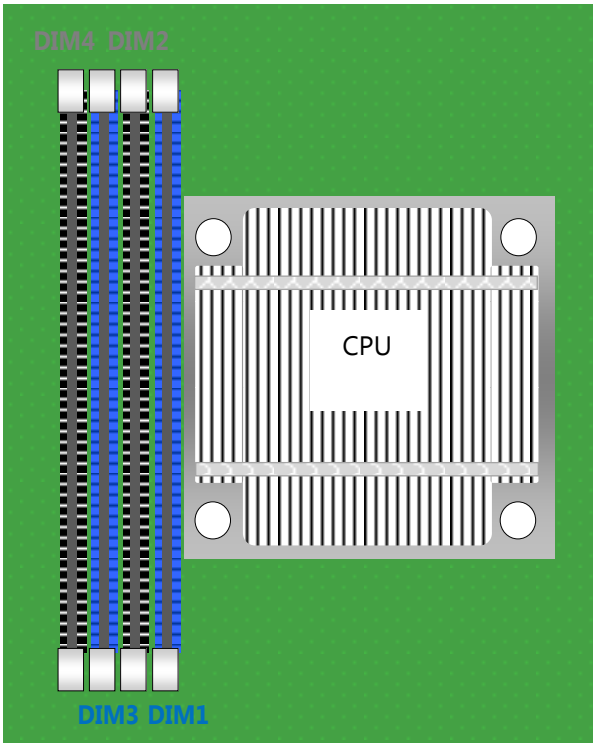
7. At last, install the fan duct and secure it with the original screws.

Installing the System Memory

The motherboard supports 4 memory slots for DDR4 UDIMM with speeds of up to 2666MHz. The CPU requires at least 2 memory modules to boot and run from.

Supported System Memory Summary

Total Slots	4
Number of Channels	2 (2 DIMMs per channel)
Supported DIMM Capacity	4GB, 8GB, 16GB, 32GB
Memory Size	Maximum 128 GB UDIMM (32GB*4)
Memory Type	DDR4 ECC or Non-ECC UDIMM 2666/2400/2133 MHZ
Minimum DIMM Installed	At least 2 memory modules to boot and run from



DIMM Population Guidelines

- Please install even number of DIMMs following the memory module installation instructions to install the DIMMs
- Use memory modules of the same capacity, speed, and from the same manufacturer to avoid compatibility issues and to achieve optimal CPU performance.

Recommended DIMM Population Scheme

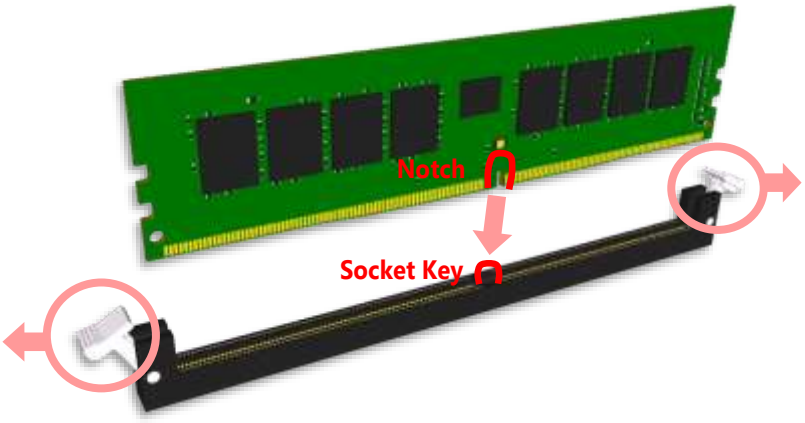
The table below shows the recommended schemes for DIMM population. To guarantee balanced system performance, please install identical DIMMs of the same capacity, speed, number of ranks, and from the same manufacturer.

SLOT #	DIM4	DIM3	DIM2	DIM1
2 DIMMs		○		○
4 DIMMs	○	○	○	○

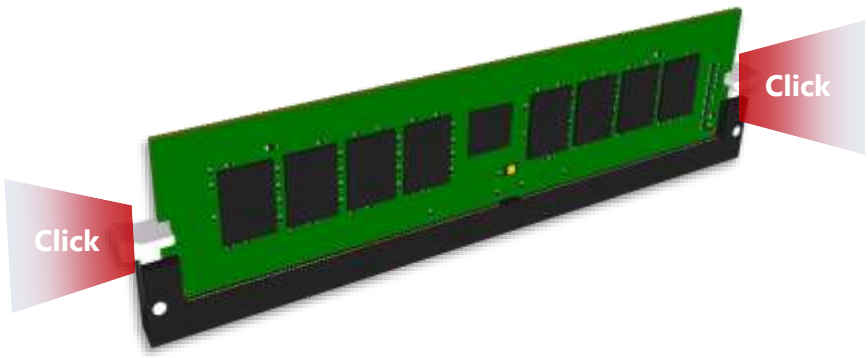
Memory Module Installation Instructions

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.



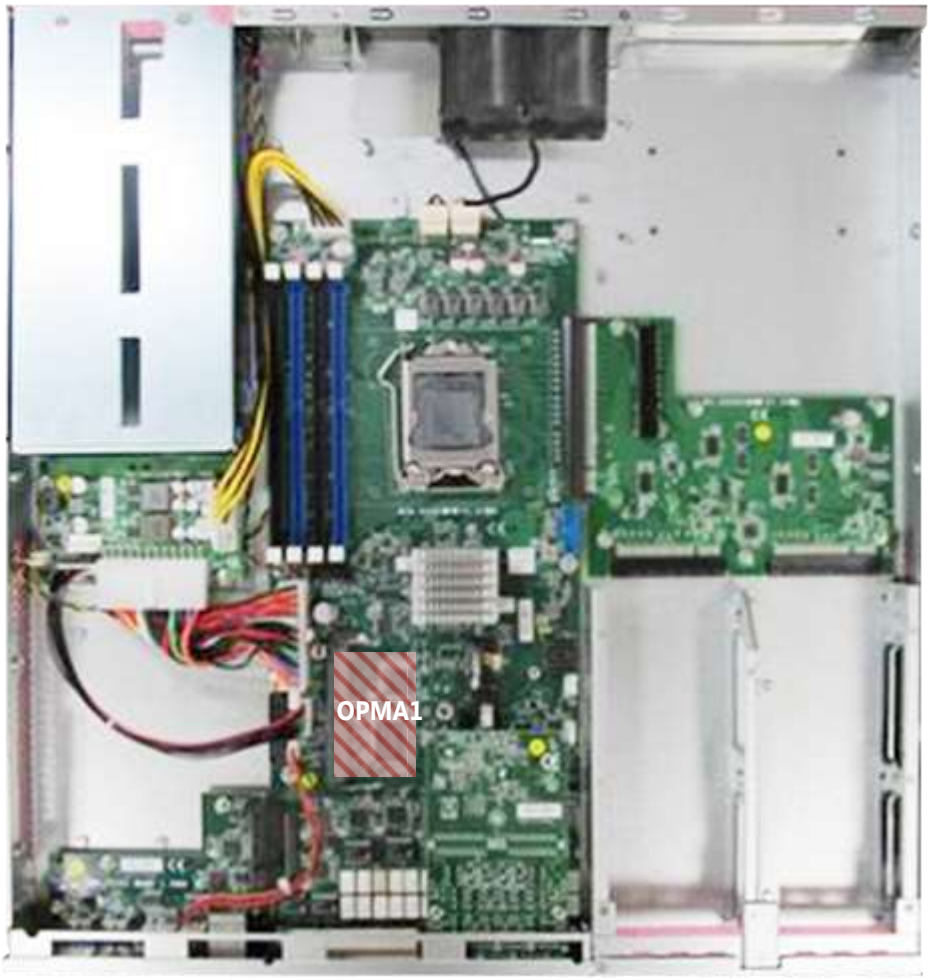
4. Push the module down into the slot until it is firmly seated. Press vertically on both corners of the card until it clicks into place.



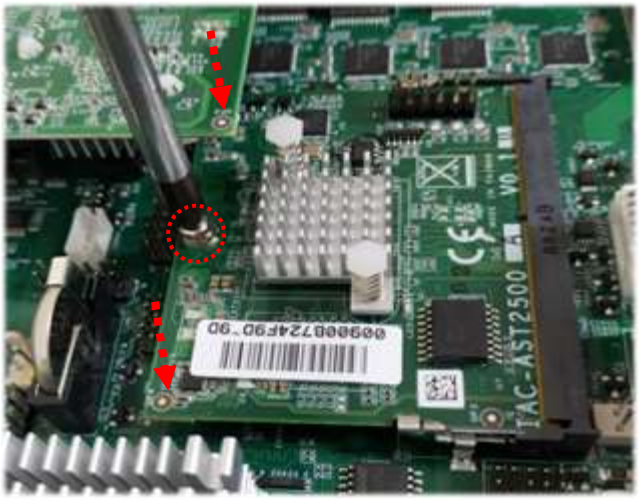
Installing the IPMI Card

This system supports IPMI module card (IAC-AST2500) through the **OPMA1** slot. For instructions on remote server management, please refer to Remote Server Management

1. Locate the **OPM1** slot.



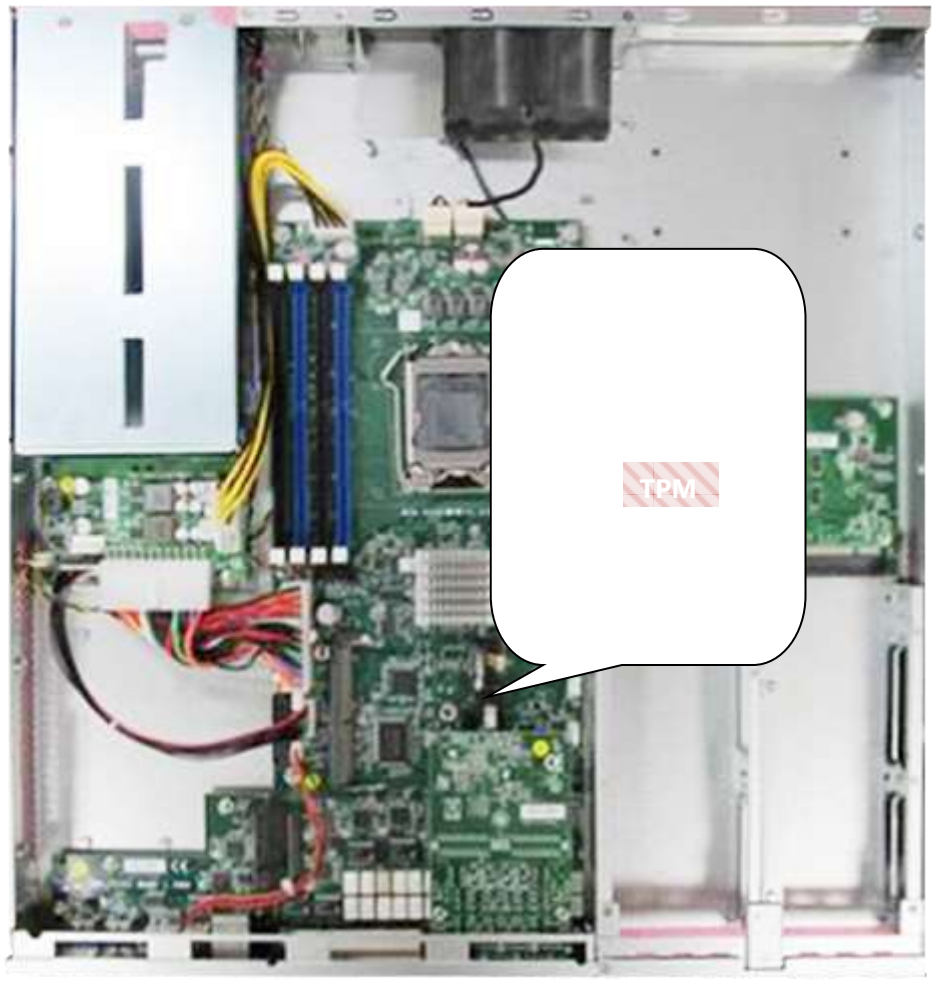
2. Insert the IPMI module into the slot at 15° angle, vertically press it down on both corners (indicated in the picture) to have it click into place, and then secure it with a screw.



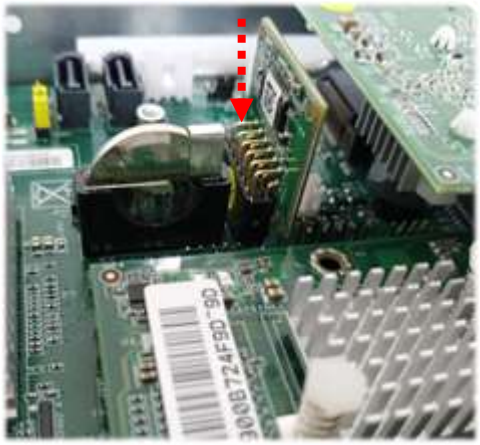
Installing the TPM Module

This system supports the TPM module card (IAC-AST2500) through the **TPM** slot.

1. Locate the **TPM** slot.



2. Insert the TPM module into the 12-pin slot. Make sure it is properly seated.

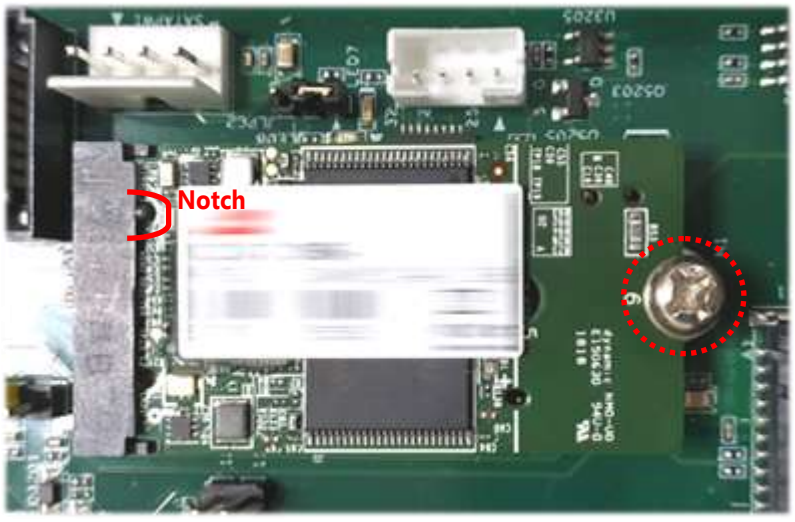


Installing the M.2 Storage Card

This system supports the M.2 storage module (2242 B+M Key) through the **M2_1** slot.

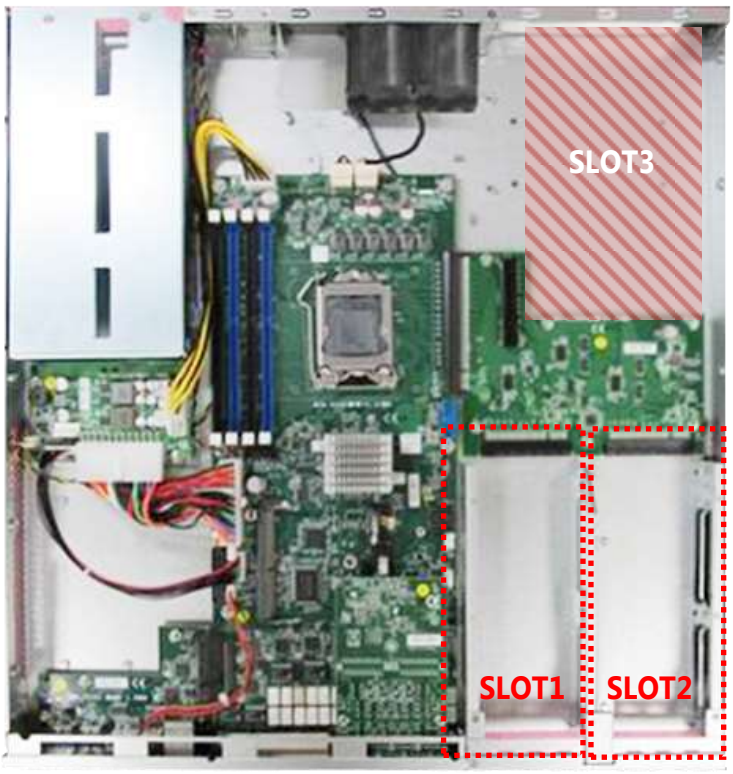
1. Locate the **M2_1** slot.

2. Insert the M.2 module into the slot at 15° angle, align the notch on the module with the corresponding socket key in the slot, and then secure it with a screw.



Installing the NIC Modules

This system can accommodate at most two **NIC** slim type modules at the front (SLOT1 and SLOT2) and another two at rear **FH/HL** PCIe expansion slot (SLOT3). Based on your application requirements, employ a combination of Riser Cards to fulfill your needs:



Riser Card Combination

Riser Card Required	SLOT1	SLOT2	SLOT3
RC-52203	1*PCIEx8	1*PCIEx8 2*PCIEx4	N/A
RC-52203 +RC-52205	1*PCIEx8	N/A	2*PCIEx4
RC-52204 +RC-52205	1*PCIEx8 2*PCIEx4	1*PCIEx8 2*PCIEx4	2*PCIEx4

The following list shows Lanner-manufactured **Slim type NIC modules** that are compatible with this system; please consult your Lanner representative for the availability of these products.

Model	Ports	Connector Speed	Chipset	PCIE Interface	LAN Bypass
NCS2-IGM806A	8	1Gb RJ-45	Intel i350AM-4	2* PCIEx4	G3
NCS2-ISM405A	4	1Gb SFP	Intel i350AM-4	1* PCIEx4	Fiber Bypass Non-Latching
NCS2-ISM802A	8	1Gb SFP	Intel i350AM-4	2* PCIEx4	N/A
NCS2-IMM802A	4+4	1Gb SFP / 1Gb RJ-45	i350-AM4	2*PCIEx4	G3
NCS2-IXM405A	4	10Gb SFP+	Intel 82599ES PEX8724	1* PCIEx8	N/A
NCS2-IXM407A	4	10Gb SFP+	Intel XL710-BM1	1* PCIEx8	N/A
NCS2-IQM201A	2	40Gb QSFP+	Intel XL710-BM2	1* PCIEx8	N/A
NCS2-IXM801A	8	10Gb SFP+	Intel XL710-BM1	2*PCIEx4	N/A
NCS2-IVM201	2	25Gb SFP+	FTXXV710-AM2	1* PCIEx8	N/A

1. Locate the NIC module slot on the front panel.

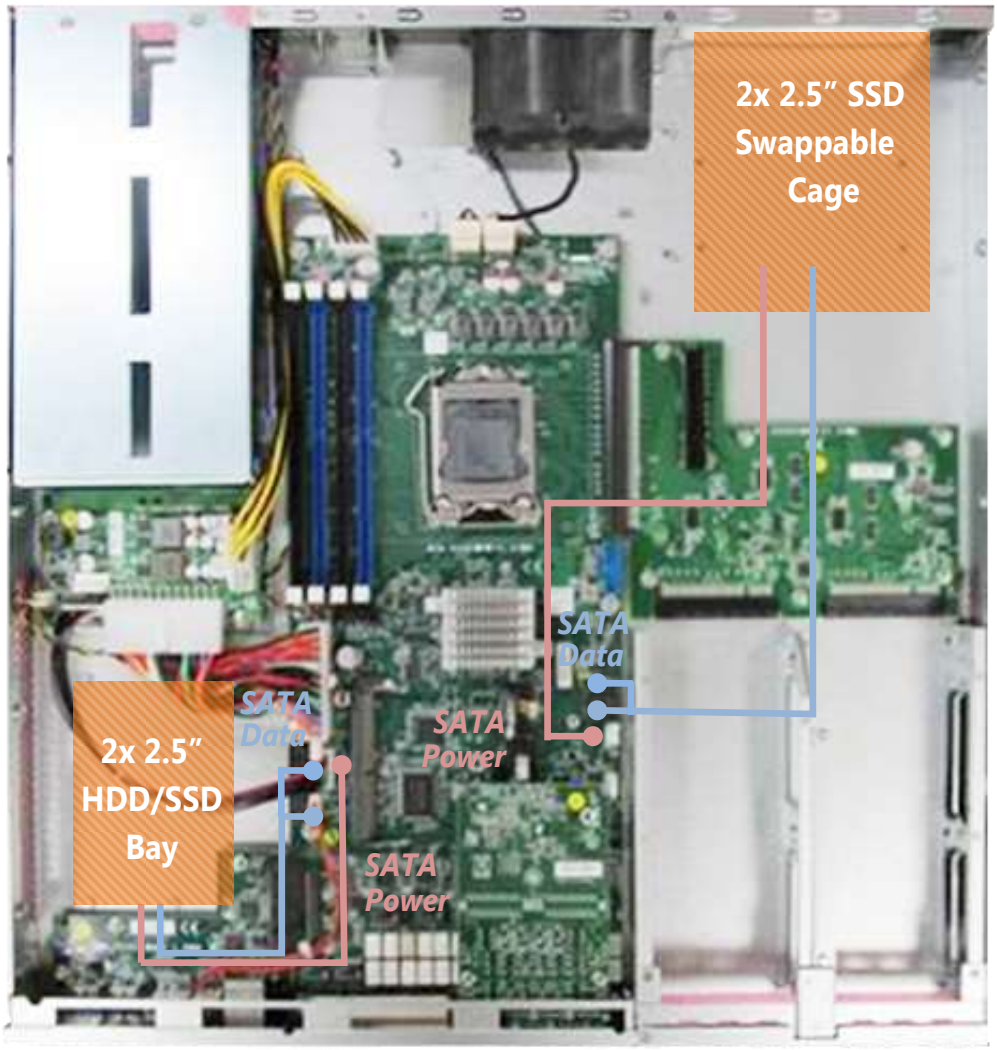
2. Rotate the two lock-screws counterclockwise and loosen them to remove the door.

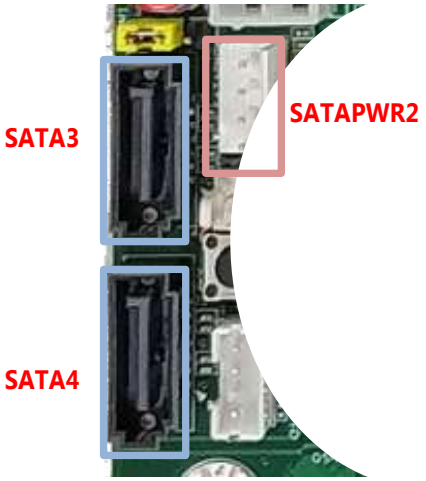
3. Insert your NIC Ethernet module. (The module shown in the image below is for reference only)L

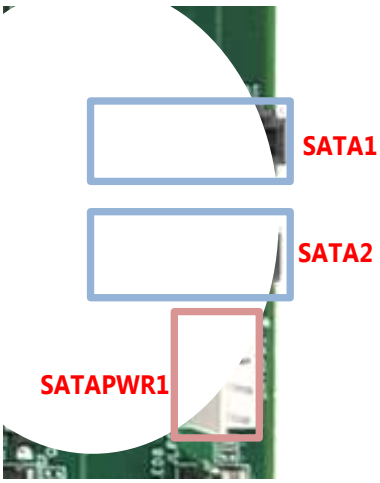
4. Once the module is firmly seated, rotate clockwise and tighten the two lock-screws.

Installing the Hard Disks

The system can accommodate two 2.5" SSD/HDD at its front disk bay. With the optional SSD swappable cage, you can add another two SSD disks for system storage. After you install the hard drives, make sure the SATA data cables and SATA power cables are connected to the designated connectors on the motherboard, as indicated in the picture below.



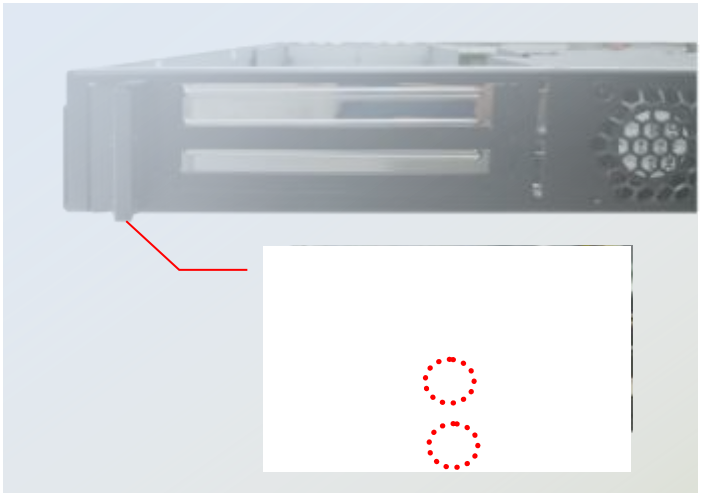




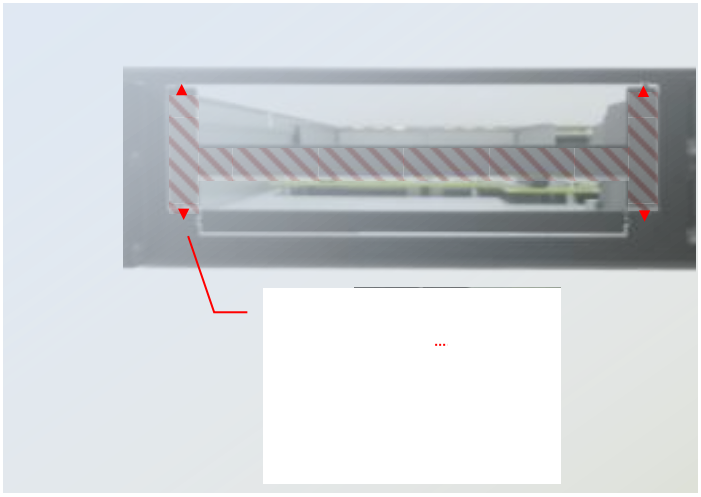
SSD Swappable Cage and Hard Disk Installation

1. On Rear panel, loosen the screws that secure the slot bracket so that you can remove both PCIe slot covers, and then lock the bracket back with the screws.

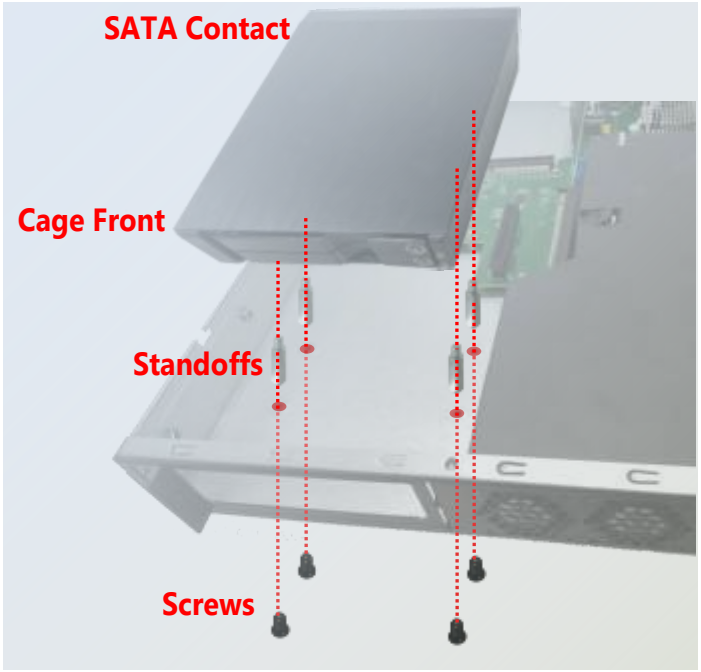
The PCIe slot covers are no longer needed then.



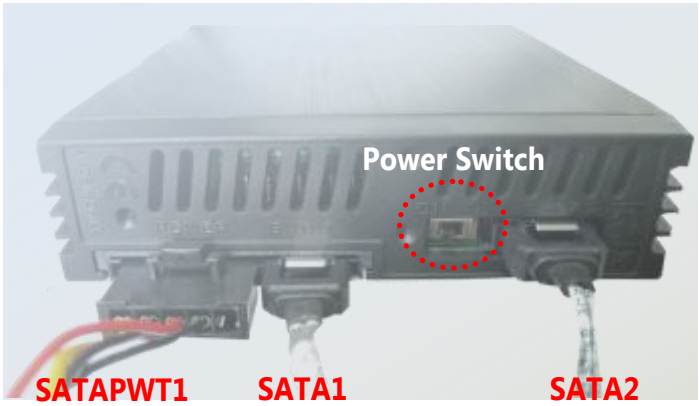
2. The colored area indicated in the picture is to be removed to accommodate the SSD swappable cage. Press on the four connected points with a flathead screwdriver to cut off the unneeded parts. It is recommended not to use your bare hands to tear apart the metal pieces in case of injury.



3. Align the screws holes on the cage bottom with the provided standoffs as well as the holes on the chassis, and secure the cage onto the chassis using the provided screws.



4. Attach the SATA cables and the SATA Power cable to the cage, and insert the cable ends into the corresponding connectors on Motherboard.



5. Make sure the power switch is turned to "ON" position

6. Pull out the lever to open the slot.

Push the SSD into the slot, with its SATA contact facing inward.

Push the lever back to close the slot; the mechanism of the caddy will have the SDD connected into the socket automatically.

7. Lock the tray with the provided key. Turn the key 90° clockwise to the "Locked" position.

HDD/SSD Bay Installation

The HDD/SSD bay supports 2 x 2.5" SATA HDDs or SSDs as data storage. Please follow the steps below for installation.

1. Locate the disk drive tray at the corner of the system. Loosen the screw indicated in the picture and slide the tray downwards to have it loosened from the four latching spots. Take the tray out and prepare to install SATA 2.5" disk drives.

2. Place the disk drive in the tray, as shown in the image below. Apply two disk screws with two rubber washers for each side of the disk drive. If you are going to install two disks, always start by installing the disk in the lower slot.

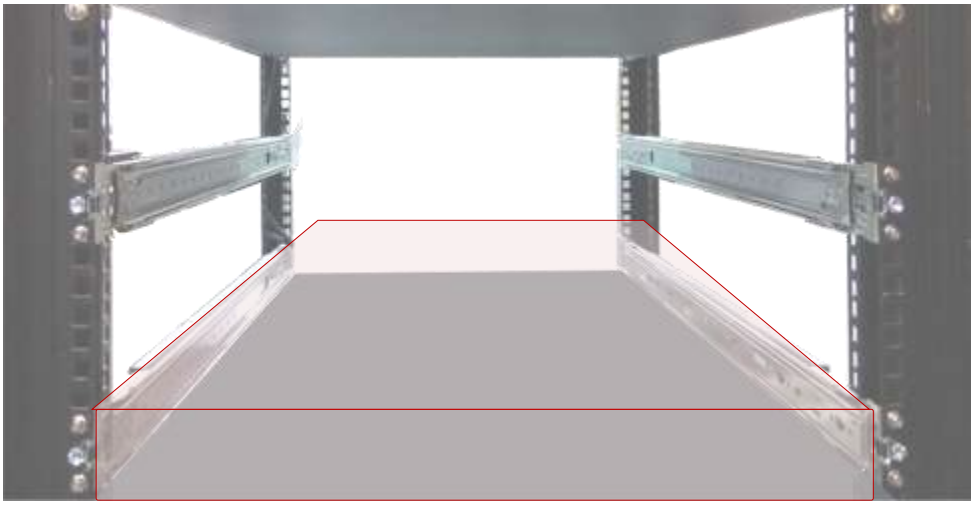
3. Place the tray with HDD/SSD installed back to its original spot inside the system. Remember to aim at the four latching holes. Then slide the tray upwards to get it locked and secure it with the original screw.
4. Attach the SATA cables and the SATA Power cable to the disks, and insert the cable ends into the corresponding connectors on Motherboard.

Mounting the System

There are various methods to mount this system based on your application and the environment. This system came with two types of mounting kits for a typical rack or enclosure mounting installation or installing this system in a rack:

- **Ear Brackets**

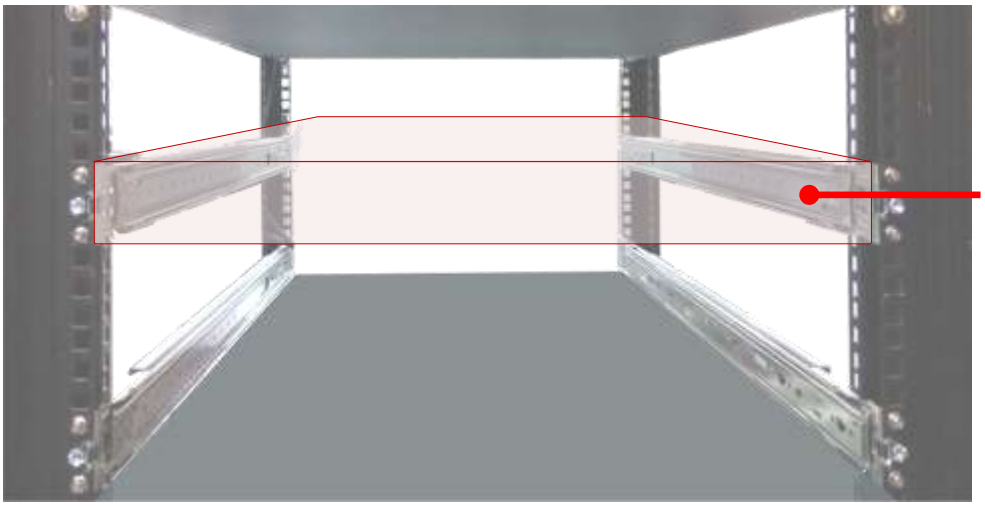
This method is quick and easy by fixing this system to the front posts of the rack while being the most unstable method, for the bracket assembly alone cannot provide sufficient support to the chassis. Please ensure the use of these brackets goes with a shelf or slide rails to prevent the chassis from falling over.



The system shall be installed on the rack along with a shelf or slide rails, for the “Mounting Ears" are meant to secure the system, not to support it.

- **Slide Rail Kit + Short Ear Brackets**

The slidable rails allow you to access the system easily while solidly securing it on the rack.

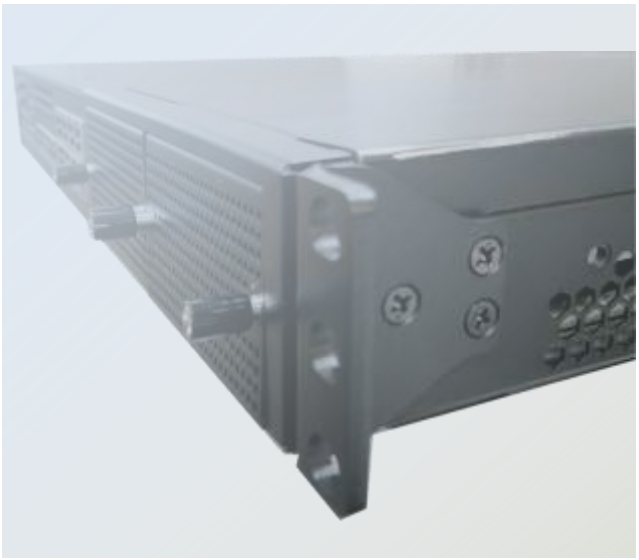


The Slide Rail Kit can secure the system while providing sufficient weight support for the device.

Attaching the Ear Brackets

The Ear Brackets come with six screws, as shown below.

Take an ear bracket, align the holes on it with those on the side of the system, and lock it onto the system with three provided screws. Do the same to the other ear bracket.



Attaching the Ear Brackets

The slide rail kit shall include the following items:

- **1** x pack of FL00IJ0-A screws (for securing the sliding rails on the unit)

- **2** x Slide-Rails

Fully stretched slide rail:

Note

If any component is missing or damaged, please contact your dealer immediately for assistance.

Attaching Rail Brackets

1. Unpack a slide rail and slide the inner channel to its end.

2. Slide the rail bracket out to its end.

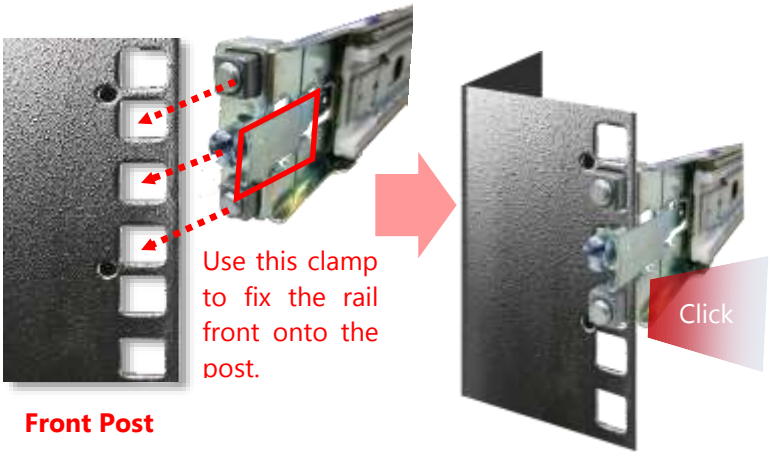
3. To detach the rail bracket from the channel, locate and push the Release Tab on the rail bracket while sliding it out.

4. Align the rail bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with 3 provided screws.

5. Repeat Steps 1~4 to attach the rail bracket to the other side of the chassis.

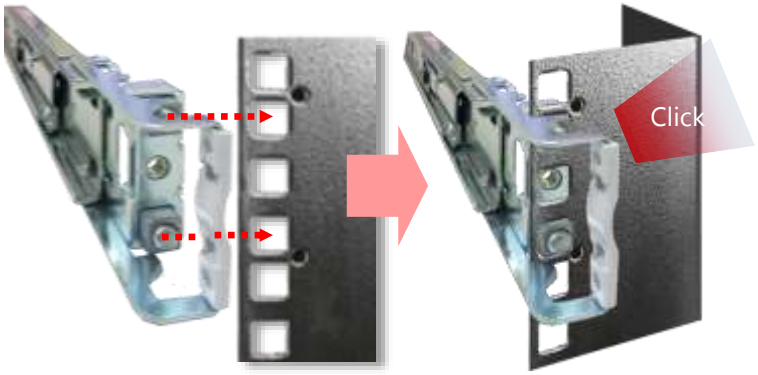
Installing the Slide Rail Assemblies

1. This slide-rail kit does NOT require screw-fixing. Aim at **3** available screw holes on the rack front and lock it by clipping the rail's front end to the post, as shown in the image below. You should hear a "click" sound once it is firmly attached.



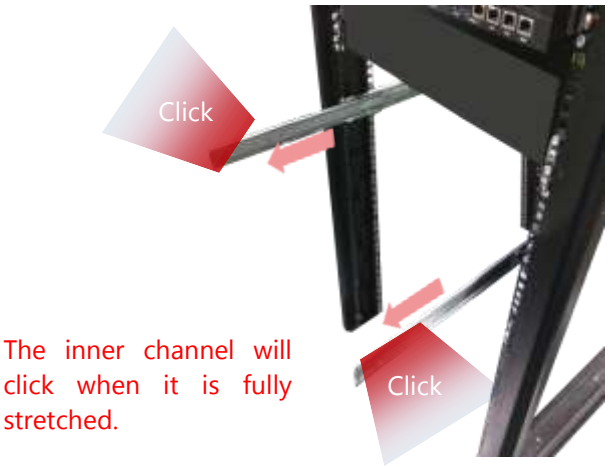
2. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the **2** available holes on the post, and the rail assembly will click into place.

3. Repeat Step 1~2 to install the other rail onto the post.

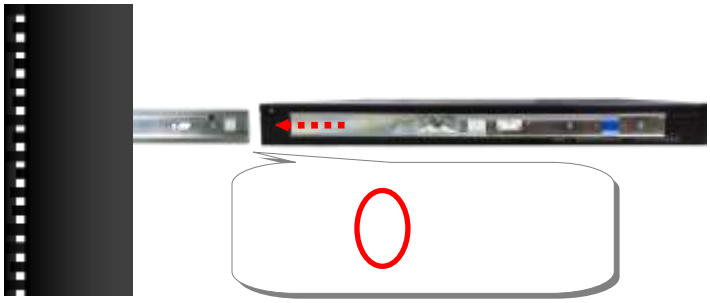


Installing the Chassis onto the Rack

1. Stretch both of the inner channels out to their fullest extent. You will hear a click sound when they are fully stretched and locked.

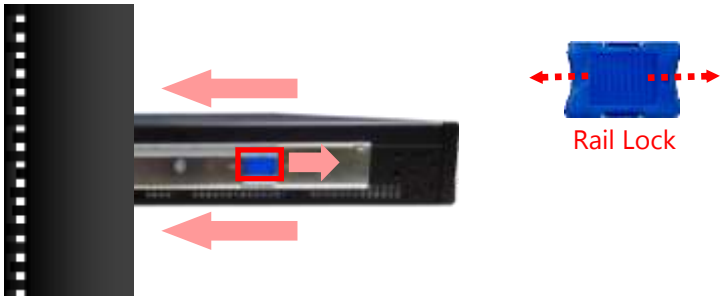


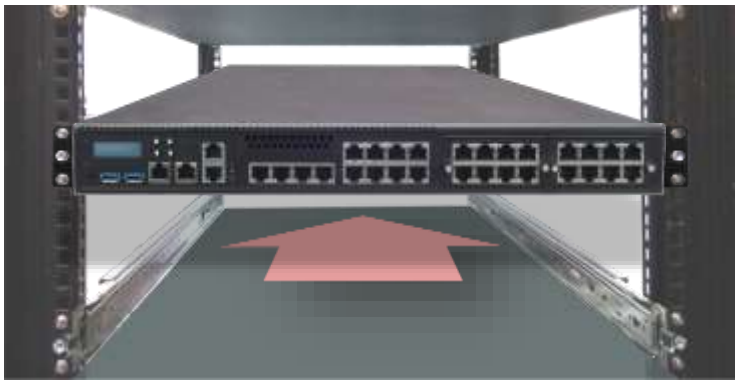
2. Hold the chassis with its front facing you, lift and gently insert it by aligning with the slide-rail assemblies as shown in the image, and then push the unit into the cabinet.



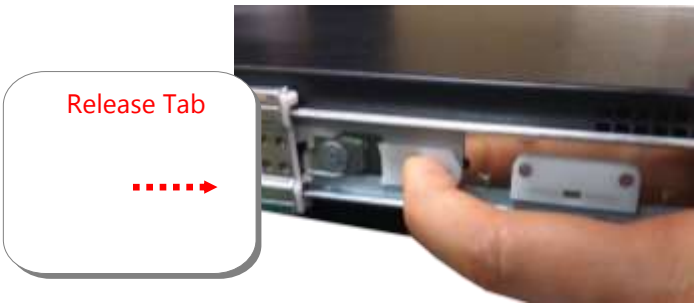
3. Keep sliding the rails in until they stop about halfway. Press down the metal clips on both inner channels and push them further into the cabinet.

4. To have the chassis completely inserted into the rack, pull and hold the Rail Lock tab on both brackets while pushing in the chassis.





To detach the chassis from the rack, pull the Release Tabs on both sides of the brackets towards you while gently sliding the chassis out.



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, just reverse the steps to install the fan back onto the enclosure and the system.

1. From the rear side of the fan, loosen the screw that secures the fan connector.

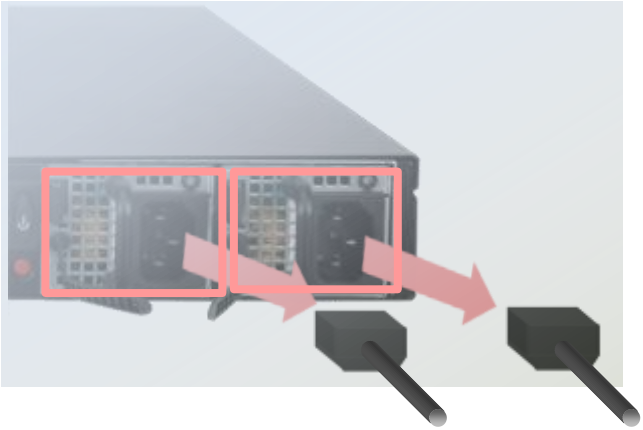
2. Disconnect the fan connector.
3. Take out the worn fan and disconnect its power cable connector from the motherboard.
4. Install a new fan by reversing the above 3 steps.

Installing the AC Power Supply

Power supply units may wear down eventually. Please be noted that this system supports 600W 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.

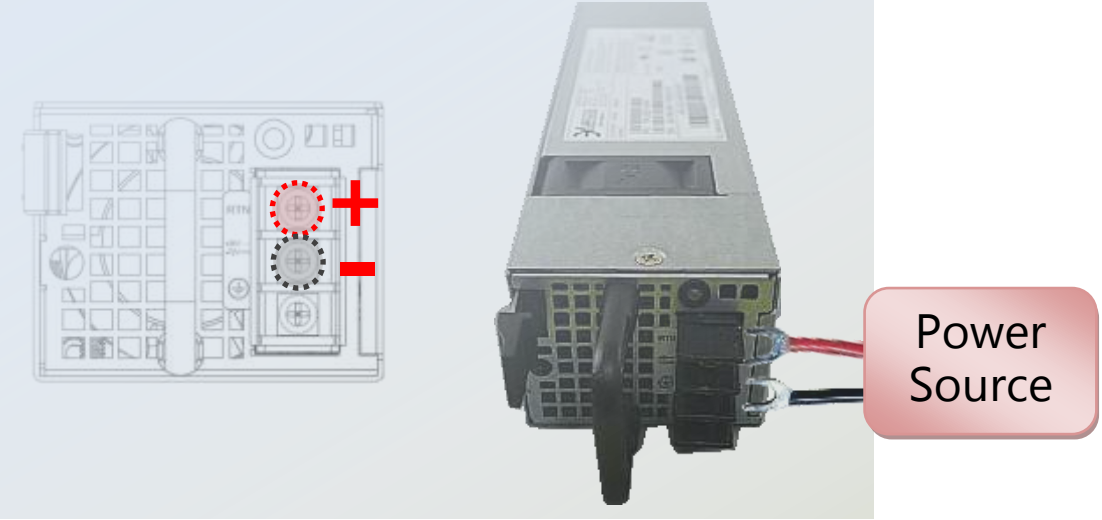
2. Pull the original unit out and replace it with the new one.



Installing the DC Power Supply

Follow the instructions below to connect the DC power cord to the connector on the PSU.

1. Loosen the two screws indicated in the picture.
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 **-36 —-72V, 12-6A** minimum (each), Tma = **40 degrees C**, and the altitude of operation = **5000m**.
- The cable should be **14AWG** (**12A** minimum, **72V** minimum).

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

CHAPTER 3: SOFTWARE SETUP

Remote Server Management

Overview

This document specifies the BMC firmware features of Lanner. The BMC firmware implements IPMI 2.0 based on ASPEED service processor. It performs all the BMC management tasks 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.

For detailed instructions on using each function, please refer to the full version of NCA-5220 BMC manuals available on.

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
	System Management	• Sensor monitoring • System power management • Watchdog timer
	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
	Maintenance	• Auto-sync time with NTP server • Remote firmware update by Web UI or Linux tool

BMC Firmware Functional 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.

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. HD, FD could be mounted by NFS and SAMBA.
- Efficient USB 2.0 based CD/DVD redirection with a typical speed of 20XCD.
- Completely secured transmission.

IPMI Commands Support List

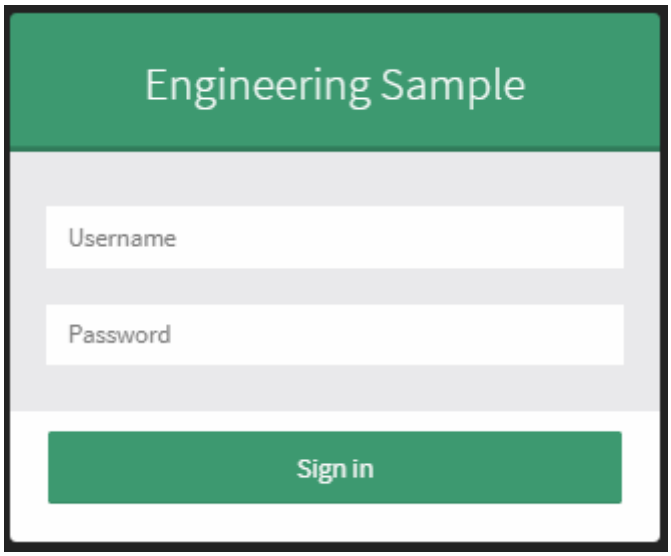
COMMANDS	NETFN	CMD
IPM Device "Global" Commands		
Get Device ID	APP (06h)	00h
Cold Reset	APP (06h)	02h
Warm Reset	APP (06h)	03h
Get Device GUID	APP (06h)	08h
BMC Watchdog Timer Commands		
Reset Watchdog Timer	APP (06h)	22h
Set Watchdog Timer	APP (06h)	24h
Get Watchdog Timer	APP (06h)	25h
BMC Device and 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
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.

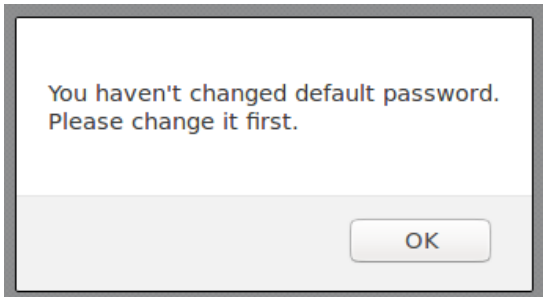
Note

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

Default User Name and Password

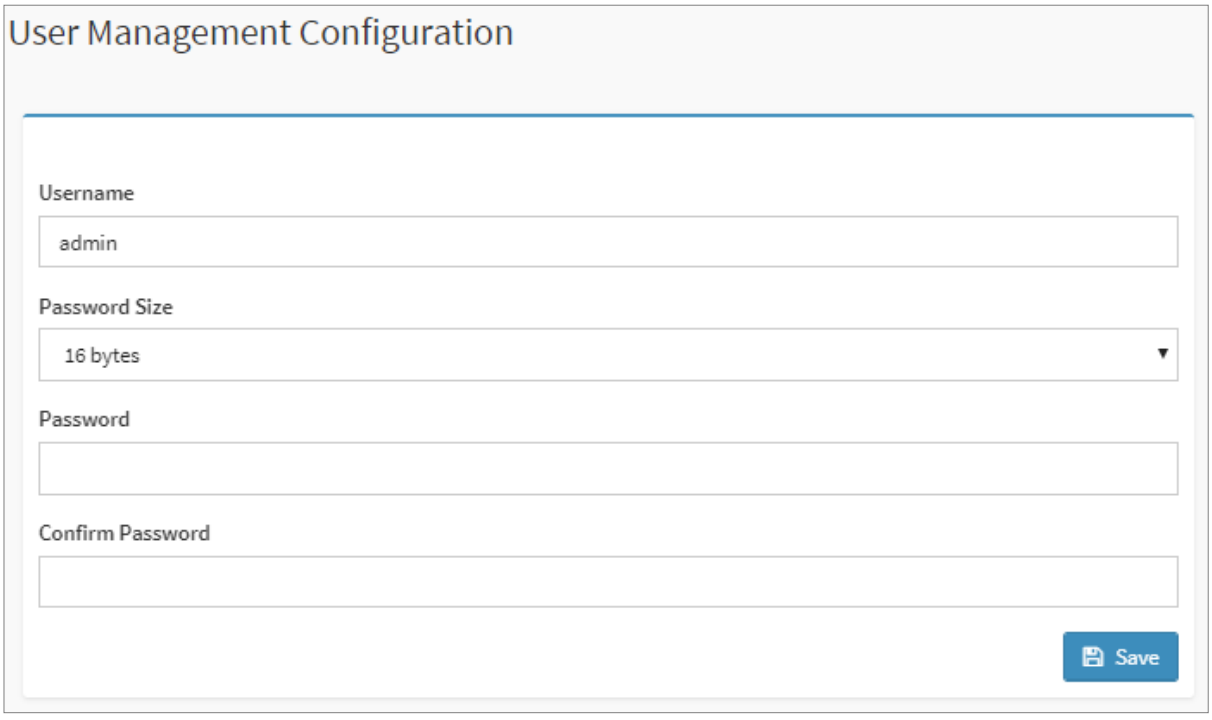
- **Username:** admin
- **Password**: admin

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.



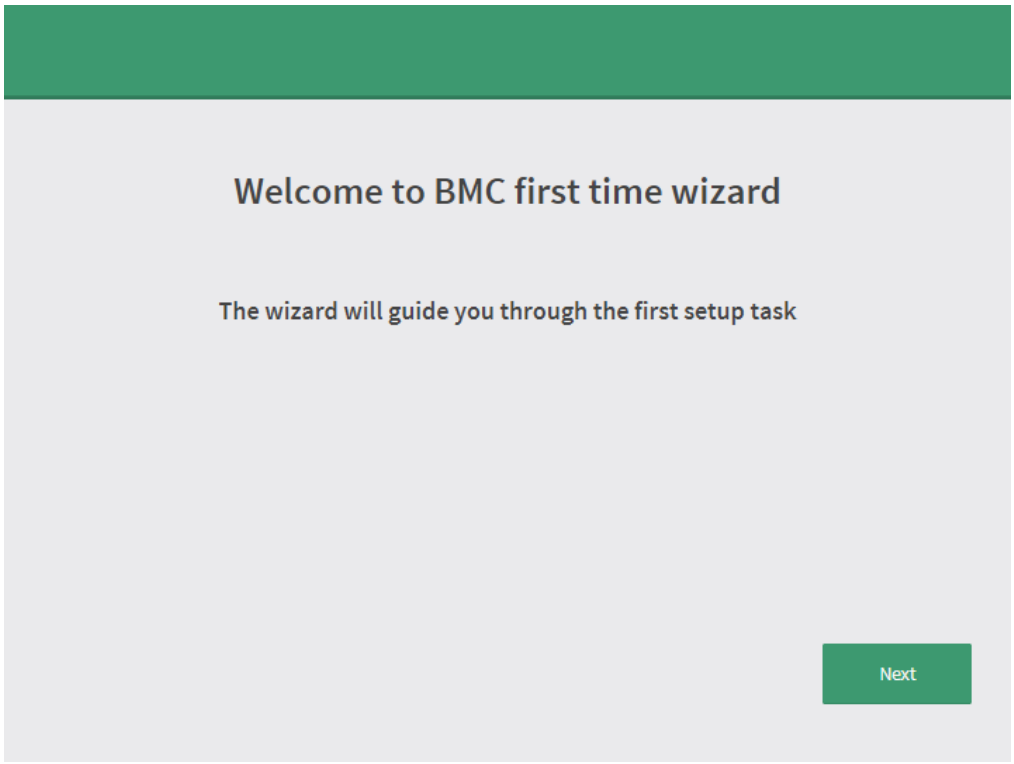
Change the default password – Set password

Note

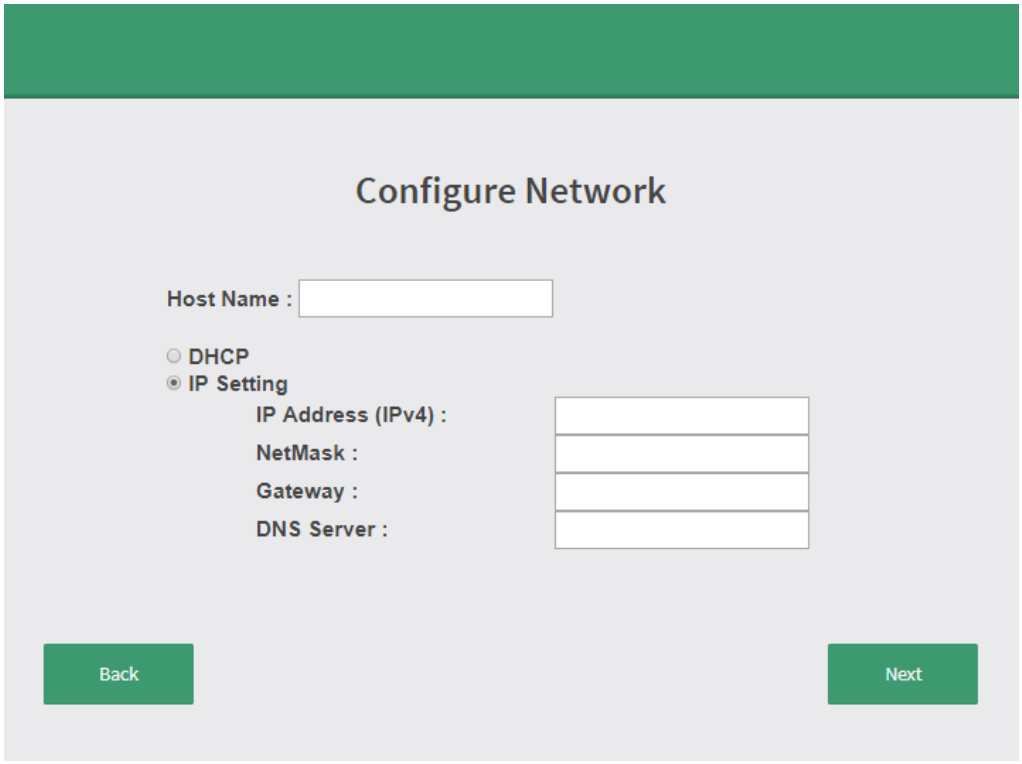
Duplicate usernames shouldn't exist across various authentication methods like LDAP, RADIUS or IPMI since the privilege of one Authentication method is overwritten by another authentication method during logging in, and hence the correct privilege cannot be returned properly.

First Time Wizard

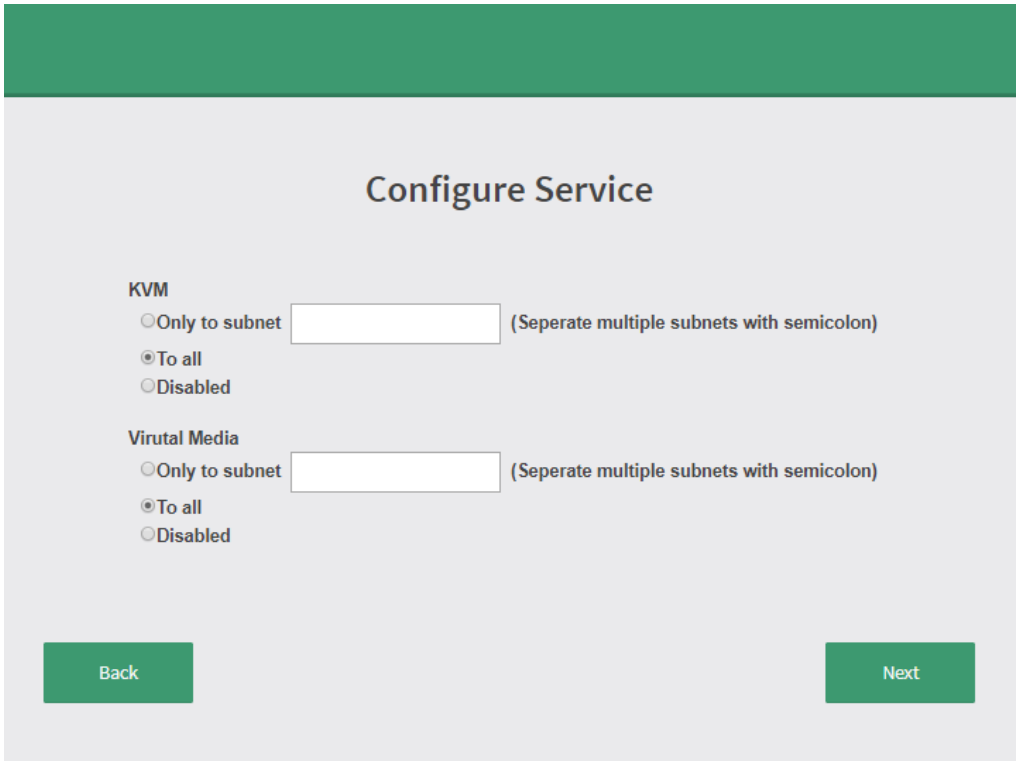
After the first time login, you will see first time wizard welcome page as the following picture. Please press the "Next" button and configure your BMC step by step.



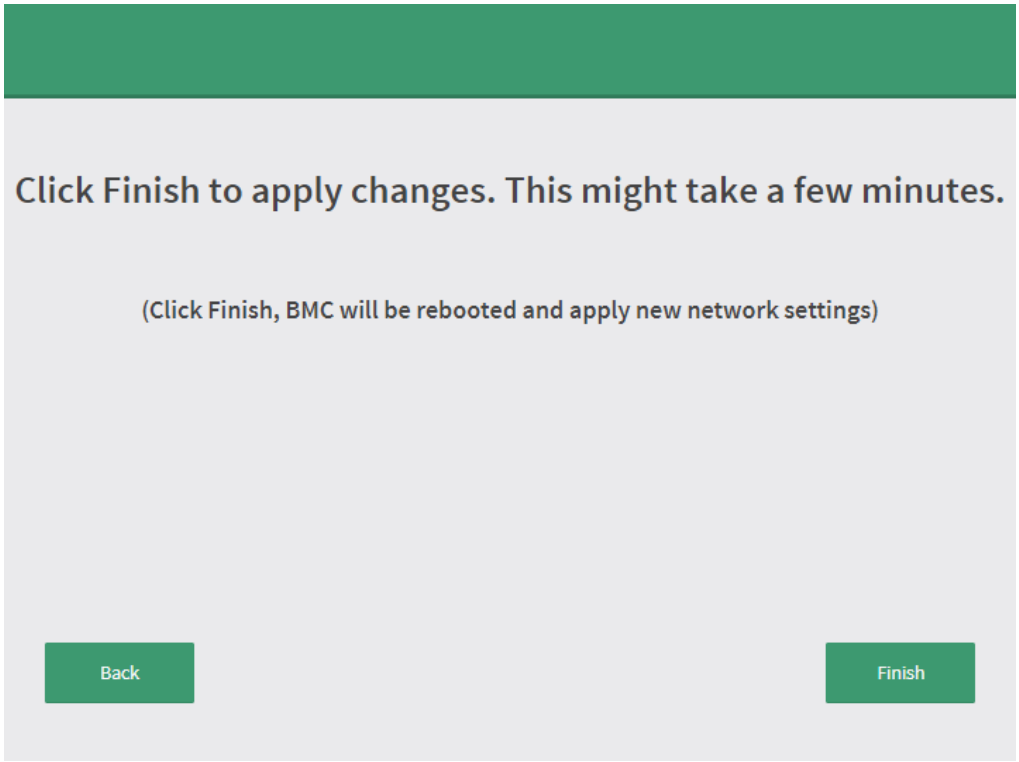
In the "Configure Network" page, you could specify the hostname and network settings of BMC.



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



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 Web UI after a few minutes.



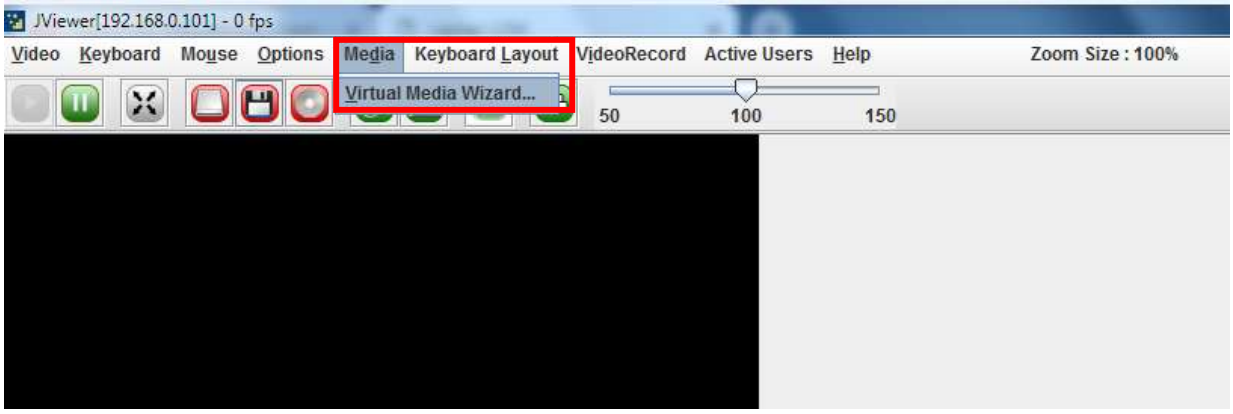
Installing Operating System

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

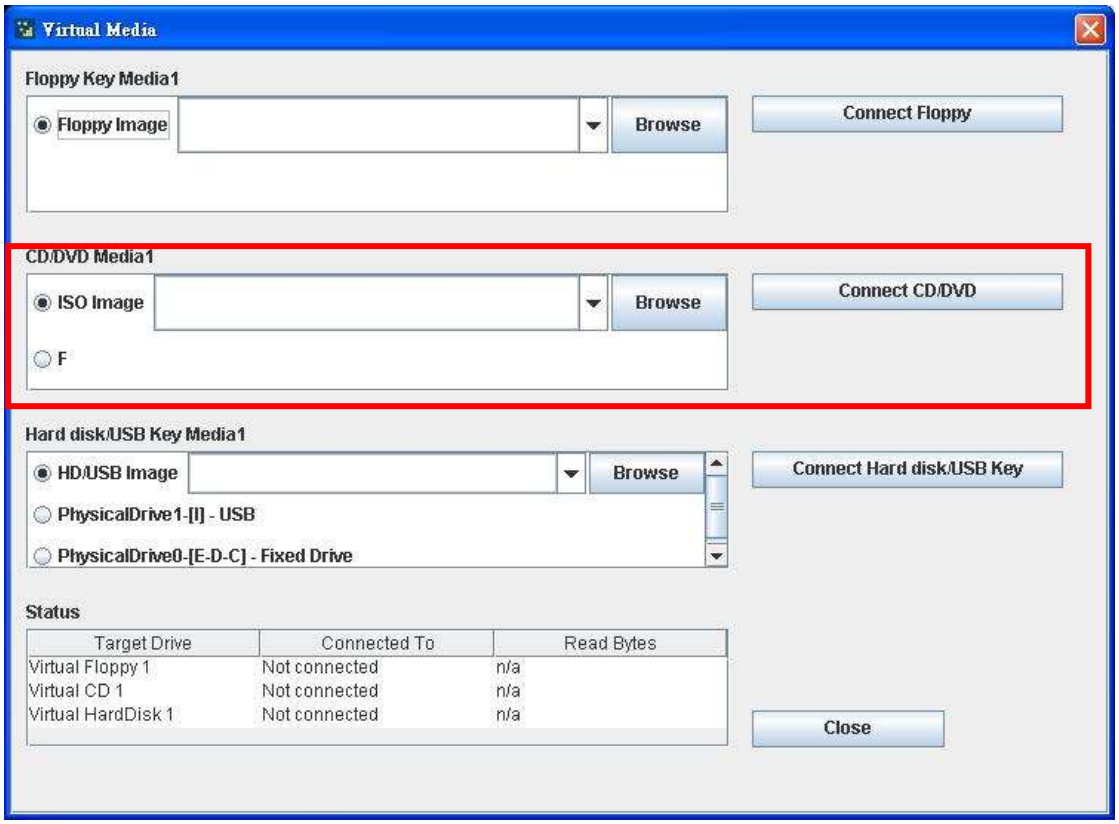
Via IPMI Interface

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."

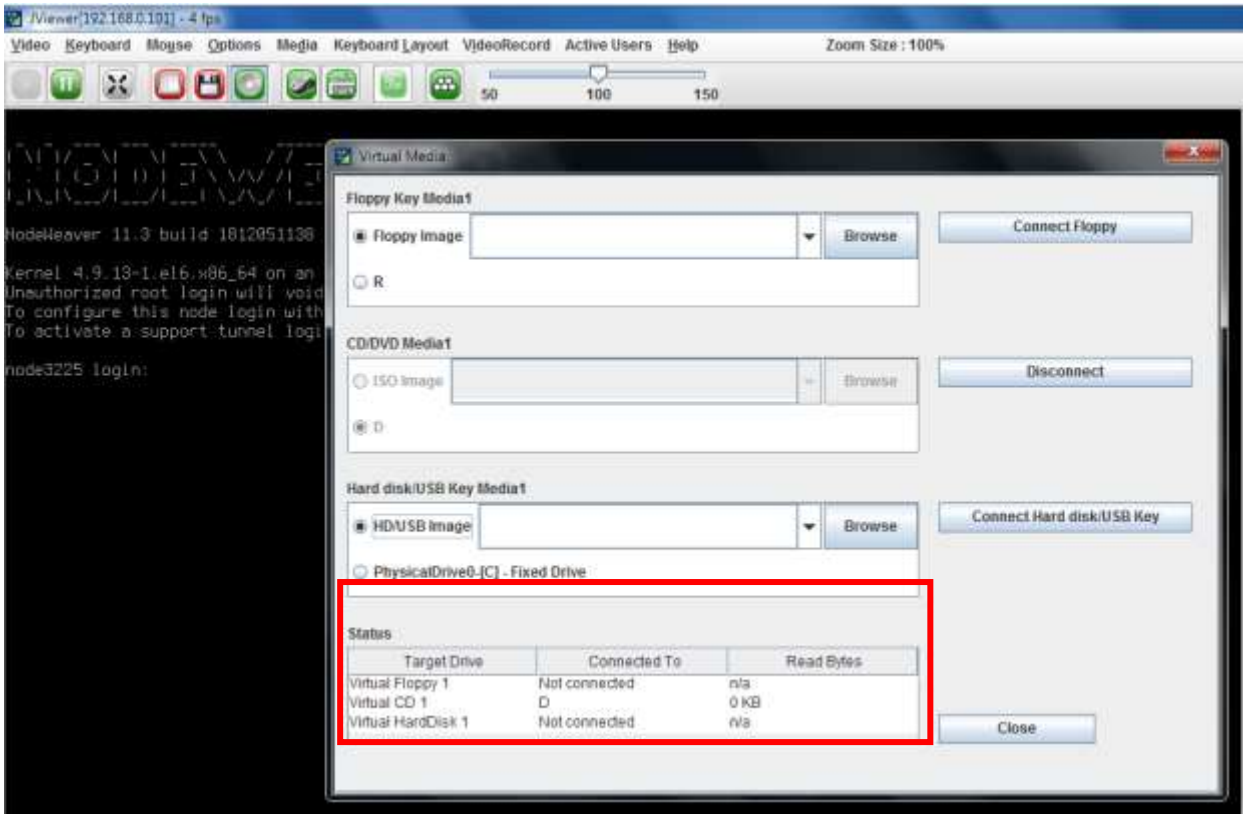
5. After a JViewer screen pops up, select "Media" and then "Virtual Media Wizard" from the toolbar.



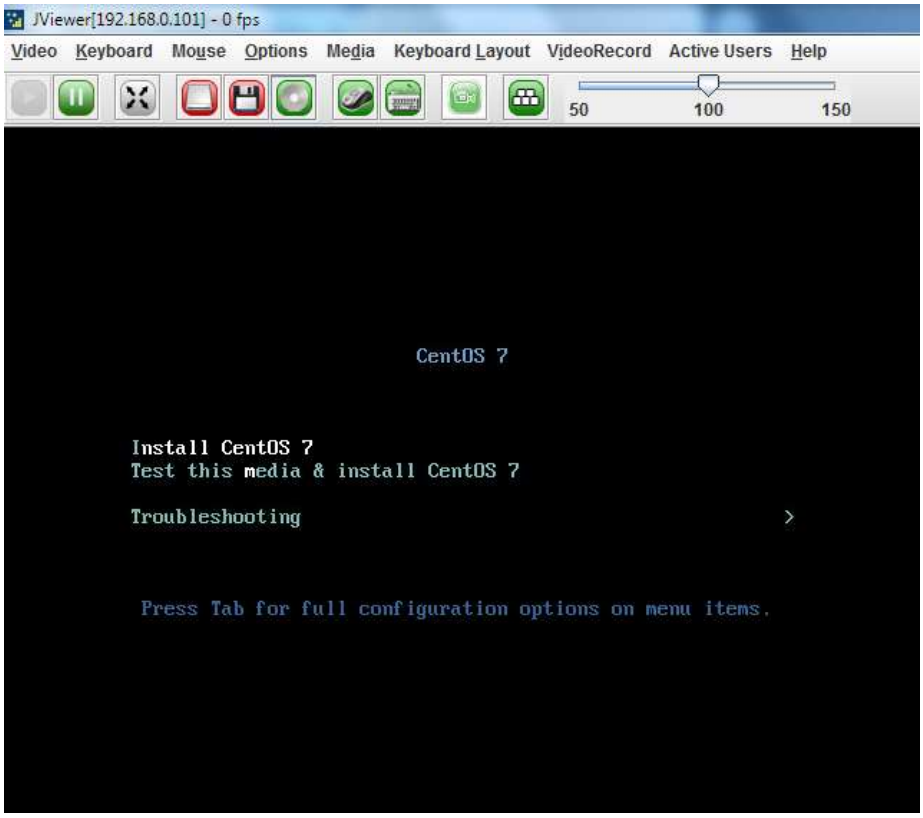
6. On **Virtual Media** screen, select your media type to load the image. For example, click on "Browse" of **CD/DVD Media 1** and then "Connect CD/DVD."



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.



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.

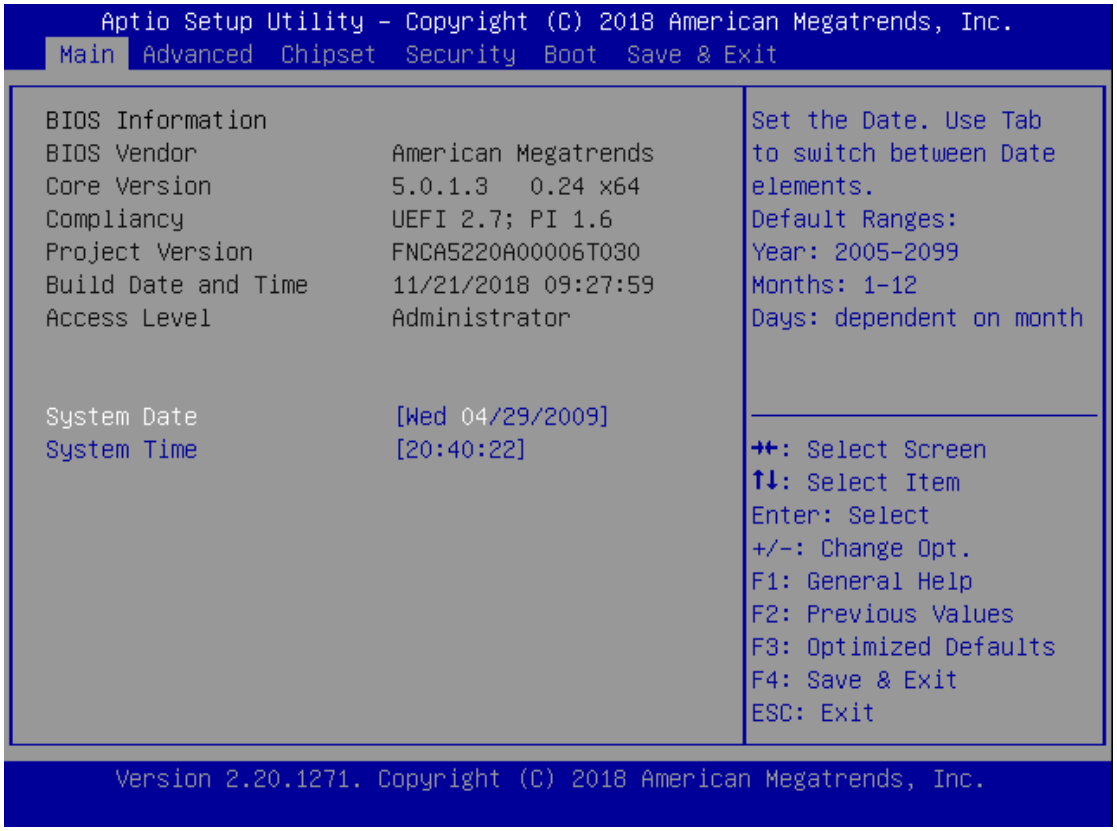
Main Setup

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

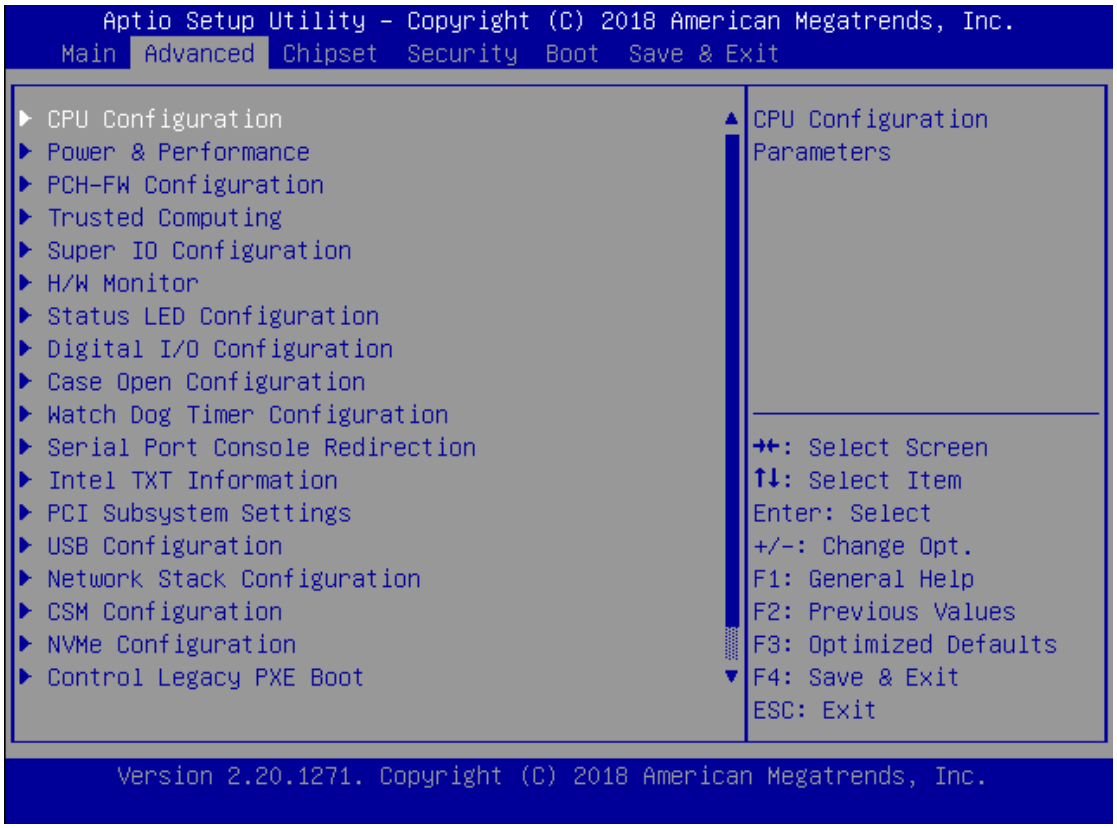
Setup main page contains BIOS information and project version information.



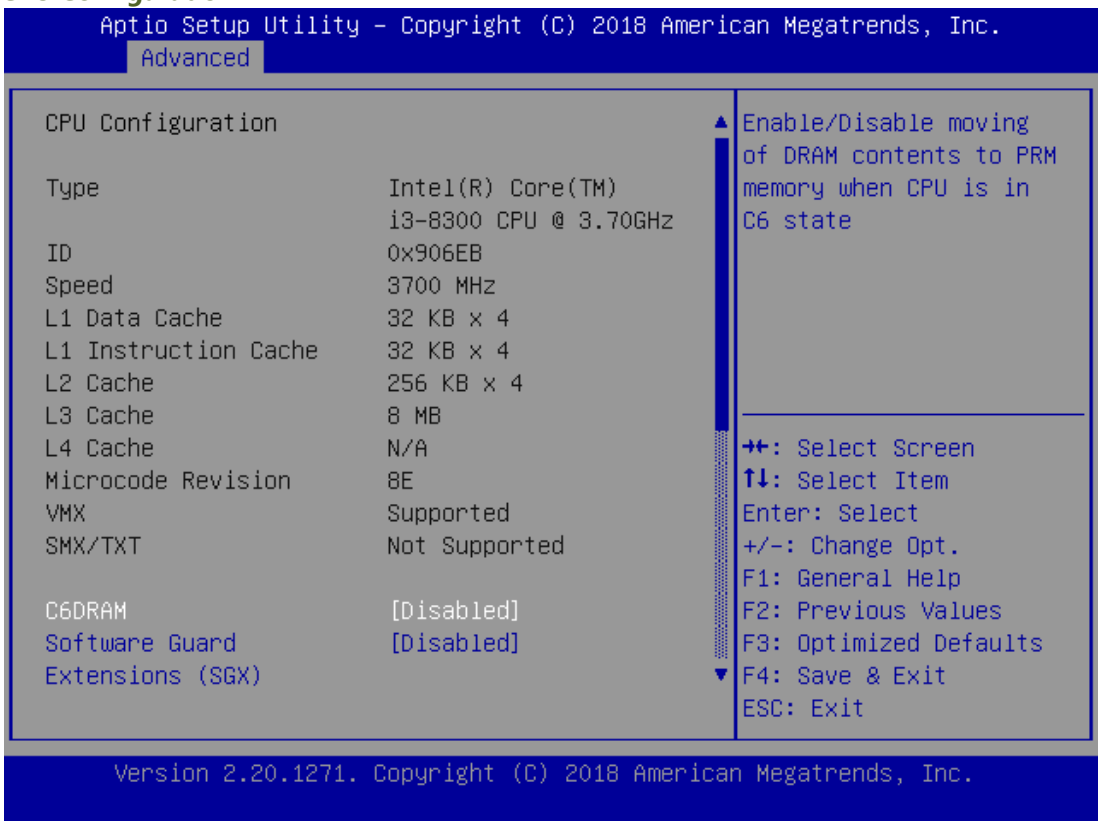
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default Range of Year: 2005-2099 Default Range of Month: 1-12 Days: dependent on Month.
System Time	To set the Date, use **<Tab>** to switch between Date elements.

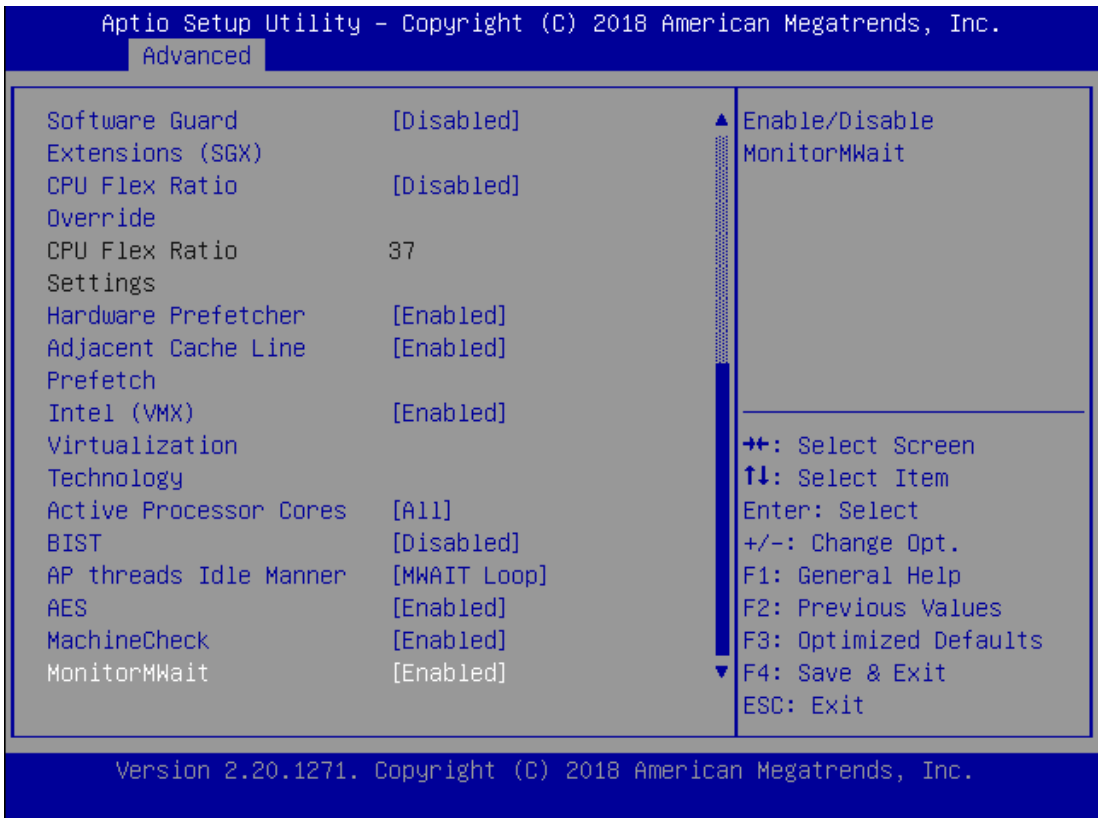
Advanced Page

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



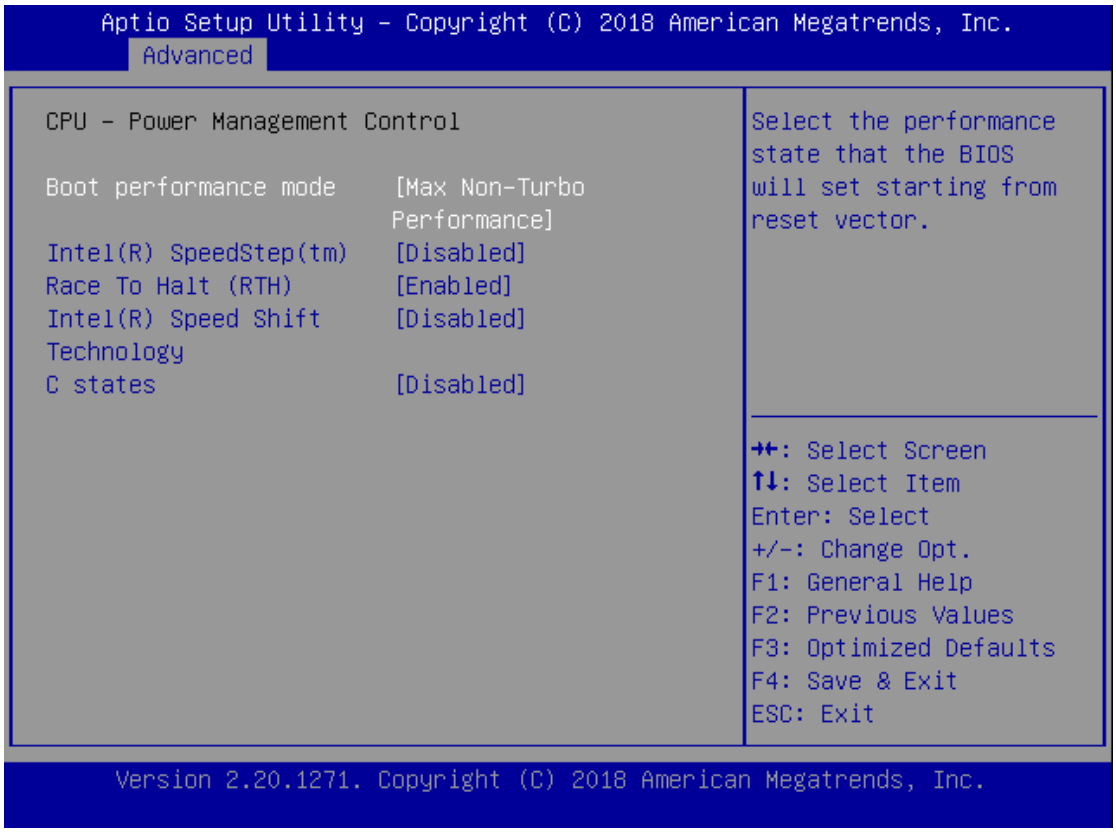
CPU Configuration





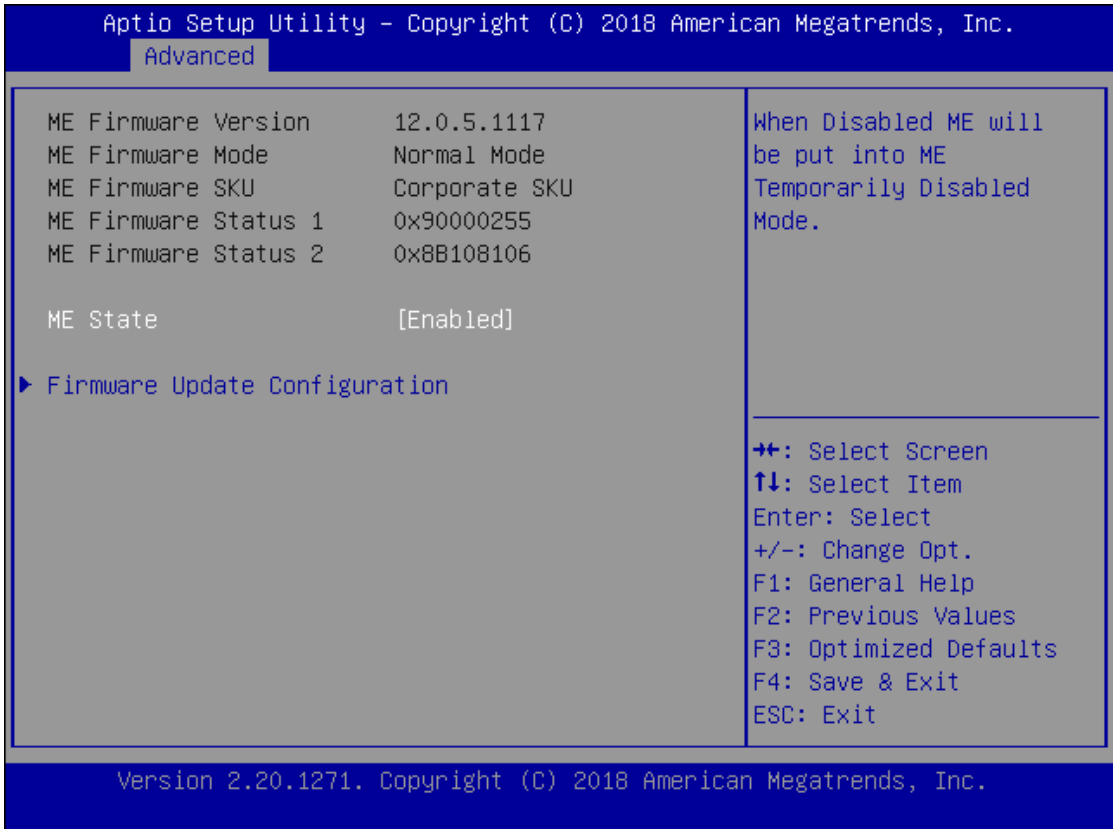
Feature	Options	Description
C6DRAM	Disabled Enabled	Enable/Disable moving of DRAM contents to PRM memory when CPU is in C6 state
Software Guard Extensions (SGX)	Disabled Enabled	Enable/Disable Software Guard Extensions (SGX)
CPU Flex Ratio Override	Disabled Enabled	Enable/Disable CPU Flex Ratio Programming
CPU Flex Ratio Override	37	Enable/Disable CPU Flex Ratio Programming
Hardware Prefetcher	Disabled Enabled	To turn on/off the MLC streamer prefetcher.
Adjacent Cache Line Prefetch	Disabled Enabled	To turn on/off prefetching of adjacent cache lines.
Intel (VMX) Virtualization Technology	Disabled Enabled	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	All 1 2 3 4 5	Number of cores to enable in each processor package.
Hyper-Threading	Disabled Enabled	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
BIST	Disabled Enabled	Enable/Disable BIST (Built-In Self Test) on reset
AP threads Idle Manner	HALT Loop MWAIT Loop RUN Loop	AP threads Idle Manner for waiting signal to run
AES	Disabled Enabled	Enable/Disable AES (Advanced Encryption Standard)
MachineCheck	Disabled Enabled	Enable/Disable Machine Check
MonitorMWait	Disabled Enabled	Enable/Disable MonitorMWait

Power & Performance



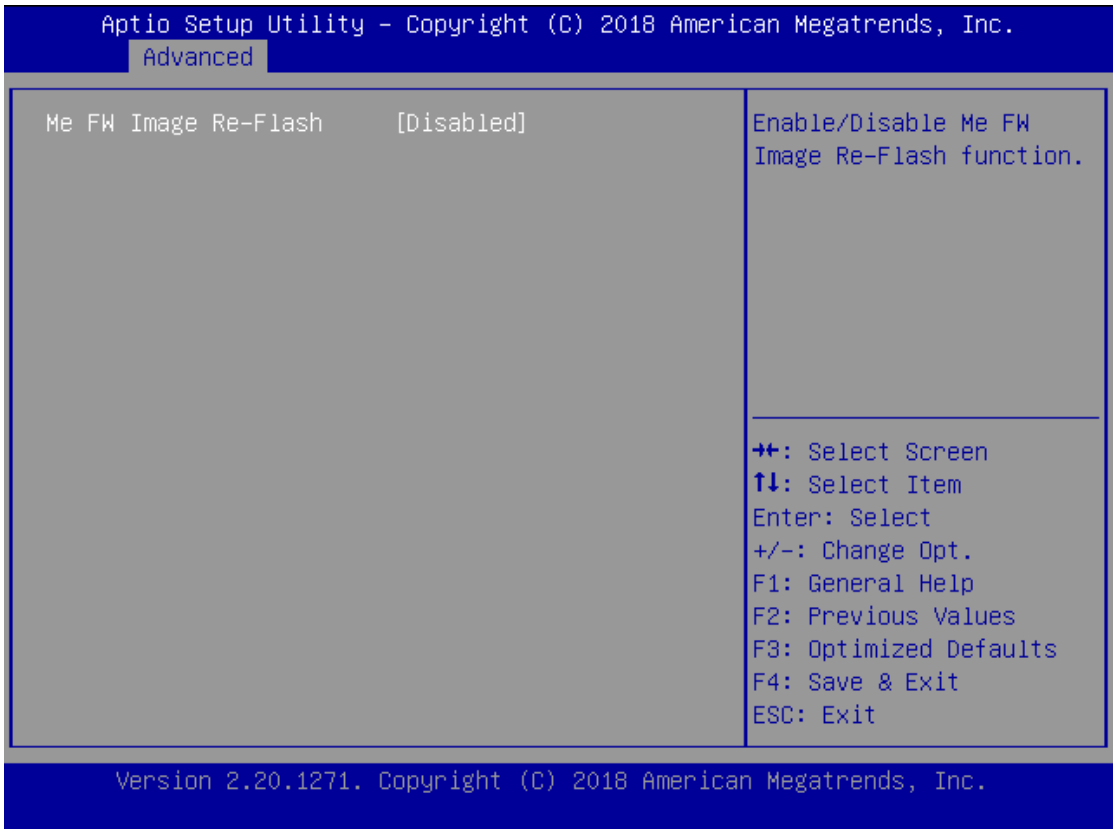
Feature	Options	Description
Boot performance mode	Max Battery Max Non-Turbo Performance Turbo Performance"	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Disabled Enabled	Allows more than two frequency ranges to be supported.
Race To Halt (RTH)	Disabled Enabled	Enable/Disable Race To Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20)
Intel(R) Speed Shift Technology	Disabled Enabled	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
C states	Disabled Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.

PCH-FW Configuration



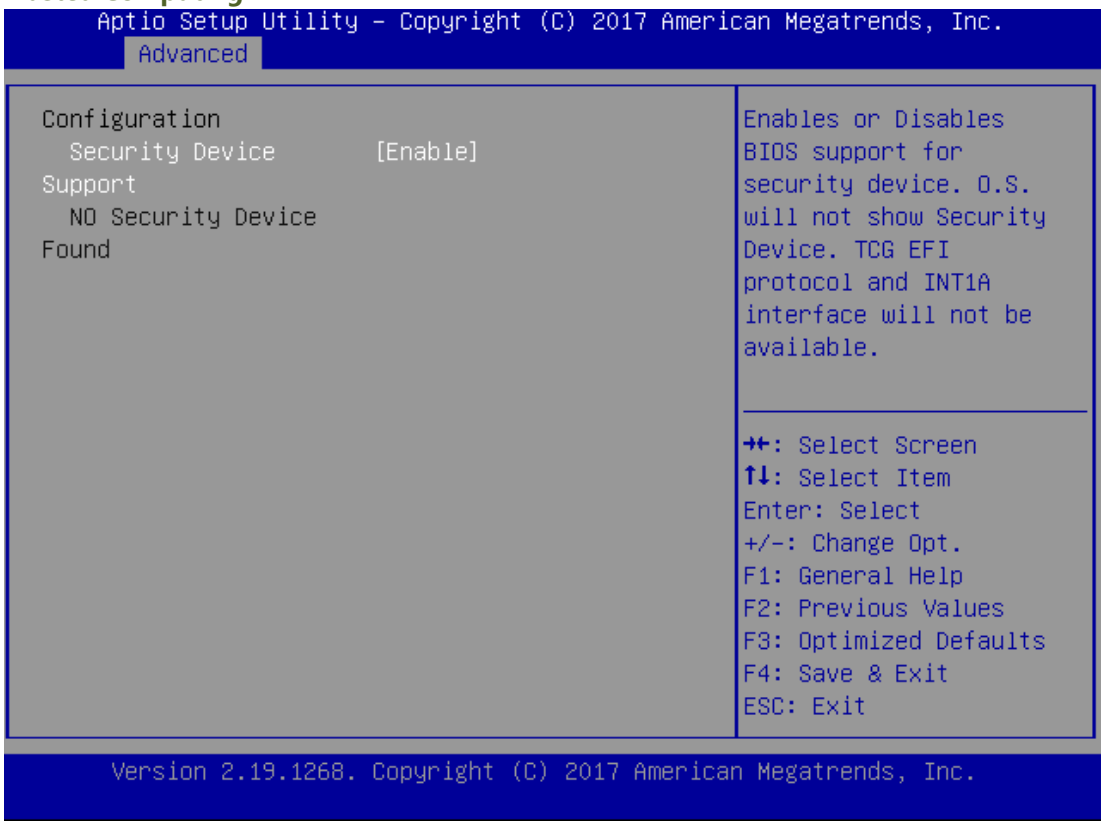
Feature	Options	Description
ME State	Disabled Enabled	When Disabled ME will be put into ME Temporarily Disabled Mode.

PCH-FW Configuration



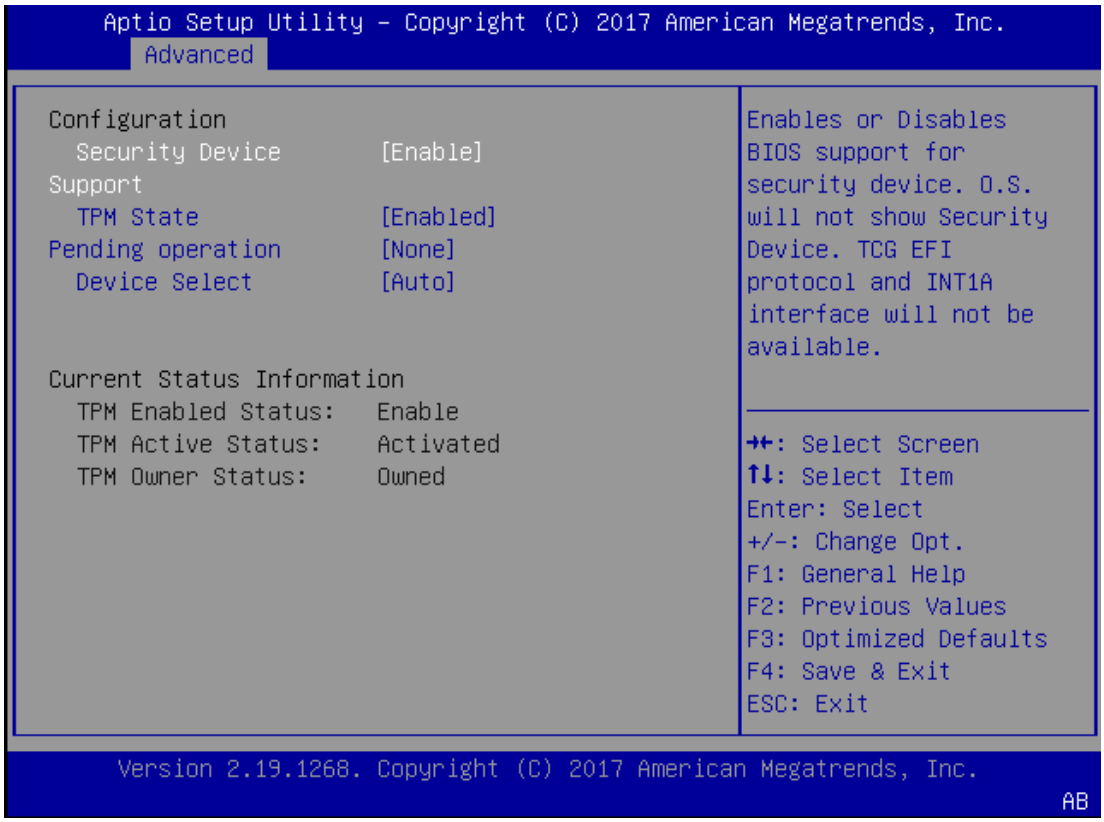
Feature	Options	Description
Me FW Image Re-Flash	Disabled Enabled	Enable/Disable Me FW Image Re-Flash function.

Trusted Computing



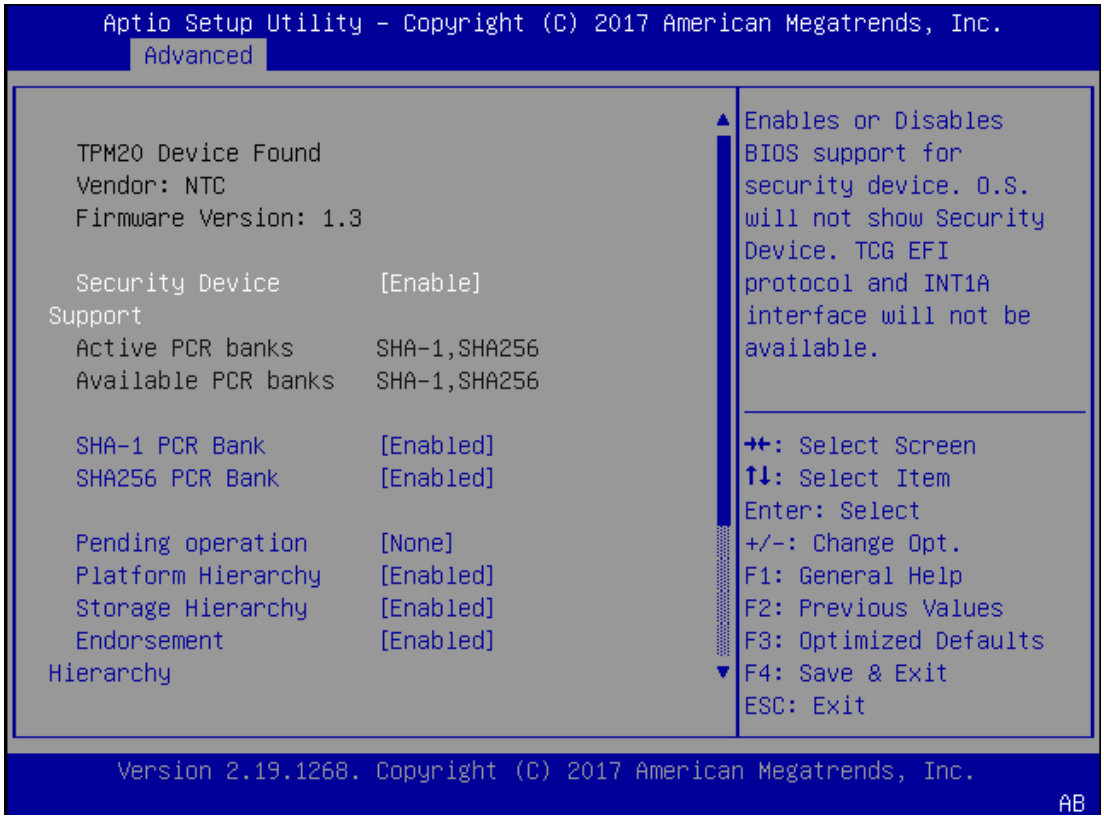
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

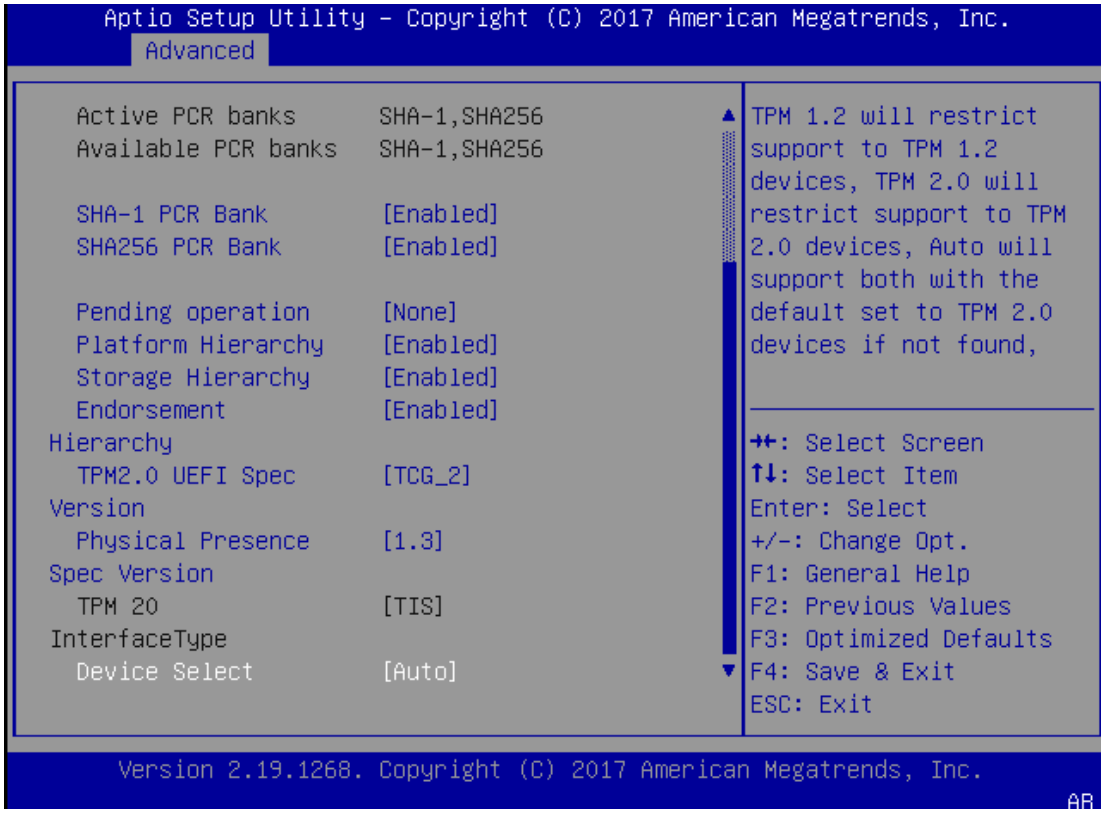
Trusted Computing (TPM1.2)



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

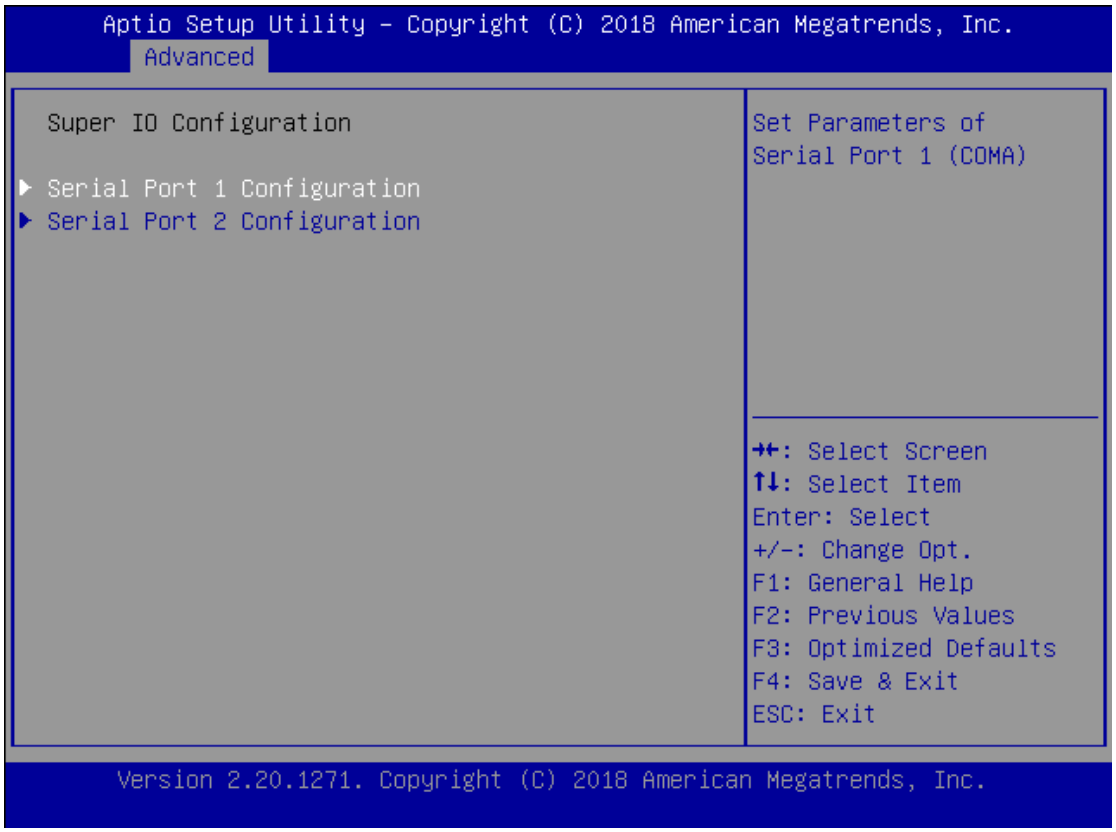
Trusted Computing (TPM2.0)



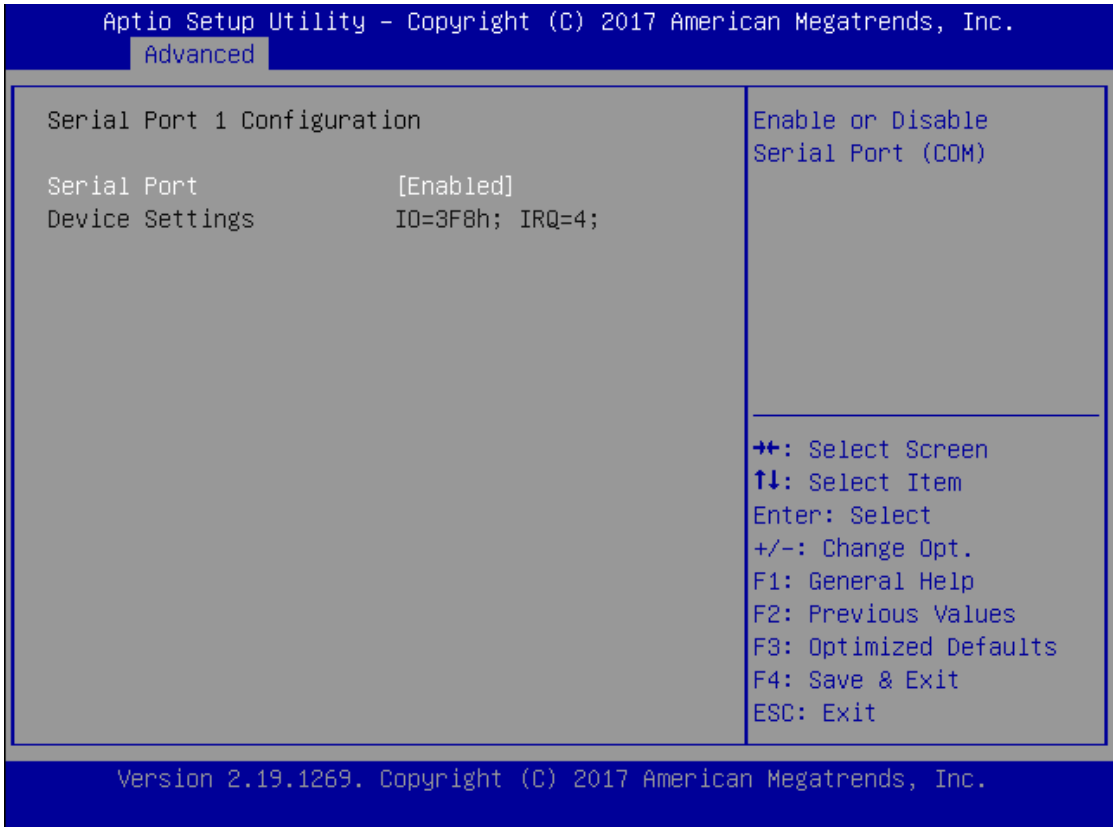


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1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

Super IO Configuration

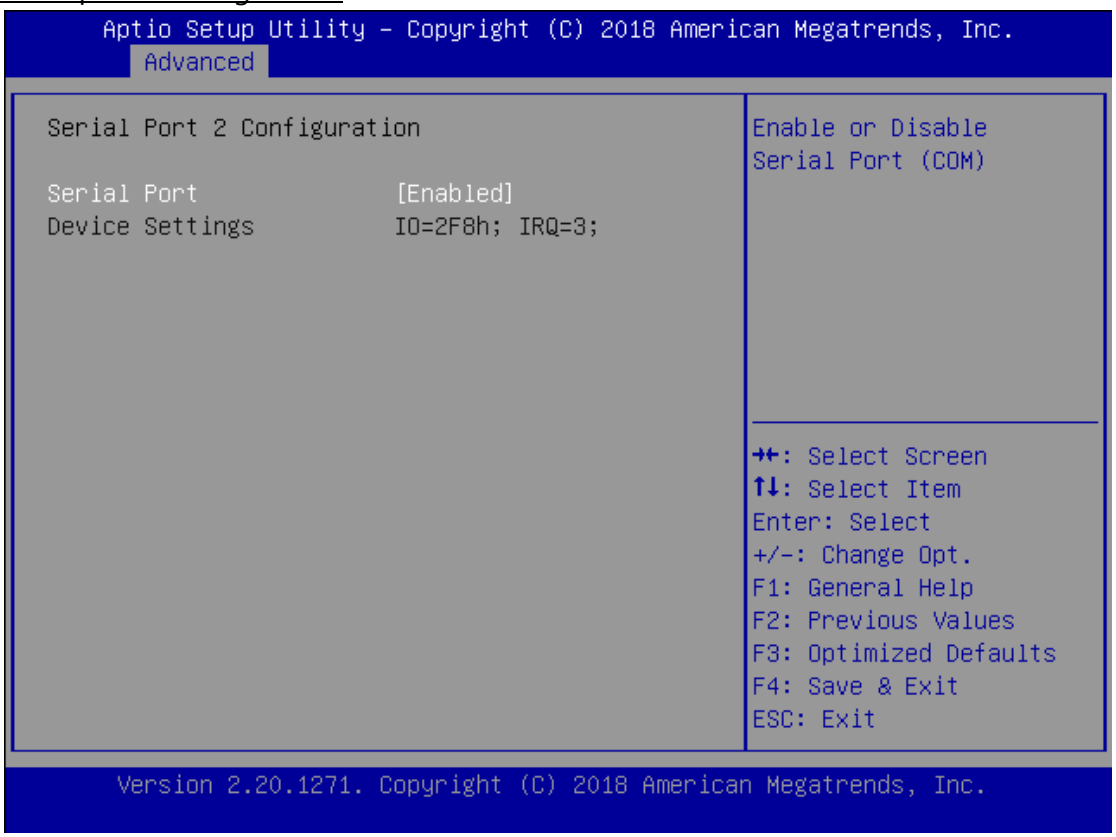


Serial port 1 Configuration



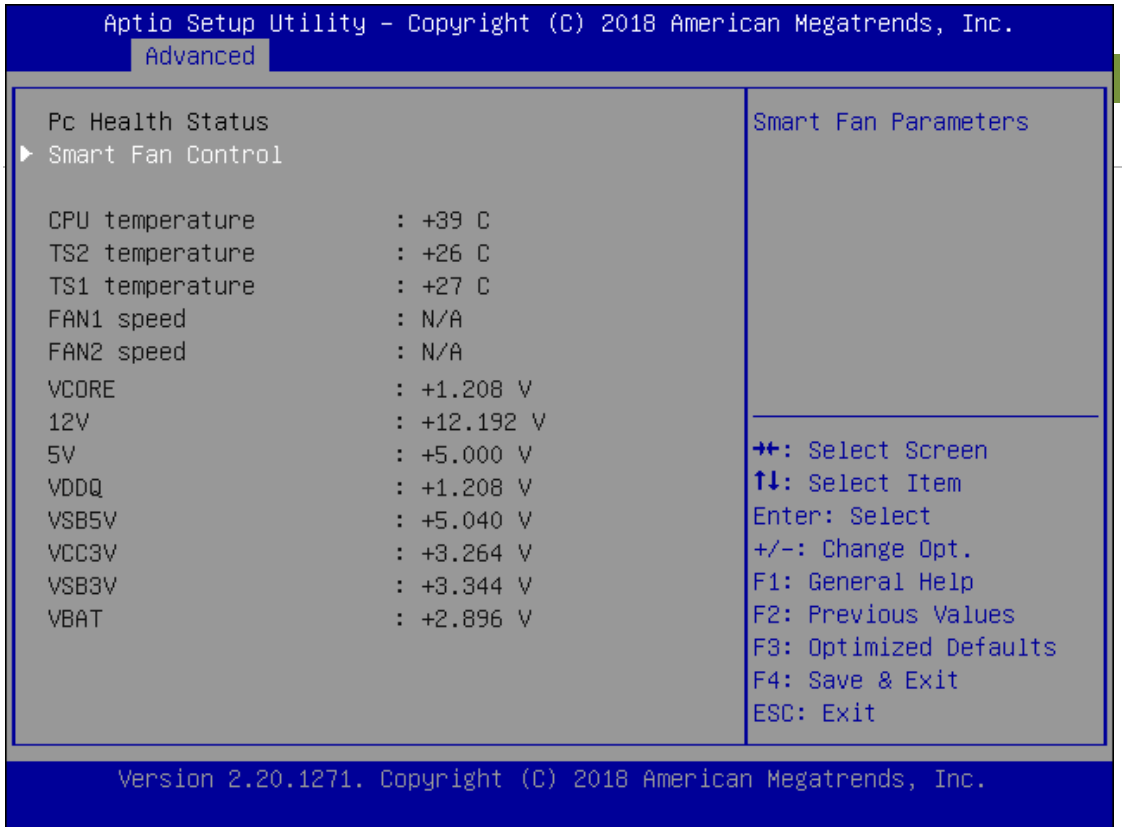
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 4

Serial port 2 Configuration

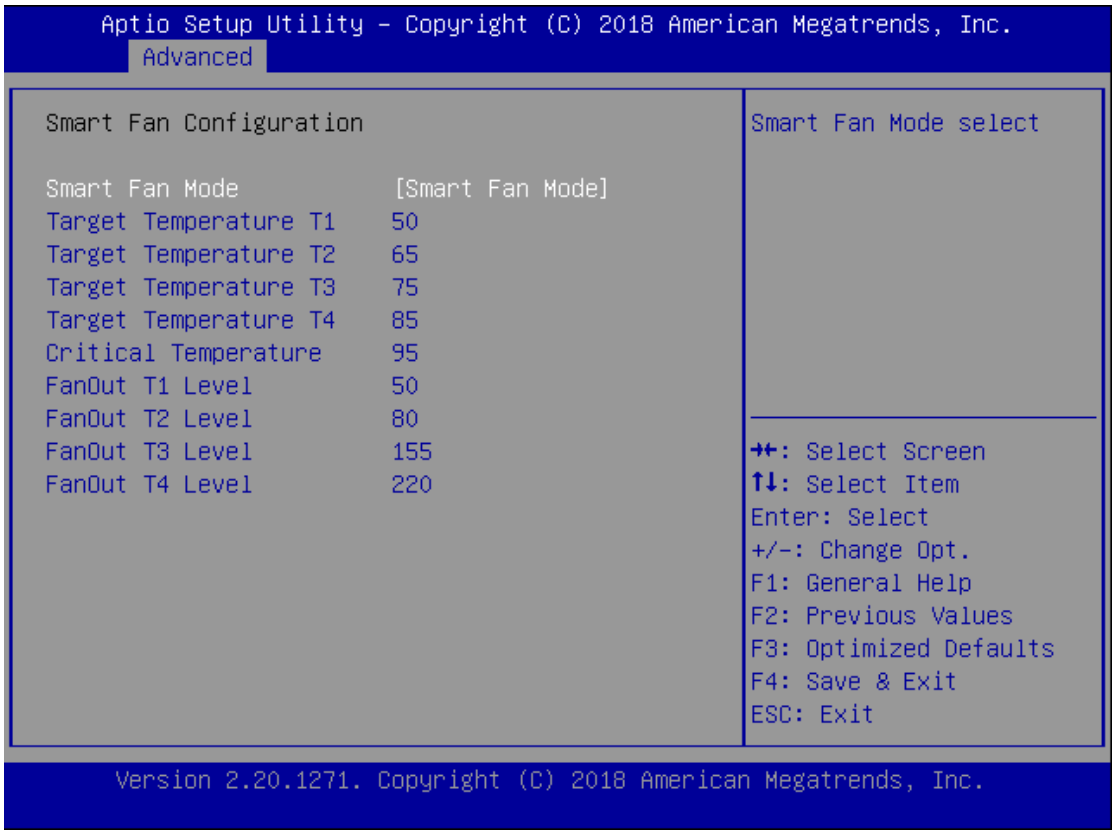


Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 2.
Device Settings	NA	IO=2F8h; IRQ = 3

H/W Monitor

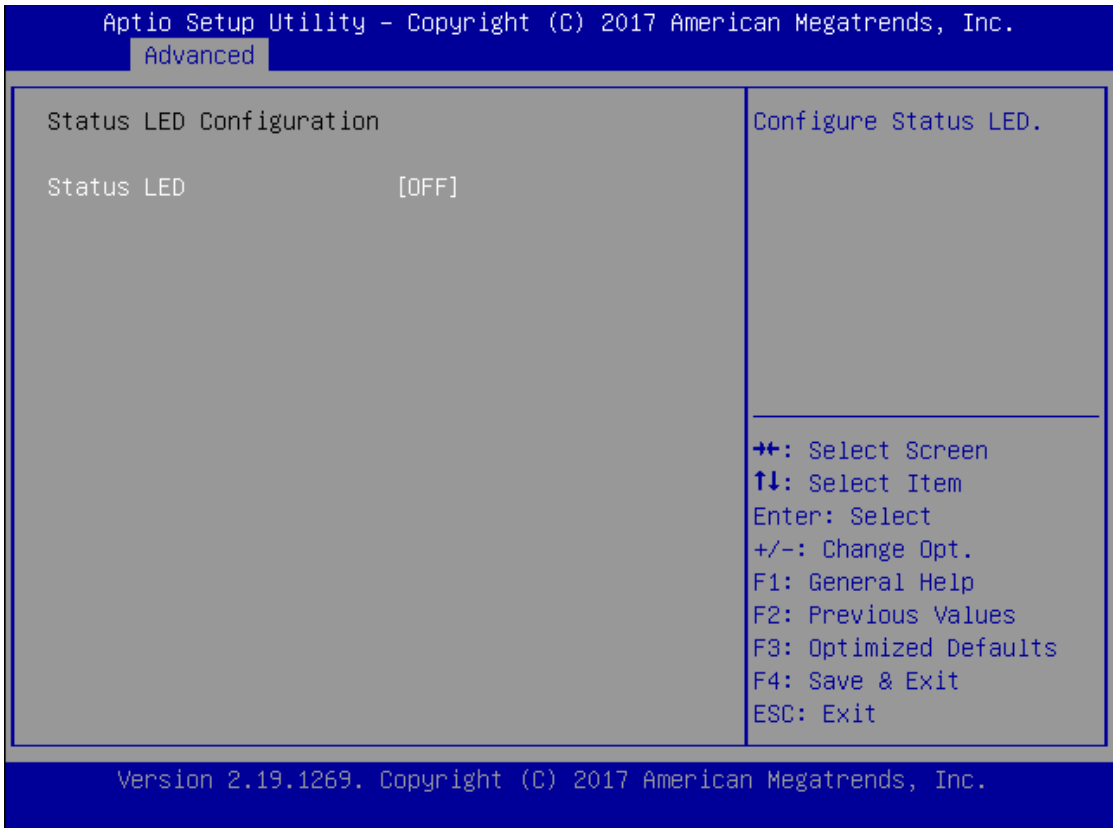

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Pc Health Status
Smart Fan Control
CPU temperature : +39 C
TS2 temperature : +26 C
TS1 temperature : +27 C
FAN1 speed : N/A
FAN2 speed : N/A
VCORE : +1.208 V
12V : +12.192 V
5V : +5.000 V
VDDQ : +1.208 V
VSB5V : +5.040 V
VCC3V : +3.264 V
VSB3V : +3.344 V
VBAT : +2.896 V
Smart Fan Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.

Smart Fan Control



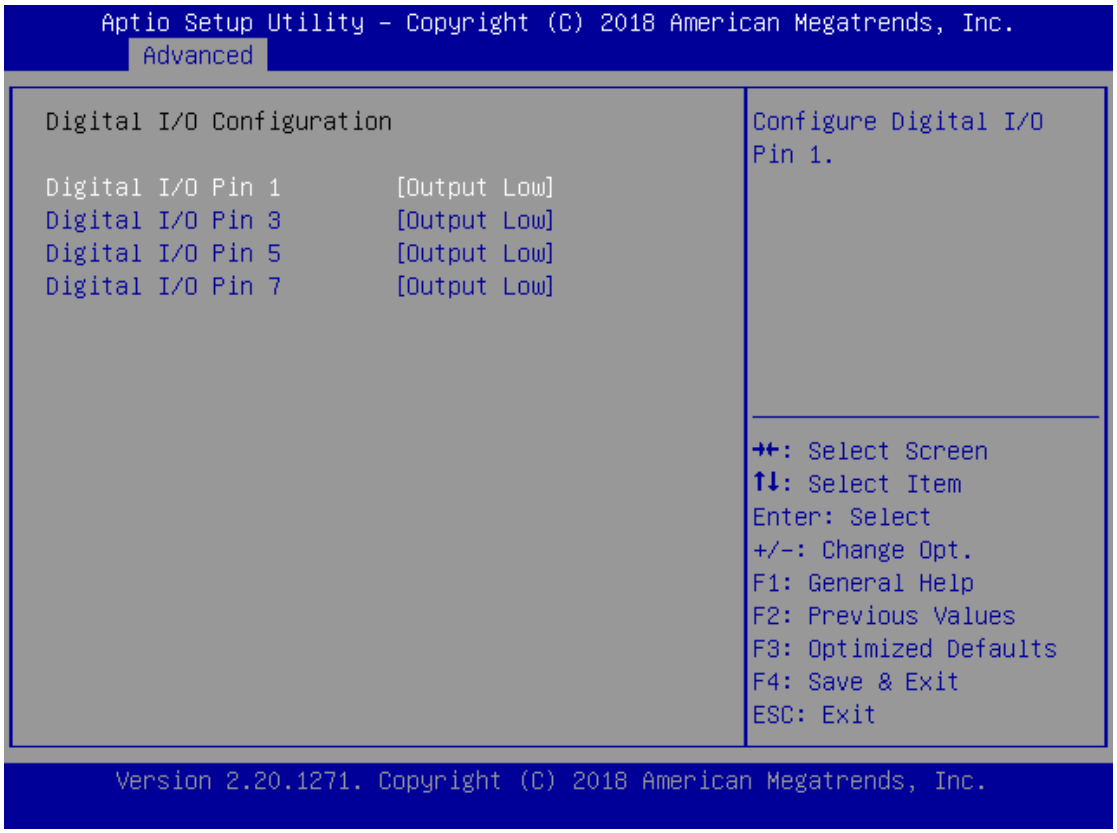
Feature	Options	Description
Smart Fan Mode	Manual Mode Smart Fan Mode	Smart Fan Mode select
Target Temperature T1	50	Input Target Temperature (Range:0 - 127)
Target Temperature T2	65	Input Target Temperature (Range:0 - 127)
Target Temperature T3	75	Input Target Temperature (Range:0 - 127)
Target Temperature T4	85	Input Target Temperature (Range:0 - 127)
Critical Temperature	95	Input Target Temperature (Range:0 - 127)
FanOut T1 Level	50	Input Target Fan Out
FanOut T2 Level	80	Input Target Fan Out
FanOut T3 Level	155	Input Target Fan Out
FanOut T4 Level	220	Input Target Fan Out

Status LED Configuration



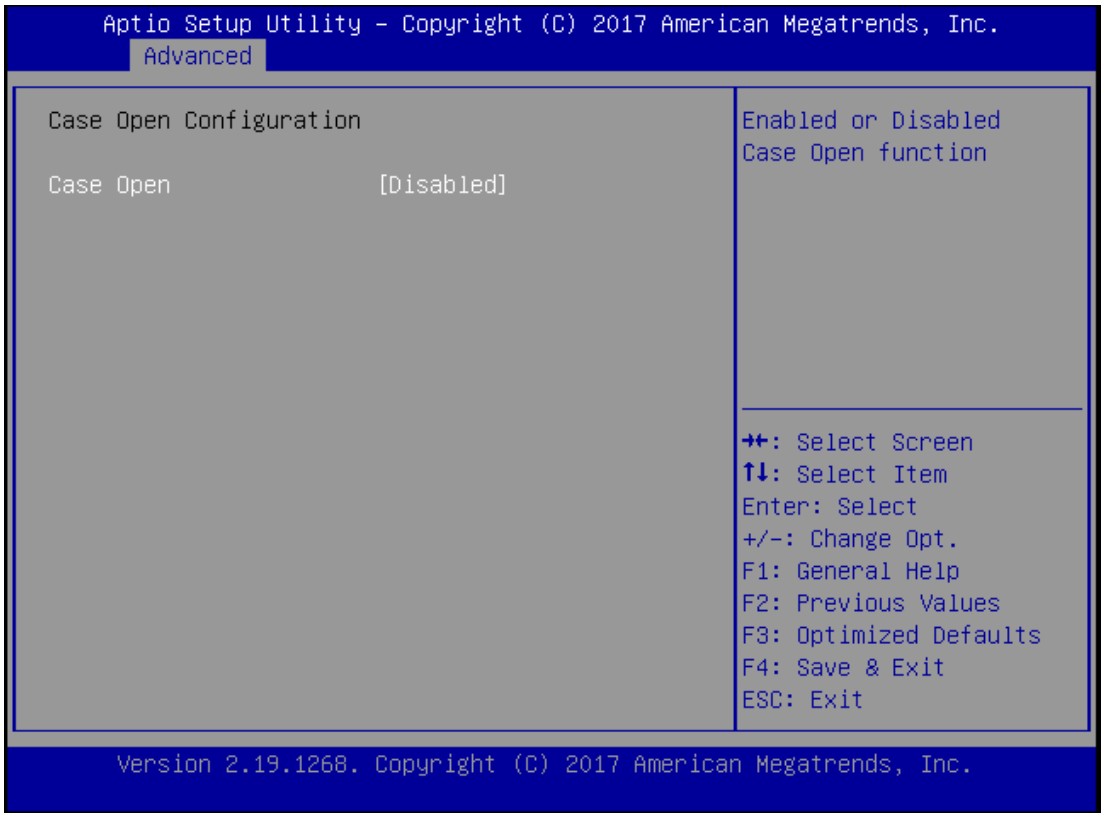
Feature	Options	Description
Status LED	OFF Green Red	Configures Status LED color

Digital I/O Configuration



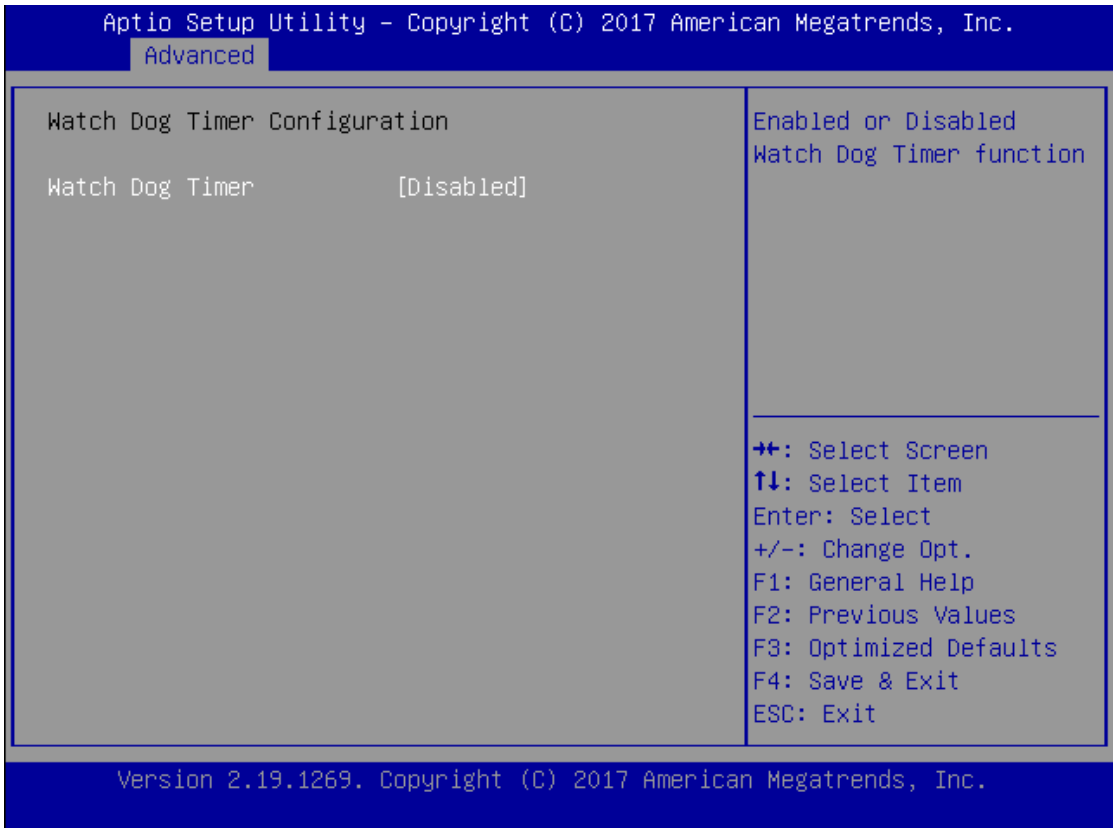
Feature	Options	Description
Digital I/O Output 1	Output Low Output High	Configure Digital I/O Pin1
Digital I/O Output 3	Output Low Output High	Configure Digital I/O Pin3
Digital I/O Output 5	Output Low Output High	Configure Digital I/O Pin5
Digital I/O Output 7	Output Low Output High	Configure Digital I/O Pin7

Case Open Configuration



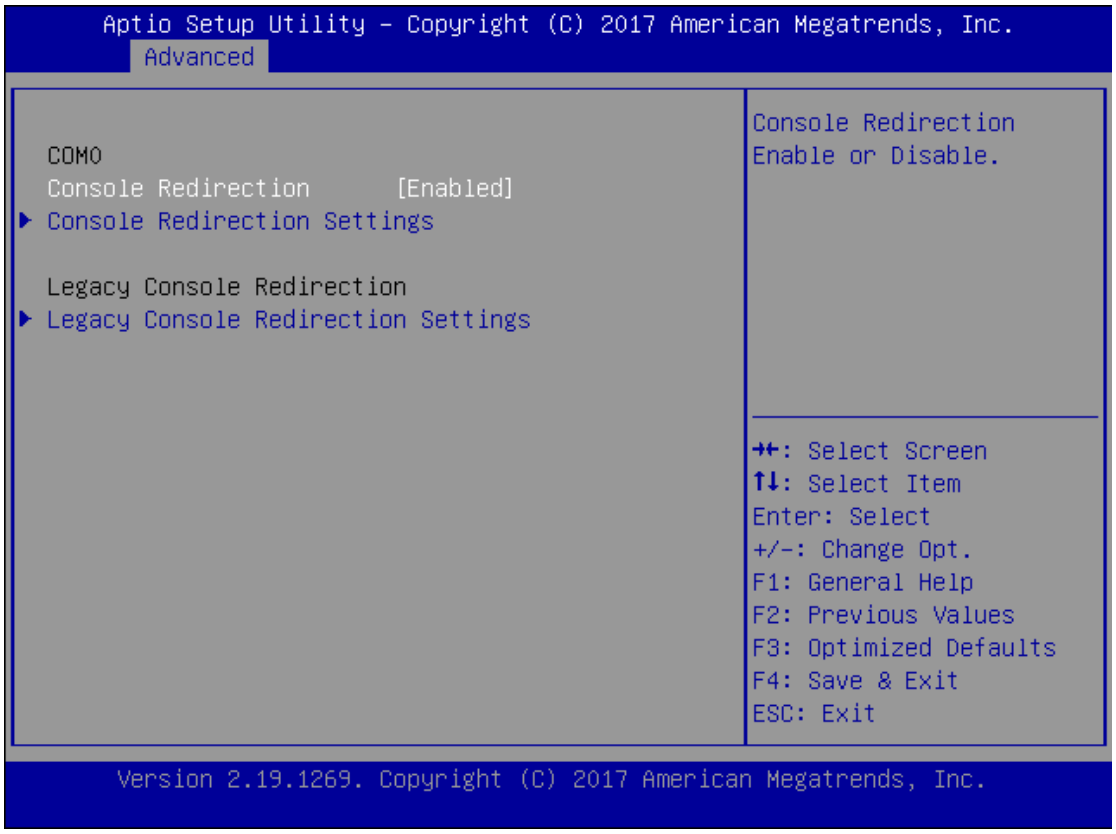
Feature	Options	Description
Case Open	Enabled Disabled	Enables or disables Case Open function

Watch Dog Timer Configuration



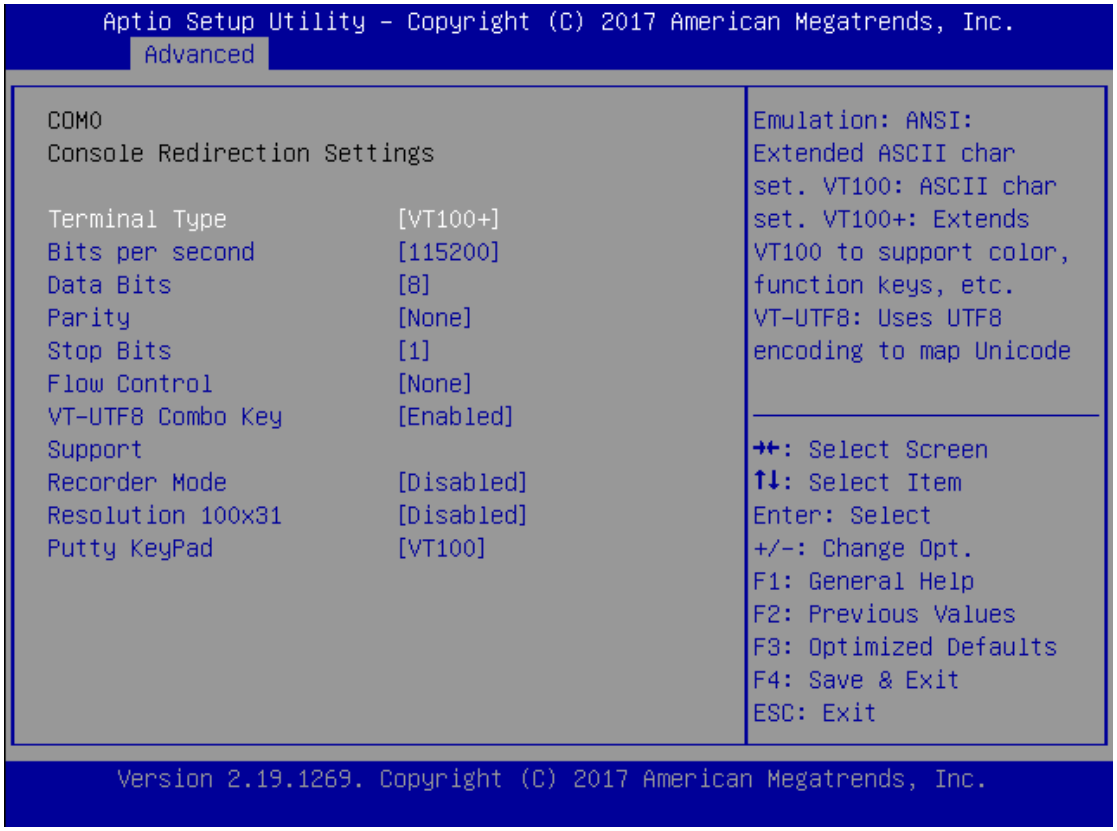
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Serial Port Console Redirection



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

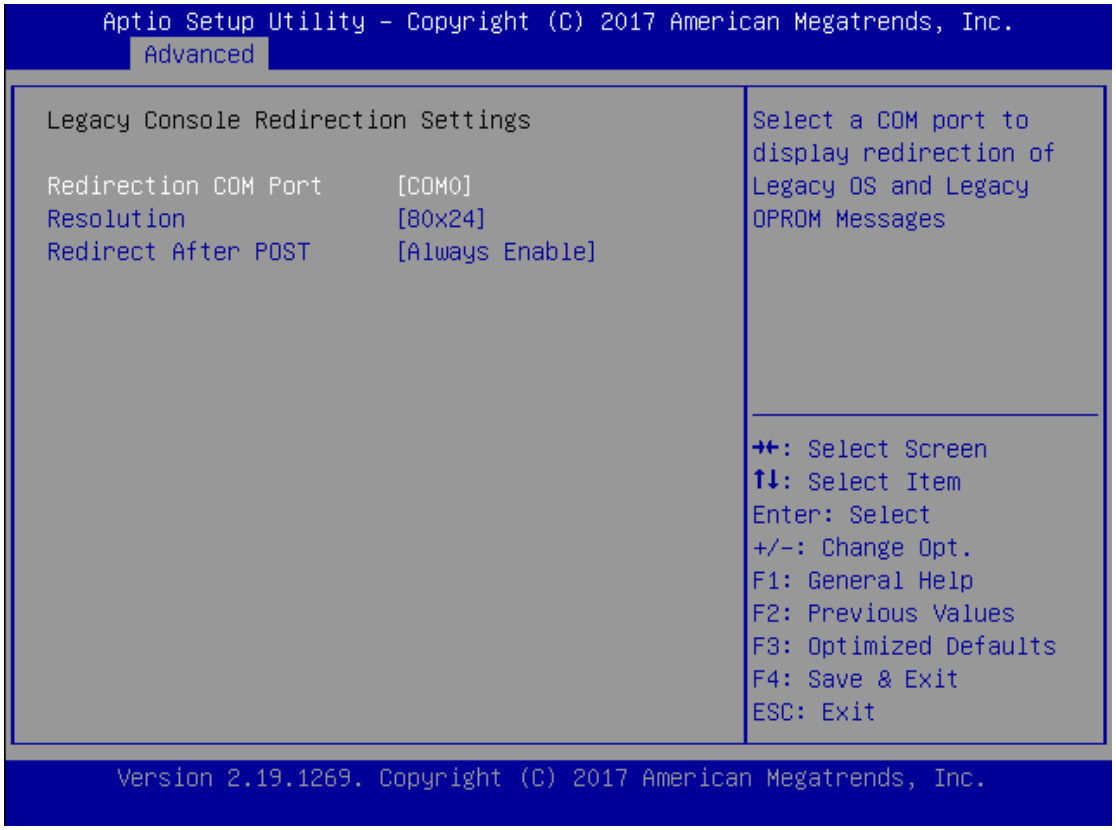
Console Redirection Settings



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

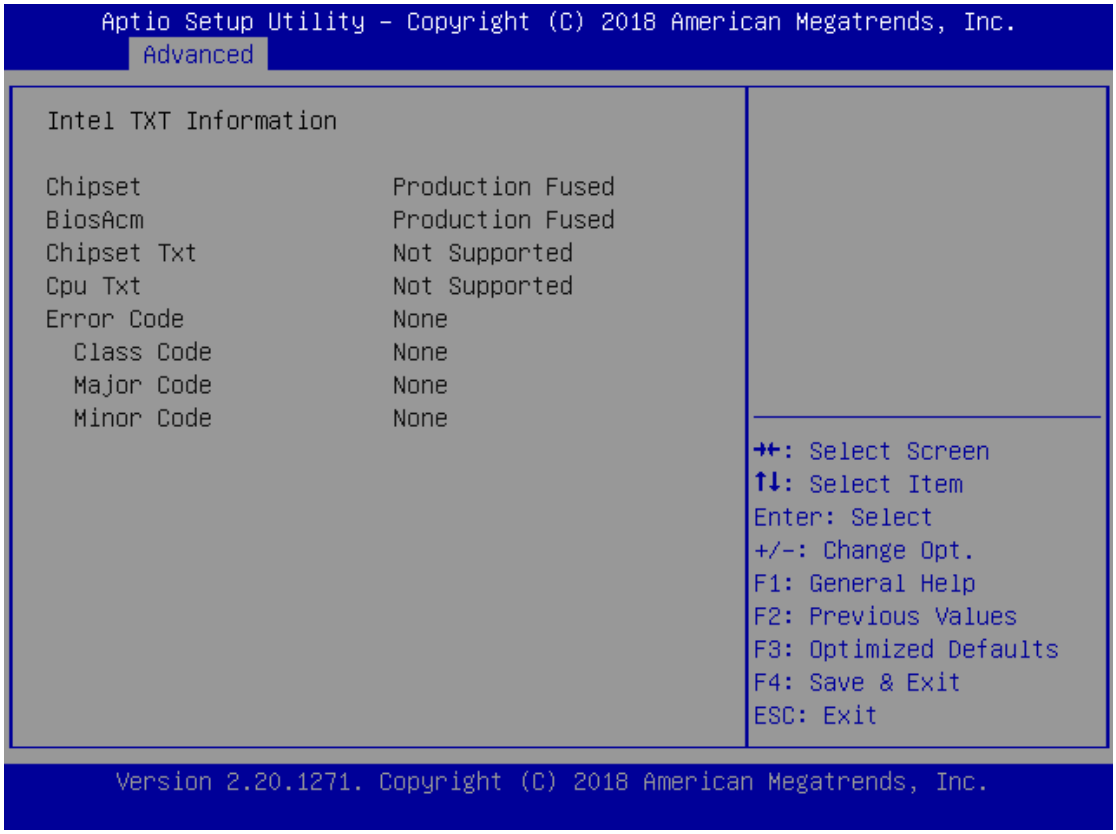
	RTS/CTS	
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.

Console Redirection Settings

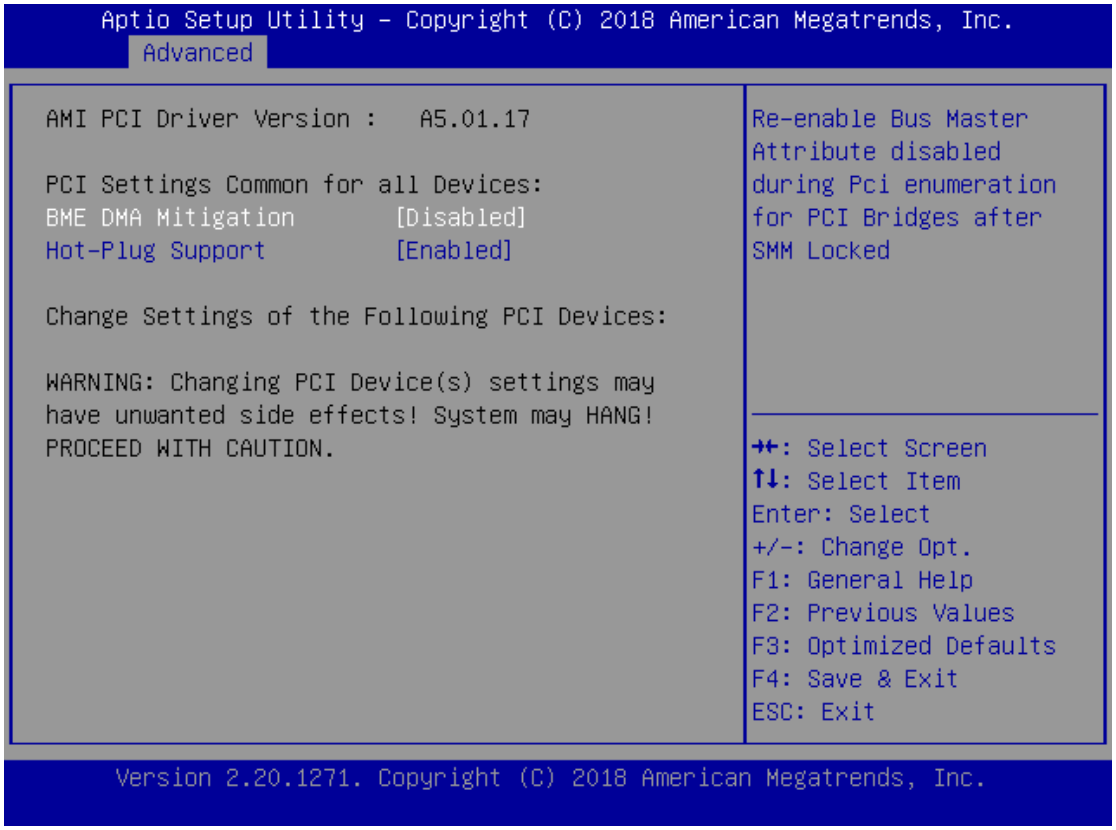


Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirection After BIOS POST	Always Enable BootLoader	When **Bootloader** is 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**.

Intel TXT Information

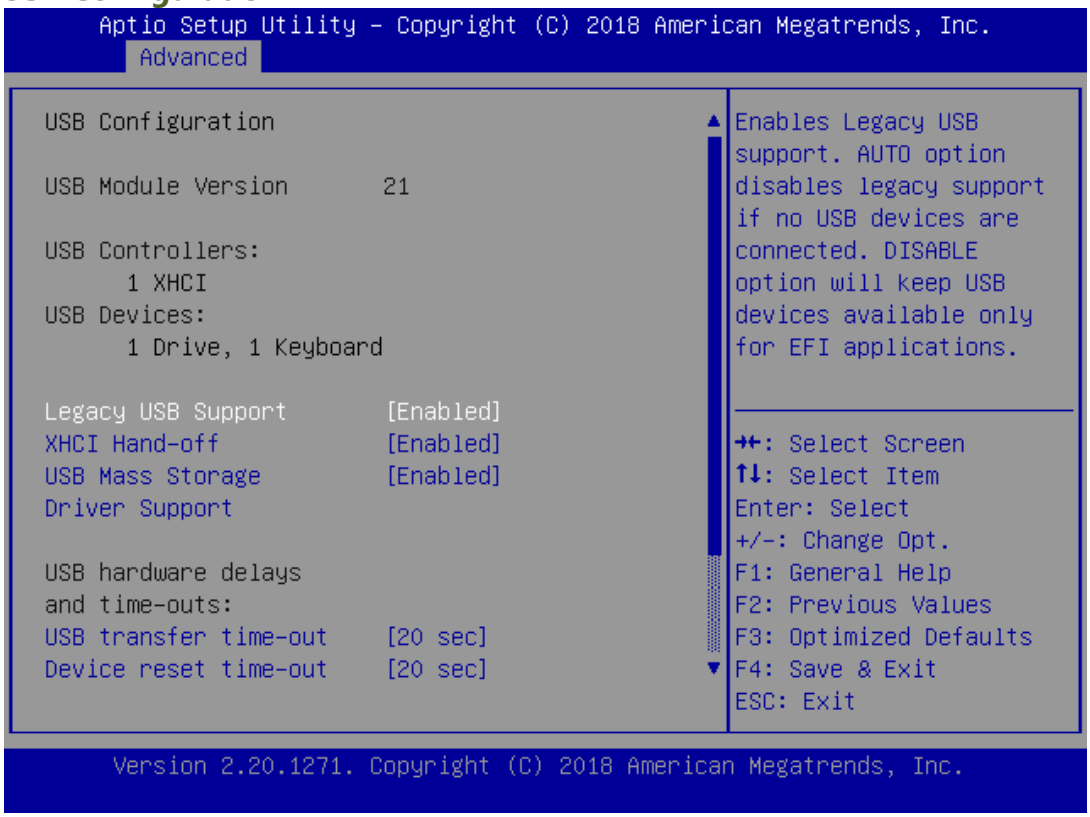


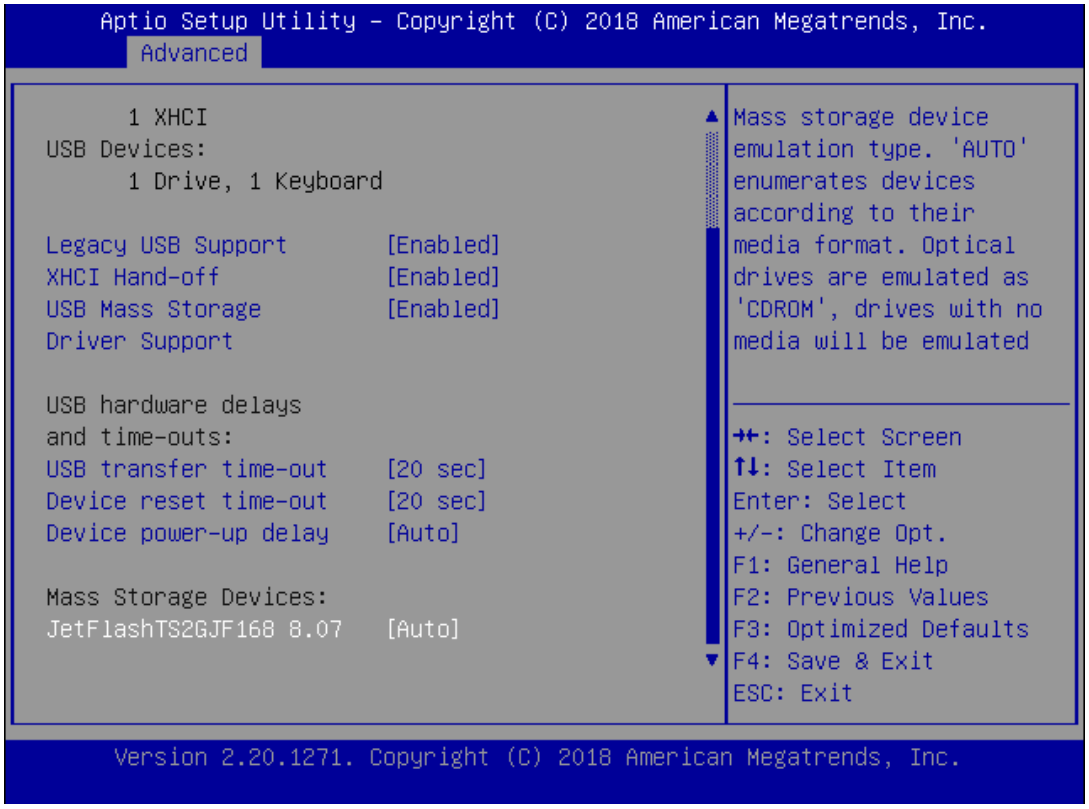
PCI Subsystem Settings



Feature	Options	Description
BME DMA Mitigation	Disabled Enabled	Re-enable Bus Master Attribute disabled during PCI enumeration for PCI Bridges after SMM Locked
Hot-Plug Support	Disabled Enabled	Globally Enables or Disables Hot-Plug support for the entire System. If System has Hot-Plug capable Slots and this option set to Enabled, it provides a Setup screen for selecting PCI resource padding for Hot-Plug.

USB Configuration

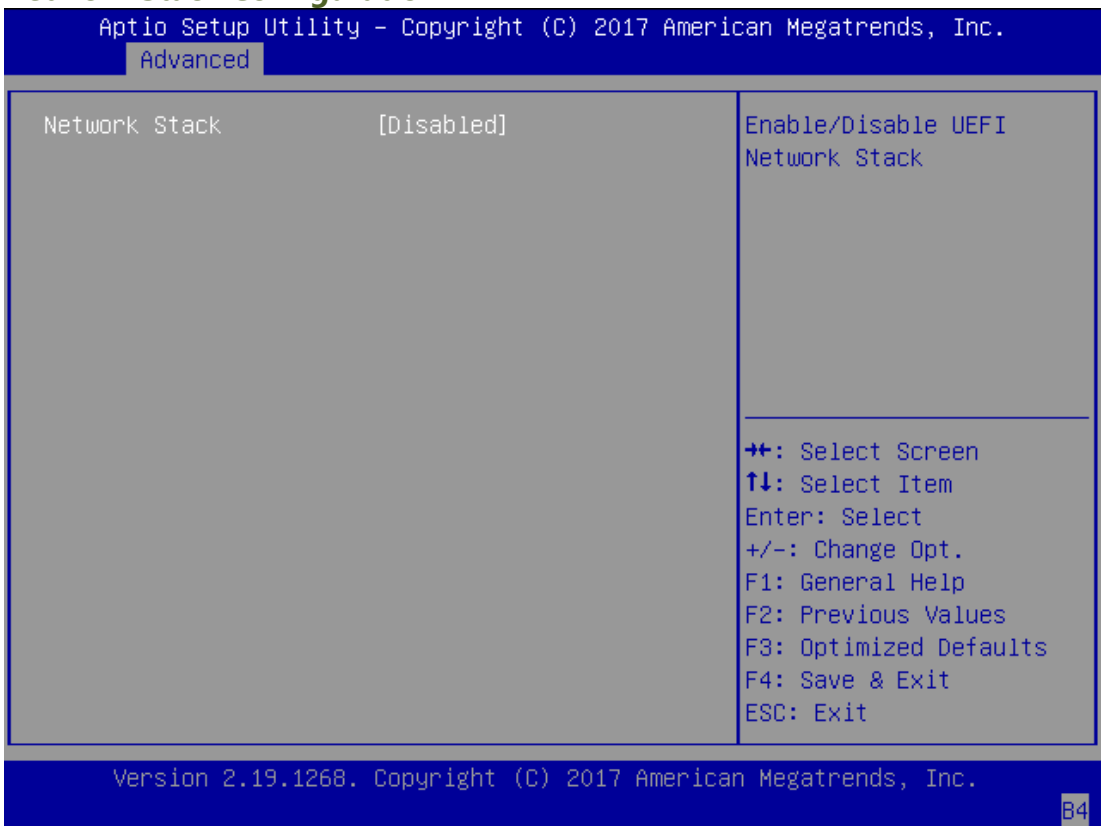




Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. **Auto** option disables legacy support if no USB devices are connected;

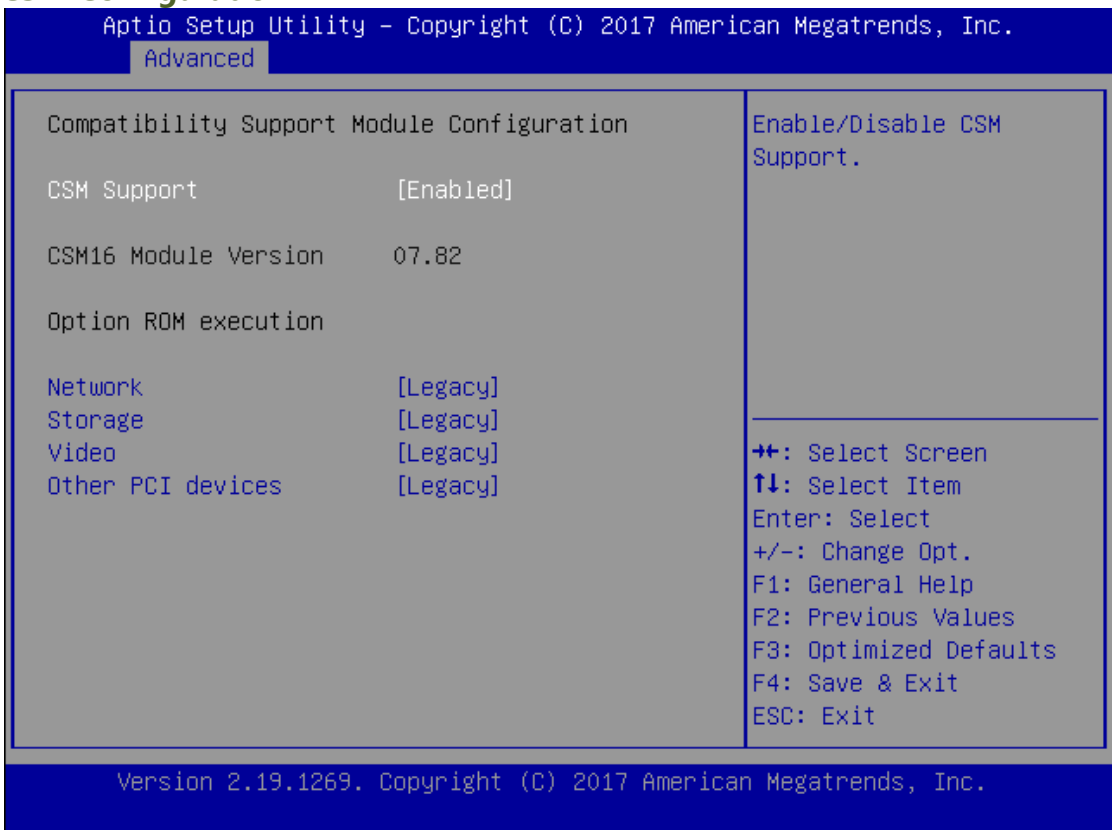
		Disabled option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass 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.

Network Stack Configuration



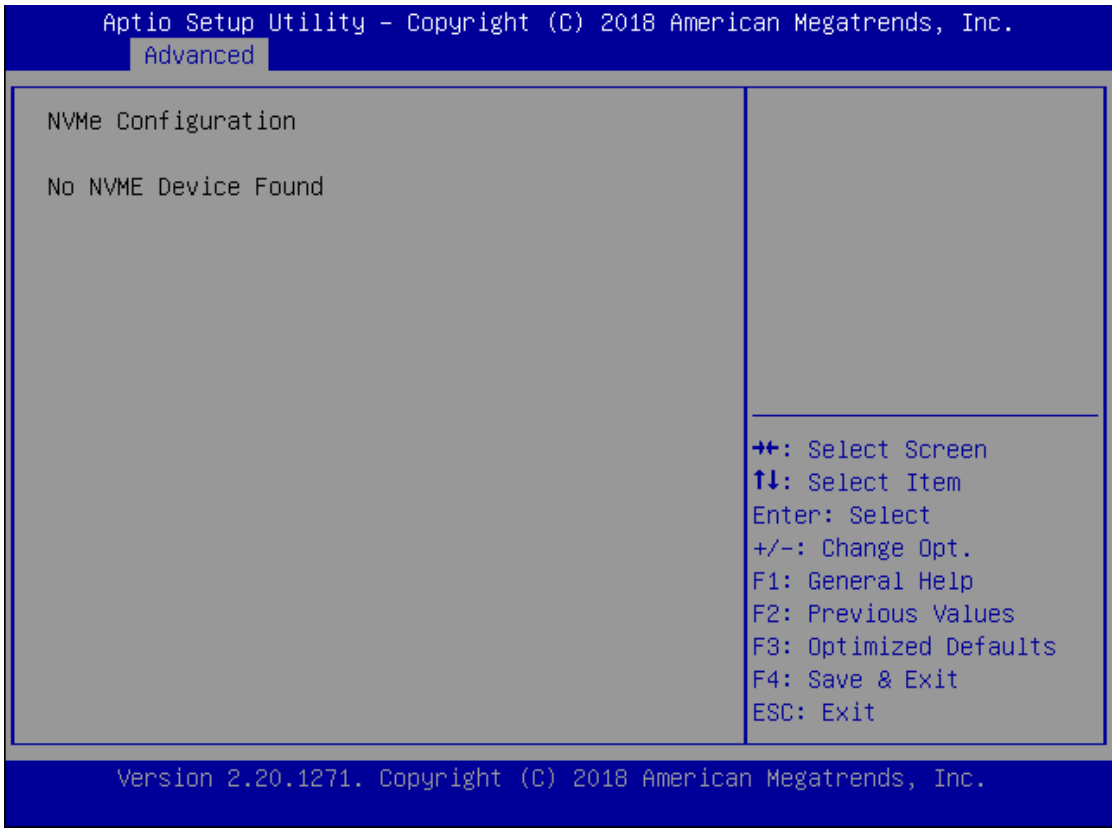
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack

CSM Configuration

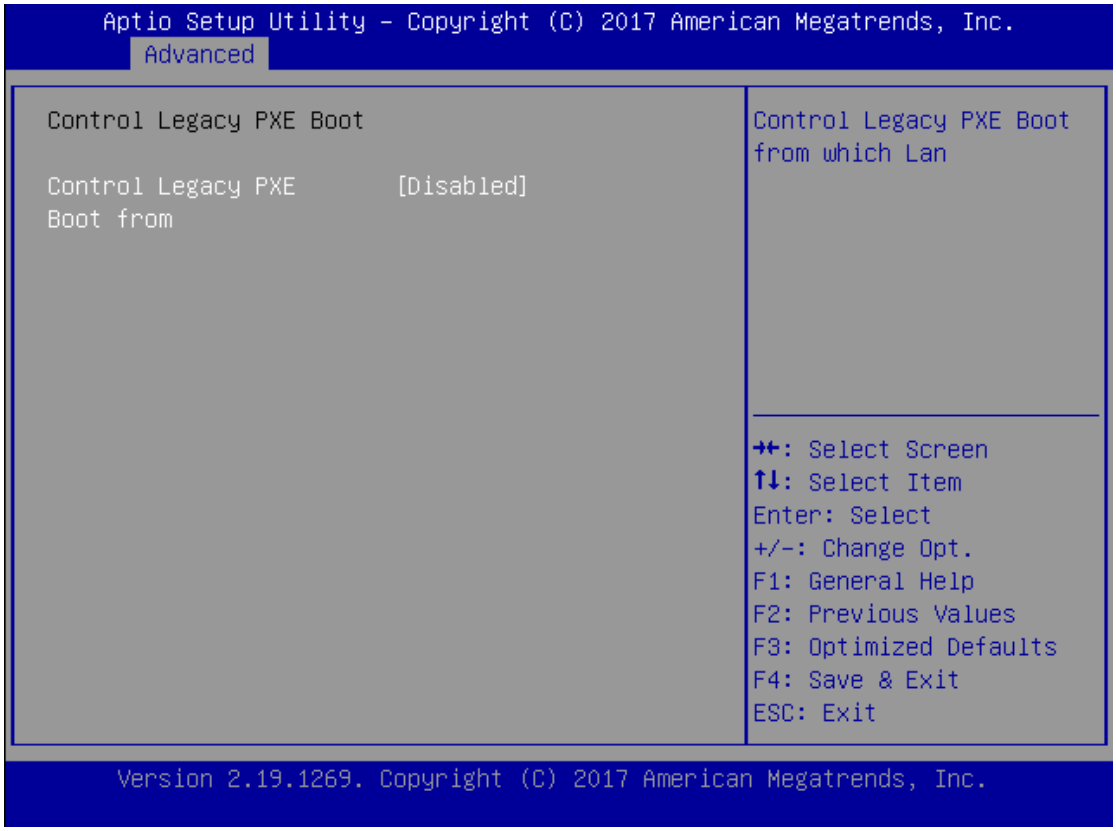


Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls 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



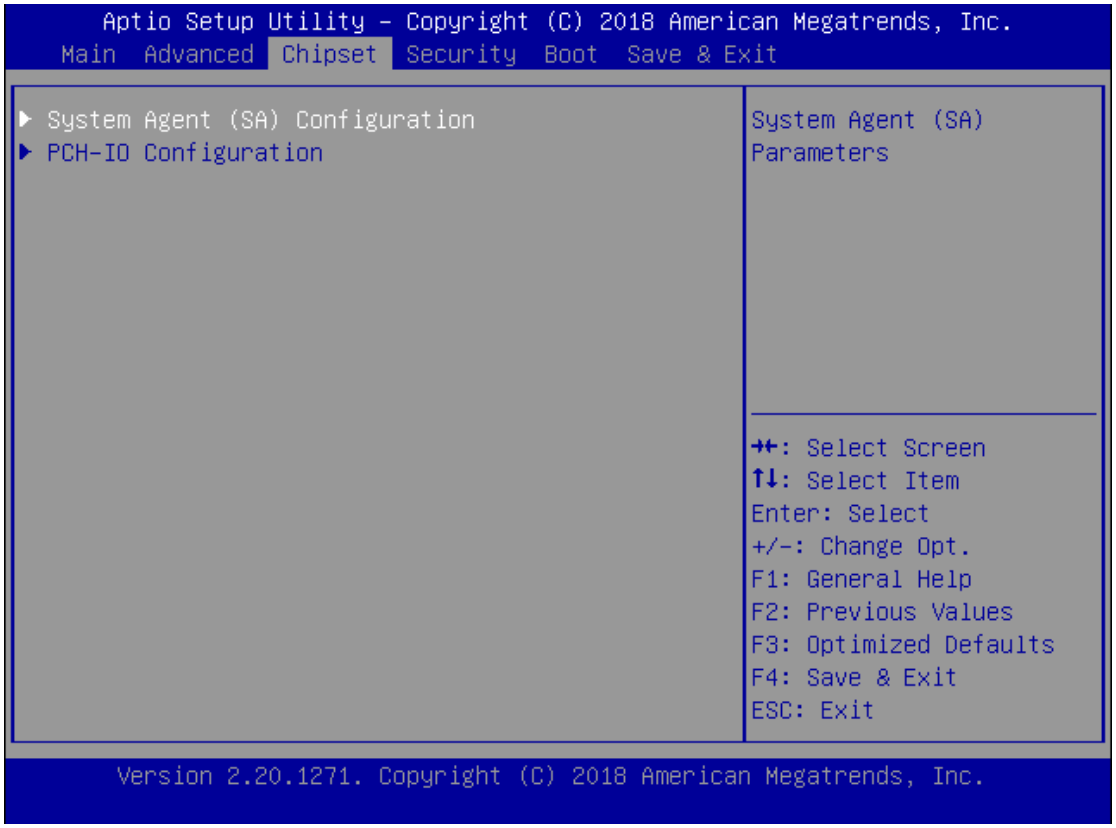
Control Legacy PXE Boot



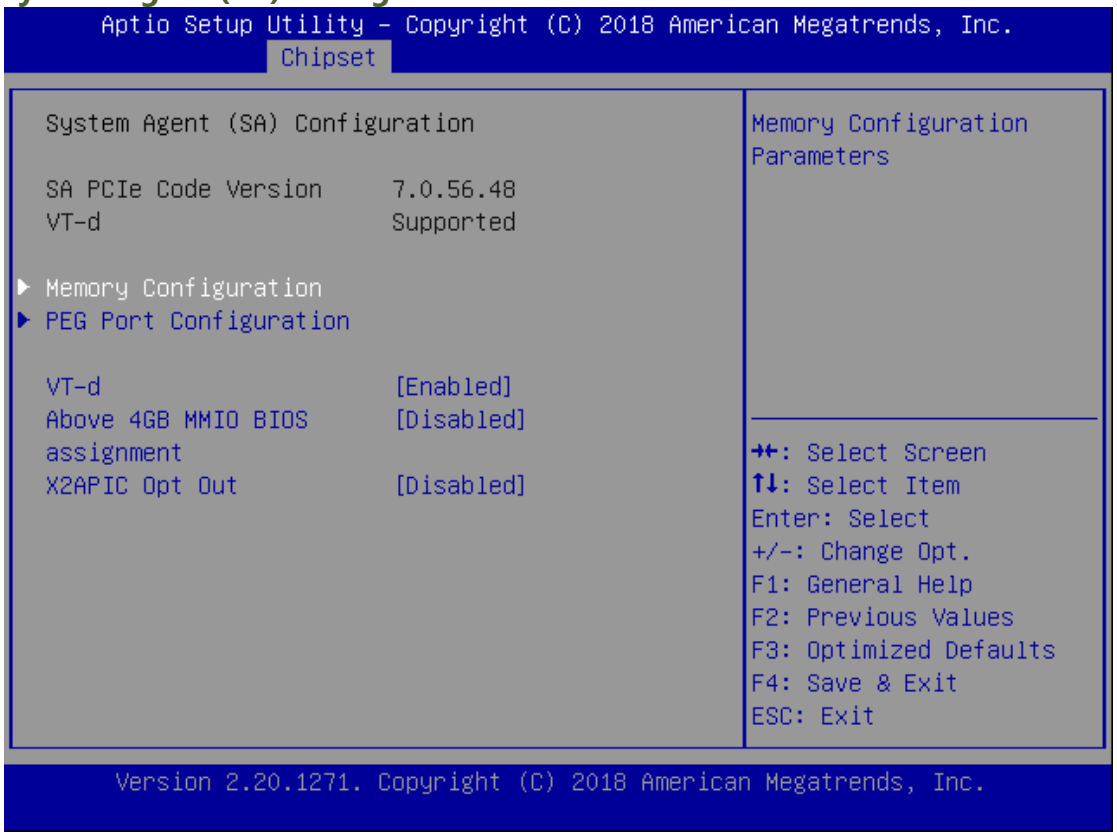
Feature	Options	Description
Control Legacy PXE Boot from	Disabled MGMT Lan1 MGMT Lan2	Control Legacy PXE Boot from which Lan

Chipset

Select the Chipset 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.

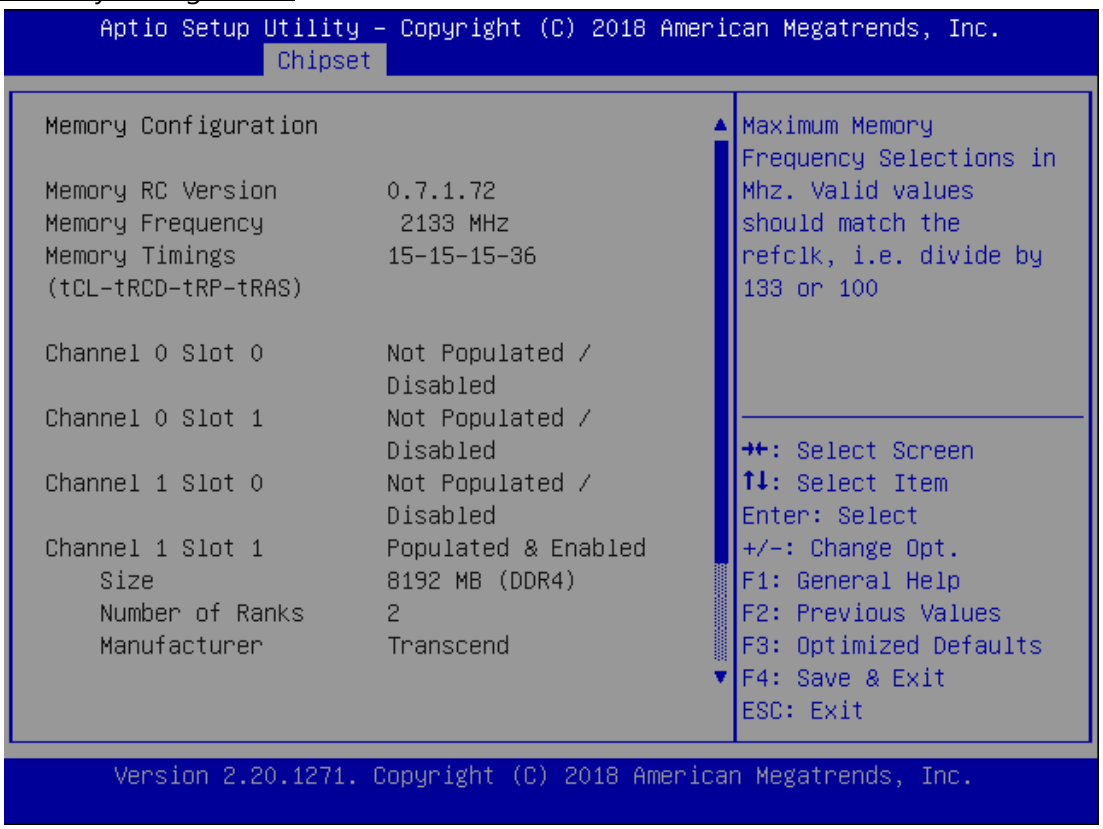


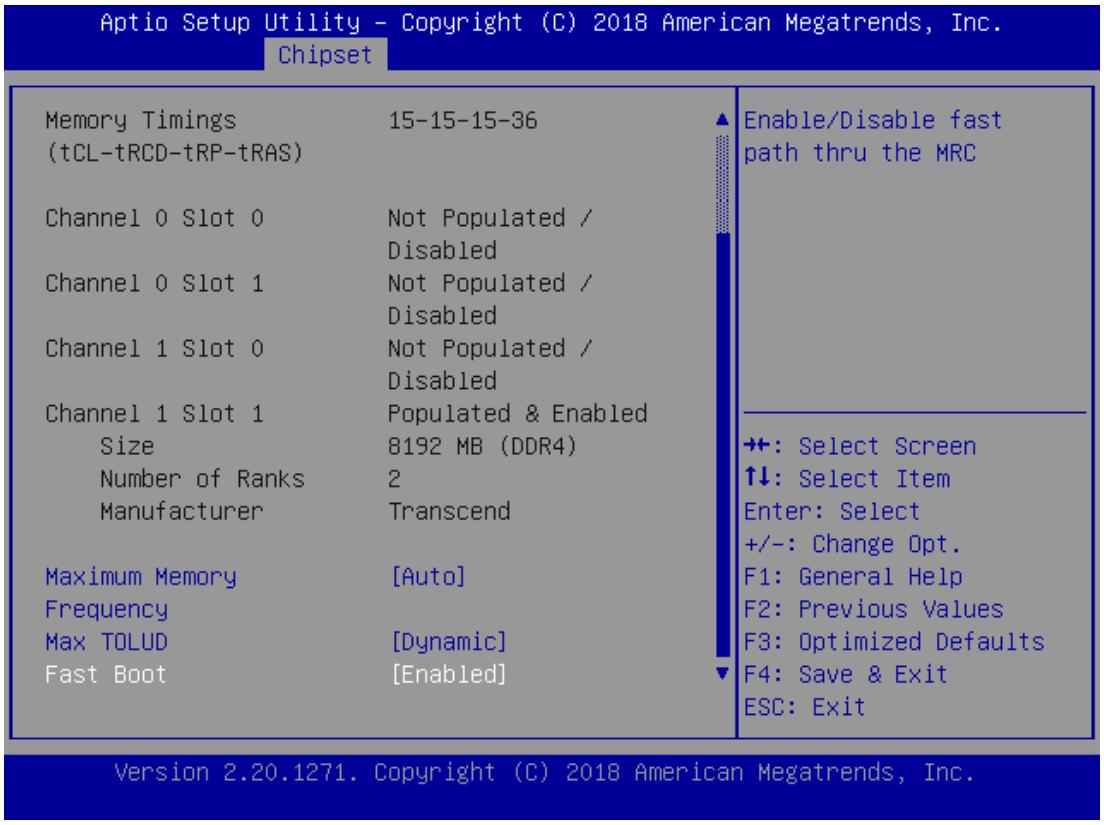
System Agent (SA) Configuration



Feature	Options	Description
VT-d	Disabled Enabled	VT-d capability
Above 4GB MMIO BIOS assignment	Disabled Enabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment This is enabled automatically when Aperture Size is set to 2048MB.
X2APIC Opt Out	Disabled Enabled	Enable/Disable X2APIC_OPT_OUT bit

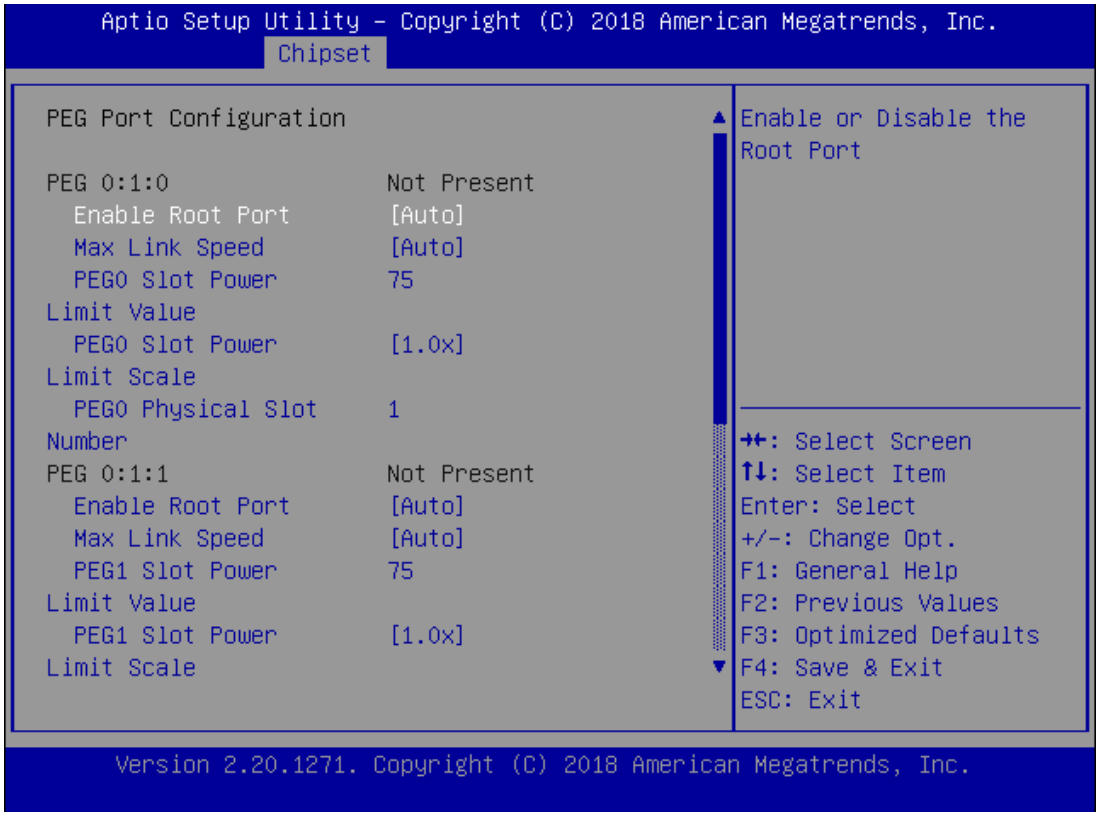
Memory Configuration

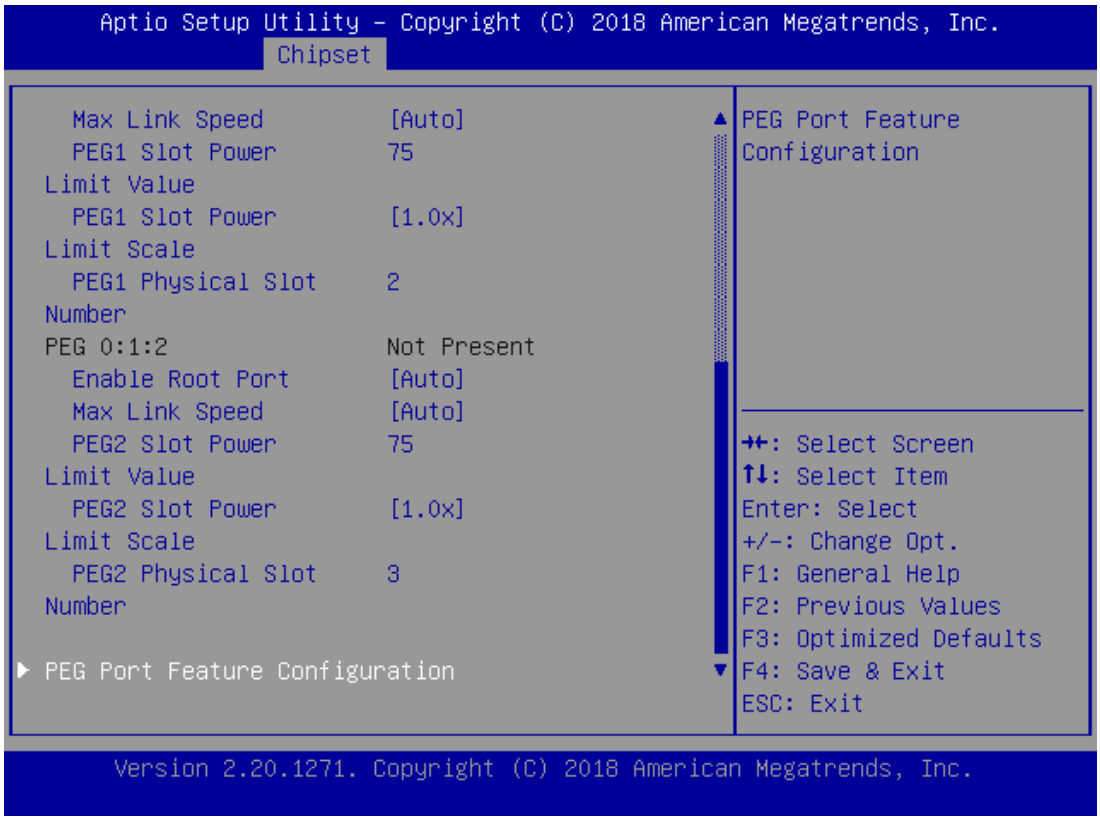




Feature	Options	Description
Maximum Memory Frequency	Auto 1067 ~ 3200	Maximum Memory Frequency Selections in Mhz. Valid values should match the refclk, i.e. divide by 133 or 100
Max TOLUD	Dynamic 1 GB ~ 3.5GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller
Fast Boot	Disabled Enabled	Enable/Disable fast path thru the MRC

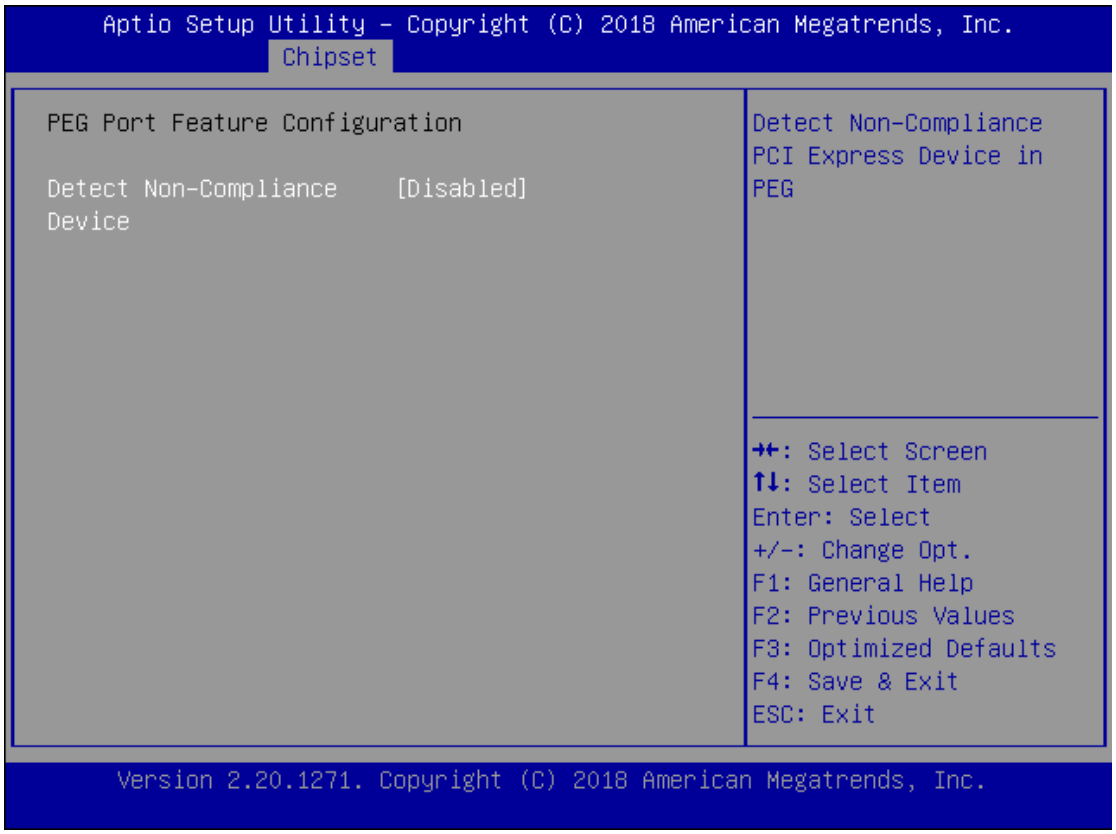
PEG Port Configuration





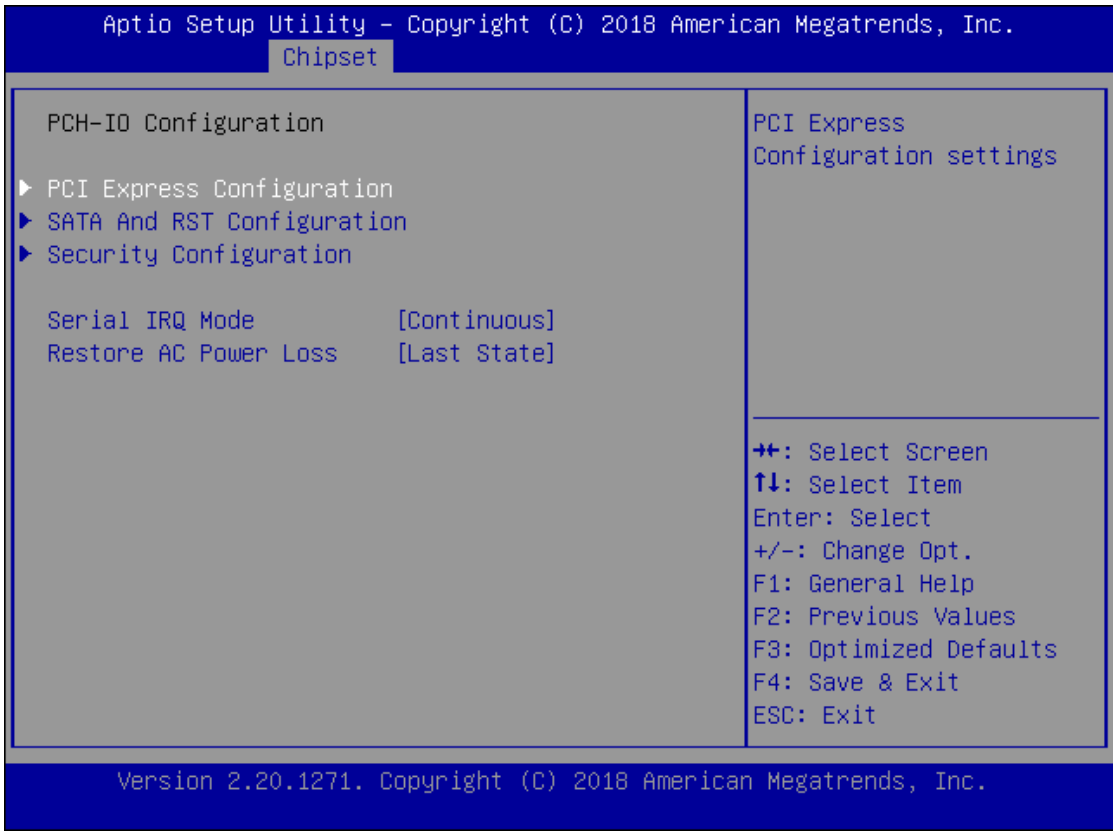
Feature	Options	Description
Enable Root Port	Disabled Enabled Auto	Enable or Disable the Root Port
Max Link Speed	Auto Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed
PEG0 Slot Power Limit Value	75	Sets the upper limit on power supplied by slot. Power limit (in Watts) is calculated by multiplying this value by the Slot Power Limit Scale. Values 0-255
PEG0 Slot Power Limit Scale	1.0x 0.1x 0.01x 0.001x	Select the scale used for the Slot Power Limit Value.
PEG0 Physical Slot Number	1	Set the physical slot number attached to this Port. The number has to be globally unique within the chassis. Values 0-8191

PEG Port Feature Configuration



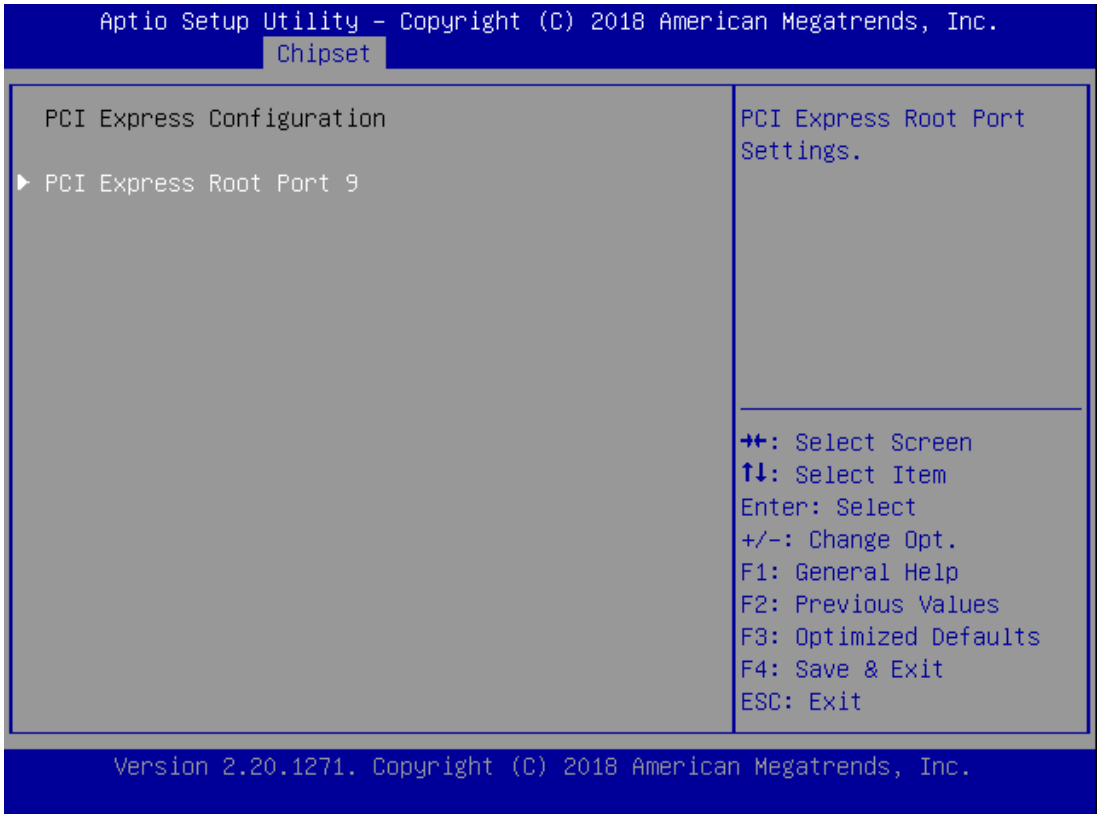
Feature	Options	Description
Detect Non-Compliance Device	Disabled Enabled	Detect Non-Compliance PCI Express Device in PEG

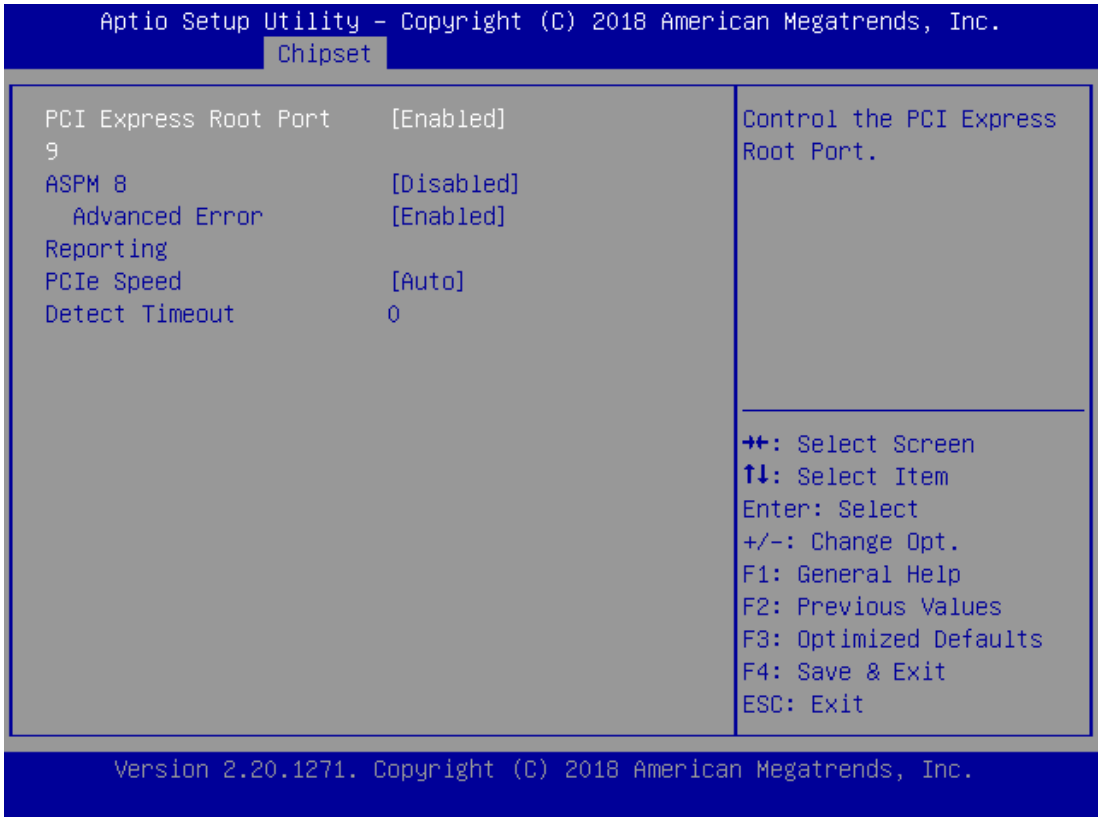
PCH-IO Configuration



Feature	Options	Description
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.
Restore AC Power Loss	Power On Power Off Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).

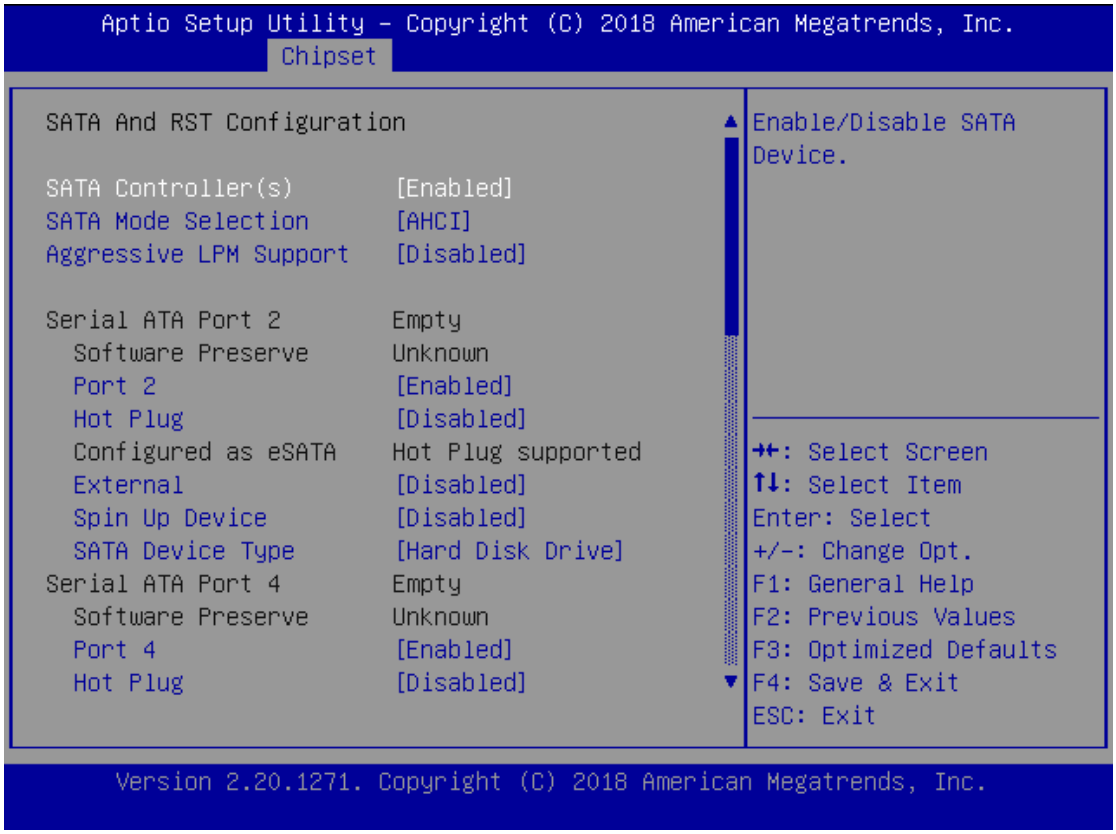
PCI Express Configuration





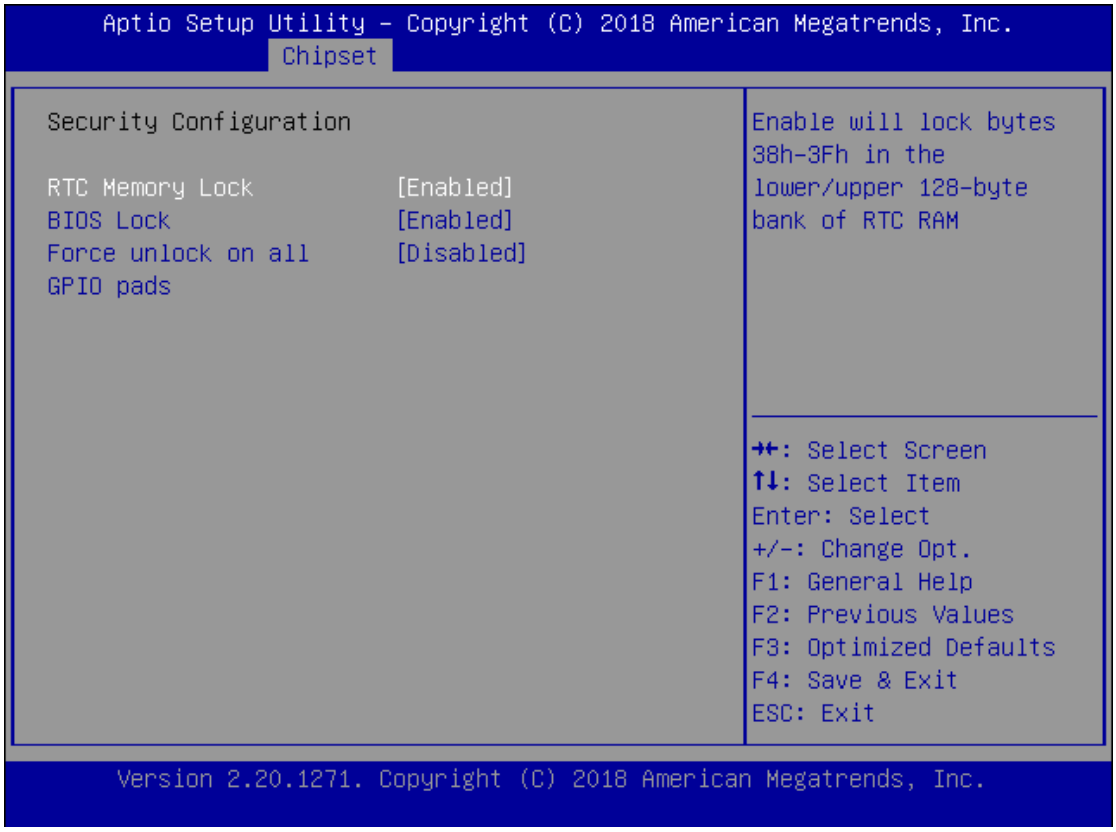
Feature	Options	Description
PCI Express Root Port 9	Disabled Enabled	Control the PCI Express Root Port.
ASPM 8	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM
Advanced Error Reporting	Disabled Enabled	Advanced Error Reporting Enable/Disable.
PCIe Speed	Auto Gen1 Gen2 Gen3	Configure PCIe Speed
Detect Timeout	0	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.

SATA And RST Configuration



Feature	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI Intel RST	Determines how SATA controller(s) operate.
Aggressive LPM Support	Enabled Disabled	Enable PCH to aggressively enter link power state.
Port 2	Enabled Disabled	Enable or Disable SATA Port
Hot Plug	Enabled Disabled	Designates this port as Hot Pluggable.
External	Enabled Disabled	Marks this port as external.
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives 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

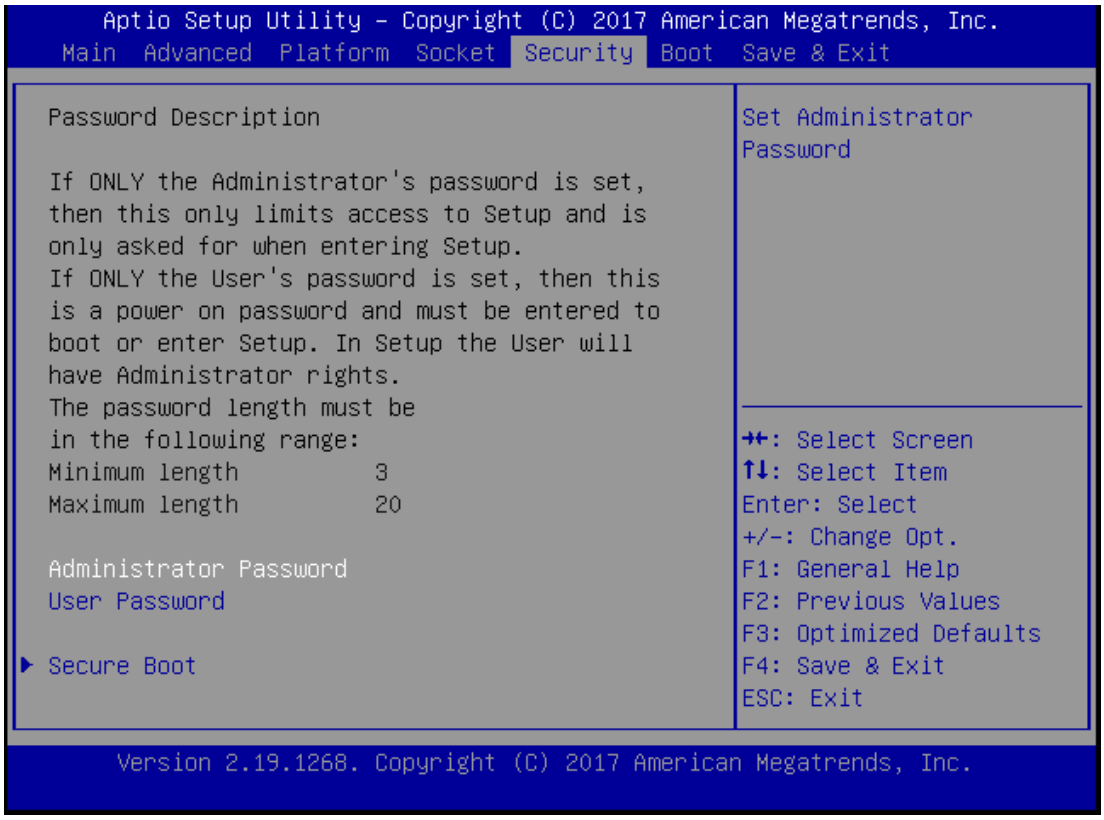
Security Configuration



Feature	Options	Description
RTC Memory Lock	Disabled Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	Disabled Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
Force unlock on all GPIO pads	Disabled Enabled	If Enabled BIOS will force all GPIO pads to be in unlocked state

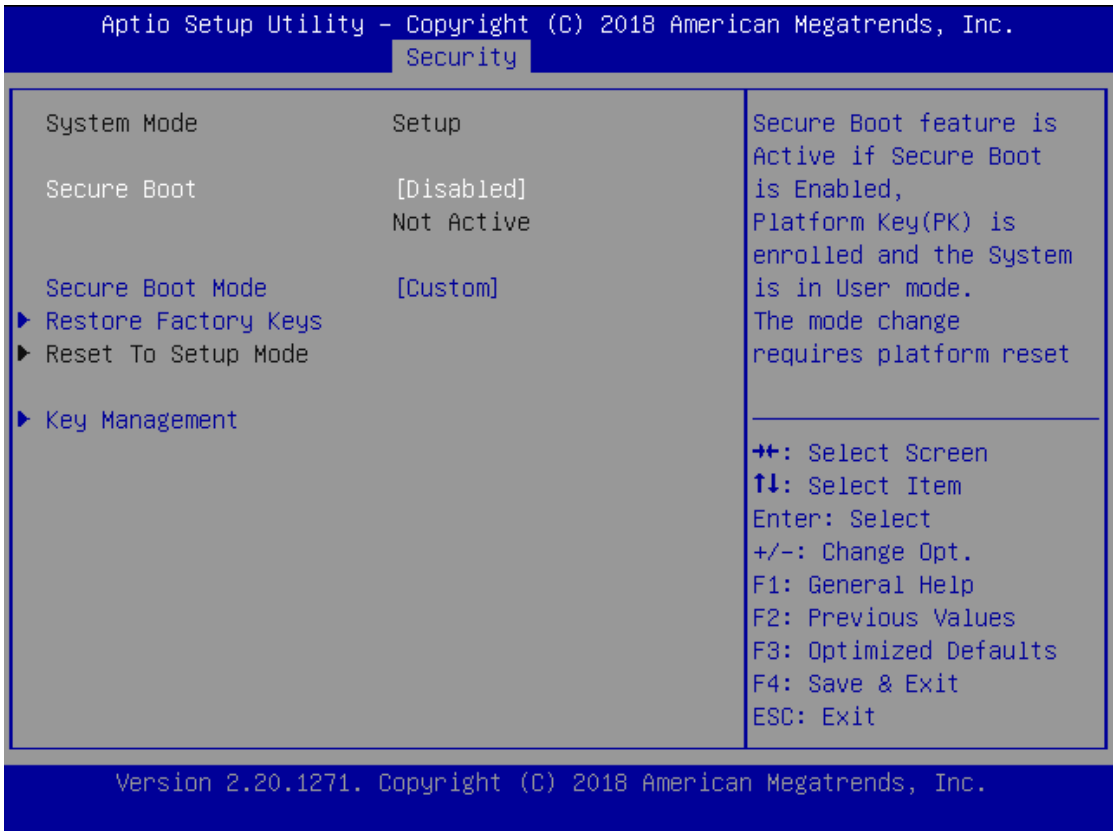
Security

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.



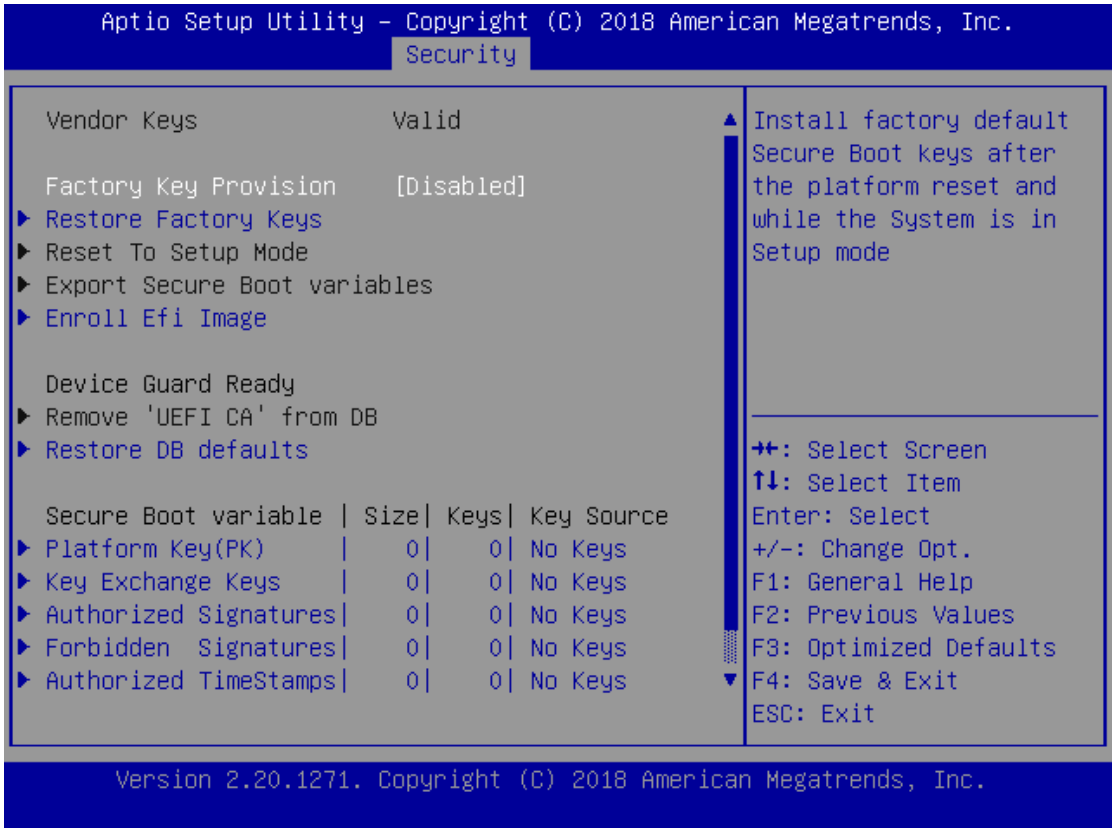
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



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

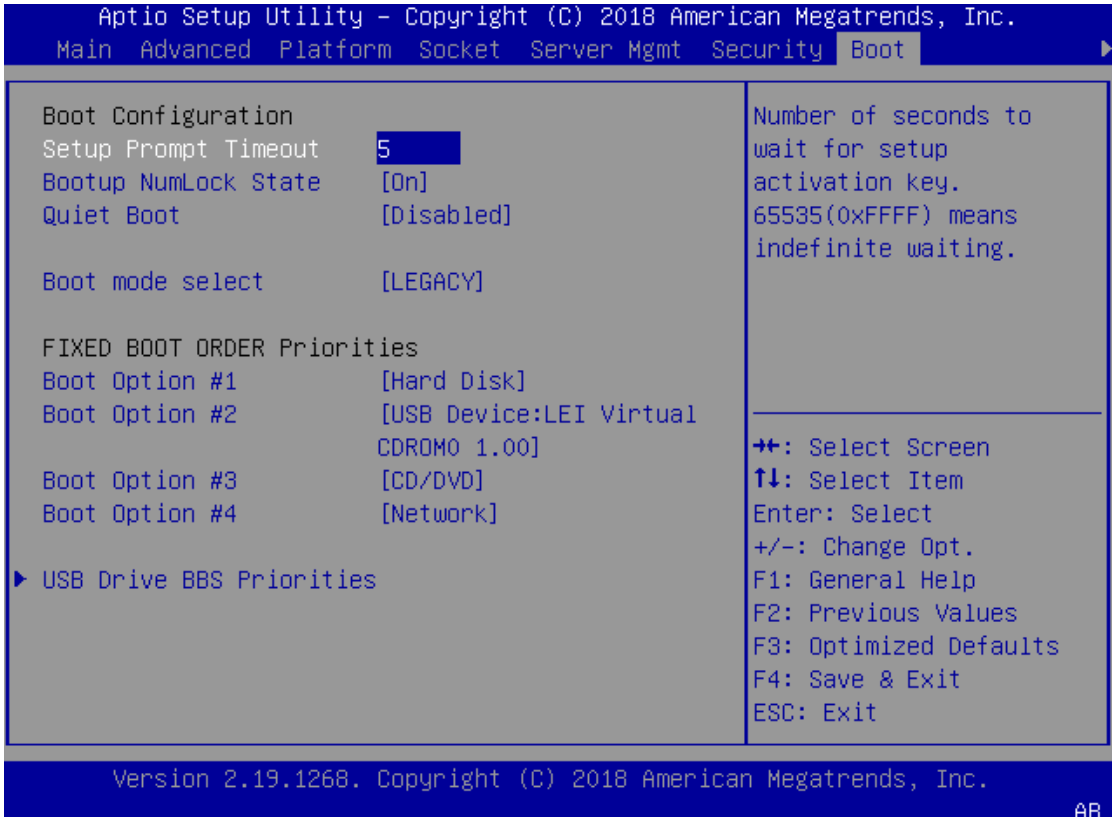
Key Management



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

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.

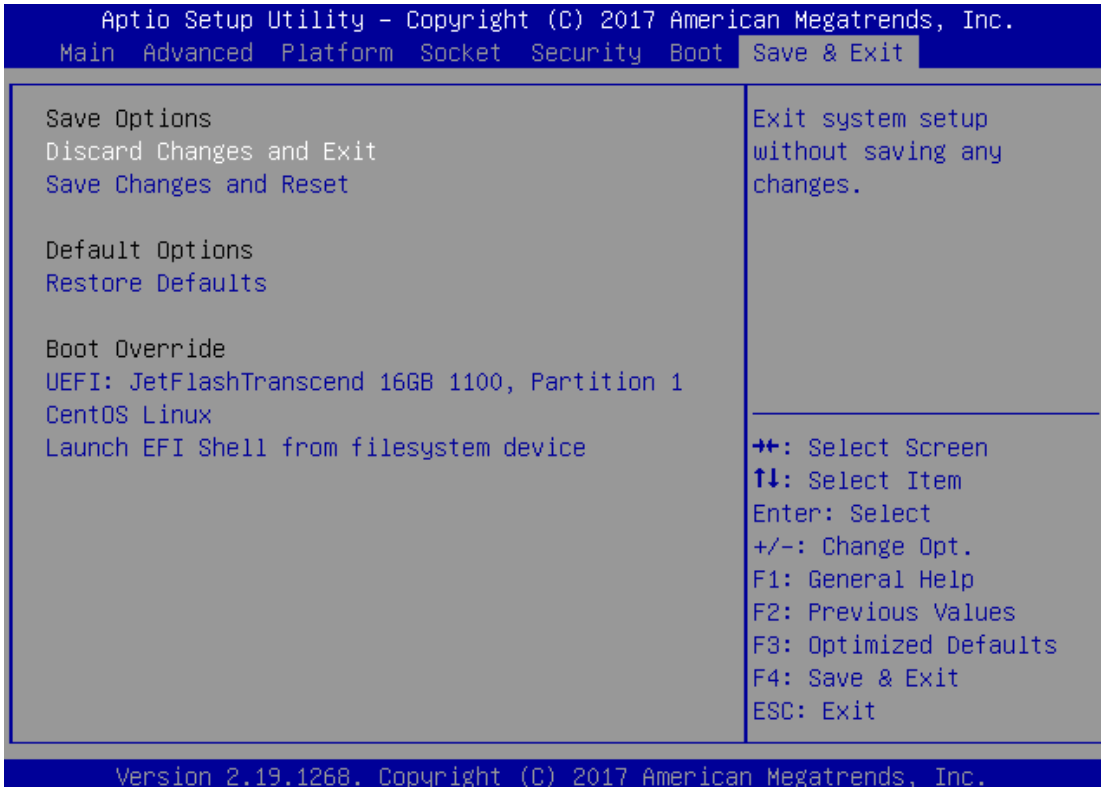


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL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

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

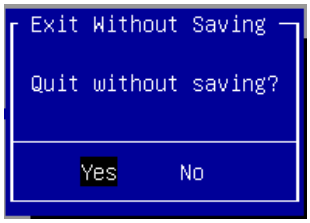
Save and Exit Menu

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.



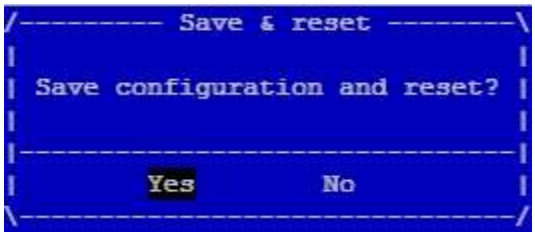
- **Discard Changes and Exit**

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



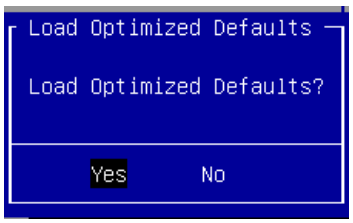
- **Save Changes and Reset**

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



- **Restore Defaults**

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



Note

The items under Boot Override were not same with image. It should depend on devices connect on system.

APPENDIX A: LED INDICATOR EXPLANATIONS

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

- **System Power**

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

- **System Status**

  This LED indicator is programmable. 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**

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**

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*

APPENDIX B: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period, whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on the "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: The customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

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

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

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

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date