Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-4020 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 selected text more transparent and explicable to users. 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 visit the Lanner Q&A page for diagnostic procedures 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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Documentation Feedback

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

Contact Information

Taiwan Corporate Headquarters

Lanner Electronics Inc.

7F, No.173, Sec.2, Datong Rd. Xizhi District,

New Taipei City 22184, Taiwan

立端科技股份有限公司

221 新北市汐止區

大同路二段 173 號 7 樓

T: +886-2-8692-6060

F: +886-2-8692-6101

E: contact@lannerinc.com

China

Beijing L&S Lancom Platform Tech. Co., Ltd.

Guodong LOFT 9 Layer No. 9 Huinan Road, Huilongguan Town, Changping District, Beijing 102208 China

T: +86 010-82795600

F: +86 010-62963250

E: service@ls-china.com.cn

USA

Lanner Electronics Inc.

47790 Westinghouse Drive Fremont, CA 94539

T: +1-855-852-6637

F: +1-510-979-0689

E: sales_us@lannerinc.com

Canada

LEI Technology Canada Ltd

3160A Orlando Drive Mississauga, ON L4V 1R5 Canada

T: +1 877-813-2132

F: +1 905-362-2369

E: sales_ca@lannerinc.com

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Federal Communication Commission Interference Statement

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

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

FCC Caution

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

Note

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

Important

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

Safety Guidelines

Follow these guidelines to ensure general safety:

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

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Lithium Battery Caution

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

- Leaving a battery in an extremely high temperature environment can result in an explosion or the leakage of flammable liquid or gas.
- A battery subjected to extremely low air pressure may result in an explosion or the leakage of flammable liquid or gas.

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

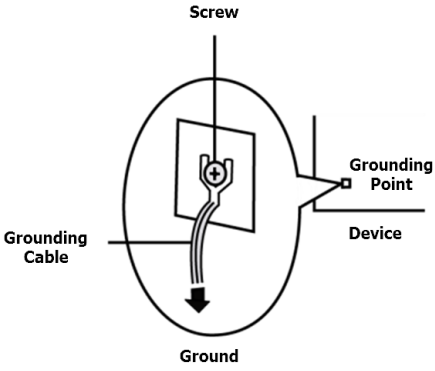
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect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

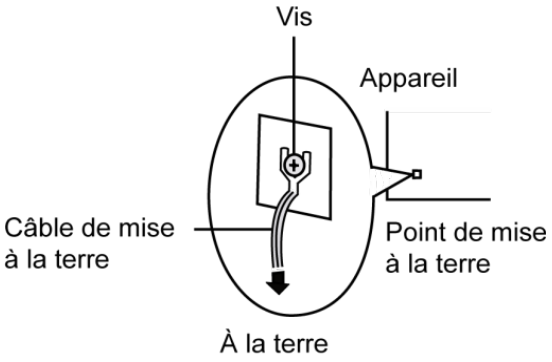
Grounding Procedure for DC Power Source

- 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 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.

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.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The NCA-4020, a rackmount network appliance powered by Intel® Xeon® D-2100 (codenamed Skylake-DE) CPU, features 8~16-core computing performance, 10x GbE RJ45 (8 Port PoE+), 4x 10G SFP, DPDK and Intel® QAT for improved network performance; it is also a verified Intel® Selection Solution for uCPE.

Main Features

- Intel® Xeon D-2100 8/12/16 Cores Processor
- 4x DDR4 2666 MHz, Max. 128GB
- Up to 10x GbE RJ45 w/ 8 Port PoE+ and 4x SFP+
- 1x RJ45 Console, 1x IPMI, 2x USB 2.0
- 2x 2.5" Internal HDD/SSD Bays, 2x M.2 Onboard Slot
- 3x SIM Card Slots, 1x Mini-PCIE Slot, 1x PCI-E*8 FH/HL (Optional)
- Intel® QuickAssist Technology

Package Content

Your package contains the following items:

- 1x NCA-4020 Network Appliance
- 2x Power Cord (Default US Type)
- 1x Short Ear Rack mount kit with screws
- 1x Console cable(RJ45)
- 2x SATA cable
- 1x SATA Power cable
- 8x HDD rubber washers and screws
- 1x Nameplate

Note

If you should find any components missing or damaged, please contact your dealer immediately for assistance.

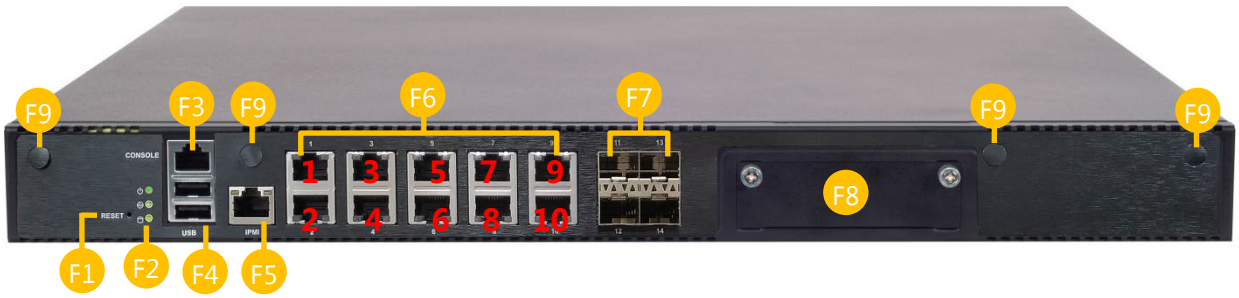
Ordering Information

SKU No.	Description
NCA-4020A	Intel® Xeon® D-2187NT, 16 Cores, 10 GbE RJ45 with 8 Port POE+ and 4 SFP+ with BMC
NCA-4020B	Intel® Xeon® D-2166NT, 12 Cores, 10 GbE RJ45 with 8 Port POE+ and 4 SFP+ with BMC
NCA-4020C	Intel® Xeon® D-2146NT, 8 Cores, 10 GbE RJ45 with 4 Port POE+ and 4 SFP+ with BMC
NCA-4020D	Intel® Xeon® D-2145NT, 8 Cores, 10 GbE RJ45 with 4 Port POE+ and 4 SFP+ with BMC

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	Intel® Xeon® D2100 8/12/16 Cores
	CPU Socket	1x FCPGA
	Chipset	N/A
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 2666 MHz REG DIMM
	Max. Capacity	128GB
	Socket	4x 288pin DIMM
Networking	Ethernet Ports (By SKU)	10x GbE RJ45 with 8x Port PoE+ and 4x SFP+ or 10x GbE RJ45 with 4x Port PoE+ and 4x SFP+
	Bypass	N/A
	NIC Module Slot	N/A
LOM	IO Interface	1x RJ45
	OPMA slot	IPMI Chip Onboard
I/O Interface	Reset Button	1
	LED	Power/Status/Storage
	Power Button	1x ATX Power Switch
	Console	1x RJ45
	USB	2x USB 2.0
	LCD Module	N/A
	Display	1x Internal Pin Header
	Power input	AC /DC power inlet on PSU
Storage	HDD/SSD Support	2x 2.5" Internal Bays
	Onboard Slots	2x M.2 (w/ LTE support)
Expansion	PCIe	1x PCI-E*8 FH/HL (Optional)
	mini-PCIe	1x Mini-PCIe (PCIe*1/USB2.0)
	SIM card Slot	3x SIM cover
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes (Optional)
Cooling	Processor	Passive CPU heat sink
	System	3x individual hot-swappable cooling fans with smart fan
Environmental Parameters	Temperature	0~40°C Operating -40~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	438mm x 470mm x 44mm
	Weight	7.9kg
Package Dimensions	(WxDxH)	732mm x 582mm x215mm
	Weight	13.6kg
Power	Type/Watts	600W 1+1 Redundant PSU
	Input	AC 100~240V @47~63 Hz
	PoE Power Output	SKU A/B: 25.5W per port, total power budget 204W SKU C/D: 25.5W per port, total power budget 102W
Approvals and Compliance		CE/FCC Class A, UL

Front Panel

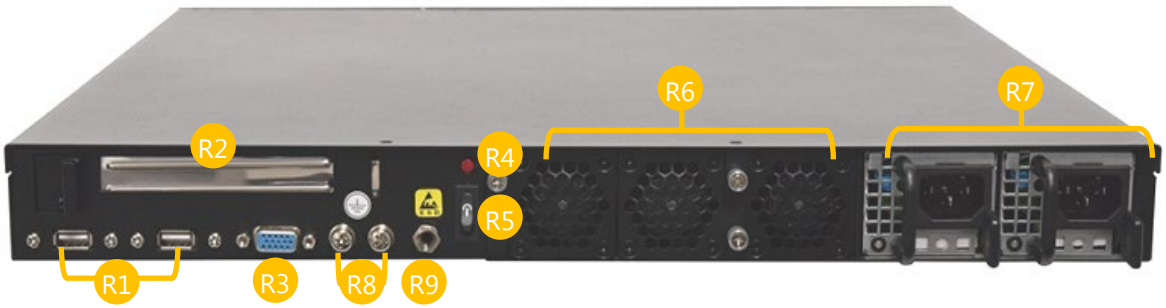


No.	Description	
F1	Reset Button	For software reset
F2	LED Indicators	 System Power System Status HDD Activity
F3	Console Port	1x RJ45 console port
F4	USB Ports	2x USB 2.0 port
F5	LOM Port	1x IPMI port
F6	RJ45 Port	10x 1G RJ45 port with LED SKU A/B: LAN3~10 are PoE Ports SKU C/D: LAN3~6 are PoE Ports
F7	SFP+ Port	4x 10G SFP+ port with LED
F8	SIM Slot	3x Nano SIM Connector
F9	Antenna Port	4x Reserved antenna port for Wi-Fi / LTE module

Note

Please refer to Appendix A: LED Indicator Explanations for descriptions of the LED Indicators

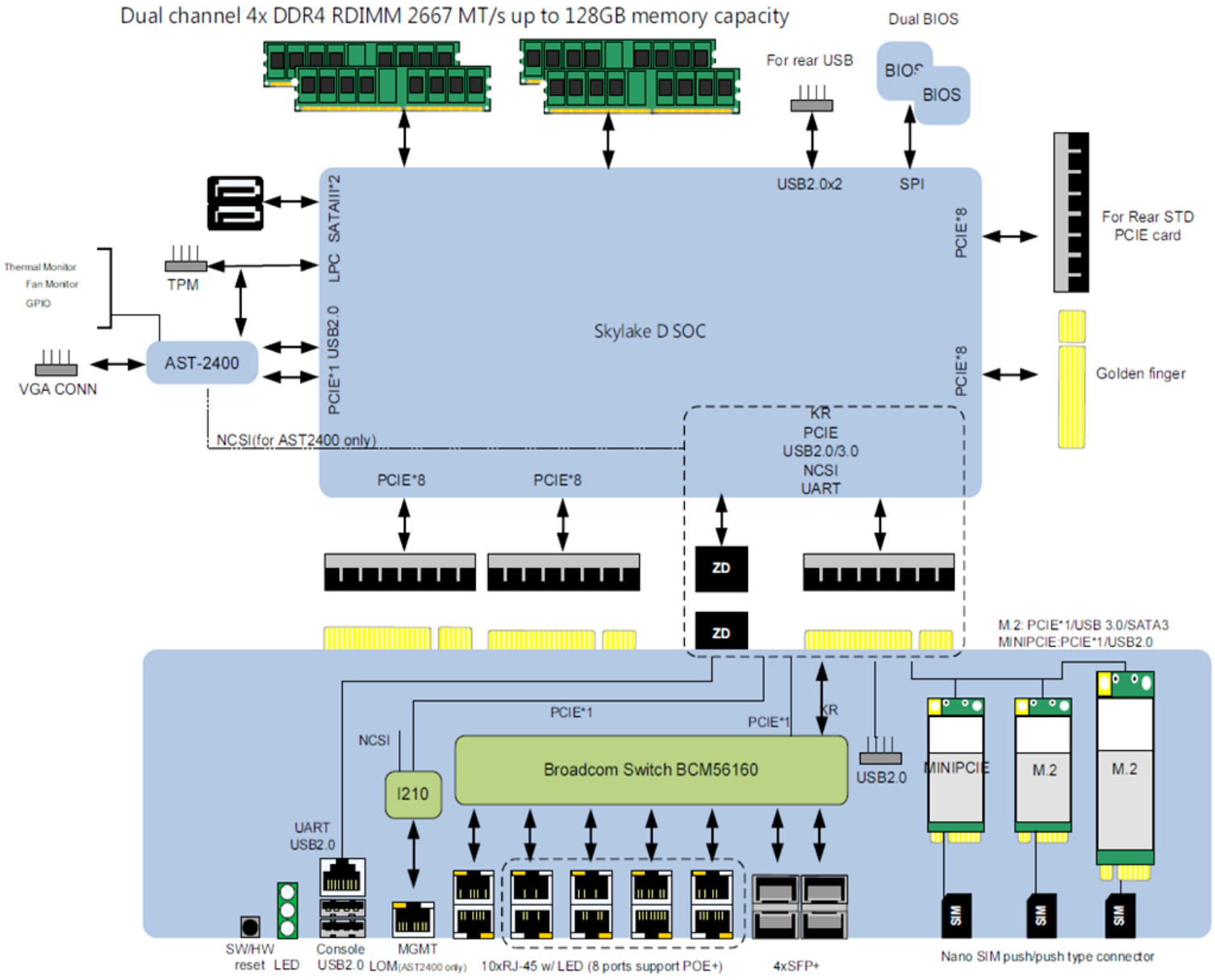
Rear Panel



No.	Description	
R1	USB Port	2x USB 2.0 (Optional)
R2	PCIe slot	PCI-E*8 FH/HL
R3	VGA Port	1 x VGA or Console (Optional)
R4	Alarm Button	1x Alarm Button
R5	Power Switch	1x Power Button
R6	Fans	3x hot-swappable cooling fans with smart fan
R7	Redundant PSU	600W 1+1 Redundant PSUs
R8	Grounding Point	
R9	ESD Jack	

Block Diagram

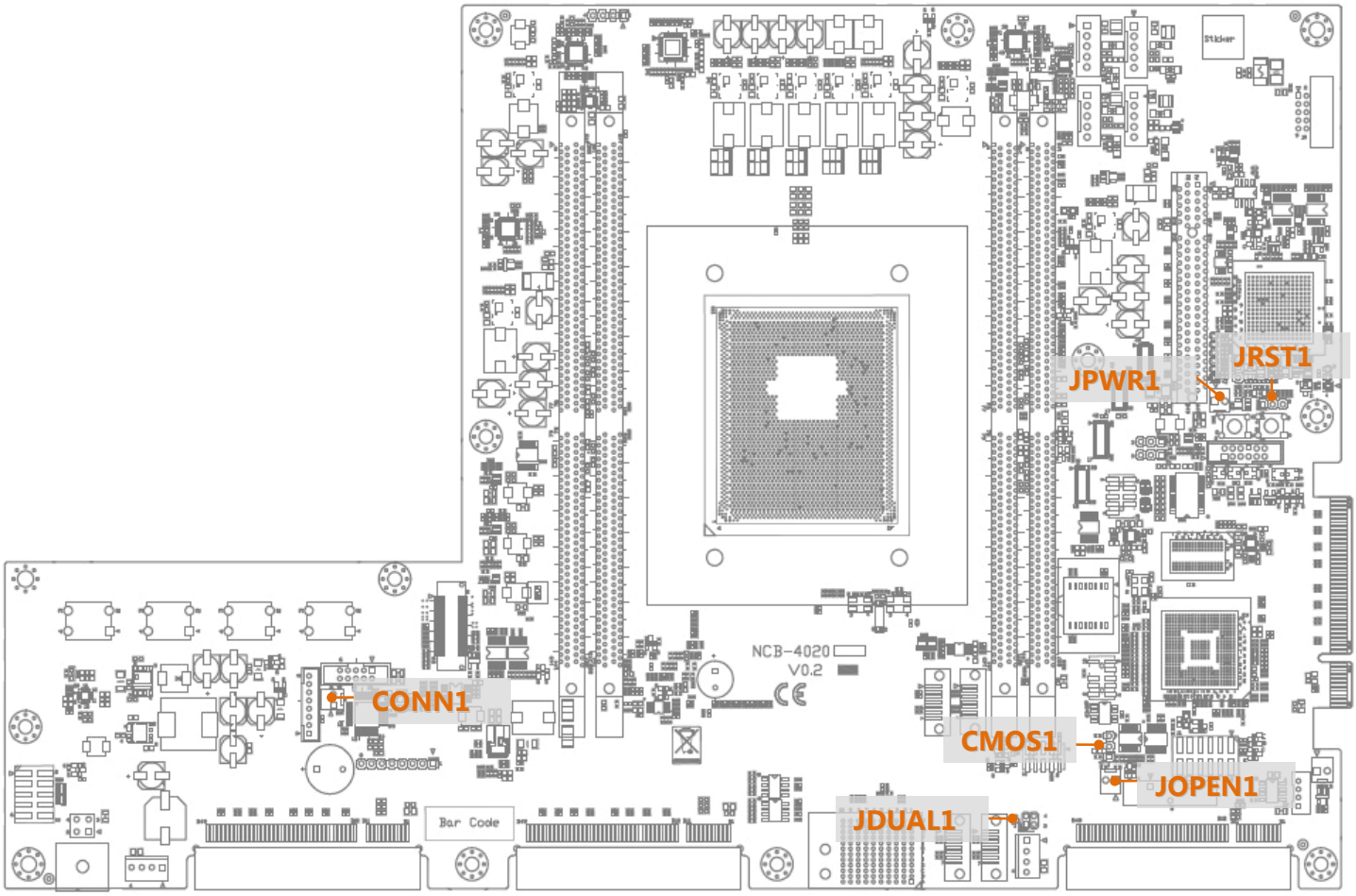
The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.



Motherboard

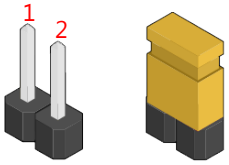
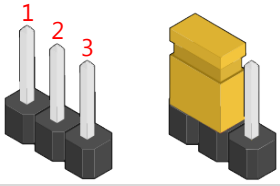
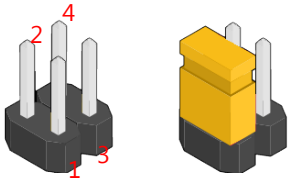
Internal Jumpers

This motherboard layout shows the jumpers on the board.



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

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

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

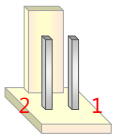
JDUAL1：DUAL BIOS Switch

Configuration	Function
1-2 & 3-4	Flash 1st BIOS(U2)(Default)
1-3 & 2-4	Flash 2nd BIOS(U3)

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

CONN1：Enable / Disable PMBUS ALERT#

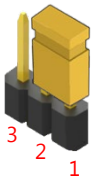
Configuration	Description
1-2 Open	Normal(Default)
1-2 Short	Mute PMBUS Alert#



Pin	Description
1	ALERT
2	GND

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

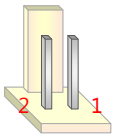
Function	Description
Software Reset	Software Reset(Default)
Hardware Reset	Hardware Reset



Function	Description
Short press >1 Sec	Normal shutdown/power-on
Long press 4 Sec	Forced shutdown
Press twice with each pressing down and release interval less than 0.4 Sec	NMI event

JOPEN1：Enable / Disable CASE OPEN#

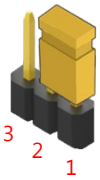
Pin	Description
1	FM_INTRUDER#
2	GND



Configuration	Description
1-2 Open	Normal(Default)
1-2 Short	Case Open#

CMOS1：Clear CMOS

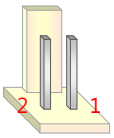
Pin	Description
1	PU VCC_RTC
2	PCH_RTCRST#
3	GND



Function	Description
1-2	Normal
2-3	Clear CMOS

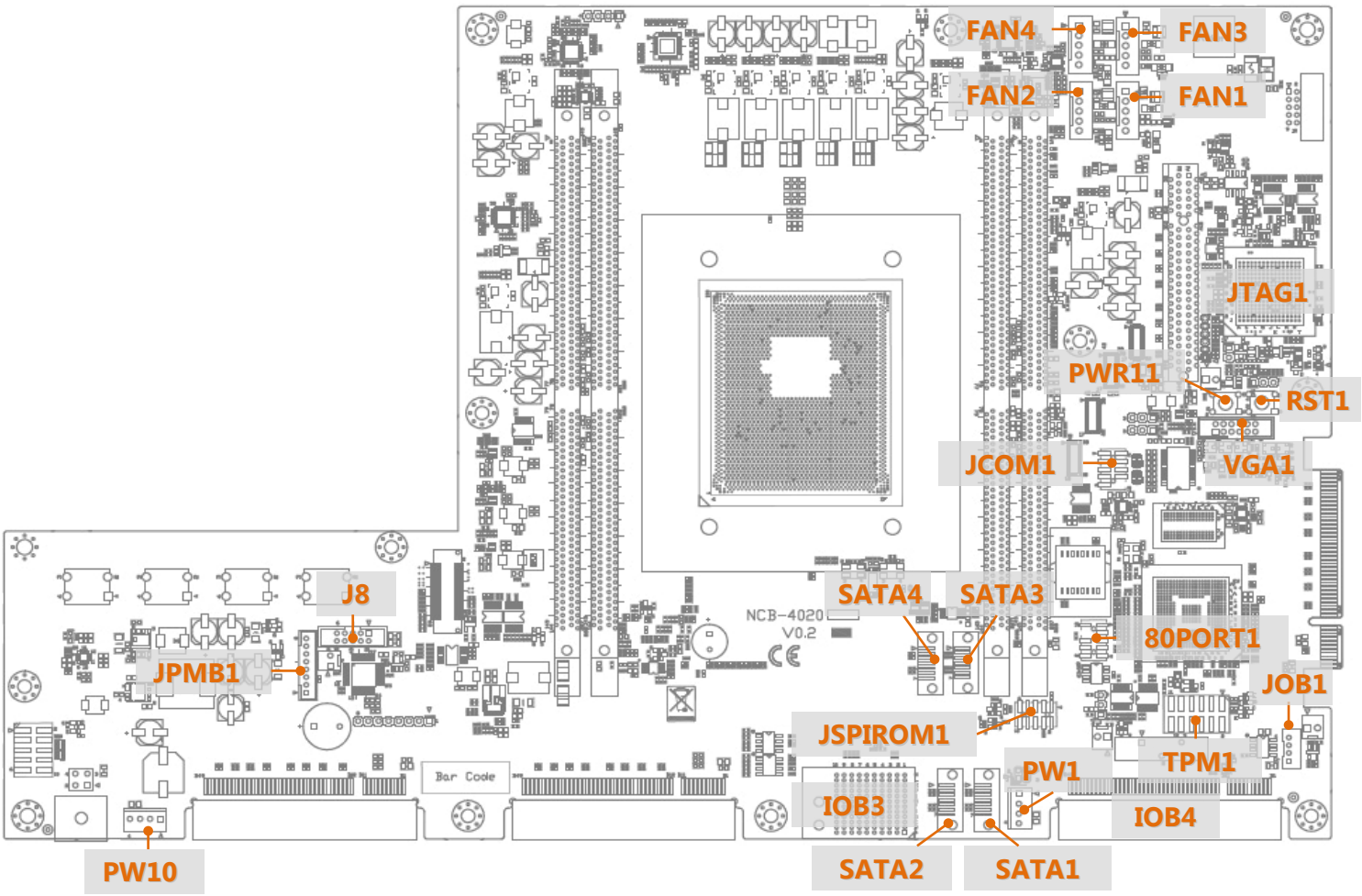
JPWR1 ：Power Button Connector

PIN	Description
1	GND
2	PWRON#



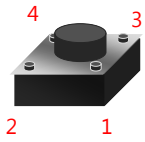
Internal Connectors

This motherboard layout shows the connectors on the board.



RST1：Reset Button

PIN	Description	PIN	Description
1	GND	2	GND
3	FP_RST#	4	FP_RST#



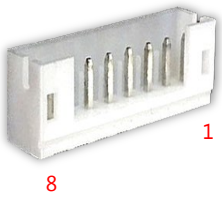
Function	Description
Short press >1 Sec	Software Reset
Press twice. The interval between the two short presses should not exceed 0.4 Sec	Hardware Reset

J8：Power Board Connector to connect **PB-40201**

PIN	Description	PIN	Description
1	+P5V_STBY_PSU	2	+P5V_STBY_PSU
3	+P5V_STBY_PSU	4	+P3V3_AUX
5	PWOK_1	6	Present#1
7	PWOK_2	8	Present#2
9	GND	10	GND

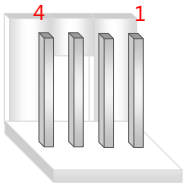
JPMB1：PMBUS Connector to connect **PB-40201**

PIN	Description	PIN	Description
1	NC	2	NC
3	ATX_PSON#	4	GND
5	NC	6	PMBUS_CLK
7	PMBUS_DAT	8	PMBUS_ALERT#



PW10 / PW11：SATA power connector

PIN	Description
1	+P12V
2	GND
3	GND
4	+P5V

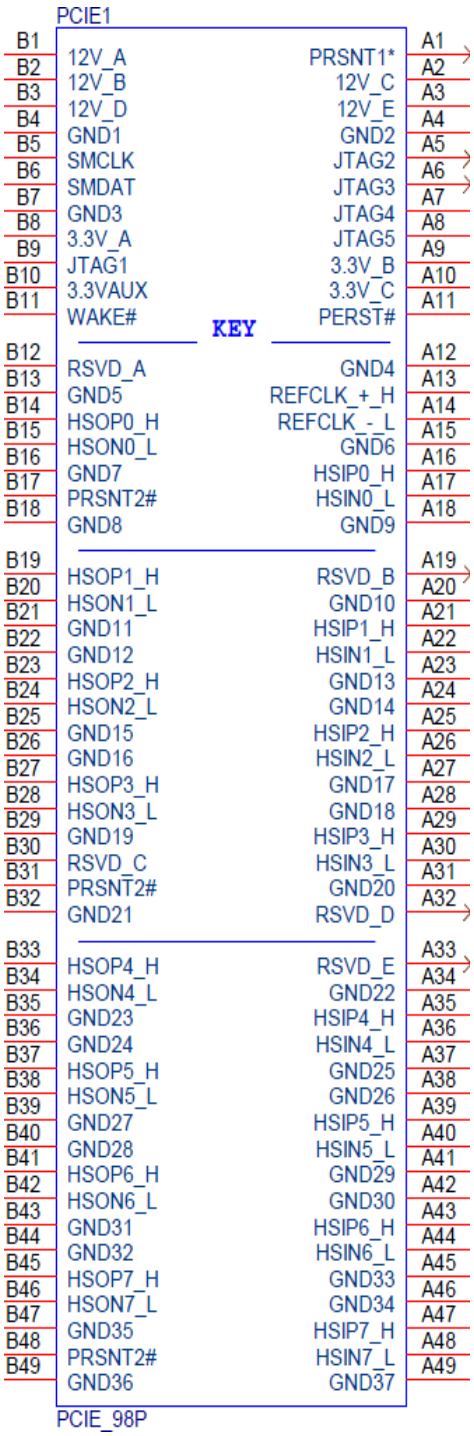


SATA1 / **SATA2 / SATA3 / SATA4**：SATA connector

PIN	Description
1	GND
2	SATA_CTX_C_DRX_P
3	SATA_CTX_C_DRX_N
4	GND
5	SATA_DTX_CRX_N
6	SATA_DTX_CRX_P
7	GND

PCIE1 / PCIE2：STD PCIe x8 connector

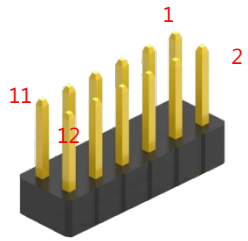
PIN	Description	PIN	Description
B1	P12V	A1	N/A
B2	P12V	A2	P12V
B3	P12V	A3	P12V
B4	GND	A4	GND
B5	I2C_SCLK	A5	N/A
B6	I2C_SDAT	A6	N/A
B7	GND	A7	SLT_X16_A7
B8	P3V3	A8	SLT_A8
B9	N/A	A9	P3V3
B10	P3V3_AUX	A10	P3V3
B11	WAKE#	A11	PCIE_RST#
B12	N/A	A12	GND
B13	GND	A13	CLK1_P
B14	CPU_TXP0	A14	CLK1_N
B15	CPU_TXN0	A15	GND
B16	GND	A16	CPU_RXP0
B17	N/A	A17	CPU_RXN0
B18	GND	A18	GND
B19	CPU_TXP1	A19	N/A
B20	CPU_TXN1	A20	GND
B21	GND	A21	CPU_RXP1
B22	GND	A22	CPU_RXN1
B23	CPU_TXP2	A23	GND
B24	CPU_TXN2	A24	GND
B25	GND	A25	CPU_RXP2
B26	GND	A26	CPU_RXN2
B27	CPU_TXP3	A27	GND
B28	CPU_TXN3	A28	GND
B29	GND	A29	CPU_RXP3
B30	CLK2_P	A30	CPU_RXN3
B31	CLK2_N	A31	GND
B32	GND	A32	N/A
B33	CPU_TXP4	A33	N/A
B34	CPU_TXN4	A34	GND
B35	GND	A35	CPU_RXP4
B36	GND	A36	CPU_RXN4
B37	CPU_TXP5	A37	GND
B38	CPU_TXN5	A38	GND
B39	GND	A39	CPU_RXP5
B40	GND	A40	CPU_RXN5
B41	CPU_TXP6	A41	GND
B42	CPU_TXN6	A42	GND
B43	GND	A43	CPU_RXP6
B44	GND	A44	CPU_RXN6
B45	CPU_TXP7	A45	GND
B46	CPU_TXN7	A46	GND
B47	GND	A47	CPU_RXP7
B48	N/A	A48	CPU_RXN7
B49	GND	A49	GND



Function	Description
x4+x4+x4+x4	[#A7/#A8]=10
x8+x8	[#A7/#A8]=11
X16	[#A7/#A8]=01

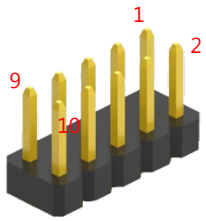
TPM1：TPM connector

PIN	Description	PIN	Description
1	IRQ_SERIAL	2	LPC_LFRAME#
3	LPC_LAD0	4	CLK_24_LPC
5	LPC_LAD1	6	+P3V3_AUX
7	LPC_LAD2	8	NC
9	LPC_LAD3	10	+P3V3
11	PLT_RST#	12	GND



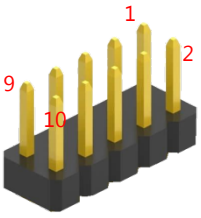
JSPIROM1：SPI ROM programming connector

PIN	Description	PIN	Description
1	SPI_HD1#	2	SPI_CS1#_DUAL
3	SPI_CS0#_DUAL	4	+P3V3_SPI_ME
5	SPI_MISO	6	SPI_PCH_IO3
7	NC	8	SPI_CLK
9	GND	10	SPI_MOSI



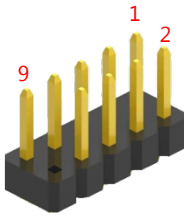
80PORT1：80 Port connector

PIN	Description	PIN	Description
1	CLK_24M_DB	2	LPC_LAD1
3	PLT_RST#	4	LPC_LAD0
5	LPC_LFRAME#	6	+P3V3
7	LPC_LAD3	8	NC
9	LPC_LAD2	10	GND



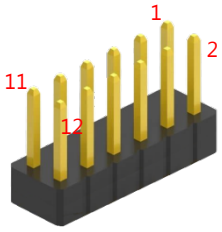
JCOM1：Series Port pin header

PIN	Description	PIN	Description
1	COM2_DCD#	2	COM2_DST#
3	COM2_RX#	4	COM2_RTS#
5	COM2_TX#	6	COM2_CTS#
7	COM2_DTR#	8	COM2_RI#
9	GND	10	N/A



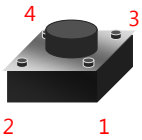
VGA1：VGA Connector

PIN	Description	PIN	Description
1	DAC_RO	2	GND
3	DAC_GO	4	GND
5	DAC_BO	6	GND
7	HSYNC_O	8	N/A
9	VSYNC_O	10	GND
11	DDC_DATA	12	DDC_CLK



PWR1：Power Button

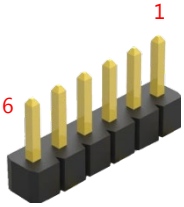
PIN	Description	PIN	Description
1	GND	2	GND
3	PWRON#	4	PWRON#



Function	Description
Short press >1 Sec	Normal shutdown/power-on
Long press 4 Sec	Forced shutdown
Press twice. The interval between the two short presses should not exceed 0.4 Sec	NMI event

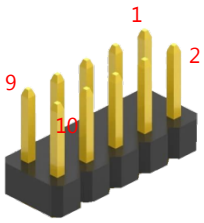
JTAG1：CPLD Flash Programming Pin Header

PIN	Description
1	+P3V3_AUX
2	JTAG_PLD_TDO
3	JTAG_PLD_TDI
4	JTAG_PLD_TMS
5	GND
6	JTAG_PLD_TCK



USB1：USB Ports Connector

PIN	Description	PIN	Description
1	+P5V_USB1	2	+P5V_USB1
3	USB20_N3_L	4	USB20_N4_L
5	USB20_P3_L	6	USB20_P4_L
7	GND	8	GND
9	GND	10	GND

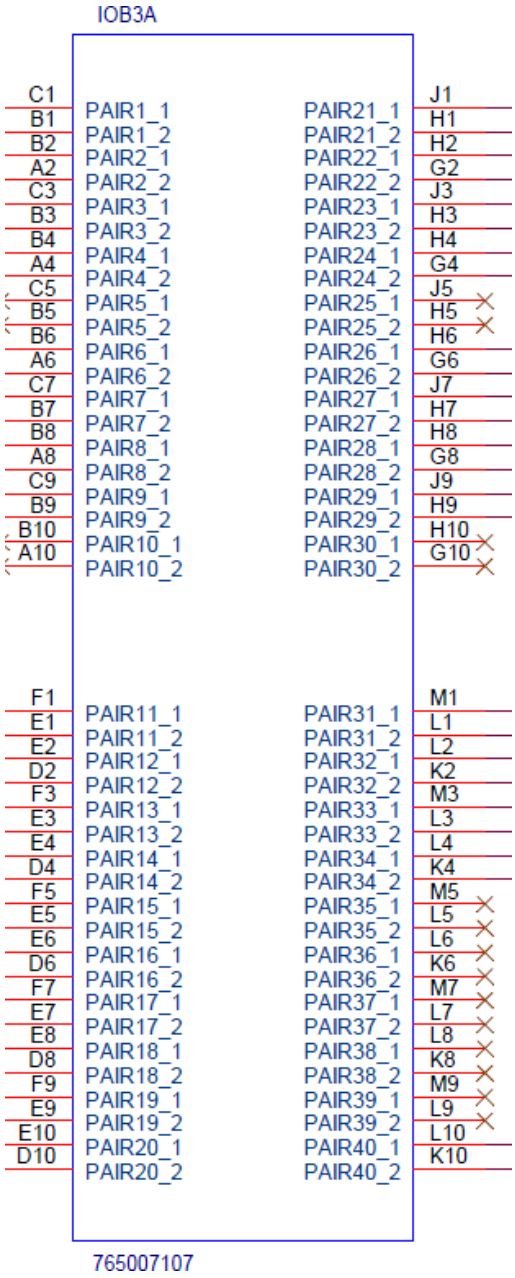


FAN1 / FAN2 / FAN3 / FAN4：FAN connector

PIN	Description
1	GND
2	+P12V
3	BMC_FAN_TECH_IN2
4	BMC_FAN_TECH_IN1
5	BMC_PWMOUT1

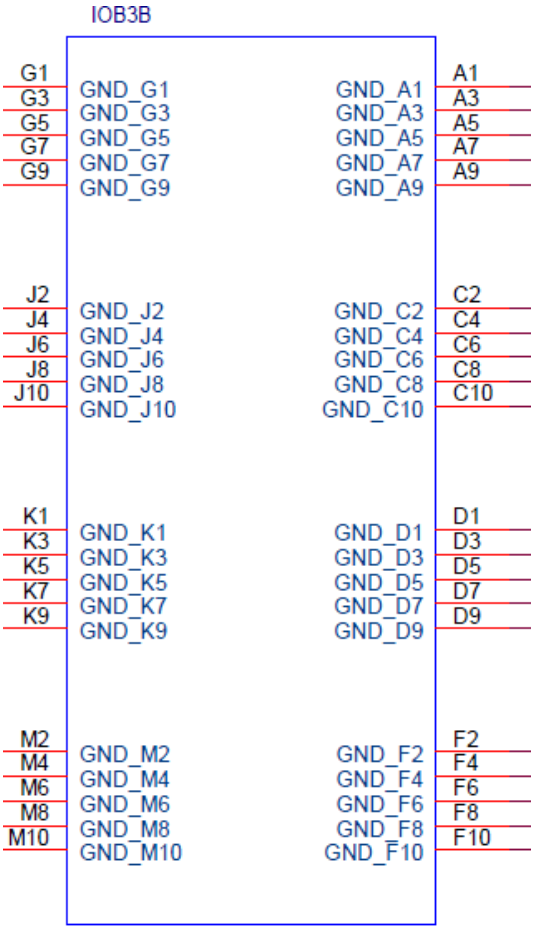
IOB3 : IO HI-Speed BUS connector to connect **IO-40201**

PIN	Description	PIN	Description
C1	KR_TXP3	J1	KR_RXP3
B1	KR_TXN3	H1	KR_RXN3
B2	KR_TXP1	H2	KR_RXP1
A2	KR_TXN1	G2	KR_RXN1
C3	KR_TXP2	J3	KR_RXP2
B3	KR_TXN2	H3	KR_RXN2
B4	KR_TXP0	H4	KR_RXP0
A4	KR_TXN0	G4	KR_RXN0
C5	N/A	J5	N/A
B5	N/A	H5	N/A
B6	USB3_TXP2	H6	USB3_RXP2
A6	USB3_TXN2	G6	USB3_RXN2
C7	USB3_TXP3	J7	USB3_RXP3
B7	USB3_TXN3	H7	USB3_RXN3
B8	PCIE_TXP4	H8	PCIE_RXP4
A8	PCIE_TXN4	G8	PCIE_RXN4
C9	PCIE_TXP5	J9	PCIE_RXP5
B9	PCIE_TXN5	H9	PCIE_RXN5
B10	N/A	H10	N/A
A10	N/A	G10	N/A
F1	SATA_TXP5	M1	SATA_RXP5
E1	SATA_TXN5	L1	SATA_RXN5
E2	SATA_TXP4	L2	SATA_RXP4
D2	SATA_TXN4	K2	SATA_RXN4
F3	PCIE_TXP3	M3	USB2_P1
E3	PCIE_TXN3	L3	USB2_N1
E4	CLK_56160_P	L4	PCIE_RXP3
D4	CLK_56160_N	K4	PCIE_RXN3
F5	CLK_SWB2_P	M5	N/A
E5	CLK_SWB2_N	L5	N/A
E6	CLK_SWB3_P	L6	N/A
D6	CLK_SWB3_N	K6	N/A
F7	CLK_SWB4_P	M7	N/A
E7	CLK_SWB4_N	L7	N/A



E8	I2C_SFP_SCL5	L8	N/A
D8	I2C_SFP_SDA5	K8	N/A
F9	IPMI_CLK	M9	N/A
E9	IPMI_DAT	L9	N/A
E10	IO_BOARD_PWROK	L10	SMB_BMC_SCL6
D10	P35V_OK	K10	SMB_BMC_SDA6

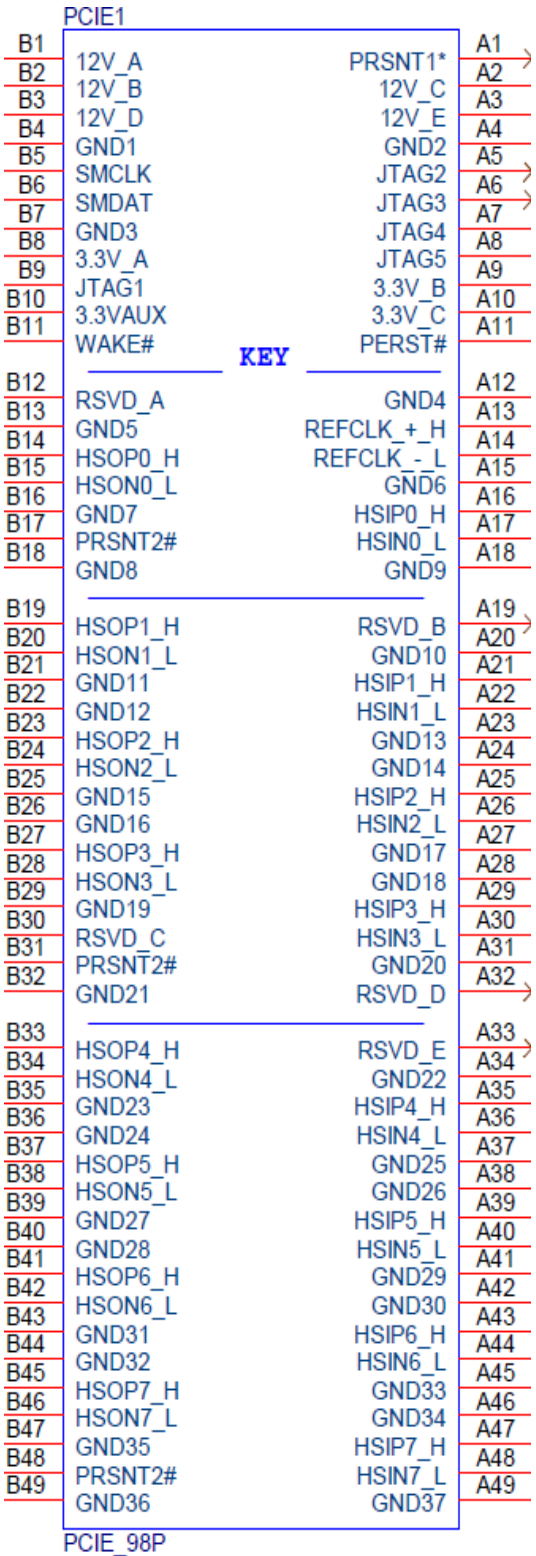
PIN	Description	PIN	Description
G1	GND	A1	GND
G3	GND	A3	GND
G5	GND	A5	GND
G7	GND	A7	GND
G9	GND	A9	GND
J2	GND	C2	GND
J4	GND	C4	GND
J6	GND	C6	GND
J8	GND	C8	GND
J10	GND	C10	GND
K1	GND	D1	GND
K3	GND	D3	GND
K5	GND	D5	GND
K7	GND	D7	GND
K9	GND	D9	GND
M2	GND	F2	GND
M4	GND	F4	GND
M6	GND	F6	GND
M8	GND	F8	GND
M10	GND	F10	GND



IOB4：IO BUS connector to connect **IO-40201**

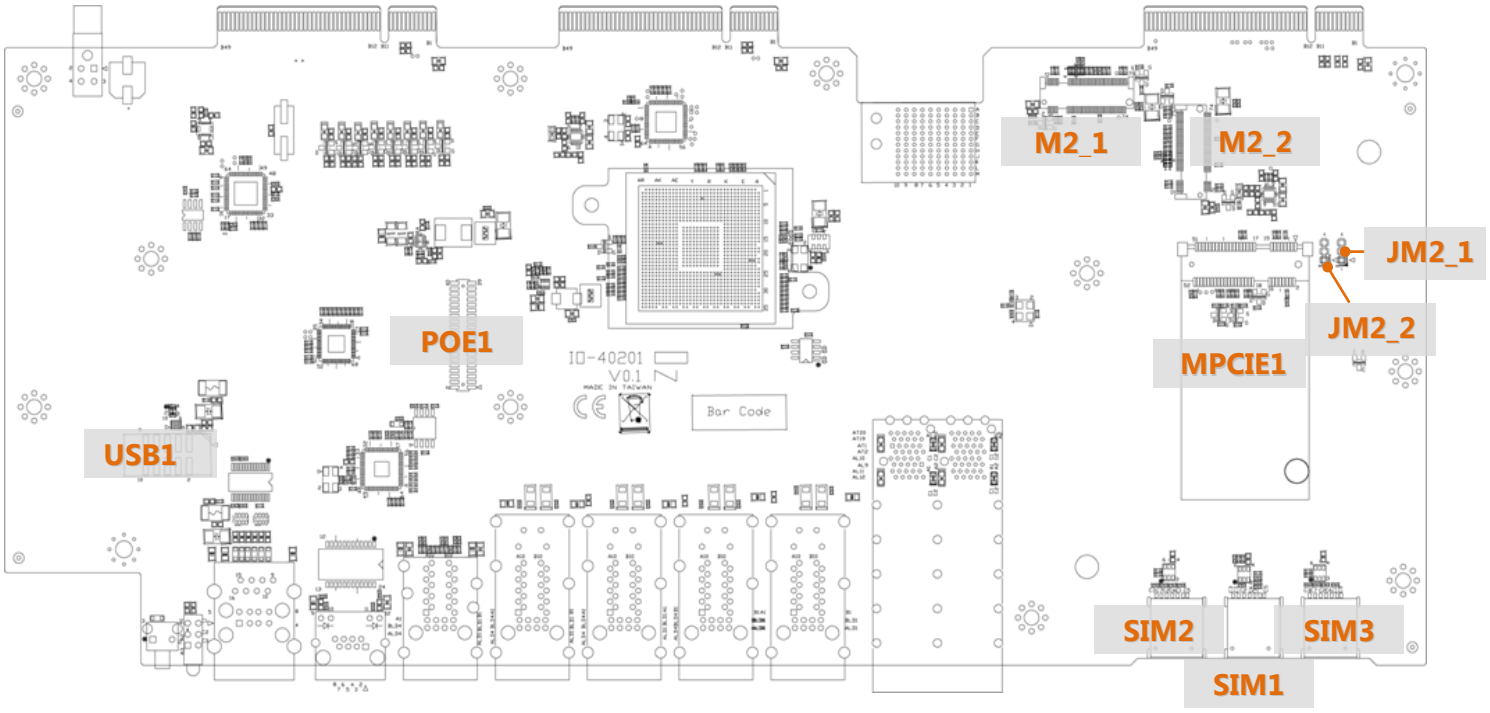
(not a standard PCIe x8 connector for PCIe card)

PIN	Description	PIN	Description
B1	P12V	A1	P12V
B2	P12V	A2	P12V
B3	P12V	A3	P12V
B4	P5V	A4	P5V_SBY
B5	P5V	A5	P5V_SBY
B6	P3V3_AUX	A6	P5V_SBY
B7	P3V3_AUX	A7	P5V_SBY
B8	P3V3	A8	P3V3
B9	P3V3	A9	P3V3
B10	P3V3	A10	P3V3
B11	P3V3	A11	P3V3
B12	GND	A12	GND
B13	GND	A13	GND
B14	GND	A14	GND
B15	GND	A15	GND
B16	GND	A16	GND
B17	GND	A17	GND
B18	GND	A18	GND
B19	I2C_SLK4	A19	CPLD_IO_RSVD1
B20	I2C_SDA4	A20	CPLD_IO_RSVD2
B21	I2C_SLK5	A21	CPLD_IO_RSVD3
B22	I2C_SDA5	A22	GPP_D23_RSVD
B23	SATA_PCIE_M2_1_SEL	A23	GPP_D18_RSVD
B24	SATA_PCIE_M2_2_SEL	A24	GPP_D17_RSVD
B25	I2C_SLK6	A25	GPP_C19_RSVD
B26	I2C_SDA6	A26	GPP_D20_RSVD
B27	SFP+_OPTXENB_0	A27	GPP_A23_RSVD
B28	SFP+_OPTXENB_1	A28	GPP_A22_RSVD
B29	SFP+_OPTXENB_2	A29	GPP_A17_RSVD
B30	SFP+_OPTXENB_3	A30	N/A
B31	N/A	A31	M2_1_LED_N
B32	PLT_RST#_B	A32	M2_2_LED_N
B33	FP_RST#	A33	BMC_UART_CTS#
B34	LAN_WAKE#	A34	BMC_UART_RTS
B35	BCM56160_RST#	A35	BMC_UART_DSR#
B36	N/A	A36	BMC_UART_DTR
B37	N/A	A37	BMC_UART_RX
B38	N/A	A38	BMC_UART_TX
B39	N/A	A39	FM_PHY_DIS#
B40	GND	A40	PCIE_WAKE#
B41	BMC_RGMII_TXD0	A41	PLT_RST#
B42	BMC_RGMII_TXD1	A42	N/A
B43	BMC_RGMII_TXEN	A43	RST_PCIE_PLTRST#
B44	GND	A44	USB_OC#
B45	BMC_RGMII_RXD0	A45	HDD_LED#
B46	BMC_RGMII_RXD1	A46	LED_GRN_STATUS
B47	BMC_RGMII_RXER	A47	LED_YEW_STATUS
B48	BMC_RGMII_RCLK	A48	N/A
B49	BMC_RGMII_CRSDV	A49	N/A



IO Board

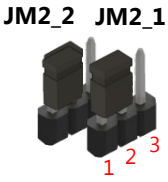
The IO board layout shows the connectors and jumpers on the board.



Internal Jumper

JM2_2 / JM2_1：M2_2 LED Select Jump

PIN	Description
1	N/A
2	M.2_LED#
3	SYS_HDD_LED#

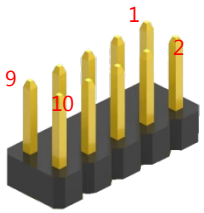


Function	Description
1-2	HDD LED by System (Default)
2-3	HDD LED by M.2

Internal Connectors

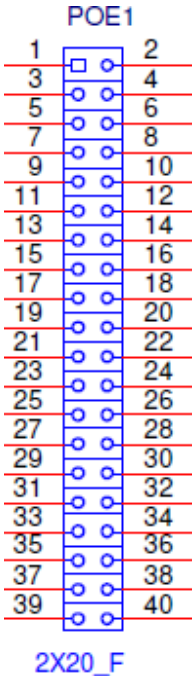
USB1：Internal USB Connector

PIN	Description	PIN	Description
1	+P5V_USB1	2	+P5V_USB1
3	USB20_N6	4	NC
5	USB20_P6	6	NC
7	GND	8	GND
9	GND	10	GND



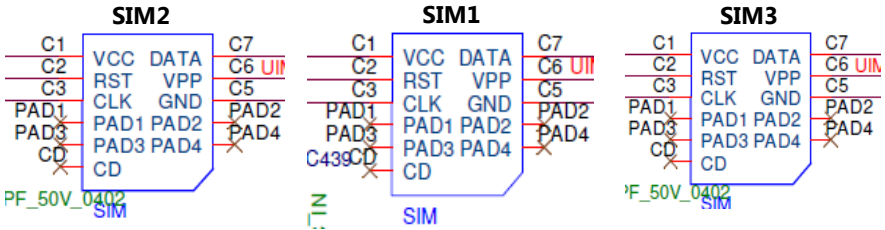
POE1：POE board Connector (To PB-40202)

PIN	Description	PIN	Description
1	+P3V3	2	GND
3	+P3V3	4	GND
5	SCK4	6	SDA4
7	N/A	8	N/A
9	POE_VPORT_OUT1	10	N/A
11	POE_VPORT_OUT1	12	POE_GND
13	POE_VPORT_OUT2	14	POE_GND
15	POE_VPORT_OUT2	16	POE_GND
17	POE_VPORT_OUT3	18	POE_GND
19	POE_VPORT_OUT3	20	POE_GND
21	POE_VPORT_OUT4	22	POE_GND
23	POE_VPORT_OUT4	24	POE_GND
25	POE_VPORT_OUT5	26	POE_GND
27	POE_VPORT_OUT5	28	POE_GND
29	POE_VPORT_OUT6	30	POE_GND
31	POE_VPORT_OUT6	32	POE_GND
33	POE_VPORT_OUT7	34	POE_GND
35	POE_VPORT_OUT7	36	POE_GND
37	POE_VPORT_OUT8	38	POE_GND
39	POE_VPORT_OUT8	40	POE_GND



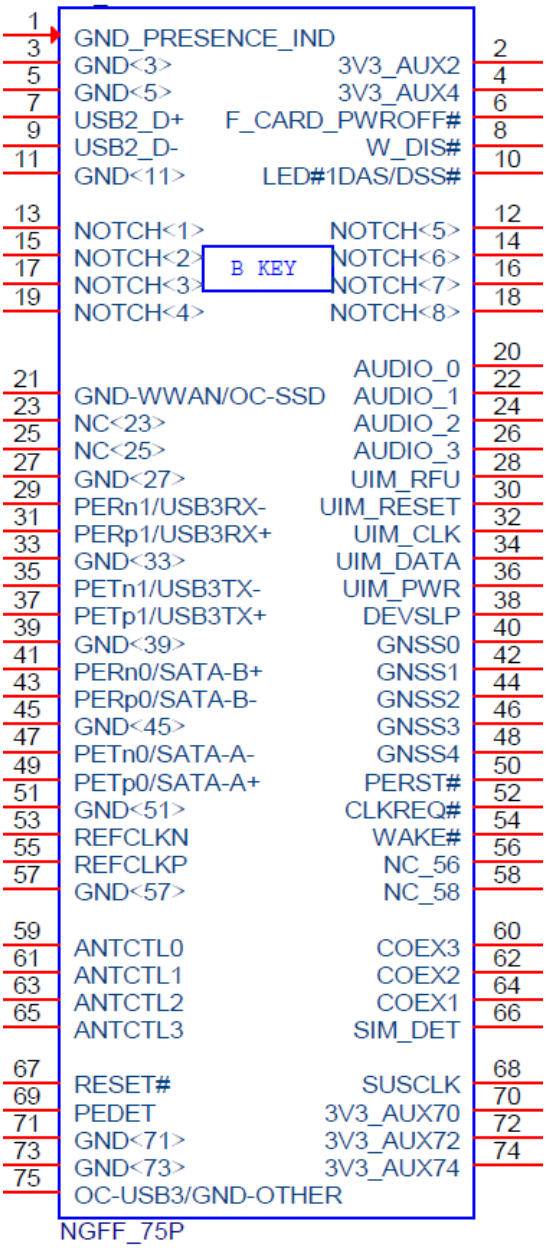
SIM2：SIM Card for M2_1 / **SIM1**：SIM Card for MPCIE1 / **SIM3**：SIM Card for M2_2

PIN	Description
C1	UIM1_PWR
C2	UIM1_RST1
C3	UIM1_CLK1
C5	GND
C6	UIM1_SVPP
C7	UIM1_DAT1



M2_1 / M2_2 3-1：M.2 Slot-1 / M.2 Slot-2

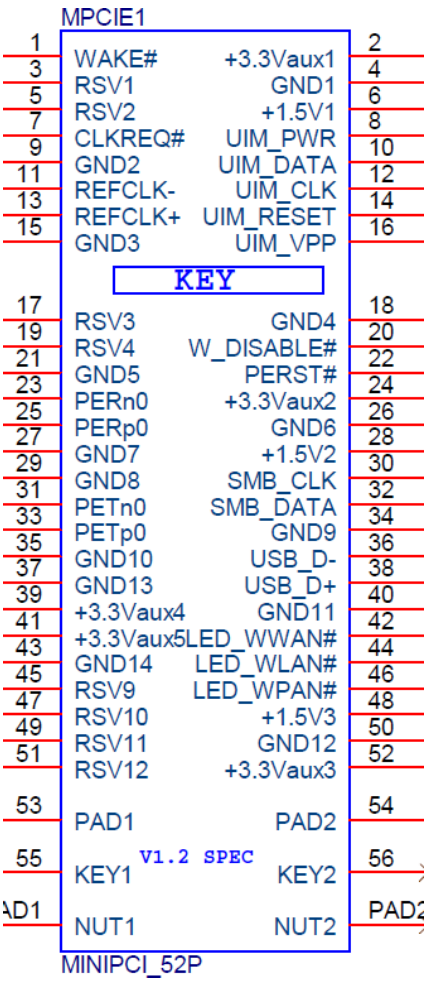
PIN	Description	PIN	Description
1	N/A	2	P3V3
3	GND	4	P3V3
5	GND	6	M.2_POWEROFF#
7	USB2_P	8	N/A
9	USB2_N	10	M.2_LED#
11	GND	12	N/A
13	N/A	14	N/A
15	N/A	16	N/A
17	N/A	18	N/A
19	N/A	20	N/A
21	N/A	22	N/A
23	N/A	24	N/A
25	N/A	26	N/A
27	GND	28	UIM_VPP
29	USB3_RXN	30	UIM_RST#
31	USB3_RXP	32	UIM_CLK
33	GND	34	UIM_DAT
35	USB3_TXN	36	UIM_PWR
37	USB3_TXP	38	N/A
39	GND	40	N/A
41	SATARP_PCIERN	42	N/A
43	SATARN_PCIERP	44	N/A
45	GND	46	N/A
47	SATATN_PCIETN	48	N/A
49	SATATP_PCIETP	50	RST#
51	GND	52	N/A
53	CLK_PCIE_N	54	N/A
55	CLK_PCIE_P	56	N/A
57	GND	58	N/A
59	N/A	60	N/A
61	N/A	62	N/A
63	N/A	64	N/A
65	N/A	66	N/A
67	N/A	68	N/A
69	M2_PEDET	70	P3V3
71	GND	72	P3V3
73	GND	74	P3V3
75	N/A		



Function	Description
M2_PEDET = GND	SATA interface
M2_PEDET = HIGH	PCIe interface

MPCIE1：Mini PCI Express Slot

PIN	Description	PIN	Description
1	N/A	2	P3V3
3	N/A	4	GND
5	N/A	6	P1V5
7	N/A	8	UIM_PWR
9	GND	10	UIM_DAT
11	CLK100_N	12	UIM_CLK
13	CLK100_P	14	UIM_RST#
15	GND	16	UIM_VPP
17	N/A	18	GND
19	N/A	20	W_DISABLE#
21	GND	22	PE_RST#
23	PCIE_RXN	24	P3V3
25	PCIE_RXP	26	GND
27	GND	28	P1V5
29	GND	30	I2C_SCL
31	PCIE_TXN	32	I2C_SDA
33	PCIE_TXP	34	GND
35	GND	36	USB2_N
37	GND	38	USB2_P
39	P3V3	40	GND
41	P3V3	42	N/A
43	GND	44	N/A
45	N/A	46	N/A
47	N/A	48	P1V5
49	N/A	50	GND
51	N/A	52	P3V3
53	GND	54	GND
55	N/A	56	N/A



CHAPTER 2: HARDWARE SETUP

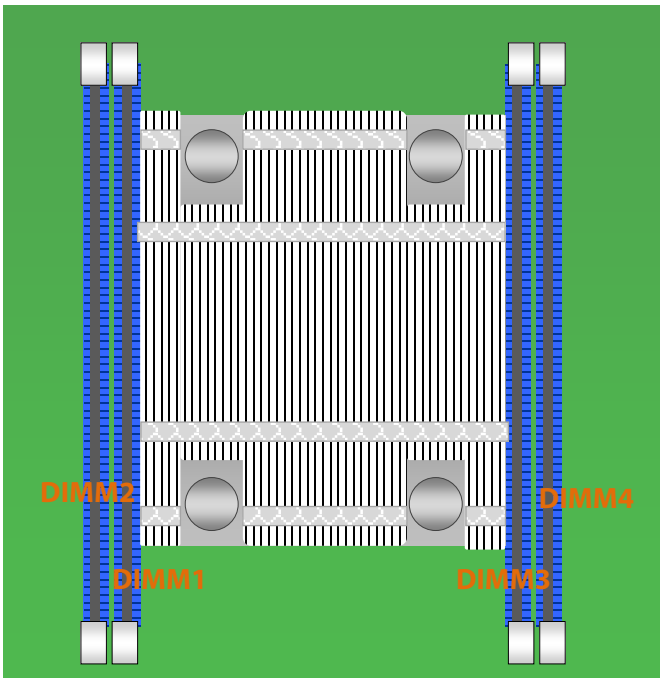
To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely. Also, please wear ESD protection gloves when conducting the steps in this chapter.

Installing the System Memory

The motherboard supports 4 memory slots for DDR4 registered DIMM.

Supported System Memory Summary

Total Slots	4
Number of Channels	4 (Channel 0~3, 1 DIMM per channel)
Supported DIMM Capacity	4GB, 8GB, 16GB, 32GB
Memory Size	Maximum 128 GB RDIMM (32GB*4)
Memory Type	DDR4 ECC RDIMM 2133/2400/2666 MHZ
Minimum DIMM Installed	At least 1 memory module to boot and run from.



DIMM Population Guidelines

Please do follow the memory module installation instructions to install the DIMMs, and make sure you e use memory modules of the same capacity, speed and from the same manufacturer to avoid compatibility issues.

Recommended DIMM Population Scheme

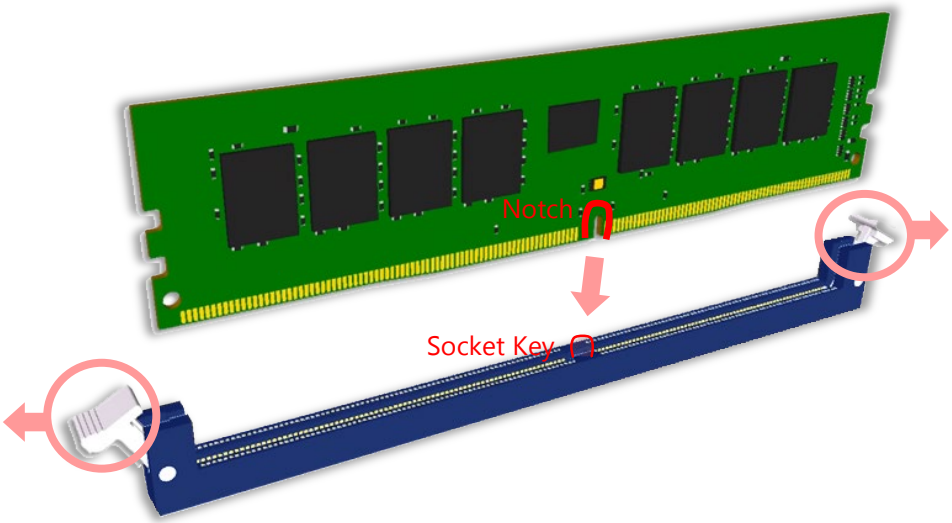
The table below shows the recommended schemes for DIMM population. To guarantee balanced system performance, please install identical DIMMs of the same capacity, speed, number of ranks, and from the same manufacturer.

	DIMM #	2	1	3	4
Number of DIMMs Installed for CPU	1 DIMM			○	
	2 DIMMs			○	○
	3 DIMMs		○	○	○
	4 DIMMs	○	○	○	○

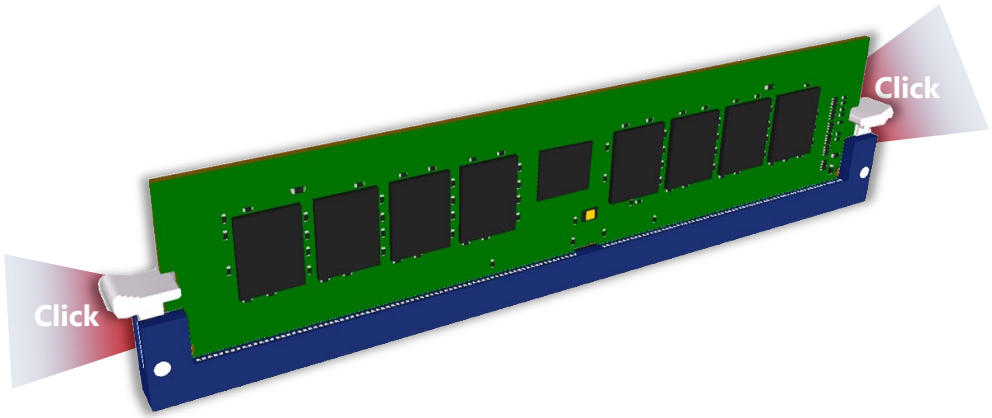
Memory Module Installation Instructions

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 M.2 Modules for Storage or LTE

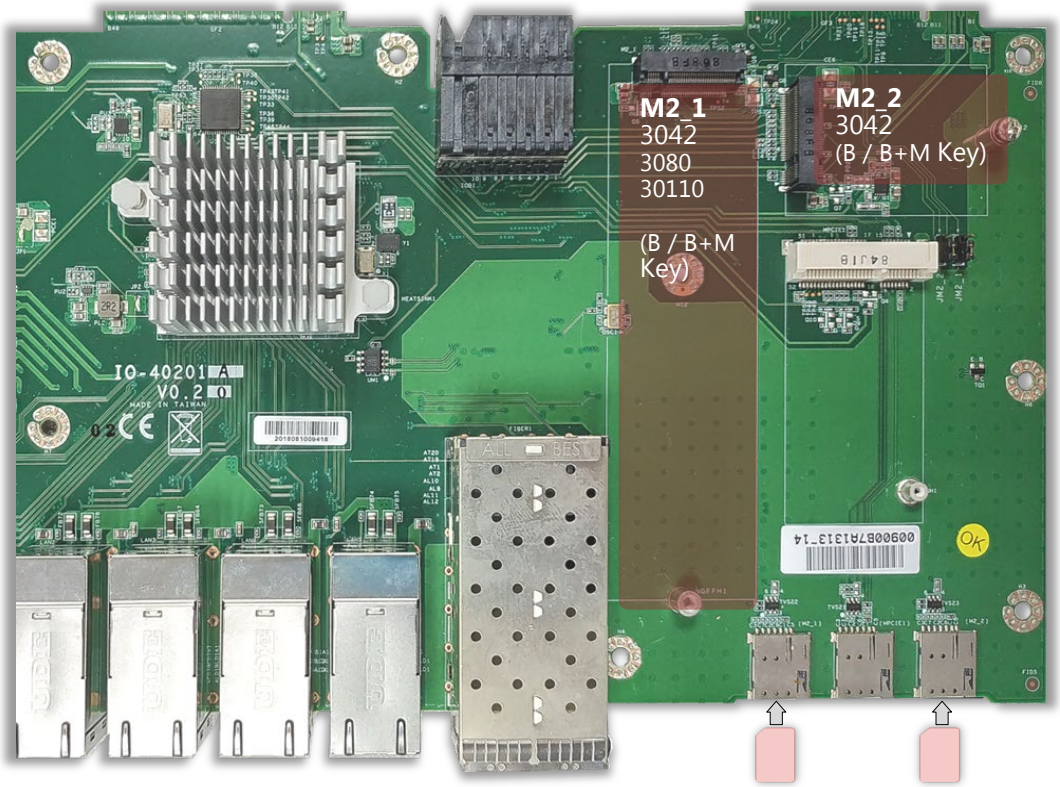
This system supports two M.2 module slots that can accommodate various module sizes.

- 1x M.2-3042, B key or B+M Key (Optional) via PCIEx1/USB3.0/SATA3 interface.
- 1x M.2-3042/3080/30110, B key or B+M key (Optional) via PCIEx1/USB3.0/SATA3 interface

To install the M.2 module

1. Align the notch of the module with the socket key in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.
2. Push down the module and secure it with the screw that comes with it.

For a 4G-LTE module, you also need to insert the nano-SIM card into the corresponding slot.



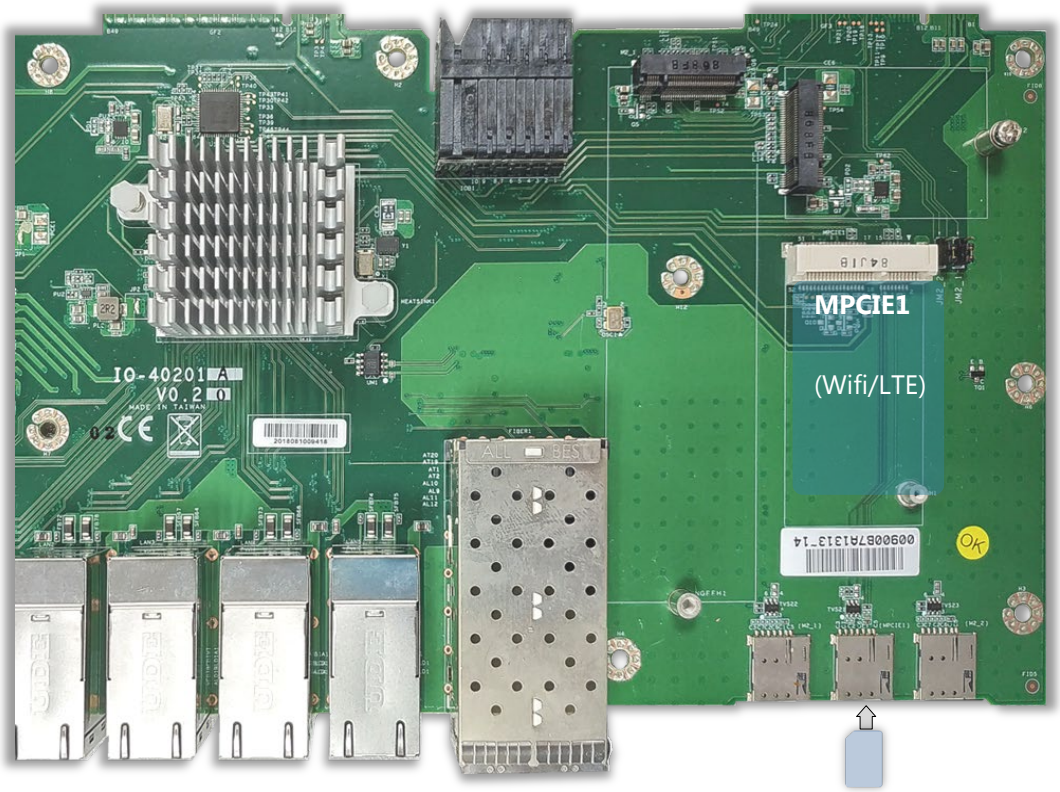
Installing MPCIE Module

This system supports one MPCIE module slot **MPCIE1** that supports wireless connection.

To install the MPCIE module

1. Align the notch of the module with the socket key in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.
2. Push down the module and secure it with the screw that comes with it.

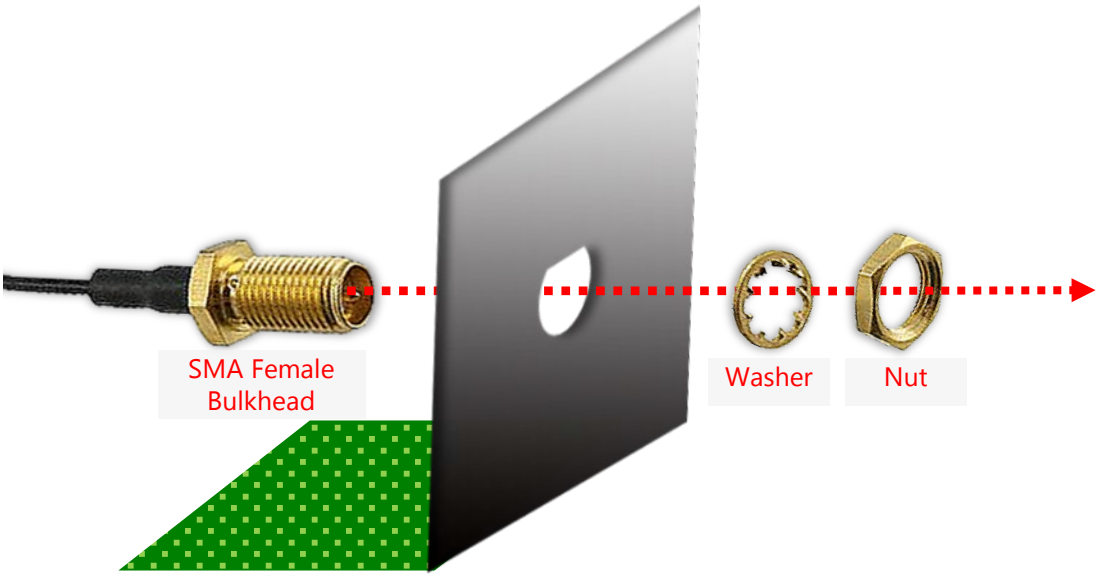
For a 4G-LTE module, you also need to insert the nano-SIM card into the corresponding slot.



Mounting an SMA-Mount Antenna Cable Assembly

To mount the Wi-Fi/LTE antennas:

1. Take out the antenna pigtail cable from the Antenna Kit. From inside the chassis, insert the SMA Female Bulkhead through the antenna hole on the panel.



2. From outside the panel, attach the Washer and Nut, and tighten the Nut using an SMA Torque Wrench.

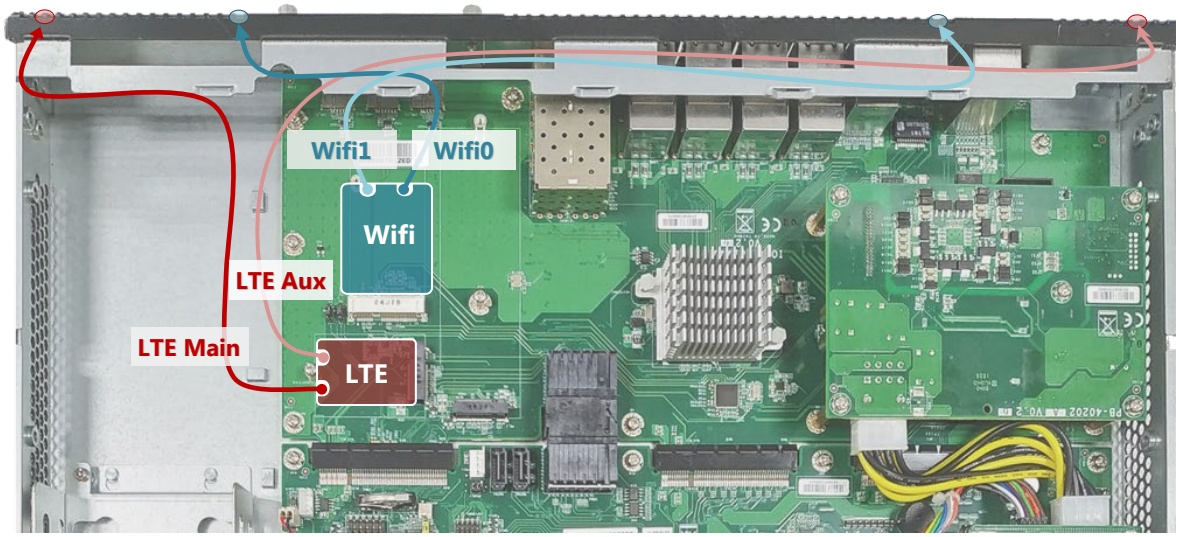
Warning

Do not use any tool other than an SMA Torque Wrench to fasten the Nut. For example, general pliers or tweezers without limited twisting force are very likely to cause the distortion of SMA connector.

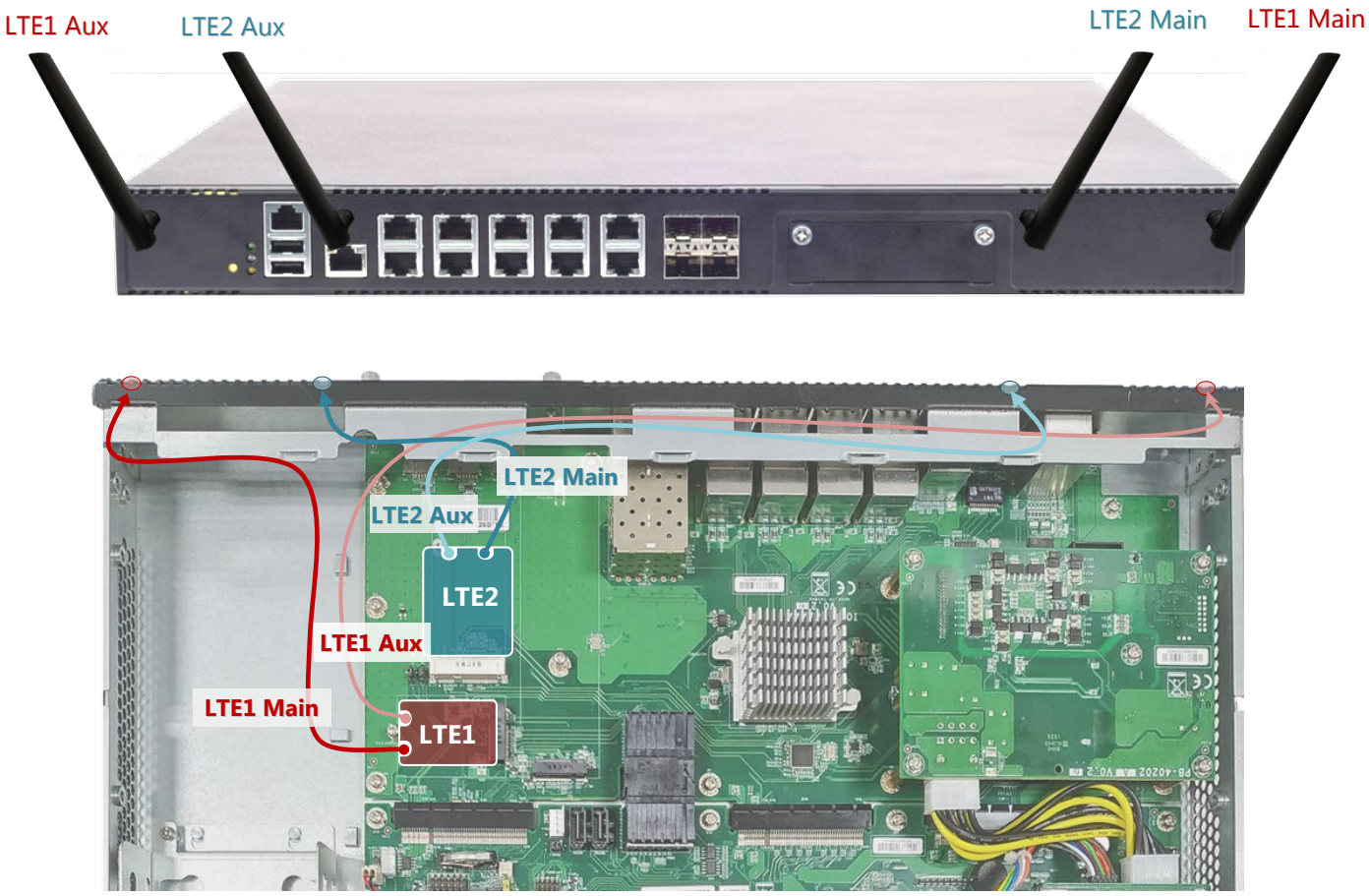
RF Cable Routing

For optimal RF signal reception, please connect the antenna cables to the Wifi or LTE modules as described in this section, and attach antennas to the right SMA connectors on the front panel.

Configuration1: Wifi (MPCIE1) + LTE(M2_2)



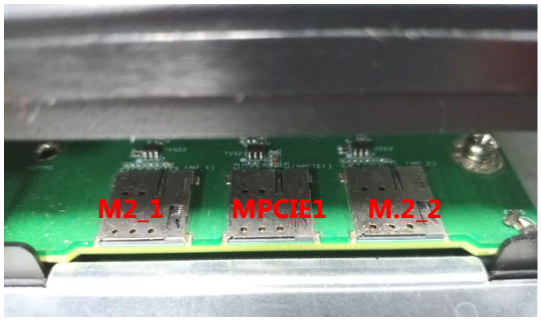
Configuration2: LTE1 (M2_2) + LTE2 (MPCIE1)

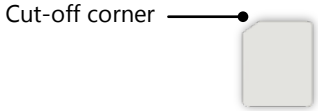


Installing Nano SIM Cards

This system supports three nano-SIM slots respectively for **M2_1**, **MPCIE1** and **M2_2** slots. To install the SIM card:

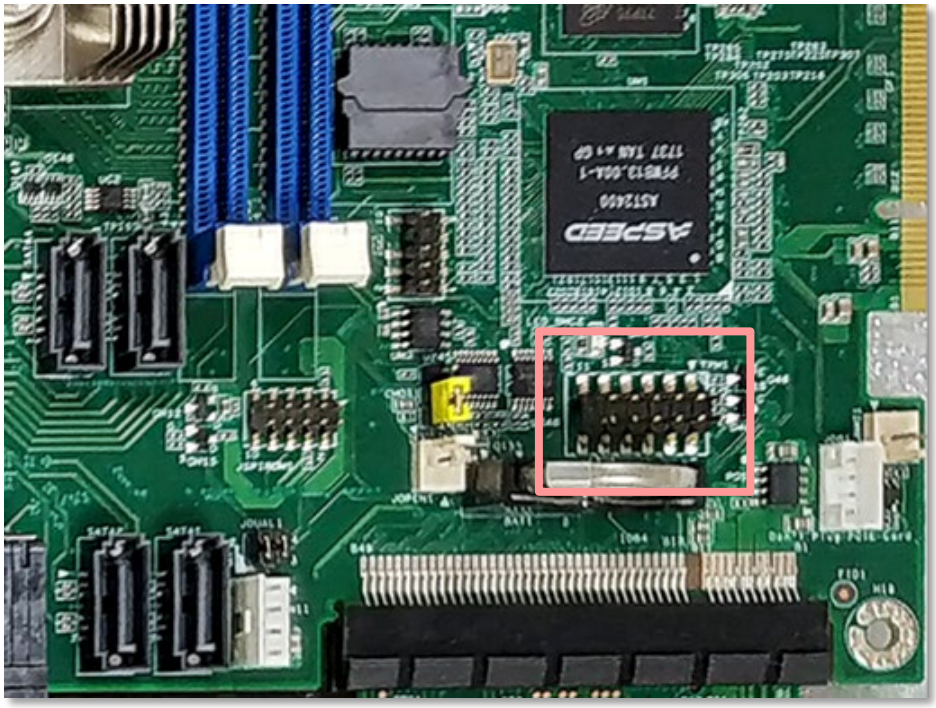
1. On the front panel, loosen the two screws that secure the SIM slot door.
2. After the SIM slots are revealed, push in the SIM card with the cut-off corner facing inwards, and the golden contacts facing down. You will hear a click sound once the card is correctly connected in the slot.
3. To take the SIM card out, slightly push it to have it ejected.



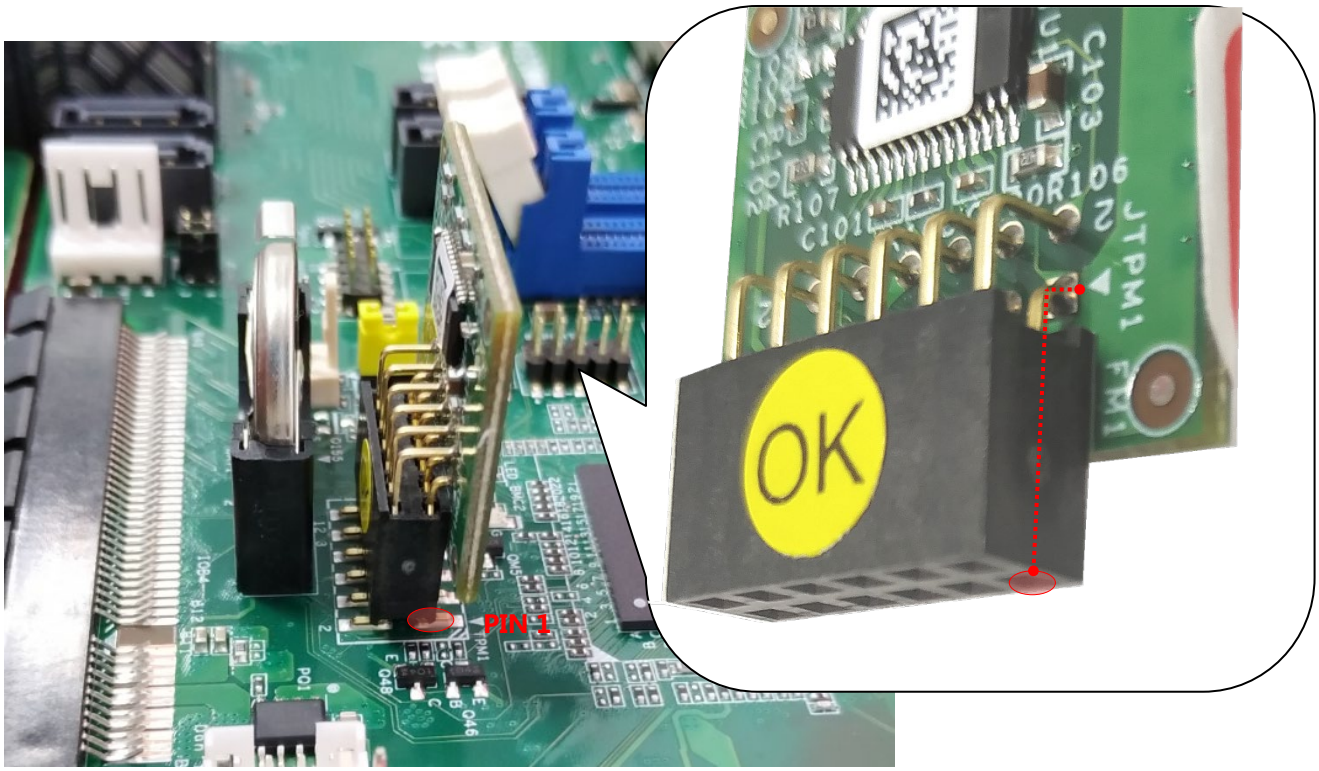


Installing the TPM Module

1. Locate the **TPM1** connector on the motherboard.



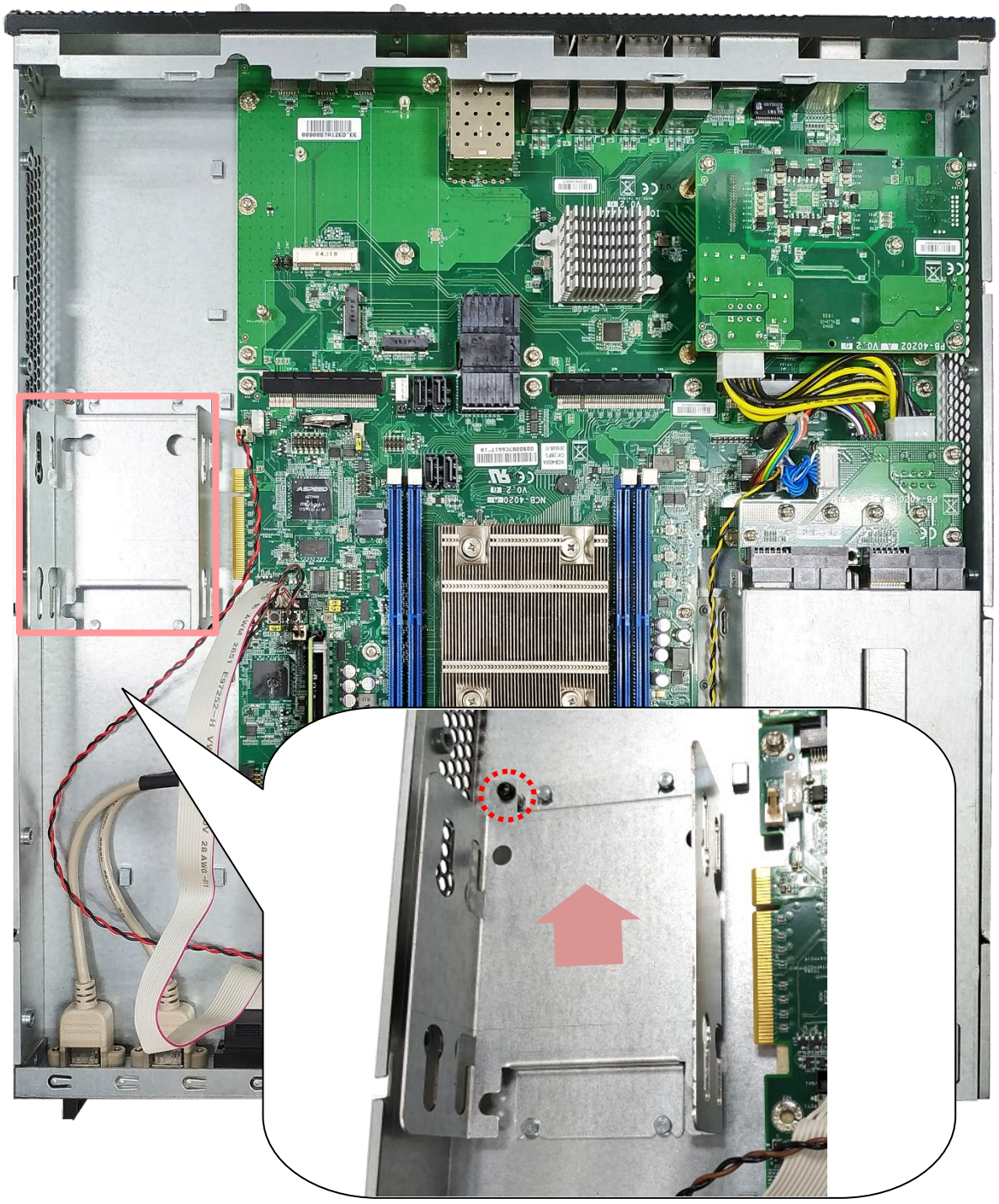
2. Insert the TPM module. It is important the PIN 1 marked on the connector is inserted into the corresponding pin hole in the module.



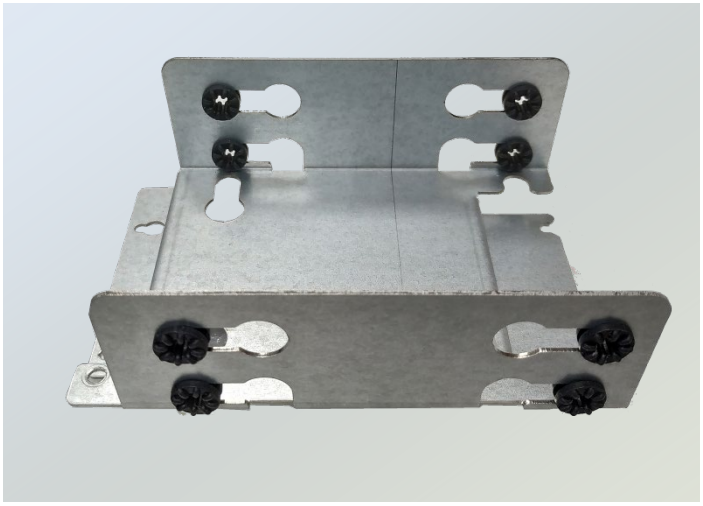
Installing the Hard Disk

This system supports two 2.5" HDD/SSD with a disk tray.

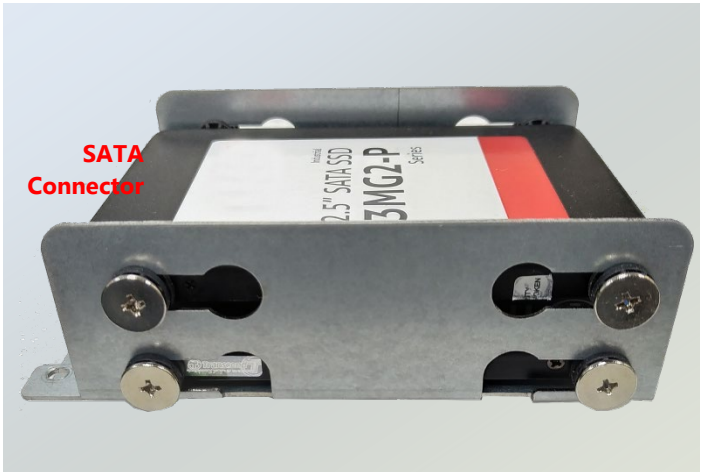
1. The disk tray is already secured on the bottom panel. Loosen the screw that secures it and slide the tray in the direction shown in the picture to remove it.



2. Insert the rubber washers into the notches of the tray, and slide them to the position shown in the picture.

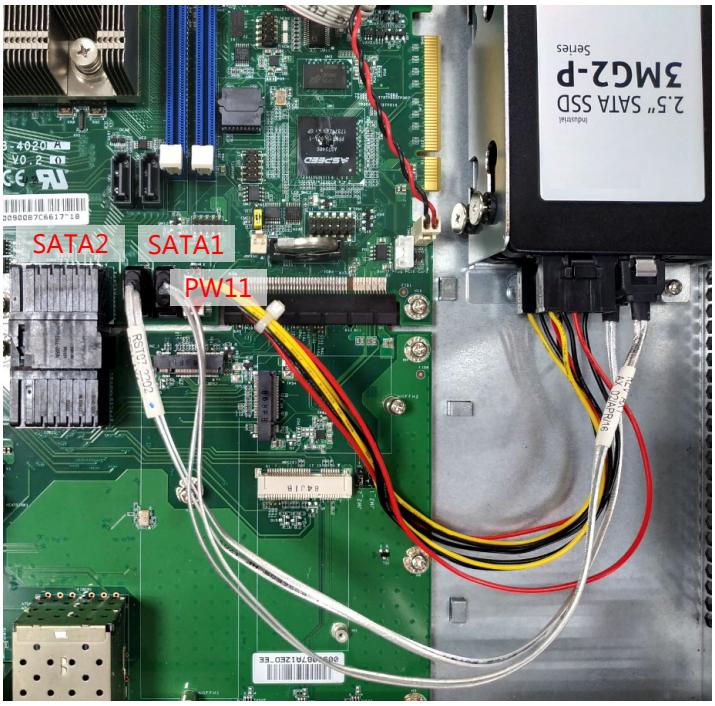


3. Mount the disk onto the tray and secure it with the provided disk screws. Make sure the **SATA connector** faces the direction shown in the picture.



4. Secure the tray on the bottom panel with the provided screw.

5. Connect the hard disks to **SATA1** port and **SATA2** port with the two provided SATA data cables. Since these two disks shares the same power source from **PW11** port, connect them to the **PW11** port using the provided SATA power cable. Arrange the cables and route them neatly to avoid them from getting tangled.



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.

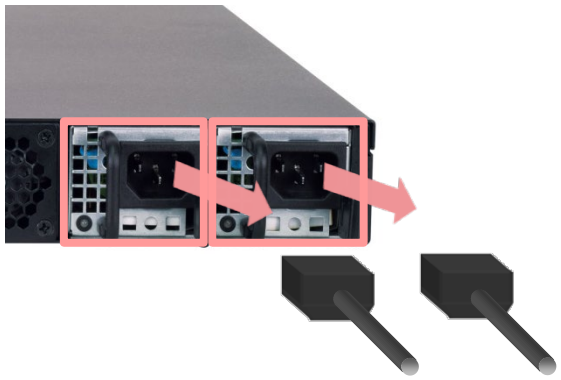
2. Take out the worn fan and replace it with a new one.

Installing the AC Power Supply

Power supply units wear down eventually. Please be noted that this system supports only 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.

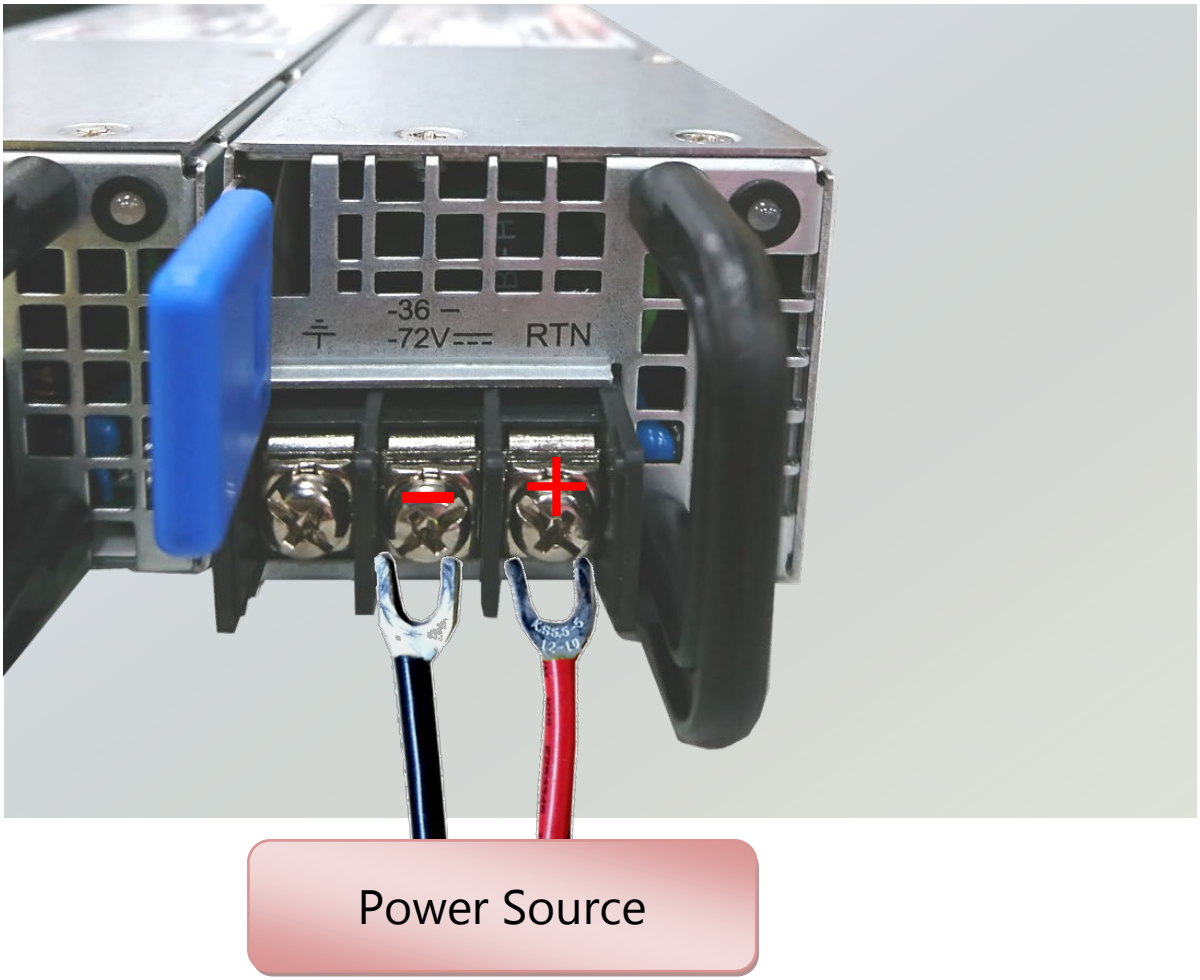
2. Pull the original unit out and replace it with the new one.



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, 22-11A** minimum (each), Tma = **40 degrees C**, and the altitude of operation = **5000m**.
- The cable should be **12AWG** (**22A** minimum, **72V** minimum).

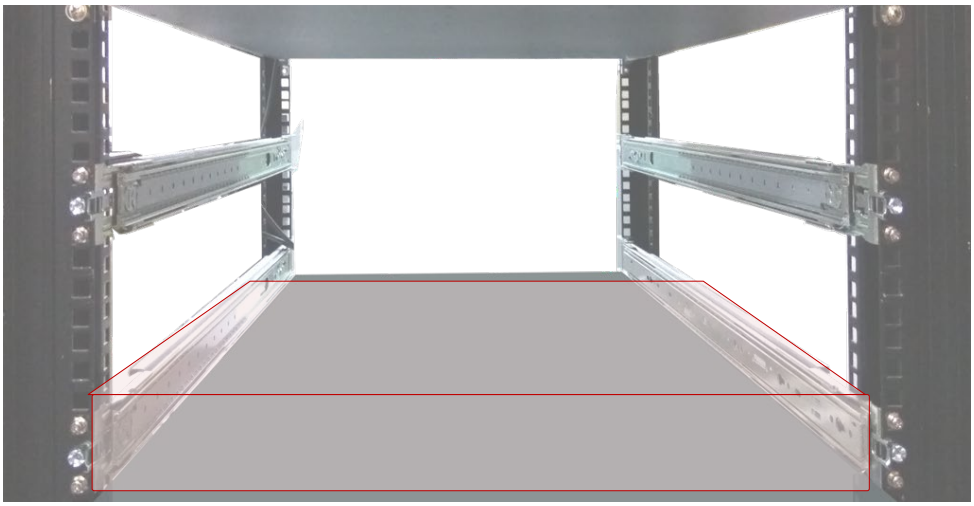
If you need further assistance with purchasing the power source, please contact Lanner Electronics Inc. for further information.

Mounting the System

There are two methods for installing this system into a rack:

- With **Mounting Ear Brackets** only

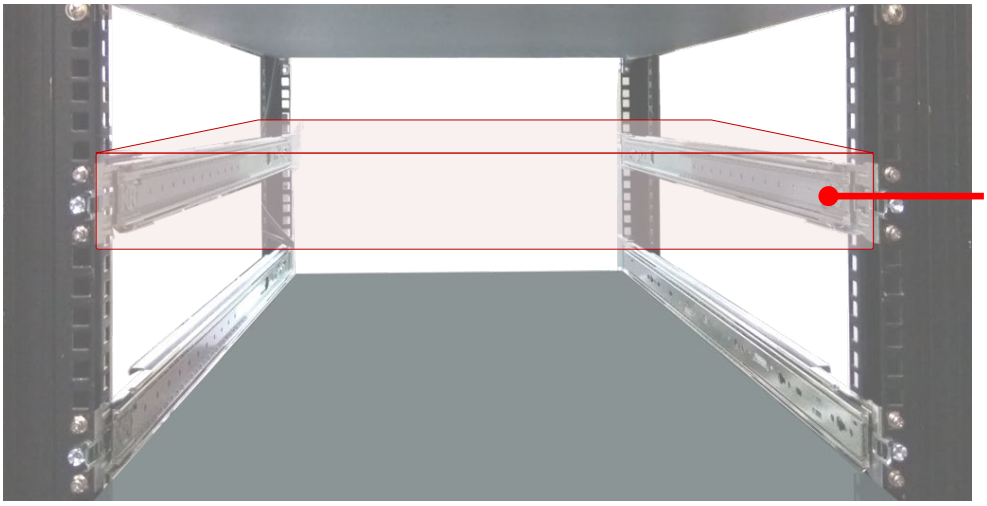
This method is quick and easy by fixing this system to the front posts of the rack, but it also makes servicing the system more difficult. Please note that the use of these brackets must go with a rack shelf or slide rails to prevent the chassis from falling over, for the bracket assembly alone cannot provide sufficient support to the chassis.



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.

- With **Slide Rail Kit + Mounting Ear Brackets**

This method is rather complicated, but the slidable rails allow you to access the system easily while securing it in the rack solidly.



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

Installing the System Using Mounting Ear Brackets Only

1. Check the accessory pack for the following items:

- 1x Screw Pack

- 2x Ear Brackets

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

3. Repeat Step 2 to attach the bracket to the other side of the chassis.

4. Install the chassis into the rack with the brackets fixed onto the posts using the provided screws. The actual approach you adopt and the needed parts for assembly will depend on the supporting accessory (shelf or rail kit) you use.

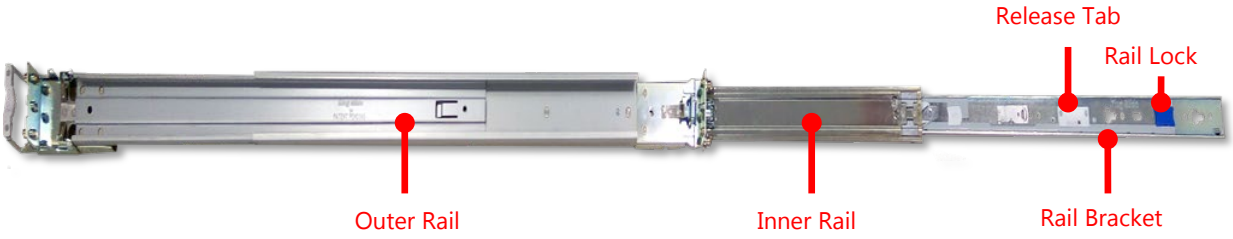
.

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

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

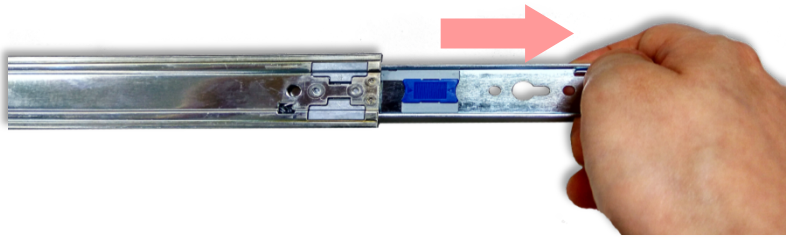
   - 1x pack of M4X4L screws (for securing the Rail Brackets on the system)
   - 1x pack of 7.1 Round Hole screws (for securing the system on the rail posts)
   - 2x Slide Rails

A rail consists of the following parts:

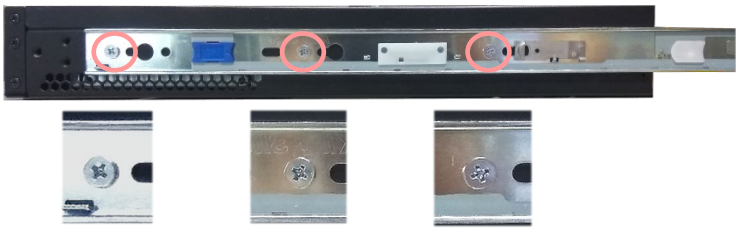


2. Unpack a slide rail and slide the Inner Rail all the way to the end.

3. Stretch the bracket to the fullest.
4. Remove the bracket from the Inner Rail by pushing the Release Tab on the bracket outwards while sliding it out.



5. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided M4X4L screws.



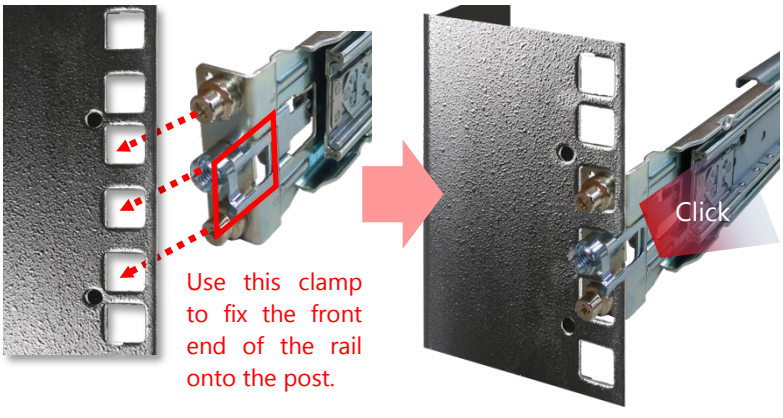
Align the screws with the holes indicated on the brackets and the screw holes on the side of the chassis.

6. Repeat Steps 2~5 to attach the bracket to the other side of the chassis.

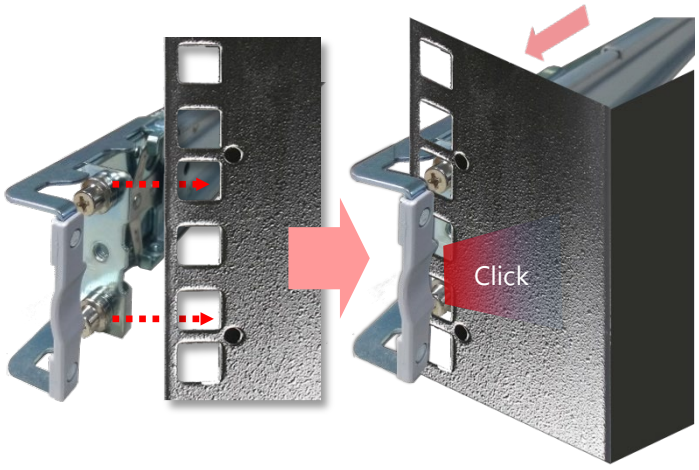
7. Follow the instructions in Installing the System Using Mounting Ear Brackets Only to attach the Mounting Ear Brackets.

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

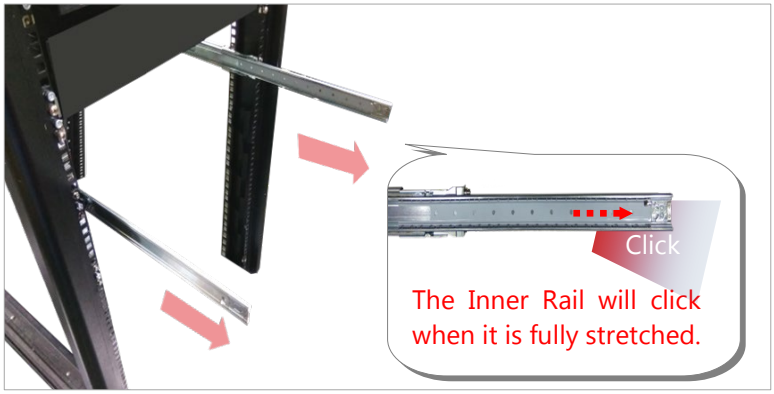
8. This slide-rail kit does NOT require screw-fixing. Simply aim at three available screw holes on the rack front and snap the rail front into the rack post as shown in the image. You should hear a "click" sound once it is firmly attached.



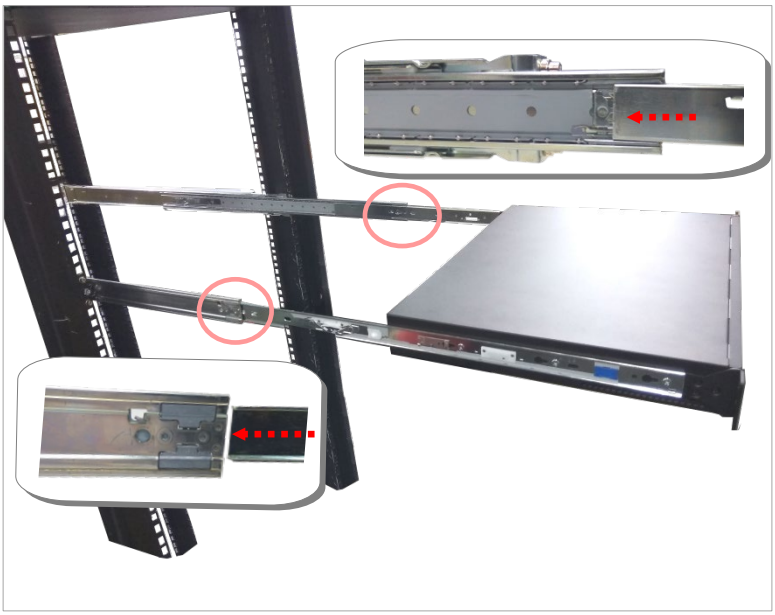
9. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the two available holes on the post, and the rail assembly will click into place.



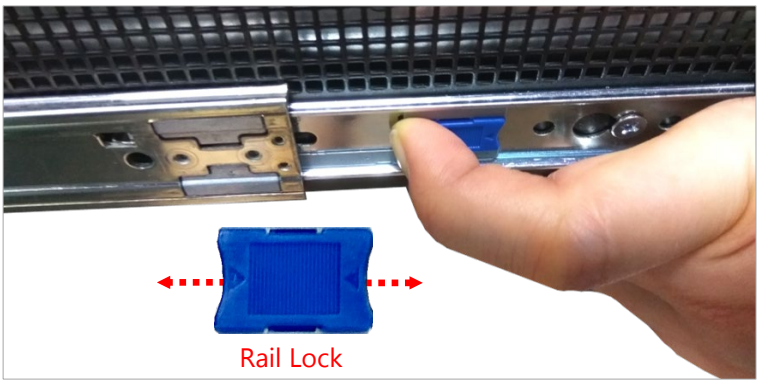
10. Stretch both of the Inner Rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



11. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the system while aligning them with the Inner Rails as shown in the image, and then push the system into the cabinet.

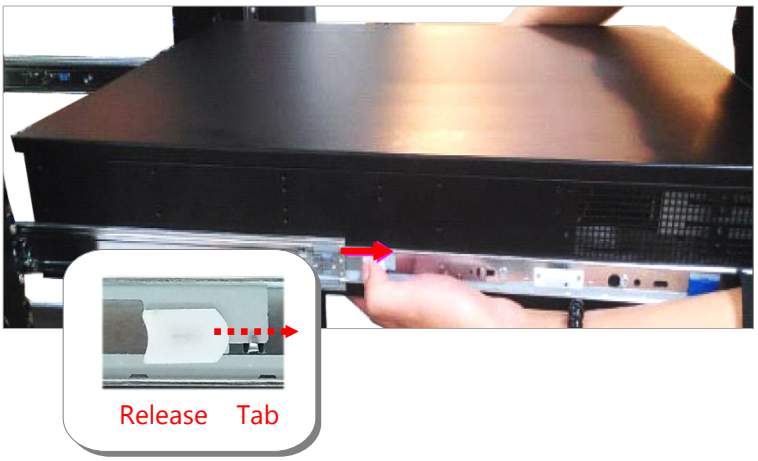


12. While pushing in the system, also push and hold the Rail Lock tab on both brackets.



Push the system all the way in until it stops.

To remove the system from the rack, gently pull it outwards while pushing the Release Tab on both sides of the brackets.



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.

BMC Main Features

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

Fan Speed Control

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

Field Replaceable Unit (FRU)

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

System Event Log (SEL)

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

Serial over LAN (SOL)

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

User Management

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

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

Keyboard, Video, Mouse (KVM) Redirection

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

Virtual Media Redirection

- The BMC provides remote virtual CD, HD and FD redirection. CD image could be mounted directly in KVM window. 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.

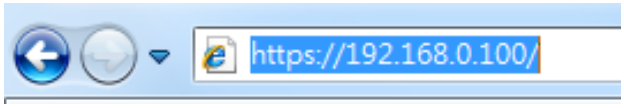
IPMI Commands Support List

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
FRU Device Commands		
Get FRU Inventory Area Info	Storage (0Ah)	10h
Read FRU Data	Storage (0Ah)	11h
Write FRU Data	Storage (0Ah)	12h
SDR Device Commands		
Get SDR Repository Info	Storage (0Ah)	20h
Get SDR Repository Allocation Info	Storage (0Ah)	21h
Get SDR	Storage (0Ah)	23h
Get SDR Repository Time	Storage (0Ah)	28h
SEL Device Commands		
Get SEL Info	Storage (0Ah)	40h
Get SEL Allocation Info	Storage (0Ah)	41h
Get SEL Entry	Storage (0Ah)	43h

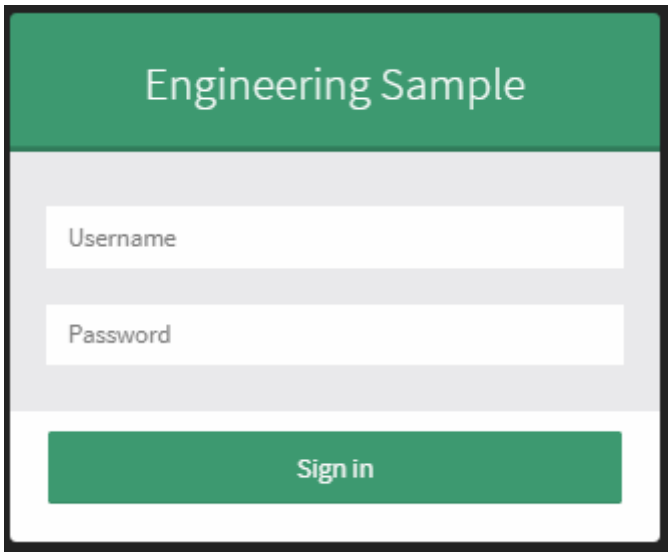
Delete SEL Entry	Storage (0Ah)	46h
Clear SEL	Storage (0Ah)	47h
Get SEL Time	Storage (0Ah)	48h
Set SEL Time	Storage (0Ah)	49h
Get SEL Time UTC Offset	Storage (0Ah)	5Ch
Set SEL Time UTC Offset	Storage (0Ah)	5Dh
LAN Device Commands		
Set LAN Configuration Parameters	Transport (0Ch)	01h
Get LAN Configuration Parameters	Transport (0Ch)	02h
Serial/Modem Device Commands		
Set User Callback Options	Transport (0Ch)	1Ah
Get User Callback Options	Transport (0Ch)	1Bh
SOL Activating	Transport (0Ch)	20h
Set SOL Configuration Parameters	Transport (0Ch)	21h
Get SOL Configuration Parameters	Transport (0Ch)	22h

Using BMC Web UI

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



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



Login Page

- **Username**: Enter your username in this field.
- **Password**: Enter your password in this field.
- **Sign me in**: After entering the required credentials, click the **Sign me in** to log in to Web UI.

Note

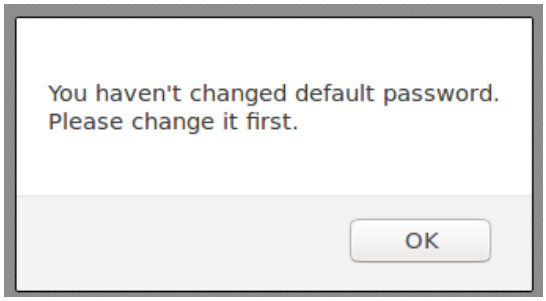
(1) If not specified, the default IP to access BMC is https://192.168.0.100.

(2) Please use **https** to access Web UI.

Default User Name and Password

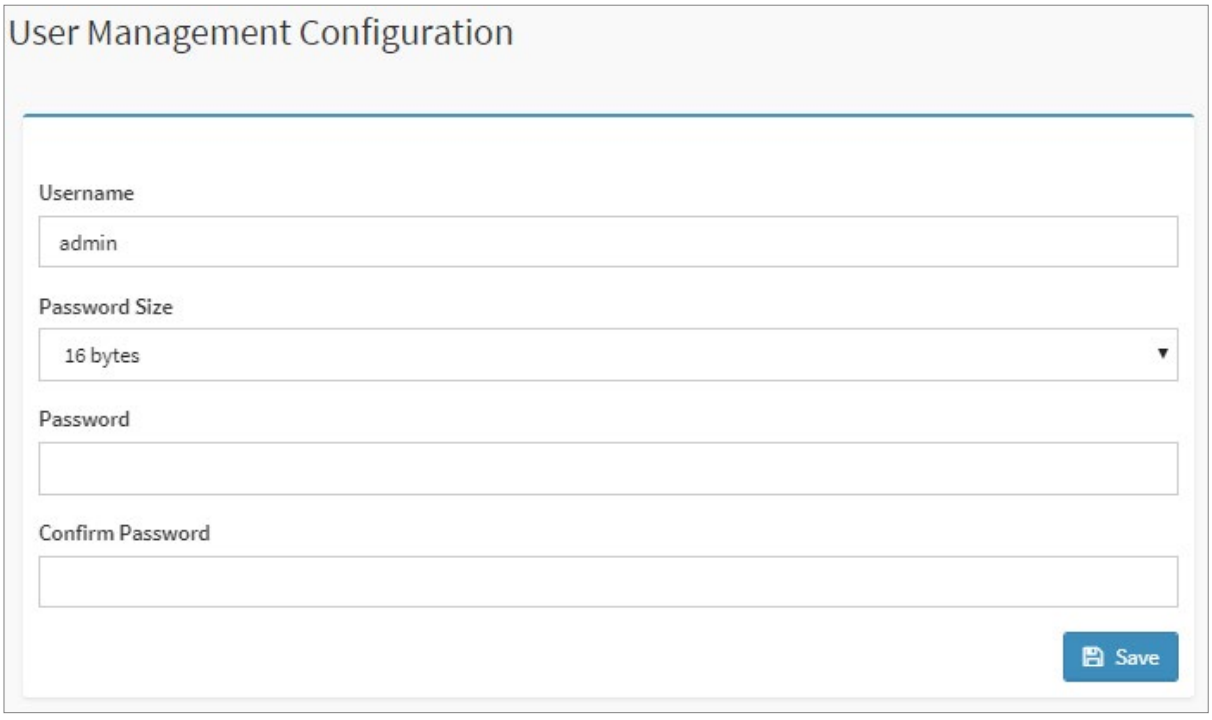
- **Username:** admin
- **Password**: admin

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.



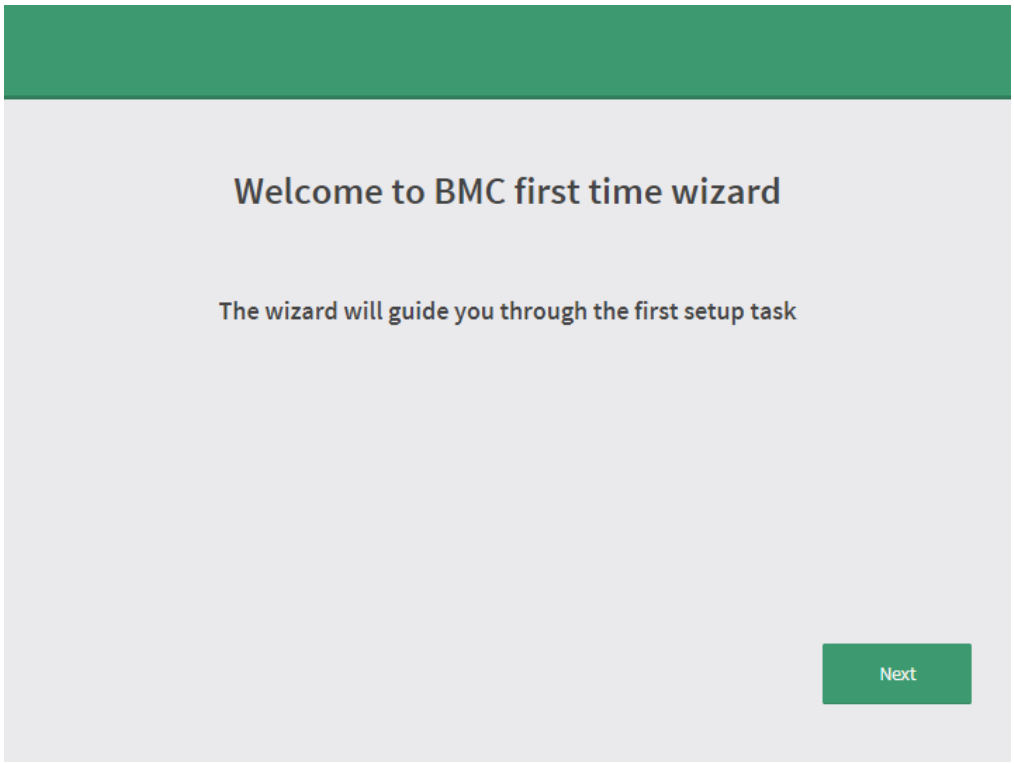
Change the default password – Set password

Note

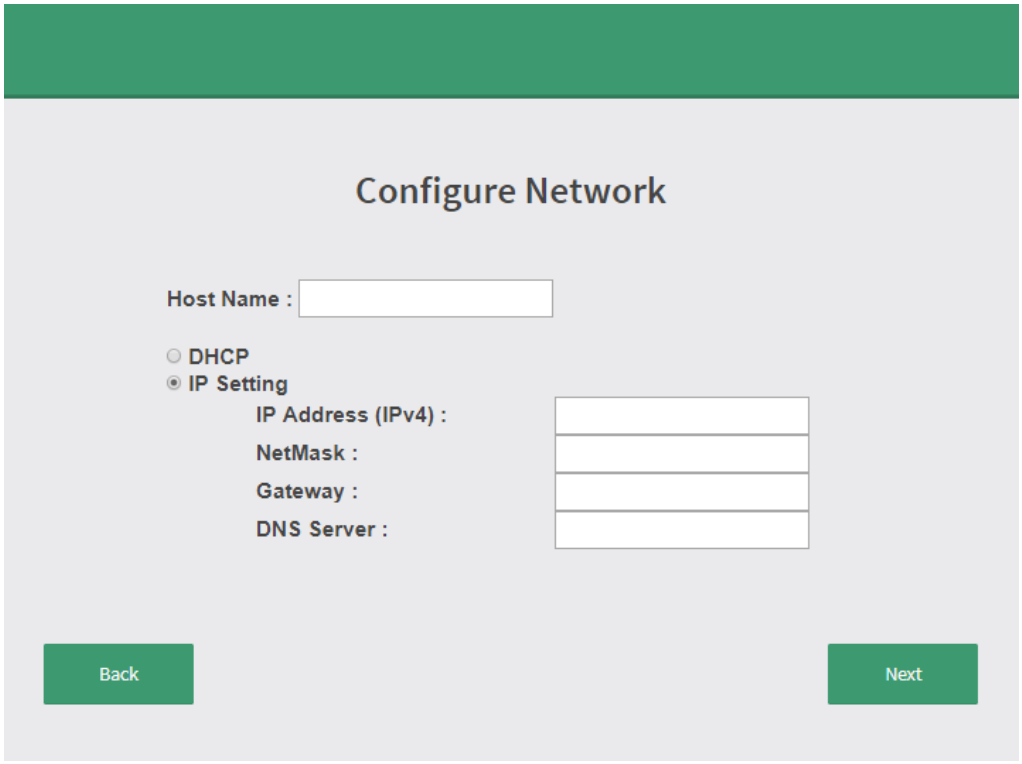
Duplicate usernames shouldn't exist across various authentication methods like LDAP, RADIUS or IPMI since the privilege of one Authentication method is overwritten by another authentication method during logging in, and hence the correct privilege cannot be returned properly.

First Time Wizard

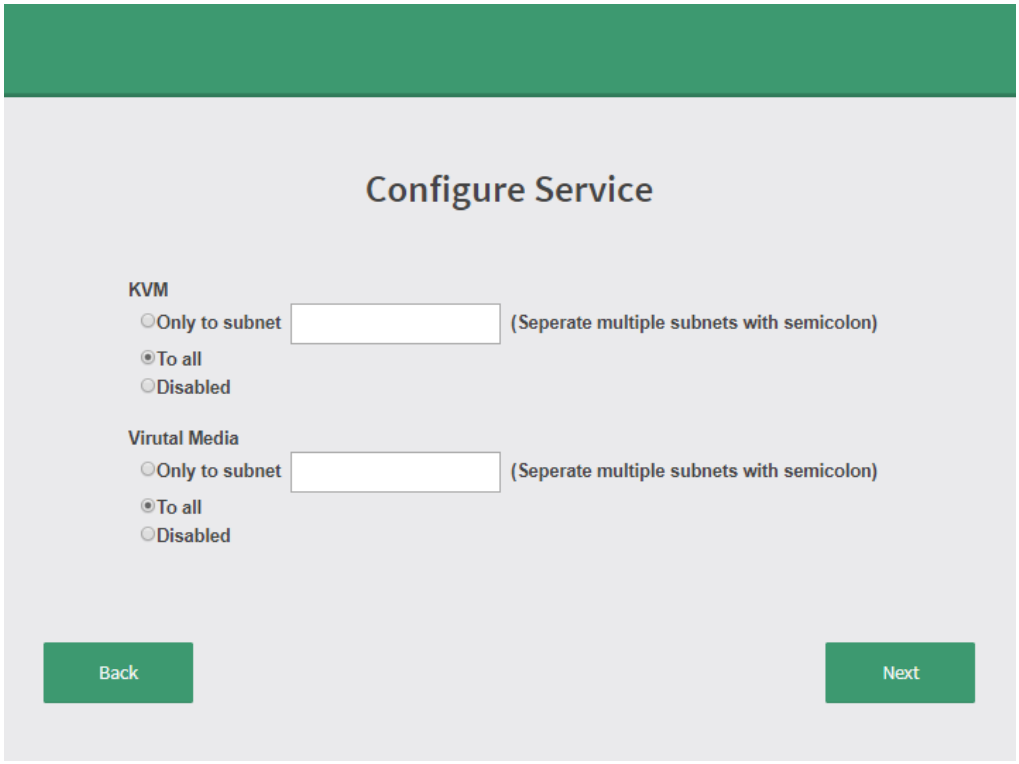
After the first time login, you will see first time wizard welcome page as the following picture. Please press the "Next" button and configure your BMC step by step.



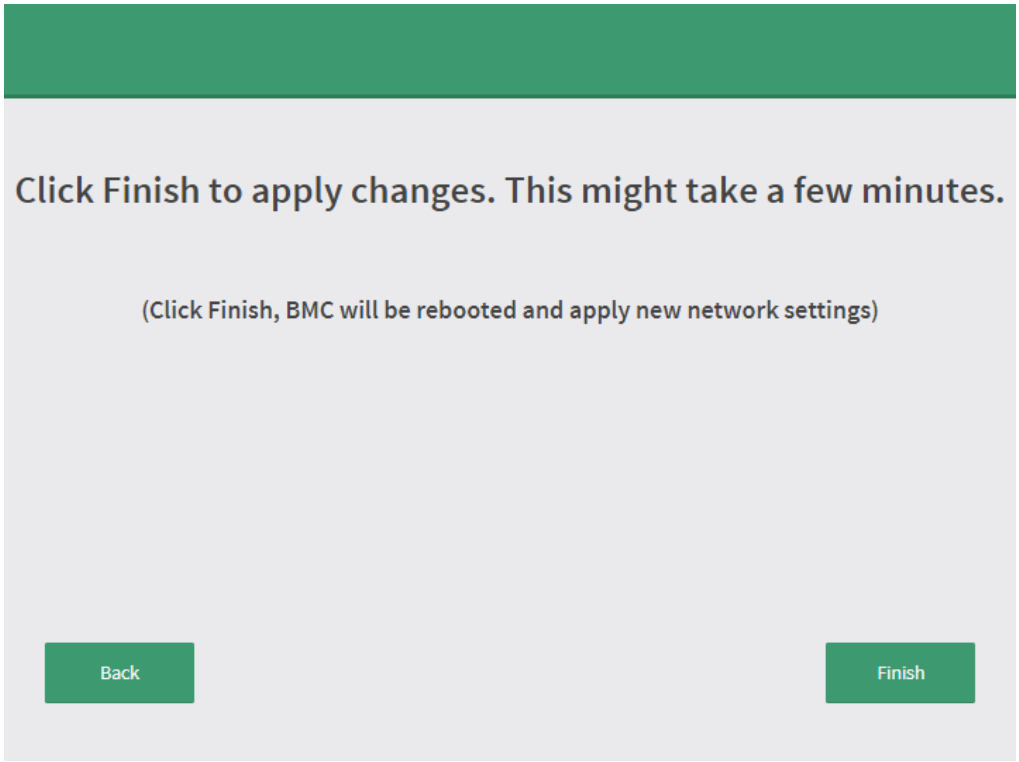
In the "Configure Network" page, you could specify the hostname and network settings of BMC.



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 WebUI after a few minutes.



Web UI Layout

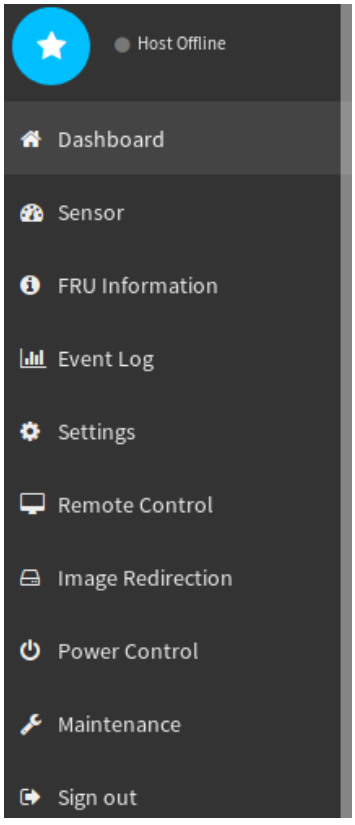
The BMC Web UI consists of various menu items:

Menu Bar

The menu bar displays the following:

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

A screenshot of the menu bar is shown below:



Menu Bar

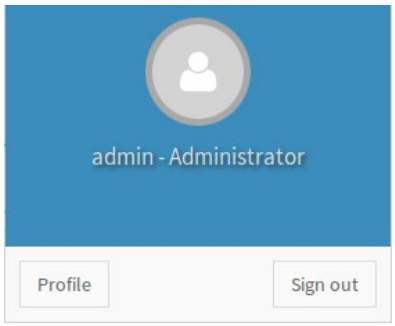
Quick Button and Logged-in User

The user information and quick buttons are located at the top right of the Web UI.

User Information

Logged-in user information: Click the icon admin to view the logged-in user information.

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



Logged-in User Information

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

- **Notification**: Click the icon to view the notification messages.
- **Refresh**: Click the icon Refresh to reload the current page.
- **Sign out**: Click the icon Sign out to log out of the Web UI.

Logged-in user and its privilege level

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

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

Help

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

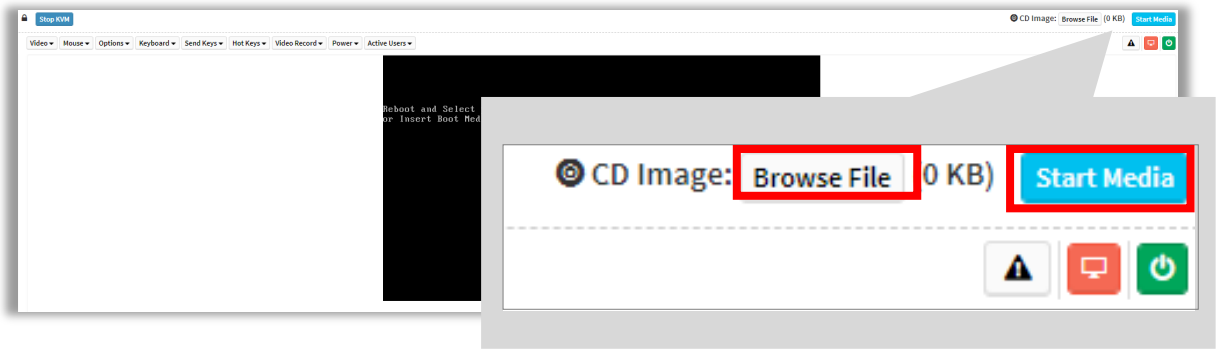
Installing Operating System

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

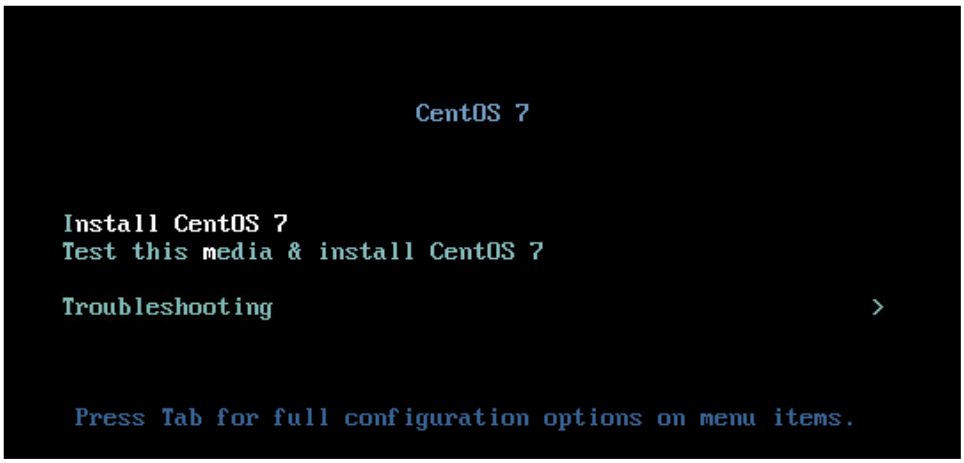
Via IPMI Interface

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 Remote Server Management for instructions on how to access the target system through Web UI).
4. After entering the main screen, click "**Launch KVM**" to open the Remote Control KVM page:

5. Click "**Browse File**" to select **CD Image**.



6. Click "**Start Media**" to redirect the selected CD image file to the Host.
7. 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.

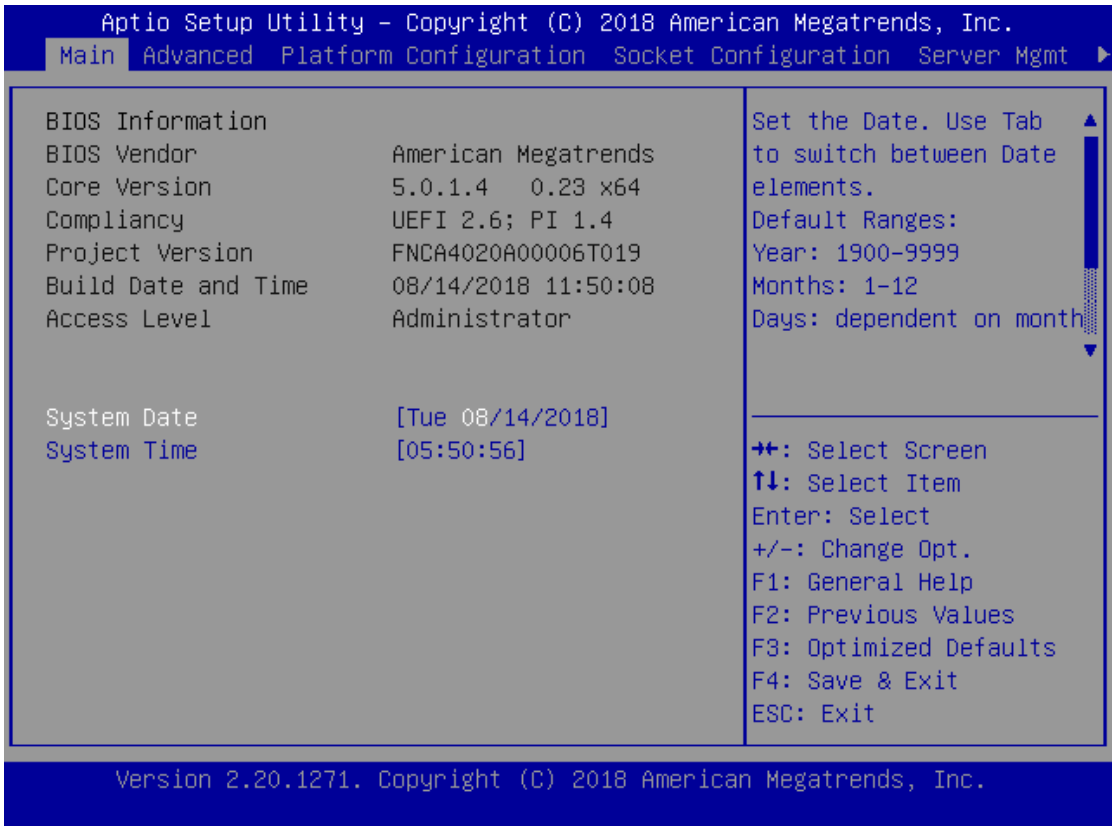
Main Page

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

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

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

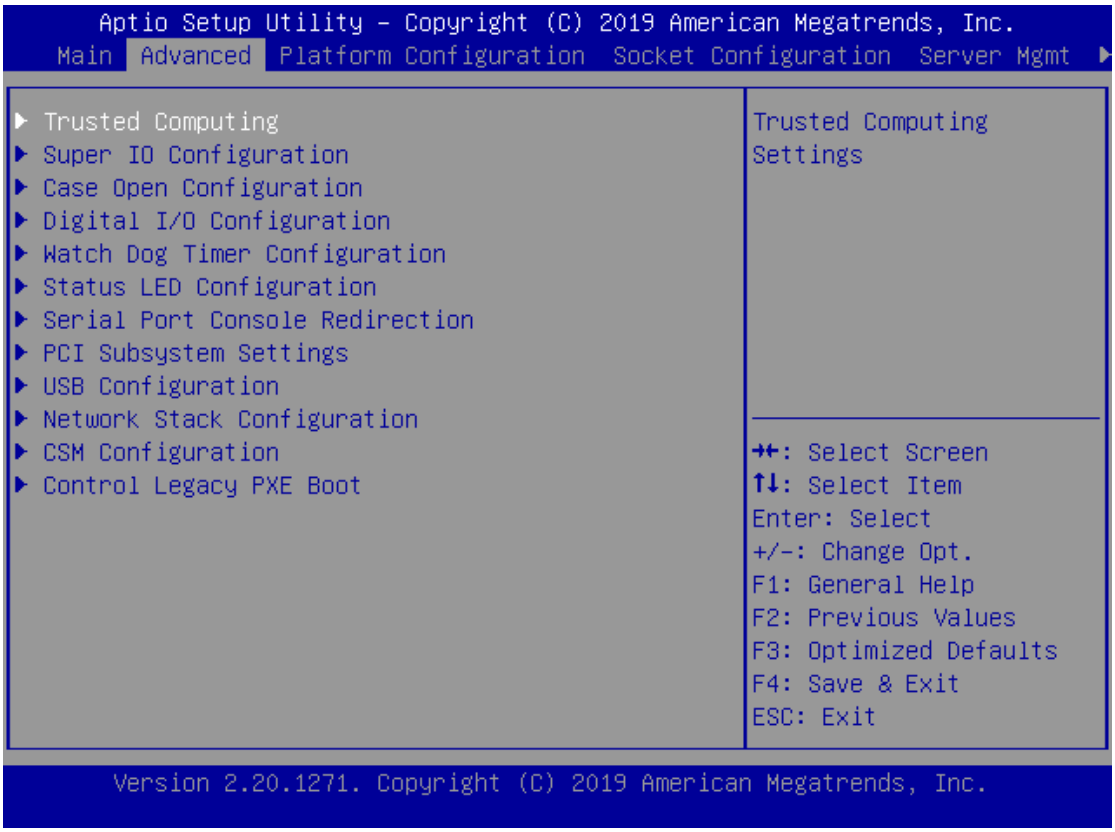
Setup main page contains BIOS information and project version information.



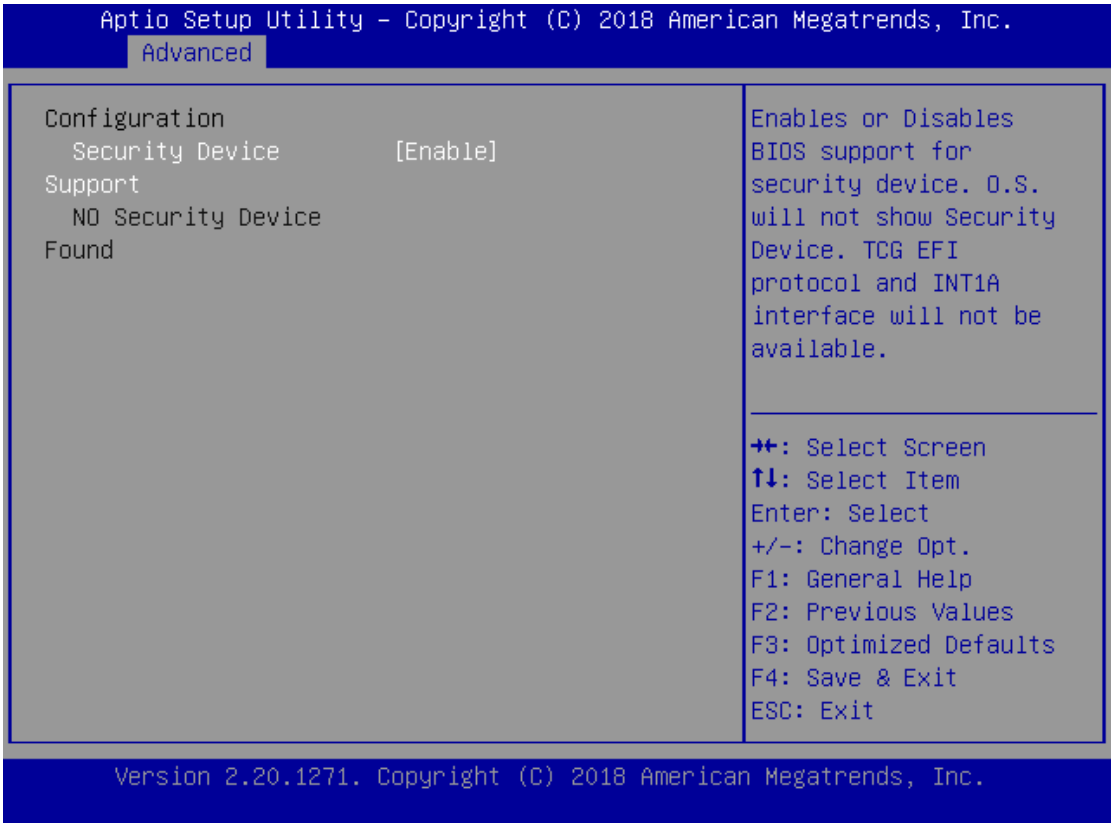
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<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.

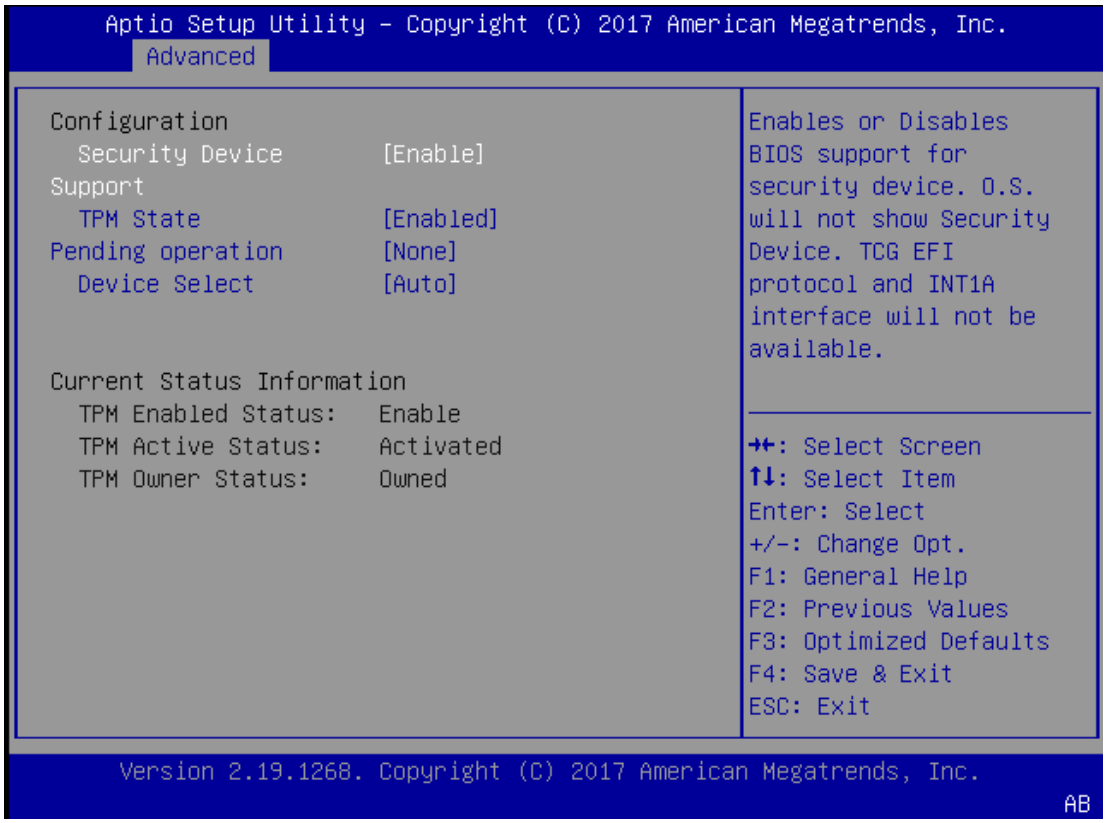


Trusted Computing



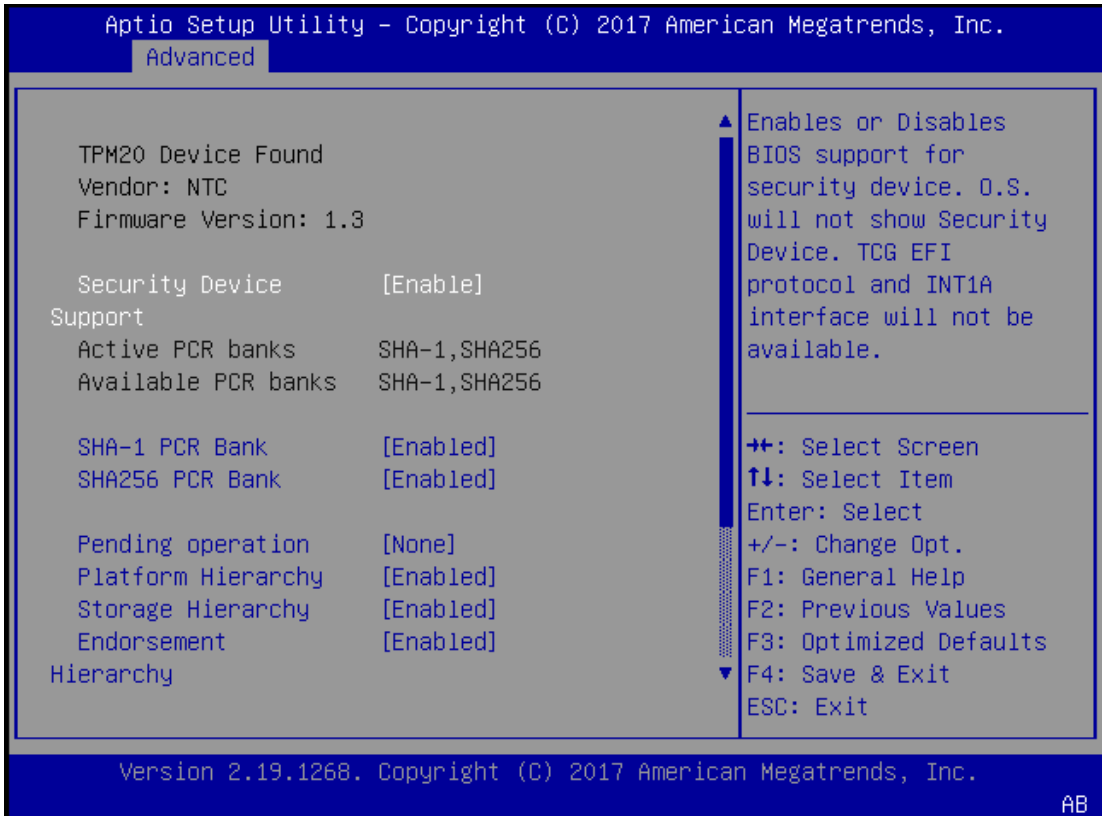
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

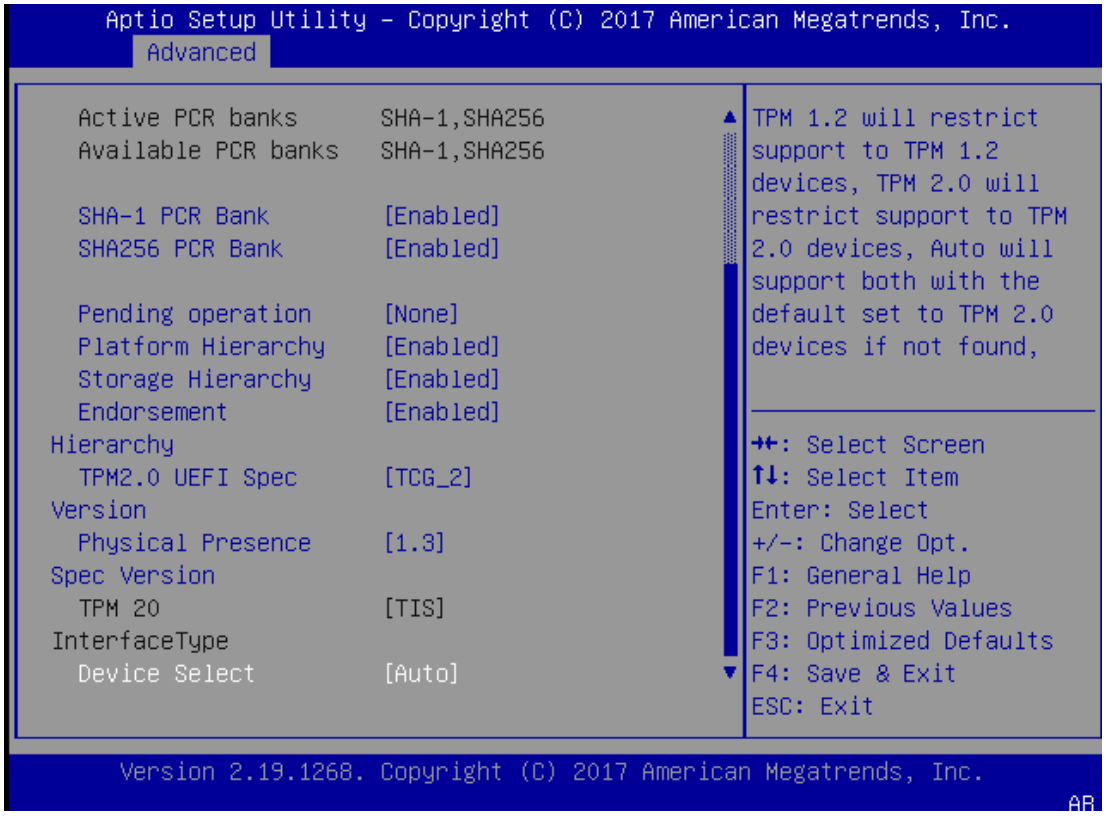
Trusted Computing (TPM1.2)



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 the Device.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

Trusted Computing (TPM2.0)

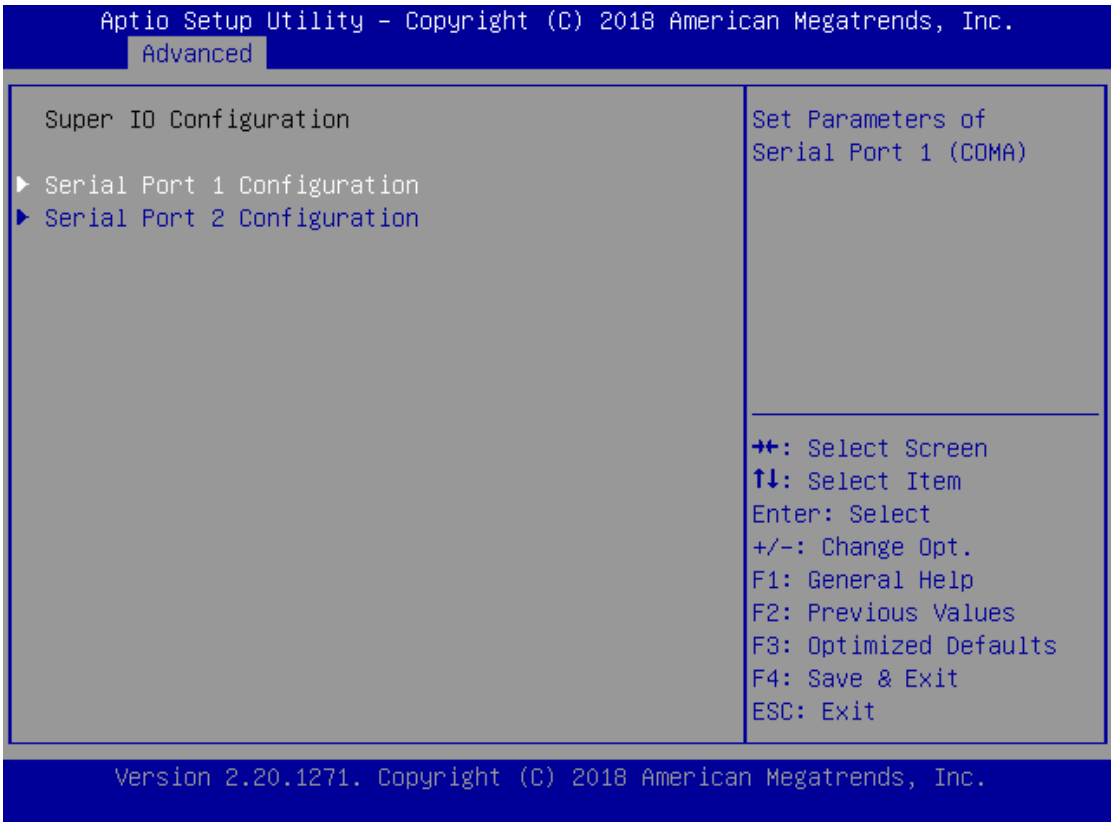




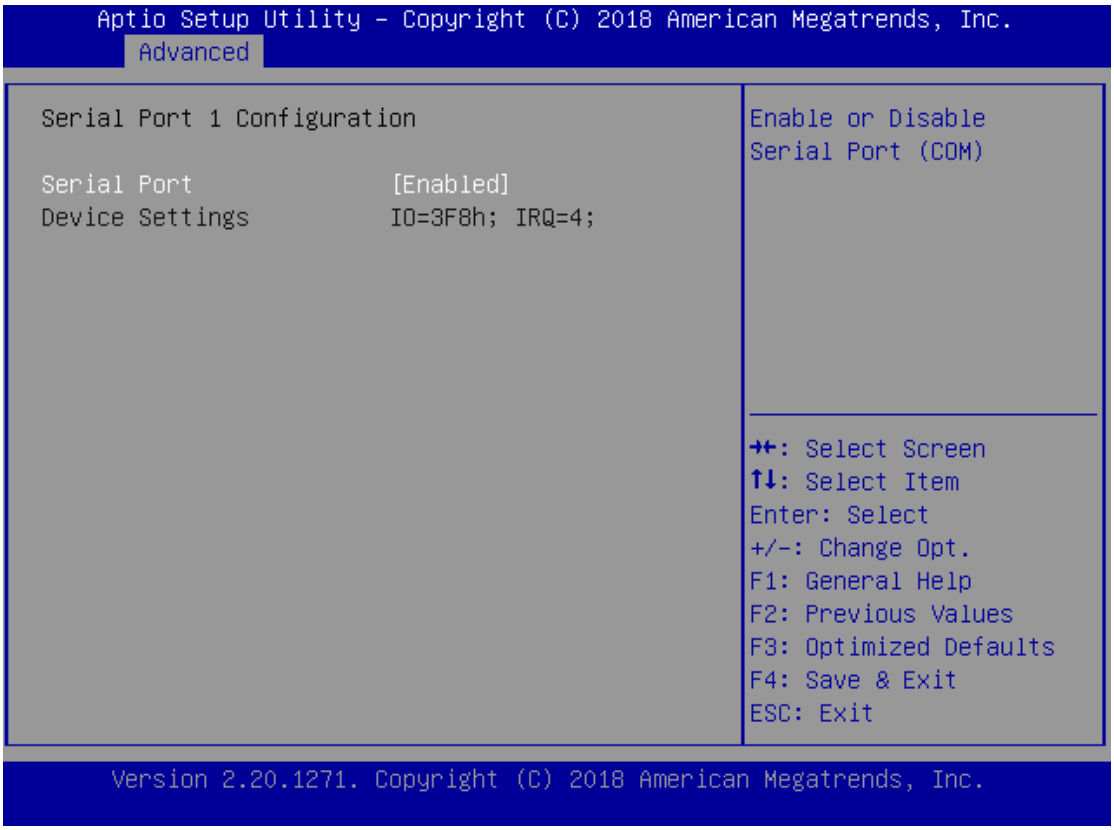
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security

		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 the Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, **TCG_1_2**: Supports the Compatible mode for Win8/Win10 **TCG_2**: Supports new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3.  Note Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select **TPM 20 Device** for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

Super IO Configuration

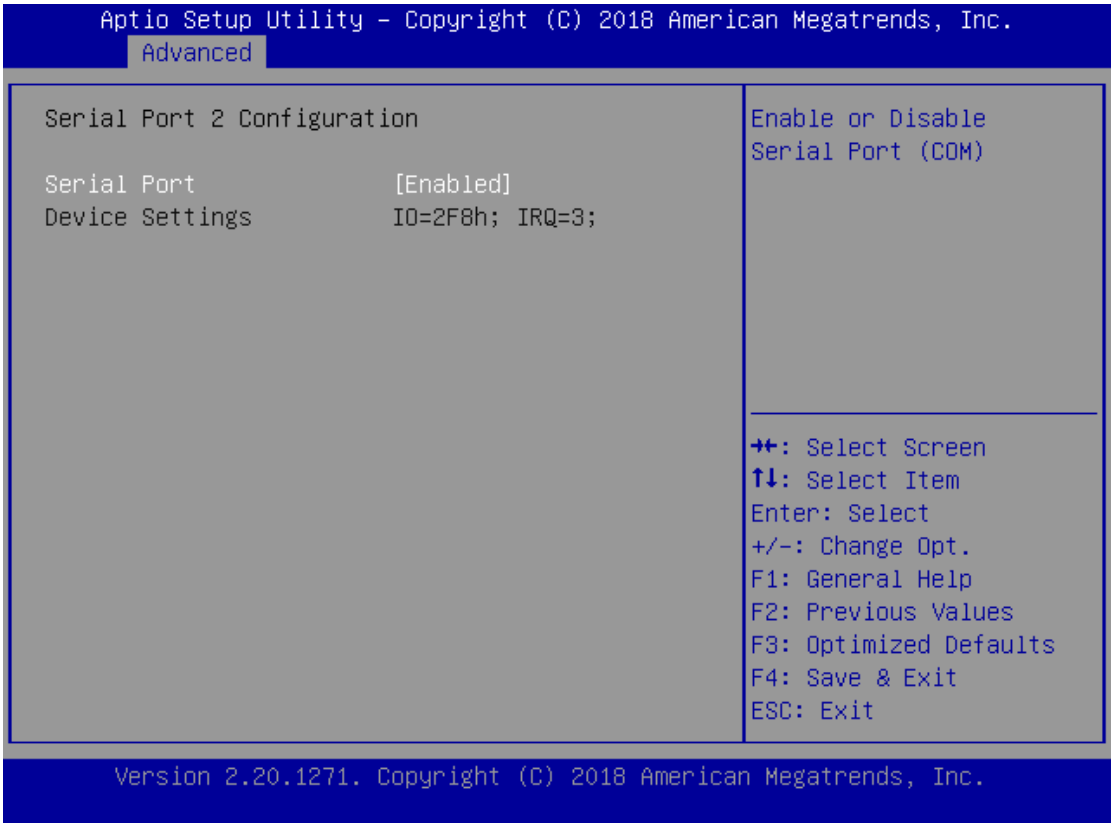


Serial port 1 Configuration



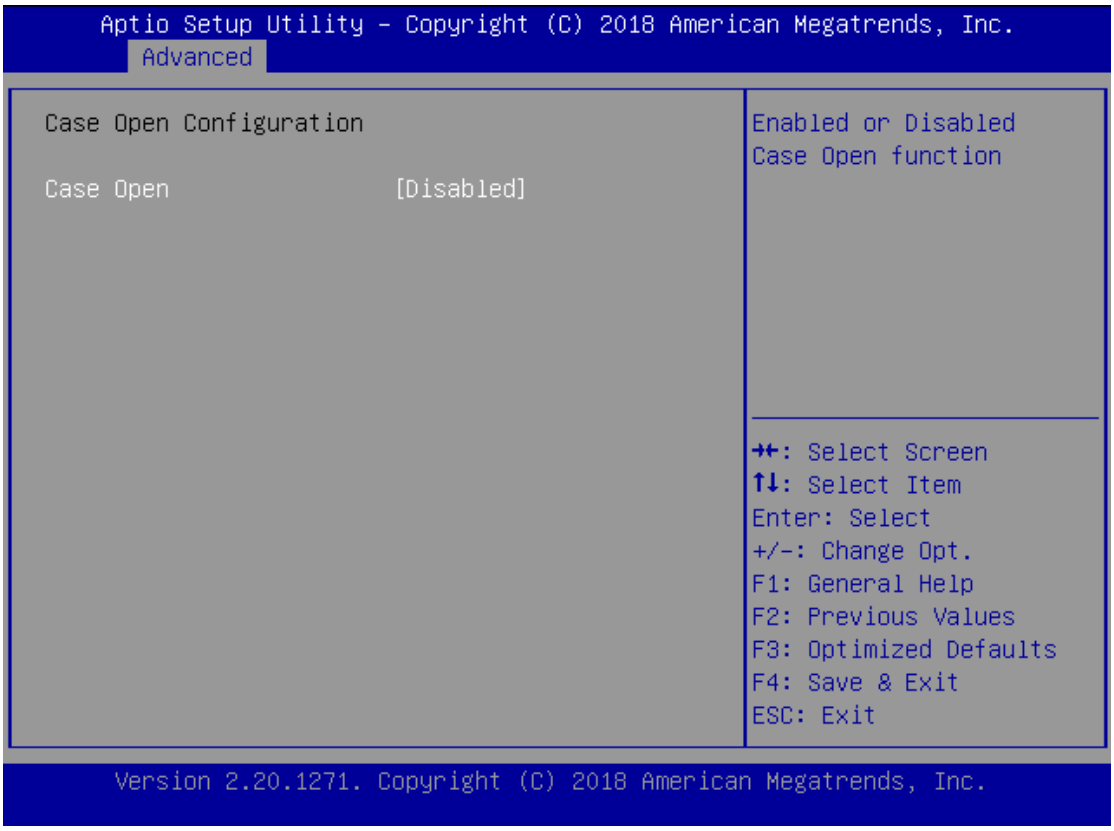
Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=3F8h; IRQ = 4

Serial port 2 Configuration



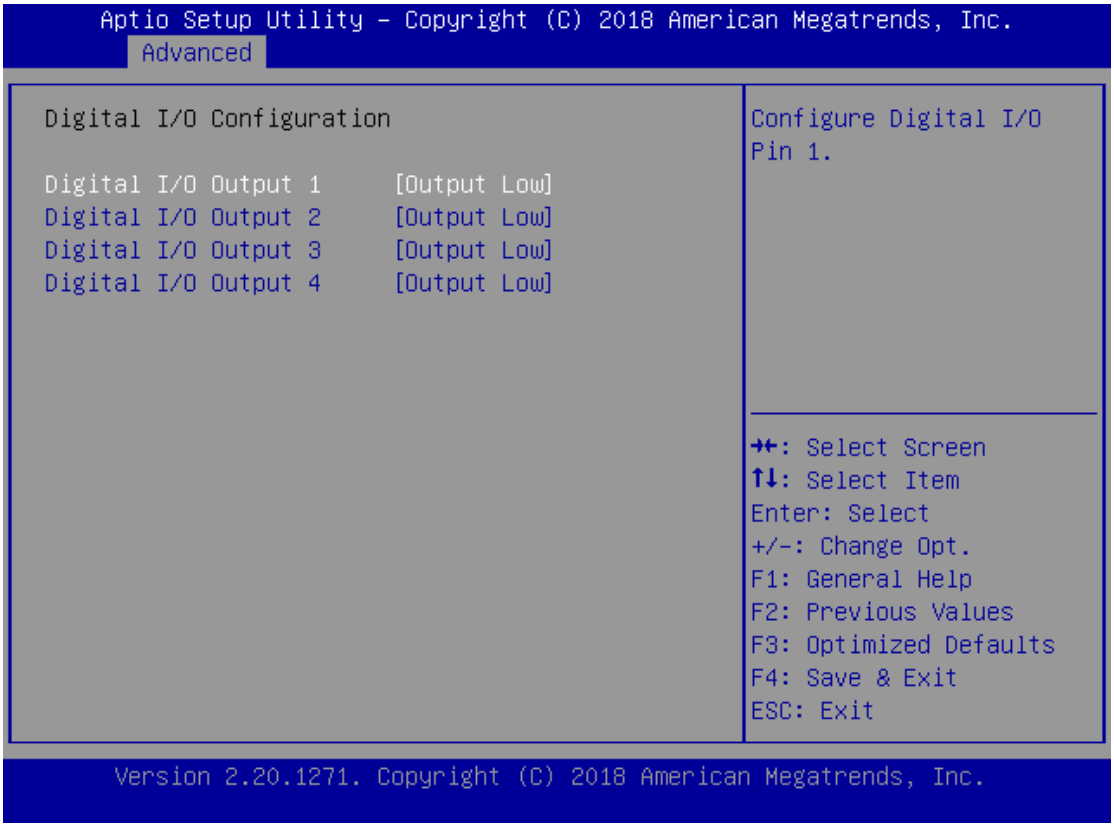
Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=2F8h; IRQ = 3

Case Open Configuration



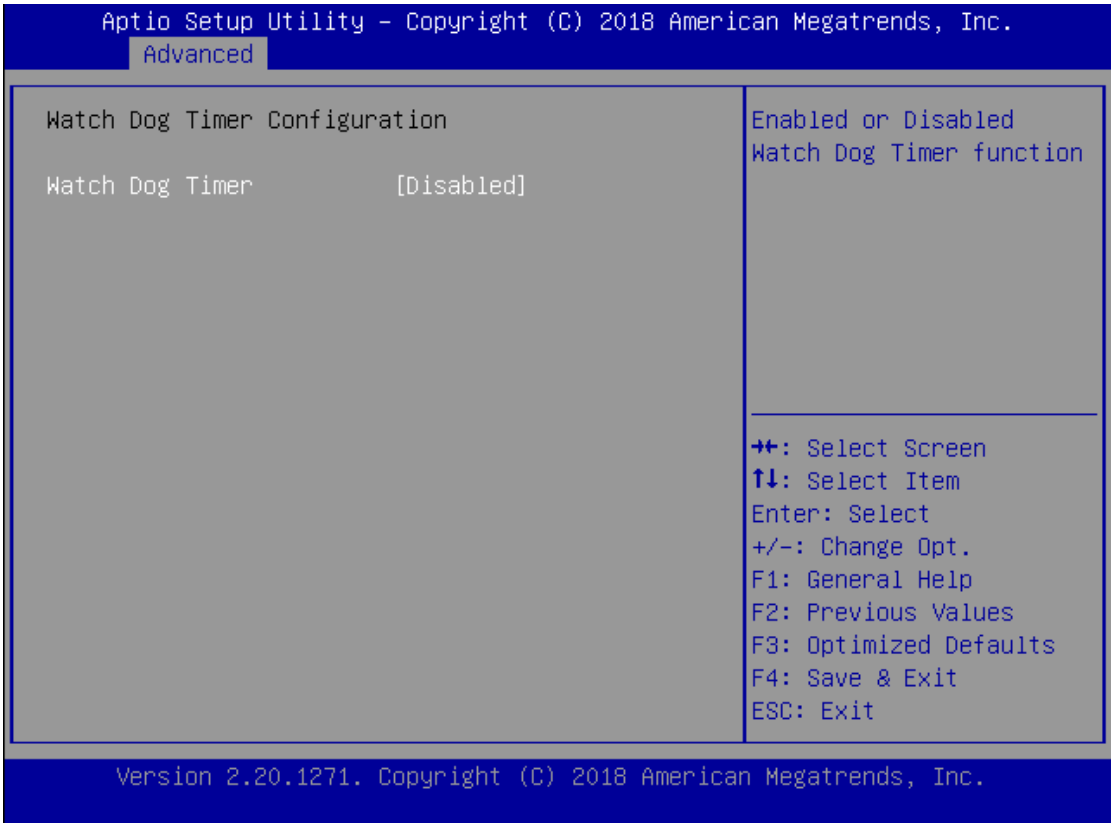
Feature	Options	Description
Case Open	Enabled Disabled	Enables or disables Case Open function

Digital I/O Configuration



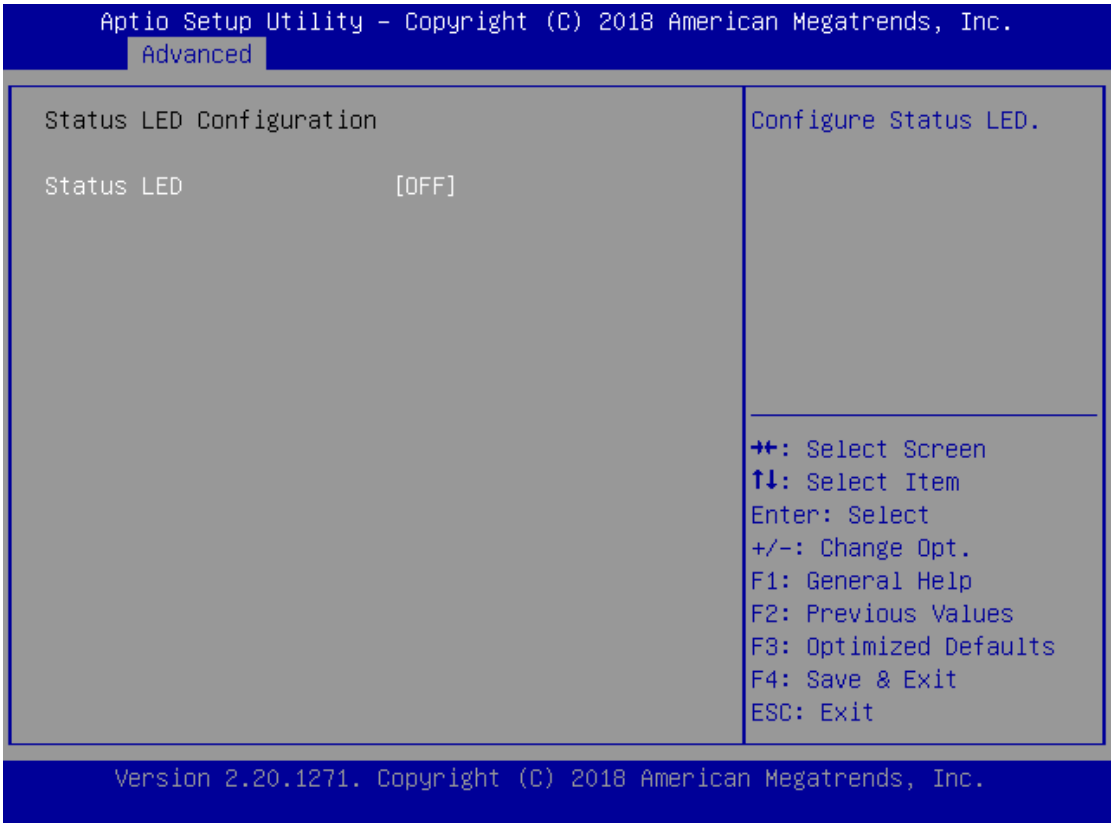
Feature	Options	Description
Digital I/O Output 1	Output Low Output High	Configure Digital I/O Pin1
Digital I/O Output 2	Output Low Output High	Configure Digital I/O Pin3
Digital I/O Output 3	Output Low Output High	Configure Digital I/O Pin5
Digital I/O Output 4	Output Low Output High	Configure Digital I/O Pin7

Watch Dog Timer Configuration



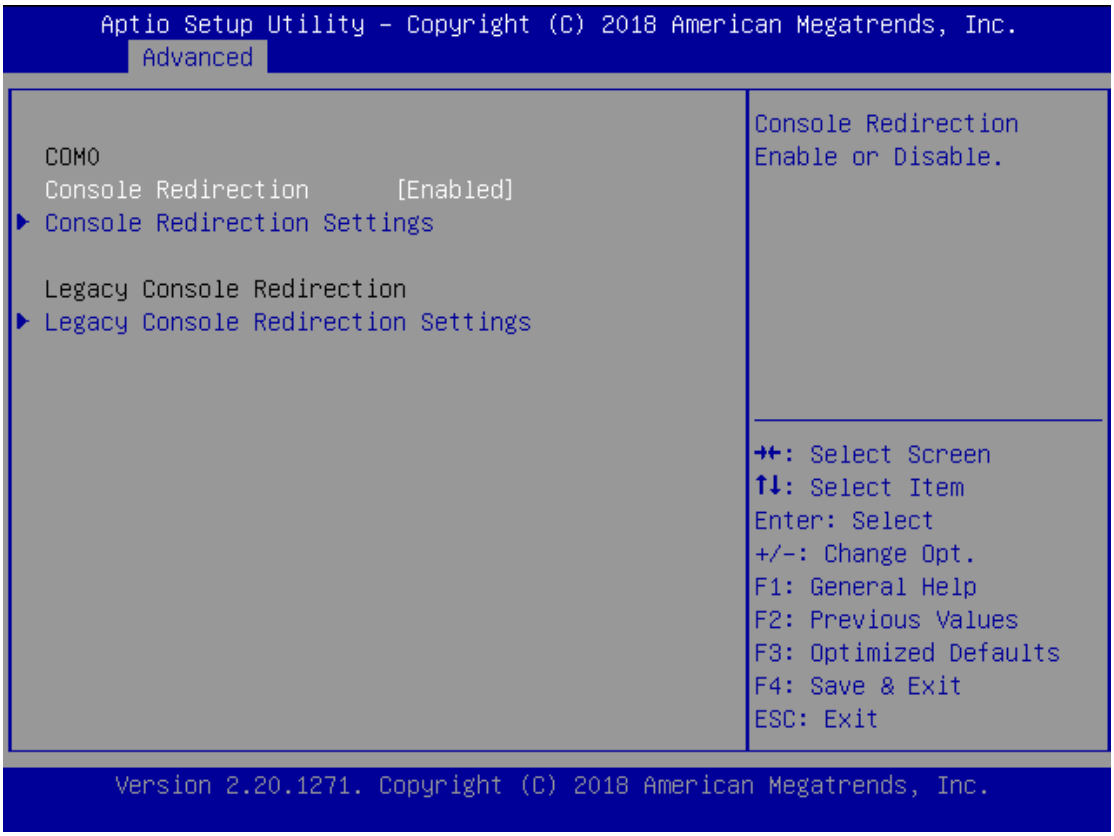
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Status LED Configuration



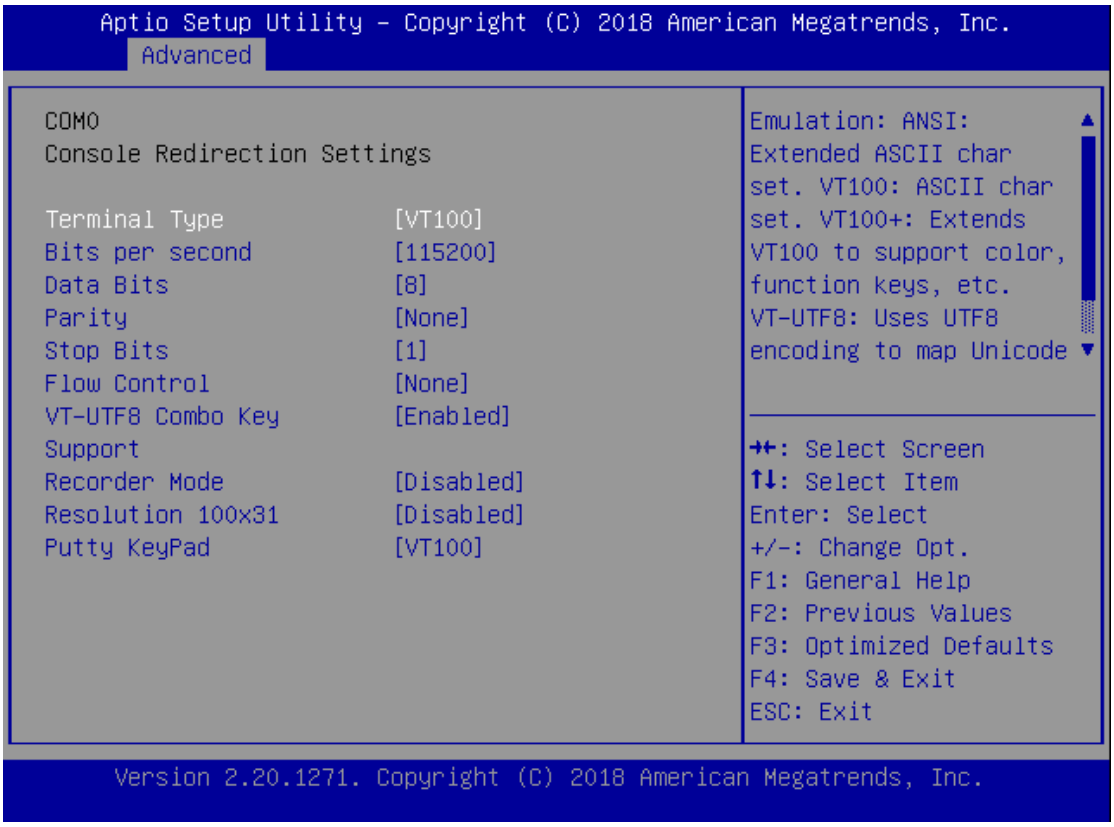
Feature	Options	Description
Status LED	OFF GREEN RED	Configures Status LED color

Serial Port Console Redirection



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

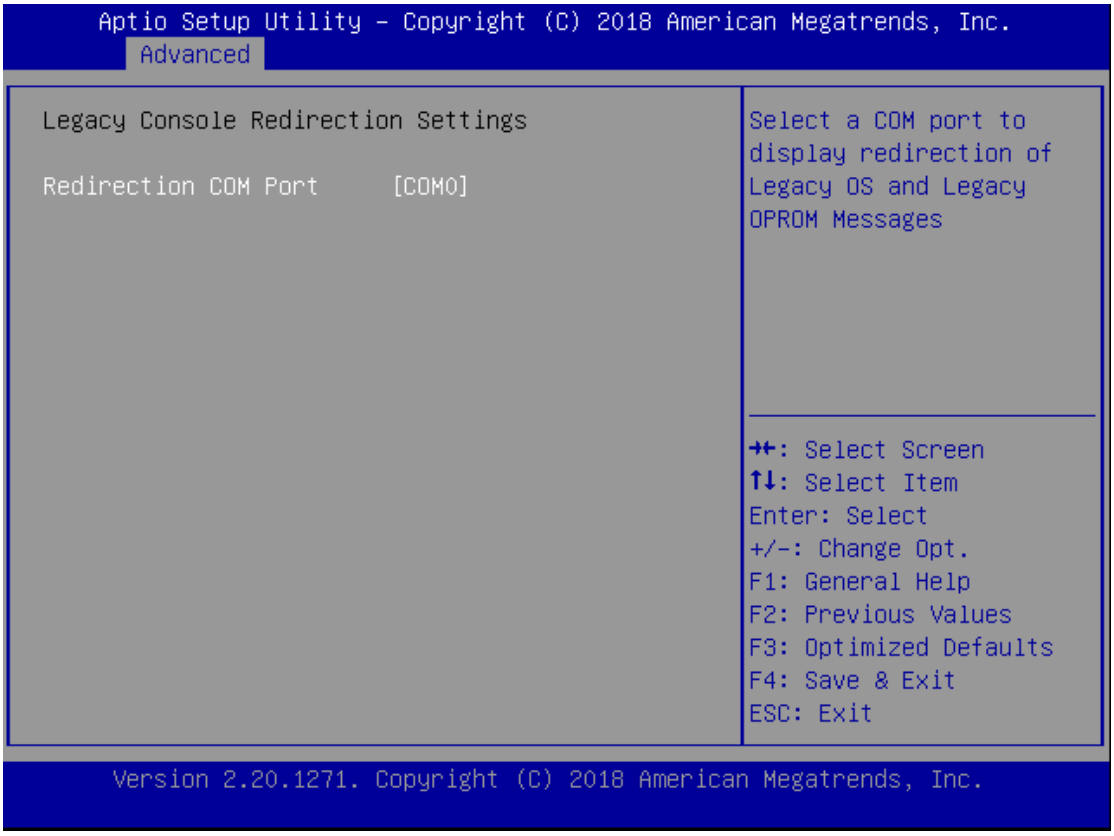
Console Redirection Settings



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.

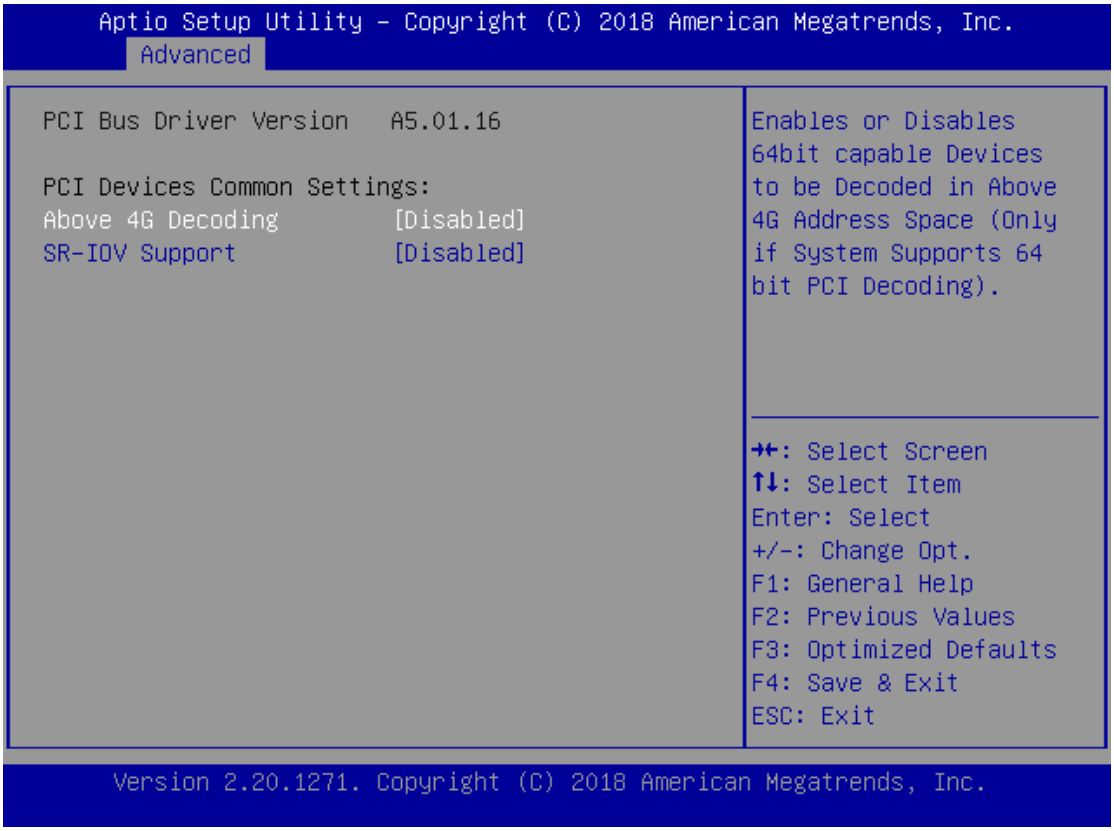
	RTS/CTS	
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal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

Legacy Console Redirection Settings



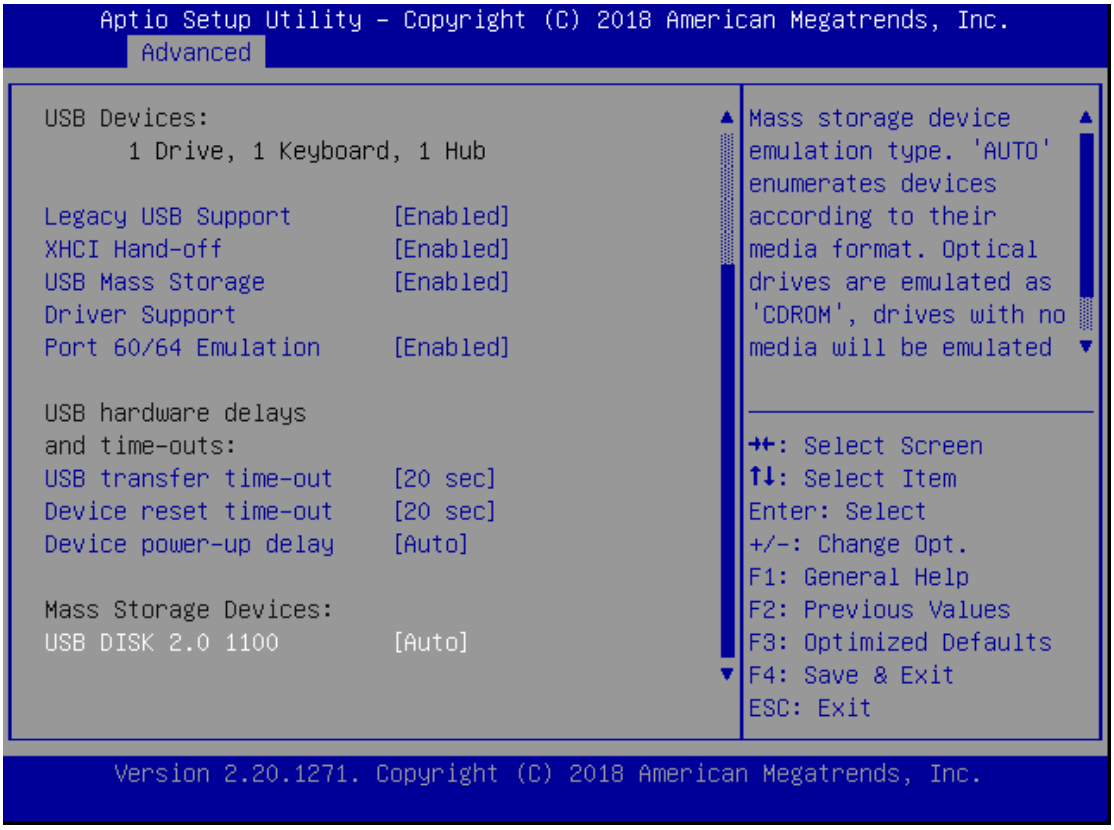
Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

PCI Subsystem Settings



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

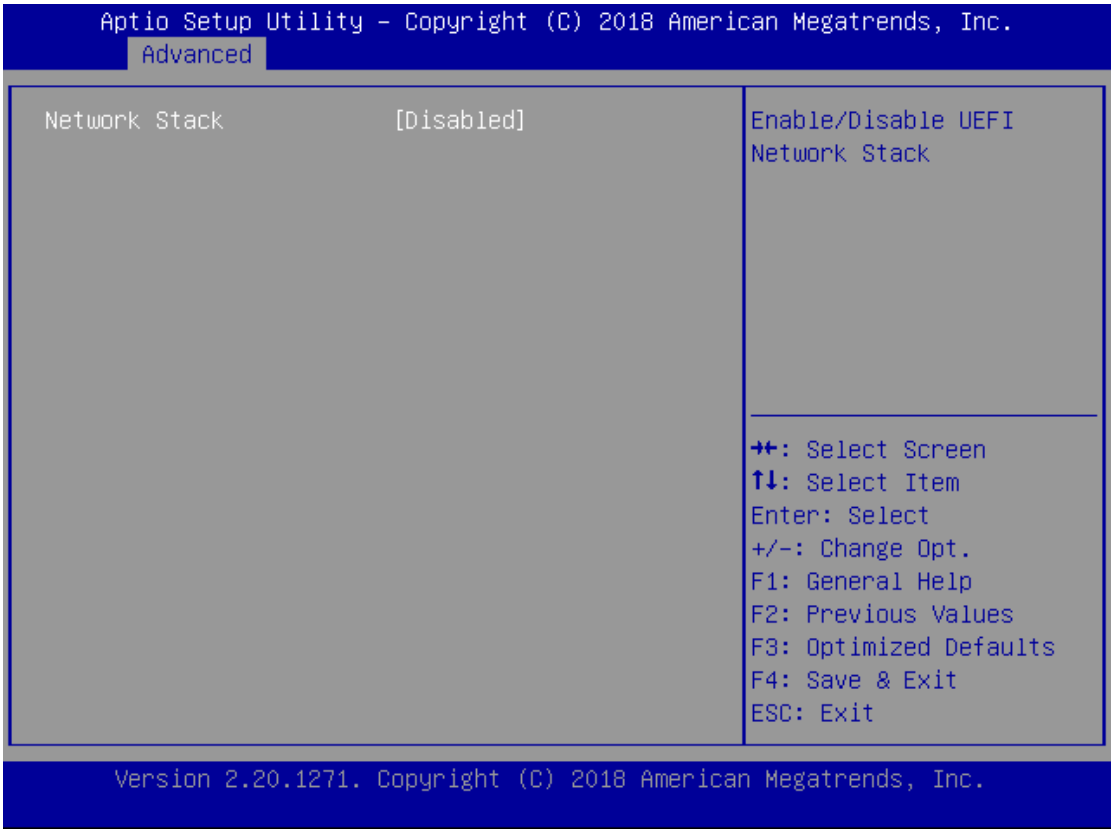
USB Configuration



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.
Port 60/64 Emulation	Enabled Disabled	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers

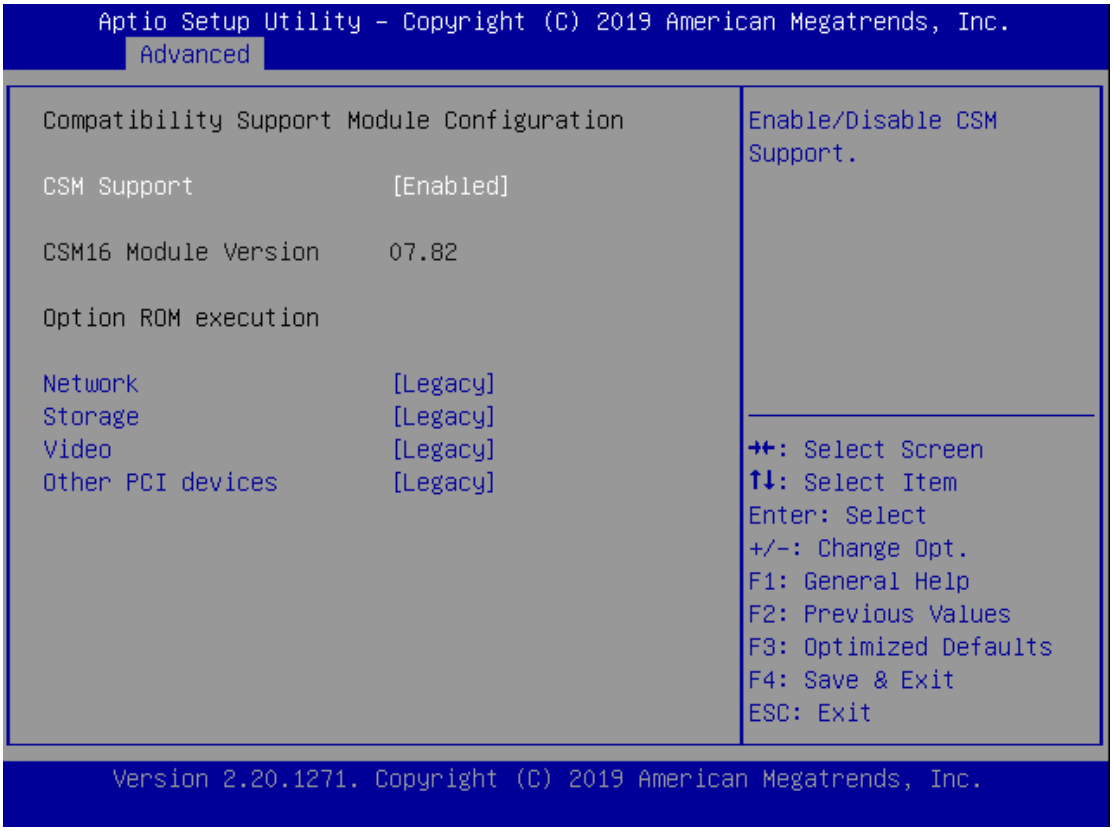
Device reset time-out	1 sec 5 sec 10 sec 20 sec	USB mass storage device Start Unit command time-out
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Network Stack Configuration



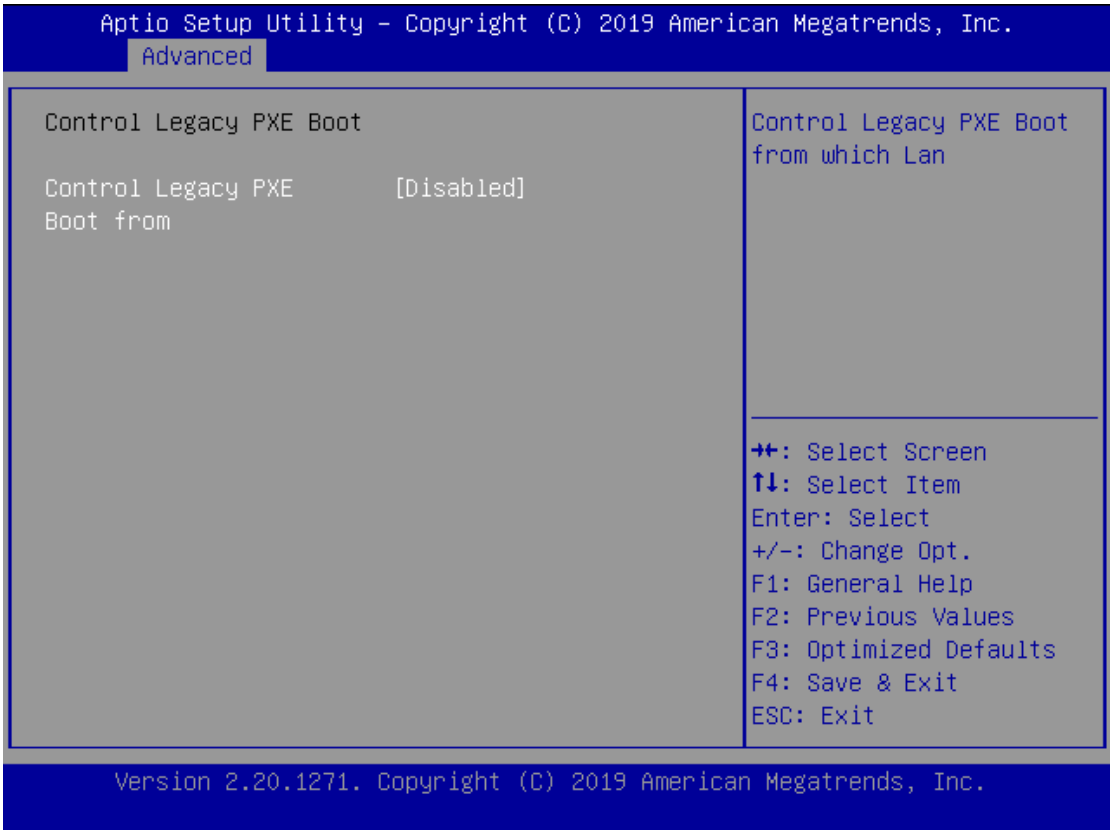
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled,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

CSM Configuration



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

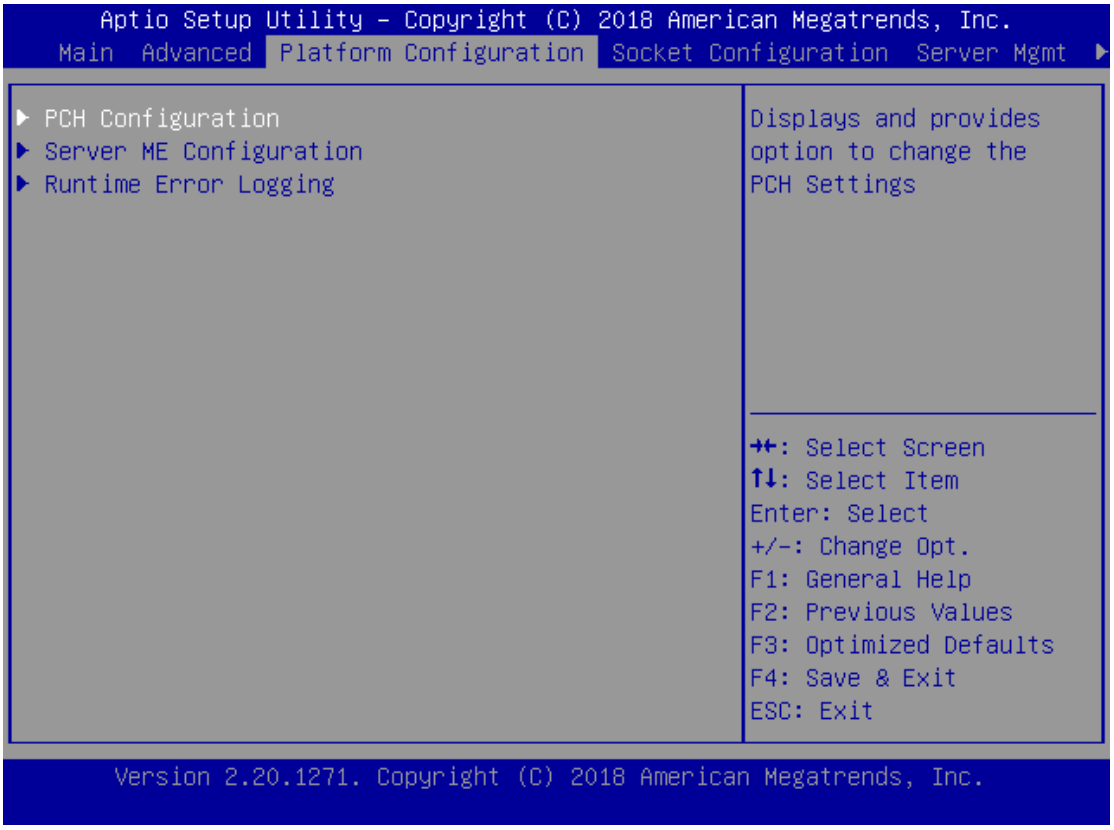
Control Legacy PXE Boot



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

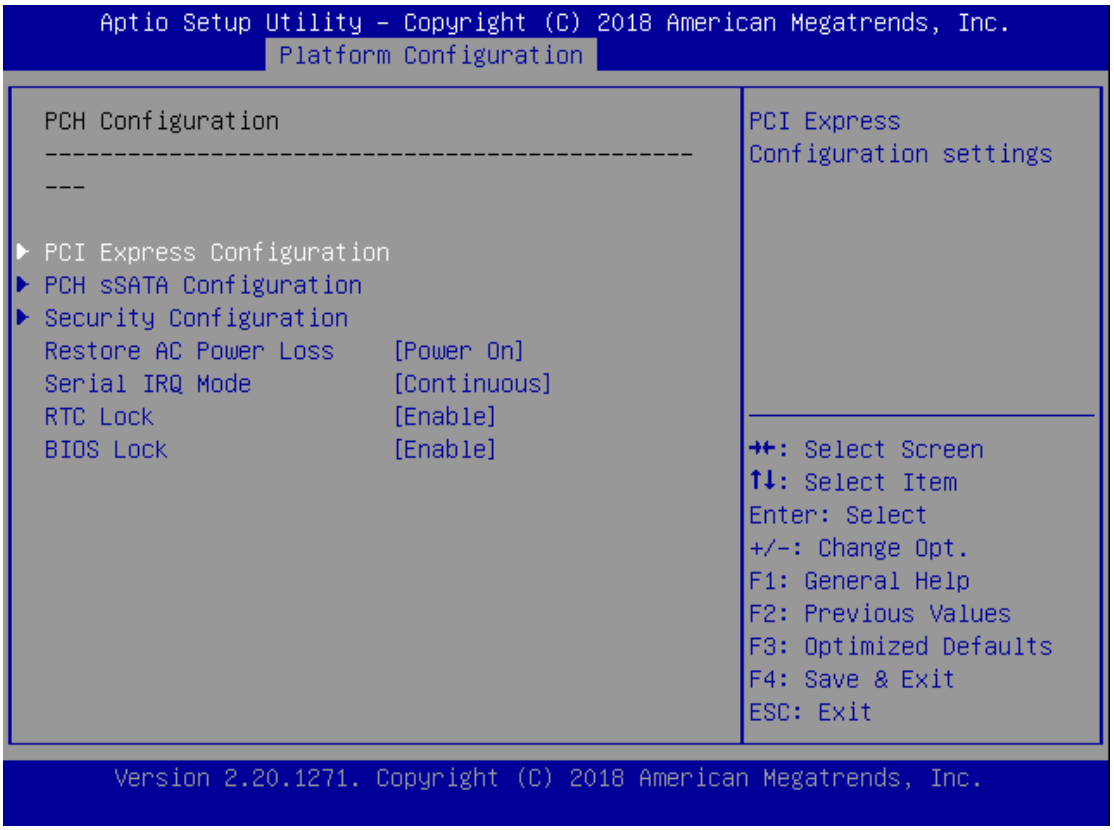
Platform Configuration Page

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



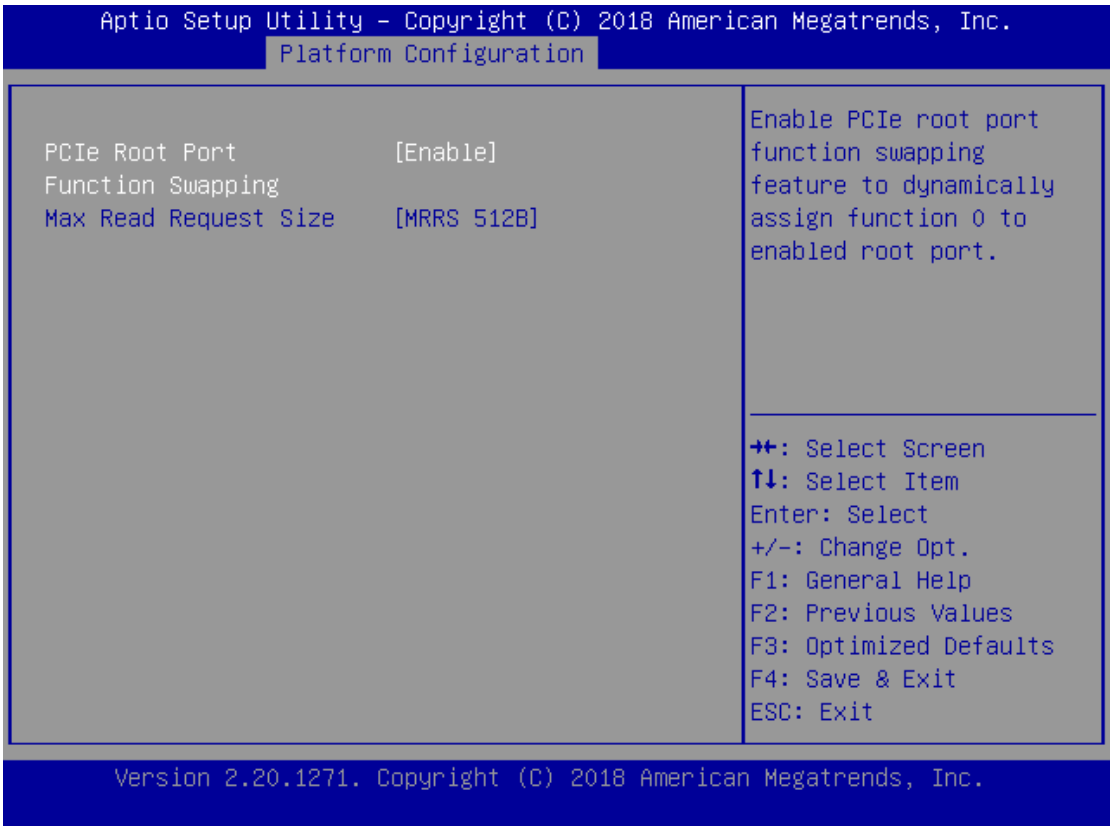
Feature	Options	Description
PCH Configuration	None	Displays and provides option to change the PCH Settings
Server ME Configuration	None	Configure Server ME Technology Parameters
Runtime Error Logging	None	Press <Enter> to view or change the runtime error log configuration.

PCH Configuration



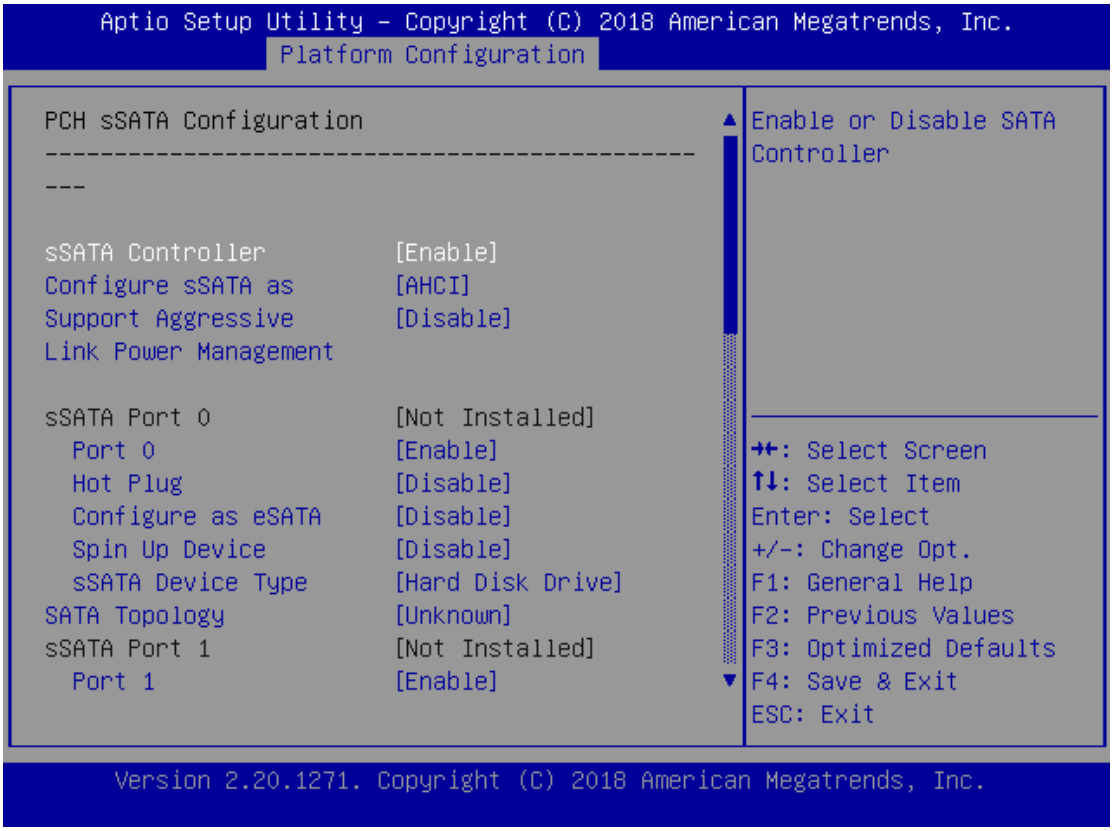
Feature	Options	Description
PCI Express Configuration	None	PCI Express Configuration settings
PCH SATA Configuration	None	SATA devices and settings
PCH sSATA Configuration	None	sSATA devices and settings
Security Configuration	None	Security Configuration settings
Restore AC Power Loss	Power ON Power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

PCI Express Configuration



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

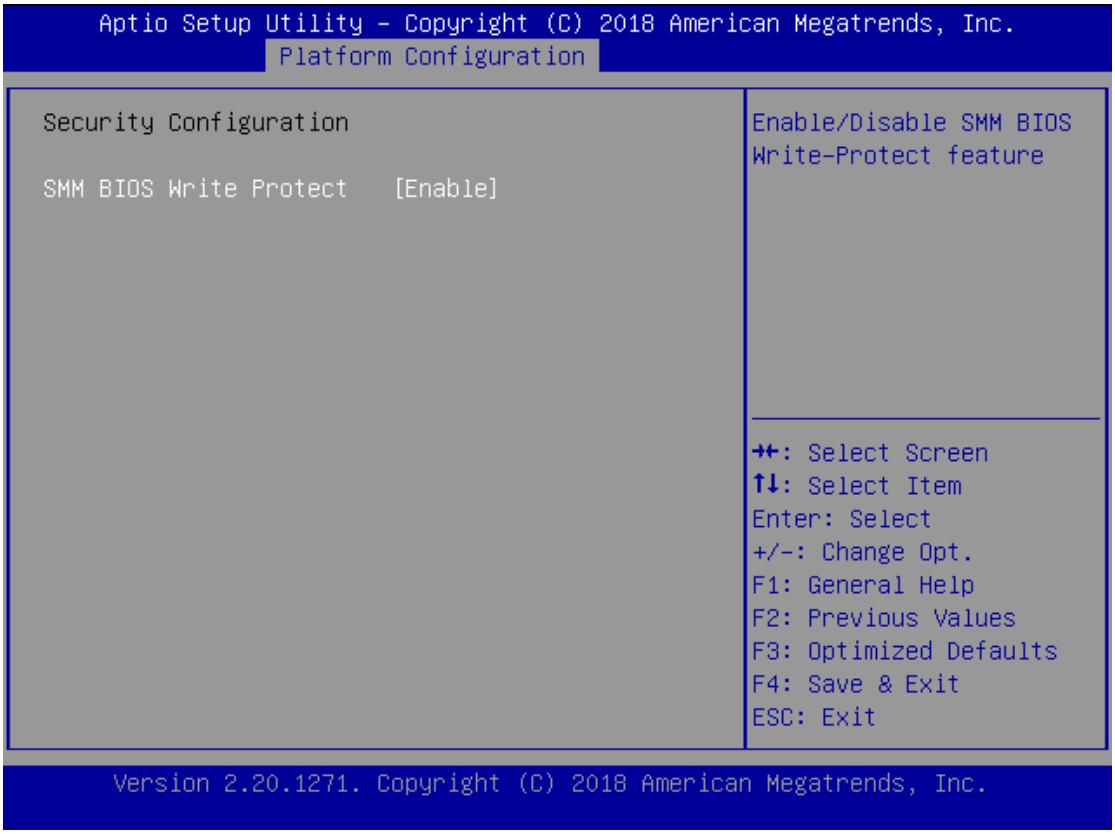
PCH sSATA Configuration



Feature	Options	Description
sSATA Controller	Disabled Enabled	Enables or disables sSATA Controller
Configure SATA as	AHCI RAID	This will configure sSATA as **RAID** or **AHCI**.
Support Aggressive Link Power Management	Disabled Enabled	Enables or disables SALP
Port 0/1/2/3/4/5	Disabled Enabled	Enable or Disable sSATA Port
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configure as eSATA	Disabled Enabled	Configures port as External SATA (eSATA)
Mechanical Presence Switch	Disabled Enabled	Controls reporting if this port has an Mechanical Presence Switch.Note: Requires hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggerred Spin Up will be performed and only the drives witch have this option enabled will

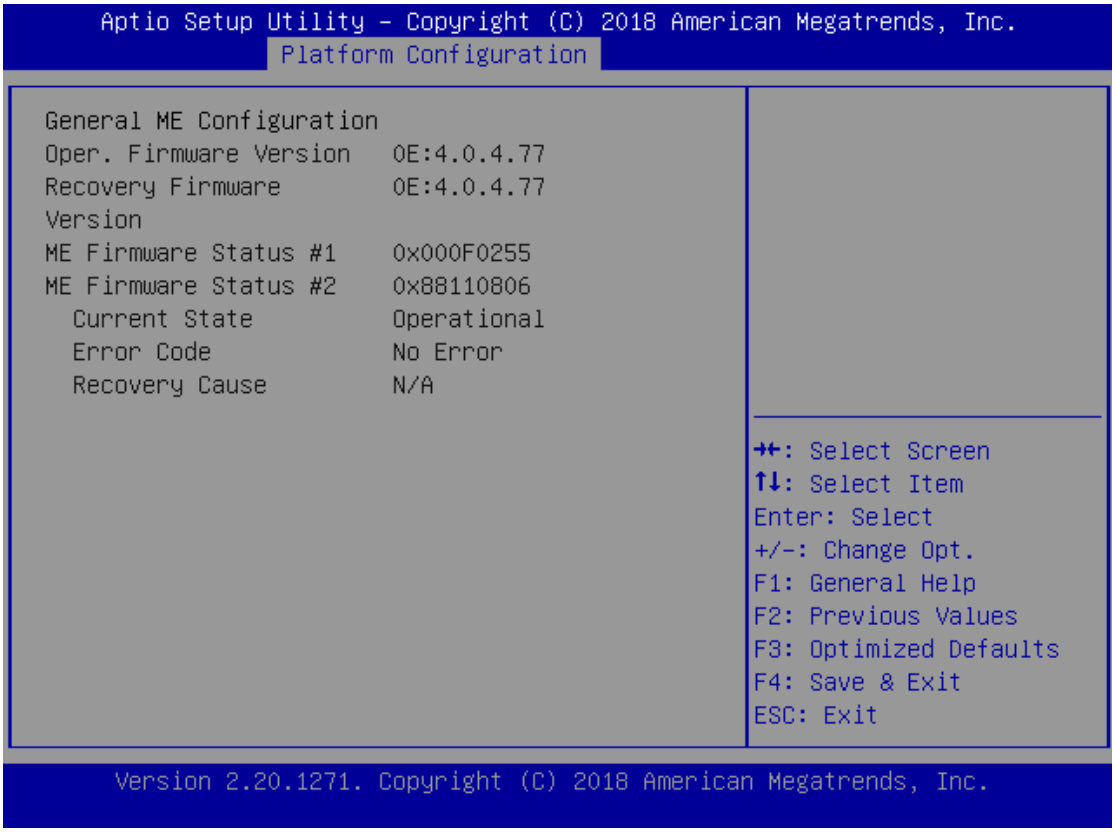
		spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Topology	Unknown ISATA Direct Connect Flex M2	Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2

Security Configuration

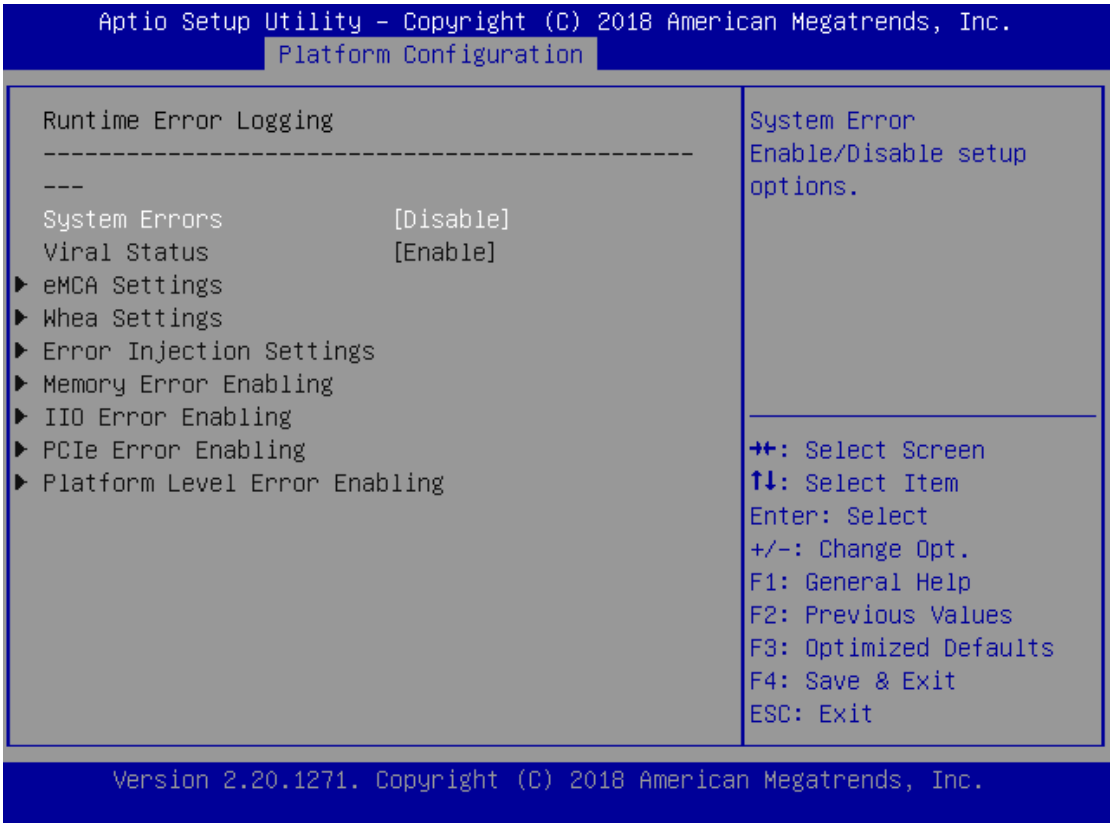


Feature	Options	Description
SMM BIOS Write Protect	Disabled Enabled	Enable/Disable SMM BIOS Write-Protect feature

Server ME Configuration



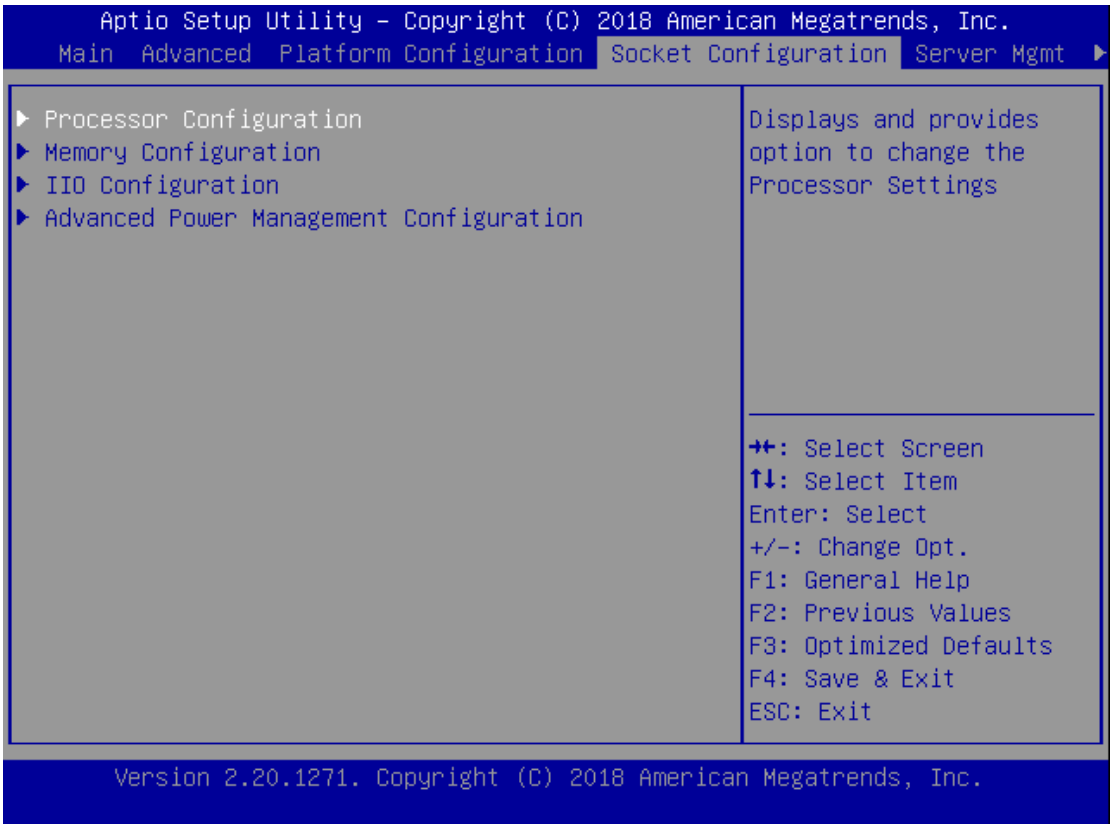
Runtime Error Logging



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

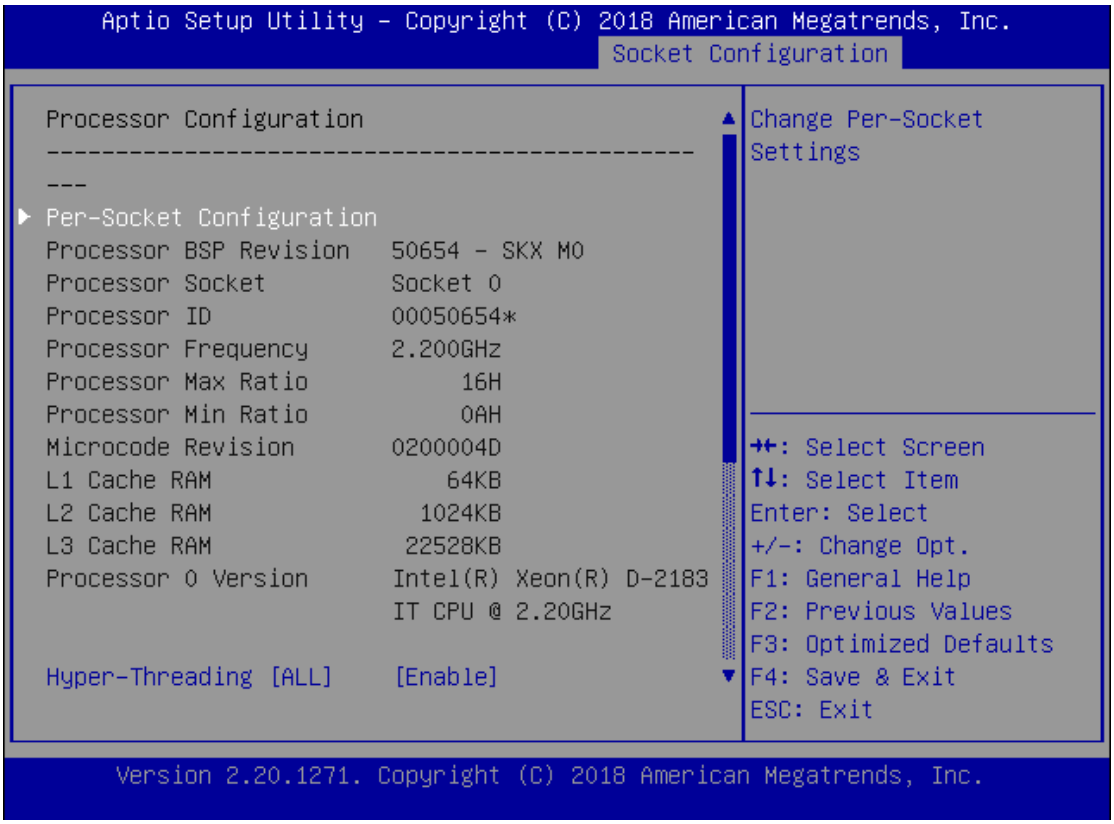
Socket Configuration Page

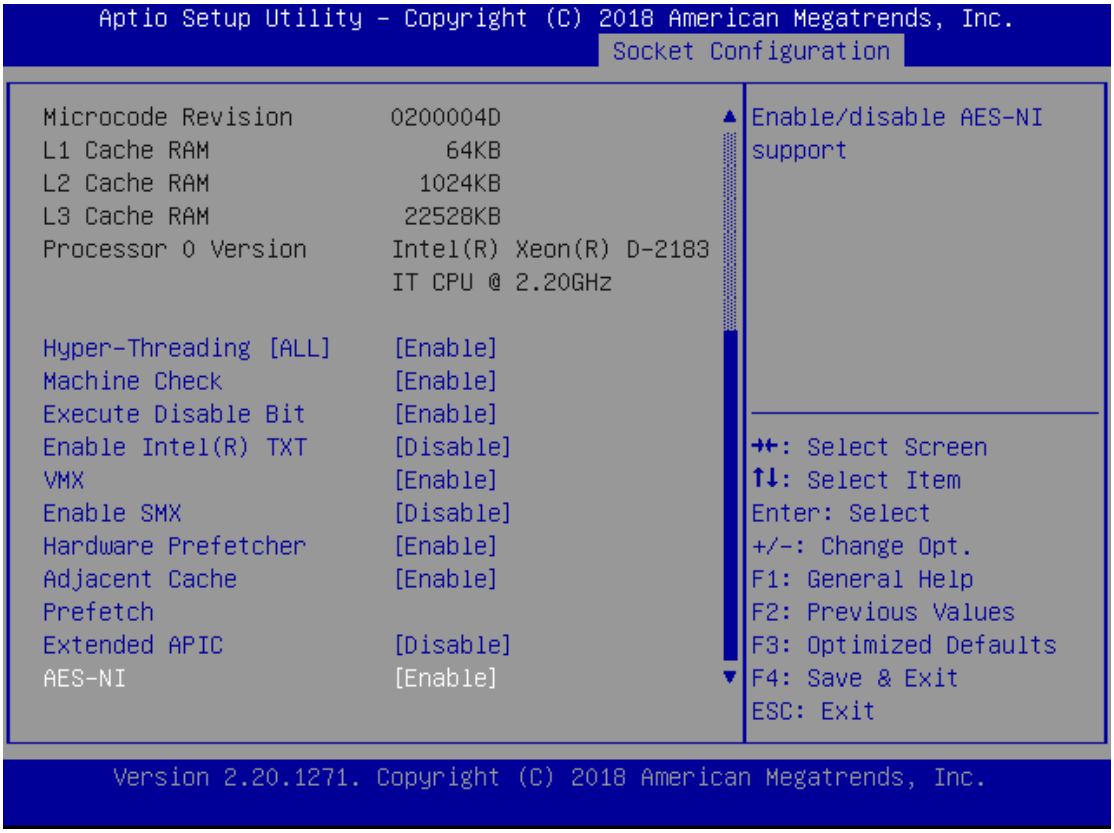
Select the Socket menu item from the BIOS setup screen to enter the Socket Setup screen. Users can select any of the items in the left frame of the screen.



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

Processor Configuration

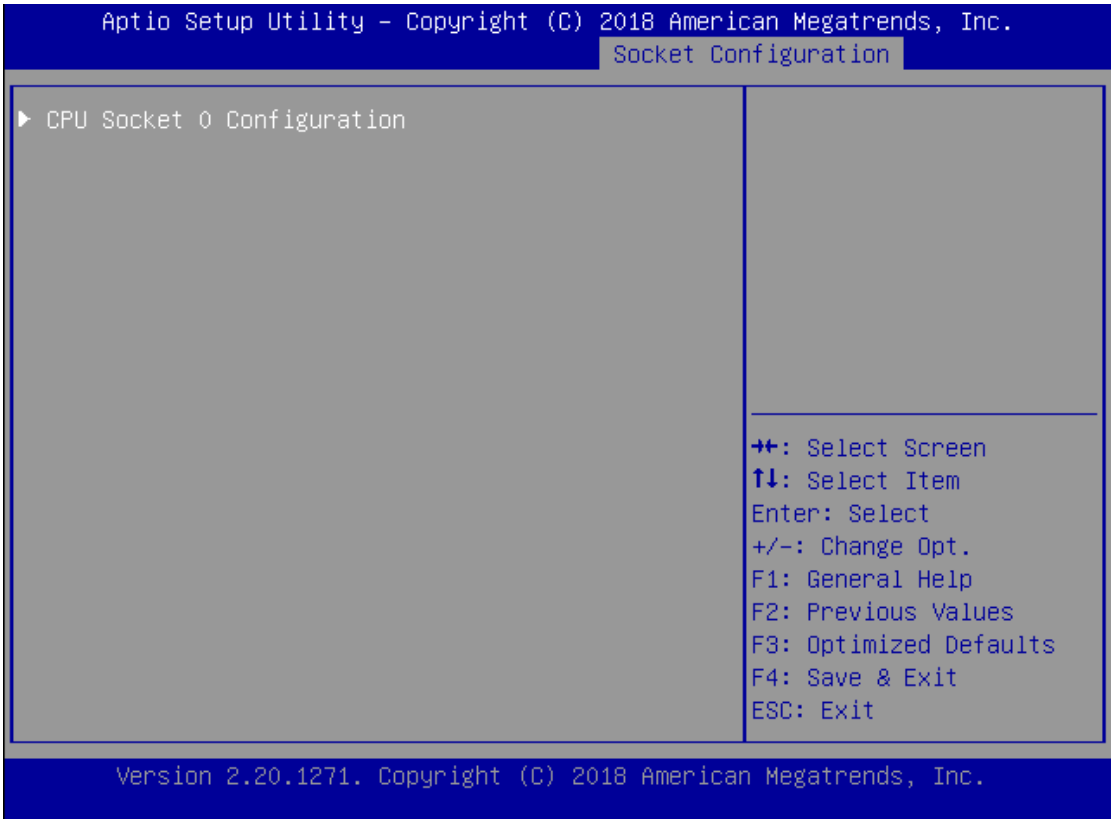




Feature	Options	Description
Hyper-Threading [ALL]	Disabled Enabled	Enables Hyper Threading (Software Method to Enable/Disable Logical Processor threads.

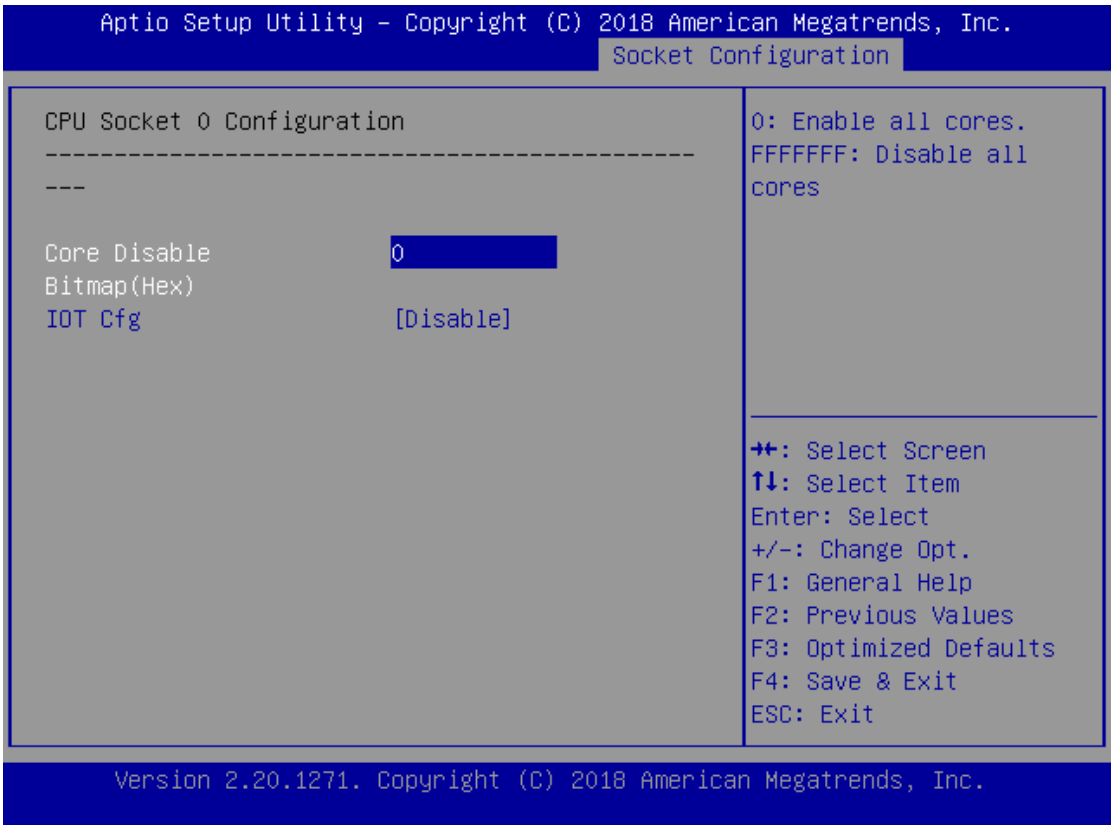
Machine Check	Disabled Enabled	Enable or Disable the Machine Check
Execute Disable Bit	Disabled Enabled	When disabled, it forces the XD feature flag to always return 0.
Enable Intel® TXT	Disabled Enabled	Enables Intel(R) TXT
VMX	Disabled Enabled	Enables the Vanderpool Technology, which takes effect after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

Per-Socket Configuration



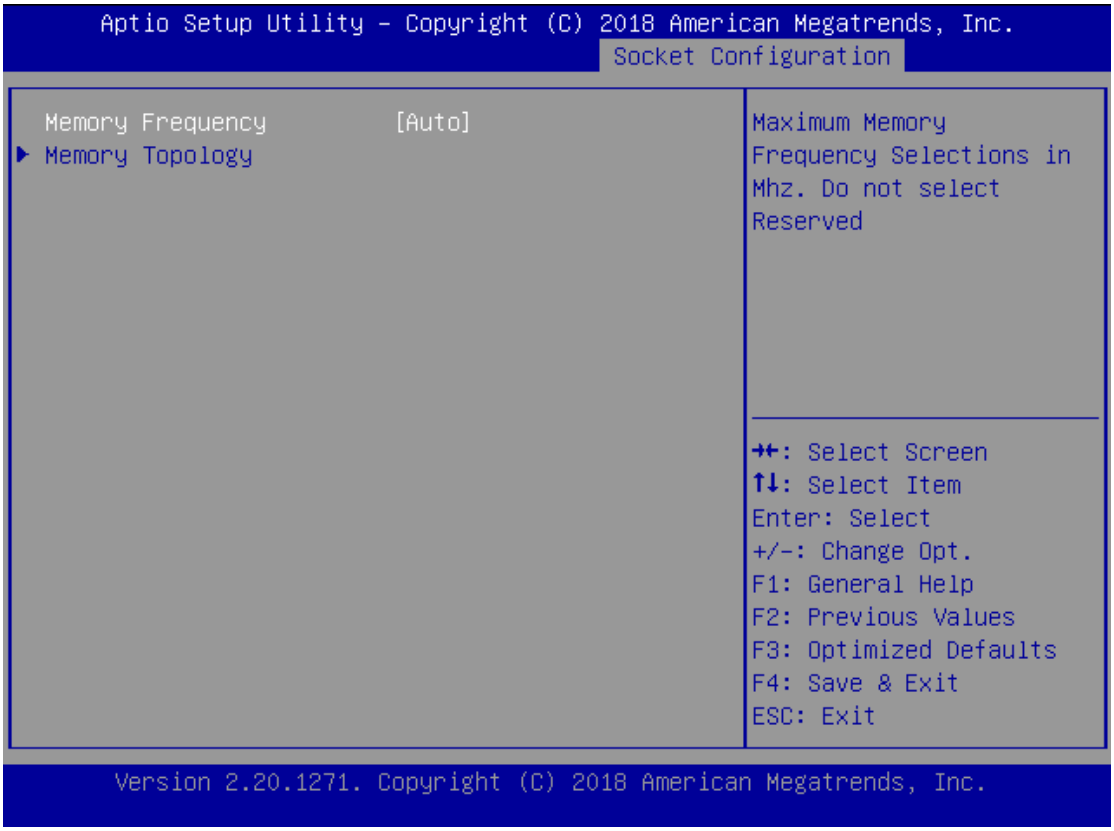
Feature	Options	Description
CPU Socket0 Configuration	None	None

CPU Socket0 Configuration



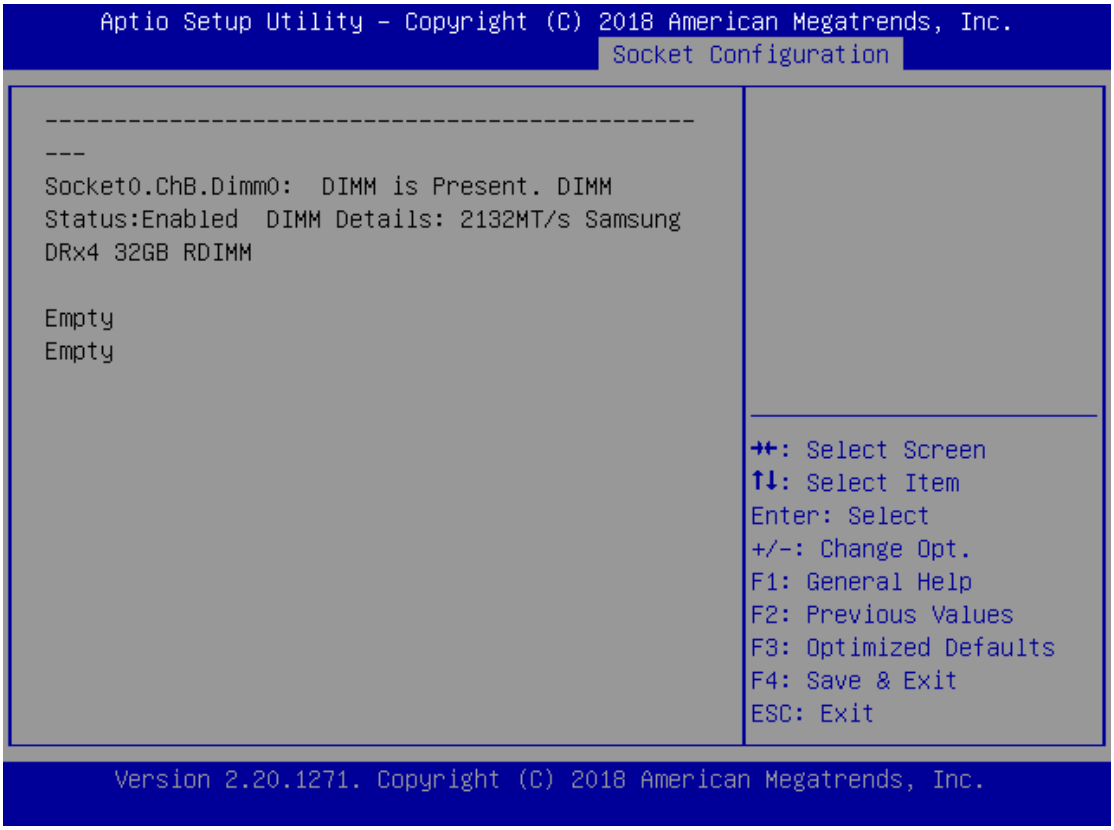
Feature	Options	Description
Core Disable Bitmap(Hex)	0	0: Enable all cores. 3fff: Disable all cores
IOT Cfg	Disabled Enabled	None

Memory Configuration

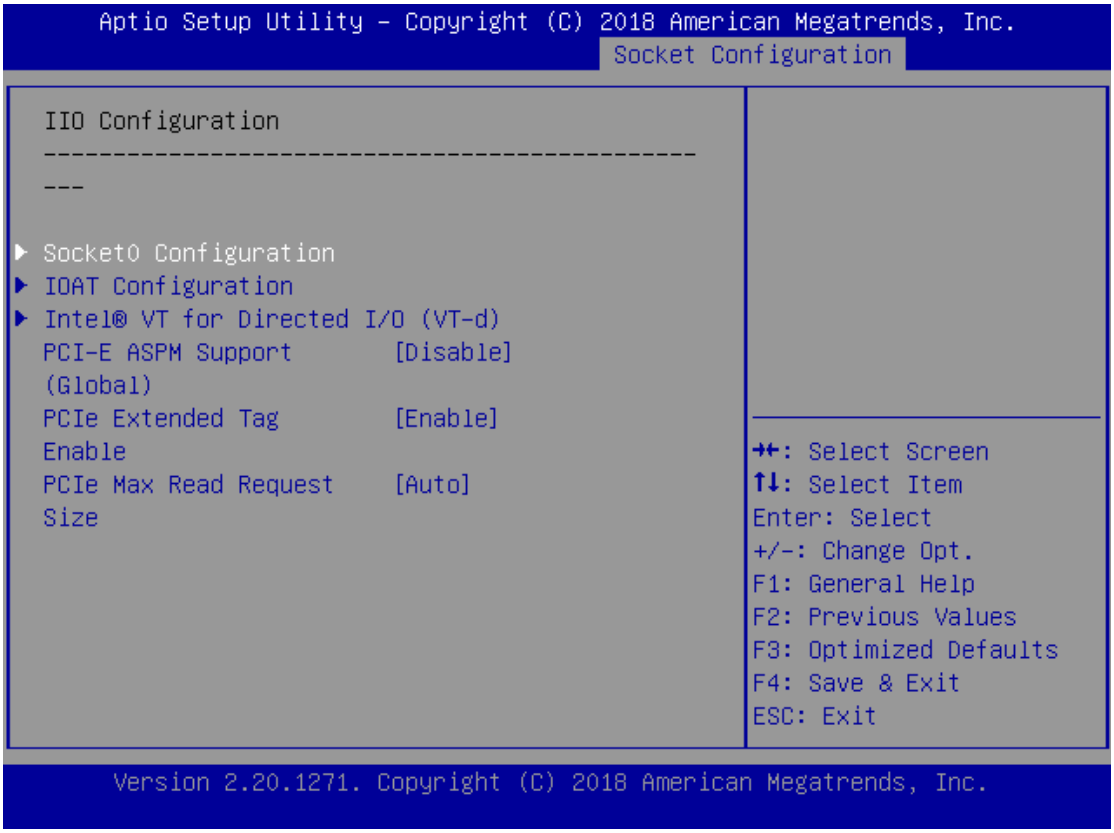


Feature	Options	Description
Memory Frequency	Auto	Maximum Memory Frequency Selections in Mhz. Do not select Reserved
	800	
	1000	
	1066	
	1200	
	1333	
	1400	
	1600	
	1800	
	1866	
	2000	
	2133	
	2200	
	2400	
	2600	
	2666	
	2800-OvrClk	
	2933-OvrClk	
	3000-OvrClk	
	3200-OvrClk	
	3400-OvrClk	
	3600-OvrClk	

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

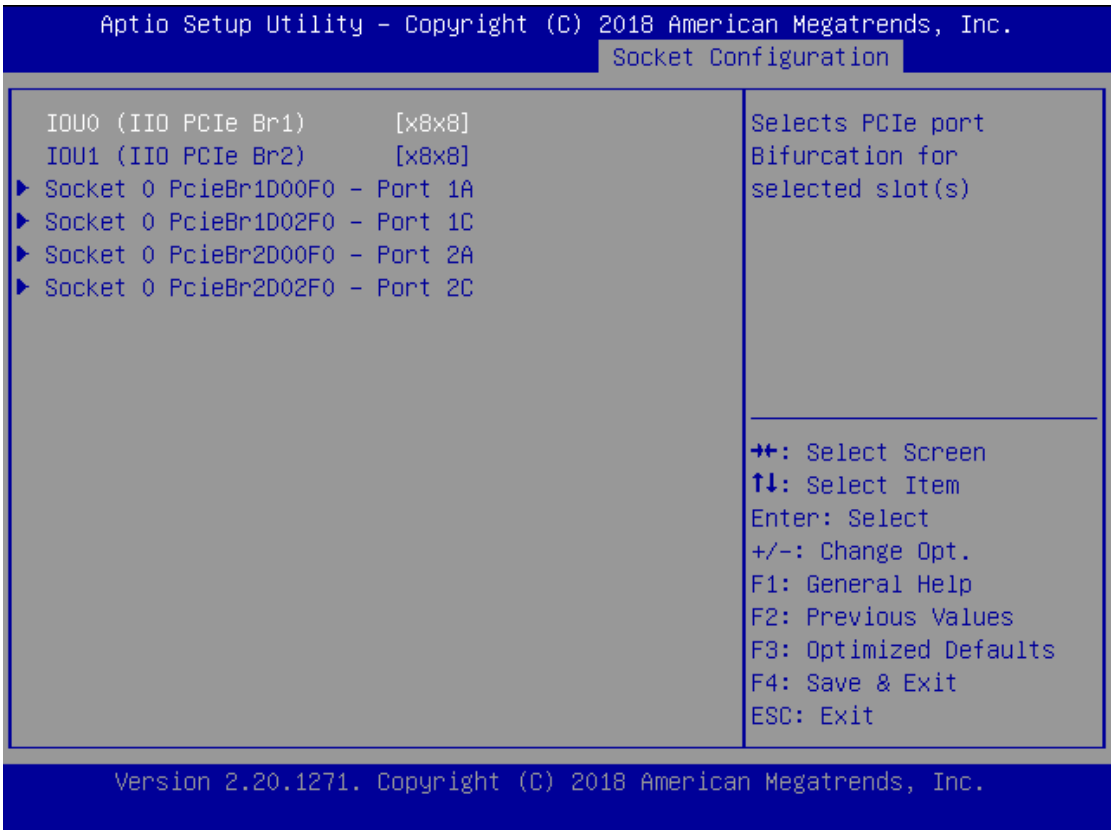


IIO Configuration



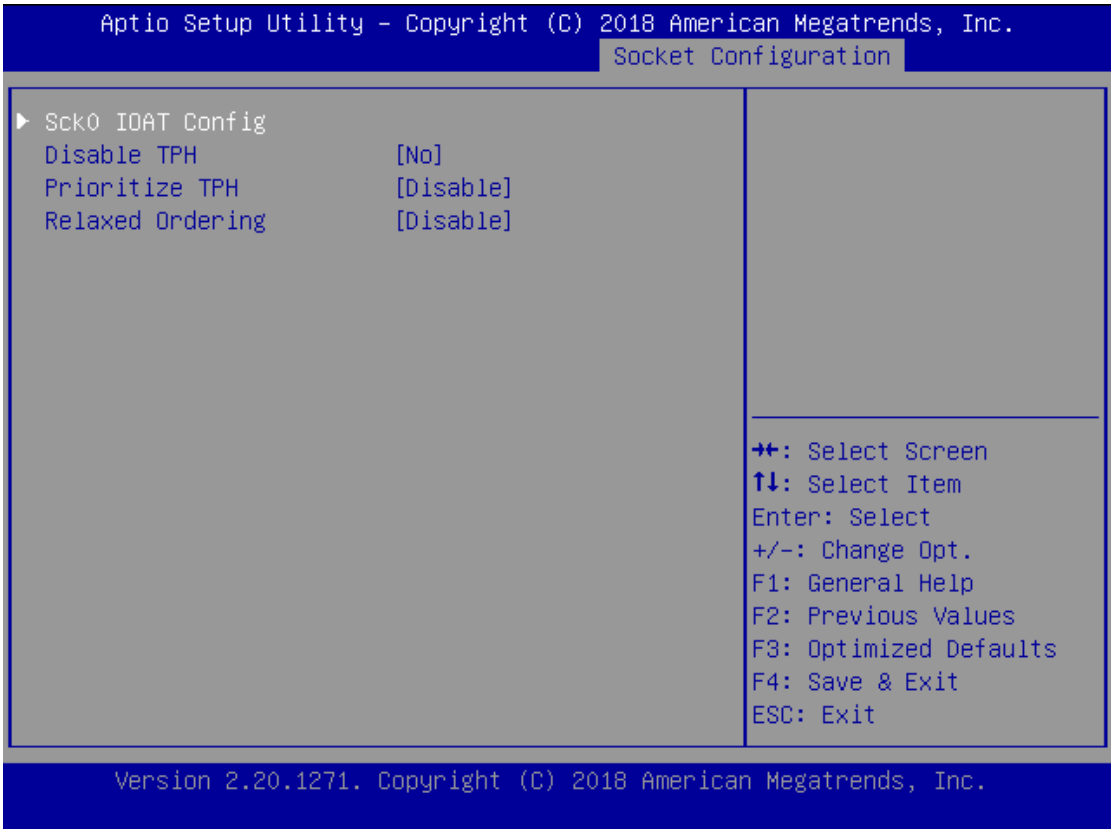
Feature	Options	Description
Socket0 Configuration	None	None
IOAT Configuration	None	All IOAT configuration options
Intel® VT for Directed I/O (VT-d)	None	Press **<Enter>** to bring up the Intel? VT for Directed I/O (VT-d) Configuration menu.
PCI-E ASPM Support (Global)	Disabled Per-Port L1 Only	This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

Socket0 Configuration



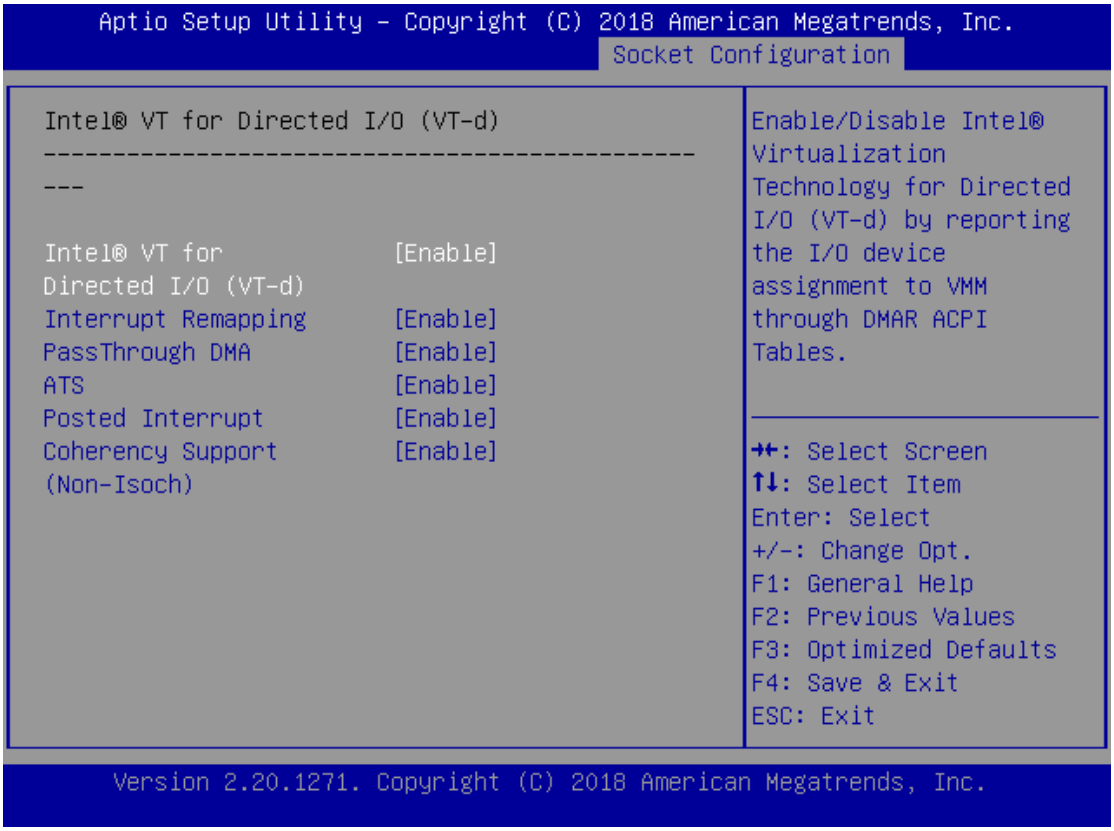
Feature	Options	Description
Socket 0 PcieBr1D00F0	None	Settings related to PCI Express Port 1A
Socket 0 PcieBr1D02F0	None	Settings related to PCI Express Port 1C
Socket 0 PcieBr2D00F0	None	Settings related to PCI Express Port 2A
Socket 0 PcieBr2D02F0	None	Settings related to PCI Express Port 2C

IOAT Configuration



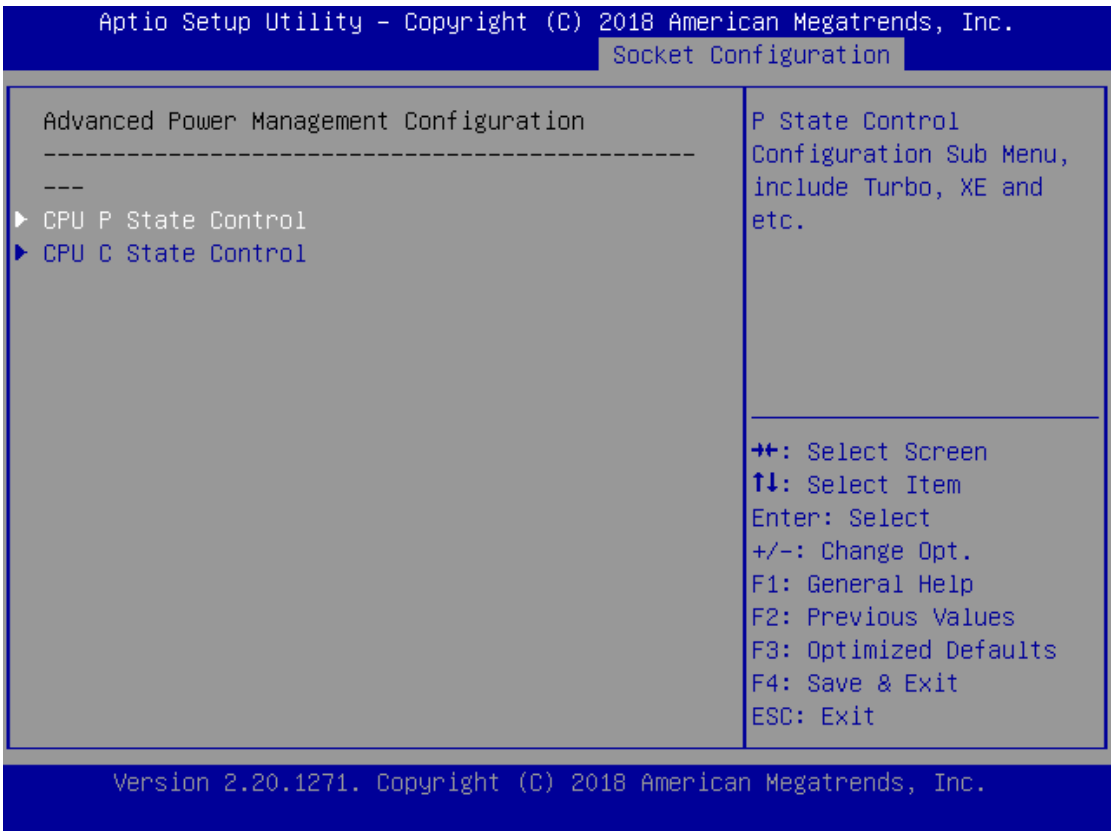
Feature	Options	Description
Sck0 IOAT Config	None	None
Disable TPH	No Yes	TLP Processing Hint disable
Prioritize TPH	Disabled Enabled	Prioritize TPH
Relaxed Ordering	Disabled Enabled	Relaxed Ordering Enable/Disable

Intel® VT for Directed I/O (VT-d)



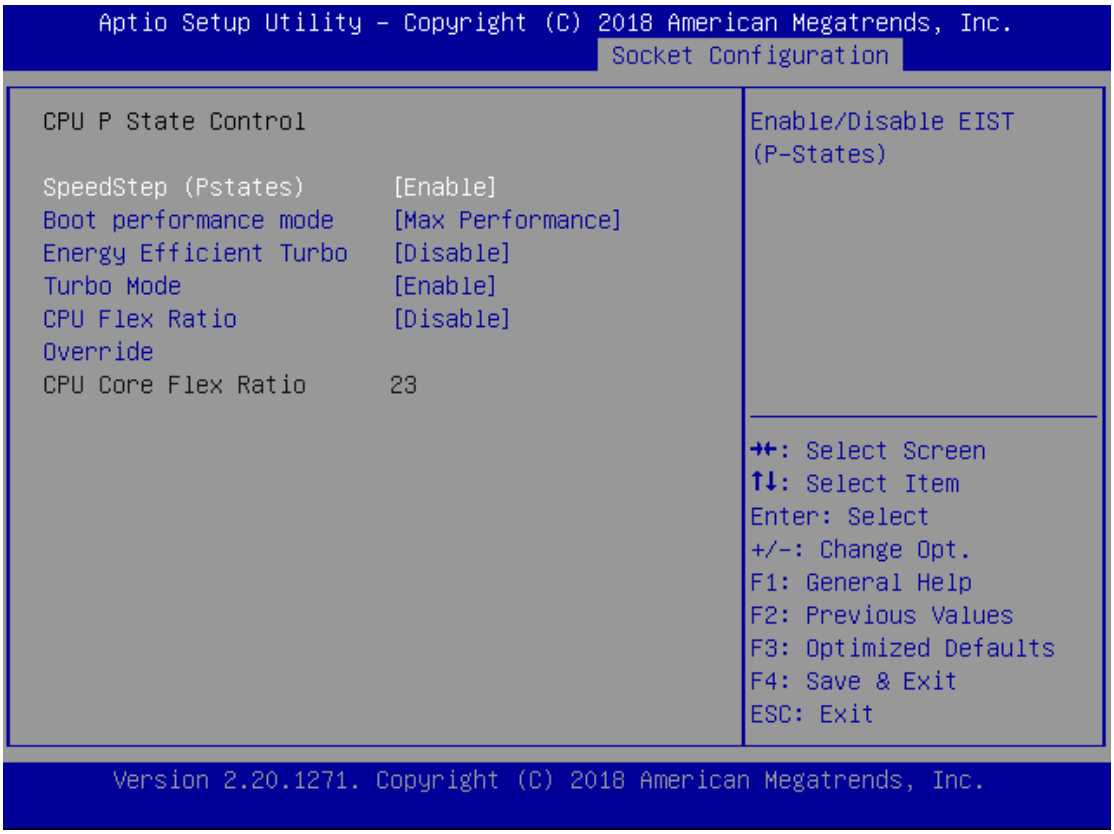
Feature	Options	Description
Intel® VT for Directed I/O (VT-d)	Disabled Enabled	Press **<Enter>** to bring up the Intel? VT for Directed I/O (VT-d) Configuration menu.
Interrupt Remapping	Disabled Enabled	Enable/Disable VT_D Interrupt Remapping Support
PassThrough DMA	Disabled Enabled	Enable/Disable Non-Isoch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

Advanced Power Management Configuration



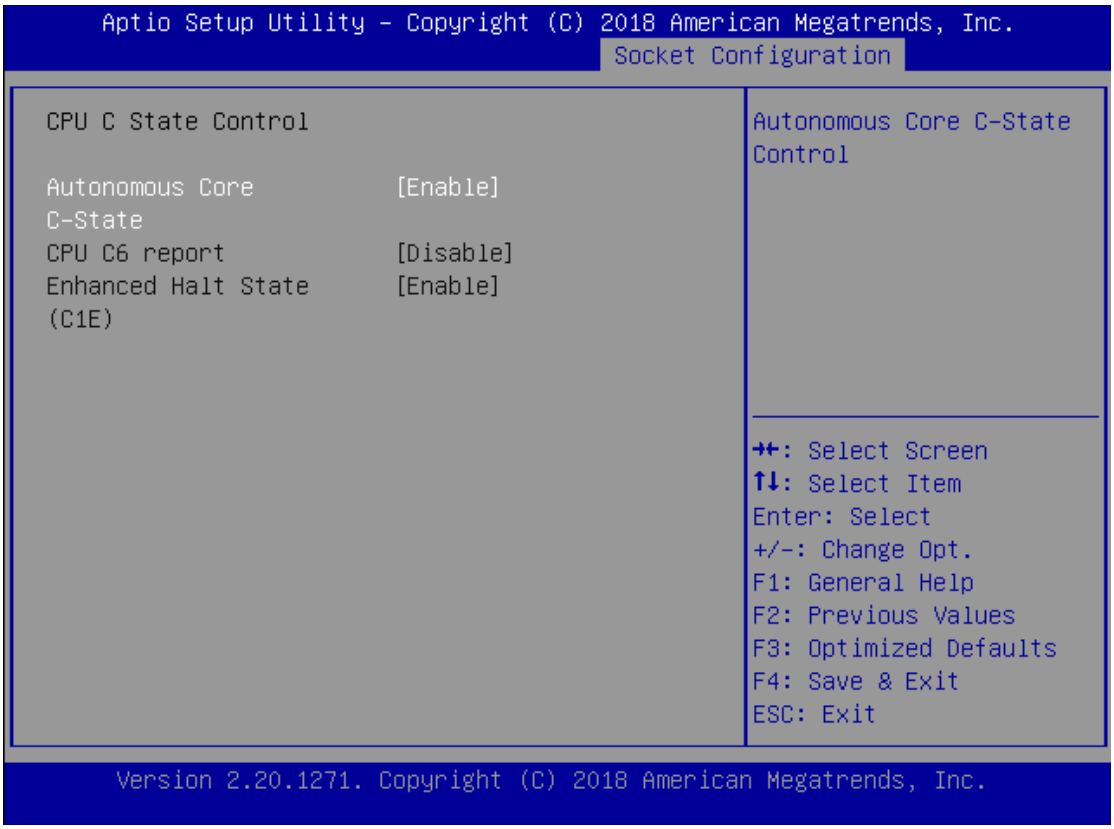
Feature	Options	Description
CPU P State Control	None	P State Control Configuration Sub Menu, include Turbo, XE and etc.
CPU C State Control	None	CPU C State setting

CPU P State Control



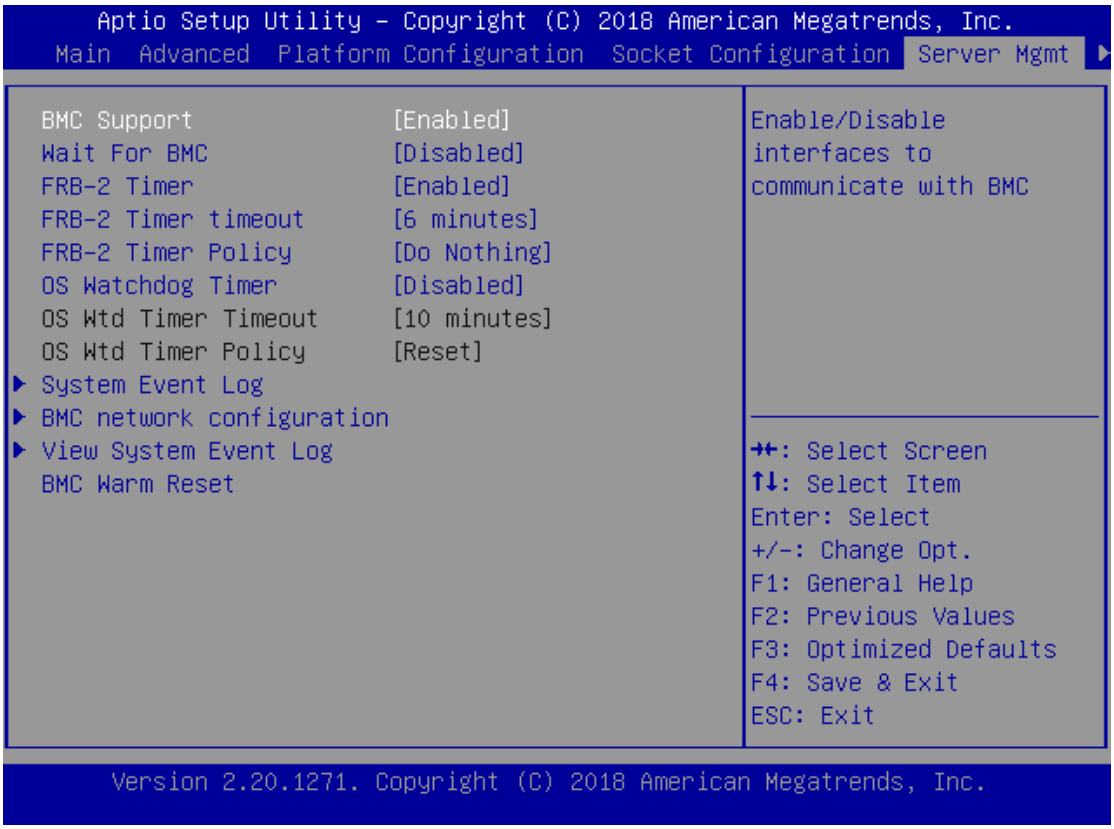
Feature	Options	Description
SpeedStep(Pstates)	Disabled Enabled	Enables or disables EIST (P-States)
Boot performance mode	Max Performance Max Efficient Set by Intel Node Manager	Select the performance state that the BIOS will set before OS hand off.
Energy Efficient Turbo	Disabled Enabled	Energy Efficient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

CPU C State Control



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

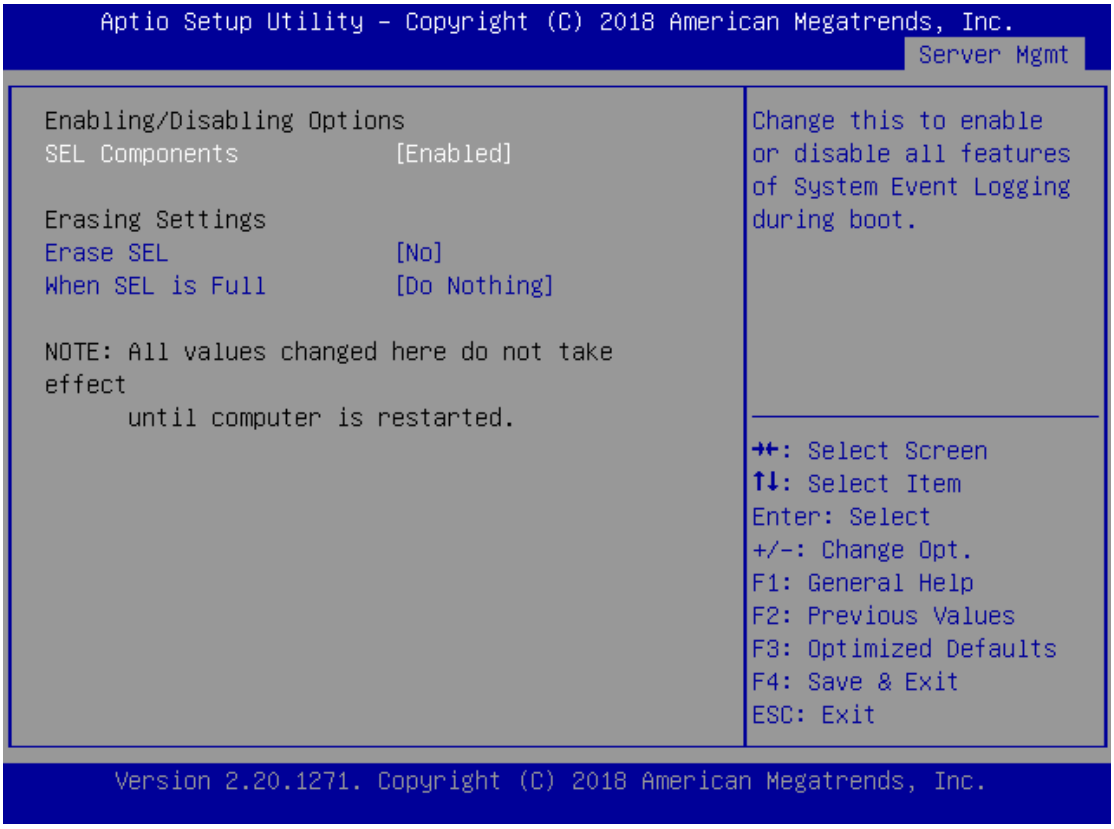
Server Mgmt Page



Feature	Options	Description
BMC Support	Enabled Disabled	Enable or disables interfaces to communicate with BMC.
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enabled Disabled	Enables or disables FRB-2 timer (POST timer).
FRB-2 Timer timeout	3 minutes 4 minutes 5 minutes 6 minutes	Enter value Between 3 to 6 min for FRB-2 Timer Expiration value.

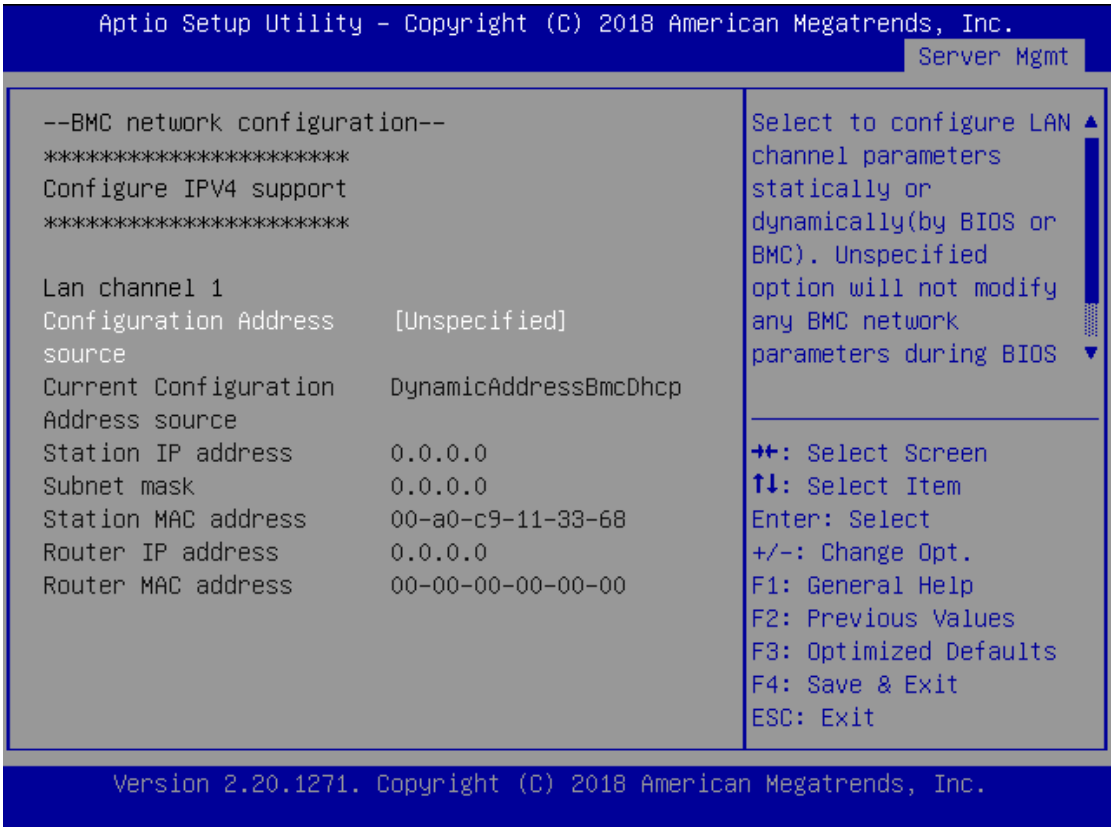
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	Enabled Disabled	If enabled, it starts a BIOS timer which can only be shut off by Management Software after the OS loads. It also helps verify that the OS is successfully loaded or follows the OS Boot Watchdog Timer policy.
OS Wtd Timer Timeout	5 minutes 10 minutes 15 minutes 20 minutes	Configure the length of the OS Boot Watchdog Timer. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
System Event Log	NA	Press **<Enter>** to change the SEL event log configuration.
BMC network configuration	NA	Configure BMC network parameters.
View System Event Log	NA	Press **<Enter>** to view the System Event Log Records.
BMC Warm Reset	NA	Press **<Enter>** to do Warm Reset BMC.

System Event Log



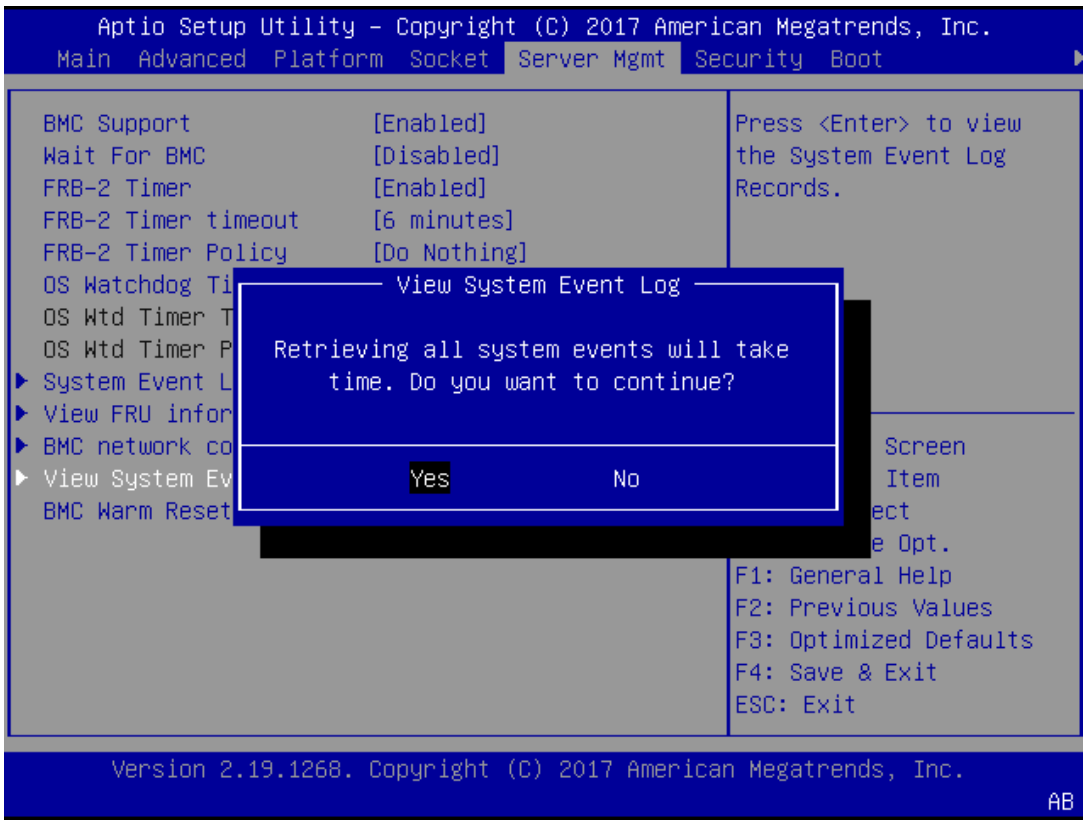
Feature	Options	Description
SEL Components	Disabled Enabled	Enables or disables all features of System Event Logging during boot.
Erase SEL	NO Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately	Choose options for reactions to a full SEL.

BMC network configuration



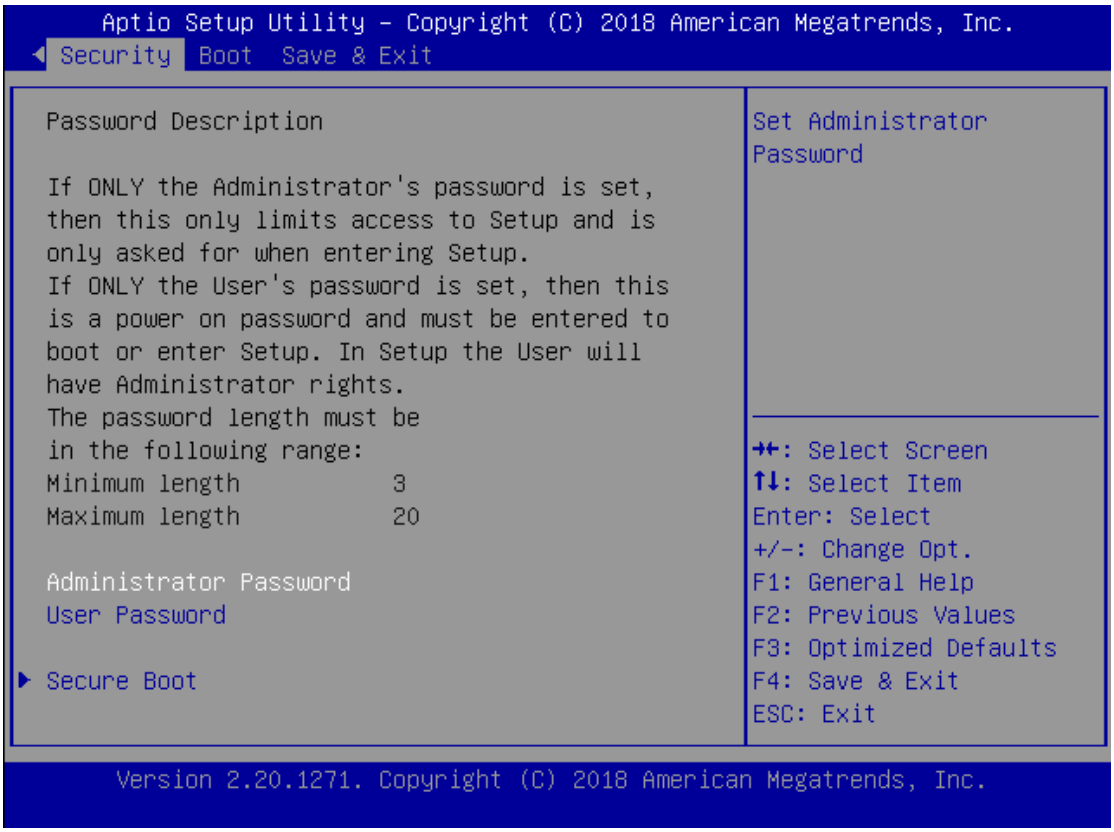
Feature	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically(by BIOS or BMC). The **unspecified** option will not modify any BMC network parameters during BIOS phase.

View System Event Log



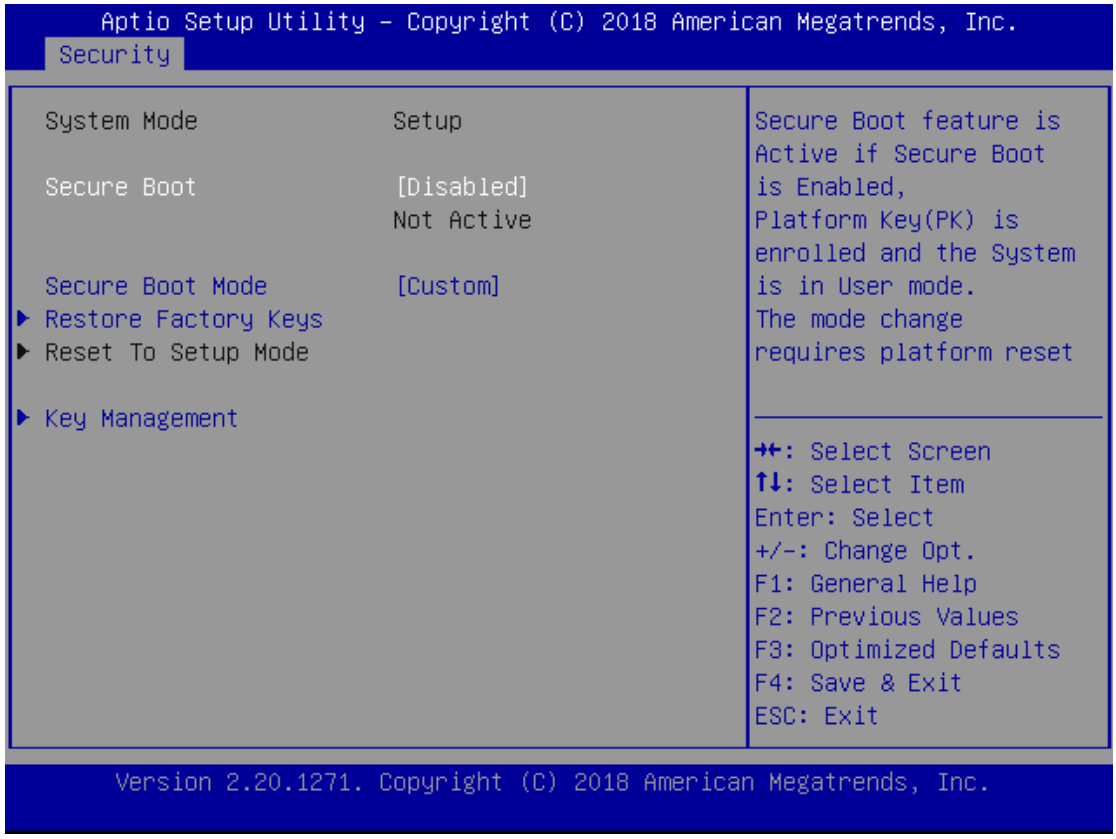
Security Page

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.



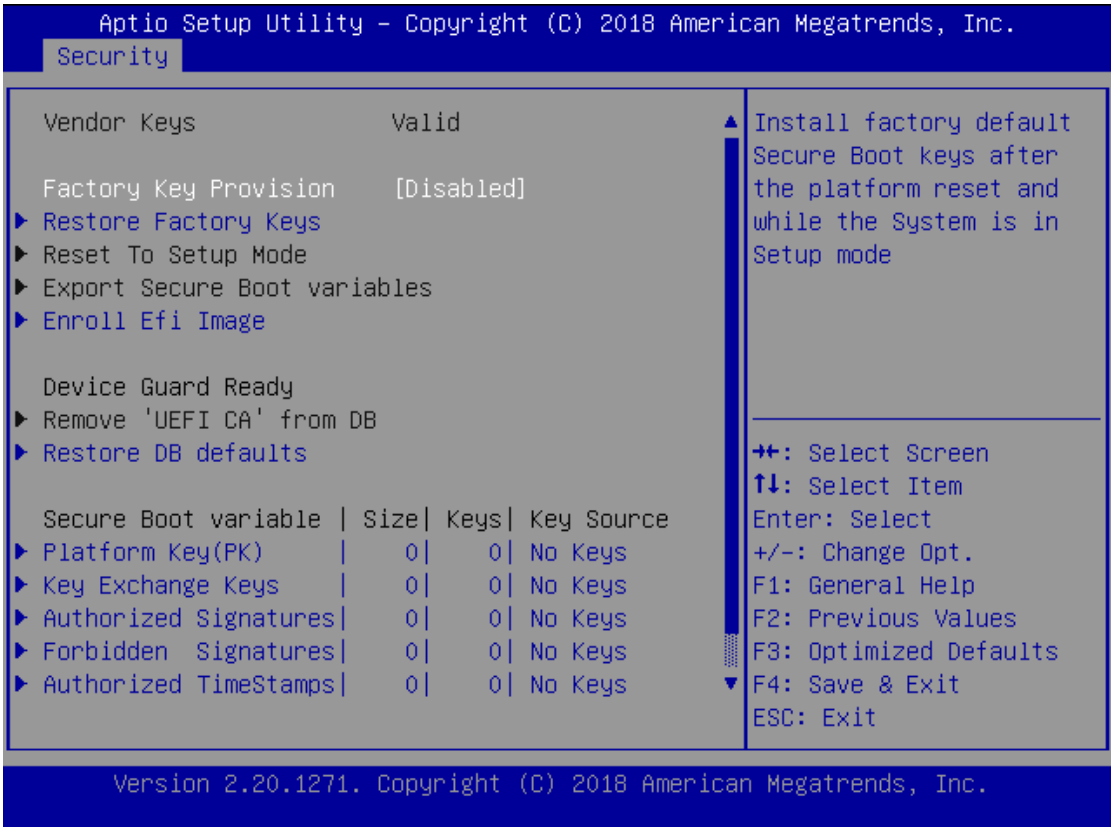
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

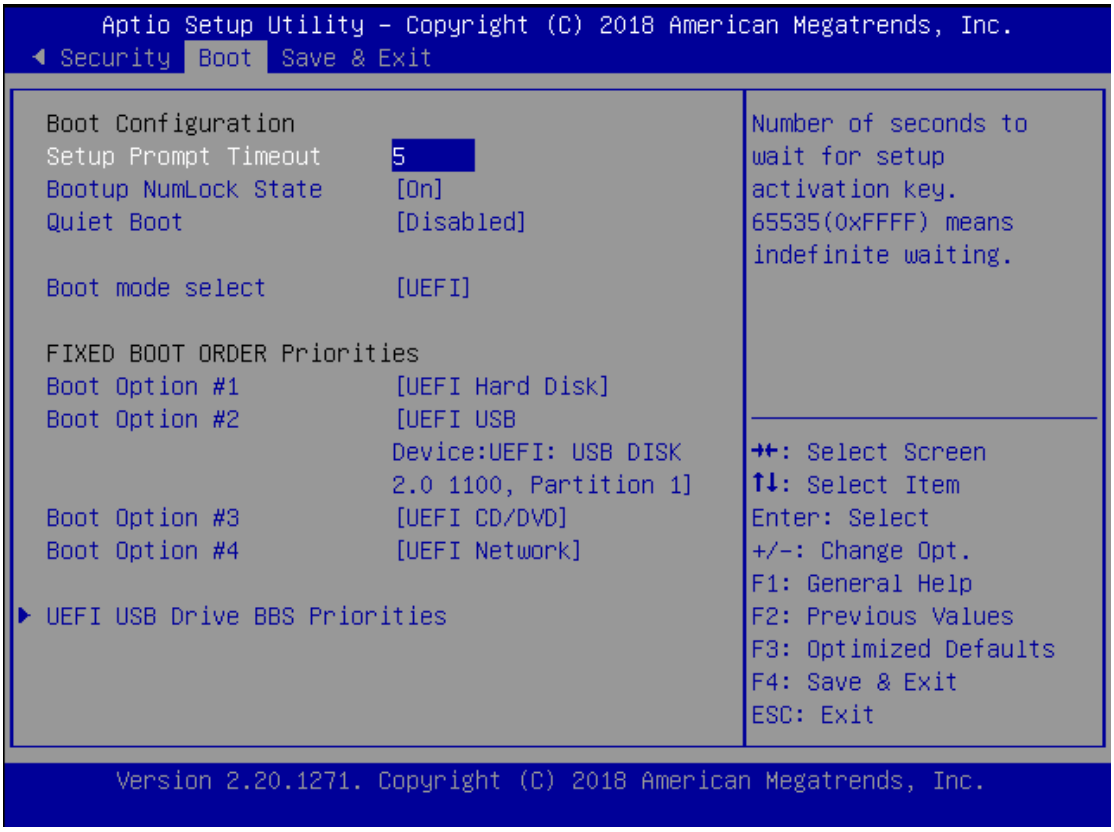
Key Management



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)

Boot Page

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.

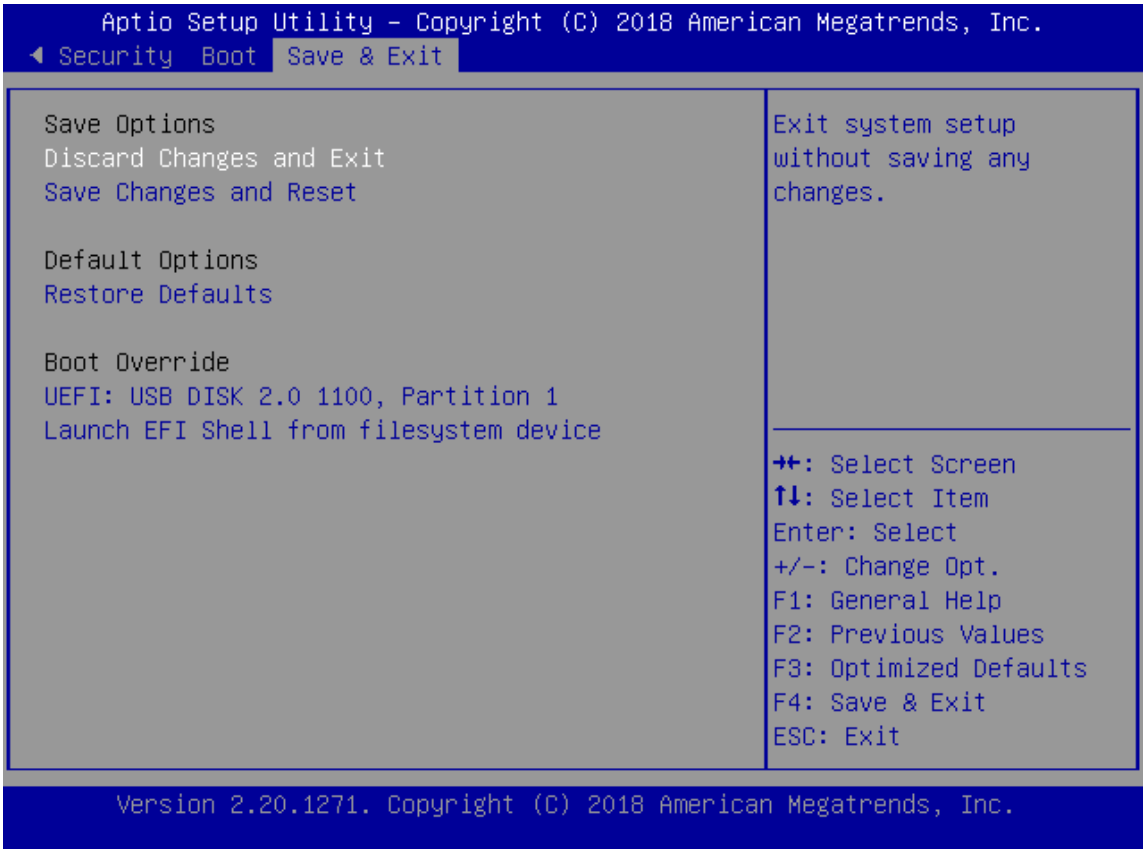


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL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

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

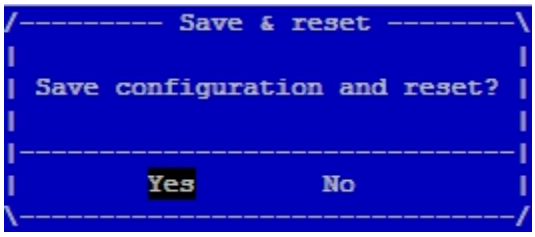
Save and Exit Page

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



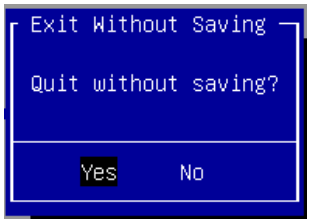
■ Save Changes and Reset

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



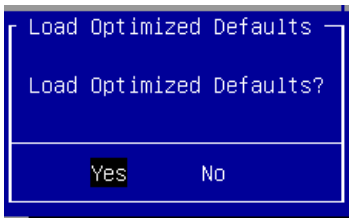
■ Discard Changes and Exit

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



■ 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 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*

Note

It is normal behavior that LAN LED turns steady Amber upon system power initialization.

- **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**

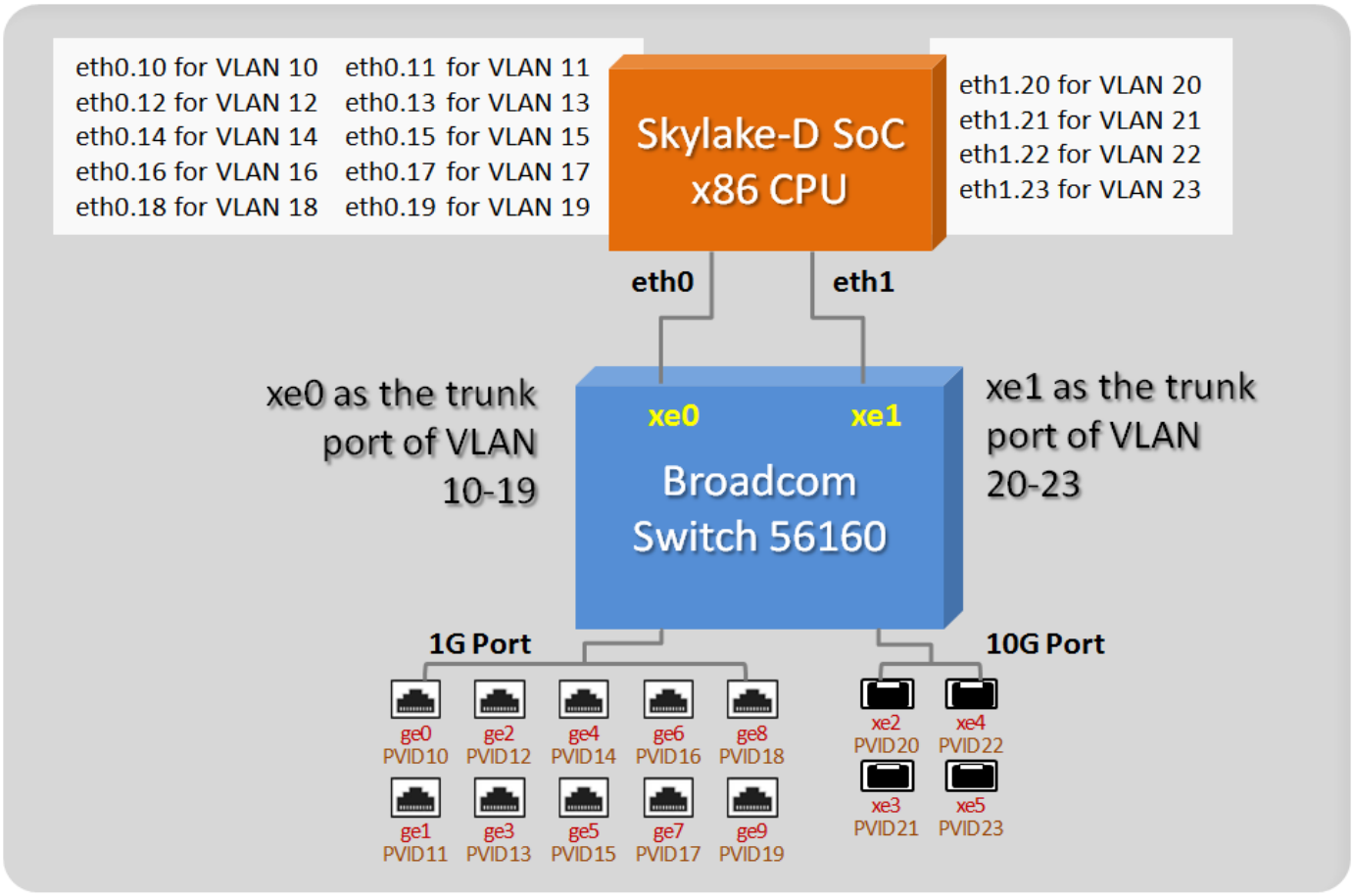
Blinking Green	*Link has been established and there is activity on this port*
Solid Green	*Link has been established and there is no activity on this port*
Off	*No link is established*

- **Speed**

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

APPENDIX B: IEEE 802.1Q VLAN TAG APPLICATION NOTE

Sample Diagram



BCM Diagnostic Shell

- Decompress the tarball to a working directory:
  e.g., `tar xzf bcm_sdk_6.5.13_kv-4.15.0_x64_static_0529.tar.gz -C /root/brcm/sdk_bin`

- Enter the folder where you decompresses the tar file as above and launch BCM diagnostic shell with root privilege:
  e.g., `cd /root/brcm/sdk_bin/bcm_sdk_6.5.13_kv-4.15.0_x64_static_0529`
  e.g., `sudo ./bcm_diag.sh`

- When the prompt "**BCM.0>**" shows up, you are in the BCM diagnostic shell.

- Please refer to the help command of BCM diagnostic shell for more information
  e.g., "**ps**" to show all port status
  e.g., "**vlan show**" to dump VLAN group setting

VLAN Configuration on Switch Side

The VLAN settings shown below are already applied to rc.SOC file.

- Create 802.1Q VLAN Group

```
vlan remove 1 pbm=ge,xe
vlan create 10 pbm=ge0,xe0
vlan create 11 pbm=ge1,xe0
vlan create 12 pbm=ge2,xe0
vlan create 13 pbm=ge3,xe0
vlan create 14 pbm=ge4,xe0
vlan create 15 pbm=ge5,xe0
vlan create 16 pbm=ge6,xe0
vlan create 17 pbm=ge7,xe0
vlan create 18 pbm=ge8,xe0
vlan create 19 pbm=ge9,xe0
vlan create 20 pbm=xe2,xe1
vlan create 21 pbm=xe3,xe1
vlan create 22 pbm=xe4,xe1
vlan create 23 pbm=xe5,xe1
```

- Port VID assignment

```
pvlan set ge0 10
pvlan set ge1 11
pvlan set ge2 12
```

```
pvlan set ge3 13
pvlan set ge4 14
pvlan set ge5 15
pvlan set ge6 16
pvlan set ge7 17
pvlan set ge8 18
pvlan set ge9 19
pvlan set xe2 20
pvlan set xe3 21
pvlan set xe4 22
pvlan set xe5 23
```

- Install VLAN package

```
apt install vlan
```

- Load 802.1Q kernel module

```
modprobe 8021q
```

- Create VLAN interface

```
vconfig add enp183s0f0 10
vconfig add enp183s0f0 11
vconfig add enp183s0f0 12
vconfig add enp183s0f0 13
vconfig add enp183s0f0 14
vconfig add enp183s0f0 15
vconfig add enp183s0f0 16
vconfig add enp183s0f0 17
vconfig add enp183s0f0 18
vconfig add enp183s0f0 19
vconfig add enp183s0f1 20
vconfig add enp183s0f1 21
vconfig add enp183s0f1 22
vconfig add enp183s0f1 23
```

- Bring up VLAN interface

```
ifconfig enp183s0f0 up
ifconfig enp183s0f0.10 10.10.10.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.11 10.10.11.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.12 10.10.12.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.13 10.10.13.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.14 10.10.14.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.15 10.10.15.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.16 10.10.16.1 netmask 255.255.255.0 up
```

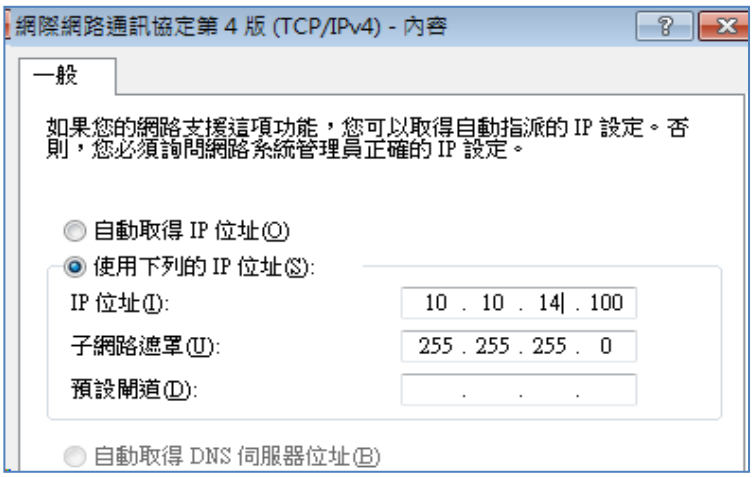
```
ifconfig enp183s0f0.17 10.10.17.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.18 10.10.18.1 netmask 255.255.255.0 up
ifconfig enp183s0f0.19 10.10.19.1 netmask 255.255.255.0 up
ifconfig enp183s0f1 up
ifconfig enp183s0f1.20 10.10.20.1 netmask 255.255.255.0 up
ifconfig enp183s0f1.21 10.10.21.1 netmask 255.255.255.0 up
ifconfig enp183s0f1.22 10.10.22.1 netmask 255.255.255.0 up
ifconfig enp183s0f1.23 10.10.23.1 netmask 255.255.255.0 up
```

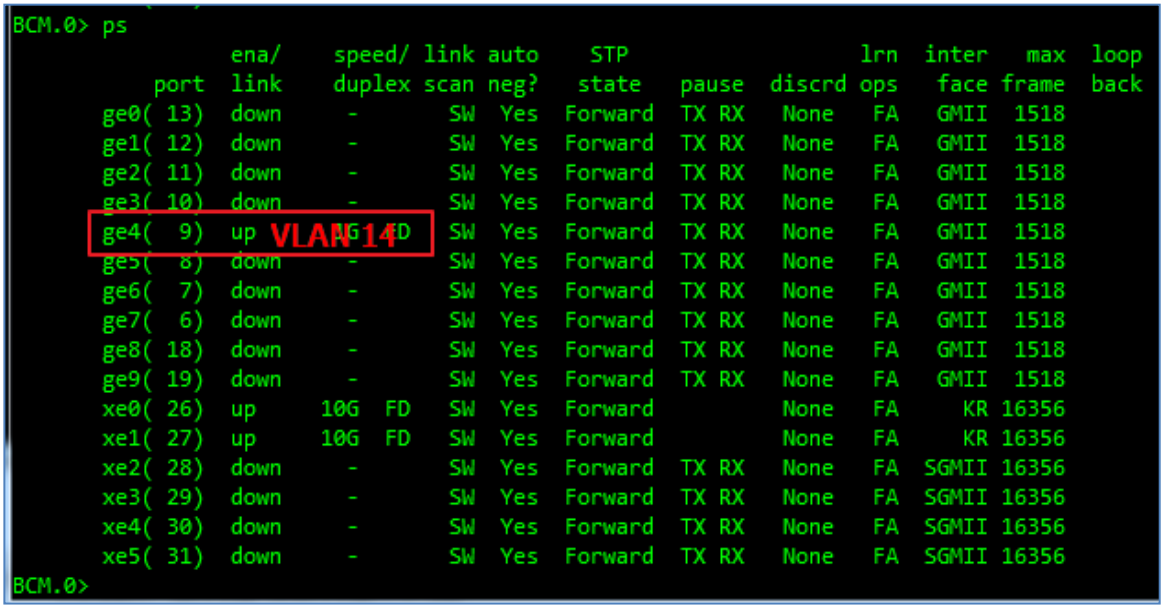
Note

The interface name, **enp183s0f0.xx** and **enp183s0f1.xx**, displayed in the example are based on the actual condition of system

Host Receives a Packet with VLAN Tag

- Setup an IP address of PC with same IP subnet as host side specific interface, e.g., **enp183s0f0.14**
- Connect PC copper port to BCM switch copper port **ge4**.





- Use tcpdump utility to capture packets

  `sudo tcpdump -nni enp183s0f0 -e -v vlan`

- Send a ping request from PC to Host
- The host received the ARP & ICMP requests with VLAN tag from interface **enp183s0f0.14** and sent the replies with VLAN tag as well.

```
C:\Users\owen_wu>ping 10.10.14.1 -n 1

Ping 10.10.14.1 (使用 32 位元組的資料):
回覆自 10.10.14.1: 位元組=32 時間=1ms TTL=64
```

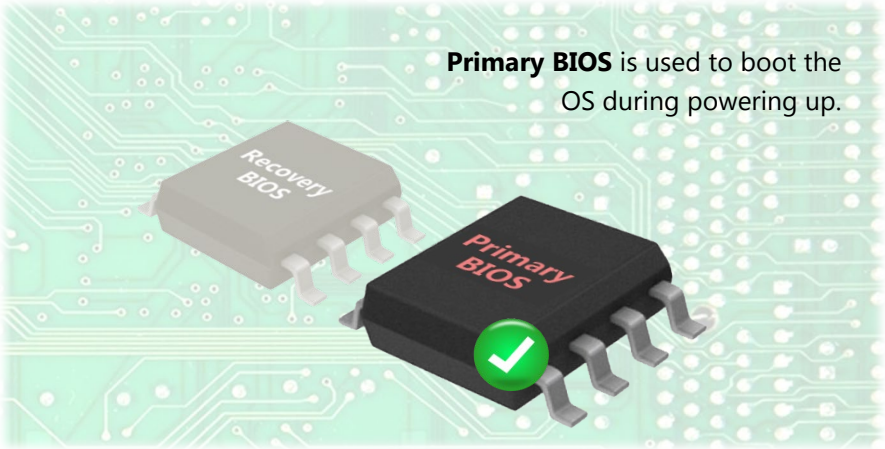
```
05:42:11.945624 30:65:ec:bd:ce:02 > ff:ff:ff:ff:ff:ff, ethertype 802.1Q (0x8100), length 64: vlan 14, p 0, ethertype A
RP, Ethernet (len 6), IPv4 (len 4), Request who-has 10.10.14.1 tell 10.10.14.100, length 46
05:42:11.945650 00:90:0b:7c:66:0b > 30:65:ec:bd:ce:02, ethertype 802.1Q (0x8100), length 46: vlan 14, p 0, ethertype A
RP, Ethernet (len 6), IPv4 (len 4), Reply 10.10.14.1 is-at 00:90:0b:7c:66:0b, length 28
05:42:11.946266 30:65:ec:bd:ce:02 > 00:90:0b:7c:66:0b, ethertype 802.1Q (0x8100), length 78: vlan 14, p 0, ethertype I
Pv4, (tos 0x0, ttl 128, id 2206, offset 0, flags [none], proto ICMP (1), length 60)
    10.10.14.100 > 10.10.14.1: ICMP echo request, id 1, seq 3228, length 40
05:42:11.946298 00:90:0b:7c:66:0b > 30:65:ec:bd:ce:02, ethertype 802.1Q (0x8100), length 78: vlan 14, p 0, ethertype I
Pv4, (tos 0x0, ttl 64, id 30273, offset 0, flags [none], proto ICMP (1), length 60)
    10.10.14.1 > 10.10.14.100: ICMP echo reply, id 1, seq 3228, length 40
```

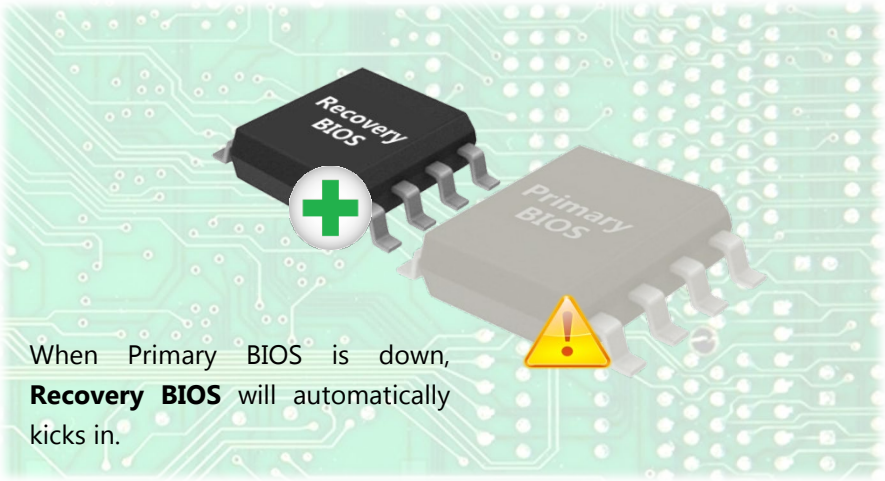
APPENDIX C: DUAL BIOS INTRODUCTION

Why Dual BIOS?

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

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



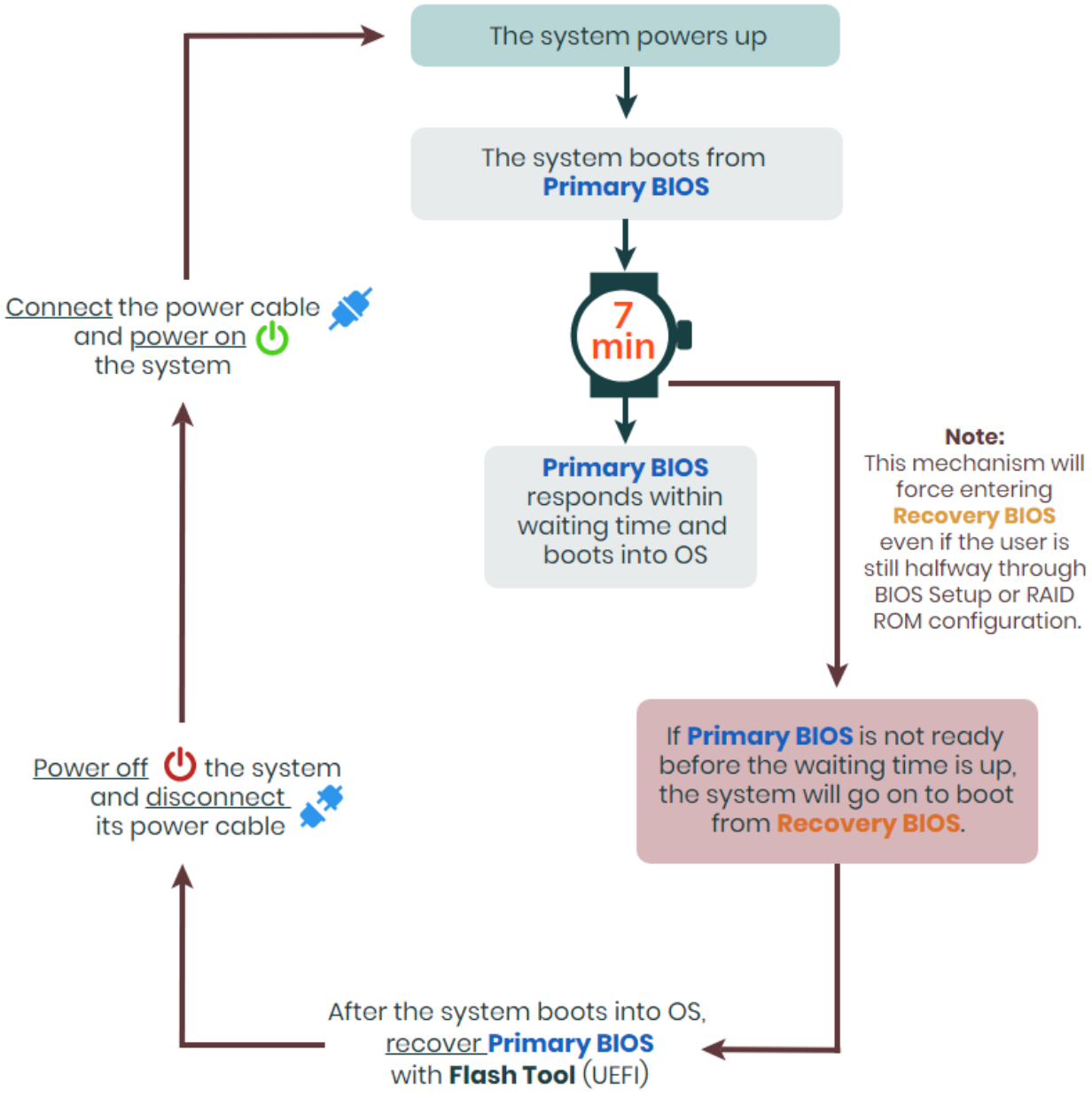


Addressing BIOS Start-up Failure with Dual BIOS

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

How Dual BIOS Works

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



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

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

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

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

Get Ready for BIOS Update

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

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

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

APPENDIX D: TERMS AND CONDITIONS

Warranty Policy

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

RMA Service

Requesting an RMA#

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

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

RMA Service Request Form

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

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time 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