

Lanner

Industrial Embedded Platforms

Intelligent Edge Computing Solutions for Smart City

NCA-5310 User Manual

Version: 1.3

Date of Release:2023-07-31

About this Document

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

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

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

Icon Description

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

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

Online Resources

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

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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 (T_{ma}) specified by the manufacturer.
- ▶ Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- ▶ Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- ▶ Reliable Grounding - Reliable grounding of rack mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Warning

Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

“Product shall be used with Class 1 laser device modules.”

Avertissement

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.

“Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.”

Electrical Safety Instructions

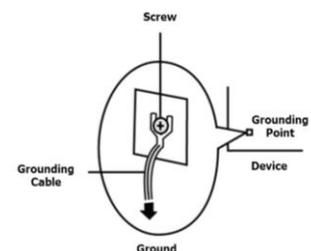
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect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

Consignes de sécurité électrique

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

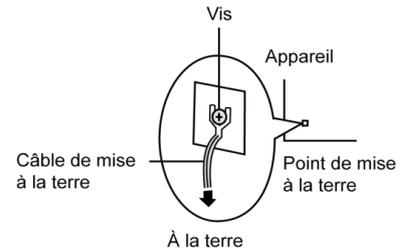
Grounding Procedure for DC Power Source

- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the DC power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before DC power.



Procédure de mise à la terre pour source d'alimentation CC

- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation CC doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



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



Important

1. The product is only to be connected to network without routing to outside plant.
2. The product is intended to be supplied UL listed DC power source with rated -48V to -60 Vdc, 22A minimum. Maximum operating ambient is 40°C minimum and the altitude of operation = 5000m minimum. The power cable should use 12 AWG minimum. If further assistance is required, please contact Lanner Technical Support.

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CHAPTER 1: PRODUCT OVERVIEW

The NCA-5310 series unit is a high performance 1U Rack mount network security system utilizing the cutting-edge capabilities of the AMD Rome/Naples platform with one EPYC 7000 Series CPU.

Main Features

- ▶ AMD EPYC 7000 Series w/ Support for Naples (up to 32C64T) & Rome (up to 64C128T)
- ▶ 8x 288-pin DIMM, Max. 512GB DDR4 3200MHz ECC R-DIMM
- ▶ 1x GbE RJ45 Intel® i210, Max. 4x NIC Module Slots
- ▶ Max. 2x 2.5" Bays, 1x RJ45 Console, 1x PCIe*8 FHHL

Package Content

Your package contains the following items:

- ▶ 1x NCA-5310 Network Security Platform
- ▶ 2x Power cable
- ▶ 1x Ear Rack mount kit with screws
- ▶ 1x Console cable
- ▶ 1x LAN Cable (Grey)
- ▶ 2x SATA cable

Ordering Information

SKU No.	Main Features
NCA-5310A	AMD EYPC 7000 Series, w/ Support for Naples (up to 32C64T) and Rome (up to 64C128T), 1x GbE RJ45, 4x NIC Module Slots (2x by default, 2x with optional kit), 1x Console Port

Optional Accessories

Part No.	Description
PSE2811-111	TPM 2.0 Module
PSE7129-010	IPMI Card (for AMD Series)
AV-ICE06	Crypto Card A SKU: PSE5694-010; B SKU: PSE5693-010; C SKU: PSE5695-010
PSF8546-001	Front NIC Kit, cable kit for front external NIC modules (Support PCIe Gen4)
PSF8547-001	Rear PCIE Kit, cable kit for rear PCIe slot (Support PCIe Gen4)
0P1W000152000	DC 900W Power Supply Unit
098W000300014	1U Slider Rail Kit, width: 438mm; Load:27kg; Tool-less
PSF8545-001	Fan Kit

System Specifications

Form Factor		1U 19" Rackmount
Platform	Processor Options	AMD EPYC 7000 Series w/ Support for Naples (up to 32C64T) & Rome (up to 64C128T)
	CPU Socket	SP3
	Chipset	N/A
	Security Acceleration	40Gbps Encryption + 40Gbps Decryption
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 3200MHz ECC REG DIMM
	Max. Capacity	512GB
	Socket	8x 288-pin DIMM
Networking	Ethernet Ports (By SKU)	1 x GbE RJ45 Intel® i210
	Bypass	N/A
	NIC Module Slot	4x NIC Module Slots (2x by default, 2x with optional kit)
LOM	IO Interface	1 x RJ45
	OPMA slot	Yes
I/O Interface	Reset Button	1
	LED	Power/Status/Storage
	Power Button	1 x ATX Power Switch
	Console	1 x RJ45
	USB	2 x USB 3.0
	LCD Module	N/A
	Display	AC Power Inlet on PSU
Storage	HDD/SSD Support	2 x 2.5" Bays
	Onboard Slots	1 x 22110/2280 M.2 Slot
Expansion	PCIe	1 x PCIe*8 FHHL
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes (Optional)
Cooling	Processor	Passive CPU Heatsink
	System	5 x Individual Hot-swappable Cooling Fans
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~95% Non-Operating
System Dimensions	(WxDxH)	438 x 610 x 44 mm
	Weight	18 kg
Package Dimensions	(WxDxH)	739 x 582 x 215 mm
	Weight	19.5 kg
Power	Type/Watts	550W 1+1 ATX Redundant PSUs
	Input	AC 100V~240V @47~63Hz
Approvals and Compliance		RoHS, CE/FCC, UL

Front Panel



No.	Description	
F1	Reset button	For software reset
F2	LED Indicators	 <ul style="list-style-type: none"> System Power System Status HDD Activity
F3	USB Ports	2x USB 3.0
F4	RJ45 Port	1x RJ45 port
F5	Console Port	1x Console port
F6	NIC Module Slot	4x NIC Slots

Rear Panel

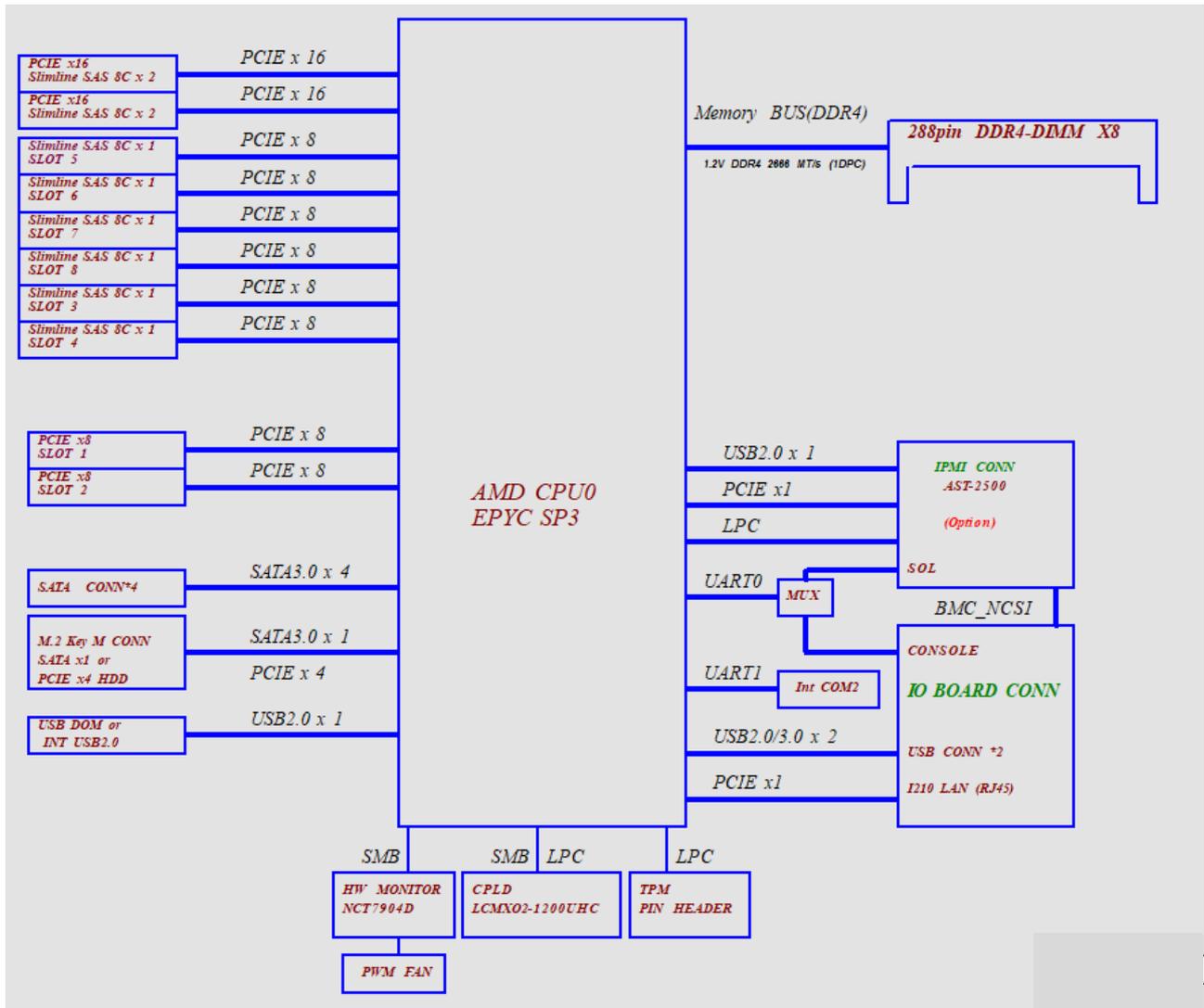


No.	Description	
R1	Power Supply	2 x 800W Redundant PSU
R2	Fans	5 x Hot-swappable Cooling Fans
R3	Power Switch	1 x Power Button

Motherboard Information

Block Diagram

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

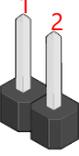
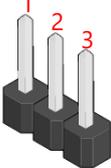


Internal Jumpers and Connectors

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

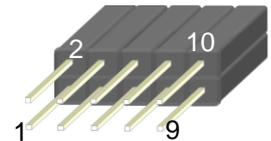
Jumper Setting

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

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

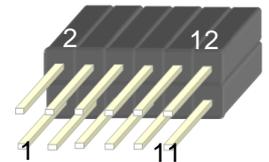
JUSB1: USB2.0

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



JTPM1

Pin No.	Description	Pin No.	Description
1	P0_SERIRQ	2	P0_LFRAME_L
3	P0_LAD0	4	TPM_LPCCLK
5	P0_LAD1	6	P3V3_SB
7	P0_LAD2	8	
9	P0_LAD3	10	P3V3
11	TPM_RST#	12	GND



ATX4: 24 Pin Power Connector

Pin No.	Description	Pin No.	Description
2	12VSB	1	GND
4	5V	3	GND
6	12V	5	GND

8	12V	7	GND
10	12V	9	GND
12	12V	11	GND
14	12V	13	GND
16	12V	15	GND
18	12V	17	GND
20	12V	19	GND
22	3V	21	GND
24	3V	23	GND

JATX4~6: 4 pin Power Connector

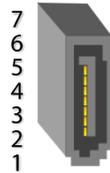
Pin No.	Description	Pin No.	Description
1	GND	2	GND
3	P3V3	4	P12V

JATXP12V: 4 pin Power Connector (Reserve)

Pin No.	Description	Pin No.	Description
1	GND	2	GND
3	P12V	4	P12V

JSATA1~JSATA4: SATA

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



SATAPWR1/2: 4 pin Power Connector

Pin No.	Description	Pin No.	Description
1	P12V	2	GND
3	GND	4	P5V

JFAN1~5: and JFAN_MID: FAN Connector

Pin No.	Description
1	Ground

2	12V
3	RPM Sense
4	RPM Sense
5	PWM Status

JGP1: EXT GPIO header

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

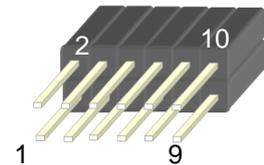
JNGFF3

Pin No.	Description	Pin No.	Description
1	GND	2	P3V3
3	GND	4	P3V3
5	PCIE_M2TX_C_PRX_N7	6	X
7	PCIE_M2TX_C_PRX_P7	8	X
9	GND	10	M.2_LED_N
11	PCIE_PTX_M2RX_N7	12	P3V3
13	PCIE_PTX_M2RX_P7	14	P3V3
15	GND	16	P3V3
17	PCIE_M2TX_C_PRX_N6	18	P3V3
19	PCIE_M2TX_C_PRX_P6	20	X
21	GND	22	X
23	PCIE_PTX_M2RX_N6	24	X
25	PCIE_PTX_M2RX_P6	26	X
27	GND	28	X
29	PCIE_M2TX_C_PRX_N5	30	X
31	PCIE_M2TX_C_PRX_P5	32	X
33	GND	34	X
35	PCIE_PTX_M2RX_N5	36	X
37	PCIE_PTX_M2RX_P5	38	N
39	GND	40	X
41	PCIE_M2TX_C_PRX_N4	42	X
43	PCIE_M2TX_C_PRX_P4	44	X
45	GND	46	X

47	PCIE_PTX_M2RX_N4	48	X
49	PCIE_PTX_M2RX_P4	50	NGFF_M2_RST#
51	GND	52	NGFF_CLKREQ#
53	M2_CLK_N	54	NGFF_PWAKE#
55	M2_CLK_P	56	X
57	GND	58	X
67	X	68	NGFF_32K_CLK_R
69	M2_PEDET	70	GND
71	GND	72	GND
73	GND	74	GND
75	GND		

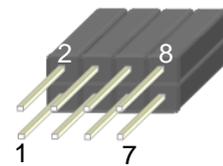
JCOM2: COM PORT

Pin No.	Description	Pin No.	Description
1		2	
3	BMC_COM2_RX	4	BMC_COM2_RTS
5	BMC_COM2_TX	6	BMC_COM2_CTS#
7		8	
9	IO_GND2	10	P5V



JPMB1: PMBUS

Pin No.	Description	Pin No.	Description
1	P3V3_SB	2	
3	ATX_PSON#	4	GND
5	ATXPWGD	6	PMBUS_CLK
7	PMBUS_DAT	8	PMBUS_ALERT#



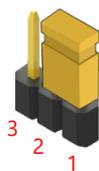
JOPEN1: Case open

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



JCMOS1 : Clear CMOS

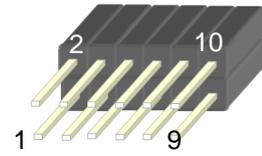
Pin	Description
1	VRTC
2	PCH_RTCRST#
3	GND



Function	Description
1-2	Normal
2-3	Clear CMOS

JSPIROM1: Flash BIOS

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



JDUAL1 : Chip Select

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

JPWR1: Power on

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



JIOB1: IO board

Pin No.	Description	Pin No.	Description
B1	P3V3	A1	P0_UART0_TXD
B2	P3V3	A2	GND
B3	P3V3	A3	P0_UART0_RXD
B4	P0_SPD_SMBUS_CLK	A4	IOBAORD_DETECT
B5	P0_SPD_SMBUS_CLK	A5	P0_UART0_CTS_L
B6	P0_SPD_SMBUS_CLK	A6	P0_UART0_RTS_L
B7	P0_SPD_SMBUS_CLK	A7	USB_OC#0
B8	LED_GRN_STATUS	A8	USB_OC#1
B9	LED_YEW_STATUS	A9	HDD_LED#
B10	PCIE_RST#_IOBMC	A10	FP_RESET#
B11	PCIE_WAKE_L	A11	P3VP_SB
B12	GND	A12	P3VP_SB
B13	x	A13	P3VP_SB
B14	x	A14	GND
B15	GND	A15	CLK_LAN1_CLKDP
B16	x	A16	CLK_LAN1_CLKDN
B17	x	A17	GND
B18	GND	A18	PCIE_PTX_C_LANRX_P8

B19	x	A19	PCIE_PTX_C_LANRX_N8
B20	x	A20	GND
B21	GND	A21	PCIE_PTX_C_LANRX_P10
B22	x	A22	PCIE_PTX_C_LANRX_N10
B23	x	A23	GND
B24	GND	A24	PCIE_PTX_C_LANTX_P8
B25	USB20_P0	A25	PCIE_PTX_C_LANTX_N8
B26	USB20_N0	A26	GND
B27	GND	A27	PCIE_PTX_C_LANTX_P10
B28	USB20_P1	A28	PCIE_PTX_C_LANTX_N10
B29	USB20_N1	A29	GND
B30	GND	A30	X
B31	USB3_HTX_DRX_N0	A31	X
B32	USB3_HTX_DRX_P0	A32	X
B33	GND	A33	X
B34	USB3_HRX_DTX_N0	A34	X
B35	USB3_HRX_DTX_P0	A35	X
B36	GND	A36	GND
B37	USB3_HTX_DRX_N1	A37	X
B38	USB3_HTX_DRX_P1	A38	X
B39	GND	A39	X
B40	USB3_HRX_DTX_N1	A40	X
B41	USB3_HRX_DTX_P1	A41	X
B42	GND	A42	X
B43	BMC_RMII2_RXD0	A43	GND
B44	BMC_RMII2_CRSDV	A44	BMC_RMII2_RCLK
B45	BMC_RMII2_RXD1	A45	GND
B46	GND	A46	P5V
B47	BMC_RMII2_TXD0	A47	P5V
B48	BMC_RMII2_TXEN	A48	P5V
B49	BMC_RMII2_TXD1	A49	P5V

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 and wear ESD protection gloves.

Opening the Chassis

1. Loosen the 2 thumb screws on the rear panel.



2. Gently pull the top cover backward a bit, and lift the cover up to remove it.

Installing the CPU

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

Installing the processor onto the motherboard involves two stages:

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

Tools Required

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

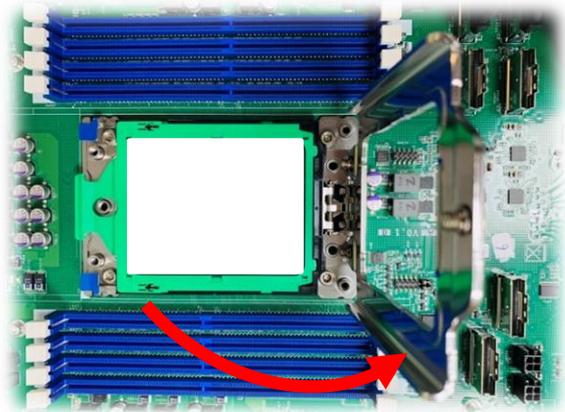
Note: The images of tools shown in this document are merely for reference; the actual tools you use might differ.

Mounting the CPU onto the Heat Sink

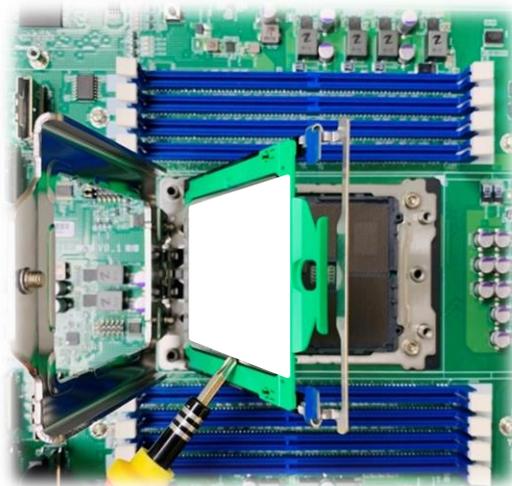
1. Loosen the screws that secure metal frame in the sequence of #3→#2→#1 using the T20 torque.



2. Once #1 screw is loosened, the metal frame will pop up by itself.



3. Gently lift the inner frame by the blue tab, and pull out the protective cap.



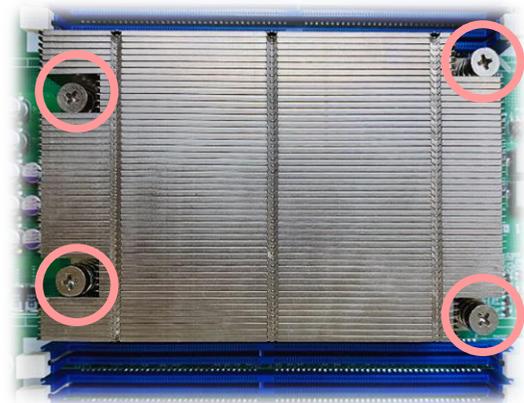
- Carefully insert the CPU. Make sure the alignment corner marked on the CPU matches that of the metal frame. When securing the metal frame, fasten the screws in the sequence of #1→#2→#3.



Alignment mark



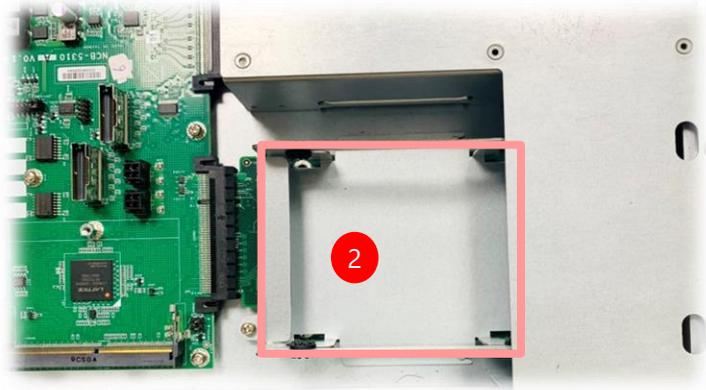
- Secure the heat sink onto the CPU with the four 4 screws.



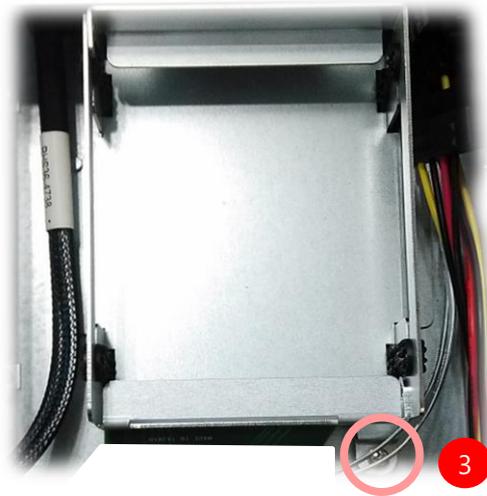
Installing the Disk Drive(s)

NCA-5520 is built with two 2.5" HDD/SSD slot (HDD preferred) drive bay. The following will discuss disk drive installation procedures based on their HDD/SSD designs.

1. Power off the system.
2. Locate the 2.5" disk bay on the front panel.



3. Loosen the screw that fixes the tray onto the motherboard.



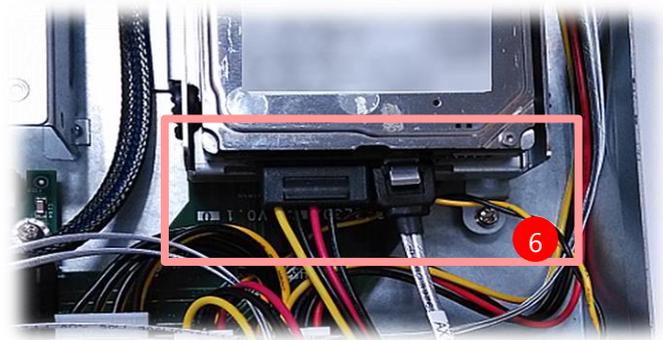
4. Mount the disk onto the empty tray. Make sure the disk connector faces the SATA contacts inside the system.



5. Install the tray back to the original position with the screw. Make sure the notch of the tray's side engages properly into the pin as shown in the picture.



6. Connect the SATA cable and SATA power cable to the hard disk.



Installing the TPM Module

The motherboard provides one Trusted Platform Module (TPM) slot. Follow the procedures below for installing a TPM.

1. Locate the TPM socket.



2. Carefully insert the TPM. Make sure the alignment corner marked on the motherboard matches that of the TPM.



Installing the NIC Modules

This system comes with NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

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

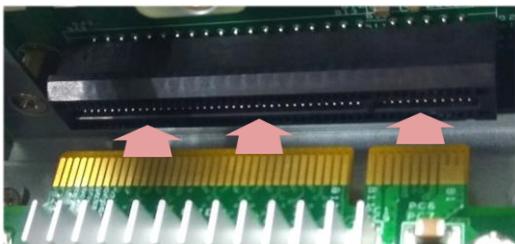
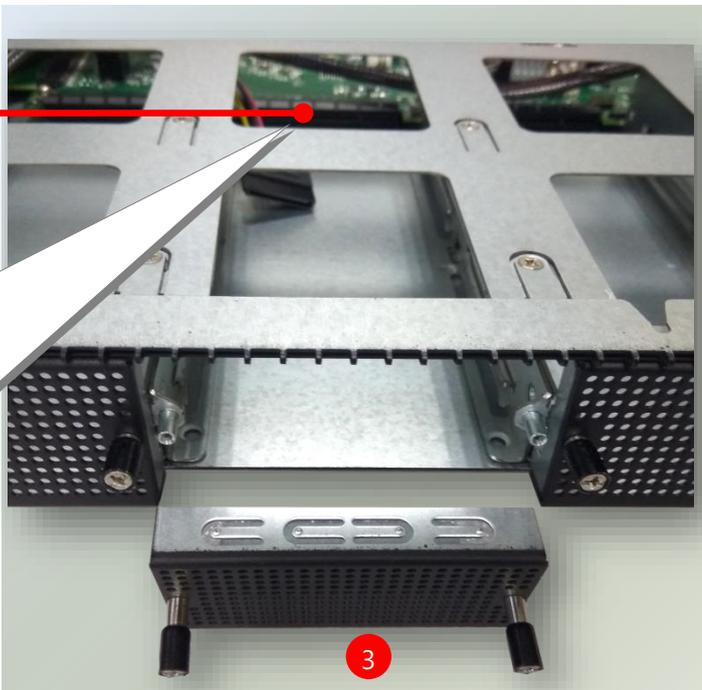


2. Rotate clockwise and loosen the two lock-screws.



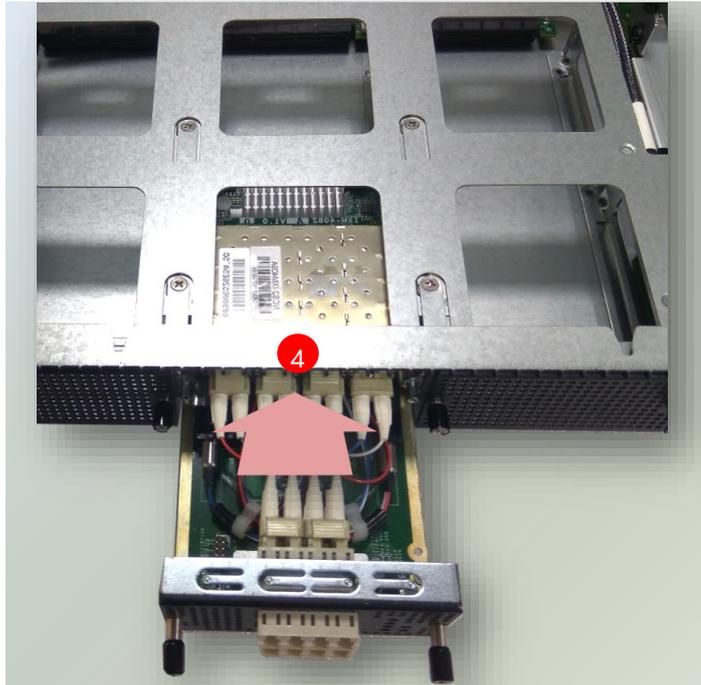
3. Remove the door and locate the socket for module insertion.

Socket



Align the golden fingers to the socket on the motherboard carefully while inserting this module.

4. Insert the NIC module. (The module shown in the image below is for reference only).



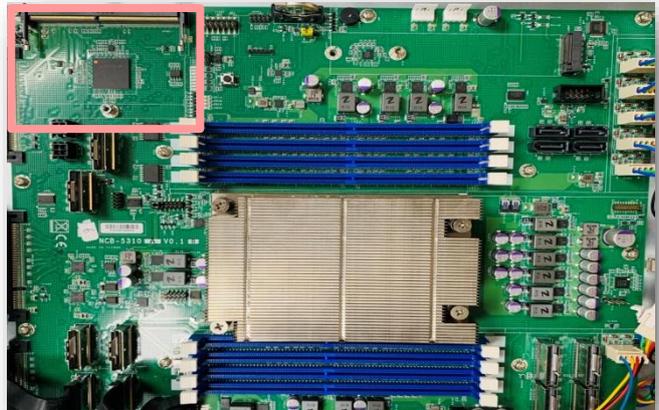
2. Once the module is firmly seated, rotate counter-clockwise and tighten the two lock-screws.



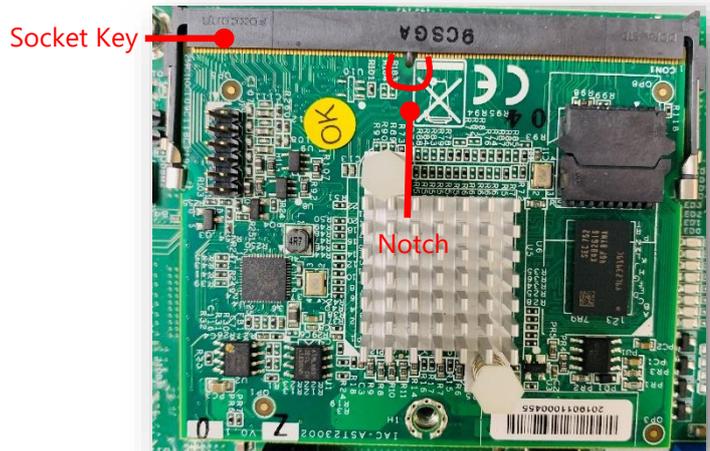
Installing the IPMI card

The motherboard provides one IPMI slot. Follow the procedures below for installing an IPMI card.

1. Locate the IPMI socket. Align the notch of the card with the socket key in the slot.



2. Insert the module at 30 degrees into the socket until it is fully seated in the connector.



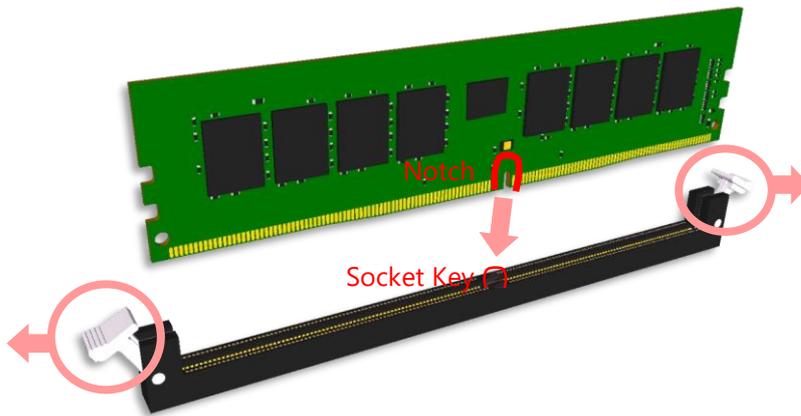
3. Push down on the module and secure it with screws that come with it.



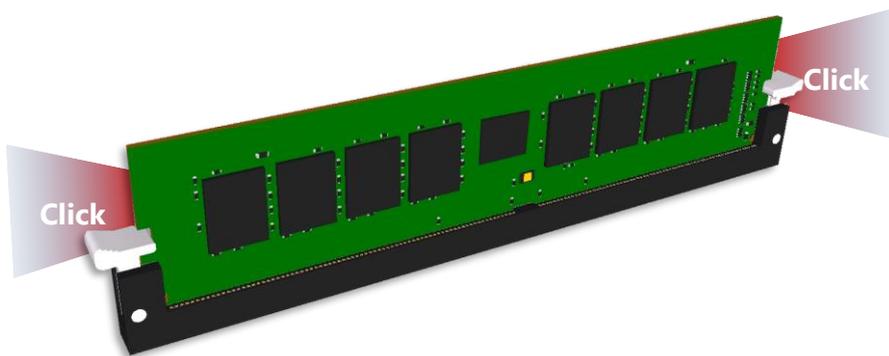
Installing the System Memory

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

1. Power off the system.
2. Pull open the DIMM slot latches.
3. Align the notch of the module with the socket key in the slot and carefully insert the card into the slot.



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



Installing the M.2 Storage

The motherboard supports one M.2 storage, please follow the steps below to install it.

1. Locate the M.2 slot.



2. Align the notches of the module with the socket keys in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.

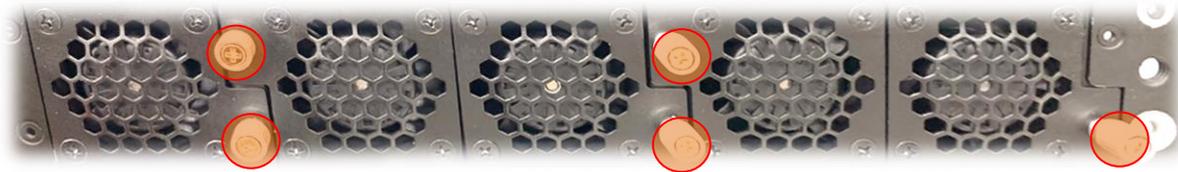


3. Push down the module and secure it with the screw that comes with it.

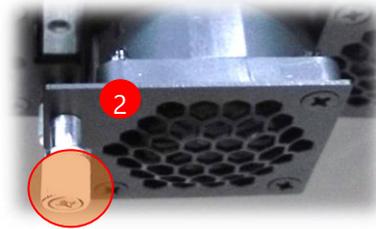


Replacing the Cooling Fans

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. On the rear panel, loosen the screws that secure the fan.
2. Take out the worn fan and disconnect its power cable connector from the motherboard.
3. Install a new fan by reversing the above steps.



Installing the AC Power Supply

Power supply units wear down eventually. Please be noted that this system supports only 850W PSU. Please prepare the power supply units matching this capacity.

1. On the rear panel, locate the power supply units and disconnect the power cords.
2. Pull the original unit out and replace it with a new one.



Mounting the System

► With Slide Rackmount Rail Kit + Short Ear Brackets



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

1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:
 - 1x pack of M4X4L screws (for securing the sliding rail on the system)
 - 2 x Slide Rails

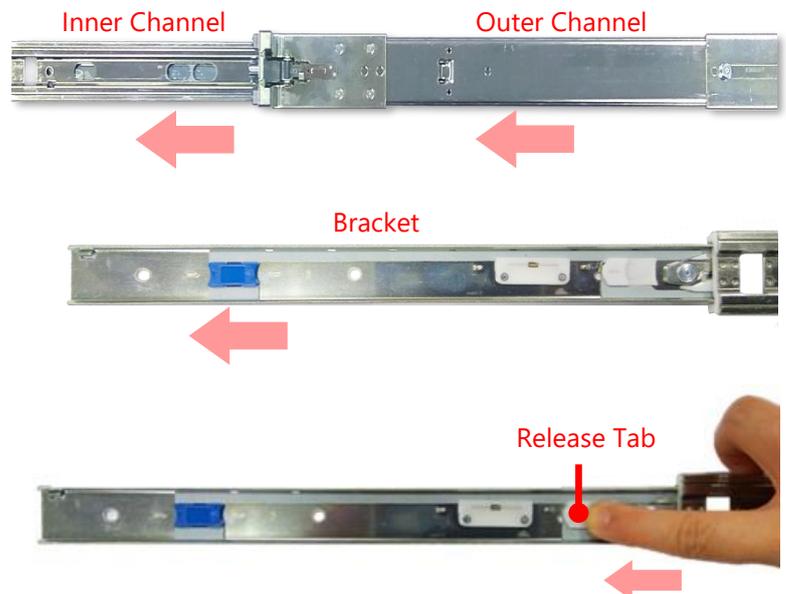


The rail consists of the following parts:



Attaching the Rail Brackets

2. Unpack a slide rail and slide the Inner Channel all the way to the end.
3. Stretch the Rail Bracket to the fullest.
4. Remove the Rail Bracket from the Inner Channel by pushing the Release Tab on the Rail Bracket outwards while sliding it out.



5. Align the bracket on the side of the system and make sure the screw-holes are matched. Then secure the bracket onto the system with three (3) screws.



6. Repeat for the other side of the system.

Assembling the Ear Brackets

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



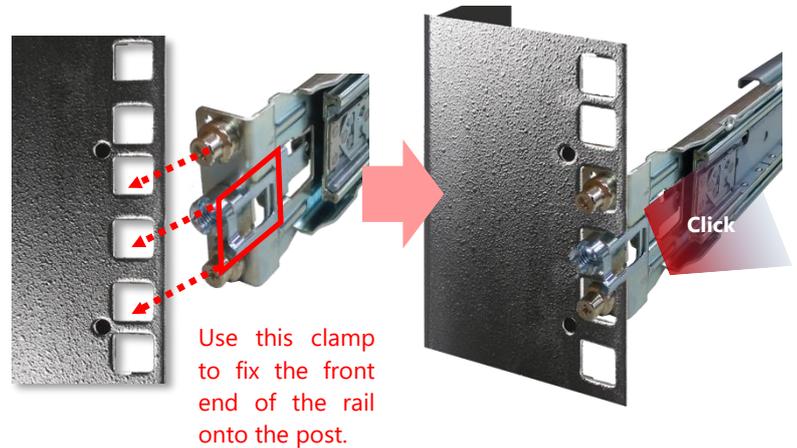
2. Install the Ear Brackets on both sides of the system using the provided screws.



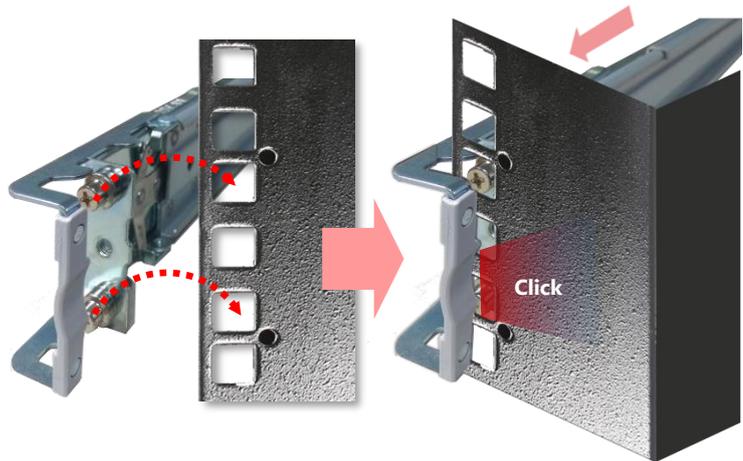
Installing the Slide Rails

Next, to install the slide rails onto the rack.

1. This slide rail kit does NOT require screw-fixing. Simply latch on the three (3) available screw holes on the rack post front and lock it by clipping the rail's Outer Channel front end to the post as shown in the image. You should hear a "click" sound once it is firmly attached.

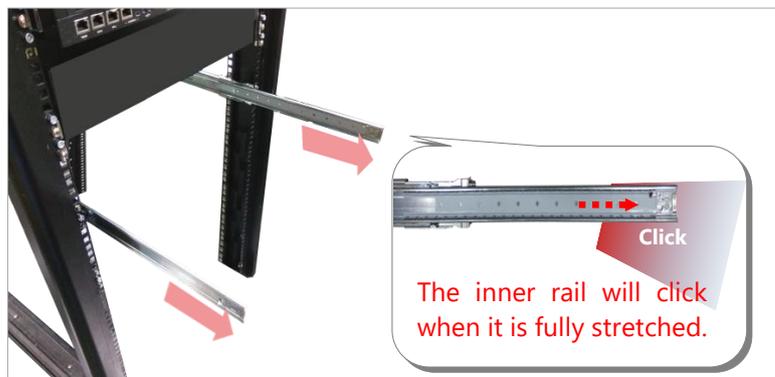


2. For the rear rack installation, latch and engage the bolts on the rail's Outer Channel end with the two (2) available holes on the rack post, and the slide rail assembly will click into place.



Installing the System into the Rack

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



2. 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 Channel as shown in the image, and then push the system into the cabinet.



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



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



5. Push the system all the way into the rack. The installation is now complete.



6. Secure the Ear Brackets onto both front posts with provided screws (if needed).



CHAPTER 3: SOFTWARE SETUP

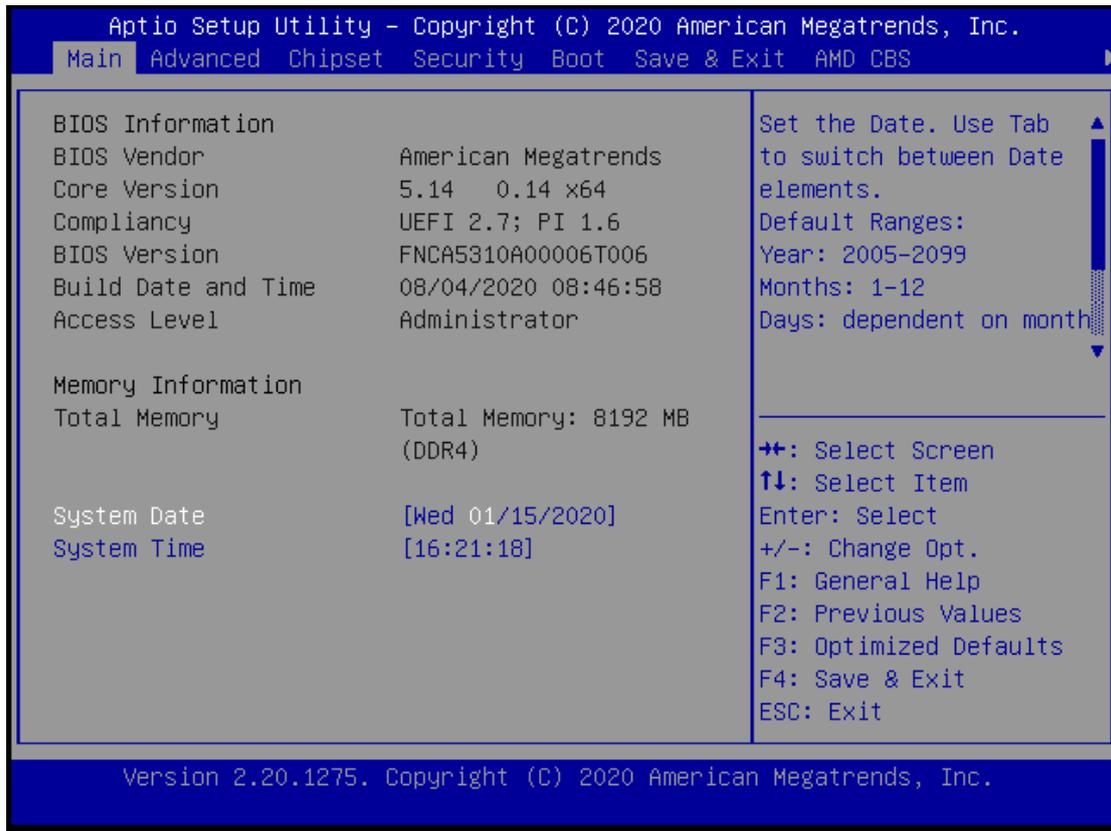
Entering Setup

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

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

Main Page

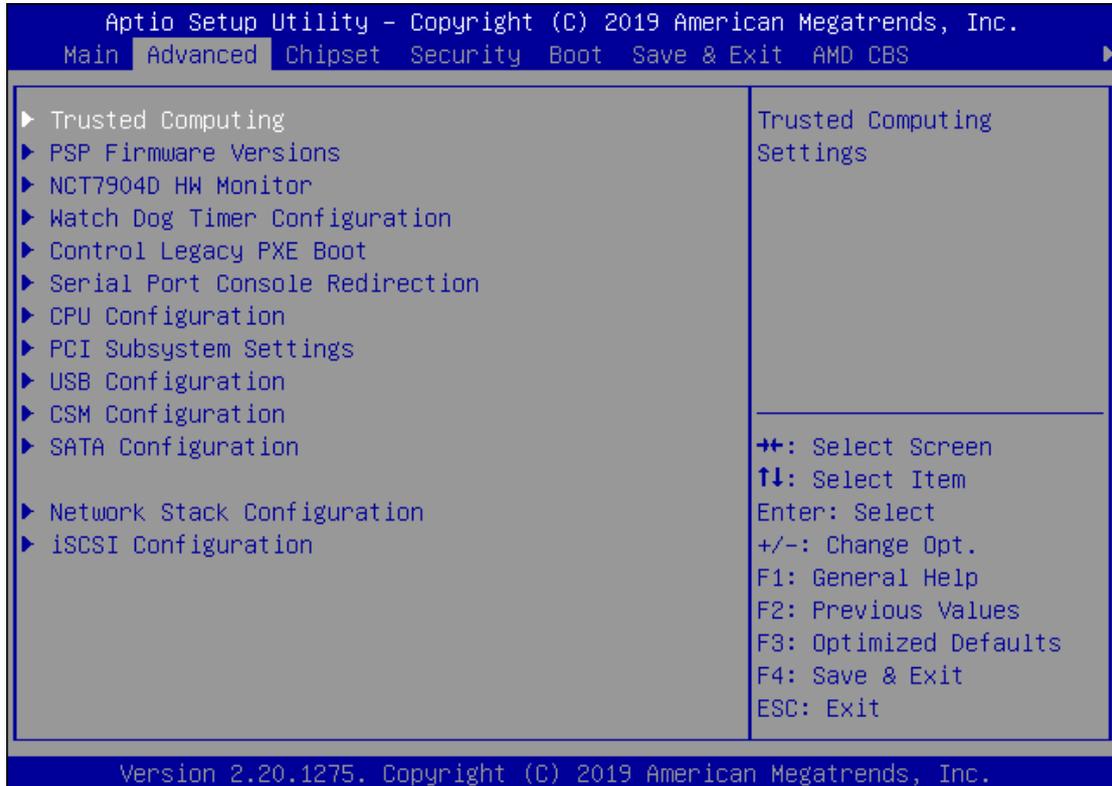
Setup main page contains BIOS information and project version information.



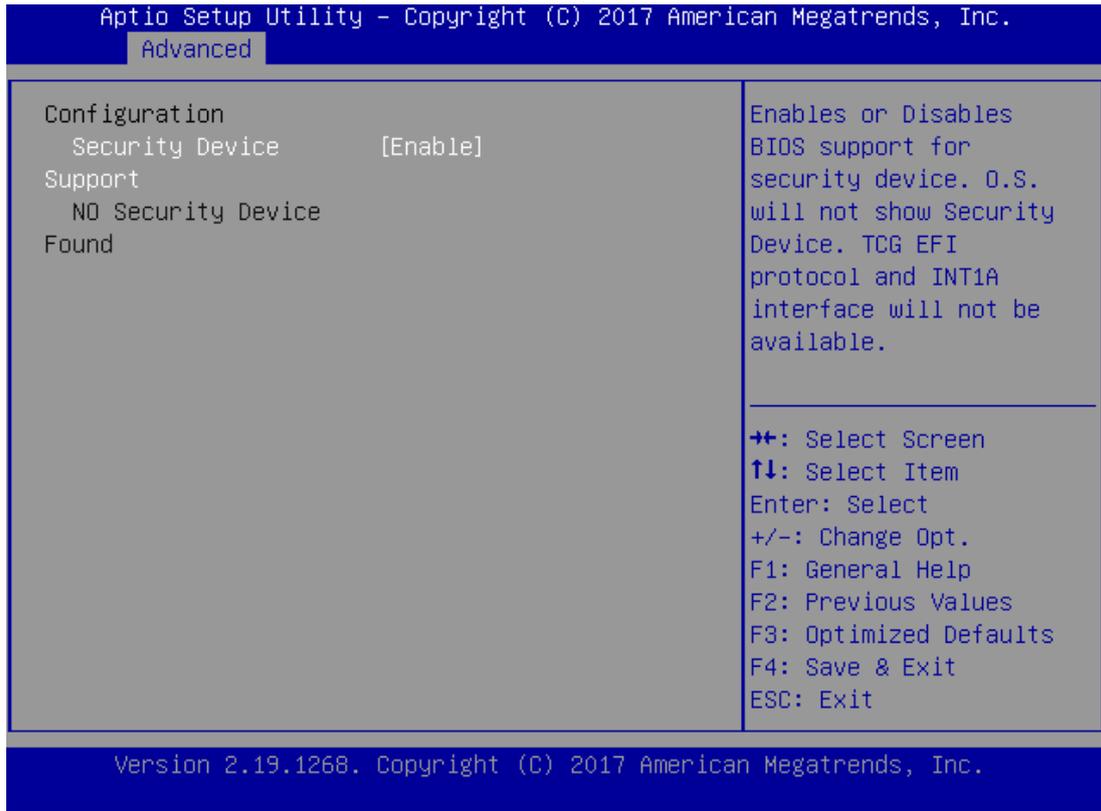
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliance: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use <Tab>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

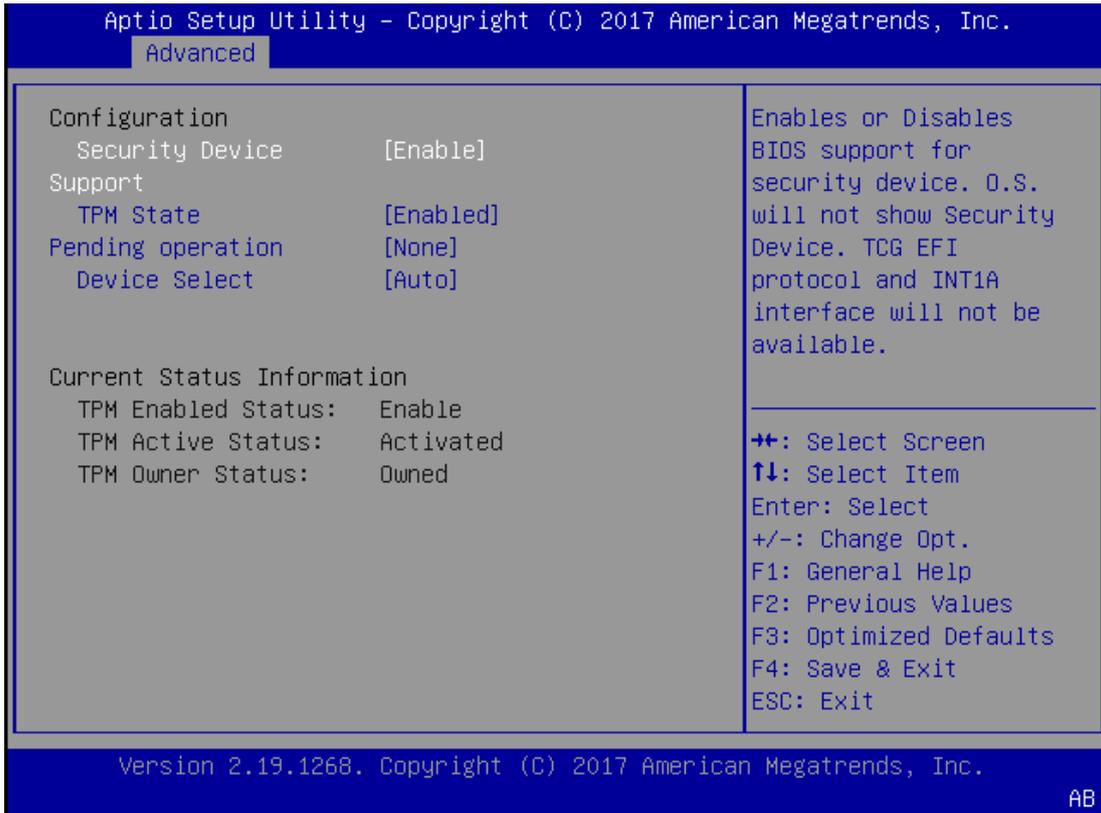


Trusted Computing



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

Trusted Computing (TPM2.0)

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Advanced

<p>TPM20 Device Found Vendor: NTC Firmware Version: 1.3</p> <p>Security Device [Enable] Support</p> <p>Active PCR banks SHA-1,SHA256 Available PCR banks SHA-1,SHA256</p> <p>SHA-1 PCR Bank [Enabled] SHA256 PCR Bank [Enabled]</p> <p>Pending operation [None] Platform Hierarchy [Enabled] Storage Hierarchy [Enabled] Endorsement [Enabled] Hierarchy</p>	<p>▲ Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.</p> <hr/> <p>↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
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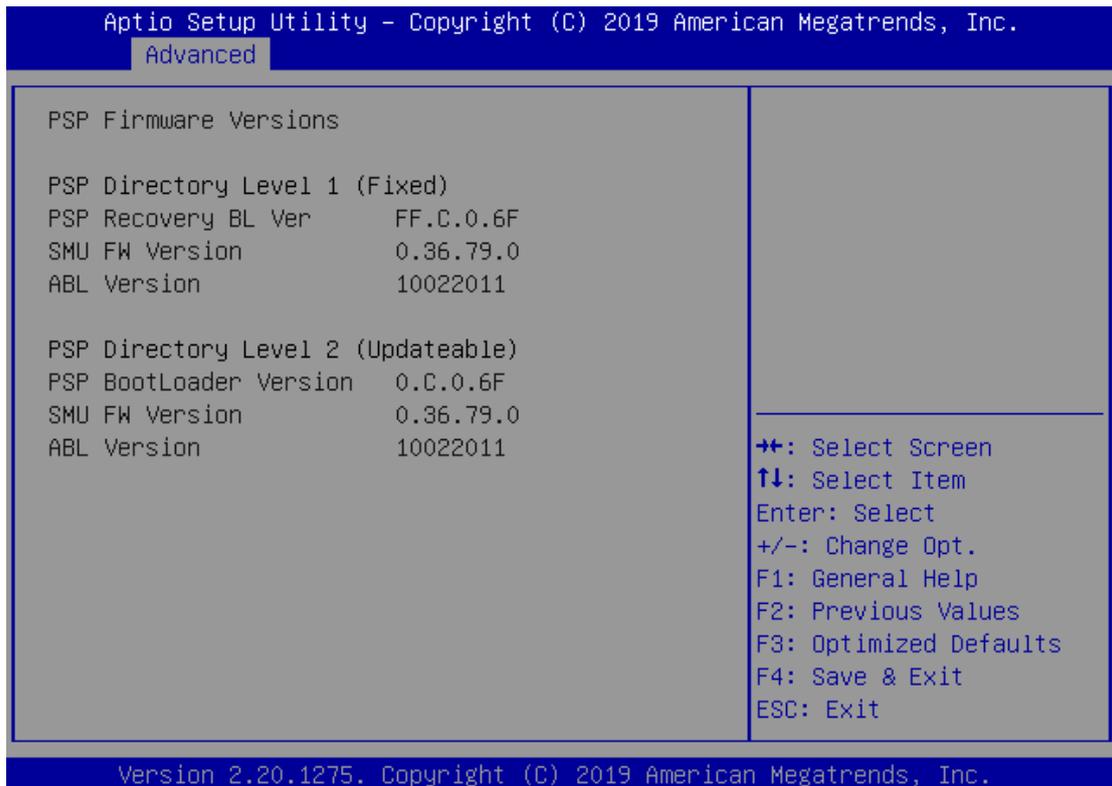
Advanced

<p>Active PCR banks SHA-1,SHA256 Available PCR banks SHA-1,SHA256</p> <p>SHA-1 PCR Bank [Enabled] SHA256 PCR Bank [Enabled]</p> <p>Pending operation [None] Platform Hierarchy [Enabled] Storage Hierarchy [Enabled] Endorsement [Enabled] Hierarchy</p> <p>TPM2.0 UEFI Spec [TCG_2] Version</p> <p>Physical Presence [1.3] Spec Version</p> <p>TPM 20 [TIS] InterfaceType</p> <p>Device Select [Auto]</p>	<p>▲ TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found,</p> <hr/> <p>↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
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Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, TCG_1_2: Supports the Compatible mode for Win8/Win10 TCG_2: Supports new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select TPM 20 Device for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	TPM 1.2 will restrict support to TPM 1.2 devices; while TPM 2.0 will restrict support to TPM 2.0 devices; Auto will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

PSP Firmware Versions



Feature	Description
PSP Firmware Versions	PSP Recovery BL Ver SMU FW Version ABL Version PSP BootLoader Version SMU Version ABL Version

NCT7904D HW Monitor

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Advanced

Pc Health Status	Smart Fan Mode Select
▶ Smart Fan Mode Configuration	
CPU0 Temp : +61 C	
System Temp1 : +33 C	
System Temp2 : +35 C	
Fan1A Speed : N/A	
Fan1B Speed : N/A	
Fan2A Speed : N/A	
Fan2B Speed : N/A	
Fan3A Speed : N/A	
Fan3B Speed : N/A	
Fan4A Speed : N/A	
Fan4B Speed : N/A	
Fan5A Speed : N/A	
Fan5B Speed : N/A	
Fan6A Speed : N/A	
12V_SENSE : +11.904 V	
	▲ ⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit ▼

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Advanced

Smart Fan Mode Configuration	Fan Mode Select
Fan Out Mode [Smart Fan Mode]	
Target 65	
Temperature1(T1)	
Target 70	
Temperature1(T2)	
Target 75	
Temperature1(T3)	
Target 80	
Temperature1(T4)	
Critical Temperature 90	
FanOut T1 Level 60	
FanOut T1 Leve2 100	
FanOut T1 Leve3 150	
FanOut T1 Leve4 220	
Fan2 Mode [Smart Fan Mode]	
	▲ ⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit ▼

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Advanced

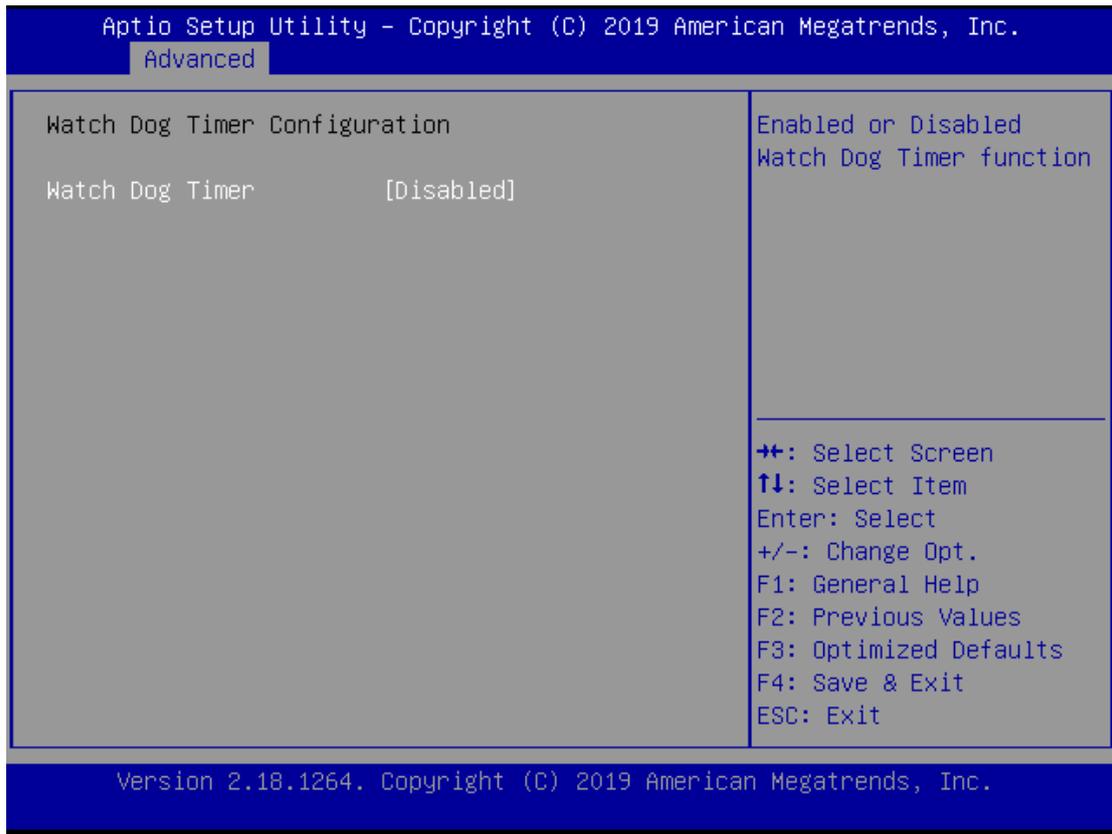
FanOut T1 Level1	60	▲	Input Target FAN Output Value(Range:0 - 255)
FanOut T1 Leve2	100		
FanOut T1 Leve3	150		
FanOut T1 Leve4	220		
Fan2 Mode	[Smart Fan Mode]		
Target	20		
Temperature1(T1)			
Target	30		
Temperature1(T2)			
Target	35		
Temperature1(T3)			
Target	45		
Temperature1(T4)			
Critical Temperature	48		
FanOut T1 Level1	60		
FanOut T1 Leve2	100		
FanOut T1 Leve3	150		
FanOut T1 Leve4	220		

▼

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

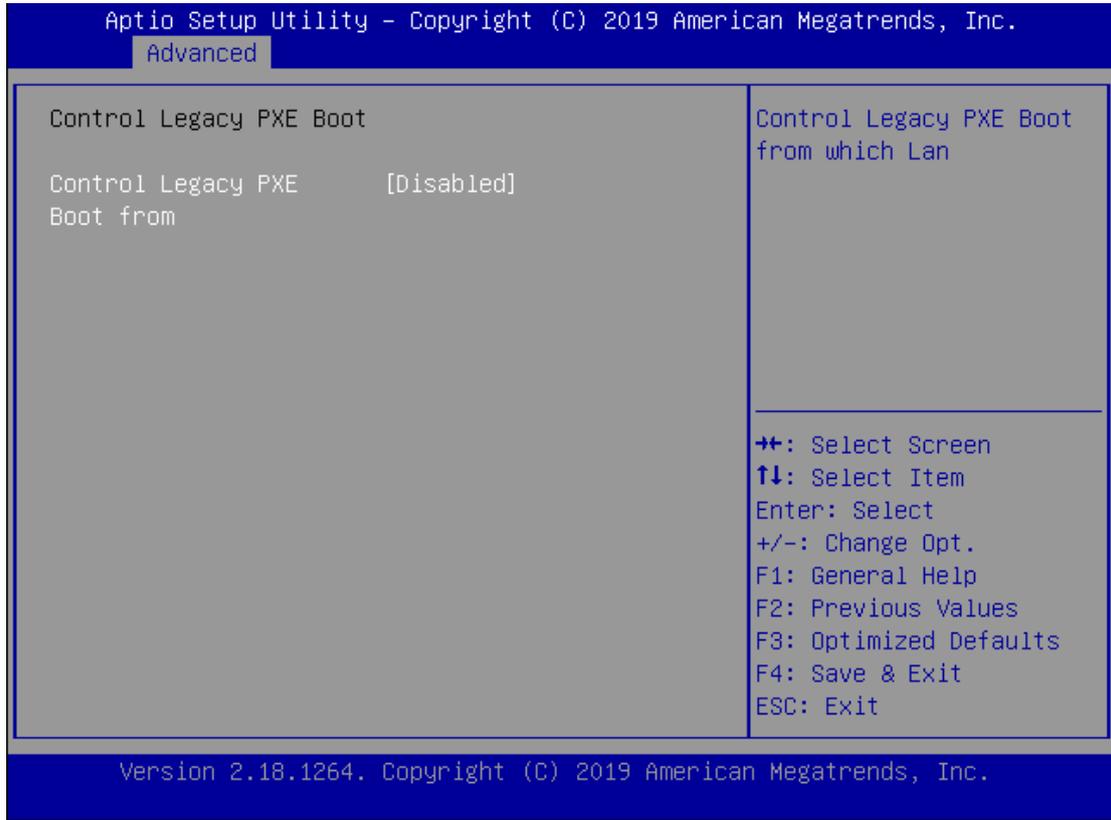
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Watch Dog Timer Configuration



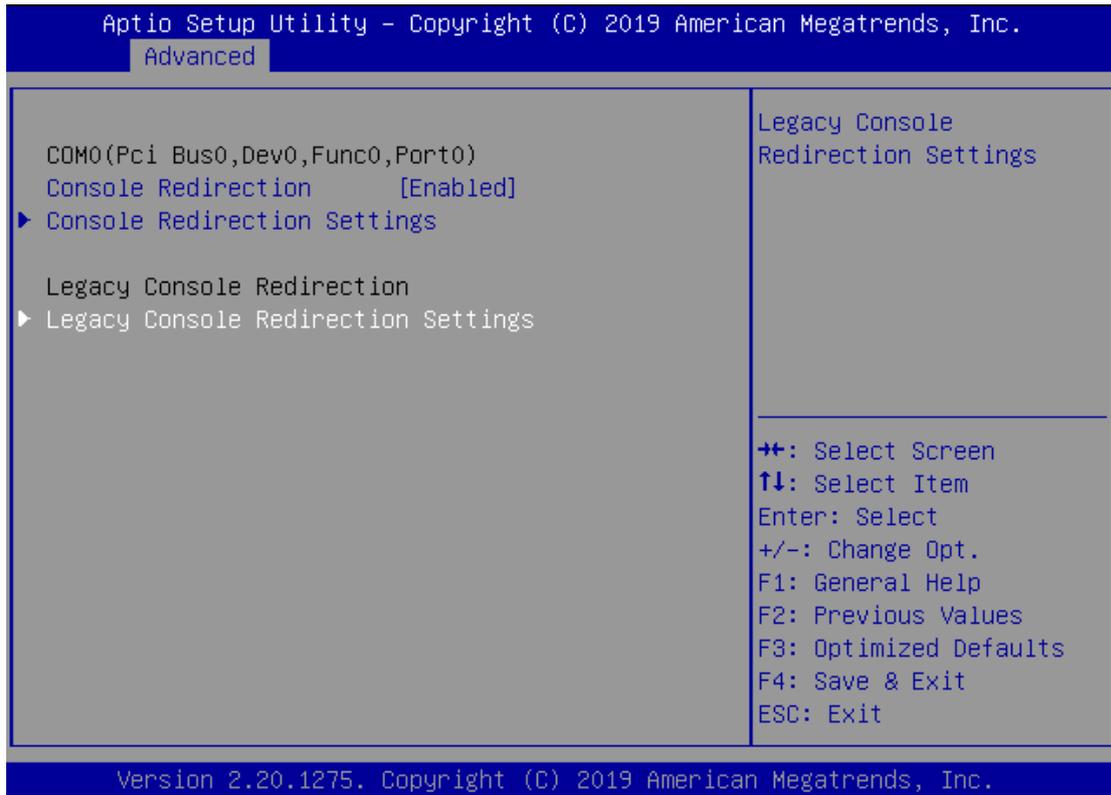
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Watch Dog Timer Enable or Disable.

Control Legacy PXE Boot



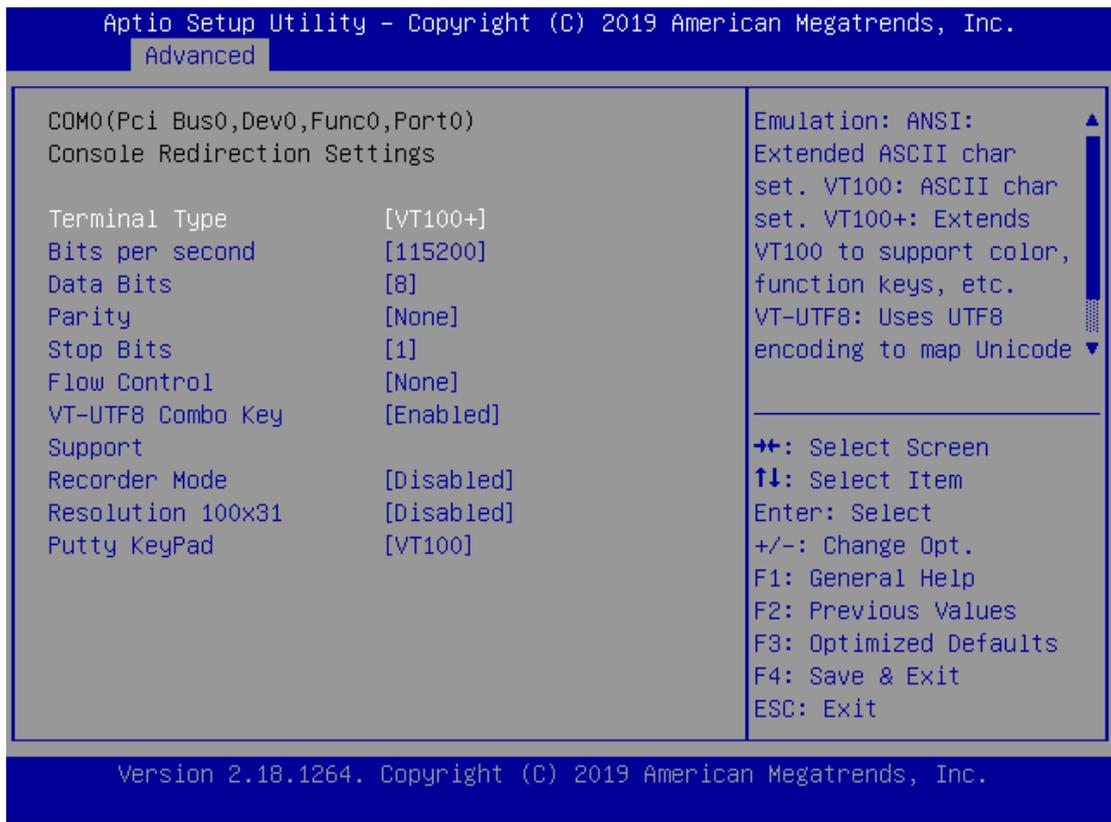
Feature	Options	Description
Control Legacy PXE Boot from	Enabled Disabled	PXE Enable or Disable.

Serial Port Console Redirection



Feature	Options	Description
Consol Redirection	Enabled Disabled	Enables or disables Console Redirection.

Console Redirection Setting



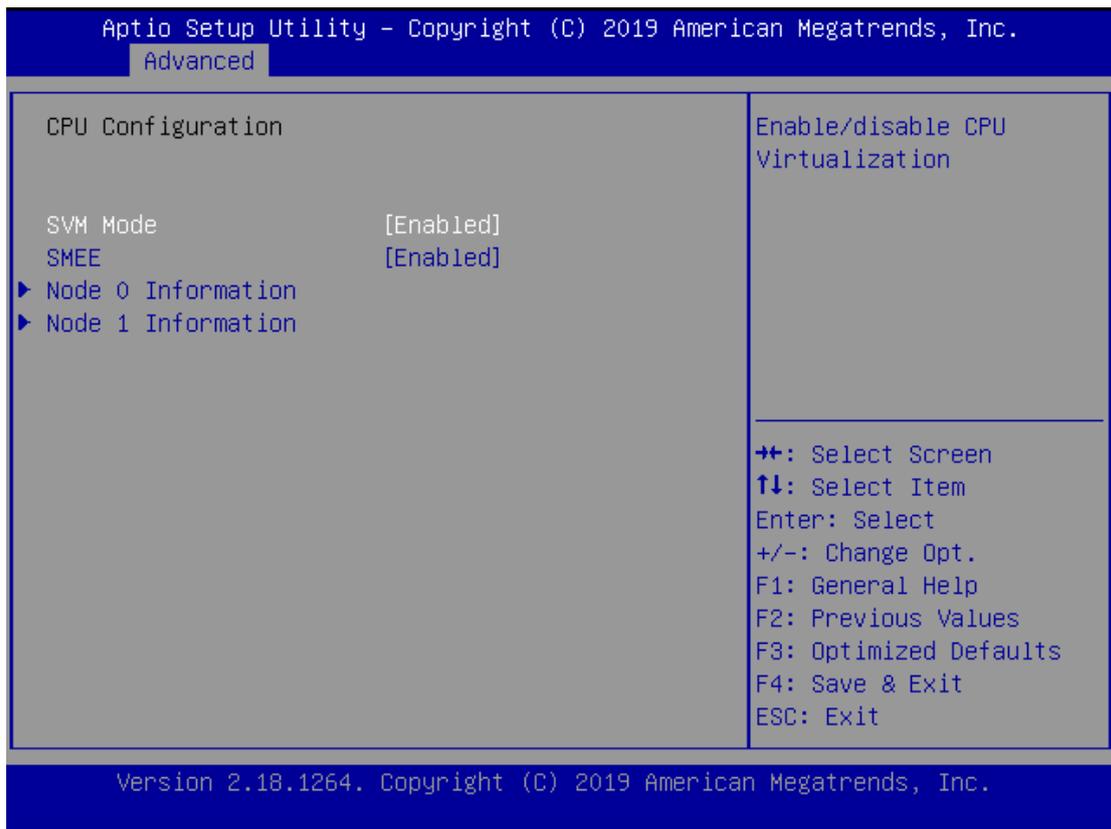
Feature	Options
Terminal Type	VT100 VT100+ VT-UTF8 ANSI
Bits per second	9600 19200 38400 57600 115200
Data Bits	7 8
Parity	None Even Odd Mark Space
Stop Bits	1 2
Flow Control	None Hardware RTS/CTS

VT-UTF8 Combo Key Support	Disabled Enabled
Recorder Mode	Disabled Enabled
Resolution 100x31	Disabled Enabled
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400

Legacy Console Redirection Settings

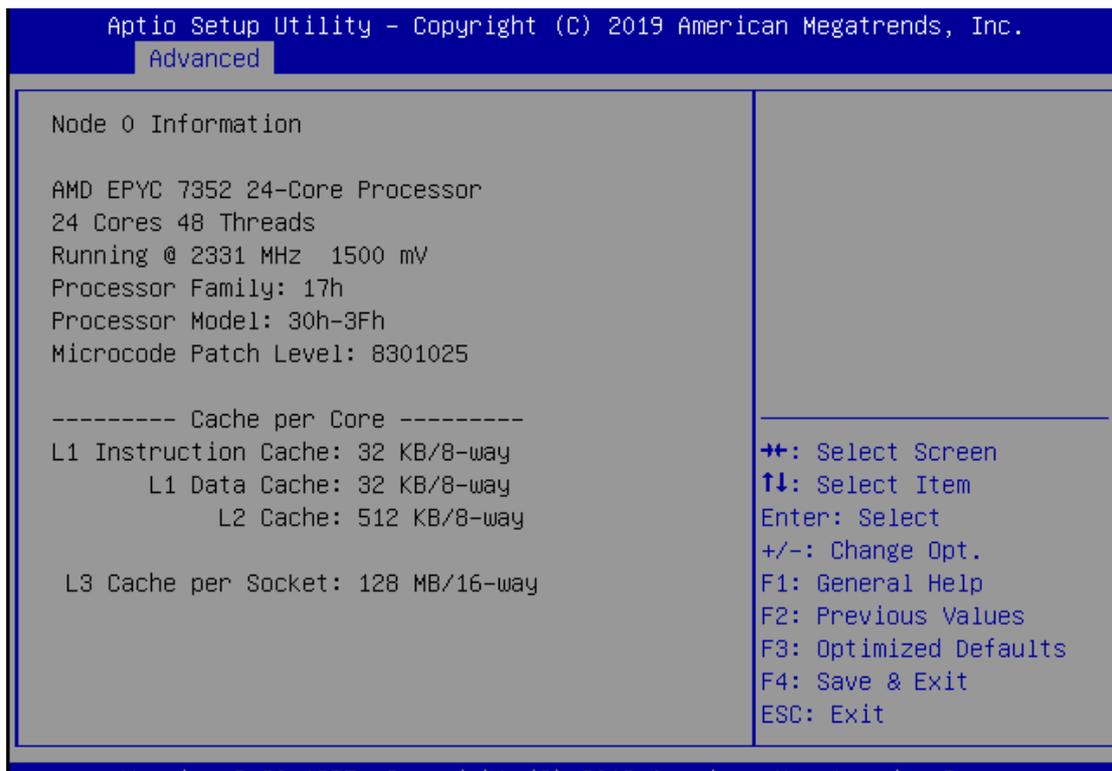


CPU Configuration

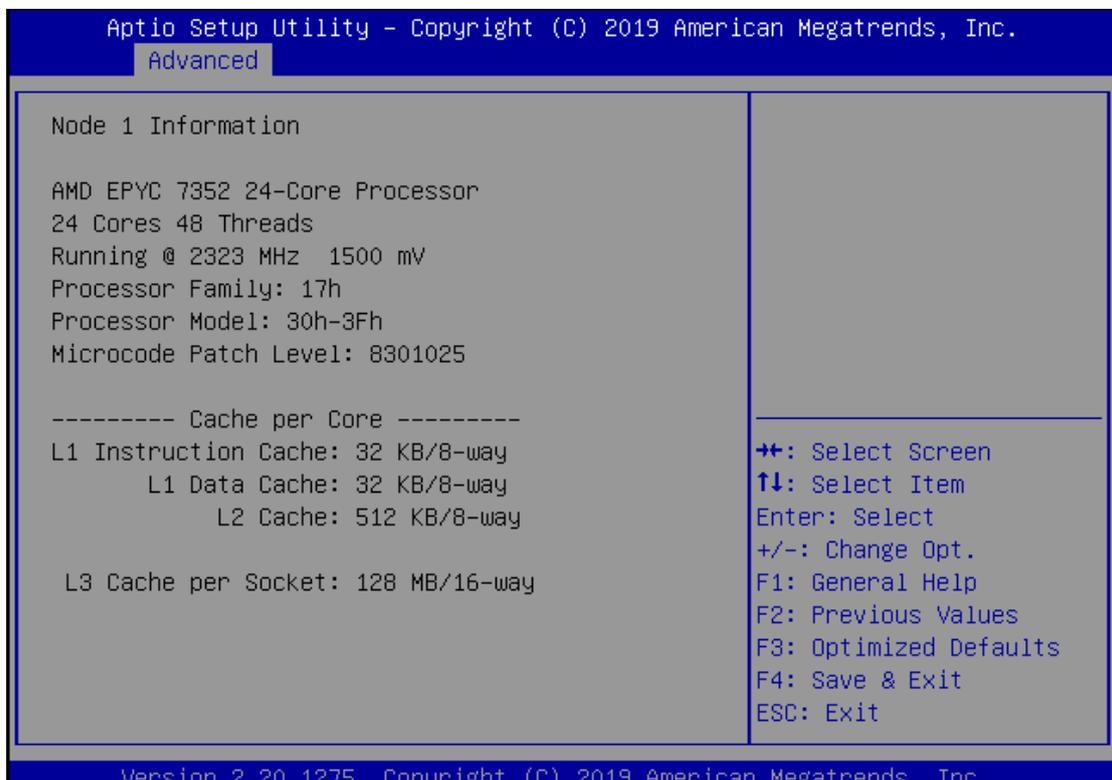


Feature	Options	Description
SVM Mode	Disabled Enabled	Enable/disable CPU Virtualization
SMEE	Disabled Enabled	Control secure memory encryption enable

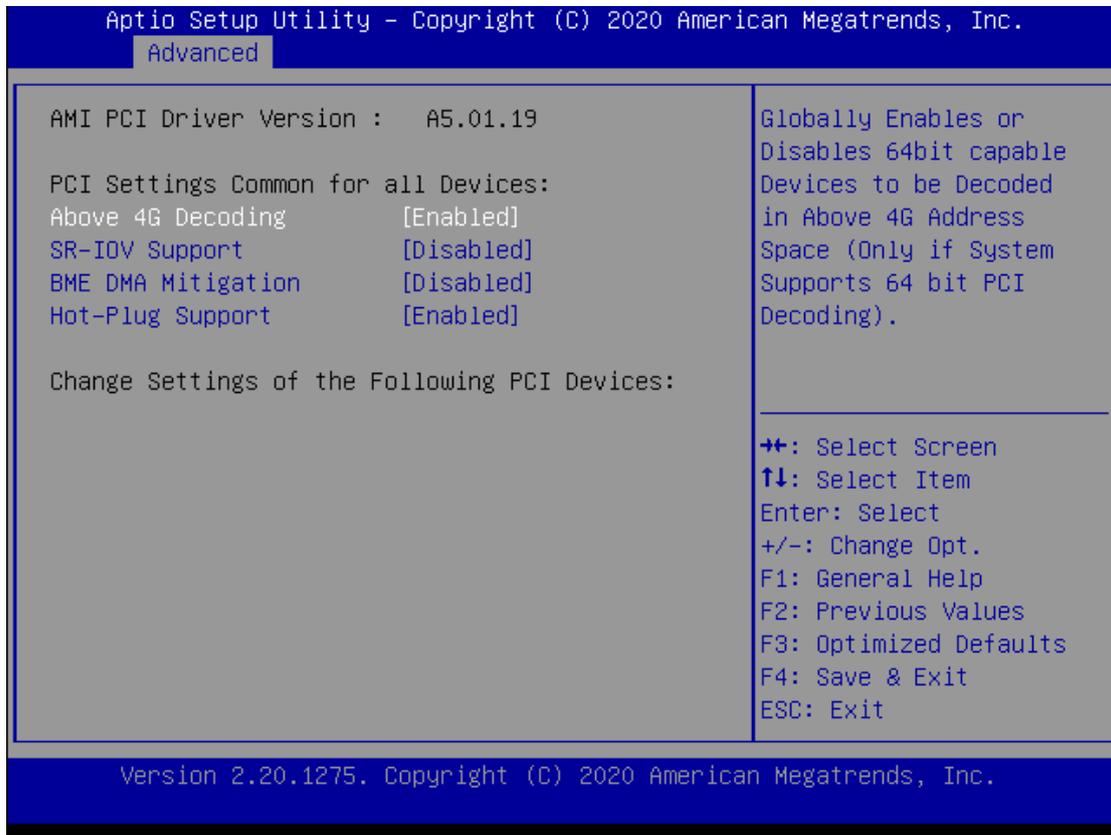
Node 0 Information



Node 1 Information

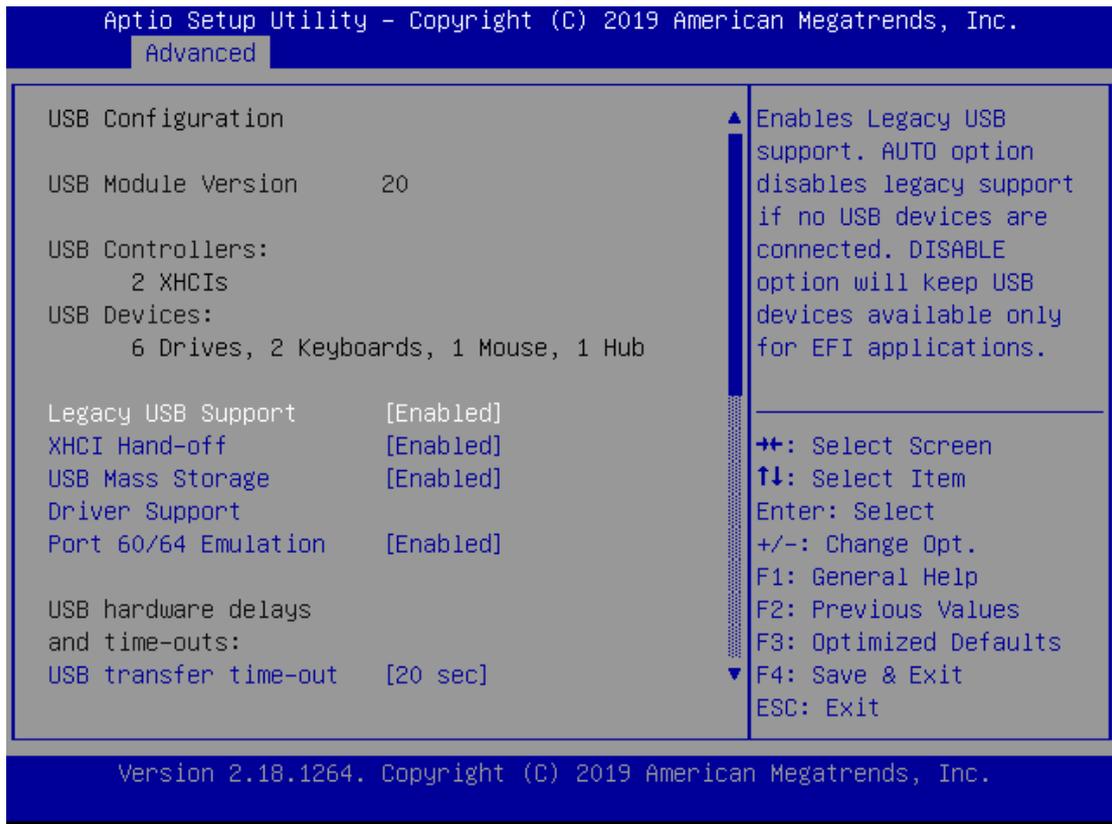


PCI Subsystem Settings



Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Globally 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 system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.
BME DMA Mitigation	Disabled Enabled	Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Lock
Hot-plug support	Disabled Enabled	Globally Enables or Disables Hot-Plug support for the entire System. If system has Hot-plug capable Slots and this option set to Enabled, it provides a Setup screen for

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	1 sec	USB mass storage device Start Unit command time-out

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

CSM Configuration

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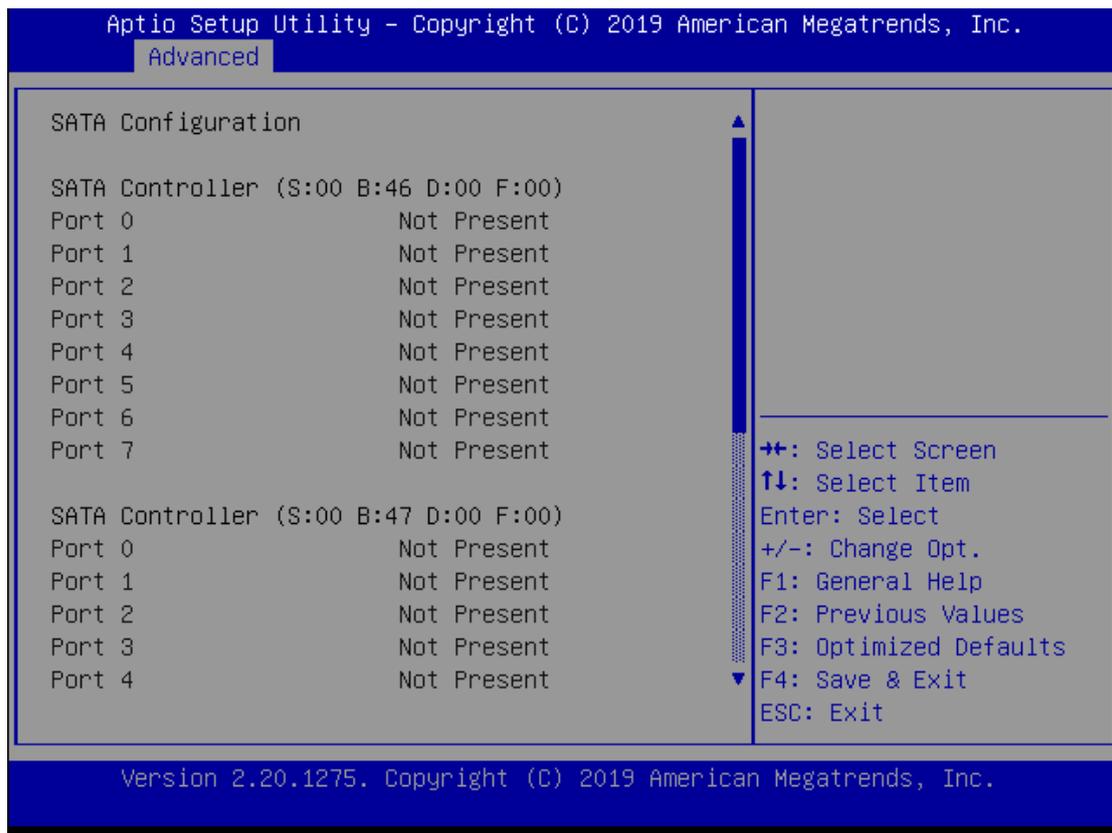
Advanced

Compatibility Support Module Configuration CSM Support [Enabled] CSM16 Module Version 07.83 Option ROM execution Network [Legacy] Storage [Legacy] Video [Legacy] Other PCI devices [Legacy]	Enable/Disable CSM Support. ⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
---	--

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Feature	Options	Description
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

SATA Configuration



Network Stack Configuration

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Advanced

Network Stack	[Disabled]	Enable/Disable UEFI Network Stack
---------------	------------	-----------------------------------

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

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Advanced

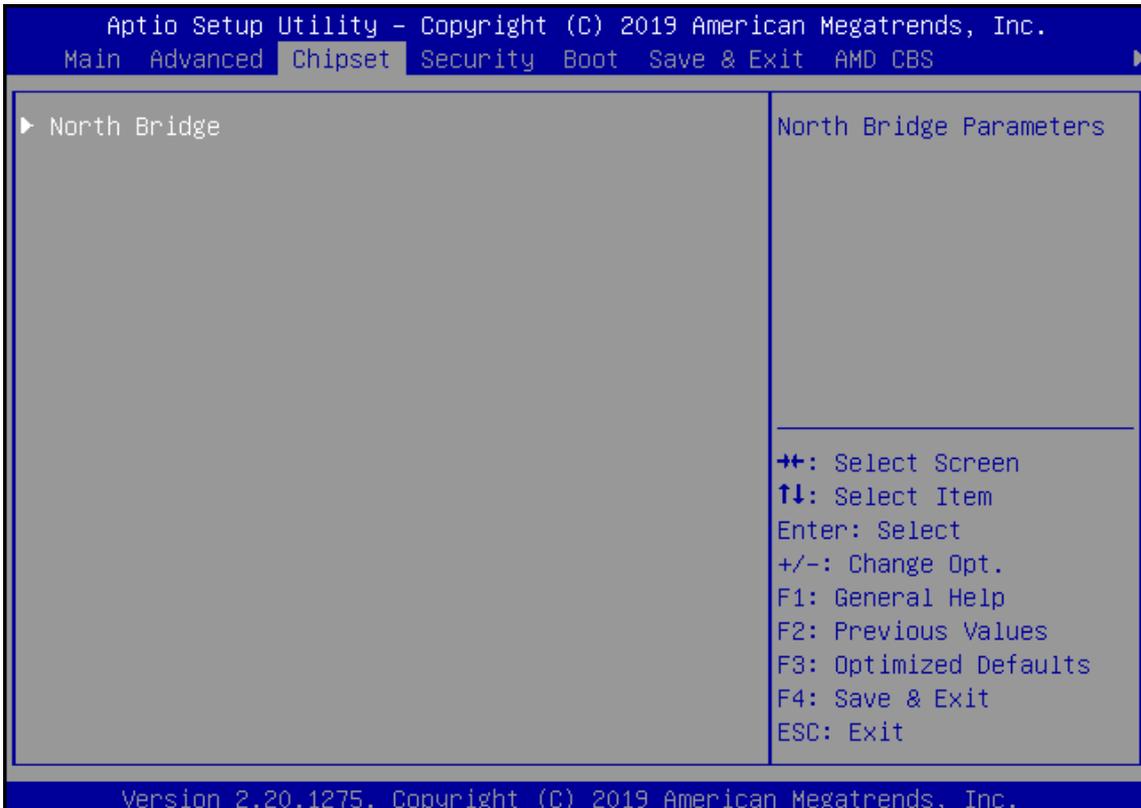
Network Stack	[Enabled]	Enable/Disable UEFI Network Stack
Ipv4 PXE Support	[Disabled]	
Ipv4 HTTP Support	[Disabled]	
Ipv6 PXE Support	[Disabled]	
Ipv6 HTTP Support	[Disabled]	
IPSEC Certificate	[Enabled]	
PXE boot wait time	0	
Media detect count	1	

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

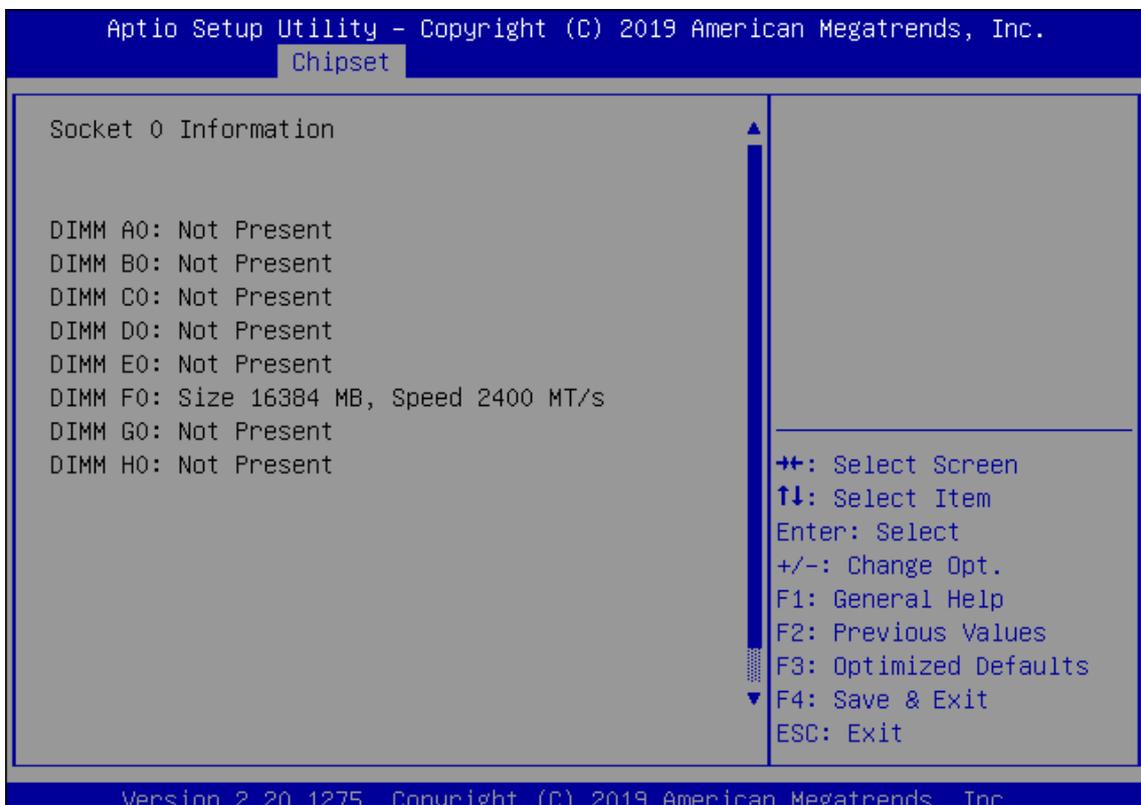
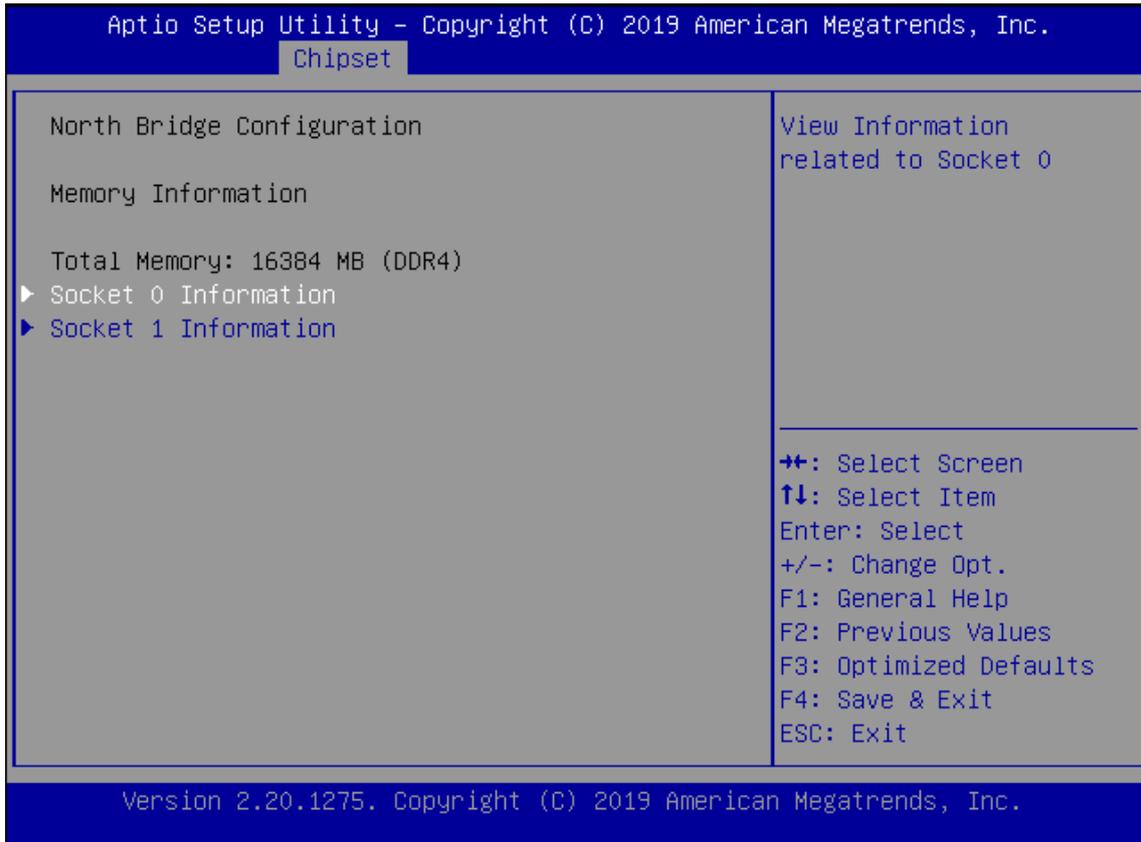
Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.

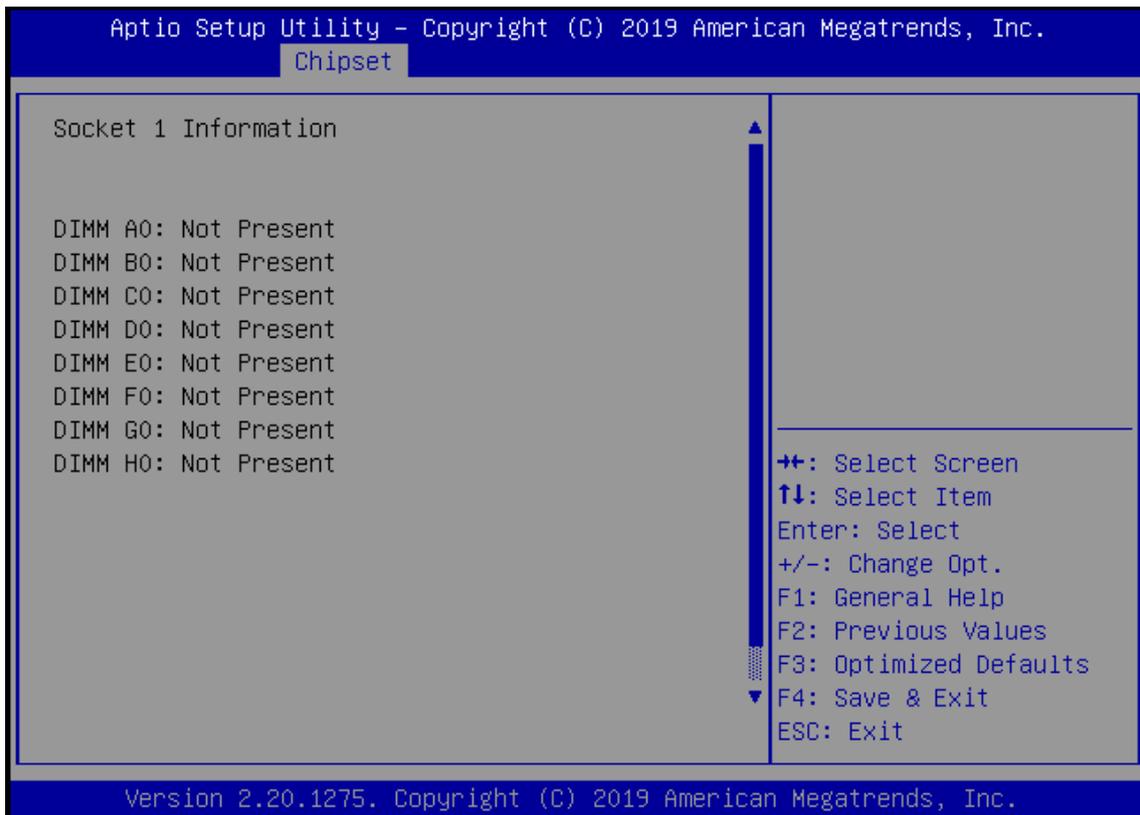
Chipset

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

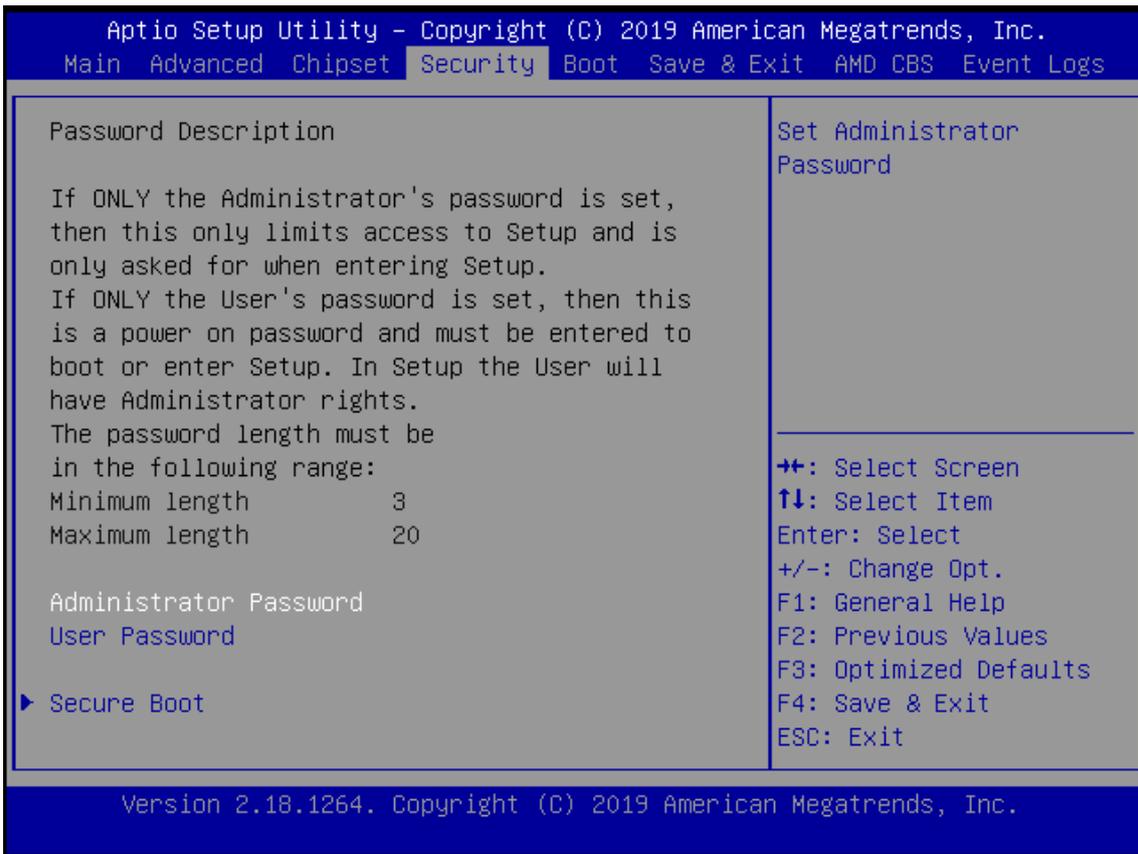


North Bridge





Security



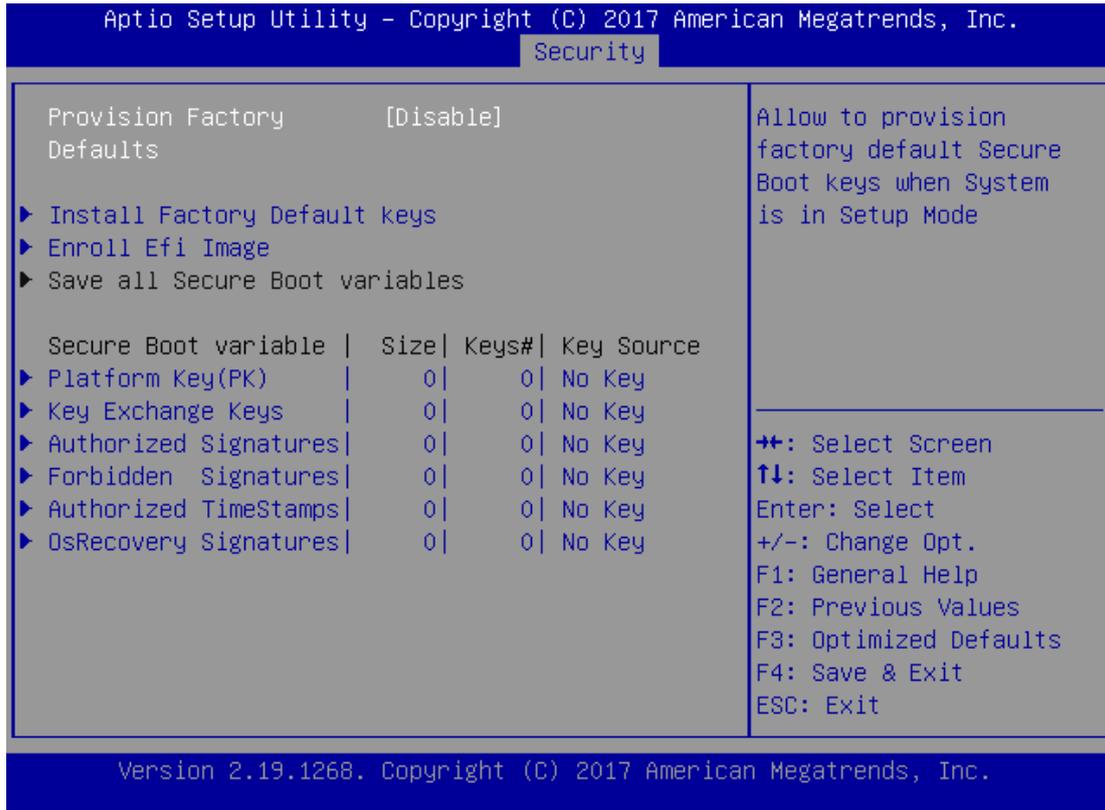
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



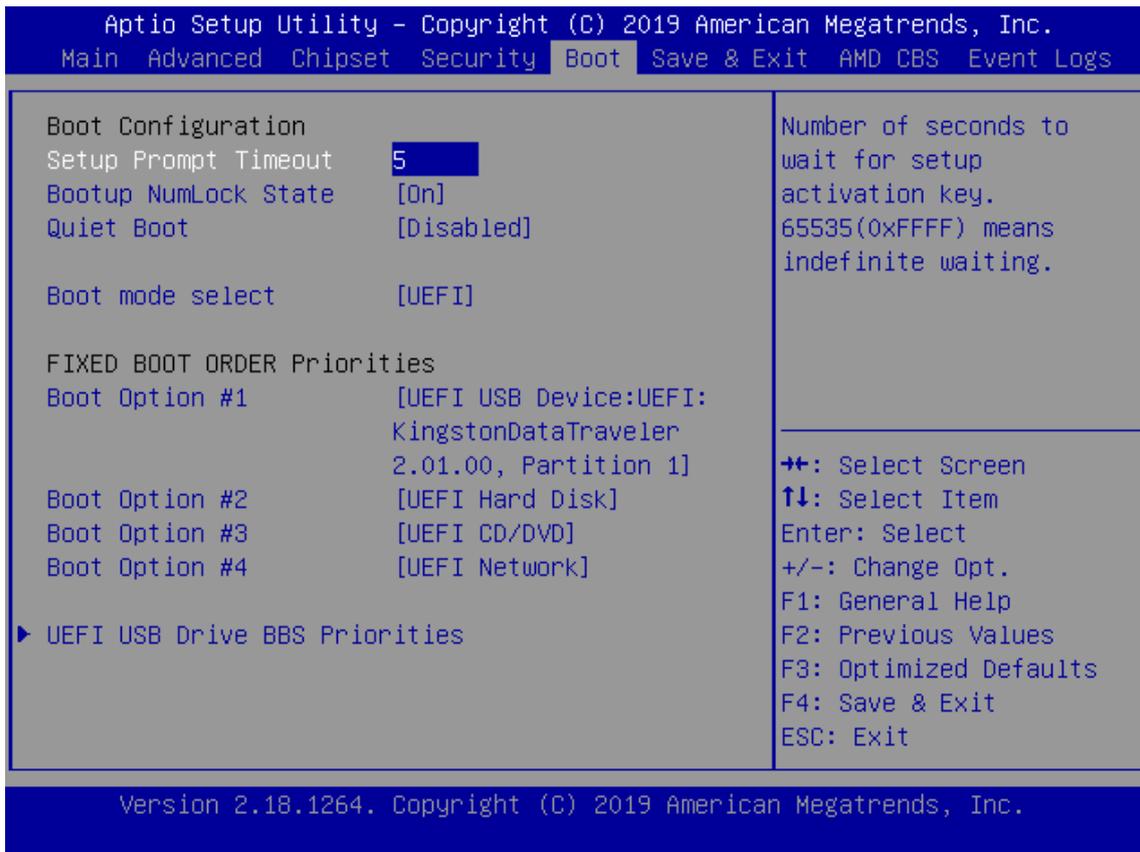
Feature	Options	Description
Attempt Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector: In Custom mode, Secure BootVariables can be configured without authentication

Key Management



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

Boot Menu

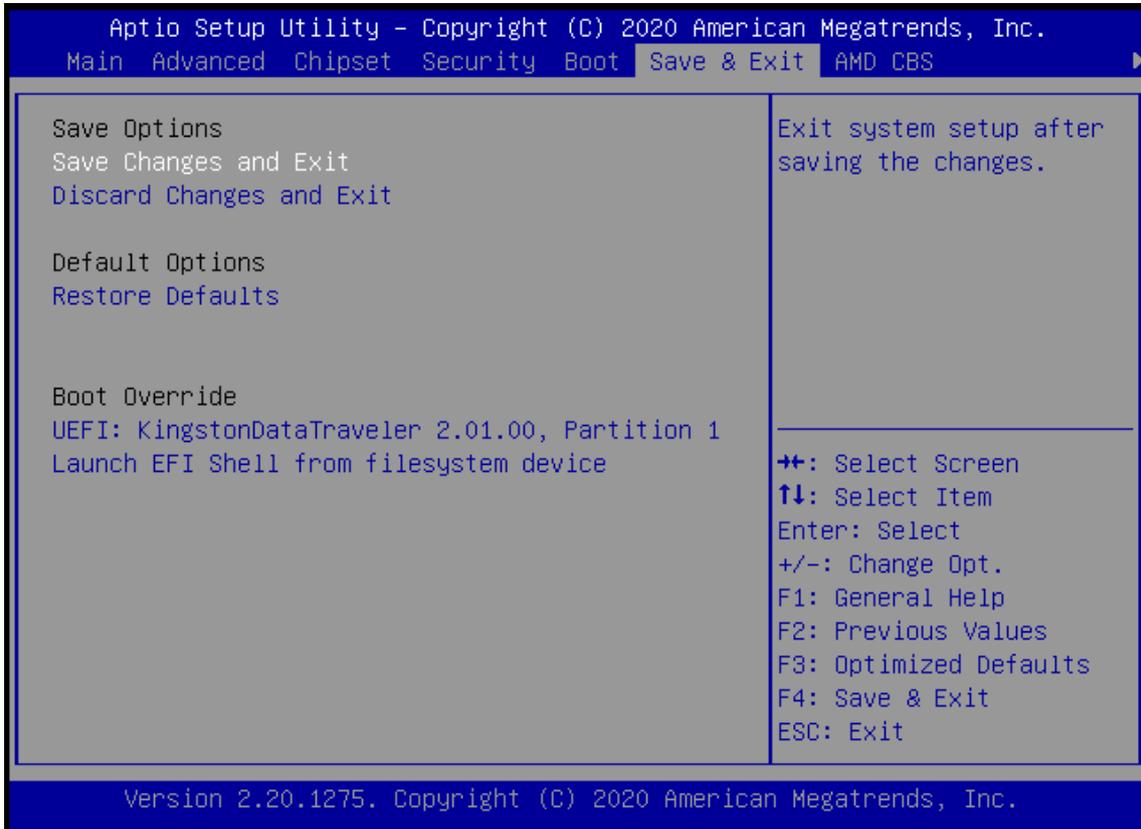


Feature	Options	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
BootupNumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Enabled Disable	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL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

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

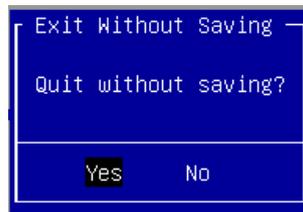
Save and Exit Menu

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



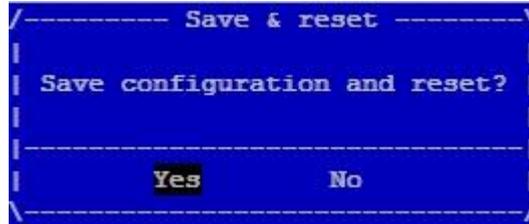
Discard Changes and Reset

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



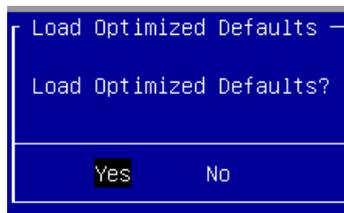
Save Changes and Reset

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



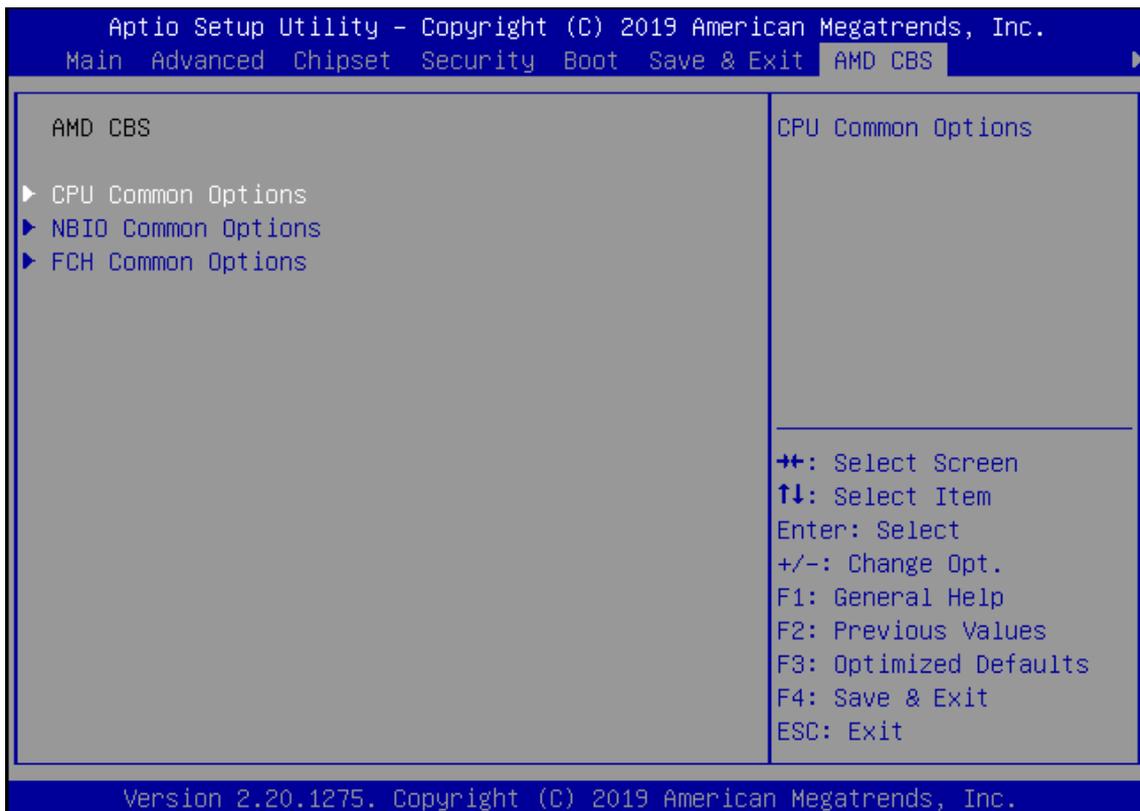
Restore Defaults

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

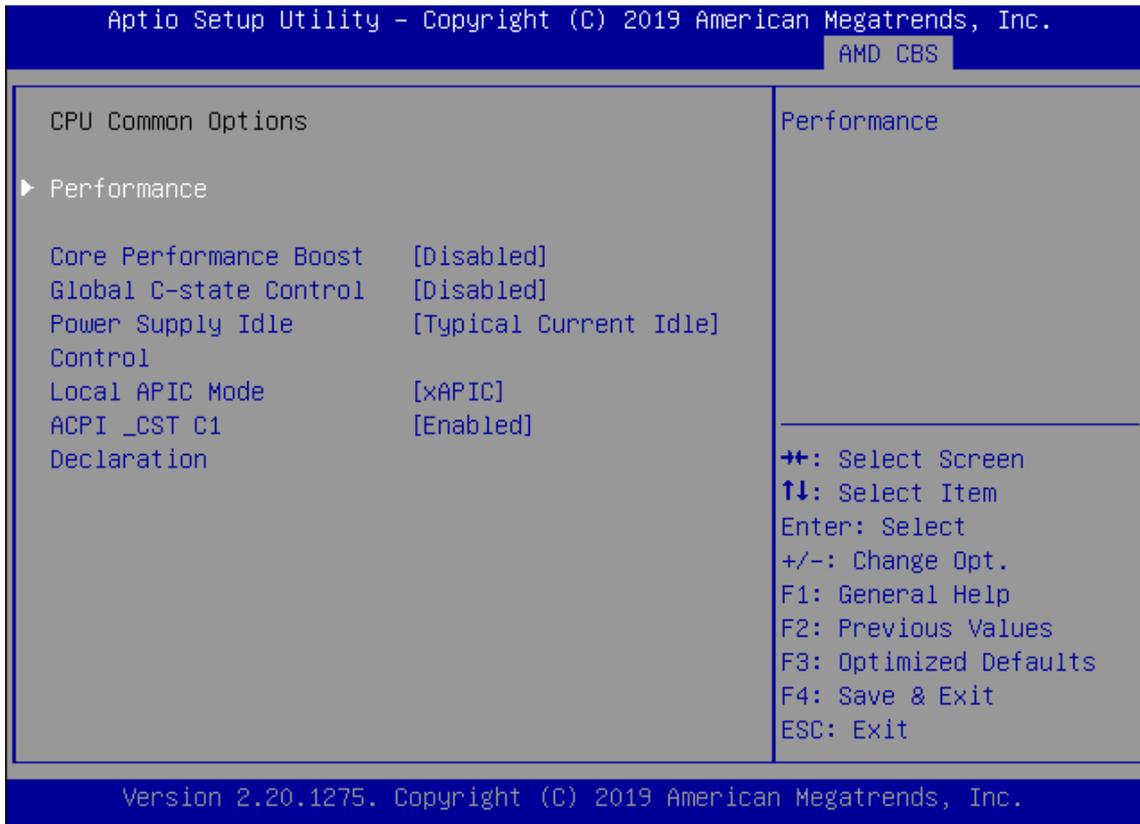


Note: The items under Boot Override were not same with image. It should depend on devices connect on system.

AMD CBS

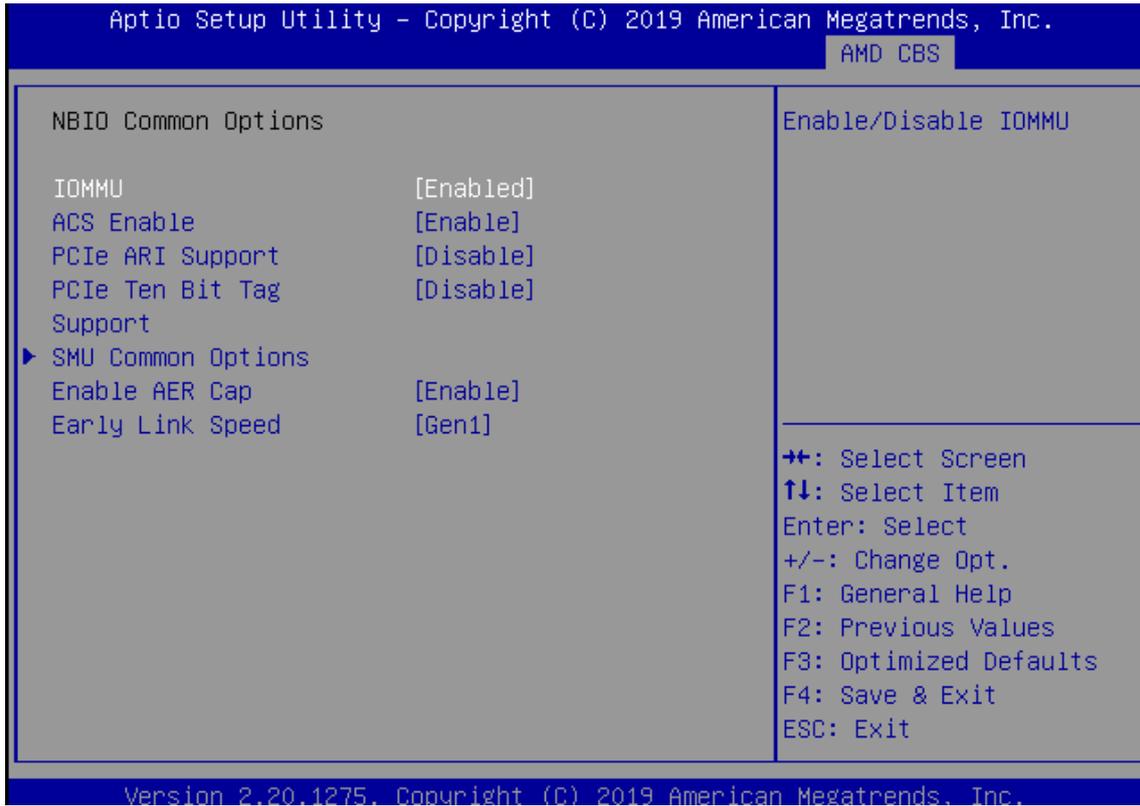


CPU Common Options



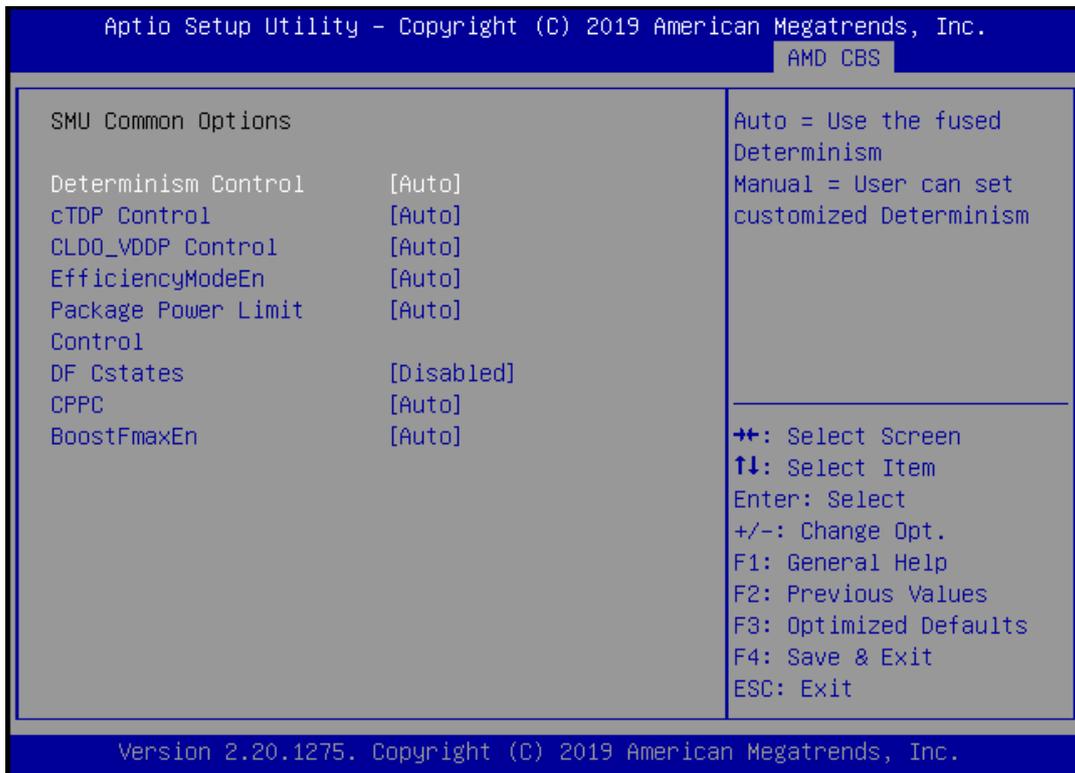
Feature	Options	Description
Core Performance Boost	Disabled Enabled	Disable CPB
Global C-state Control	Disabled Enabled	Controls IO based C-state generation and DF C-states.
Power Supply Idle Control	Low Current Idle Typical Current Idle Auto	Power Supply Idle Control
Local APIC Mode	xAPIC x2APIC Auto	
ACPI _CST C1 Declaration	Disabled Enabled Auto	Determines whether or not to declare the C1 state to the OS.

NBIO Common Options



Feature	Options	Description
IOMMU	Disabled Enabled Auto	Enable/Disable IOMMU
ACS Enable	Disabled Enabled Auto	AER must be enabled for ACS enable to work.
PCIe ARI Support	Disabled Enabled Auto	Enables Alternative Routing-ID Interpretation.
PCIe Ten Bit Tag Support	Disabled Enabled Auto	Enables PCIe ten-bit tags for supported devices. Auto = Disabled
Enable AER Cap	Disabled Enabled Auto	Enables Advanced Error Reporting Capability
Early Link Speed	Auto Gen1 Gen2	Set Early Link Speed

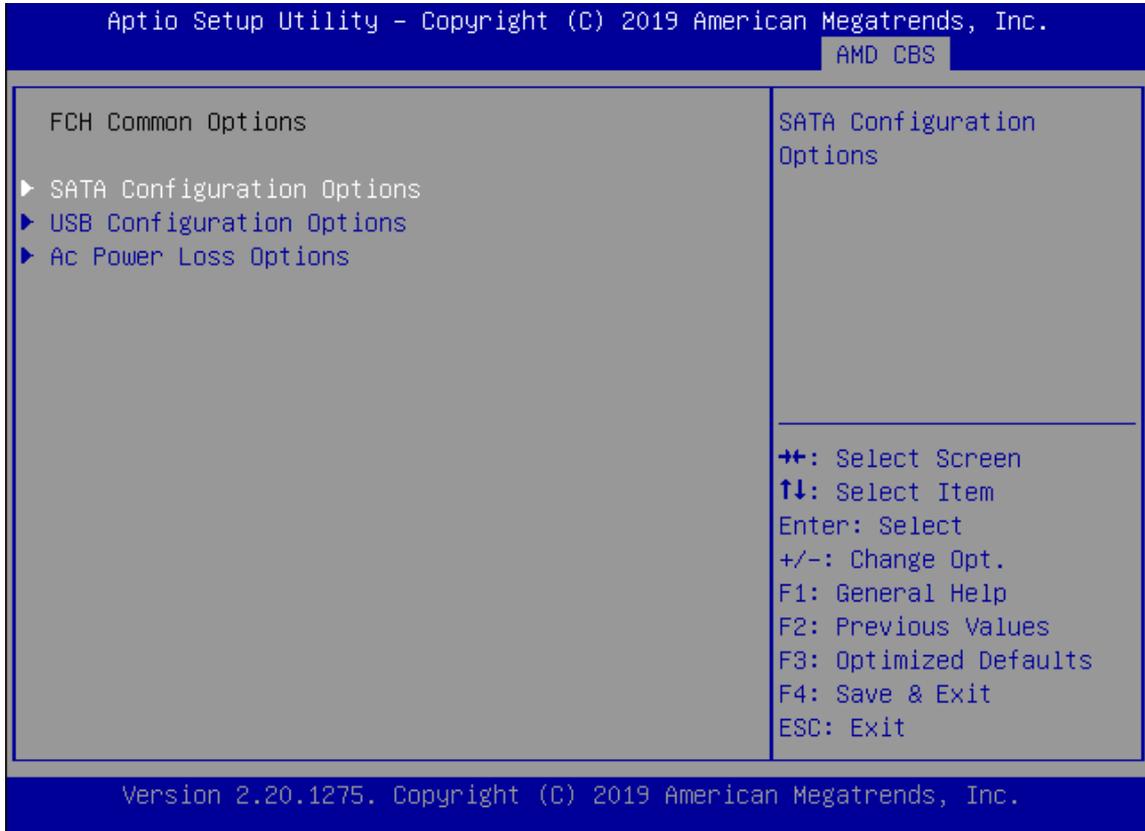
SMU Common Options



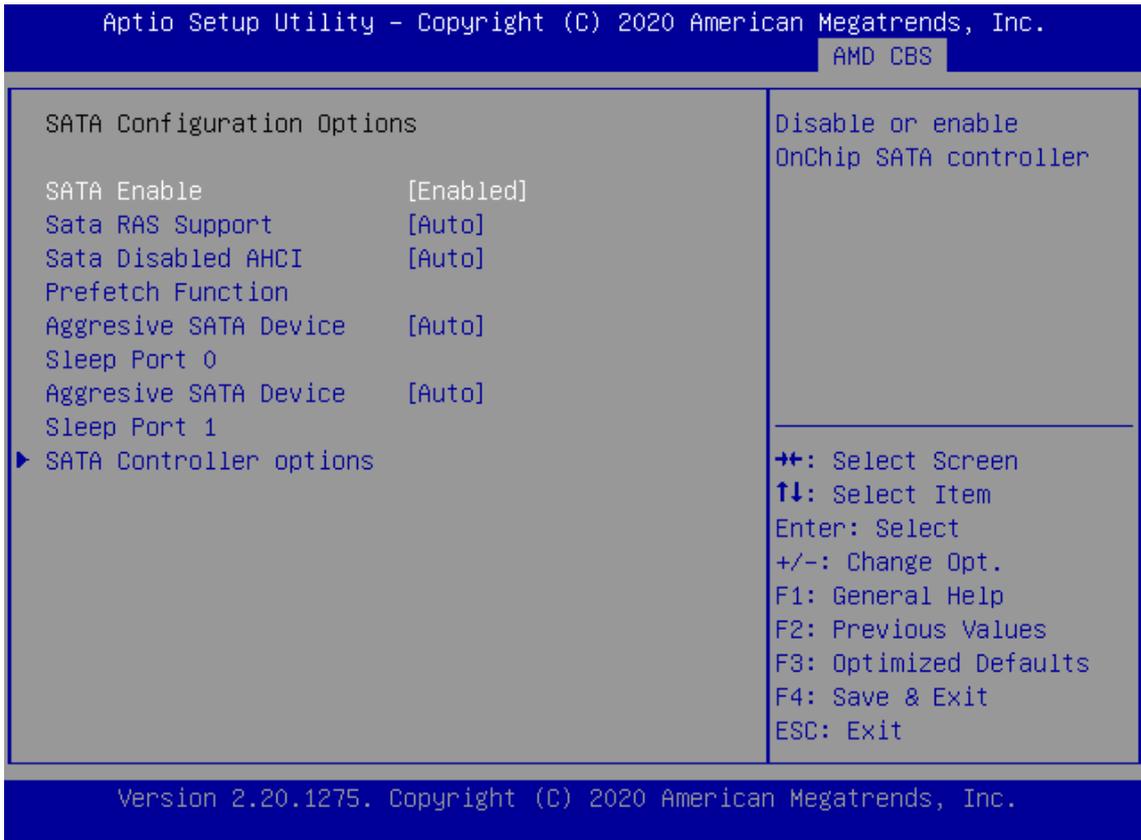
Feature	Options	Description
Determinism Control	Manual Auto	Auto = Use the fused Determinism Manual = User can set customized Determinism
cTDP Control	Manual Auto	Auto = Use the fused TDP Manual = User can set customized TDP ***TDP is used to define the RC thermal model only***
CLDO_VDDP Control	Manual Auto	Manual = User can set customized CLDO_VDDP voltage
EfficiencyModeEn	Enabled Auto	0 = use performance optimized CCLK DPM settings 1 = use power efficiency optimized CCLK DPM settings
Package Power Limit Control	Manual Auto	Auto = Use the fused PPT Manual = User can set customized PPT ***PPT will be used as the ASIC power limit***
DF Cstates	Disabled Enabled Auto	Enable = Enable DF C-states Disable = Disable DF C-states
CPPC	Disabled Enabled Auto	FEATURE_CPPC_MASK

BoostFmaxEn	Manual Auto	Auto = Use the default Fmax Manual = User can set the boost Fmax
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FCH Common Options

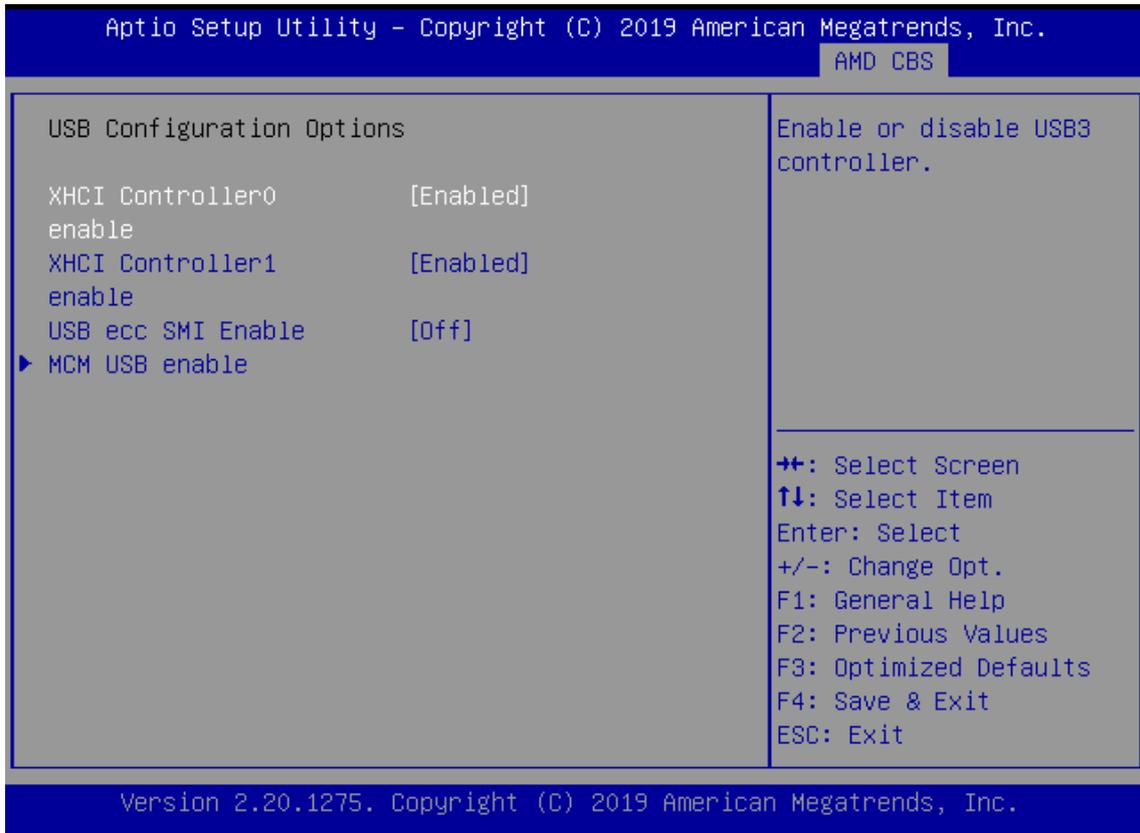


SATA Configuration Options



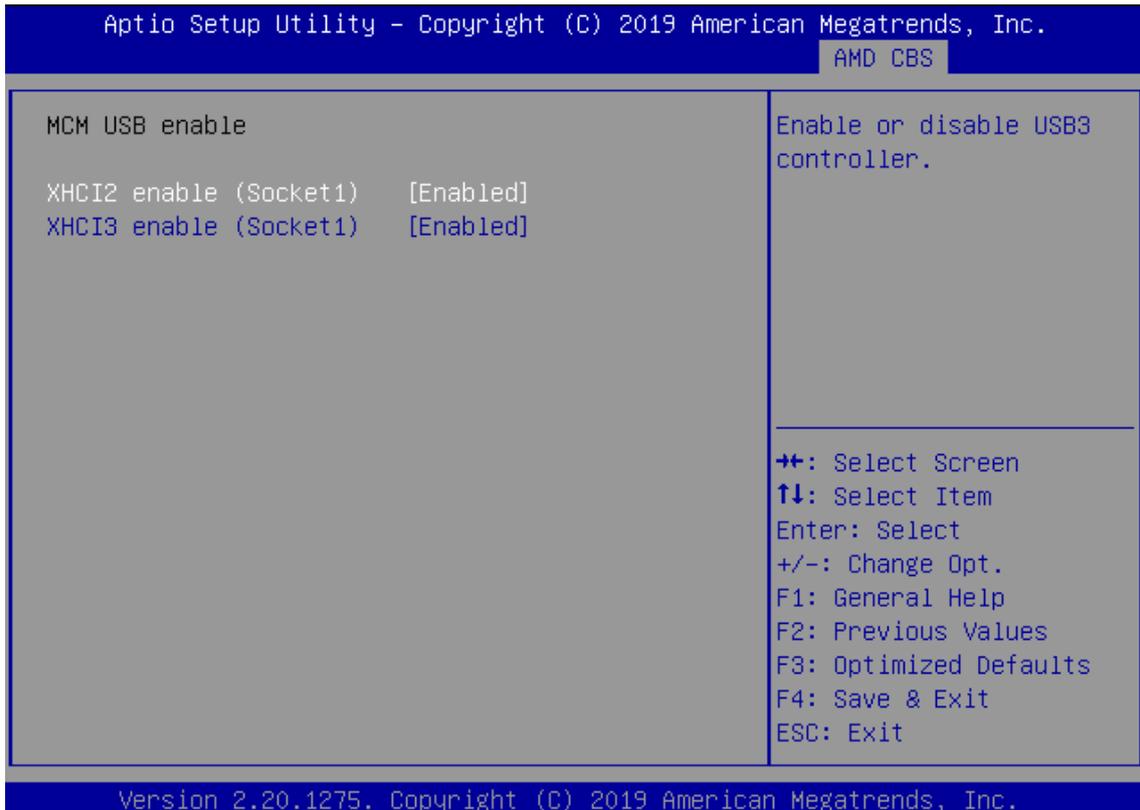
Feature	Options	Description
SATA Enable	Disabled Enabled Auto	Disable or enable OnChip SATA controller
Sata RAS Support	Disabled Enabled Auto	Disable or enable Sata RAS Support
Sata Disabled AHCI Prefetch Function	Disabled Enabled Auto	Disable or enable Sata Disabled AHCI Prefetch Function
Aggressive SATA Device Sleep Port 0	Disabled Enabled Auto	
Aggressive SATA Device Sleep Port 1	Disabled Enabled Auto	
Aggressive SATA Device Sleep Port 1	Disabled Enabled Auto	

USB Configuration Options



Feature	Options	Description
XHCI Controller0 enable	Disabled Enabled Auto	Enable or disable USB3 controller.
XHCI Controller1 enable	Disabled Enabled Auto	Enable or disable USB3 controller.
USB ecc SMI Enable	Enabled Off Auto	

MCM USB enable



Feature	Options	Description
XHCI2 enable (Socket1)	Disabled Enabled Auto	Enable or disable USB3 controller.
XHCI3 enable (Socket1)	Disabled Enabled Auto	Enable or disable USB3 controller.

AC Power Loss Options

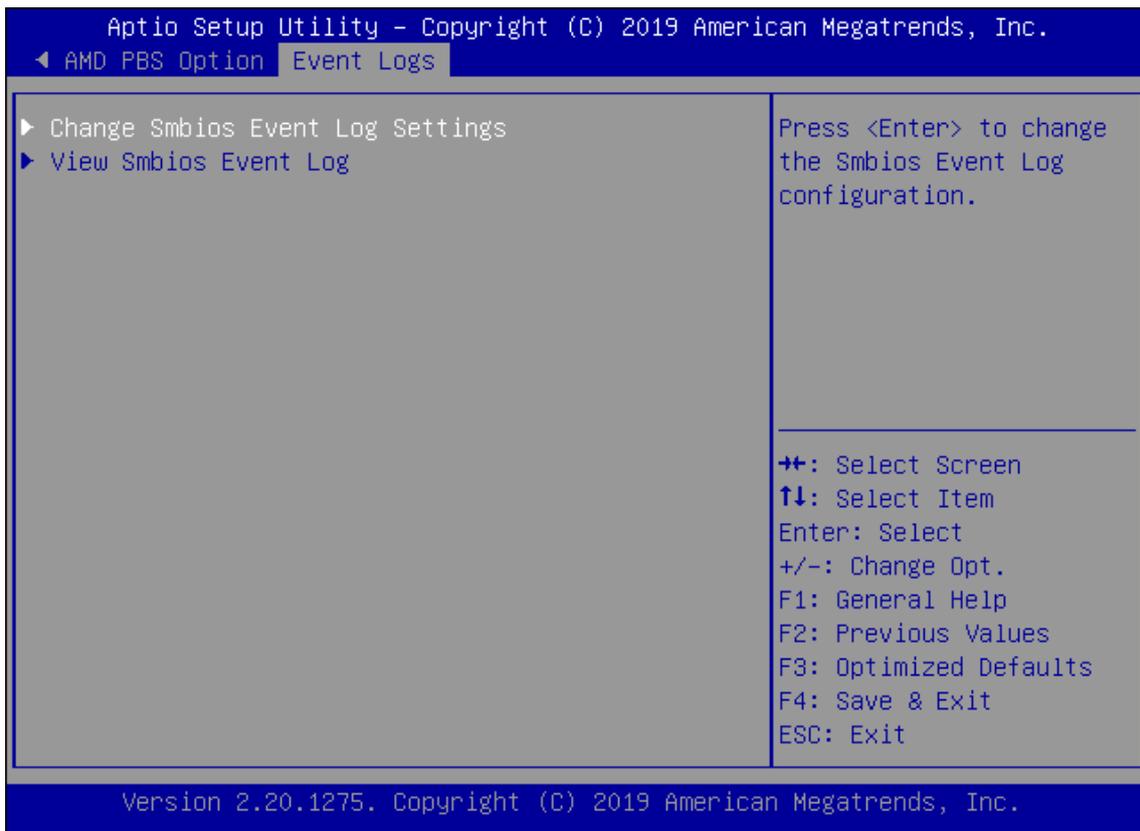
Feature	Options	Description
Ac Loss Control	S5 State S0 State Last State	Select Ac Loss Control Method

AMD PBS Option

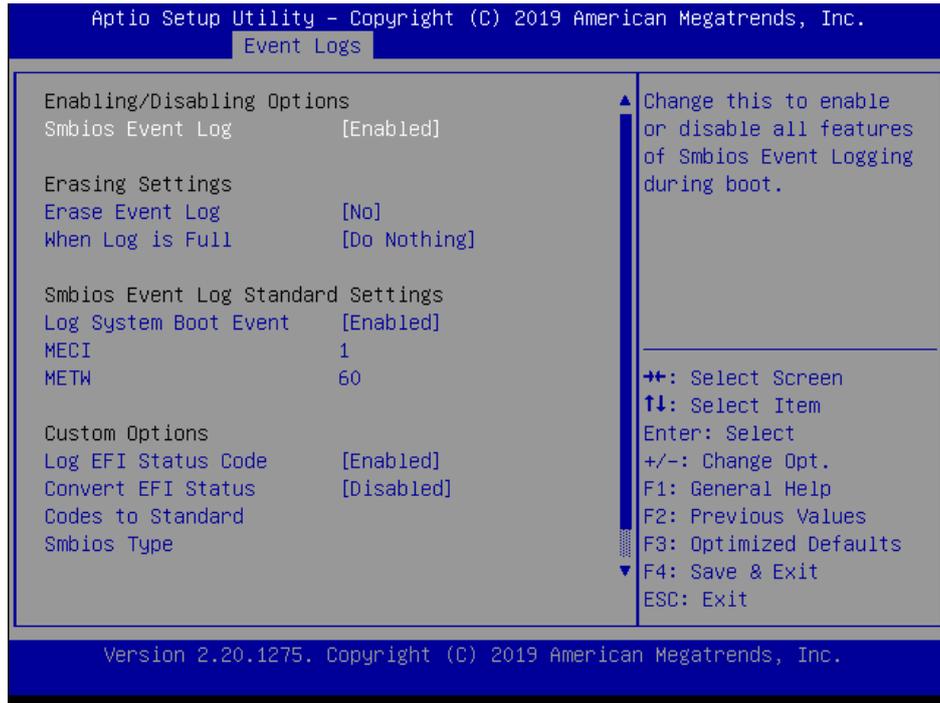
The screenshot shows the 'AMD PBS Option' menu in the Aptio Setup Utility. The 'SPI Locking' option is currently set to '[Disabled]'. The utility title is 'Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.' and the version is 'Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.'.

Feature	Options	Description
SPI Locking	Disabled Enabled	Enable/ disable SPI Locking for protect ROM part

Event Logs



Change Smbios Event Log Settings



Feature	Options	Description
Smbios Event Log	Disabled Enabled	Change this to enable or disable all features of Smbios Event Logging during boot.
Erase Event Log	No Yes, Next reset Yes, Every reset	Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
When Log is Full	Do Nothing Erase Immediately	Choose options for reactions to a full Smbios Event Log.
Log System Boot Event	Enabled Disabled	Choose option to enable/disable logging of System boot event
MECI	1-255	Multiple Event Count Increment: The number of occurrences of a duplicate event that must pass before the multiple-event counter of log entry is updated. The value ranges from 1 to 255.
METW	0-99	Multiple Event Time Window: The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.
Log EFI Status Code	Enabled Disabled	Enable or disable the logging of EFI Status Codes as OEM reserved type E0 (if not already converted to legacy).
Convert EFI Status Codes to Standard	Enabled Disabled	Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

Smbios Type

Change Smbios Event Log Settings

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Event Logs

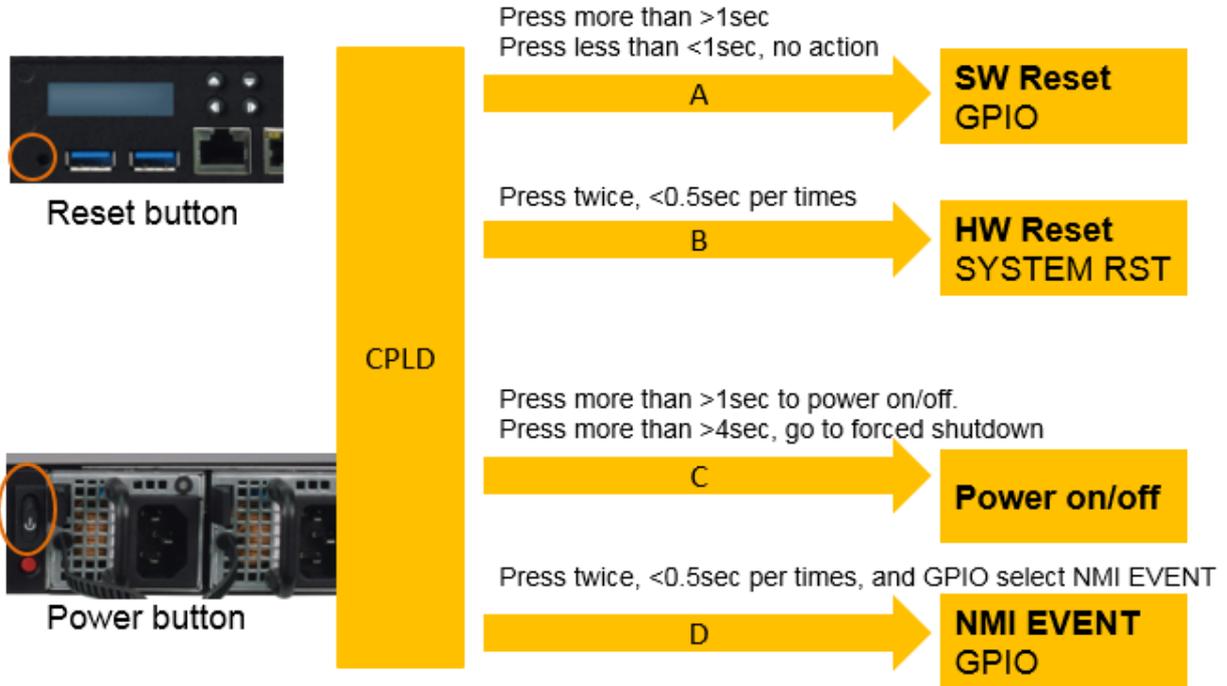
DATE	TIME	ERROR CODE	SEVERITY	COUNT	DESCRIPTION
01/01/19	06:34:38	Smbios 0x16	N/A	N/A	Log Area Reset and Count is applicable only for Multi-Events
01/01/19	06:34:38	Smbios 0x17	N/A	N/A	

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

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APPENDIX A: SMART POWER AND RESET BUTTON

Smart Power and Reset Button – Control by CPLD



APPENDIX B: DPDK PERFORMANCE OPTIMIZATION GUIDE

AMD CBS

Setting	Steps	Options	Description
Core Performance Boost	Advanced → Zen Common Options → Core Performance Boost	Disabled	Turns the boost function ON or OFF on all cores.
		Auto	
Global C-stdat Control	Advanced → Zen Common Options → Global C-stdat Control	Disabled	Disable or enable Infinity Fabric to low power mode
		Enabled	
Core/Thread Enablement	Advanced → Zen Common Options → Core/Thread Enablement	Disable	Disable or enable Symmetric Multithreading Settings. The benefit of this setting is application-dependent. (Note: DPDK does not recommend turns on the SMT function. However, based on 7232P DPDK test results in Lanner. Advised to turn on SMT at 7232P for DPDK testing.)
		Auto	
Local APIC Mode	Advanced → Zen Common Options → Local APIC Mode	xAPIC	Use xAPIC scales to only 255 hardware threads. Use x2APIC scales beyond 255 hardware threads but not supported by some legacy OS versions. Use x2APIC only if 256 hardware threads in the system; otherwise use xAPIC . (Note: Interrupt delivery is faster when using x2APIC mode over the legacy xAPIC mode. However, not all operating systems support AMD's x2APIC implementation.)
		x2APIC	
		Auto	
Determinism Control	Advanced → NBIO Common Options → SMU Common Options → Determinism Control	Auto	Do not show Determinism control function.
		Manual	Enable Determinism control function.
Performance	Advanced → NBIO Common Options → SMU Common Options → Determinism Slider → Performance	Auto	According to OPN
		Power	Provide improved runtime performance and guarantees the power draw of each part will be up to but not exceed the cTDP power limit.
		Performance	Reduces CPU to CPU performance variability within a cluster SMU(System Management Unit) policy choices.
APBDIS	Advanced → NBIO Common Options →	10	Turns Algorithm Performance Boost as OFF to switch p-state dynamically by usage.

	SMU Common Options ➔ APBDIS	1	Turns Algorithm Performance Boost as ON to fixed SOC Pstate. This setting governs the boost behavior of the core. For high-performance computing workloads, we recommend lock maximum boost state (memory p-states is necessary for Rome. P0 the highest performance memory p-state)
Fixed SOC Pstate	Advanced ➔ NBIO Common Options ➔ SMU Common Options ➔ Fixed SOC Pstate	P0	Need to set APBDIS=1 and recommend fixed SOC Pstate at P0
Preferred IO	Advanced ➔ NBIO Common Options ➔ Preferred IO	Manual	Enable/Disable Preferred-IO function. Note: This setting will provide enhanced priority to a single PCI device and increase the PCI clock. For systems with a single Mellanox PCI card, this needs to be enabled when using a high-performance, low-latency interconnect.
		Auto	
Preferred IO Bus	Advanced ➔ NBIO Common Options ➔ Preferred IO Bus	C0	1. Check which one you use, PCI device or PCI slot . 2. Use command lspci in CLI to determine which PCI device the Mellanox card is hosted on, and set it as this address.
cTDP Control	Advanced ➔ NBIO Common Options ➔ cTDP Control	Manual	Set configurable Thermal Design Point by manually
		Auto	Use default configurable Thermal Design Point Note: Each CPU has a minimum and maximum cTDP threshold. Ensure cTDP=PPL in BIOS.
PPL	Advanced ➔ NBIO Common Options ➔ PPL	Manual	Set Package Power Limit by manually
		Auto	Use default Package Power Limit Note: Every CPU has a maximum PPL limit. Ensure PPL=cTDP. PPL can be set lower than the cTDP minimum
IOMMU	Advanced ➔ NBIO Common Options ➔ NB configuration ➔ IOMMU	Disabled	Disable/enable IOMMU function (Note: Special case for 2x64 cores with SMT=ON. You should set IOMMU=ON, Local APIC Mode=Auto and add iommu=pt kernel boot parameter.)
		Enable	
NUMA nodes per socket	Advanced ➔ DF Common Options ➔ Memory Addressing ➔ NUMA nodes per socket	NPS0	Interleave memory accesses across all channels in both sockets. (not recommended)
		NPS1	Interleave memory accesses across all eight channels (ABCDEFGH) in each socket report 1 NUMA node per socket

		NPS2	Interleave memory accesses across groups of 4 channels (ABCD/EFGH) in each socket report 2 NUMA nodes per socket
		NPS4	Interleave memory accesses across pairs of 2 channels (AB/CD/EF/GH) in each socket report 4 NUMA nodes per socket
		Note: This setting enables a trade-off between minimizing local memory latency (for NUMA aware or highly parallelizable workloads) and maximizing per-core memory bandwidth (for non-NUMA-friendly workloads)	
Overclock	Advanced ➔ UMC Common Options ➔ DDR4 Common Options ➔ DRAM Timing Configuration ➔ Accept ➔ Overclock ➔ Enable	Enable	Enable DRAM Timing Configuration
Speed	Advanced ➔ UMC Common Options ➔ DDR4 Common Options ➔ DRAM Timing Configuration ➔ Accept ➔ Overclock ➔ Memory Clock ➔ Speed	xxxMHz	Configure DRAM as maximum DRAM clock according to DRAM specification
TSME	Advanced ➔ UMC Common Options ➔ DDR4 Common Options ➔ Security ➔ TSME	Disable	Disable Transparent Secure Memory Encryption function
		Enable	Enable Transparent Secure Memory Encryption function to encrypts all the memory

Kernel

Setting	Description
\$ sudo met start	Start Mellanox Software Tools.
\$ sudo systemctl disable irqbalance.service	Disable irqbalance daemon to ensure that irqbalance does not restart on the next boot.
\$ sudo systemctl stop irqbalance.service	Stop irqbalance to prevent irqbalance from migrating the NIC's IRQs to other cores.
\$ sudo ufw disable	Disable Uncomplicated Firewall function to ensure that ufw does not restart on next boot.
\$ sudo ufw stop	Stop Uncomplicated Firewall function.
\$ sudo mlnx_affinity start	Start Mellanox affinity service.
\$ sudo cpupower -c all frequency-set -g performance	Set the governor of CPU frequency as a performance mode.
\$ sudo cpupower -c all idle-set -d 1	Disable all core C1 idle state.
\$ sudo cpupower -c all idle-set -d 2	Disable all core C2 idle state.
\$ sudo mlnx_tune -p HIGH_THROUGHPUT	Use mlnx_tune command to apply HIGH_THROUGHPUT profile.
\$ sudo setpci -s <port_bus>(ex:C0:00.0) 68.w=5957	Use setpci command verify Max_Read_Req BIOS parameter (Recommend by Mellanox).
\$ sudo set_irq_affinity_bynode.sh 0	Run script to optimizing single-port traffic (When you using signal port, recommend by Mellanox).
\$ sudo ifconfig <NIC_Name>(ex:eth0) mtu 9000	Set Maximum Transmission Unit of NIC as 9000.
\$ sudo ethtool -A <NIC_Name>(ex:eth0) rx off tx off	Disable Tx/Rx auto-negotiation of NIC.
\$ sudo ethtool -a <NIC_Name>(ex:eth0)	Check Tx/Rx auto-negotiation of NIC.
\$ sudo ethtool -G <NIC_Name>(ex:eth0) rx 8192 tx 8192	Set Tx/Rx ring size of NIC as 8192.
\$ sudo ethtool -g <NIC_Name>(ex:eth0)	Check Tx/Rx ring size of NIC.
\$ sudo ethtool -K <NIC_Name>(ex:eth0) lro off	Disable large receive offload of NIC.
\$ sudo ethtool -k <NIC_Name>(ex:eth0) grep large	Check large receive offload of NIC. Other inspection methods:
\$ sudo lscpu	Display CPU information.
\$ sudo hwloc-ls	Display the CPU cache memory.
\$ sudo numactl -H	Show inventory of available nodes on the system.
\$ sudo cpupower frequency-info	Display cpu frequency, governor, and other configurations.
\$ sudo cpupower monitor	Reports processor topology, frequency, and idle power state statistics.
\$ sudo htop	Display the cause of load by each process.
\$ sudo free -g	Display the amount of memory in GigaByte format.

APPENDIX C: TERMS AND CONDITIONS

Warranty Policy

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

RMA Service

Requesting an RMA#

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



Note

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

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: <input type="checkbox"/> Repair (Please describe failure details) <input type="checkbox"/> Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Apply Date:
Return Shipping Address: _____	
Shipping by: <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express: _____ <input type="checkbox"/> Others: _____	

Item	GP	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 |
| 03: CMOS Data Lost | 09: Cache RMA Problem | 15: PS2 | 21: Shut Down |
| 04: FDC Fail | 10: Memory Socket Bad | 16: LAN | 22: Panel Fail |
| 05: HDC Fail | 11: Hang Up Software | 17: COM Port | 23: CRT Fail |
| 06: Bad Slot | 12: Appearance Damage | 18: Watchdog Timer | 24: Others (Pls specify) |

Requested by

Confirmed by supplier

Authorized Signature / Date

Authorized Signature / Date