Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-6120
User Manual

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About this Document

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

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

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

Icon Descriptions

The icons are used in the manual to serve as an indication of interest topics or important messages. Below is a description of these icons:

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

Online Resources

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

Technical Support

In addition to contacting your distributor or sales representative, if there are any technical queries, you could submit a support ticket to our **Lanner Technical Support** department.

Documentation Feedback

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Compliances and Certification

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. To protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

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.

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).
- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.
- The machine can only be used in a restricted access location and must be installed by a skilled person.
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Warning

- Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.
- Product shall be used with Class 1 laser device modules.

Avertissement

- Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.
- Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.

Electrical Safety Instructions

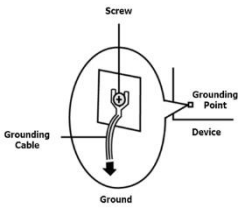
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire (green-and-yellow) is required and the part connecting the conductor must be greater than 2.5 mm2 or 12 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 2.5 mm2 ou 12 AWG.

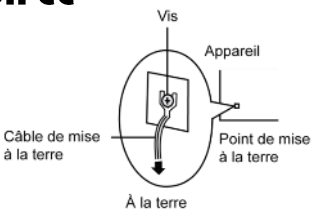
Grounding Procedure for DC Power Source

- Connect the grounding cable to the ground.
- The protection device for the DC power source must provide 20A 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 20A de courant.
- Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.



For DC input, this unit is intended to be supplied by an UL listed power source, rated 48 to 60Vdc, 20A min, and an altitude operation 5000m min.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The NCA-6120, a high-performance 2U rackmount network security appliance, is powered by the AMD EPYC™7000 Series CPUs (Rome/Milan) and delivers up to 40Gbps encryption/decryption security acceleration for application delivery, MEC, WAN optimization, DPI/IPS/IDS, NFV/SDN and NGFW/UTM.

Main Features

- AMD EPYC™ 7000 Series, w/ Support for Milan & Rome
- 16x 288-pin DIMM, Max. 1024GB DDR4 3200MHz ECC R-DIMM
- 1x GbE RJ45 Intel® i210, 1x RJ45 Console, Max. 8x NIC Slots
- Max. 4x 3.5" or 2.5" Swappable Bays
- 2x PCIe*8 FHHL or 1x PCIe*16 FHFL

Package Content

Your package contains the following items:

- 1x NCA-6120 Network Security Platform
- 2x Power cable (Default US Type)
- 1x Short Ear Rack mount kit with screws
- 1x Console cable (RJ45)
- 1x LAN cable (Grey)
- 1x LAN cable (Red)

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

Ordering Information

SKU No.	Main Features
NCA-6120A	AMD EYPC 7000 Series, Up to 64C128T, 2x GbE RJ45, 4x 2.5"/ 3.5" SSD/HDD, 4x NIC Module Slots.
NCA-6120B	AMD EYPC 7000 Series, Up to 64C128T, 2x GbE RJ45, 2x 2.5"/3.5" SSD/HDD, 8x NIC Module Slots.

Optional Accessories

Slim Type NIC Module					
Module	Ports	Connector Speed	Chipset	PCIe Interface	LAN Bypass
NCS2-IGM428A	4 RJ-45	1Gb	Intel i350AM-4	Gen2	G3
NCS2-IGM806A	8 RJ-45	1Gb	Intel i350AM-4	Gen2	G3
NCS2-ISM405A	4 SFP	1Gb	Intel i350AM-4	Gen2	G3
NCS2-ISM406A	4 SFP	1Gb	Intel i350AM-4	Gen2	N/A
NCS2-ISM802A	8 SFP	1Gb	Intel i350AM-4	Gen2	N/A
NCS2-IMM802A	4+4 SFP + RJ-45	1Gb	Intel i350AM-4	Gen2	N/A
NCS2-IXM407A	4 SFP+	10Gb	Intel XL710-BM1	Gen3	N/A
NCS2-IXM801A	8 SFP+	10Gb	Intel XL710-BM1	Gen3	N/A
NCS2-IXM803A	8 SFP+	10Gb	Intel E810-CAM2	Gen4	N/A
NCS2-IXM409A	4 SFP+	10Gb	Intel XL710-BM1	Gen3	G3
NCS2-ITM401A	4 RJ-45	10Gb	Intel XL710-BM1	Gen3	N/A
NCS2-IXM206A	2 SFP+	10Gb	Intel X710-BM2	Gen3	N/A
NCS2-IXM415A	4 SFP28	25Gb	Intel E810-CAM1	Gen4	N/A
NCS2-IVM201A	2 SFP28	25Gb	Intel XXV710-AM2	Gen3	N/A
NCS2-IQM201A	2 QSFP+	40Gb	Intel XL710-BM2	Gen3	N/A
N2S-IHM203A	2 QSFP28	100Gb	Intel E810-CAM2	Gen4	N/A
NCS2-IHM204A	2 QSFP28	100Gb	Intel E810-CAM2	Gen4	N/A
N2S-MHM203A	2 QSFP28	100Gb	Mellanox connectX VI	Gen4	N/A

Additional Optional Accessories Kits	
Model No.	**Description**
IAC-TPM01C	TPM 2.0 Module
IAC-AST2500B	IPMI Module
0P1W000164000	DC 900W Redundant Power Supply Kit
PSF6407-010	2U Slide Rackmount Rail Kit

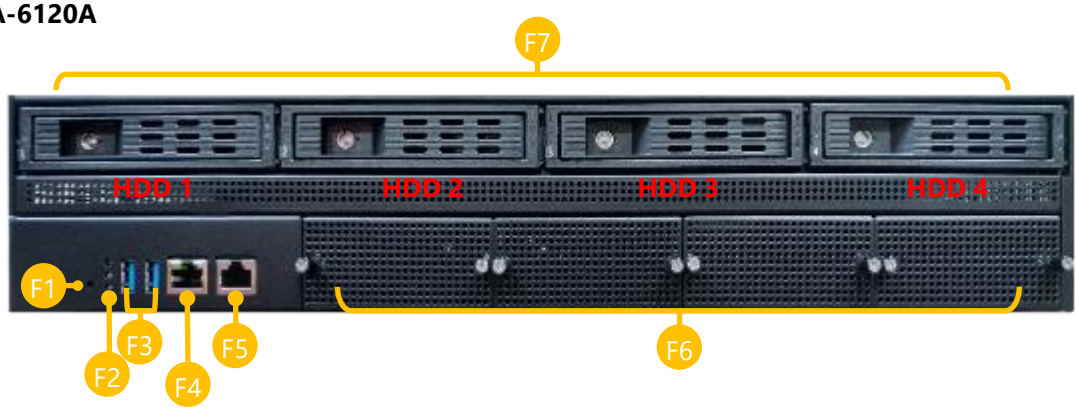
Note: We recommended to use Lanner Slim type NIC modules on this system; please consult Lanner for product compatibility if you consider adopting modules manufactured by other vendors.

System Specifications

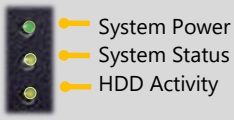
Form Factor		2U 19" Rackmount
Platform	Processor Options	AMD EPYC™ 7000 Series 64C128T
	CPU Socket	SP3
	Security Acceleration	40Gbps Encryption + 40Gbps Decryption
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 3200MHz ECC REG DIMM
	Max. Capacity	1024GB
	Socket	16x 288-pin DIMM
Networking	Ethernet Ports (By SKU)	1x GbE RJ45 Intel® i210
	Bypass	N/A
	NIC Module Slot	A SKU: 4x NIC Module Slot B SKU: 8x NIC Module Slot
LOM	IO Interface	1x RJ45
	OPMA slot	Yes
I/O Interface	Reset Button	1x Reset Button
	LED Indicator	Power/Status/Storage, pls refer to Appendix A
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 3.0 Ports
	Display Port	1x VGA Port (Optional)
	Power Input	AC Power Inlet on PSU
Storage	HDD/SSD Support	SKU A: 4x 3.5" / 2.5" Swappable Bays SKU B: 2x 3.5" / 2.5" Swappable Bays
	Onboard Slots	1x M.2 (SATA/PCIe) 2280 B-Key
Expansion	PCIe	2x PCIe*8 FHHL or 1x PCIe*16 FHFL (Optional)
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes (Optional)
Cooling	Processor	Passive CPU heat sink
	System	4x Individual Hot-Swappable Cooling Fans
Environmental Parameters	Temperature	0~40ºC Operating -20~70ºC Non-Operating
	Humidity (RH)	5~90% Operating 5~95% Non-Operating
System Dimensions	(WxDxH)	438 x 600 x 88 mm
	Weight	24 kg
Package Dimensions	(WxDxH)	825 x 600 x 270 mm
	Weight	26 kg
Power	Type/Watts	850W 1+1 ATX Redundant PSUs
	Input	AC 100~240V @47~63 Hz
Approvals and Compliance		RoHS, CE/FCC, UL

Front Panel

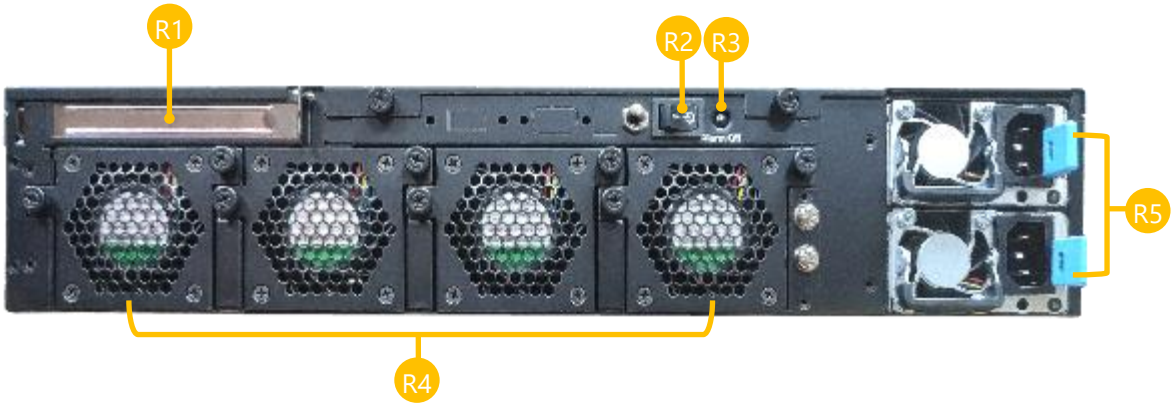
NCA-6120A



NCA-6120B

No.	Description	
F1	Reset Button	1x Reset Button (Press Once for Software Reset; Press Twice for Hardware Reset)
F2	LED Indicators	
F3	USB Port	2x USB 3.0 Ports
F4	Management Port	1x RJ45 Management (LOM) Port
F5	Console Port	1x RJ45 Console Port
F6	NIC Module Slots	SKU A: 4x NCS2 NIC Module Slots SKU B: 8x NCS2 NIC Module Slots
F7	HDD Tray	SKU A: 4x 3.5”/2.5” HDD/SSD Trays SKU B: 2x 3.5”/2.5” HDD/SSD Trays

Rear Panel

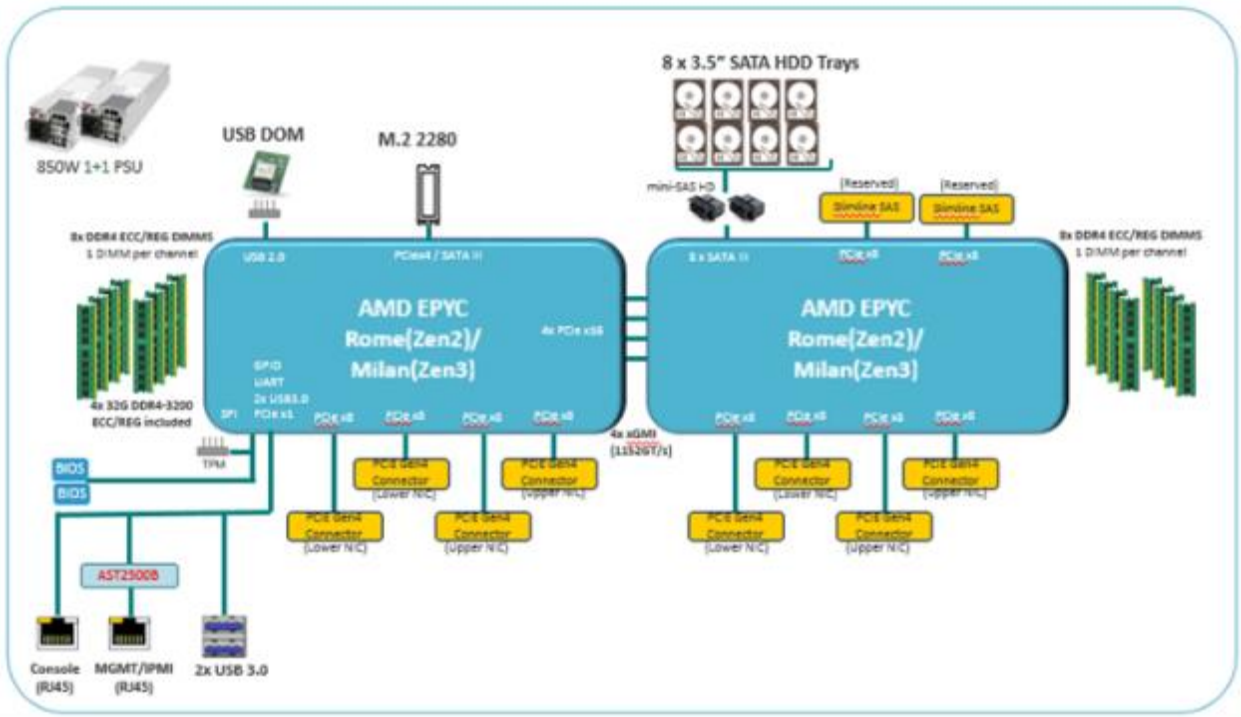


No.	Description	
R1	Rear PCIe Expansion	1x PCIe expansion slot (Optional)
R2	Power Switch	1x Power Button - Short press to power off the system; - Long press (> 4sec) to force the system to shut down - Short press twice to have GPIO select **NMI EVENT**
R3	Alarm off Button	An audible alarm will sound when the system's redundant power is missing. Press this button to turn the alarm off.
R4	Fans	4x Independent Swappable Fans
R5	Power Supply	2x 850W Redundant (N+1 Design)

Motherboard Information

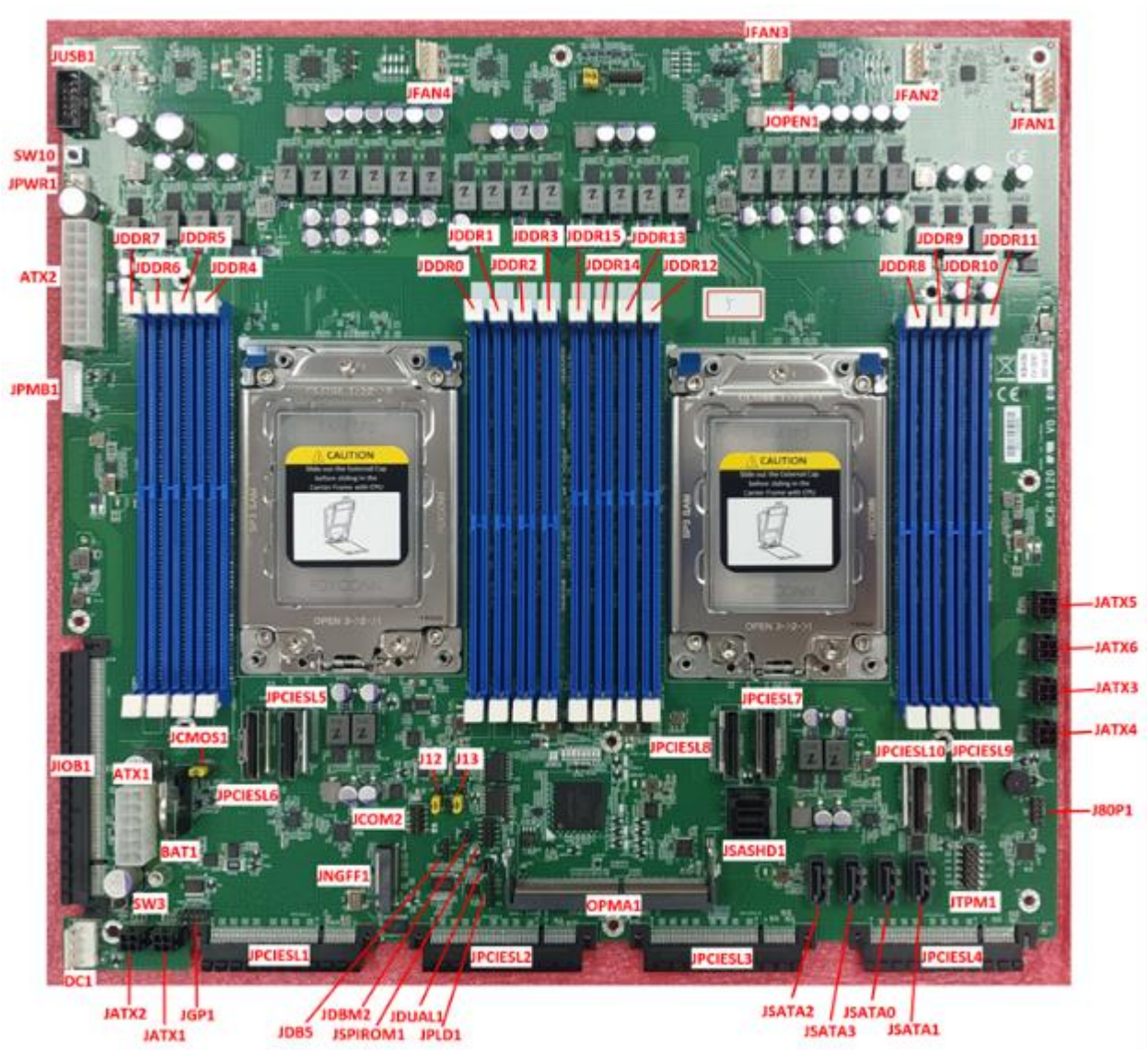
Block Diagram

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 Connectors

The IO board layout shows the connectors and jumpers on the board. Refer to the below picture as a reference of the pin assignments and the internal connectors.

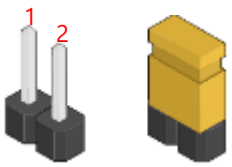
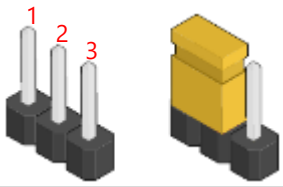
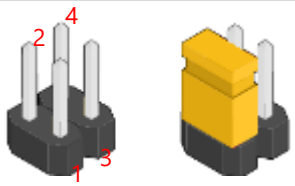


Internal Jumpers

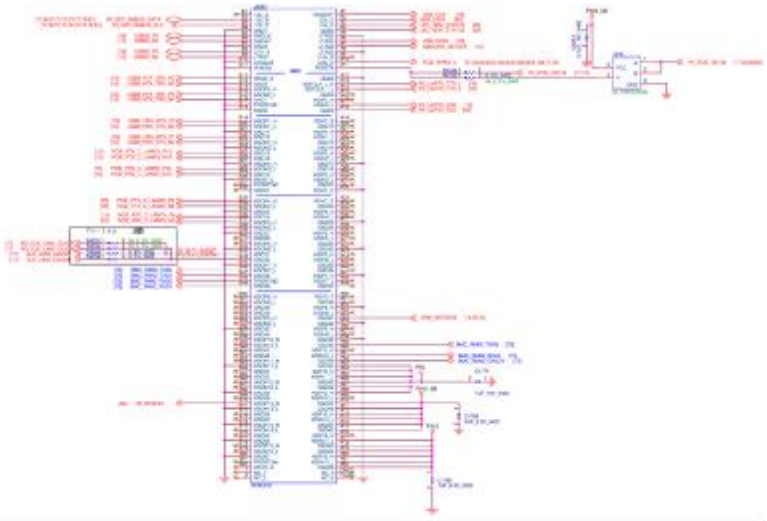
The pin headers on the motherboard are often associated with important functions. With the shunt (Jumper) pushed down on the designated pins (the pin numbers are printed on the circuit board, surrounding the pin header), certain feature can be enabled or disabled. While changing the jumpers, make sure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

Jumper Setting

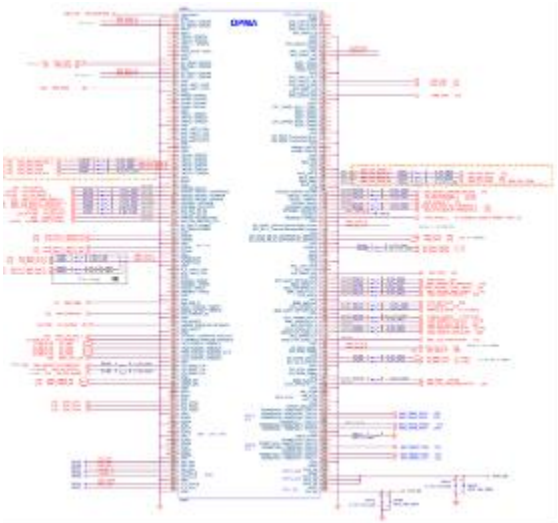
To short the designated pins, push the jumper down on them so that they become **SHORT**. To make the pins setting **OPEN**, simply remove the jumper cap.

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

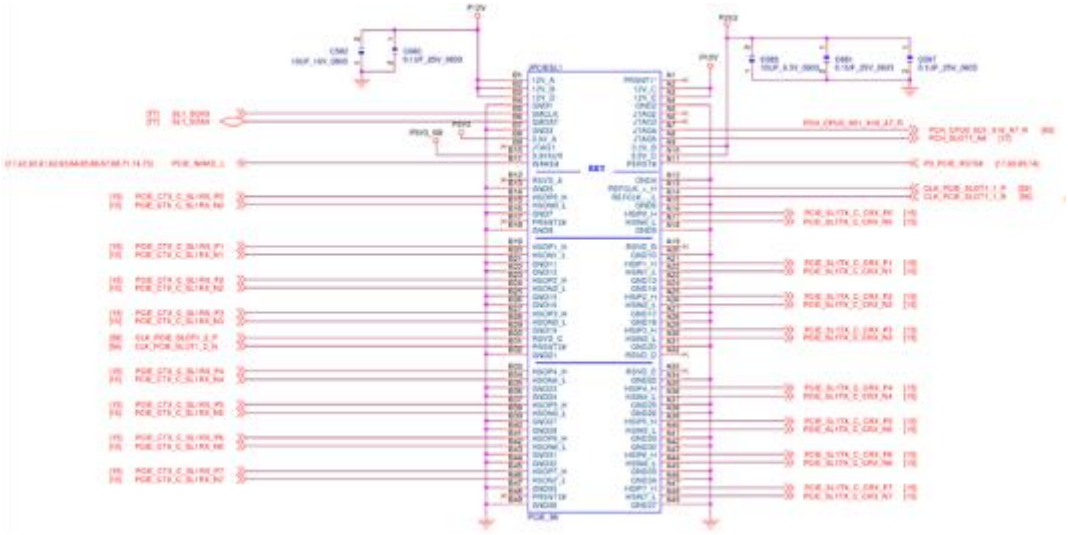
JIOB1: IO Board Connector



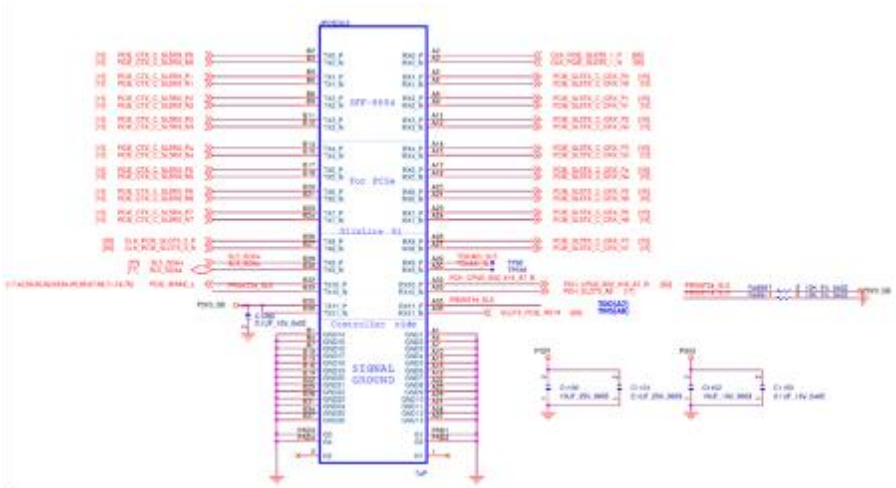
OPMA1: IPMI Card Connector



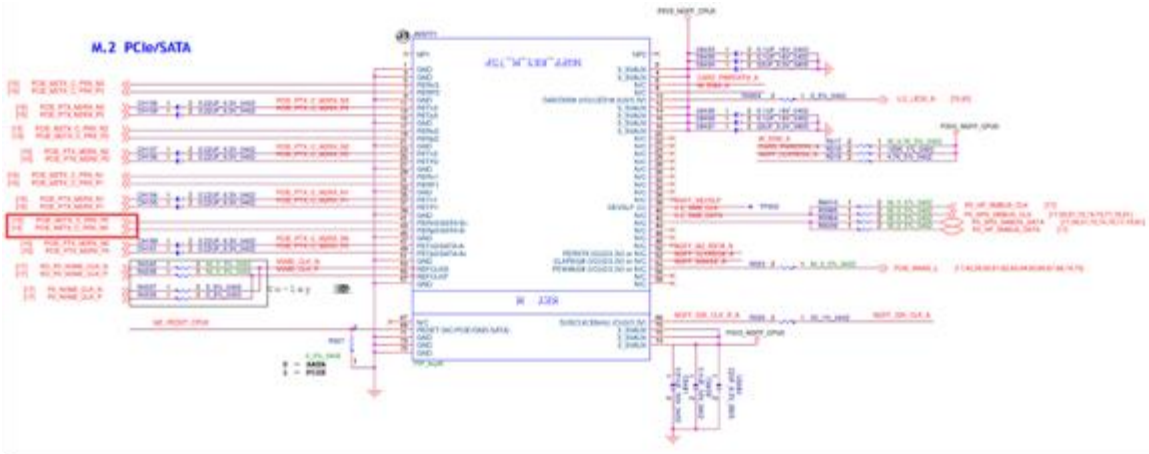
JPCIESL1~4: PCIe Slot



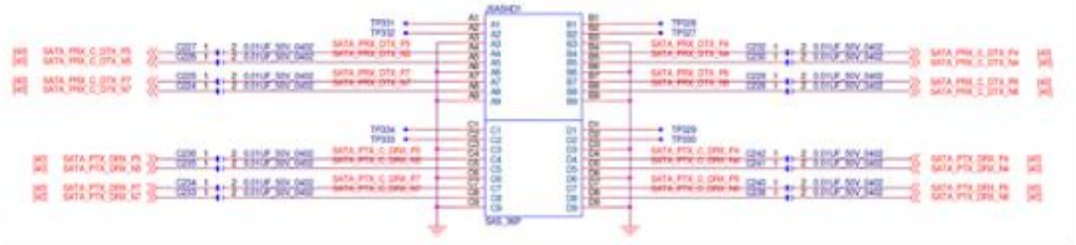
JPCIESL5~10: PCIe SlimSAS Cable Connector



JNGFF1: M.2 PCIe/SATA Connector

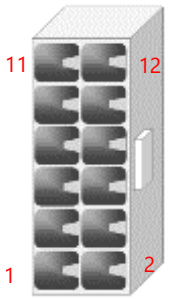


JSASHD1: SASHD Connector



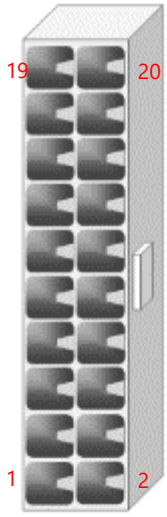
ATX1: 12 Pin Power Connector

PIN	Description	PIN	Description
1	GND	2	P12V
3	GND	4	P12V
5	GND	6	P5V
7	GND	8	P3V3
9	GND	10	P3V3
11	GND	12	P12V_SB



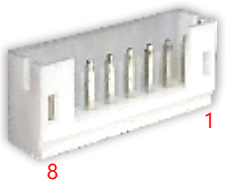
ATX2: 20-Pin Power Connector

PIN	Description	PIN	Description
1	GND	2	P3V3
3	GND	4	GND
5	GND	6	GND
7	GND	8	GND
9	GND	10	GND
11	P12V	12	P12V
13	P12V	14	P12V
15	P12V	16	P12V
17	P12V	18	P12V
19	P12V	20	P12V



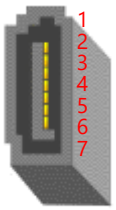
JPMB1：PMBUS Connector

PIN	Description	PIN	Description
1	NC	2	NC
3	ATX_PSON#	4	GND
5	ATXPWGD	6	PMBUS_CLK_PSU_R
7	PMBUS_DAT_PSU_R	8	PMBUS_ALERT#_R



JSATA1 ~ JSATA4：SATA Connector

PIN	Description
1	GND
2	TX_P
3	TX_N
4	GND
5	RX_N
6	RX_P
7	GND



JFAN1 ~ 4: Fan Connector

PIN	Description
1	GND
2	P12V
3	RPM Sense
4	RPM Sense
5	PWM

DC1: SATA Power Connector

PIN	Description
1	P12V
2	P5V
3	P3V3
4	GND

JATX1~6: 4-Pin PCIe Power Connector

PIN	Description	PIN	Description
1	GND	2	GND
3	P3V3	4	P12V

JUSB1: USB 2.0 Function

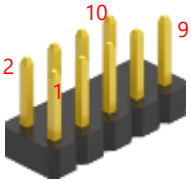
PIN	Description	PIN	Description
1	P5V_USB1	2	--
3	USB20_L_N3	4	--
5	USB20_L_P3	6	--
7	USBGND1	8	--
9	NC	10	--

JTPM1: TPM Function

PIN	Description	PIN	Description
1	P0_SERIRQ	2	P0_LFRAME_L
3	P0_LAD0	4	TPM_LPCCLK
5	P0_LAD1	6	P3V3_SB
7	P0_LAD2	8	NC
9	P0_LAD3	10	P3V3
11	TPM_RST#	12	GND

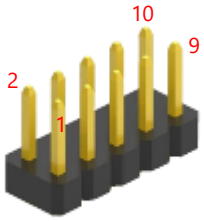
JCOM2: COM Port Function

PIN	Description	PIN	Description
1	NC	2	NC
3	COM2_RX	4	COM2_RTS
5	COM2_TX	6	COM2_CTS#
7	NC	8	NC
9	IO_GND2	10	--



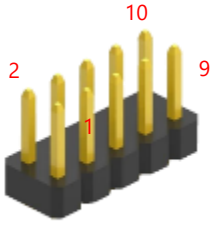
JSPIROM1: Flash BIOS Pin Header

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



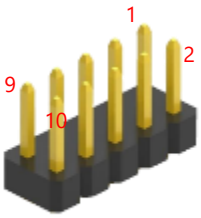
JGP1: EXT GPIO Function

PIN	Description	PIN	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



J80P1: Debug Port Pin Header

PIN	Description	PIN	Description
1	80PORT_LPC_CLK	2	P0_LAD1
3	BUF_LPC_RST_L	4	P0_LAD0
5	P0_LFRAME_L	6	P3V3
7	P0_LAD3	8	
9	P0_LAD2	10	GND



JPLD1: CPLD FLASH Pin Header

PIN	Description
1	P3V3_CPLD_2
2	JTAG_PLD_TDO
3	JTAG_PLD_TDI
4	JTAG_PLD_TMS
5	GND
6	JTAG_PLD_TCK

JDB5: BMC Debug Pin Header

PIN	Description
1	UARTS5_RX
2	GND
3	UARTS_TX

JDBM2: CPLD Debug Mode Pin Header

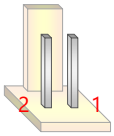
PIN	Description
1	P3V3_CPLD
2	FM_JTAG_EN_DEBUG

JOPEN1: Case Open Function

PIN	Description
1	GND
2	HM_CASEOPEN#

JPWR1: Power ON Function

PIN	Description
1	GND
2	PWRON#



JCMOS1 (1-2)

1-2: NORMAL (Default)

2-3: Clear CMOS

PIN	Description
1	NC
2	P0_VDDBT_RTC_G
3	GND

J12 (1-2)

1-2: Enable Dual BIOS (Default)

2-3: Disable Dual BIOS

PIN	Description
1	P3V3_CPLD
2	DUAL_BIOS_DIS
3	GND

J13 (1-2)

1-2: Force Boot up from BIOS1 (Default)

2-3: Force Boot up from BIOS2

PIN	Description
1	P3V3_CPLD
2	DUAL_BIOS_SEL
3	GND

JDUAL1 (1-2, 3-4)

1-2, 3-4: Flash 1st BIOS (Default)

1-3, 2-4: Flash 2nd BIOS

PIN	Description
1	SPI_CS0#
2	SPI_CS0#_DUAL
3	SPI_CSI#_DUAL
4	SPI_CS1#

SW3: Front Panel RST Button

SW10: Power ON Button

CHAPTER 2: HARDWARE SETUP

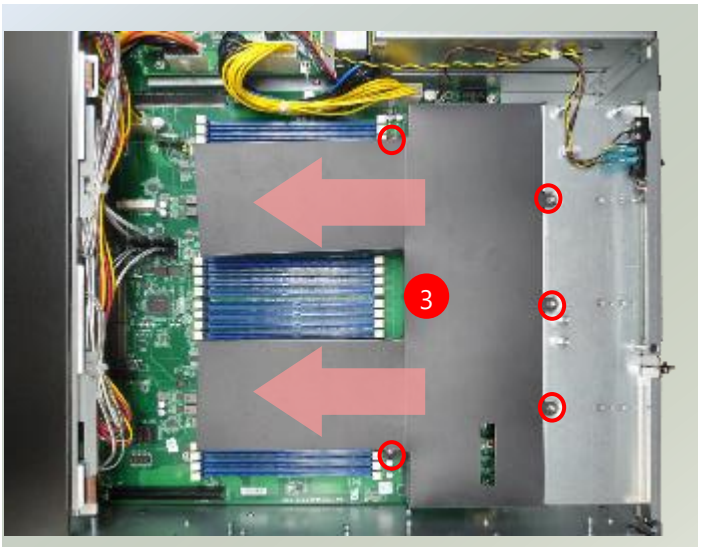
To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to shut down the device completely. Also, please wear ESD protection gloves when conducting the steps in this chapter.

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 chassis cover up to remove it.

3. Remove the hood that encloses the CPUs and the fans. Unscrew the five (5) screws securing the hood, then left up the hood and place aside. Please follow the instructions below to install the processor and heatsink module.



Installing the CPU

Please note that the system delivered to you 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 to make sure you have acquired the necessary knowledge and comply with the requirements.

Installing the processor onto motherboard involves two stages:

1. Remove the protective plastic cap.
2. Install the processor.
3. Install the Heatsink onto the motherboard.

Tools Required

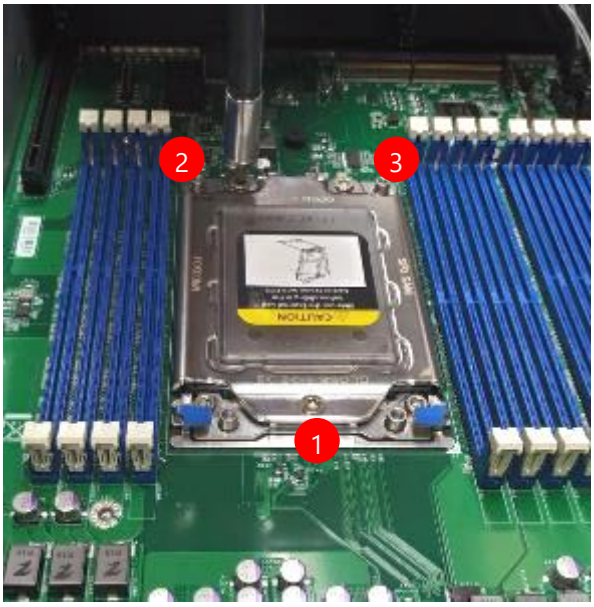
Tool	Description	
Torque screwdriver (Star T20)	For opening/closing the CPU sockets.	
ESD Protection (ESD gloves, ESD-safe work surface, etc.)	During the entire assembly process, at least wear a pair of ESD gloves to avoid damaging or contaminating the electronic parts while enhancing your own safety.	

Note

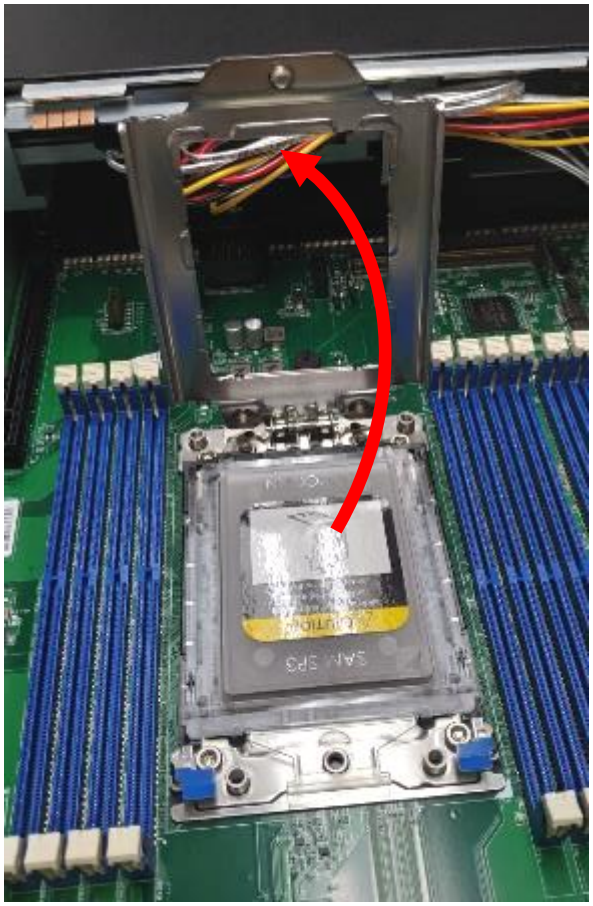
The images of tools shown in this document are merely for reference; the actual tools you use might differ.

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.

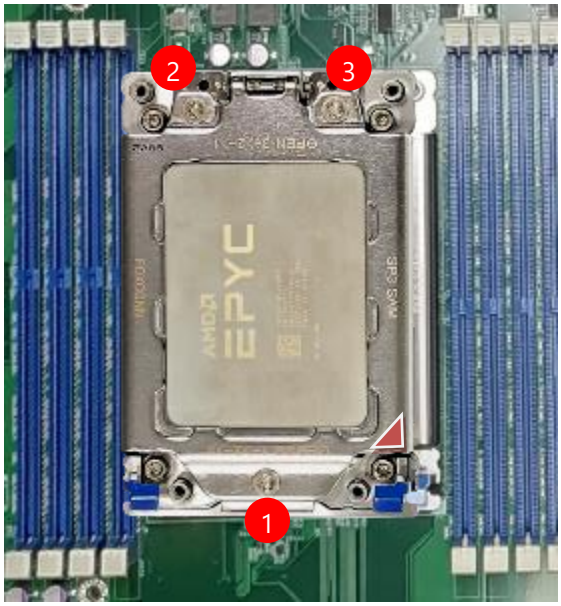


2. Once **#1** screw is loosened, the metal frame will pop up by itself.



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

4. 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.**

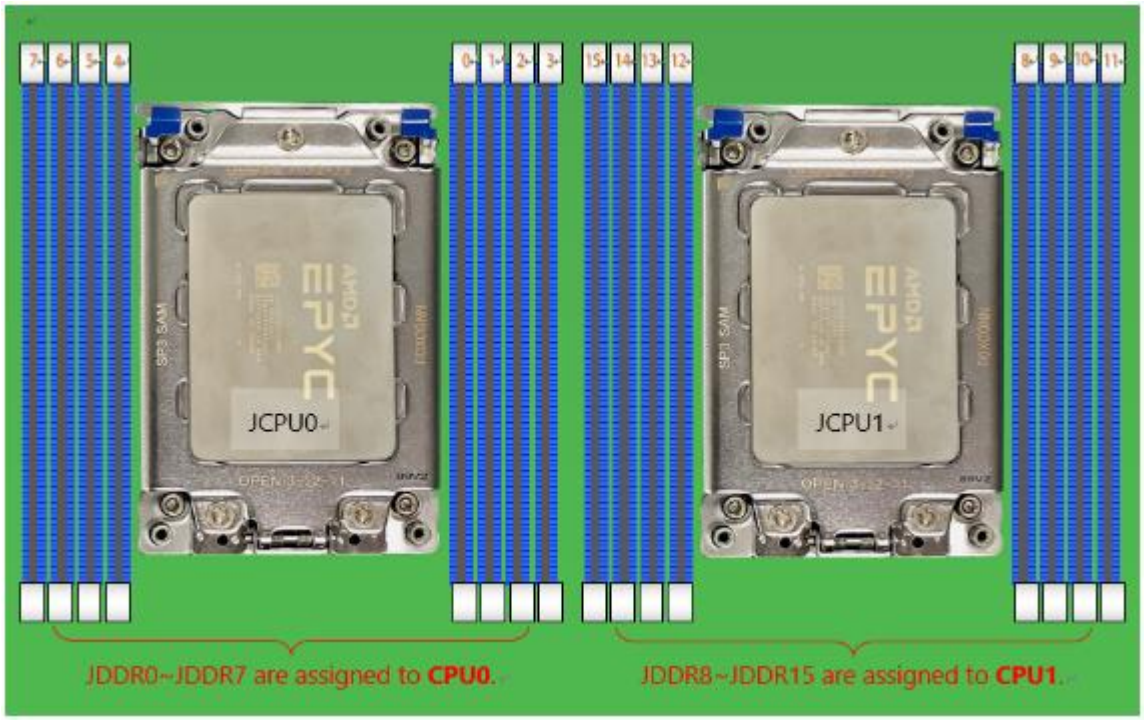


Installing the System Memory

The motherboard supports 16 memory slots for DDR4 registered DIMM.

Supported System Memory Summary

Total Slots	16 (8 slots per processor)
Number of Channels	8 (Channel 0~7, 1 DIMM per channel) per processor
Supported DIMM Capacity	8GB, 16GB, 32GB, 64GB
Memory Size	Maximum 1024GB RDIMM (64GB*16)
Memory Type	DDR4 REG, ECC RDIMM 3200MHz
Minimum DIMM Installed	Each processor requires at least 4 memory modules to boot and run from.



DIMM Population Guidelines

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

- Do not mix RDIMMs with LRDIMMs.
- For optimal performance, split the DIMMs evenly across the CPUs when two CPUs are installed.
- Using memory modules of the same capacity, speed and from the same manufacturer are highly recommended. However, with mixed module speeds, the overall speed will be that of the slowest installed memory module.
- For best performance, AMD recommends populating all eight memory channels per socket, with every channel having the same capacity.
- Please do follow the memory module installation instructions to install the DIMM, and make sure the DIMM population guidelines are met.

One DIMM Configuration (Not Recommended)

Interleave: None (NPS=1,2, or 4)

All DIMM have the same capacity.

DIMM are unpopulated.

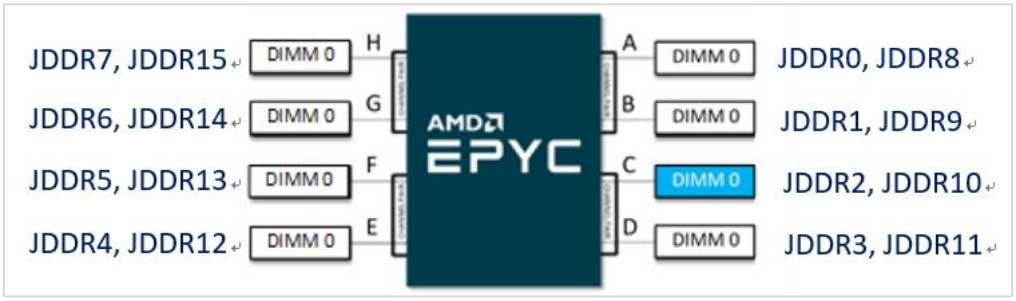


Figure 1. One DIMM Population in 1 DPC Configuration

Two DIMM Configuration (Not Recommended)

Interleave: CD, (NPS=1,2, or 4)

All DIMM have the same capacity.

DIMM are unpopulated.

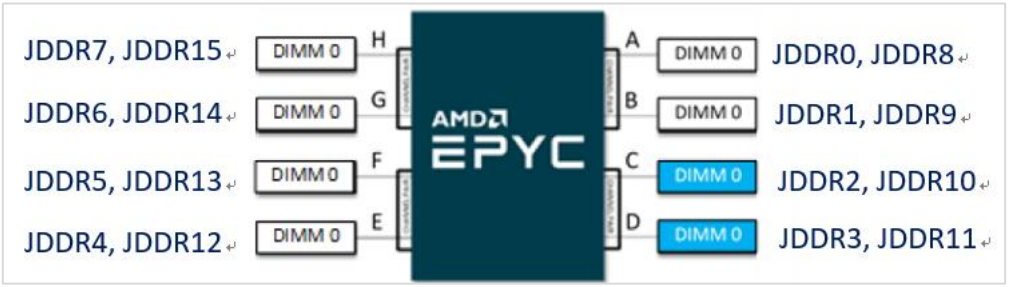


Figure 2. Example Two DIMM Population in 1 DPC Configuration

Four DIMM Configuration (Conditionally recommended only with EPYC processors that have 128MB L3 or less[1])

Interleave: CDGH, (NPS=1; default and preferred)

All DIMM have the same capacity.

DIMM are unpopulated.

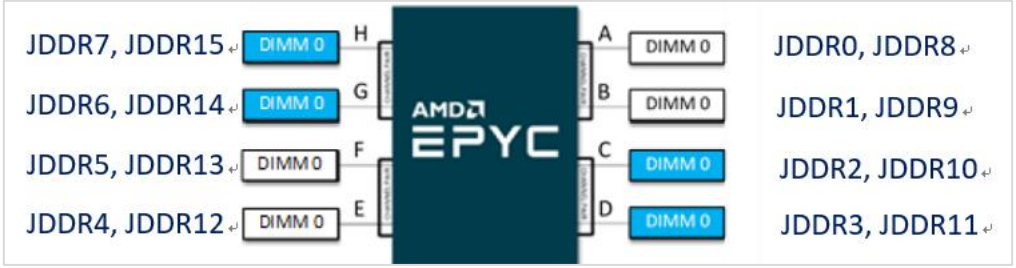


Figure 3. Example Four DIMM Population in 1 DPC Configuration

Six DIMM Configuration (Conditionally recommended if only 6 channels can be populated[2])

Interleave: ACDEGH, (NPS=1; default and preferred)

Other interleave options: CD, GH (NPS=2 or 4)

Channels ACDEGH are the only channels capable of six-way interleaving. No other channels may be populated.

All DIMM have the same capacity, and only with ≤ 256GB per channel.

DIMM are unpopulated.

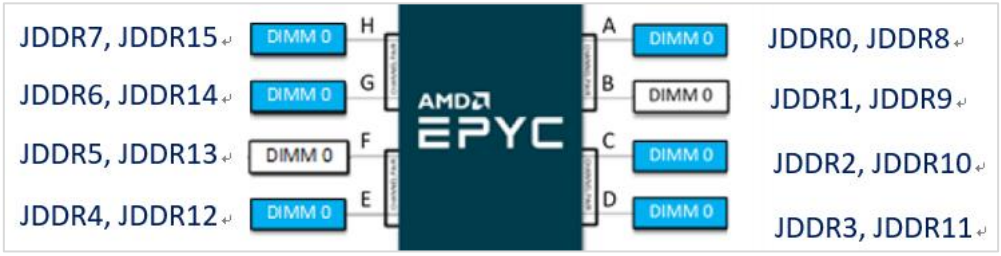


Figure 4. Example Six DIMM Population in 1 DPC Configuration

Eight DIMM Configuration (Recommended)

Interleave: ABCDEGH, (NPS=1; default and preferred)

Other interleave options: ABCD, EFGH (NPS=2) and AB, CD, EF, GH (NPS=4)

All DIMM have the same capacity.

DIMM are unpopulated.

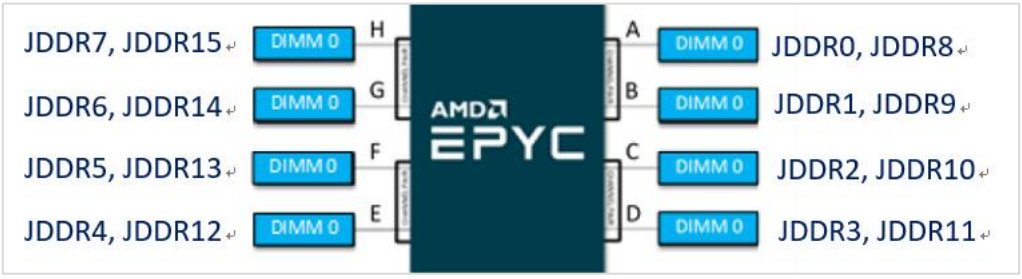


Figure 5. Example Eight DIMM Population in 1 DPC Configuration

NOTES:

[1] If a customer chooses to populate only four channels in the system, AMD recommends limiting the processors in that system to those with 128MB or less of L3 and populating channels CDGH identically. This will enable four-way interleaving, which will generally provide the best performance with a four DIMM population.

[2] If a customer chooses to populate only six channels, AMD recommends populating channels ACDEGH with equal capacity, where all channels are less than 256GB each. This will enable six-way interleaving, which will generally provide the best performance with a six-channel population. Note that the memory interleaving size must be set to 2KB or 4KB for six-way interleaving operation.

Recommended DIMM Population Scheme

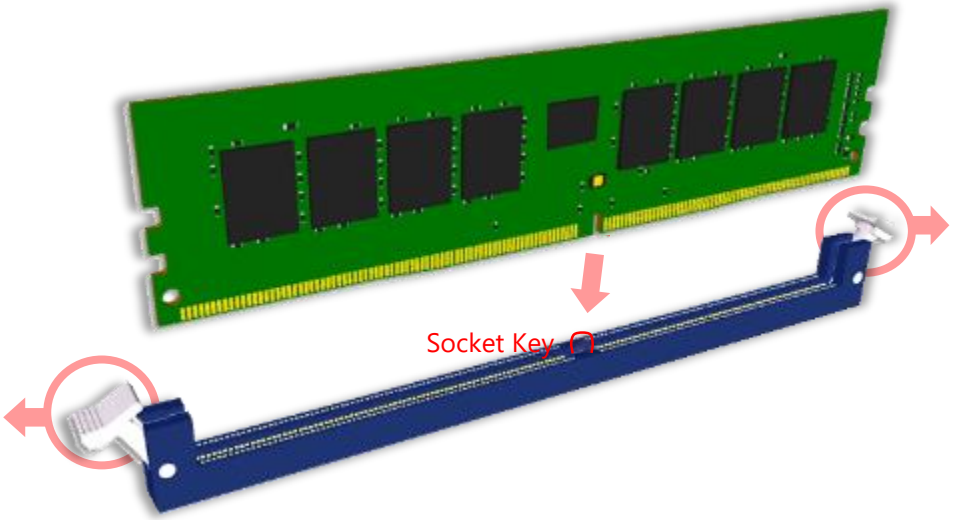
The table below shows the recommended schemes for DIMM population. To guarantee balanced system performance, please install identical DIMMs of the same capacity, speed, number of ranks, and from the same manufacturer. As the recommended minimum requirement, each channel pair of a processor should have at least one DIMM installed.

	Processor	CPU0								JCPU1								Channel pair
	JDDR # (Channel)	7	6	5	4	0	1	2	3	15	14	13	12	8	9	10	11	
Number of DIMMs Installed for 1 CPU	4 DIMMs	○	○					○	○									
	8 DIMMs	○	○	○	○	○	○	○	○									
Number of DIMMs Installed for 2 CPUs	8 DIMMs	○	○					○	○	○	○					○	○	
	16 DIMMs	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

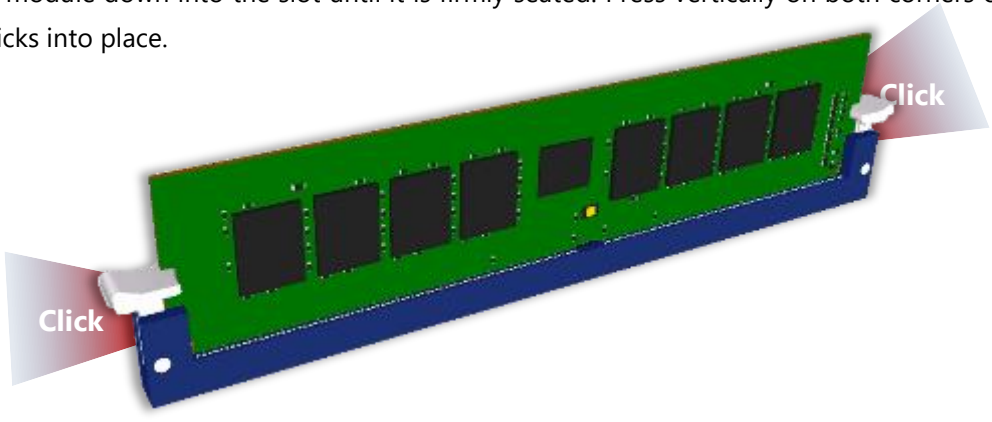
Memory Module Installation Instructions

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

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



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

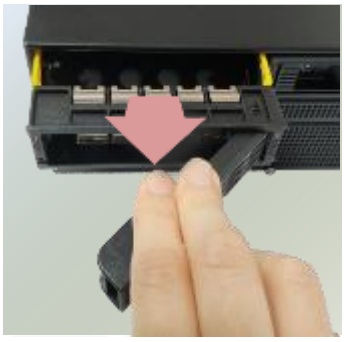


Installing the Disk Drive(s)

This system is built with drive bays that can accommodate 2.5" or 3.5" HDD/SSD. The following will discuss disk drive installation procedures based on their HDD/SSD designs.

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

2. To remove the tray, put your finger on the tab and pull it open, hold the tab and then pull out the tray.



3. The tray is designed to accommodate one 3.5" hard disk or one 2.5" hard disk.

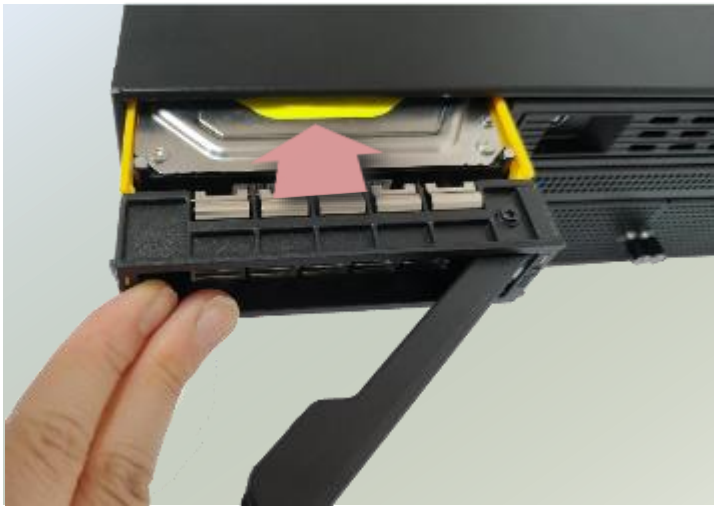
   Mounting a 3.5" hard disk

   Secure the hard disk on the tray with 4~6x #6-32 disk screws. Make sure the SATA contacts of the disk face towards the SATA connector inside the system.

Mounting a 2.5" hard disk

Secure the hard disk on the tray with 3x M3 disk screws. Make sure the SATA contacts of the disk face towards the SATA connector inside the system.

4. To install the mounted disk tray, push the tray into position in the chassis.

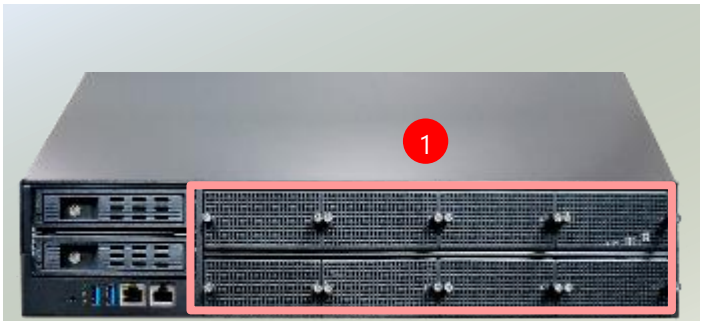


5. Close the hinge tab.

Installing the NIC Modules

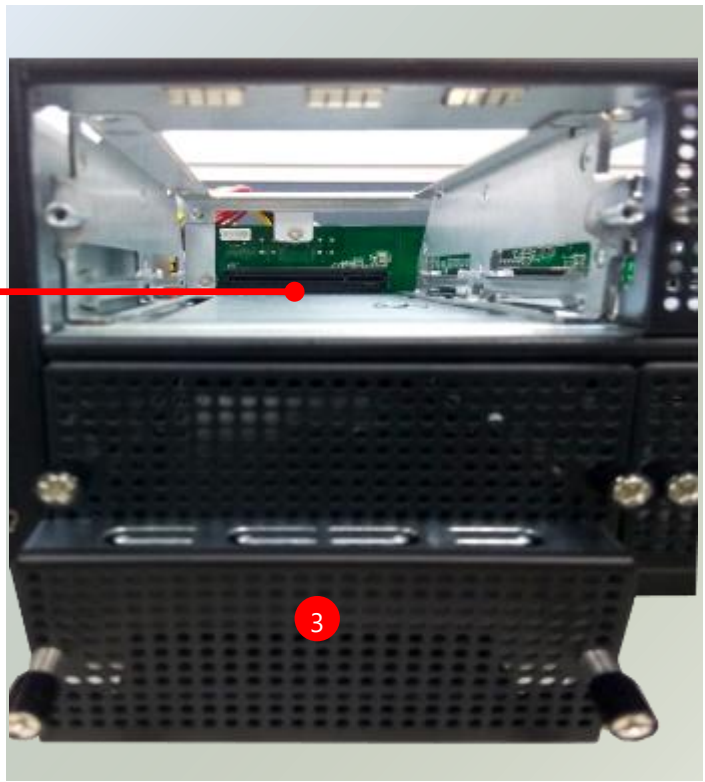
This system comes with NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

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

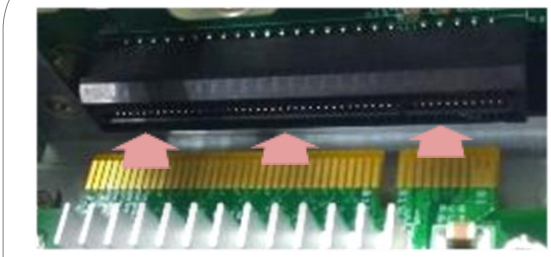


2. Rotate clockwise and loosen the two lock-screws.

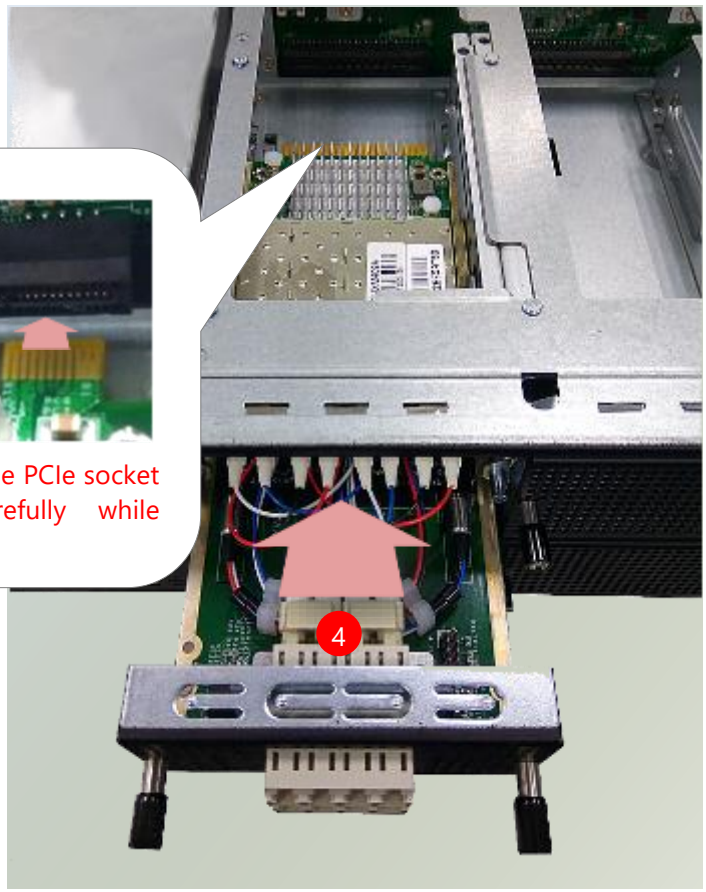
3. Remove the door and locate the PCIe socket for module insertion.



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



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



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

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.

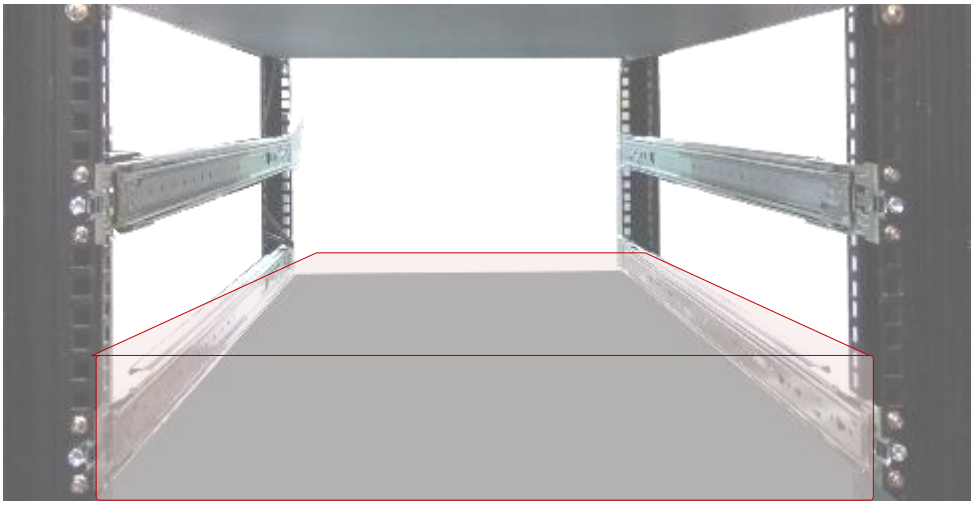
2. Pull the original unit out and replace it with a new one.

Mounting the System

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

- **Ear Brackets**

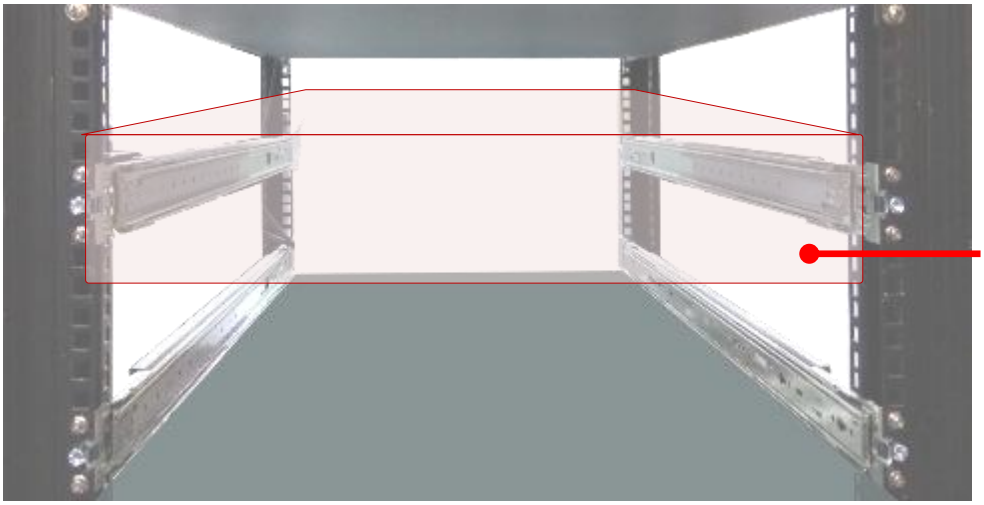
This method is quick and easy by fixing this system to the front posts of the rack while being the most unstable method, for the bracket assembly alone cannot provide sufficient support to the chassis. Please ensure the use of these brackets goes with a shelf or slide rails to prevent the chassis from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



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

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

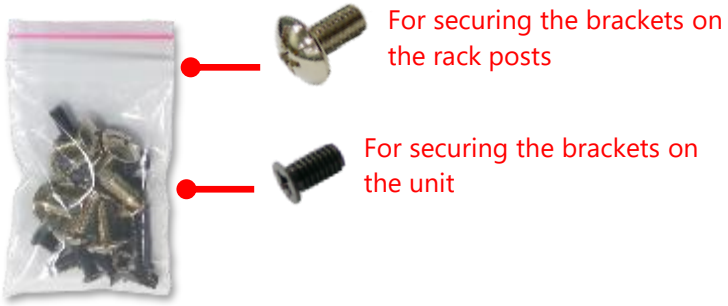
Although this method is rather complicated, the slidable rails allow you to access the system easily while securing it in the rack solidly.



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

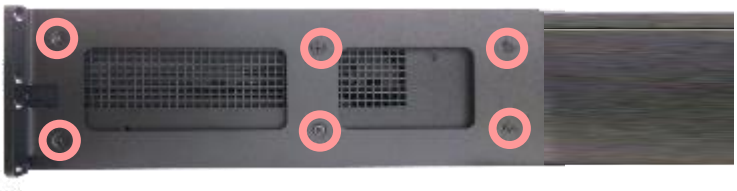
Installing the System Using Mounting Ear Bracket

1. Check the package contents. The mounting ear brackets shall include the items below:



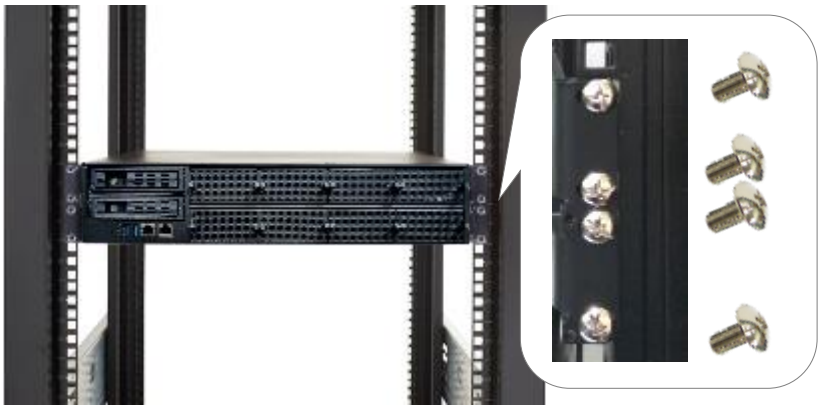
- 1x Screw Pack
- 2x Ear Brackets

2. Secure the bracket onto one side of the chassis using six provided screws.



3. Secure the other bracket on 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 take 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 Short Mounting Ear Brackets)

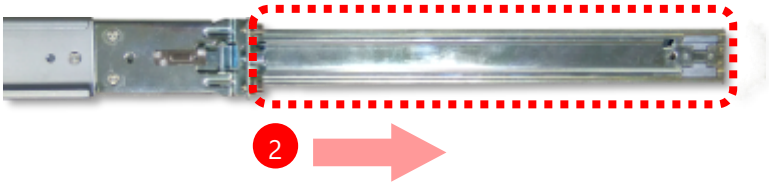
1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:

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

The rail consists of the following parts:

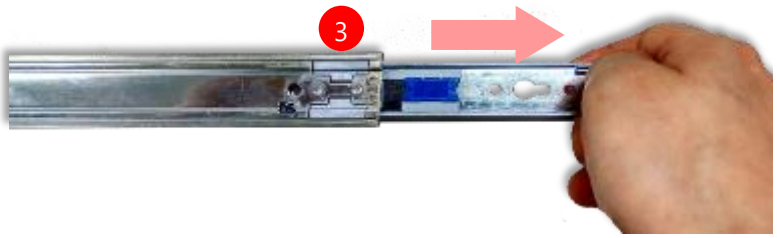
Attaching the Rail Brackets

2. Unpack a slide rail and slide the inner channel all the way to the end.

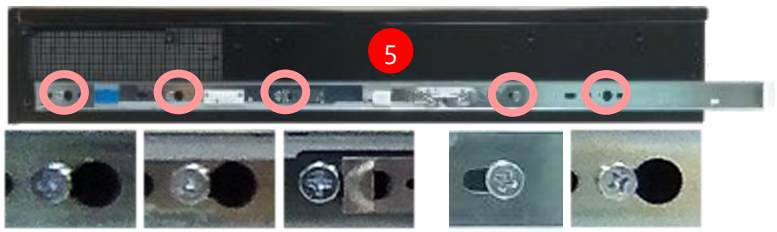


3. Stretch the bracket to the fullest.

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 five provided M4X4L screws.



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

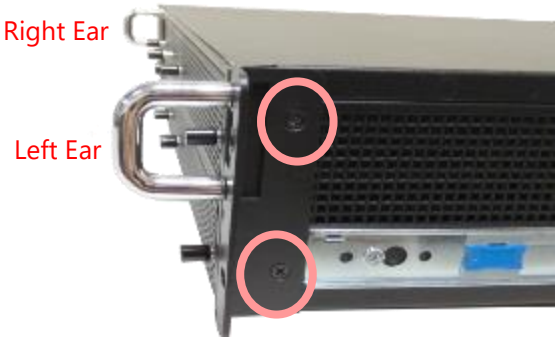
6. Repeat Step 2~5 to attach the bracket to the other side of the chassis.

Assembling the Ear Brackets

7. Check the package contents. The supplied mounting kit shall include the items below:

- 1x pack of screws
- 2x Standard Ear Brackets

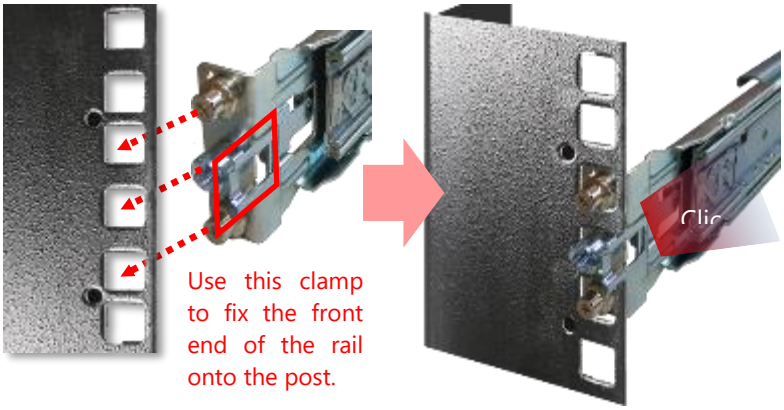
8. Install the brackets on both sides of the system using the provided screws.



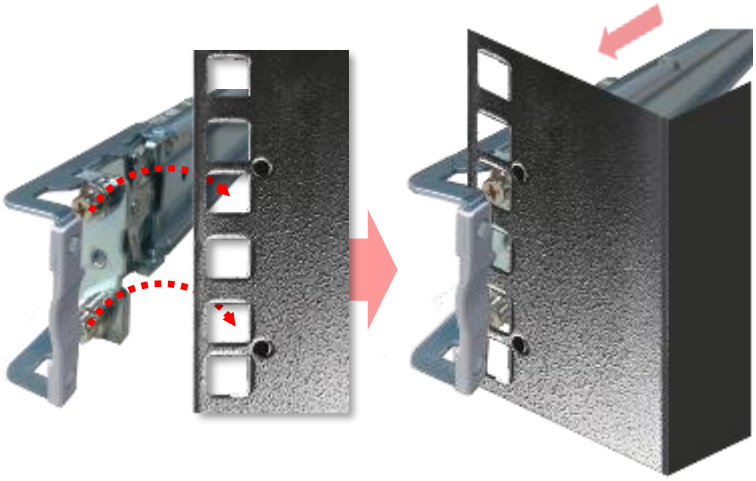
Installing the Slide Rails

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

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

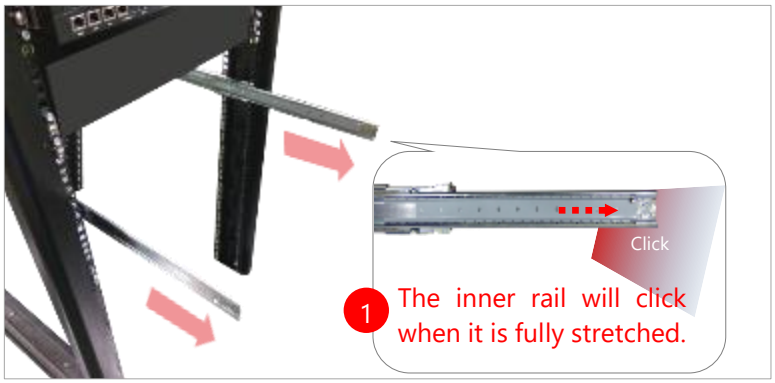


10. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the 2 available holes on the post, and the rail assembly will click into place.

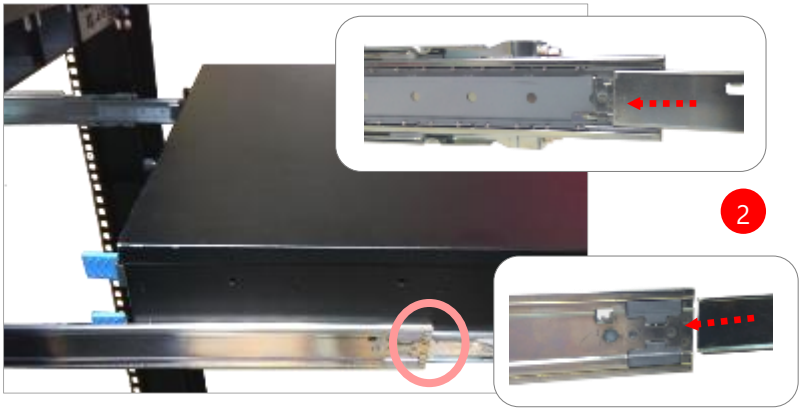


Installing the System into the Rack

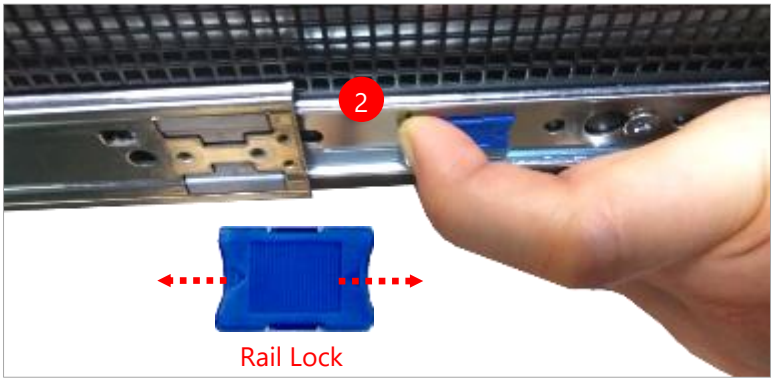
11. Stretch both of the inner rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



12. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the model while aligning them with the slide-rail assemblies as shown in the image below, and then push the system into the cabinet.



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



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

CHAPTER 3: SOFTWARE SETUP

BIOS Setup

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

Main Setup Page

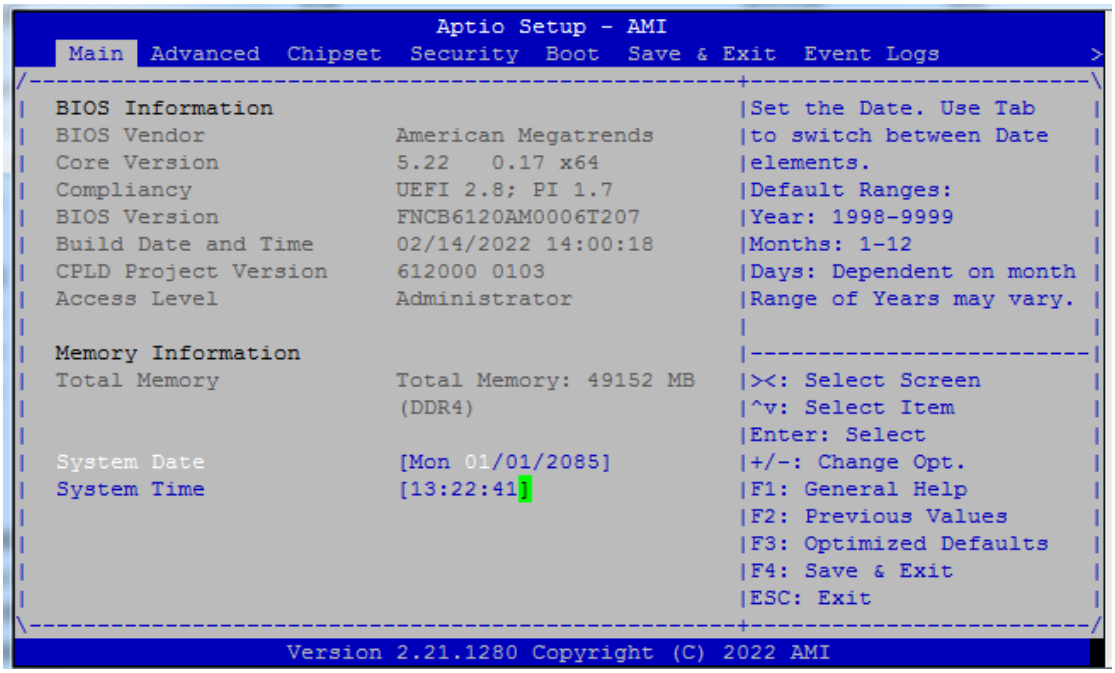
To enter the BIOS setup utility, simply follow the steps below:

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

Main Page

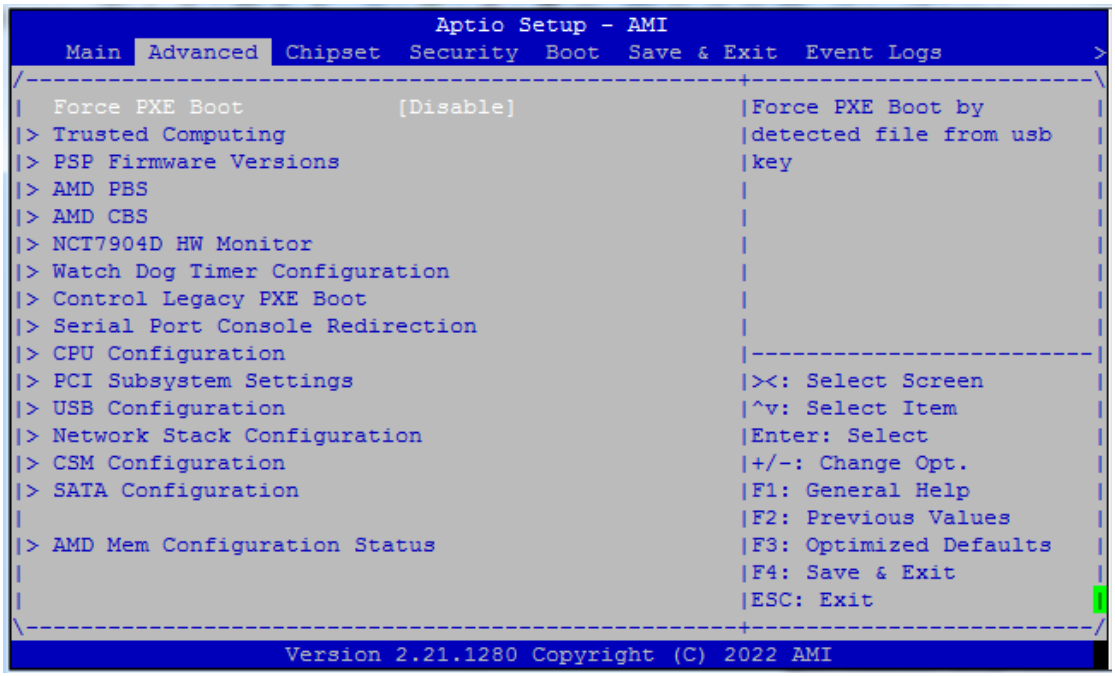
Setup main page contains BIOS information and project version information.



Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 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.

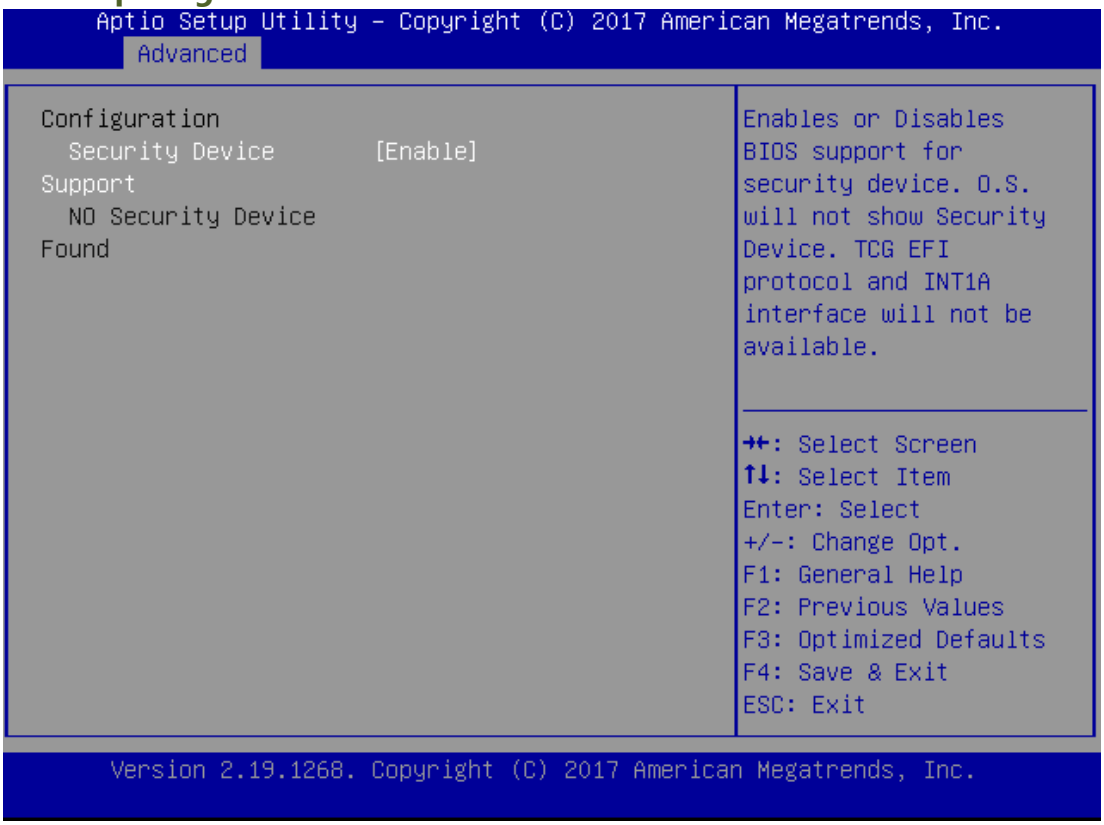
Advanced Page

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.



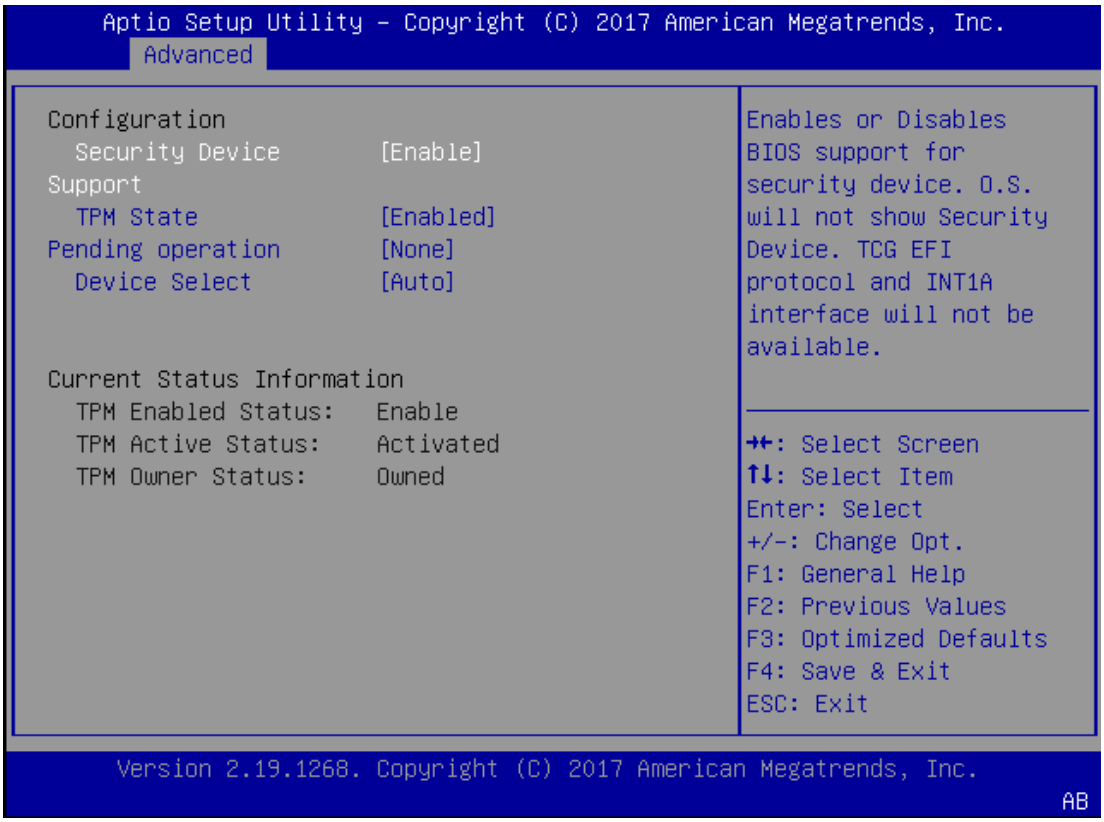
Feature	Options	Description
Force PXE Boot	Enabled Disabled	Force PXE Boot by detected file from USB Key

Trusted Computing



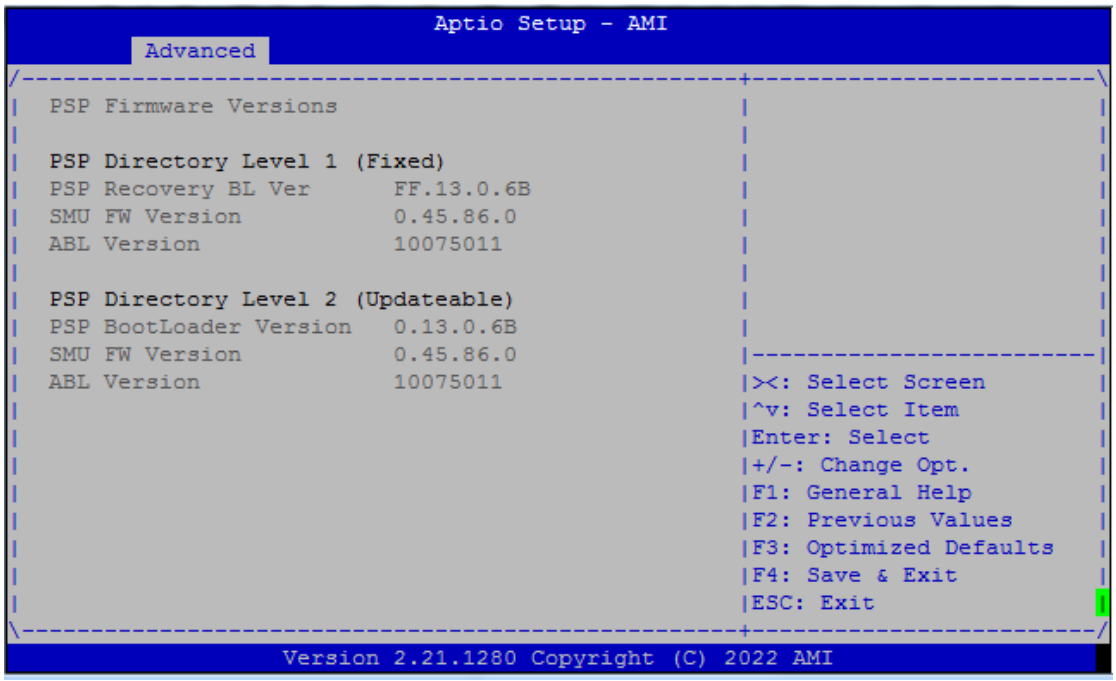
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

Trusted Computing (TPM1.2)



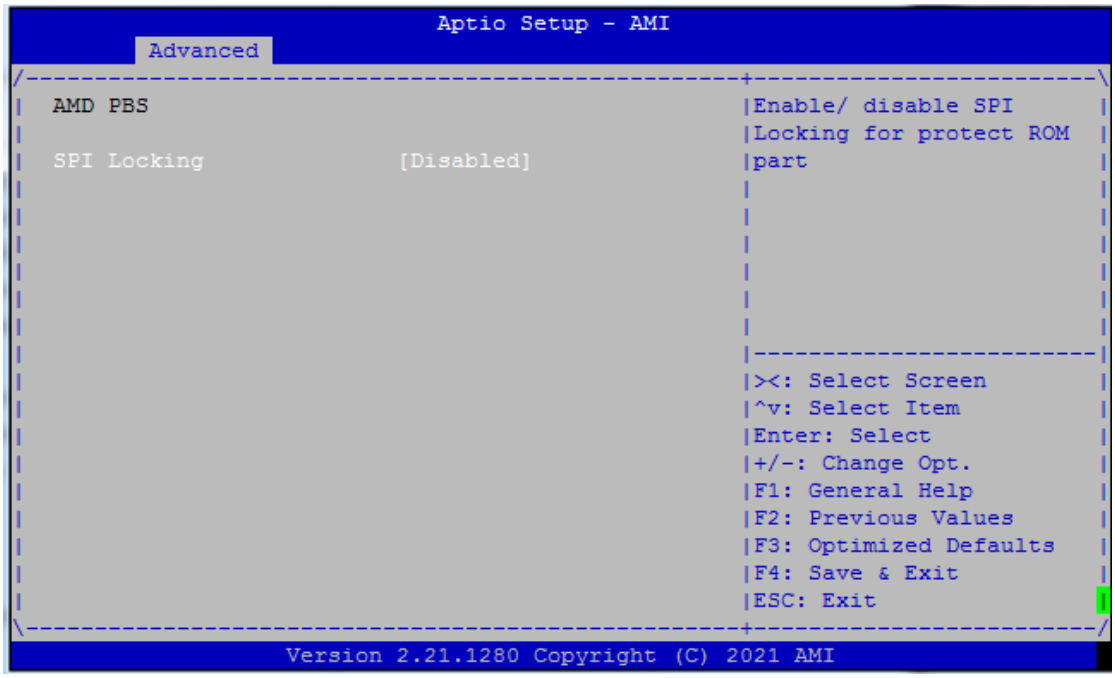
Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
TPM State	Enabled Disabled	Enables or disables Security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

PSP Firmware Versions



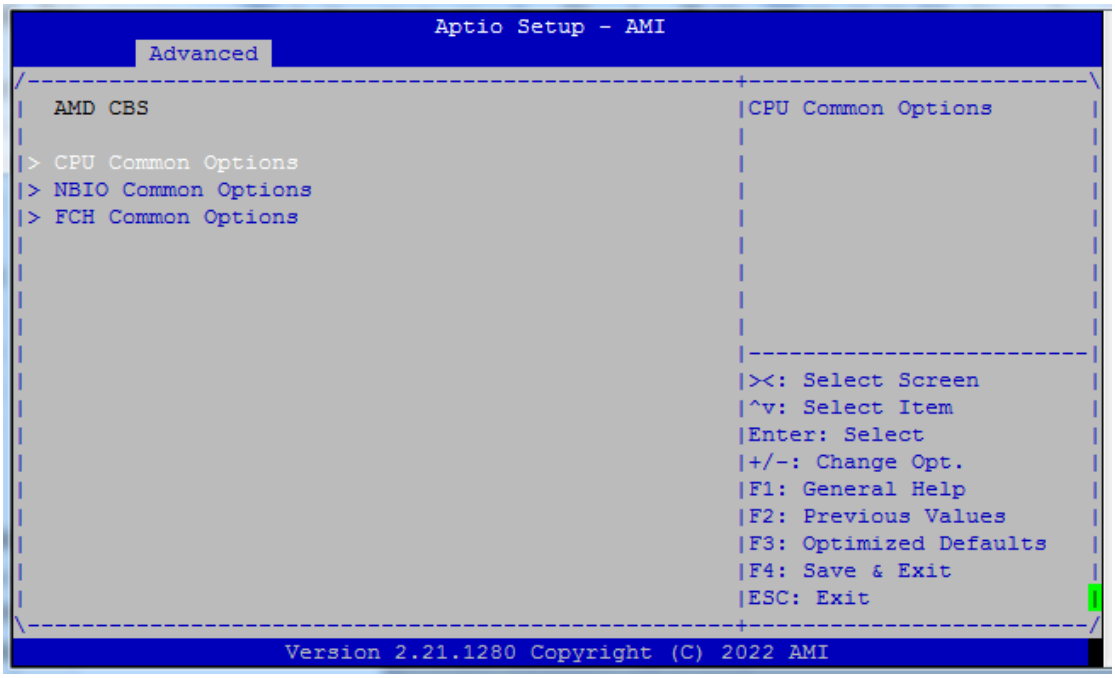
Feature	Description
PSP Firmware Versions	PSP Recovery BL Ver SMU FW Version ABL Version PSP BootLoader Version SMU Version ABL Version

AMD PBS

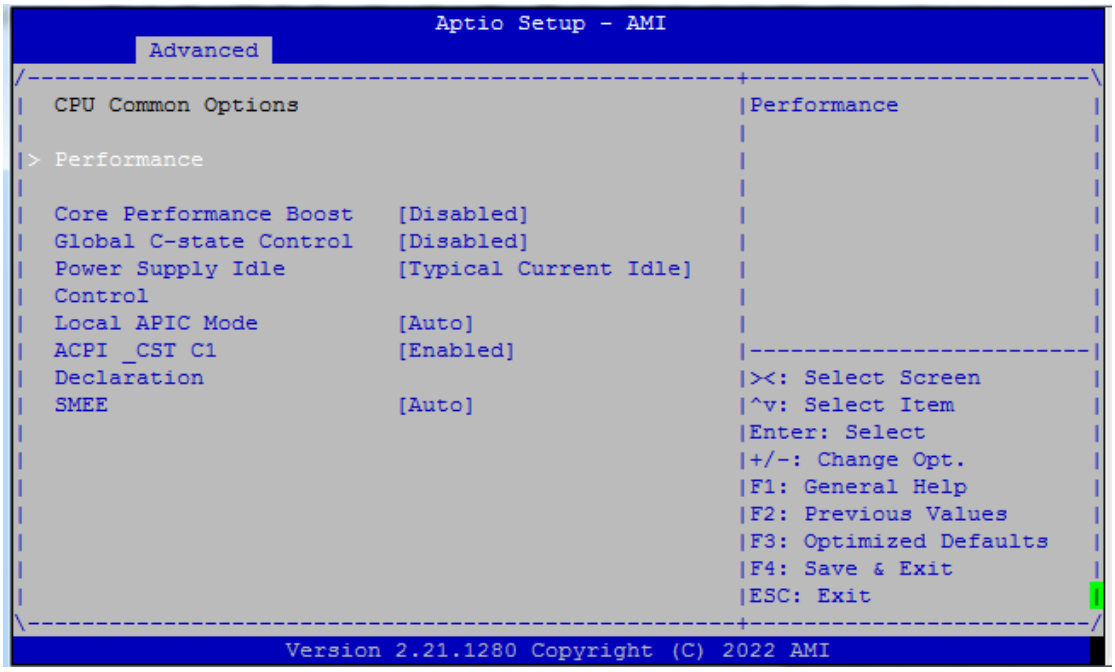


Feature	Options	Description
SPI Locking	Enabled Disabled	Enable/Disable SPI Locking for protecting ROM part.

AMD CBS

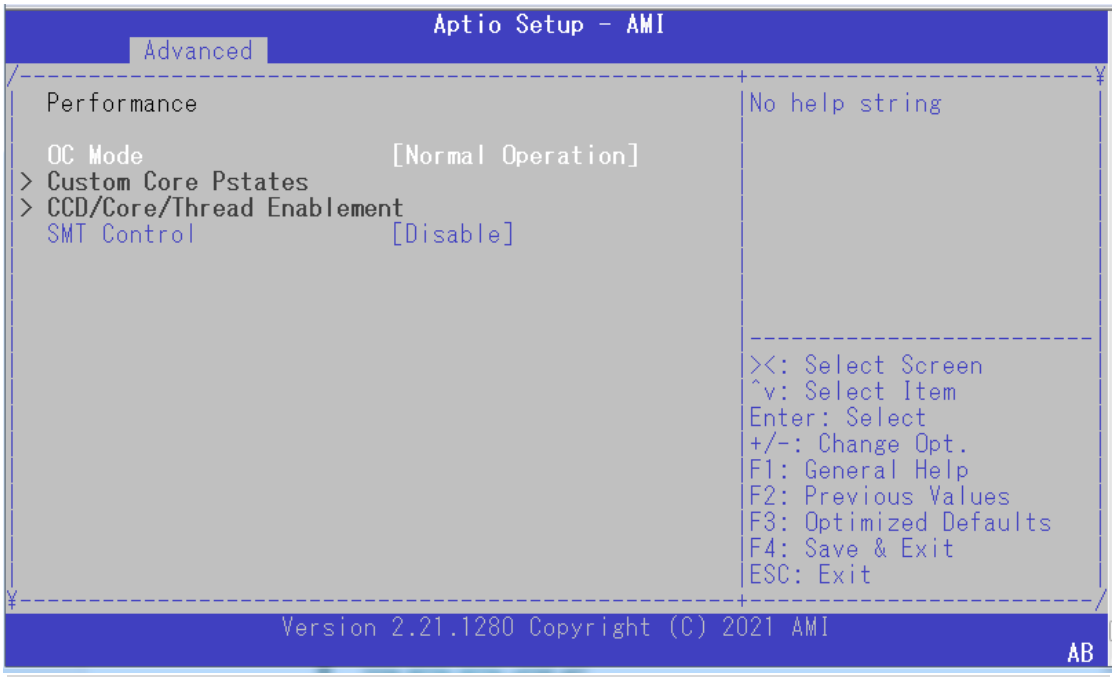

Aptio Setup – AMI
Advanced
AMD CBS
> CPU Common Options
> NBIO Common Options
> FCH Common Options
CPU Common Options
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.21.1280 Copyright (C) 2022 AMI

CPU Common Options



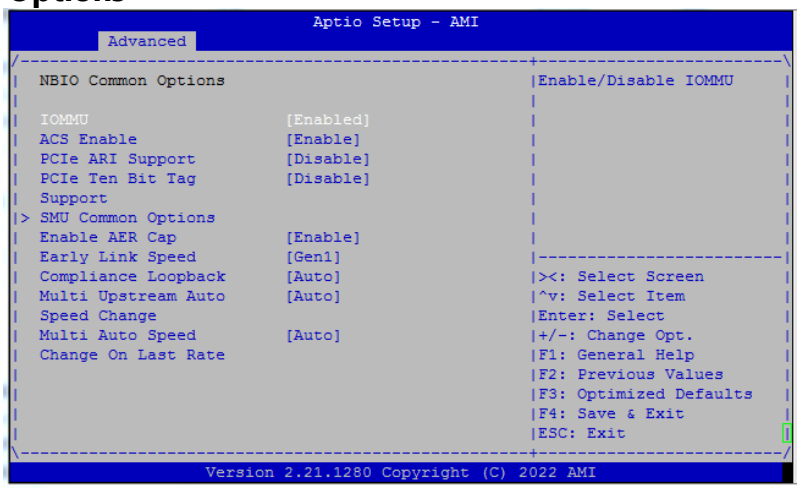
Feature	Options	Description
Core Performance Boost	Disabled Auto	Disable CPB
Global C-state Control	Disabled Enabled Auto	Controls IO based C-state generation and DF C-states.
Power Supply Idle Control	Low Current Idle Typical Current Idle Auto	Power Supply Idle Control
Local APIC Mode	Compatibility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

Performance



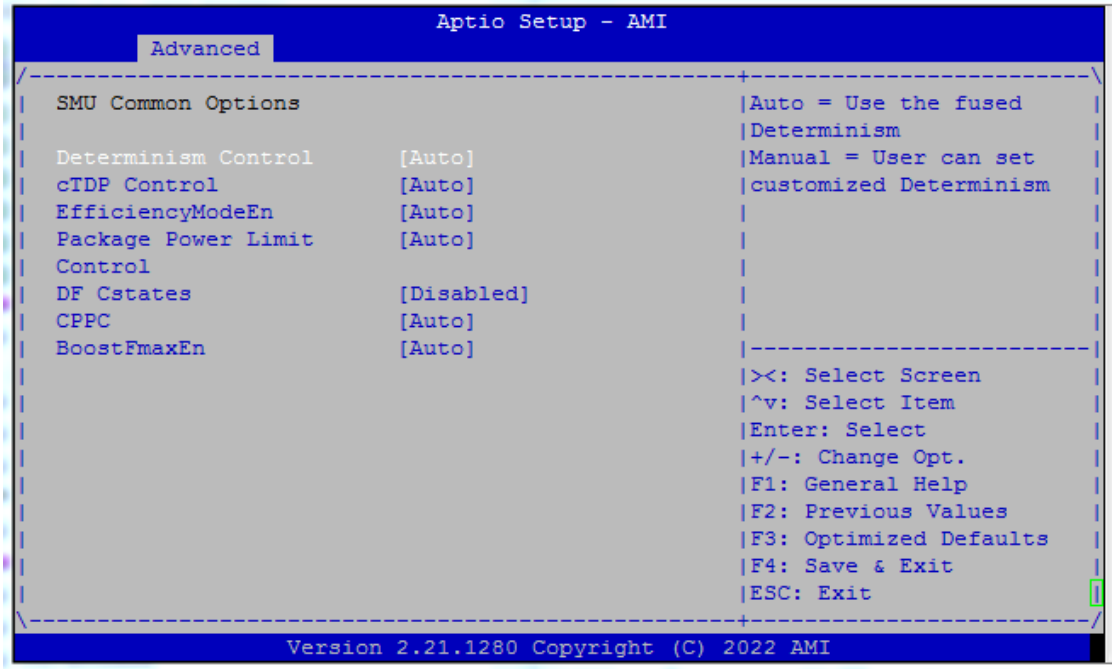
Feature	Options	Description
OC Mode	Normal Operation Customized	--
SMT Control	Disabled Enabled Auto	--

NBIO Common Options



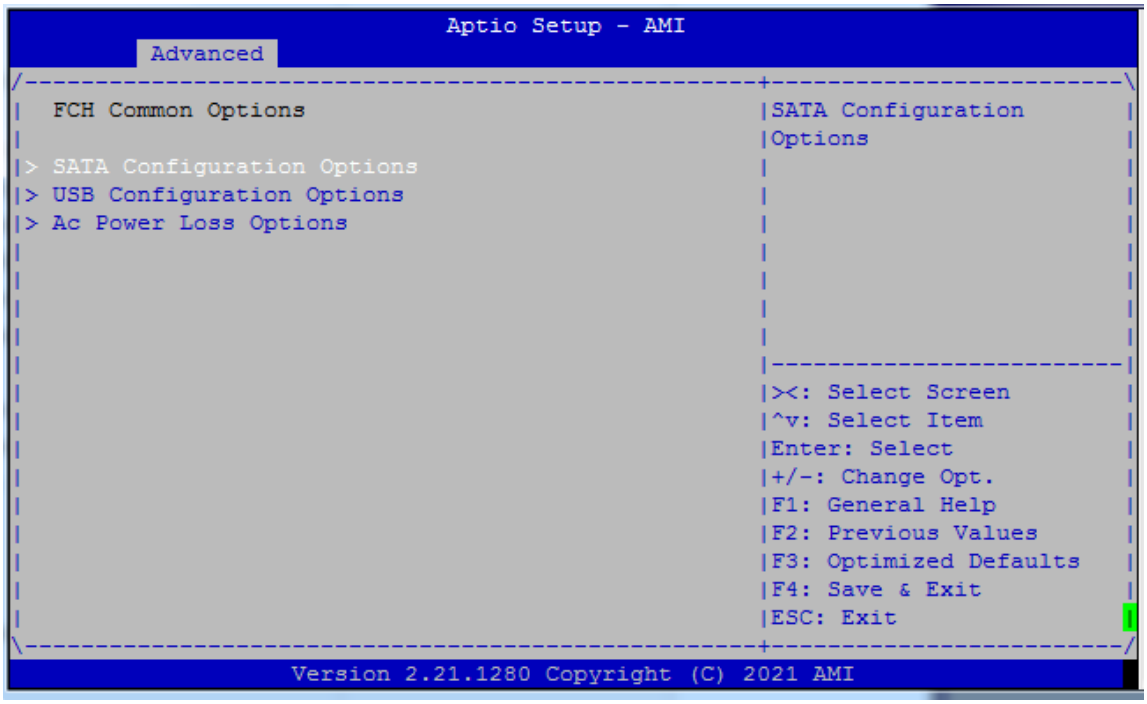
Feature	Options	Description
IOMMU	Disabled Enabled Auto	Enable/Disable IOMMU
ACS Enable	Disabled Enabled Auto	AER must be enabled for ACS enable to work.
PCIe ARI Support	Disabled Enabled Auto	Enables Alternative Routing-ID Interpretation.
PCIe Ten Bit Tag Support	Disabled Enabled Auto	Enables PCIe ten-bit 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
Compliance Loopback	Disabled Enabled Auto	Compliance Loopback Test
Multi Upstream Auto	Disabled Enabled Auto	Defines the setting of this feature for all PCIe devices. 'Auto' uses the DXIO default setting of 0 for Gen1 and 1 for Gen2/3
Multi Auto Speed Change On Last Rate	Disabled Enabled Auto	Force PCIe link training speed to last advertised for all ports. Disabled=Use highest data rate ever advertised. Enabled=Use last data rate advertised.

SMU Common Options

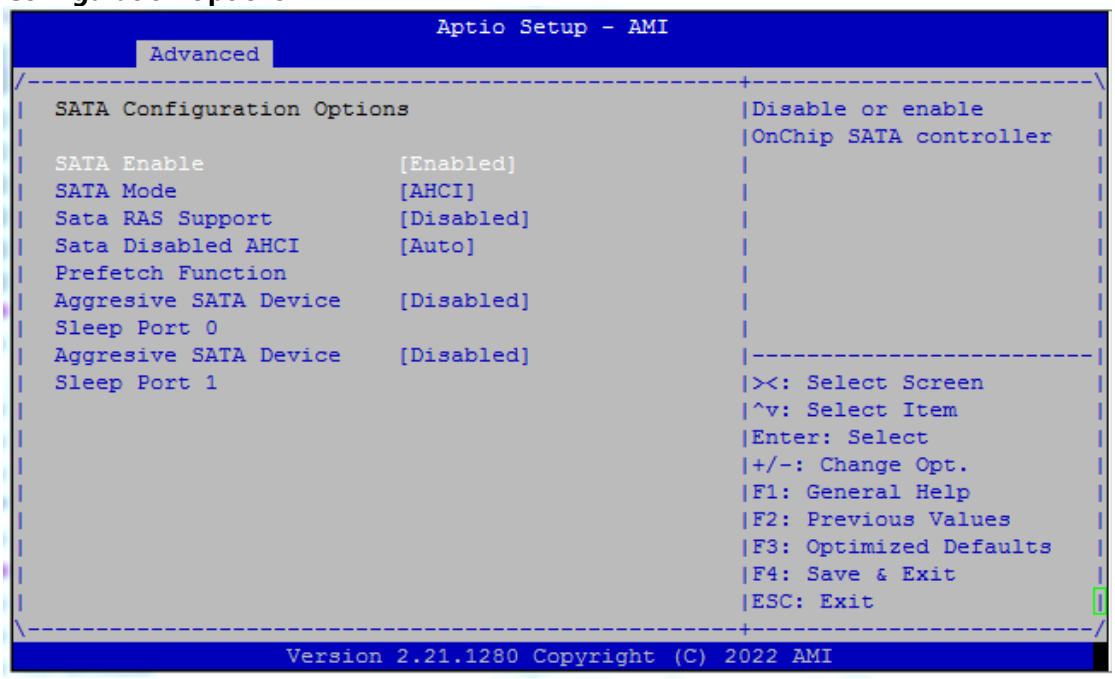


Feature	Options	Description
Determinism Control	Manual Auto	Auto = Use the fused Determinism Manual = User can set customized Determinism
cTDP Control	Manual Auto	Auto = Use the fused TDP Manual = User can set customized TDP ***TDP is used to define the RC thermal model only***
EfficiencyModeEn	Enabled 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

FCH Common Options

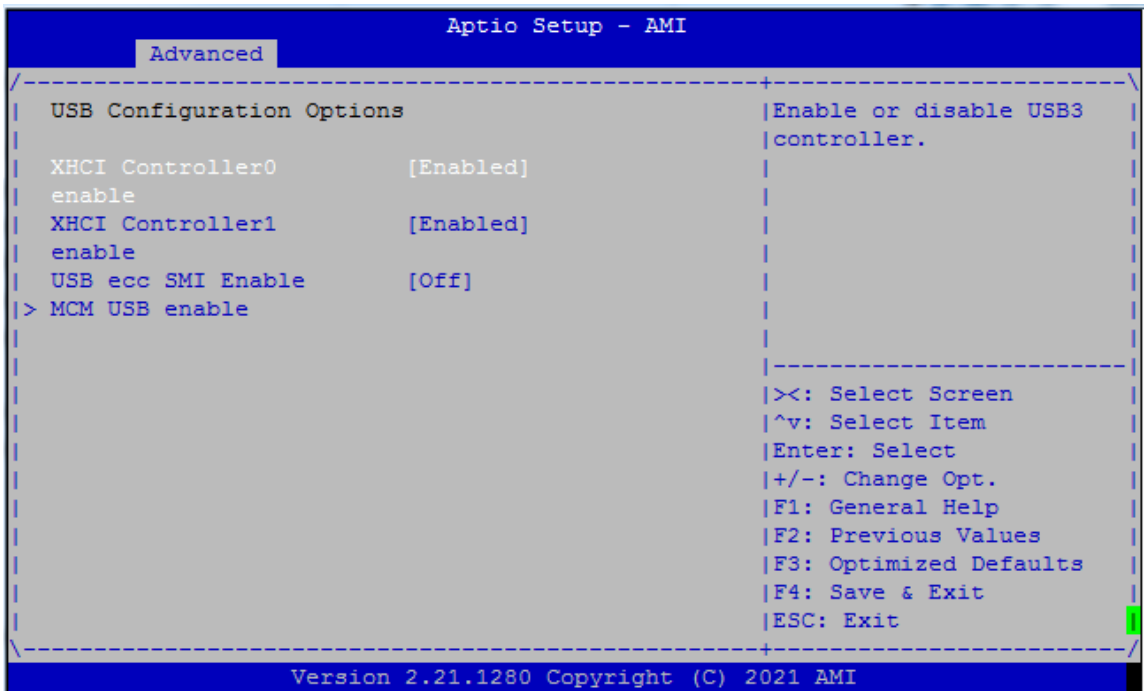


SATA Configuration Options



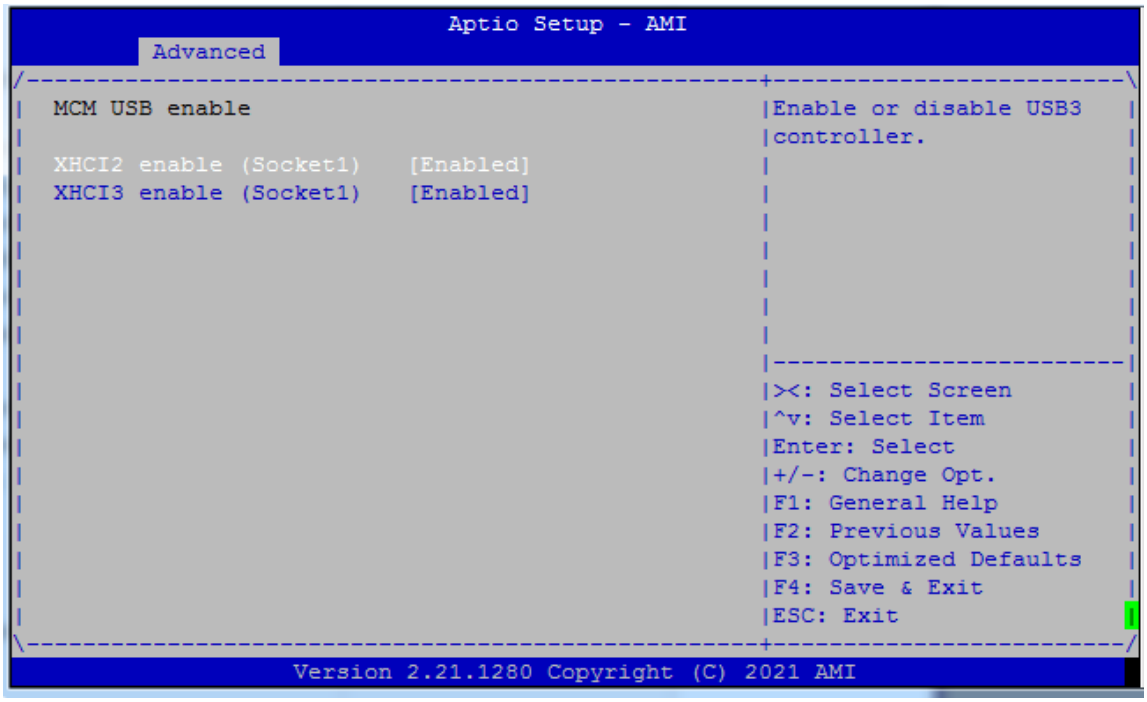
Feature	Options	Description
SATA Enable	Disabled Enabled Auto	Disable or enable OnChip SATA controller
SATA Mode	AHCI AHCI as ID 0x7904 Auto	Select OnChip SATA Type
Sata RAS Support	Disabled Enabled Auto	Disable or enable Sata RAS Support
Sata Disabled AHCI Prefetch Function	Disabled Enabled Auto	Disable or enable Sata Disabled AHCI Prefetch Function
Aggresive SATA Device Sleep Port 0	Disabled Enabled Auto	Enable or disable aggresive SATA device sleep on port 0
Aggresive SATA Device Sleep Port 1	Disabled Enabled Auto	Enable or disable aggresive SATA device sleep on port 1

USB Configuration Options



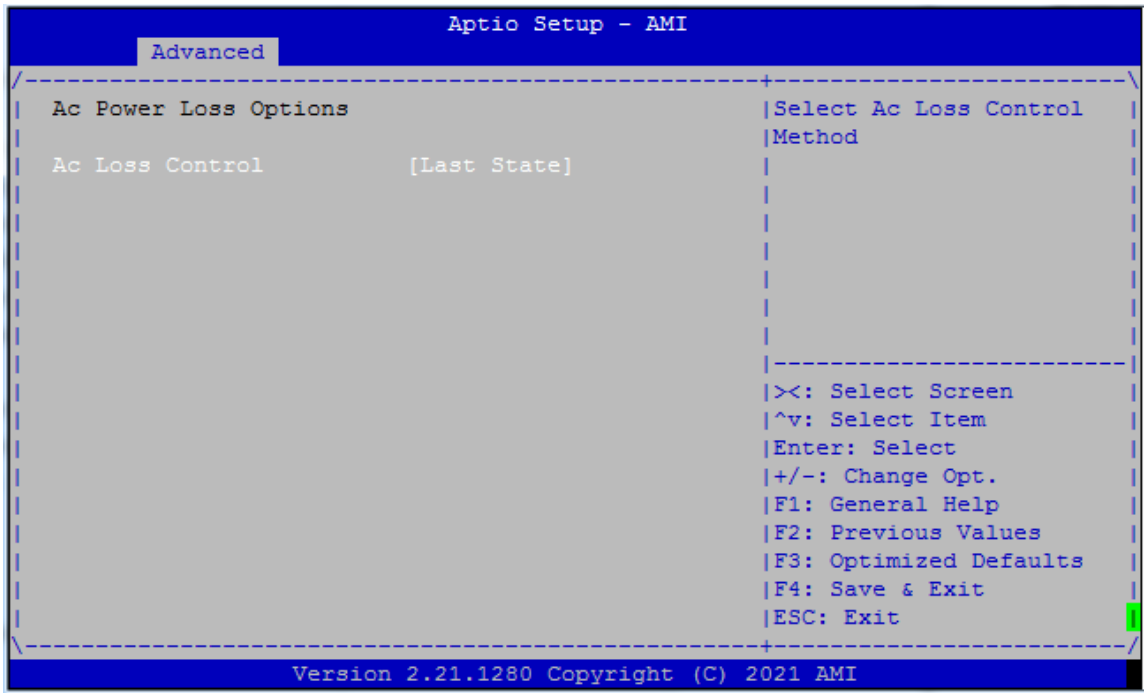
Feature	Options	Description
XHCI Controller0 enable	Disabled Enabled Auto	Enable or disable USB3 controller.
XHCI Controller1 enable	Disabled Enabled Auto	Enable or disable USB3 controller.
USB ecc SMI Enable	Enabled Off Auto	--

MCM USB Enable



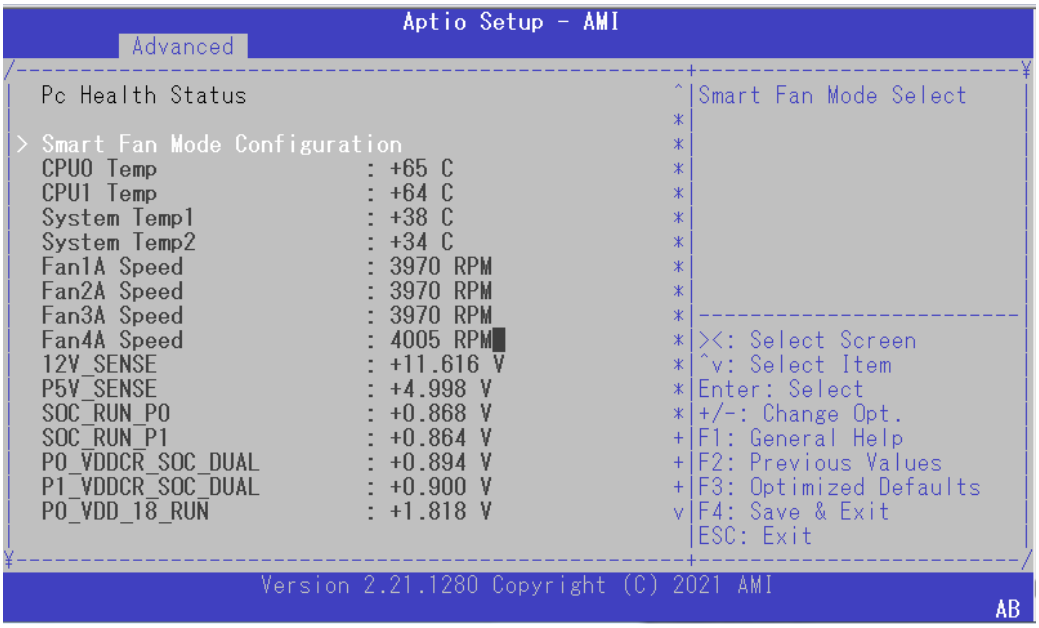
Feature	Options	Description
XHCI2 enable (Socket1)	Disabled Enabled Auto	Enable or disable USB3 controller.
XHCI3 enable (Socket1)	Disabled Enabled Auto	Enable or disable USB3 controller.

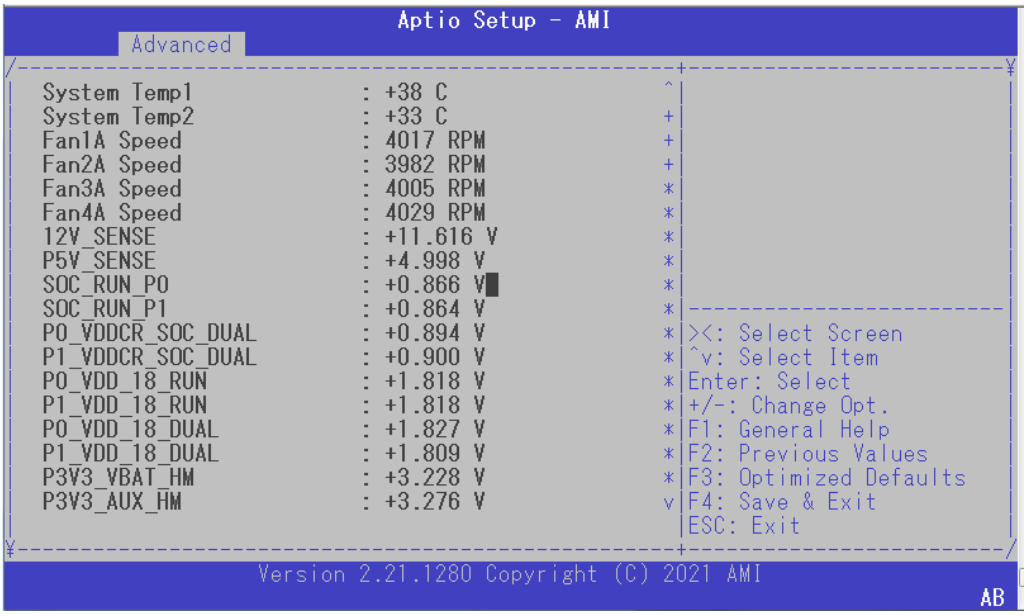
AC Power Loss Options

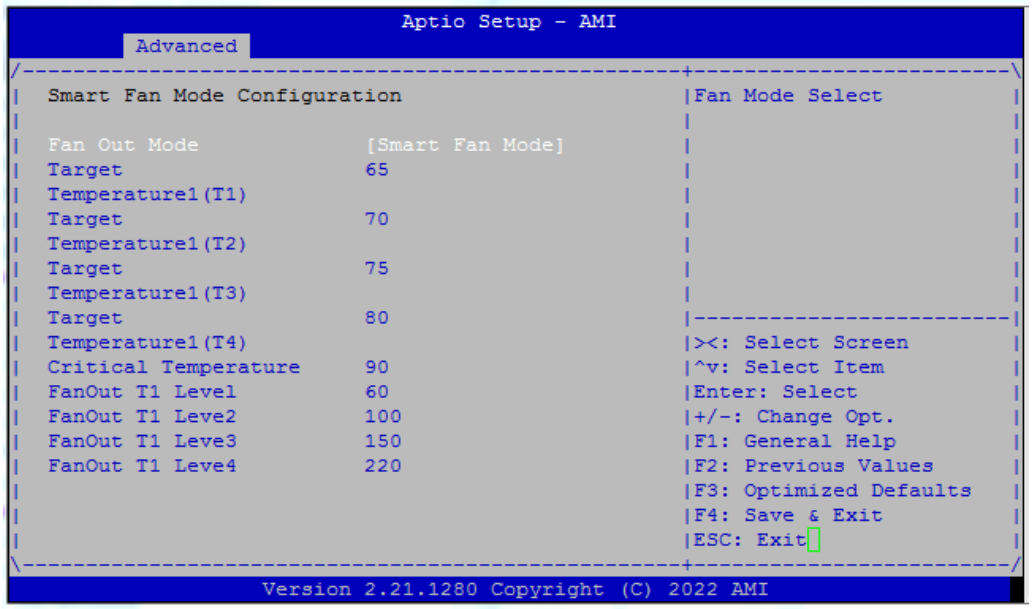


Feature	Options	Description
AC Loss Control	Always OFF Always ON Last State	Select AC Loss Control Method

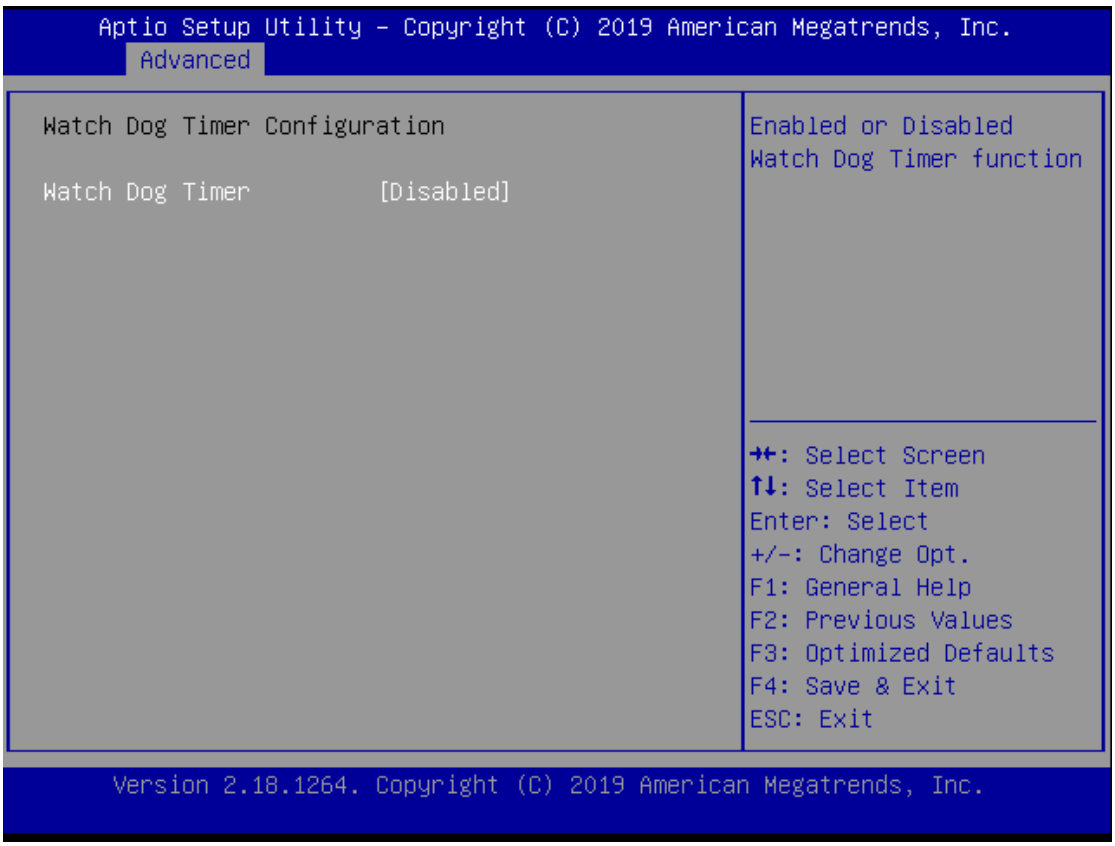
NCT7904D HW Monitor





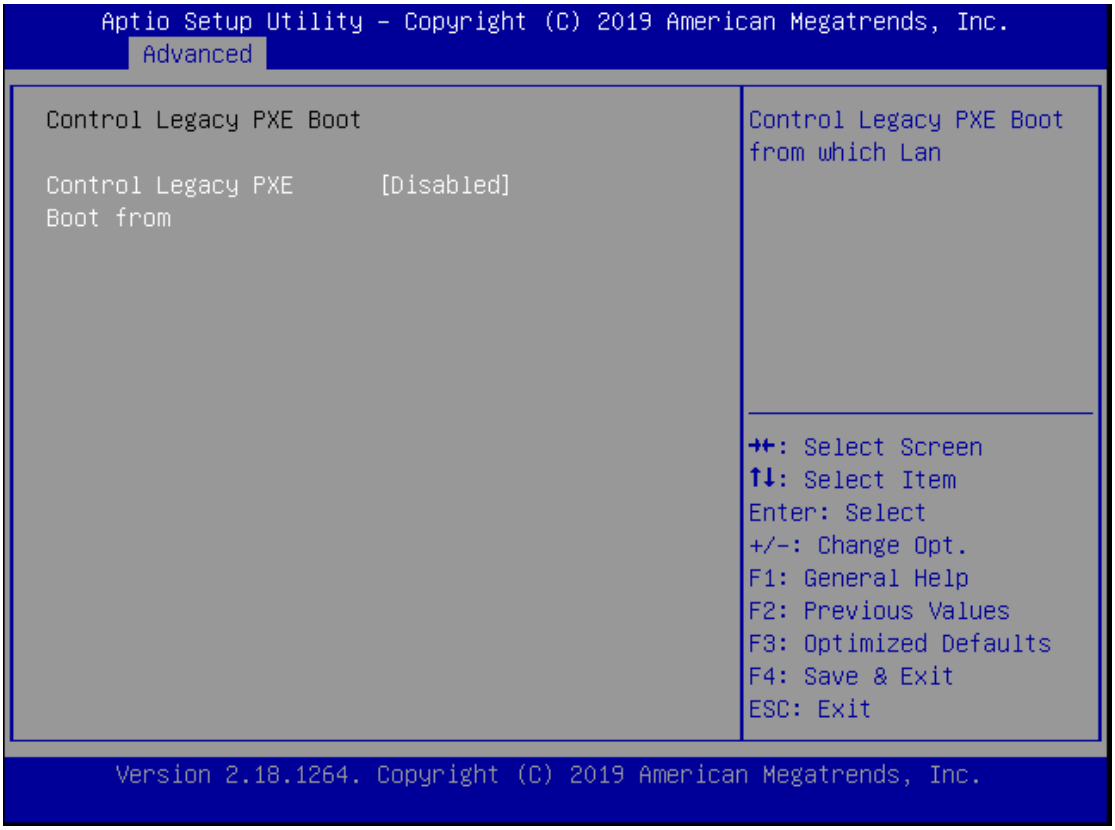


Watch Dog Timer Configuration



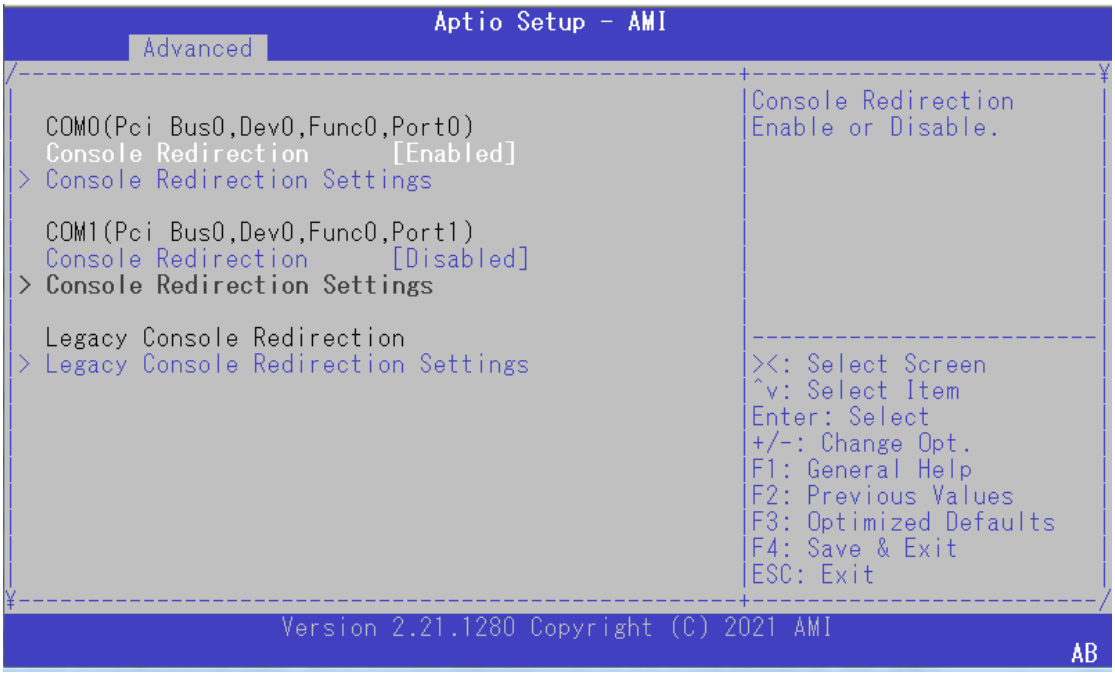
Feature	Options	Description
Watch Dog Timer	Enabled Last State	Watch Dog Timer Enable or Disable.

Control Legacy PXE Boot



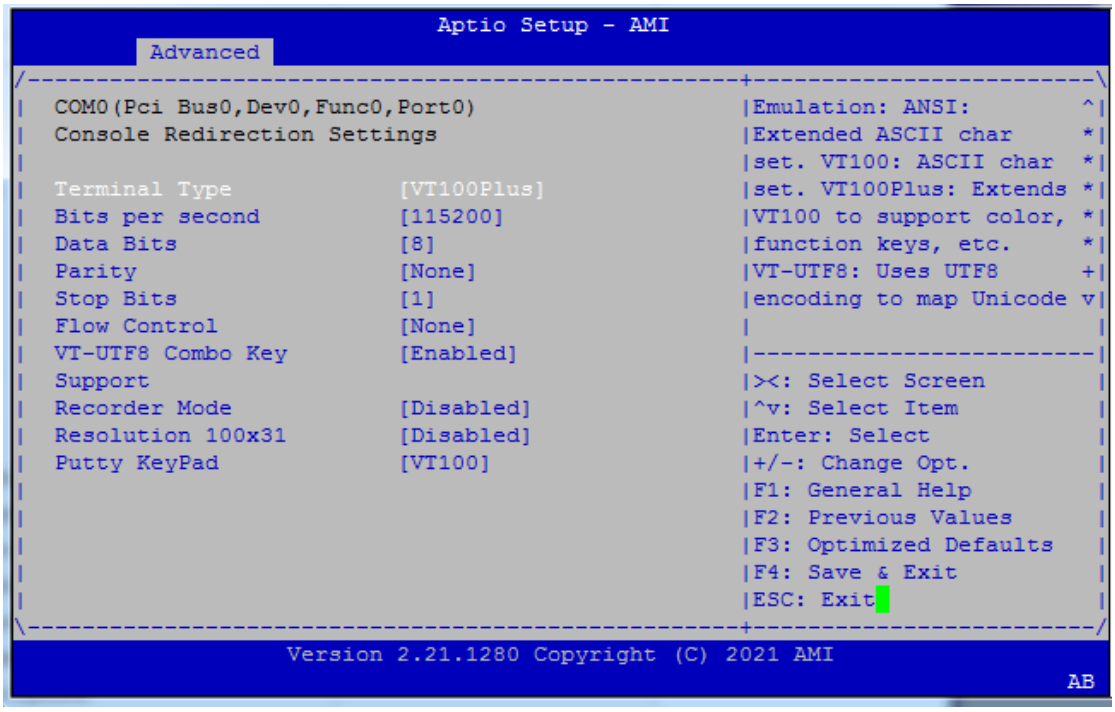
Feature	Options	Description
Control Legacy PXE Boot from	Enabled Disabled	PXE Enable or Disable.

Serial Port Console Redirection



Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Enables or disables Console Redirection.
COM1 Console Redirection	Enabled Disabled	Enables or disables Console Redirection.

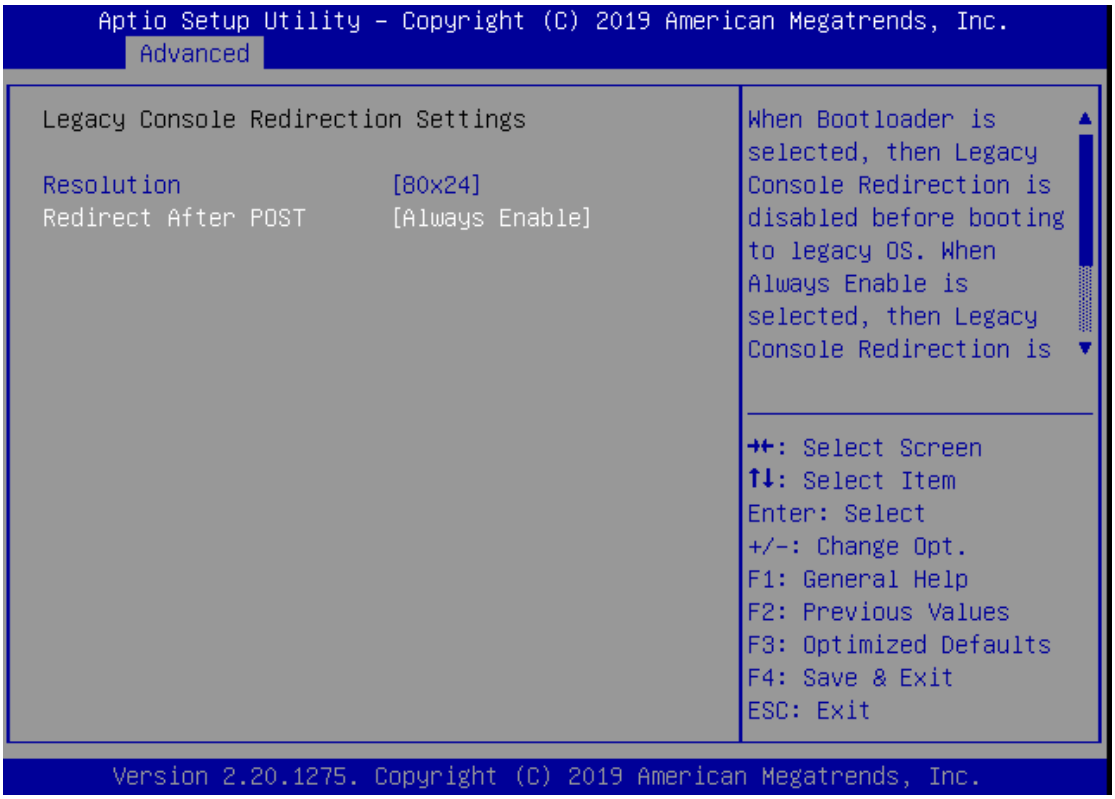
Console Redirection Setting



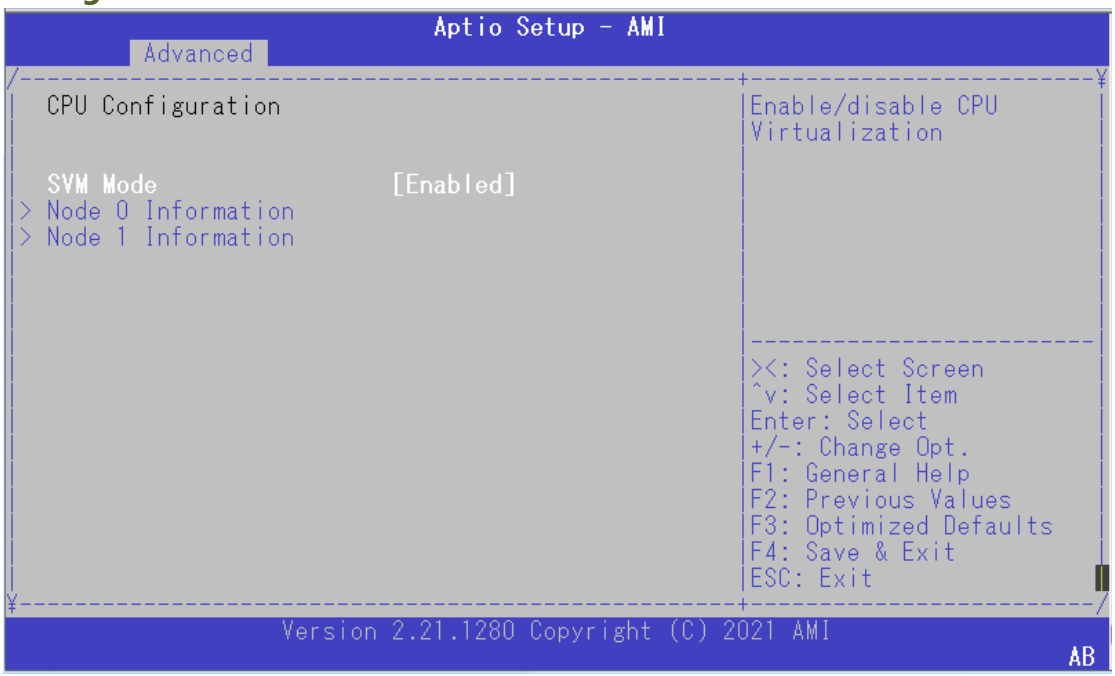
Feature	Options	Description
Terminal Type	VT100 VT100Plus VT-UTF8 ANSI	VT100: ASCII char set VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 enfcoding to map Unicode chars onto 1 or more bytes. ANSI: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	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 RTS/CTS	Flow control can prevent data loss from buffer overflow.
VT-UTF8 Combo Key Support	Disabled Enabled	Enable 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

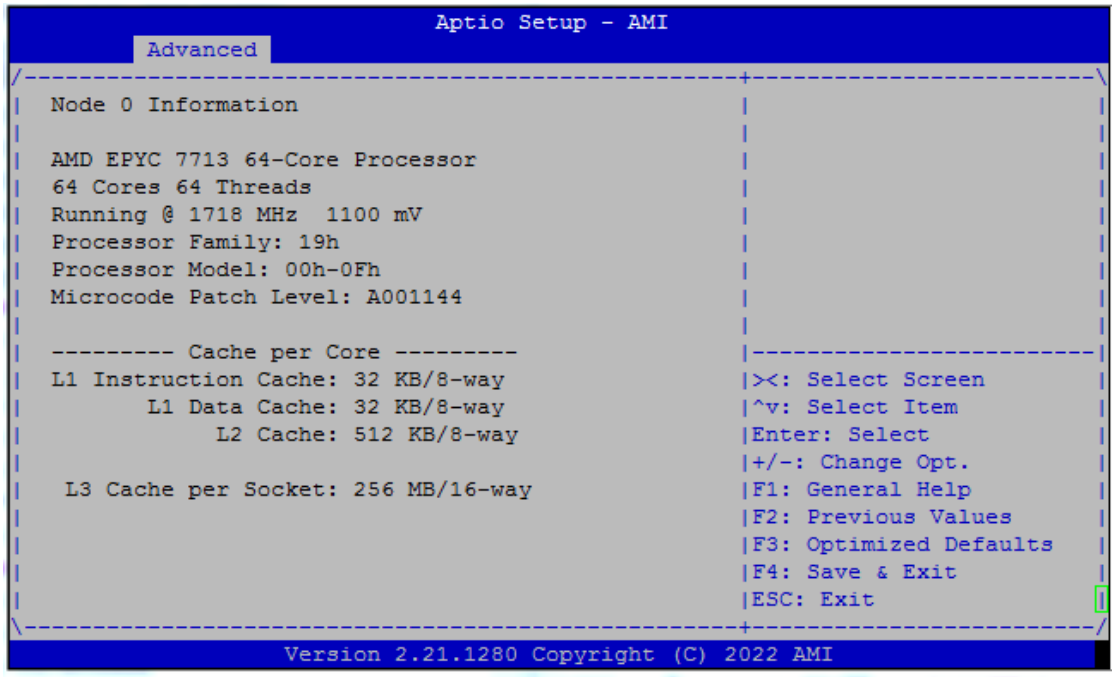


CPU Configuration

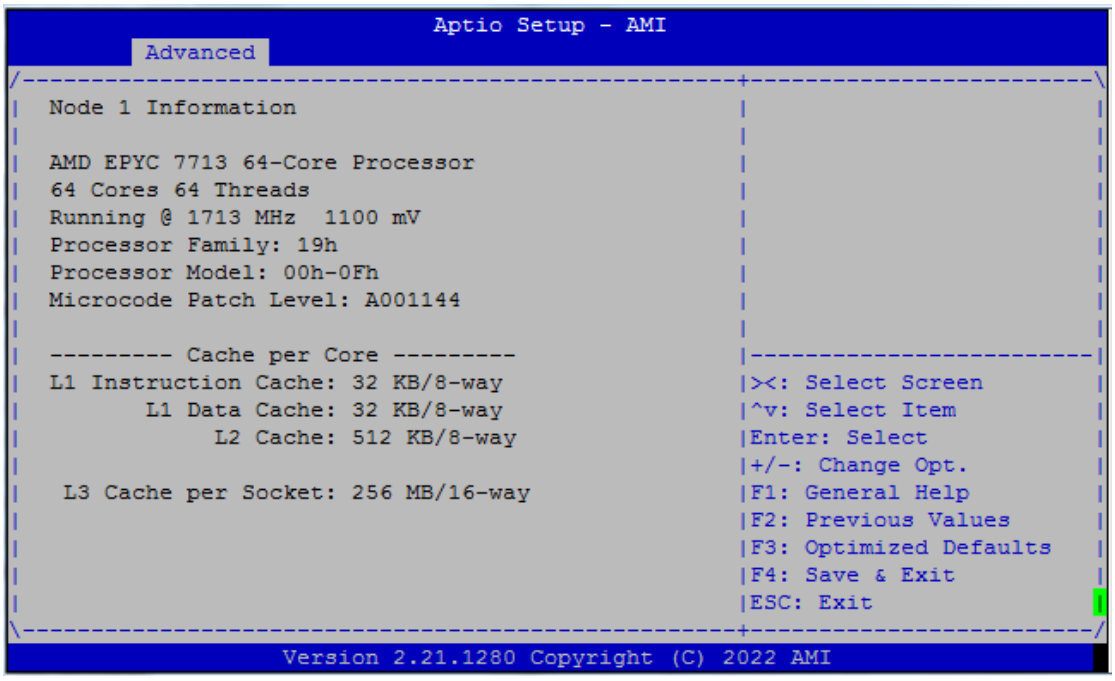


Feature	Options	Description
SVM Mode	Enabled Disabled	Enables or disables CPU Virtualization

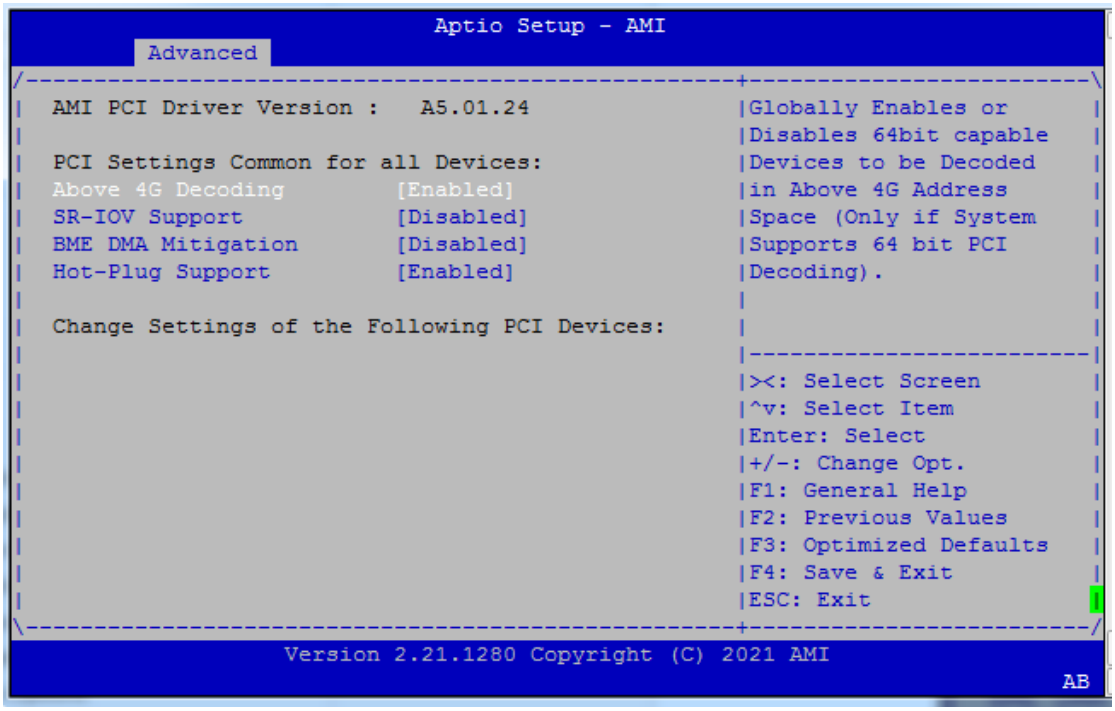
Node 0 Information



Node 1 Information

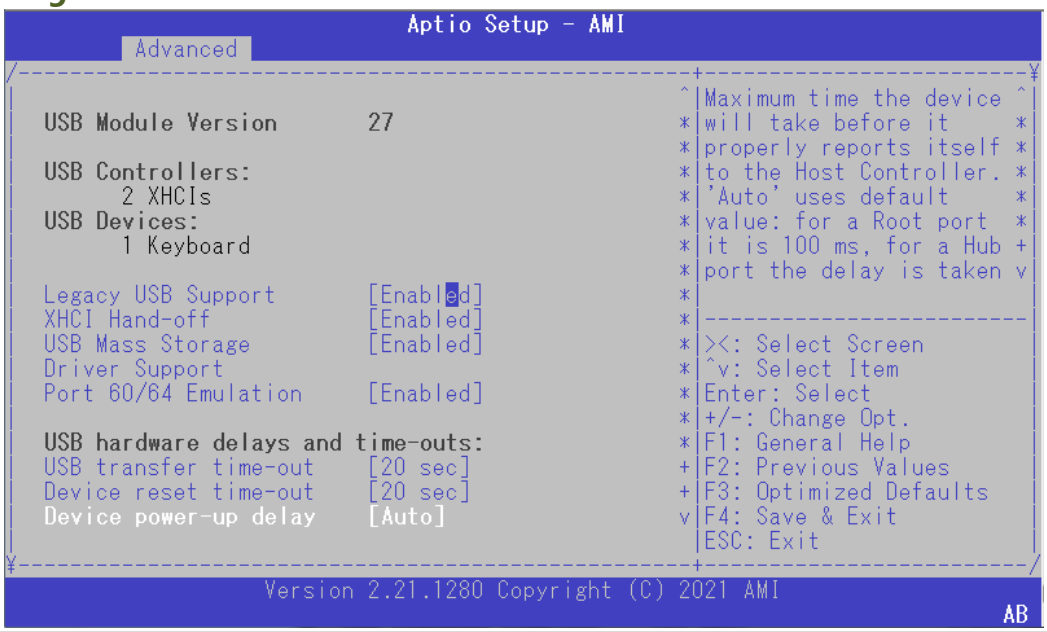


PCI Subsystem Settings



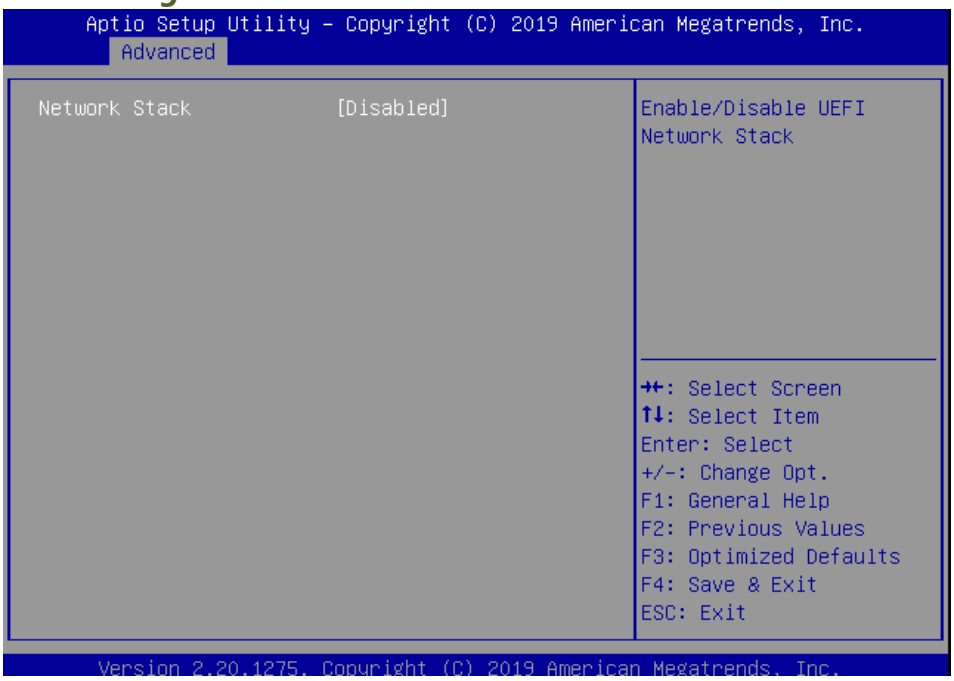
Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).
SR-IOV Support	Disabled Enabled	If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.
BME DMA Mitigation	Disabled Enabled	Re-enable Bus Master Attribute disabled during Pci enumeration for PCI Bridges after SMM Locke
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

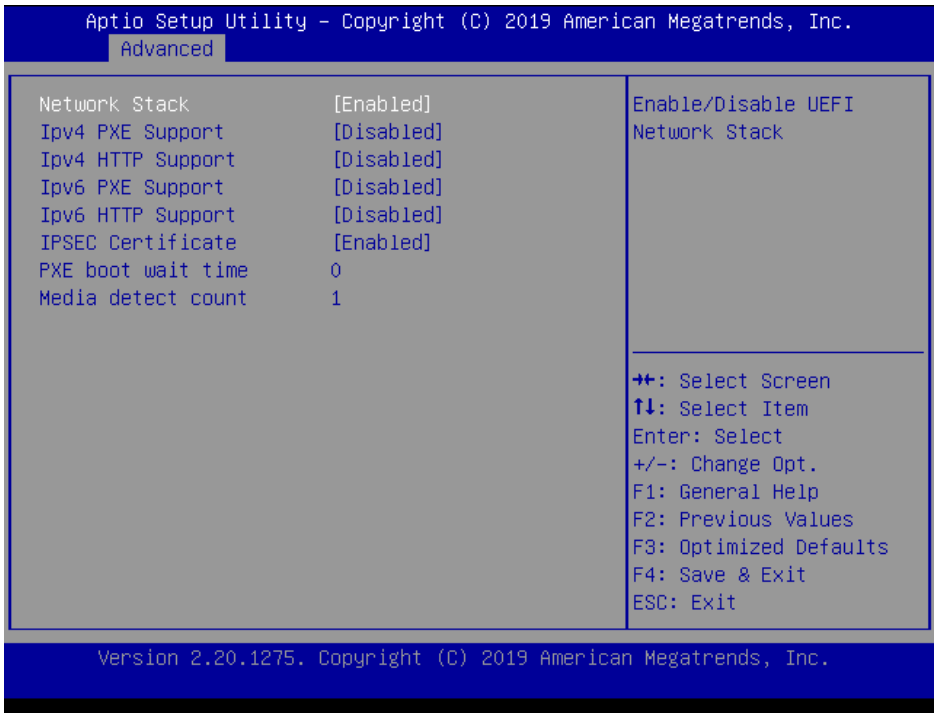
USB Configuration



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 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.

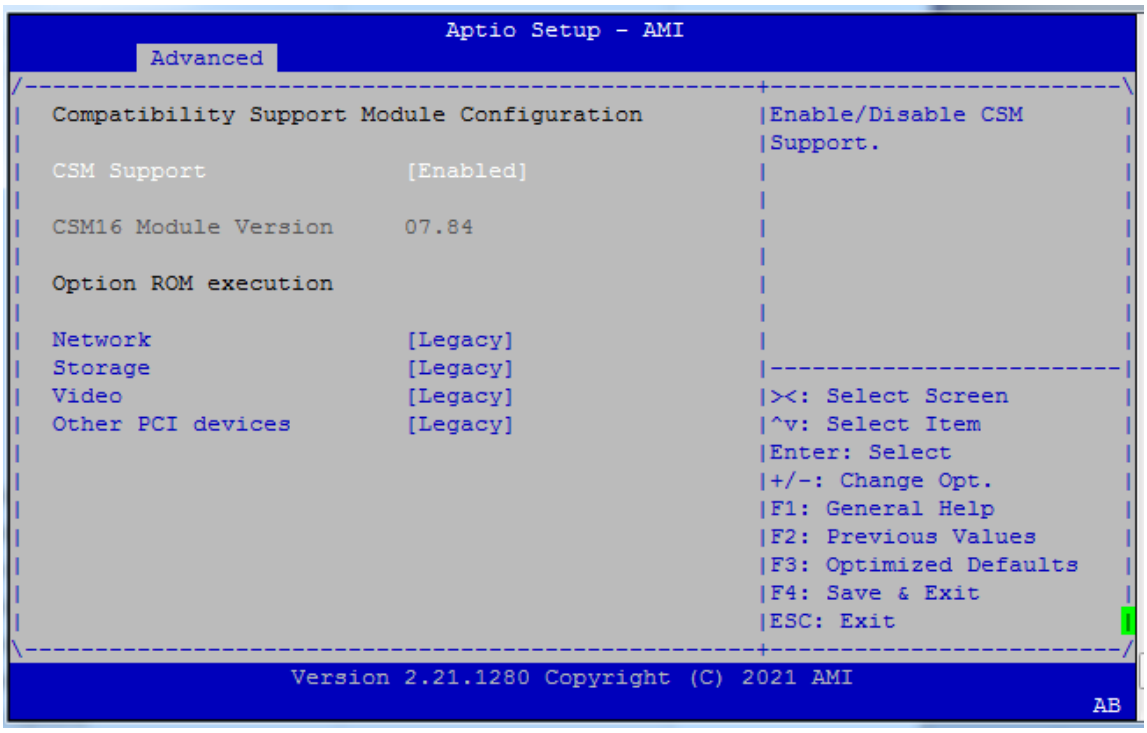
Network Stack Configuration





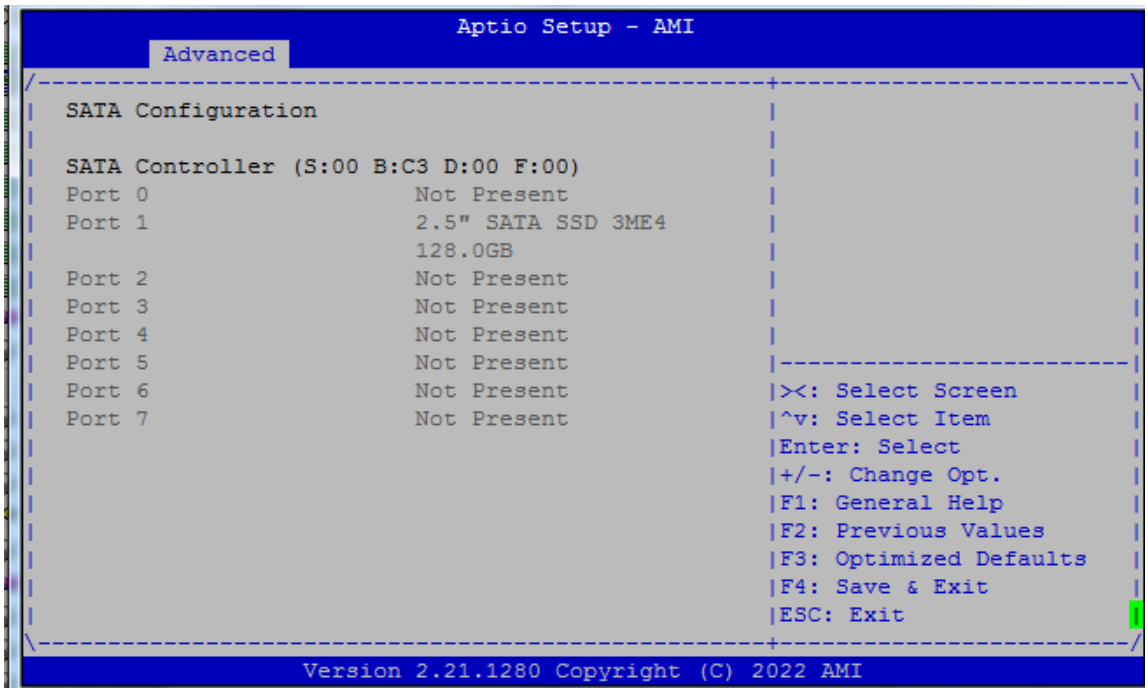
Feature	Options	Description
Network Stack	Disabled Enabled	Enable/Disable UEFI Network Stack

CSM Configuration

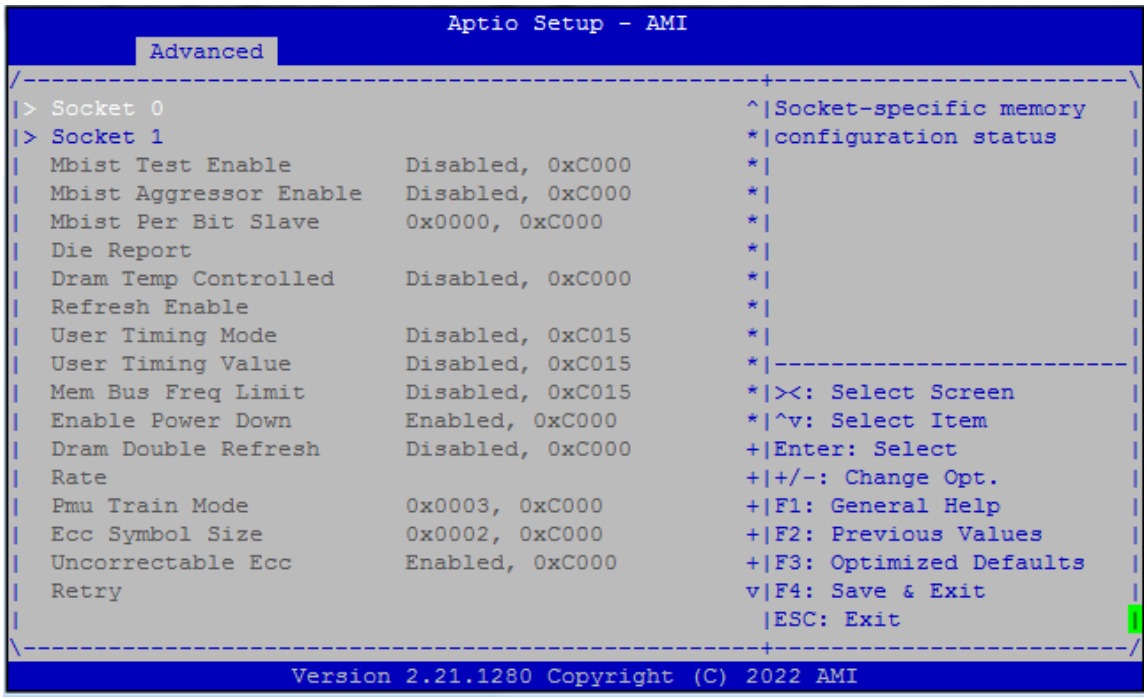


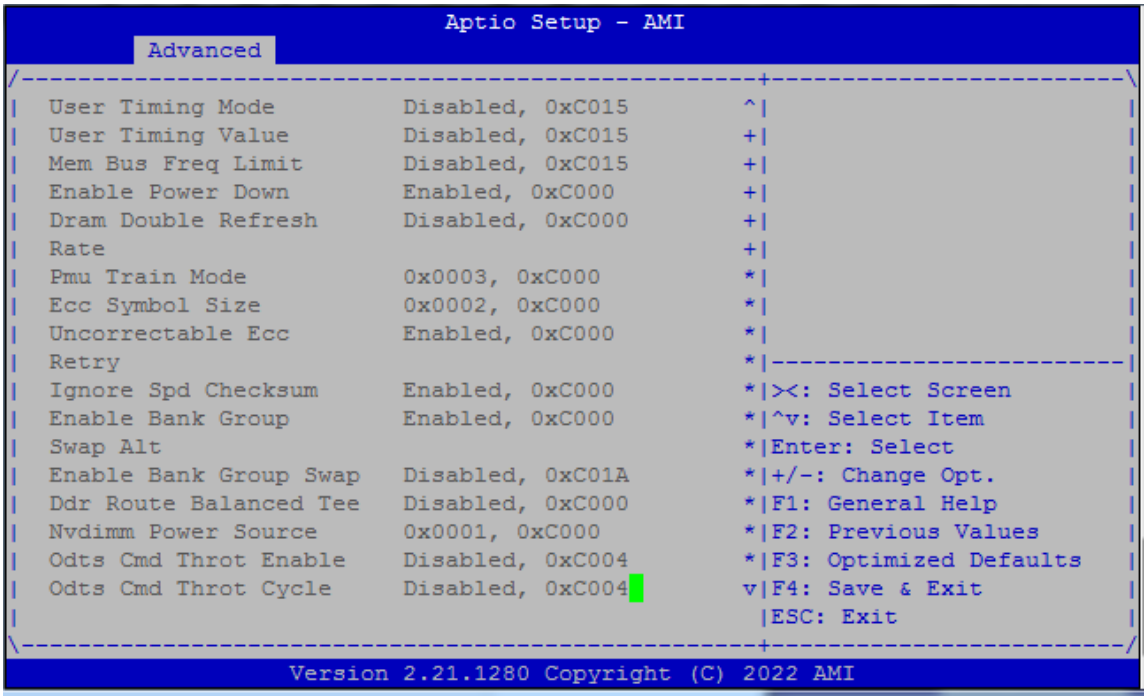
Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls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

SATA Configuration



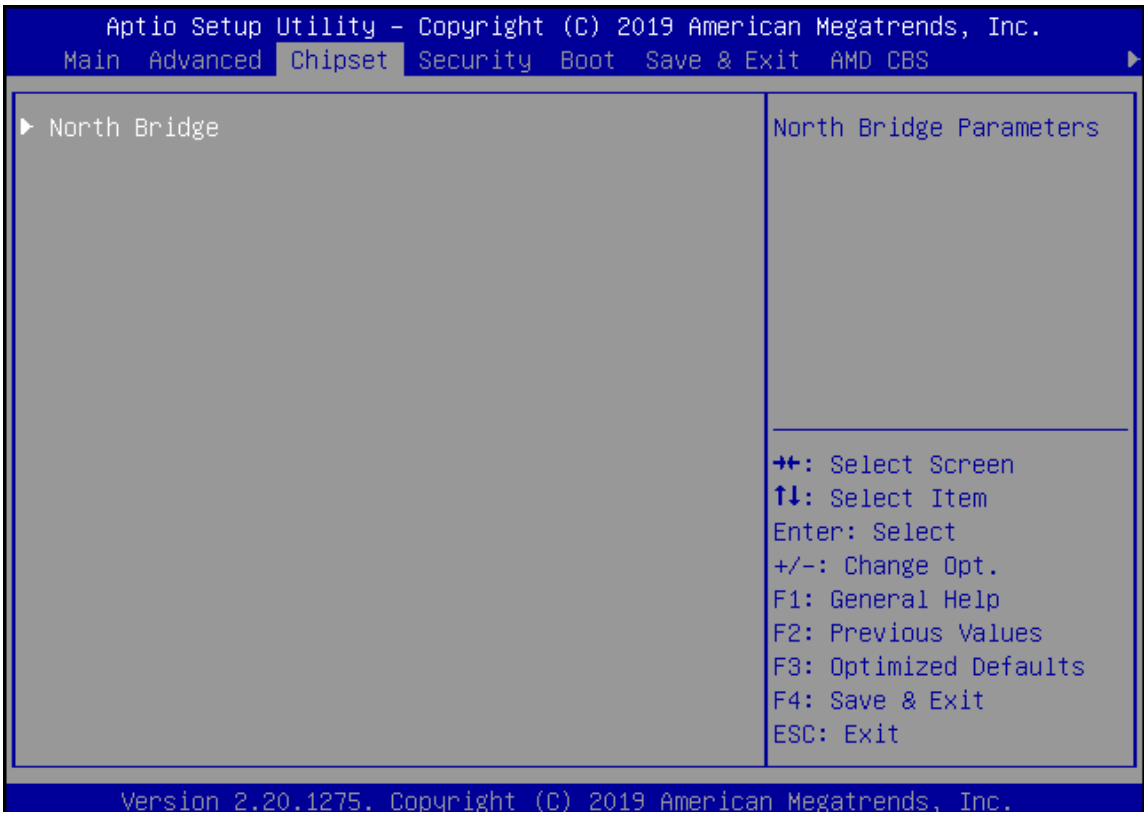
SATA Configuration



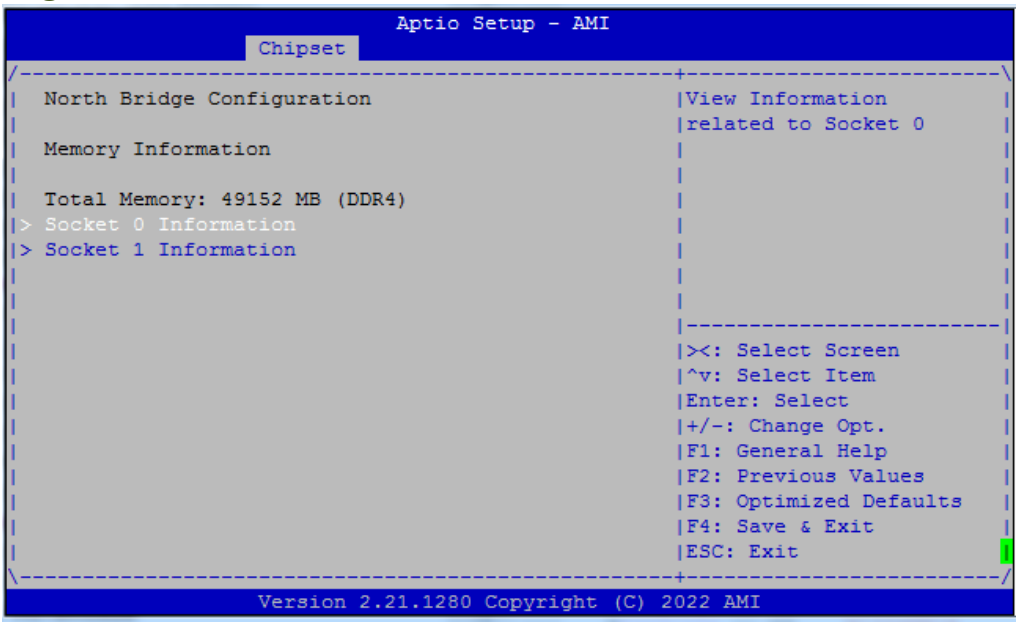


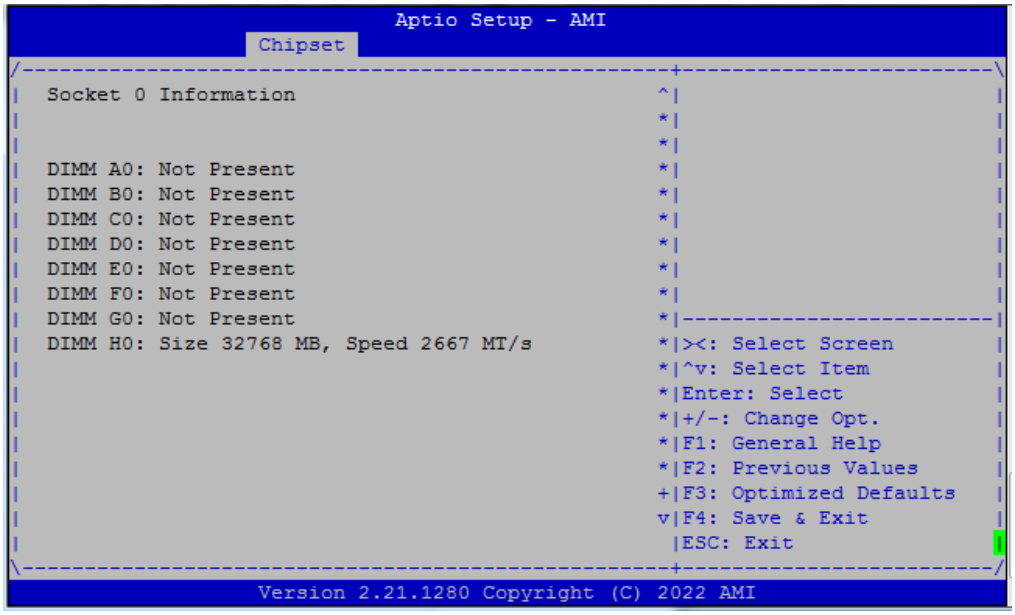
Chipset

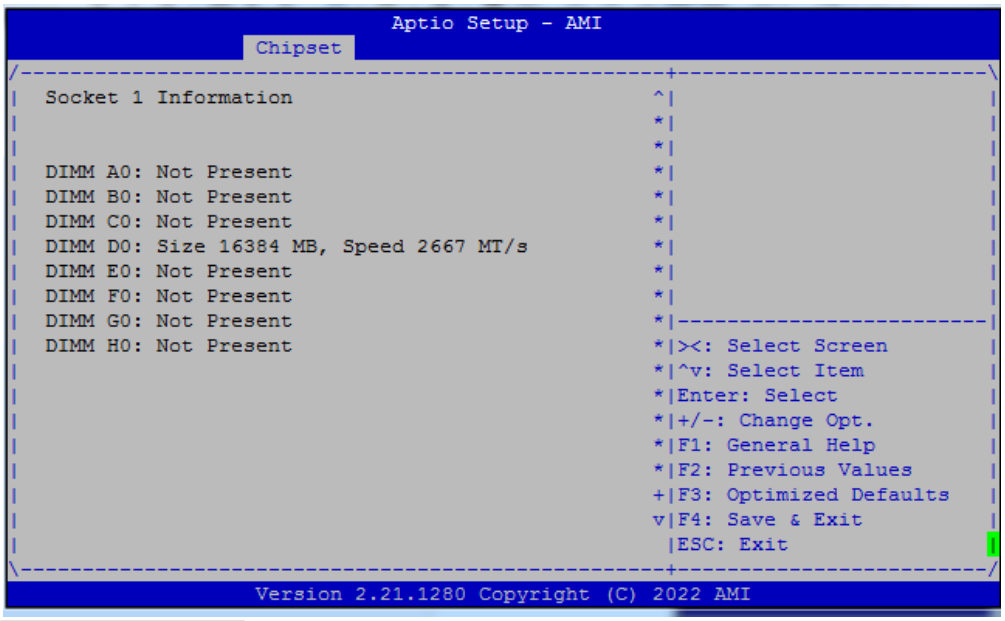
Select the Chipset menu item from the BIOS setup screen to enter the Chipset Setup screen. Users can select any of the items on the left frame of the screen.



North Bridge

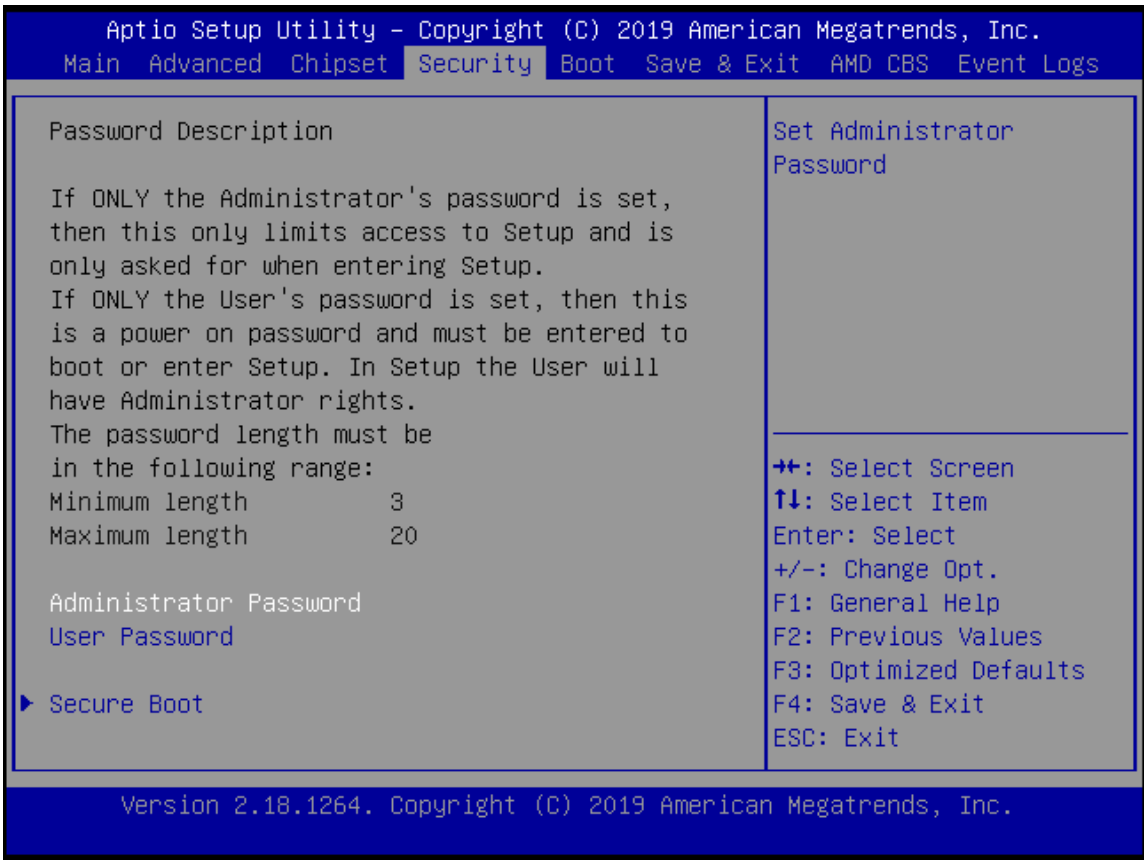






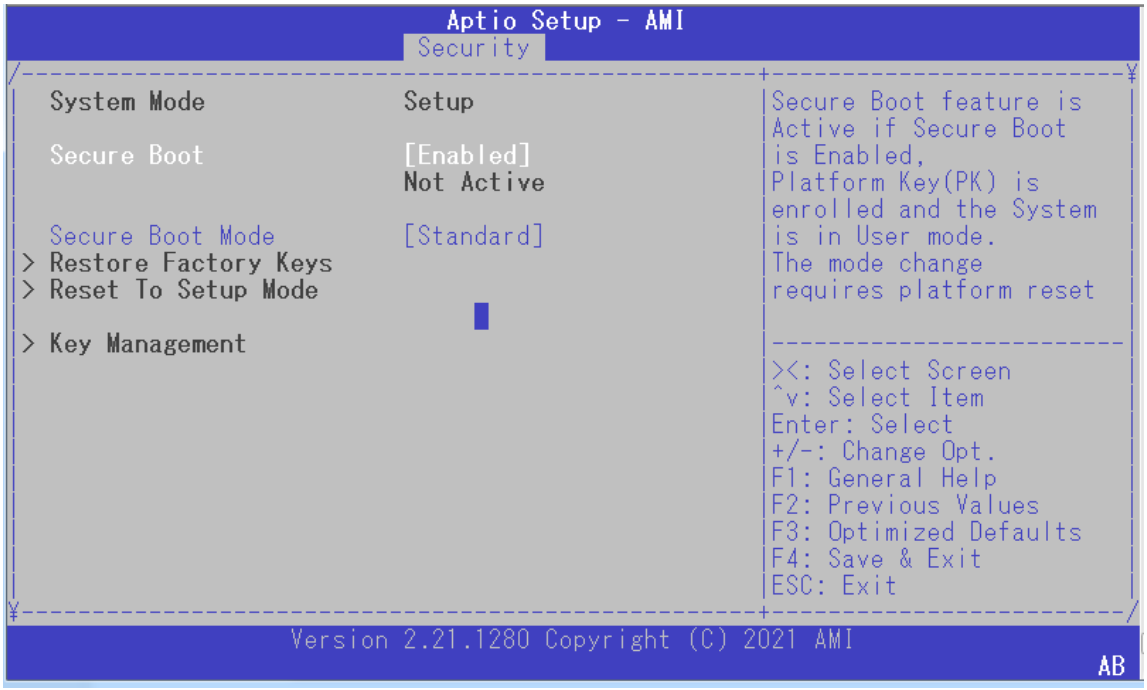
Security

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



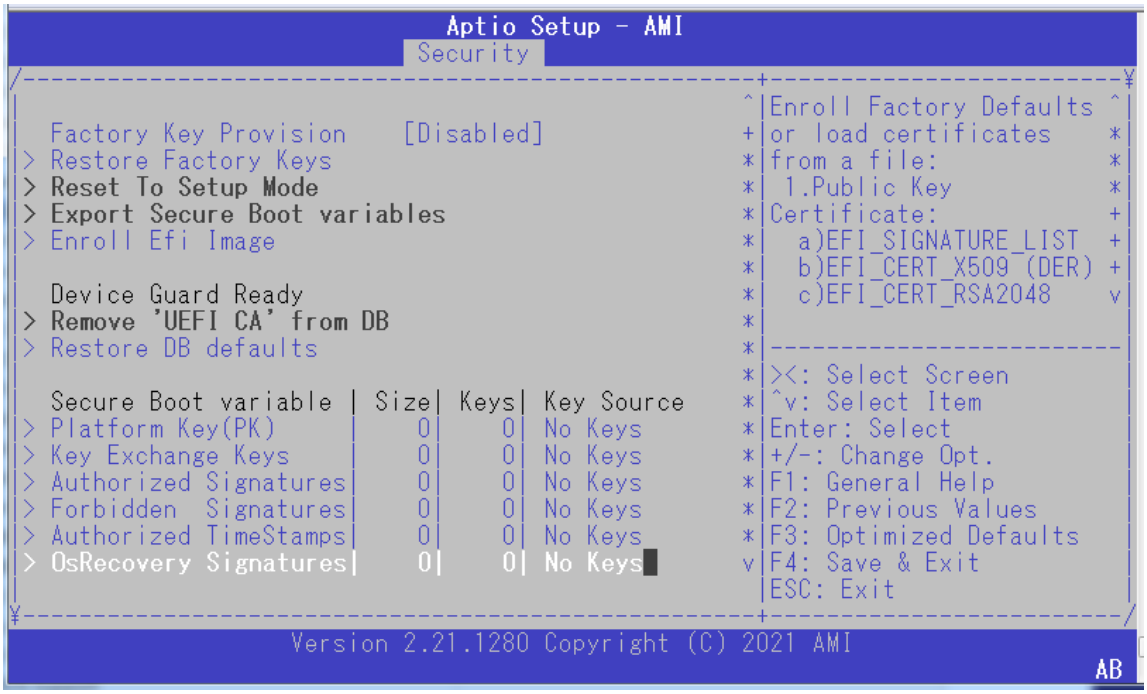
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



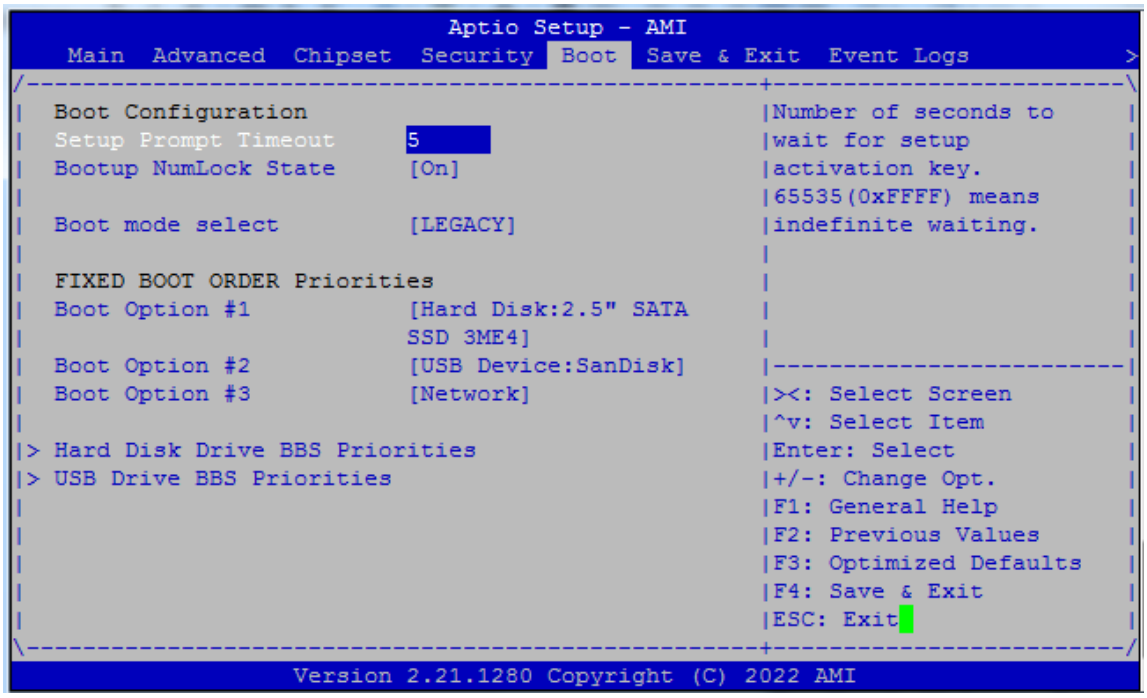
Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Secure Boot mode selector: In **Custom** mode, Secure BootVariables can be configured without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

Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
Restore Factory Keys	None	Force System to User Mode. Install factory default Secure Boot key databases
Enroll Efi Image	None	Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db)
Restore DB defaults	None	Restore DB variable to factory defaults

Boot Menu

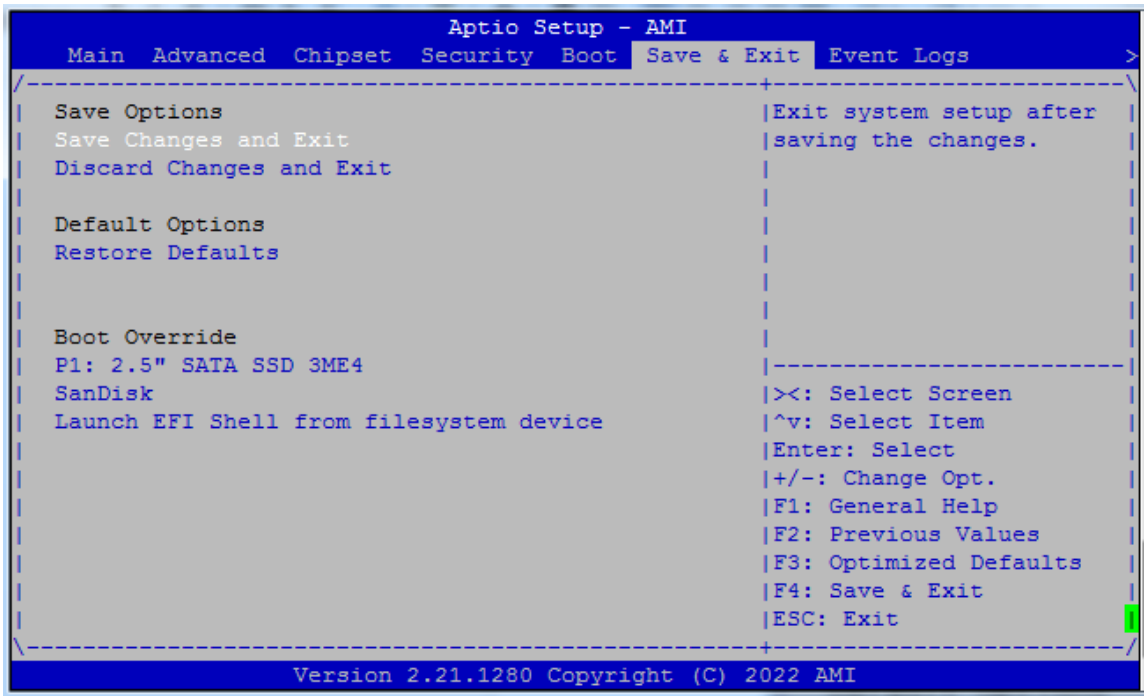


Feature	Options	Description
Setup Prompt Timeout	5	The Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
BootupNumLock State	On Off	Select the keyboard NumLock state.
Quiet Boot	Enabled Disable	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI	Select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

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

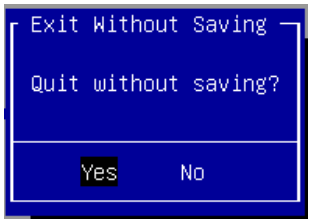
Save and Exit Menu

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.



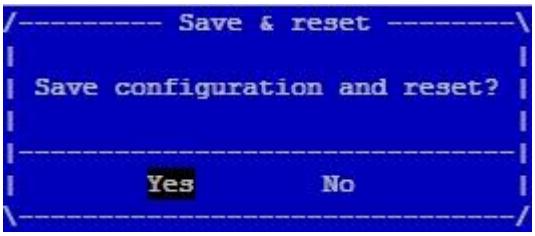
Discard Changes and Reset

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.



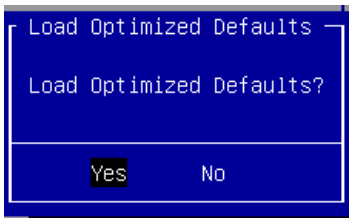
Save Changes and Reset

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.



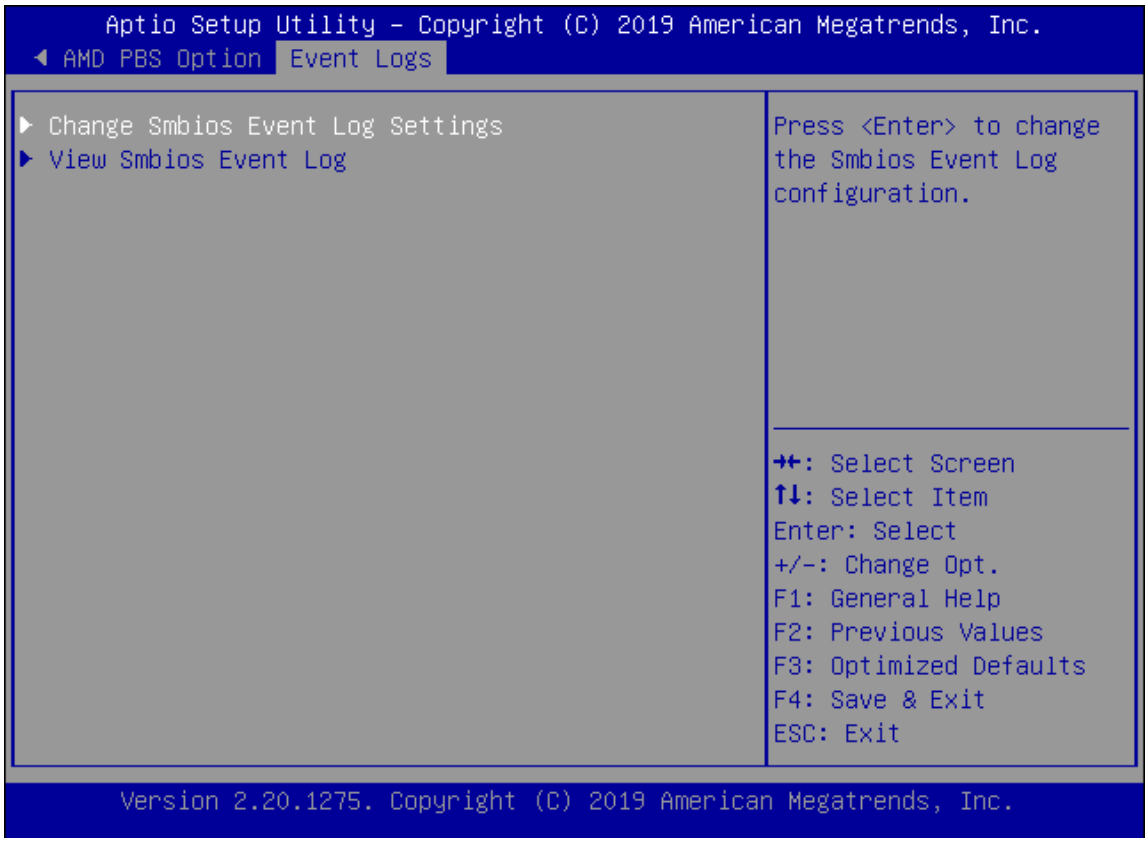
Restore Defaults

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

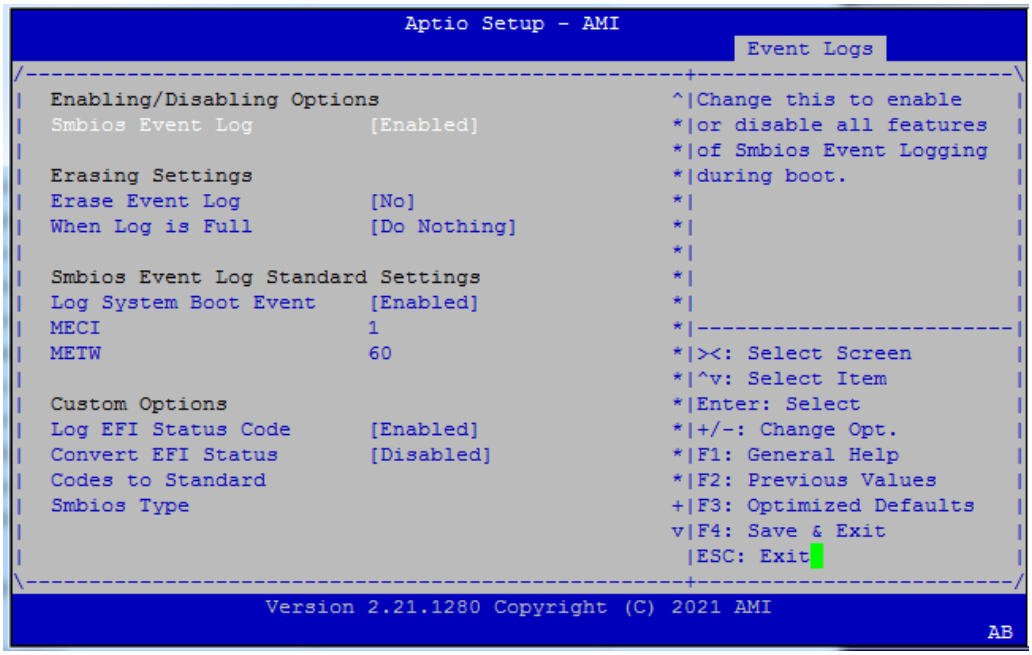


PS: The items under Boot Override were not same with image. It should depend on devices connect on system.

Event Logs

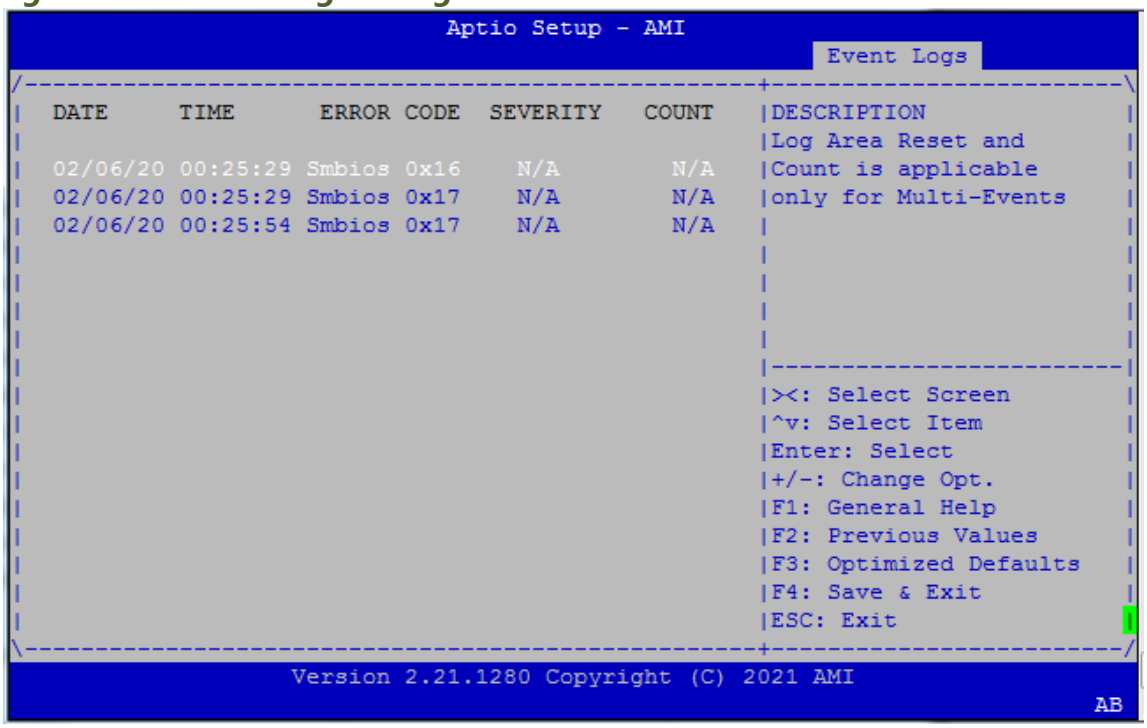

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
AMD PBS Option
Event Logs
Change Smbios Event Log Settings
View Smbios Event Log
Press <Enter> to change the Smbios Event Log configuration.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.20.1275. Copyright (C) 2019 American Megatrends, Inc.

Change Smbios Event Log Settings



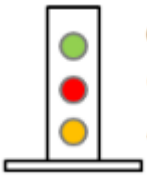
Feature	Options	Description
Smbios Event Log	Disabled Enabled	Change this to enable or disable all features of Smbios Event Logging during boot.
Erase Event Log	No Yes, Next reset Yes, Every reset	Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
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	Mutiple 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	Mutiple 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 Smbios Type	Enabled Disabled	Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

Change Smbios Event Log Settings



APPENDIX A: LED INDICATOR EXPLANATIONS

System Power / Status / HDD Activity



Green : Power
Green / Red : Status
Amber : HDD

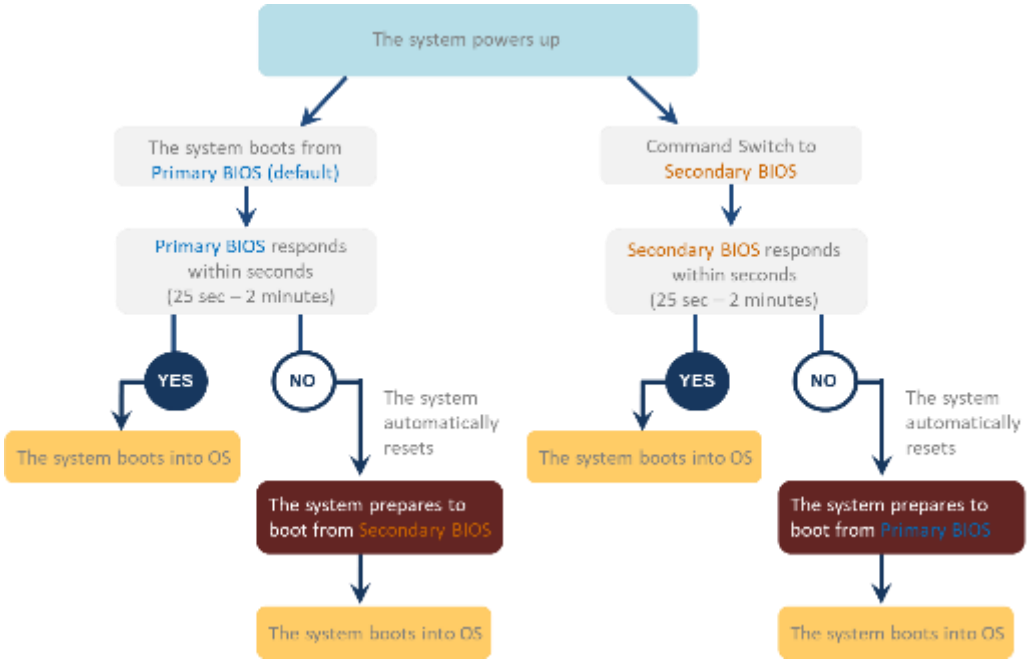
LED	COLOR ON LCM	COLOR ON BOARD	LED ACTION	DESCRIPTION
POWER	**Green**	**Green**	Steady	When system power on
	Off	Off	N/A	No power on
STATUS	**Green**	**Green**	Steady	control by GPIO
	Amber	**Red**	Steady	control by GPIO
	Off	Off	N/A	control by GPIO (Default) or No power on
HDD	**Amber**	**Amber**	**Blinking**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

APPENDIX B: DUAL BIOS INTRODUCTION

Failure when booting up BIOS is not uncommon and can occur most often during a power failure, a mishandled BIOS update, a malware attack resulting in data corruption. When it happens, recovering procedures consume considerable time and effort. Lanner understands this pain and have empowered our products with the Dual BIOS feature.

How Dual BIOS Works

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



2nd Gen Dual BIOS

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

- **Flexible recovery timer control**

Users can designate the amount of time before recovery BIOS launch. The amount of time is no longer fixed to 7 minutes.

- **Flexible Dual BIOS ROMs control.**

Users can flash both the Primary BIOS and Secondary BIOS, thus run different versions of BIOS ROMS independently for maximum compatibility.

- **Flexible Dual BIOS ROMs switch**

The 2nd Gen Dual BIOS allow users to choose one of the BIOS ROMS (Primary BIOS/Secondary BIOS) for booting up. Use software command prompt to toggle between Primary BIOS and Secondary BIOS.

	Gen1 Dual BIOS	Gen2 Dual BIOS
Function	Primary / Recovery 2ND BIOS for recovery purpose	Primary / Secondary (Peer to Peer) Both BIOS can let the system work
Detection Time	7 min	Seconds (By platform design)
2nd BIOS updated	Only using the SPI facility	By BIOS tool command or SPI facility
MAC/DMI	Only for BIOS1	For both BIOS
CPLD Interface	GPIO	LPC or eSPI (By Platform)

Figure 1. Gen 1 vs Gen 2 Dual BIOS comparison chart

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.

Get Ready for BIOS Update

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

- Firmware and Flash Tool
- BIOS Engineering Spec

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

Note:
1. Dual BIOS feature cannot work with BIOS Boot Guard function
2. To update BIOS, it is mandatory to have both BIOS updated first. This is to avoid both BIOS having ME code variations, which could lead to unexpected risk and errors.
3. When the system enters BIOS menu or Option ROM, the system will not reboot automatically.

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

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

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 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. Your computer will reboot during restart in order to change State of the Device.

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
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: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date