

## Industrial Communication Platforms

Next Generation Industrial Cyber Security Solutions

# ICS-P371 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.

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## Icons

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

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

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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 to meet FCC emission limits and 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 Battery is replaced by an incorrect type.
- ▶ Dispose of used batteries according to the instructions.
- ▶ Installation only by a skilled person who knows all Installation 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 surrounding environment can result in an explosion or the leakage of flammable liquid or gas.
- ▶ A battery subjected to extremely low air pressure that 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 Precaution

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ 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.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of airflow required for safe operation of the equipment is not compromised.
- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ 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 over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable earthing 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).

### Installation & Operation:

- ▶ 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.

### 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

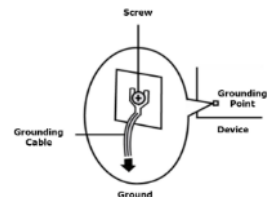
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect the ground wire after turning off the power. A ground wire is required and the part connecting the conductor must be greater than 4 mm<sup>2</sup> 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 mm<sup>2</sup> ou 10 AWG.

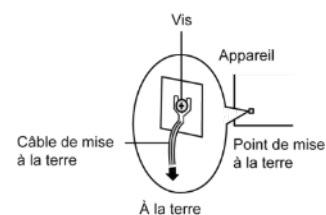
## Grounding Procedure for Power Source

- ▶ Loosen the screw of the earthing point.
- ▶ Connect the grounding cable to the ground.
- ▶ The protection device for the power source must provide 30 A current.
- ▶ This protection device must be connected to the power source before power.
- ▶ The cable should be 16 AWG



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

- ▶ Desserrez la vis du terminal de mise à la terre.
- ▶ Branchez le câble de mise à la terre à la terre.
- ▶ L'appareil de protection pour la source d'alimentation doit fournir 30 A de courant.
- ▶ Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation.
- ▶ Le câble doit être 16 AWG



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# CHAPTER 1: PRODUCT OVERVIEW

ICS-P371 Series is empowered by Intel® Atom™ X6211E/X6413E/X6425E CPU (formerly Elkhart Lake) for enhanced IoT platform and high processing performance. ICS-P371 is compliant with IEC 61850-3 and IEEE 1613 and can operate in a wide range of operating temperatures from -40°C to 70°C.

## Package Content

Your package contains the following items:

- ▶ 1x ICS-P371 Cyber Security Platform
- ▶ 2x 4-Pin Terminal Block; 1x 2-Pin Terminal Block
- ▶ 1x 6-pin Terminal Block mating connector with screws for power input

## Ordering Information

SKU No.	Main Features
ICS-P371A	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6211E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA storage expansion
ICS-P371B	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6413E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA Storage expansion
ICS-P371C	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6425E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA Storage expansion
ICS-P371D	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6211E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA storage expansion, and IPMI module
ICS-P371E	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6413E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA Storage expansion, and IPMI module
ICS-P371F	IEC 61850-3 Wide Temp Industrial Cyber Security Gateway with Intel® Atom® X6425E processor, 6x RJ45, 2x SFP LAN Ports, LTE/5G-Sub6, Wi-Fi, and SATA Storage expansion, and IPMI module

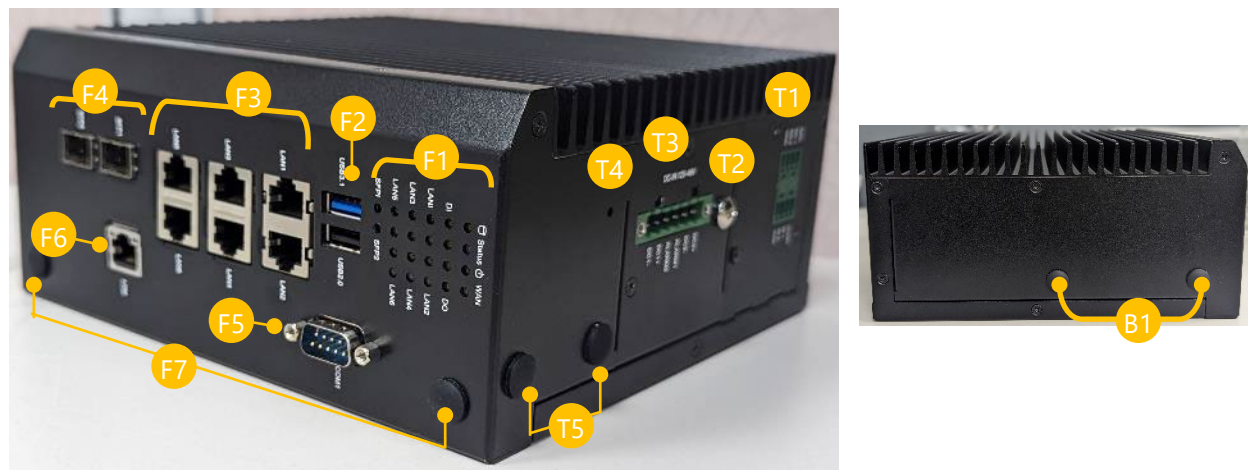
## Optional Accessories

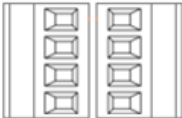
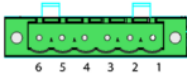
Model No.	Description
HDD/SSD Kit	2.5" Drive Bay Kit w/ brackets, screws, SATA/power cables
5G Kit	5G Module Kit w/ thermal pads, screws, internal antenna cables, external antennas
Wi-Fi Kit	Wi-Fi Module Kit w/ thermal pad, screws, internal antenna cables, external antennas
Cable Kit	Console Cable Kit (P/N: 080W000783000)
Wallmount Kit	Wall Mount Kit w/ brackets, and screws

## System Specifications

<b>Processor System</b>	CPU	Intel Atom® X6211E/X6413E/X6425E
	Frequency	Atom X6211E: 1.3 GHz; Atom X6413E: 1.5 GHz; Atom X6425E: 2.0 GHz
	Core Number	Atom X6211E: 2 cores; Atom X6413E/X6425E: 4 cores
	BIOS	AMI SPI Flash BIOS
	Chipset	SoC
<b>Fanless</b>		Yes
<b>System Memory</b>	Technology	DDR4, non ECC & IB-ECC
	Max. Capacity	32 GB
	Socket	1x 260-pin SODIMM
<b>Graphic</b>	Interface	1x Internal DP Port
<b>Ethernet</b>	Controller	Intel® i226IT/i210IS
	Speed	RJ45: 100M/1G/2.5GbE, SFP: 1 GbE
	Interface	6x RJ45, 2x SFP; 1x IPMI Ports (By SKU)
	Bypass	1 Pair Bypass by RJ45
<b>Storage</b>	Type	SATA
	Installation	1x 2.5" drive bay; 1x M.2 M-Key 2242
	Type	SD
	Installation	1x Micro SD Reader
<b>Expansion</b>	M.2	1x M.2 B-Key 3042/3050/3052 for LTE/5G Sub6 module, with dual Nano-SIM; 1x M.2 E-Key for Wi-Fi module (By SKU)
<b>I/O</b>	Serial Port	2x RS-232, DB9 Male
	DIO	2x Isolated DI; 2x Isolated DO
	USB Port	1x USB 3.0; 1x USB 2.0 Type A
	Power-On/Reset Button	1x Reset Button
	LED	System Status, Ethernet Status, Programmable LEDs
<b>Watchdog Timer</b>		Watchdog timer 256 level time interval system reset, software programmable
<b>Power</b>	Power Supply Voltage	Dual +12~48Vdc
	Connector	Phoenix contact 6-pin connector with lock
	Power Consumption (Idle)	24.2W~31.7W
	Power Consumption (Full Load)	41.6W~46.8W
<b>Environment</b>	Operating Temperature	-40°C ~ 70°C
	Storage Temperature	-40°C ~ 85°C
	Relative Humidity	5% ~ 95%, Non-Condensing
<b>Mechanical</b>	Dimension (WxHxD)	87 x 196 x 180 mm
	Construction	Aluminum & SGCC
	Weight	2.2 kg
	Mounting	DIN rail or Wall mount (Optional)
<b>Driver Support</b>	Microsoft Windows	Windows 10/11 IoT
	Linux	Linux Kernel 2.6X or later (Depends on Intel® formal release)
<b>Certification</b>	FCC/CE Class A, UL (IEC-62368), C1D2 (SKU F Only), IEC 61850-3, IEEE 1613	

Top & Front & Bottom Panel



No.	Description															
T1	DIO	<div>2x 4-Pin Terminal Block for 2x Isolated DI (Dry &amp; Wet for Sink/Source) &amp; 2x Isolated DO; DI: -3~5V @ 7mA, Logical Value 0; 13~30V @ 7mA, Logical Value 1 (Design Spec as Logical Value 0 for under 9V and 1 for above 9V) DO: Sink DO voltage typical 24V (up to 30V) @ 200mA</div> <div><div>COM 0 DI 1 DI 2 GND</div><div></div><div>GND DO 1 DO 2 GND</div></div>														
T2	Grounding Hole	1x Hole for grounding cable to connect to the ground (optional)														
T3	DC-in Jack	<div>1x 6-Pin Terminal Block, +12~48Vdc power input with lock Input Power connector: Dual power input</div> <div><table><tr><th>Pin No.</th><th>Description</th></tr><tr><td>1</td><td>DC2+</td></tr><tr><td>2</td><td>DC2-</td></tr><tr><td>3</td><td>ALARM1</td></tr><tr><td>4</td><td>ALARM2</td></tr><tr><td>5</td><td>DC1+</td></tr><tr><td>6</td><td>DC1-</td></tr></table></div>	Pin No.	Description	1	DC2+	2	DC2-	3	ALARM1	4	ALARM2	5	DC1+	6	DC1-
Pin No.	Description															
1	DC2+															
2	DC2-															
3	ALARM1															
4	ALARM2															
5	DC1+															
6	DC1-															
T4	Reset Button	1x Reset Button														
T5	Antennas	2x Antennas for Wi-Fi Module (optional)														

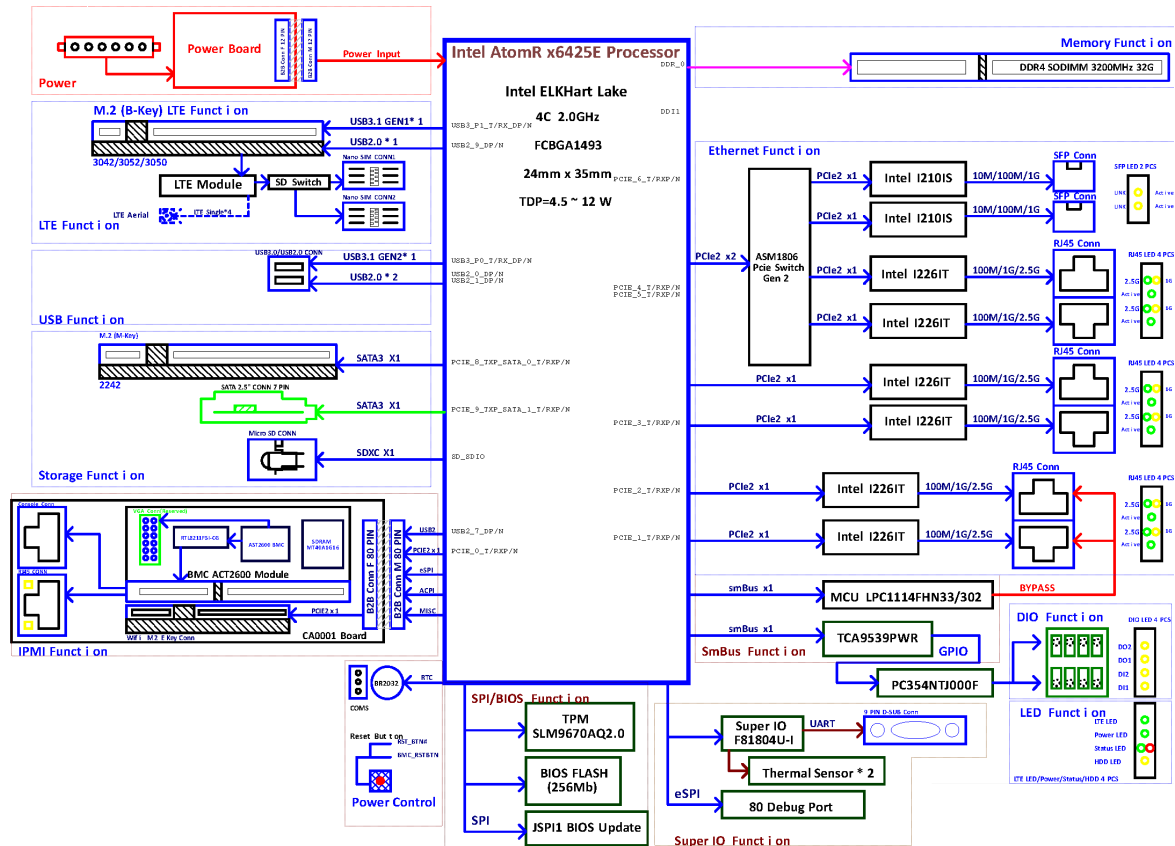
No.	Description	
F1	LED Indicators	Storage Status, System Status, Ethernet Status, Programmable LEDs
F2	USB Port	1x USB 3.0 Port; 1x USB 2.0 Port
F3	LAN Port	6x RJ45 Ethernet Ports
F4	SFP Port	2x SFP Ports
F5	COM Port	1x DB9 Male RS-232 COM Port
F6	IPMI Port	1x RJ45 IPMI Port (By SKU)
F7	Antennas	2x Antennas for LTE/5G Module (Optional)

No.	Description	
B1	Antennas	2x Antennas for LTE/5G Module (Optional)

## 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.



## Power Board Connectors

### PWR1: Power Button (12~36V)

Pin	Signal
1	DC_GND
2	DC_IN
3	ALARM2
4	ALARM1
5	DC_IN
6	DC_GND

## Internal Jumper & Connectors

### JCMOS1: RTC Reset

1-2: Clear CMOS for RTC

2-3: Clear CMOS for SRTC

Pin	Signal
1	RTC_RST#
2	NC
3	SRTC_RST#

### J8: Power SMBUS Debug

Pin	Signal
1	GND
2	SMB_CLK_VR
3	SMB_DATA_VR

### J18: For Program MCU (Debug / Burn in code)

ARM Programming Selection

1-2: Disable (Default)

2-3: Enable

Pin	Signal
1	+P3V3_STBY
2	PIO1_1_GPIO2
3	GND

**J17: LTE Module GPS Select**

1-2: EM7455/MV31-W/RM00Q

2-3: FN980

Pin	Signal
1	+P3V3
2	W_DIS2#_OE
3	GND

**COM1**

Pin	Signal
1	N/A
2	RX
3	TX
4	N/A
5	GND
6	N/A
7	RTS
8	CTS
9	N/A

**JDebug1**

Pin	Signal
1	+P3V3_STBY
2	GND
3	UART_TX
4	UART_RX

**JSPI1**

Pin	Signal
1	SPI0_IO3_HOLD#
2	NC
3	SPI0_CS0_R#
4	+P3V3_STBY_SPI
5	SPI0_IO1_MISO_R
6	NC
7	NC
8	SPI0_CLK_R
9	GND
10	SOC_SPI_MOSI_R

**JPW1**

Pin	Signal
1	+P12V
2	GND
3	GND
4	+P5V

**ESPI1**

Pin	Signal	Pin	Signal
1	ESPI_CLK	2	ESPI_IO1
3	ESPI_RST#	4	ESPI_IO0
5	ESPI_CS0#	6	+P3V3
7	ESPI_IO3	8	NA
9	ESPI_IO2	10	GND
11	+P3V3_STBY	12	NC

**Carrier Board Connectors****JDebug1**

Pin	Signal
1	+P3V3_STBY
2	GND
3	UART_TX
4	UART_RX

## CHAPTER 2: HARDWARE INSTALLATION

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

### Opening the Chassis

1. Power off the system and unplug the power cord.
2. Unscrew the six (6) screws on the system's top panel. Then, remove the side metal partitions.
3. Loosen the one (1) screw on the top panel, the six (6) screws on the bottom panel and rear panel.

Top Panel



Bottom Panel

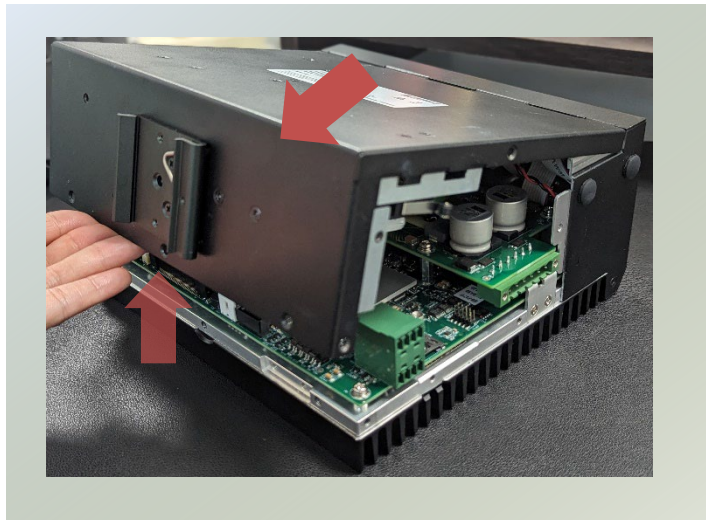


Rear Panel





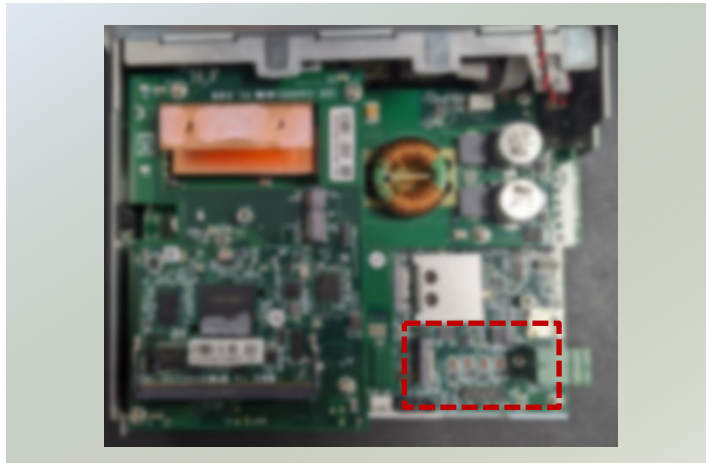
4. Turn the system upside down. Slide the chassis cover away from the system and lift the cover to remove.



## Installing the SATA Storage (Optional)

The motherboard supports one M.2 M-Key for SATA storage module expansion. Please follow the procedures for installation.

1. Power off the system and remove the chassis cover.
2. Locate the M.2 slot on the motherboard.



3. Align the notch of the SATA storage module with the socket key in the pin slot.



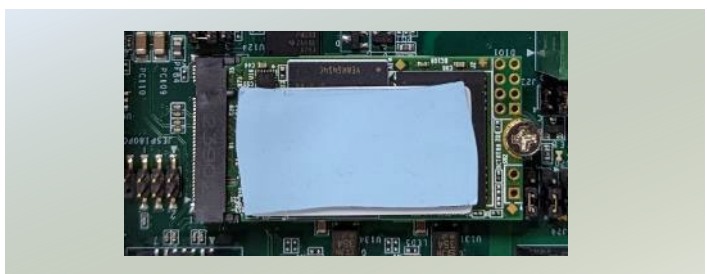
4. Insert the storage module pins at 30 degrees into the socket until it is fully seated.



5. Push down on the module card and secure it with one (1) screw.



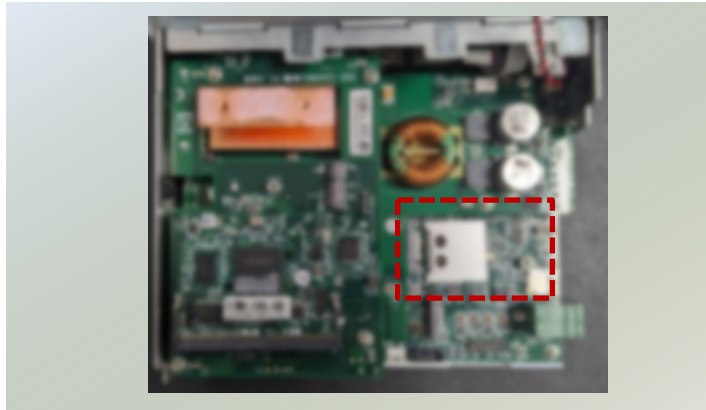
6. Next, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the module card.



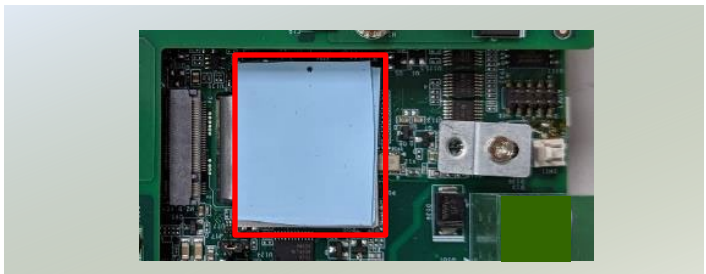
## Installing the LTE/5G Module (Optional)

The motherboard supports one M.2 B-Key for LTE/5G module card expansion. LTE module requires two antennas and 5G module requires four antennas. Please follow the procedures for installation.

1. Power off the system and remove the chassis cover.
2. Locate the M.2 slot on the motherboard.

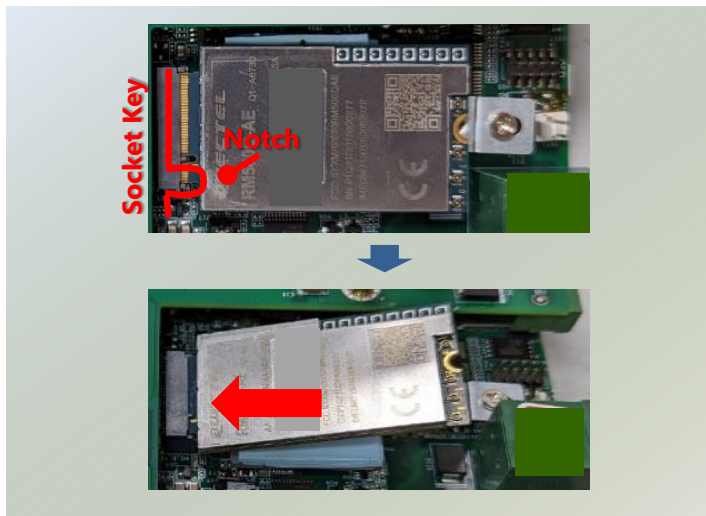


3. Then, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the space.



4. Align the notch of the module card with the socket key in the pin slot.

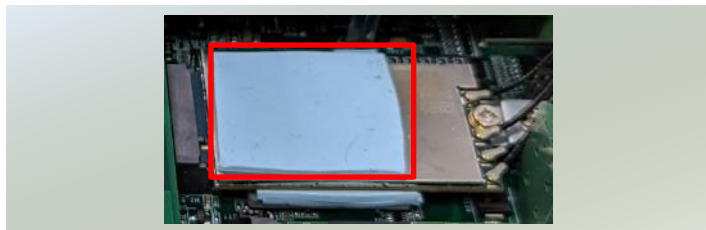
5. Insert the module card at 30 degrees into the socket until it is fully seated.



6. Push down on the module card and secure it with a screw.



7. Next, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the module card.



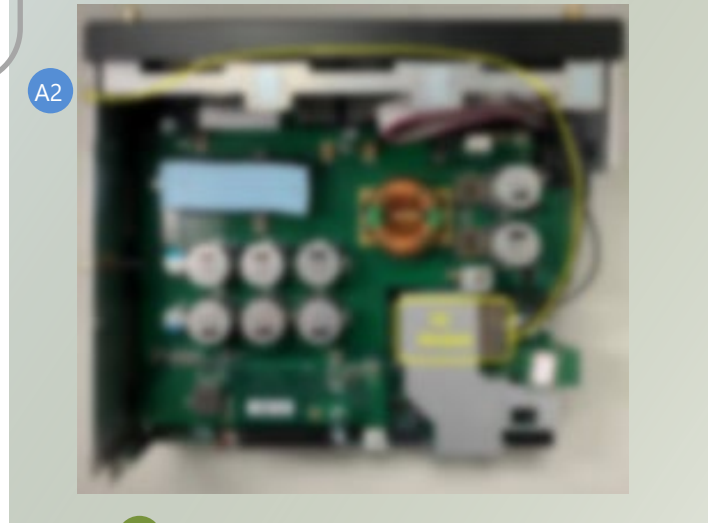
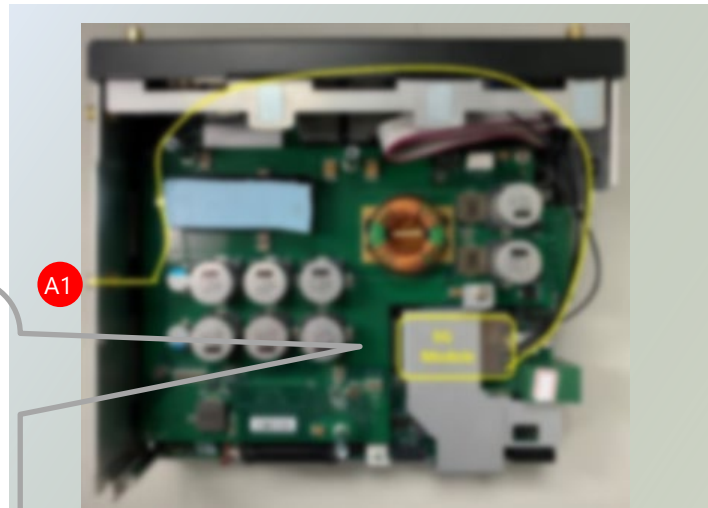


## Installing 5G Antenna

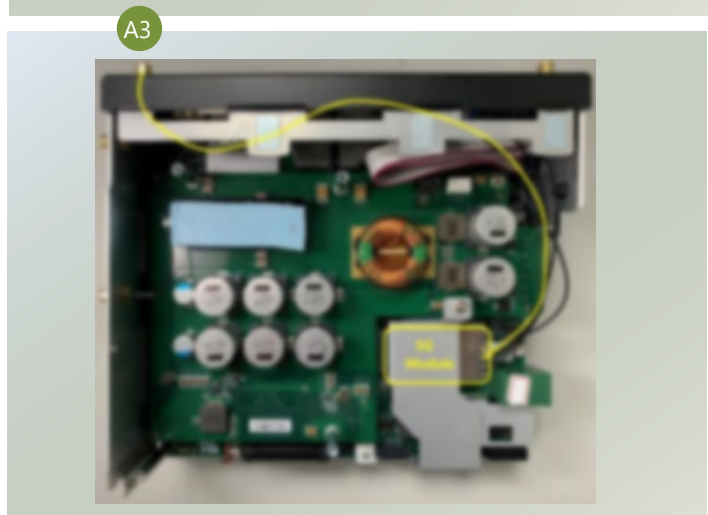
### Bottom & Front Panel



1. Locate the four (4) antenna hole placements. Locate the four (4) IPEX connectors on the LTE module card.



2. Connect the RF cables to the LTE module card and screw them in the antenna holes.



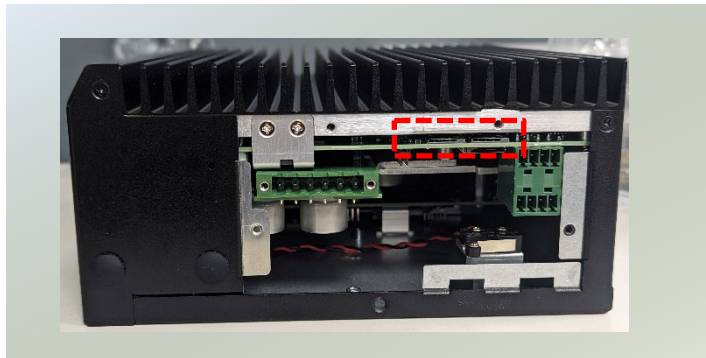


3. Screw the four (4) antennas to the system.

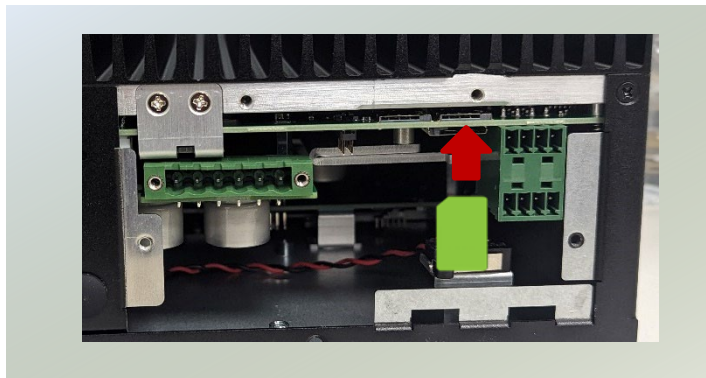


### Installing the SIM cards

1. The dual Nano-SIM card slot is located on the top panel. Remove the side metal partition on the top panel and locate the SIM card slots.



2. Insert and push the sim card, gold contacts facing downwards, all the way in until it clicks into place. Repeat if dual SIM cards will be placed.



3. To remove/replace the SIM card, use your fingertips to push it once, to have the card automatically eject.

## Installing the Wi-Fi Module (Optional)

ICS-P371 SKU D/E/F supports one M.2 E-Key for optional Wi-Fi module card expansion. Wi-Fi module requires two antennas. Please follow the procedures for installation.

1. Power off the system and remove the [chassis cover](#).
2. Locate the M.2 slot on the carrier board.



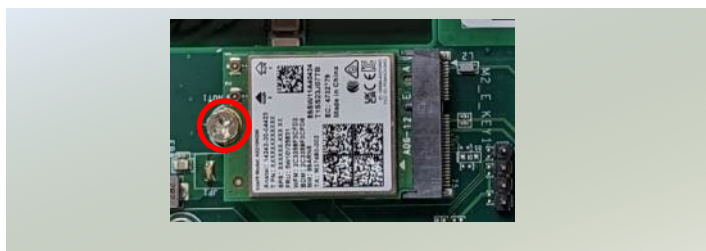
3. Align the notch of the module card with the socket key in the pin slot.



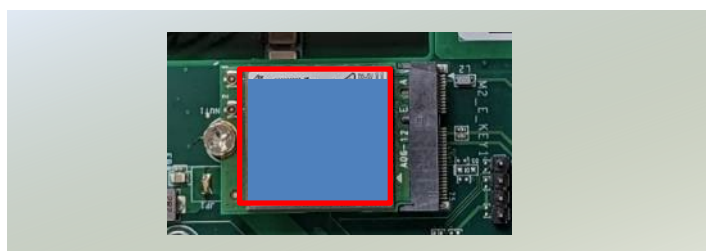
4. Insert the module card at 30 degrees into the socket until it is fully seated.



5. Push down on the module card and secure it with a screw.



6. Next, thermal pad placement. Remove the protective film on the thermal pad (included in the accessory pack) and gently place on the module card.



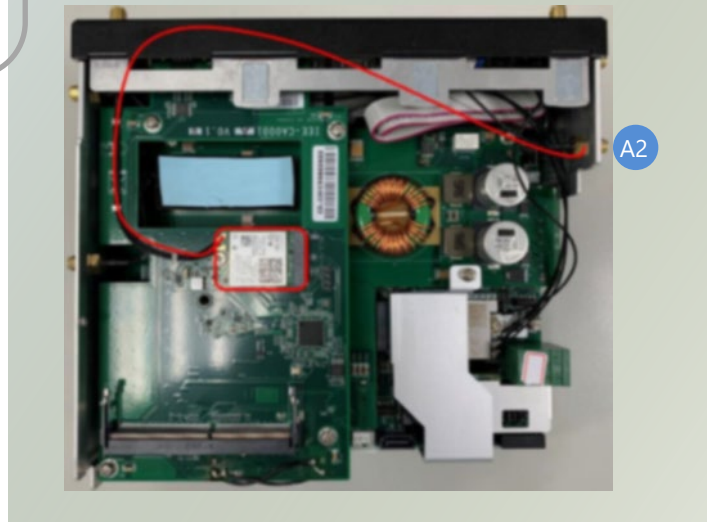
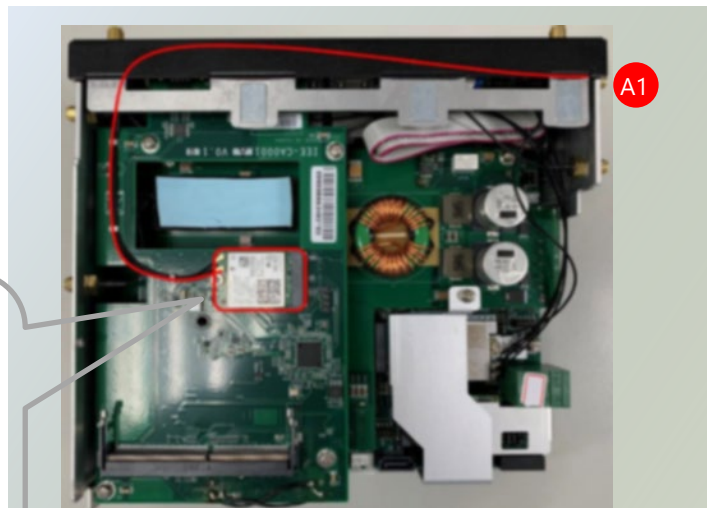


## Installing Wi-Fi Antenna

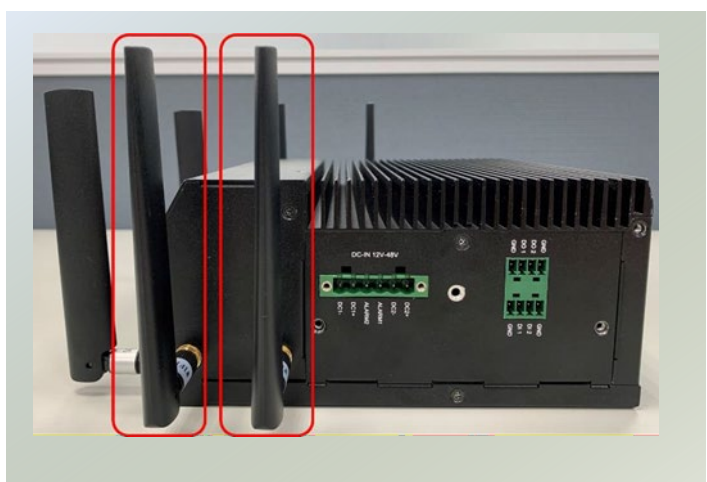
### Top Panel



1. Locate the two (2) antenna hole placements. Locate the two (2) IPEX connectors on the LTE module card.
2. Connect the RF cables to the LTE module card and screw them in the antenna holes.



3. Screw the two (2) antennas on to the system.



## Installing the SD Card

The system supports one SD card expansion, on the top panel. The SD card socket supports a push-push mechanism, allowing inserting and ejecting the SD card to be as easy as one push.

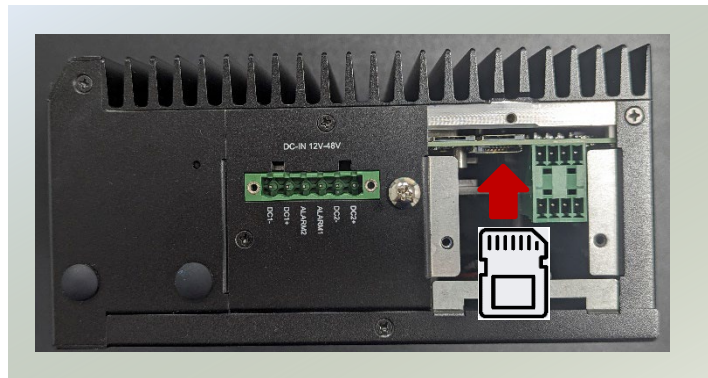
1. The SD card slot is located on the top panel. Loosen the three (3) screws to remove the side metal partition.



2. Locate the SD Card slot.



3. Insert and push the SD card all the way in until it clicks into place.



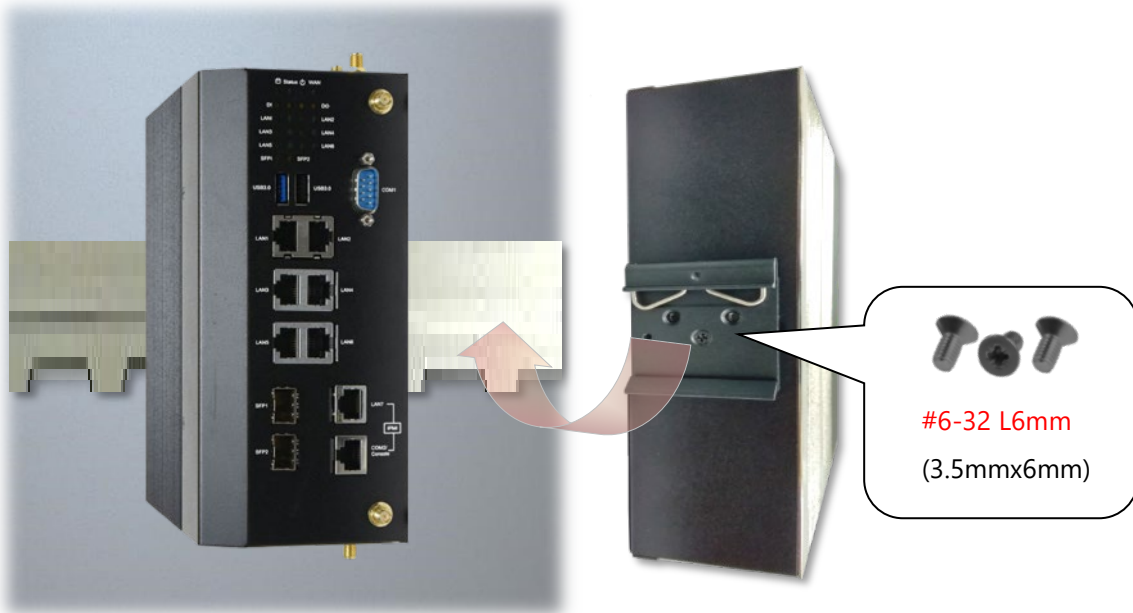
4. To remove/replace the SD card, use your fingertips to push it once, to have the card automatically eject.



## DIN Rail Mounting (Optional)

The system can be mounted to a wall with a DIN Rail Bracket.

1. Attach the Bracket to the rear of the system with **three** screws.
2. Hang the system onto a rail by engaging the hook of the Bracket into the DIN Rail until it is totally fixed.



## 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

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

1. Boot up the system.
2. Pressing the **<Tab>** or **<Del>** key immediately allows you to enter the Setup utility, 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

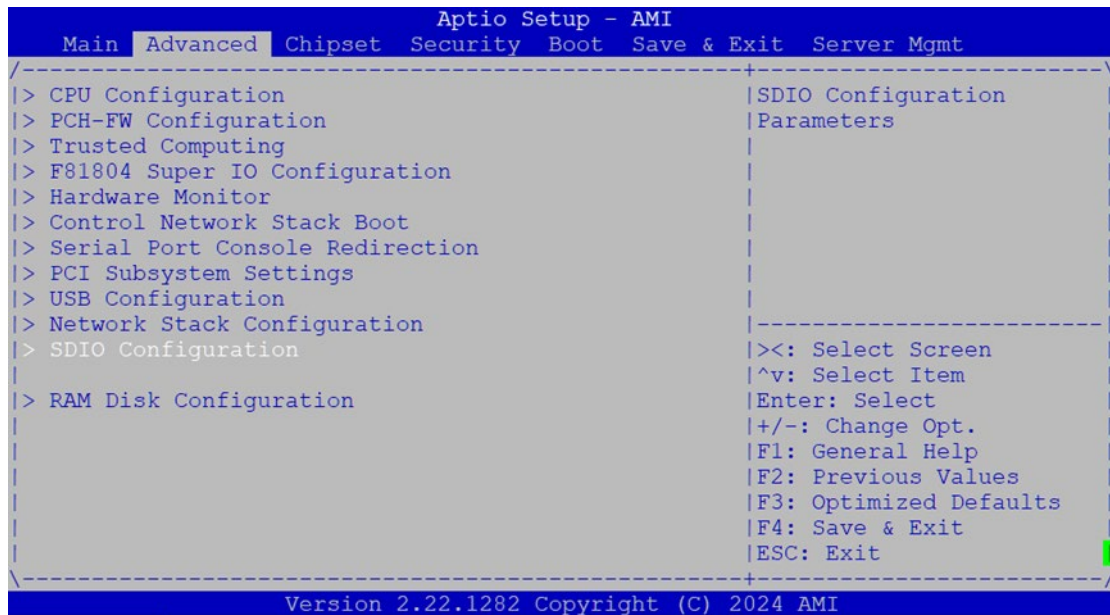
Setup main page contains BIOS information and project version information.



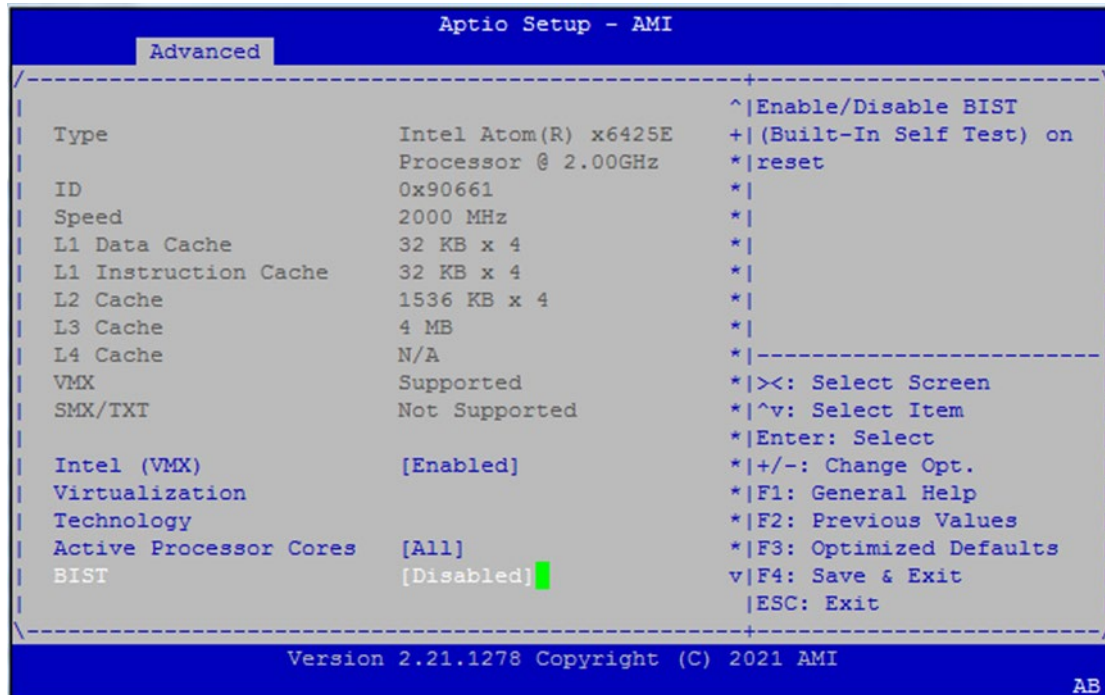
Feature	Description
BIOS Information	BIOS Vendor : American Megatrends Core Version : AMI Kernel version, CRB code base, X64 Compliance : UEFI version, PI version Project Version : BIOS release version Build Date and Time : MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use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

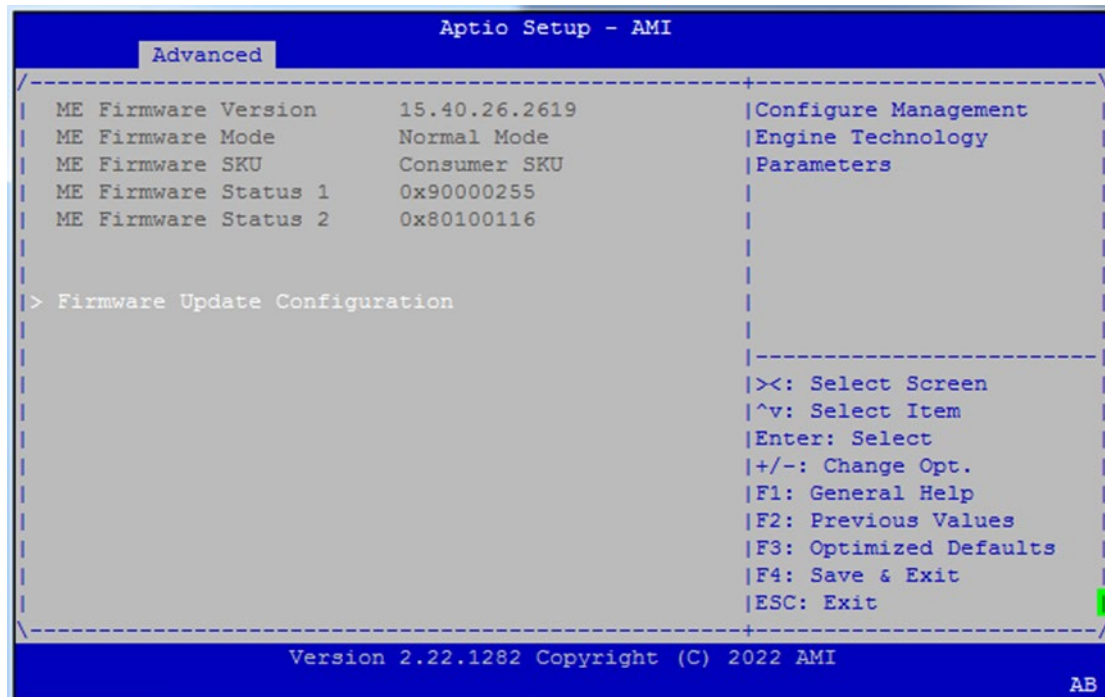


## CPU Configuration

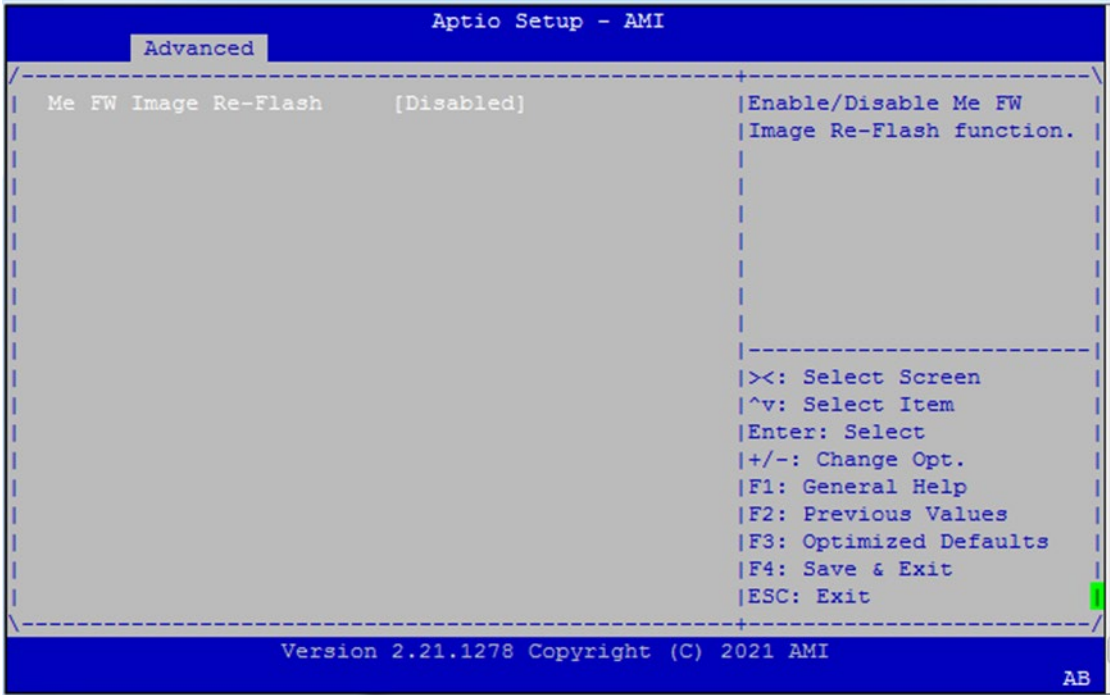


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active Processor Cores	All 1 2 3	Number of cores to enable in each processor package.
BIST	Enabled Disabled	Enable/Disable BIST (Built-In Self-Test) on reset

## PCH-FW Configuration



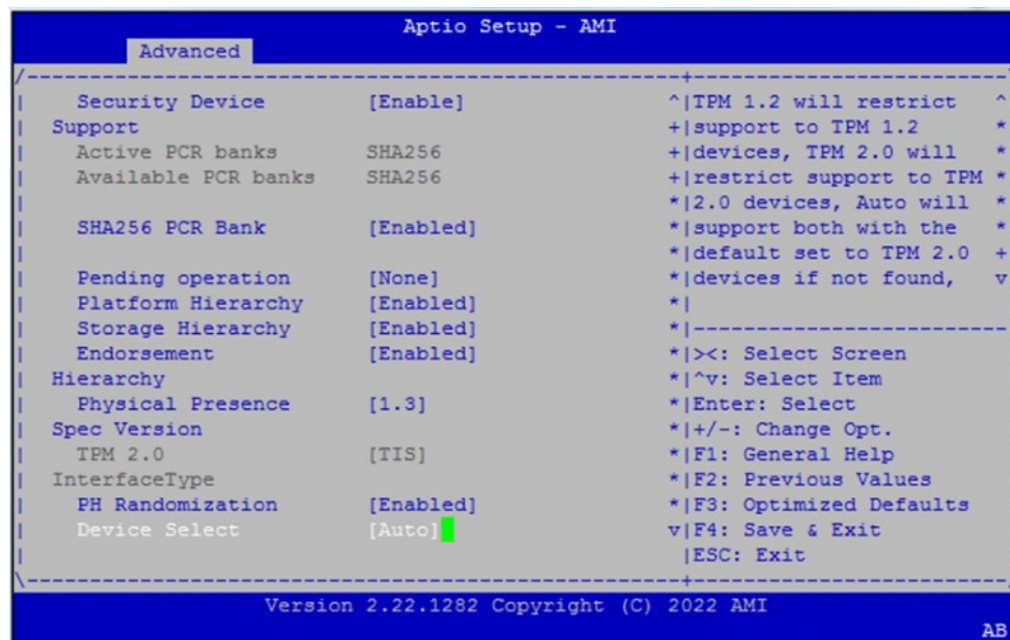
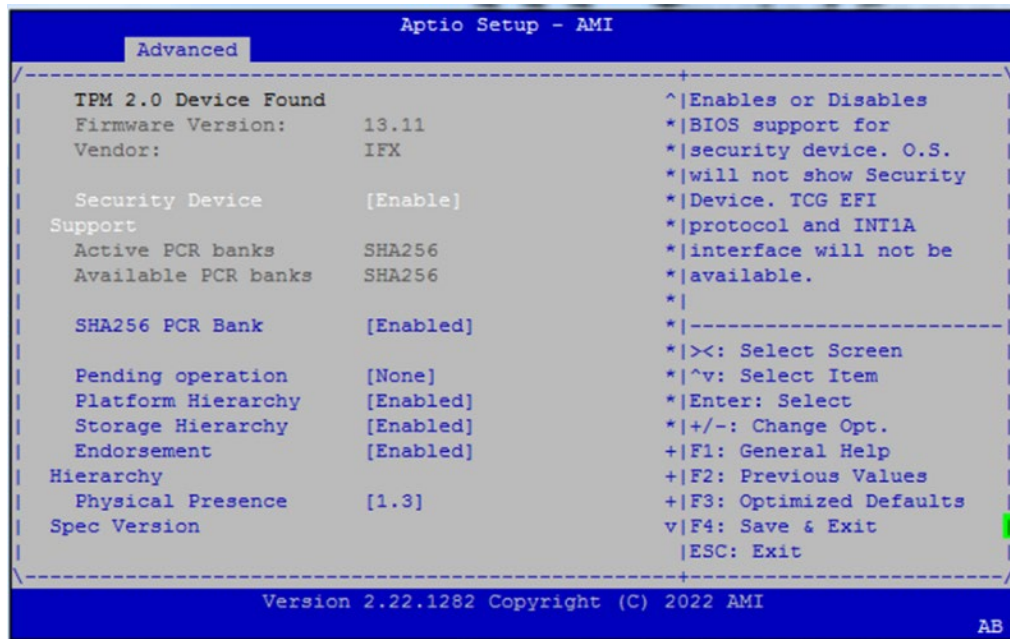
Firmware Update Configuration



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



## Trusted Computing



Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Enabled Disabled	Enables or Disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. <b>NOTE:</b> Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.

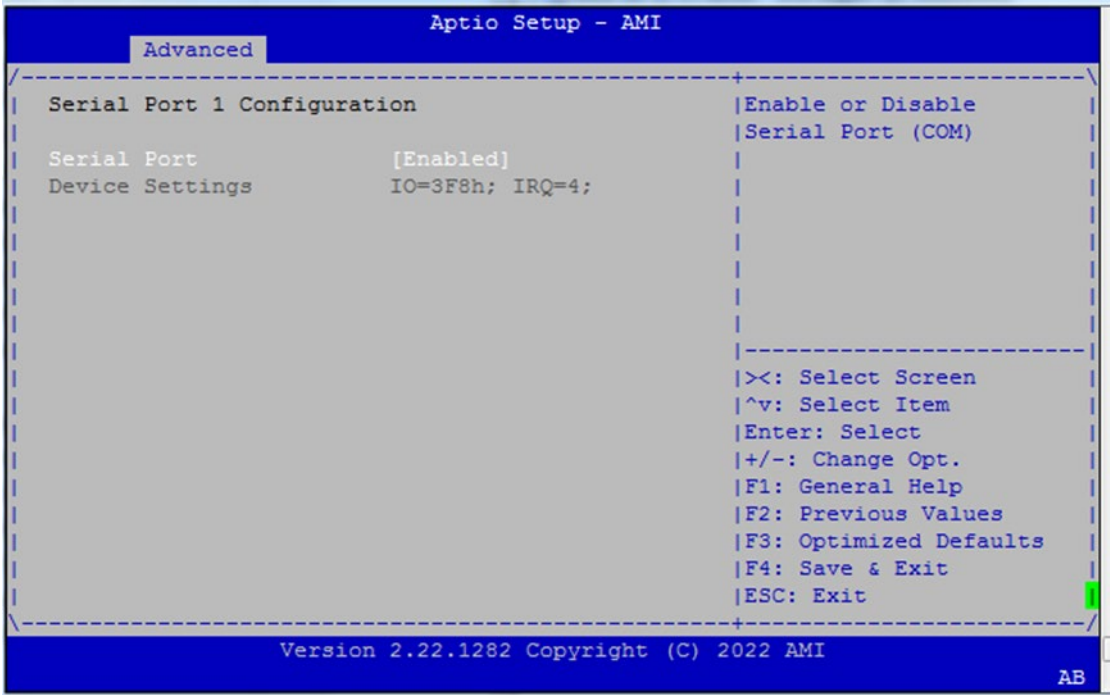


Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. <b>NOTE:</b> Some HCK tests might not support 1.3.
PH Randomization	Enabled Disabled	Enables or Disables Platform Hierarchy randomization. DO NOT ENABLE THIS QUESTION IN PRODUCTION PLATFORMS. THIS IS FOR DEVELOPMENT TESTING. OVERRIDE ChangePlatformAuth ELINK for production platforms supporting TXT.
Device Select	TPM 1.2 TPM 2.0 Auto	<b>TPM 1.2</b> will restrict support to TPM 1.2 devices; while <b>TPM 2.0</b> will restrict support to TPM 2.0 devices; <b>Auto</b> will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

## F81804 Super IO Configuration

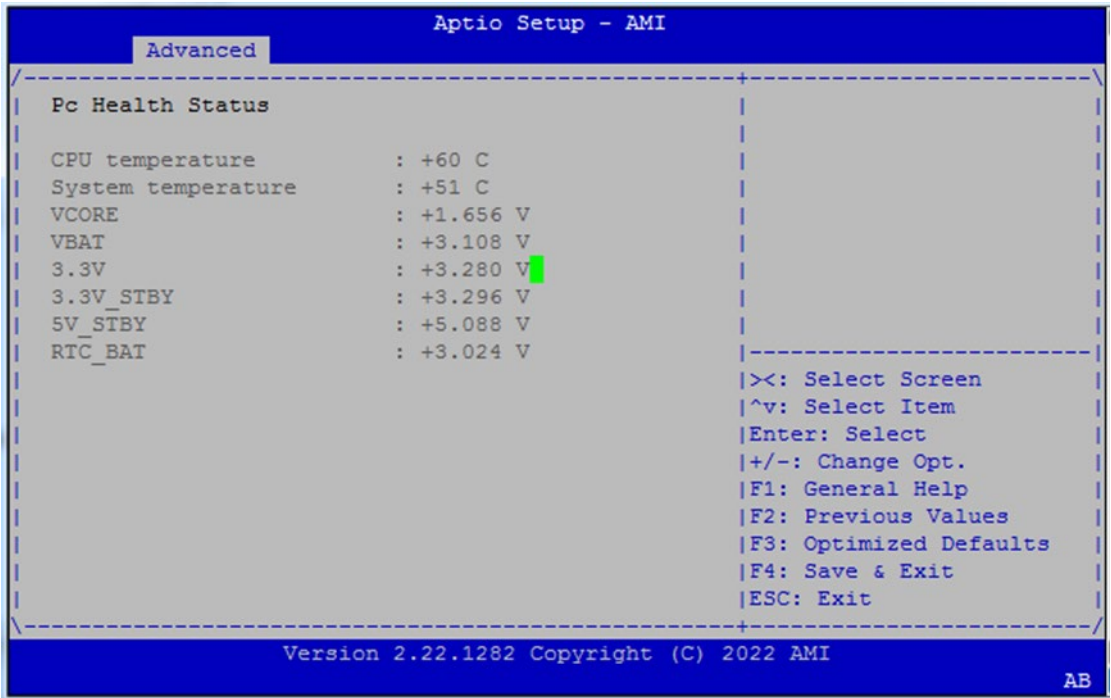


Serial Port 1 Configuration



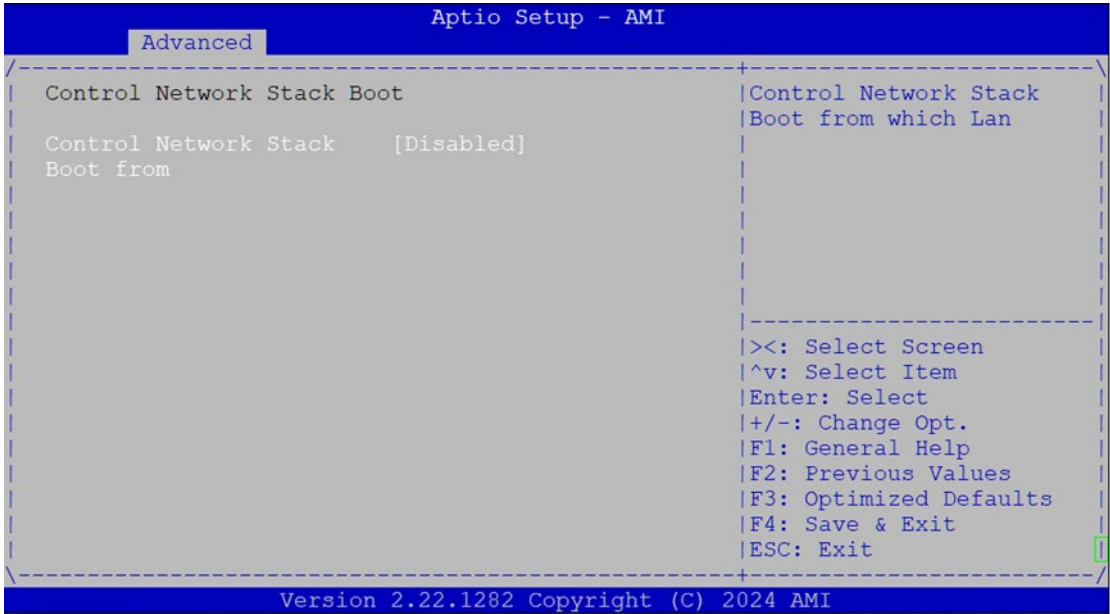
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port (COM)

Hardware Monitor



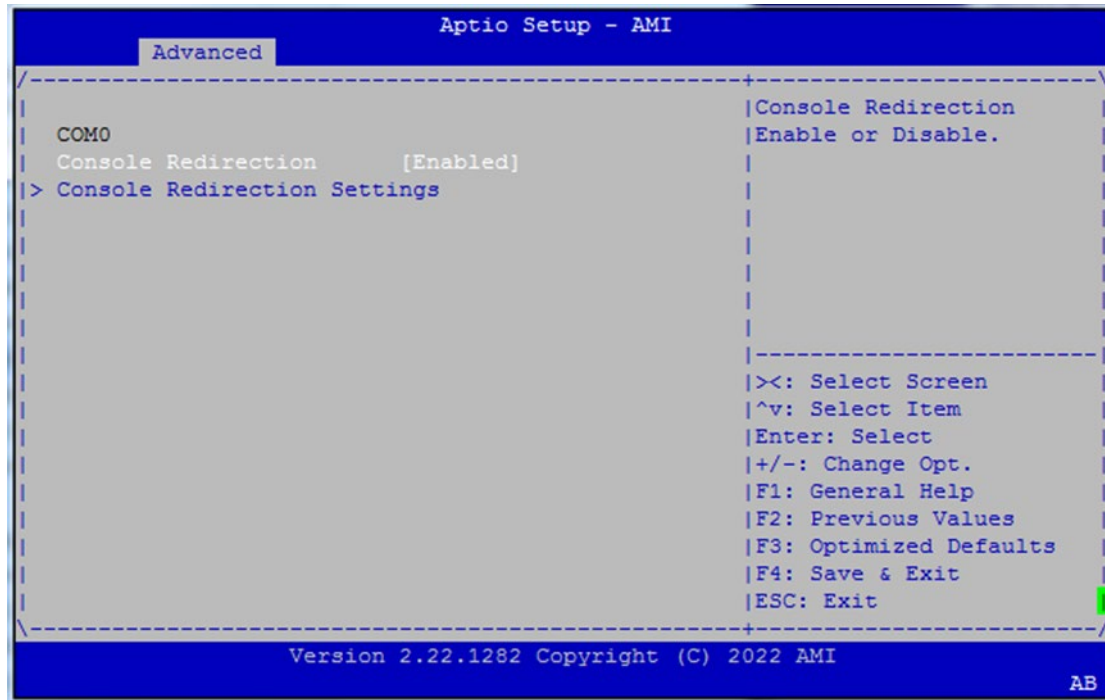
Feature	Description
CPU temperature	This value reports the CPU temperature.
SYS temperature	This value reports the System temperature.
VCORE	This value reports the CPU VCORE.
VBAT	This value reports the VBAT.
3.3V	This value reports the 3.3V Input voltage.
3.3V_STBY	This value reports the 3.3V_STBY Input voltage.
5V_STBY	This value reports the 5V_STBY Input voltage.
RTC_BAT	This value reports the RTC_BAT Input voltage.

Control Network Stack Boot



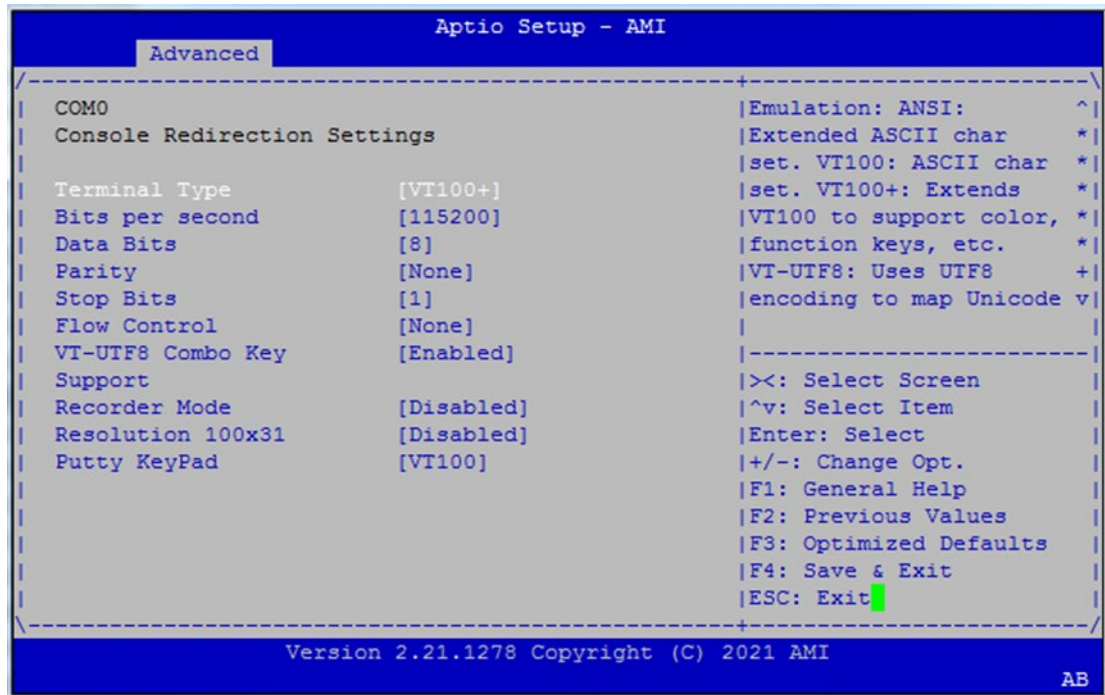
Feature	Options	Description
Control Network Stack Boot from	Disabled	Control Network Stack Boot from which Lan
	LAN1	
	LAN2	
	LAN3	

## Serial Port Console Redirection



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

## Console Redirection Settings

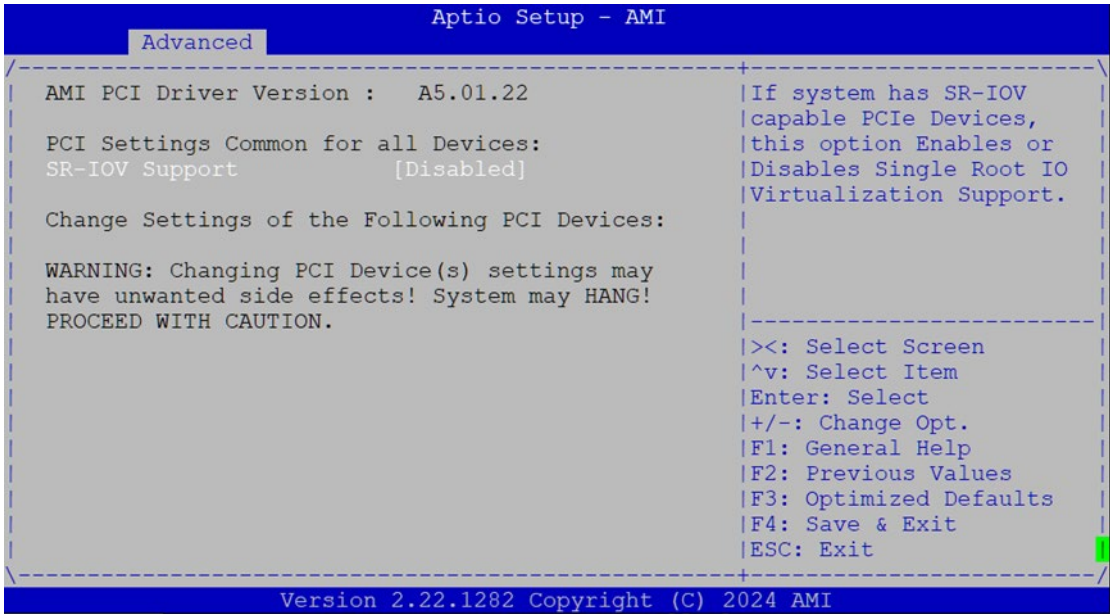


Feature	Options	Description
Terminal Type	VT100 <b>VT100+</b> VT-UTF8 ANSI	ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 <b>115200</b>	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 <b>8</b>	Data Bits
Parity	<b>None</b> Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	<b>1</b> 2	Stop bits indicate the end of a serial data packet.
Flow Control	<b>None</b> Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.

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

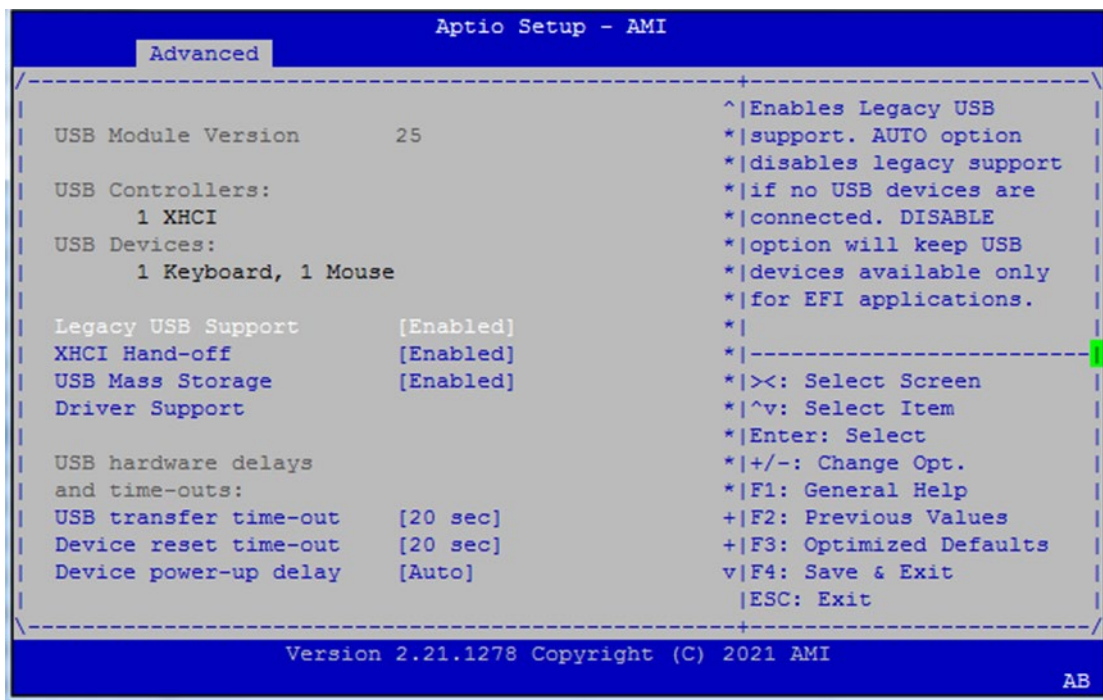


PCI Subsystem Settings



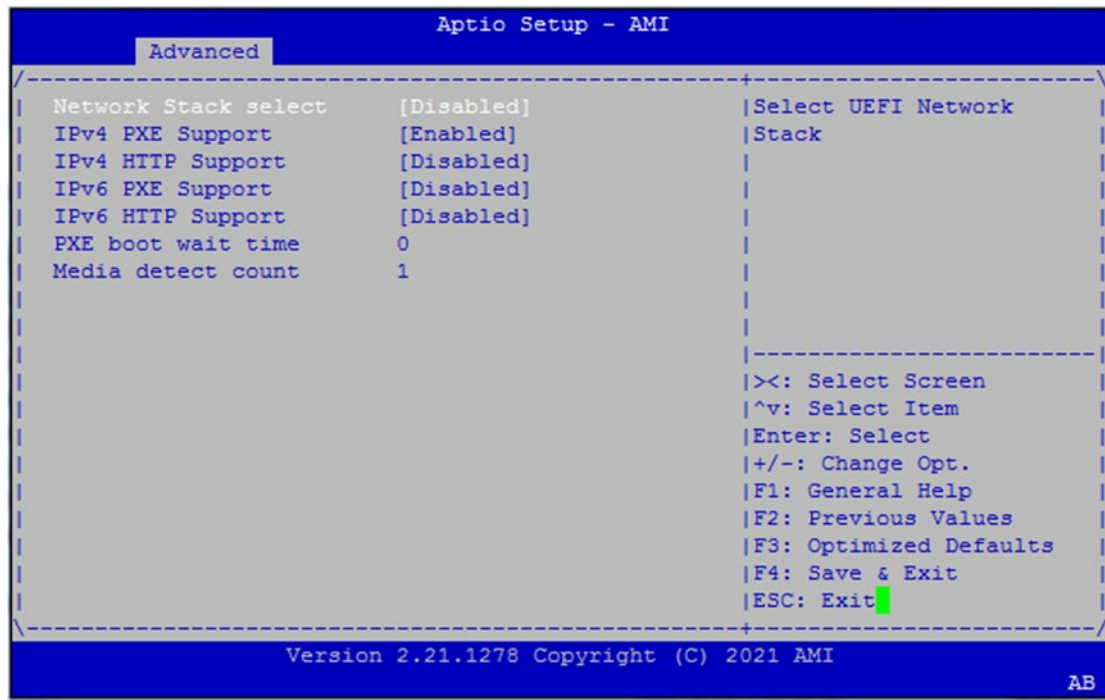
Feature	Options	Description
SR-IOV Support	Disabled Enabled	If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

## USB Configuration



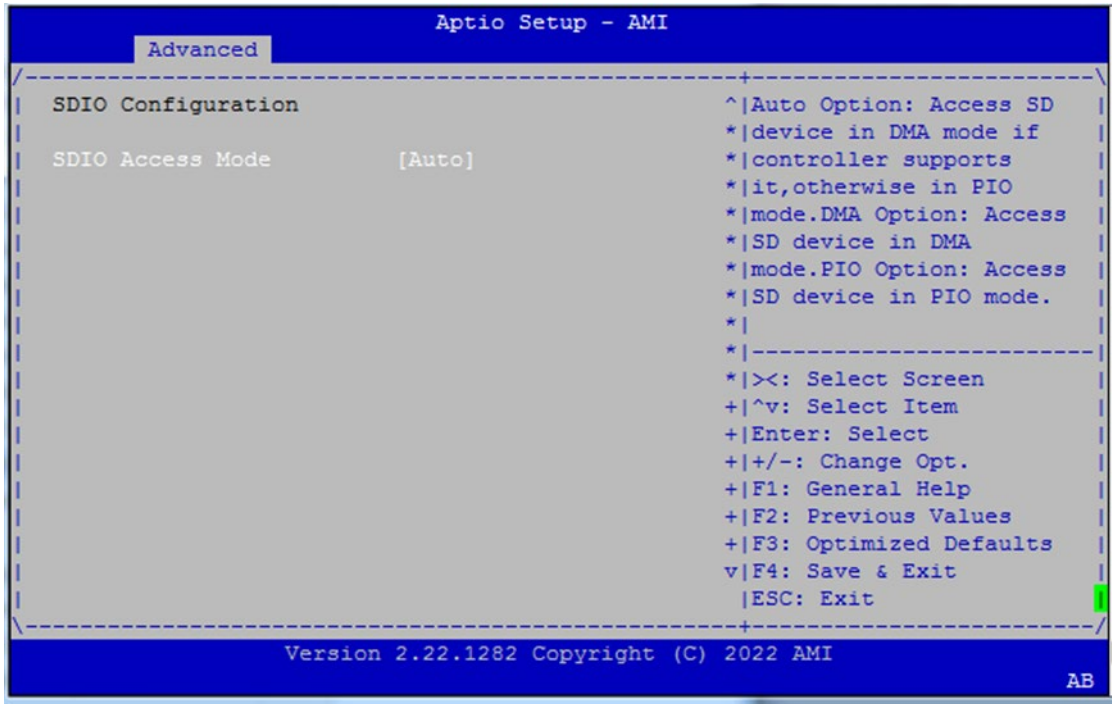
Feature	Options	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. <b>Auto</b> option disables legacy support if no USB devices are connected; <b>Disabled</b> option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset time-out	10 sec 20 sec 30 sec 40 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. <b>Auto</b> 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



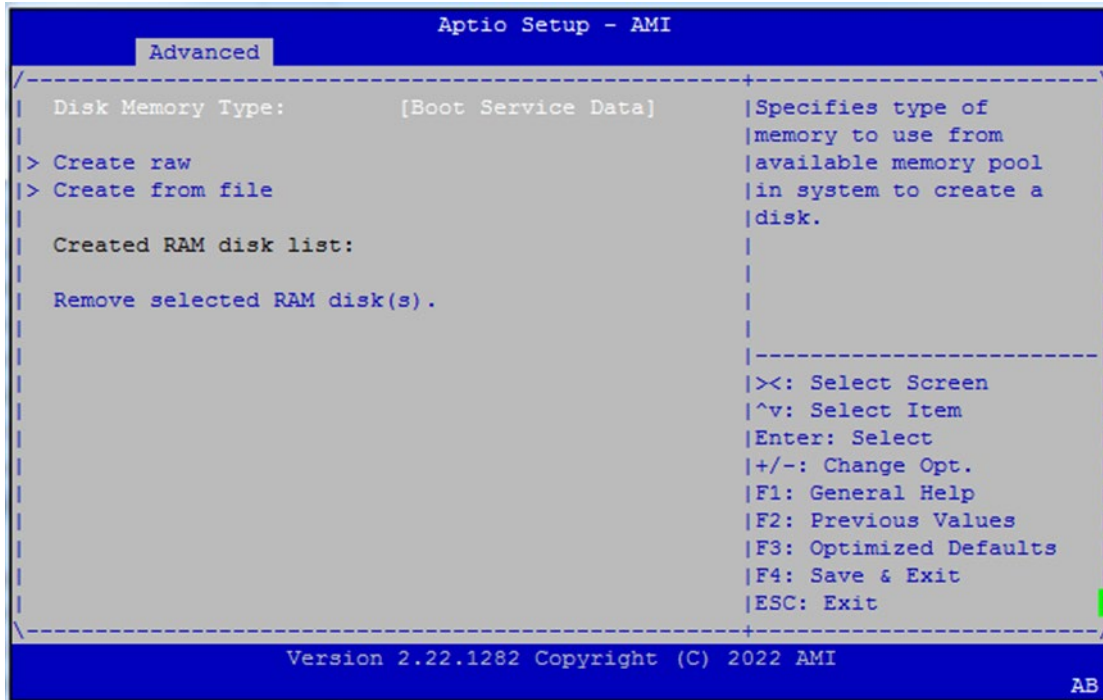
Feature	Options	Description
Network Stack select	Disabled LAN1 LAN2	Select UEFI Network Stack
IPv4 PXE Support	Disabled Enable	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	Disabled Enable	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	Disabled Enable	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	Disabled Enable	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	0	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	1	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

SDIO Configuration



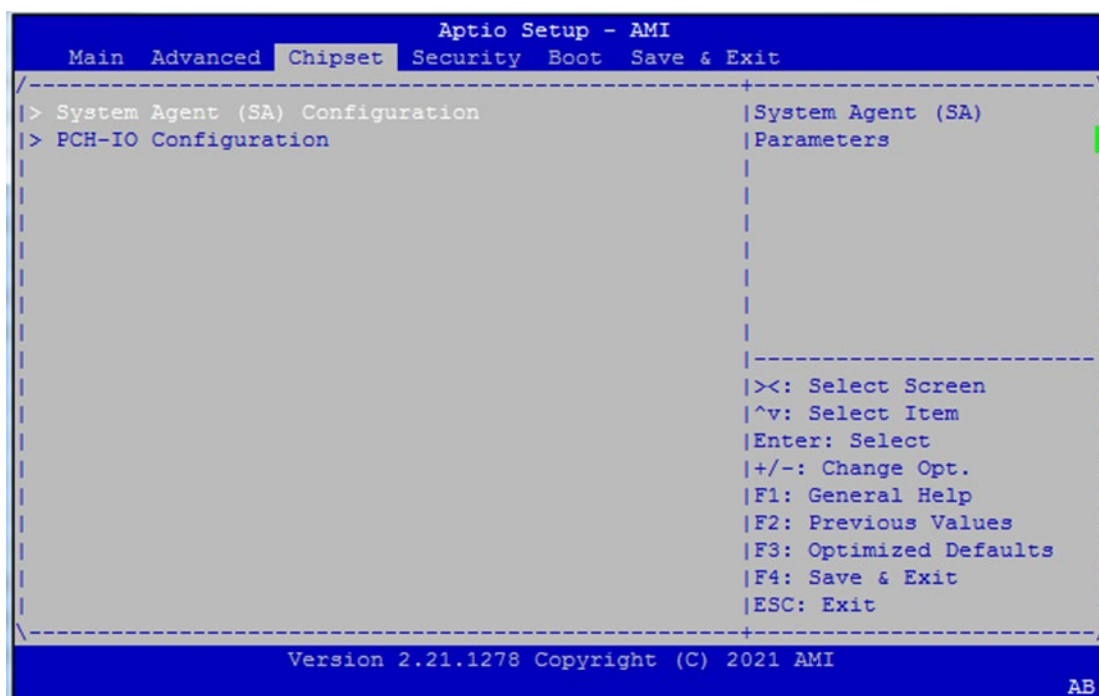
Feature	Options	Description
SDIO Access Mode	Auto	Auto Option: Access SD device in DMA mode if controller supports it, otherwise in PIO mode. DMA Option: Access SD device in DMA mode. PIO Option: Access SD device in PIO mode.
	ADMA	
	SDMA	
	PIO	

## RAM Disk Configuration

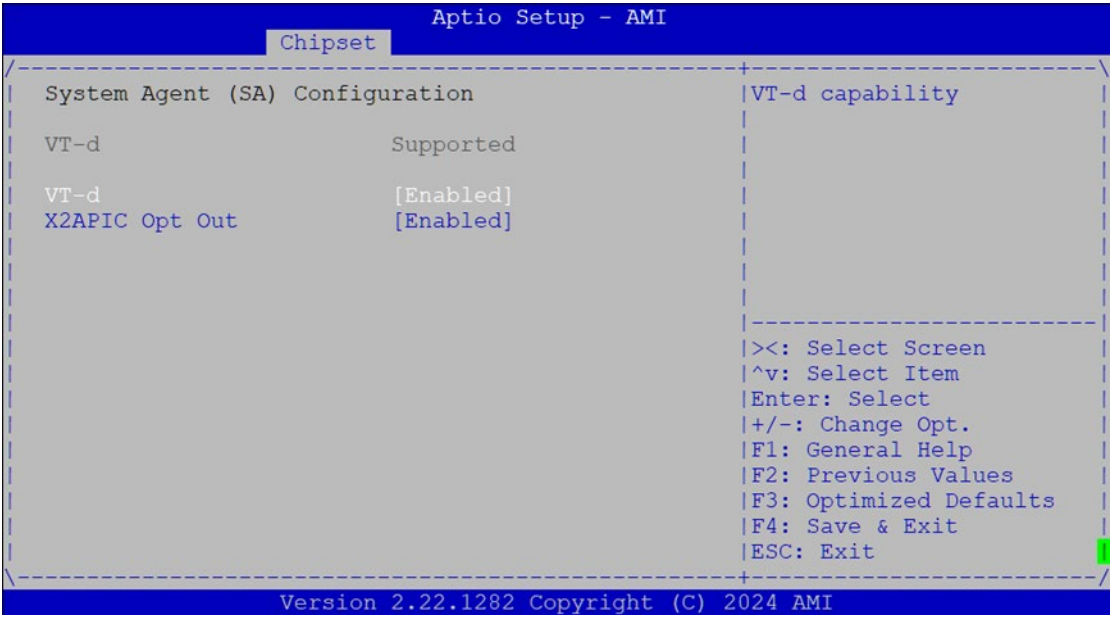


## Chipset

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



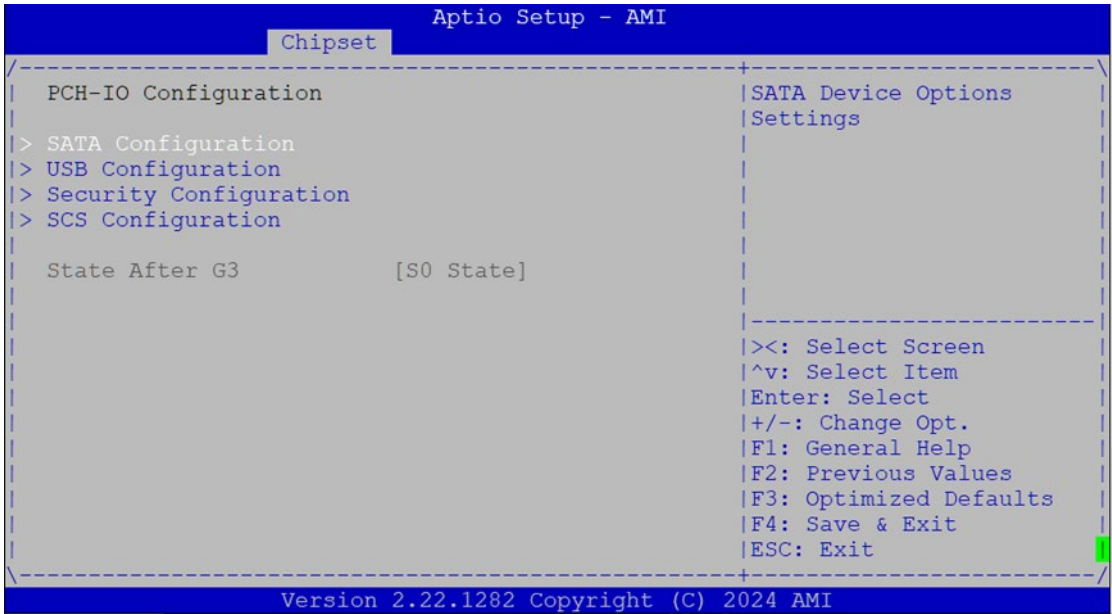
System Agent (SA) Configuration



Feature	Options	Description
VT-d	Enabled Disabled	VT-d capability
X2APIC Opt Out	Enabled Disabled	Enable/Disable X2APIC_OPT_OUT bit

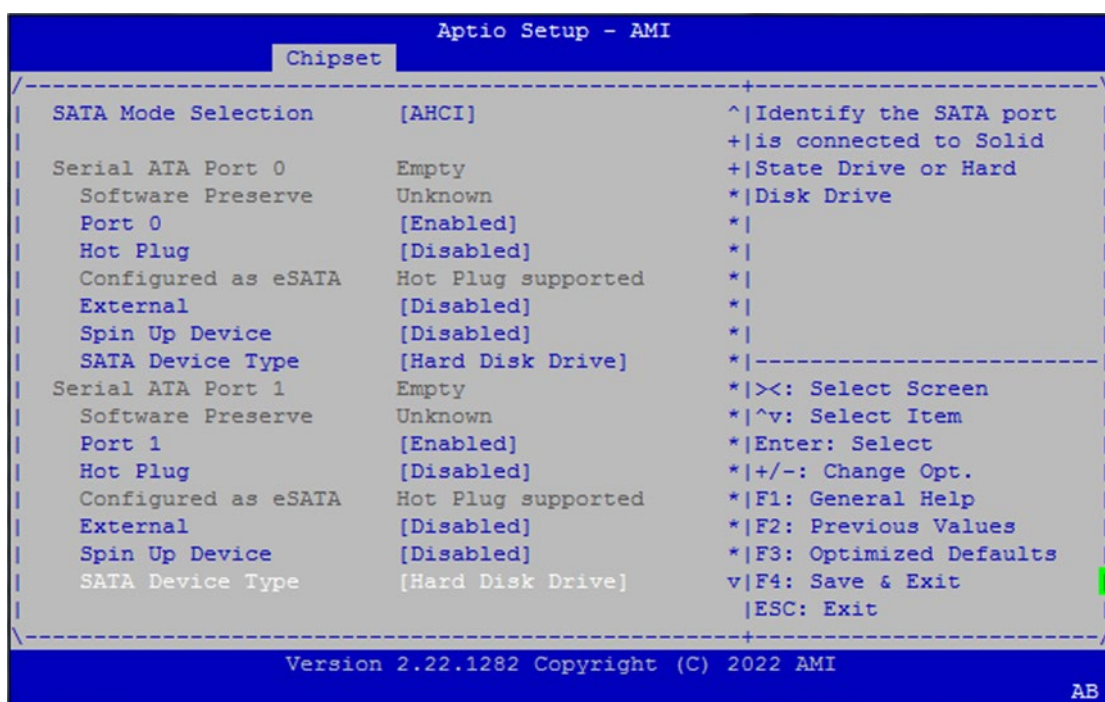
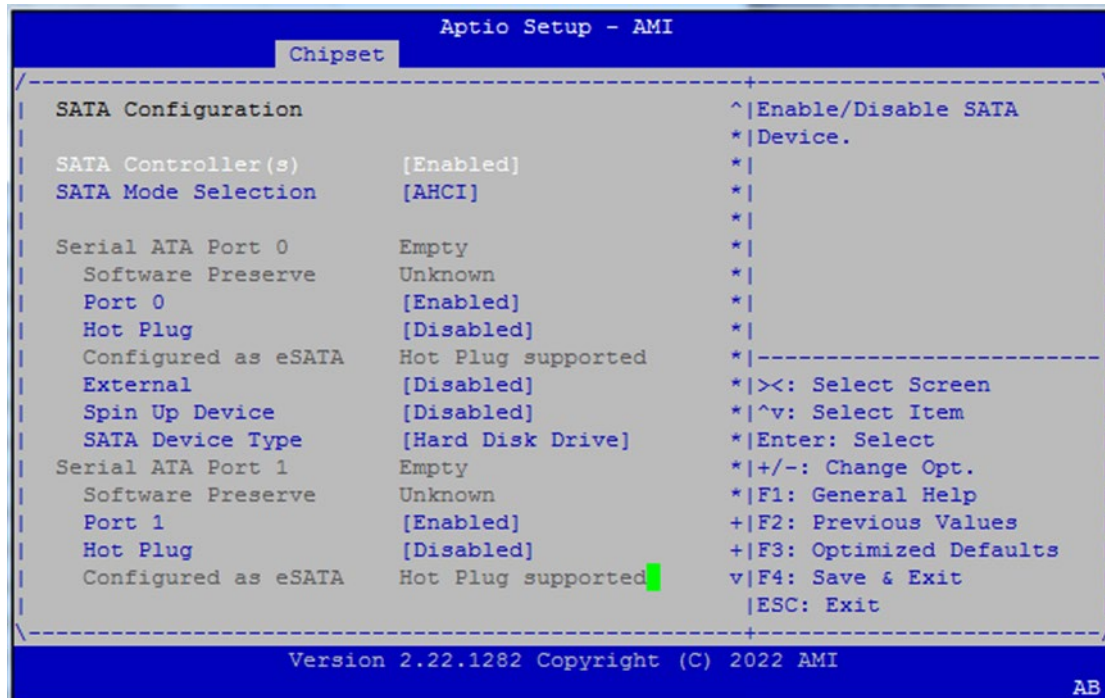


PCH-IO Configuration





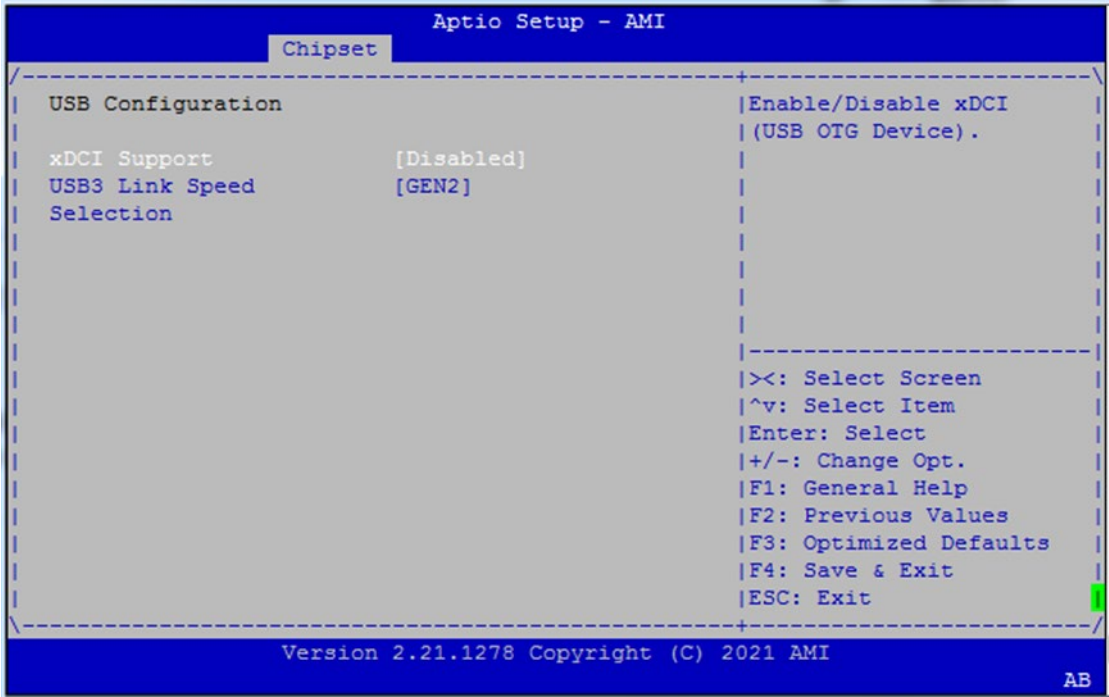
## SATA Configuration



Feature	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.
Port 0	Enabled Disabled	Enable or Disable SATA Port
Hot Plug	Enabled Disabled	Designates this port as Hot Pluggable.
External	Enabled Disabled	Marks this port as external.

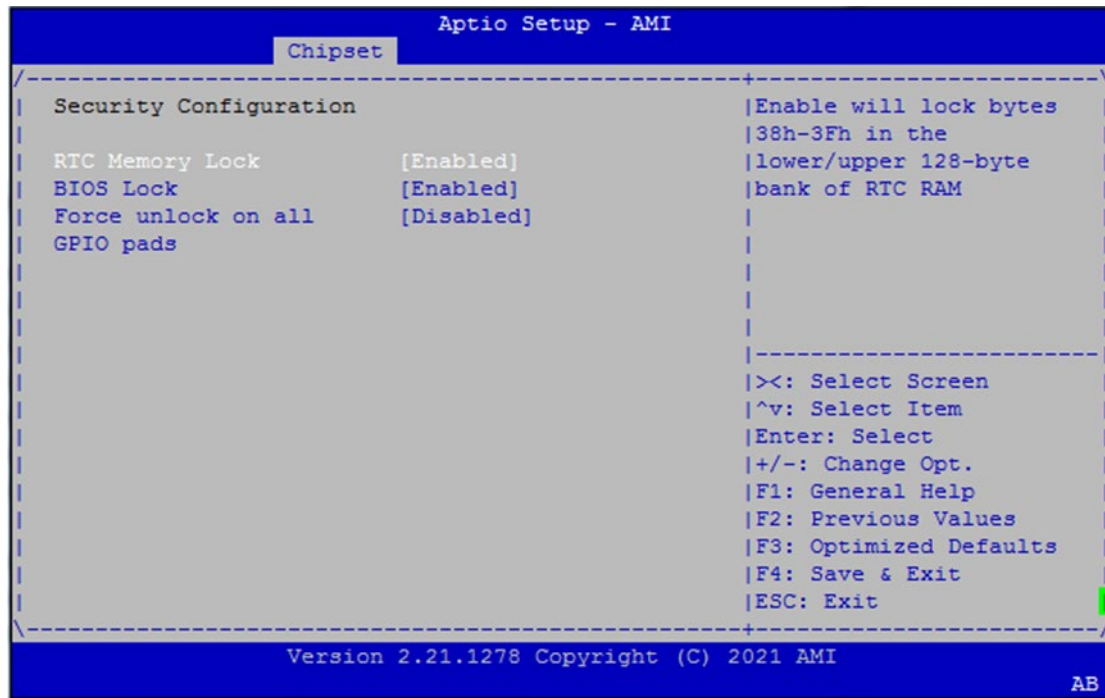
Spin Up Device	Enabled Disabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive

USB Configuration



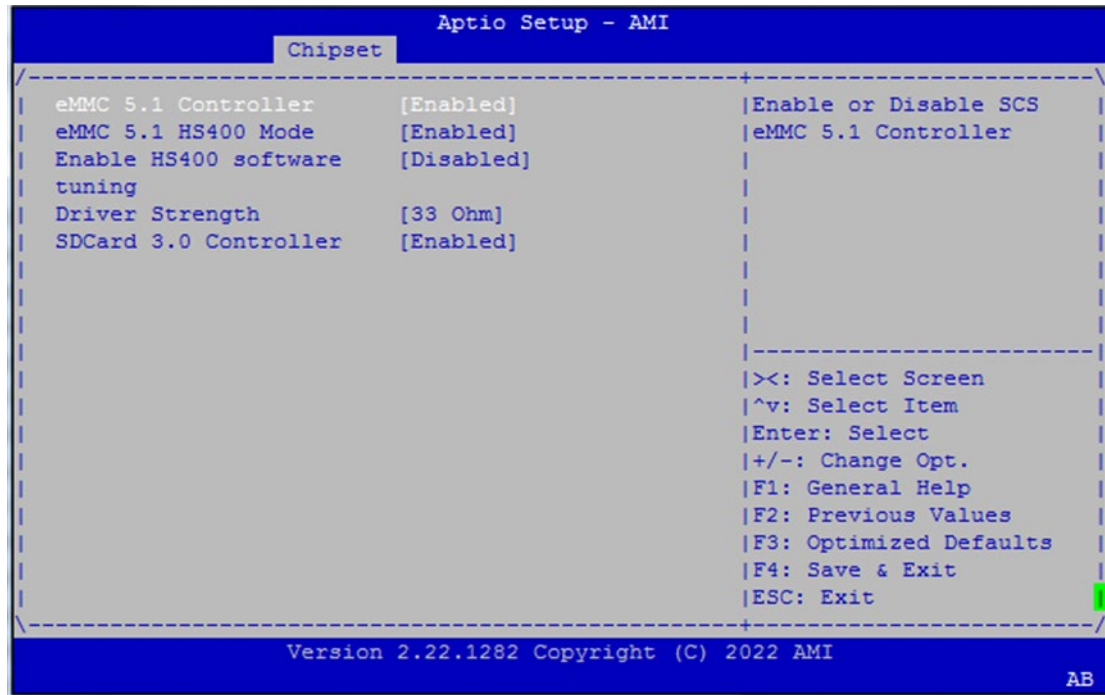
Feature	Options	Description
xDCI Support	Enable Disable	Enable/Disable xDCI (USB OTG Device).
USB3 Link Speed Selection	GEN1 GEN2	This option is to select USB3 Link Speed GEN1 or GEN2

## Security Configuration



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

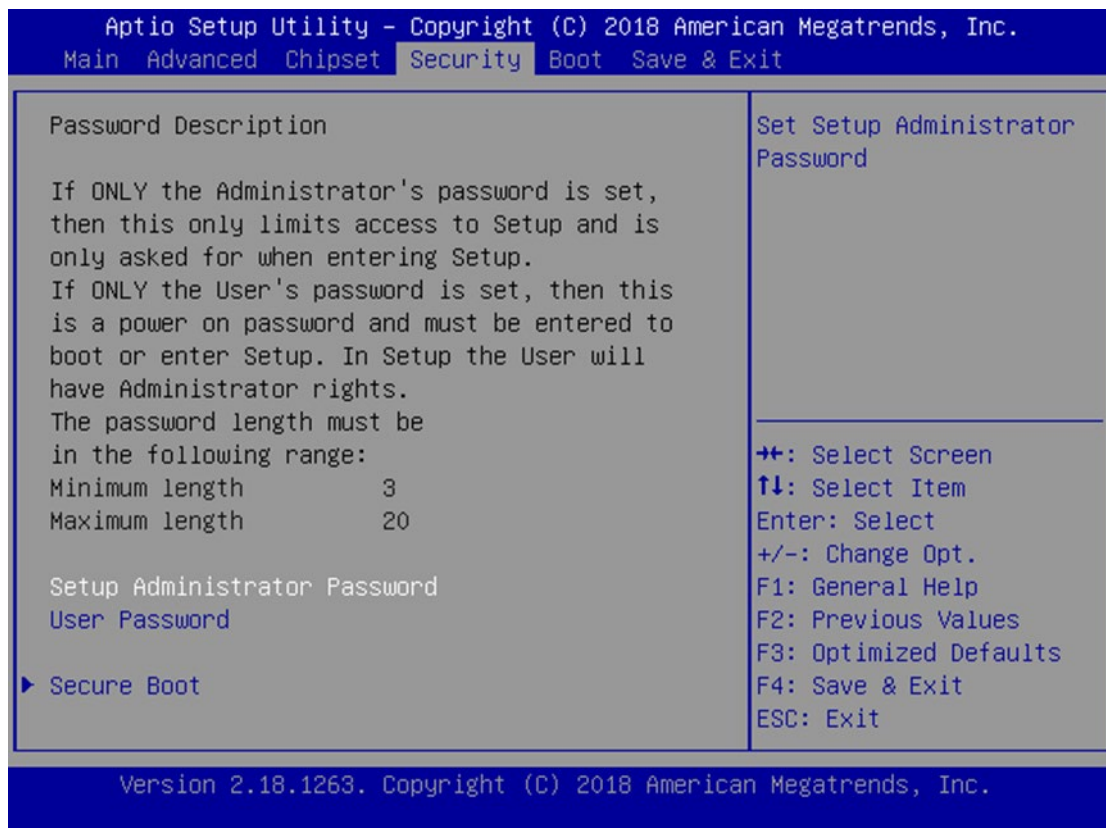
## SCS Configuration



Feature	Options	Description
eMMC 5.1 Controller	Enabled Disabled	Enable or Disable SCS eMMC 5.1 Controller
eMMC 5.1 HS400 Mode	Enabled Disabled	Enable or Disable SCS eMMC 5.1 HS400 Mode
Enable HS400 software tuning	Enabled Disabled	Software tuning should improve eMMC HS400 stability at the expense of boot time
Driver Strength	33 Ohm 40 Ohm 50 Ohm	Sets I/O driver strength
SDCard 3.0 Controller	Enabled Disabled	Enable or Disable SCS eMMC 5.1 Controller

## Security

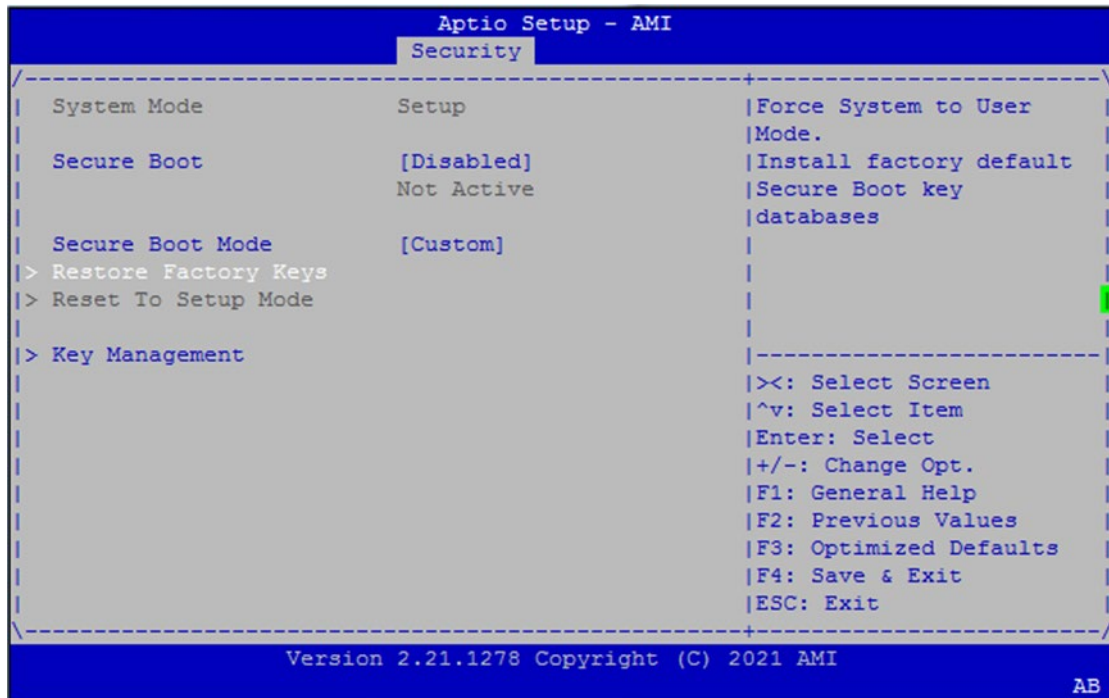
Select the Security menu item from the BIOS setup screen to enter the Security Setup screen. Users can select any of the items in the left frame of the screen.



Feature	Description
Setup 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.

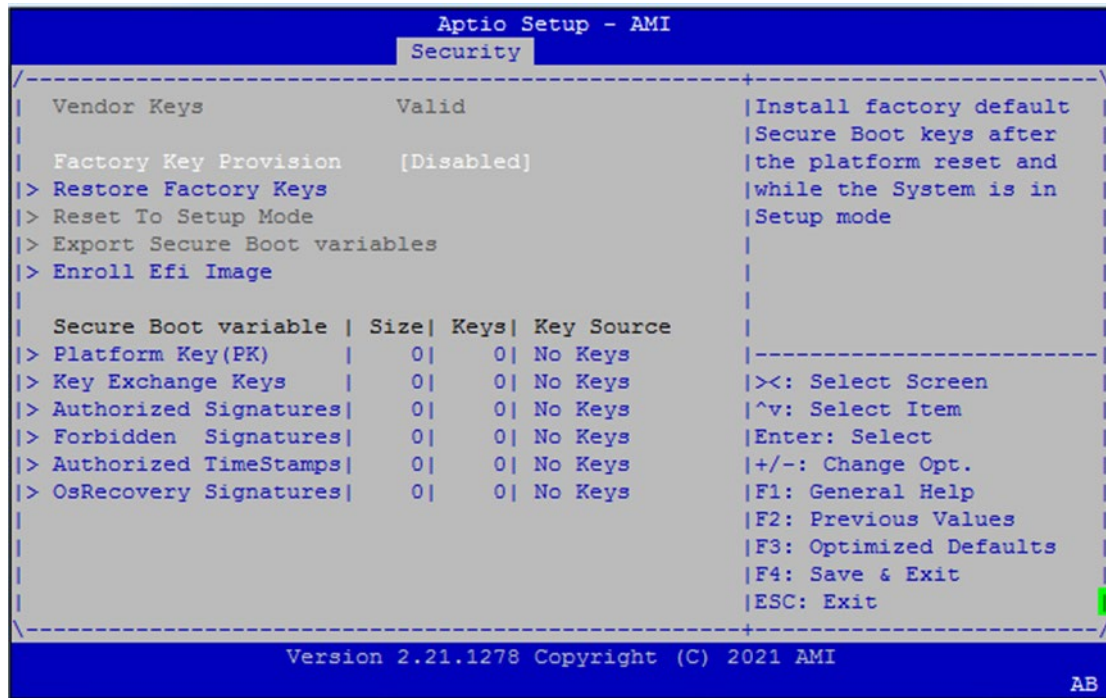


## Secure Boot



Feature	Options	Description
Secure Boot	Disabled Enabled	Secure Boot feature is Active if Secure Boot is Enabled, Platform Key (PK) is enrolled and the System is in User mode. The mode change requires platform reset
Secure Boot Mode	Standard Custom	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication

## Key Management

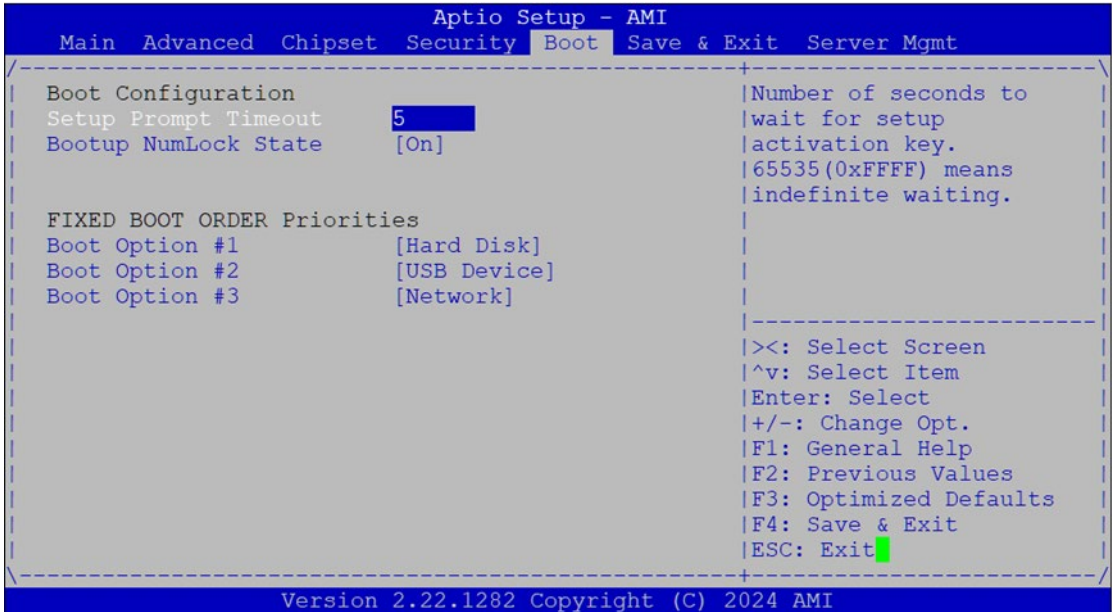


Feature	Options	Description
Factory Key Provision	Disabled Enabled	Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode
Restore Factory Keys	None	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	None	Delete all Secure Boot key databases from NVRAM
Export Secure Boot variables	None	Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device
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)



# Boot Menu

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

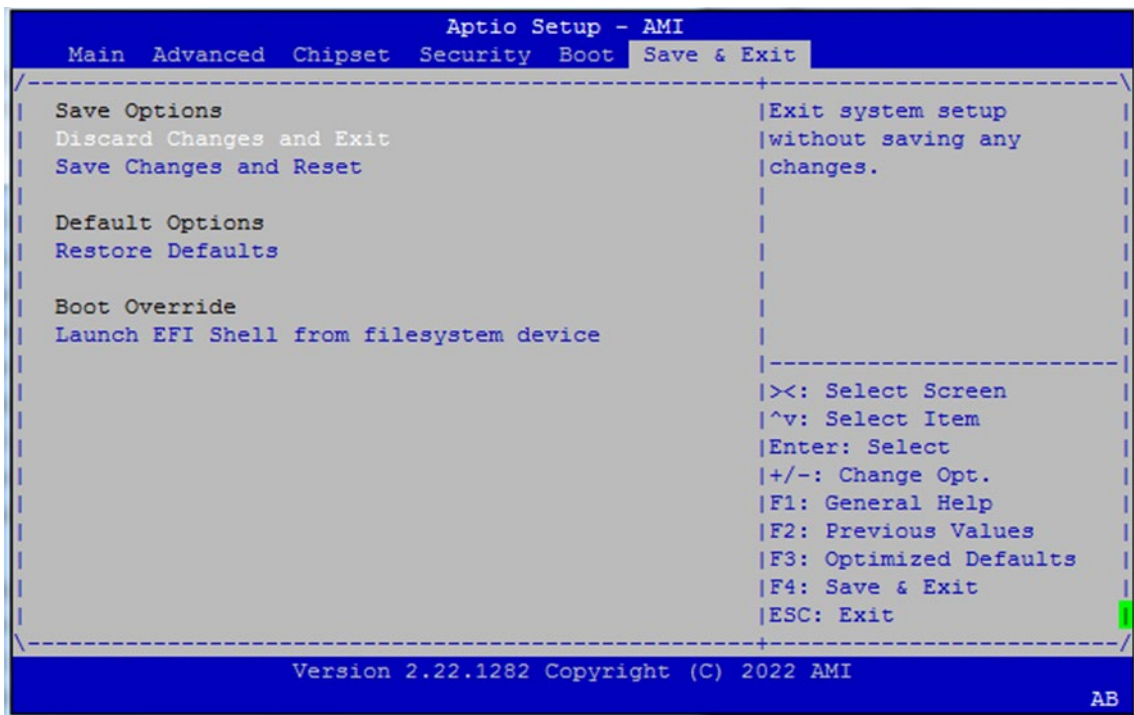


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state

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

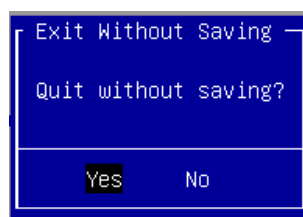
## Save and Exit Menu

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



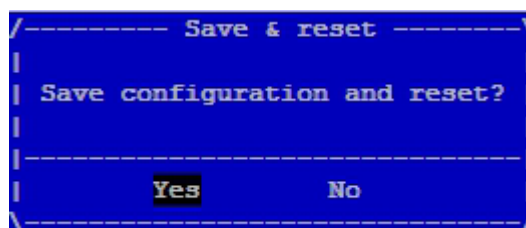
### Discard Changes and Exit

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



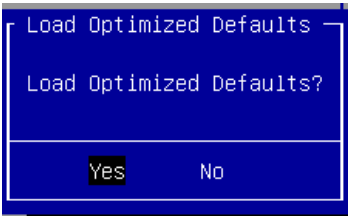
### Save Changes and Reset

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



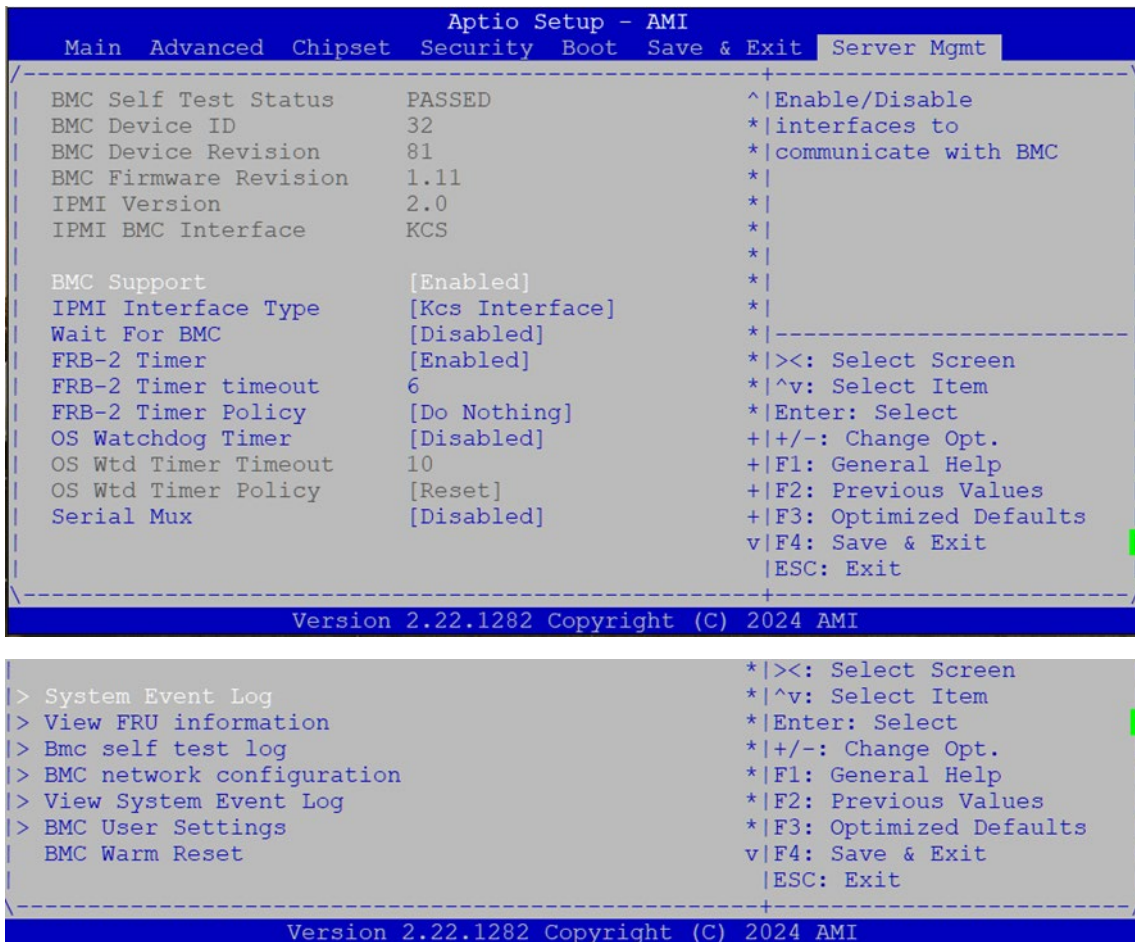
**Restore Defaults**

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



Note: The items under Boot Override will depend on the actual devices connected to the system.

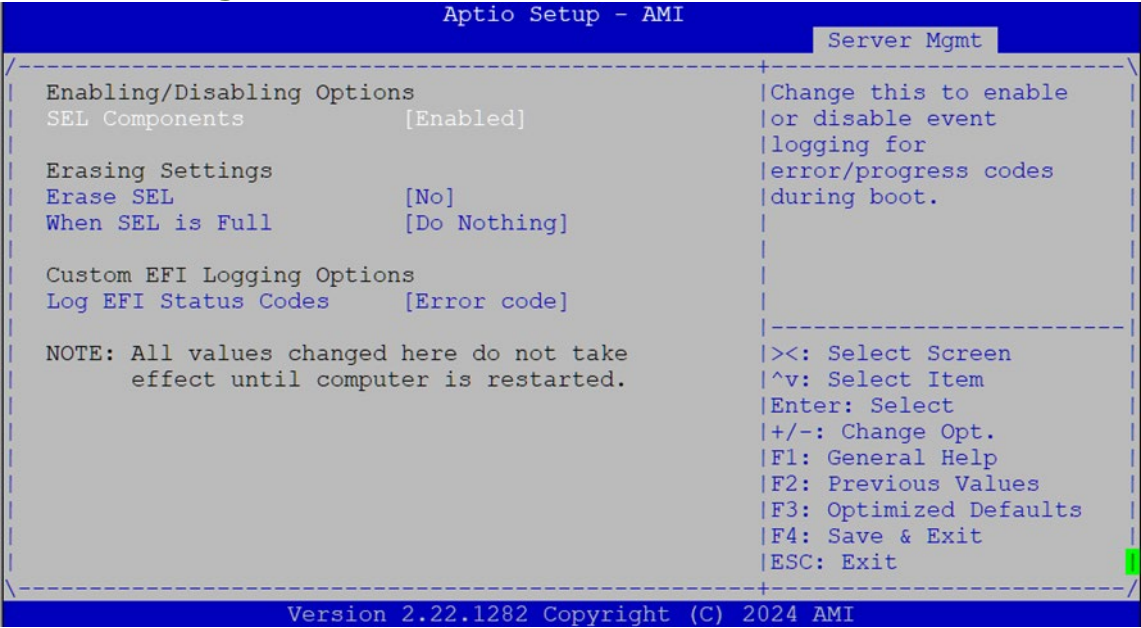
## Server Mgmt (B SKU Only)



Feature	Options	Description
BMC Support	Enabled Disabled	Enable/Disable interfaces to communicate with BMC
IPMI Interface Type	Kcs Interface Bt Interface	Type of Interface to communicate BMC from HOST
Wait For BMC	Enabled Disabled	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.
FRB-2 Timer	Enabled Disabled	Enable or Disable FRB-2 timer (POST timer)
FRB-2 Timer timeout	6	Enter value Between 1 to 30 min for FRB-2 Timer Expiration
FRB-2 Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.
OS Watchdog Timer	Enabled	If enabled, starts a BIOS timer which can only be shut off by

	Disabled	Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.
OS Wtd Timer Timeout	10	Enter the value Between 1 to 30 min for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.
OS Wtd Timer Policy	Do Nothing Reset Power Down Power Cycle	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.
Serial Mux	Enabled Disabled	Press <Enter> to enable or disable Serial Mux configuration.

System Event Log



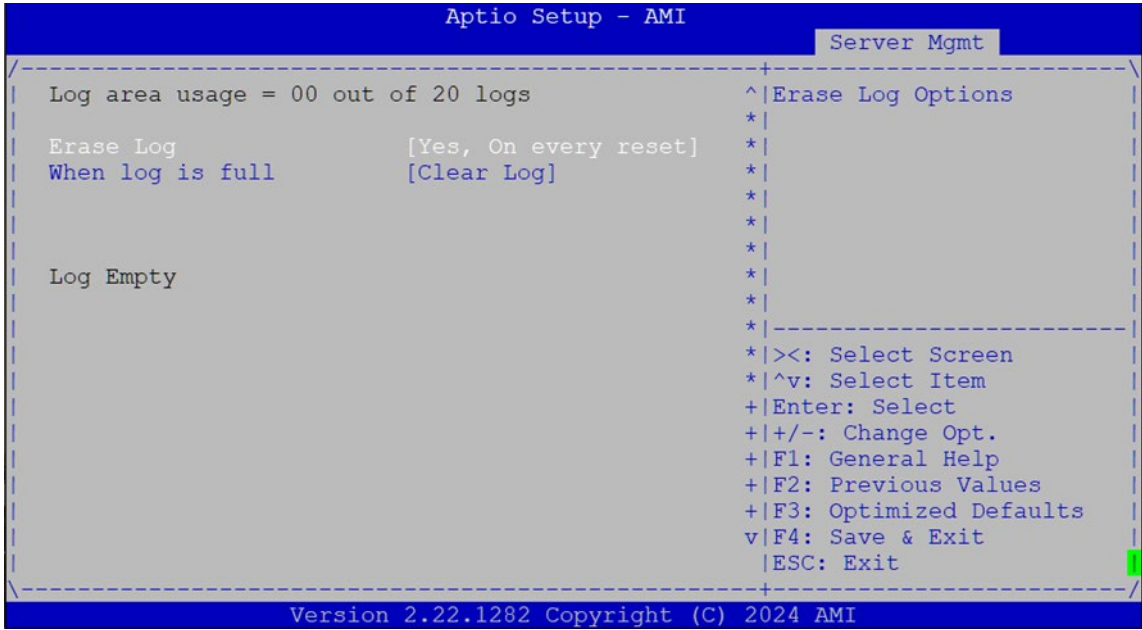
Feature	Options	Description
SEL Components	Disabled Enabled	Change this to enable or disable event logging for error/progress codes during boot.
Erase SEL	No Yes, On next reset Yes, On every reset	Choose options for erasing SEL.
When SEL is Full	Do Nothing Erase Immediately Delete Oldest Record	Choose options for reactions to a full SEL.
Log EFI Status Codes	Disabled Both Error code Progress code	Disable the logging of EFI Status Codes or log only error code or only progress code or both.

## View FRU Information

Aptio Setup - AMI		Server Mgmt
FRU Information		^
		*
System Manufacturer	To be filled by O.E.M.	*
System Product Name	To be filled by O.E.M.	*
System Version	To be filled by O.E.M.	*
System Serial Number	To be filled by O.E.M.	*
Board Manufacturer	To be filled by O.E.M.	*
Board Product Name	To be filled by O.E.M.	*
Board Part Number	To be filled by O.E.M.	*
Board Serial Number	To be filled by O.E.M.	*
Chassis Manufacturer	To be filled by O.E.M.	*
Chassis Part Number	To be filled by O.E.M.	*
Chassis Serial Number	To be filled by O.E.M.	*
SDR Version	1.5	*
System UUID	673444AC-BFDE-1000-01CA-0007CF0B9000	*
NOTE: No FRU information for fields indicate		v
		ESC: Exit
><: Select Screen ^v: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit		
Version 2.22.1282 Copyright (C) 2024 AMI		



BMC Self-Test Log



Feature	Options	Description
Erase Log	Yes, On every reset No	Erase Log Options
When log is full	Clear Log Do not log any more	Select the action to be taken when log is full

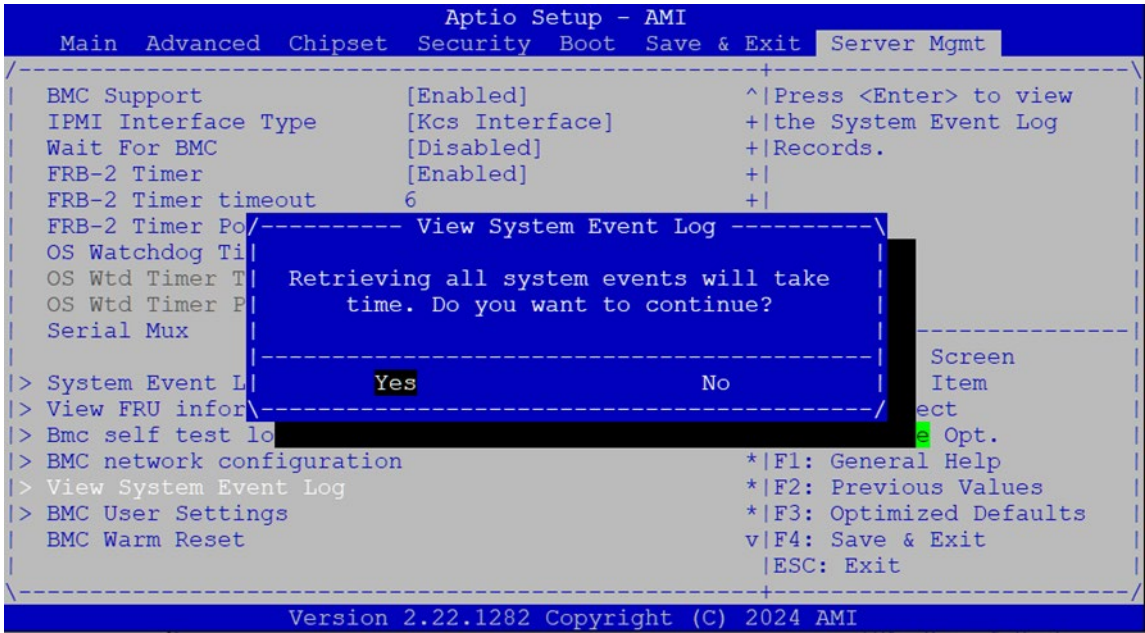
BMC Network Configuration

Aptio Setup - AMI		Server Mgmt
Lan channel 1		^ Select to configure LAN ^
Configuration Address	[Unspecified]	+ channel parameters *
source		+ statically or *
Current Configuration	StaticAddress	* dynamically(by BIOS or *
Address source		* BMC). Unspecified *
Station IP address	192.168.0.100	* option will not modify *
Subnet mask	255.255.255.0	* any BMC network +
Station MAC address	00-90-0B-CF-07-00	* parameters during BIOS v
Router IP address	0.0.0.0	*
Router MAC address	00-00-00-00-00-00	*
Lan channel 2		+ ><: Select Screen
Configuration Address	[Unspecified]	+ ^v: Select Item
source		+ Enter: Select
Current Configuration	Unspecified	+ +/-: Change Opt.
Address source		+ F1: General Help
Station IP address	0.0.0.0	+ F2: Previous Values
Subnet mask	0.0.0.0	+ F3: Optimized Defaults
		v F4: Save & Exit
		ESC: Exit
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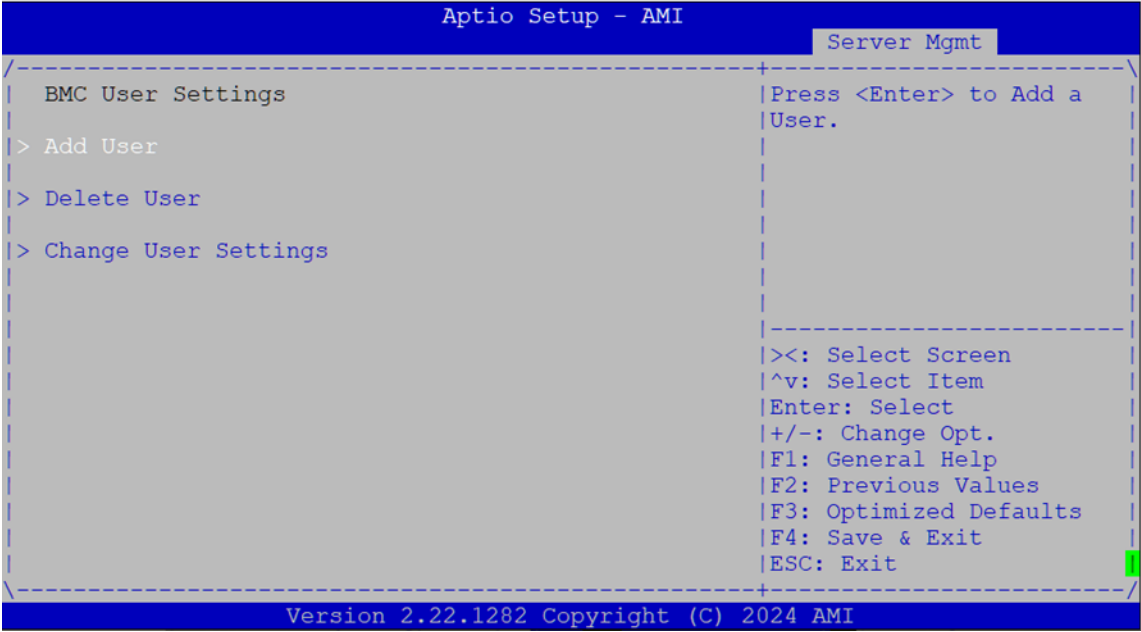
Aptio Setup - AMI		Server Mgmt
Router IP address		^ Enable or Disable LAN1
Router MAC address	0.0.0.0	+ IPv6 Support
		+
*****		+
Configure IPv6 support		+
*****		+
		+
Lan channel 1		+
		+
IPv6 Support	[Disabled]	+
		+ -----
IPV6 Support is Disabled		* ><: Select Screen
		* ^v: Select Item
Lan channel 2		* Enter: Select
		* +/-: Change Opt. *
IPv6 Support	[Disabled]	* F1: General Help
		* F2: Previous Values
IPV6 Support is Disabled		* F3: Optimized Defaults
		v F4: Save & Exit
		ESC: Exit
Version 2.22.1282 Copyright (C) 2024 AMI		

Feature	Options	Description
Configuration Address source	Unspecified Static DynamicBmcDhcp	Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC). Unspecified
IPv6 Support	Enabled Disabled	Enable or Disable LAN IPv6 Support

View System Event Log

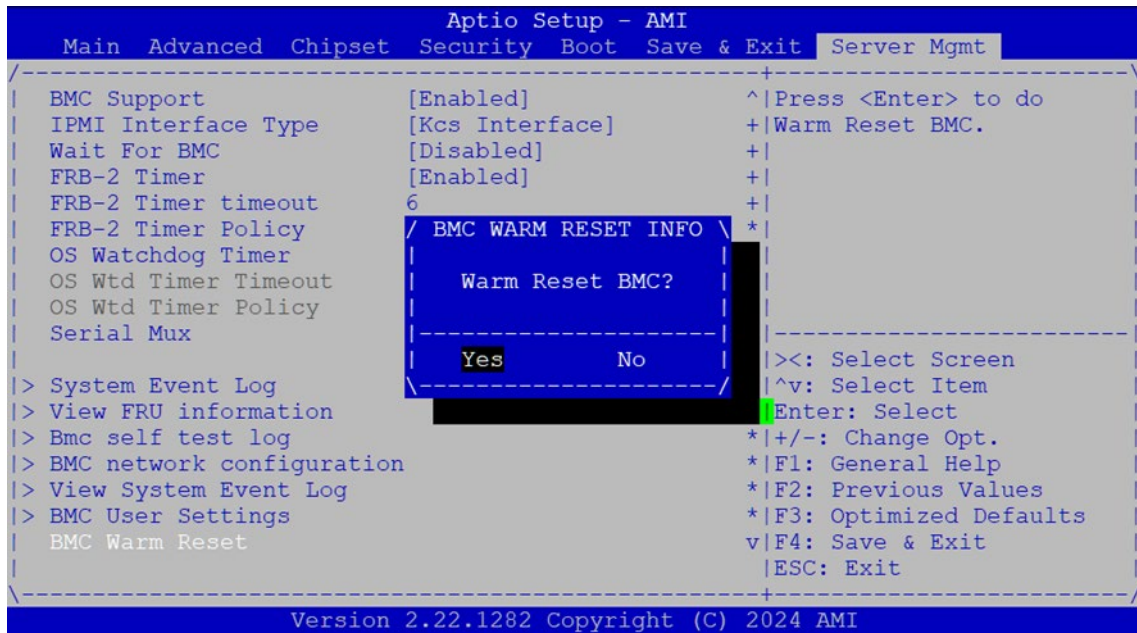


BMC User Setting



Feature	Options	Description
Add User	N/A	Press <Enter> to Add a User.
Delete User	N/A	Press <Enter> to Delete a User.
Change User Settings	N/A	Press <Enter> to Change User Settings.

## BMC Warm Reset



# APPENDIX A: 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.

<b>RMA No:</b>		Reasons to Return: <input type="checkbox"/> Repair(Please include failure details)	
		<input type="checkbox"/> Testing Purpose	
Company:		Contact Person:	
Phone No.		Purchased Date:	
Fax No.:		Applied Date:	
Return Shipping Address: _____			
Shipping by: <input type="checkbox"/> Air Freight <input type="checkbox"/> Sea <input type="checkbox"/> Express _____			
<input type="checkbox"/> Others: _____			
<b>Item</b>	<b>Model Name</b>	<b>Serial Number</b>	<b>Configuration</b>

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***

***Confirmed By Supplier***

\_\_\_\_\_  
Authorized Signature / Date

\_\_\_\_\_  
Authorized Signature / Date