



Network Appliance Platform

Hardware Platforms for Network Computing

LUNA-D125 User Manual

Version:1.4

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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:



Note: This mark indicates that there is a note of interest and is something that you should pay special attention to while using the product.



Warning: This mark indicates that there is a caution or warning and it is something that could damage your property or product.

Online Resources

The listed websites are links to the online product information and technical support.

Resources	URL
Lanner	http://www.lannerinc.com
Product Resource	http://www.lannerinc.com/download-center
RMA	http://eRMA.lannerinc.com

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Compliances and Certification

FCC Class A Certification

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.

Notice

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

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 trained electrician or only by an electrically trained 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.

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).

Mounting Installation Precaution

Environment:

- ▶ 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 (T_{ma}) 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 air flow 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:

- ▶ 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.

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.
- ▶ La machine ne peut être utilisée qu'à un lieu fixe comme en laboratoire, salle d'ordinateurs ou salle de classe.

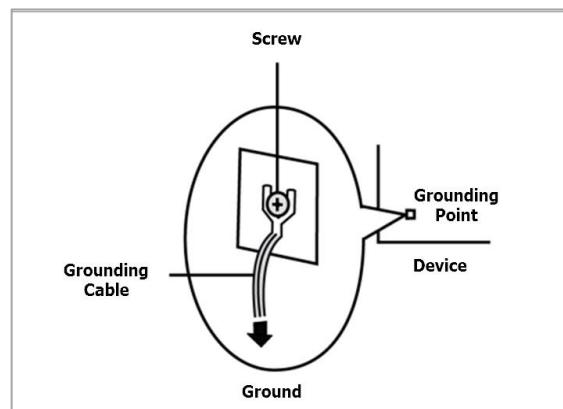
Sécurité de fonctionnement

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).

Grounding Procedure for DC Power Source

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

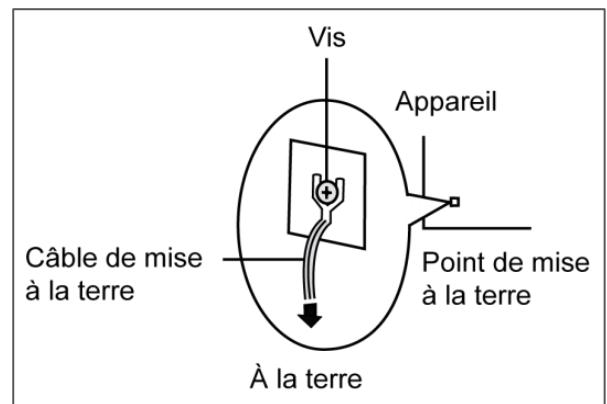


Electrical Safety Instructions

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

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

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



Consignes de sécurité électrique

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



CAUTION: TO DISCONNECT POWER, REMOVE ALL POWER CORDS FROM UNIT.

注意：要断开电源，请将所有电源线从本机上拔下。

WARNING: Wenn Sie das Gerät zwecks Wartungsarbeiten vom Netz trennen müssen, müssen Sie beide Netzteile abnehmen.

ATTENTION: DÉBRANCHER TOUS LES CORDONS D'ALIMENTATION POUR DÉCONNECTER L'UNITÉ DU SECTEUR.

This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.

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, such as labs or computer facilities with the proper authorization.

Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

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CHAPTER 1: PRODUCT OVERVIEW

LUNA-D125 series is an Intel Rangeley (ATOM) based system desktop platform, based on 2-Core CPU with 4x GbE ports. This system is targeted at low cost desktop with ECC DDR3L Memory support.

Package Content

- ▶ Your package contains the following items:
- ▶ 1x LUNA-D125 Network Security Platform
- ▶ 1x Power cord
- ▶ 1x 36W power adaptor
- ▶ 1x Nameplate
- ▶ 4x Rubber foot



Ordering Information

SKU No.	Main Features
LUNA-D125A	Intel® Atom® C2316, 4x GbE, Intel® QuickAssist Technology



Note: If any component should be missing or damaged, please contact your dealer immediately for assistance.

Optional Accessories

Model Name	Description
mini-PCIe Wifi Kit	1x mini-PCIe card + 2x Antennas + Accessories
M.2 3042 (B key) LTE Kit	1x M.2 card + 2x Antennas + Accessories
Rackmount Kit	2x Mounting Ears + Accessories
Adapter holder Kit	1x Adapter Holder Bracket

System Specifications

Form Factor	Desktop	
Platform	Processor Options	Intel® Atom® C2316 (Rangeley)
	CPU Socket	Onboard
	Chipset	SoC
		Intel® QuickAssist Technology
BIOS	AMI SPI Flash BIOS	
System Memory	Technology	DDR3L 1333MHz non-ECC SODIMM
	Max. Capacity	16 GB
	Socket	1x 204-pin SODIMM
Networking	Ethernet Ports	4x GbE RJ45
	Bypass	N/A
	NIC Module Slot	N/A
LOM	IO Interface	N/A
	OPMA slot	N/A
I/O Interface	Reset Button	1
	LED	Power/Status/Storage 2x LED per GbE ports
	Power Button	1
	Console	1x RJ45
	USB	2x USB 2.0
	LCD Module	N/A
	Display	N/A
	Power input	1x DC Jack
	HDD/SSD Support	N/A
	Onboard Slots	8GB onboard storage, 1 x M.2 2242 (SATAIII)
Expansion	mini-PCIe	1x mini PCIe Connector (Support PCIe x1 signal)
	M.2	1x M.2 2242 B key socket (SATAIII signal) 1x M.2 3042 B key socket (PCIE/USB2.0/UIM)
	SIM card Slot	1x Nano SIM Card Connector for one of the 3042 M.2 slots
	Antenna hole	4x Antenna hole
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Infineon SLB9665
Cooling	Processor	Thermal Pad
	System	Fanless
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~ 95% Non-Operating
System Dimensions	(WxDxH)	185 x 44 x 137 mm
	Weight	1.0 kg
Package Dimensions	(WxDxH)	290 x 196 x 106 mm
	Weight	1.3 kg
Power	Type/Watts	12V 3A 36W Power Adapter
	Input	AC 100~240V @47~63 Hz
Approvals and Compliance		RoHS, CE, FCC Class B, UL

Front Panel

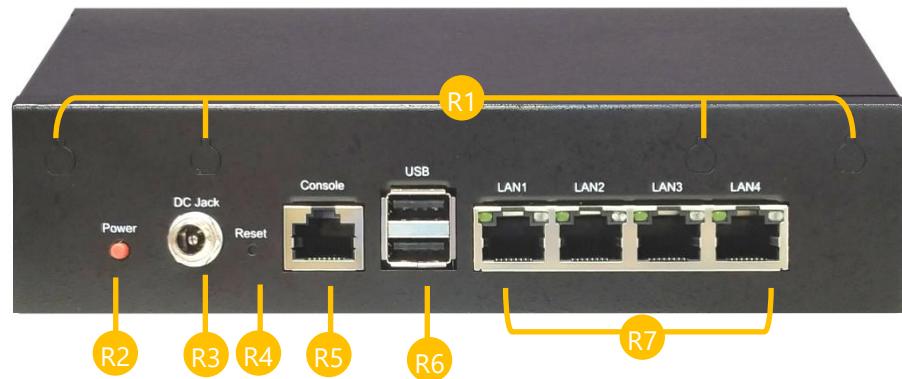


No.	Description	
F1	SIM Slot	For 1x Nano SIM card
F2	Data Connection LED Indicators	 Data Speed Data Link
F3	System LED Indicators	 System Power System Status HDD Activity



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

Rear Panel

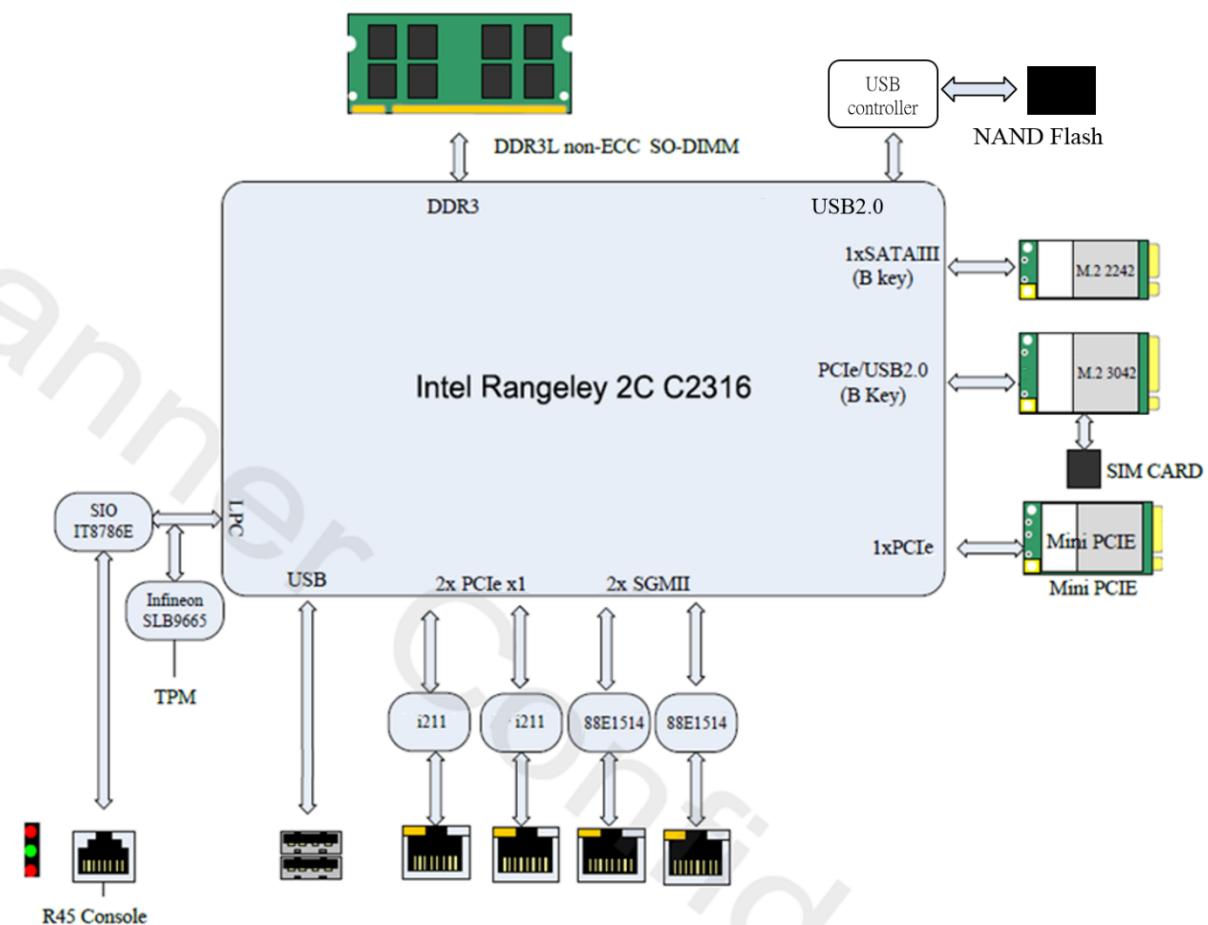


No.	Description	
R1	Antenna Port	4x Antennas (from left to right LTE→ Wi-fi→ Wi-fi→ LTE)
R2	Power Button	Push to power on/off the system
R3	DC-in Jack	For power supply
R4	Reset Button	Software control by GPIO
R5	Console Port	1x RJ45 console port
R6	USB Ports	2x USB 2.0 port
R7	GbE Ports	4x RJ45 port with LED (LAN1 for PXE Boot)

CHAPTER 2: MOTHERBOARD INFORMATION

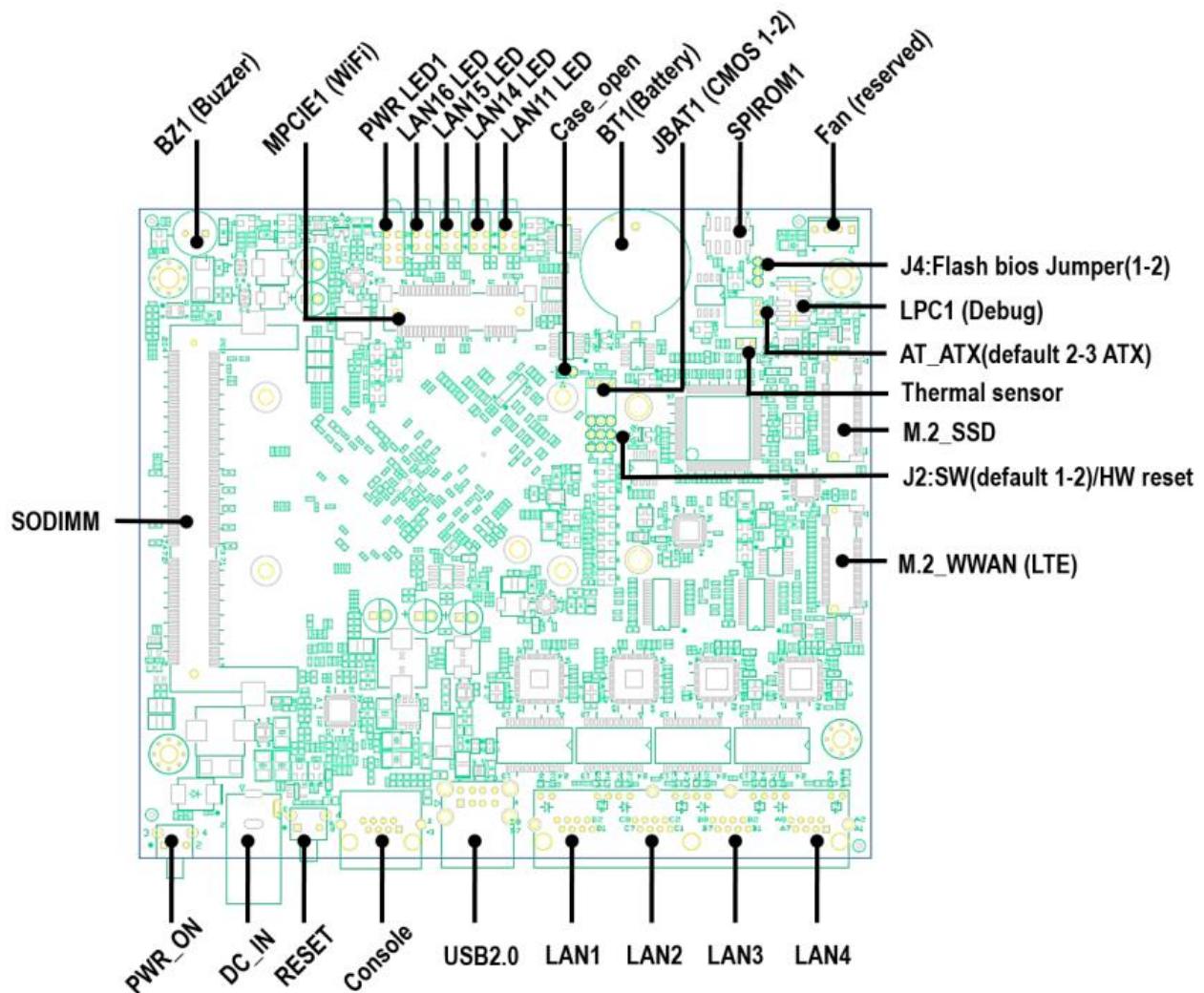
Block Diagram

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



Motherboard Layout

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



Internal Jumper & Connectors

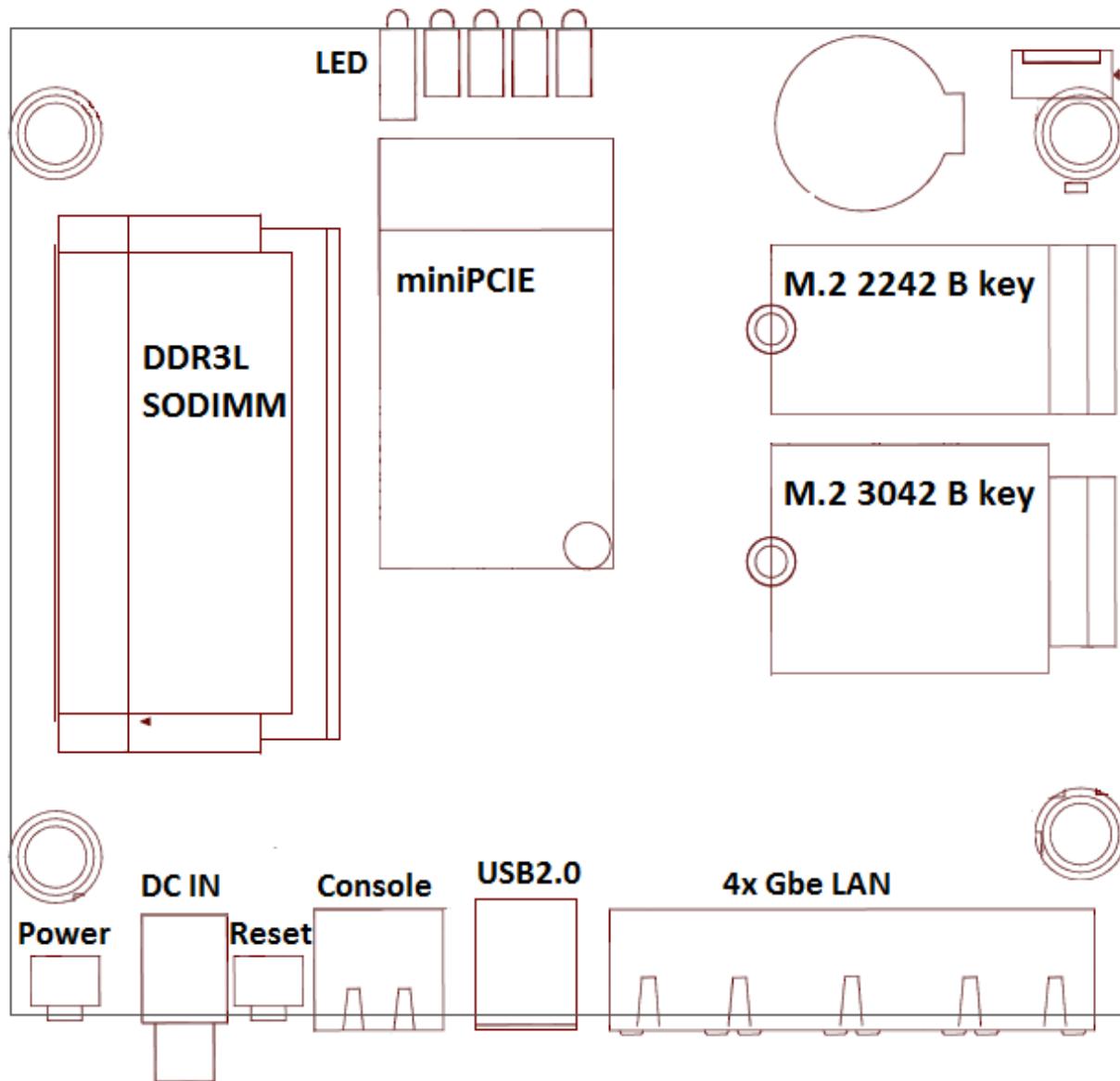
Jumper/Connector	Description					
LAN1~LAN4	RJ45 GbE ports					
USB1	Standard USB2.0 Type-A Connector					
COM1	RJ45 Console Debug Port					
DC_IN1	DC2.5V power supply					
DIMM1	DDR3L 204-pin SO-DIMM Slot					
BZ1	Buzzer					
MPCIE1	Mini-PCIe Slot					
SIM1	Nano SIM Slot					
M.2_SSD	M.2 2242 B-Key Socket, supporting SATA III signal for SSD module.					
M.2_WWAN	M.2 3042 B-Key Socket, supporting PCIe x 1 and USB2.0 signal with a SIM card for the 4G module.					
BT1	3.3V RTC battery holder					
CPU_FAN1	Reserved 4-pin system fan connector					
LED1	System LED indicator					
LED11,14,15,16	LAN_LED RJ45 Port data transmission status					
SW2	Power button					
SW1	Reset button					
SPIROM1	Reserved BIOS Debug port					
LPC1	Reserved LPC Debug port					
CSAE_OPEN	Case-open pin header					
JBAT1	Clear CMOS Jumper					
	<table border="1"> <thead> <tr> <th>Setting</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1-2 </td> <td>Normal (Default)</td> </tr> <tr> <td>2-3 </td> <td>Clear CMOS</td> </tr> </tbody> </table>	Setting	Mode	1-2	Normal (Default)	2-3
Setting	Mode					
1-2	Normal (Default)					
2-3	Clear CMOS					
AT_ATX	Configures the automatic power-on function					
	<table border="1"> <thead> <tr> <th>Setting</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1-2 </td> <td>Auto power-on (AT)</td> </tr> <tr> <td>2-3 </td> <td>Normal (ATX_default)</td> </tr> </tbody> </table>	Setting	Mode	1-2	Auto power-on (AT)	2-3
Setting	Mode					
1-2	Auto power-on (AT)					
2-3	Normal (ATX_default)					
J2	Hardware/Software Reset Jumper					
	<table border="1"> <thead> <tr> <th>Setting</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1-2 </td> <td>SW Reset (Default)</td> </tr> <tr> <td>2-3 </td> <td>HW Reset</td> </tr> </tbody> </table>	Setting	Mode	1-2	SW Reset (Default)	2-3
Setting	Mode					
1-2	SW Reset (Default)					
2-3	HW Reset					
J4	Flash BIOS ROM selection jumper					
	<table border="1"> <thead> <tr> <th>Pin</th> <th>Mode</th> </tr> </thead> <tbody> <tr> <td>1-2 </td> <td>Normal mode (Default)</td> </tr> <tr> <td>2-3 </td> <td>Flash. Bios mode</td> </tr> </tbody> </table>	Pin	Mode	1-2	Normal mode (Default)	2-3
Pin	Mode					
1-2	Normal mode (Default)					
2-3	Flash. Bios mode					

Pin Definitions

JP/CN	pin#	Signal	Remark
SPIROM1	1	SPI HOLD0 L	
	2	Dummy net	
	3	SPI AVN CS0 J N	
	4	V 3P3 SPI	
	5	PMU AVN SPI MIS	
	6	Dummy net	
	7	Dummy net	
	8	PMU AVN SPI R C	
	9	GND	
	10	PMU AVN SPI R M	
JP/CN	pin#	Signal	Remark
J4	1-2	Normal mode	default jumper 1-2
	2-3	Flash bios mode	
JP/CN	pin#	Signal	Remark
AT_ATX	1-2	AT mode	default jumper 2-3
	2-3	ATX mode	
JP/CN	pin#	Signal	Remark
J2	1	RST_FP_BTN#_SIO	1-2: SW reset(default) 2-3: HW reset
	2	RST_FP_BTN#	
	3	RST_FP_BTN#_R_SO_C	
JP/CN	pin#	Signal	Remark
JBAT1	1		1-2: Normal (Default) 2-3: Clear CMOS
	2	AVN_RTEST_N	
	3	GND	

CHAPTER 3: HARDWARE SETUP

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



Opening the Chassis

1. Loosen the four screws (indicated in the photos) that fix this unit's side panels.



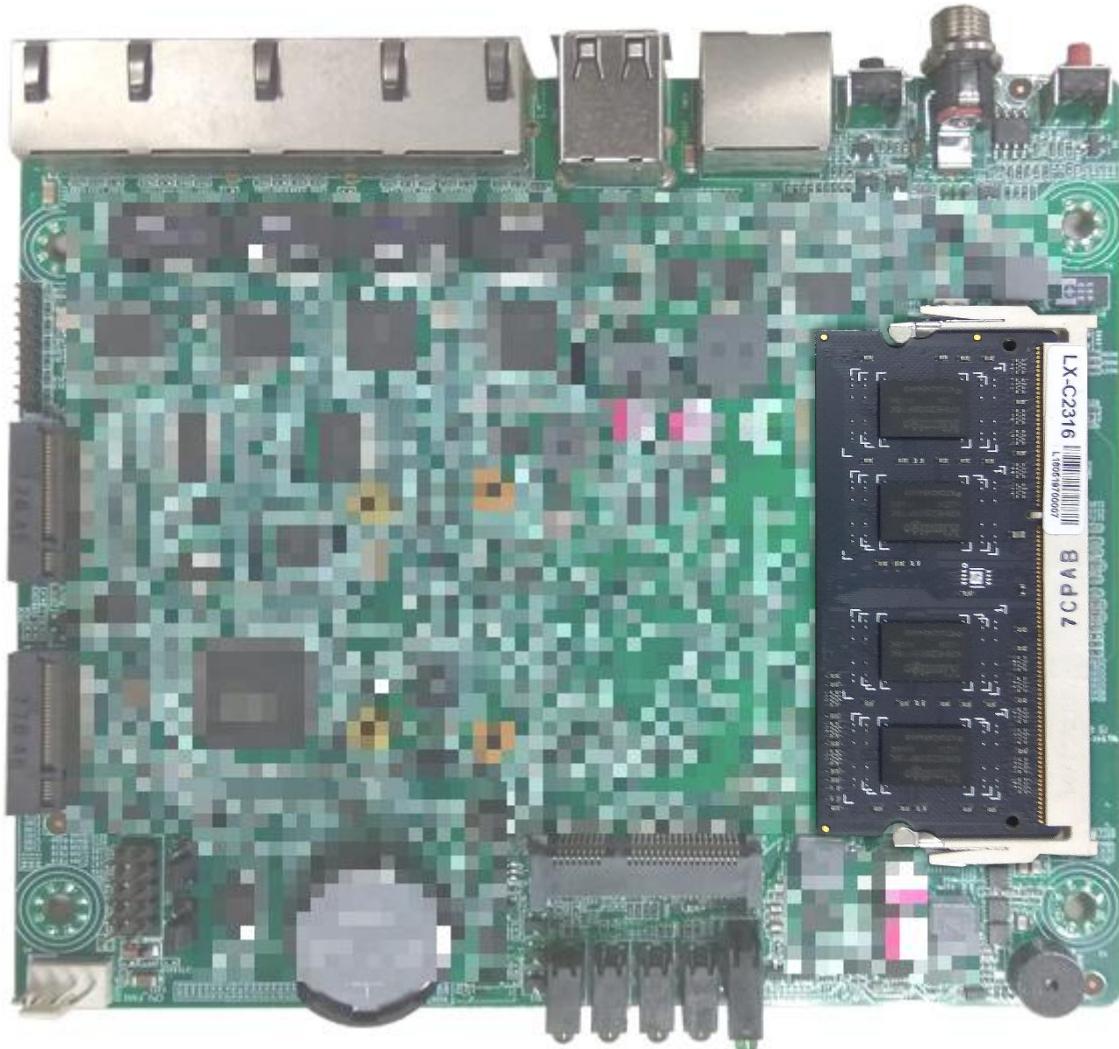
2. Loosen the screw that fixes the SIM Slot cover, and then pull open the bottom panel.



Replacing the System Memory

The motherboard supports DDR3L memory that features data transfer rates of 1333 MHz to meet the higher bandwidth requirements of the latest operating system and Internet applications. To replace the memory:

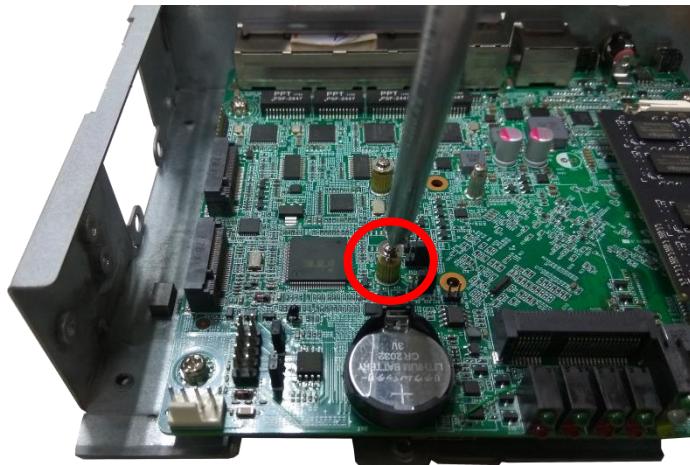
1. Open the DIMM slot latches.
2. Replace the default DIMM with a new one.



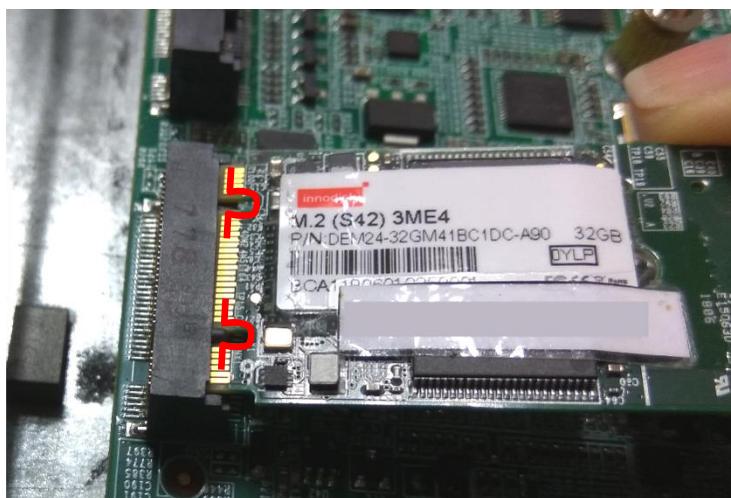
Note: The system requires DDR3L 1333 memory. Do not install memories with different specifications. The system can support up to 16 GB in maximum.

Installing M.2 Card (SSD)

1. Remove the screw located across from the slot.



2. Align the notches of the M.2 card with the socket keys in the slot. Tilt the end of the gold fingers down while carefully inserting the card into the slot.

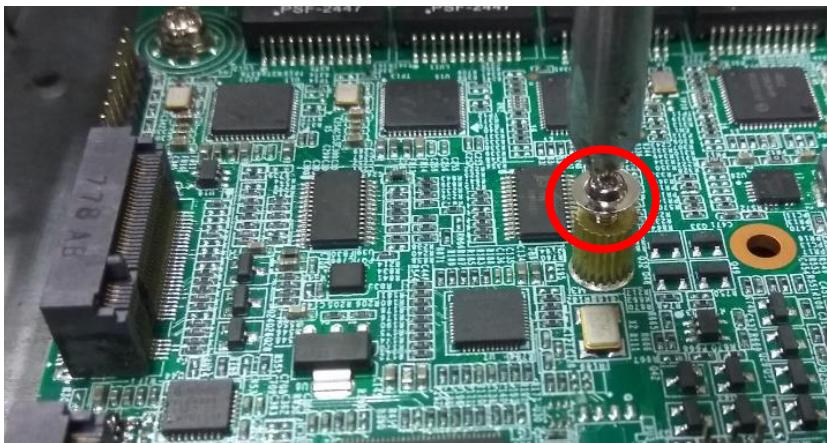


3. Secure the M.2 card with the screw you loosened earlier.

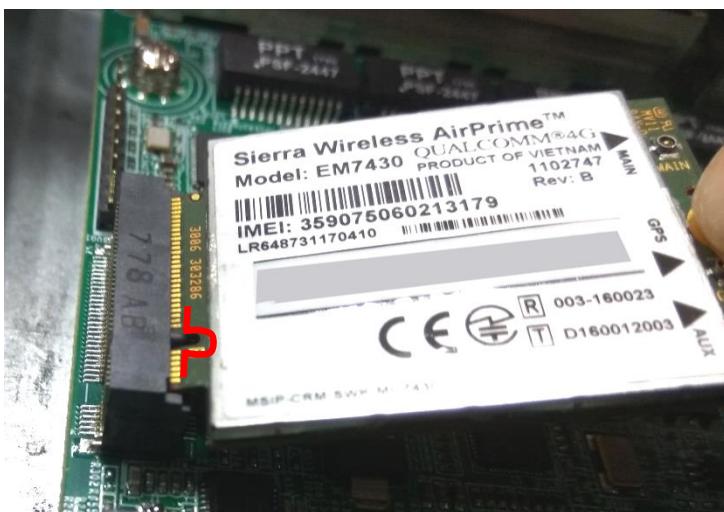


Installing LTE Kit (M.2 LTE Card with Antenna)

1. Remove the screw located across from the slot.



2. Align the notch of the M.2 card with the socket key in the slot. Tilt the end of the gold fingers down while carefully inserting the card into the slot.

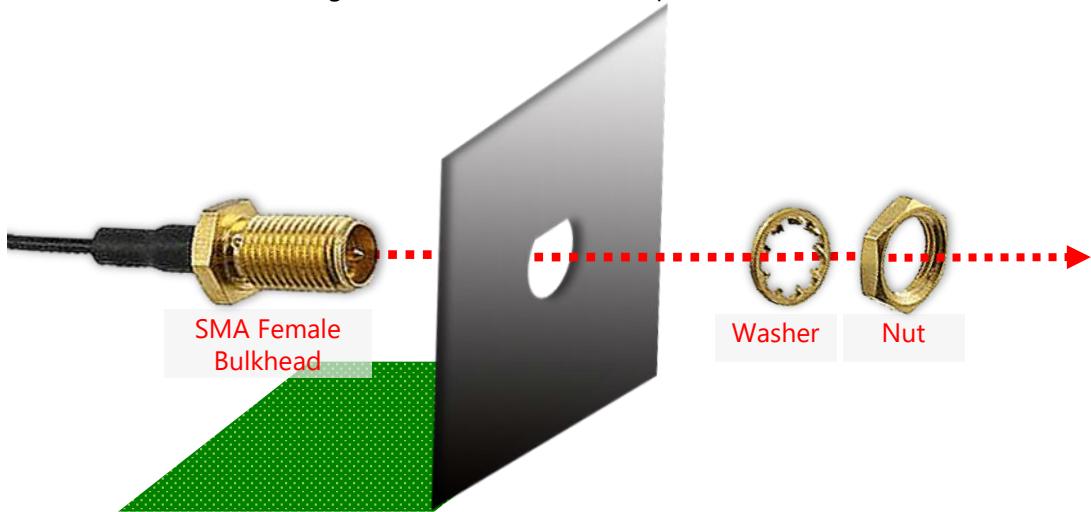


3. Fix the card with the screw you loosened earlier.



4. Assemble the LTE Antenna cables using the Lock Nut and Washer onto the front panel.

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



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

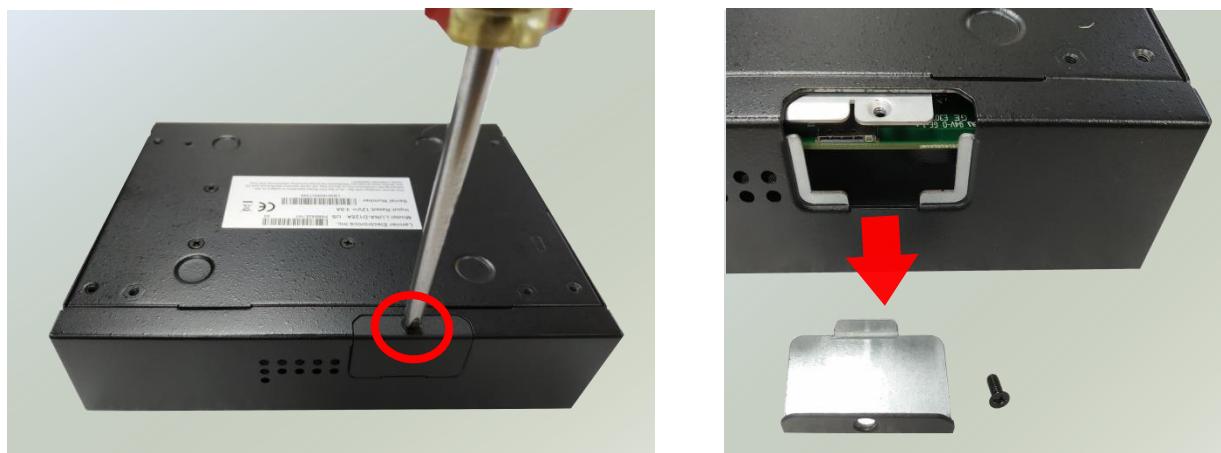


Warning: Do not use any tool other than an SMA Torque Wrench to fasten the Nut. For example, general pliers or tweezers without limited twisting force are very likely to cause the distortion of SMA connector.

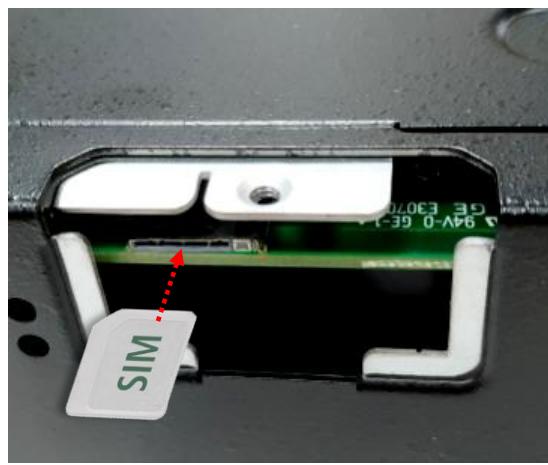
- (3) Snap one LTE antenna cable onto the U.FL connector for **MAIN**, and the other one onto the U.FL connector for **AUX**.



5. Flip over the system, and loosen the screw that fixes the slot cover.



- Push the SIM card all the way in until it clicks into place. Make sure the angled corner of the card is positioned as shown in this picture, with its gold contact facing down.



The SIM socket supports push-push mechanism, allowing the SIM card ejection to be as easy as one push. To remove the card, push the card with your fingertip or a paperclip to have it bounce out automatically.

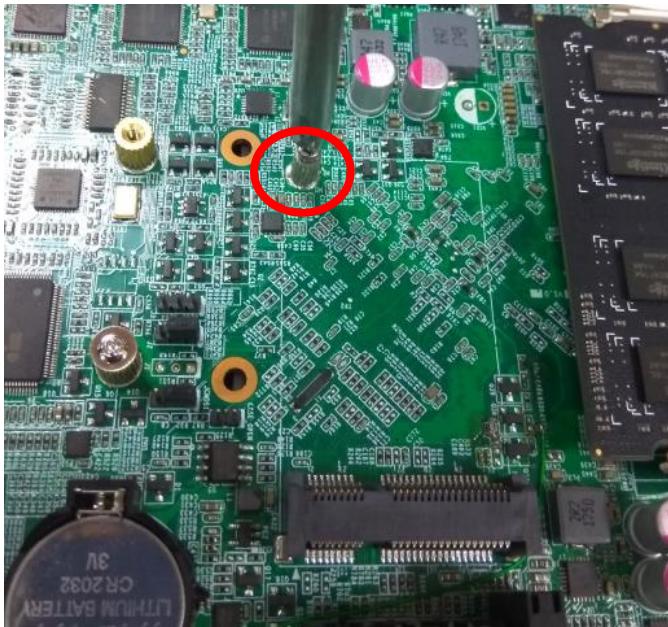


- Attach the LTE antennas onto the front panel. Make sure the antenna cables (Main and Aux) go through the right holes as indicated in the picture.



Installing Wi-Fi Kit (Mini PCIe Wi-Fi Card with Antenna)

1. Remove the screw located across from the slot.



2. Align the notch of the MPCle card with the socket key in the slot. Tilt the end of the gold fingers down while carefully inserting the card into the slot.



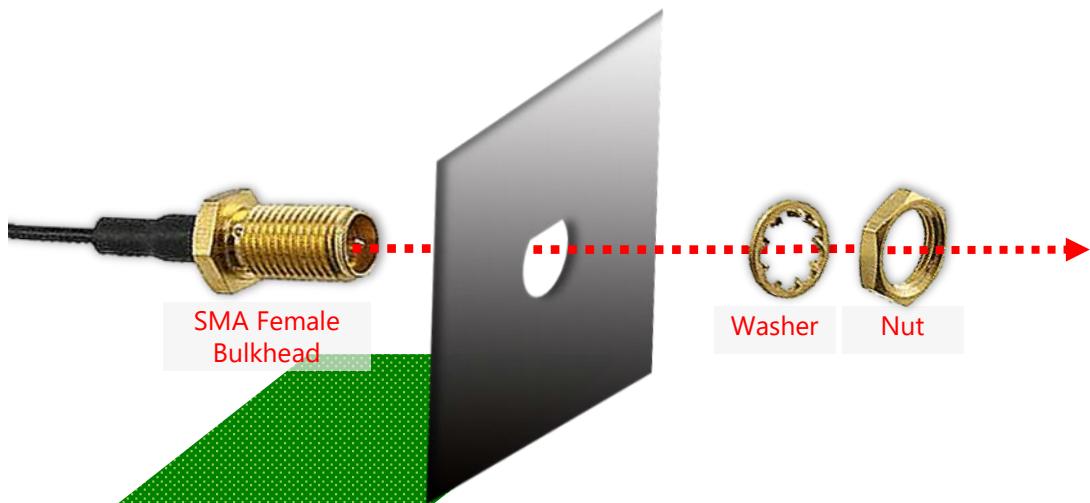
- Secure the Wi-Fi card with the screw you loosened earlier.



- Assemble the Wi-Fi Antenna cables using the Lock Nut and Washer onto the front panel.



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

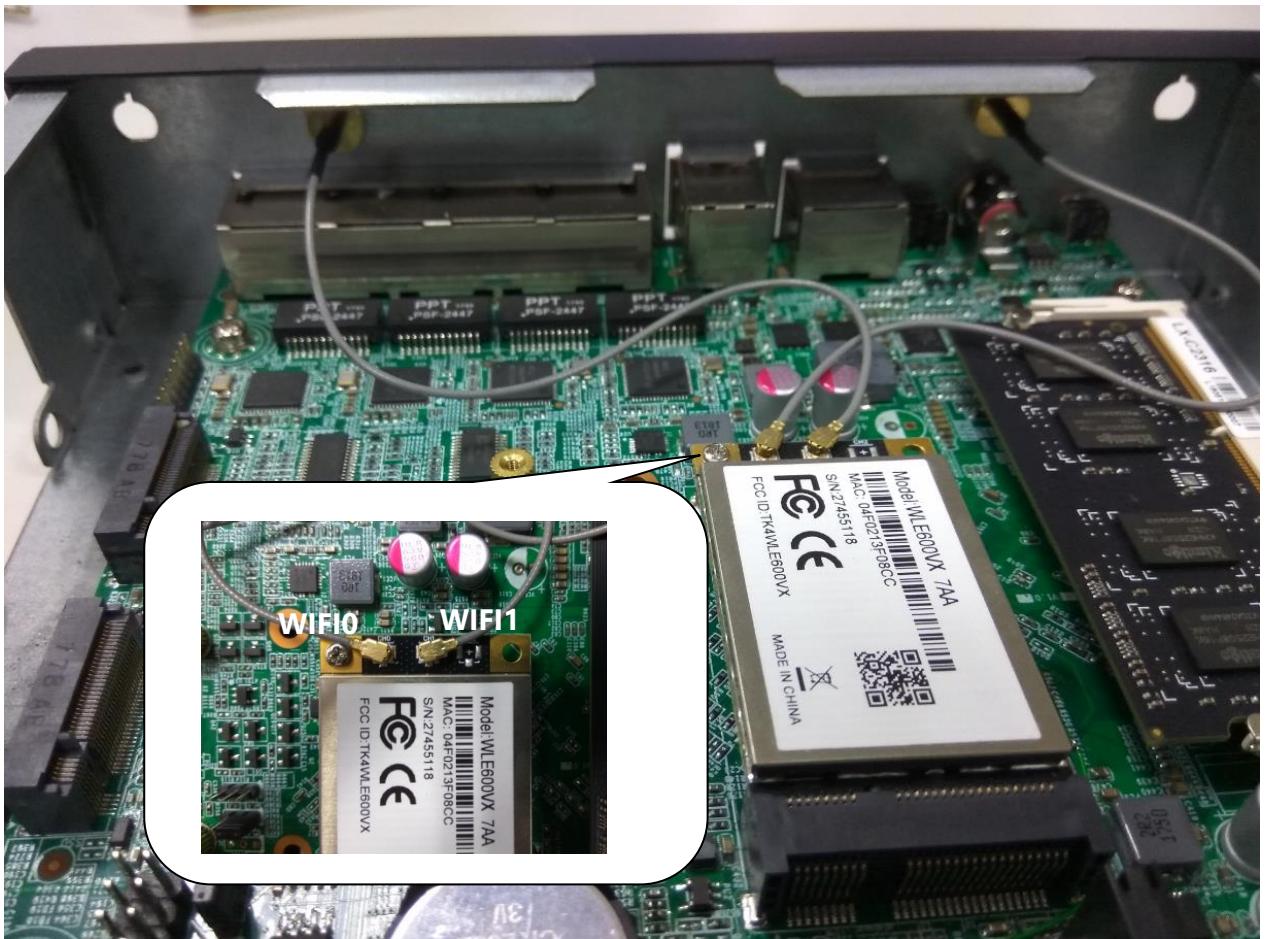


- (2) From outside the panel, attach the Washer and Nut, and tighten the Nut using an SMA Torque Wrench.



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

- (3) Snap one Wi-Fi antenna cable onto the U.FL connector for **WIFI0**, and the other one onto the U.FL connector for **WIFI1**.



5. Attach the WI-FI antennas onto the front panel. Make sure the antenna cables (WIFI0 and WIFI1) go through the right holes as indicated in the picture.



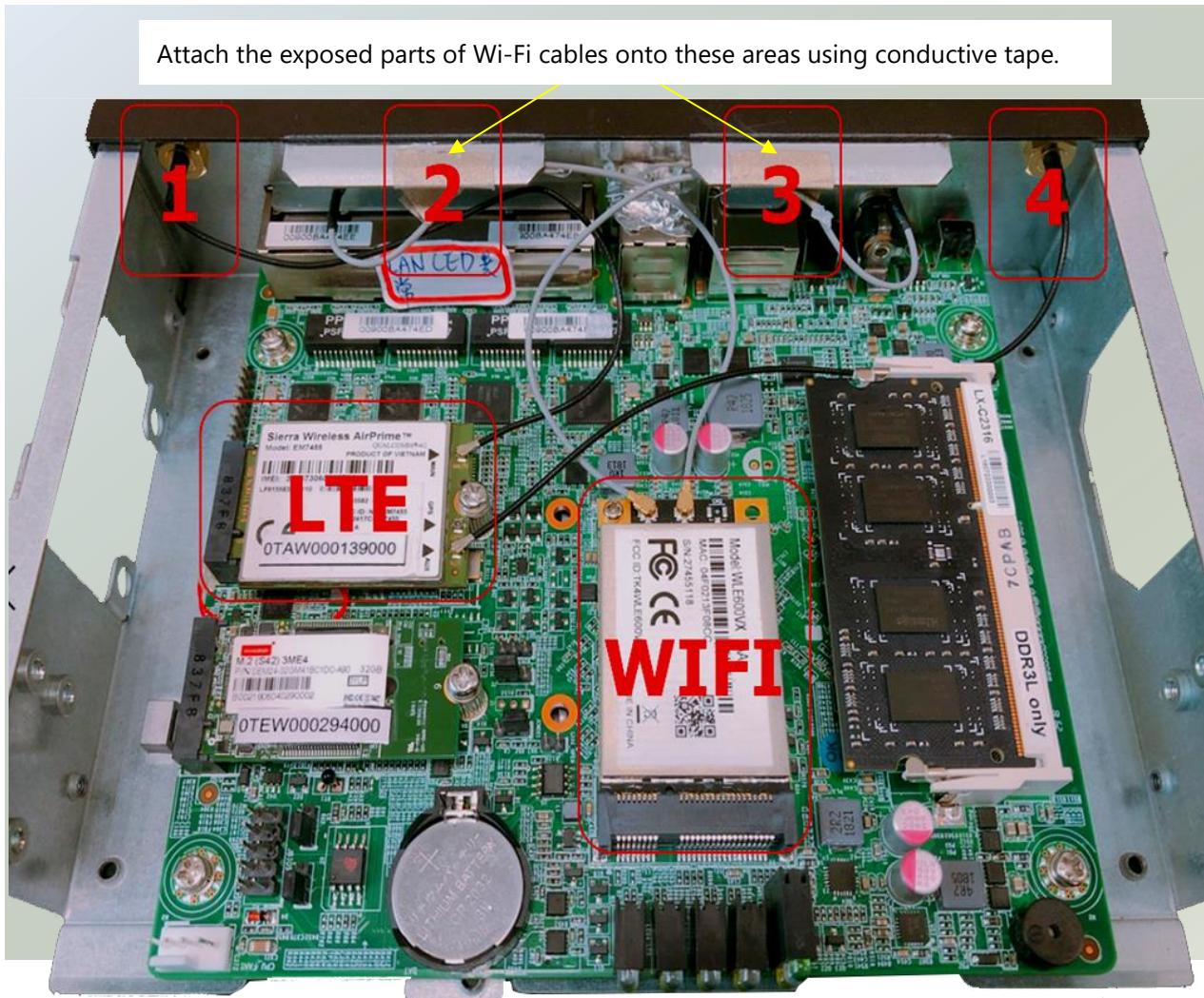
WiFi/LTE Cable Routing Example

Please make sure your Wi-Fi/LTE module is connected with the right antenna holes as shown in the picture.

Important Notice



Please avoid the exposed parts of stripped Wi-Fi cables from being in contact with the circuit board by fixing them onto the indicated areas (2 and 3) lest a short circuit should occur.



Antenna Hole	Connector
1	LTE Main
2	WIFI 0
3	WIFI 1
4	LTE Aux

Rackmount the System (with the Adapter Holder)

With the Rackmount Kit, this system can be fixed onto the rack post along with the system's power adapter. Please contact Lanner's sales representative for purchasing these kits.

What's in the Rackmount Kit

Check the kit contents for the following items:

- ▶ 1x pair of Ear Brackets
- ▶ Screws for the fixture of the ear brackets



What's in the Adapter Holder Kit

Check the kit contents for the following items:

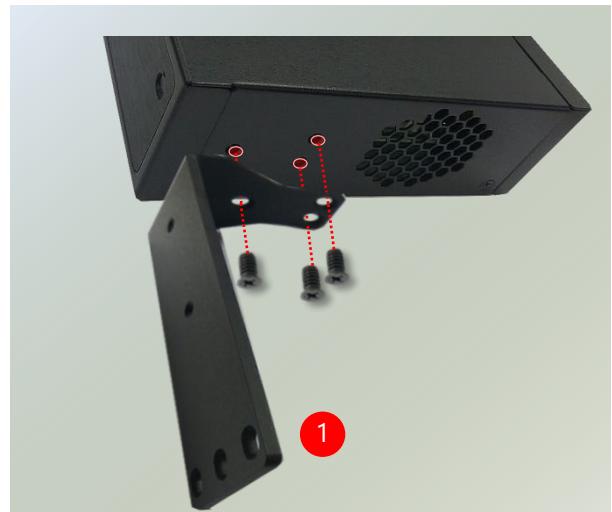
- ▶ 1x Adapter Holder
- ▶ 1x Adapter Bracket
- ▶ Screws for the fixture of the adapter holder and the adapter bracket.



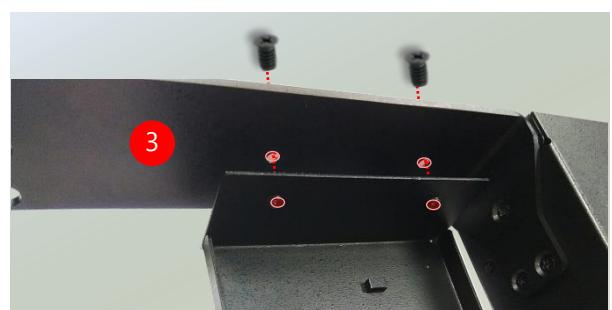
,

Attaching the Rackmount Assembly to the Chassis

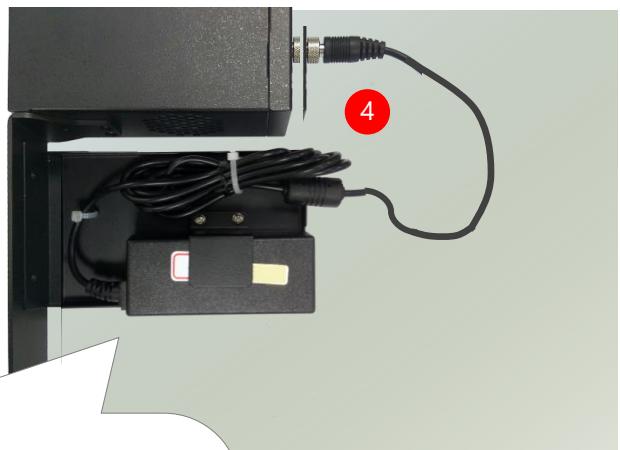
1. On one side of the system, align the ear bracket to the screw holes on the side panel and fix it using three screws.



2. Secure the other ear bracket to the other side of the system.



3. Fix the adapter holder to the left bracket using two screws.



4. Attach the power adapter's connector to the power supply jack on the rear panel and fasten the screw lock.

5. Secure the adapter with the adapter bracket using two screws.

6. Use the cable ties to fix the adapter's cable on the bracket.



Installing the System to the Rack

1. In the rack, install a shelf to support the system (recommended).
2. Hold the system with its front facing you, lift and carefully insert the system into the rack. Attach the brackets to the rail rack using screws and round-hole/square-hole retainer nuts.



CHAPTER 4: BIOS SETUP

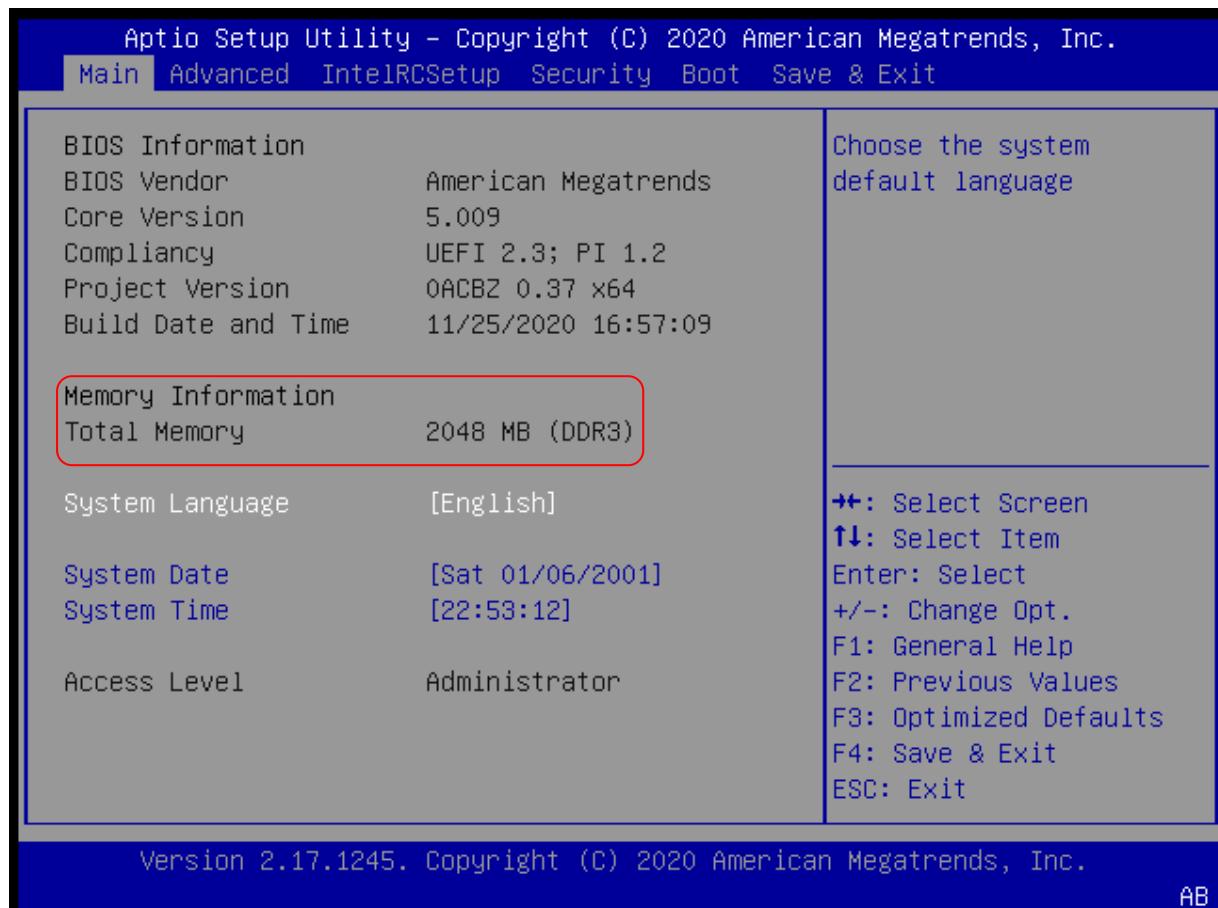
Main Setup

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

1. Boot up the system.
2. Pressing the **<Esc>** key immediately allows you to enter the Setup utility.

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

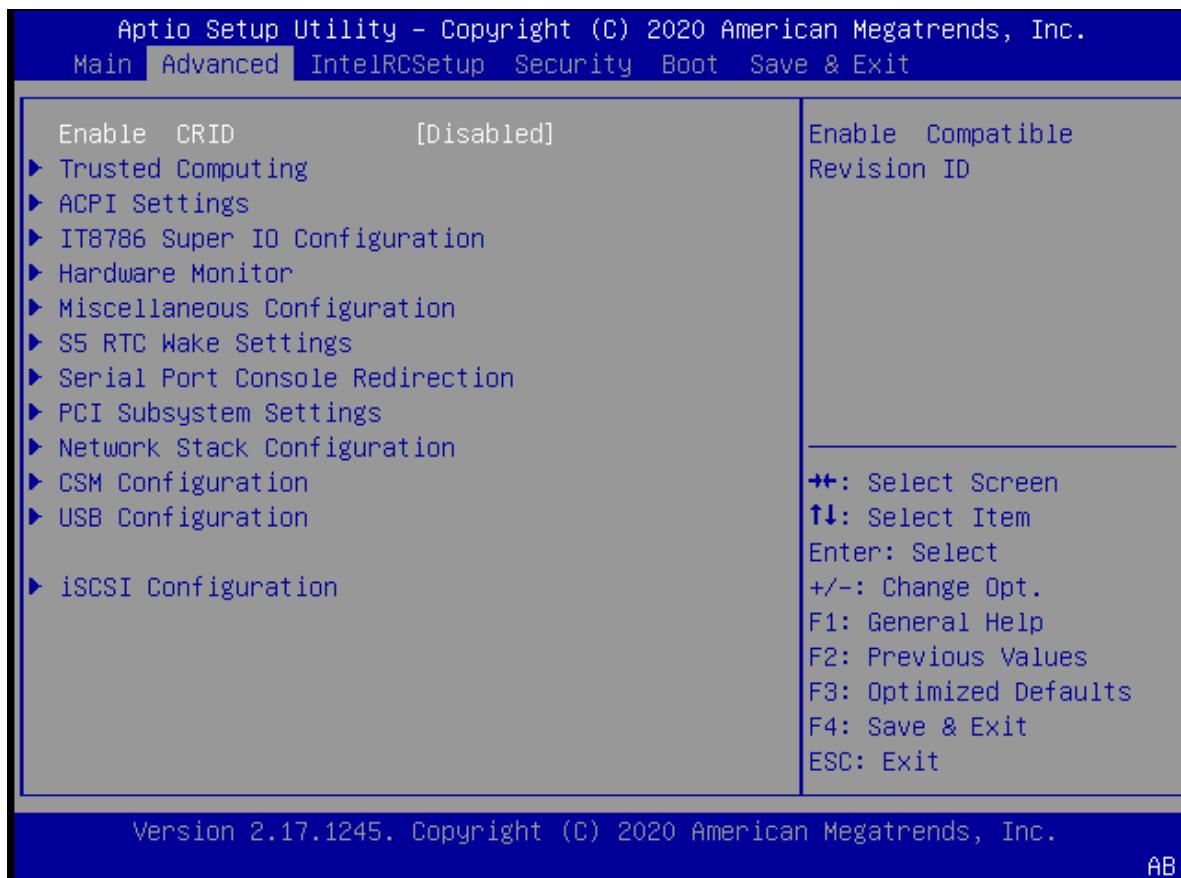
On **Main** Setup screen, you can configure the following two settings:



Item	Description
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 Setup

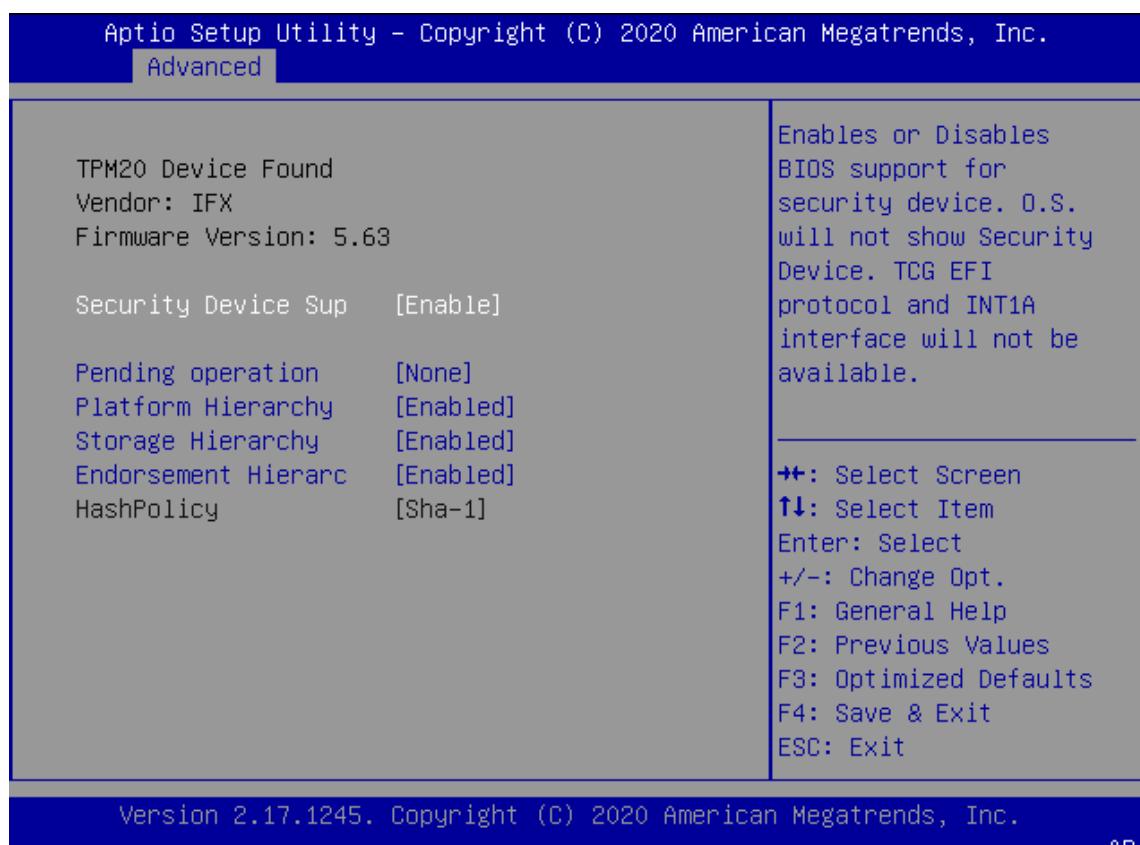
Use [→] or [←] to select **Advanced** setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.



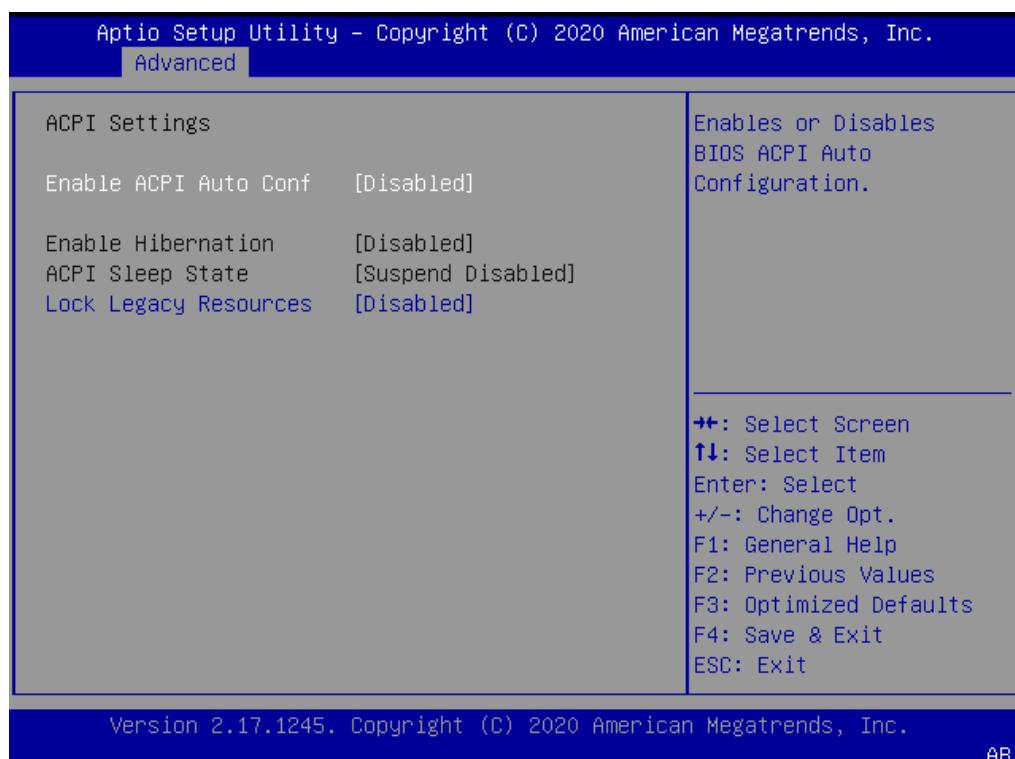
Item	Option	Description
Enable CRID	Disabled Enabled	Enable Compatible Revision ID

Trusted Computing (TPM2.0)

On **Advanced** Setup screen, select and enter "**Trusted Computing**".

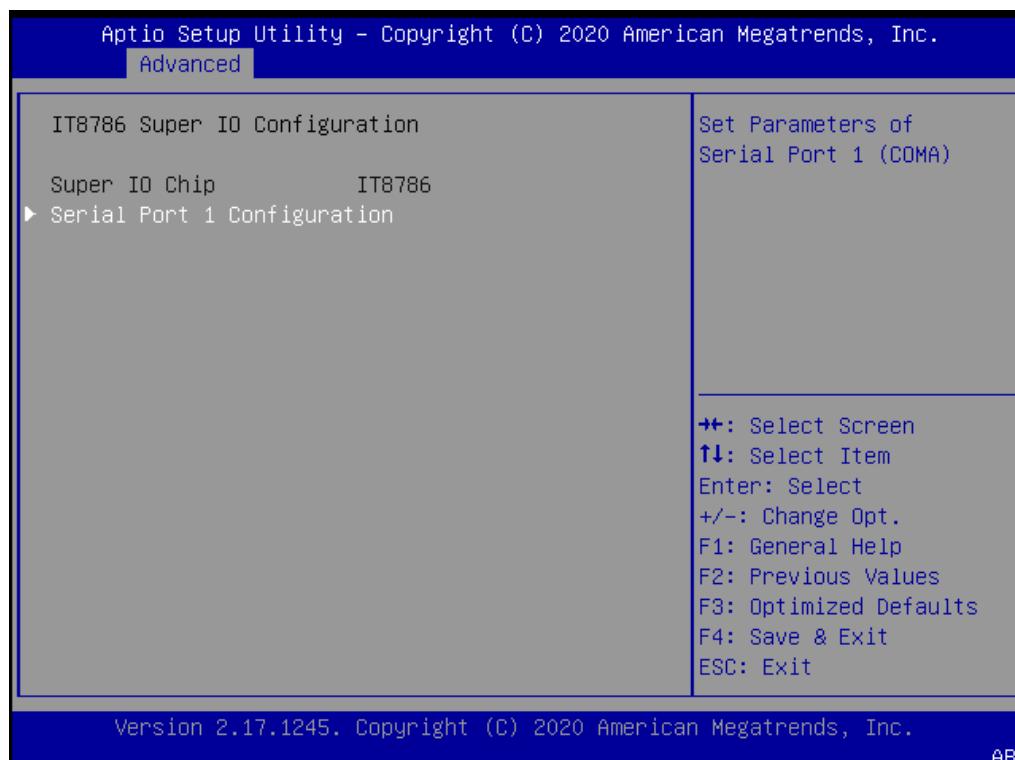


Item	Option	Description
Security Device Sup	Disable Enable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Pending operation	None TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disabled Enabled	Enable or Disable Platform Hierarchy.
Storage Hierarchy	Disabled Enabled	Enable or Disable Storage Hierarchy.
Endorsement Hierarc	Disabled Enabled	Enable or Disable Endorsement Hierarchy.

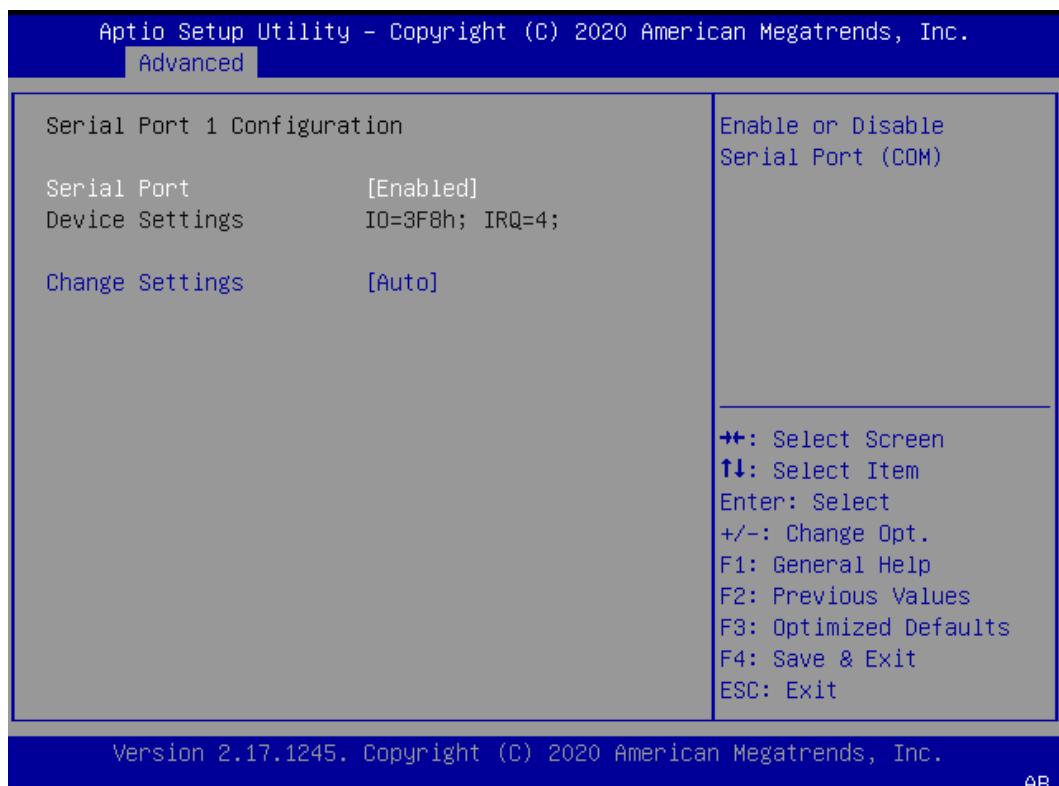


Item	Option	Description
Enable ACPI Auto Configuration	Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Lock Legacy Resources	Disabled	Enables or Disables Lock of Legacy Resources

Super IO Configuration

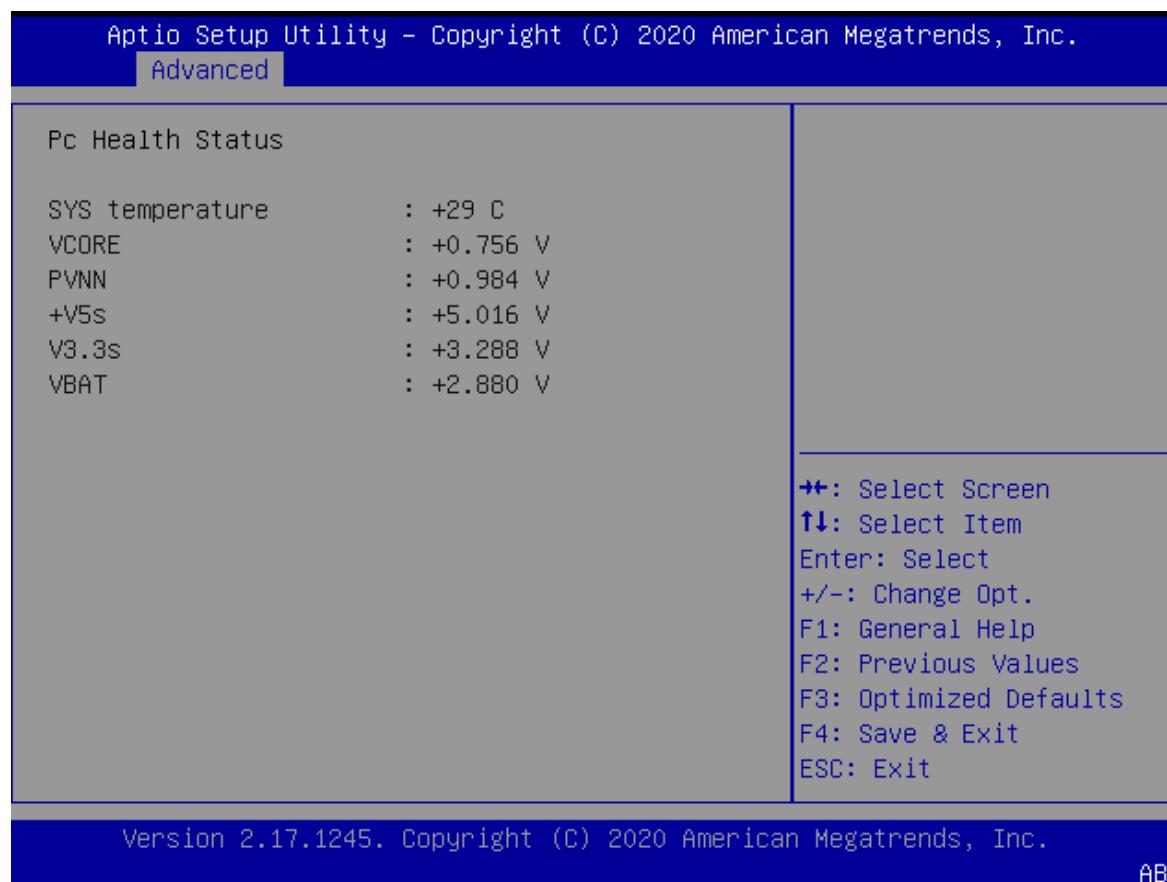


Serial Port 1 configuration

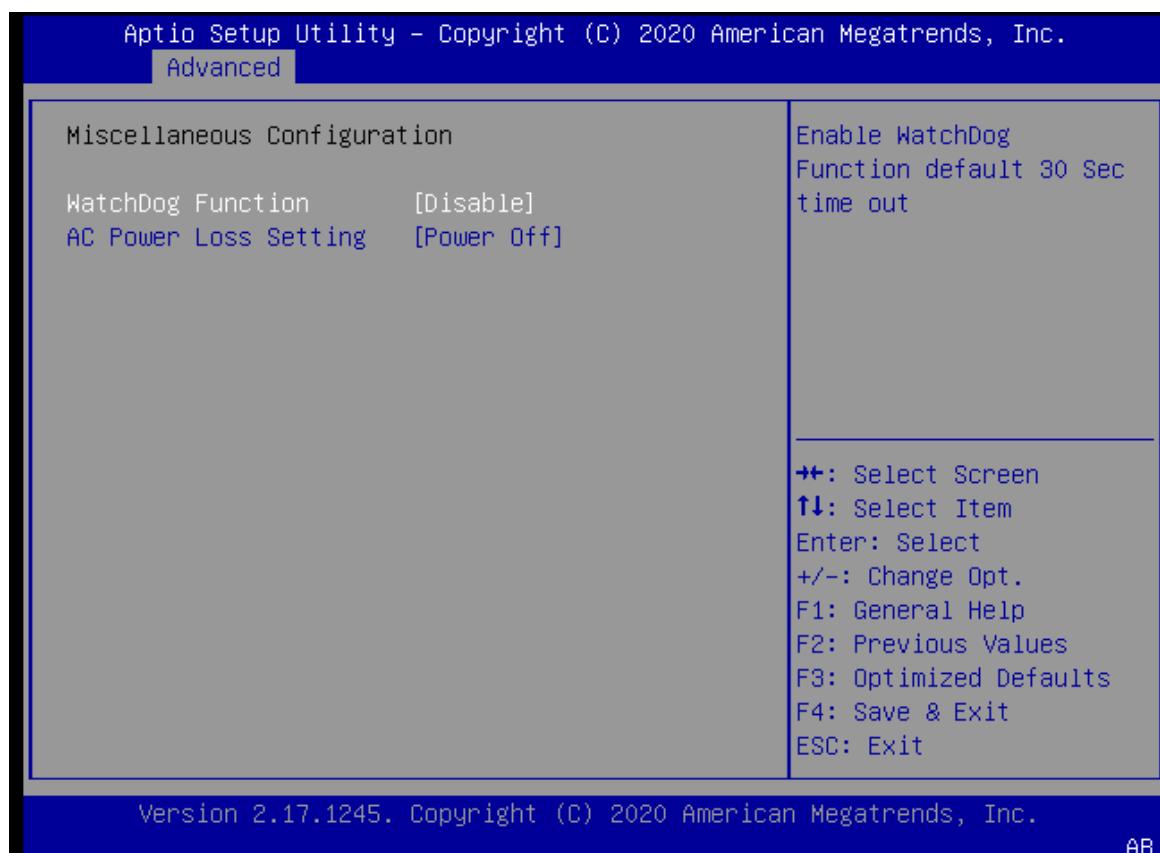


Item	Option	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port 1.
Change Setting	Auto IO=3F8h; IRQ = 4 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Select an optimal settings for Super IO Device.

H/W Monitor

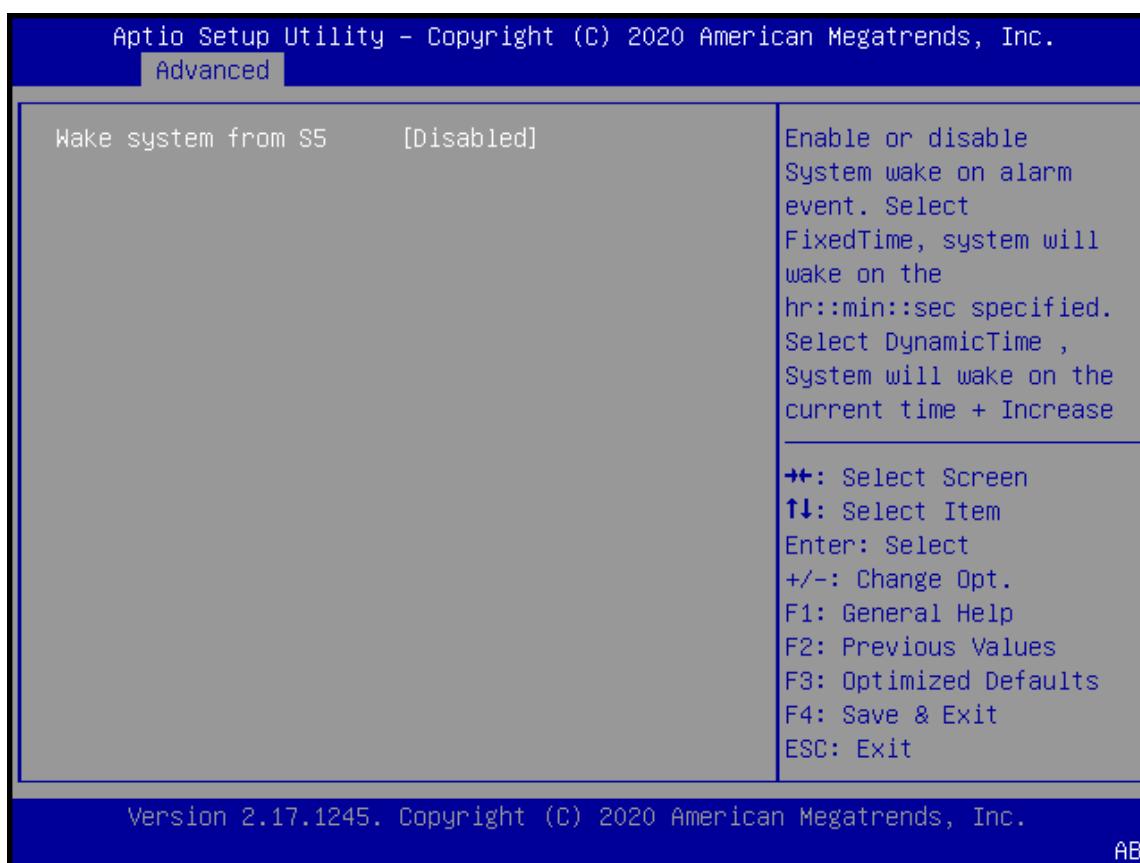


Miscellaneous Configuration



Item	Option	Description
Watch Dog function	Enabled Disabled	Enable WatchDog function default 30 Sec time out.
AC Power Loss Setting	Auto Power On Power Off	Power Loss Function ControlIn end of BIOS post to Disable/Enable Watchdog function

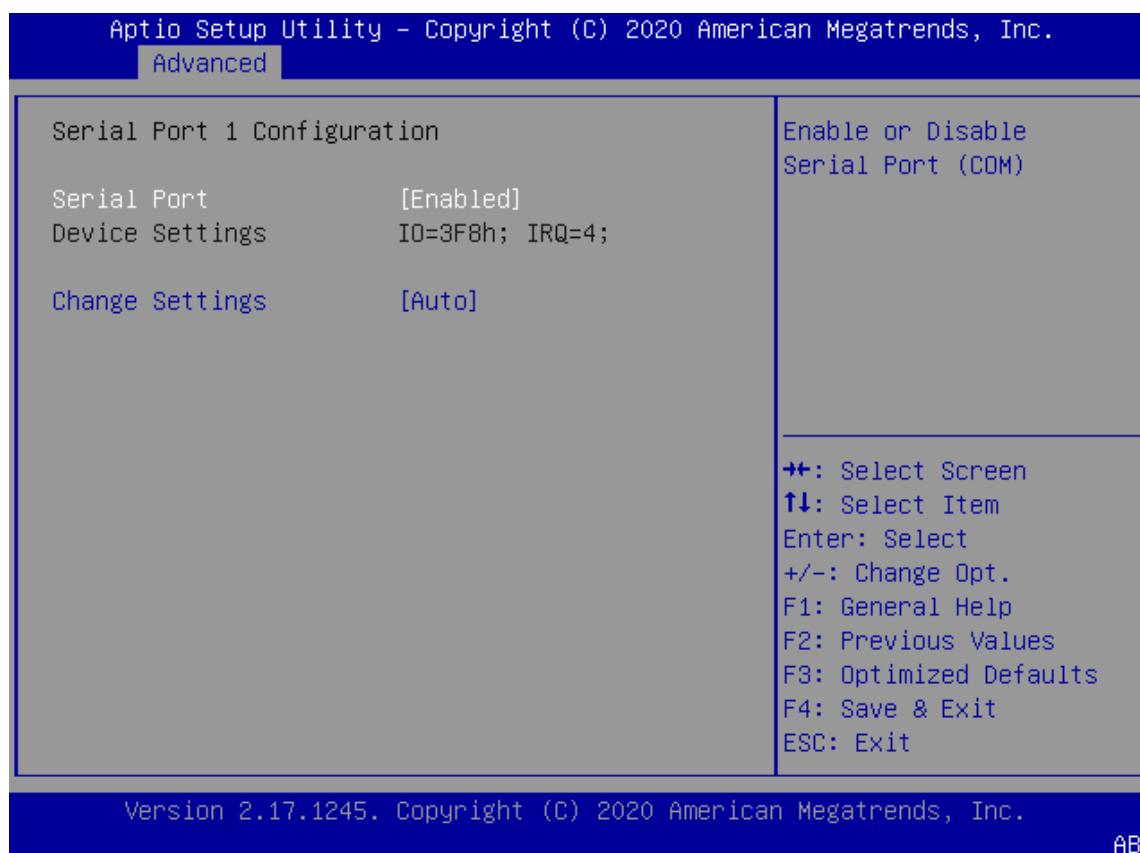
S5 RTC Wake Settings



Item	Option	Description
Wake system from S5	Enabled Disable	Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s).

Serial Port Console Redirection

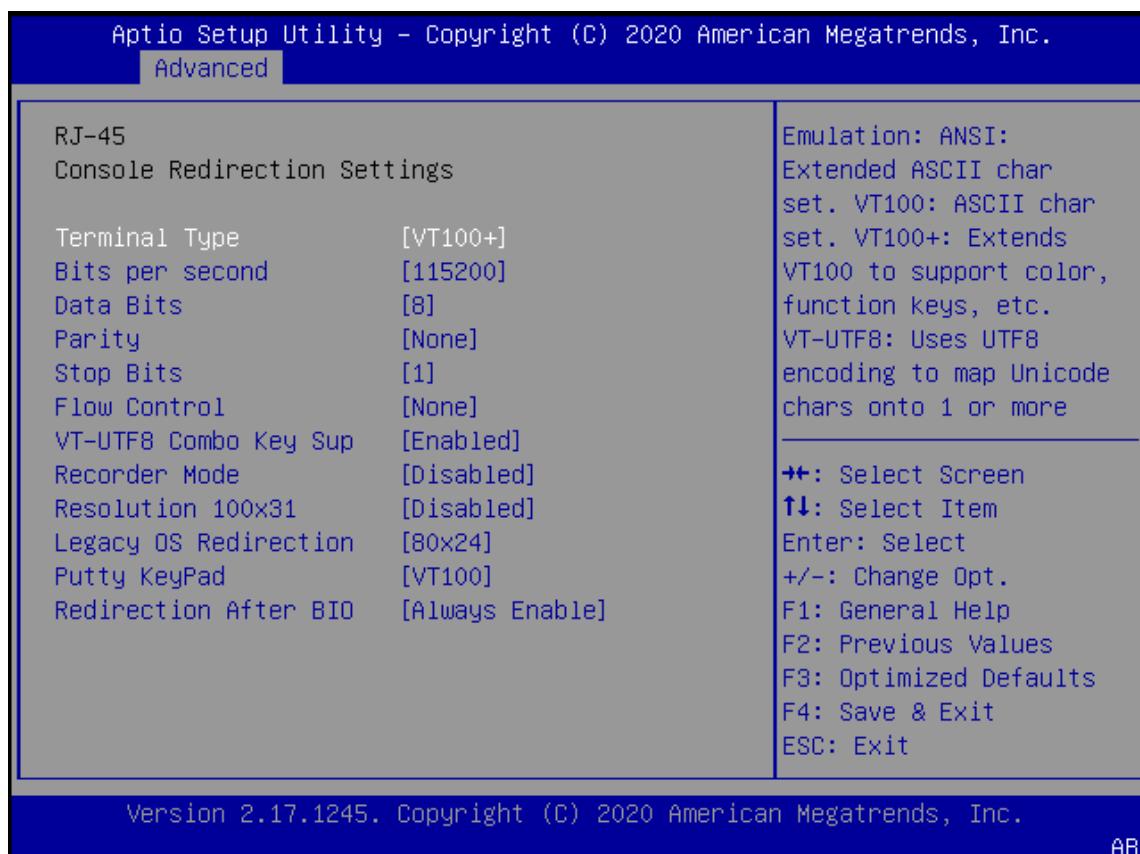
On Advanced Setup screen, select and enter "Serial Port Console Redirection."



Item	Option	Description
COM0 Console Redirection	Disabled Enabled	Console Redirection Enable or Disable.

Console Redirection Settings

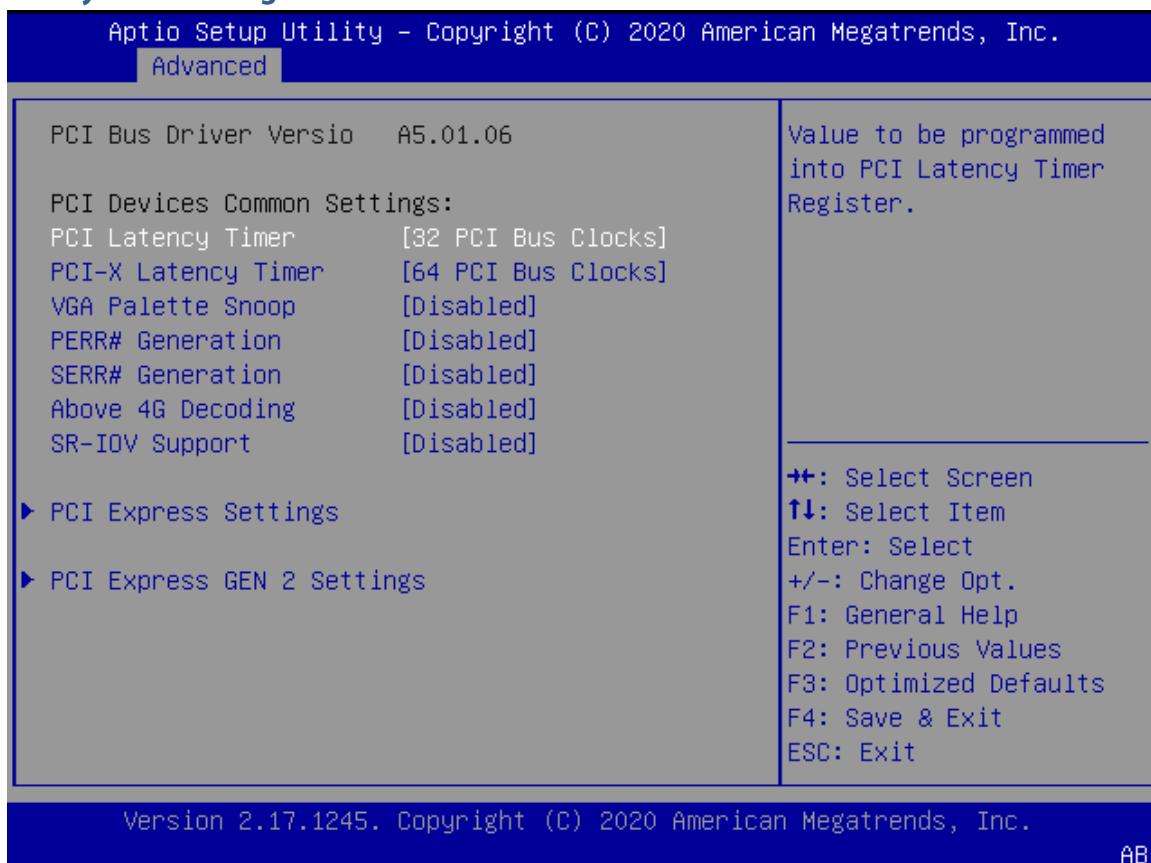
Select and enter "Console Redirection Settings" for more advanced settings.



Item	Option	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Emulation: 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
Bits per second	9600 19200 38300 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	Stop bits indicate the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow.

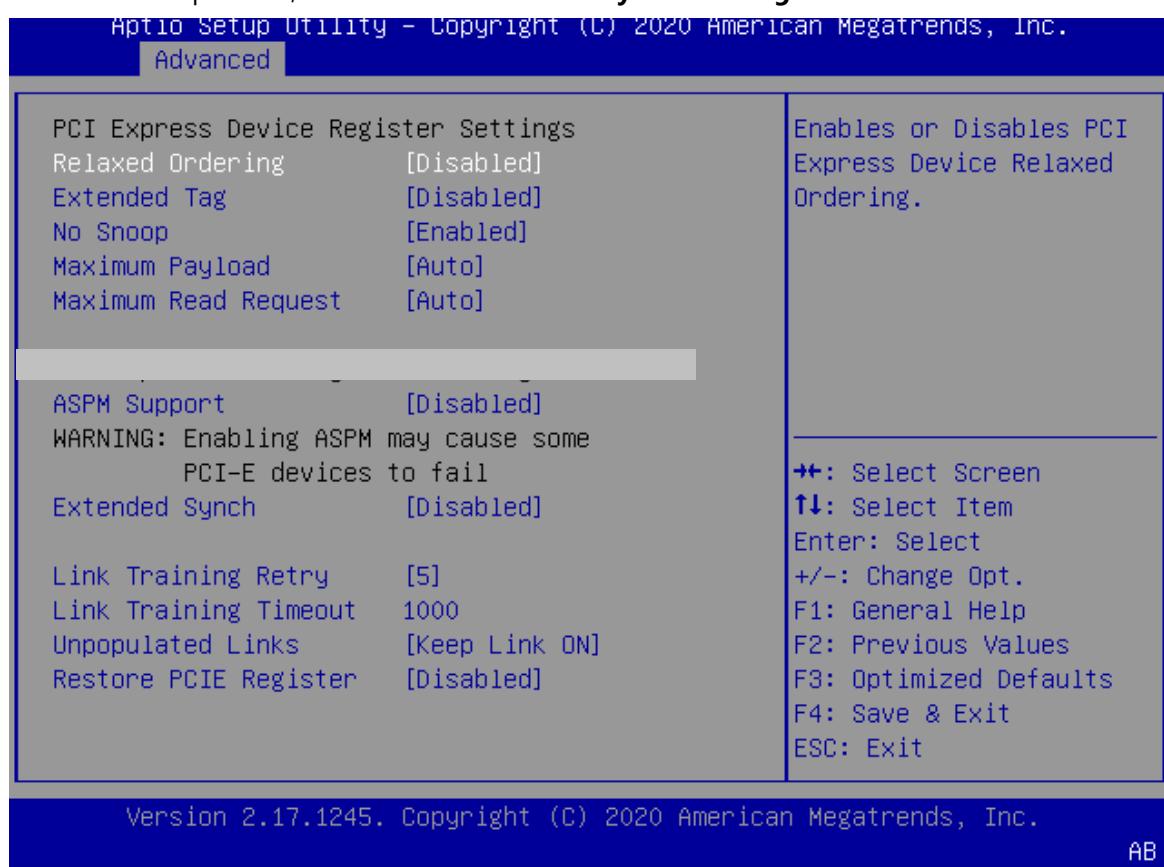
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Legacy OS Redirection	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.
Redirection After BIO	Always Enable BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

PCI Subsystem Settings



PCI Express Settings

On **Advanced** Setup screen, select and enter "**PCI Subsystem Settings**"



Item	Option	Description
PCI Latency Timer	32 PCI Bus Clocks	Value to be programmed into PCI Latency Timer Register
	64 PCI Bus Clocks	
	96 PCI Bus Clocks	
	128 PCI Bus Clocks	
	160 PCI Bus Clocks	
	192 PCI Bus Clocks	
	224 PCI Bus Clocks	
PCI-X Latency Timer	248 PCI Bus Clocks	Value to be programmed into PCI Latency Timer Register
	32 PCI Bus Clocks	
	64 PCI Bus Clocks	
	96 PCI Bus Clocks	
	128 PCI Bus Clocks	
	160 PCI Bus Clocks	
	192 PCI Bus Clocks	
VGA Palette Snoop	224 PCI Bus Clocks	Enables or Disables VGA Palette Registers
	248 PCI Bus Clocks	
VGA Palette Snoop	Disabled	Enables or Disables VGA Palette Registers

	Enabled	Snooping
PERR# Generation	Disabled	Enables or Disables PCI Device to Generate PERR#
	Enabled	
SERR# Generation	Disabled	Enables or Disables PCI Device to Generate SERR#
	Enabled	
Above 4G Decoding	Disabled	Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64bit PCI Decoding)
	Enabled	
SR-IOV Support	Enable Disable	If system has SR-IOV capable PCIe Devices, this option Enables or Disables Single Root IO Virtualization Support.

PCI Express Gen2 Device Register Settings

Aptio Setup Utility - Copyright (C) 2020 American Megatrends, Inc.	
Advanced	
PCI Express GEN2 Device Register Settings	In device Functions that support Completion Timeout programmability, allows system software to modify the Completion Timeout value. 'Default' 50us to 50ms. If 'Shorter' is
Completion Timeout [Default]	
ARI Forwarding [Disabled]	
AtomicOp Requester En [Disabled]	
AtomicOp Egress Block [Disabled]	
IDO Request Enable [Disabled]	
IDO Completion Enable [Disabled]	
LTR Mechanism Enable [Disabled]	
End-End TLP Prefix Bl [Disabled]	
PCI Express GEN2 Link Register Settings	+*: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Target Link Speed [Auto]	
Clock Power Management [Disabled]	
Compliance SOS [Disabled]	
Hardware Autonomous W [Enabled]	
Hardware Autonomous S [Enabled]	

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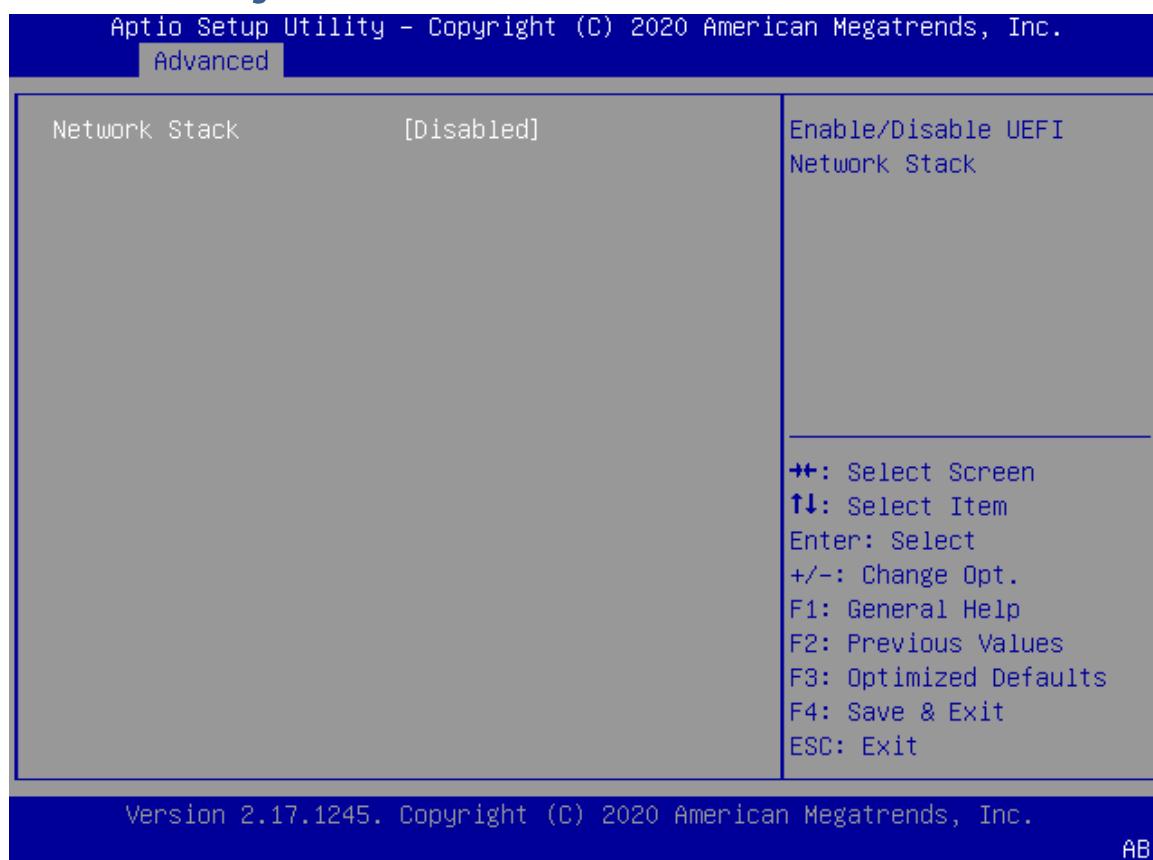
AB

Item	Option	Description
Relaxed Ordering	Disabled Enabled	Enables or Disables PCI Express Device Relaxed Ordering
Extended Tag	Disabled Enabled	If ENABLED allows Device to use 8-bit Tag field as a requester
No Snoop	Disabled Enabled	Enables or Disables PCI Express Device No Snoop option
Maximum Payload	Auto 128 Bytes 256 Bytes 512 Bytes 1024 Bytes 2048 Bytes 4096 Bytes	Set Maximum Payload of PCI Express Device or allow System BIOS to select the value
Maximum Read Request	Auto 128 Bytes 256 Bytes 512 Bytes 1024 Bytes 2048 Bytes 4096 Bytes	Set Maximum Read Request Size of PCI Express Device or allow System BIOS to select the value
ASPM Support	AUTO Disable	Set the ASPM Level: Force L0s - Force all links to L0s State AUTO - BIOS auto configure DISABLE - Disables ASPM
Extended Synch	Disabled	If ENABLED, it allows for generation of Extended

	Enabled	Synchronization patterns
Link Training Retry	Disabled 2 3 5	Defines number of Retry Attempts software will take to retrain the link if previous training attempt was unsuccessful.
Link Training Timeout	1000	Defines number of Microseconds software will wait before polling 'Link Training' bit in Link Status register. Value ranges from 10 to 10000 uS.
Unpopulated Links	Keep Link ON Disable Link	In order to save power, software will disable unpopulated PCI Express links, if this option set to 'Disable Link'.
Restore PCIE Register	Enabled Disabled	On non-PCI Express aware OS's (Pre Windows Vista) some devices may not be correctly reinitialized after S3. Enabling this restores PCI Express device configurations on S3 resume. Warning: Enabling this may cause issues with other hardware after S3 resume.
Completion Timeout	Default Shorter Longer Disabled	In device Functions that support Completion Timeout programmability, allows system software to modify the Completion Timeout value. 'Default' 50us to 50ms. If 'Shorter' is selected, software will use shorter timeout ranges supported by hardware. If 'Longer' is selected, software will use longer timeout ranges.
ARI Forwarding	Disable Enable	If supported by hardware and set to 'Enabled', the Downstream Port disables its traditional Device Number field being 0 enforcement when turning a Type1 Configuration Request into a Type0 Configuration Request, permitting access to Extended Functions in an ARI Device immediately below the Port. Default value: Disabled
AtomicOp Requester Enable	Disable Enable	If supported by hardware and set to 'Enabled', this function initiates AtomicOp Requests only if Bus Master Enable bit is in the Command Register Set.
AtomicOp Egress Block	Disable Enable	If supported by hardware and set to 'Enabled', this function initiates AtomicOp Requests only if Bus Master Enable bit is in the Command Register Set.
IDO Request Enable	Disable Enable	If supported by hardware and set to 'Enabled', this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated.

IDO Completion Enable	Disable Enable	If supported by hardware and set to 'Enabled', this permits setting the number of ID-Based Ordering (IDO) bit (Attribute[2]) requests to be initiated.
LTR Mechanism Enable	Disable Enable	If supported by hardware and set to 'Enabled', this enables the Latency Tolerance Reporting (LTR) Mechanism.
End-End TLP Prefix Blocking	Disable Enable	If supported by hardware and set to 'Enabled', this function will block forwarding of TLPs containing End-End TLP Prefixes.
Target Link Speed	Auto Force to 2.5 GT/s Force to 5.0 GT/s	If supported by hardware and set to 'Force to 2.5 GT/s' for Downstream Ports, this sets an upper limit on Link operational speed by restricting the values advertised by the Upstream component in its training sequences. When 'Auto' is selected HW initialized data will be used.
Clock Power Management	Disabled Enabled	If supported by hardware and set to 'Enabled', the device is permitted to use CLKREQ# signal for power management of Link clock in accordance to protocol defined in appropriate form factor specification."
Compliance SOS	Disabled Enabled	If supported by hardware and set to 'Enabled', this will force LTSSM to send SKP Ordered Sets between sequences when sending Compliance Pattern or Modified Compliance Pattern.
Hardware Autonomous Width	Disabled Enabled	"If supported by hardware and set to 'Disabled', this will disable the hardware's ability to change link width except width size reduction for the purpose of correcting unstable link operation.
Hardware Autonomous Speed	Disabled Enabled	If supported by hardware and set to 'Disabled', this will disable the hardware's ability to change link speed except speed rate reduction for the purpose of correcting unstable link operation.

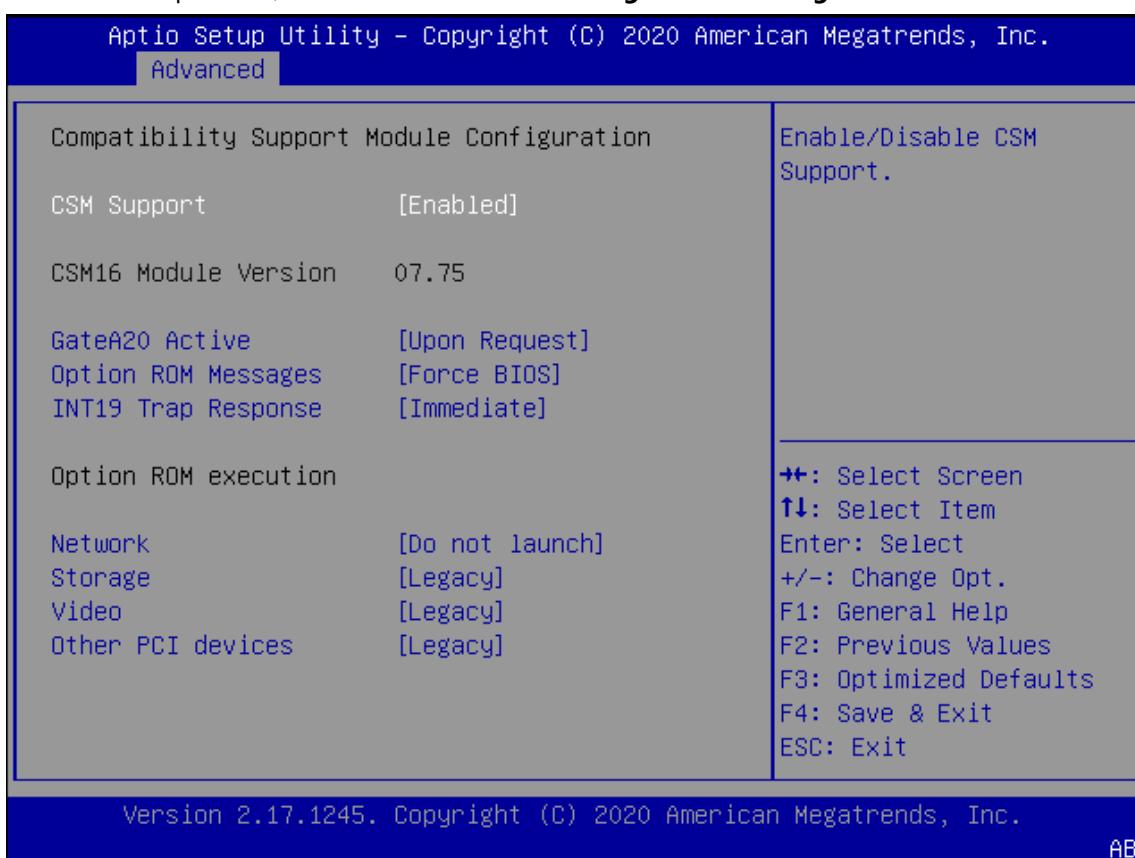
Network Stack Configuration



Item	Option	Description
Network Stack	Disabled	Enable/Disable UEFI Network Stack
	Enabled	

CSM Configuration Settings

On **Advanced** Setup screen, select and enter “**CSM Configuration Settings**”

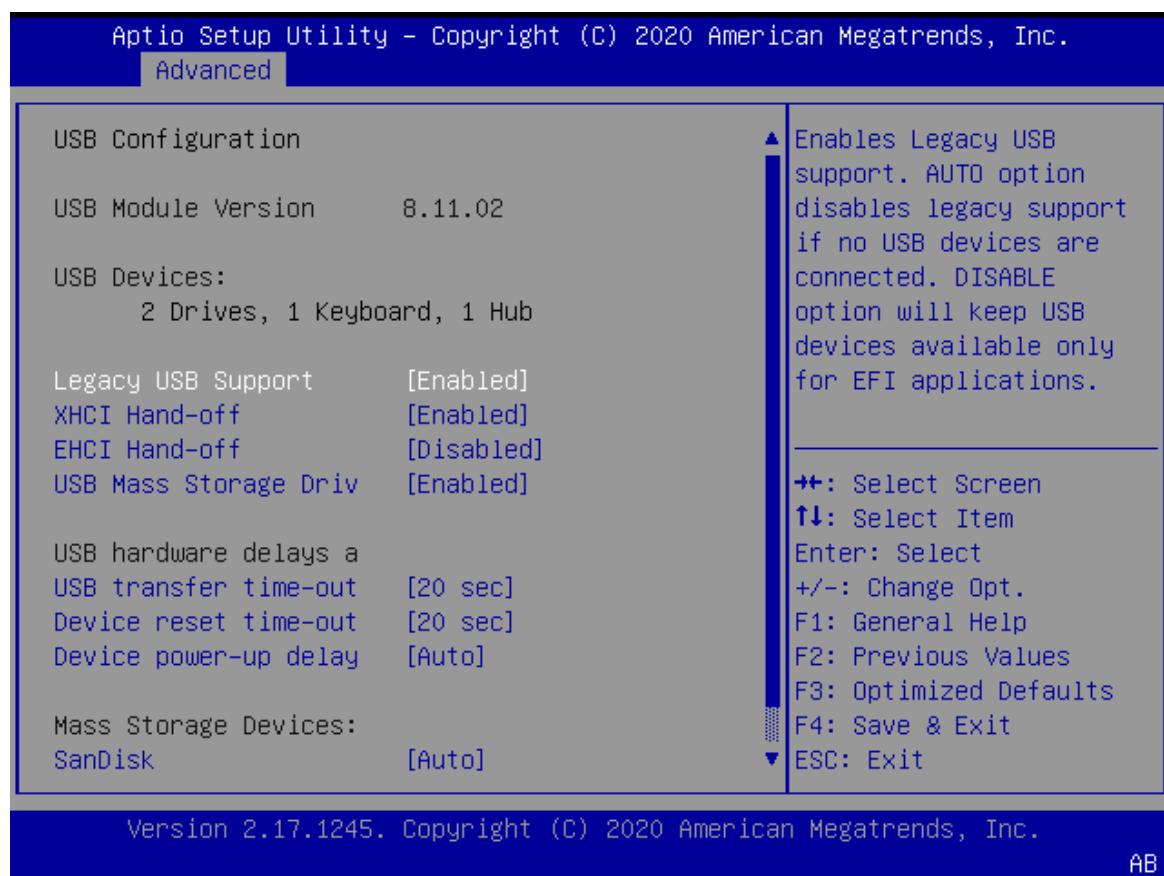


Item	Option	Description
CSM Support	Disabled Enabled	Enable/Disable CSM Support
GateA20 Active	Upon Request Always	UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20; this option is useful when any RT code is executed above 1MB.
Option ROM Messages	Force BIOS Keep Current	Set display mode for Option ROM
INT19 Trap Response	Immediate Postponed	BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch	Controls the execution of UEFI and Legacy Storage OpROM

	UEFI Legacy	
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

USB Configuration Settings

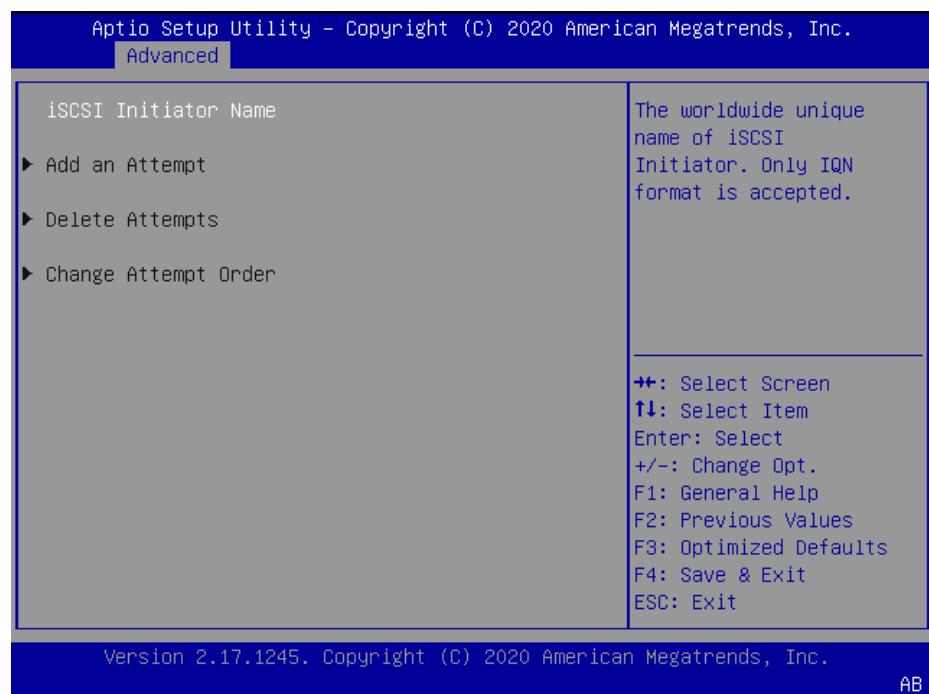
On **Advanced** Setup screen, select and enter “**USB Configuration Settings**”



Item	Option	Description
Legacy USB Support	Enabled	Enables Legacy USB support.
	Disabled	AUTO option disables legacy support if no USB devices are connected.
	Auto	DISABLE option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
	Disabled	
USB Mass Storage Driver Support	Enabled	Enable/Disable USB Mass Storage Driver Support.
	Disabled	
USB transfer time-out	1 sec	The time-out value for Control, Bulk, and Interrupt transfers.
	5 sec	
	10 sec	
	20 sec	
Device reset time-out	1 sec	USB mass storage device Start Unit command time-out.
	5 sec	

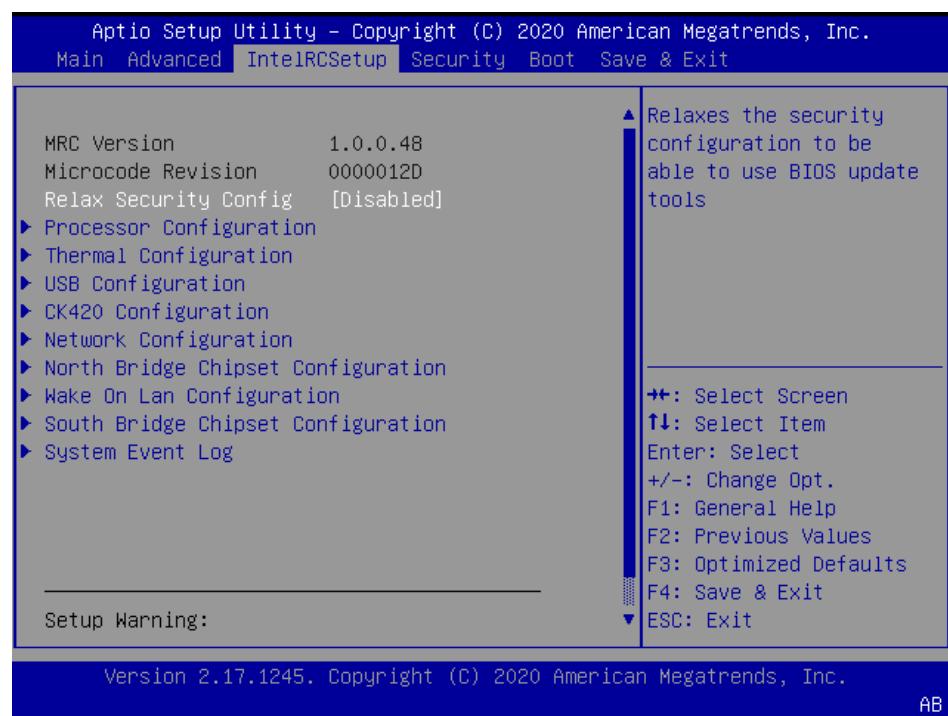
	10 sec 20 sec	
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 <u>ms</u> , for a Hub port the delay is taken from Hub descriptor.

iSCSI Configuration

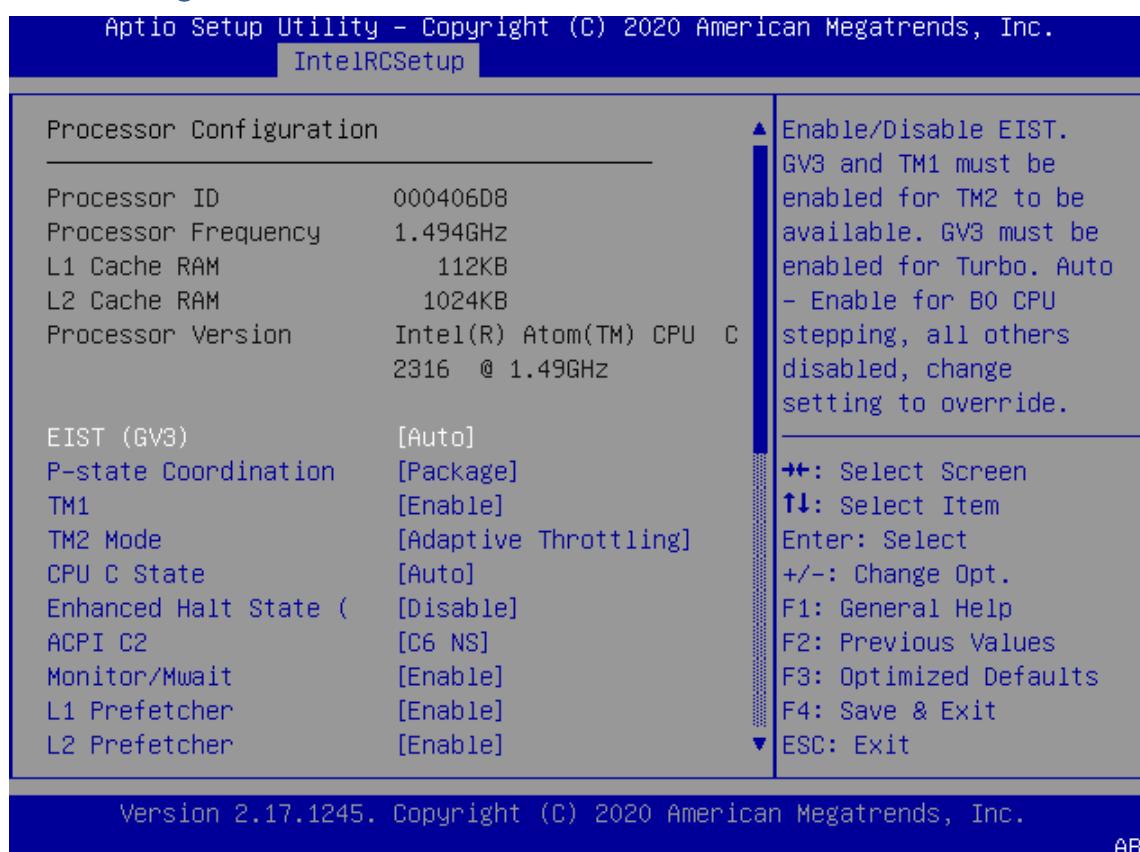


Item	Description
iSCSI Initiator Name	The worldwide unique name of iSCSI Initiator. Only IQN format is accepted."

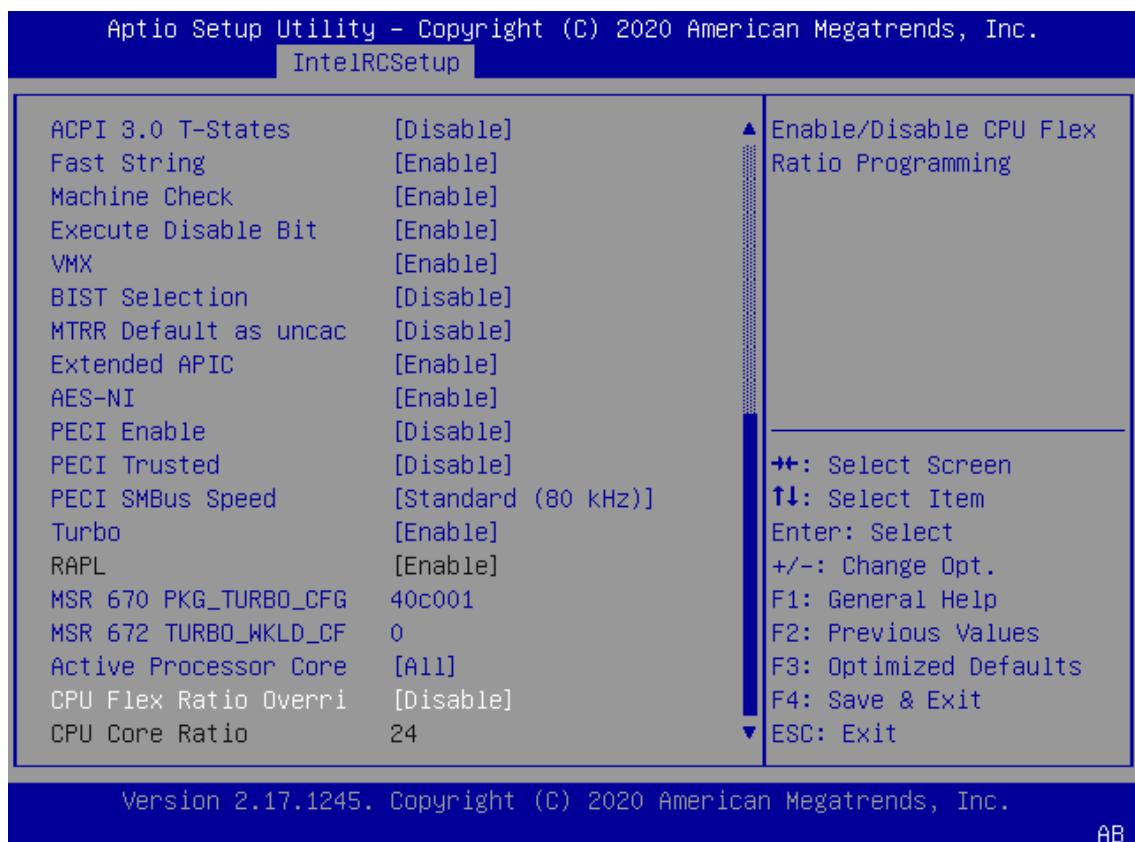
IntelRCSsetup



Processor Configuration



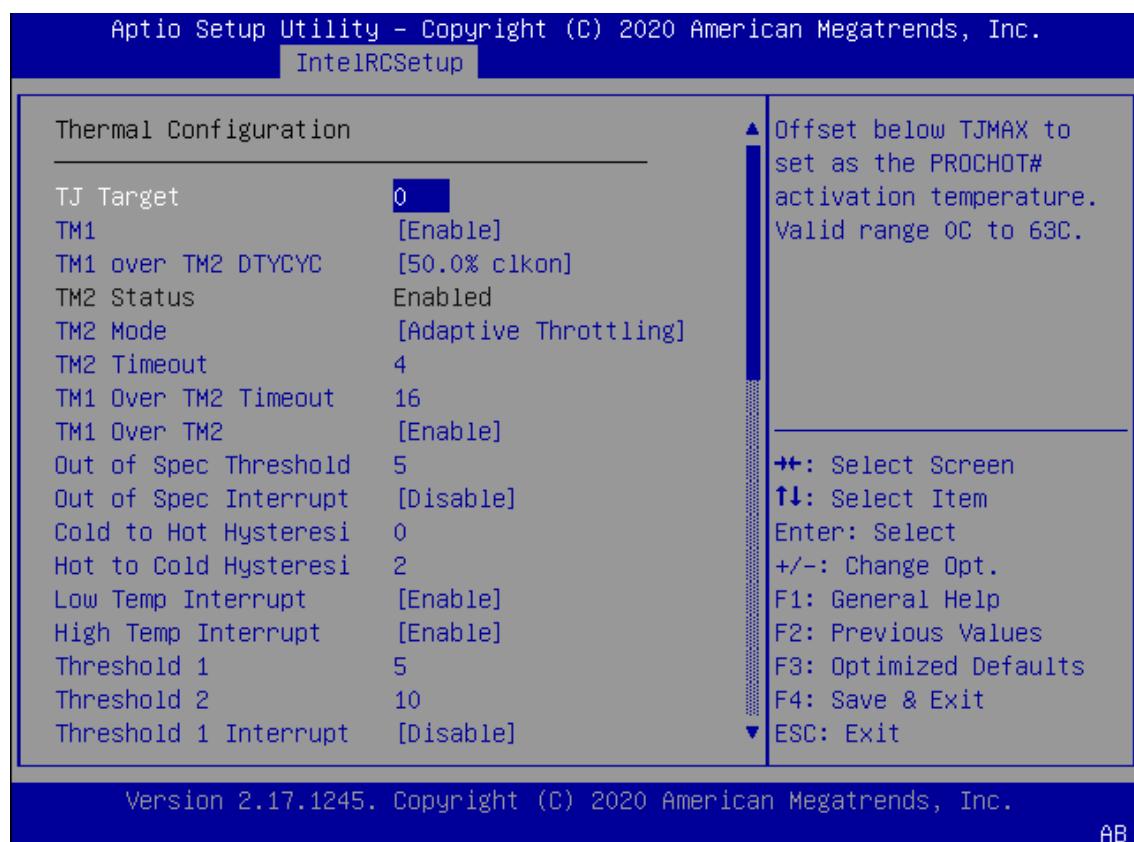
Item	Option	Description
EIST (GV3)	Disabled Enabled Auto	Enable/Disable EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 must be enabled for Turbo. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.
TM1	Disabled Enabled	Enable/Disable TM1. TM1 and GV3 must be enabled in order to support TM2
CPU C State	Disabled Enabled Auto	Enables the Enhanced Cx state of the CPU, takes effect after reboot. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.
Execute Disable Bit	Disabled Enabled	When disabled, forces the XD feature flag to always return 0.
Turbo	Disabled Enabled	Enable or Disable CPU Turbo capability. This option only applies to ES2 and above.
Active Processor Cores	ALL 4 2	Number of cores to enable in SoC package.



Item	Option	Description
ACPI 3.0 T-States	Disable Enable	Enable/Disable EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 must be enabled for Turbo. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.
Fast String	Disable Enable	When enabled, enable fast strings for REP MOVS/STOS
Machine Check	Disable Enable	Enable or Disable the Machine Check
Execute Disable Bit	Disable Enable	When disabled, forces the XD feature flag to always return 0.
VMX	Disable Enable	Enables the Vanderpool Technology, takes effect after reboot.
BIST Selection	Disable Enable	Enables BIST, takes effect after reboot.
MTRR Default as uncatchable	Disable Enable	EFI_CACHE_IA32_MTRR_DEF_TYPE msr(2FF) as uncacheable
Extended APIC	Disable Enable	Enable/disable extended APIC support

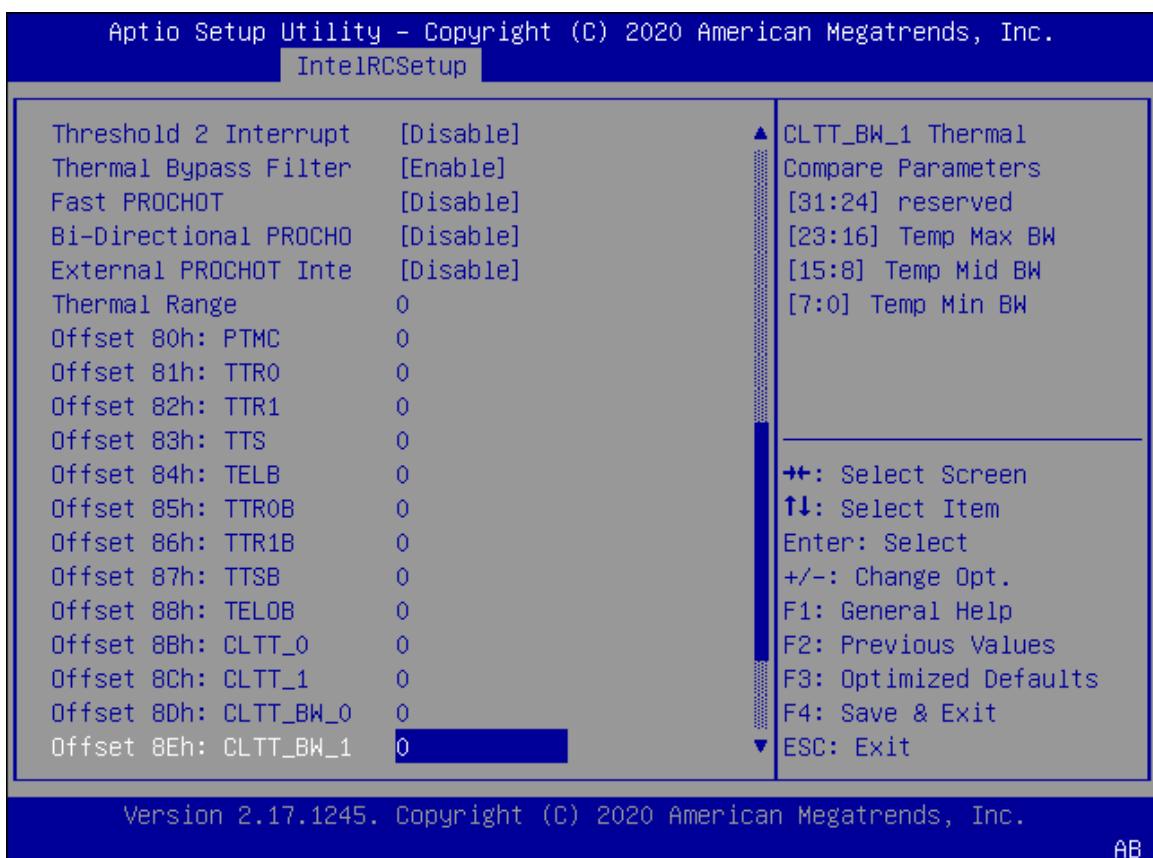
AES-NI	Disable Enable	Enable/disable AES-NI support
PECI Enable	Disable Enable	Enable/disable Punit PECL support
PECI Trusted	Disable Enable	Enable/disable Punit Trusted PECL support
PECI SMBus Speed	Standard (80 kHz) Standard (100 kHz) Fast Mode (400 kHz) Fast Mode Plus (1 MHz)	PECI SMBus Speed: Value to indicate what speed physical bus must operate.
Turbo	Disable Enable	Enable or Disable CPU Turbo capability. This option only applies to ES2 and above.
RAPL	Enable	Enable or Disable CPU RAPL capability. This option only applies to ES2 and above.
MSR 670 PKG_TURBO_CFG	40c001	Specifies various parameters used for Turbo, Min Energy [28:16], SoC TDP Policy [11:9], ICCMax Control [4:3], Turbo Mode [2:0] and others
MSR 672 TURBO_WKLD_C F	0	Specifies ICCMax Throttle Ratio for C6 exits when PKG_TURBO_CFG1[4:3] == 10y
Active Processor Core	All 4 2	Number of cores to enable in SoC package.
CPU Flex Ratio	Disable Enable	Enable/Disable CPU Flex Ratio Programming
CPU Core Ratio	24	
ACPI 3.0 T-States	Disable Enable	Enable/Disable EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 must be enabled for Turbo. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.

Thermal Configuration



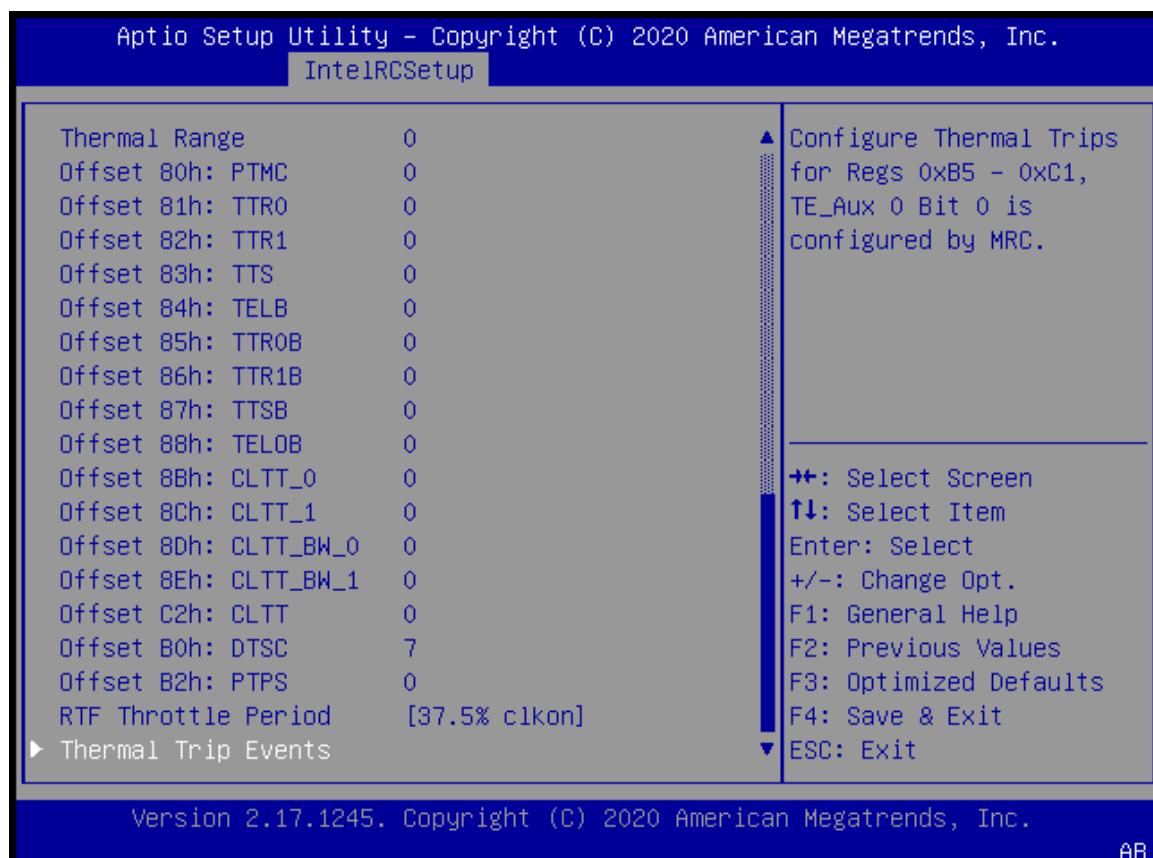
Item	Option	Description
TJ Target	0	Offset below TJMAX to set as the PROCHOT# activation temperature. Valid range 0C to 63C.
TM1	Disable Enable	Enables generation of a <u>thermal</u> interrupt whenever Out of <u>Spec</u> temperature threshold is crossed.
TM1 over TM2	100% clkon	
DTYCYC	87.5% clkon 75.0% clkon 62.5% clkon 50.0% clkon 37.5% clkon 25.0 % clkon 12.5 % clkon	This option determines how much clock modulation is applied when TM1 over TM2 is engaged.
TM2 Status	LFM Throttling Adaptive Throttling	TM1 and GV3 must be enabled in order to support TM2
TM2 Mode	Disable Enable	Select LFM throttling or adaptive throttling for TM2 mechanisms.
TM1 Over TM2	5	"Allows TM1 to engage after the TM1 Over TM2 Timeout"

		if TM2 has not cooled the processor.
Out of Spec Threshold	Disable Enable	Degrees over TJMAX the temperature can reach before BIOS must execute a graceful shutdown. Range is 0C - 63C
Out of Spec Interrupt	0	Enables generation of a <u>thermal</u> interrupt whenever Out of <u>Spec</u> temperature threshold is crossed.
Cold to Hot Hysteresi	2	Degrees above TJ Target PROCHOT# asserts (i.e., HOT). Range is 0C - 7C
Hot to Cold Hysteresi	Disable Enable	Degrees below TJ Target PROCHOT# is <u>de-asserted</u> (i.e., NOT_HOT). Range is 0C - 7C
High Temp Interrupt	Disable Enable	Triggers an interrupt when the temperature goes from NOT_HOT to HOT.
Threshold 1	5	Degrees below TJMAX to signal an interrupt whenever the temperature crosses this threshold. Range is 0C - 127C
Threshold 2	10	Degrees below TJMAX to signal an interrupt whenever the temperature crosses this threshold. Range is 0C - 127C
Threshold 1 Interrupt	Disable Enable	Enables generation of a <u>thermal</u> interrupt whenever Threshold 1 is crossed.

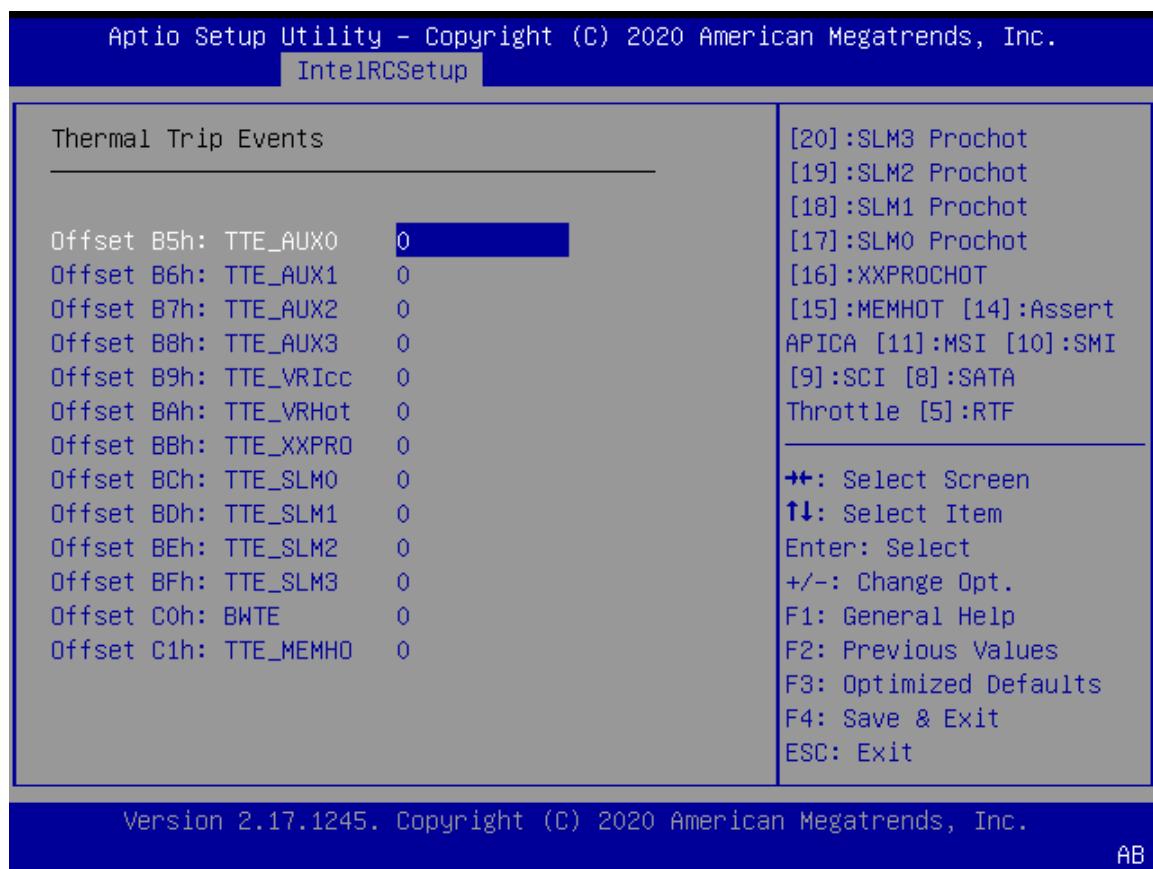


Item	Option	Description
Threshold 2 Interrupt	Disable Enable	Enables generation of a <u>thermal</u> interrupt whenever Threshold 2 is crossed.
Thermal Bypass Filter	Disable Enable	When Enabled <u>thermal</u> averaging is bypassed and DTS reports the current temperature offset.
Fast PROCHOT	Disable Enable	Enables FastProcHot.
Bi-Directional PROCHO	Disable Enable	When disabled, PROCHOT# is an output pin only. Depends on CPU feature flag CPUID_EDX(eax=1) Bit 29 being set.
External PROCHOT Inte	Disable Enable	Enables generation of an interrupt when an external device drives the PROCHOT# pin.
Thermal Range	0	Specifies the lower valid range for DIG_TEMP_READOUT. 0 = All values valid 1 .. 15 = TJMAX down to (TJMAX - (35 + (5 * value)))
Offset 80h: PTMC	0	Programmable <u>Thermtrip</u> Management Control. Range is 0 - 0xFFFFFFFF. [31:22]RSVD [21]PER_MEM_CH_TEMP [20]VR_BASED_TEMP [19]MOD3_THERM_EN [18]MOD2_THERM_EN [17]MOD1_THERM_EN [16]MOD0_THERM_EN [15]MEMHOT_THERM_EN [14]MEM_MANAGE_MODE [13]MEM_THROTTLE_MODE [12]BW_THROT_EN

		[11]XXTTS_THERM_EN [10]PROCHOT_THERM_EN [9]SVIDVR_ICC_EN [8]SVID_THERM_EN [7:4]RSVD [3]AUX3_THERM_EN [2]AUX2_THERM_EN [1]AUX1_THERM_EN [0]AUX0_THERM_EN"
Offset 81h: TTR0	0	Rank 0 Bandwidth Trip Thresholds (BUNIT). Bits[0:7] Read Threshold 0 - 0xFF. Bits[15:8] Write Threshold 0 - 0xFF.
Offset 82h: TTR1	0	Rank 1 Bandwidth Trip Thresholds (BUNIT). Bits[0:7] Read Threshold 0 - 0xFF. Bits[15:8] Write Threshold 0 - 0xFF.
Offset 83h: TTS	0	Total Bandwidth Trip Thresholds (BUNIT). Bits[0:7] Read Threshold 0 - 0xFF. Bits[15:8] Write Threshold 0 - 0xFF
Offset 84h: TELB	0	Thermal Enforcement Limits for BW Trips (BUNIT). Bits[31:24] Rank1 Write. Bits[23:16] Rank 1 Read. Bits[15:8] Rank 0 Write. Bits[7:0] Rank 0 Read. 0x01=12.5% 0x03=25% 0x07=37.5% 0x0F=50% 0x1F=62.5% 0x3F=75% 0x7F=87.5% 0xFF=100%"
Offset 85h: TTR0B	0	Channel 0 Bandwidth Trip Threshold (DUNIT). Specify number of transactions. Valid Range 0x0 - 0xFFFFFFFF
Offset 86h: TTR1B	0	Channel 1 Bandwidth Trip Threshold (DUNIT). Specify number of transactions. Valid Range 0x0 - 0xFFFFFFFF
Offset 87h: TTSB	0	Total Bandwidth Trip Threshold (DUNIT). Specify number of transactions. Valid Range 0x0 - 0xFFFFFFFF
Offset 88h: TELOB	0	Thermal Enforcement Limits for BW Trips (DUNIT). Bits[15:8] Channel 1 BW Limit. Bits[7:0] Channel 0 BW Limit. 0x01=12.5% 0x03=25% 0x07=37.5% 0x0F=50% 0x1F=62.5% 0x3F=75% 0x7F=87.5% 0xFF=100%
Offset 8Bh: CLTT_0	0	CLTT_0 Thermal Compare Parameters [31:24] reserved [23:16] Temp Max [15:8] Temp Mid [7:0] Temp Min
Offset 8Ch: CLTT_1	0	CLTT_1 Thermal Compare Parameters [31:24] reserved [23:16] Temp Max [15:8] Temp Mid [7:0] Temp Min
Offset 8Dh: CLTT_BW_0	0	CLTT_BW_0 Thermal Compare Parameters [31:24] reserved [23:16] Temp Max BW [15:8] Temp Mid BW [7:0] Temp Min BW
Offset 8Eh: CLTT_BW_1	0	CLTT_BW_1 Thermal Compare Parameters [31:24] reserved [23:16] Temp Max BW [15:8] Temp Mid BW [7:0] Temp Min BW



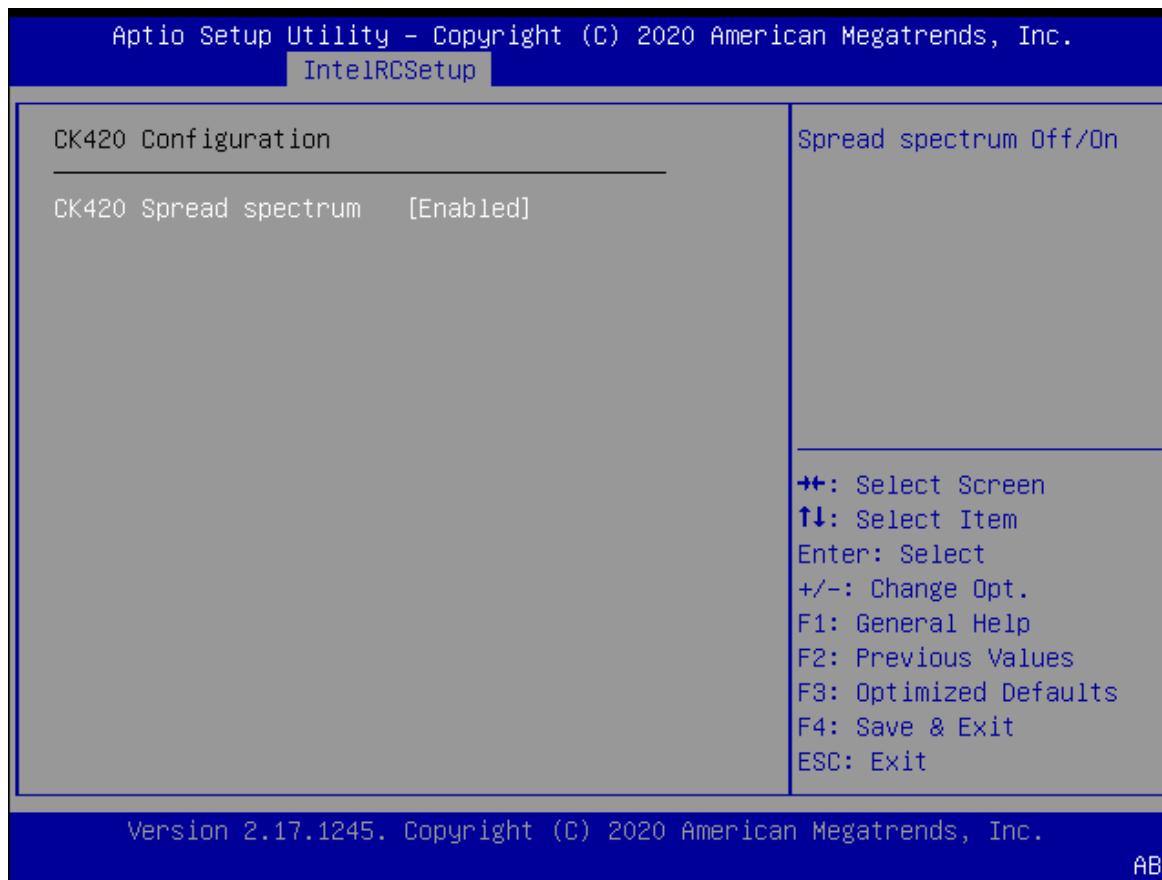
Item	Option	Description
Offset C2h: CLTT	0	CLTT BW Trip Event Policies
Offset B0h: DTSC	7	Digital Thermal Sensor Control. Bit[0] DTS0 Enable. Bit[1] DTS1 Enable. Bit[2] DTS2 Enable.
Offset B2h: PTPS	0	Programmable Trip Point Settings [31:24] Aux3 [23:16] Aux2 [15:8] Aux1 [7:0] Aux0 cannot be modified, MRC configures it.
RTF Throttle Period	100% clkon 87.5% clkon 75.0% clkon 62.5% clkon 50.0% clkon 37.5% clkon 25.0% clkon 12.5% clkon	Specifies the Root Fabric Throttling Period



Item	Option	Description
Offset B5h: TTE_AUX0	0	[20]:SLM3 Prochot [19]:SLM2 Prochot [18]:SLM1 Prochot [17]:SLM0 Prochot [16]:XXPROCHOT [15]:MEMHOT [14]:Assert APICA [11]:MSI [10]:SMI [9]:SCI [8]:SATA Throttle [5]:RTF Throttle [1]:Memory Bandwidth [0]:DDR 2x Refresh (MRC configures for TE_AUX0)
Offset B6h: TTE_AUX1	0	
Offset B7h: TTE_AUX2	0	
Offset B8h: TTE_AUX3	0	
Offset B9h: TTE_VRIcc	0	
Offset BAh: TTE_VRHot	0	
Offset BBh: TTE_XXPRO	0	
Offset BCh:	0	

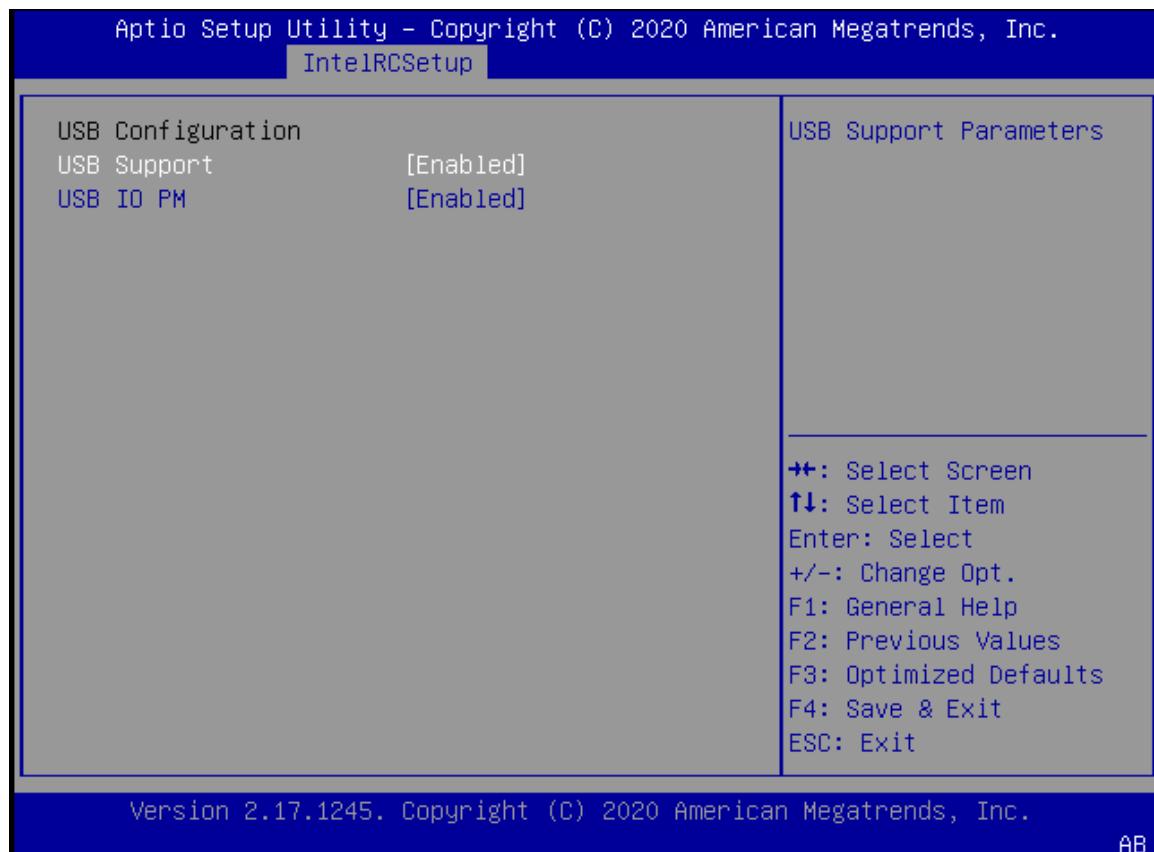
TTE_SLM0		
Offset BDh: TTE_SLM1	0	
Offset BEh: TTE_SLM2	0	
Offset BFh: TTE_SLM3	0	
Offset C0h: BWTE	0	
Offset C1h: TTE_MEMHO	0	

CK420 Configuration



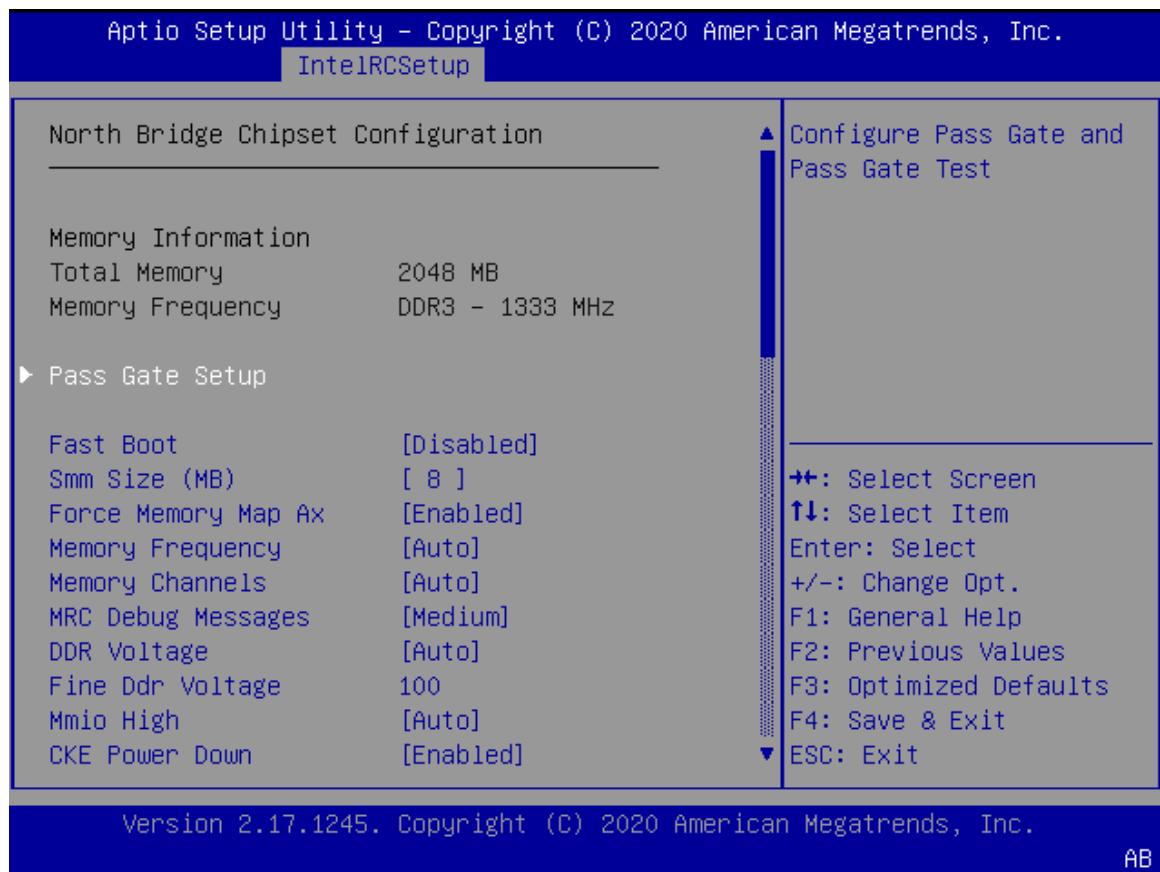
Item	Option	Description
CK420 Spread spectrum	Disable Enable	Spread spectrum Off/On

USB Configuration



Item	Option	Description
USB Support	Disable Enable	USB Support Parameters
USB IO PM	Disable Enable	Enable/Disable IO PM

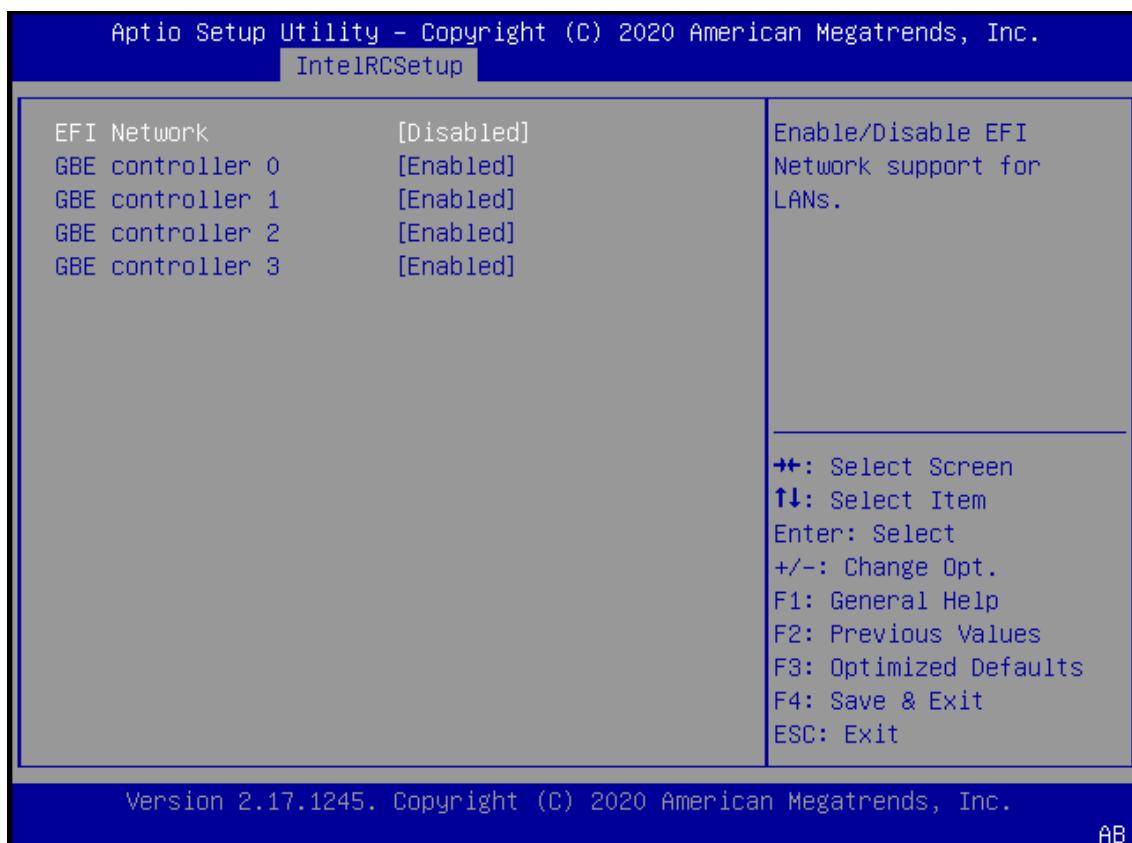
North Bridge Chipset Configuration



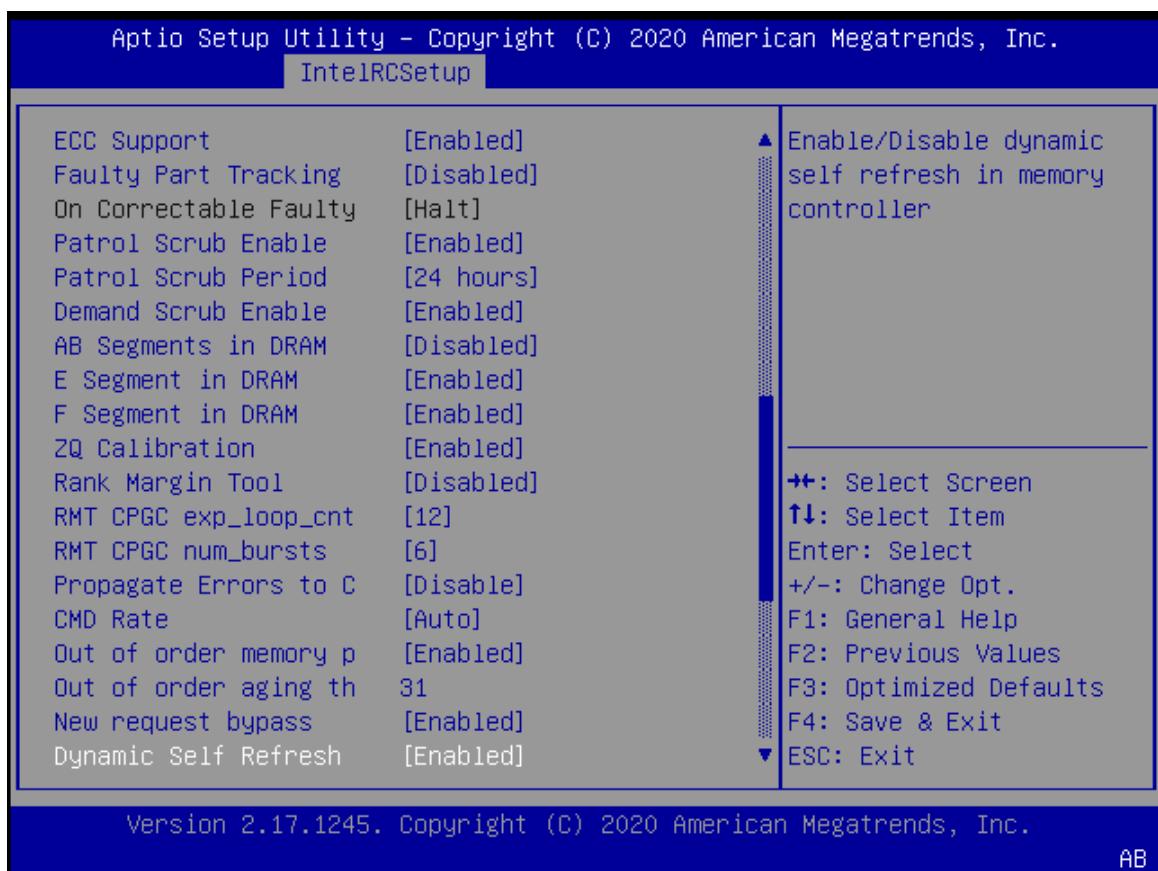
Item	Option	Description
Fast Boot	Disable Enable	Enables / Disables the Fast Boot by skipping some drivers
Smm Size (MB)	2 4 8 16	Specify the size of the SMM/TSEG region 1 MB aligned
Force Memory Map Ax	Auto Enable	Force Memory Map for Ax parts
Memory Frequency	Auto DDR3-1333 DDR3-1600	DDR3 memory frequency
Memory Channels	Auto Single Channel	DDR3 memory channels enabled
MRC Debug Messages	Disabled Minimum Medium Maximum	Enable to display debug output in MRC

	Auto	
DDR Voltage	1.25V	Select the desired DDR voltage
	1.35V	
	1.50V	
Fine Ddr Voltage	100	Select between -100 to 100 mV in steps of 5mv. 0 > -100mV :: 100 > 0mV :: 200 > 100mV
Mmio High	Auto	
	256MB	
	512MB	
	1024MB	Configure the MMIO High. AUTO: will leave the MMIOH according with the total memory installed in the system
	2048MB	
	4096MB	
	8192MB	
CKE Power Down	Disable	Enables/Disables the CKE Power Down
	Enable	

Network Configuration



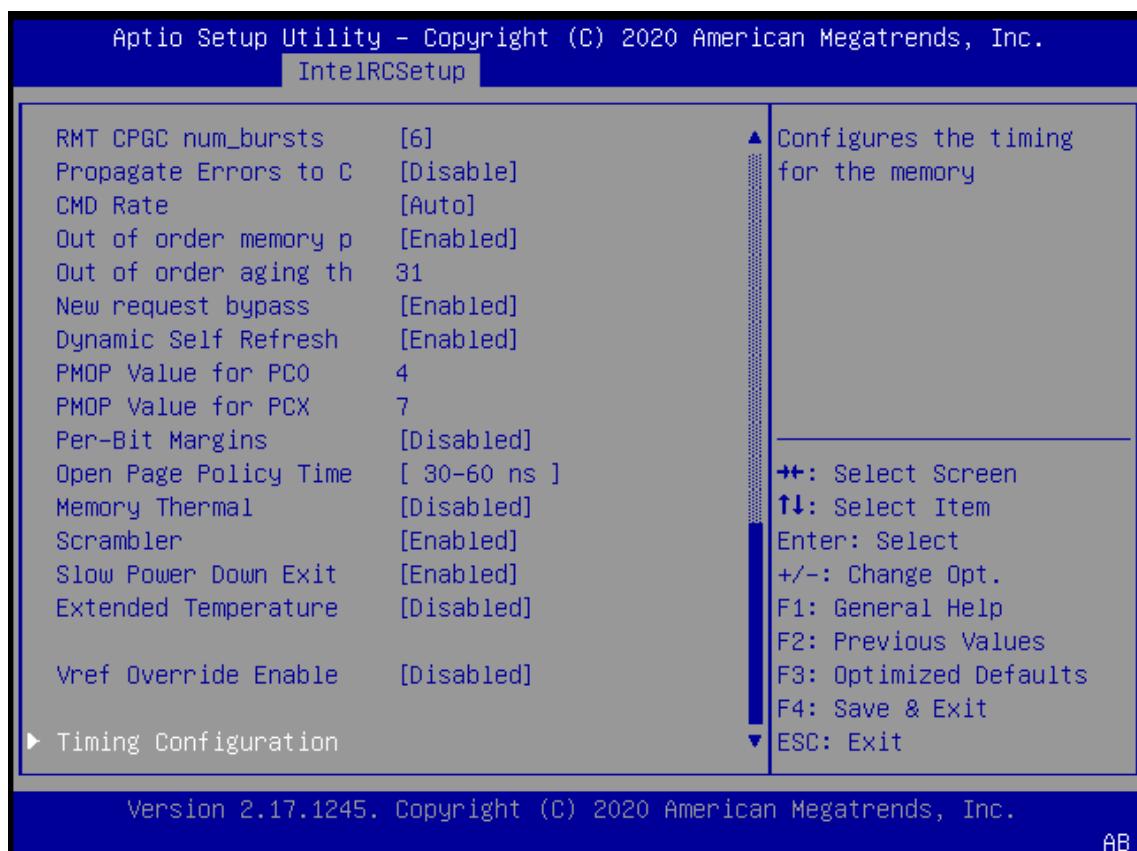
Item	Option	Description
EFI Network	Disable Enable	Enable/Disable EFI Network support for LANs.
GBE controller 0	Disable Enable	Enable/Disable the GBE hardware controller if supported by SKU
GBE controller 1	Disable Enable	Enable/Disable the GBE hardware controller if supported by SKU
GBE controller 2	Disable Enable	Enable/Disable the GBE hardware controller if supported by SKU
GBE controller 3	Disable Enable	Enable/Disable the GBE hardware controller if supported by SKU



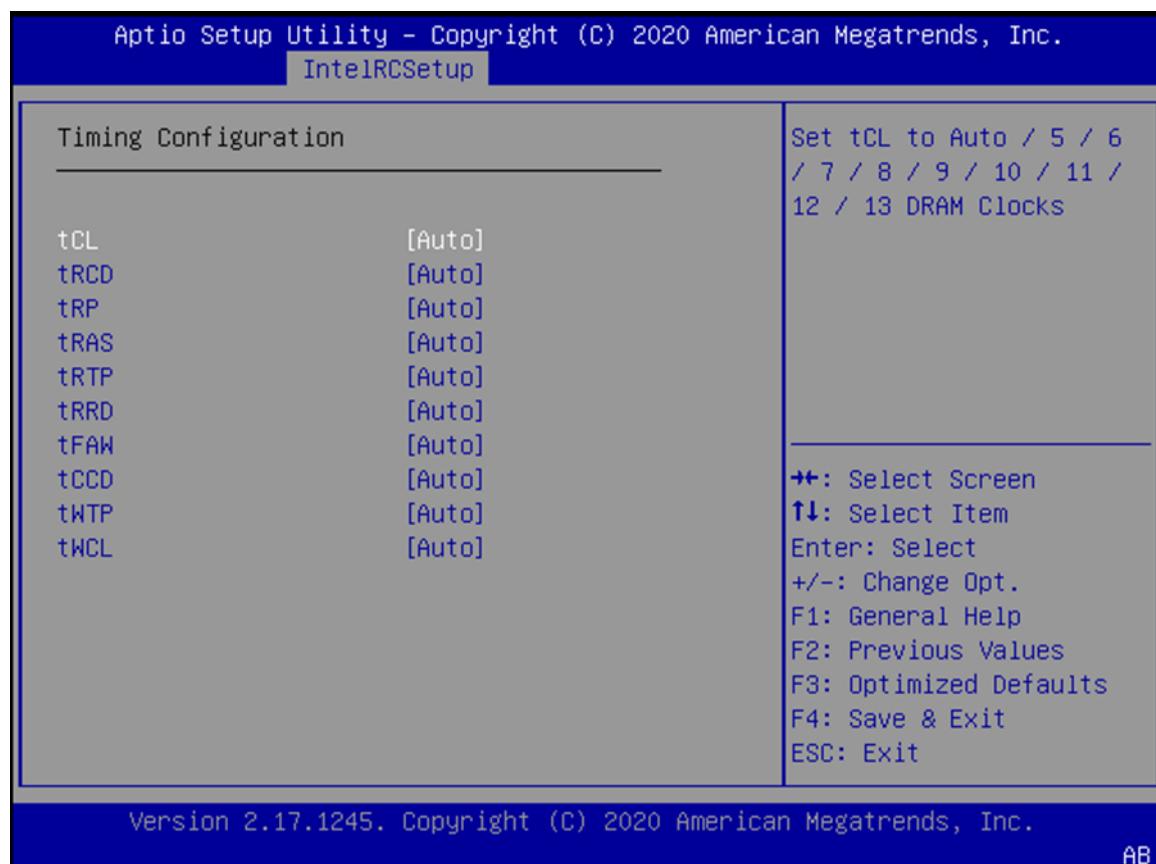
Item	Option	Description
ECC Support	Disable Enable	Select to enable/disable ECC Support
Faulty Part Tracking	Disable Enable	Select to enable/disable faulty part tracking
On Correctable Faulty	Halt	On Correctable Faulty DIMM issue (single bit) halt or continu
Patrol Scrub Enable	Disable Enable	Select to enable/disable Patrol Scrub Support
Patrol Scrub Period	24 hours 10 hours 4 hours 1 hours	Select the Patrol Scrub Period
Demand Scrub Enable	Disable Enable	Select to enable/disable Demand Scrub Support
AB Segments in DRAM	Disable Enable	When this bit is set reads and writes targeting AorB-segments are routed to DRAM
E Segment in DRAM	Disable Enable	When this bit is set reads and writes targeting E segment are routed to DRAM

F Segment in DRAM	Disable Enable	When this bit is set reads and writes targeting F segment are routed to DRAM
ZQ Calibration	Disable Enable	Enables ZQ Calibration.
Rank Margin Tool	Disable Enable	Enable Rank Margin Tool support
RMT CPGC exp_loop_cnt	1 2 3 4 5 6 7 8 9 10 11 12	Set the CPGC exp_loop_cnt field for MRC trainings $2^{(\text{exp_loop_cnt} - 1)}$
RMT CPGC num_bursts	1 2 3 4 5 6 7 8 9 10 11 12	Set the CPGC num_bursts field for RMT execution $2^{(\text{num_bursts} - 1)}$
Propagate Errors to Cores (BMC MODE)	Disable Enable	To configure the Bunit Machine Check Mode to propagate errors to cores
CMD Rate	Auto 1N 2N 3N	Set CMD Rate to Auto / 1N / 2N / 3N
Out of order memory	Disable Enable	Enables out of order memory processing, improving performance

process		
Out of order aging threshold	31	Specifies the number of requests that can be processed ahead of another request sitting in the In-Progress request queue before OOO is disabled
New request bypass	Disable Enable	Enables new memory requests to be processed immediately, skipping the In-Progress queue, if the queue is empty
Dynamic Self Refresh	Disable Enable	Enable/Disable dynamic self-refresh in memory controller



Item	Option	Description
PMOP Value for PC0	4	Power Mode Opcode for PC0
PMOP Value for PCX	7	Power Mode Opcode for PCX
Per-Bit Margins	Disable Enable	Enable to show per-bit margins in MRC training
Open Page Policy Time	Disabled Immediate 30-60 ns 60-120 ns 120-240 ns 240-480 ns 480-960 ns 1-2 us	Set Page Closure Timer to Disabled / Immediate / 30-60 ns / 60-120ns / 120-240ns / 240-480ns / 480-960ns / 1-2us
Memory Thermal	Disable Enable	Enable/Disable Memory Thermal Management mode
Scrambler	Disable Enable	Enable / Disable the scrambler
Slow Power Down Exit	Disable Enable	Enable / Disable Slow Power Down Exit from pre-charge
Extended Temperature	Disable Enable	Enable / Disable Extended Temperature Range
Vref Override Enable	Disable Enable	Enables/Disables Vref Override Enable

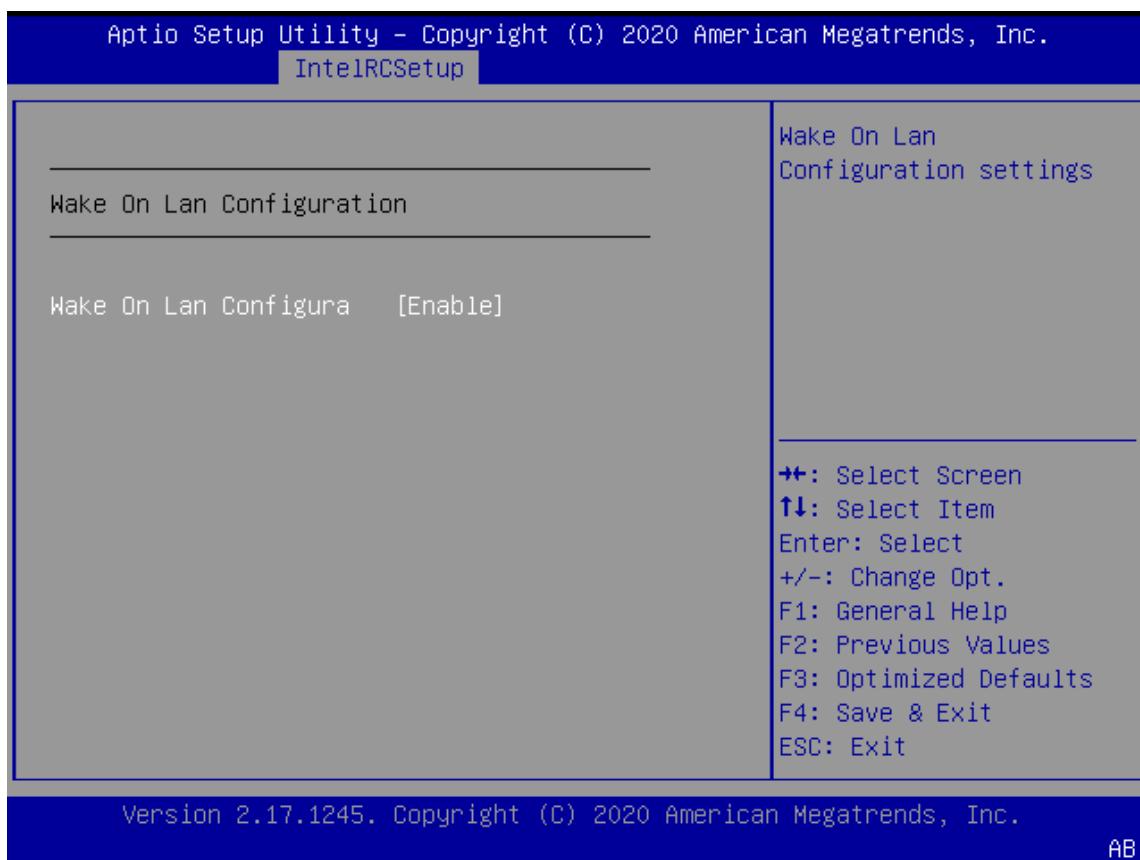


Item	Option	Description
tCL	Auto	
	5	
	6	
	7	
	8	Set tCL to Auto / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 DRAM Clocks
	9	
	10	
	11	
	12	
	13	
tRCD	Auto	
	5	
	6	
	7	
	8	Set tRCD to Auto / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 DRAM Clocks
	9	
	10	
	11	
	12	
	13	
tRP	Auto	
	5	
	6	Set tRP to Auto / 5 / 6 / 7 / 8 / 9 / 10 / 11 / 12 / 13 DRAM Clocks
	7	
	8	
	9	

	10 11 12 13	
tRAS	Auto 14 15 16 17 18 19 20 21 22 23 24	Set tRAS to Auto / 14 / 15 / 16 / 17 / 18 / 19 / 20 / 21 / 22 / 23 / 24 / 25 / 26 / 27 / 28 / 29 / 30 / 31 / 32 / 33 / 34 DRAM clocks
tRTP	Auto 4 5 6 7	Set tRTP to Auto / 4 / 5 / 6 / 7 DRAM clock
tRRD	Auto 4 5 6 7	Set tRRD to Auto / 4 / 5 / 6 / 7 DRAM clocks
tFAW	Auto 16 17 18 19 20 21 22 23 24 25 26	Set tFAW to Auto / 16 / 17 / 18 / 19 / 20 / 21 / 22 / 23 / 24 / 25 / 26 / 27 / 28 / 29 / 30 / 31 / 32 / 33 / 34 / 35 / 36 DRAM clocks
tCCD	Auto 4 12 18	Set tCCD to Auto / 4 / 12 / 18 DRAM clocks
tWTP	Auto 15 16 17 18 19 20 21 22 23 24	Set tWTP to Auto / 15 / 16 / 17 / 18 / 19 / 20 / 21 / 22 / 23 / 24 / 25 / 26 / 27 / 28 / 29 / 30 DRAM clocks

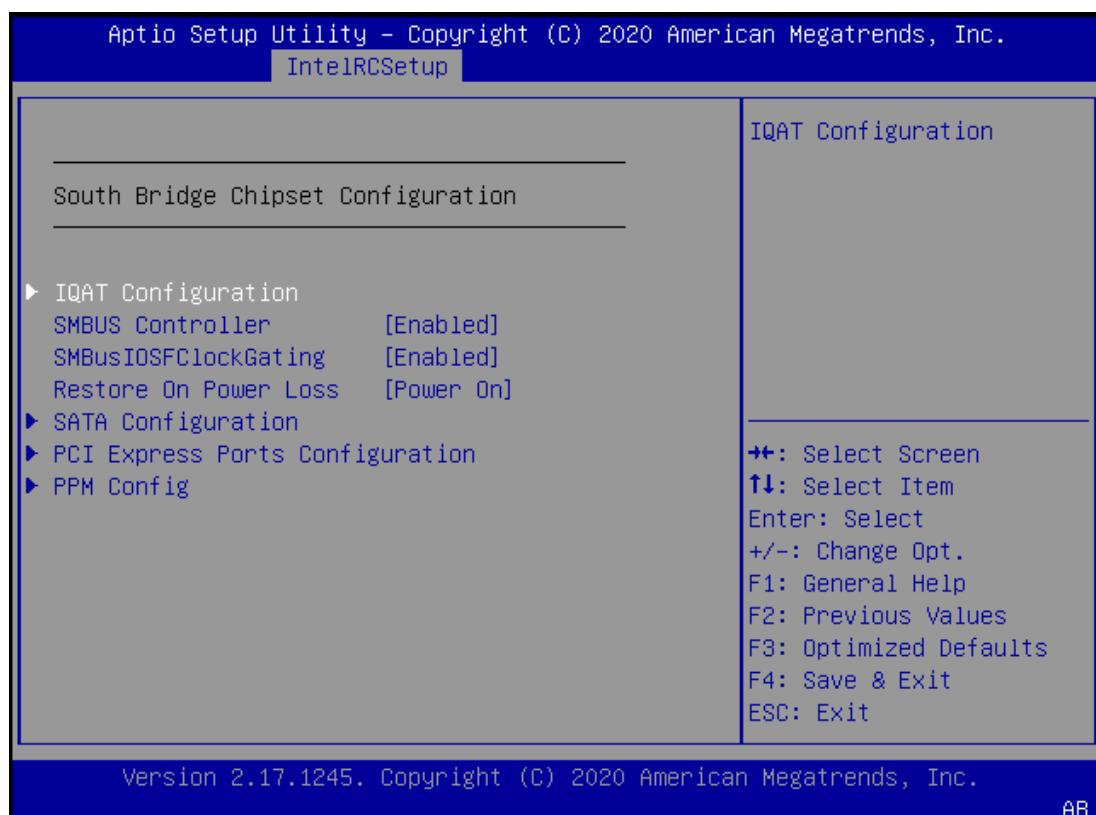
	25	
	Auto	
	5	
	6	
tWCL	7	Set tWCL to Auto / 5 / 6 / 7 / 8 / 9 DRAM clocks
	8	
	9	

Wake ON Lan Configuration



Item	Option	Description
Wake On Lan Configuration	Disable Enable	Wake On Lan Configuration settings

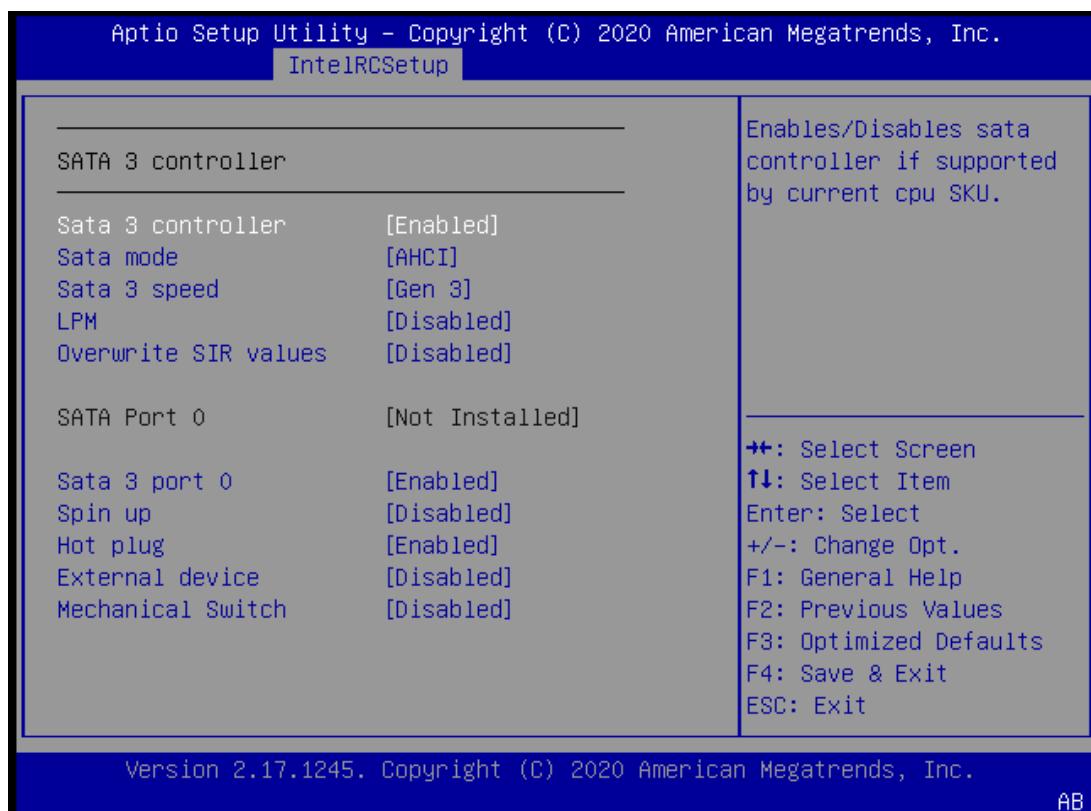
South Bridge Chipset Configuration



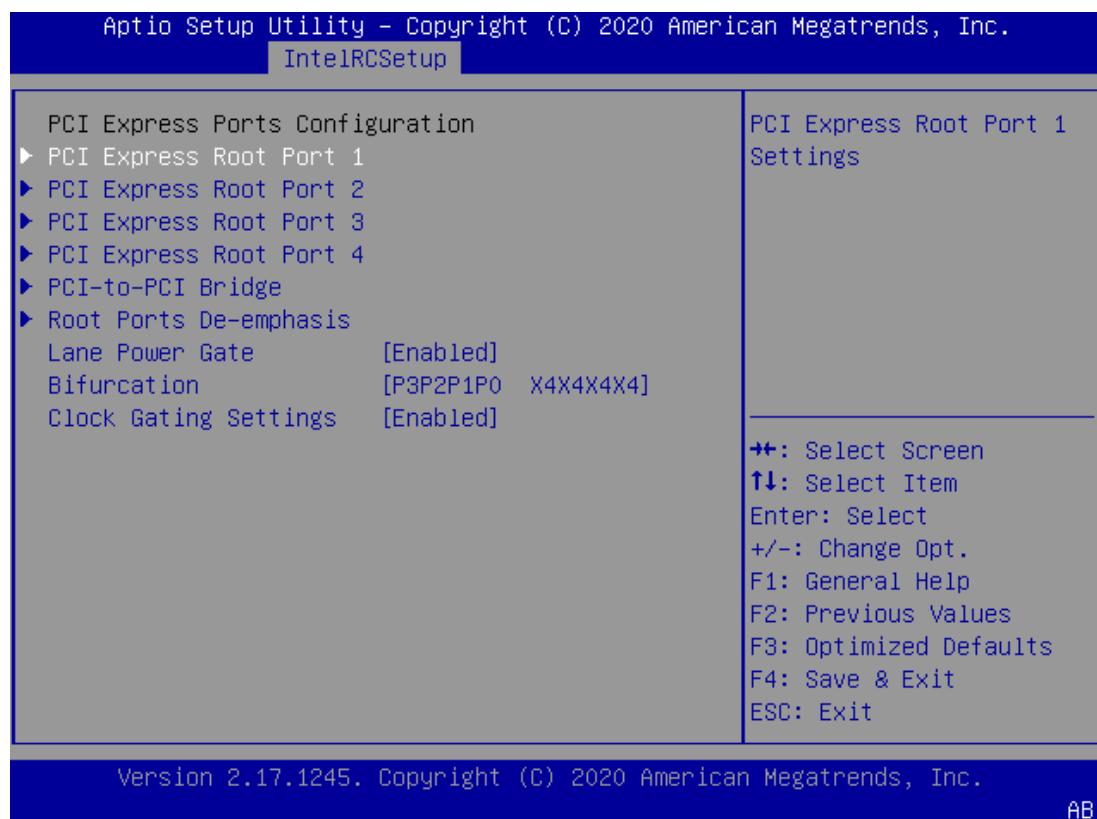
Feature	Option	Description
SMBUS Controller	Disable Enable	SMBUS Controller options
SMBusIOSFClockGating	Disable Enable	SMBusIOSFClockGating
Restore On Power Loss	Auto Power On Power Off	Restore On AC Power Loss Options



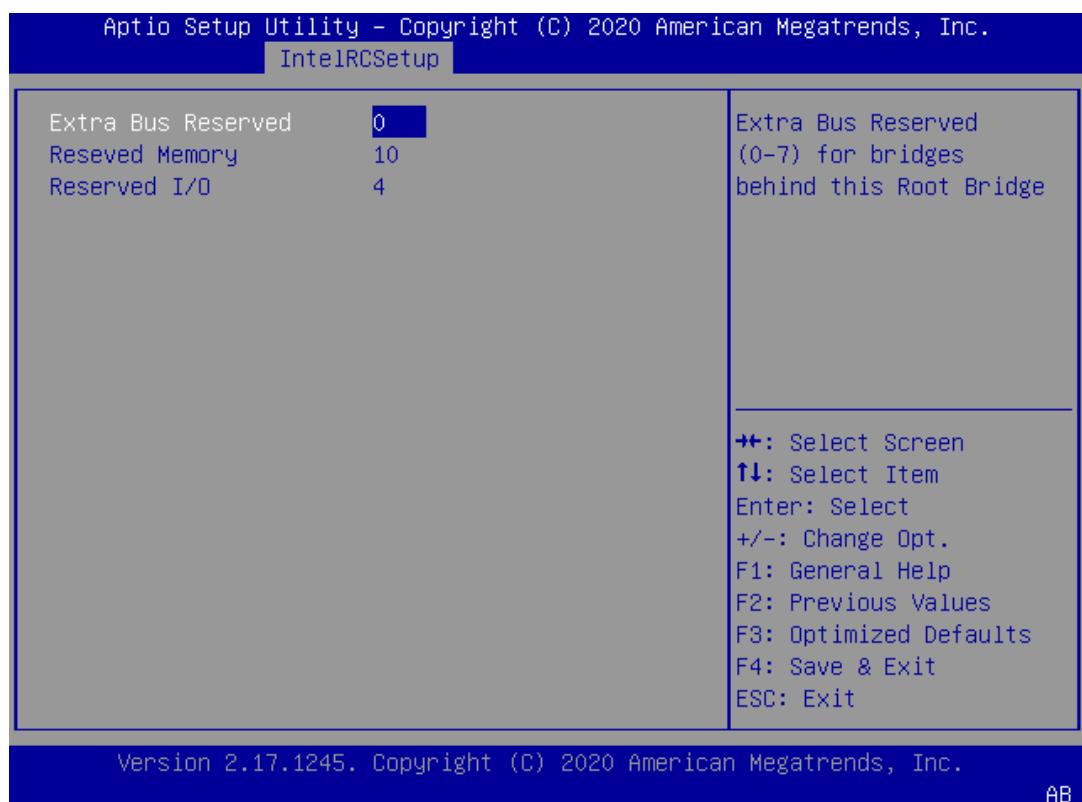
Feature	Option	Description
IQAT	Disable Enable	Hides IQAT device from OS



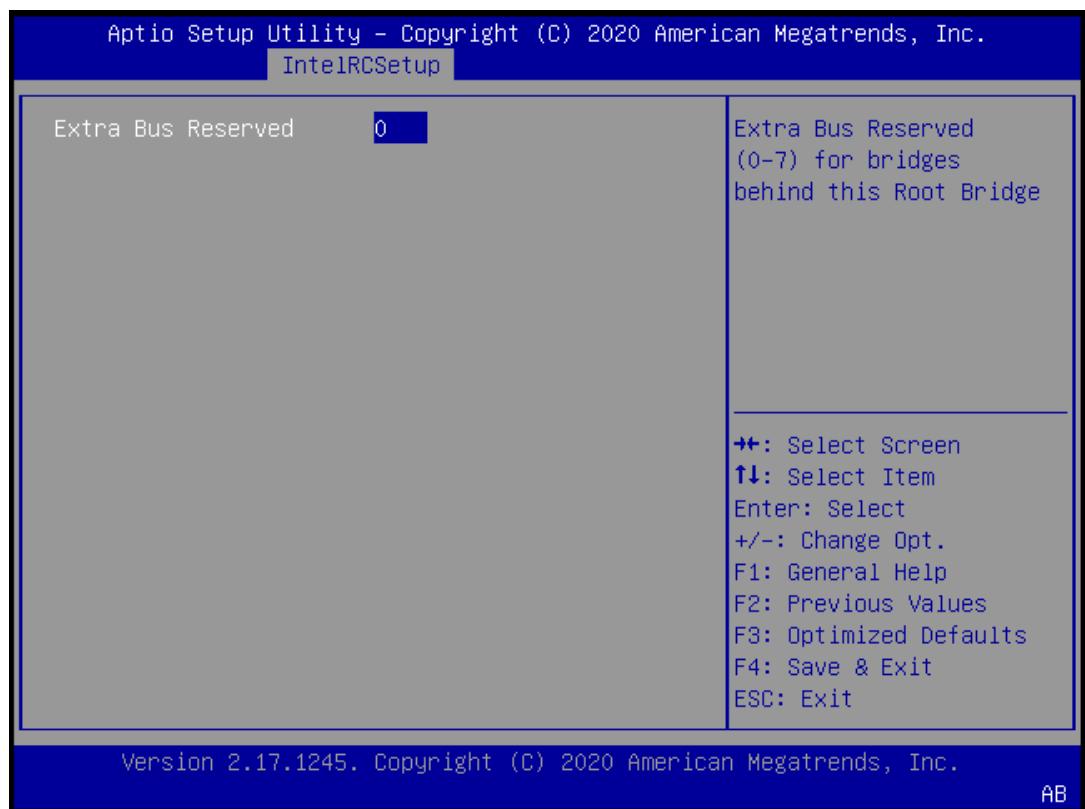
Feature	Option	Description
Sata 3 controller	Disable Enable	Enables/Disables sata controller if supported by current cpu SKU.
Sata mode	AHCI IDE	Sata mode
IDE Mode	Legacy Native	IDE Mode
Sata 3 speed	Gen 1 Gen 2 Gen 3	Indicates the highest allowable speed of the interface.
LPM	Disable Enable	Enables/Disables Link Power Management
Overwrite SIR values	Disable Enable	Overwrite SIR values
Sata 3 port 0	Disable Enable	Enables/Disables sata device if supported by current cpu SKU.
Spin up	Disable Enable	Spin up
External device	Disable Enable	External SATA device
Mechanical Switch	Disable Enable	Mechanical Switch



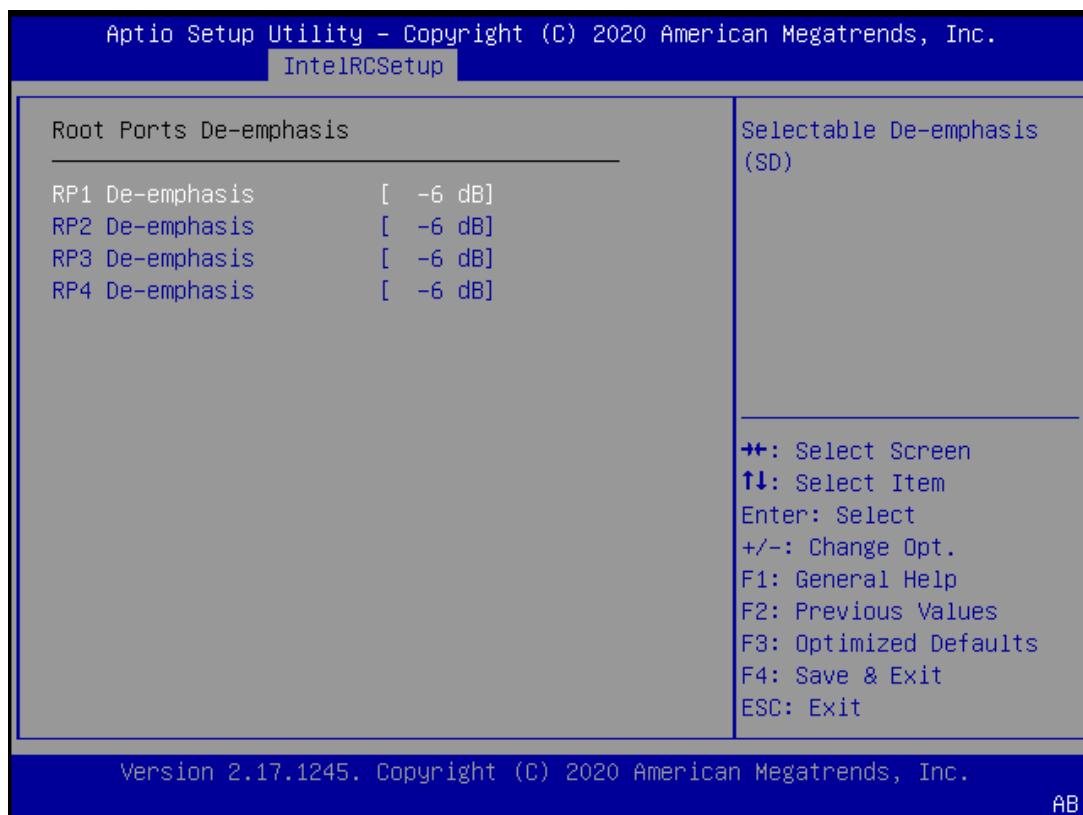
Feature	Option	Description
Lane Power Gate	Disable Enable	{Power Gate for PCIe Root Ports}
Bifurcation	Auto -----P0 X16 --P2--P0 X8X8 --P2P1P0 X8X4X4 P3P2--P0 X4X4X8 P3P2P1P0 X4X4X4X4	Select Root Complex Bifurcation Config
Clock Gating Settings	Disable Enable	Enable/Disable CL for PCIe Devices



Feature	Option	Description
Extra Bus Reserved	0	Extra Bus Reserved (0-7) for bridges behind this Root Bridge
Reserved Memory	10	Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge
Reserved I/O	4	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge



Feature	Option	Description
Extra Bus Reserved	0	Extra Bus Reserved (0-7) for bridges behind this Root Bridge

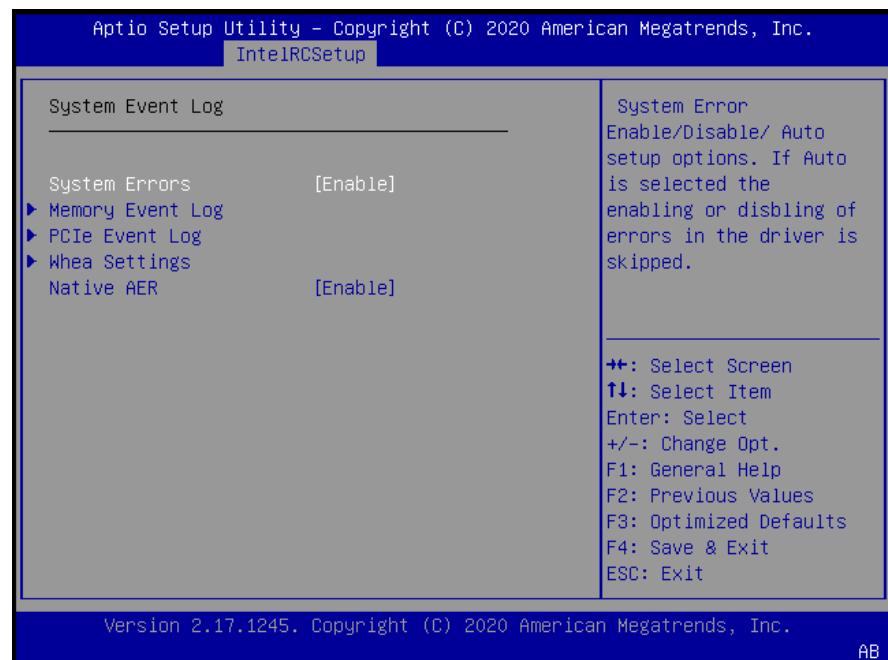


Feature	Option	Description
RP1 De-emphasis	-6 dB	Selectable De-emphasis(SD)
RP2 De-emphasis	-6 dB	Selectable De-emphasis(SD)
RP3 De-emphasis	-6 dB	Selectable De-emphasis(SD)
RP4 De-emphasis	-6 dB	Selectable De-emphasis(SD)

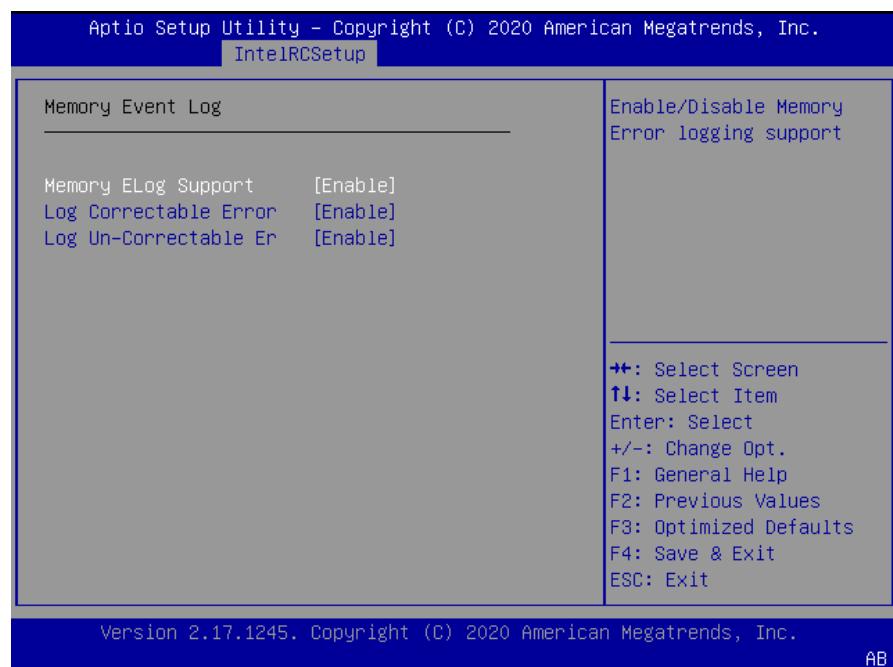


Feature	Option	Description
C-state POPUP	Disable Enable	Enable/Disable C-state POPUP

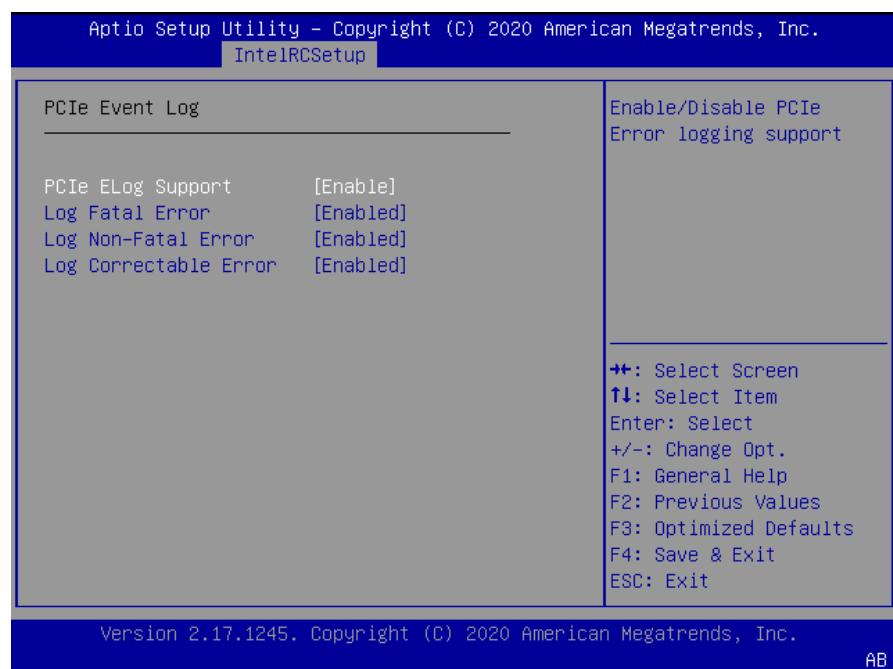
System Event Log



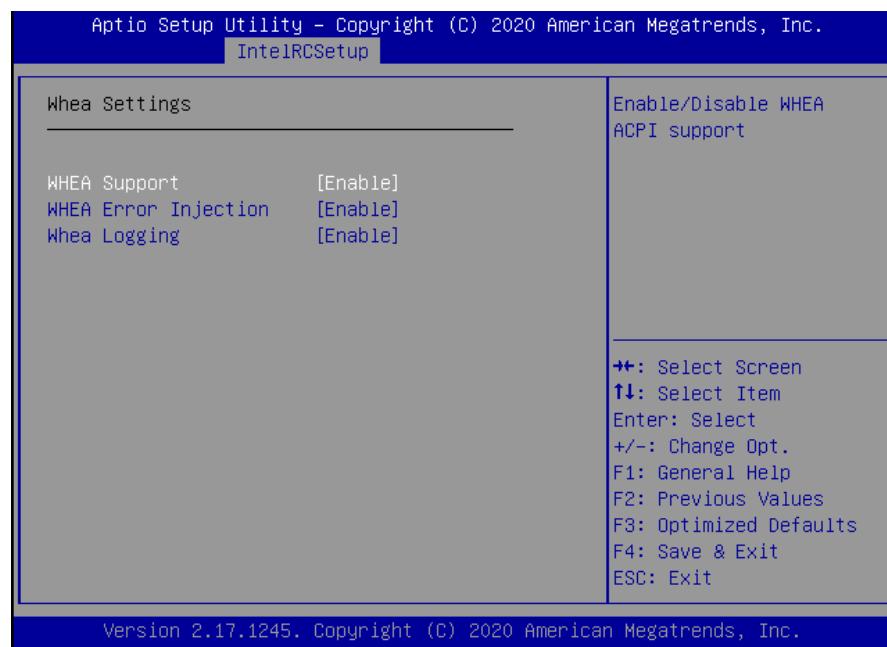
Feature	Option	Description
System Errors	Disable Enable	Enable/Disable C-state POPUP
Native AER	Disable Enable	Enable/Disable Native Advanced Error reporting capability.



Feature	Option	Description
Memory ELog Support	Disable Enable	Enable/Disable MemoryError logging support
Log Correctable Error	Disable Enable	Enable/Disable Correctable Memory Error logging support
Log Un-Correctable Error	Disable Enable	Enable/Disable un-Correctable Memory Error logging support



Feature	Option	Description
PCIe ELog Support	Disable Enable	Enable/Disable PCIe Error logging support
Log Fatal Error	Disable Enable	Send system event Signal on Fatal error
Log Non-Fatal Error	Disable Enable	Send system event Signal on Non Fatal error
Log Correctable Error	Disable Enable	Send system event Signal on Correctable error



Feature	Option	Description
WHEA Support	Disable Enable	Enable/Disable WHEA ACPI support
WHEA Error Injection	Disable Enable	Whea EINJ ACPI 5.0 support for set error type with address and vendor extensions.
Whea Logging	Disable Enable	Enable/Disable Whea logging of errors.

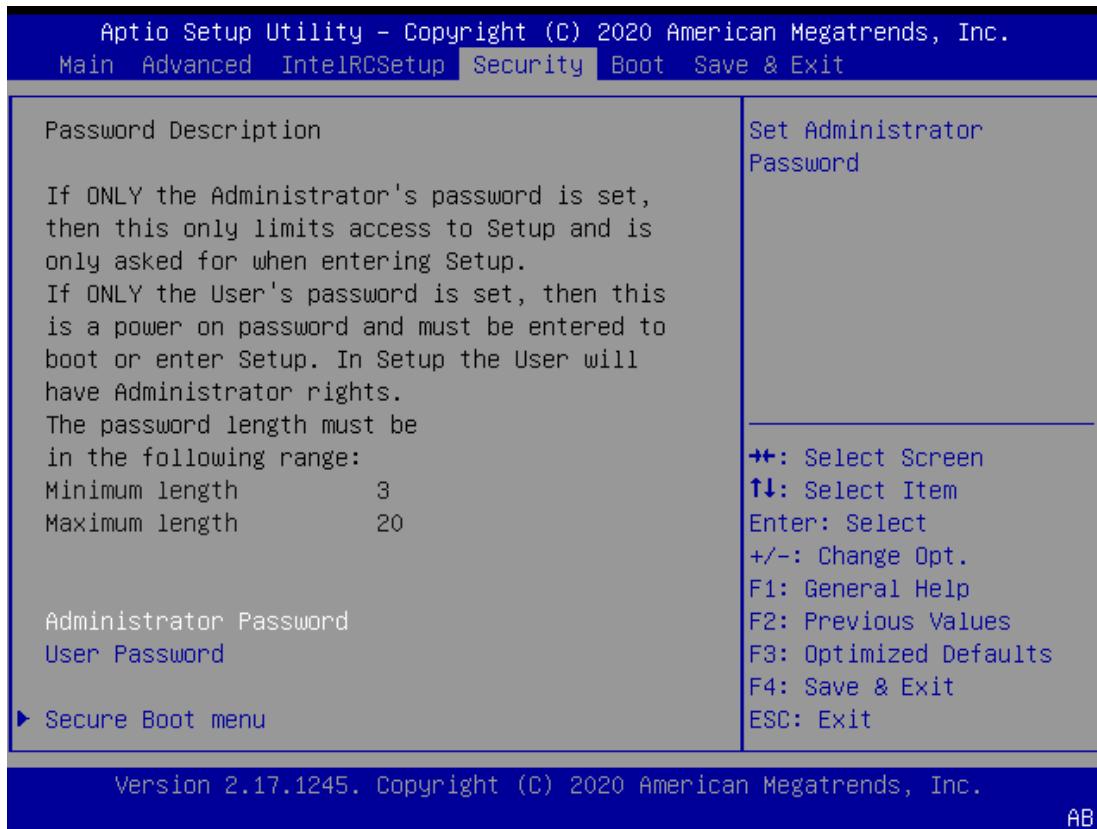
Security Setup

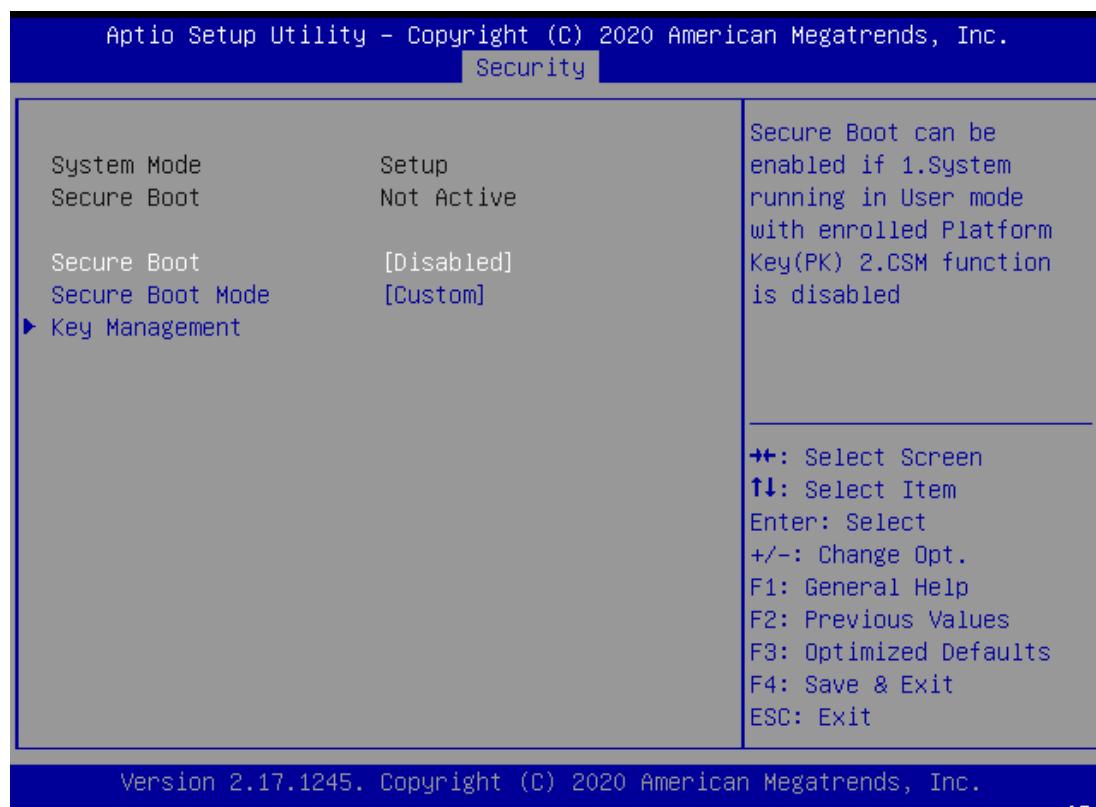
Select the Security menu item from the BIOS setup screen to enter the Security Setup screen.

Users can select any of the items in the left frame of the screen.

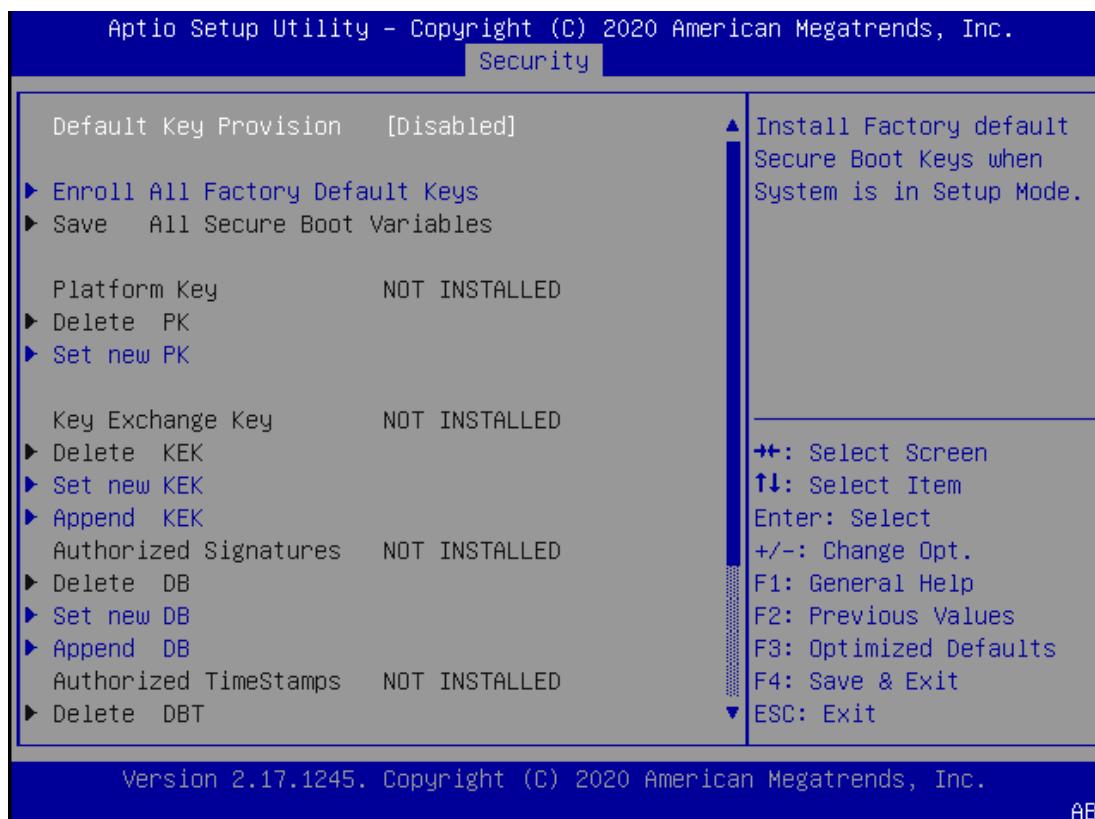
Item	Description
Administrator Password	If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup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

Secure Boot



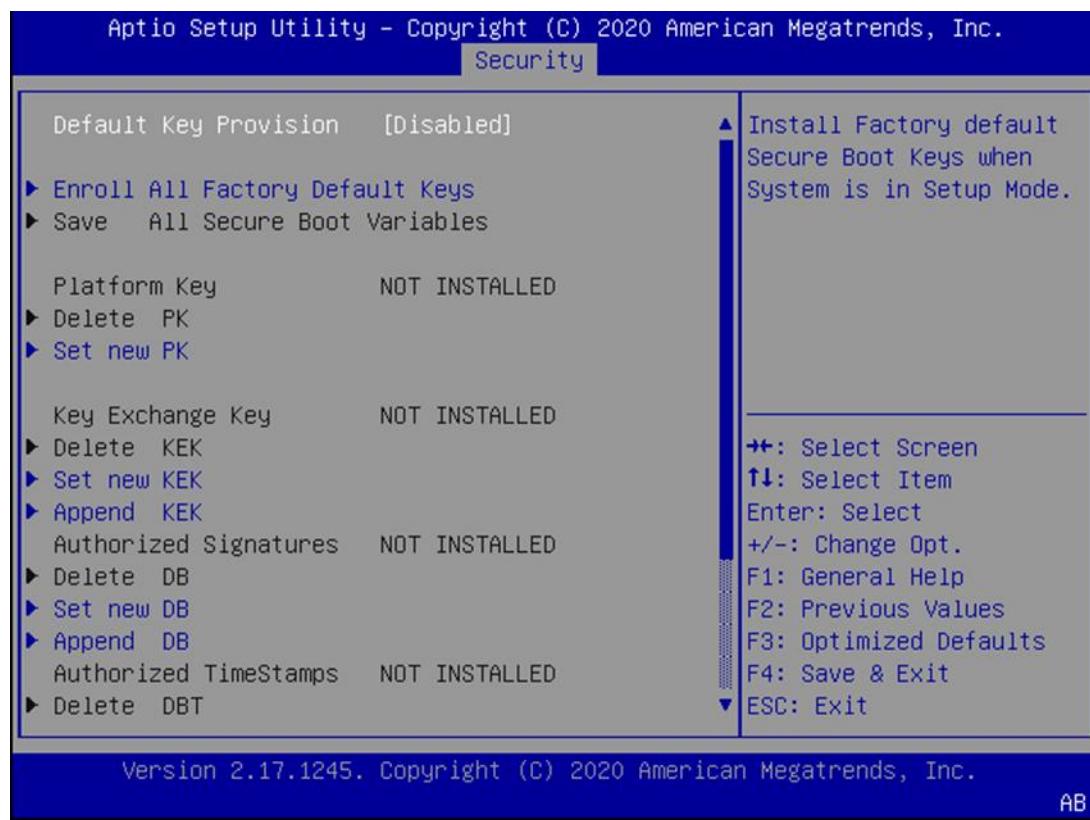


Item	Option	Description
Secure Boot	Disable Enable	Secure Boot can be enabled if 1.System running in User mode with enrolled Platform Key(PK) 2.CSM function is disabled
Secure Boot Mode	Standard Custom	Secure Boot mode selector. 'Custom' Mode enables users to change Image Execution policy and manage Secure Boot Keys.



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

Key Management

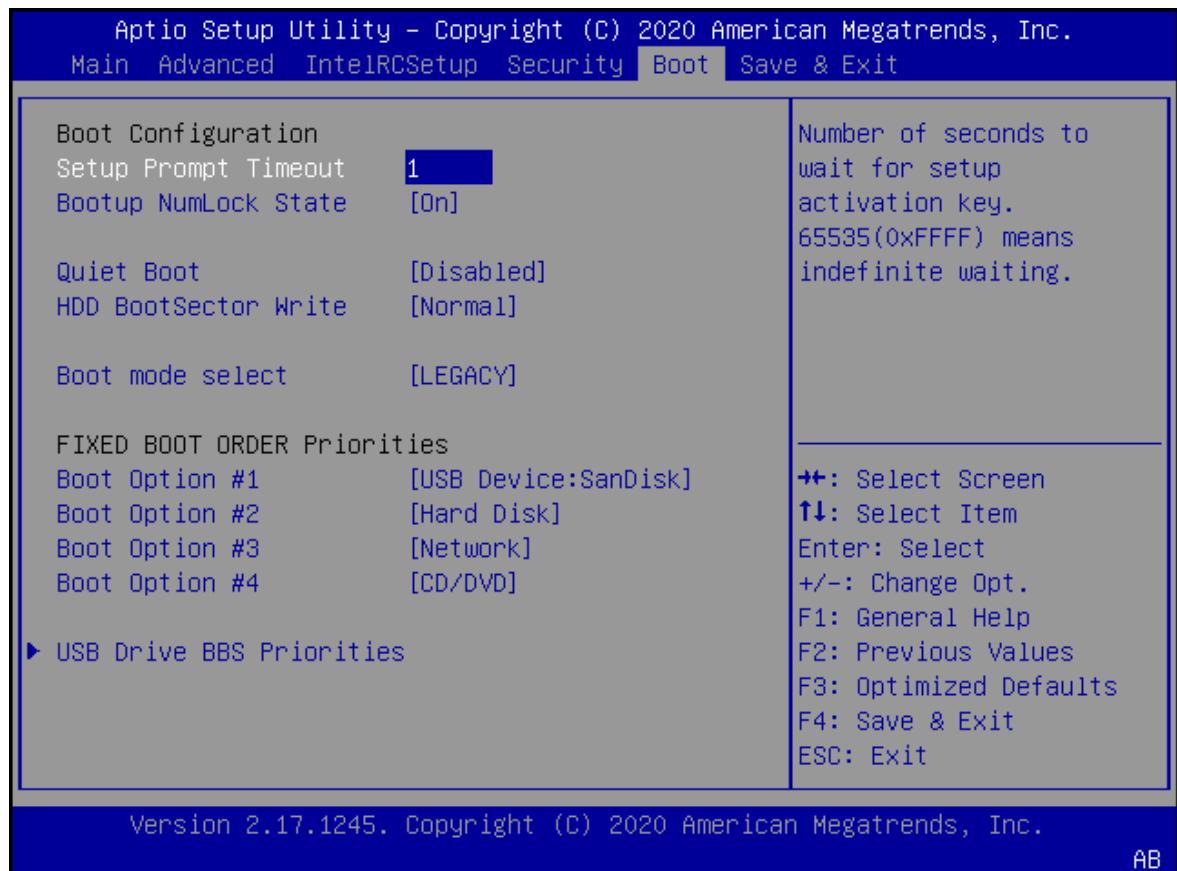


Item	Option	Description
Default Key Provision	Disabled	Install Factory default Secure Boot Keys when System is in Setup Mode
Enroll All Factory Default Keys	Yes	Force System to User Mode - install all Factory Default keys(PK,KEK, <u>db,dbt,dbx</u>). Change takes effect after reboot.
Set new PK	Yes	Insert Factory Default Keys or load from a file formatted as:\n1. Public Key Certificate in:\n a)EFI_SIGNATURE_LIST,\n b)EFI_CERT_X509 (DER encoded),\n c)EFI_CERT_RSA2048 (bin),\n d)EFI_CERT_SHA256 (bin)\n2. Efi Time-Based Authenticated Variable"
Set new KEK	No	Insert Factory Default Keys or load from a file formatted as:\n1. Public Key Certificate in:\n a)EFI_SIGNATURE_LIST,\n b)EFI_CERT_X509 (DER encoded),\n c)EFI_CERT_RSA2048 (bin),\n d)EFI_CERT_SHA256 (bin)\n2. Efi Time-Based Authenticated Variable"
Append KEK	Yes	Press 'Yes' to load '%s'\nfrom Factory Defaults or\nSelect 'No' to load from a file
Set new DB		Insert Factory Default Keys or load from a file formatted

		as:\n1.Public Key Certificate in:\n a)EFI_SIGNATURE_LIST,\n b)EFI_CERT_X509 (DER encoded),\n c)EFI_CERT_RSA2048 (bin),\n d)EFI_CERT_SHA256 (bin)\n2. <u>Efi</u> Time-Based Authenticated Variable"
Append DB		Press 'Yes' to load '%s'\nfrom Factory Defaults or\nSelect 'No' to load from a file
Set new DBT	Yes	Insert Factory Default Keys or load from a file formatted as:\n1.Public Key Certificate in:\n a)EFI_SIGNATURE_LIST,\n b)EFI_CERT_X509 (DER encoded),\n c)EFI_CERT_RSA2048 (bin),\n d)EFI_CERT_SHA256 (bin)\n2. <u>Efi</u> Time-Based Authenticated Variable"
	No	Press 'Yes' to load '%s'\nfrom Factory Defaults or\nSelect 'No' to load from a file

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.

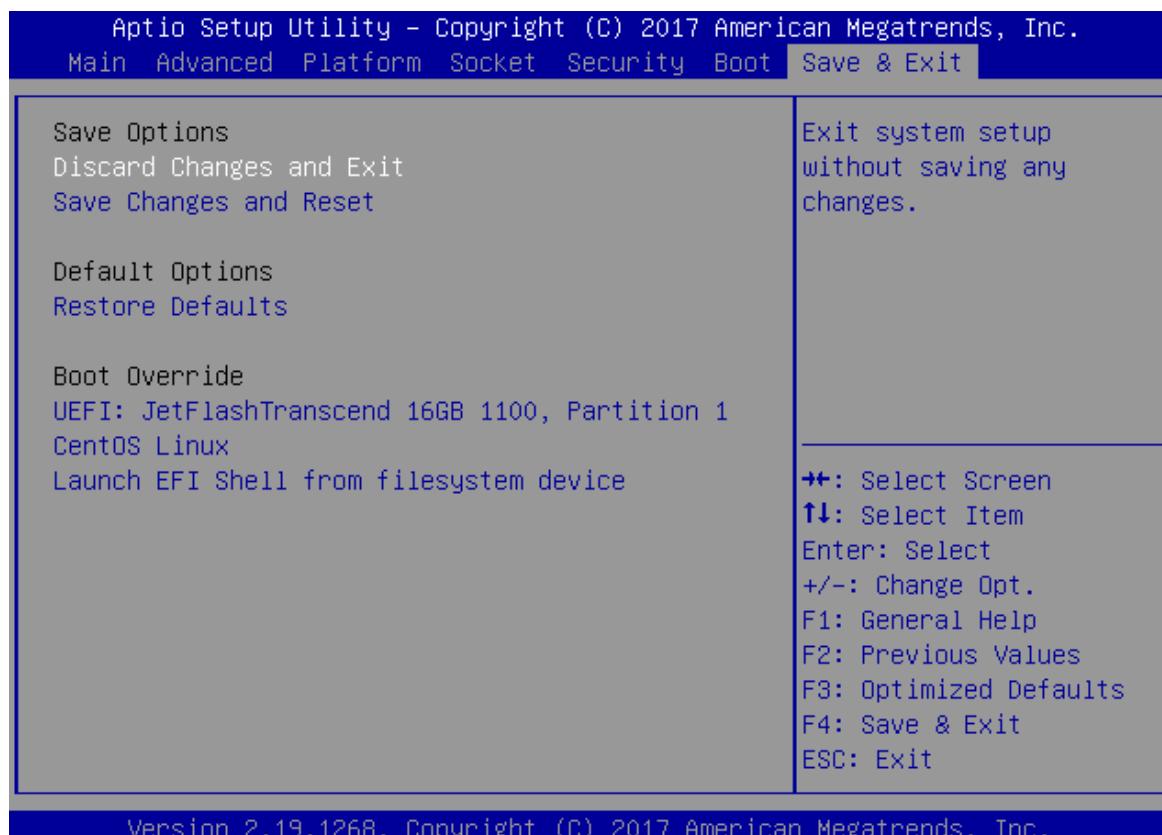


Item	Option	Description
Setup Prompt Timeout	5	Number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On	Select the keyboard NumLock state
Boot mode select	LEGACY	Select boot mode for LEGACY or UEFI.
	UEFI	

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

Save & Exit Setup

Use [→] or [←] to select **Save & Exit** setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.



Item	Option	Description
Save Changes and Exit	Yes When Users have completed the system configuration changes, select this option to save the changes and Exit from BIOS Setup, so the new system configuration parameters can take effect. The following window will appear after selecting the 'Save Changes and Exit' option selected. Select YES to Save Changes and Exit Setup.	
Discard Changes and Exit	Yes Select this option to quit Setup without saving any modifications to the system configuration. The following window will appear after selecting the 'Discard Changes and Exit' option selected. Select YES to Discard changes and Exit Setup.	
Restore Defaults	Yes Restore default values for all setup options. Select YES to load Optimized defaults.	

APPENDIX A: LED INDICATOR EXPLANATIONS

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



► System Power

<i>Solid Green</i>	<i>The system is powered on</i>
<i>Off</i>	<i>The system is powered off</i>

► System Status

This LED indicator is programmable. You could program it to display the operating status of the behaviors described below:

<i>Solid Green</i>	<i>Defined by GPIO</i>
<i>Solid Red</i>	<i>Defined by GPIO</i>
<i>Off</i>	<i>Defined by GPIO</i>

► HDD Activity

If this LED blinks, it indicates data access activities; otherwise, it remains off.

<i>Blinking Amber</i>	<i>Data access activity</i>
<i>Off</i>	<i>No data access activity</i>



► Link Activity

<i>Blinking Amber</i>	<i>Link has been established and there is activity on this port</i>
<i>Solid Amber</i>	<i>Link has been established and there is no activity on this port</i>
<i>Off</i>	<i>No link is established</i>

► Speed

<i>Solid Amber</i>	<i>Operating as a Gigabit connection (1000 Mbps)</i>
<i>Solid Green</i>	<i>Operating as a 100-Mbps connection</i>
<i>Off</i>	<i>Operating as a 10-Mbps connection</i>

APPENDIX B: INSTALLING INTEL® LAN CONTROLLER DRIVER FOR LINUX

To install the Intel® LAN controller base driver for the Red Hat® and Linux operating system, please visit, enter the product category and download the utility package of this system.

For the latest driver update, please visit Intel® download center at <https://downloadcenter.intel.com/>, use the keyword search or the filter to access the driver's product page, and then download the latest controller driver as well as the ReadMe document.

Product Name Keyword	I211-AT
Download Type	Drivers
Operating System	Linux*
Product page	https://downloadcenter.intel.com/product/64404/Intel-Ethernet-Controller-I211-AT

APPENDIX C: TERMS AND CONDITIONS

Warranty Policy

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

RMA Service

Requesting an RMA#

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



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

RMA Service Request Form

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

*Problem Code:

- 01:D.O.A.
- 02: Second Time R.M.A.
- 03: CMOS Data L
- 04: FDC Fail
- 05: HDC Fail
- 06: Bad Slot

- 07: BIOS Problem
- 08: Keyboard Controller Fail
- 09: Cache RMA Problem
- 10: Memory Socket Bad
- 11: Hang Up Software
- 12: Out Look Damage

- 13: SCSI
- 14: LPT Port
- 15: PS2
- 16: LAN
- 17: COM Port
- 18: Watchdog

- 19: DIO
- 20: Buzzer
- 21: Shut Down
- 22: Panel Fail
- 23: CRT Fail
- 24: Others (Pls specify)

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date