Lanner

Network Appliance Platform

Hardware Platforms for Network Computing

NCA-1516 User Manual

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About this Document

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

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

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

Icons Descriptions

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

Icon Descriptions

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

Online Resources

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

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

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Federal Communication Commission Interference Statement

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

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

FCC Caution

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

Note

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

Important

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

Safety Guidelines

Follow these guidelines to ensure general safety:

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

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Lithium Battery Caution

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

Avertissement concernant la pile au lithium

- Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- Jetez les piles usagées conformément aux instructions.
- L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.

Operating Safety

- Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.

- Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Sécurité de fonctionnement

- L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- Les décharges électrostatiques (ESD) peuvent endommager l'équipement et gêner les circuits électriques. Des dégâts d'ESD surviennent lorsque des composants électroniques sont mal manipulés et peuvent causer des pannes totales ou intermittentes. Suivez les procédures de prévention d'ESD lors du retrait et du remplacement de composants.
- Portez un bracelet anti-ESD et veillez à ce qu'il soit bien au contact de la peau. Si aucun bracelet n'est disponible, reliez votre corps à la terre en touchant la partie métallique du châssis.
- Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Mounting Installation Precautions

The following should be put into consideration for rack-mount or similar mounting installations:

- Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.
- Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable Grounding - Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Electrical Safety Instructions

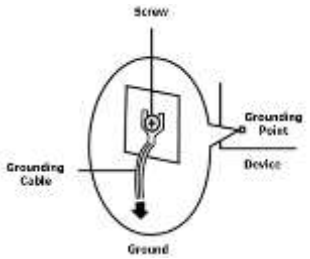
Before turning on the device, ground the grounding cable of the equipment. Proper grounding (grounding) is very important to protect the equipment against the harmful effects of external noise and to reduce the risk of electrocution in the event of a lightning strike. To uninstall the equipment, disconnect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

Consignes de sécurité électrique

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

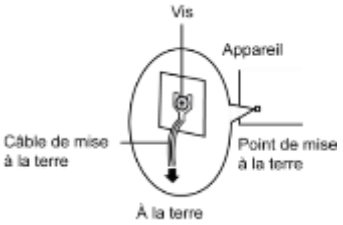
Grounding Procedure for DC Power Source

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



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

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



- This equipment must be grounded. The power cord for product should be connected to a socket-outlet with earthing connection.
  Cet équipement doit être mis à la terre. La fiche d'alimentation doit être connectée à une prise de terre correctement câblée

- Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.
  Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

- The machine can only be used in a restricted access location and has installation instructions by a skilled person (for Fan side).
  Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT.

Instruction for the installation of the conductor to building earth by a skilled person.

Table of Contents

CHAPTER 1: PRODUCT OVERVIEW

The NCA-1516, a desktop network appliance powered by Intel® Atom® C3000, is capable of both mmWave 5G, Sub-6GHz 5G and its Wi-Fi 6 (Optional) is both 2.4G and 5G compatible. Hardware performance is supercharged with Intel's QuickAssist Technology and Intel® AES-NI. The NCA-1516 is equipped with ample network communication features and configurations for vCPE/uCPE and Edge security.

The NCA-1516 offers a mPCIe expansion slot that supports Intel Movidius Myriad X Vision Processing Unit (VPU). The Intel Movidius VPU creates a reliable hardware platform for developers to deploy a robust Edge AI solution for intelligent surveillance, traffic management, access control, retail and beyond.

Package Content

Your package contains the following items:

- 1x NCA-1516 Network Security Platform
- 1x Power Adapter
- 1x Power Cable
- 4x Rubber Foot
- 1x Nameplate
- 1x Console Cable

Optional Accessory Kits

Model	Description
FN980	5G Sub 6 Kit for NCA-1516
RM500Q-AE	5G Sub 6 Kit for NCA-1516
EM7455	LTE Kit for NCA-1516
EM7430	LTE Kit for NCA-1516
EM7465	LTE Kit for NCA-1516
EM7411	LTE Kit for NCA-1516
EM7511	LTE Kit for NCA-1516
WLE-1216VX	Wi-Fi Kit for NCA-1516
WPEB-265AXI	Wi-Fi Kit for NCA-1516
WLE600VX	Wi-Fi Kit for NCA-1516
IO-1516P1A	PoE Kit for NCA-1516
Rackmount Kit	1U Rackmount kit

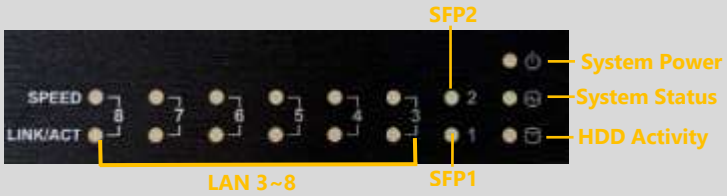
Ordering Information

SKU No.	Main Features
NCA-1516A	C3958, 2x DDR4 ECC SODIMM, 6x 1GbE RJ45 , 2x 10G SFP+ w/ LED, 60W Adapter
NCA-1516B	C3858, 2x DDR4 ECC SODIMM, 6x 1GbE RJ45 , 2x 10G SFP+ w/ LED, 60W Adapter
NCA-1516C	C3758, 2x DDR4 ECC SODIMM, 6x 1GbE RJ45 , 2x 10G SFP+ w/ LED, 60W Adapter
NCA-1516D	C3558, 2x DDR4 ECC SODIMM, 6x 1GbE RJ45 , 2x 10G SFP+ w/ LED, 60W Adapter
NCA-1516E	C3758R, 2xDDR4 ECC SODIMM, 6x 1GbE RJ45, 2x 10G SFP+ w/ LED, 60W Adapter
NCA-1516F	C3558R, 2xDDR4 ECC SODIMM, 6x 1GbE RJ45, 2x 10G SFP+ w/ LED, 60W Adapter

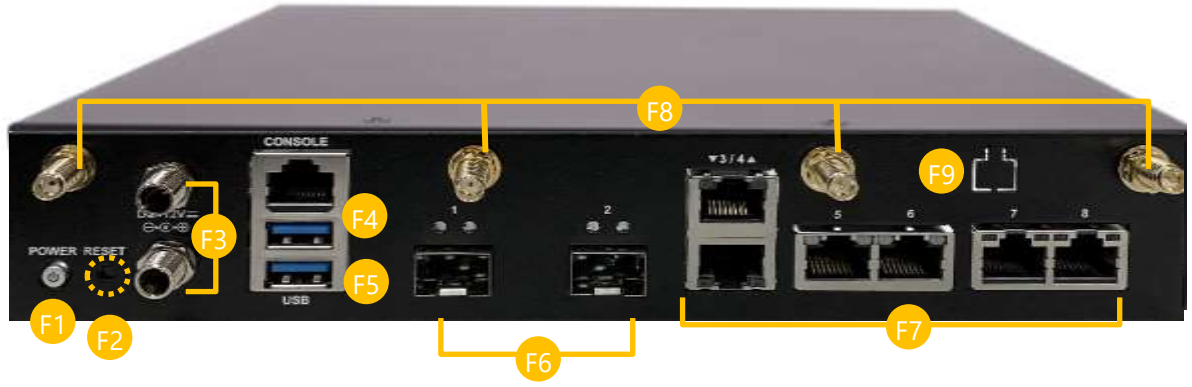
System Specifications

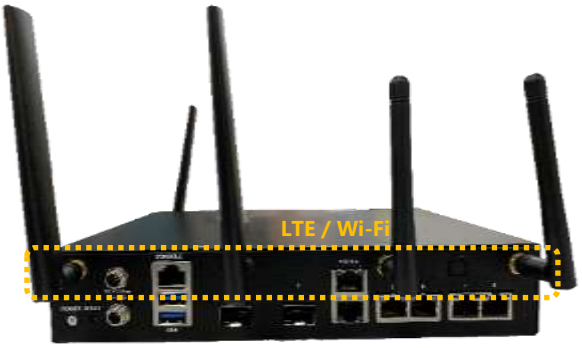
Form Factor		Desktop
Platform	Processor Options	Intel® Atom® C3000 (By SKU)
	CPU Socket	Onboard
	Chipset	SoC
	Security Acceleration	Intel® QuickAssist Technology
BIOS		AMI SPI Flash BIOS
System Memory	Technology	DDR4 1866/2133/2400MHz ECC/Non-ECC (By SKU)
	Max. Capacity	64GB
	Socket	2x 260-pin SODIMM
Networking	Ethernet Ports (By SKU)	4x 1GbE RJ45 Intel® i350 2x 1GbE RJ45 Intel® SoC Integrated MAC (Optional PoE+ Support) 2x 10G SFP+ SoC Integrated MAC
	Bypass	N/A
	NIC Module Slot	N/A
LOM	IO Interface/OPMA slot	N/A
I/O Interface	Reset Button	1x Reset Button (Default software reset control by GPIO)
	LED Indicator	Power/Status/Storage
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 3.0 Ports
	Power Input	2x DC Jack (Optional 2nd DC Jack)
Storage	HDD/SSD Support	N/A
	Onboard Slots	1x M.2 2242 B-Key (SATA); 1x Onboard EMMC 8G (By Request)
Expansion	M.2	1x M.2 3052/3580 B-Key (PCIe/USB 3.0) 1x M.2 3042 B-Key (USB 3.0)
	mini-PCIe	1x Mini-PCIe (PCIe/USB2.0)
	SIM card Slot	2x Nano SIM Slot (dedicated to an optionally installed LTE module)
Miscellaneous	Watchdog	Yes
	Internal RTC with Li Battery	Yes
	TPM	Yes
Cooling	System	1 x Cooling Fan with Smart Fan or Fanless (By Request)
	Processor	Passive CPU Heatsink
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~95% Non-Operating
System Dimensions	(WxDxH)	231 x 200 x 44 mm
	Weight	1.2 kg
Package Dimensions	(WxDxH)	358 x 135 x 290 mm
	Weight	2.75 kg
Power	Type/Watts	60W 5A/12V PSU
	Input	AC 100~240V @50~60 Hz
Approvals and Compliance		RoHS, CE/FCC Class B, UL

Rear Panel

No.	Description	
R1	SIM Card Slot	2x Nano SIM Slots
R2	LED Indicators	
R3	Antenna Port	2x SMA connector for LTE module (Optional) 

Front Panel

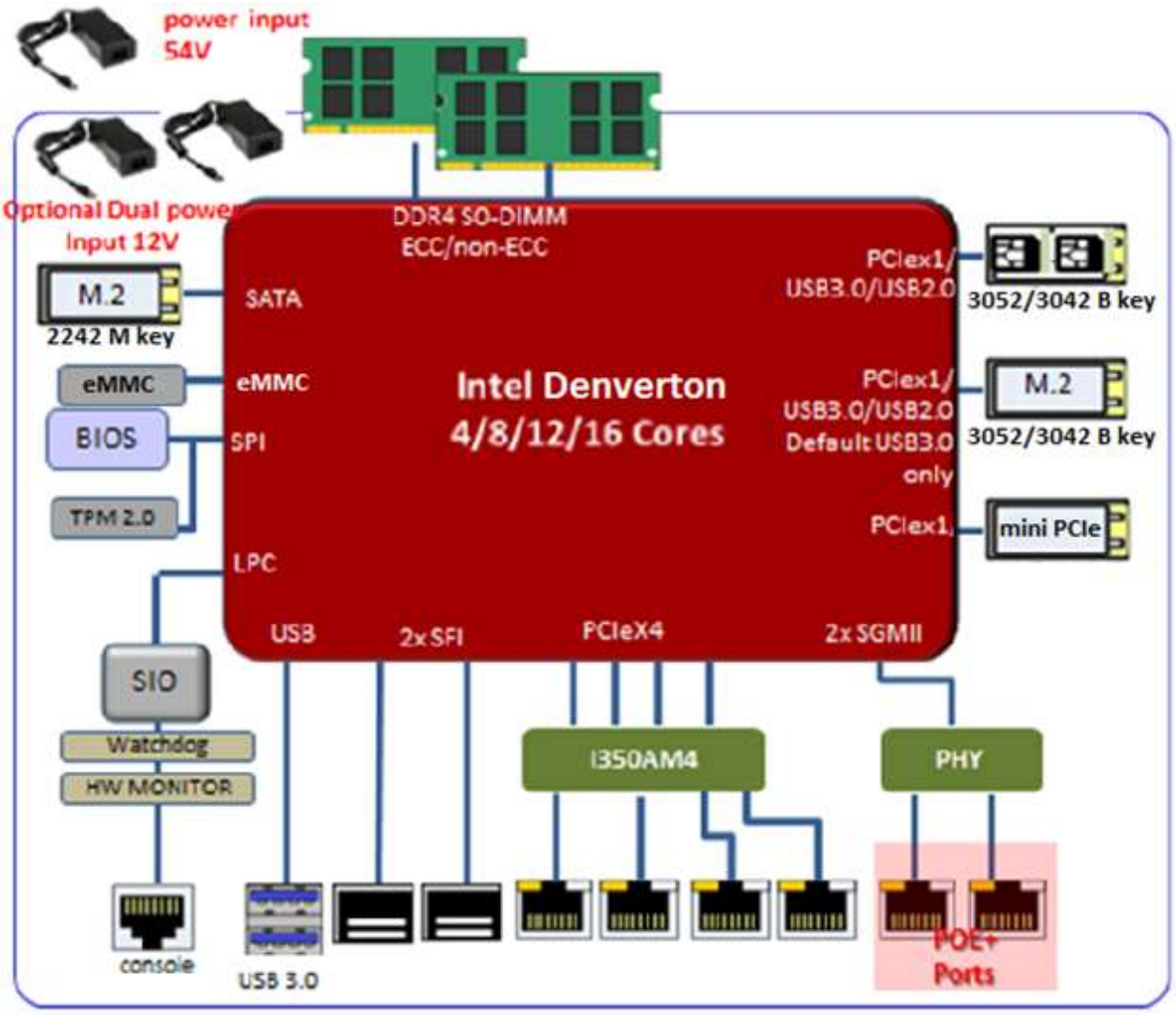


No.	Description	
F1	Power Switch	Press to power on/off the system
F2	Reset Button	1x Reset Button
F3	Power Supply	DC Jack
F4	Console Port	1x RJ45 Console Port
F5	USB Port	2x USB 3.0 Ports
F6	SFP Port	2x 10G SFP+ Ports
F7	LAN Port	6x 1GbE RJ45 Ports
F8	Antenna Port	4x SMA connectors for Wi-Fi / LTE module (Optional) 
F9	PoE Expansion	Expansion PoE Kit Port (Optional)

Motherboard Information

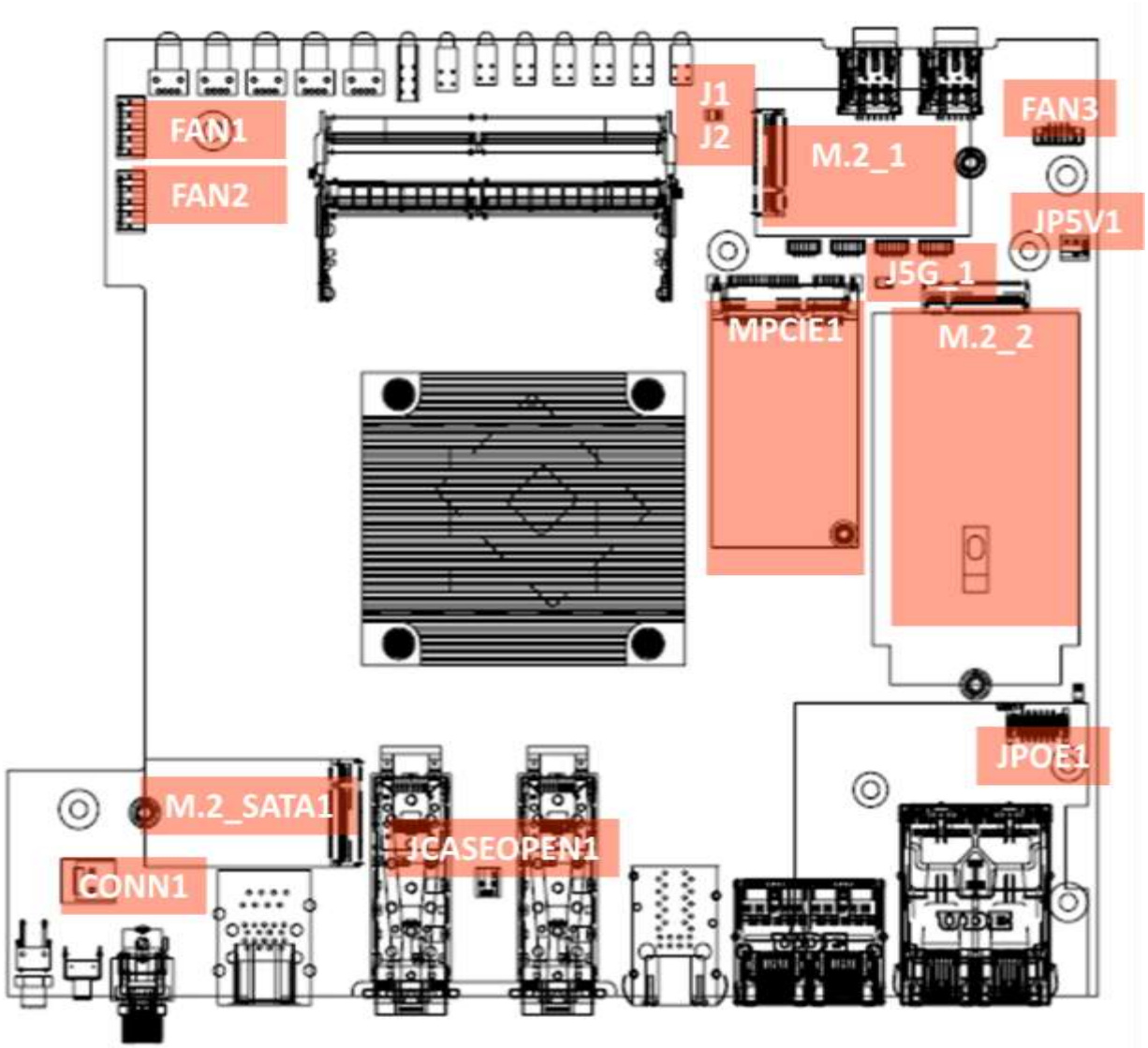
Block Diagram

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



Jumper Setting and Pin Assignment

The motherboard board layout shows the connectors on the board. Refer to the below picture as a reference of the pin assignments.



FAN1、FAN2

Pin No.	Description
1	GND
2	12V
3	FANIN
4	NC
5	FANOUT

J2/J1: SIM Socket Selection

SIM Socket Selection		Location		
J2	J1	SIM Slot 1	SIM Slot 2	
1-2 ON	**1-2 ON**	M.2_2 Slot (WWAN UIM 1)	NA	DEFAULT
2-3 ON	**1-2 ON**	M.2_1 Slot (WWAN UIM 1)	NA	
1-2 ON	**2-3 ON**	M.2_2 Slot (WWAN UIM 1)	M.2_1 Slot (WWAN UIM 2)	
2-3 ON	**2-3 ON**	M.2_1 Slot (WWAN UIM 1)	M.2_1 Slot (WWAN UIM 2)	

JCPLD1: Burning CPLD Code Pin Header

Pin No.	Description	Pin No.	Description
1	JTAG_PLD_TCK	2	GND
3	JTAG_PLD_TDO	4	+P3V3_AUX
5	JTAG_PLD_TMS	6	Not Connected
7	Not Connected	8	Not Connected
9	JTAG_PLD_TDI	10	GND

FAN3: 5G Module FAN Connector (Optional Usage)

Pin No.	Description
1	GND
2	12V
3	5G_FAN_IN_CONN
4	5G_FAN_CTL_CONN

MMWAVE1 / MMWAVE2 / MMWAVE3 / MMWAVE4 (Optional Usage):

Millimeter Wave Power Connector Source to Antenna

MMWAVE1		MMWAVE2		MMWAVE3		MMWAVE4	
Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	MMWAVE_PON0	1	MMWAVE_PON1	1	MMWAVE_PON2	1	MMWAVE_PON3
2	PON_GND	2	PON_GND	2	PON_GND	2	PON_GND
3	+mmWAVE_PWR	3	+mmWAVE_PWR	3	+mmWAVE_PWR	3	+mmWAVE_PWR
4	+P3V7_S	4	+P3V7_S	4	+P3V7_S	4	+P3V7_S
5	GND	5	GND	5	GND	5	GND

J5G_1: 5G Module Selection Pin Header (Optional Usage)

1-2/ 3-4 / 5-6/ 7-8/ 9-10 Short for EM9190, Remove for FM980n

Pin No.	Description	Pin No.	Description
1	PCIE_DIS	2	1.8V
3	VBUS_SENSE	4	1.8V
5	EM9190_VCC1	6	3.3V
7	EM9190_VCC2	8	3.3V
9	EM9190_VCC3	10	3.3V

JPV1: 5V Power Connector for Feed Wi-Fi 6 Module (Optional Usage)

Pin No.	Description
1	GND
2	5V

J80PORT1: Debug 80 Port Pin Header

Pin No.	Description	Pin No.	Description
1	LPC_CLKOUT0	2	SOC_LPC_LAD1
3	SOC_PLTRST_N	4	SOC_LPC_LAD0
5	SOC_LPC_FRAME_N	6	3.3V
7	SOC_LPC_LAD3	8	Not Connected
9	SOC_LPC_LAD2	10	GND

DYING_GASP1: Dying Gasp Board Pin Header 1

Pin No.	Description	Pin No.	Description
1	LTC3350_RESET_STATUS	2	EN_SCAP_CHARGE
3	SCAP_STATUS_FULL	4	DGPFI
5	Not Connected	6	Not Connected

J3: ME Recover Mode, mounted for normal use

Pin No.	Description
1	GND
2	ME_RECVR_MODE

JSPIROM1: For Burning SPI ROM Pin Header

Pin No.	Description	Pin No.	Description
1	SPI_HD1#	2	Not Connected
3	SOC_SPI_CS0#_ROM	4	3.3V
5	SOC_SPI_MISO_ROM	6	SOC_SPI_IO3_ROM
7	Not Connected	8	SOC_SPI_CLK_ROM
9	GND	10	SOC_SPI_MOSI_ROM

J4: For Dying Gasp Module Pin Selection

1-2 For Dying Gasp
2-3 For Normal SFP+ Module

Pin No.	Description
1	+P3V3_SFP+
2	SFP+0_RS0
3	GND

JRTC1: Clear RTC pin header

1-2 For Normal Usage
2-3 Clear RTC

Pin No.	Description
1	Not Connected
2	SOC_SRTCRST_N
3	GND

JCMOS1: Clear CMOS pin header

1-2 For Normal Usage
2-3 Clear CMOS

Pin No.	Description
1	Not Connected
2	SOC_RTEST_N
3	GND

JPOE1: Connected PoE+ Board to Board Connector

Pin No.	Description	Pin No.	Description
A1	POE_VPORT_OUT1	B1	Not Connected
A2	POE_VPORT_OUT1	B2	Not Connected
A3	POE_GND	B3	GND
A4	POE_GND	B4	GND
A5	Not Connected	B5	3.3V
A6	Not Connected	B6	3.3V

DYING_GASP2: Dying Gasp Board Pin Header 2

Pin No.	Description	Pin No.	Description
1	SPI_HD1#	2	Not Connected
3	SOC_SPI_CS0#_ROM	4	3.3V
5	SOC_SPI_MISO_ROM	6	SOC_SPI_IO3_ROM
7	Not Connected	8	SOC_SPI_CLK_ROM
9	GND	10	SOC_SPI_MOSI_ROM

CONN1: 2nd 12V DC-IN adapter pin header

Pin No.	Description
1	V12A_DC_B

2	GND

JCASEOPEN1: To Case open slide switch connector

Pin No.	Description
1	SIO_CASEOPEN0_N
2	GND

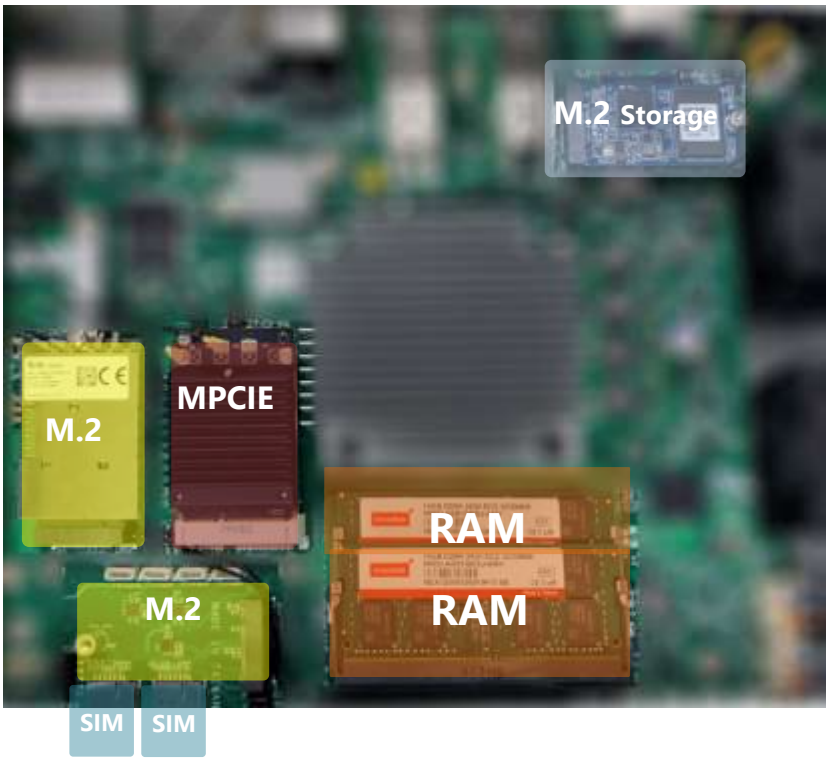
JBAT1: Pin header for button cell

Pin No.	Description
1	SIO_CASEOPEN0_N
2	GND

CHAPTER 2: HARDWARE INSTALLATION

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.

This system supports multiple wireless connectivity methods with three M.2 slots and one MPCIE slot. Based on your application and modules used, install modules in the corresponding slots.



Opening the Chassis

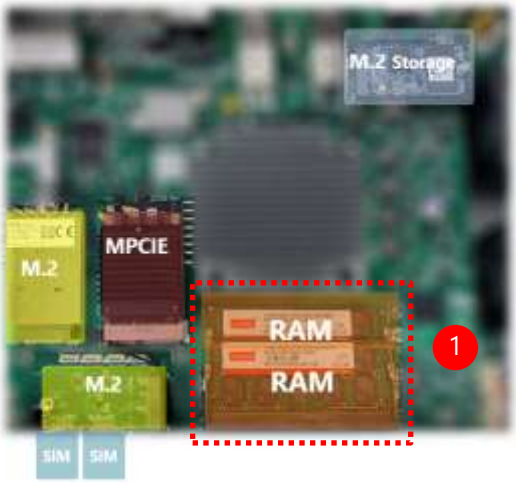
1. Unscrew the six (6) screws which secure the chassis on the system's front, side panels and the top panel.

2. Pull open the chassis and lift it up to remove.

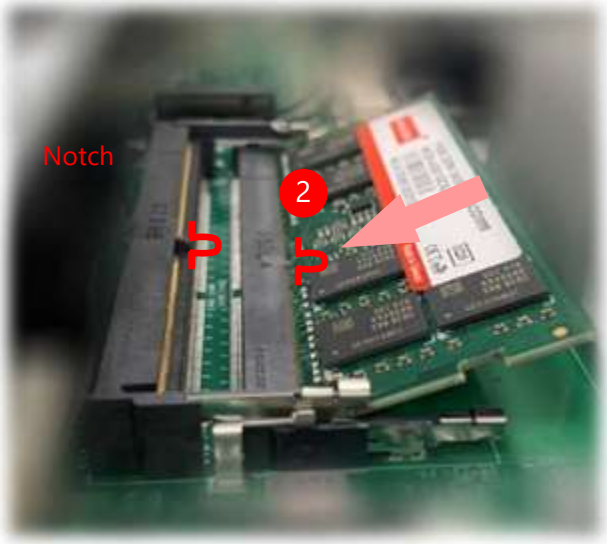
Installing System Memory (Optional)

The motherboard supports DDR4 registered DIMM memory for heavy-duty operations. Please follow the steps below to install the DIMM memory modules.

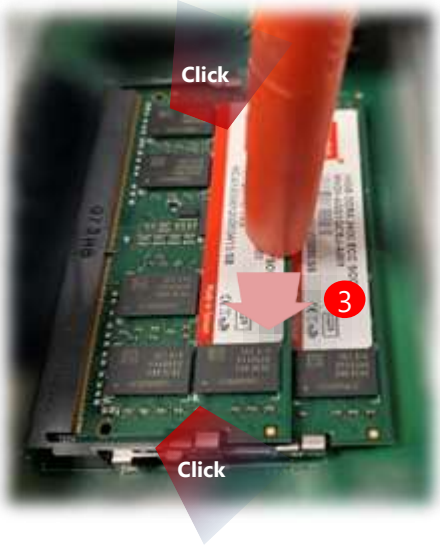
1. Locate the **system memory** slot.



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



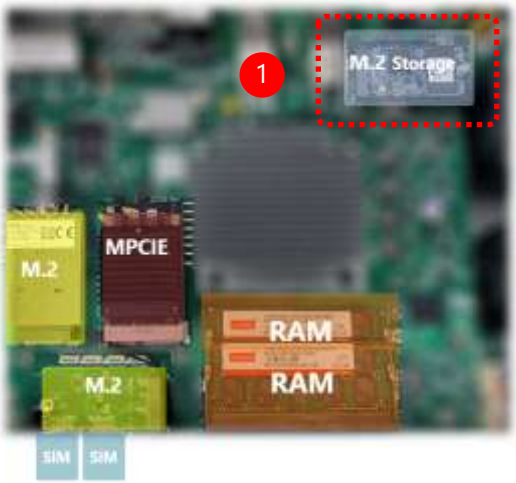
3. Press vertically on the other end of the card until it clicks into place.



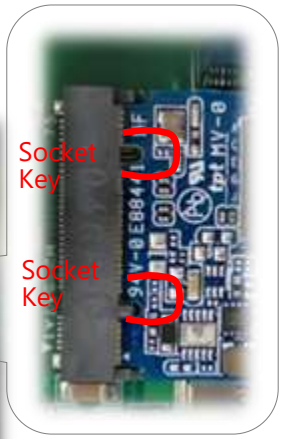
Installing M.2 Storage Card (Optional)

The motherboard supports one M.2 slot for additional data storage. Follow the instructions below for installation.

1. Locate the **M2_1** slot.



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

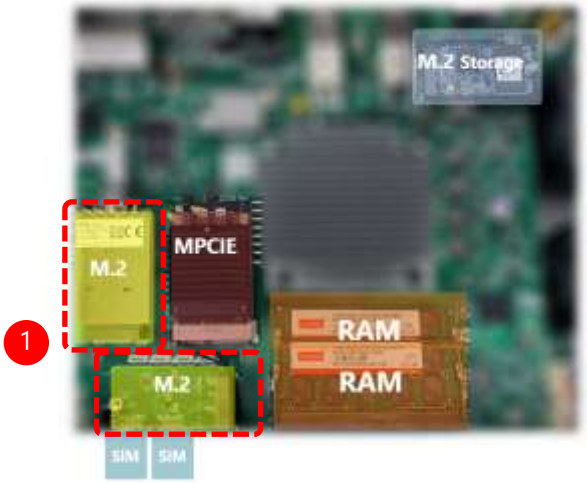


3. Push down the module and secure it with one (1) screw (included in the accessory pack).

Installing LTE/5G Module Card (Optional)

The motherboard supports two M.2 slots for LTE/5G or Wi-Fi modules cards (Optional). Please follow the steps below to install the LTE or Wi-Fi modules cards.

1. Locate the **M.2** slot



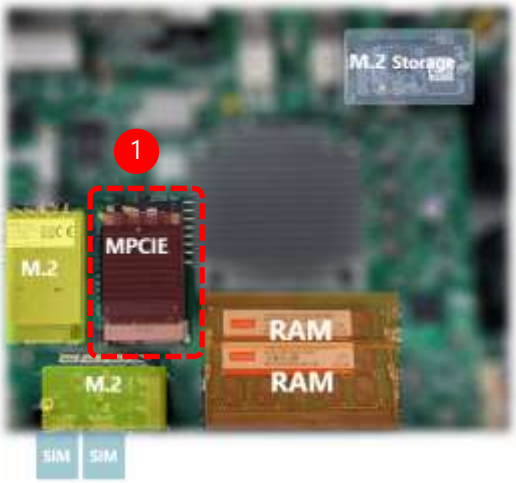
2. Align the notches of the module card with the socket keys in the slot. Tilt the end of the gold fingers down while carefully inserting the card into the slot.

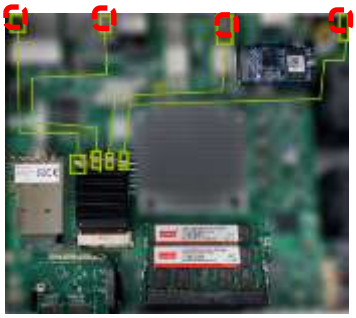
3. Secure the card with one (1) screw (included in the accessory pack).

Installing Wi-Fi Module Card (Optional)

The motherboard supports one mPCIE slot for a Wi-Fi module card (Optional). Please follow the steps below to install the Wi-Fi module card.

1. Locate the mPCIE slot.





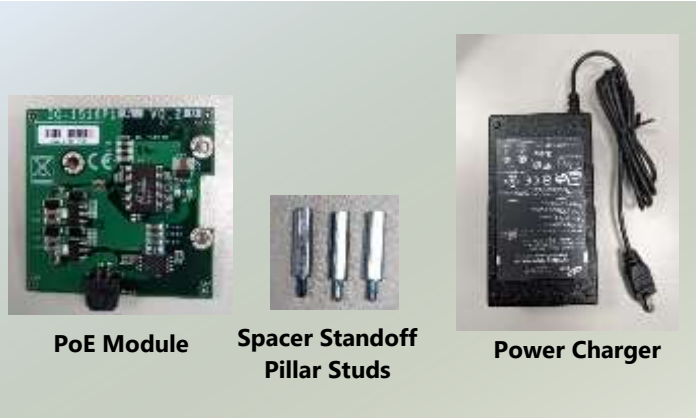
2. Align the notches of the module card with the socket keys in the slot. Tilt the end of gold fingers down while carefully inserting the card into the slot.

3. Secure the module with one (1) screw (included in the accessory pack).

Installing PoE Module Kit (Optional)

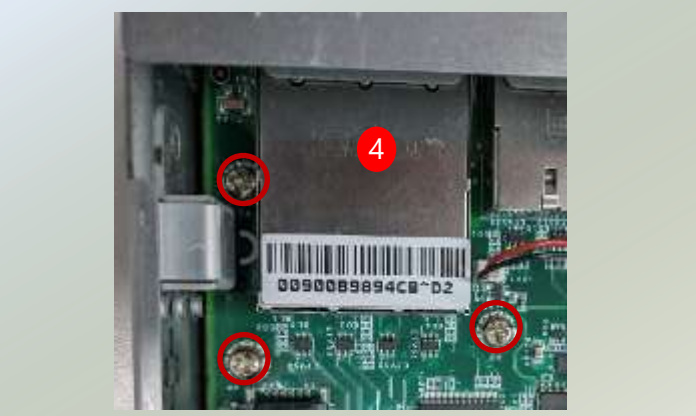
The motherboard supports one PoE module slot. Please follow the steps below to install the PoE kit.

1. The PoE Module Kit includes:
   - 1x PoE Module
   - 3x Spacer standoff pillar studs
   - 1x Power Adapter

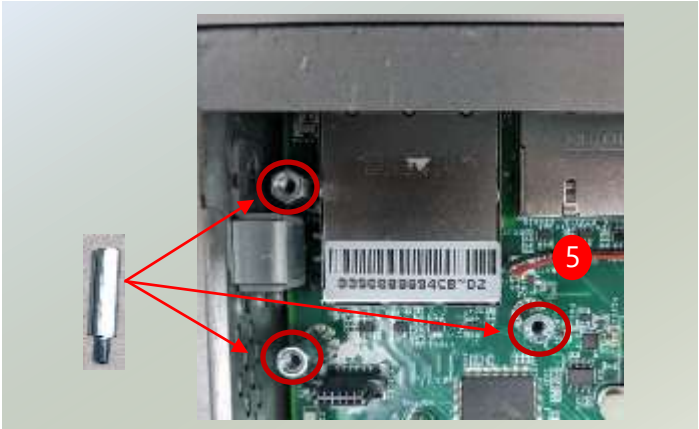


2. Power off the system and open the chassis cover.
3. Locate the PoE Module slot placement.

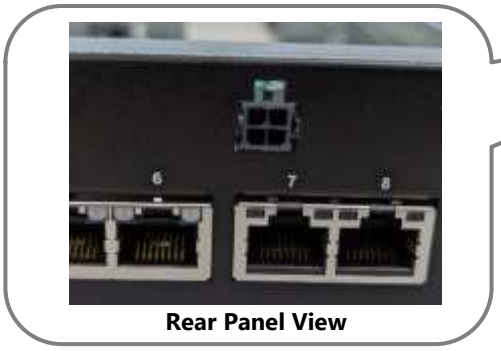
4. Remove the three (3) screws



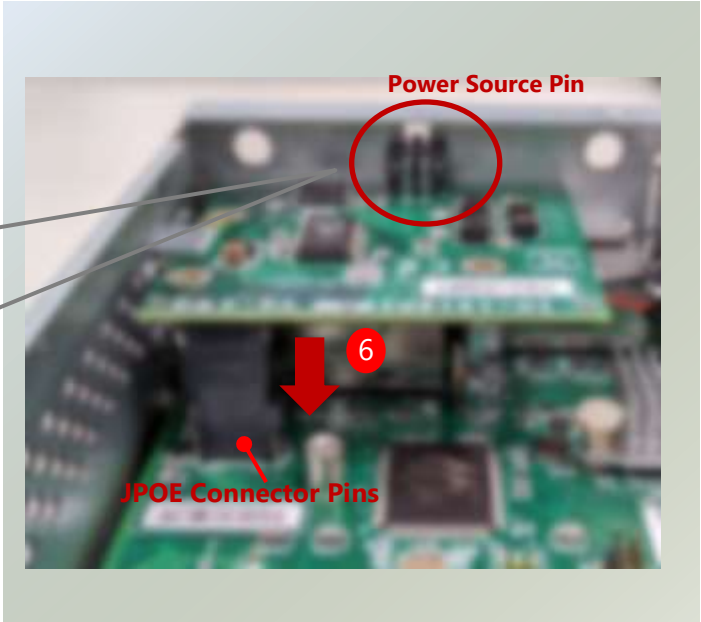
5. Replace the three (3) screws with the spacer standoff pillar studs.



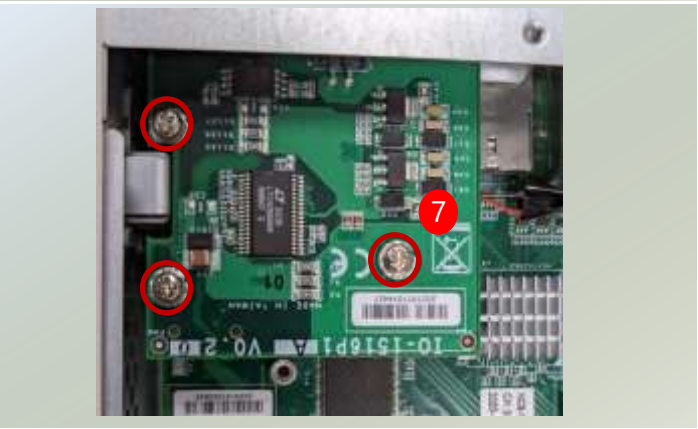
6. Align the top power source pin to the chassis rear opening spot, and insert the bottom pins into JPOE connector pins.



Rear Panel View



7. Screw in the original three (3) screws to secure the PoE module board.



8. Connect the power source pin to the power adapter.

Installing Nano SIM Cards (Optional)

The SIM slot on front panel supports an LTE module (Optional), and SIM cards are not included/sold separately. The SIM socket supports the push-push mechanism, allowing inserting and ejecting the SIM card to be as easy as one push.

1. Locate the SIM slot cover on the front panel. Loosen the two screws that secure the SIM slot cover and remove the slot cover.

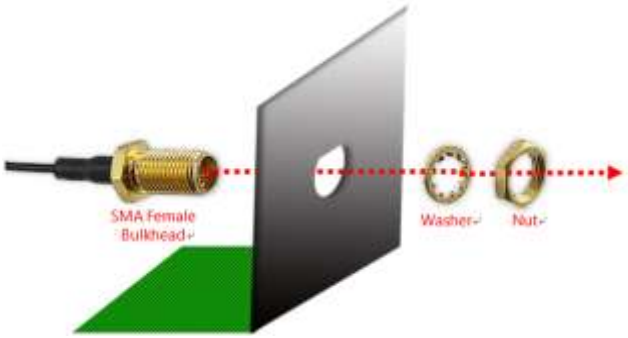
2. With the gold contacts on the SIM card facing downwards and the cut edge of the SIM card facing the left side, push the SIM card all the way in until it clicks into place.

3. To remove the SIM card, use your fingertip to push it once and the card will automatically ejected.

Antenna Cable Assembly (Optional)

To mount the Wi-Fi/LTE antennas:

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



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

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

Antenna Placement (Optional)

Lanner provides multiple options and customizations for our network appliances to suit all our customer's needs. NCA-1516 is compatible with many optional kits for 5G, LTE, and Wi-Fi. Below is best suited antenna placement to optimize coverage, and quality for 5G, LTE, and Wi-Fi modules.

	LTE	5G	Wi-Fi 5 Wave 1	Wi-Fi 5 Wave 2	Wi-Fi 6
LTE	V				
LTE x2	Vx2				
5G		V			
Wi-Fi5 W1			V		
Wi-Fi5 W2				V	
Wi-Fi6					V
LTE & Wi-Fi5 W1	V		V		
LTE & Wi-Fi5 W2	V			V	
LTE & Wi-Fi6	V				V
5G & Wi-Fi5 W1		V	V		

LTE: Antenna Placement for 1x LTE module

Rear Panel

LTEx2: Antenna Placement for 2x LTE module

Rear Panel

Front Panel

5G: Antenna Placement for 1x 5G module

Rear Panel

Front Panel

Wi-Fi5 W1: Antenna Placement for 1x Wi-Fi 5 (802.11ac Wave 1) module

Rear Panel

Wi-Fi5 W2: Antenna Placement for 1x Wi-Fi 5 (802.11ac Wave 2) module

Rear Panel

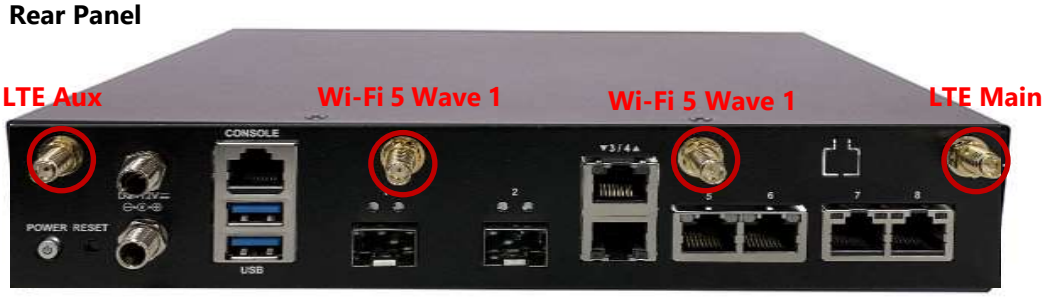
Front Panel

Wi-Fi 6: Antenna Placement for 1x Wi-Fi 6 module

Rear Panel

LTE & Wi-Fi5 W1: Antenna Placement for 1x LTE and 1x Wi-Fi 5 (802.11ac Wave 1) module

Rear Panel



LTE & Wi-Fi5 W2: Antenna Placement for 1x LTE and 1x Wi-Fi 5 (802.11ac Wave 2) module

Rear Panel

Front Panel

LTE & Wi-Fi 6: Antenna Placement for 1x LTE and 1x Wi-Fi 6 module

Rear Panel

5G & Wi-Fi 5 W1: Antenna Placement for 1x 5G and 1x Wi-Fi 5 (802.11ac Wave 1) module

Rear Panel

Front Panel

Rack-mounting the System (Optional)

With the rack mount kit, this system can be fixed onto rack posts. Please contact Lanner's sales representative for purchasing this kit.

What's in the Rack-mount Kit

Check the kit for the following items:

- 2x Ear Bracket
- 1x Adapter Bracket
- 1x Adapter Holder
- Screws for the fixture of the Brackets and the Holder (8x Screw A, 2x Screw B)

Ear Bracket

Adapter Bracket

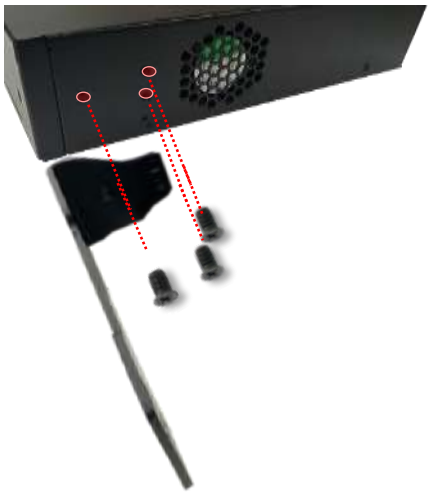
Adapter holder

Screw A

Screw B

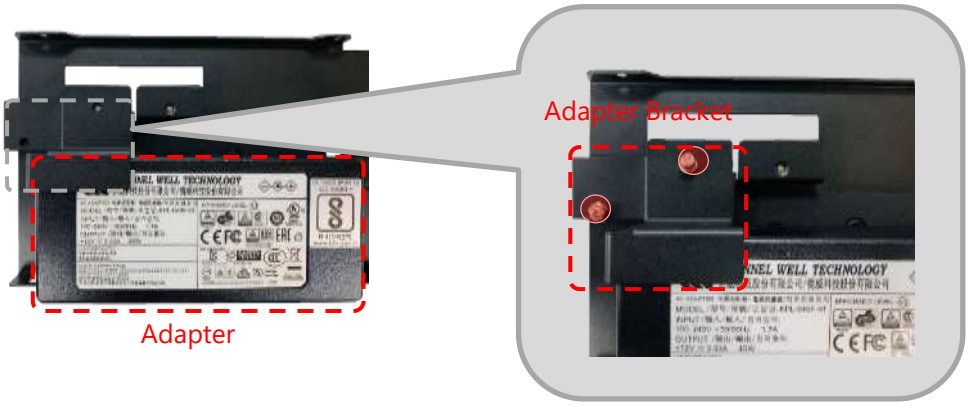
Attaching the Assembly to the Chassis

1. On one side of the system, align the ear bracket to the screw holes on the side panel and fix it using 3 screws (Screw A).



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

3. The adapter holder assembly is designed to secure a 5V adapter or a 3V adapter. Secure the adapter onto the holder with the adapter bracket and 2 provided screws (Screw B). Make sure the way you place the bracket is as shown in the picture.



4. Attach the adapter holder to the left side of system and secure it with 2 screws (Screw A)

5. Secure the adapter's cable onto the adapter holder.

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.

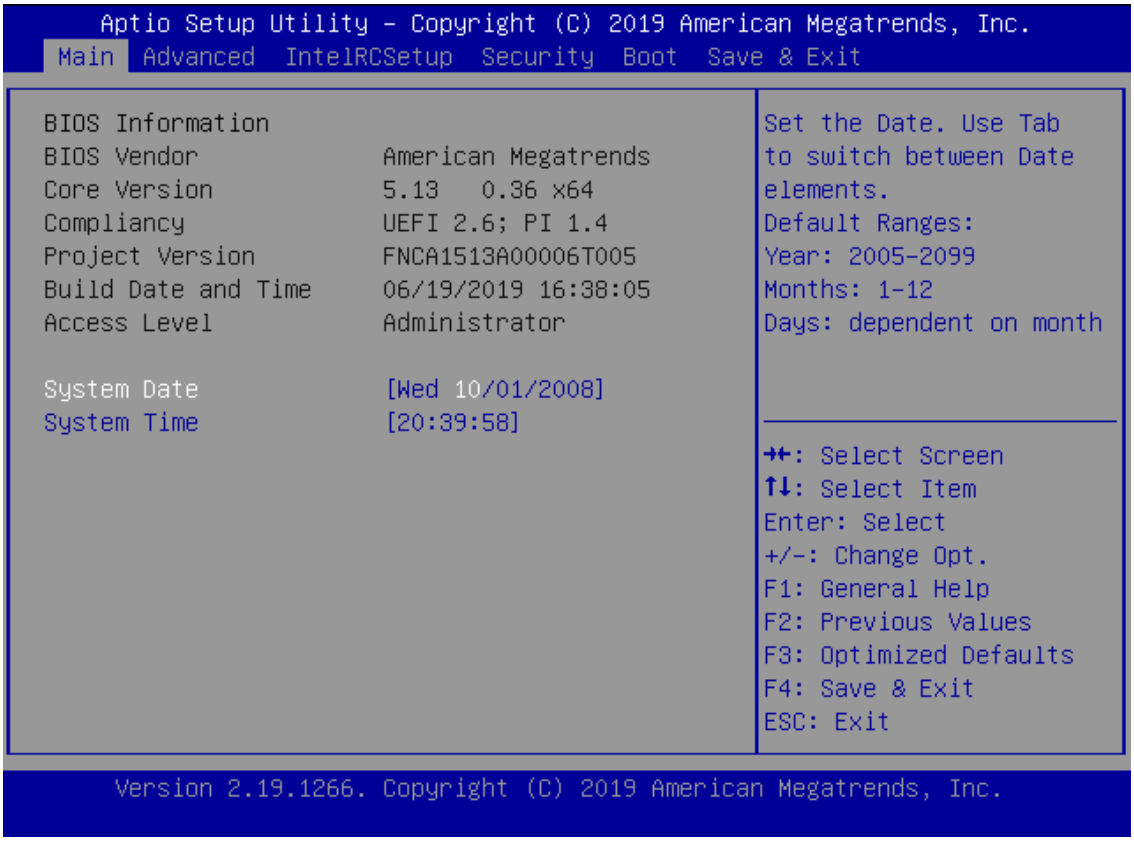
Main Setup

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, and then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

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

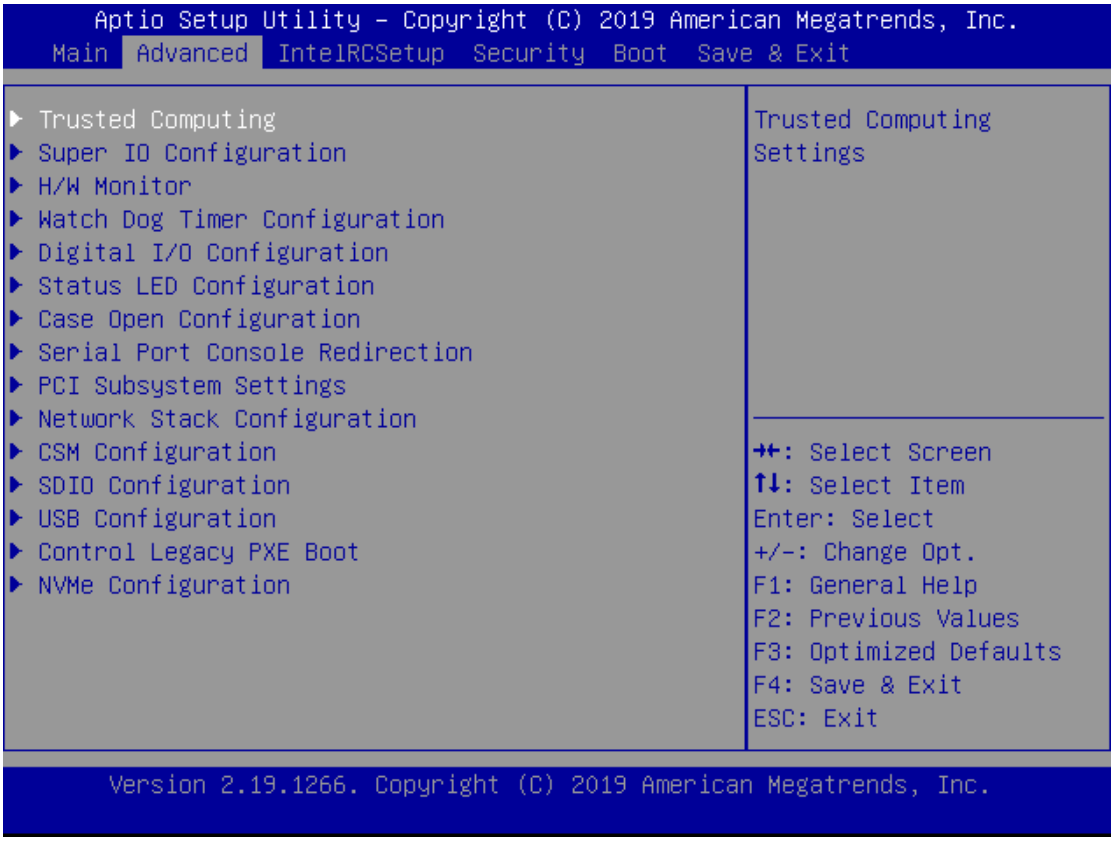
Setup main page contains BIOS information and project version information.



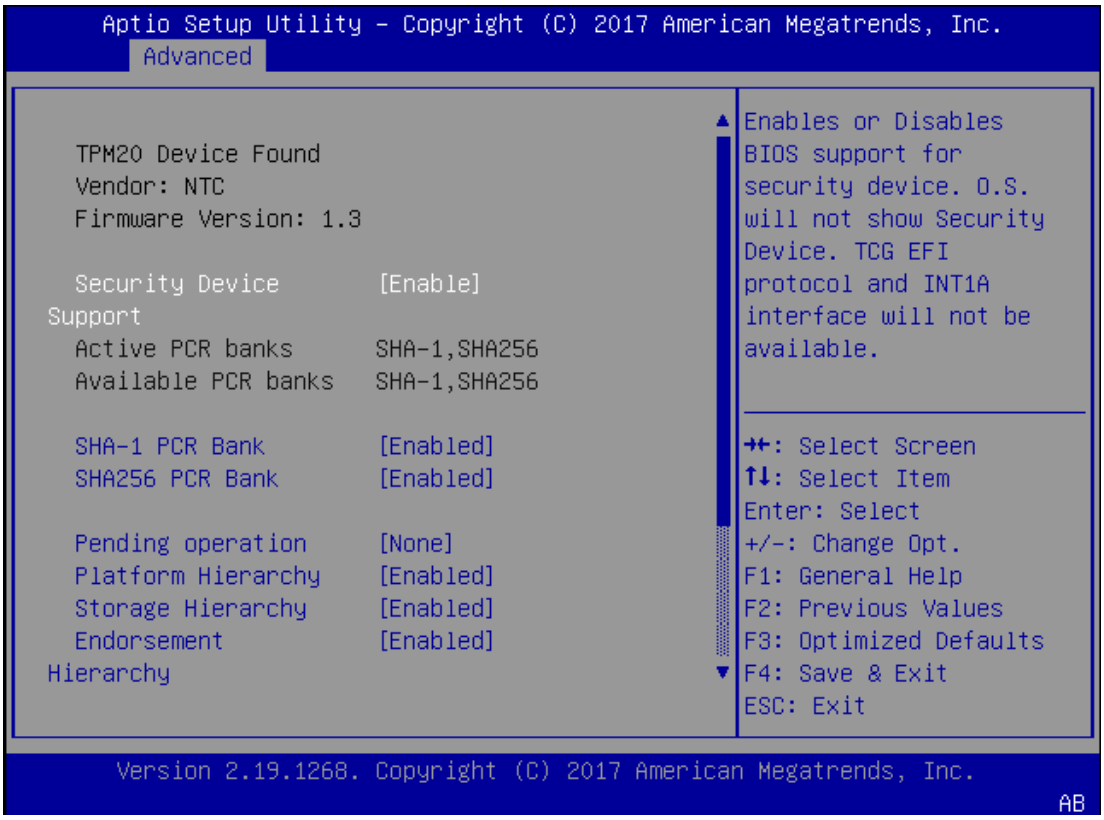
Feature	Description
BIOS Information	BIOS Vendor: American Megatrends Core Version: AMI Kernel version, CRB code base, X64 Compliancy: UEFI version, PI version Project Version: BIOS release version Build Date and Time: MM/DD/YYYY Access Level: Administrator / User
System Date	To set the Date, use **<Tab>** to switch between Date elements. Default Range of Year: 2005-2099 Default Range of Month: 1-12 Days: dependent on Month.
System Tine	To set the Date, use **<Tab>** to switch between Date elements.

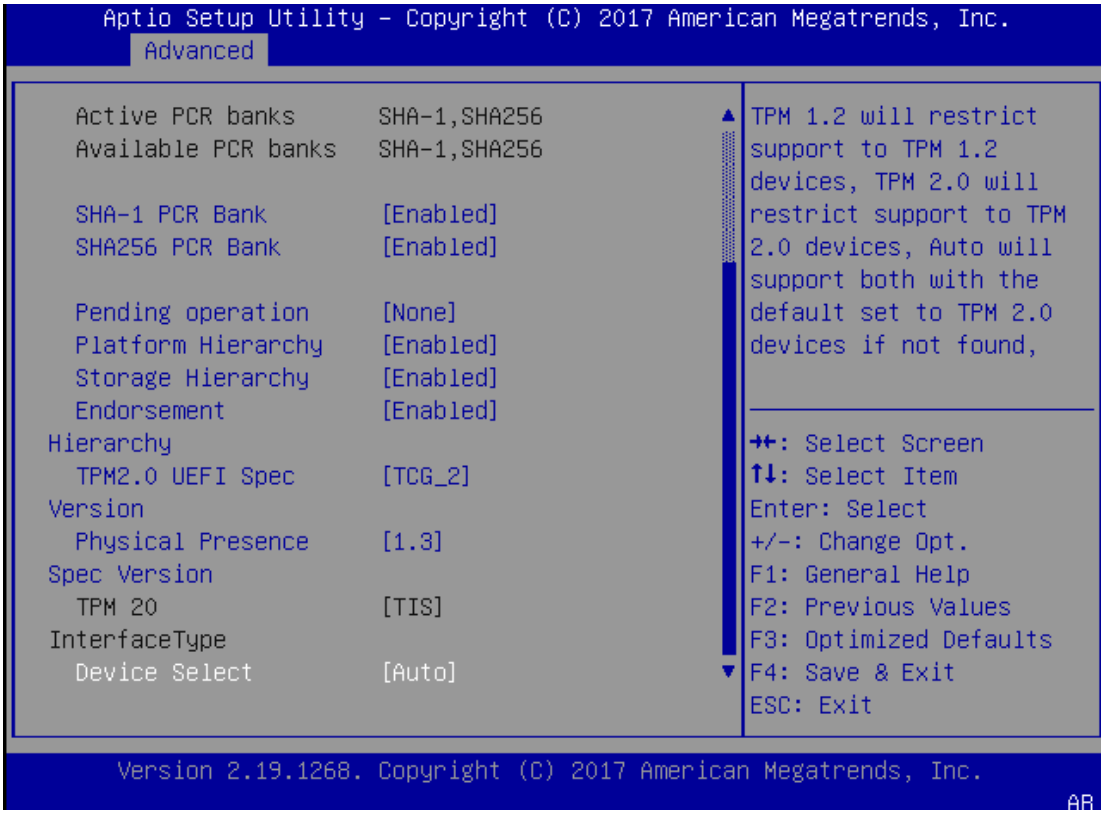
Advanced Page

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



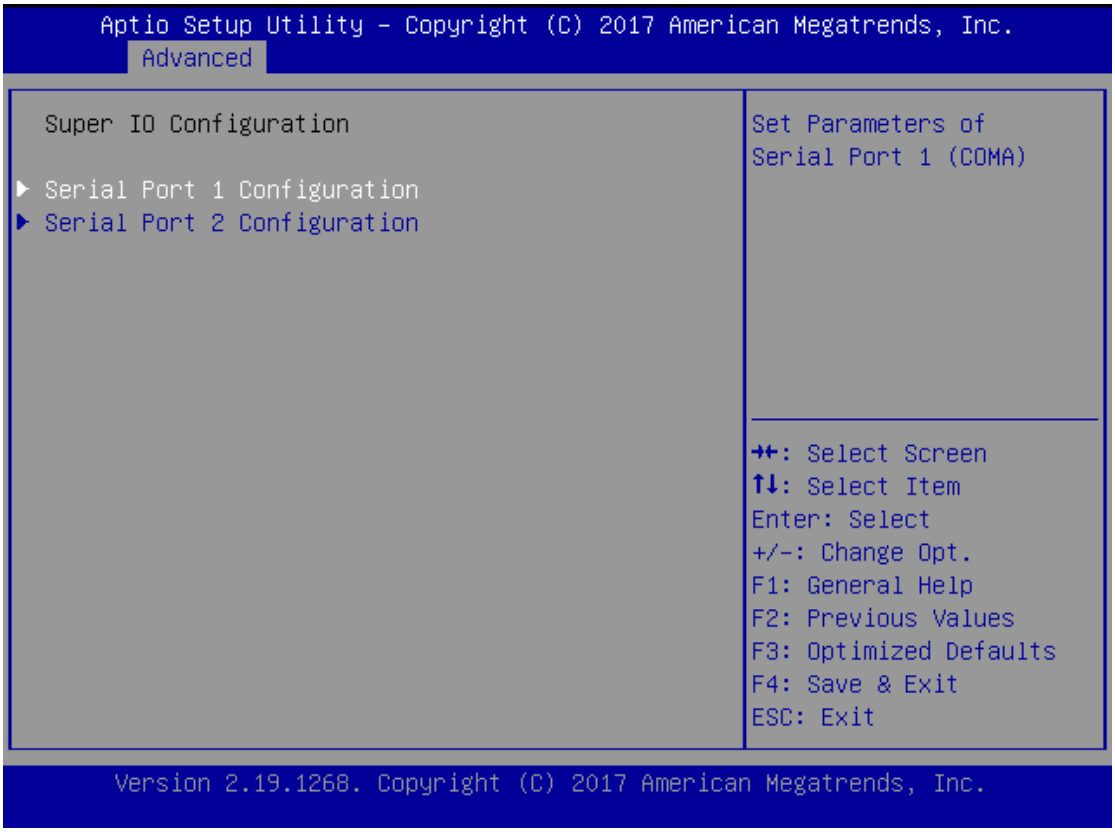
Trusted Computing



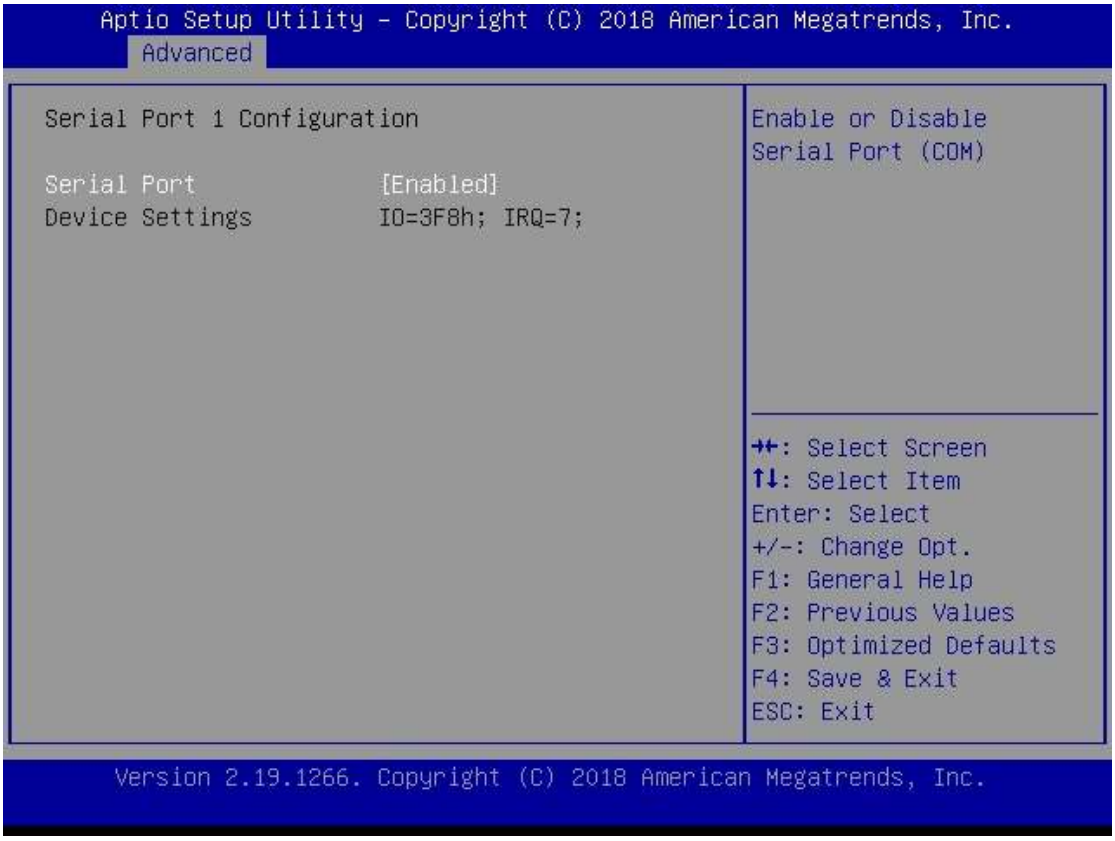


Feature	Options	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
SHA-1 PCR Bank	Enabled Disabled	Enables or disables SHA-1 PCR Bank.
SHA256 PCR Bank	Enabled Disabled	Enables or disables SHA256 PCR Bank.
Pending operation	None TPM Clear	Schedules an Operation for the Security Device. NOTE: Your computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Enabled Disabled	Enables or disables Platform Hierarchy.
Storage Hierarchy	Enabled Disabled	Enables or disables Storage Hierarchy.
Endorsement Hierarchy	Enabled Disabled	Enables or disables Endorsement Hierarchy.
TPM2.0 UEFI Spec Version	TCG_1_2 TCG_2	Select the TCG2 Spec Version, **TCG_1_2**: Supports the Compatible mode for Win8/Win10 **TCG_2**: Supports new TCG2 protocol and event format for Win10 or later.
Physical Presence Spec Version	1.2 1.3	Select to tell OS to support PPI Spec Version 1.2 or 1.3. NOTE: Some HCK tests might not support 1.3.
TPM 20 InterfaceType	TIS	Select **TPM 20 Device** for the Communication Interface.
Device Select	TPM 1.2 TPM 2.0 Auto	**TPM 1.2** will restrict support to TPM 1.2 devices; while **TPM 2.0** will restrict support to TPM 2.0 devices; **Auto** will support both with the default set to TPM 2.0 devices. If not found, TPM 1.2 devices will be enumerated.

Super IO Configuration

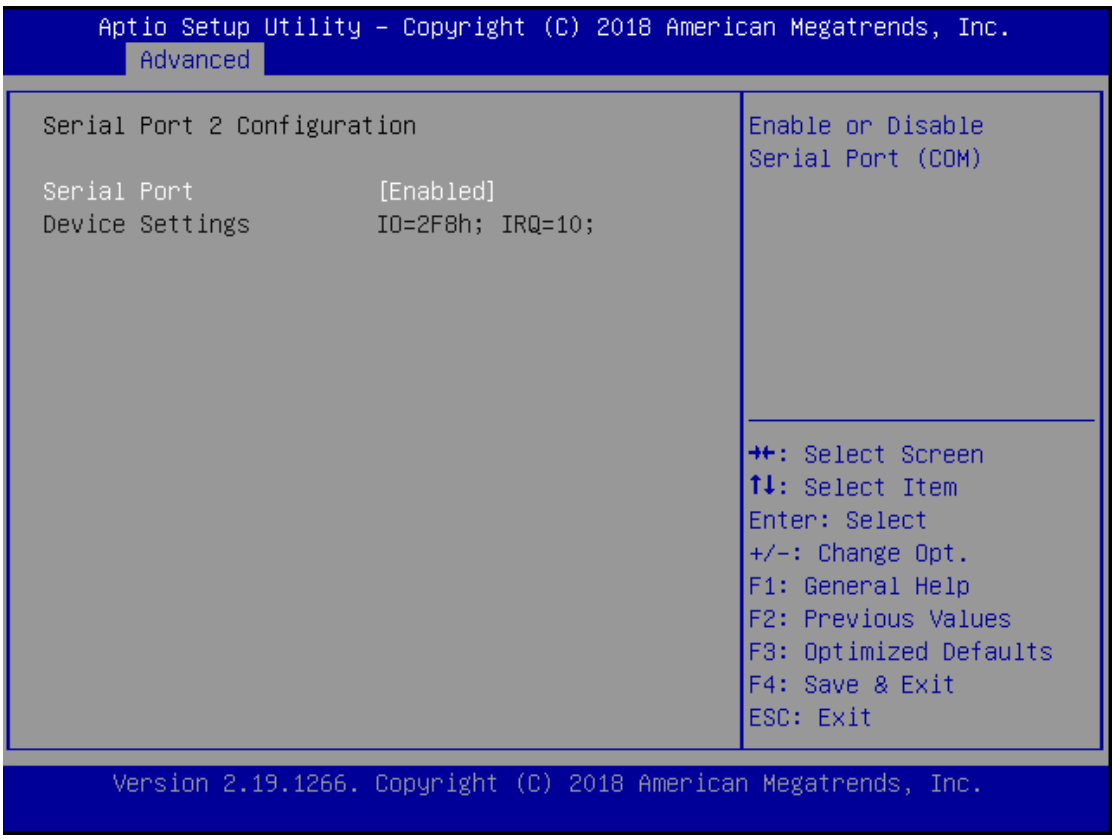


Serial Port 1 Configuration



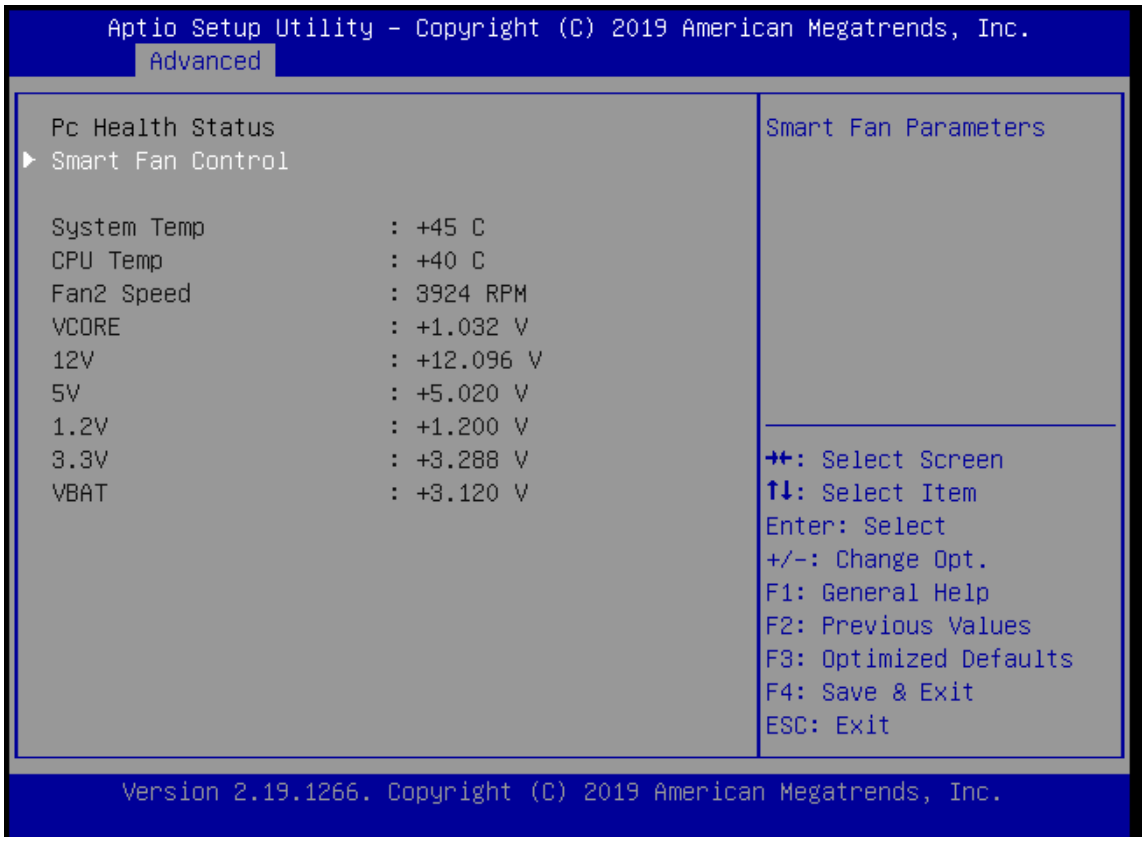
Feature	Options	Description
Serial Port	Enabled Disabled	Enables or disables Serial Port 1.
Device Settings	NA	IO=3F8h; IRQ = 7

Serial Port 2 Configuration

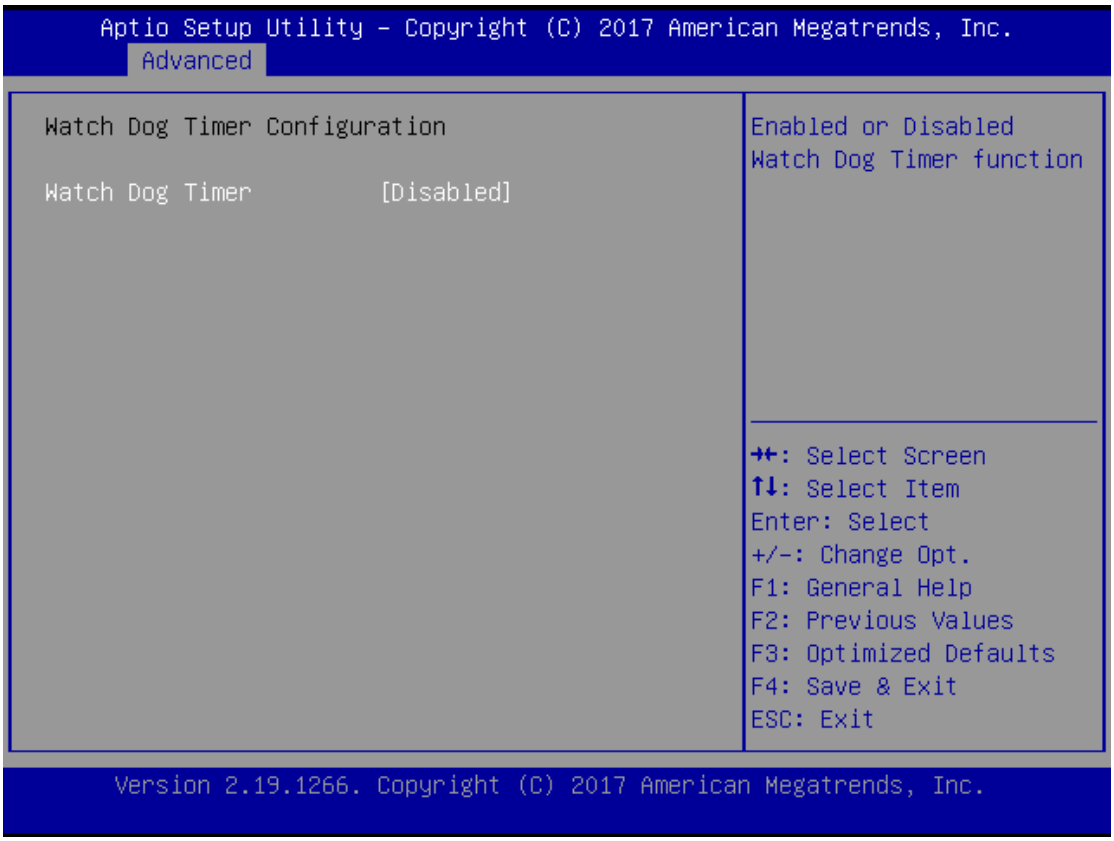


Feature	Options	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port 2.
Device Settings	NA	IO=2F8h; IRQ = 10

H/W Monitor

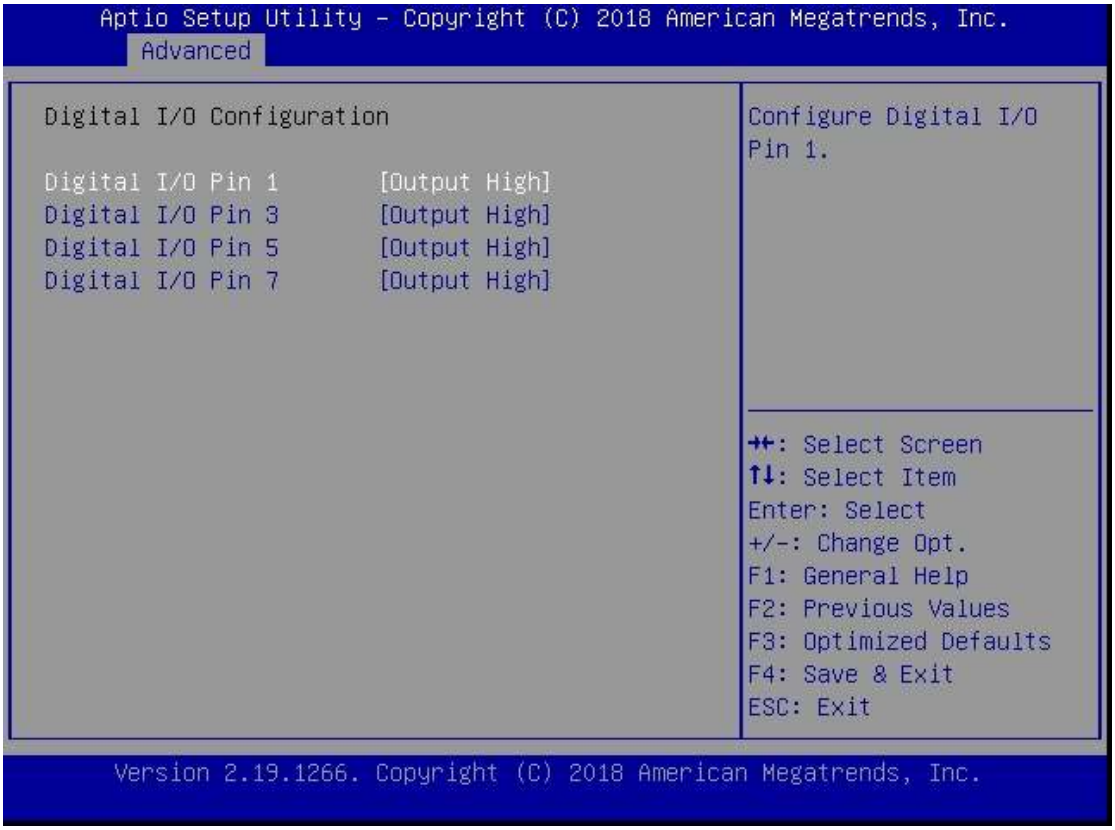

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.
Advanced
Pc Health Status
Smart Fan Control
System Temp : +45 C
CPU Temp : +40 C
Fan2 Speed : 3924 RPM
VCORE : +1.032 V
12V : +12.096 V
5V : +5.020 V
1.2V : +1.200 V
3.3V : +3.288 V
VBAT : +3.120 V
Smart Fan Parameters
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.19.1266. Copyright (C) 2019 American Megatrends, Inc.

Watch Dog Timer Configuration



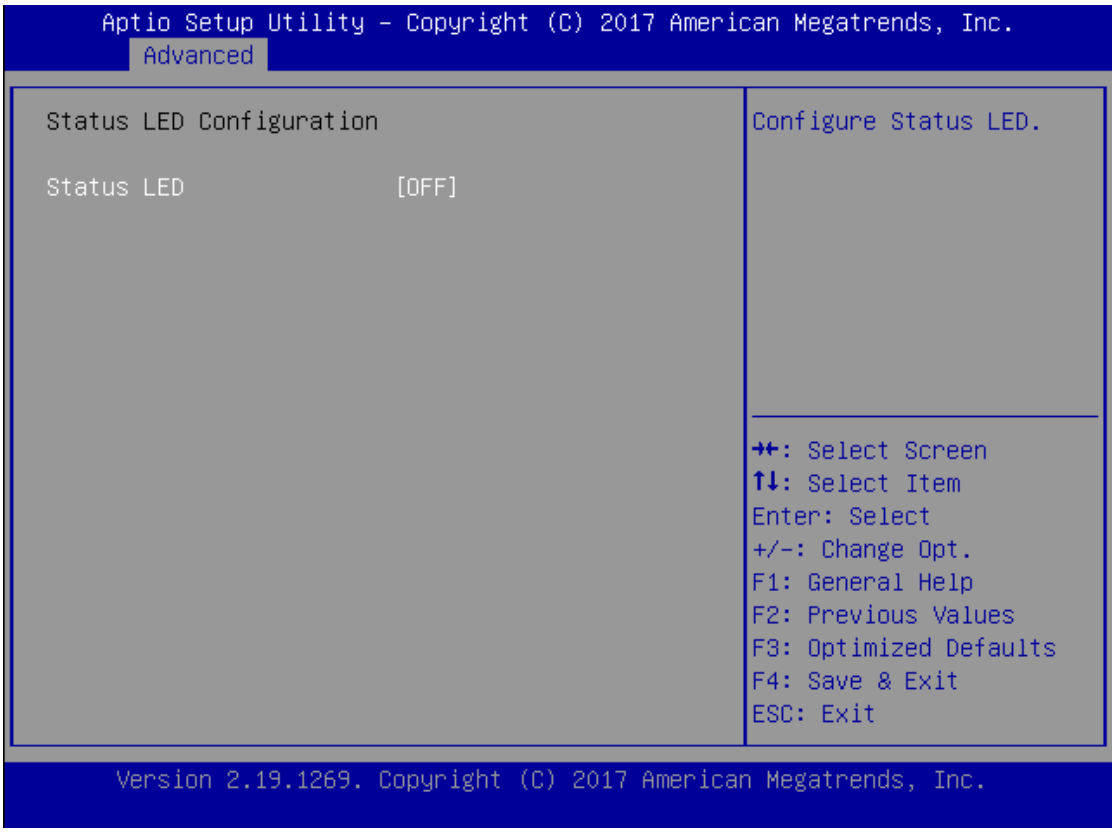
Feature	Options	Description
Watch Dog Timer	Enabled Disabled	Enables or disables Watch Dog Timer function

Digital I/O Configuration



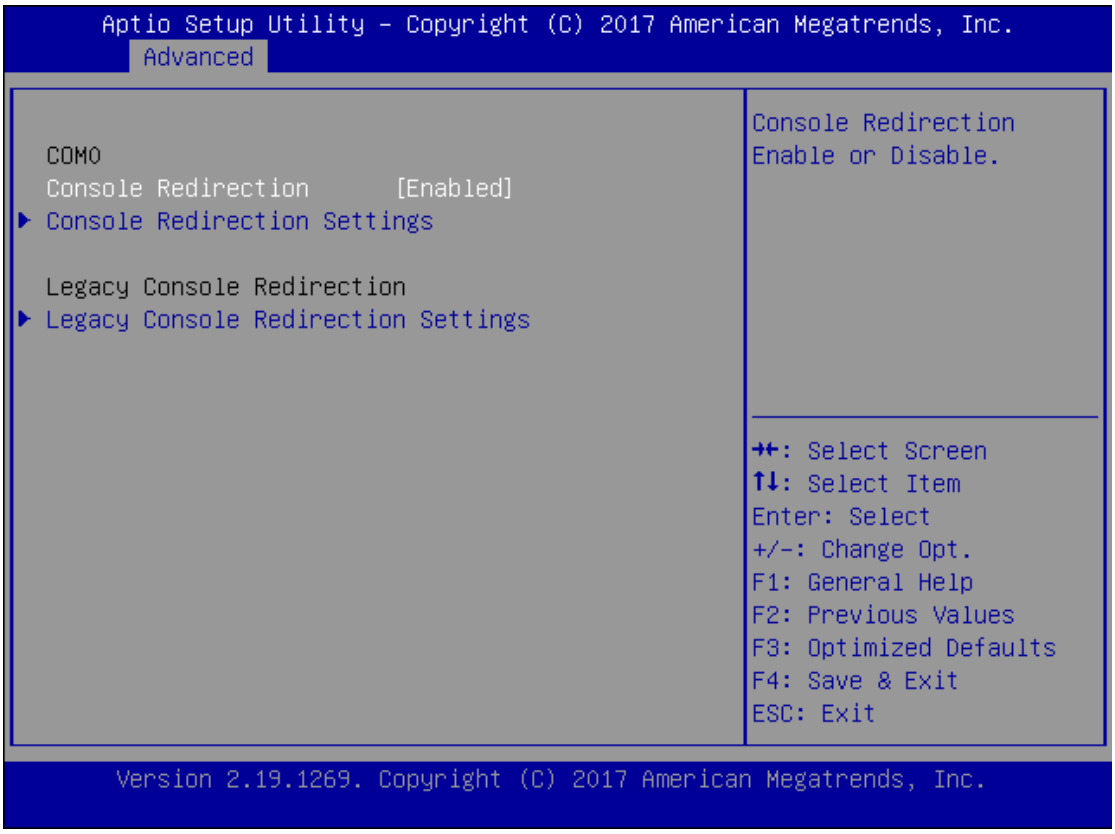
Feature	Options	Description
Digital I/O Output 1	Output Low Output High	Configure Digital I/O Pin1
Digital I/O Output 3	Output Low Output High	Configure Digital I/O Pin3
Digital I/O Output 5	Output Low Output High	Configure Digital I/O Pin5
Digital I/O Output 7	Output Low Output High	Configure Digital I/O Pin7

Status LED Configuration



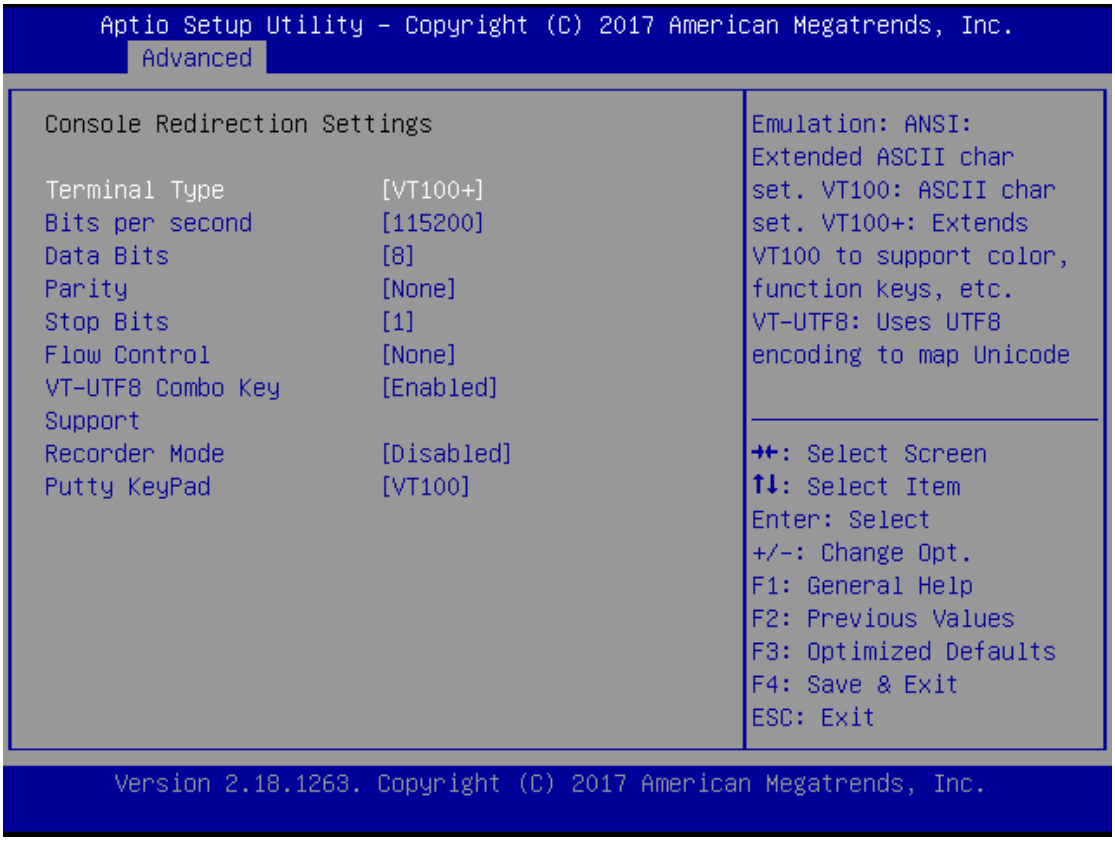
Feature	Options	Description
Status LED	OFF GREEN RED	Configures Status LED color

Serial Port Console Redirection



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

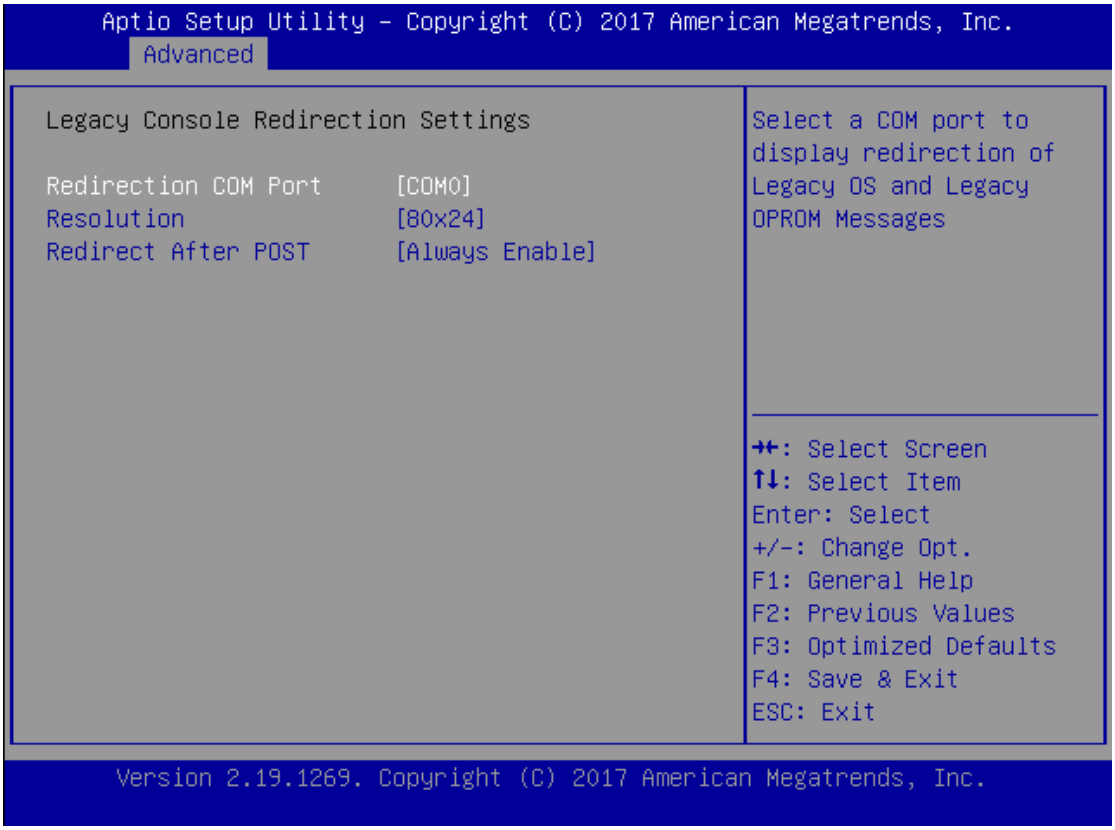
Console Redirection Settings



Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	**VT100**: ASCII char set **VT100+**:Extends VT100 to support color, function keys, etc. **VT-UTF8**:Uses UTF8 encoding to map Unicode chars onto 1 or more bytes **ANSI**: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
Data Bits	7 8	Data Bits
Parity	None Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors.
Stop Bits	1 2	Indicates the end of a serial data packet.
Flow Control	None Hardware RTS/CTS	Flow Control can prevent data loss from buffer overflow.

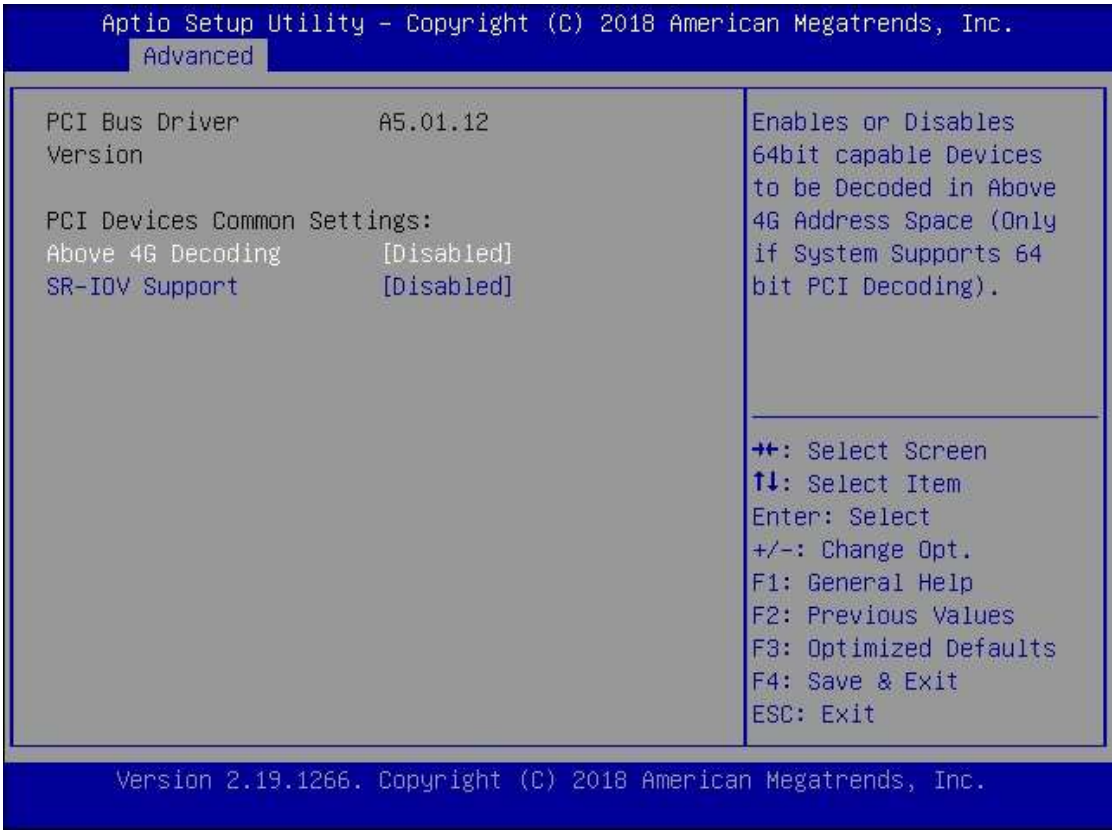
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on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

Console Redirection Settings



Feature	Options	Description
Redirection COM Port	COM0	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Redirection After BIOS POST	Always Enable BootLoader	When **Bootloader** is selected, 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**.

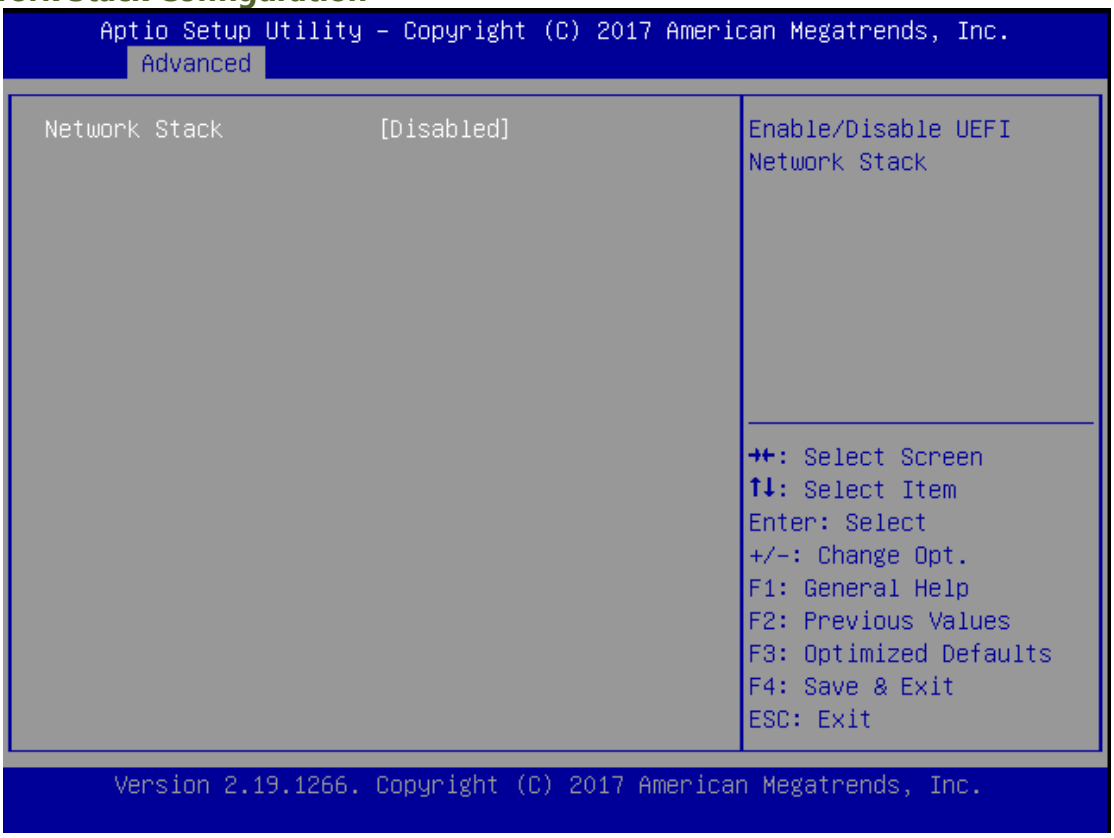
PCI Subsystem Settings



Feature	Options	Description
Above 4G Decoding	Disabled Enabled	Enable or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding).

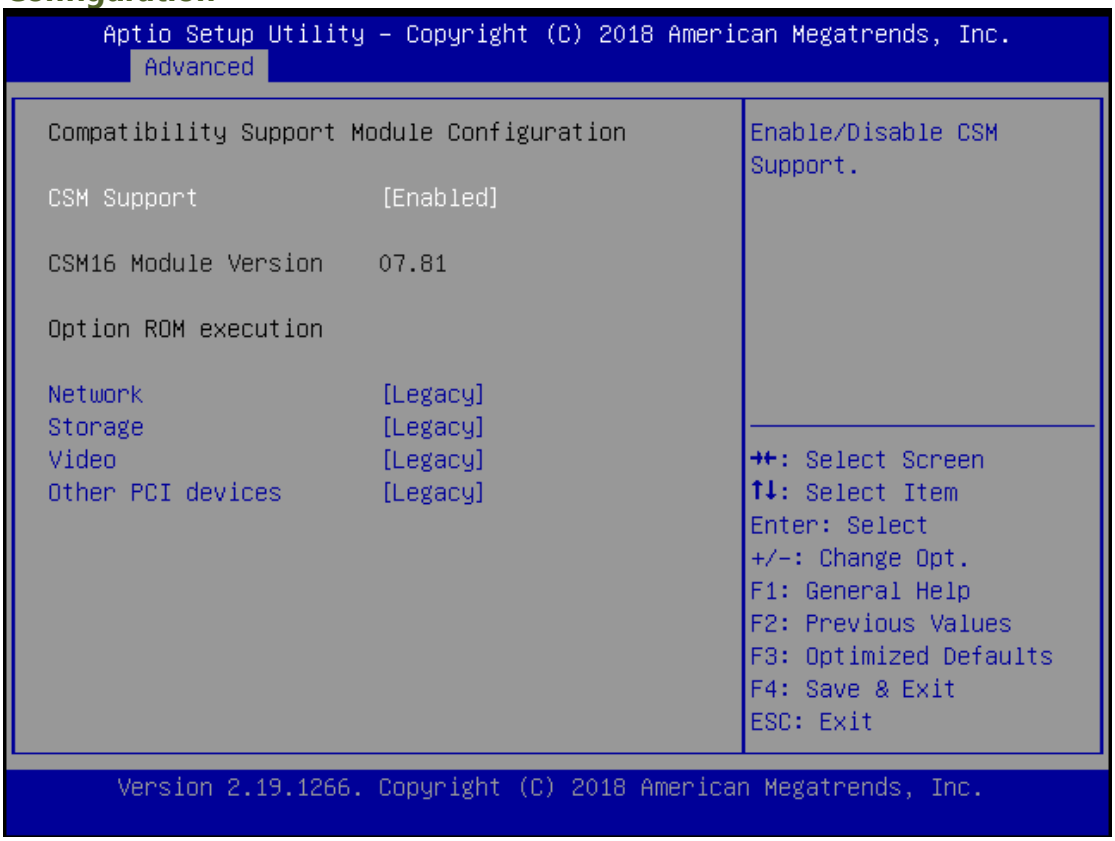
Feature	Options	Description
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

Network Stack Configuration



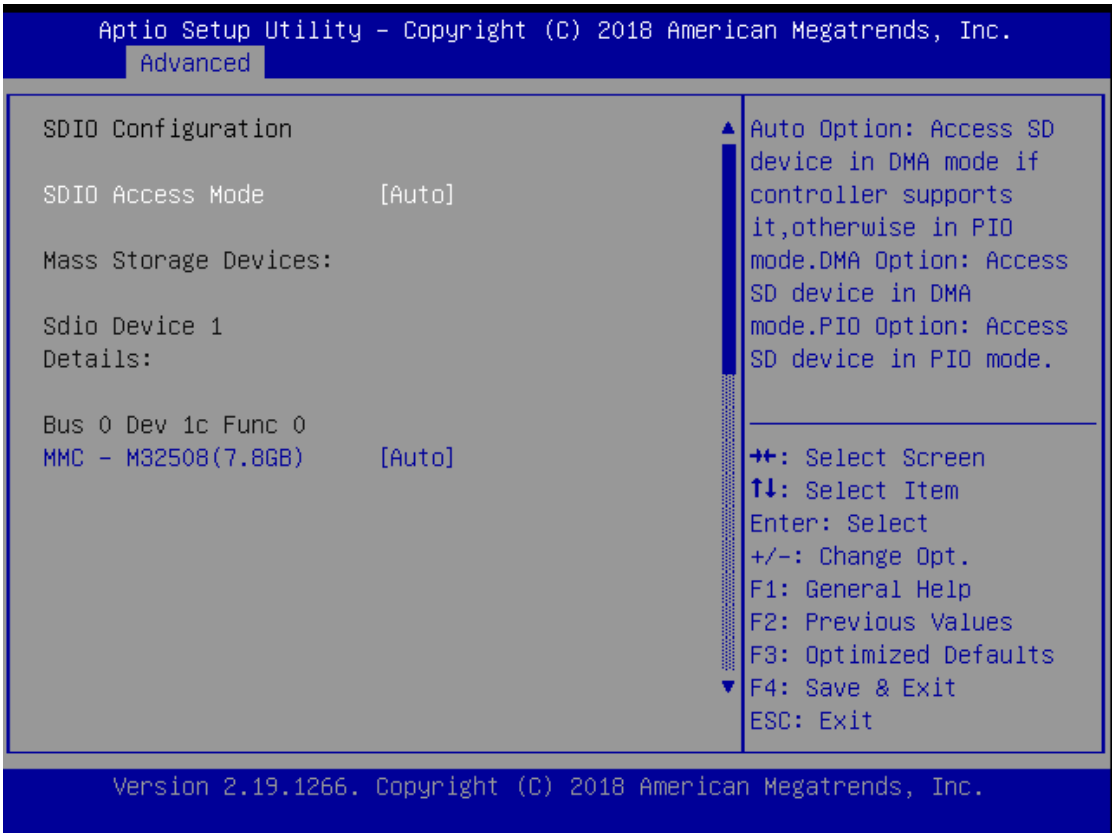
Feature	Options	Description
Network Stack	Disabled Enabled	Enables or disables UEFI Network Stack
Ipv4 PXE Support	Disabled Enabled	Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created.
Ipv4 HTTP Support	Disabled Enabled	Enables Ipv4 HTTP Boot Support. If IPV4 is disabled,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

CSM Configuration



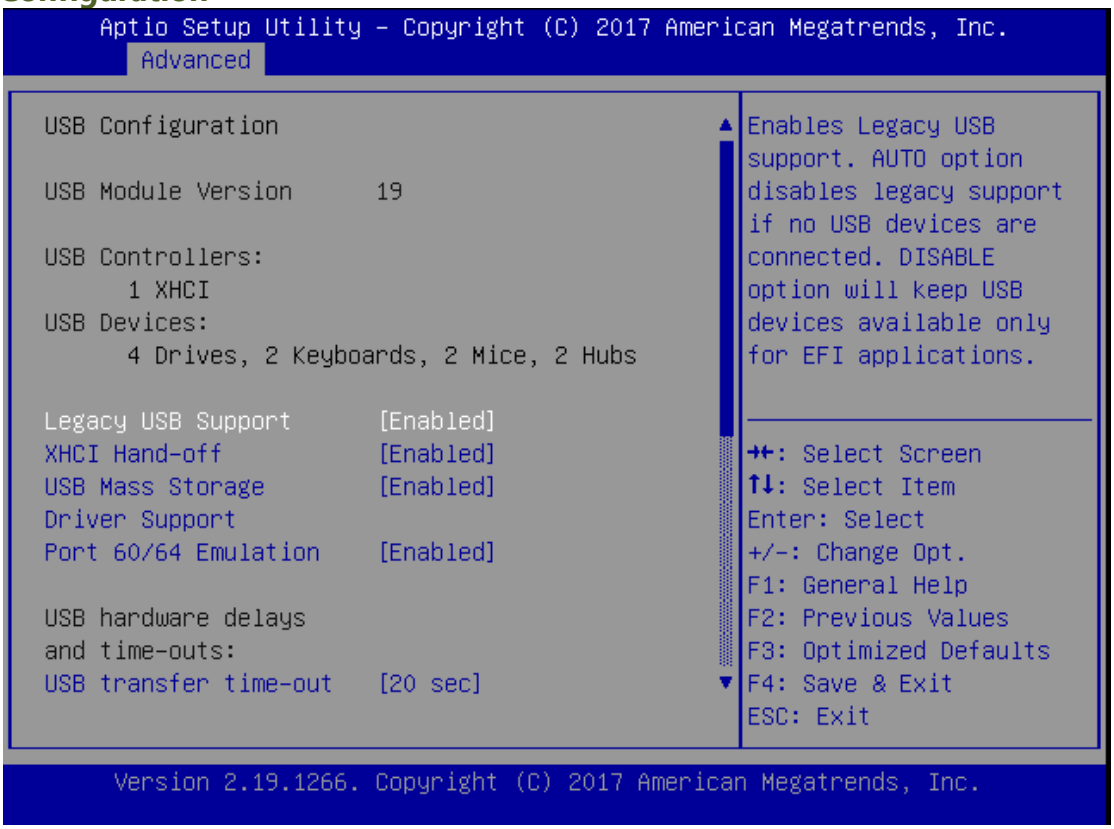
Feature	Options	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls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

SDIO Configuration



Feature	Options	Description
SDIO Access Mode	Auto ADMA SDMA PIO	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..

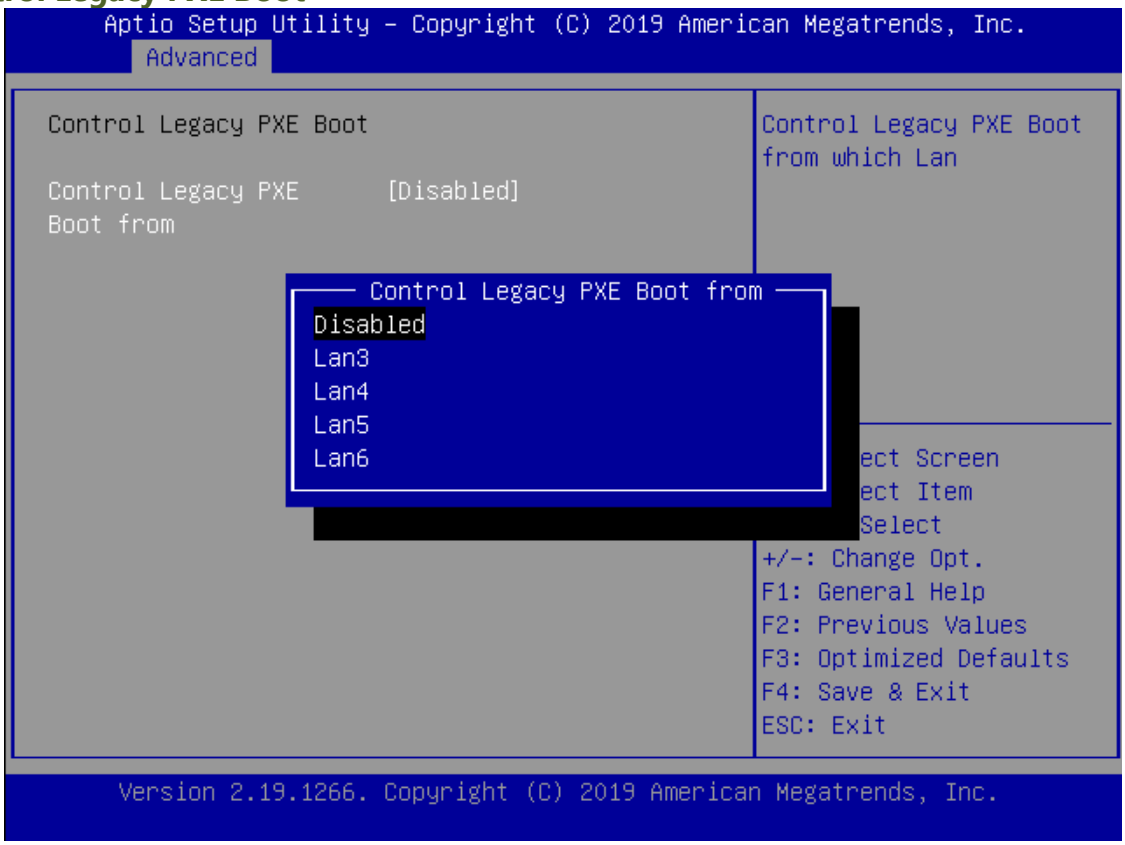
USB Configuration



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

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

Control Legacy PXE Boot

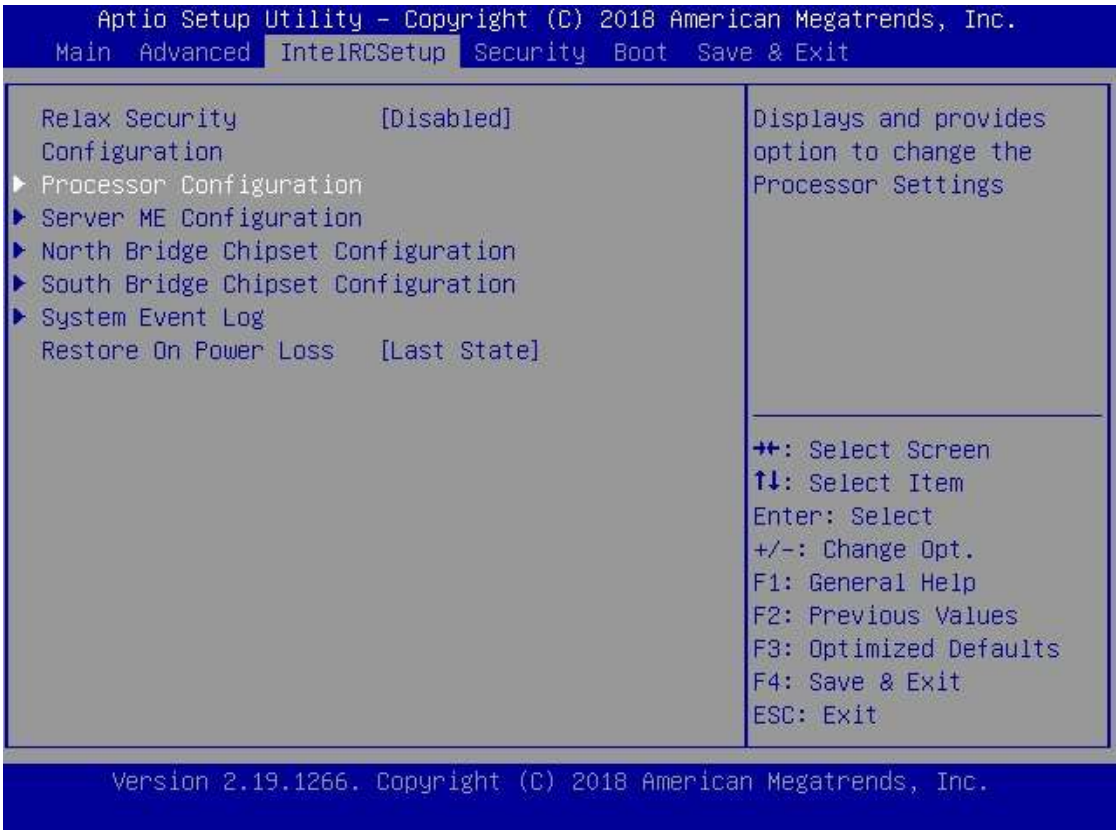


Feature	Options	Description
Control Legacy PXE Boot From	Disabled Lan3 Lan4 Lan5 Lan6	Control Legacy PXE Boot from which Lan.

NVME Configuration

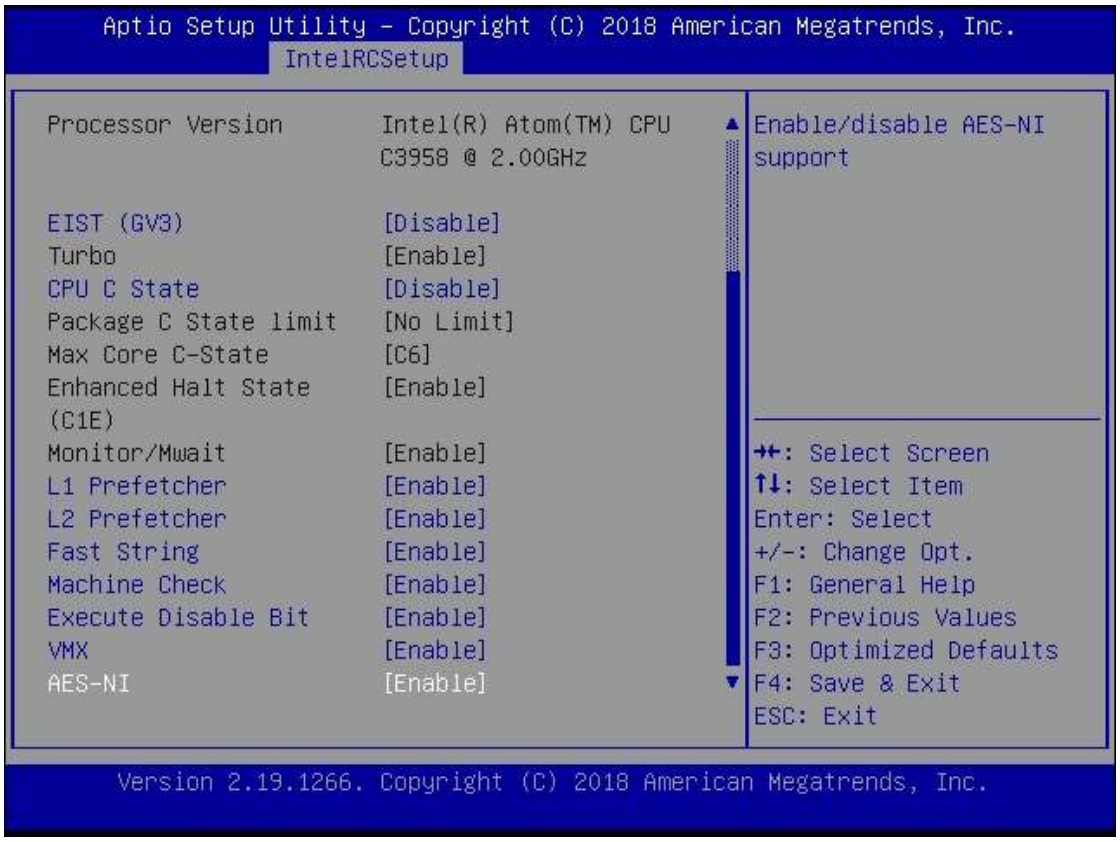
IntelRCSetup

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



Feature	Options	Description
Relax Security Configuration	Disable Enabled	Relaxes the security configuration to be able to use BIOS update tool.
Restore On Power Loss	Power On Power Off Last State	Specify what state to go to when power is re-applied after a power failure (G3 state).

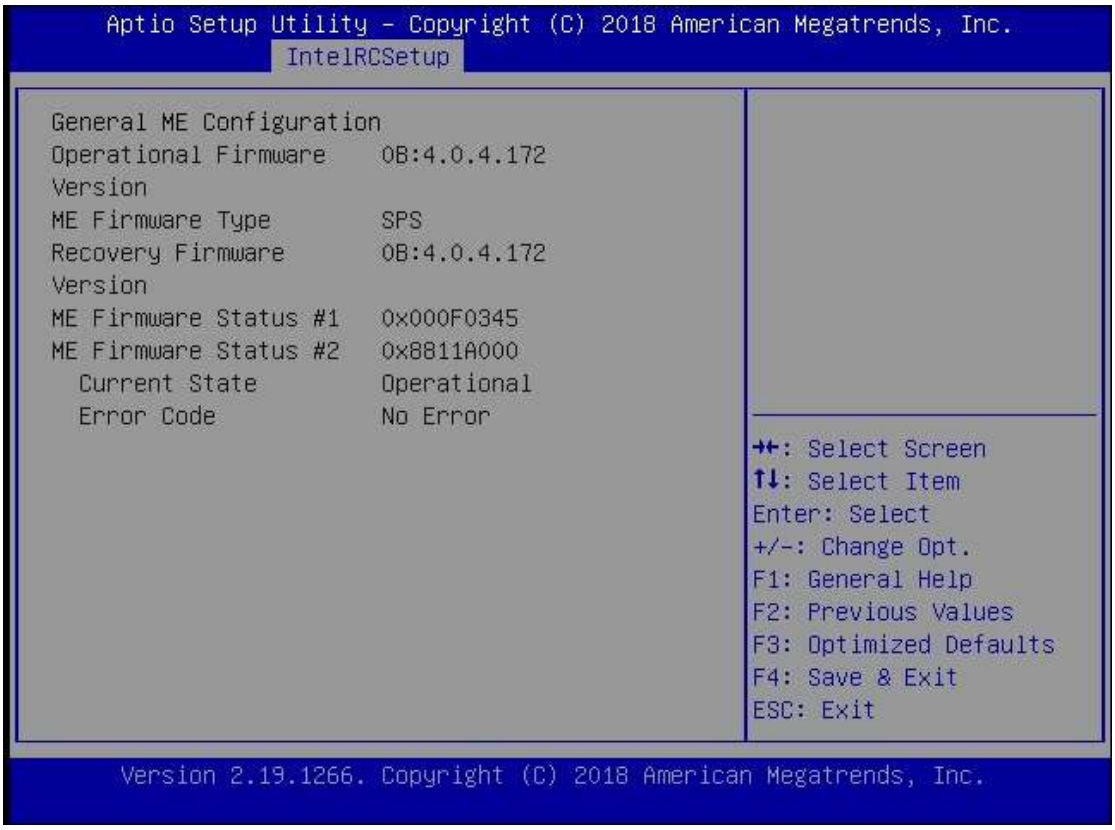
Processor Configuration



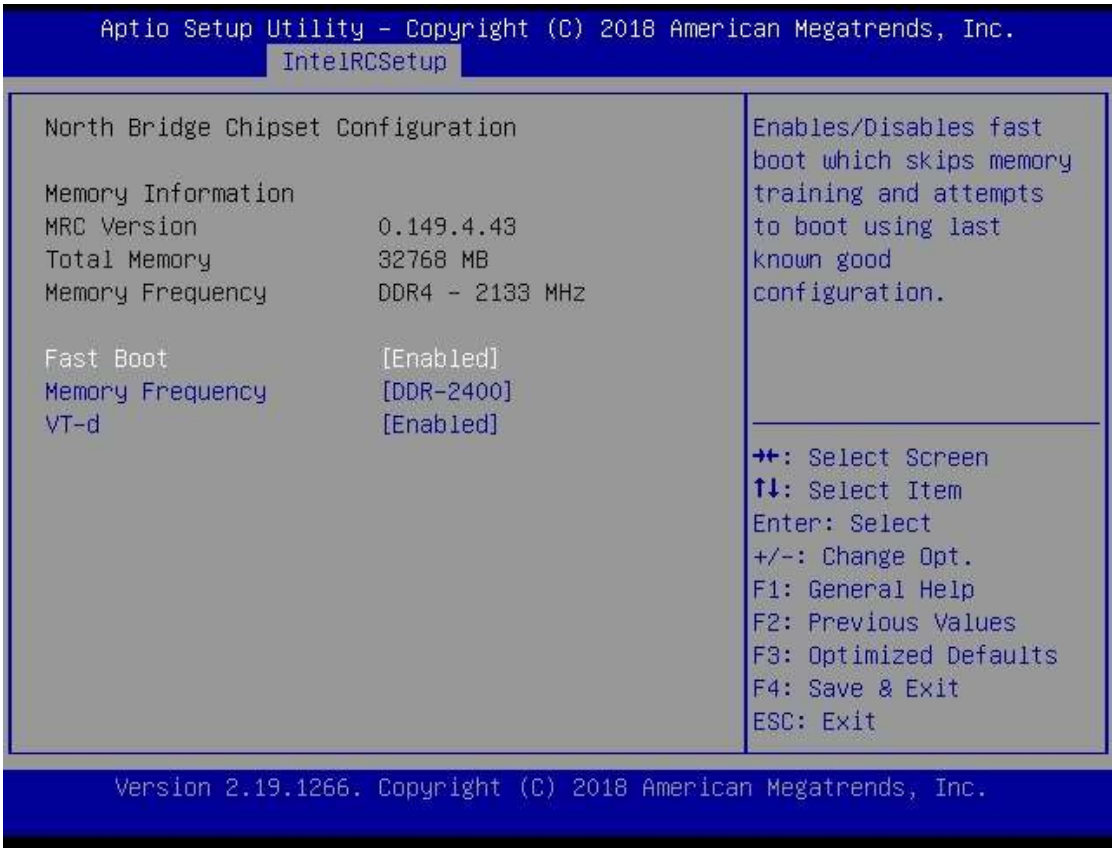
Feature	Options	Description
EIST (GV3)	Disable Enable	Enables/Disable EIST. GV3 must be enable for Turbo. .
Turbo	Enable Disable	Enable or Disable CPU Turbo capability. This option only applies to ES2 and above.
CPU C State	Disable Enable	Enable the Enhanced Cx state of the CPU, takes effect after reboot.
Package C state limit	No Pkg C-state No S0Ix No limit	Package C state limit.
Max core C-state	C1 C6	Options are:C1 and C6.
Enhanced Halt State(C1E)	Disable Enable	Enables the enhanced C1E state of the CPU, takes effects after reboot.
Monitor/Mwait	Enable Disable	Enable or Disable the Monitor/Mwait Instruction.
L1 Prefetcher	Enable Disable	Enable/Disable L1 Prefetch.

L2 Prefetcher	Enable Disable	Enable/Disable L2 Prefetch
Fast String	Disable Enable	When enables, 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.
VMS	Disable Enable	Enables the Vanderpool Technology, takes effect after reboot.
AES-NI	Disable Enable	Enable/disable AES-NI support.

Server ME Configuration

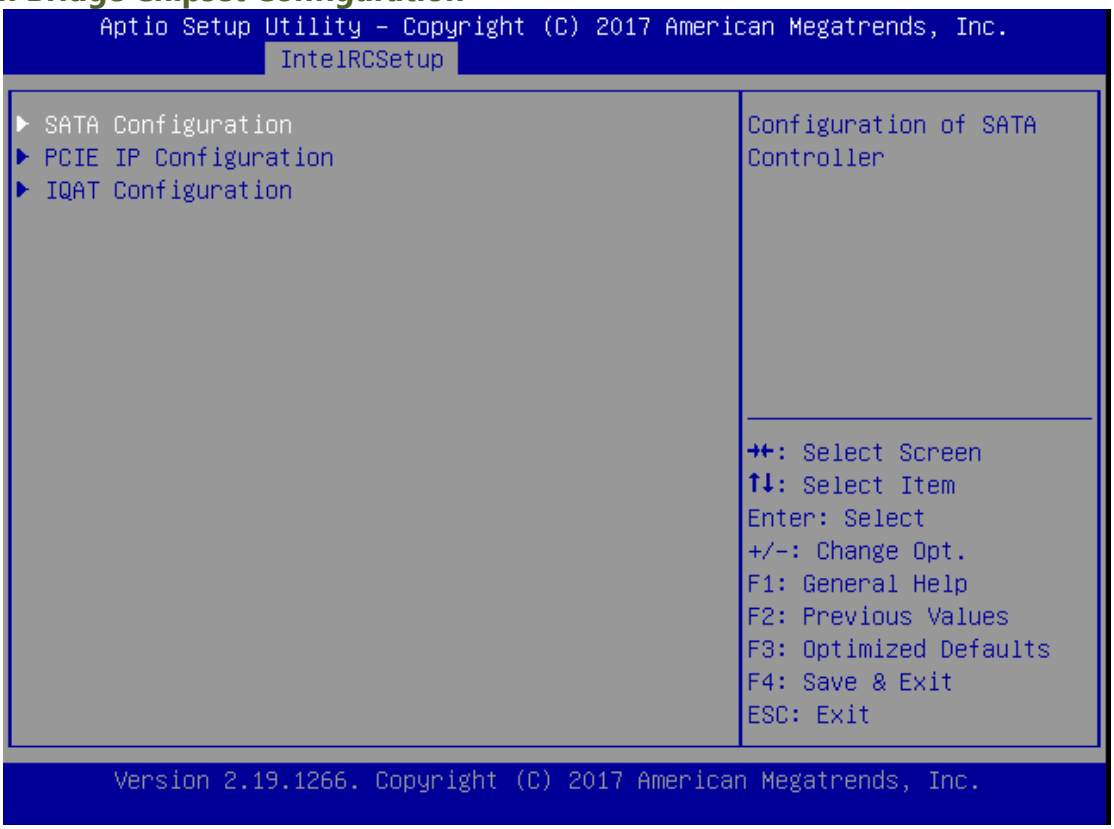


North Bridge Chipset Configuration



Feature	Options	Description
Fast Boot	Disabled Enabled	Enables/Disables fast boot, which skips memory training and attempts to boot using fast known good configuration.
Memory Frequency	DDR-1600 DDR-1867 DDR-2133 DDR-2400	DDR memory frequency: DDR4 up to DDR-2666 DDR3 up to DDR-1867.
VT-d	Disable Enable	Option to enable /Disable VT-d.

South Bridge Chipset Configuration



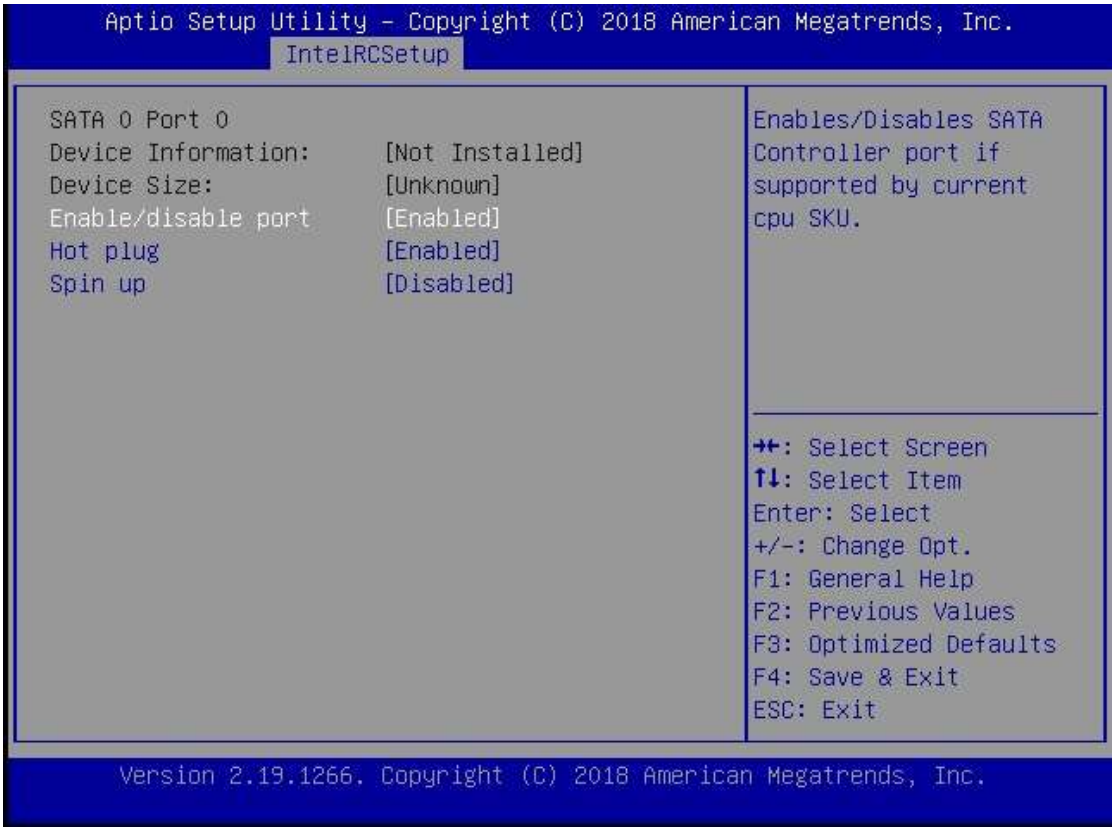
SATA Configuration

Feature	Options	Description
Enable controller	Enabled Disabled	Enables/Disables SATA Controller if supported by current CPU sku
LPM	Enabled Disabled	Enables/Disables Link Power Management
ALPM	Enabled Disabled	Enable/Disables Agresive Link Power Management
Speed Limit	Gen 1 Gen 2 Gen 3	Indicates the highest allowable speed of the interface

SATA1 Configuration

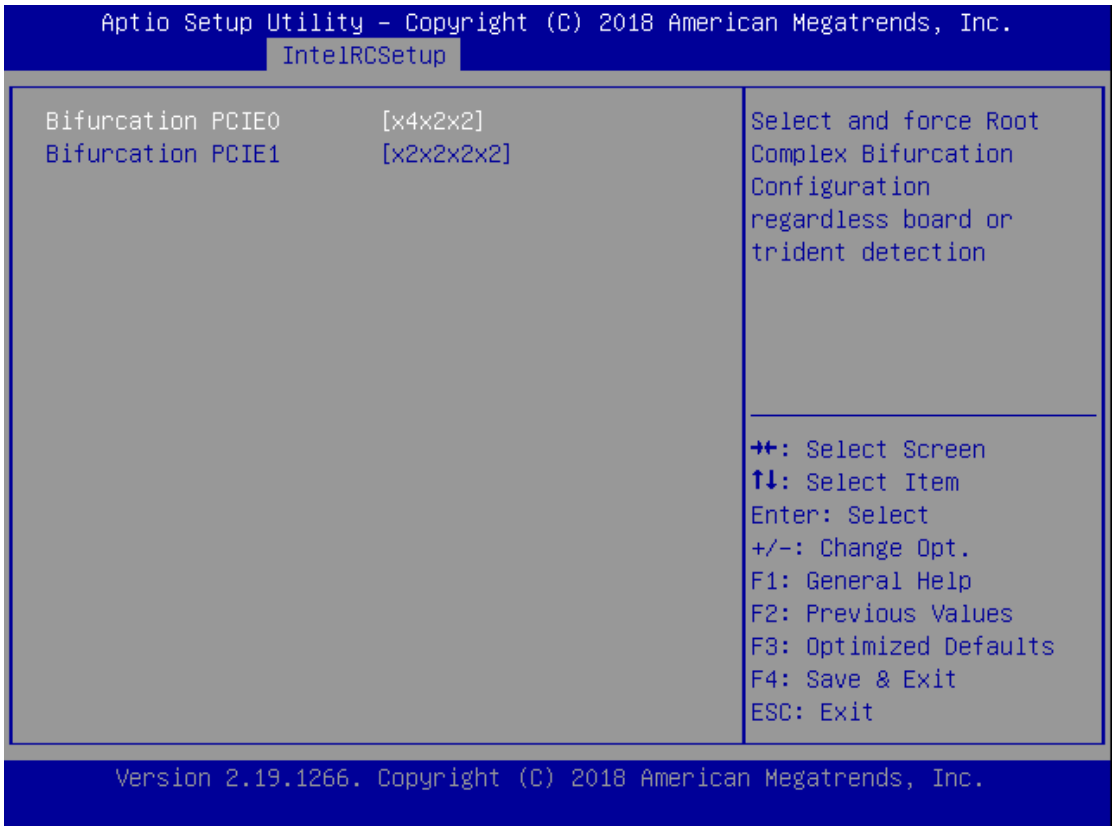
Feature	Options	Description
Enable/disable port	Enabled Disabled	Enables/Disables SATA Controller port if supported by current cpu SKU.
Hot plug	Enabled Disabled	Hot plug
Spin up	Enabled Disabled	Spin up

M2SATA1 Configuration



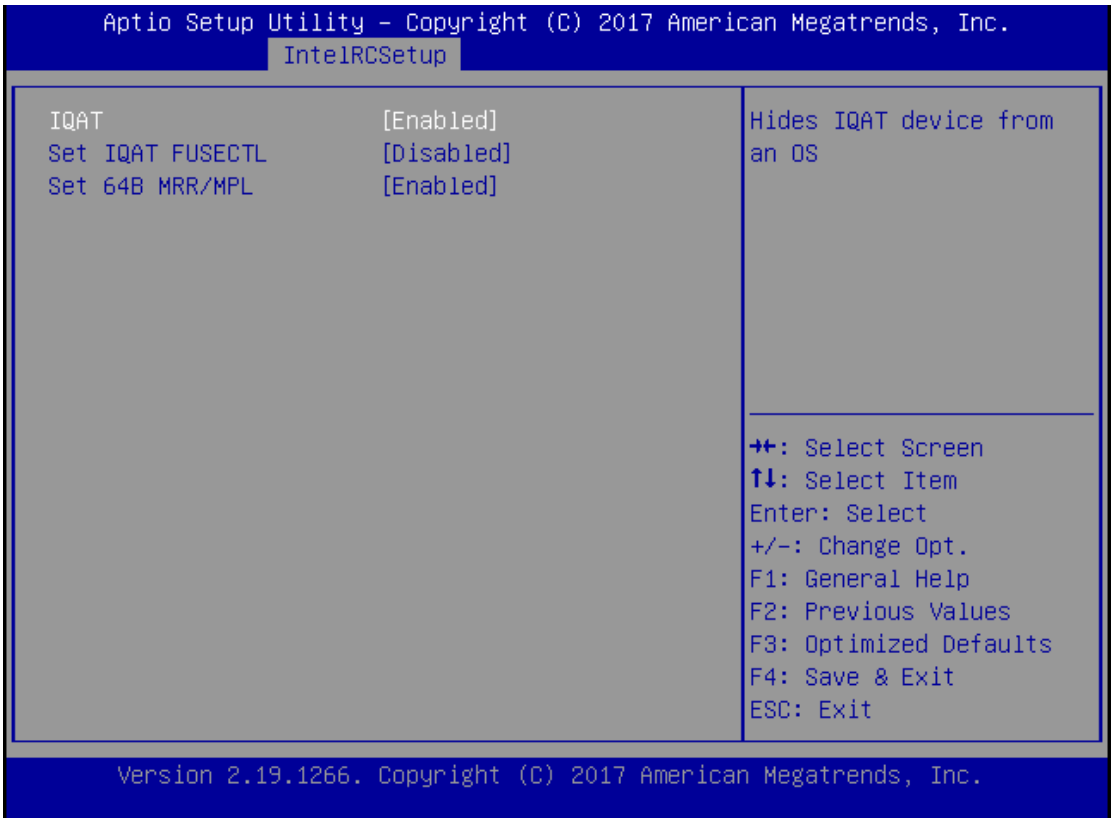
Feature	Options	Description
Enable/disable port	Enabled Disabled	Enables/Disables SATA Controller port if supported by current cpu SKU.
Hot plug	Enabled Disabled	Hot plug
Spin up	Enabled Disabled	Spin up

PCIE IP Configuration



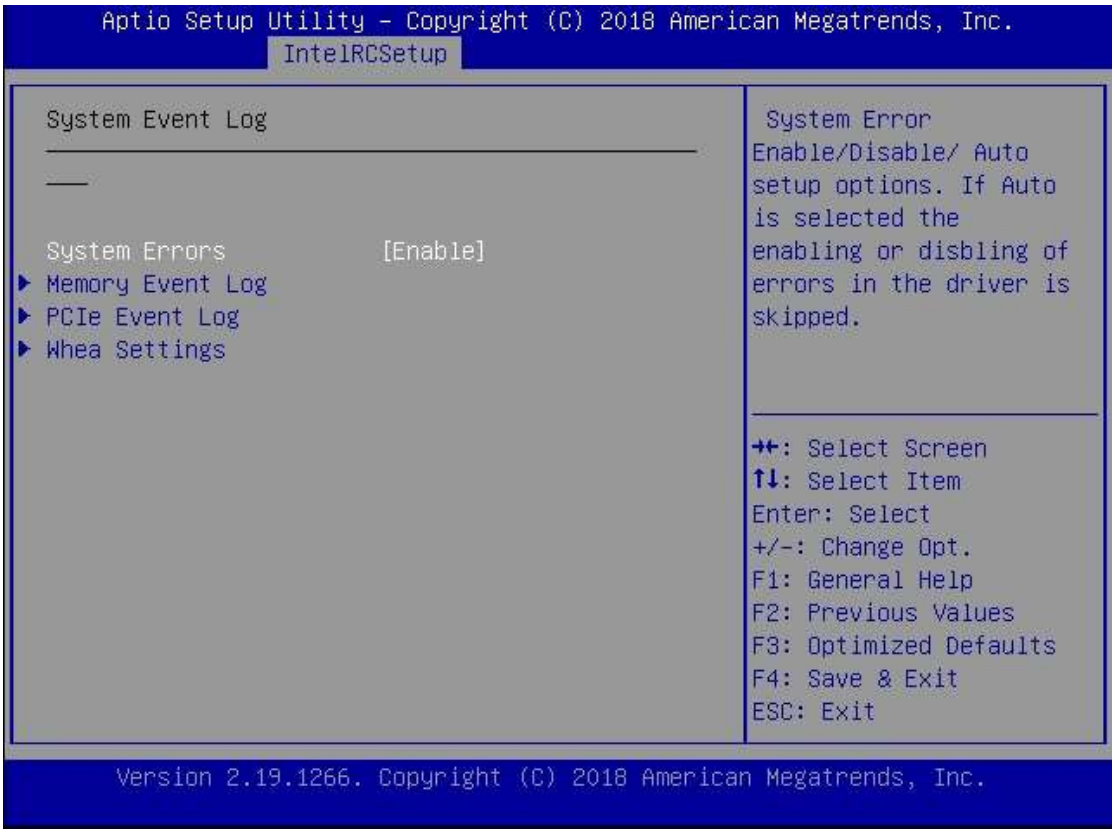
Feature	Options	Description
Bifurcation PCIE0	Auto X8 X4x4 X4x2x2 X2x2x4 X2x2x2x2	Select and force Root Complex Bifurcation Configuration regardless board or trident detection.
Bifurcation PCIE1	Auto X8 X4x4 X4x2x2 X2x2x4 X2x2x2x2	Select and force Root Complex Bifurcation Configuration regardless board or trident detection.

IQAT Configuration



Feature	Options	Description
IQAT	Enabled Disabled	Hides IQAT device from and OS.

System Event Log

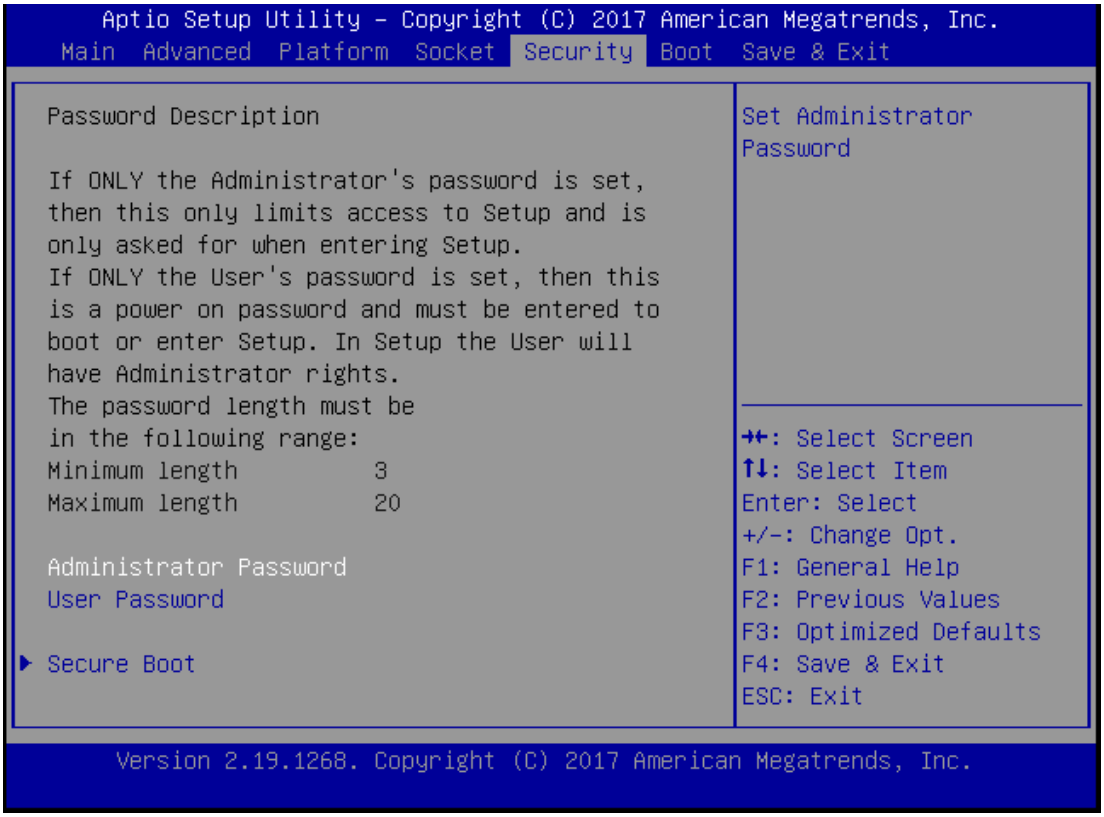


Feature	Options	Description
System Errors	Disable Enable Auto	System Error enabling and logging setup option.
Memory Elog Support	Disable Enable	Enable/Disable Memory Error logging support
Parity Check	Enable Disable	Enable/Disable Parity Check
Log Correctable	Enable Disable	Enable/Disable Correctable Memory Error logging support
Log Un-Correctable	Enable Disable	Enable/Disable Un-correctable Memory Error logging support
Enable/Disable Error Cloaking	Disable Enable	Error Cloaking Feature to hide CE Error to OS
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	Send system event Signal on Correctable

	Enable	error.
PCIe System Error	Disable Enable	Enable System Error reporting on all enumerated Root ports, bridges and devices.
PCIe Parity Error	Disable Enable	Enable Parity Error reporting on all enumerated Root ports, bridges and devices .
WHEA Support	Disable Enable	Enable/Disable WHEA ACPI support.
WHEA Error Injection 5.0 Extension	Disable Enable	When EINJ ACPI 5.0 support for set error type with address and vendor extensions.
Whea Logging	Disable Enable	Enable/Disable Whea logging of errors.
WHEA PCIe Error Injection	Disable Enable	Enable/Disable WHEA PCIe Error Injection .

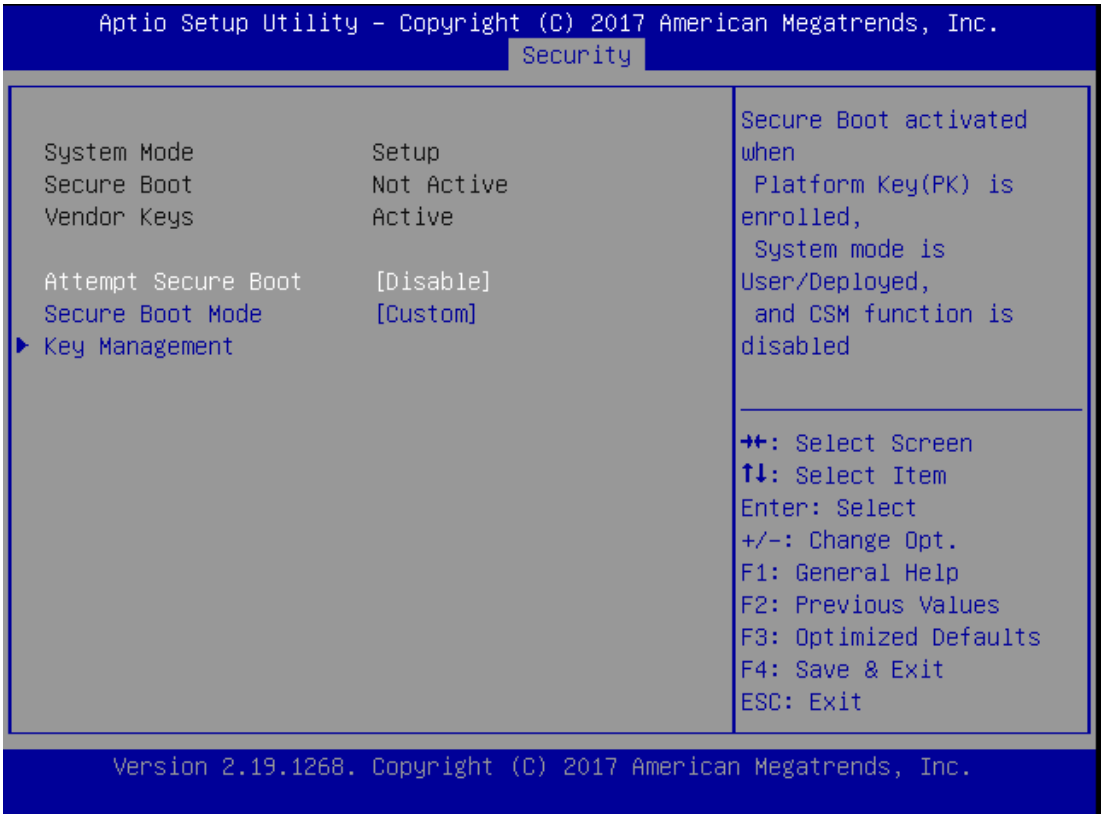
Security

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.



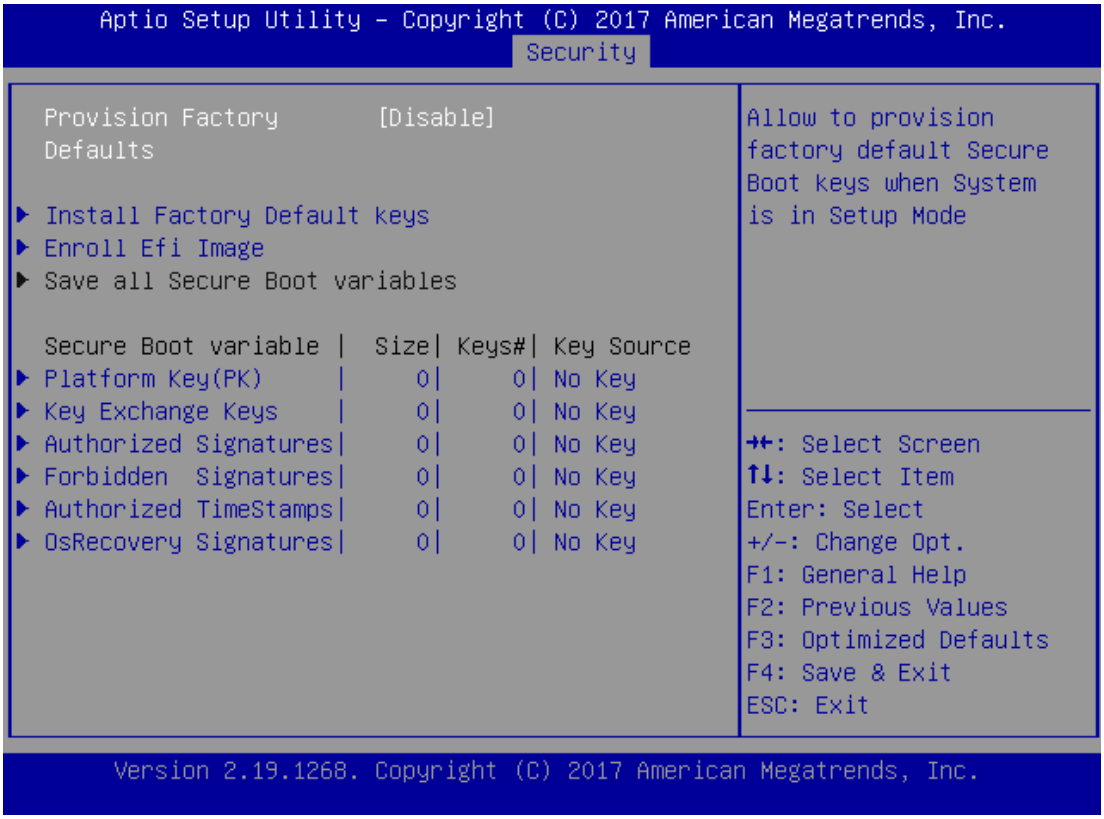
Feature	Description
Administrator Password	If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup.
User Password	If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or enter Setup. In Setup, the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

Secure Boot



Feature	Options	Description
Secure Boot Enable	Disabled Enabled	Secure Boot is activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.
Secure Boot Mode	Standard Custom	Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

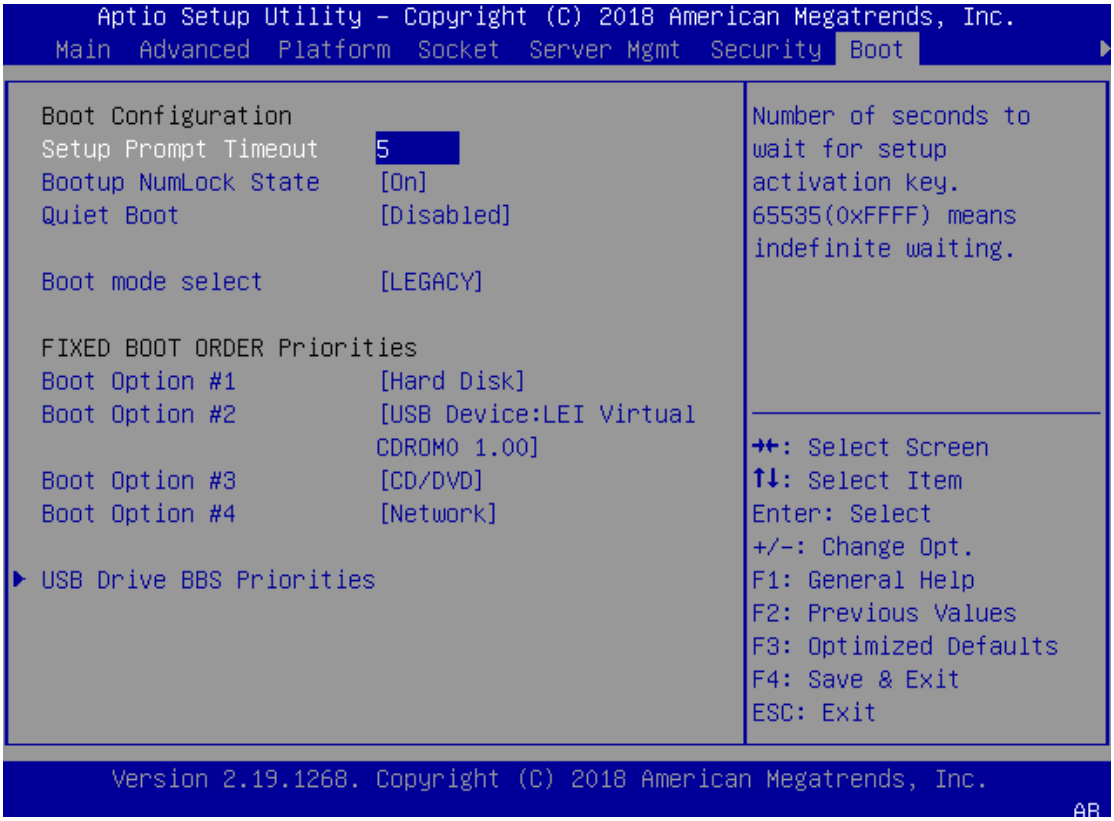
Key Management



Feature	Options	Description
Factory Key Provision	Disabled Enabled	Provision factory default keys on next re-boot only when System in Setup Mode.
Restore Factory keys	None	Force System to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys.
Enroll Efi Image	None	Allows the image to run in Secure Boot mode. Enroll SHA256 hash of the binary into Authorized Signature Database (db)

Boot 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.

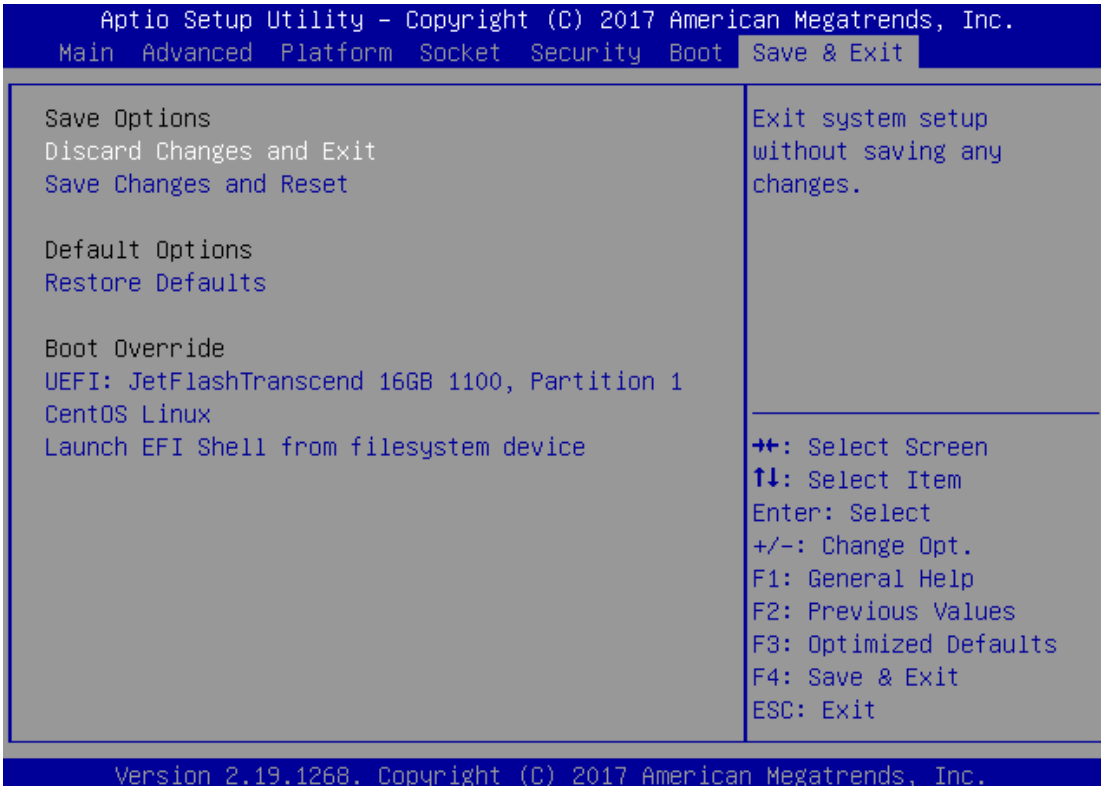


Feature	Options	Description
Setup Prompt Timeout	5	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.
Boot mode select	LEGACY UEFI DUAL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

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

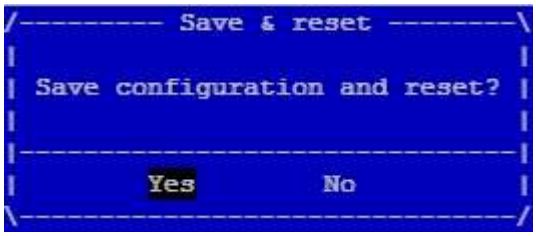
Save and Exit Menu

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



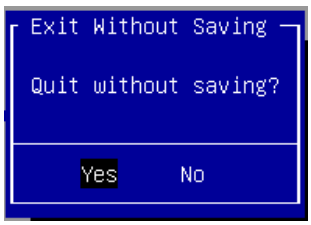
■ Save Changes and Reset

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



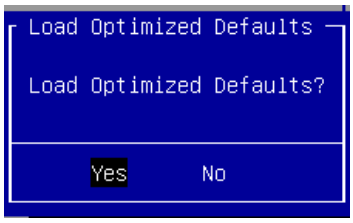
■ Discard Changes and Exit

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



■ Restore Defaults

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



Note: The items listed under Boot Override depend on devices connected to system.

APPENDIX A: SETTING UP CONSOLE REDIRECTIONS

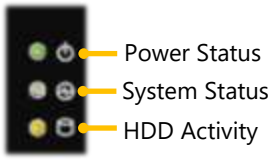
Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to the serial port of the Remote Client System.
2.
3. Configure the following settings in the BIOS Setup menu:
   BIOS > **Advanced** > **Serial Port Console Redirection** > **Console Redirection Settings**, select **115200** for the Baud Rate, **None**. for Flow control, **8** for the Data Bit, **None** for Parity Check, and **1** for the Stop Bit.

4. Configure console redirection related settings on the client system. You can use a terminal emulation program that features communication with serial COM ports such as *TeraTerm* or *Putty*. Make sure the serial connection properties of the client conform to those set in Step 1 for server.

APPENDIX B: LED INDICATOR EXPLANATIONS

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



- **System Power**

Green	*The system is powered and running*
Off	*The system is powered off*

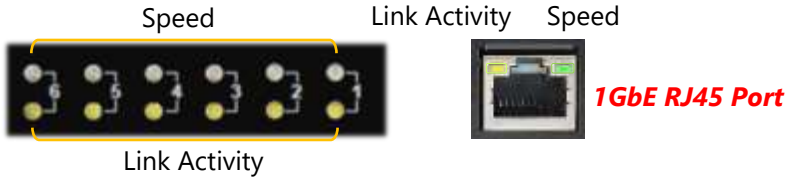
- **System Status**

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

Solid Green	*Defined by GPIO*
Solid Red	*Defined by GPIO*
Off	*Defined by GPIO*

- **HDD Activity**

Green	*A hard disk is detected*
Off	*No hard disk is detected*



- **Link Activity**

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

- **Speed**

Solid Amber	*Operating as a Gigabit connection (1000 Mbps)*
Solid Green	*Operating as a 100-Mbps connection*
Off	*Operating as a 10-Mbps connection*

APPENDIX C: RENAMING NETWORK INTERFACE

Prerequisite

1. Login as "root."
2. Have all network interfaces disconnected.

Description

It requires five steps to rename system's network interface in Linux.

1. **Scan** all network-related interfaces in the system.
2. **Filter** the network interfaces. Please only preserve the interface that you want to rename.
3. **Check** interfaces' status.
4. **Rename**.
5. **Save** the new name to the configuration file.

Config(rnif.conf)

There are some parameters that can be modified in the config file. (E.g. *Character '#' in the config file means comment*).

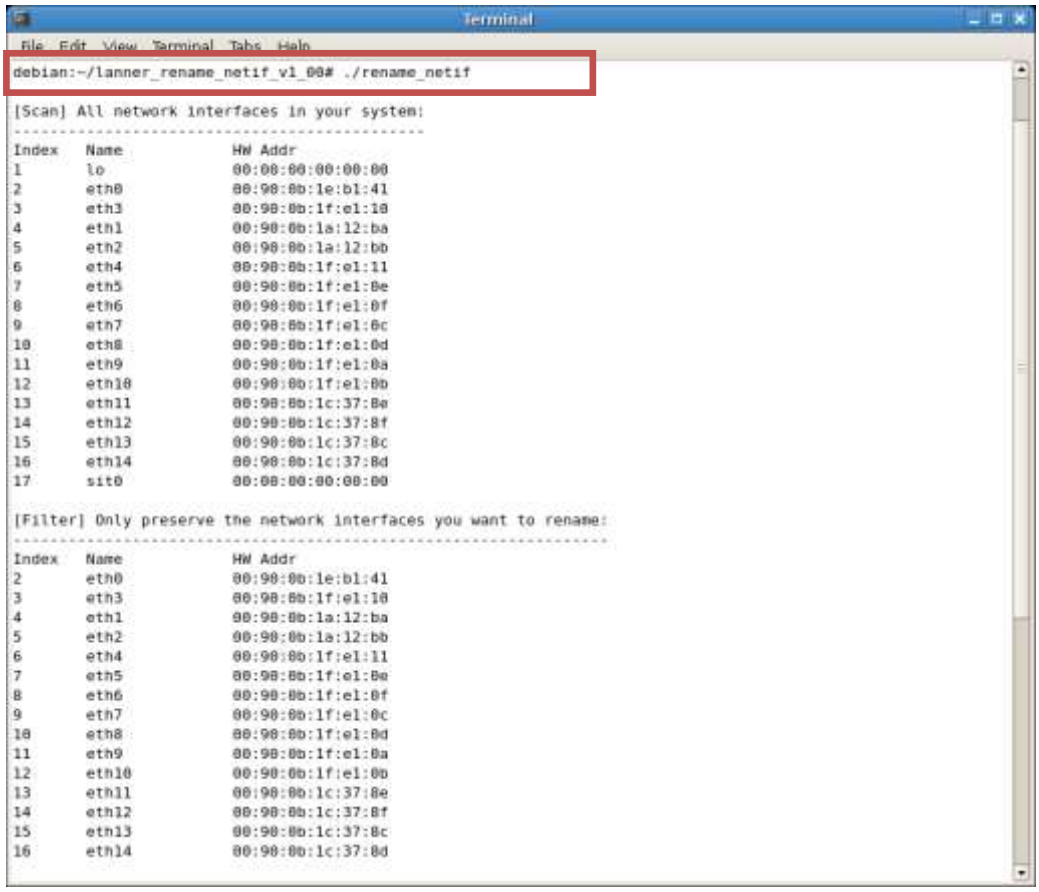
- **Filter:** The network interface that user wants to rename.
- **UdevAddress:** The path of udev rule files.
- **UdevFilename:** Udev rule file name.
- **IfcfgAddress:** The path of ifcfg files.
- **SaveStep:** If set to 0, the program will skip the step of saving.
- **AutoNaming:** The program will auto rename the network interface if user sets AutoNaming in the config file. The format is "AutoNaming oldName:newName." For example, if set "AutoNaming eth0:lanner0", the program will rename eth0 to lanner0 automatically.

Config Example

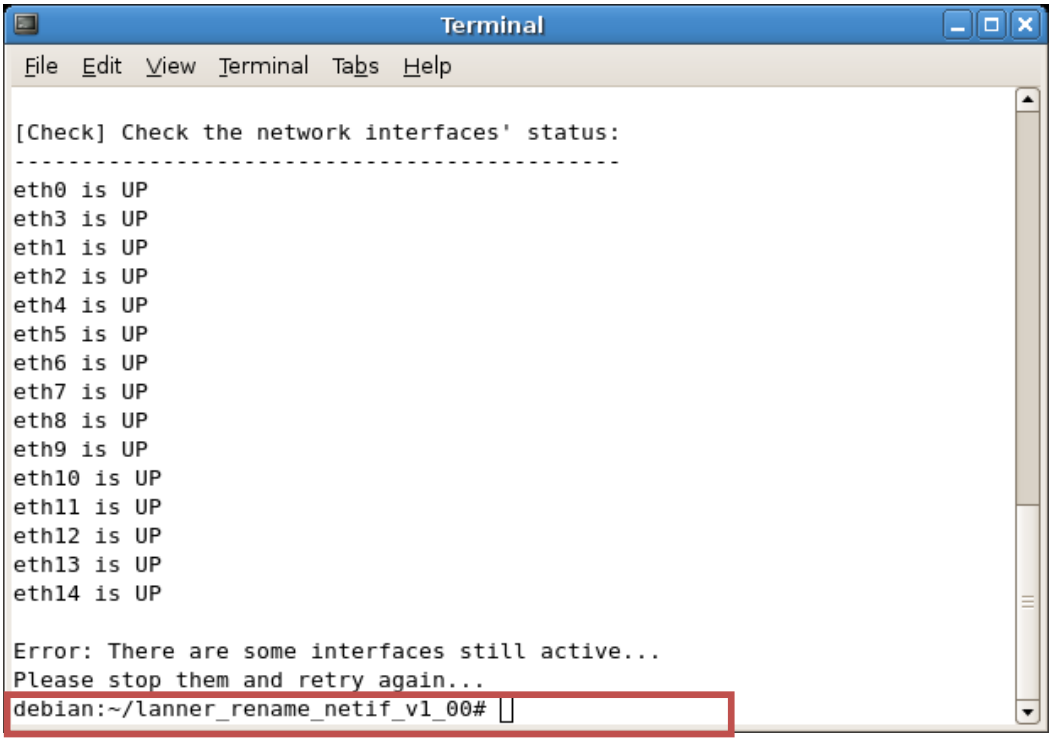
```
Filter eth
UdevAddress /etc/udev/rules.d
UdevFilename 10-lanner_net.rule
IfcfgAddress /etc/sysconfig/network-scrips
AutoSave 0
AutoNaming eth0:lanner0
AutoNaming eth1:lanner1
AutoNaming eth2:eth10
```

Screenshots of Renaming Procedures

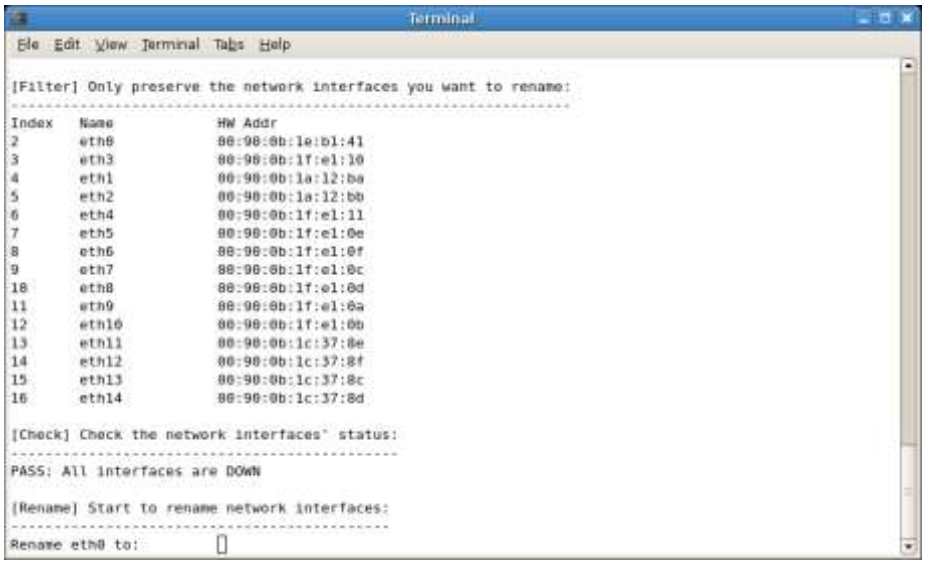
1. **Scan and filter.**



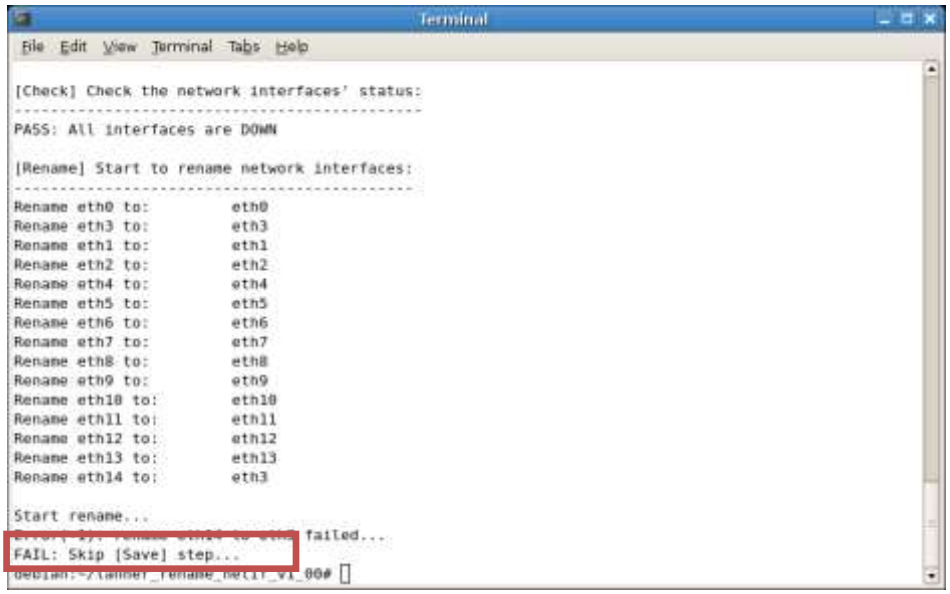
2. **If any network interface is still running, the utility will exit.**



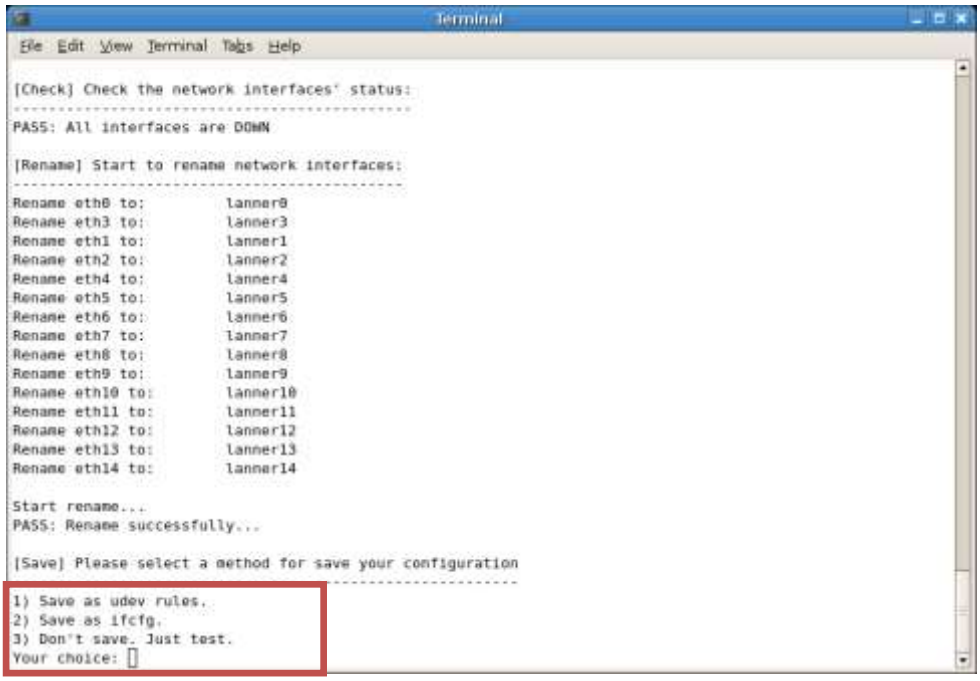
3. **Renaming will start after the message shows "PASS: All interfaces are DOWN".**



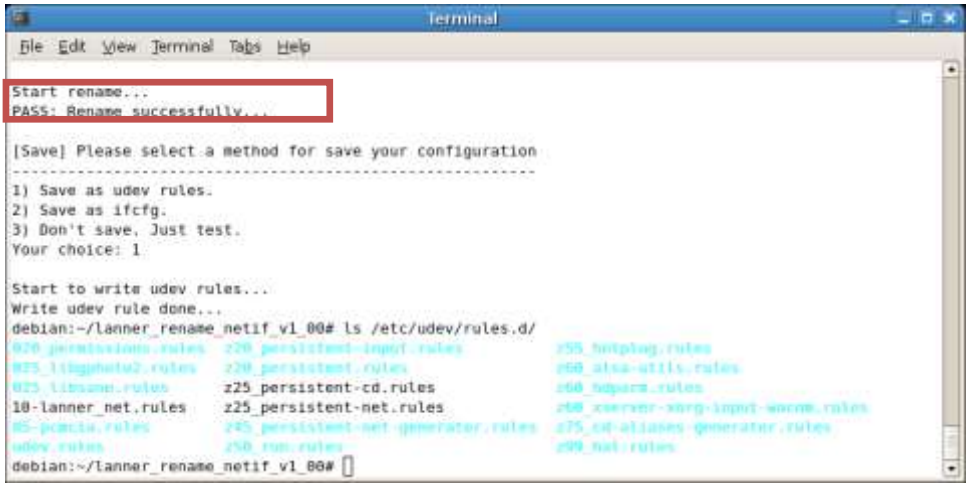
4. **If renaming fails (using the same name), the utility will skip saving step and exit.**



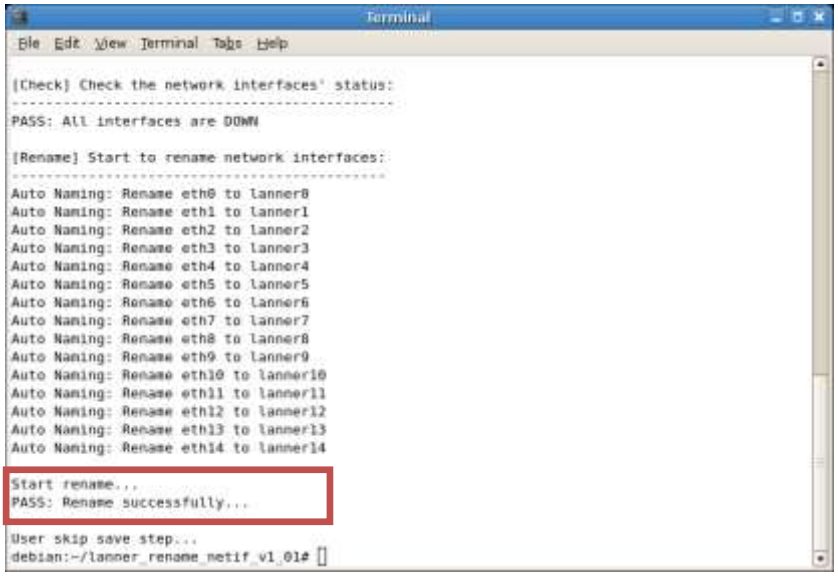
5. **If renaming is successful, choose a save method or just leave.**



6. **Save successfully.**



7. **You can skip saving and set AutoNaming.**



APPENDIX D: TERMS AND CONDITIONS

Warranty Policy

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

RMA Service

Requesting an RMA#

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

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

RMA Service Request Form

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

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
	09: Cache RMA Problem	15: PS2	21: Shut Down
03: CMOS Data Lost	10: Memory Socket Bad	16: LAN	22: Panel Fail
04: FDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
05: HDC Fail	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)
06: Bad Slot			

Request Party

Authorized Signature / Date

Confirmed By Supplier

Authorized Signature / Date