Lanner

# Network Appliance Platform

Hardware Platforms for Network Computing

# NCA-1516 User Manual

Version: 1.1

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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.

# Conventions & Icons

This document utilizes different font types and icons in order to make the selected text more transparent and explicable to users. This document contains the following conventions:

## Font Conventions

| Example | Convention | Usage |
|---|---|---|
| iptables –F | Monospace, shaded | A command to be entered at a shell command-line |
| **Setup** page | Bold | A title of a dialog box or a page |
| **<Enter>** | Between a pair of inequality signs | A physical keyboard button |
| "Menu" | Between a pair of quotation marks | A menu option or a software button to be clicked |
| *Readme.txt* | In Italic | A filename or a file path |
| IPMI User Guide | Underlined | The name of another document or a chapter in this document |

## 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.

For troubleshooting the issues with your system, please visit the Lanner Q&A page for diagnostic procedures and troubleshooting steps.

# Technical Support

In addition to contacting your distributor or sales representative, you could submit a request to our **Lanner Technical Support** at http://www.lannerinc.com/technical-support where you can fill in a support ticket to our technical support department.

# Copyright and Trademarks



# Documentation Feedback

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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# Acknowledgment



# 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.

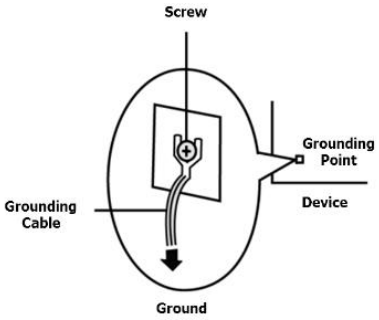
# Consignes de sécurité électrique

- 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.

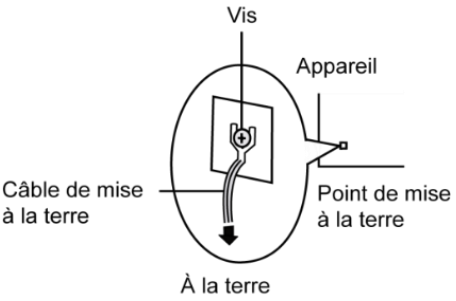
## Grounding Procedure for DC Power Source

- 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 WIfi6 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.

## 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 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 | WiFi Kit for NCA-1516 |
| WPEB-265AXI | WiFi Kit for NCA-1516 |
| WLE600VX | WiFi Kit for NCA-1516 |
| IO-1516P1A | PoE Kit for NCA-1516 |
| Rackmount Kit | 1U Rackmount kit |

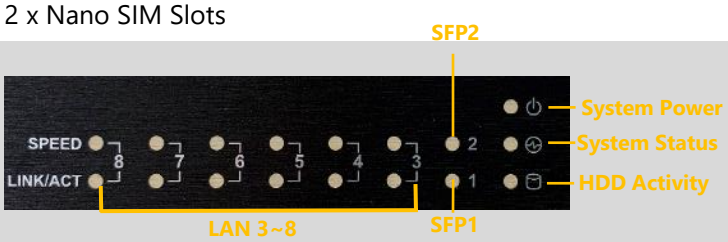
## Ordering Information

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

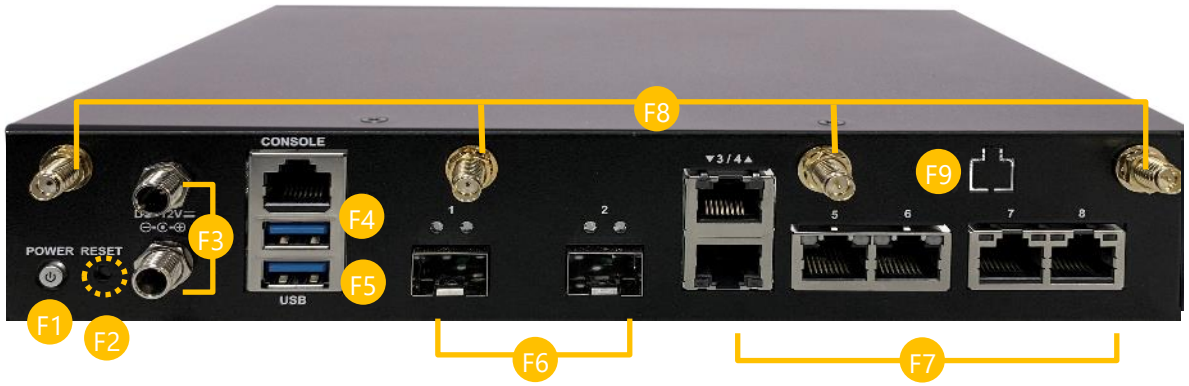
# System Specifications

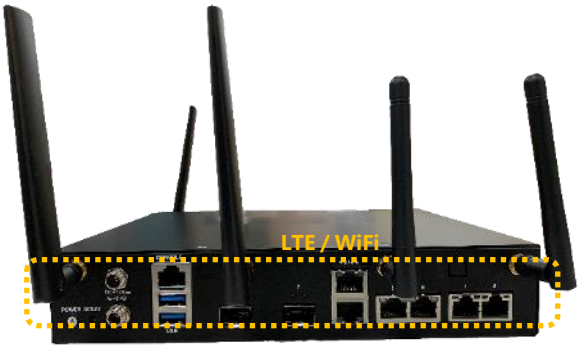
| | | |
|---|---|---|
| **Form Factor** | | Desktop |
| **Platform** | Processor Options | Intel® Atom® C3000 |
| | CPU Socket | 1 x Onboard |
| | Chipset | SoC |
| | Security Acceleration | Intel® QuickAssist Technology |
| **BIOS** | | AMI SPI Flash BIOS |
| **System Memory** | Technology | DDR4 1866/2133/2400MHz ECC/Non-ECC (By SKU) |
| | Max. Capacity | 64GB |
| | Socket | 2 x 260-pin SODIMM |
| **Networking** | Ethernet Ports (By SKU) | 4 x GbE RJ45 Intel® i350<br>2 x GbE RJ45 Intel® SoC Integrated MAC (Optional PoE+ Support)<br>2 x SFP+ SoC Integrated MAC |
| | Bypass | N/A |
| | NIC Module Slot | N/A |
| **LOM** | IO Interface | N/A |
| | OPMA slot | |
| **I/O Interface** | Reset Button | 1 |
| | LED | Power/Status/Storage |
| | Power Button | 1 x ATX Power Switch |
| | Console | 1 x RJ45 |
| | USB | 2 x USB 3.0 |
| | LCD Module | N/A |
| | Display | N/A |
| | Power input | 2 x DC Jack (Optional 2nd DC Jack) |
| **Storage** | HDD/SSD Support | N/A |
| | Onboard Slots | 1 x Onboard EMMC 8G (By Request) |
| **Expansion** | M.2 | 1x M.2 3052/3580 B Key (PCIe/USB 3.0)<br>1x M.2 3042 B Key (USB 3.0)<br>1x M.2 2242 B Key (SATA) |
| | mini-PCIe | 1 x Mini-PCIe (PCIe/USB2.0) |
| | SIM card Slot | 2 x Nano SIM |
| **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<br>-20~70°C Non-Operating |
| | Humidity (RH) | 5~90% Operating<br>5~95% Non-Operating |
| **System Dimensions** | (WxDxH) | 231 x 200x 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 |

# Front Panel


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

# Rear Panel

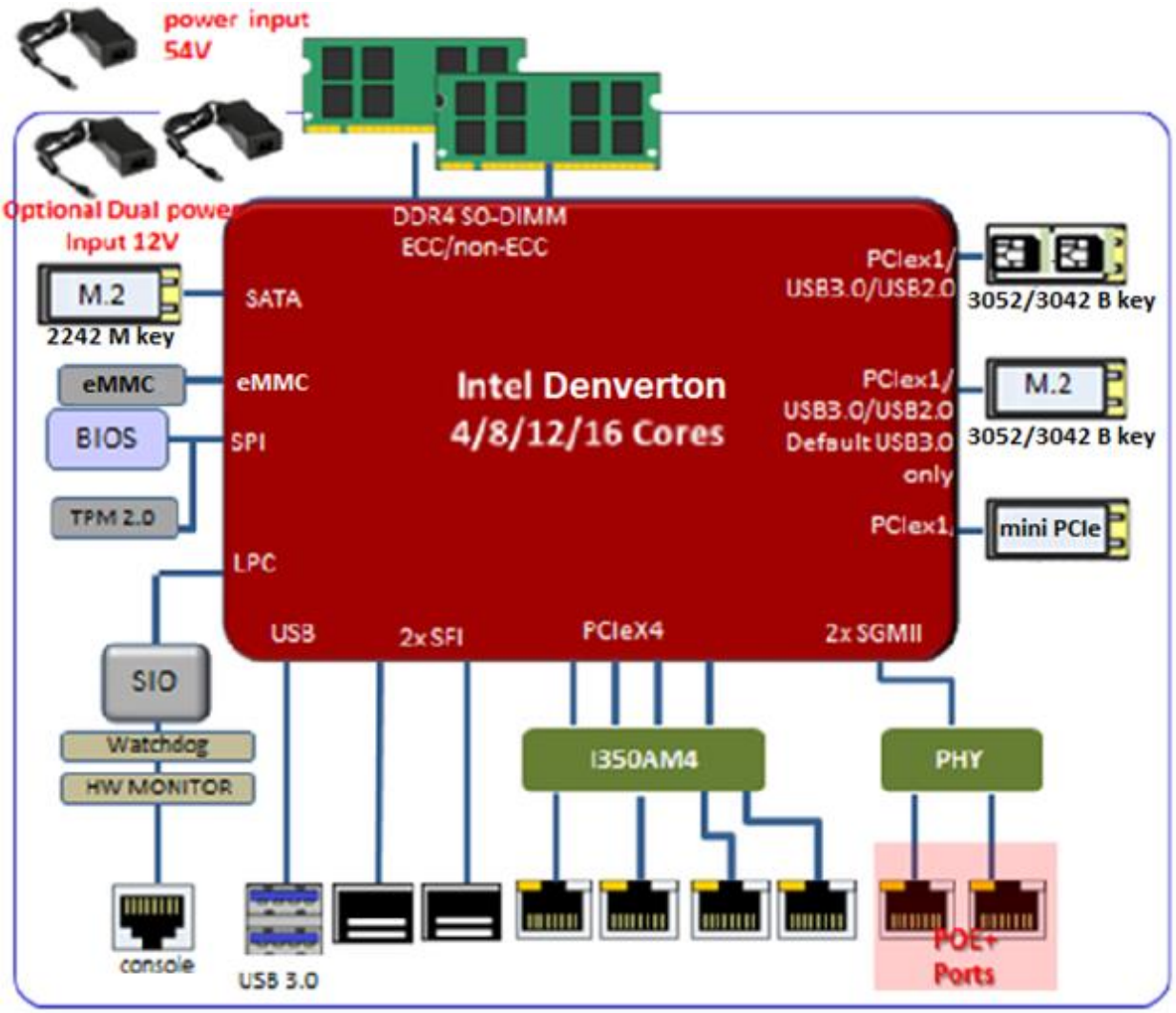



| No. | Description | |
|---|---|---|
| F1 | Power Switch | Press to power on/off the system |
| F2 | Reset Button | Press to perform a Hardware reset |
| F3 | DC Jack | Power supply |
| F4 | Console Port | 1x RJ45 console port |
| F5 | USB Port | 2 x USB 3.0 port |
| F6 | SFP Port | 2 x SFP port |
| F7 | LAN Port | 6 x RJ45 port |
| F8 | Antenna Port | 4x SMA connector for the Wi-Fi / LTE module   |
| F9 | PoE Expansion | Expansion PoE Kit Port (Optional) |

# Motherboard Information

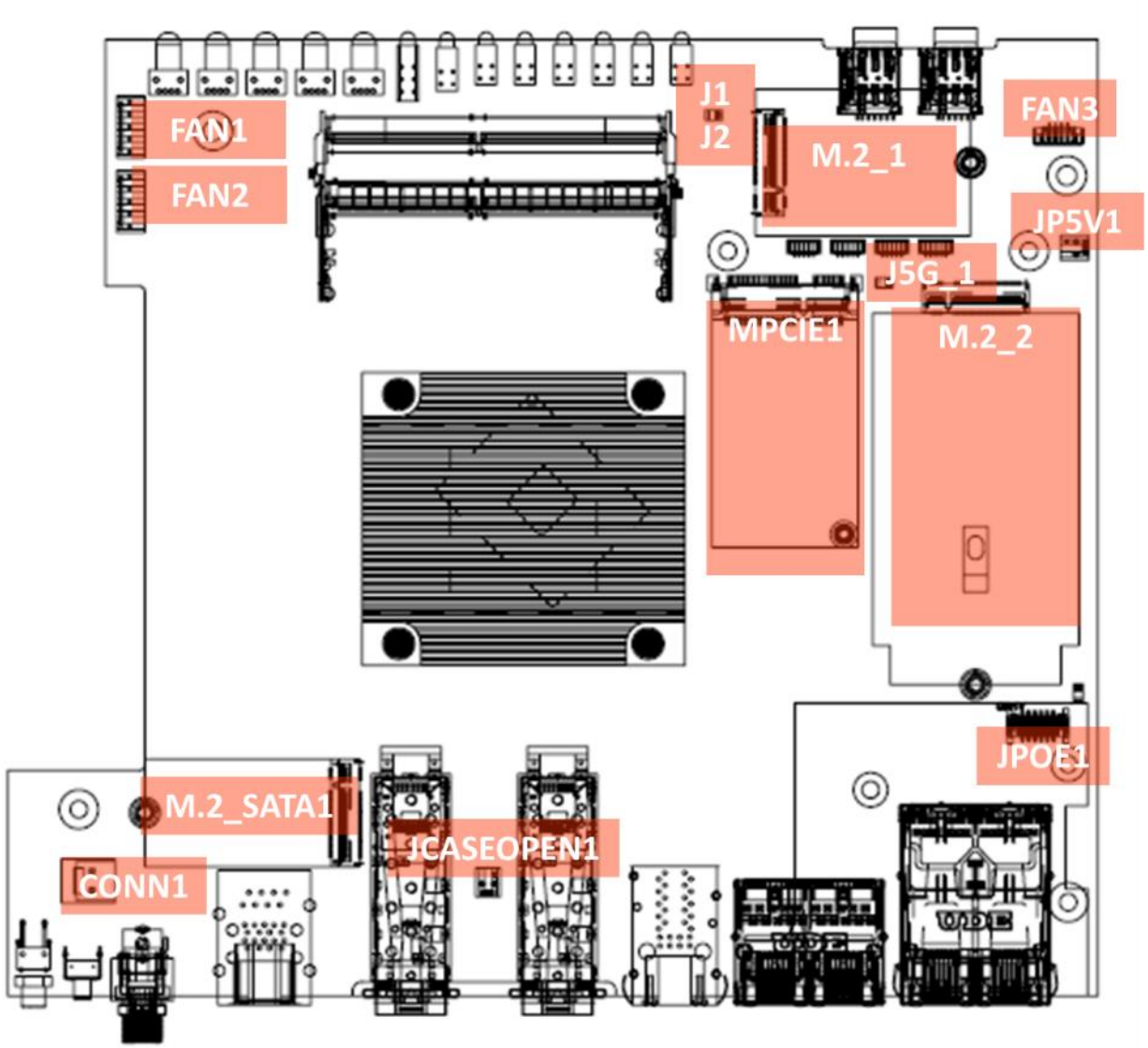
## Block Diagram

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 number | Description |
|---|---|
| 1 | GND |
| 2 | 12V |
| 3 | FANIN |
| 4 | NC |
| 5 | FANOUT |

**J1: SIM socket selection**

| PIN number | Description |
|---|---|
| 1 | 3V |
| 2 | UIM1_SEL |
| 3 | GND |

SEL=1, Host2 → Card1 SIM Socket for MiniPCIe 1st SIM card

SEL=0, Host1 → Card1 (default) SIM socket for M2_1 (LTE) 2nd SIM card

**J2: SIM socket selection**

| PIN number | Description |
|---|---|
| 1 | 3V |
| 2 | UIM2_SEL |
| 3 | GND |

SEL=1, Host2 → Card1 (default) SIM socket for M2_2 (5G) 1st SIM card

SEL=0, Host2 → Card1 SIM socket for M2_1 (LTE) 1st card

**JCPLD1: Burning CPLD code pin header**

| PIN number | Description | PIN number | 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**

| PIN number | Description |
|---|---|
| 1 | GND |
| 2 | 12V |
| 3 | 5G_FAN_IN_CONN |
| 4 | 5G_FAN_CTL_CONN |

**MMWAVE1、 MMWAVE2、 MMWAVE3 、MMWAVE4: 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**

**1-2/3-4/5-6/7-8/9-10 short for EM9190, remove for FM980n**

| PIN number | Description | PIN number | 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 |

**JP5V1: 5V power connector for feed WiFi6 module**

| PIN number | Description |
|---|---|
| 1 | GND |
| 2 | 5V |

**J80PORT1: Debug 80 port pin header**

| PIN number | Description | PIN number | 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: To Dying Gasp board pin header 1**

| PIN number | Description | PIN number | 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 number | Description |
|---|---|
| 1 | GND |
| 2 | ME_RECVR_MODE |

**JSPIROM1: For Burning SPI ROM pin header**

| PIN number | Description | PIN number | 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 using Dying Gasp module pin selection**

**1-2** for Dying Gasp
**2-3** for Normal SFP+ module

| PIN number | 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 number | 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 number | Description |
|---|---|
| 1 | *Not connected* |
| 2 | SOC_RTEST_N |
| 3 | GND |

**JPOE1: Connected PoE+ board to board connector**

| PIN number | Description | PIN number | 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: To Dying Gasp board pin header2**

| PIN number | Description | PIN number | 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 number | Description |
|---|---|
| 1 | V12A_DC_B |
| 2 | GND |

**JCASEOPEN1: To Case open slide switch connector**

| PIN number | Description |
|---|---|
| 1 | SIO_CASEOPEN0_N |
| 2 | GND |

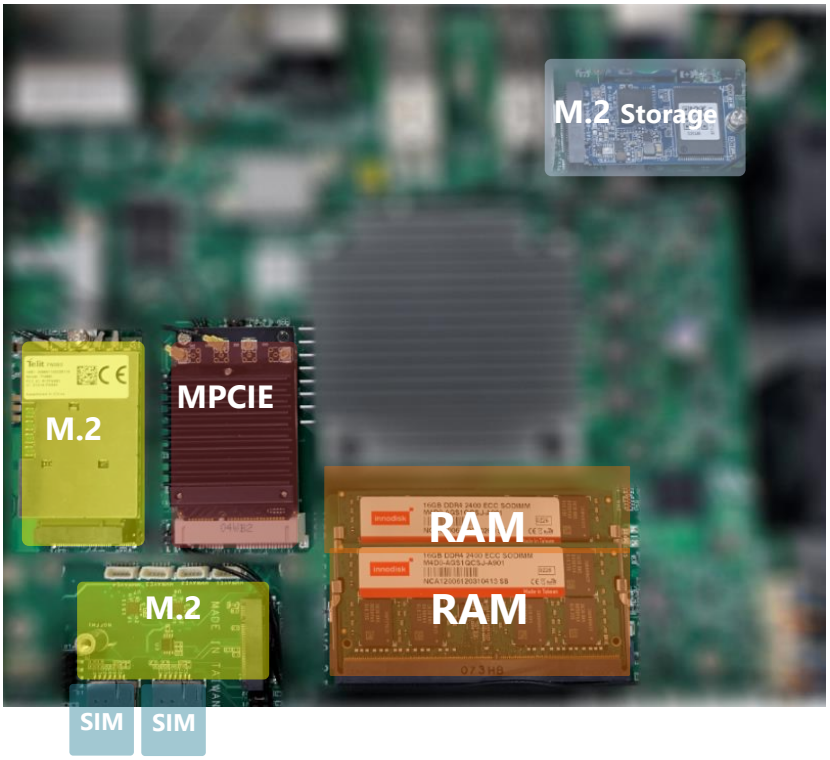
**JBAT1: Pin header for button cell**

| PIN number | 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 two M.2 slots and an MPCIE slot. Based on your application and modules used, install modules in the corresponding slots.



# Opening the Chassis

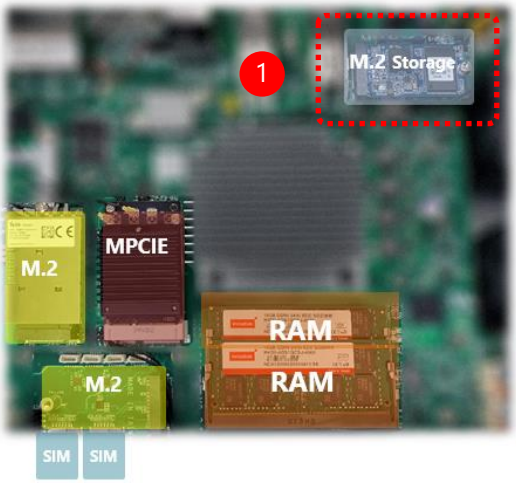
**1.** Unscrew the six (6) screws which secure the chassis on the system's front, side panels and the top panel.

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

# Installing M.2 module for Storage

The motherboard supports one M.2 storage on **M2_1**. Follow the instructions below for installation.

1. Locate the **M2_1** slot.



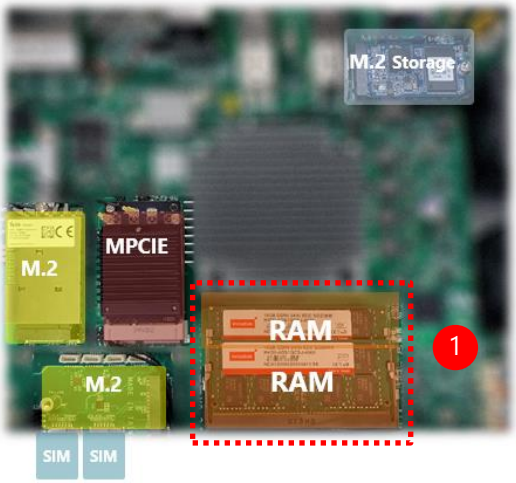

2. Align the notches of the module with the socket keys in the slot, and insert it at 30 degrees into the socket until it is fully seated in the connector.


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

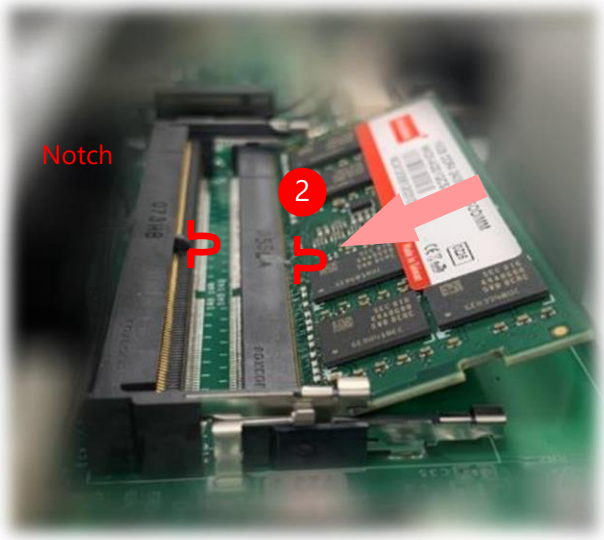
# Installing System Memory

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

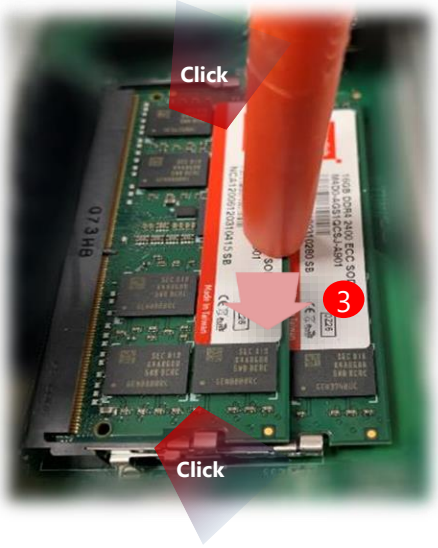
1. Locate the **system memory** slot.




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.



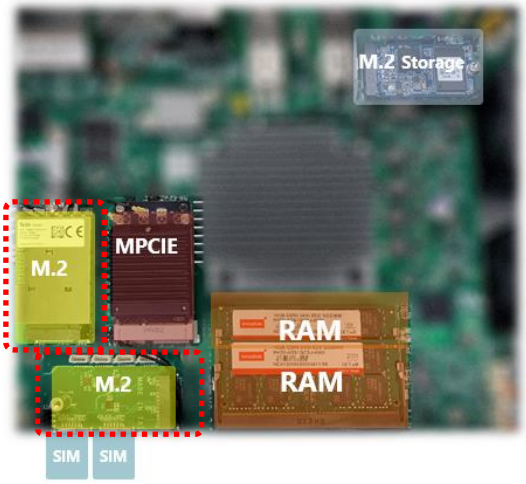

3. Press vertically on the other end of the card until it clicks into place.

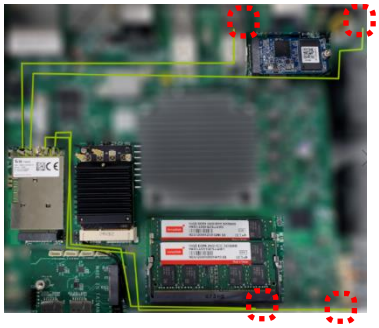


# Installing M.2 module for LTE or Wifi

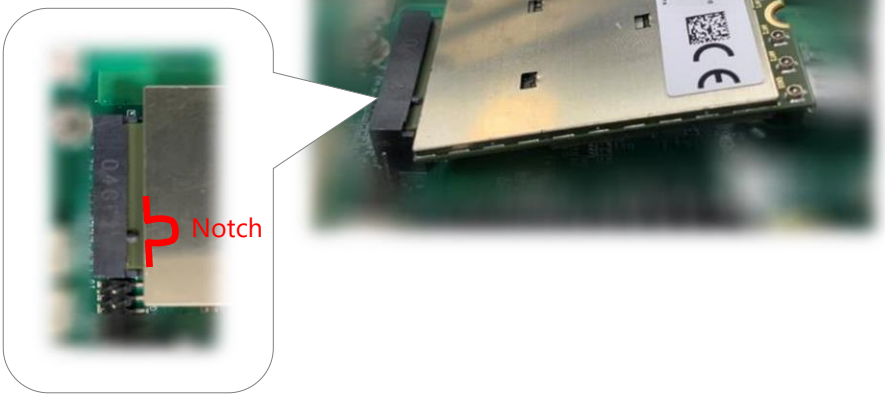
The motherboard supports two M.2 for LTE or WiFi modules on M2_1. Please follow the steps below to install the LTE or WiFi modules.

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

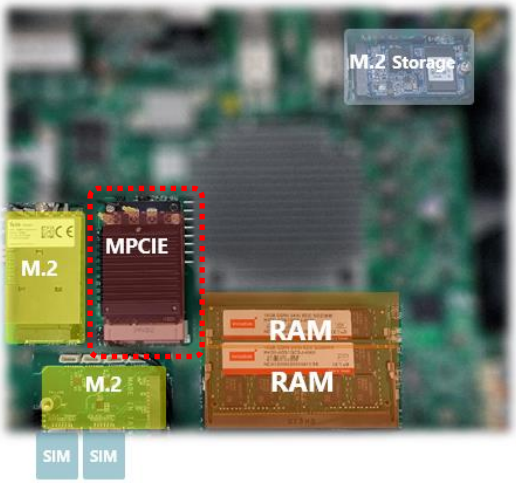


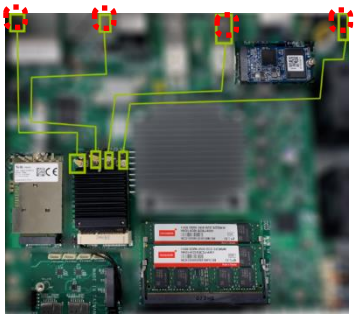

3. Fix the card with the dedicated screw provided in the accessory pack.

# Installing mPCIE module for Wifi

The motherboard supports one mPCIE slot for a WiFi module. Please follow the steps below to install the WiFi module.

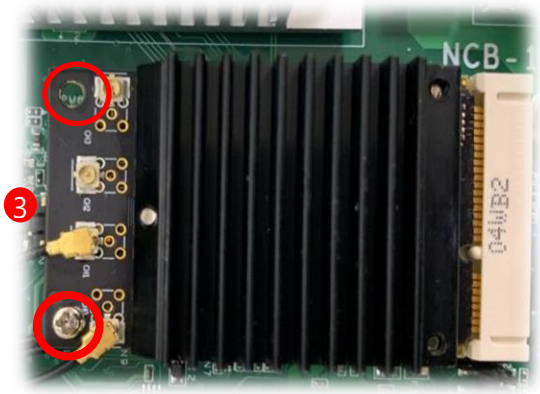
1. Locate the mPCIE slot.



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

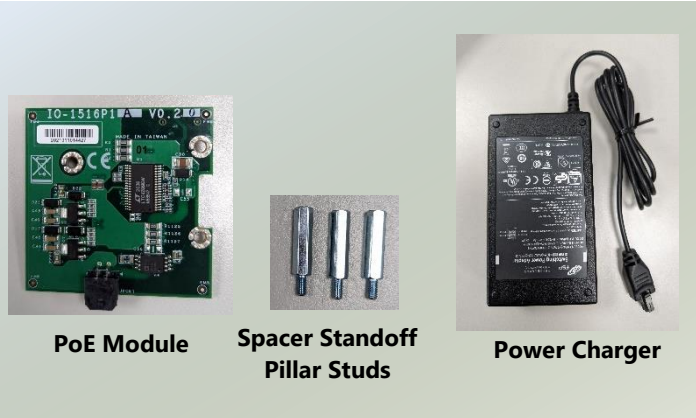

3. Fix the module with the screw provided in the accessory pack.



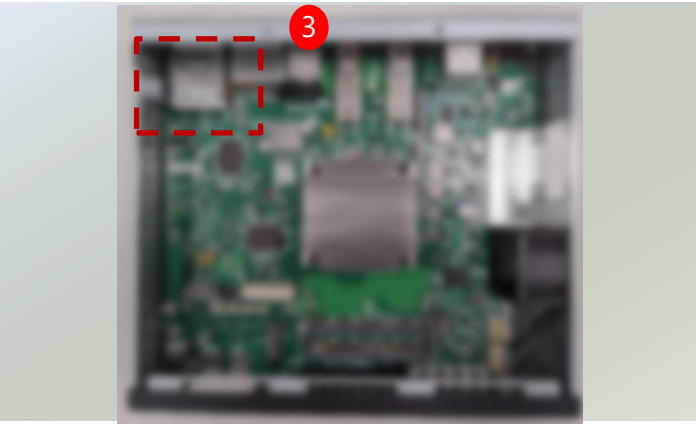
# Installing PoE Module Kit (Optional)

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

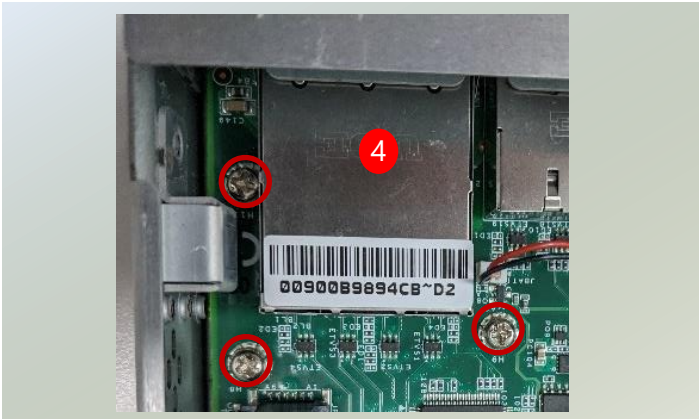
1. The PoE Module Kit includes:
   - 1x PoE Module
   - 3x Spacer standoff pillar studs
   - 1x Power Adapter



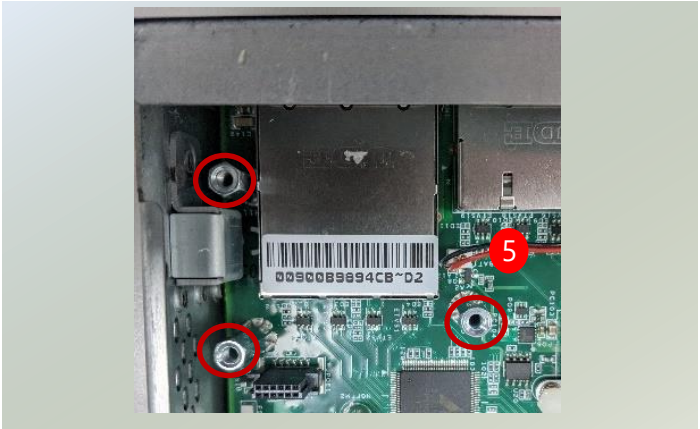

2. Power off the system and open the chassis cover.
3. Locate the PoE Module slot placement.



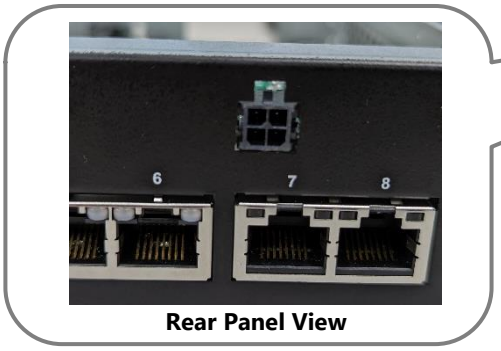

4. Remove the three (3) screws



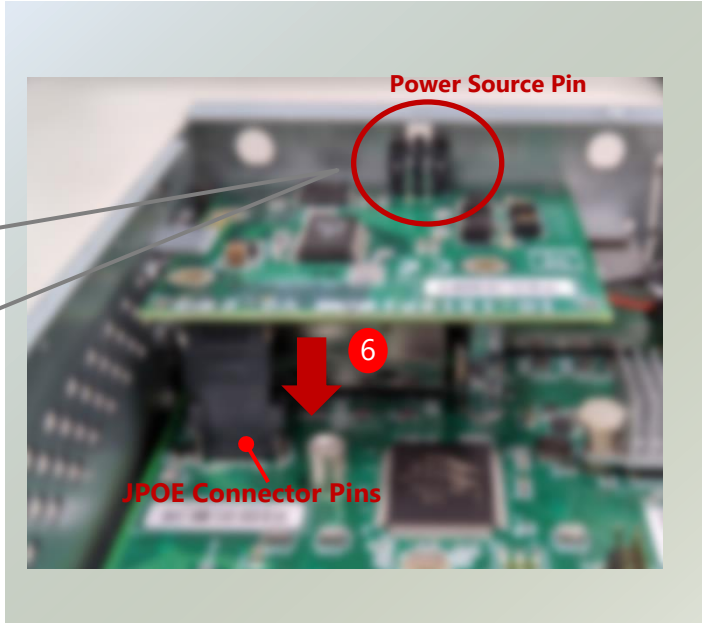

5. Replace the three (3) screws with the spacer standoff pillar studs.



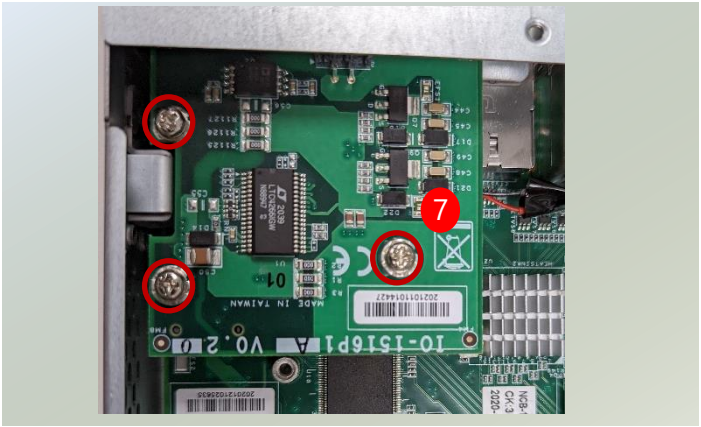
6. Align the top power source pin to the chassis rear opening spot, and insert the bottom pins into JPOE connector pins.



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 Card

The SIM slot on front panel supports an LTE module. The SIM socket supports the push-push mechanism, allowing inserting and ejecting the SIM card to be as easy as one push.

1. Loosen the two screws that secure the SIM slot cover and remove the slot cover. With the angled corner facing inward, push the SIM card all the way in until it clicks into place.

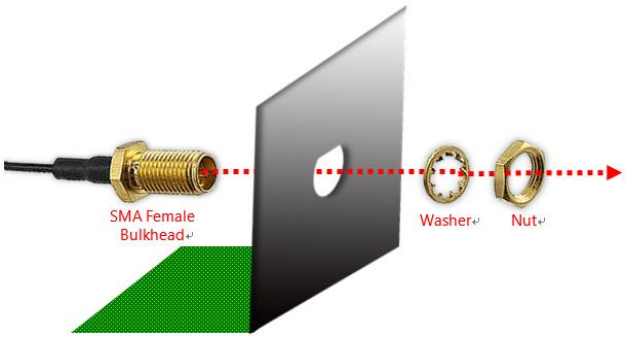

2. With the angled corner facing inward, push the SIM card all the way in until it clicks into place.


3. To remove the SIM card, use your fingertip to push it a little to have the card automatically ejected.

# Antenna Cable Assembly

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

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 WiFi. Below is best suited antenna placement to optimize coverage, and quality for 5G, LTE, and WiFi modules.

| SKU/Module | LTE | 5G | WiFi 5 Wave 1 | WiFi 5 Wave 2 | WiFi 6 |
|---|---|---|---|---|---|
| A | V | | | | |
| B | Vx2 | | | | |
| C | | V | | | |
| D | | | V | | |
| E | | | | V | |
| F | | | | | V |
| G | V | | V | | |
| H | V | | | V | |
| I | V | | | | V |
| J | | V | V | | |

**A. <u>Antenna Placement Optimization for 1x LTE module:</u>**

**Rear Panel**


**B. <u>Antenna Placement Optimization for 2x LTE module:</u>**

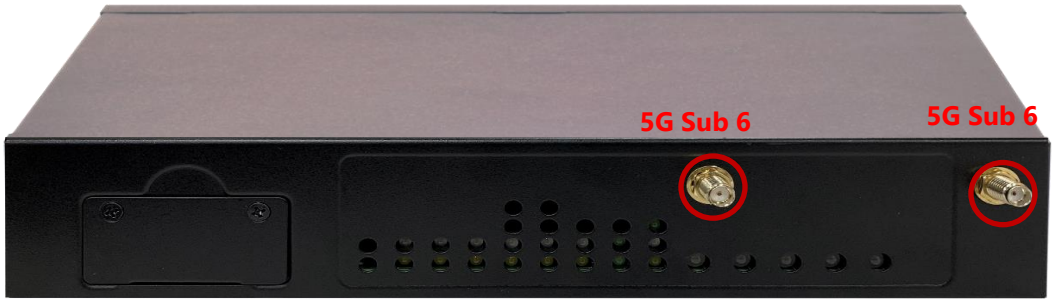
**Rear Panel**

**Front Panel**


## C. Antenna Placement Optimization for 1x 5G module:

**Rear Panel**


**Front Panel**




## D. Antenna Placement Optimization for 1x WiFi 5 (802.11ac Wave 1) module:

**Rear Panel**

**E. Antenna Placement Optimization for 1x WiFi 5 (802.11ac Wave 2) module:**

**Rear Panel**


**Front Panel**


**F. Antenna Placement Optimization for 1x WiFi 6 module:**

**Rear Panel**


**G. Antenna Placement Optimization for 1x LTE and 1x WiFi 5 (802.11ac Wave 1) module:**

**Rear Panel**

## H. Antenna Placement Optimization for 1x LTE and 1x WiFi 5 (802.11ac Wave 2):

**Rear Panel**


**Front Panel**


## I. Antenna Placement Optimization for 1x LTE and 1x WiFi 6 module:

**Rear Panel**

## J. Antenna Placement Optimization for 1x 5G and 1x WiFi 5 (802.11ac Wave 1) module:

**Rear Panel**


**Front Panel**

# Rack-mounting the System

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

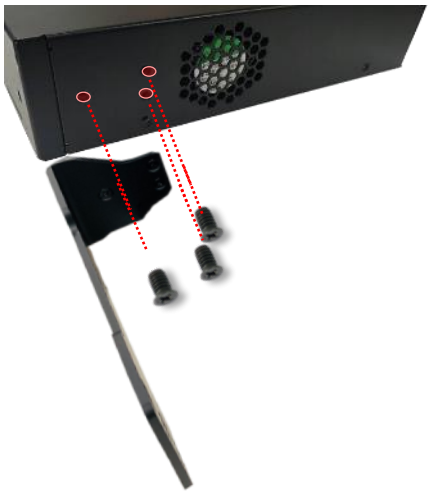
Adapter holder

Screw A

Screw B

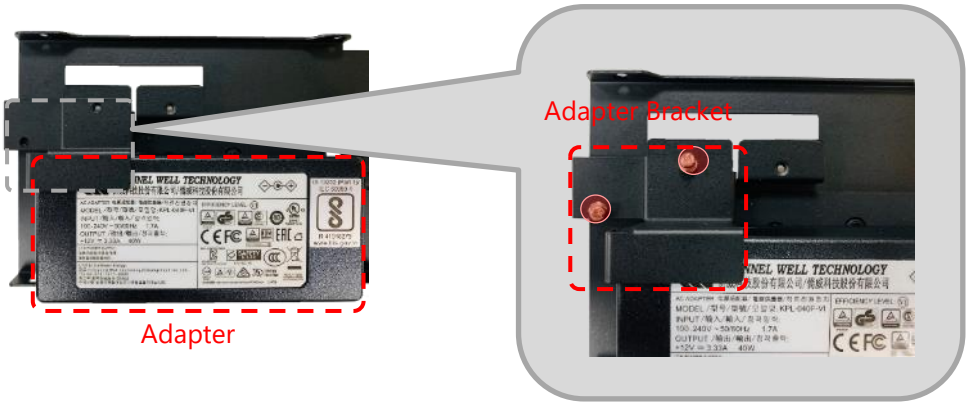
## Attaching the Assembly to the Chassis

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).

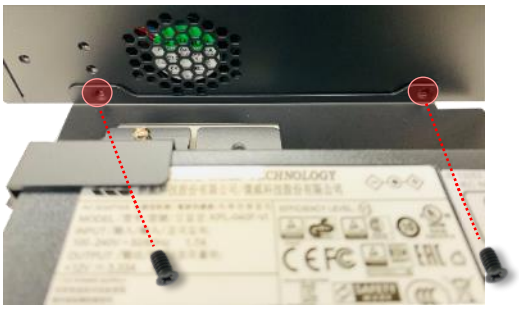


2. Secure the other ear bracket to the other side of the system.

**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. BIOS update for Lanner PCs are available for download at http://www.lannerinc.com/products/firmware-and-software/securityenhanced-bios

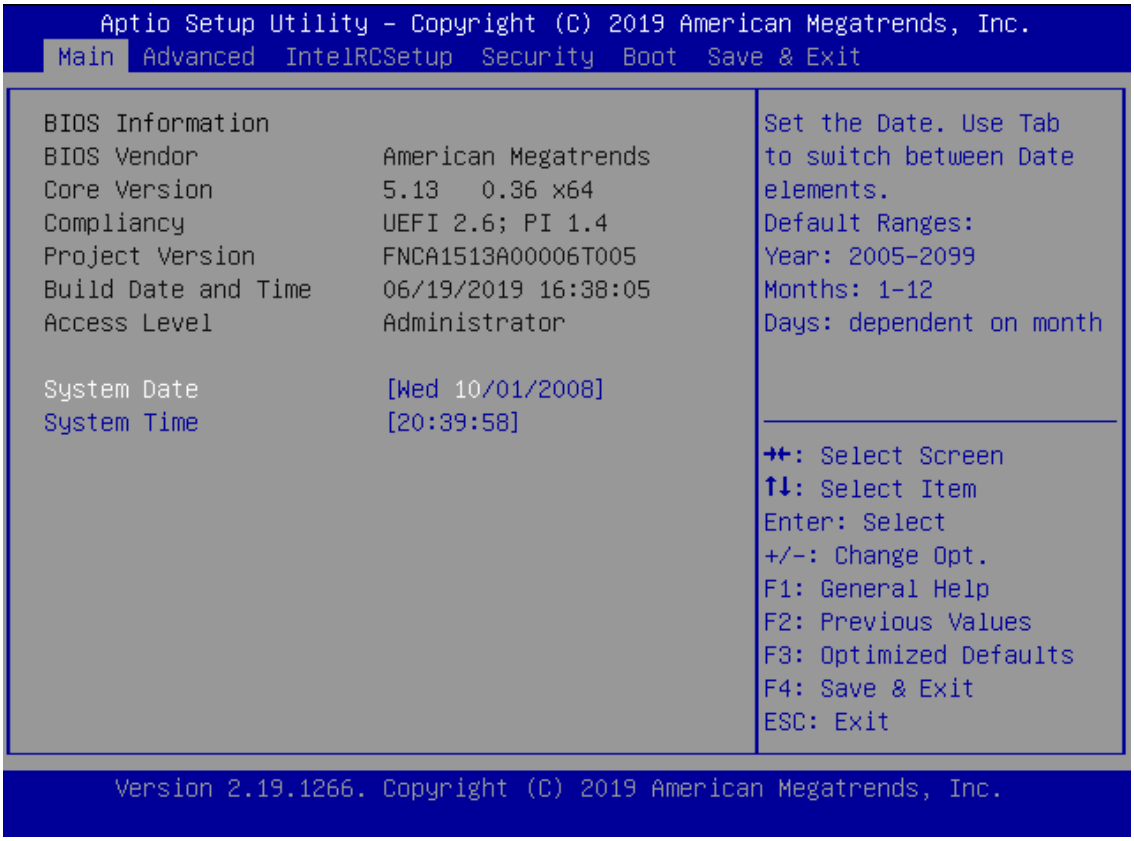
### Main Setup

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 |

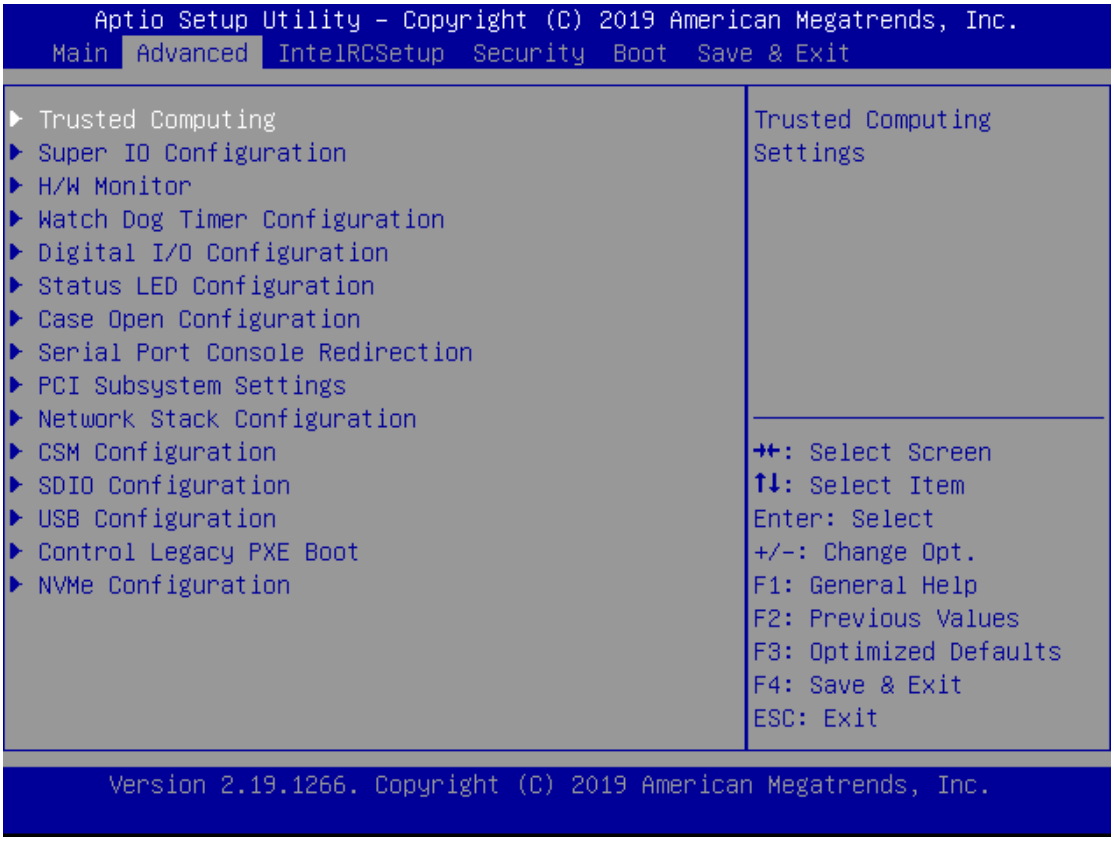
Setup main page contains BIOS information and project version information.



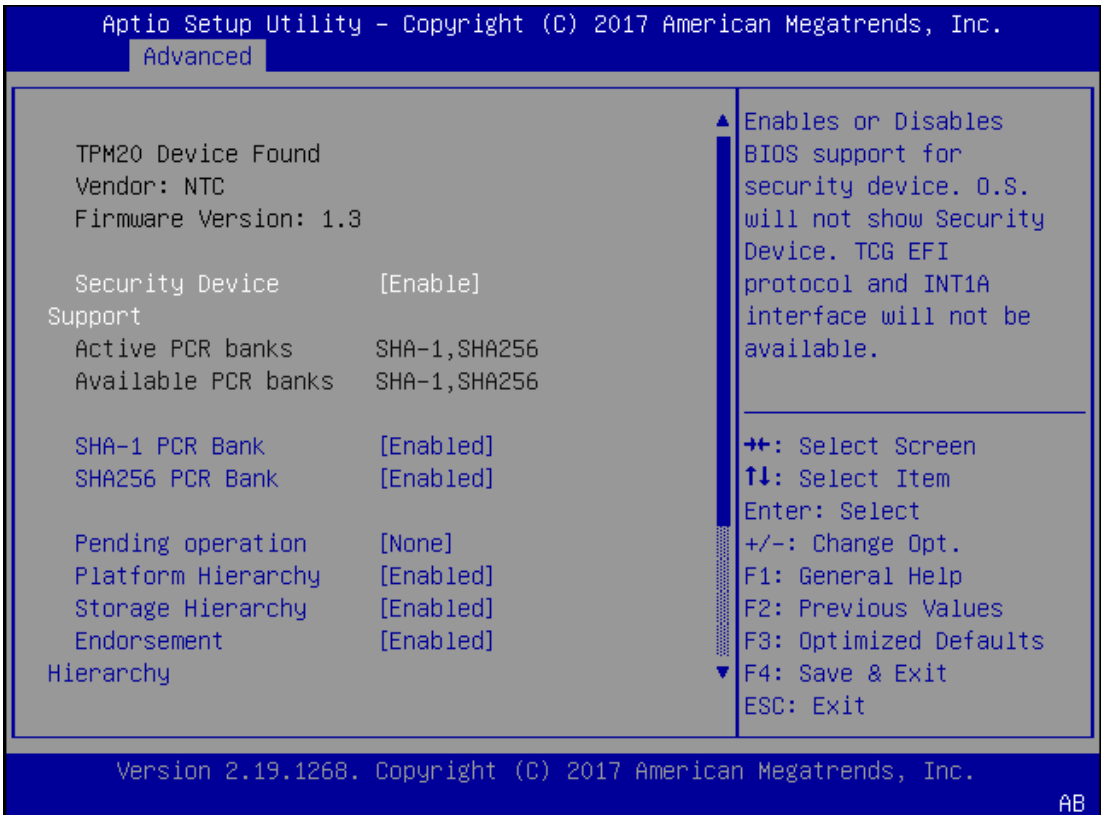

| Feature | Description |
|---|---|
| BIOS Information | BIOS Vendor: American Megatrends<br>Core Version: AMI Kernel version, CRB code base, X64<br>Compliancy: UEFI version, PI version<br>Project Version: BIOS release version<br>Build Date and Time: MM/DD/YYYY<br>Access Level: Administrator / User |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

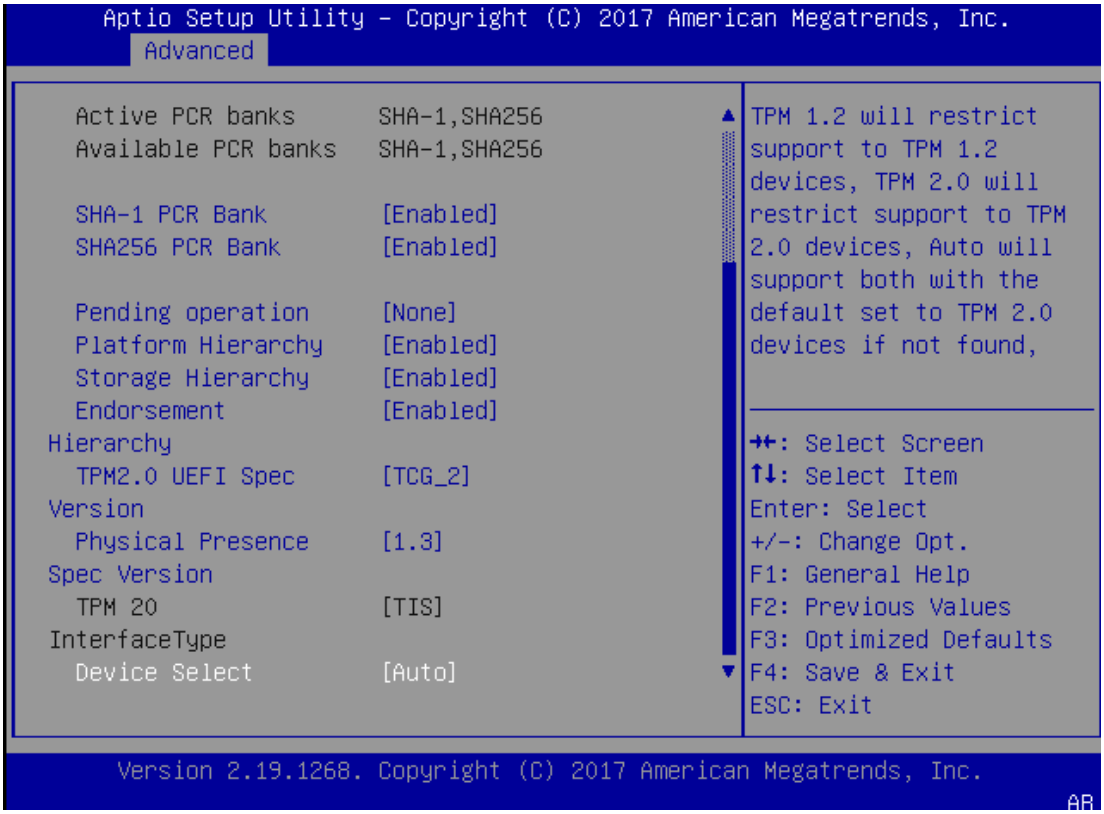
## Advanced Page

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.



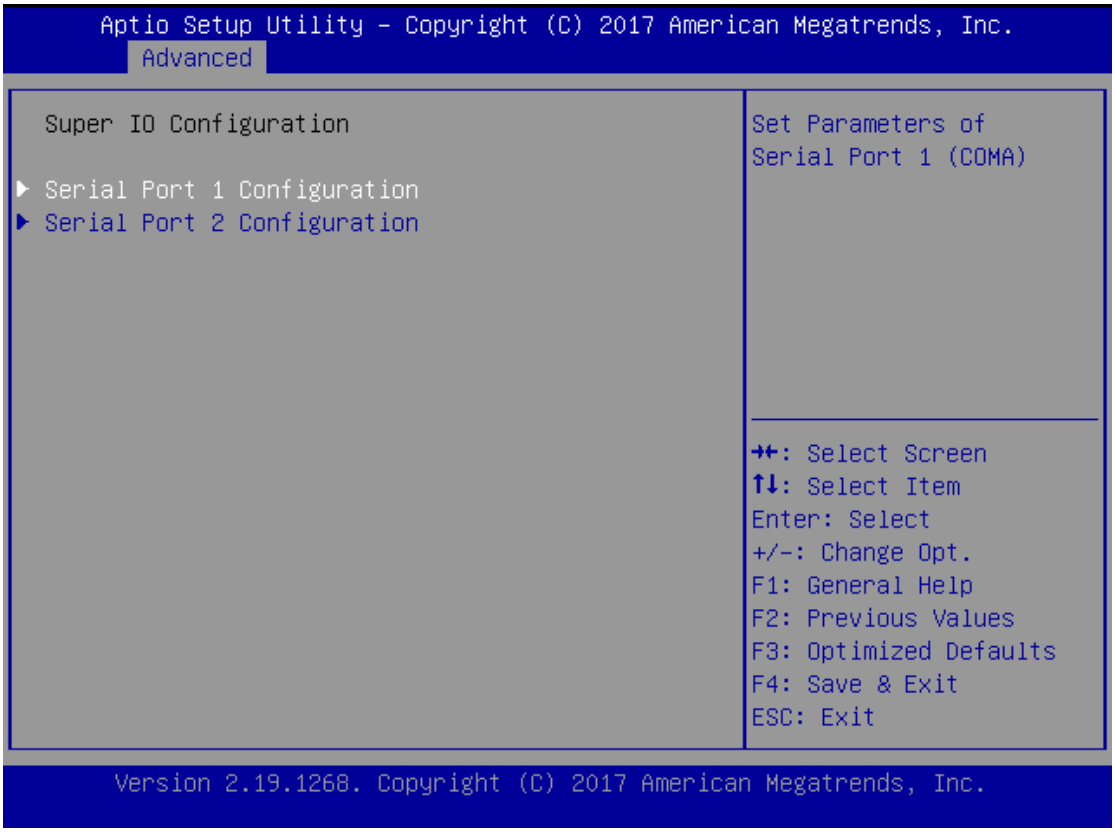
## Trusted Computing



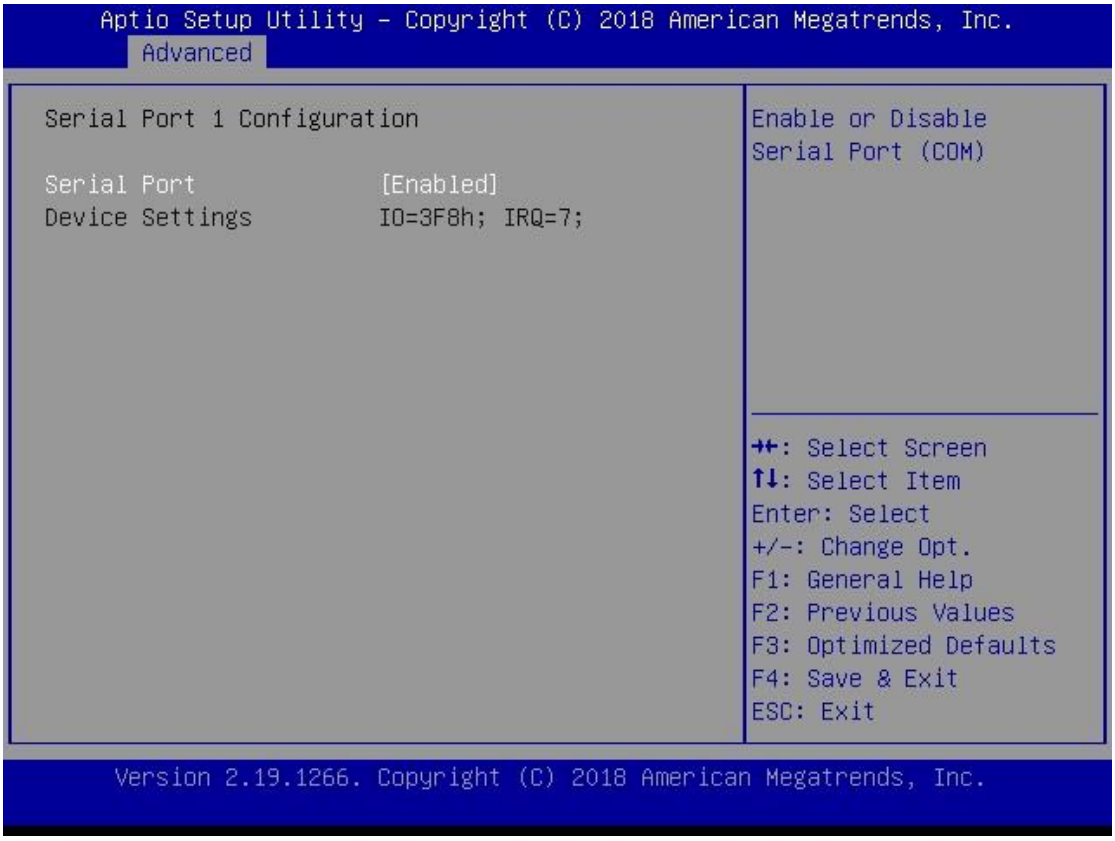



| Feature | Options | Description |
|---|---|---|
| Security Device Support | Enabled<br>Disabled | Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| SHA-1 PCR Bank | Enabled<br>Disabled | Enables or disables SHA-1 PCR Bank. |
| SHA256 PCR Bank | Enabled<br>Disabled | Enables or disables SHA256 PCR Bank. |
| Pending operation | None<br>TPM Clear | Schedules an Operation for the Security Device.<br>NOTE: Your computer will reboot during restart in order to change State of Security Device. |
| Platform Hierarchy | Enabled<br>Disabled | Enables or disables Platform Hierarchy. |
| Storage Hierarchy | Enabled<br>Disabled | Enables or disables Storage Hierarchy. |
| Endorsement Hierarchy | Enabled<br>Disabled | Enables or disables Endorsement Hierarchy. |
| TPM2.0 UEFI Spec Version | TCG_1_2<br>TCG_2 | Select the TCG2 Spec Version,<br>**TCG_1_2**: Supports the Compatible mode for Win8/Win10<br>**TCG_2**: Supports new TCG2 protocol and event format for Win10 or later. |
| Physical Presence Spec Version | 1.2<br>1.3 | Select to tell OS to support PPI Spec Version 1.2 or 1.3.<br>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<br>TPM 2.0<br>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

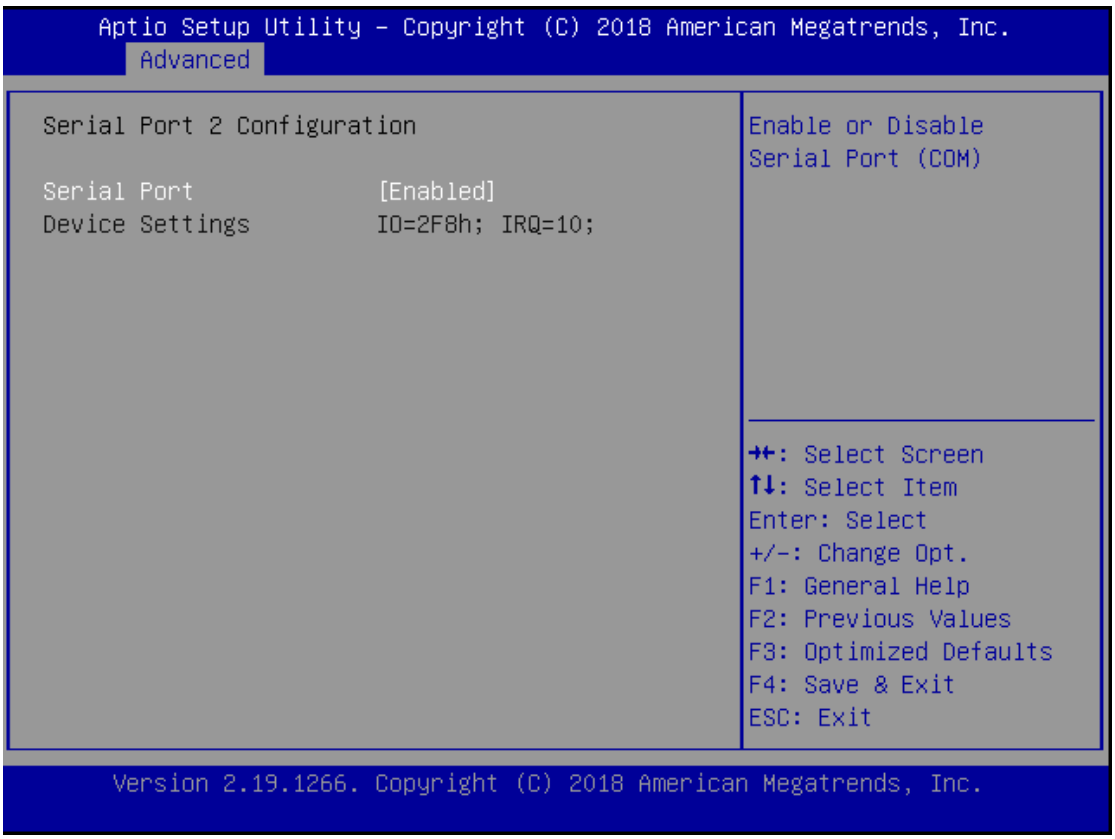


## Serial Port 1 Configuration



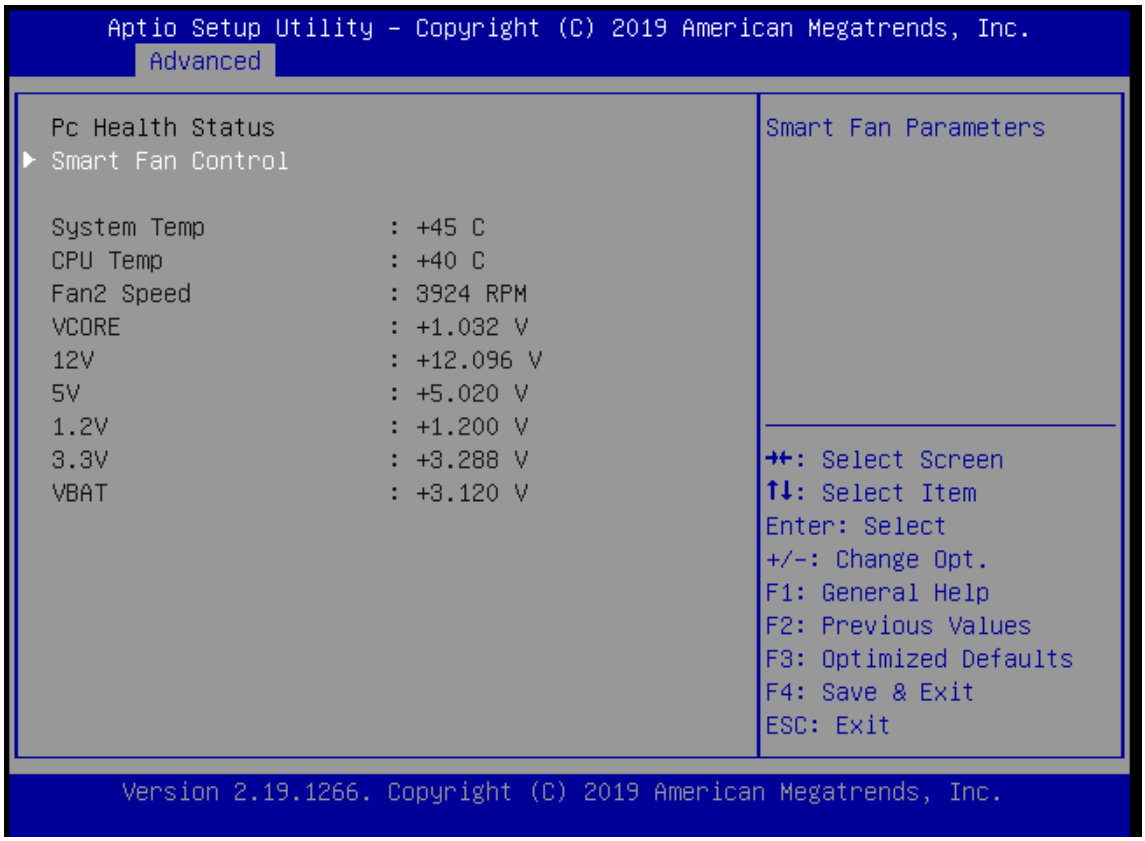

| Feature | Options | Description |
|---|---|---|
| Serial Port | Enabled<br>Disabled | Enables or disables Serial Port 1. |
| Device Settings | NA | IO=3F8h; IRQ = 7 |

## Serial Port 2 Configuration




| Feature | Options | Description |
|---|---|---|
| Serial Port | Enabled<br>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
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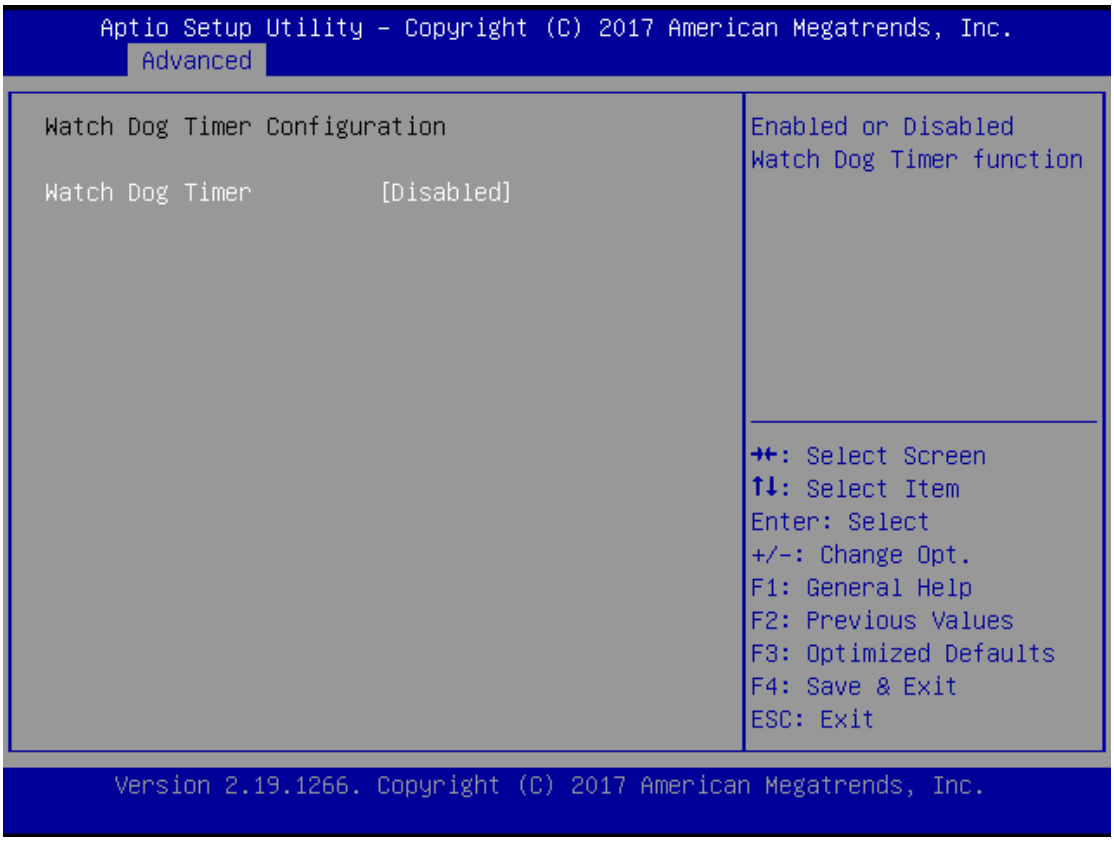
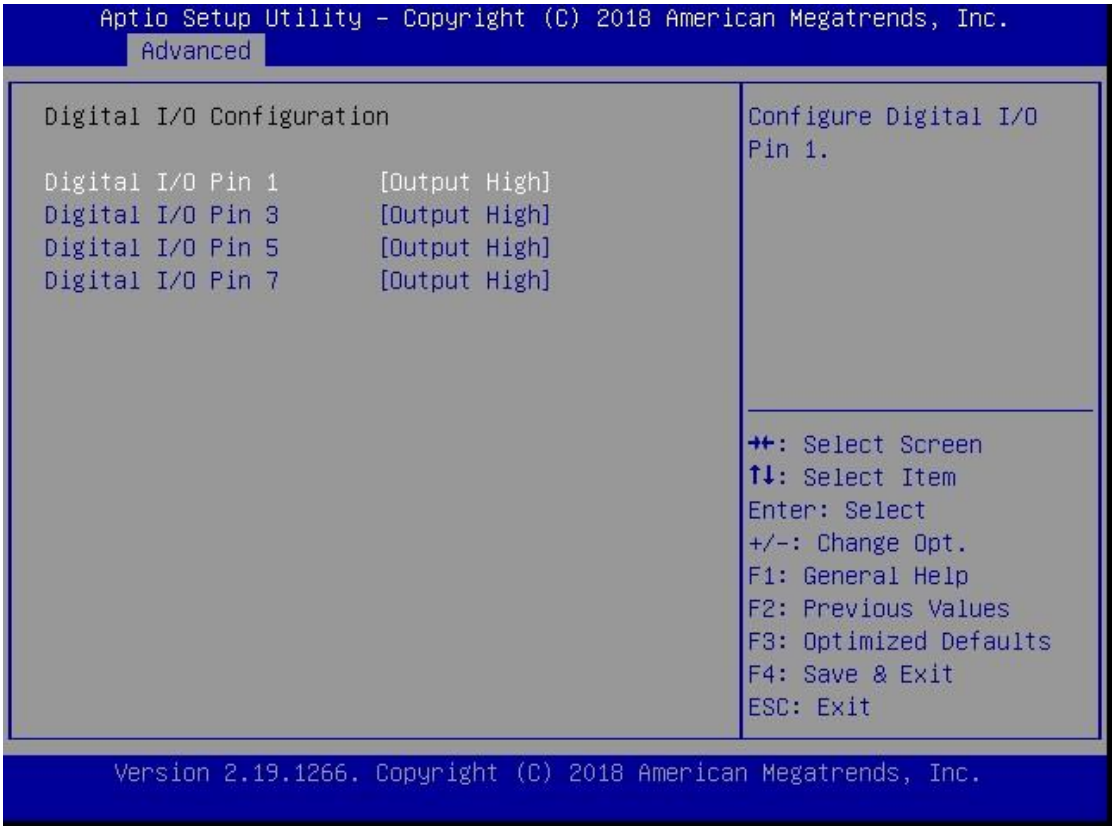
## Watch Dog Timer Configuration



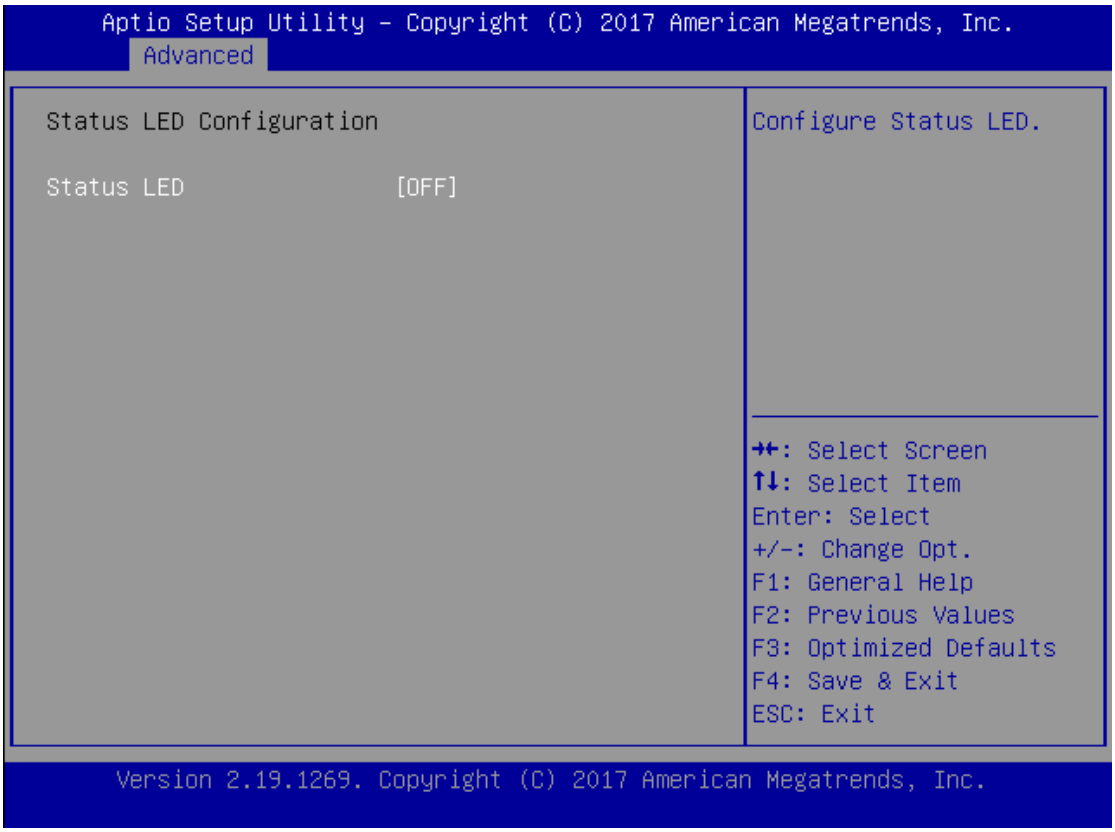

| Feature | Options | Description |
|---|---|---|
| Watch Dog Timer | Enabled<br>Disabled | Enables or disables Watch Dog Timer function |

## Digital I/O Configuration



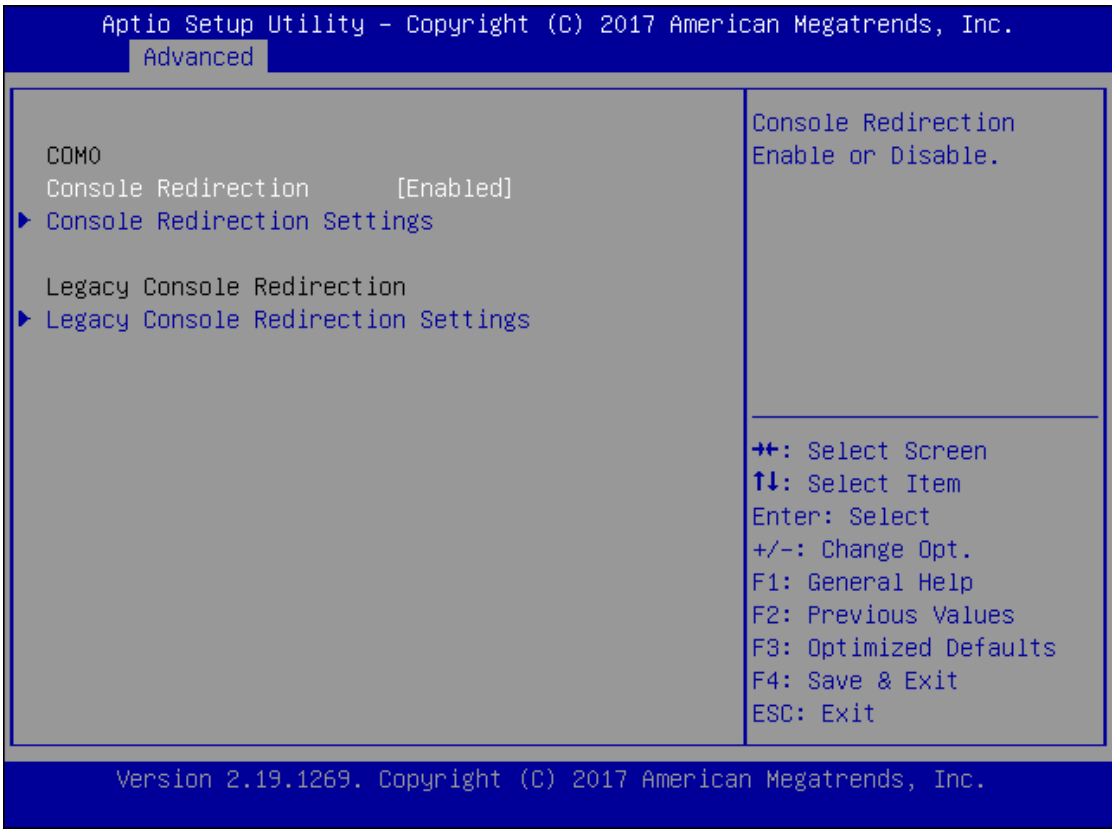

| Feature | Options | Description |
|---|---|---|
| Digital I/O Output 1 | Output Low<br>Output High | Configure Digital I/O Pin1 |
| Digital I/O Output 3 | Output Low<br>Output High | Configure Digital I/O Pin3 |
| Digital I/O Output 5 | Output Low<br>Output High | Configure Digital I/O Pin5 |
| Digital I/O Output 7 | Output Low<br>Output High | Configure Digital I/O Pin7 |

## Status LED Configuration



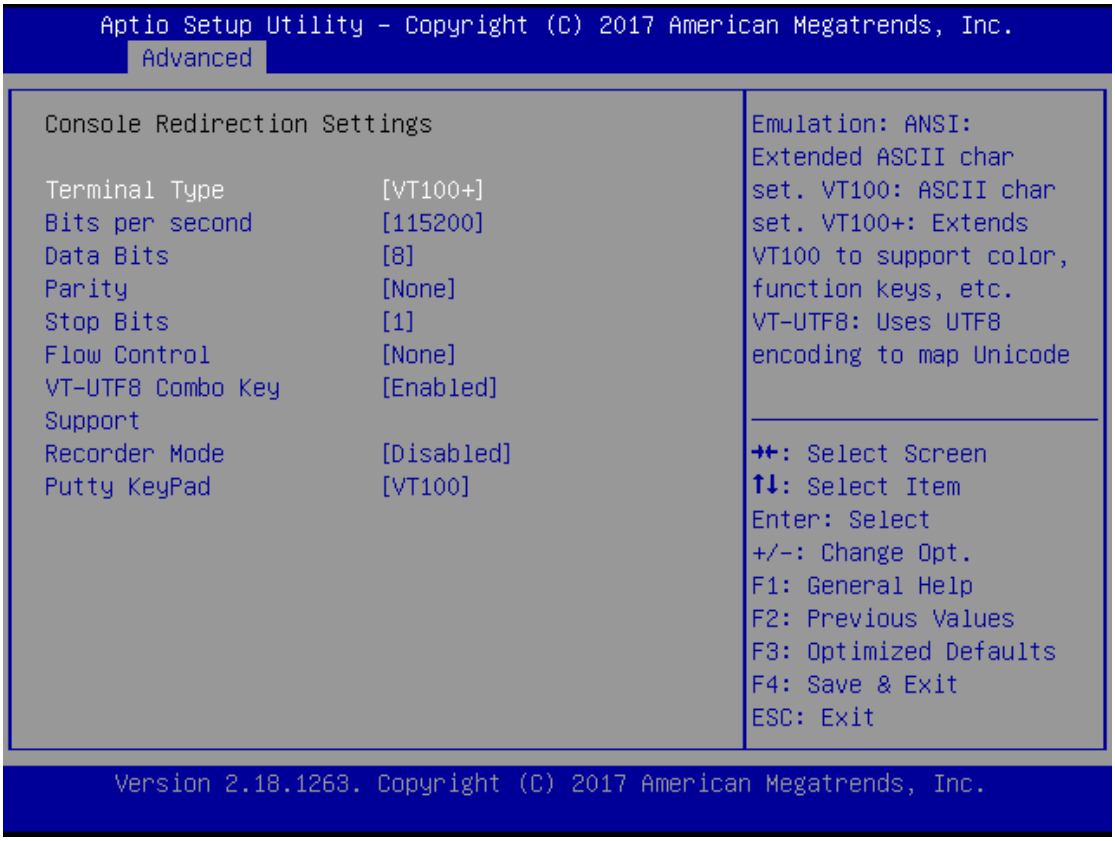

| Feature | Options | Description |
|---|---|---|
| Status LED | OFF<br>GREEN<br>RED | Configures Status LED color |

## Serial Port Console Redirection




| Feature | Options | Description |
|---|---|---|
| COM0 Console Redirection | Enabled<br>Disabled | Enables or disables Console Redirection |

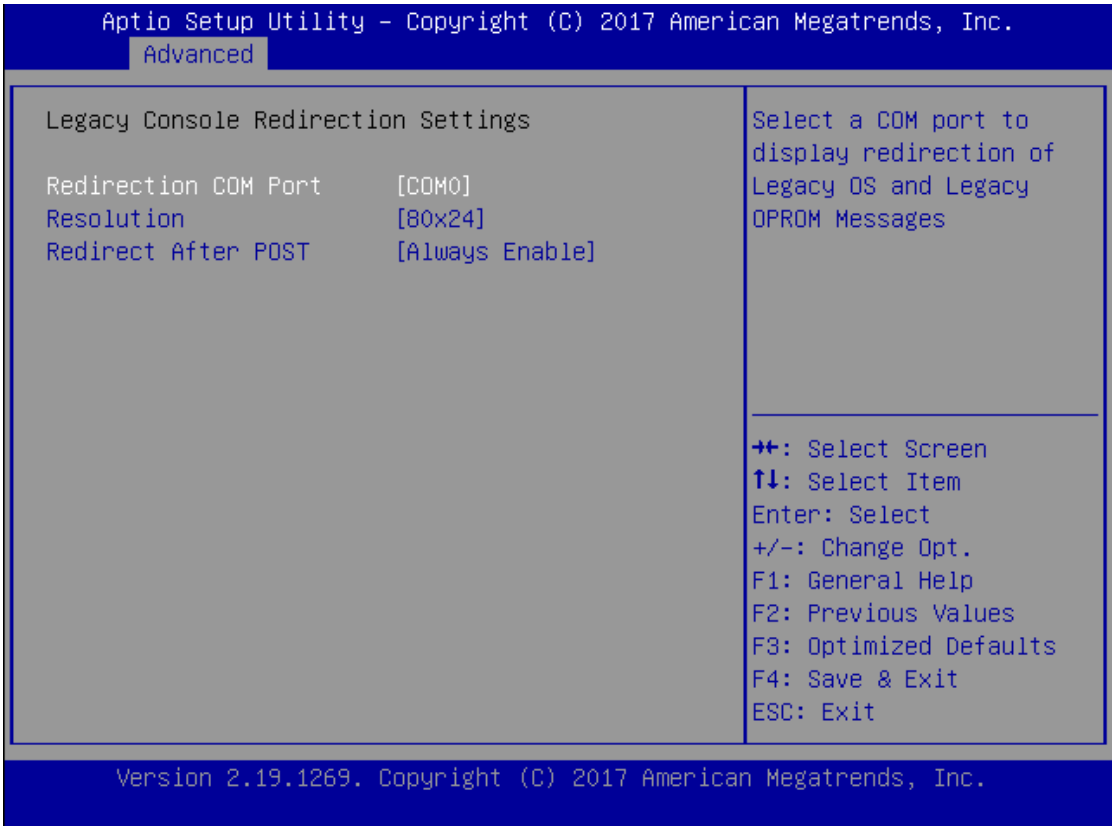
## Console Redirection Settings




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

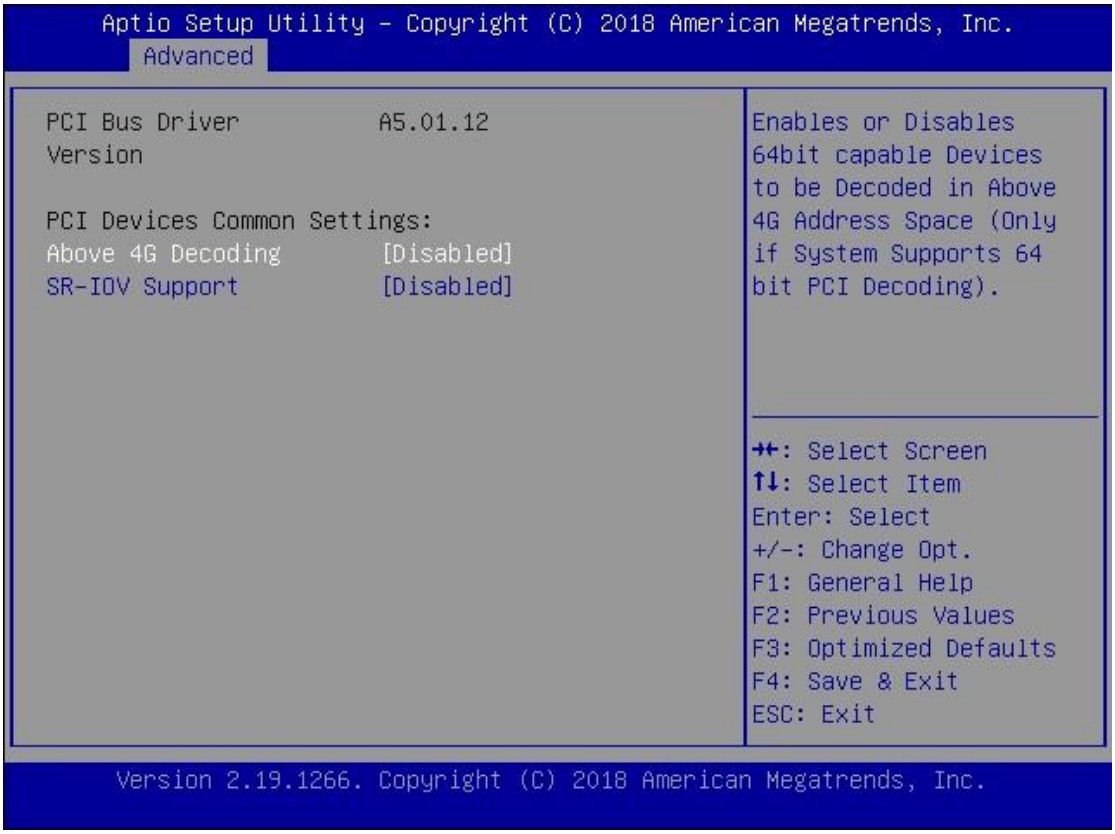
| | | |
|---|---|---|
| VT-UTF8 Combo Key Support | Disabled<br>Enabled | Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals |
| Recorder Mode | Disabled<br>Enabled | With this mode enabled, only text will be sent. This is to capture Terminal data. |
| Putty KeyPad | VT100<br>LINUX<br>XTERM86<br>SCO<br>ESCN<br>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<br>80x25 | On Legacy OS, the Number of Rows and Columns supported redirection. |
| Redirection After BIOS POST | Always Enable<br>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**. |

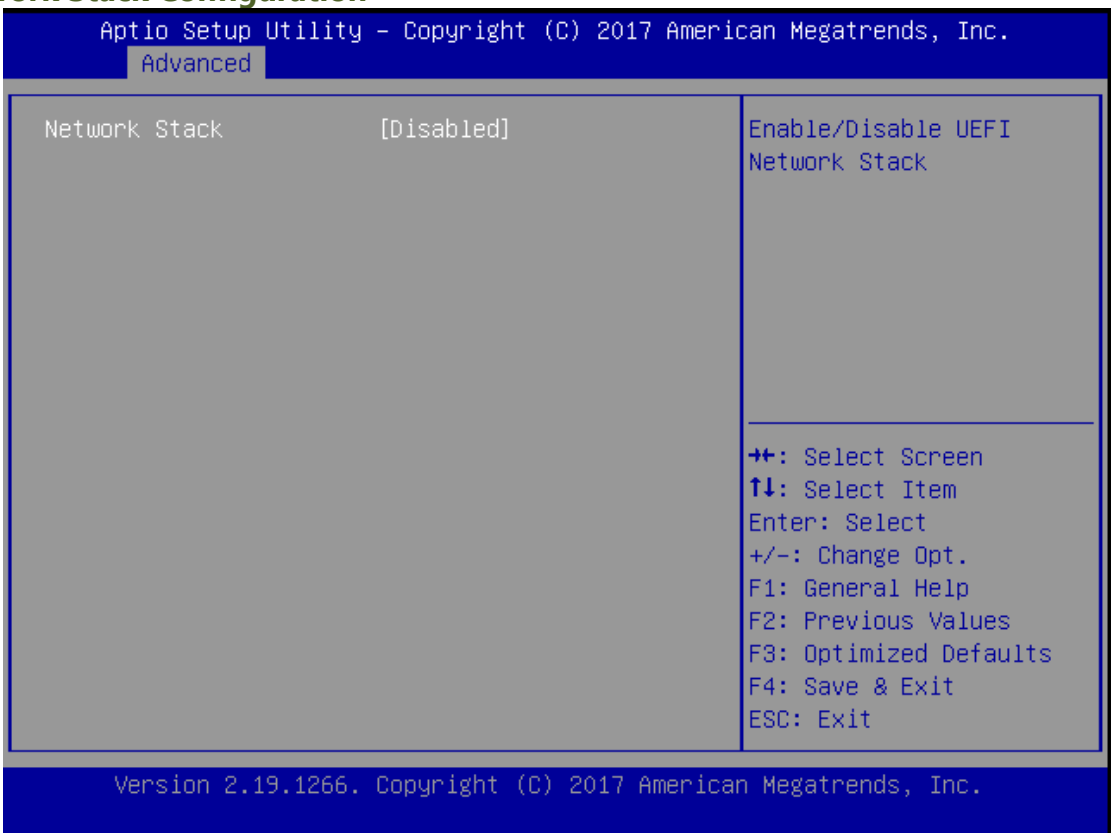
## PCI Subsystem Settings




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

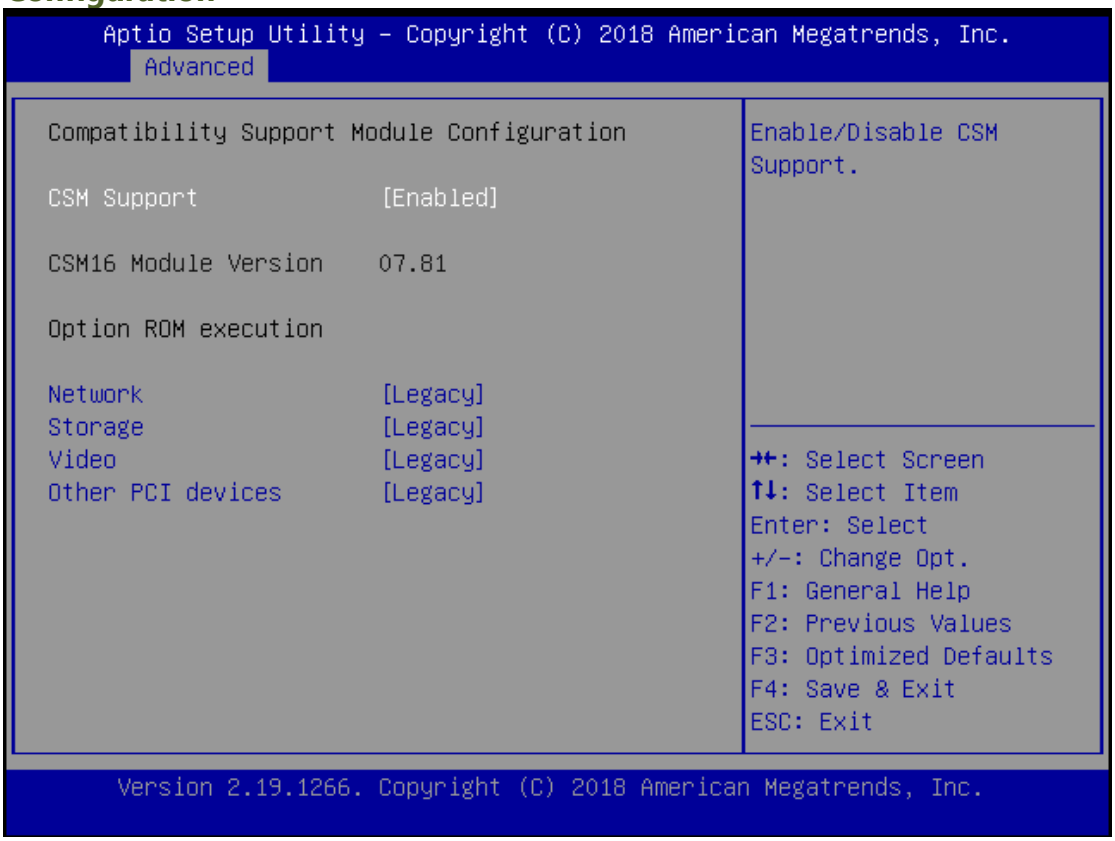
| Feature | Options | Description |
|---|---|---|
| SR-IOV Support | Disabled<br>Enabled | If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support. |

## Network Stack Configuration



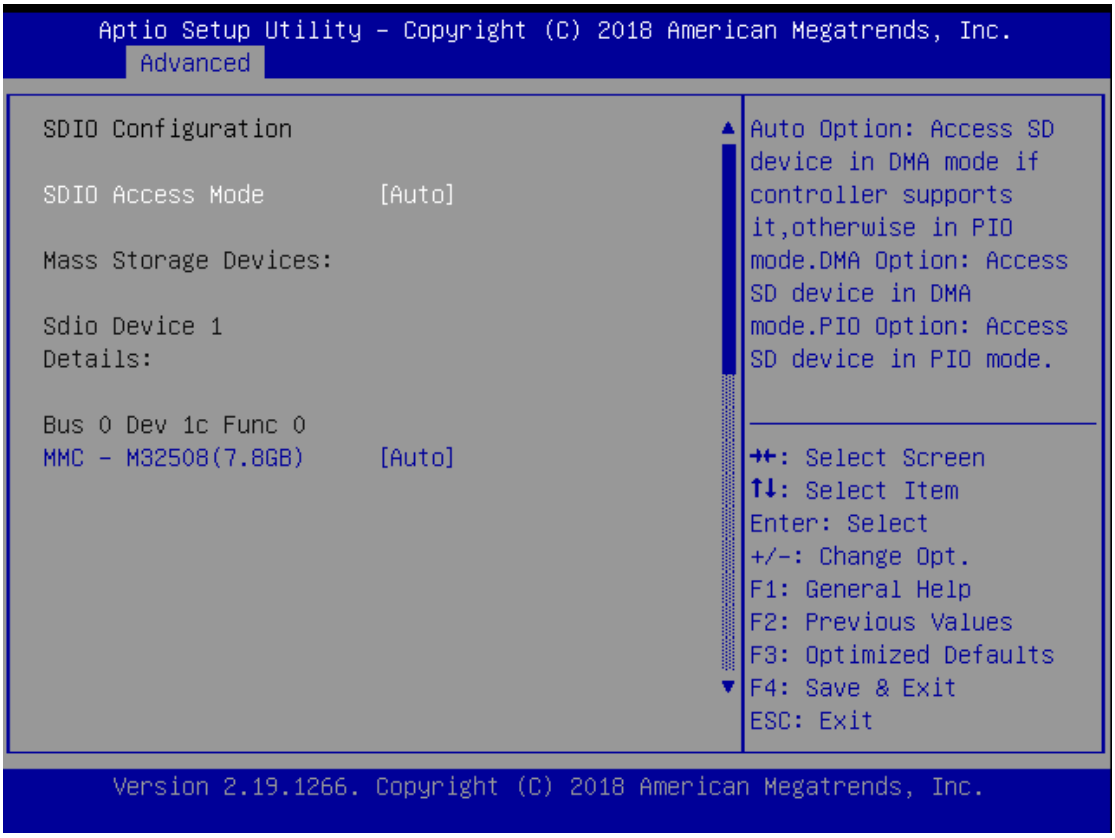

| Feature | Options | Description |
|---|---|---|
| Network Stack | Disabled<br>Enabled | Enables or disables UEFI Network Stack |
| Ipv4 PXE Support | Disabled<br>Enabled | Enables Ipv4 PXE Boot Support. If IPV4 is disabled, PXE boot option will not be created. |
| Ipv4 HTTP Support | Disabled<br>Enabled | Enables Ipv4 HTTP Boot Support. If IPV4 is disabled, HTTP boot option will not be created. |
| Ipv6 PXE Support | Disabled<br>Enabled | Enables Ipv6 PXE Boot Support. If IPV6 is disabled, PXE boot option will not be created. |
| Ipv6 HTTP Support | Disabled<br>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



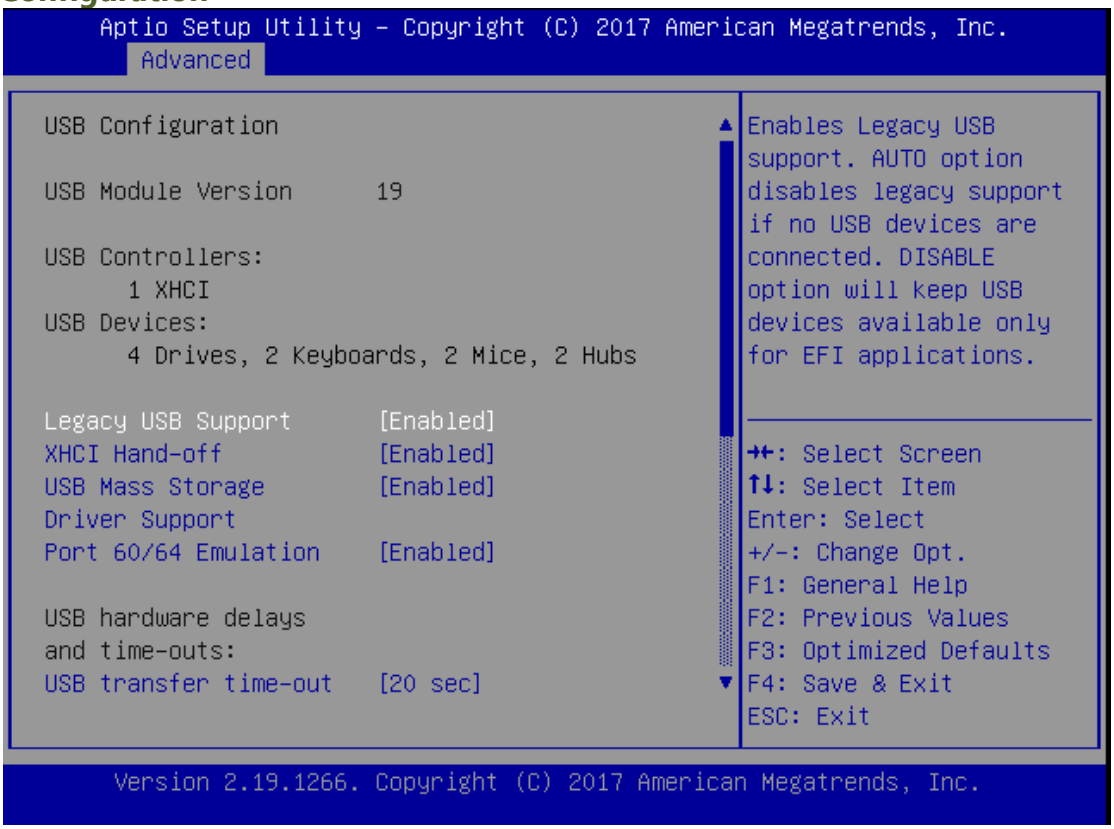

| Feature | Options | Description |
|---|---|---|
| CSM Support | Disabled<br>Enabled | Enables or disables CSM Support |
| Network | Do Not Launch<br>UEFI<br>Legacy | Controls the execution of UEFI and Legacy PXE OpROM |
| Storage | Do Not Launch<br>UEFI<br>Legacy | Controls the execution of UEFI and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

## SDIO Configuration




| Feature | Options | Description |
|---|---|---|
| SDIO Access Mode | Auto<br>ADMA<br>SDMA<br>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.. |

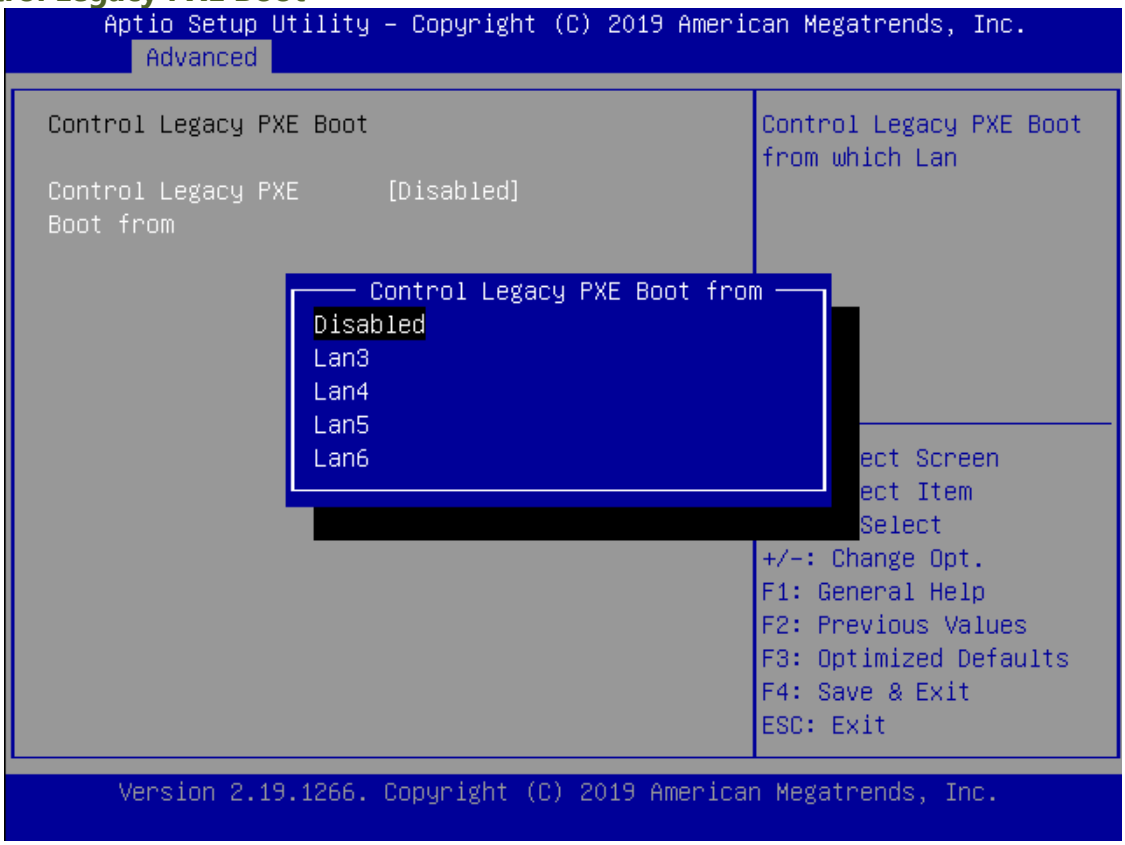
## USB Configuration




| Feature | Options | Description |
|---|---|---|
| Legacy USB Support | Enabled<br>Disabled<br>Auto | Enables Legacy USB support.<br>**Auto** option disables legacy support if no USB devices are connected;<br>**Disabled** option will keep USB devices available only for EFI applications. |
| XHCI Hand-off | Enabled<br>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<br>Disabled | Enables or disables USB Mass Storage Driver Support. |
| USB transfer time-out | 1 sec<br>5 sec<br>10 sec<br>20 sec | The time-out value for Control, Bulk, and Interrupt transfers |
| Device reset time-out | 1 sec<br>5 sec<br>10 sec<br>20 sec | USB mass storage device Start Unit command time-out |

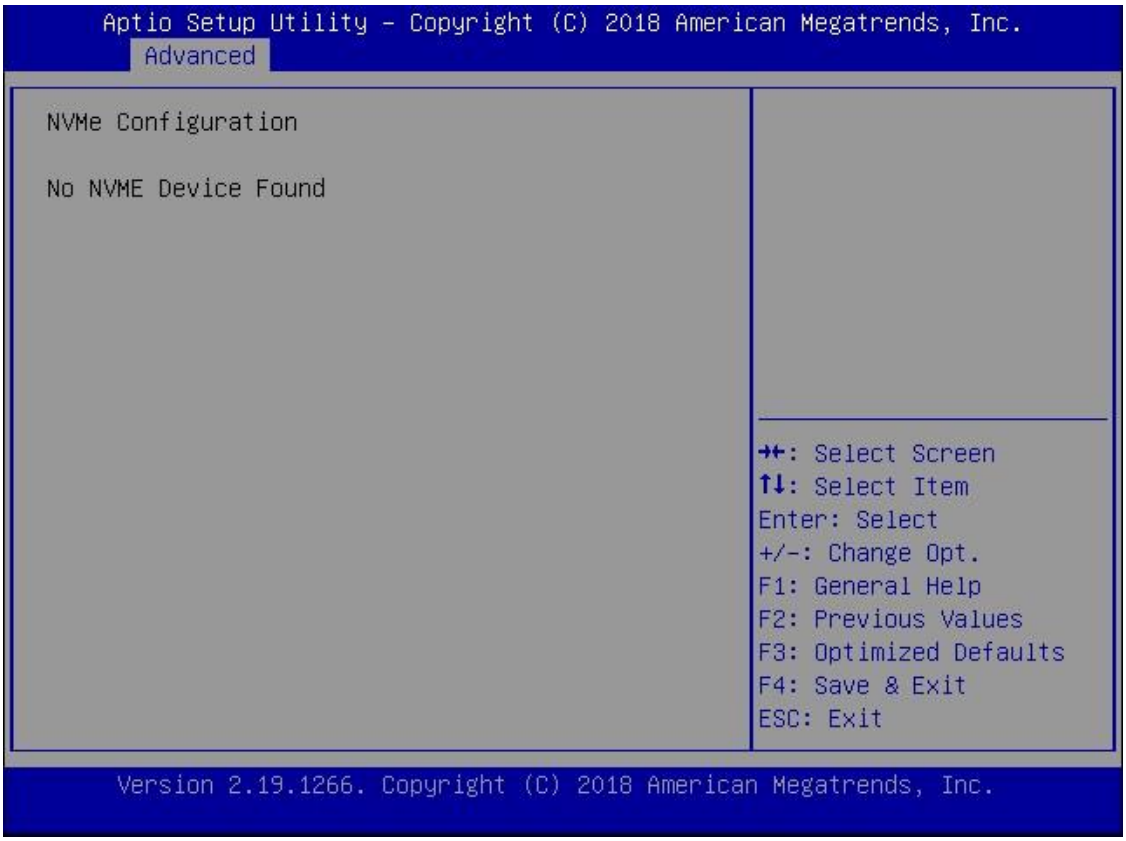
| | | |
|---|---|---|
| Device power-up delay | Auto<br>Manual | Maximum time the device will take before it properly reports itself to the Host Controller. **Auto** uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor. |

## Control Legacy PXE Boot



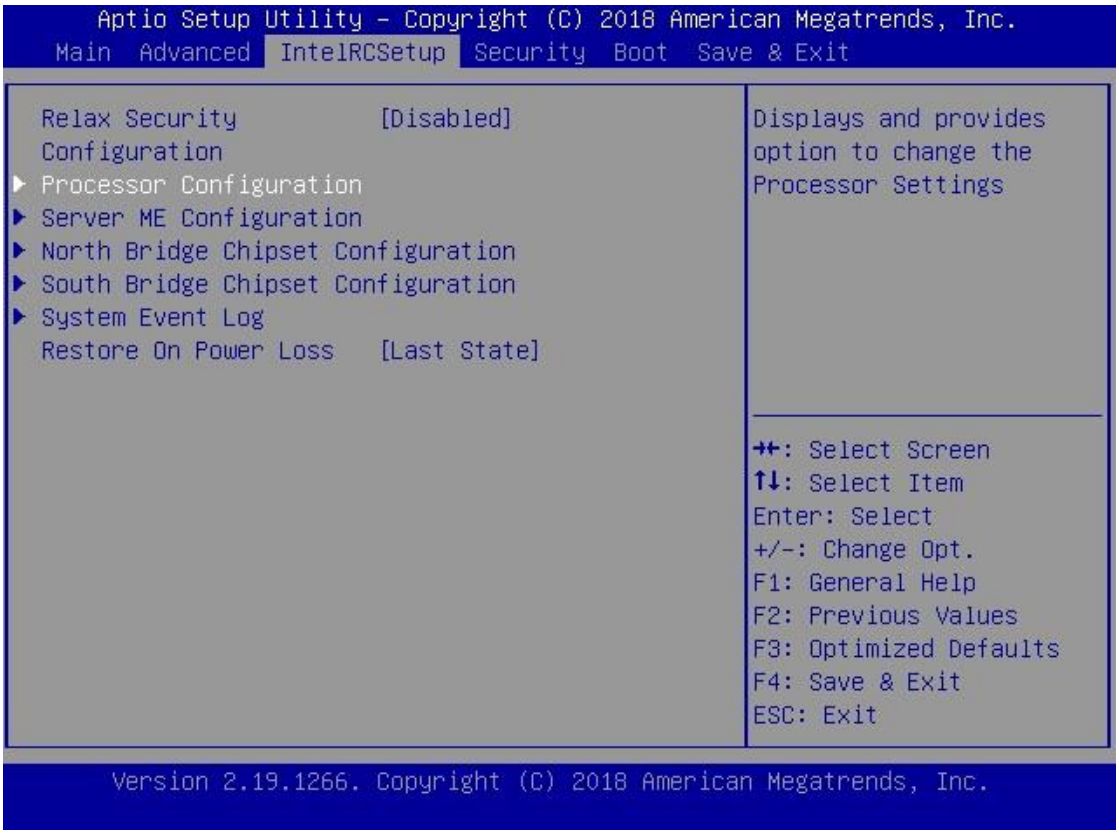

| Feature | Options | Description |
|---|---|---|
| Control Legacy PXE Boot From | Disabled<br>Lan3<br>Lan4<br>Lan5<br>Lan6 | Control Legacy PXE Boot from which Lan. |

## NVME Configuration



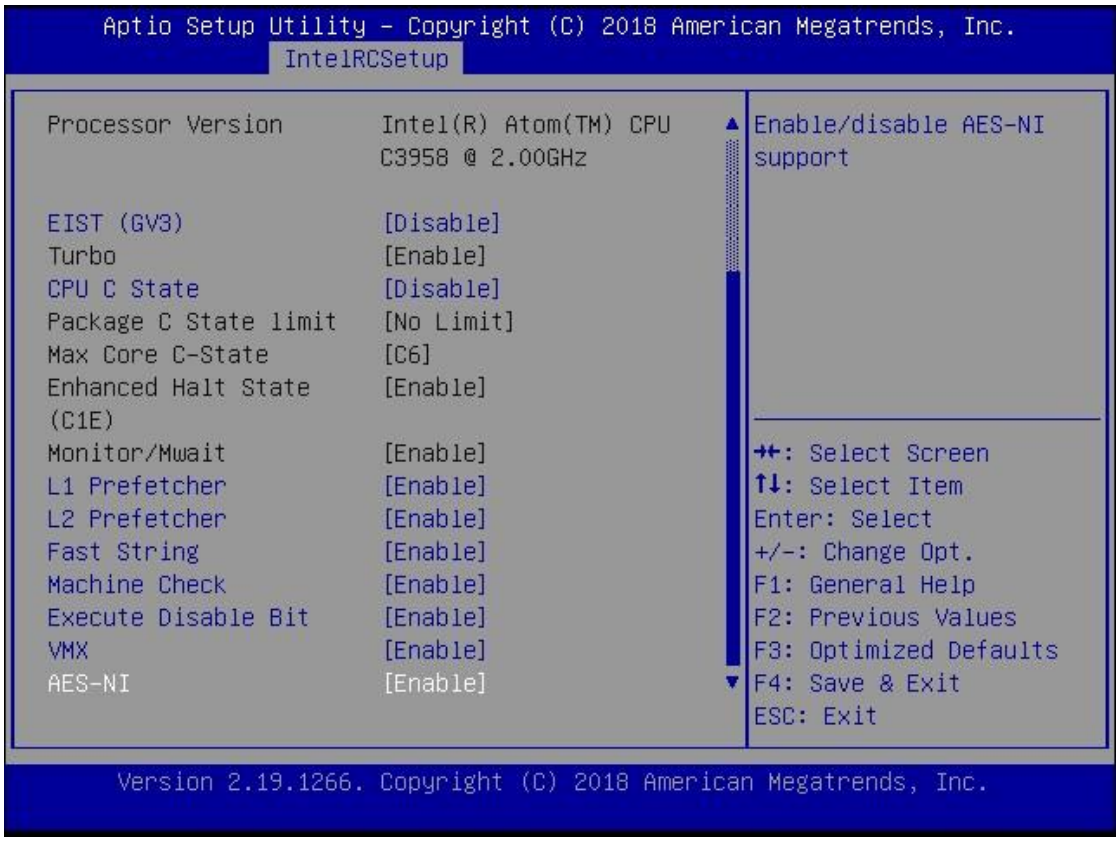
## IntelRCSetup

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<br>Enabled | Relaxes the security configuration to be able to use BIOS update tool. |
| Restore On Power Loss | Power On<br>Power Off<br>Last State | Specify what state to go to when power is re-applied after a power failure (G3 state). |

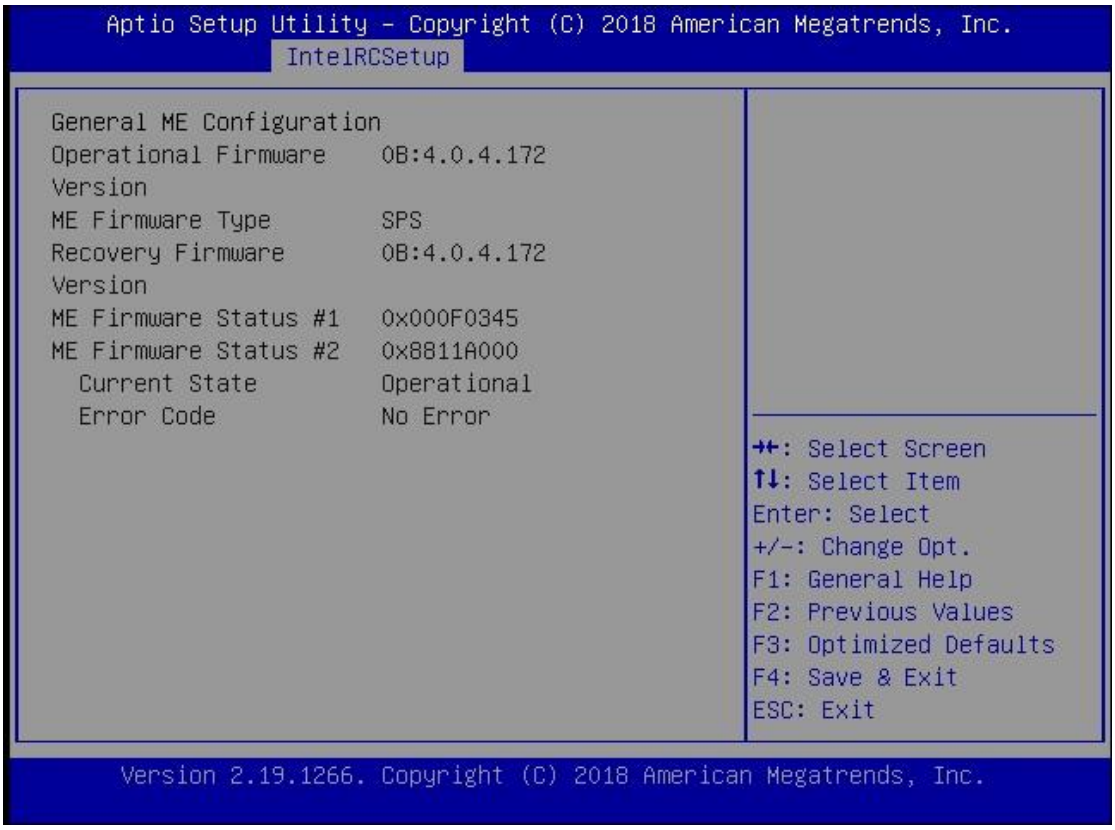
## Processor Configuration



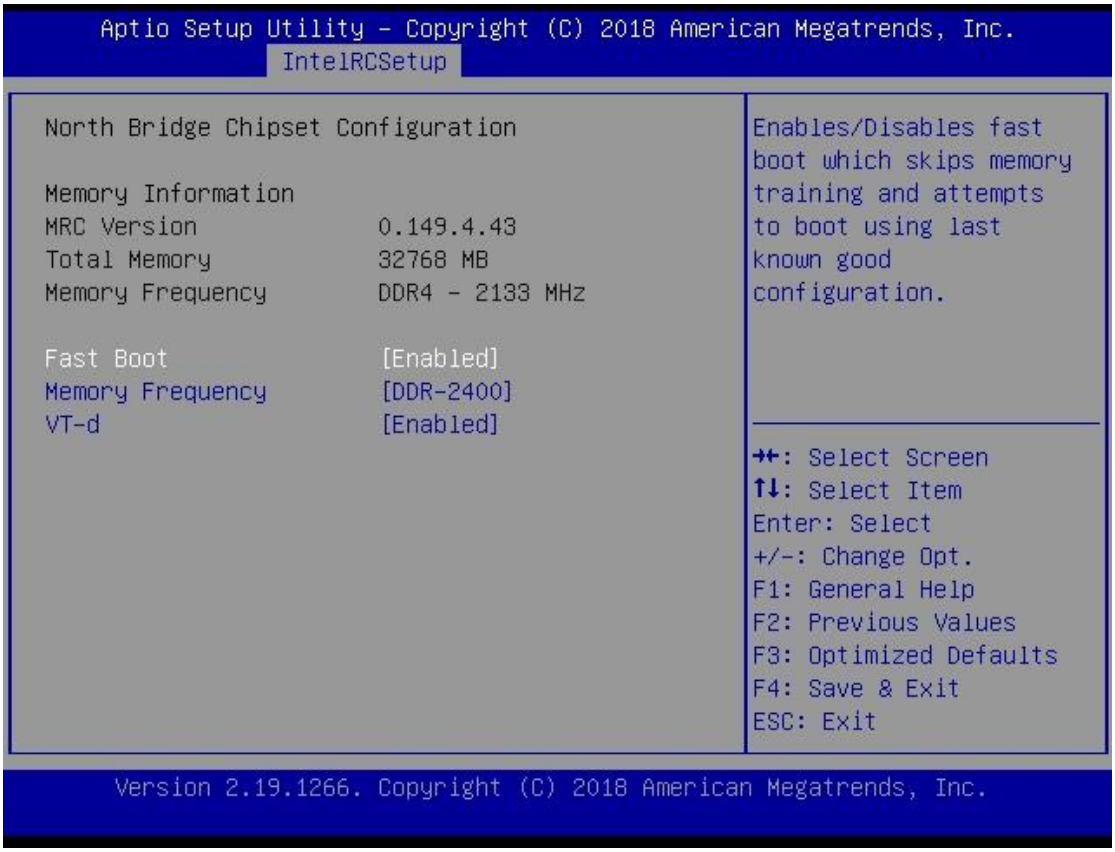

| Feature | Options | Description |
|---|---|---|
| EIST (GV3) | Disable<br>Enable | Enables/Disable EIST. GV3 must be enable for Turbo.<br>. |
| Turbo | Enable<br>Disable | Enable or Disable CPU Turbo capability. This option only applies to ES2 and above. |
| CPU C State | Disable<br>Enable | Enable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

| | | |
|---|---|---|
| L2 Prefetcher | Enable<br>Disable | Enable/Disable L2 Prefetch |
| Fast String | Disable<br>Enable | When enables, enable fast strings for REP MOVS/STOS. |
| Machine Check | Disable<br>Enable | Enable or Disable the Machine Check. |
| Execute Disable Bit | Disable<br>Enable | When disabled, forces the XD feature flag to always return 0. |
| VMS | Disable<br>Enable | Enables the Vanderpool Technology, takes effect after reboot. |
| AES-NI | Disable<br>Enable | Enable/disable AES-NI support. |

## Server ME Configuration

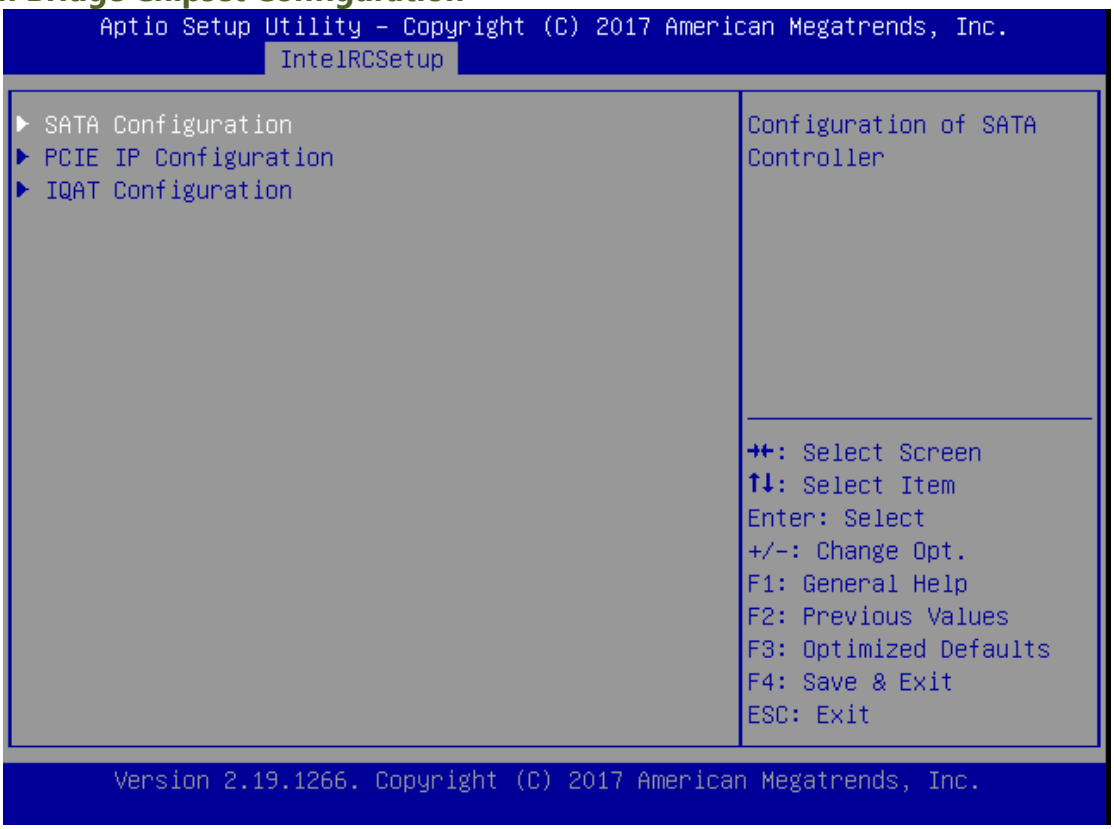


## North Bridge Chipset Configuration

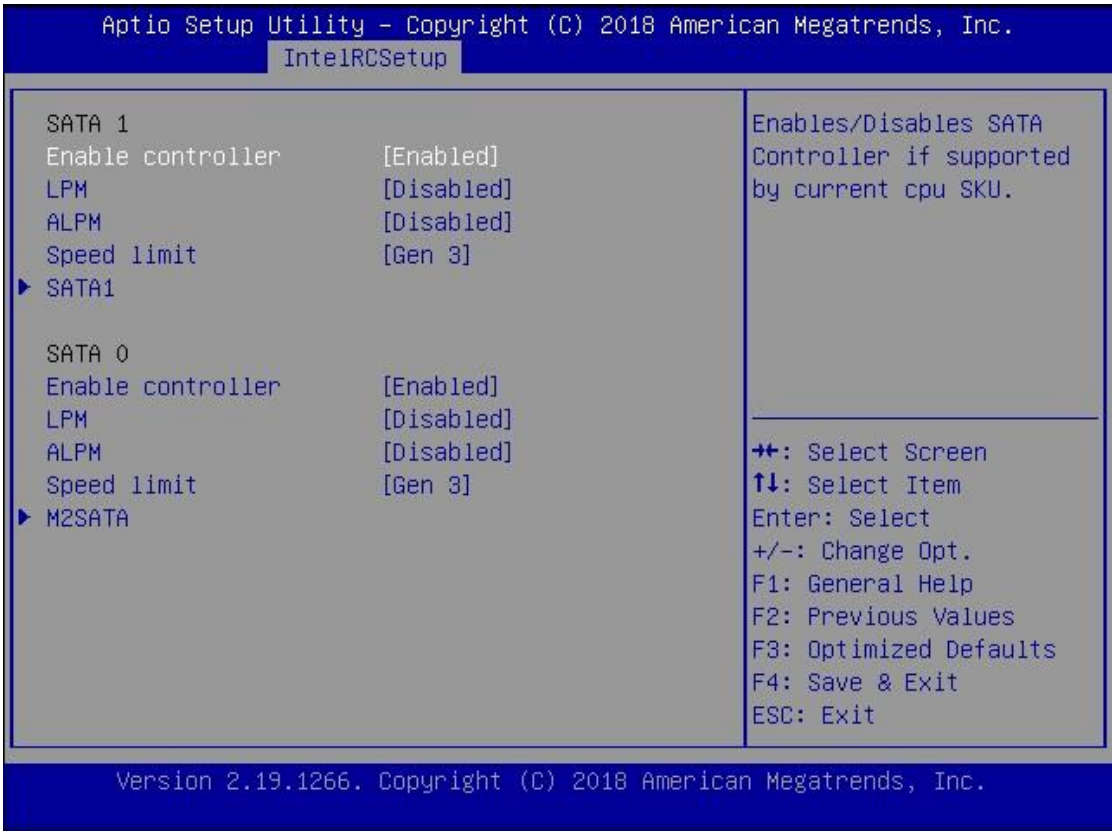



| Feature | Options | Description |
|---|---|---|
| Fast Boot | Disabled<br>Enabled | Enables/Disables fast boot, which skips memory training and attempts to boot using fast known good configuration. |
| Memory Frequency | DDR-1600<br>DDR-1867<br>DDR-2133<br>DDR-2400 | DDR memory frequency:<br>DDR4 up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

## South Bridge Chipset Configuration

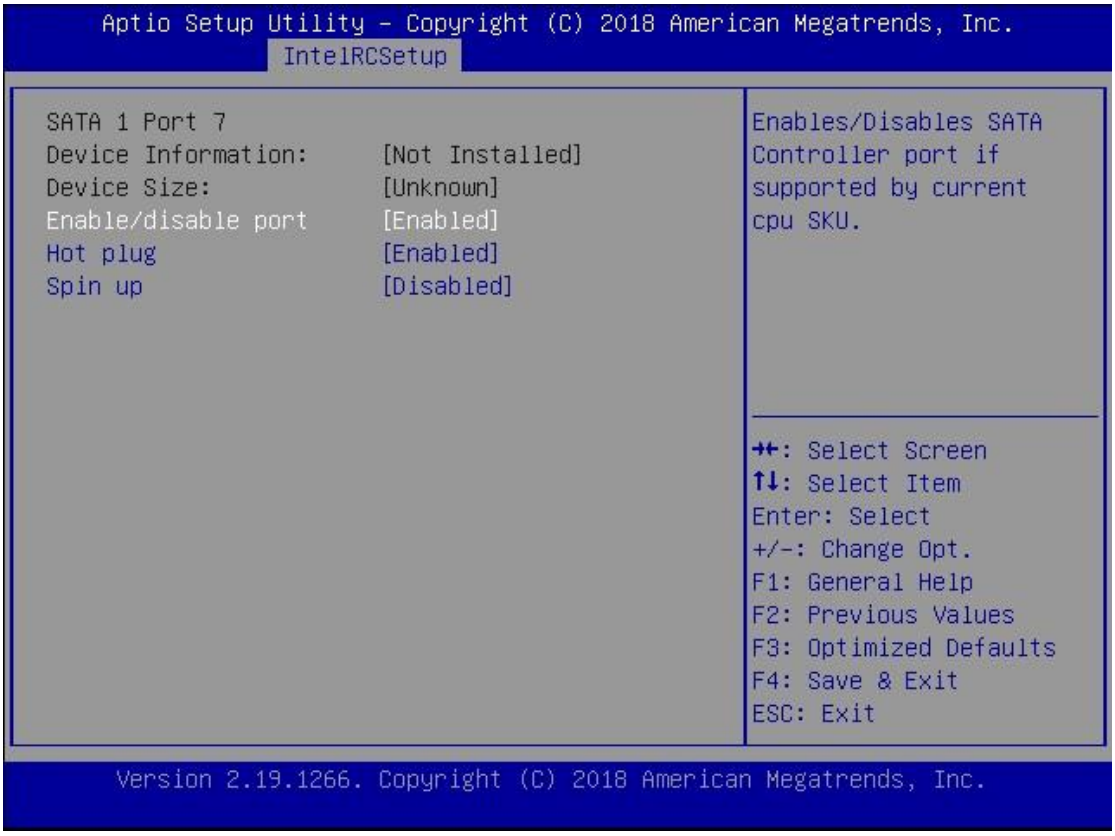


## SATA Configuration




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

## SATA1 Configuration

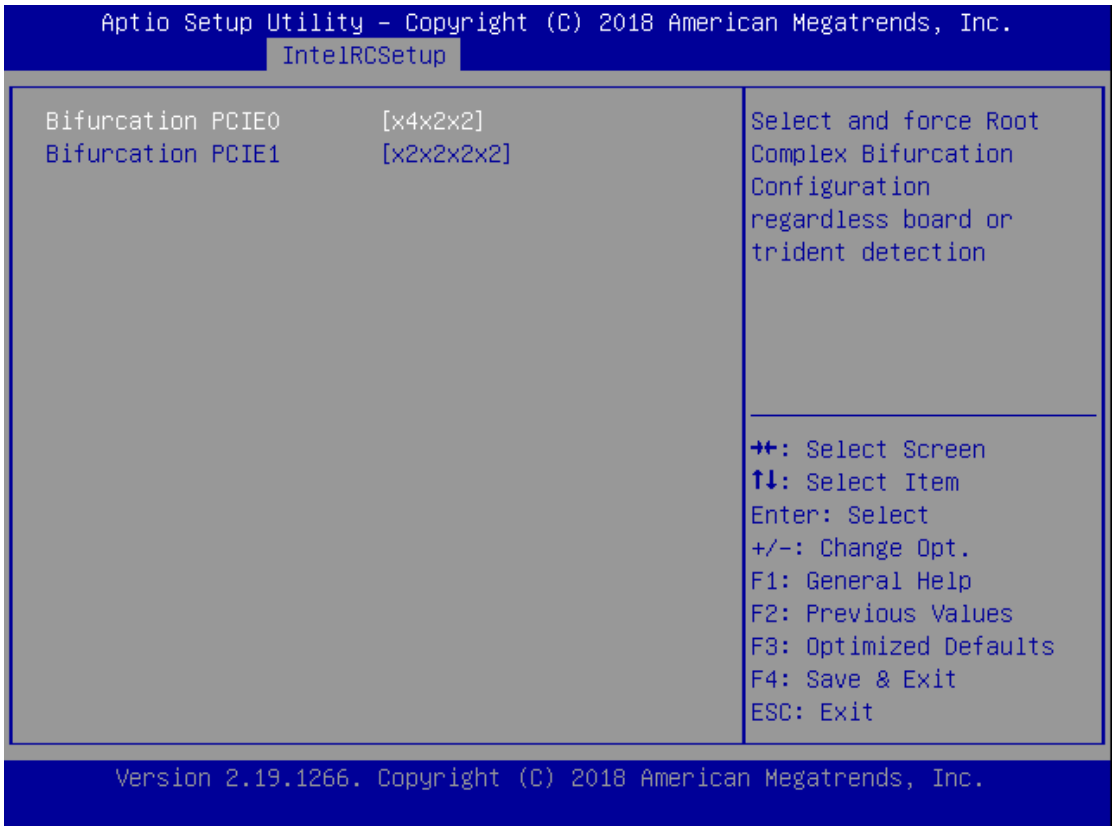



| Feature | Options | Description |
|---|---|---|
| Enable/disable port | Enabled<br>Disabled | Enables/Disables SATA Controller port if supported by current cpu SKU. |
| Hot plug | Enabled<br>Disabled | Hot plug |
| Spin up | Enabled<br>Disabled | Spin up |

## M2SATA1 Configuration

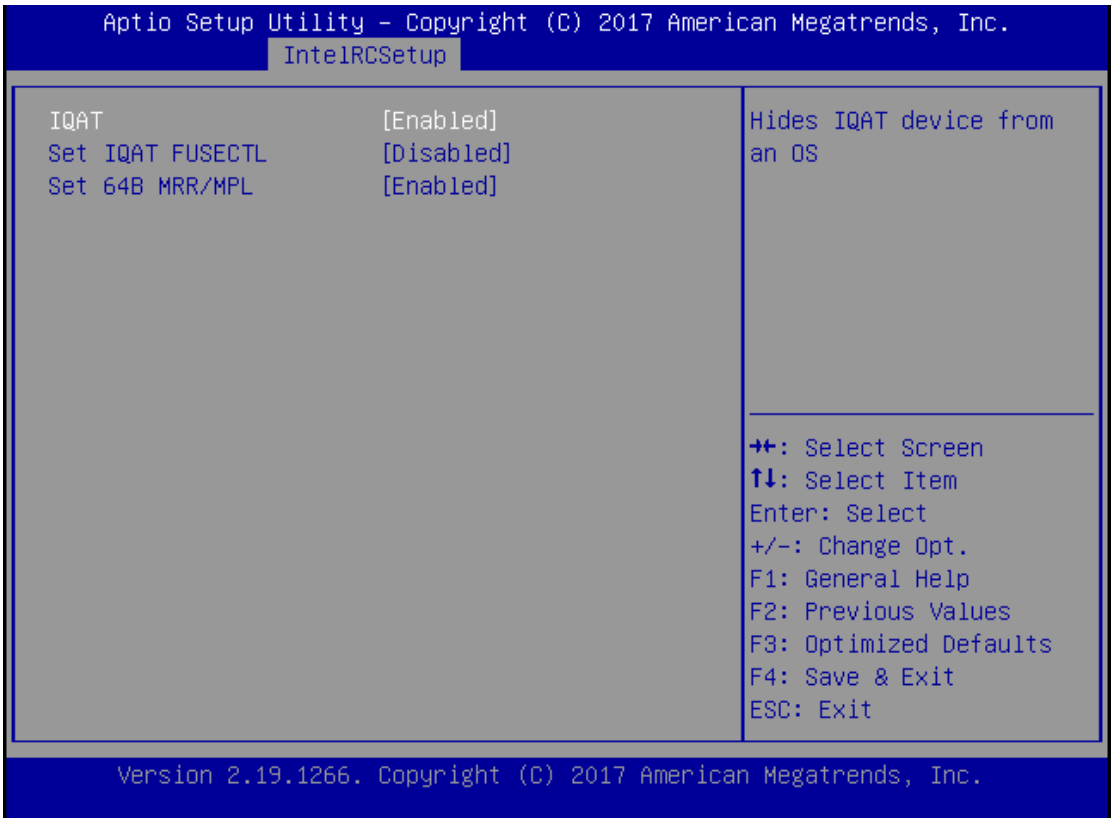

| Feature | Options | Description |
|---|---|---|
| Enable/disable port | Enabled<br>Disabled | Enables/Disables SATA Controller port if supported by current cpu SKU. |
| Hot plug | Enabled<br>Disabled | Hot plug |
| Spin up | Enabled<br>Disabled | Spin up |

## PCIE IP Configuration



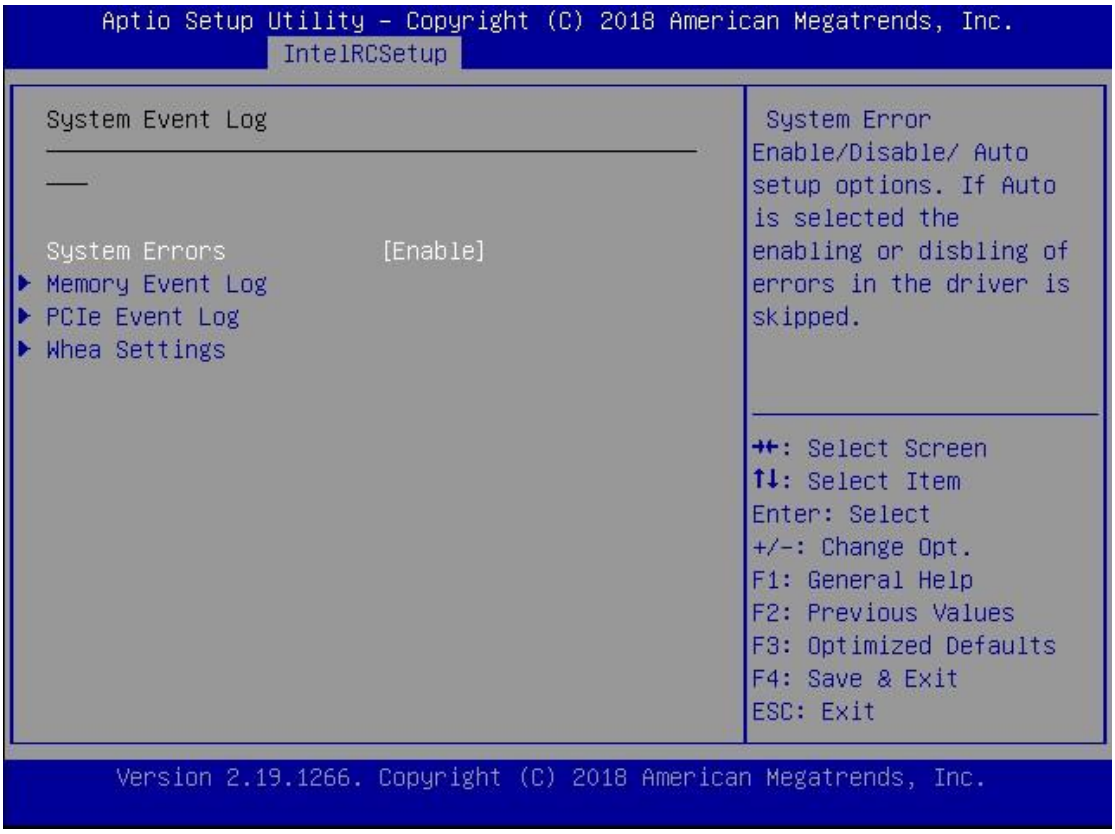

| Feature | Options | Description |
|---|---|---|
| Bifurcation PCIE0 | Auto<br>X8<br>X4x4<br>X4x2x2<br>X2x2x4<br>X2x2x2x2 | Select and force Root Complex Bifurcation Configuration regardless board or trident detection. |
| Bifurcation PCIE1 | Auto<br>X8<br>X4x4<br>X4x2x2<br>X2x2x4<br>X2x2x2x2 | Select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

## IQAT Configuration




| Feature | Options | Description |
|---|---|---|
| IQAT | Enabled<br>Disabled | Hides IQAT device from and OS. |

## System Event Log

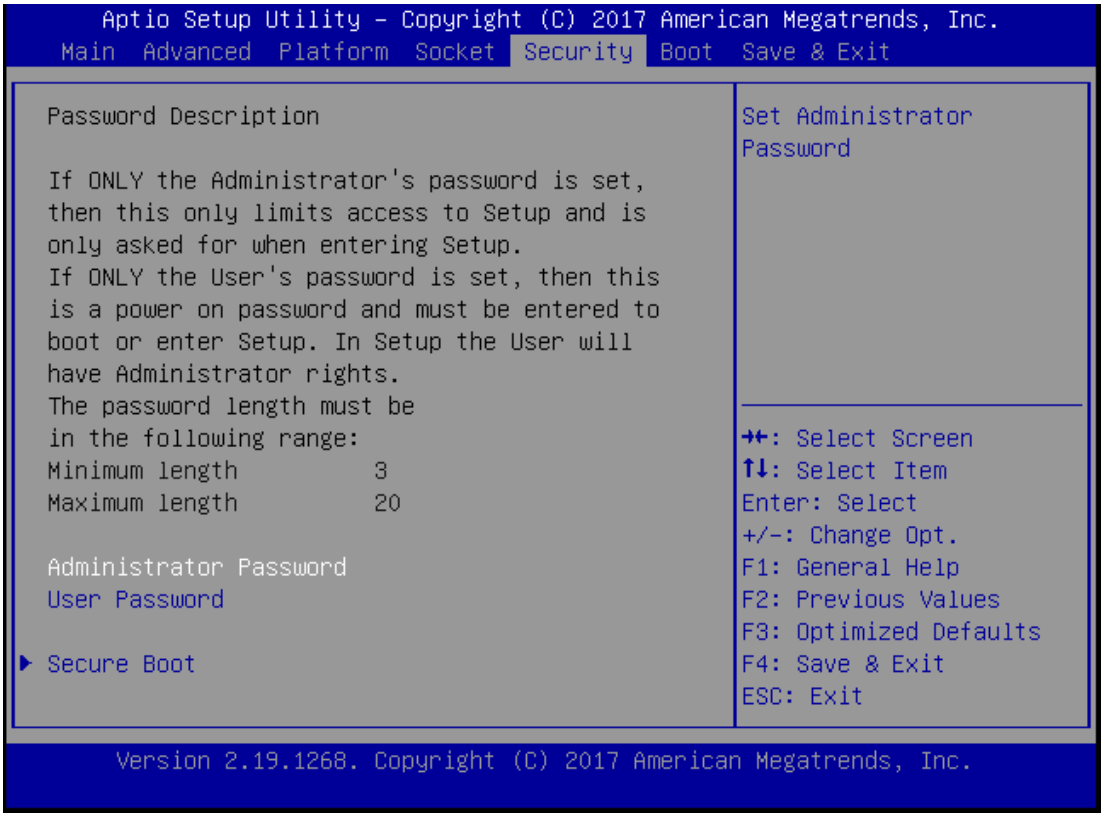



| Feature | Options | Description |
|---|---|---|
| System Errors | Disable<br>Enable<br>Auto | System Error enabling and logging setup option. |
| Memory Elog Support | Disable<br>Enable | Enable/Disable Memory Error logging support |
| Parity Check | Enable<br>Disable | Enable/Disable Parity Check |
| Log Correctable | Enable<br>Disable | Enable/Disable Correctable Memory Error logging support |
| Log Un-Correctable | Enable<br>Disable | Enable/Disable Un-correctable Memory Error logging support |
| Enable/Disable Error Cloaking | Disable<br>Enable | Error Cloaking Feature to hide CE Error to OS |
| PCIE Elog Support | Disable<br>Enable | Enable/Disable PCIe Error logging support |
| Log Fatal Error | Disable<br>Enable | Send system event Signal on Fatal error |
| Log Non-Fatal Error | Disable<br>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<br>Enable | Enable System Error reporting on all enumerated Root ports, bridges and devices. |
| PCIe Parity Error | Disable<br>Enable | Enable Parity Error reporting on all enumerated Root ports, bridges and devices . |
| WHEA Support | Disable<br>Enable | Enable/Disable WHEA ACPI support. |
| WHEA Error Injection 5.0 Extension | Disable<br>Enable | When EINJ ACPI 5.0 support for set error type with address and vendor extensions. |
| Whea Logging | Disable<br>Enable | Enable/Disable Whea logging of errors. |
| WHEA PCIe Error Injection | Disable<br>Enable | Enable/Disable WHEA PCIe Error Injection . |

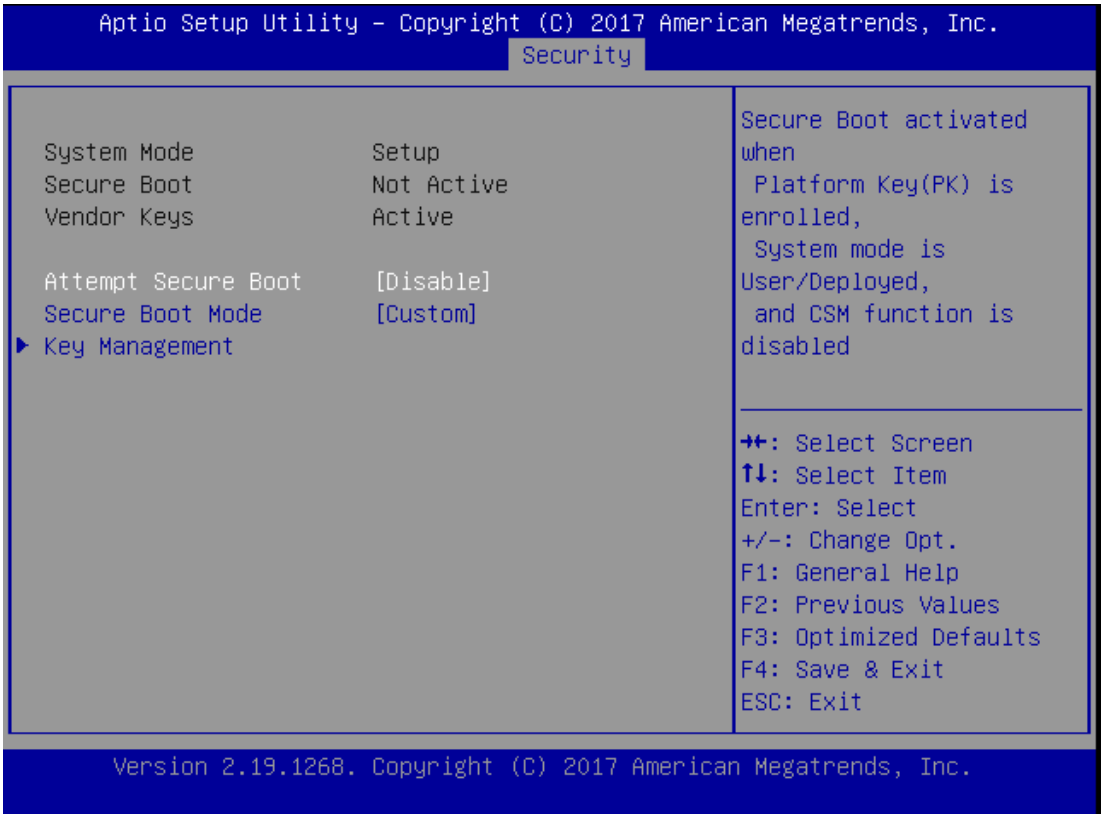
## Security

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.



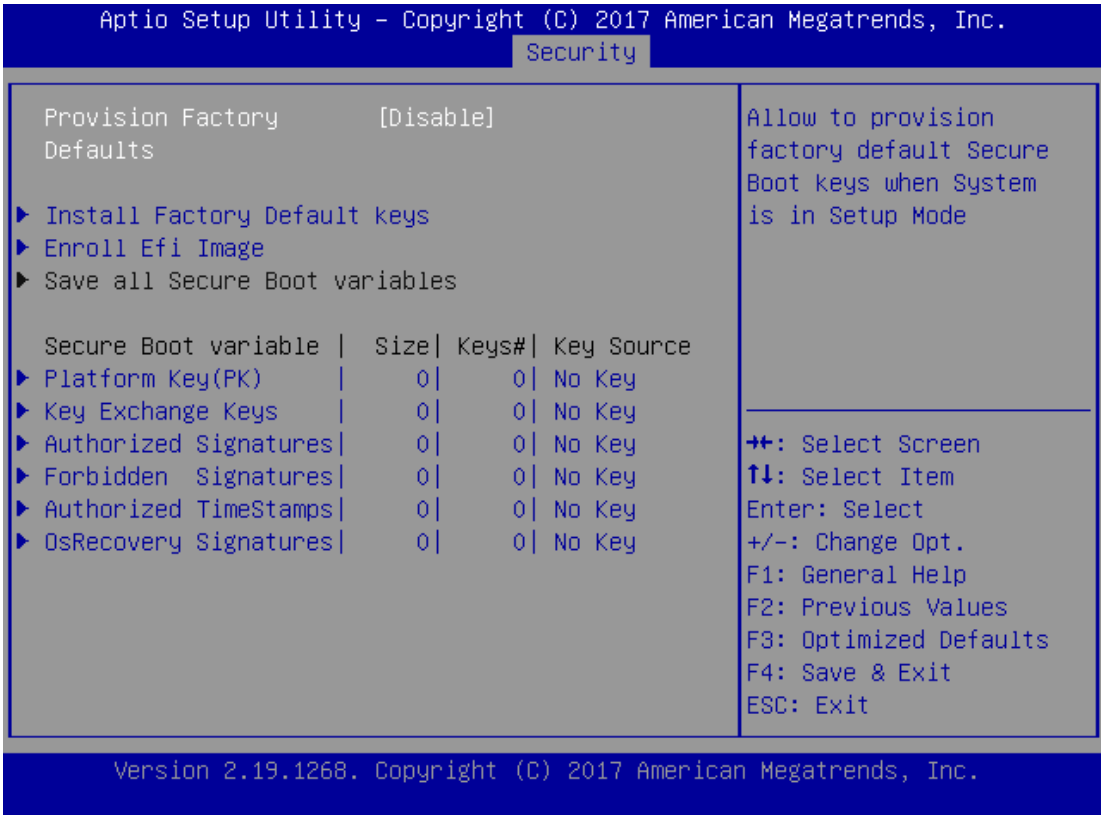

| Feature | Description |
|---|---|
| Administrator Password | If ONLY the Administrator's password is set, it only limits access to Setup and is only asked for when entering Setup. |
| User Password | If ONLY the User's password is set, it serves as a power-on password and must be entered to boot or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

## Secure Boot




| Feature | Options | Description |
|---|---|---|
| Secure Boot Enable | Disabled<br>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<br>Custom | Customizable Secure Boot mode: In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication. |

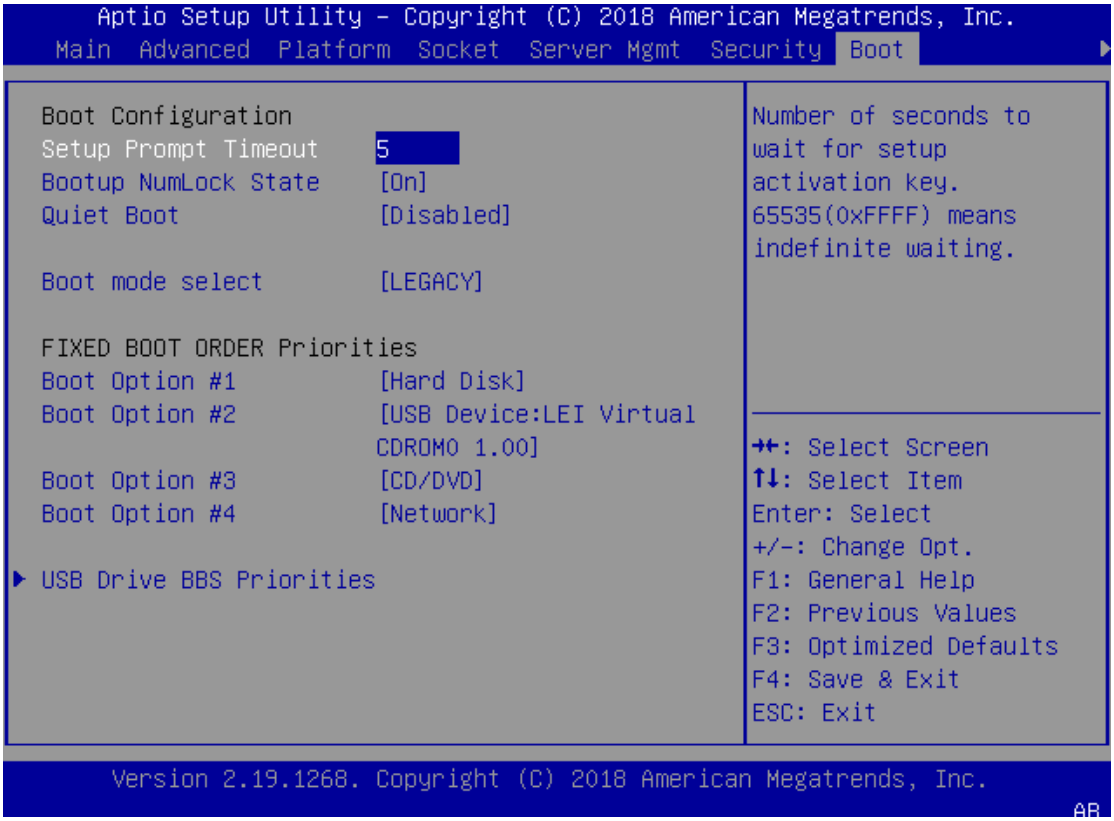
## Key Management




| Feature | Options | Description |
|---|---|---|
| Factory Key Provision | Disabled<br>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.

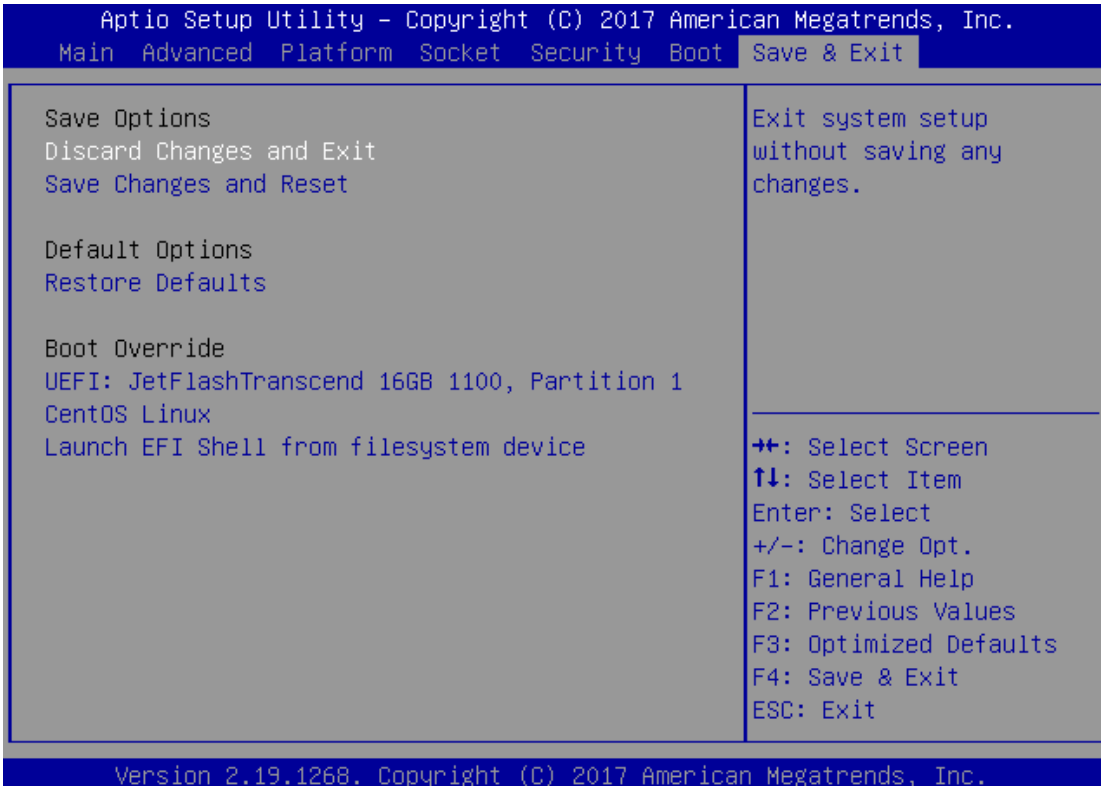



| Feature | Options | Description |
|---|---|---|
| Setup Prompt Timeout | 5 | The number of seconds to wait for setup activation key.<br>65535 means indefinite waiting. |
| Bootup NumLock State | On<br>Off | Select the keyboard NumLock state |
| Quiet Boot | Disabled<br>Enabled | Enables or disables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

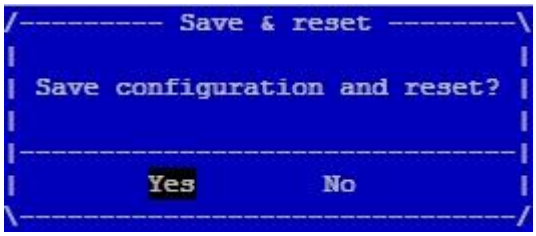
## Save and Exit Menu

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.



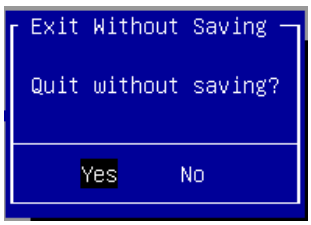

**■ Save Changes and Reset**

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.



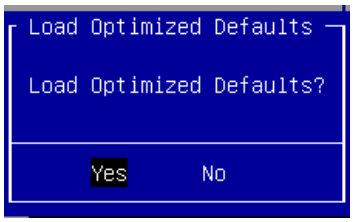

**■ Discard Changes and Exit**

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

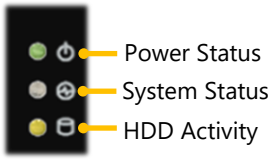
Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. 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* |

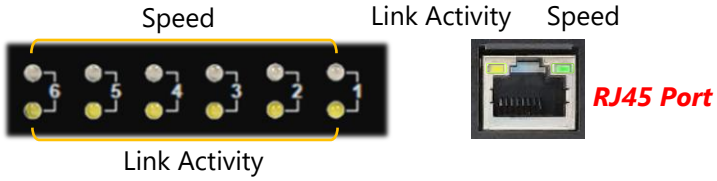
- **System Status**

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*).

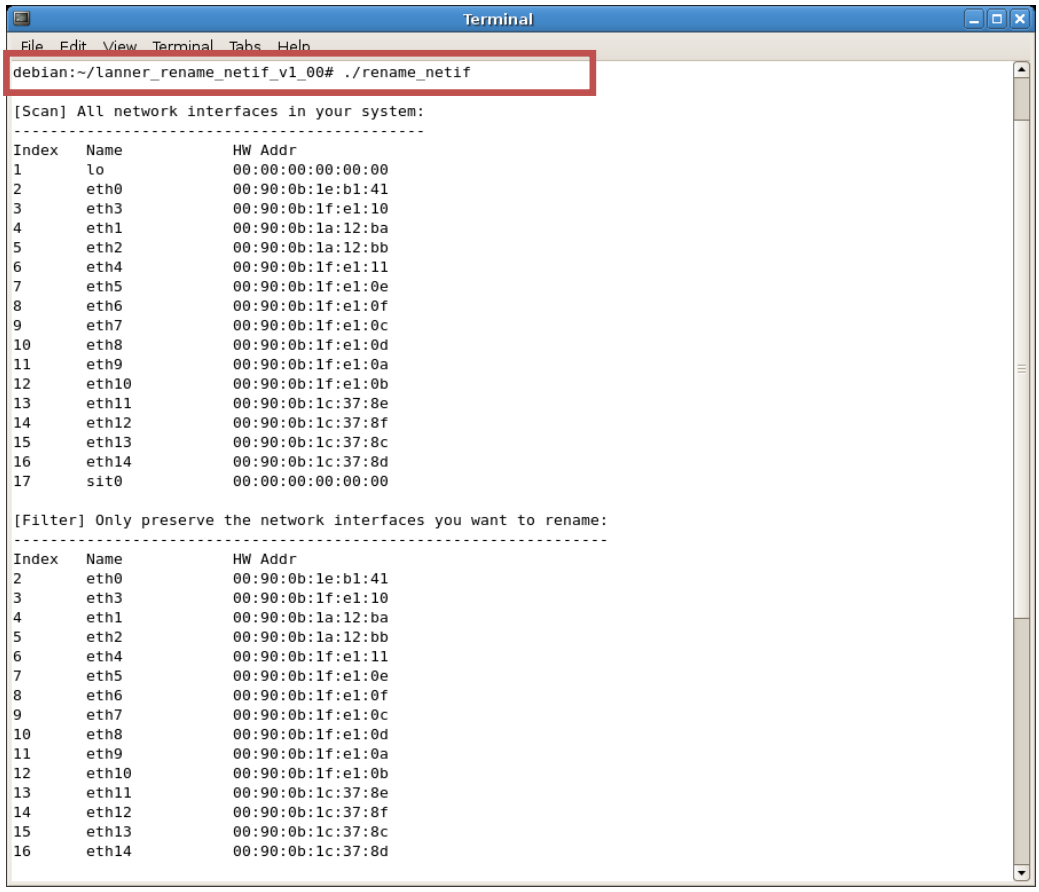
- **Filter:** The network interface that user wants to rename.
- **UdevAddress:** The path of udev rule files.
- **UdevFilename:** Udev rule file name.
- **IfcfgAddress:** The path of ifcfg files.
- **SaveStep:** If set to 0, the program will skip the step of saving.
- **AutoNaming:** The program will 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

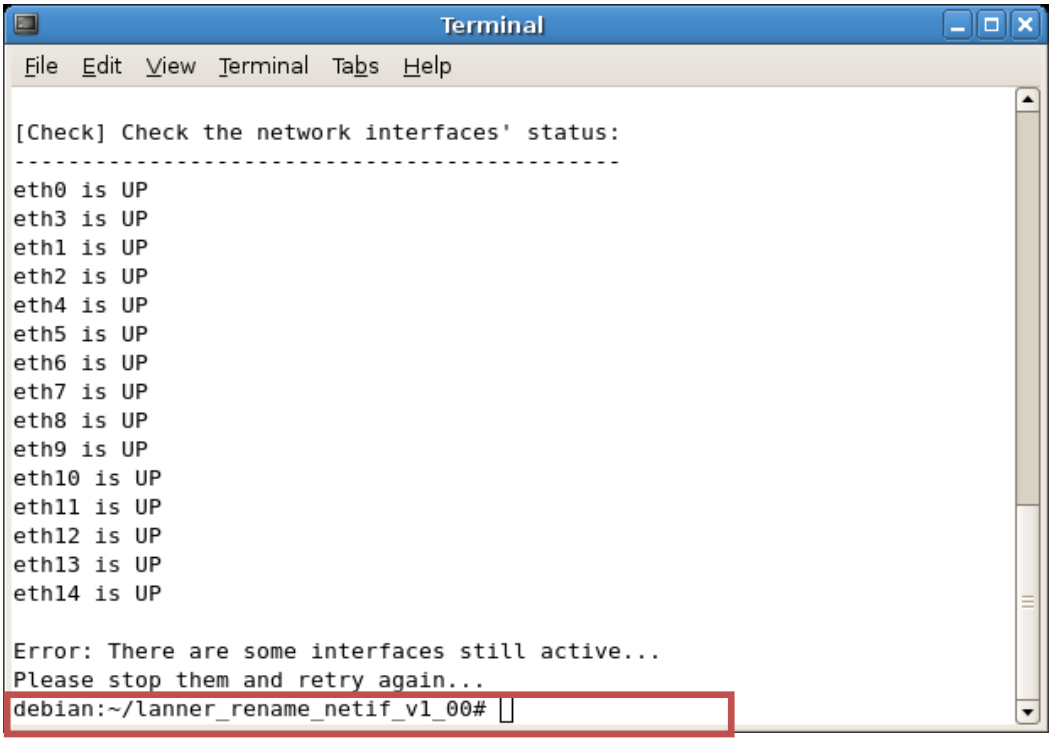
```
Filter eth
UdevAddress /etc/udev/rules.d
UdevFilename 10-lanner_net.rule
IfcfgAddress /etc/sysconfig/network-scrips
AutoSave 0
AutoNaming eth0:lanner0
AutoNaming eth1:lanner1
AutoNaming eth2:eth10
```

## Screenshots of Renaming Procedures

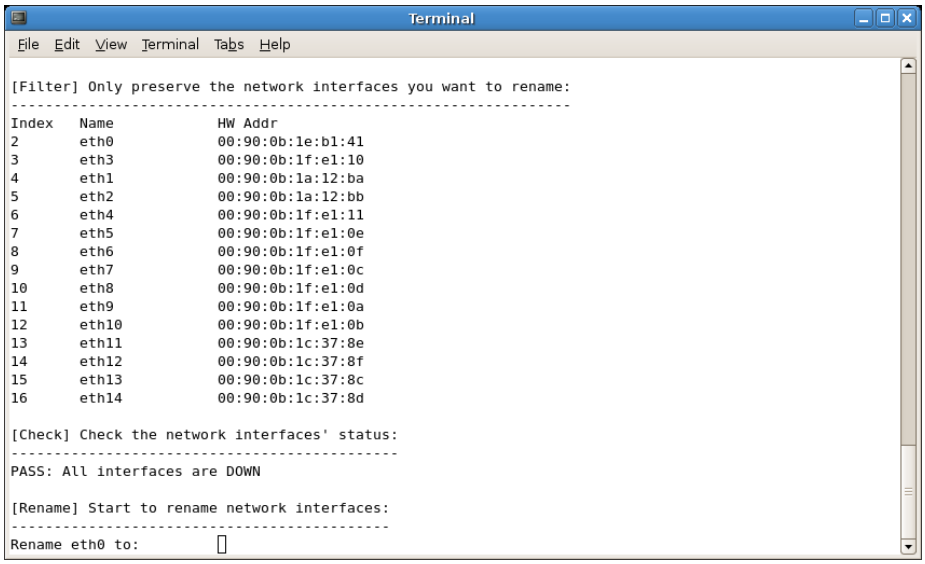
1. **Scan and filter.**



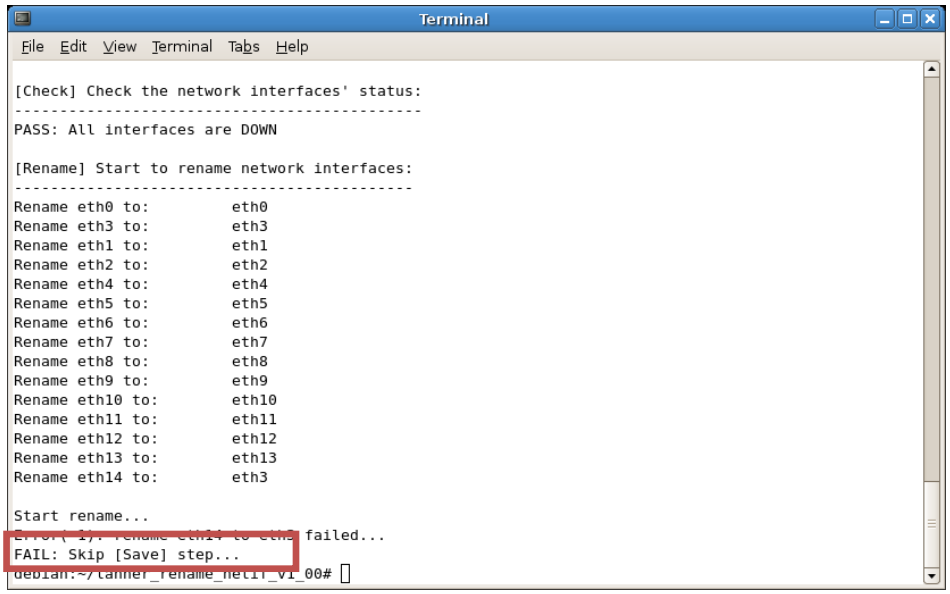

2. **If any network interface is still running, the utility will exit.**



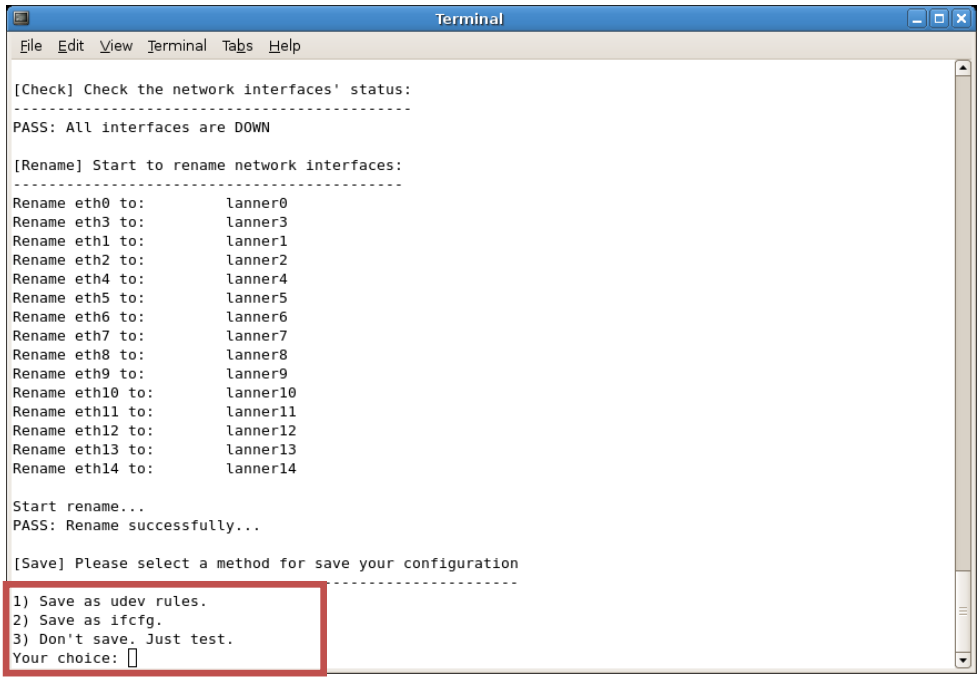
3. **Renaming will start after the message shows "PASS: All interfaces are DOWN".**



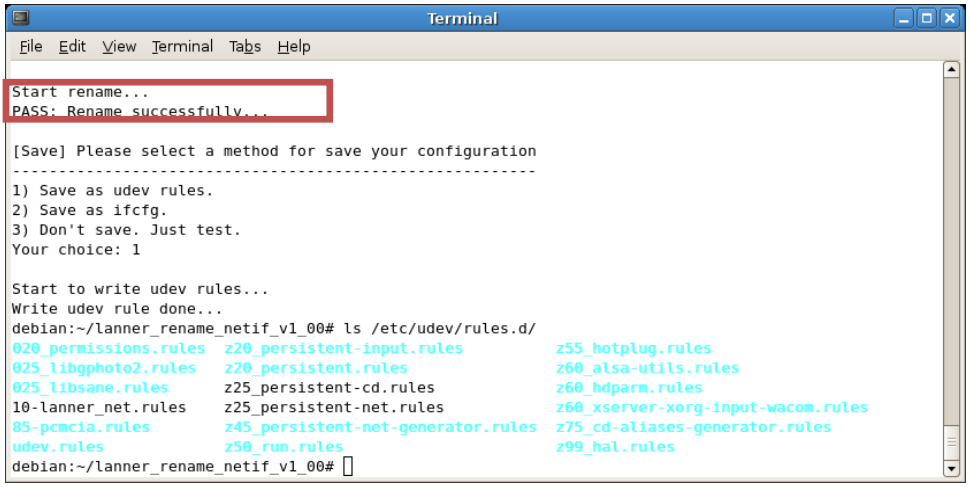

4. **If renaming fails (using the same name), the utility will skip saving step and exit.**



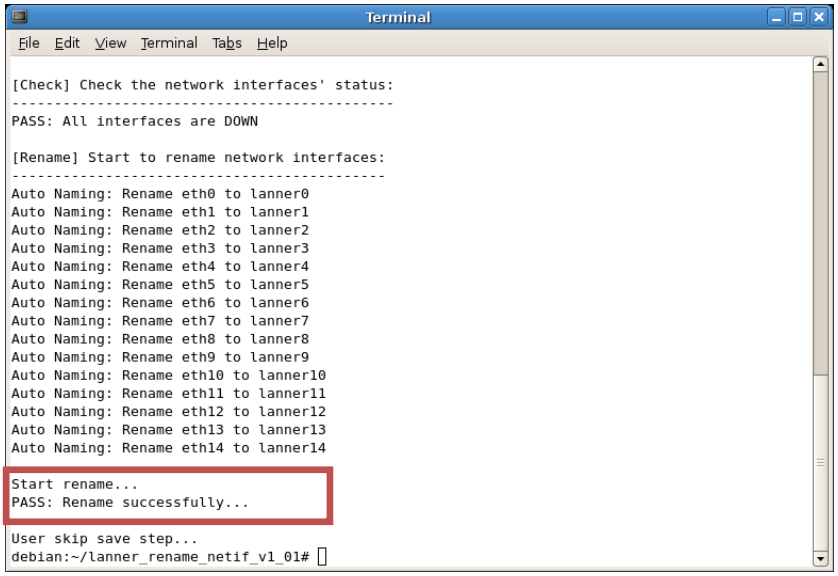
**5. If renaming is successful, choose a save method or just leave.**




**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)<br>▫ Testing Purpose |
| Company: | Contact Person: |
| Phone No. | Purchased Date: |
| Fax No.: | Applied Date: |
| Return Shipping Address: _____ | |
| Shipping by: ▫ Air Freight ▫ Sea ▫ Express_____<br>▫ 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**