

# Lanner

## Network Computing

Innovative Platforms for Next Generation Network Infrastructure

## NCA-2512 User Manual

Version: 1.4

Date of Release: 2023-12-27

## 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

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

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

## Online Resources

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## Contact Information

### Taiwan Corporate Headquarters

**Lanner Electronics Inc.**

7F, No.173, Sec.2, Datong Rd.  
Xizhi District, New Taipei City 22184,  
Taiwan

**立端科技股份有限公司**

221 新北市汐止區  
大同路二段 173 號 7 樓

T: +886-2-8692-6060

F: +886-2-8692-6101

E: [contact@lannerinc.com](mailto:contact@lannerinc.com)

### USA

**Lanner Electronics Inc.**

47790 Westinghouse Drive  
Fremont, CA 94539

T: +1-855-852-6637

F: +1-510-979-0689

E: [sales\\_us@lannerinc.com](mailto:sales_us@lannerinc.com)

### Europe

**Lanner Europe B.V.**

Wilhelmina van Pruisenweg 104  
2595 AN The Hague  
The Netherlands

T: +31 70 701 3256

E: [sales\\_eu@lannerinc.com](mailto:sales_eu@lannerinc.com)

### China

**Beijing L&S Lancom Platform Tech. Co., Ltd.**

Guodong LOFT 9 Layer No. 9 Huinan Road,  
Huilongguan Town, Changping District, Beijing  
102208 China

T: +86 010-82795600

F: +86 010-62963250

E: [service@ls-china.com.cn](mailto:service@ls-china.com.cn)

### Canada

**Lanner Electronics Canada Ltd**

3160A Orlando Drive  
Mississauga, ON  
L4V 1R5 Canada

T: +1 877-813-2132

F: +1 905-362-2369

E: [sales\\_ca@lannerinc.com](mailto:sales_ca@lannerinc.com)

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## Compliances and Certification

### CE

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

### FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. The operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## EMC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. The operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

## 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.

### **Lithium Battery Caution:**

- ▶ Risk of Explosion if Battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
- ▶ Installation only by a trained electrician or only by an electrically trained person who knows all English Installation and Device Specifications which are to be applied.
- ▶ Do not carry the handle of power supplies when moving to another place.

### **Operating Safety**

- ▶ Electrical equipment generates heat. Ambient air temperature may not be adequate to cool equipment to acceptable operating temperatures without adequate circulation. Be sure that the room in which you choose to operate your system has adequate air circulation.
- ▶ Ensure that the chassis cover is secure. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
- ▶ Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures. Be sure to follow ESD-prevention procedures when removing and replacing components to avoid these problems.
- ▶ Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. If no wrist strap is available, ground yourself by touching the metal part of the chassis.
- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

### **Mounting Installation Precaution**

#### **Environment:**

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of air flow required

for safe operation of the equipment is not compromised.

- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the unit or use of inappropriate installation components.

#### **Installation & Operation:**

- ▶ The installation of this product must be performed by trained specialists; otherwise, a non-specialist might create the risk of the system's falling to the ground or other damages.
- ▶ Lanner Electronics Inc. shall not be held liable for any losses resulting from insufficient strength for supporting the system or use of inappropriate installation components.

## **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.

## **Avertissement concernant la pile au lithium**

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

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

## Sécurité de fonctionnement

L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.

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

## Consignes de sécurité électrique

- ▶ Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- ▶ Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- ▶ Pour désinstaller l'équipement, débranchez le câble de mise à la terre après avoir éteint l'appareil.
- ▶ Un câble de mise à la terre est requis et la zone reliant les sections du conducteur doit faire plus de 4 mm<sup>2</sup> ou 10 AWG.



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

注意：要断开电源，请将所有电源线从本机上拔下。

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

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

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

## Battery Precautions

- ▶ Lithium Battery Caution: There is danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type. Dispose of batteries according to the manufacturer's instructions.
- ▶ Disposal of a BATTERY into fire or a hot oven, or mechanically crushing or cutting of a BATTERY can result in an EXPLOSION.
- ▶ Leaving a BATTERY in an extremely high temperature surrounding environment can result in an EXPLOSION or the leakage of flammable liquid or gas.
- ▶ A BATTERY subjected to extremely low air pressure may result in an EXPLOSION or the leakage of flammable liquid or gas.

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

Peut être installé dans des salles de matériel de traitement de l'information conformément à l'article 645 du National Electrical Code et à la NFPA 75.

The machine can only be used in a restricted access location, such as labs or computer facilities with the proper authorization.

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

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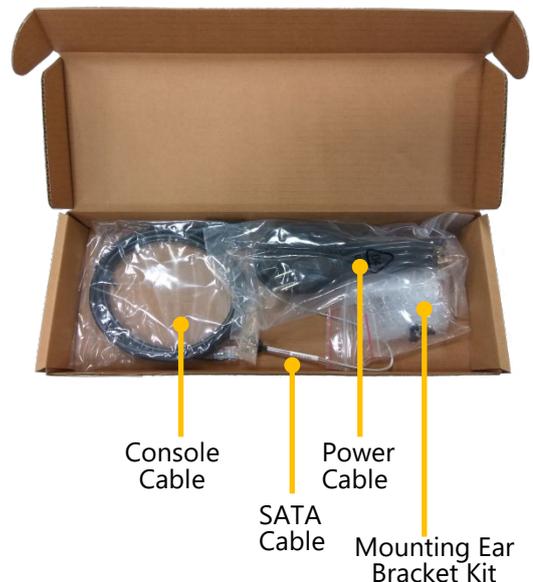
# CHAPTER 1: PRODUCT OVERVIEW

The NCA-2512, a 1U 19" rackmount network appliance with high availability, virtualization-optimized design and Intel® Atom™ C3958 CPU (codenamed Denverton) offers up to 16 cores of processing prowess, 300W redundant PSUs, 10G interface for SFP+, SR-IOV support, Intel® AES-NI and Intel® QuickAssist Technology, running at 20G. It is the ideal solution for vCPE, uCPE, SD-WAN and SD-Security on Intel® architecture servers.

## Package Content

Your package contains the following items:

- ▶ 1x NCA-2512 Network Security Platform
- ▶ 1x Accessory Pack
- ▶ 1x Power Cable, 1x Console Cable, 1x Mounting Ear Bracket Kit and 1x SATA Cable



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



**Warning:**

1. The Harcuvar system can take up to 9 minutes from booting up to EFI shell in its first initial. In the 2nd boot, 2 minutes is all it takes for a fast boot, which is considered normal for a total of 32G DIMM. However, with DIMM of higher capacity used, the boot-up time gets longer.
2. After clearing CMOS or when PXE boot is enabled, the system boot-up time is doubled.

## Ordering Information

SKU No.	Description
NCA-2512 <b>A</b>	Intel C3958 16 Core with QAT + 5x GbE + 4x SFP+ 1x NIC (1x PCIe8/2x PCIe4)
NCA-2512 <b>B</b>	Intel C3758 8 Core with QAT + 5x GbE + 4x SFP+ 1x NIC (1x PCIe8/2x PCIe4)
NCA-2512 <b>C</b>	Intel C3558 4 Core with QAT + 5x GbE

## Optional Accessories

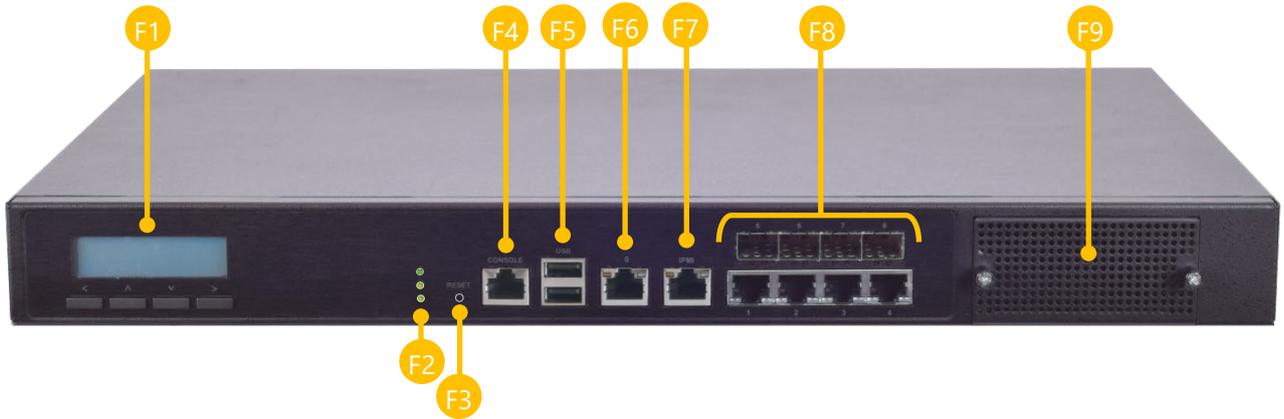
Model No.	Description
NCS2-IGM806A	8-port NIC with Intel i350 AM4 and 4pairs Gen3 Bypass
NCS2-ISM802A	8-port NIC with Intel i350-AM4 and No Bypass
NCS2-IXM407A	4-port 10GbE SFP with Intel Fortville XL710 Ethernet controller
NCS2-IXM409A	4-port 10GbE SFP with Intel Fortville XL710-BM1 Ethernet controller and Gen3 Bypass
IAC-AST2302	IPMI (Intelligent Platform Management Interface) Card with GbE management port
IAC-AST2302VGA	VGA card for network appliance to extend VGA display capability
IAC-TPM01C	TPM module supporting TPM2.0
RC-25123	Riser Card Kit for 1xPCIe8 HH/HL expansion (By SKU)
Console Cable (for Main board)	D-SUB (DB9) to 10pin flat cable, 2.0mm Pitch, 55cm
VGA Cable (for Main board)	VGA (DB15) to 12-pin flat cable, 2.54mm Pitch, 70cm
VGA Cable (for IPMI card)	VGA (DB15) to 10-pin flat cable, 2.0mm Pitch, 65cm
SATA Cable	7-pin SATA latching cable with straight (180°-180°) connectors, 40cm
RJ45 Cable	A standard Category 5E cable supporting UTP, gray, 180cm
1U Slide Rail Kit	A pair of rails and 1x screw pack

## System Specifications

<b>Form Factor</b>		1U 19" Rackmount
<b>Platform</b>	Processor Options	Intel® Atom™ C3000 8 to 16 Cores (Denverton)
	CPU Socket	Onboard
	Chipset	SoC
	Security Acceleration	Intel® QuickAssist Technology
<b>BIOS</b>		AMI SPI Flash BIOS
<b>System Memory</b>	Technology	DDR4 2400MHz, ECC or non-ECC UDIMM
	Max. Capacity	128 GB (32GBx 4 slots)
	Socket	4x 288pin DIMM
<b>Networking</b>	Ethernet Ports	1x GbE RJ45 Intel® i210
		4x GbE RJ45 Intel® i350-AM4
		4x SFP+ Intel® Denverton Integrated (By SKU)
	Bypass	2pairs Gen3 (By SKU)
	NIC Module Slot	1x NIC Module Slot
<b>LOM</b>	IO Interface	1x RJ45 (By SKU)
	OPMA slot	Yes
<b>I/O Interface</b>	Reset Button	1x Reset Button
	LED	Power/Status/Storage LED Indicator
	Power Button	1x ATX Power Switch
	Console Port	1x RJ45 Console Port
	USB Port	2x USB 2.0 Port
	LCD Module	2x20 character LCM, 4 x keypads
	Display Port	From OPMA slot (Optional)
Power Input	AC Power Inlet on PSU	
<b>Storage</b>	HDD/SSD Support	2x 2.5" HDD/SSD Bays
	Onboard Slots	1x mSATA
<b>Expansion</b>	PCIe	1x PCIe8 HH/HL (Optional)
	mini-PCIe	N/A
<b>Miscellaneous</b>	Watchdog	Yes
	Internal RTC with Li-Battery	Yes
	TPM	Yes (Optional)
<b>Cooling</b>	Processor	Passive CPU heatsink
	System	2x Cooling Smart Fans
<b>Environmental Parameters</b>	Temperature	0 to 40°C Operating -20 to 70°C Non-Operating
	Humidity (RH)	5 to 90% Operating 5 to 95% Non-Operating
<b>System Dimensions</b>	(WxDxH)	438 x 432 x 44 mm
	Weight	7.03 kg
<b>Package Dimensions</b>	(WxDxH)	582 x 548 x 182 mm
	Weight	10.39 kg
<b>Power</b>	Type/Watts	300W Redundant PSU
	Input	100-240V~, 5A-3A, 50-60Hz
<b>Approvals and Compliance</b>		RoHS

## Front Panel

### NCA-2512A/B

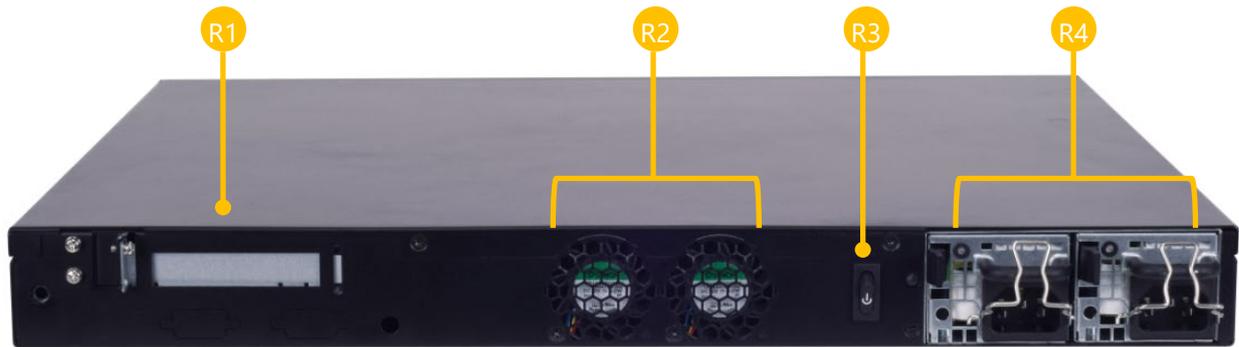


### NCA-2512C



No.	Description	
F1	LCM	2x20 Character LCM, 4x keypads
F2	LED Indicators	 <ul style="list-style-type: none"> <li><span style="color: green;">●</span> System</li> <li><span style="color: yellow;">●</span> Power</li> <li><span style="color: red;">●</span> System Status</li> </ul>
F3	Reset Button	1x Software Reset Button
F4	Console Port	1x Console Port
F5	USB Port	2x USB 2.0 Port
F6	MGMT Port	1x Management Port
F7	IPMI Port	1x RJ45 for IPMI (IPMI card required) (Optional)
F8	GbE & SFP+ Ports	GbE Ports: 1-4, SFP+ Ports: 5-8 (by SKU)
F9	NIC Module	1x STD NIC module (by SKU)

## Rear Panel



No.	Description	
R1	Rear PCIe Expansion	1x PCIe8 Expansion slot (Riser card required) (HH/HL) (Optional)
R2	Cooling Fan	2x Cooling Smart Fans
R3	Power Button	1x ATX Power button
R4	Power Supply	2x 300W PSU

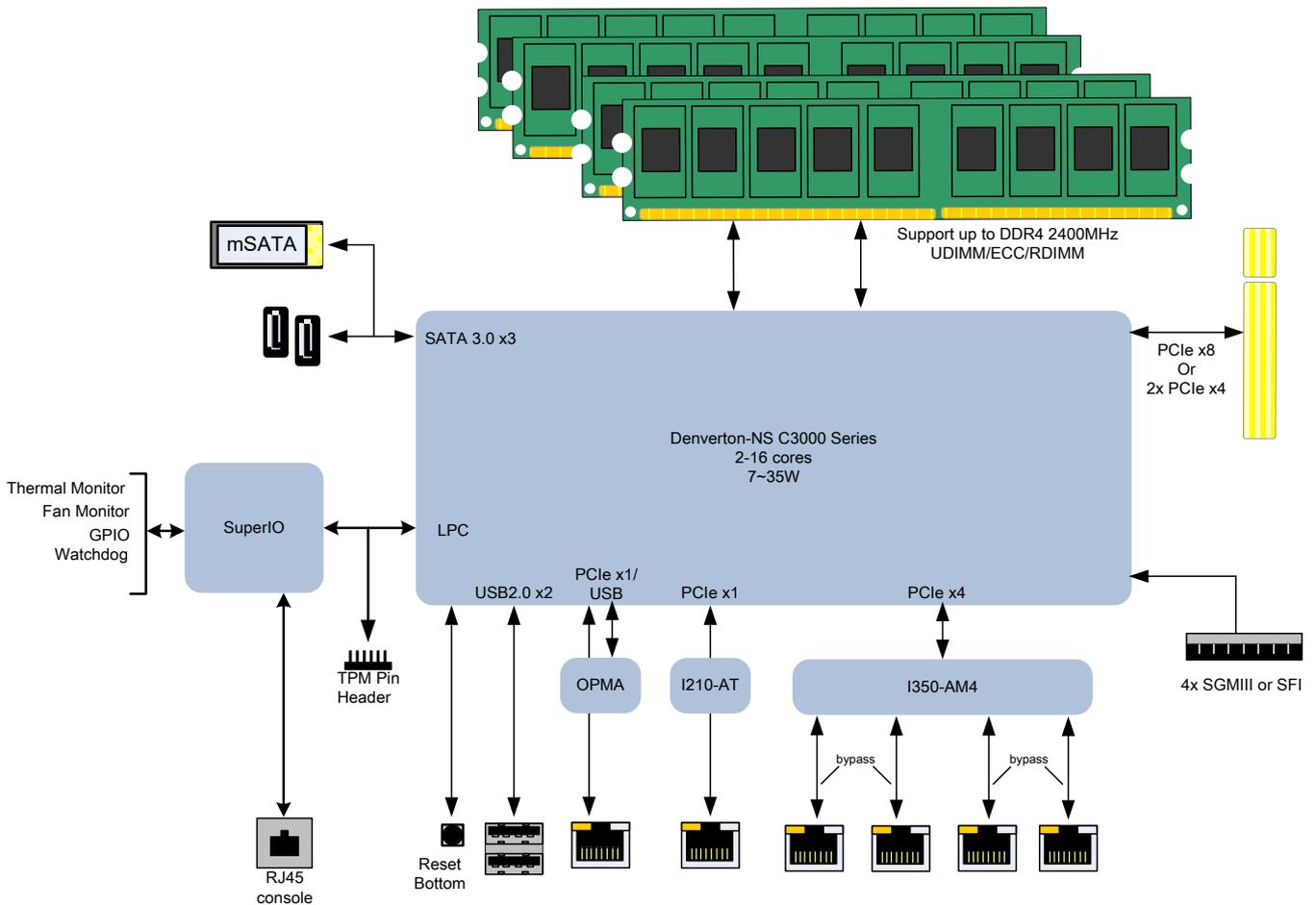


**Note:** Please refer to [Appendix A: LED Indicator Explanations](#) for description of the LED Indicators (including those on MGMT Port, IPMI Port, GbE, SFP+ Ports and HDD trays)

# CHAPTER 2: MOTHERBOARD INFORMATION

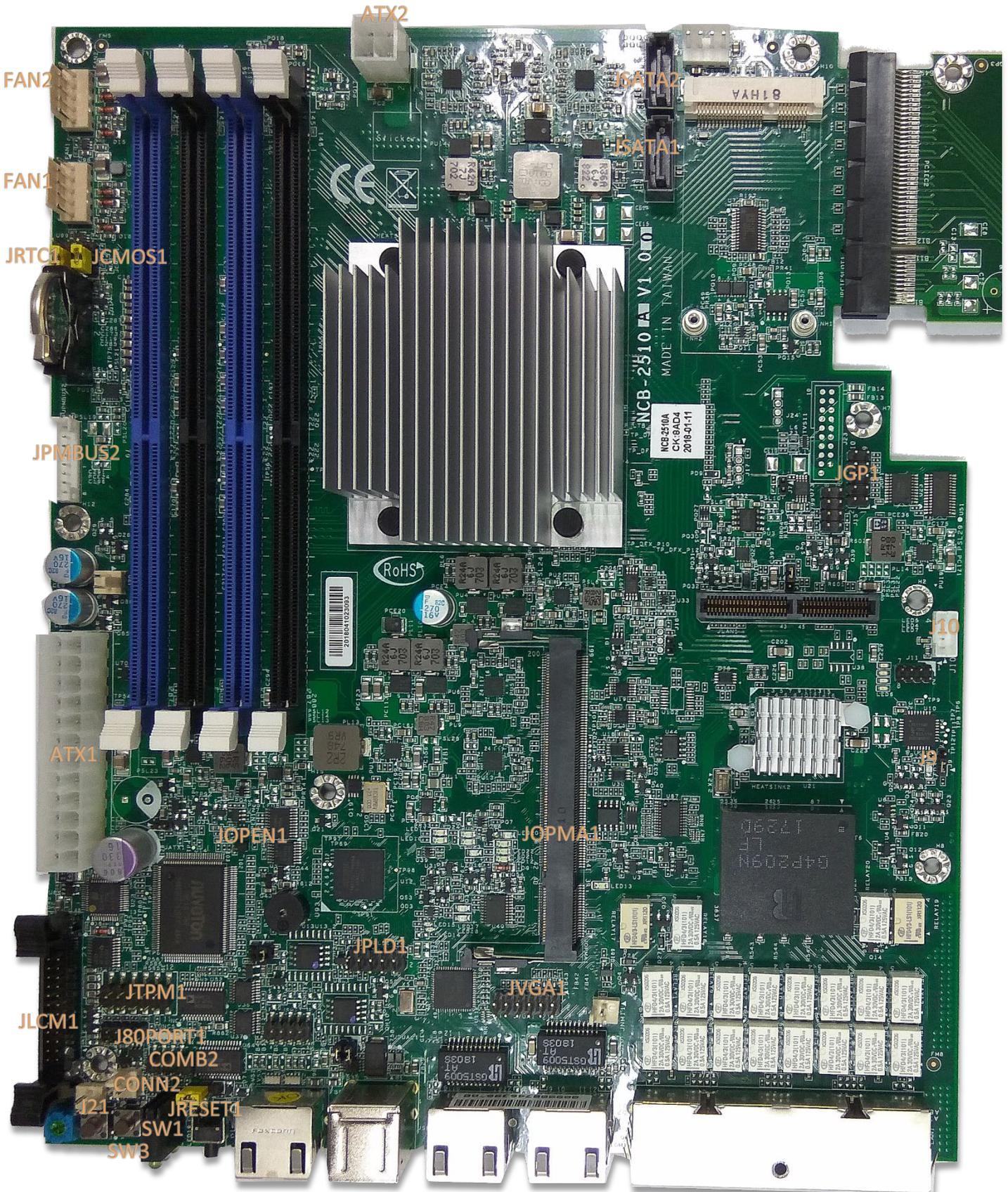
## Block Diagram

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



## Motherboard Layout

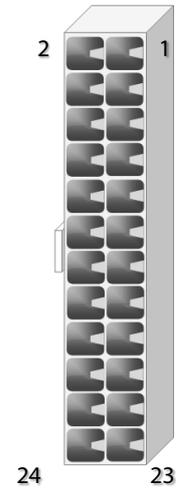
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



## Internal Jumper & Connectors

### ATX1: 24-Pin ATX Power Connector

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+3.3V	2	+3.3V	3	+3.3V	4	-12V
5	Ground	6	Ground	7	+5V	8	PS-ON-
9	Ground	10	Ground	11	+5V	12	Ground
13	Ground	14	Ground	15	Power Good	16	NC
17	Stand-By 5V	18	+5V	19	+12V	20	+5V
21	+12V	22	+5V	23	3.3V	24	Ground



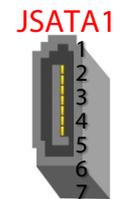
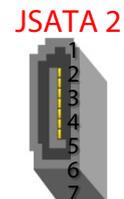
### ATX2: 4-pin Power Connector

Pin	Description	Pin	Description
1	GND	2	+12V
3	GND	4	+12V



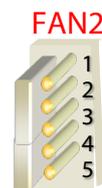
### JSATA2 & JSATA1: 180° SATA Connector (with SATA DOM)

Pin	Description	Pin	Description
1	GND	2	TX+
3	TX-	4	GND
5	RX-	6	RX+
7	SATA Power		



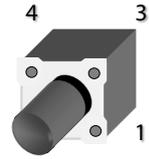
### FAN1-2: Fan Connector

Pin	Description	Pin	Description
1	GND	2	12V
3	RPM Sense	4	RPM Sense
5	PWM Status		



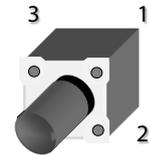
**SW3:** Reset Switch (reserved for debugging)

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	GND
<b>3</b>	FP_RST_SEL	<b>4</b>	FP_RST_SEL



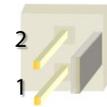
**SW1:** PSON power switch (reserved for debugging)

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	GND
<b>3</b>	FP_SWIN_R	<b>4</b>	FP_SWIN_R



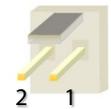
**J21:** Reset

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	FP_SWIN_R



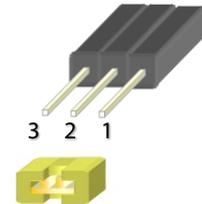
**CONN2:** PSON power

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	FP_SWIN_R



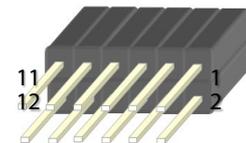
**JRESET1:** Controls the software reset method of the Reset button on front panel.

Pin	Description	Pin	Description
1,2 	HW reset	2,3 	SW reset (Default)



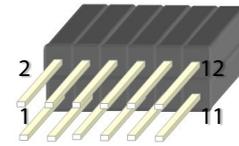
**VGA1:** VGA

Pin	Description	Pin	Description
<b>1</b>	R	<b>2</b>	Ground
<b>3</b>	G	<b>4</b>	Ground
<b>5</b>	B	<b>6</b>	Ground
<b>7</b>	H-SYNC	<b>8</b>	Ground
<b>9</b>	V-SYNC	<b>10</b>	Ground
<b>11</b>	Detect-display Data	<b>12</b>	Detect-display CLOCK



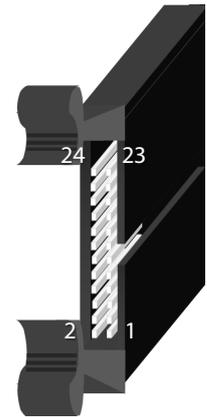
**JTPM1: TPM**

Pin	Description	Pin	Description
1	LPC_SERIRQ	2	SOC_LPC_FRAME_N
3	SOC_LPC_LAD0	4	CLK_LPC_OUT
5	SOC_LPC_LAD1	6	P3V3_STBY
7	SOC_LPC_LAD2	8	NC
9	SOC_LPC_LAD3	10	P3V3_A
11	CPLD_TPM_RESET_N	12	Ground



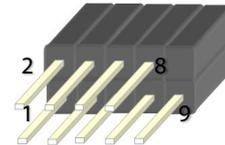
**JLCM1: LCM**

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	VCC	2	IOGND	3	LSTIN	4	VEE
5	LAFD	6	LINIT	7	LPD1	8	LPD0
9	LPD3	10	LPD2	11	LPD5	12	LPD4
13	LPD7	14	LPD6	15	LCD	16	VCC
17	K1	18	K2	19	K3	20	K4
21	GND	22	VCC3	23	GPIO	24	VCC3



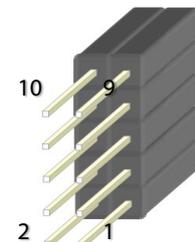
**COMB2: COM PORT**

Pin	Description	Pin	Description
1	NDCD	2	NDSR
3	NRXD	4	NRTS
5	NTXD	6	NCTS
7	NDTR	8	NRI
9	GND		

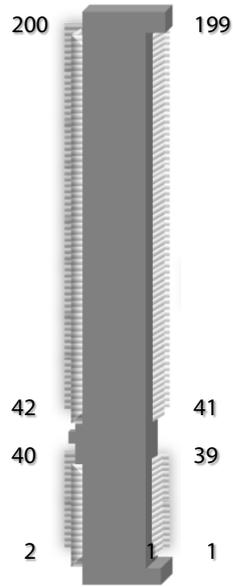
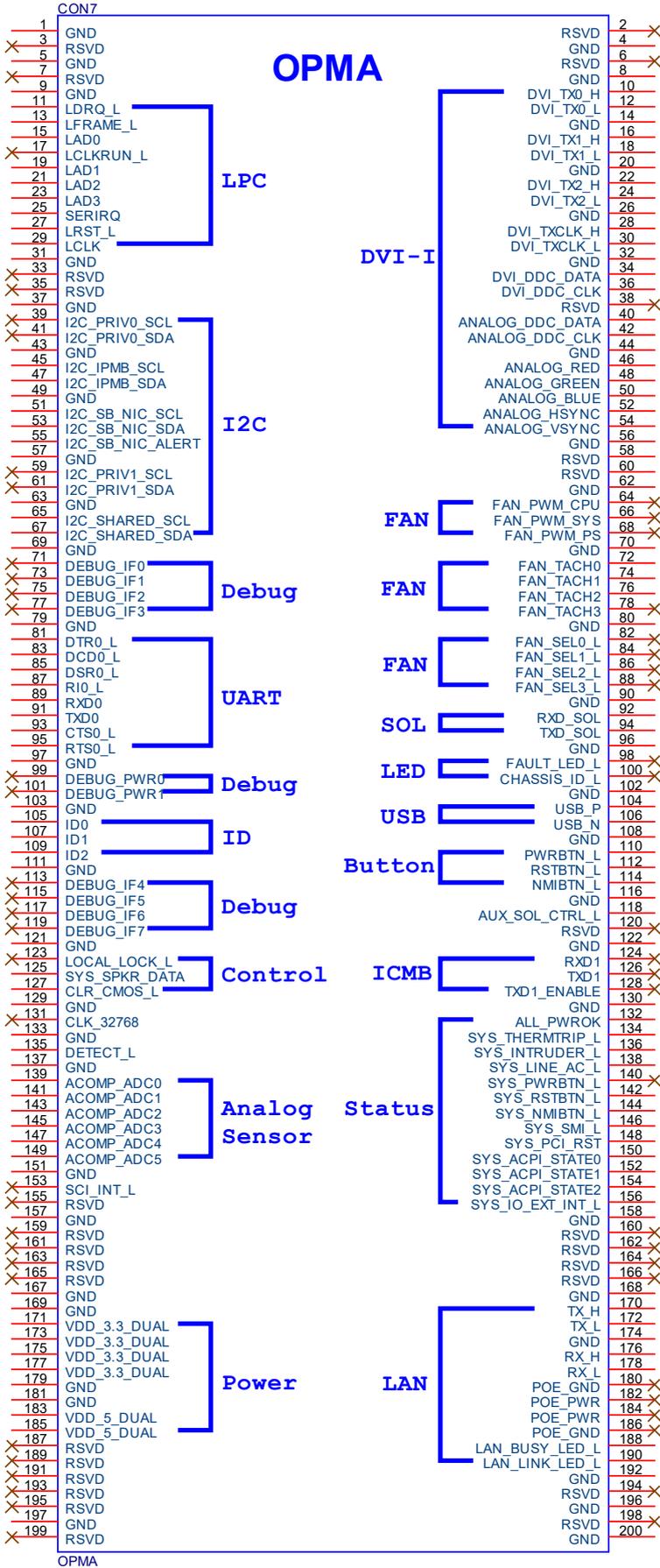


**JGP\_1: GPIO**

Pin	Description	Pin	Description
1	R	2	Ground
3	G	4	Ground
5	B	6	Ground
7	H-SYNC	8	Ground
9	V-SYNC	10	Ground

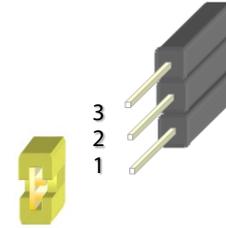


**JOPMA1: OPMA**



**JCMOS1:** Clear CMOS

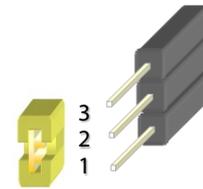
Pin	Description	Pin	Description
1.2	Normal (Default)	2.3	Clear CMOS
			



**Warning:** After clearing CMOS or when PXE boot is enabled, the system boot-up time is doubled.

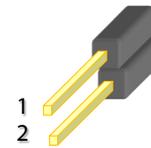
**JRTC1:** RTC

Pin	Description	Pin	Description
1.2	Normal (Default)	2.3	Clear RTC
			



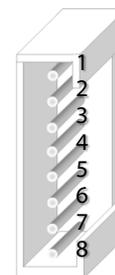
**JOPEN1:** Case open

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	CSOPEN_N



**JPMBUS2**

Pin	Description	Pin	Description
<b>1</b>	RDPW_TTL1	<b>2</b>	RDPW_TTL2
<b>3</b>	NC	<b>4</b>	GND
<b>5</b>	--	<b>6</b>	SMB_PS_CLK
<b>7</b>	SMB_PS_DATA	<b>8</b>	NC



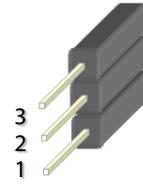
**J10:** Gen3 Bypass Firmware Update

Pin	Description	Pin	Description
<b>1</b>	GND	<b>2</b>	TX_P
<b>3</b>	TX_M	<b>4</b>	GND



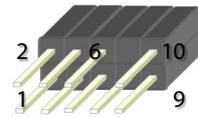
**J9: Gen3 Bypass Firmware Update**

Pin	Description	Pin	Description
1.2	Normal (Default)	2.3	Firmware Update
3		3	
2		2	
1		1	



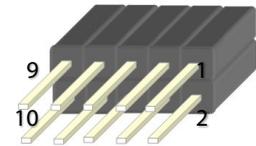
**J80PORT1: 80Port Debug**

Pin	Description	Pin	Description
1	CLK	2	LAD1
3	RST-	4	LAD0
5	LRAME-	6	POWER
7	LAD3	8	
9	LAD2	10	GND



**JPLD1: Altera CPLD**

Pin	Description	Pin	Description
1	JTAG_PLD_TCK	2	GND
3	JTAG_PLD_TDO	4	P3V3_STBY
5	JTAG_PLD_TMS	6	NC
7	NC	8	NC
9	JTAG_PLD_TDI	10	GND



## CHAPTER 3: HARDWARE SETUP

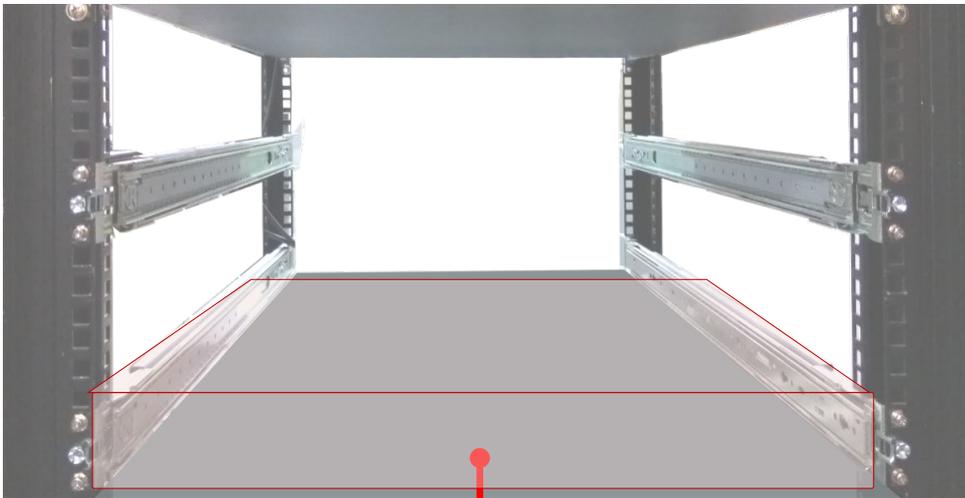
To reduce the risk of personal injury, electric shock, or damage to the system, please remove all power connections to completely shut down the device. Also, please wear ESD protection gloves when conducting the steps narrated in this chapter.

### Mounting the System

There are two methods for installing this system into a rack:

► With **Mounting Ear Brackets** only

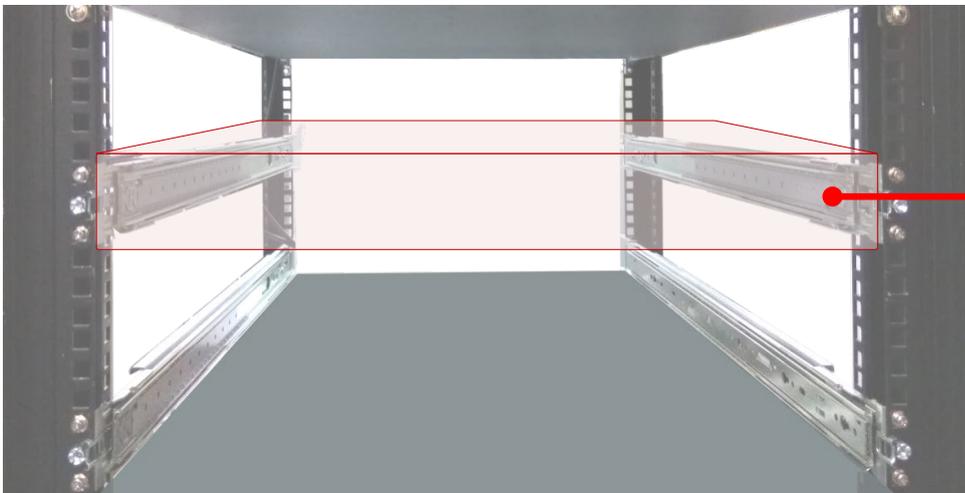
This method is quick and easy by fixing this system to the front posts of the rack, but it also makes servicing the system more difficult. Please note that the use of these brackets must go with a rack shelf or slide rails to prevent the chassis from falling over, for the bracket assembly alone cannot provide sufficient support to the chassis.



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

► With **Slide Rail Kit + Mounting Ear Brackets**

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



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

## Installing the System Using Mounting Ear Brackets Only

1. Check the accessory pack for the following items:

▶ 1x Screw Pack



▶ 2x Ear Brackets



2. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided screws.



3. Repeat Step 2 to attach the bracket to the other side of the chassis.



4. Install the chassis into the rack with the brackets fixed onto the posts using the provided screws. The actual approach you adopt and the needed parts for assembly will depend on the supporting accessory (shelf or rail kit) you use.



### Installing the System Using the Slide Rail Kit (with Mounting Ear Brackets)

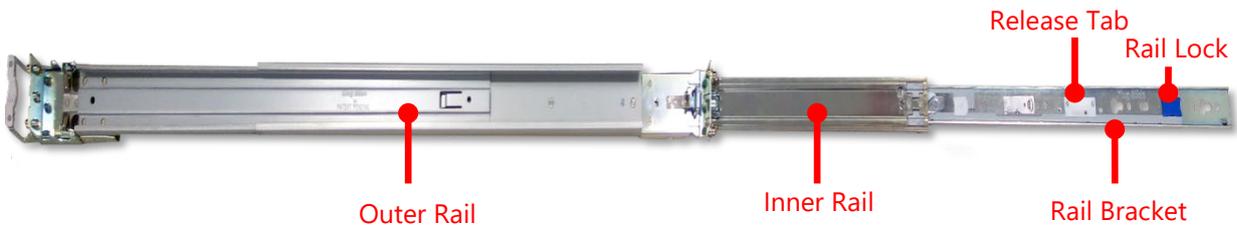
1. Check the package contents of the Slide Rail Kit. The kit shall include the following items:



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



A rail consists of the following parts:

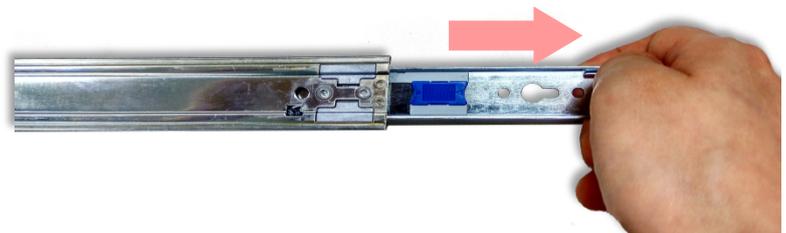


2. Unpack a slide rail and slide the Inner Rail all the way to the end.

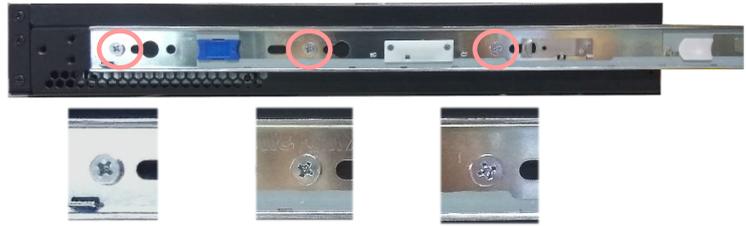


3. Stretch the bracket to the fullest.

4. Remove the bracket from the Inner Rail by pushing the Release Tab on the bracket outwards while sliding it out.



5. Align the bracket to the side of the chassis and make sure the screw-holes are matched, and then secure the bracket onto the chassis with three provided M4X4L screws.



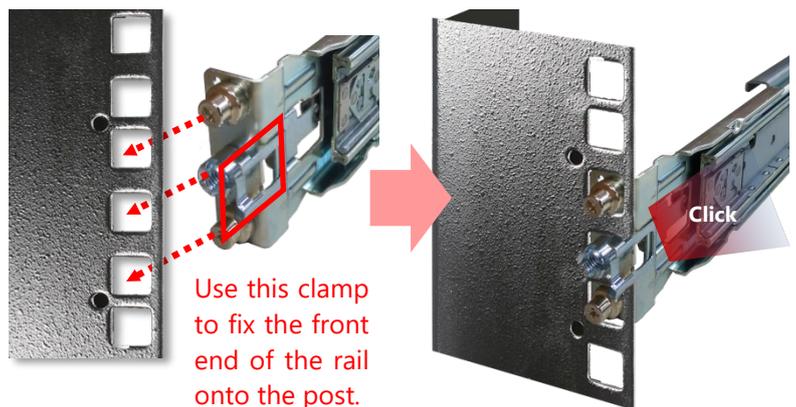
Align the screws with the holes indicated on the brackets and the screw holes on the side of the chassis.

6. Repeat Steps 2~5 to attach the bracket to the other side of the chassis.
7. Follow the instructions in Installing the System Using Mounting Ear Brackets Only to attach the Mounting Ear Brackets.

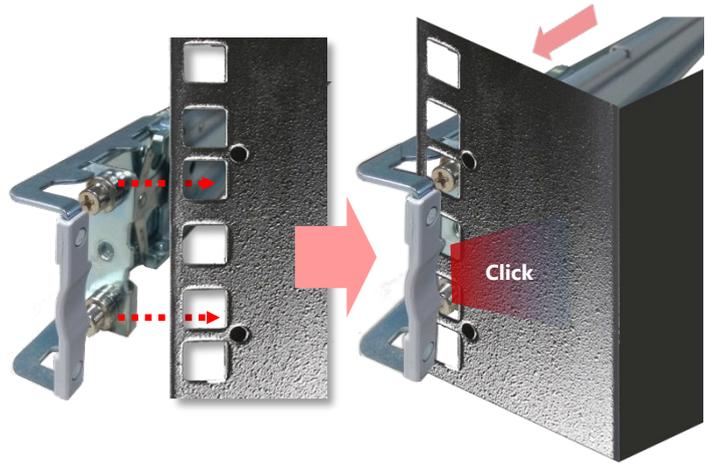


Now, you shall install the slide rail assemblies onto the rack.

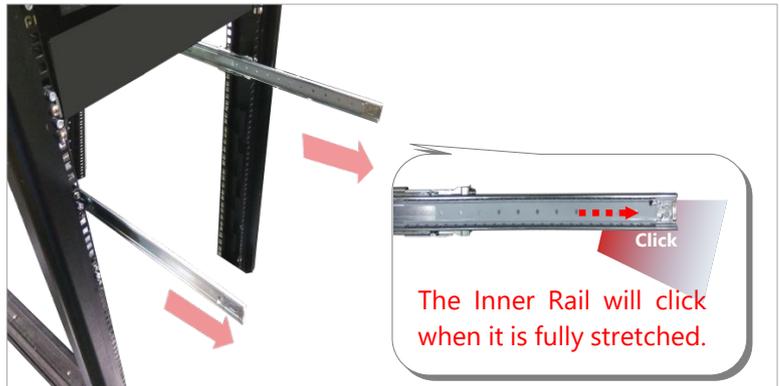
8. This slide-rail kit does NOT require screw-fixing. Simply aim at three available screw holes on the rack front and snap the rail front into the rack post as shown in the image. You should hear a "click" sound once it is firmly attached.



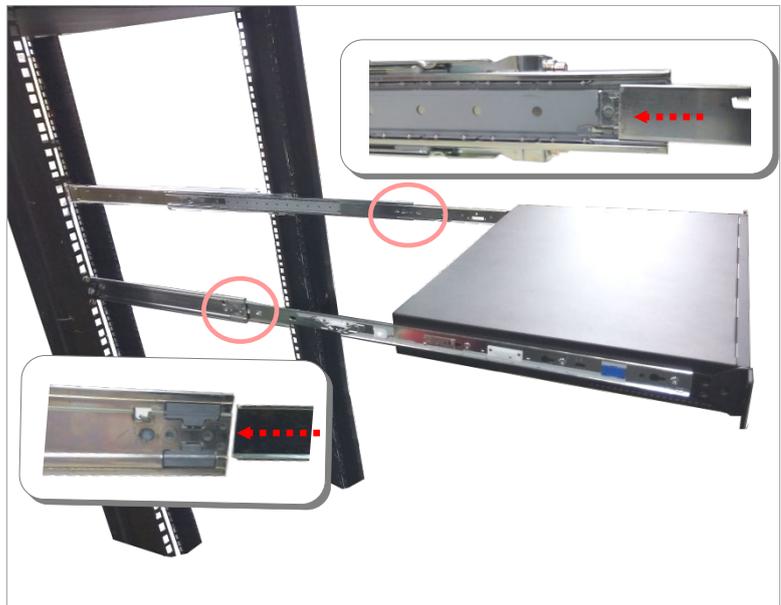
9. For the rear rack installation, slide the rail to aim and engage the bolts on the rail's rear end with the two available holes on the post, and the rail assembly will click into place.



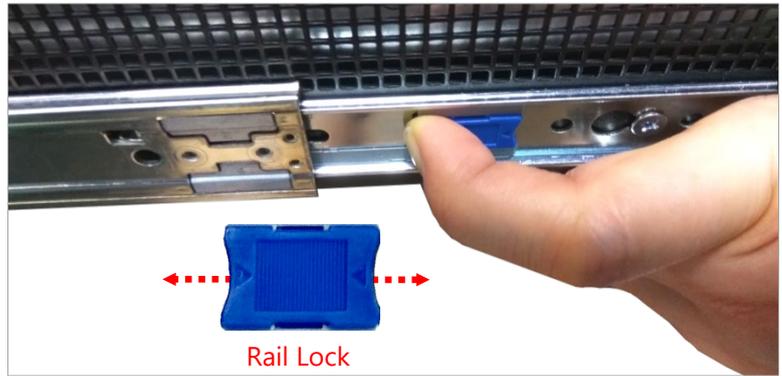
10. Stretch both of the Inner Rails out to their fullest extent. You will hear a click sound when they are fully stretched and locked.



11. Hold the system with its front facing you, lift the chassis and gently engage the brackets on the system while aligning them with the Inner Rails as shown in the image, and then push the system into the cabinet.



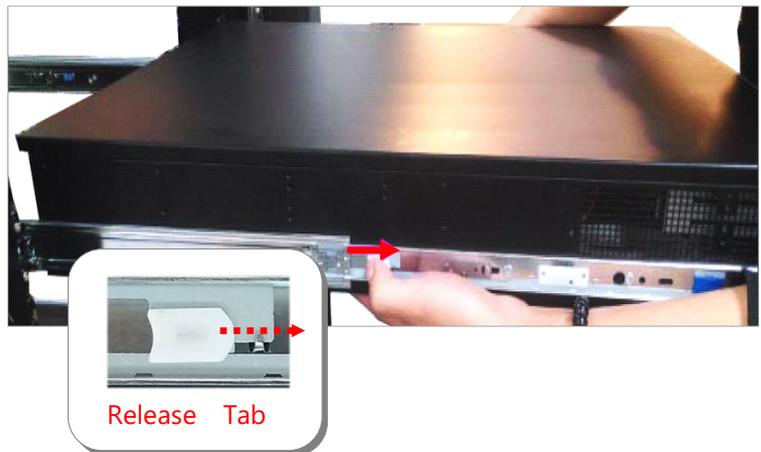
12. While pushing in the system, also push and hold the Rail Lock tab on both brackets.



Push the system all the way in until it stops.



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



## CHAPTER 4: BIOS SETUP

### Enter BIOS Setup

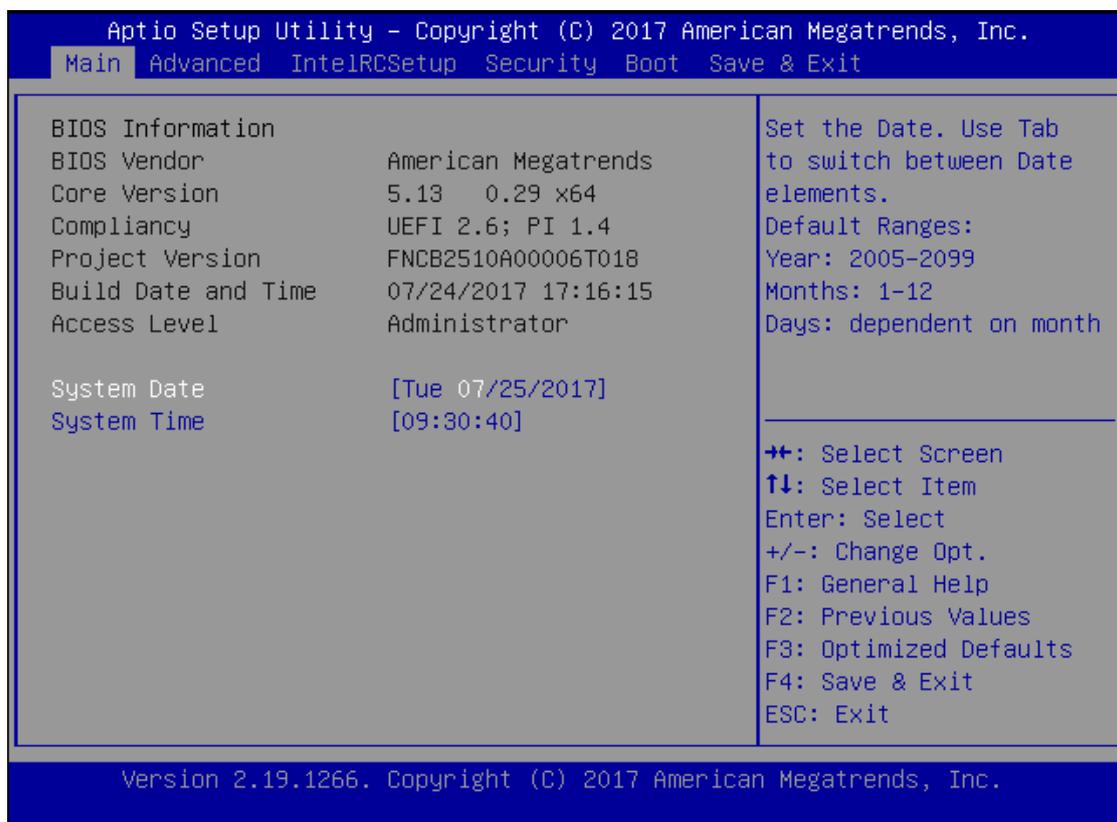
To enter the BIOS setup utility, simply follow the steps below:

1. Boot up the system.
2. Press **<Delete>** during the boot-up if you connect a keyboard to this unit. But if you connect a PC to this unit through console USB/Serial connection, then press **<Tab>**. Your system should be running POST (Power-On-Self-Test) upon booting up.
3. Then you will be directed to the BIOS main screen.
4. Instructions of BIOS navigations:

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

## Main Setup

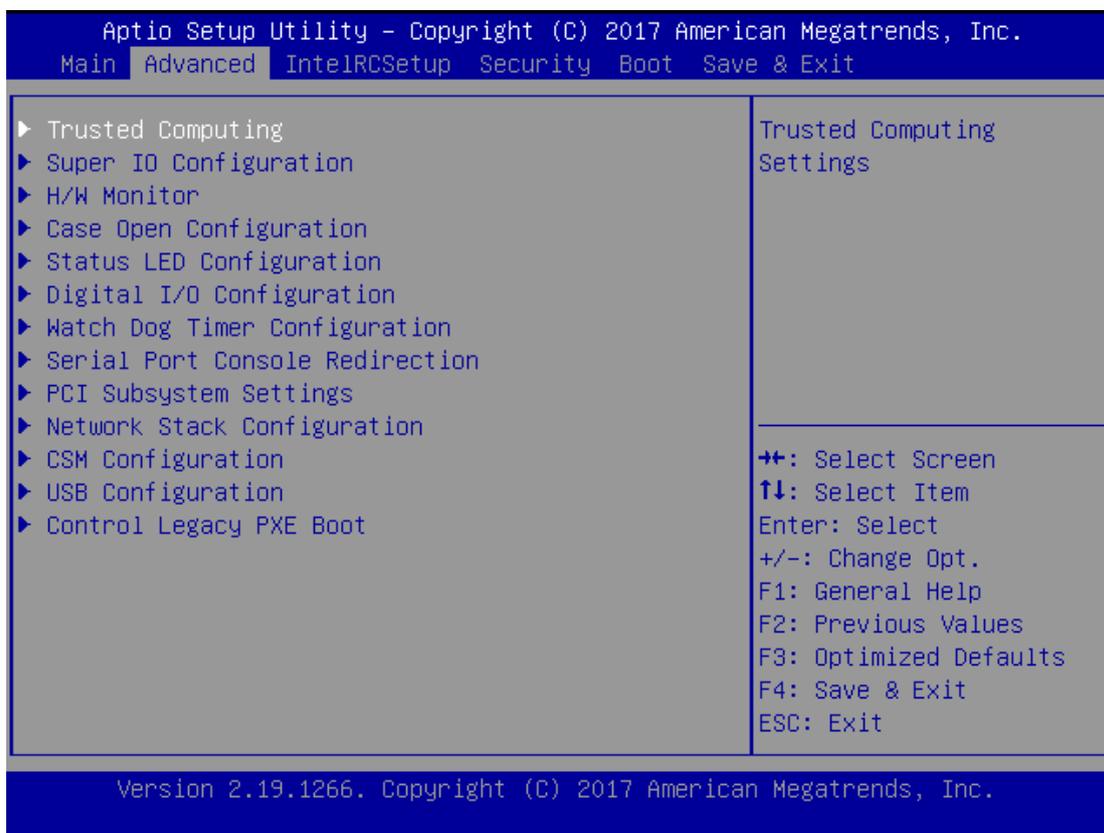
Setup main page displays a description of BIOS information and project version information. You can also set up the System Time and System Date here.



(The screenshots presented in the section are for reference only)

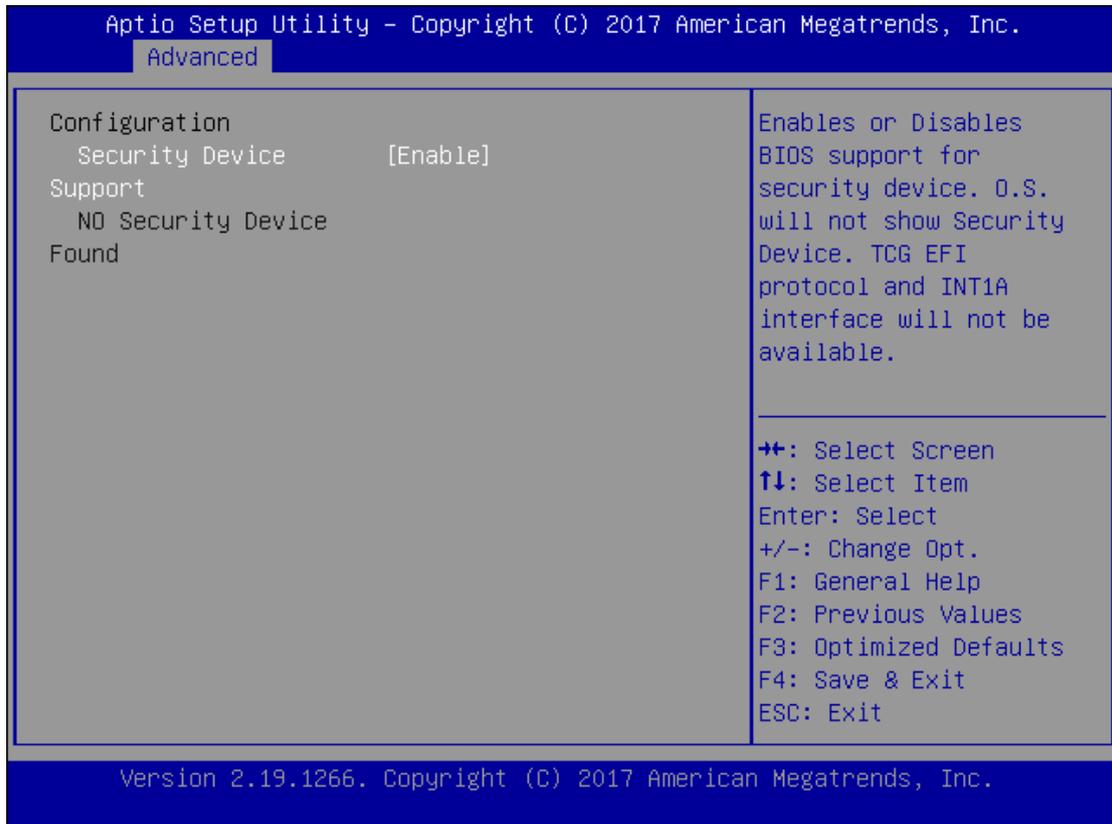
## Advanced Setup

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



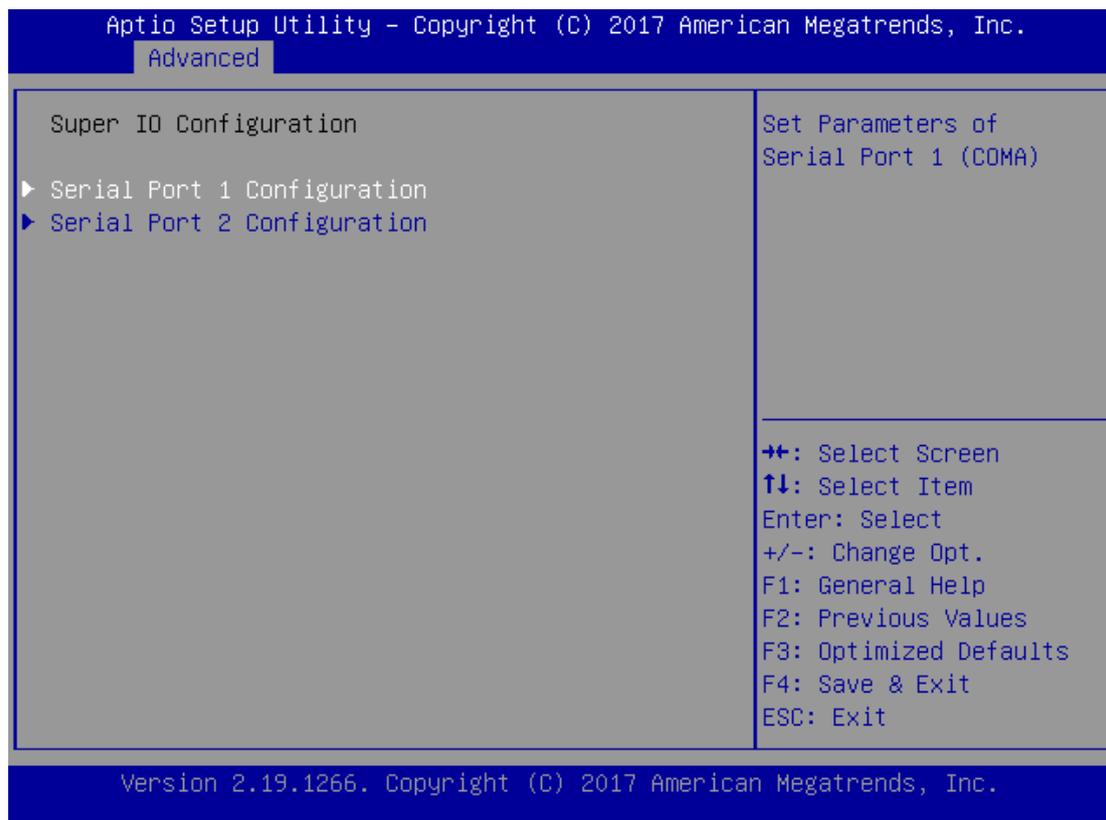
## Trusted Computing

This option allows you to configure parameters about BIOS support for the security device. Press **<Enter>** to access the submenu. The default is "Enabled".

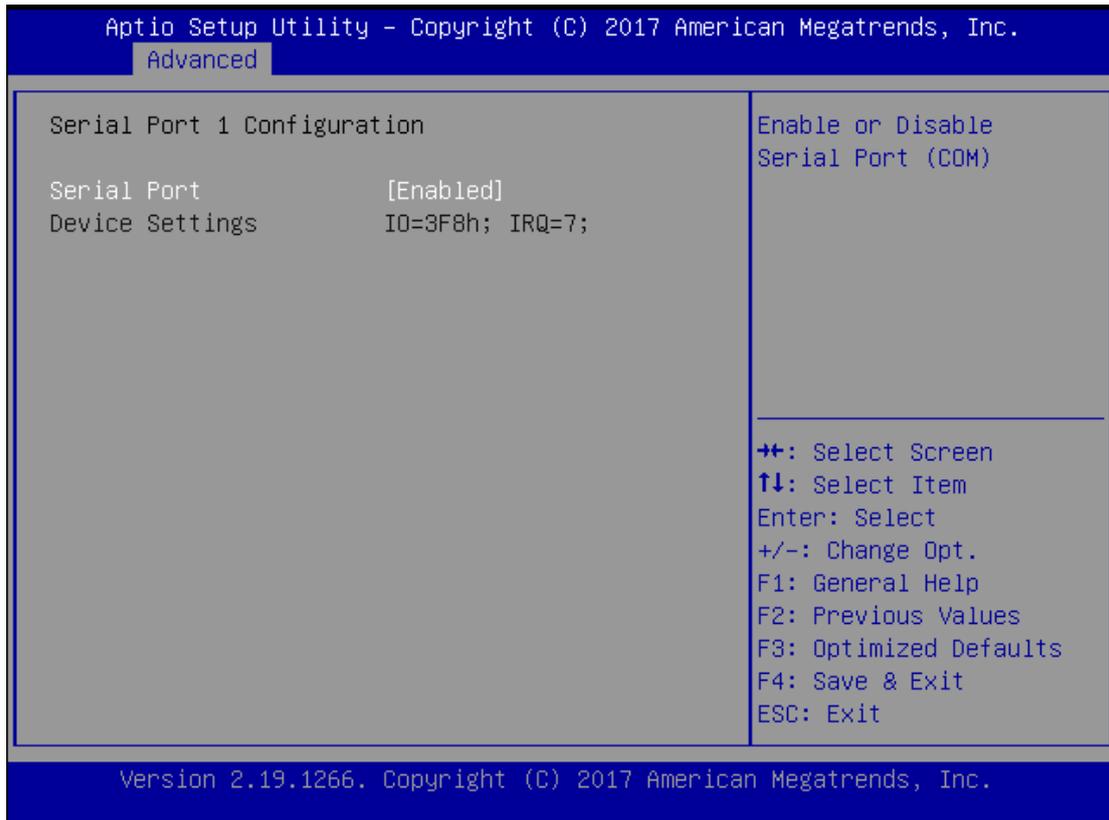


## Super IO Configuration

This option allows you to configure parameters about Super IO Chip. Press **<Enter>** to access the submenu.

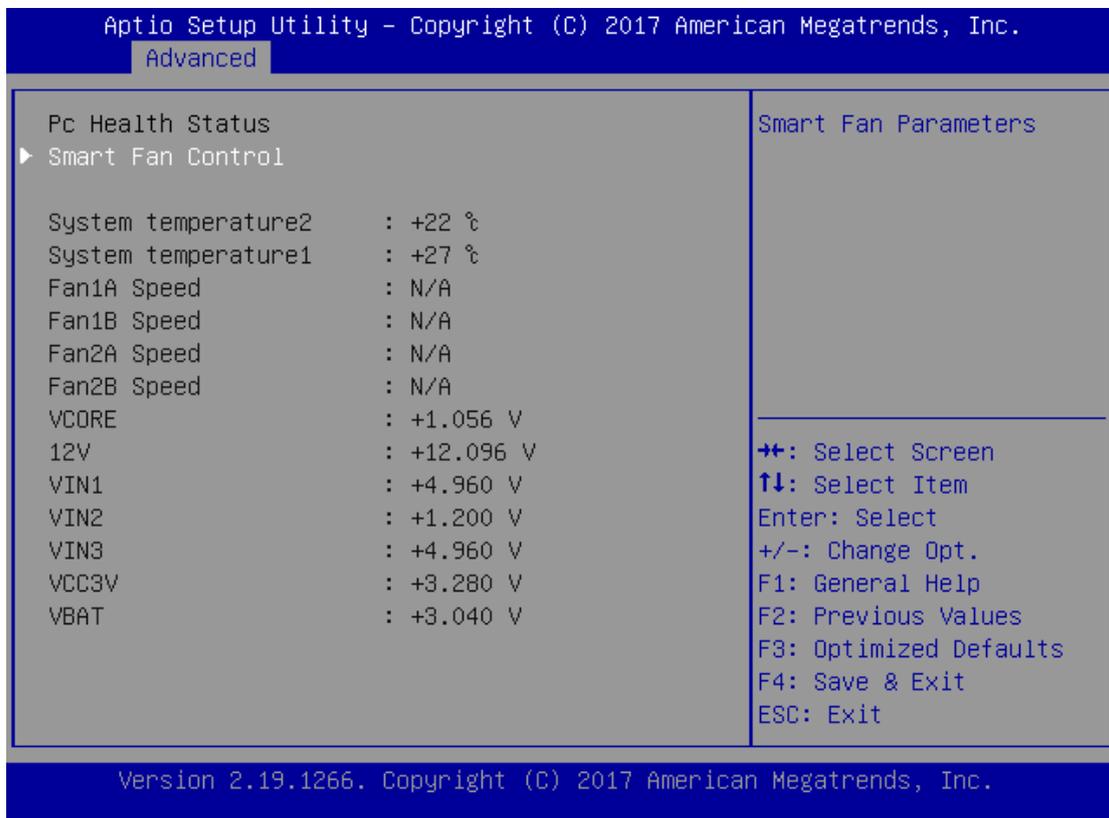


Select **Serial Port 1 Configuration** or **Serial Port 2 Configuration** to enter sub setting screen. The default is "Enabled".

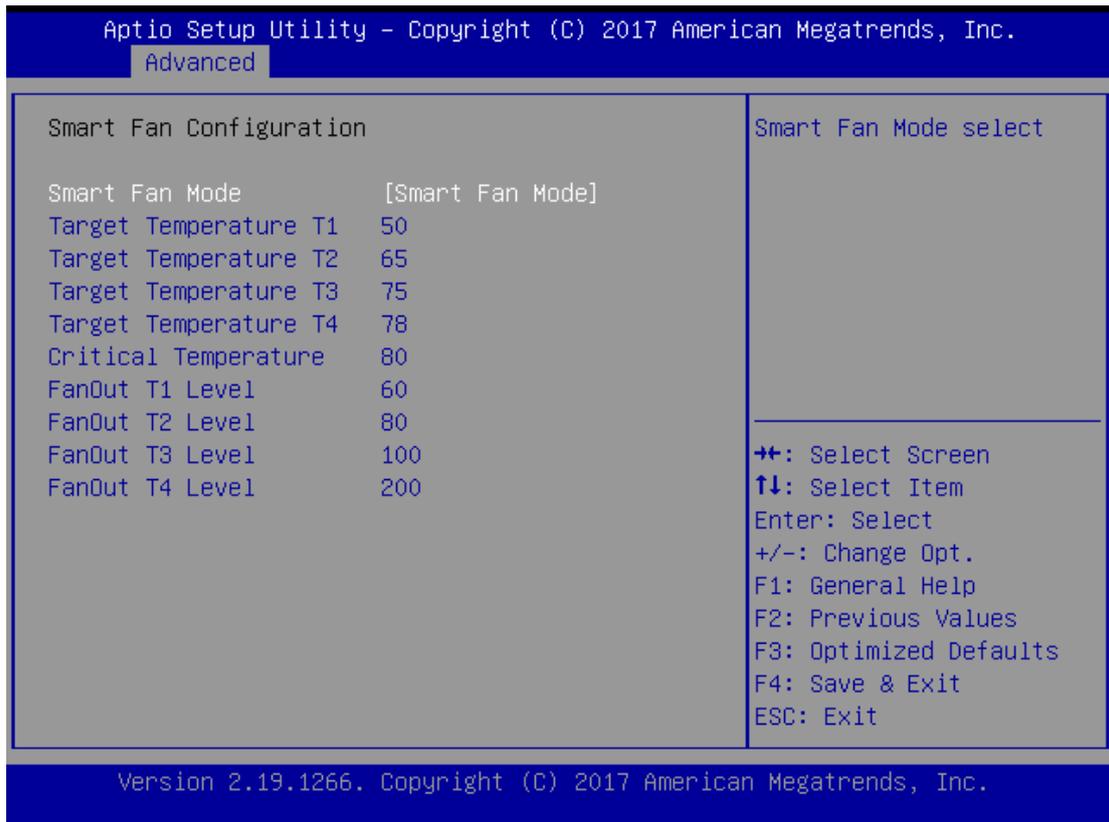


### H/W Monitor

This option allows you to configure Smart Fan properties and monitor the fan status.

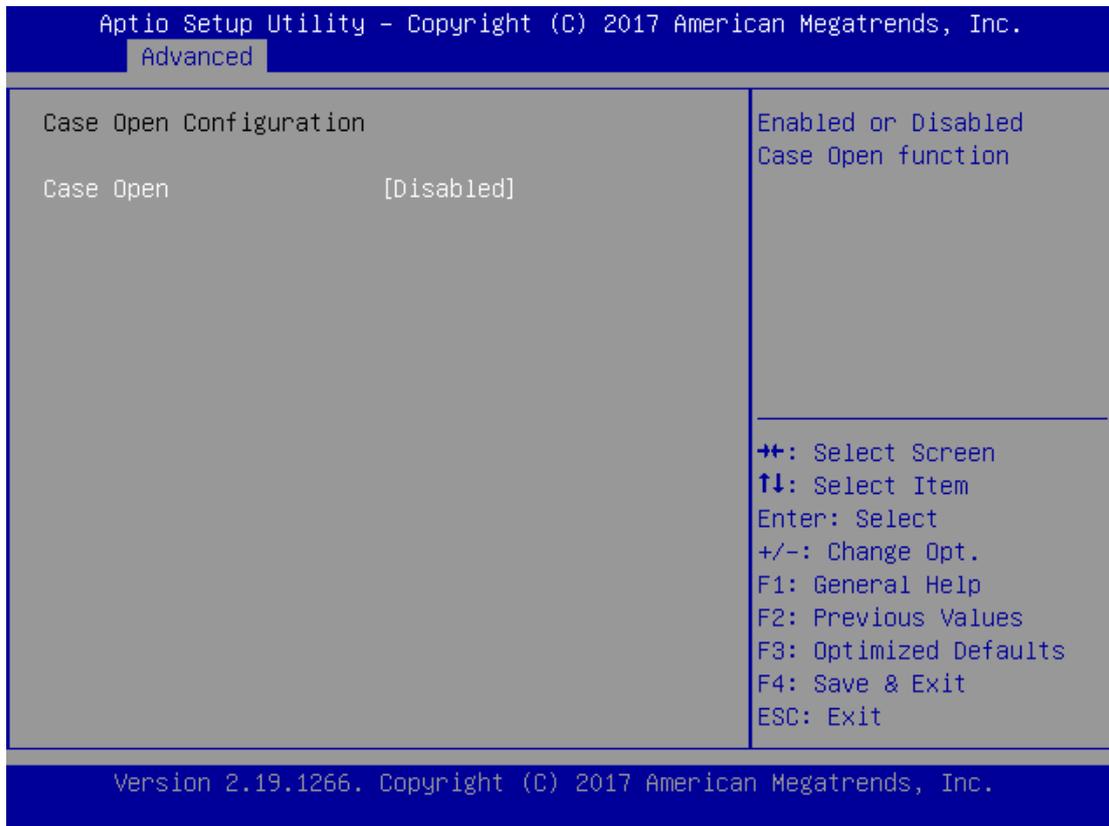


Enter "Smart Fan Control" to change fan mode. The default is "Smart Fan Mode".



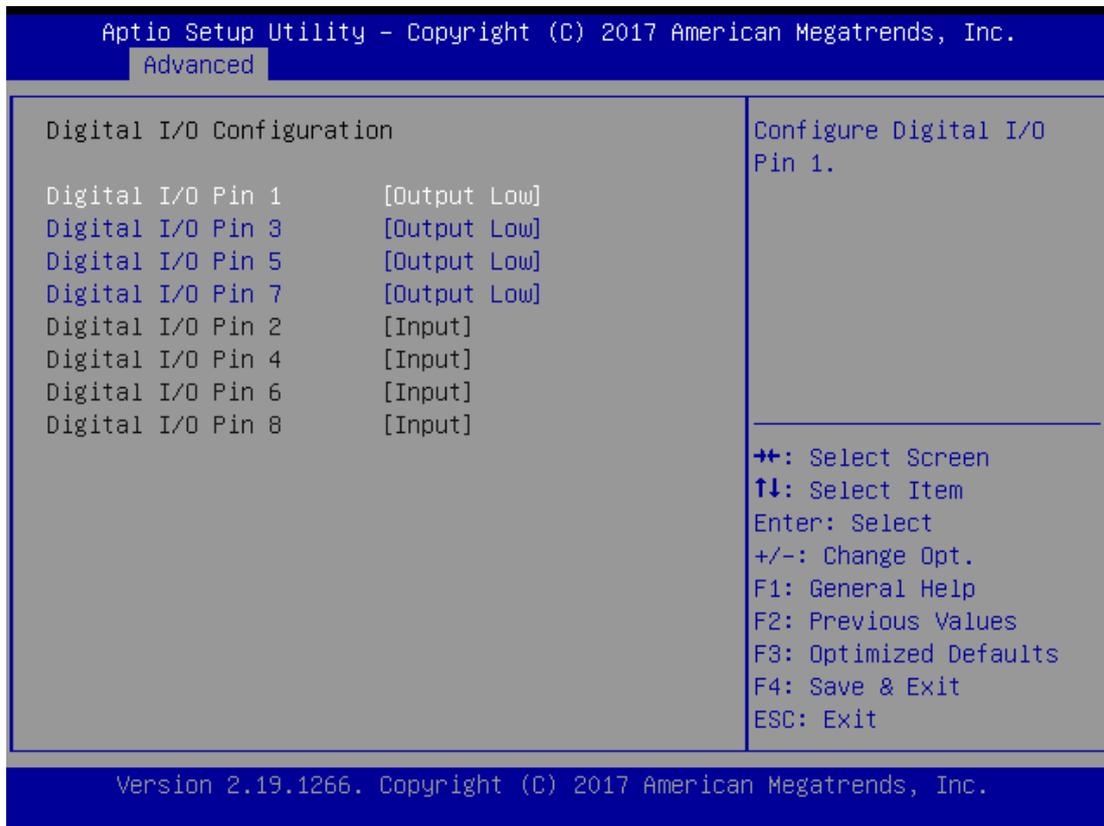
## Case Open Configuration

If with the case's support, enabling this option will have the unit sound when someone opens the case of this unit, which is considered against your organization's policy. The default is "Disabled".



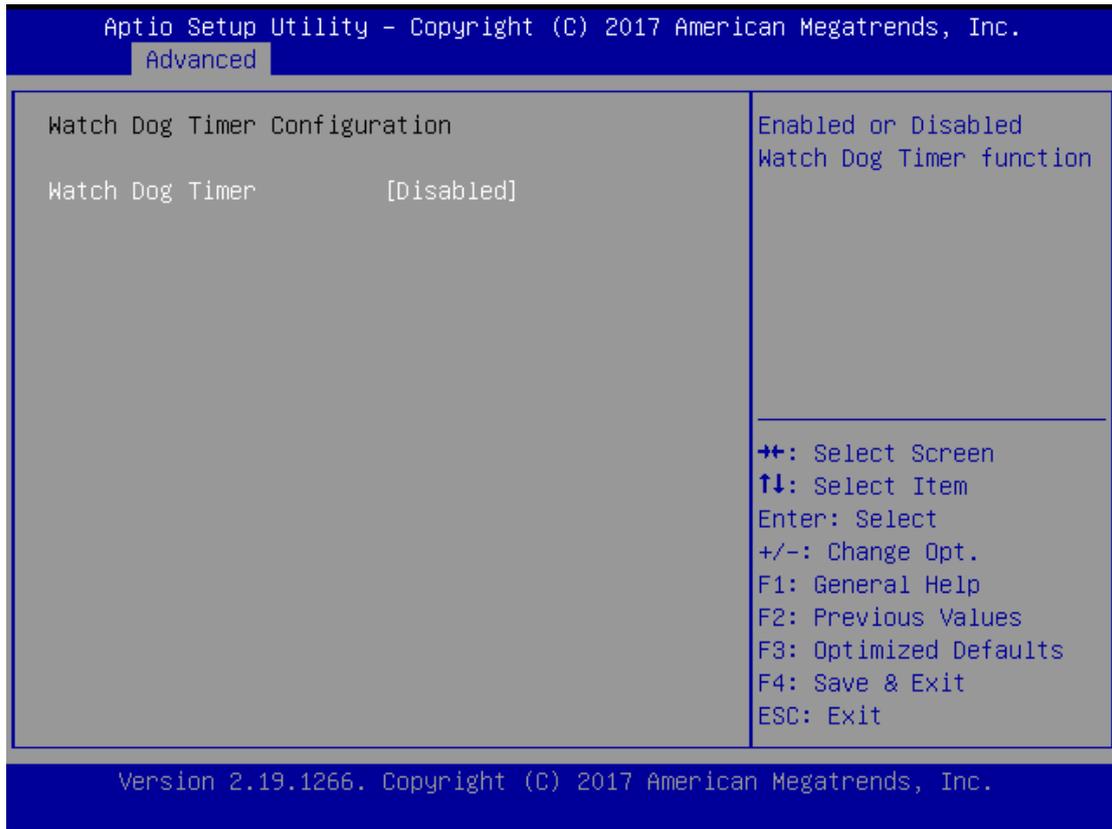
## Digital I/O Configuration

This option allows you to configure Digital I/O pin properties. Select the desired pin and press **<Enter>** to modify. The default is "Output Low".



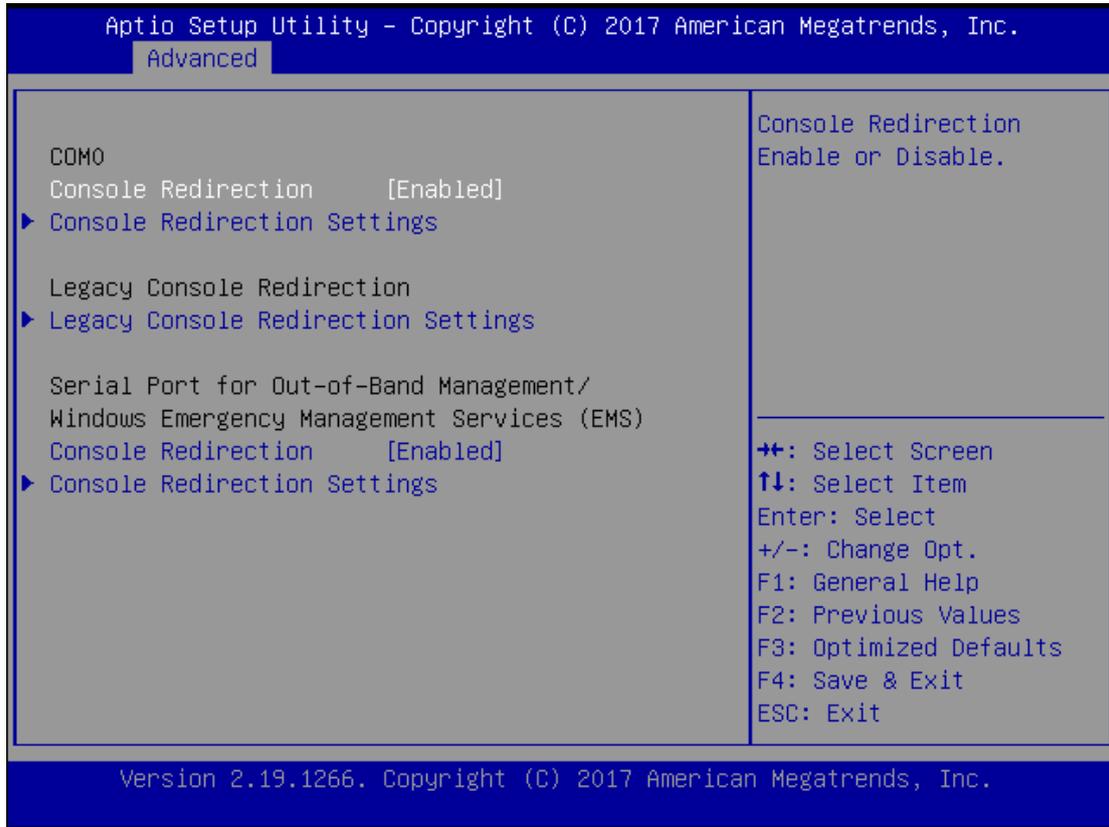
## Watch Dog Timer Configuration

This option allows you to enable or disable Watchdog Timer function. The default is "Disabled".



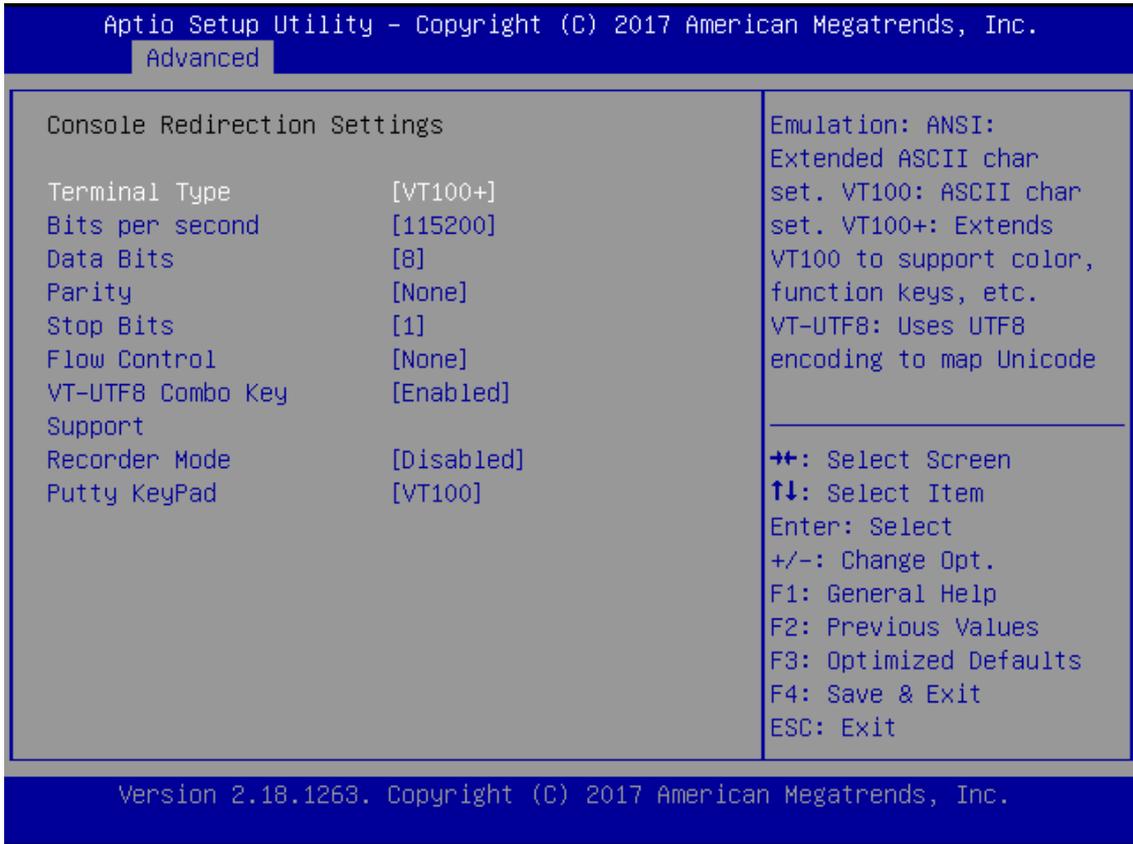
## Serial Port Console Redirection

This option allows you to configure parameters about serial port console redirection. Press **<Enter>** to access the submenu. The default is "Enabled".



**Console Redirection Settings**

Select this item to enter the setting sub-menu. These settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings.

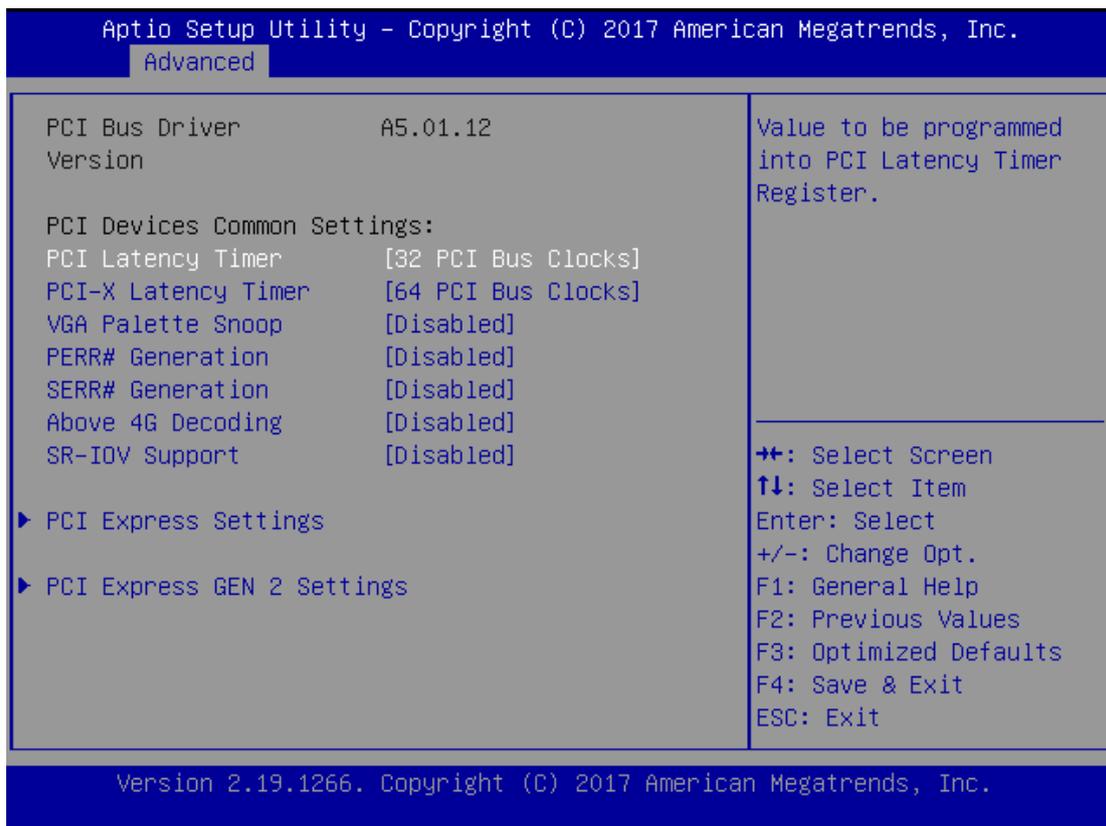


Item	Value	Description
Terminal Type	VT100 <b>VT100+</b> VT-UTF8 ANSI	<b>VT100:</b> ASCII char set. <b>VT100+:</b> Extends VT100 to support color, function keys, etc. <b>VT-UTF8:</b> Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. <b>ANSI:</b> Extended ASCII char set.
Bits per second	9600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

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

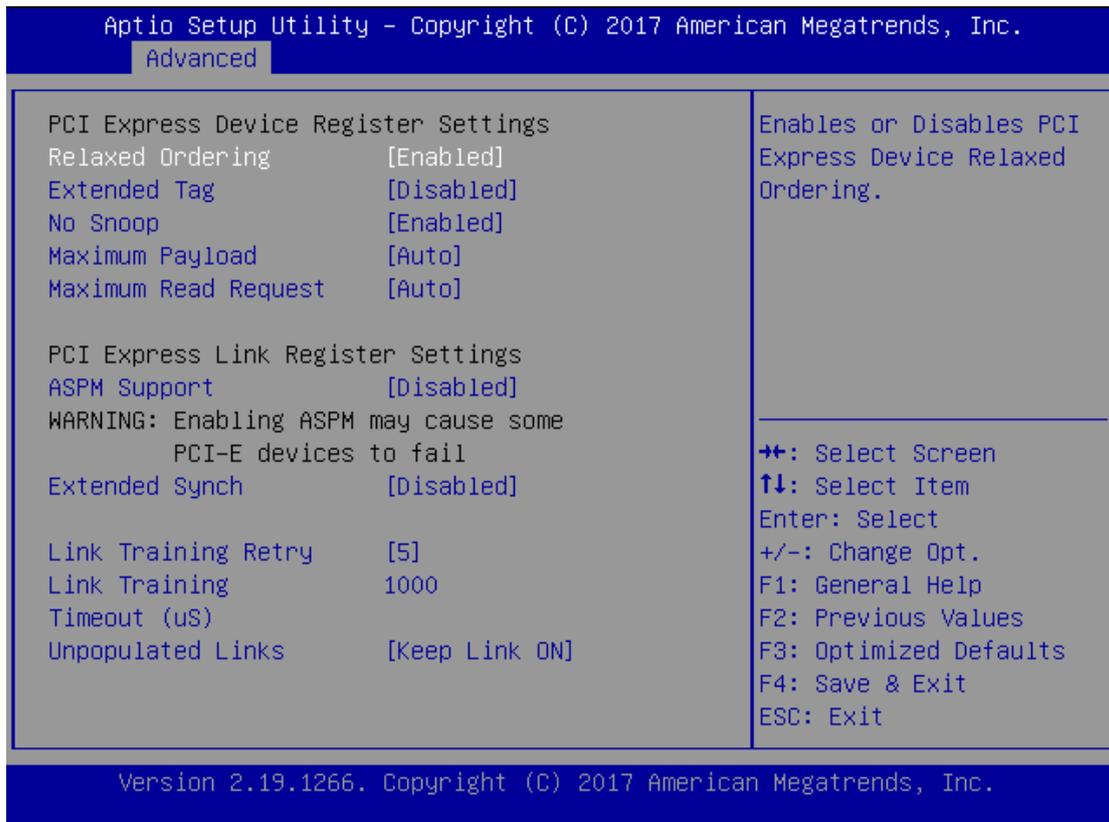
## PCI Subsystem Setting

This option allows you to configure parameters to be programmed into PCI Latency Timer Register.



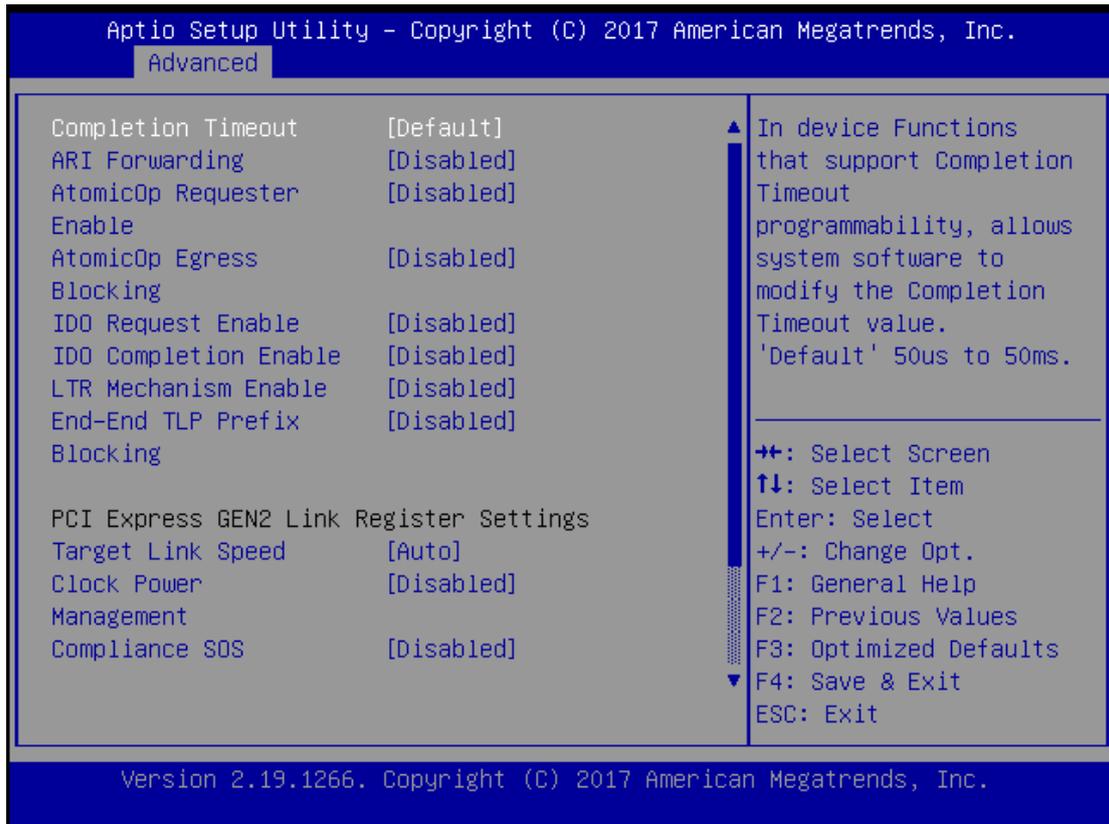
**PCI Express Settings**

This option allows you to enable or disable PCI Express Device Relaxed Ordering.



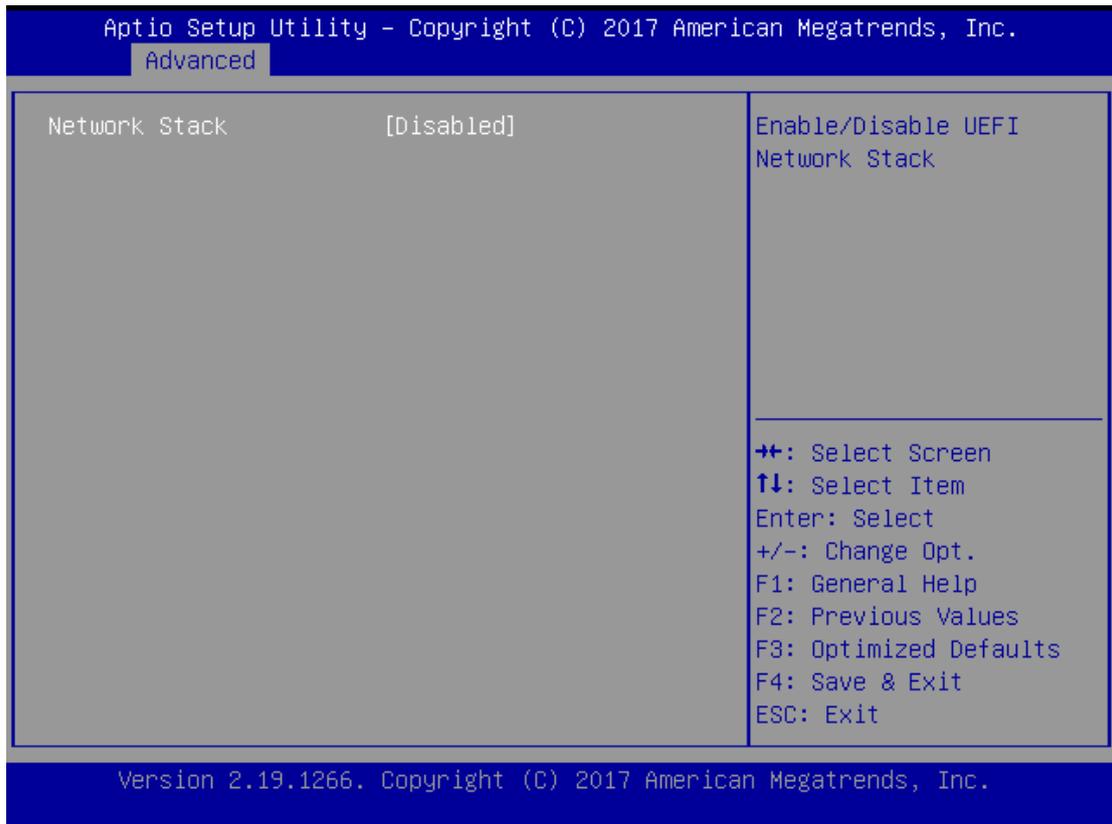
**PCI Express GEN 2 Settings**

This option allows you to enable or disable PCI ExpressGEN2 related setting.



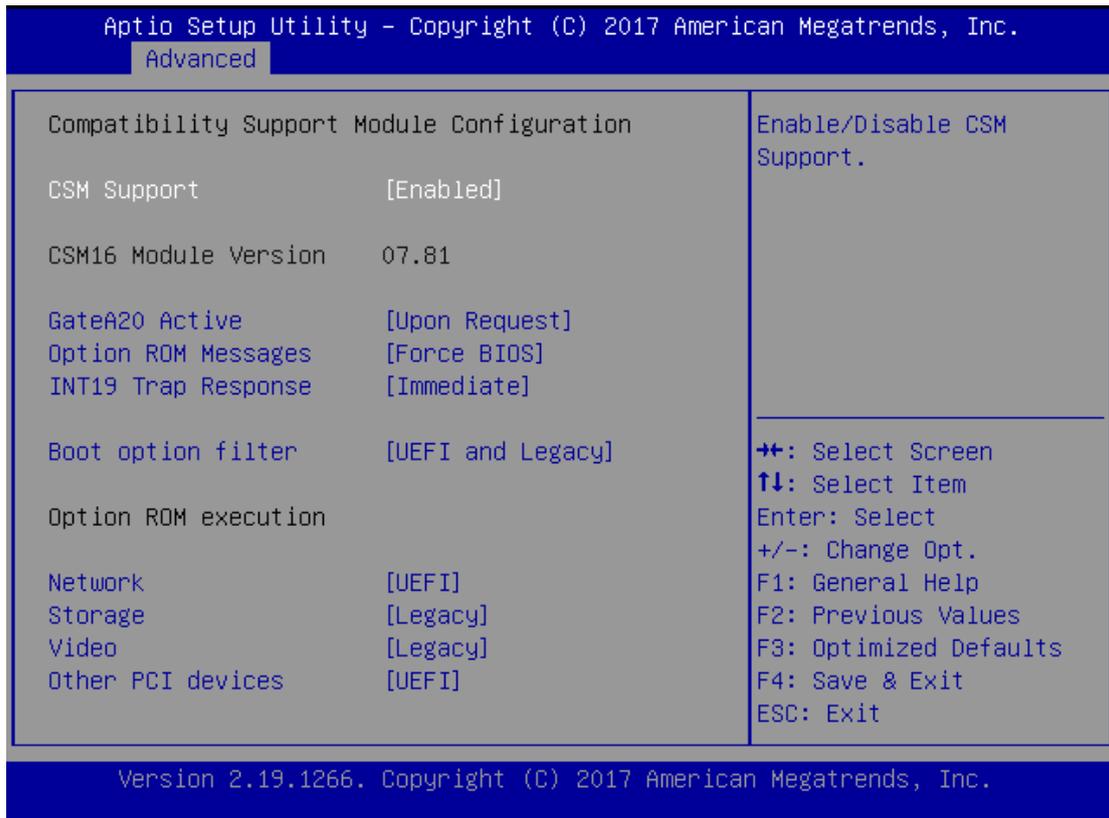
## Network Stack Configuration

This option allows you to enable or disable UEFI Network Stack. The default is "Disabled".



## CSM Configuration

This option allows you to enable or disable ROM execution settings.

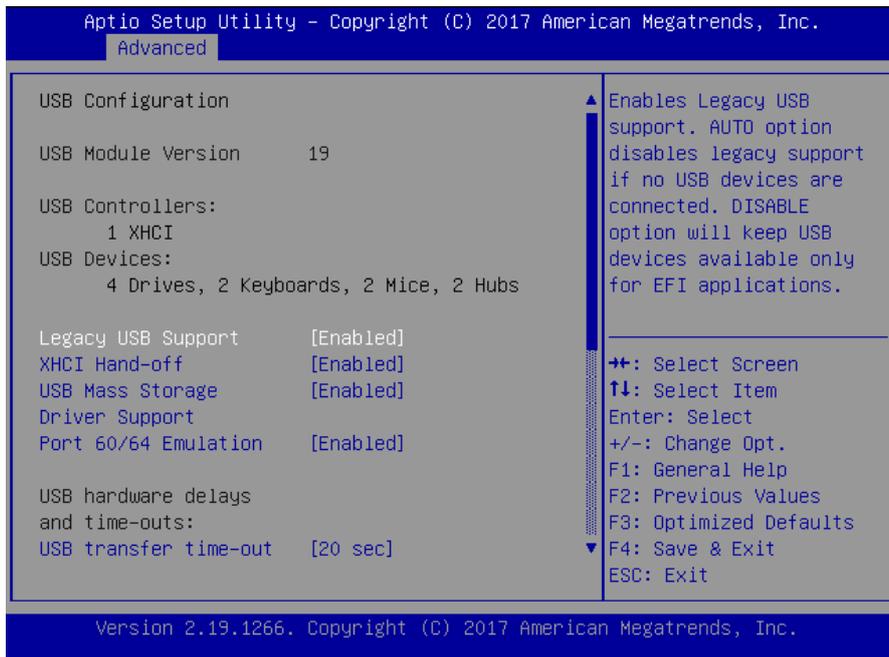


Item	Value	Description
CSM Support	Disabled Enabled	Enables or disables CSM Support
Network	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy PXE OpROM
Storage	Do Not Launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do Not Launch UEFI Legacy	Controls 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

## USB Configuration

This option allows you to change USB configuration parameters.

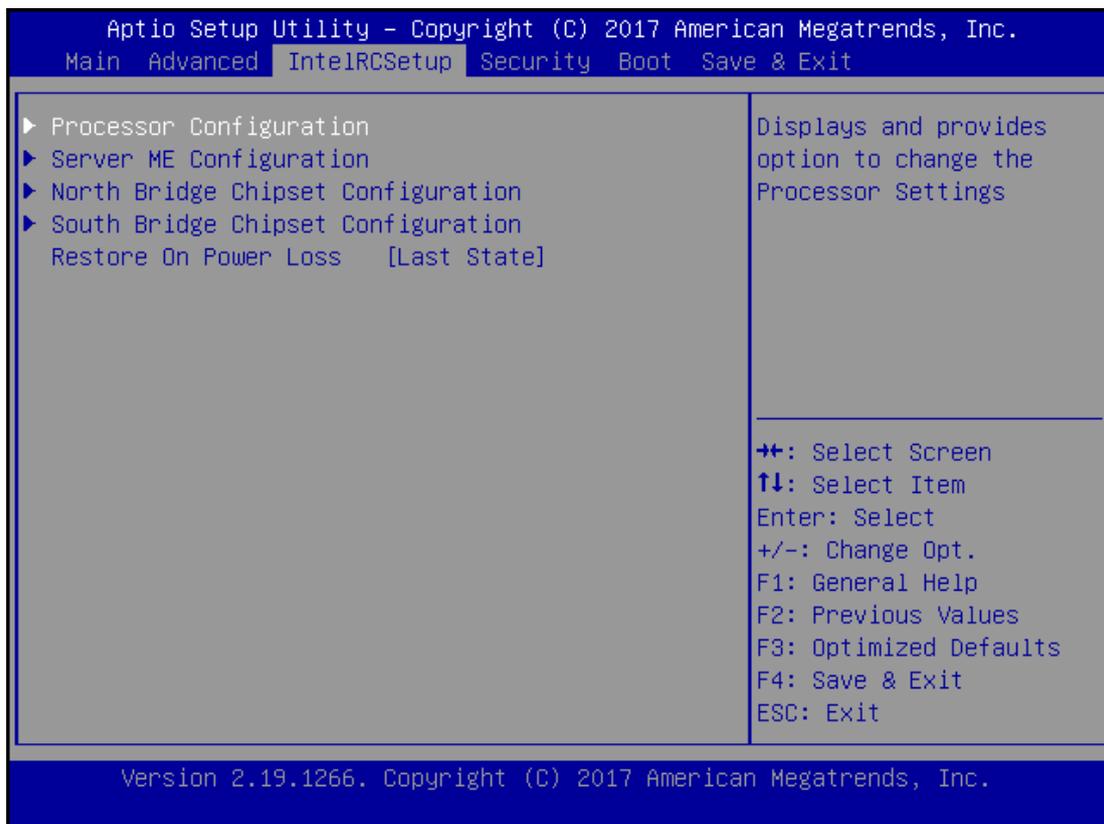
### Legacy USB Support



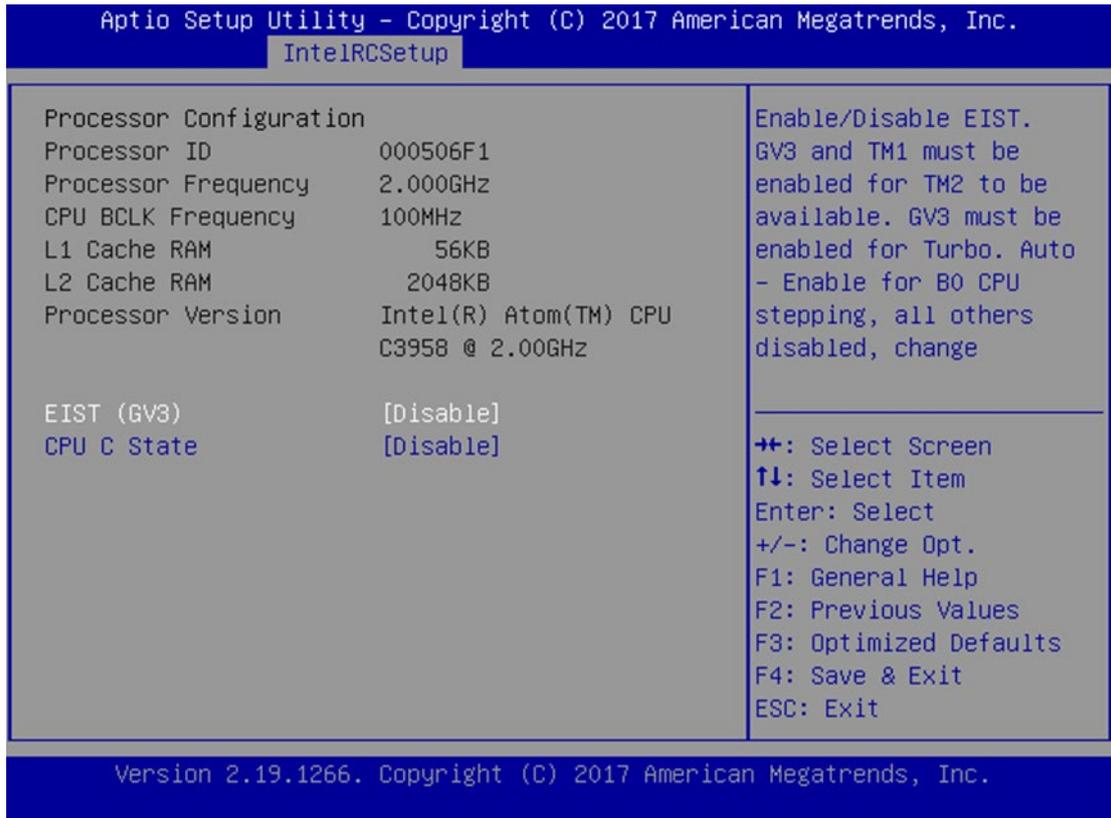
Item	Value	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. <b>Auto</b> disables legacy support if no USB devices are connected. <b>Disabled</b> will keep USB devices available only for EFI applications. The default is <b>Enabled</b> .
XHCI Hand-off	Enabled Disabled	This is a workaround for QSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. The default is "Enabled".
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass Driver Support. Default is <b>Enabled</b> .
Port 60/64 Emulation	Enabled Disabled	This option enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware operating systems. The default is <b>Enabled</b> .
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	Set USB time-out value (1, 5, 10 or 20 seconds) for Control, Bulk and Interrupt transfers. The default is <b>20 sec</b> .
Device reset time-out	10 sec 20 sec 30 sec 40 sec	Set USB mass storage device Start Unit command time-out (10, 20, 30 or 40 seconds). Default is <b>20 sec</b> .
Device power-up delay	Auto Manual	Set the maximum time the device will take before it properly reports itself to the Host Controller. " <b>Auto</b> " uses default value. For example, it is 100ms as a root port.

## IntelRCSetup

Use [←] / [→] to select the Chipset menu item from the BIOS setup screen to enter the **IntelRCSetup** Setup screen. Users can select any of the items in the left frame of the screen.



## Processor Configuration



Item	Value	Description
EIST(GV3)	Disable Enabled	Enables or disables EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 must be enabled for <u>Turbo</u> . Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.
CPU C State	Disabled Enabled	Enables the Enhanced Cx state of the CPU, takes effect after reboot. Auto - Enable for B0 CPU stepping, all others disabled, change setting to override.

## Server ME Configuration

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.

IntelRCSetup

General ME Configuration		
Operational Firmware Version	0B:4.0.3.65	
ME Firmware Type	SPS	
Backup Firmware Version	N/A	
Recovery Firmware Version	0B:4.0.3.65	
ME Firmware Status #1	0x000F0355	
ME Firmware Status #2	0x88110800	
Current State	Operational	
Error Code	No Error	

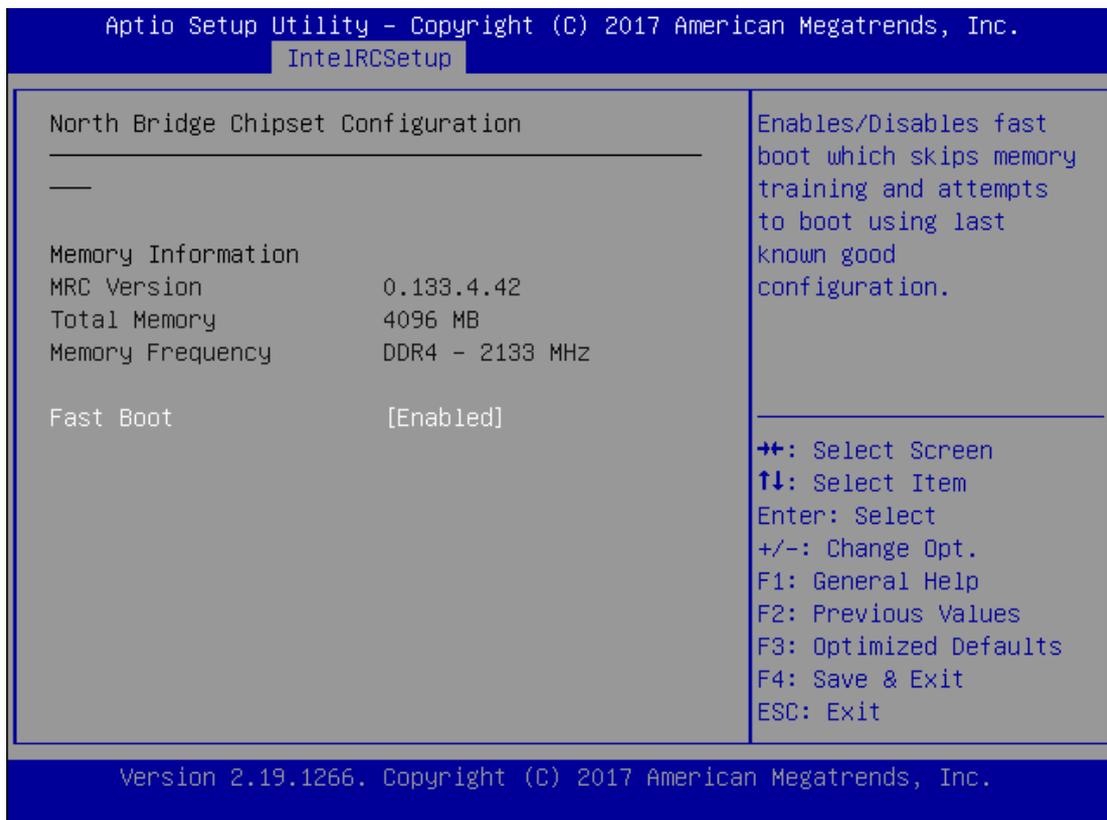
---

++: 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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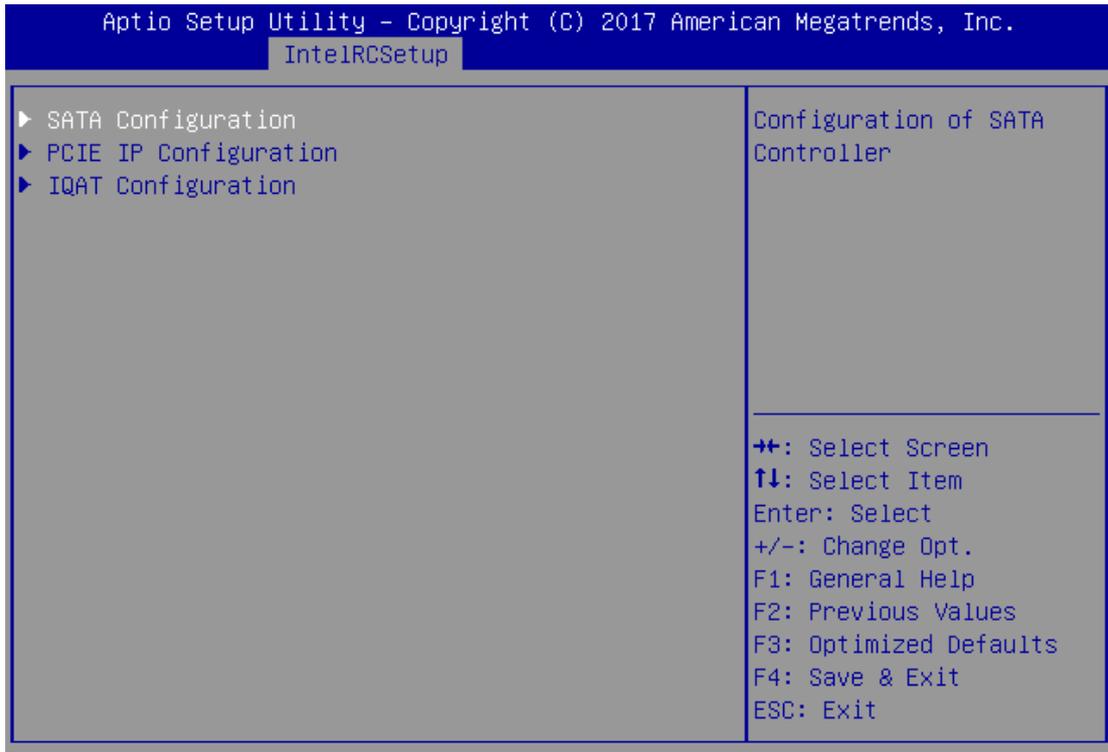
## North Bridge Chipset Configuration

This option enables or disables fast boot which skips memory training and attempts to boot using last known good configuration. The default is "Enabled".

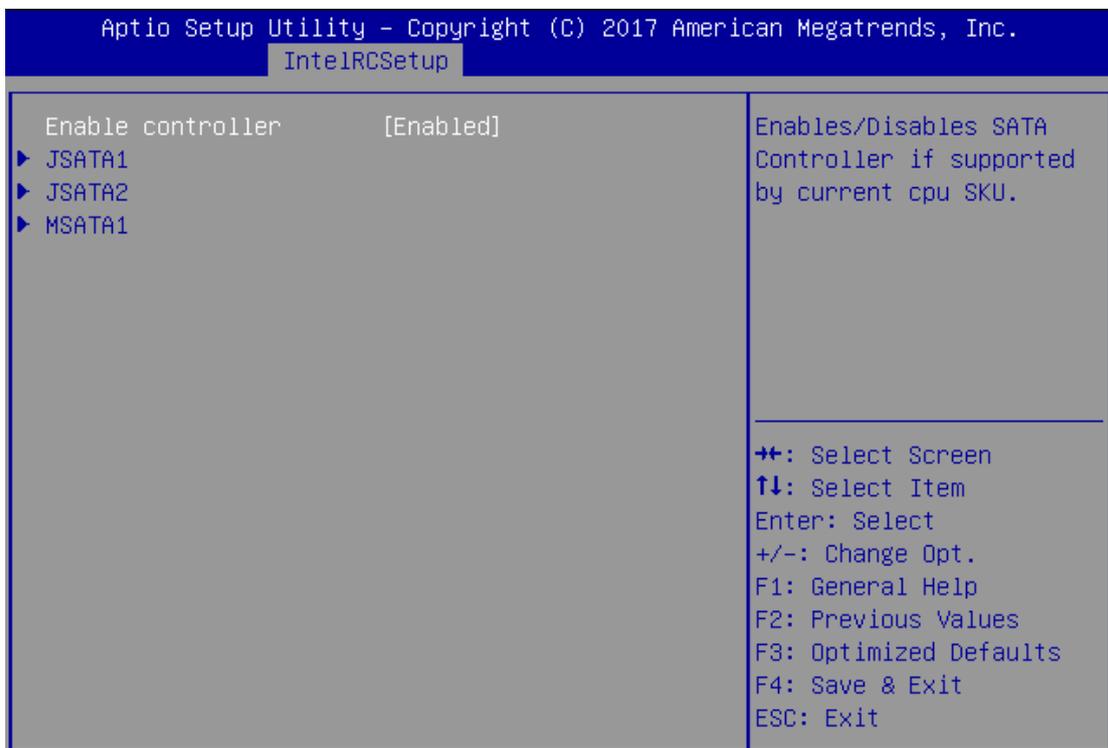


## South Bridge Chipset Configuration

This option allows you to configure SATA Controller properties.



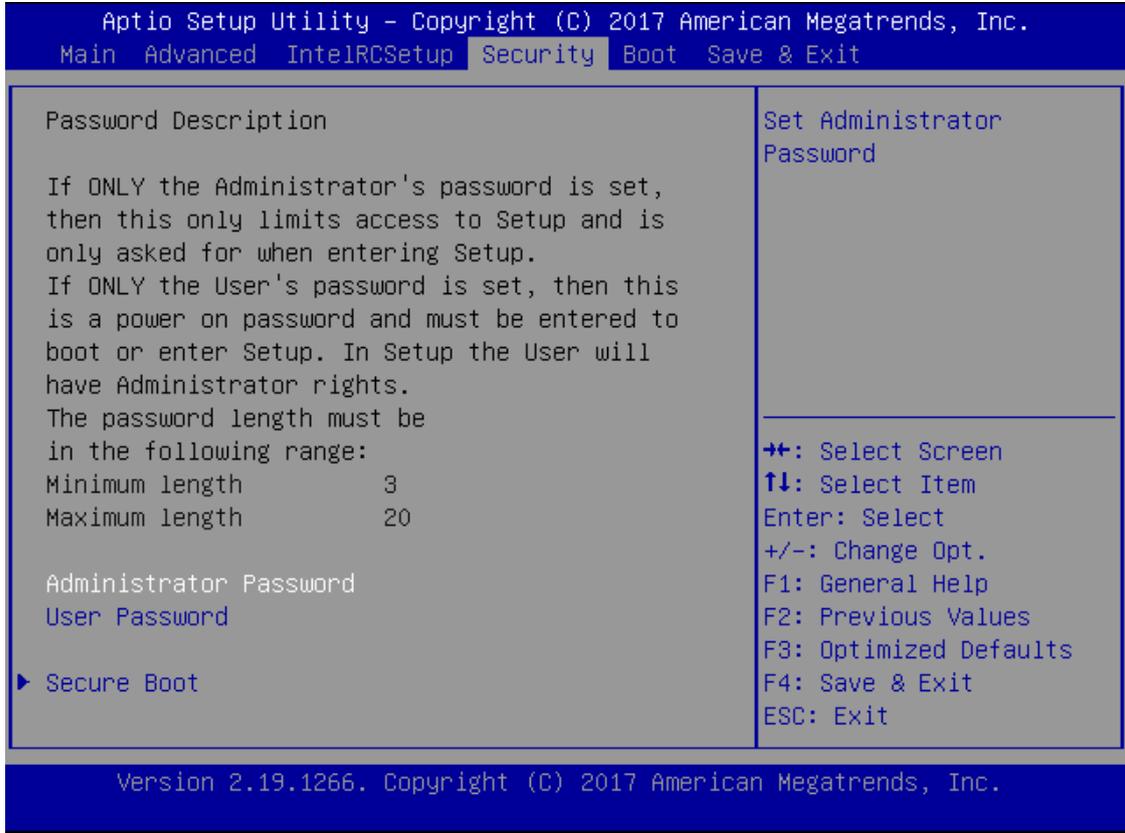
**SATA Configuration** Enables/Disables SATA Controller if supported by current CPU SKU. The default is "Enabled". Enabling the SATA controller, you can respectively modify the JSATA1, JSATA1 and mSATA properties.



## Security

Use [←] [→] to select **Security** setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.

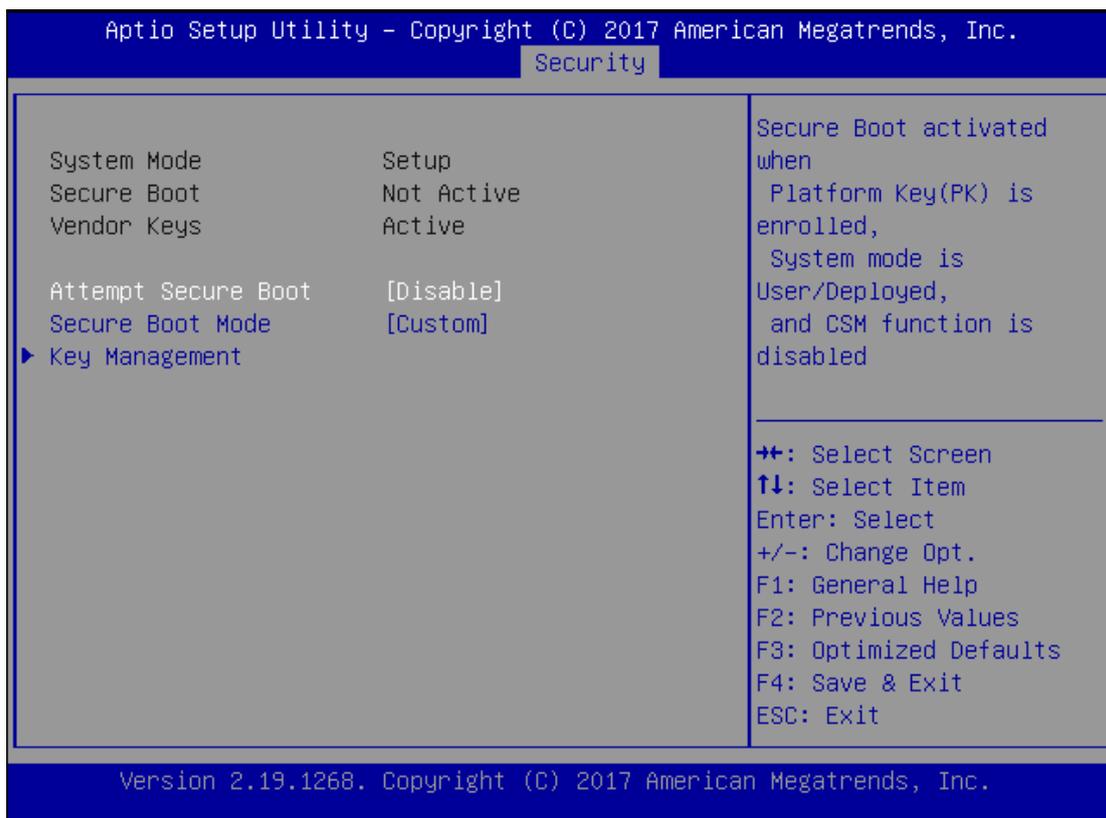
### Administrator Password & User Password



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

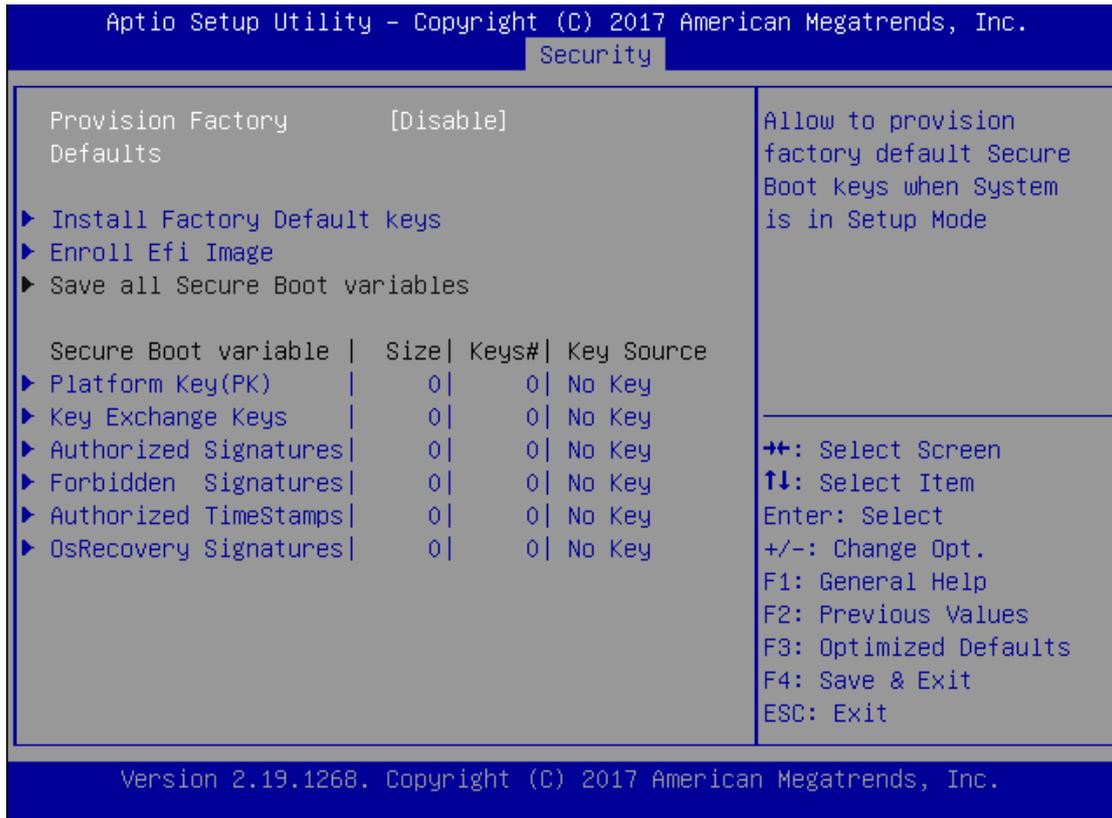
### Secure Boot

Enter **Secure Boot** page for more related settings.



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

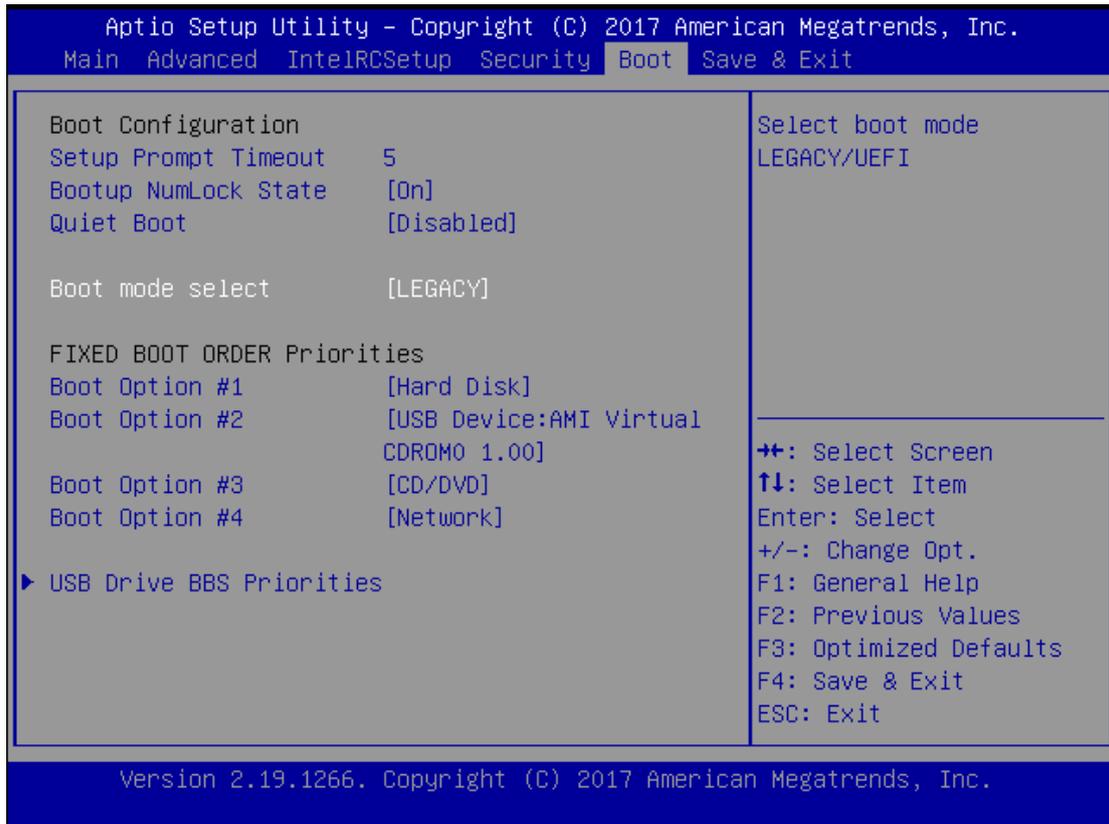
**Key Management**



Item	Value	Description
Provision Factory Defaults	<b>Disabled</b> Enabled	Allows you to provision factory default Secure Boot keys when System is in Setup Mode.
Install Factory Default keys	None	Forces System to enter User Mode - install all Factory Default 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

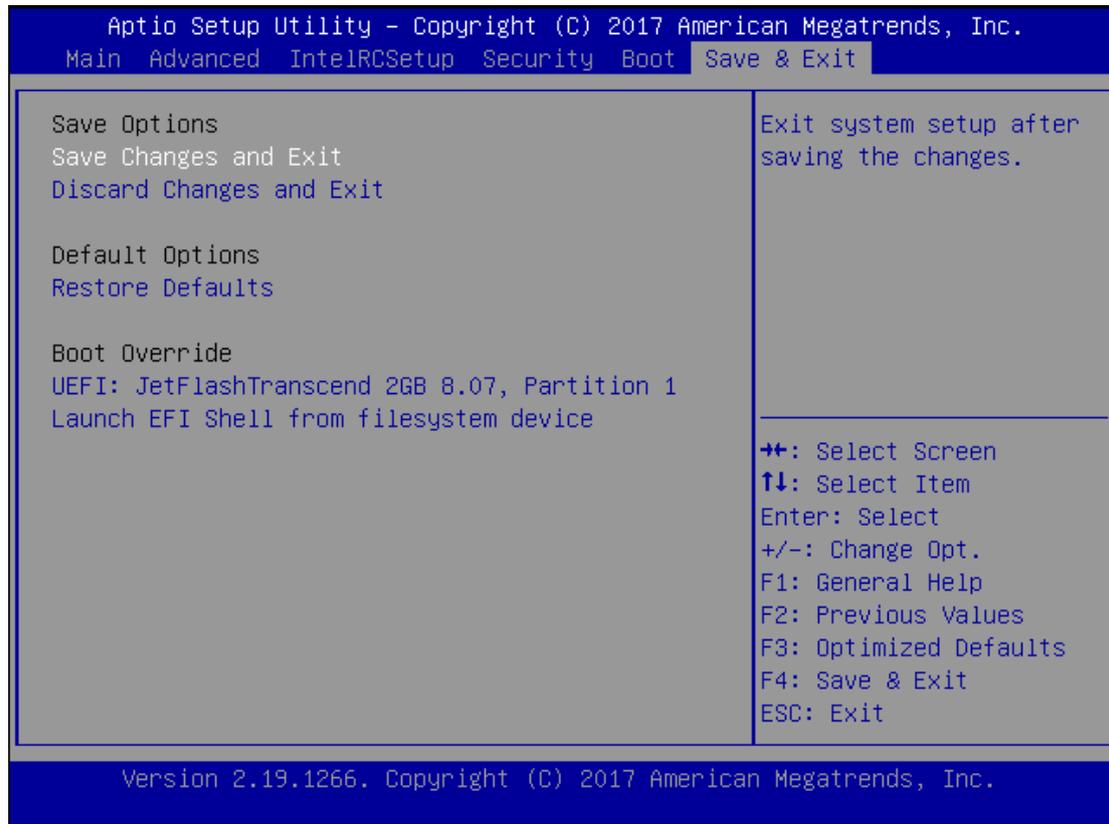
Select the **Boot** menu item from the BIOS setup screen to enter the **Boot** Setup screen.



Item	Value	Description
Quiet Boot	Disabled Enabled	Enables or disables <b>Quiet Boot</b> option.
Boot mode select	LEGACY UEFI Dual	Select boot mode.

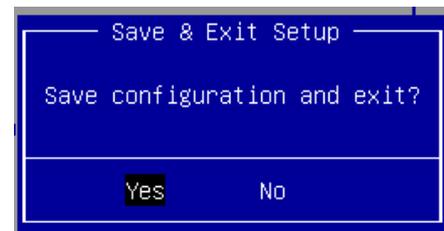
## Save and Exit Menu

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.



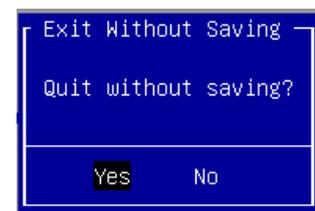
### Save Changes and Exit

When you have completed the system configuration, select this option to save the changes and Exit from BIOS Setup, so the new system configuration parameters can take effect. This window will appear after the **Save Changes and Exit** option is selected. Select **“Yes”** to save changes and exit Setup.



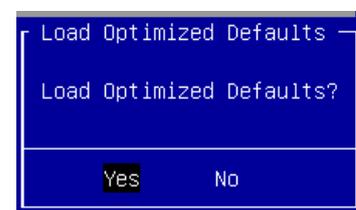
### Discard Changes and Exit

Select this option to quit Setup without saving any modifications to the system configuration. This 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.



# APPENDIX A: LED INDICATOR EXPLANATIONS

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



► **System Power**

Solid Green	The system is powered on
Off	The system is powered off

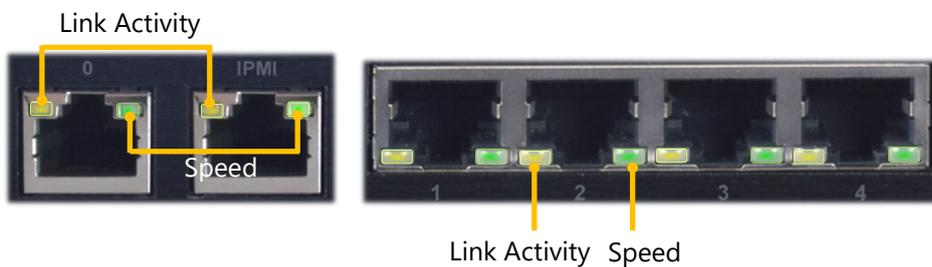
► **System Status**

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

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

► **HDD Activity**

Blinking Amber	Data access activity
Off	No data access activity

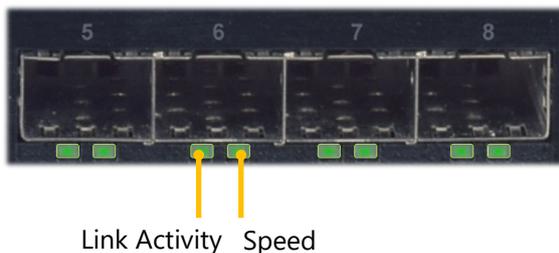


► **Link Activity**

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 has been 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



▶ **Link Activity**

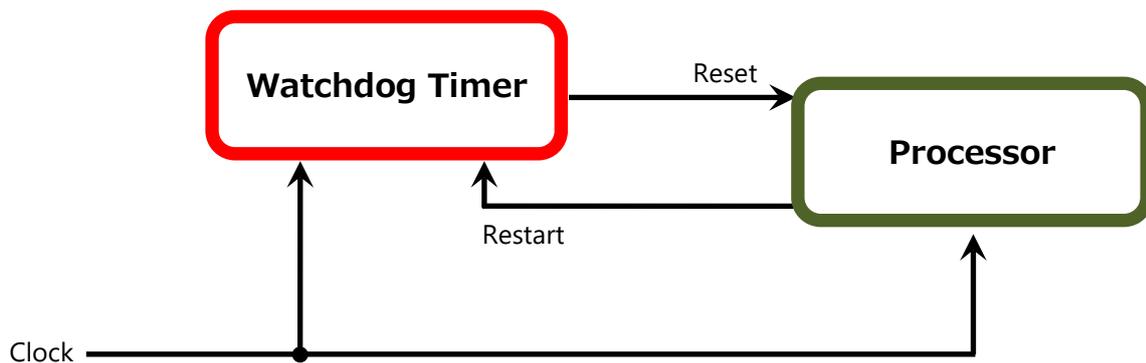
<i>Solid Green</i>	<i>Link has been established and there is no activity on this port</i>
<i>Blinking Green</i>	<i>Link has been established and there is activity on this port</i>
<i>Off</i>	<i>No link has been established</i>

▶ **Speed**

<i>Solid Green</i>	<i>Operating as a 10-Gigabit connection</i>
<i>Off</i>	<i>No link has been established</i>

## APPENDIX B: PROGRAMMING WATCHDOG TIMER

A watchdog timer is a piece of hardware that can be used to automatically detect system anomalies and reset the processor in case there are any problems. Generally speaking, a watchdog timer is based on a counter that counts down from an initial value to zero. The software selects the counter's initial value and periodically restarts it. Should the counter reach zero before the software restarts it, the software is resumed to be malfunctioning and the processor's reset signal is asserted. Thus, the processor will be restarted as if a human operator had cycled the power.



To execute the utility: enter the number of seconds to start the countdown before the system can be reset.

```
wd_tst -swt xxx (Set Watchdog Timer 1-255 seconds and start to count-down)
```

```
wd_tst -stop (Stop Watchdog Timer)
```

- For a reference utility that contains sample code for watchdog function programming, please visit <http://www.lannerinc.com/support/download-center/drivers>, enter the product category and download the utility package of NCA-2512.

## APPENDIX C: SETTING UP CONSOLE REDIRECTIONS

Console redirection lets you monitor and configure a system from a remote terminal computer by redirecting 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. 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.
3. 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 D: PROGRAMMING GENERATION 3 LAN BYPASS

The bypass function is used to link two independent Ethernet ports when the system crashes or powers off. This means if your system is equipped with a LAN Bypass function, a condition in your system will not interrupt your network traffic. Different from the previous two generations (Gen1 and Gen2), the Lanner Bypass Gen 3 employs a programming method to control the bypass function by software. There are typically two types of communication status for the bypass function, one is "Normal" and another is "Bypass" status. Furthermore, the Lanner Bypass software is capable of controlling the bypass status in the following 3 instances.

- ▶ When the system powers off, it can be forced to enable the LAN Bypass function.
- ▶ When the system is in the just-on state which is a brief moment when it powers up.

The Lanner bypass possesses the following features:

1. Communication through SMBUS (I2C)
  2. Independent bypass status control for each pair up to a total of 4 pairs
  3. Lanner Bypass Modules can bypass systems Ethernet ports on a host system during three instances: Just-on (Just-on is the brief moment when the internal power supply turns on and booting process starts), system off, or upon software request (during run-time).
  4. Software programmable bypass or normal mode
  5. Software programmable timer interval:
    - **JUST-ON** watchdog timer, used during JUST-ON, has timer setting of 5 to 1275 seconds of timer interval.
    - **Run-Time** watchdog timer, used during run-time, with of 1 to 255 seconds of timer interval.
  6. Multiple Watchdog Timers:
    - **Two for run-time:** It is designed to give you a more variety of controls of the bypass on port basis. By using dedicated watchdogs for different pairs of bypass, you have the flexibility to manage the bypass status for them differently.
    - **One for just-on:** It is designed to give you the precise control of the bypass during this phase. You can use this timer to delay enabling the bypass in just-on state.
- ▶ For a reference utility that contains sample code for LAN Bypass function programming, please visit <http://www.lannerinc.com/support/download-center/drivers>, enter the product category and download the utility package of NCA-2512.
  - ▶ For thorough implementation information of Lanner Bypass and Watchdog functionalities, go to Lanner Support website at <http://www.lannerinc.com/category/1202-network-appliances> to download [Lanner Bypass Watchdog Module-User Guide](#).
  - ▶ For a description of the physical LAN ports equipped with this function, refer to Front Panel in [Chapter 1: Product Overview](#).

## APPENDIX E: INSTALLING INTEL® LAN CONTROLLER DRIVER FOR LINUX

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

Product Name Keyword	I210 or I350
Product Category	Network I/O→Ethernet Products→Intel® Gigabit Server Adapters→ Intel® Ethernet Server Adapter I210 Series Intel® Ethernet Server Adapter I350 Series
Download Type	Drivers
Operating System	Linux*
Product page	<a href="#">Intel® Network Adapter Driver for 82575/6, 82580, I350, and I210/211-Based Gigabit Network Connections for Linux*</a>

# APPENDIX F: 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.

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

**\*Problem Code:**

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

**Request Party**

**Confirmed By Supplier**

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

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