

Lanner

Network Computing

Hardware Platforms for Network Computing

FW-8894 User Manual

Version: 1.5

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Icon Descriptions

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



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



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

Online Resources

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

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

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Compliances and Certification

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.
- ▶ The machine can only be used in a fixed location such as labs or computer facilities.

Operating Safety

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

available, ground yourself by touching the metal part of the chassis.

- ▶ Periodically check the resistance value of the antistatic strap, which should be between 1 and 10 megohms (Mohms).

Mounting Installation Precaution

Environment:

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of air flow required for safe operation of the equipment is not compromised.
- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- ▶ Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).
- ▶ 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

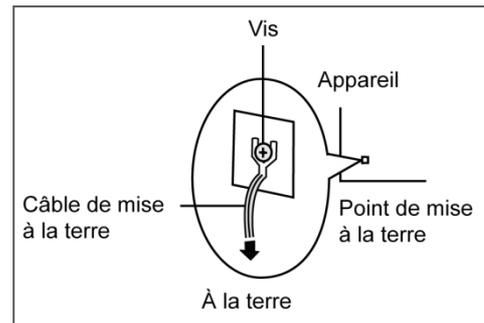
- ▶ L'équipement électrique génère de la chaleur. La température ambiante peut ne pas être adéquate pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
- ▶ Vérifiez que le couvercle du châssis 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 mm² ou 10 AWG.

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

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



Revision History

Version	Date	Descriptions
V1.0	2015/05/06	Official release
V1.0	2015/07/07	Added BIOS chapter
V1.1	2015/12/09	Modified Serial bit per second in the BIOS chapter
V1.2	2016/05/11	<ul style="list-style-type: none">▶ Modified the power supply information▶ Modified the temperature specifications
V1.3	2017/03/13	Modified package contents
V1.4	2018/05/31	Updated Chapter 5 BIOS Setup
V1.5	2019/03/22	Updated Chapter 5 BIOS Setup

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CHAPTER 1: PRODUCT OVERVIEW

Thank you for choosing Lanner FW-8894. The FW-8894 is the 1U version of our already launched powerful platform of FW-8896. It leverages many technological advancements as followed:

- ▶ Dual Intel® Haswell-EP Xeon® E5-2600 v3 CPUs with C612 chipset. Driven by dual Intel® Xeon® E5-2600 v3 CPUs with C612 chipset (codenamed "Grantley"), this new platform delivers excellent efficiency and performance. The architecture of this next generation platform supports quad-channel memory, up to 512GB of registered DDR4 RAM and 40 PCIe 3.0 lanes. Regarding the chipset, Intel® C612 PCH (codenamed "Wellsburg") with ultra peripheral connectivity supporting multiple PCIe lanes, SATA ports, USB ports and IPMI/OPMA.
- ▶ Intel® QPI® links up to 9.6 GT/s
- ▶ FW-8896 is built with dual Intel Xeon CPUs and connected by the latest Intel QPI links up to 9.6 GT/s to keep latency down to minimal even during heavy workloads.
- ▶ Up to Eight Ethernet modules with 32 GbE ports:
- ▶ Under 1U rackmount form factor, Lanner FW-8894 can fit in up to 4 Ethernet modules, with a total of up to 32 GbE ports. The appliance also supports 1/10G RJ-45 or 1/10/40G fiber Ethernet. NIC modules are available for further expansion (optional).
- ▶ Support hot-swappable cooling fans with smart fan control
- ▶ Cooling fans are essential especially in rackmount applications. The hot-swappable mechanism allows easy replacement of worn-out fans to ensure constant and reliable operations.
- ▶ Intel® Coletto Creek 8925 acceleration engine
- ▶ The integration of Intel Coletto Creek 8925 delivers up to 25 Gbps throughput and provides an optimal boost to handle repetitive and large-scale mathematical loads.
- ▶ Intel® QuickAssist Technology
- ▶ The Intel Grantley platform comes with Intel QuickAssist Technology, accelerating security packet and compression processes.

Package Content

Your package contains the following items:

- ▶ FW-8894 Network Security Platform
- ▶ 2x power cords
- ▶ 1x RoHS-compliant D-Sub 9-pin to RJ-45 8-pin console cable (080W250918001)
- ▶ 1x Cat.5e cross-over Ethernet cable (080W2E0818005)
- ▶ 1x Cat.5e Ethernet cable in grey (080W2E0818006)
- ▶ 1x SATA 7-pin cable (080W000125000)

Optional:

- ▶ RC-8894 1A PCIe riser card (RC-8896 1A, brackets, and screws) 2U slide kit
- ▶ IPMI Card: IAC-AST2300
- ▶ TPM Module: IAC-TPM01A / IAC-TPM01B



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

Ordering Information

SKU No.	Main Features
FW-8894A	4x Ethernet module slots & 2x hard drive bays, with Coletto Creek 8925
FW-8894B	4x Ethernet module slots & 2x hard drive bays without Coletto Creek 8925

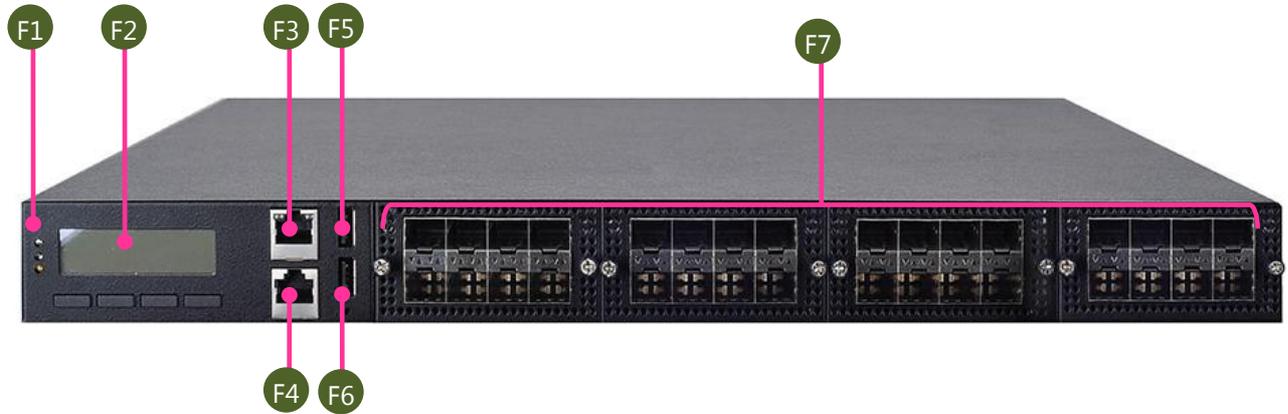
Compatible Accessories

Model No.	Specifications	Chipset	Gen3 Bypass
NCS2-IGM428A	4 x GbE RJ45	Intel i350AM-4	2 pairs
NCS2-IGM428B	4 x GbE RJ45	Intel i350AM-4	N/A
NCS2-IGM806A	8 x GbE RJ45	Intel i350AM-4	4 pairs
NCS2-IGM806B	8 x GbE RJ45	Intel i350AM-4	N/A
NCS2-IGM808A	8 x GbE RJ45	Intel i210AT	4 pairs
NCS2-IGM808B	8 x GbE RJ45	Intel i210AT	N/A
NCS2-ISM405A	4 x GbE SFP	Intel i350AM-4	2 pairs
NCS2-ISM406A	4 x GbE SFP	Intel i350AM-4	N/A
NCS2-ISM802A	8 x GbE SFP	Intel i350AM-4	N/A
NCS2-IXM204A	2 x 10G SFP	Intel 82599ES	N/A
NCS2-IXM205A	2 x 10G SFP	Intel 82599ES	1 pair
NCS2-IXM405A	4 x 10G SFP	Intel 82599ESPLX8724	N/A
NCS2-IXM407	4 x 10G SFP+	Intel Fortville	N/A
NCS2-IQM201	2 x 40G QSFP+	Intel Fortville	N/A

System Specifications

Form Factor		1U Rackmount
Platform	Processor Options	2x Intel Xeon E5-2600 v3 Series on LGA2011-R3 (Haswell-EP)
	Chipset	Intel C612 chipset
BIOS		AMI BIOS 128Mb
System Memory	Technology	DDR4 2133 MHz registered DIMM
	Max. Capacity	512 GB
	Socket	16x 288-pin DIMM
Networking	Management Port	1x RJ45 GbE port, shared with IPMI
	Bypass	Depending on Ethernet module specifications (support Lanner Gen 3 bypass)
	Ethernet Ports	3x GbE RJ45 Intel® i211
	Controllers	1x Intel® i210AT
	Ethernet Modules	up to 4 slim type modules
	Security Acceleration	Intel ColetoS Creek 8925
	LAN Ports	Up to 32 GbE ports, depending on modules installed
OS Support		Windows 7, 2008 Server, Linux kernel 2.6 or later
I/O Interface	Reset Button	1x reset button Software reset by default
	USB	2x USB 2.0
	IPMI via OPMA Slot	OPMA socket
Storage	Drive Bays	1x 3.5" or 2x 2.5" SATA HDD/SSD
	NAND Flash	1x CFast
Expansion	PCIe	4x PCIe*8 connectors for front NIC 2x PCIe*16 Zd connectors for backplane 1x PCIe*8 connectors for riser card
Miscellaneous	LCD Module	1x character type LCM with 4x keypads (graphic optional)
	Watchdog	YES
	Internal RTC with Li Battery	YES
Cooling	Processor	2x CPU heat-sink with fan duct
	System	4x independent hot-swappable cooling fans with smart fan control
Environmental Parameters	Temperature	0~40°C Operating -20~70°C Non-Operating
	Humidity (RH)	5~90% Operating 5~95% Non-Operating
System Dimensions	(WxDxH)	438 x 44 x 630 mm
	Weight	18 kg
Power	Type/Watts	100-240V/ 47-63Hz/ 10-5A
	Input	AC 100~240 V@47~63Hz
Certificate & Compliance		CE Class A, FCC Class A, RoHS

Front Panel



No.	Description	
F1	Power/Status/HDD LED	<ul style="list-style-type: none"> ▶ Power LED: If the LED is on, it indicates that the system is powered on. If it is off, it indicates that the system is powered off. ▶ Status LED: This LED indicator is programmable. You could program it to display the operating status with the behaviors as followed: If the LED is green, it indicates that the system's operational state is normal. If it is red, it indicates that the system is malfunctioning. ▶ HDD: If this LED blinks, it indicates data access activities; otherwise, it remains off.
F2	LCD System Panel	With control keys
F3	Management Port	1 x Management Port
F4	Console Port	1 x Console Port
F5	USB ports	2 x USB ports
F6	Reset switch	1 x Reset switch
F7	Ethernet NIC modules	Up to 4 Ethernet NIC modules

Rear Panel

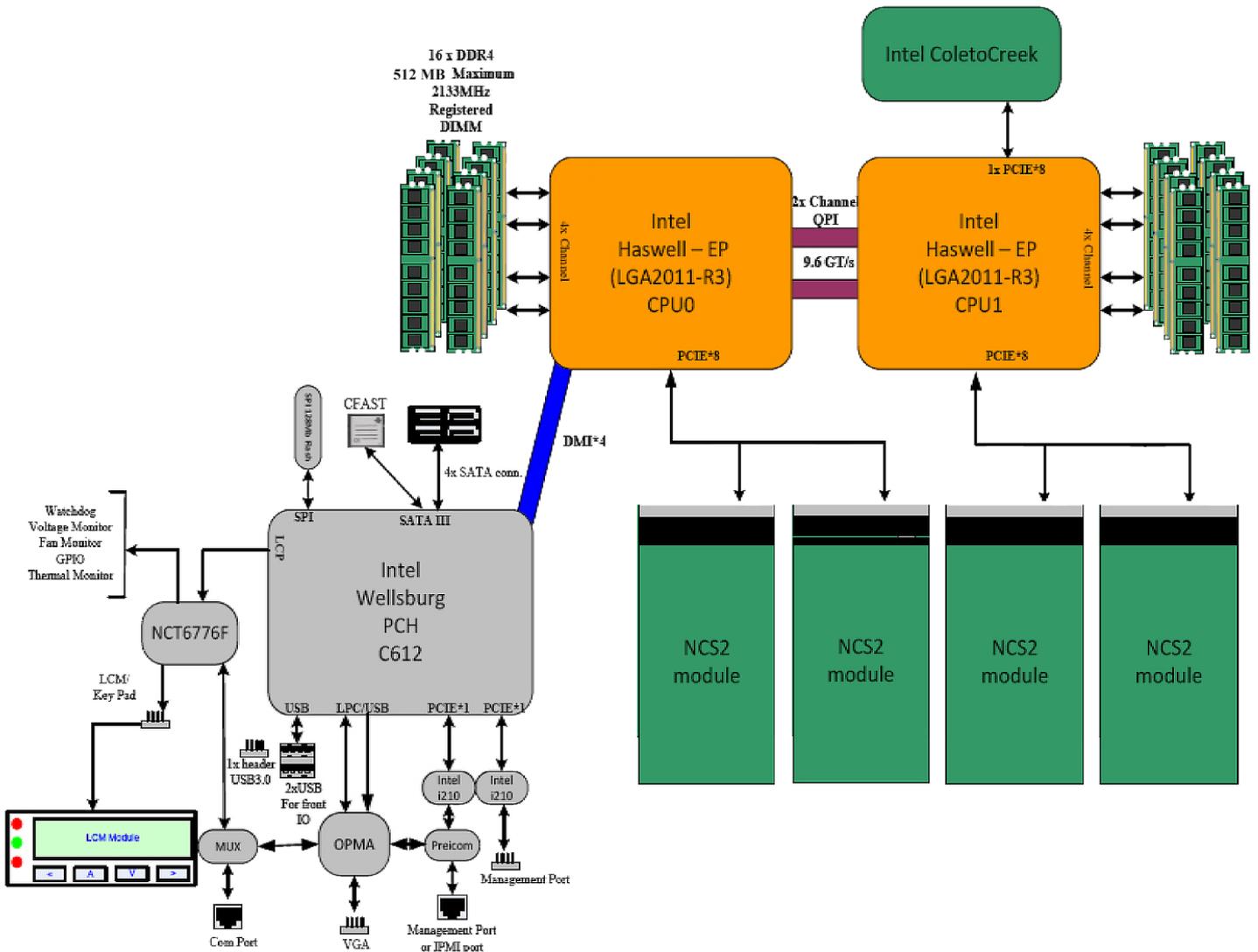


No.	Description	
R1	Cooling fans	4x Cooling fans
R2	Power switch	
R3	Power supply	Power supply units for RPS (Redundant Power Supply)

CHAPTER 2: MOTHERBOARD INFORMATION

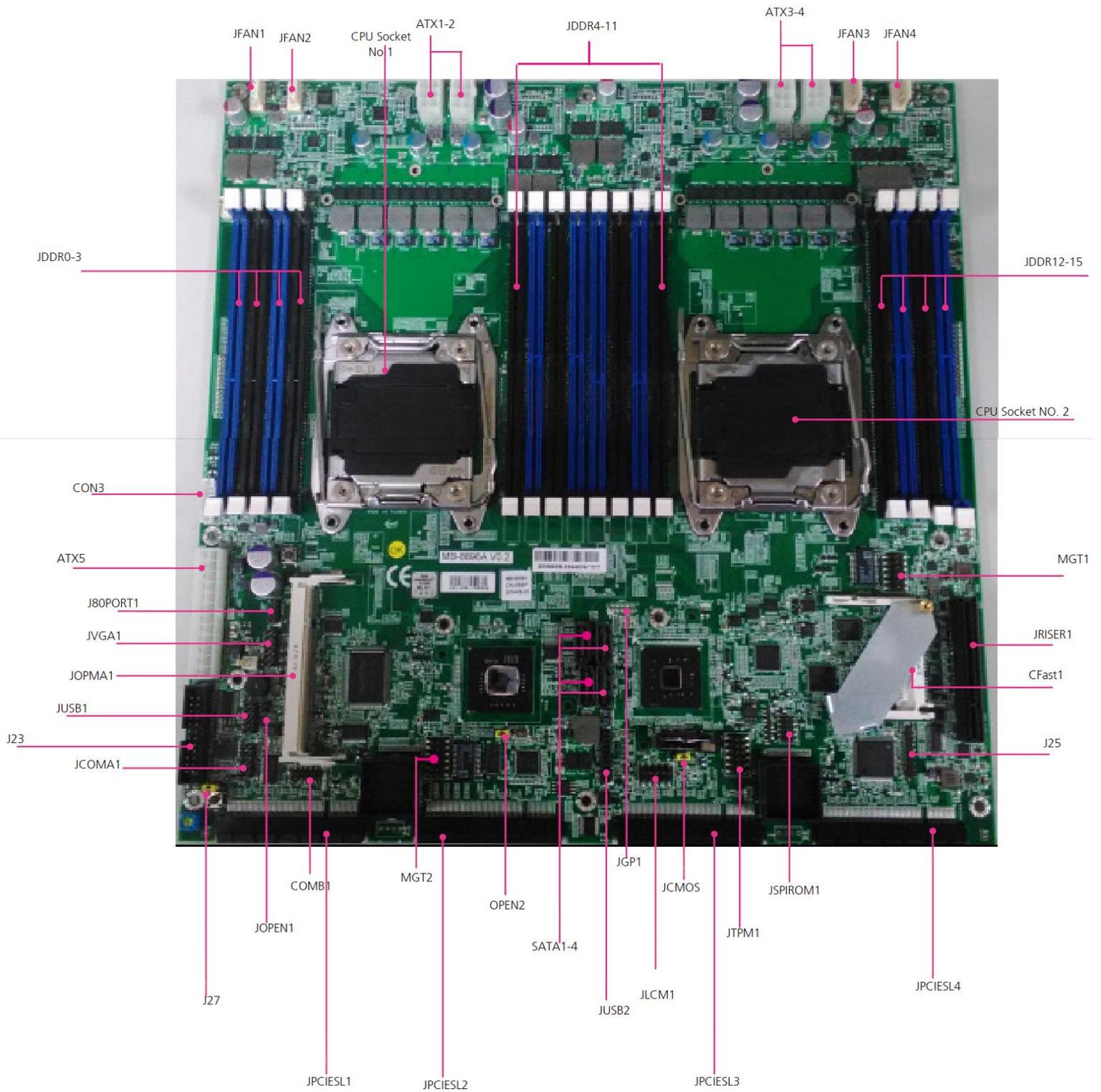
Block Diagram

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

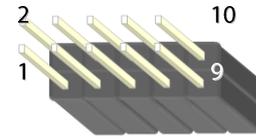
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



Jumper Setting and Connector Pin-out

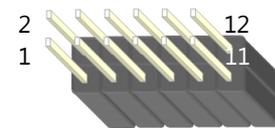
JLCM1: USB-type front LCD Message Display Module (LCM).

Pin	Description	Pin	Description
1	P5V_SB	2	P5V
3	USB20_N5	4	
5	USB20_P5	6	HDD_LED#
7	GND	8	GND
9	NTXD2	10	NRXD2



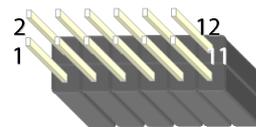
MGT1: RJ 45 LAN management port connector by Intel I210 LAN

Pin	Description	Pin	Description
1	LAN2_MDX+0	2	LAN2_MDX-0
3	LAN2_MDX+1	4	LAN2_MDX-1
5	LAN2_MDX+2	6	LAN2_MDX-2
7	LAN2_MDX+3	8	LAN2_MDX-3
9	LAN2_100#	10	LAN2_ACTR#
11	LAN2_1000#	12	P3V3_AUX



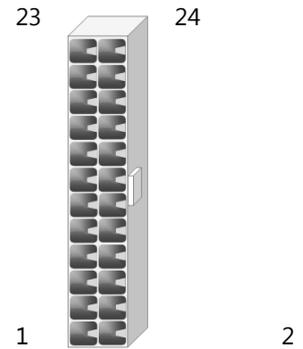
MGT2: RJ 45 LAN management port connector

Pin	Description	Pin	Description
1	MGT_MDIP_0	2	MGT_MDIN_0
3	MGT_MDIP_1	4	MGT_MDIN_1
5	MGT_MDIP_2	6	MGT_MDIN_2
7	MGT_MDIP_3	8	MGT_MDIN_3
9	MGT_LAN_100#	10	MGT_LAN_ACT#
11	MGT_LAN_1G#	12	P3V3_AUX



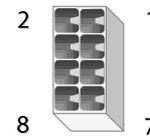
ATX5: 24-Pin ATX Power Connector

Pin	Description	Pin	Description
1	+3.3V	2	+3.3V
3	+3.3V	4	-12V
5	Ground	6	Ground
7	+5V	8	PSON-
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	21	+5V
21	+12V	22	+5V
23	3.3V	24	GND



ATX1~4: 8-Pin ATX Power Connector

Pin	Description	Pin	Description
1	GND	2	+12V
3	GND	4	+12V
5	GND	6	+12V
7	GND	8	+12V

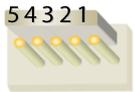


SATA1~4: SATA Connectors for SATA disk drives



Pin	Description
1	GND
2	TX_P
3	TX_N
4	GND
5	RX_N
6	RX_P
7	GND

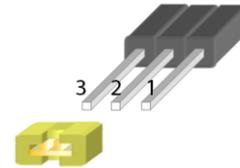
JFAN1~4: 5-Pin FAN Connector



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

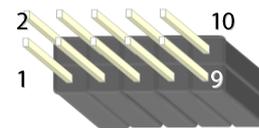
J27: Jumper for Reset

Setting	Description	Setting	Description
1.2 	HW reset	2.3 	SW reset

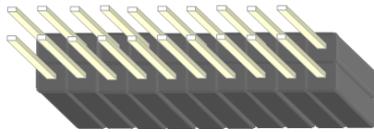


JUSB1: USB 2.0 internal pin header

Pin	Description	Pin	Description
1	P5V_USB1	2	P5V_USB1
3	USB20_L_N0	4	USB20_L_N1
5	USB20_L_P0	6	USB20_L_P1
7	USBGND1	8	USBGND1
9	USBGND1	10	USBGND1

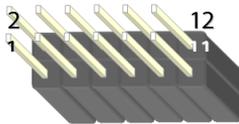


JUSB2: USB 2.0/3.0 Internal Connector



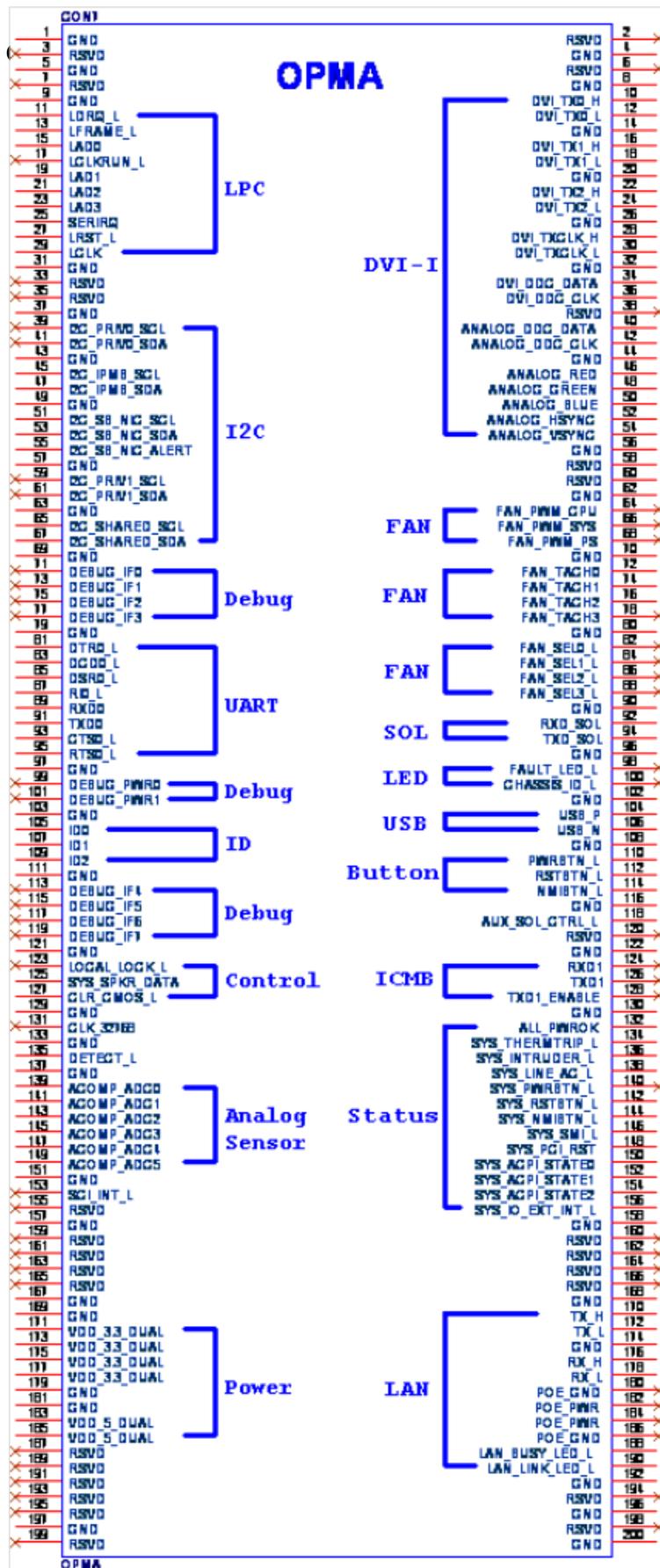
Pin	Description	Pin	Description
1		2	USB20_L_P2
3	USB20_L_P3	4	USB20_L_N2
5	USB20_L_N3	6	USBGND02
7	USBGND02	8	USB30_TX2P_C_L
9	USB30_TX1P_C_L	10	USB30_TX2N_C_L
11	USB30_TX1N_C_L	12	USBGND02
13	USBGND02	14	USB30_RX2P_L
15	USB30_RX1P_L	16	USB30_RX2N_L
17	USB30_RX1N_L	18	P5V_USB2
19	P5V_USB2	20	

JVGA1: VGA interface connector



Pin	Description	Pin	Description
1	DAC_RO	2	Ground
3	DAC_GO	4	Ground
5	DAC_BO	6	Ground
7	HSYNC_O	8	
9	VSYNC_O	10	Ground
11	DDC_DATA	12	DDC_CLK

OPMA1: OPMA interface. The OPMA connector is for connecting the OPMA card. When the OPMA card is connected, the management port will comply with the Intelligent Platform Management Interface (IPMI) standard.



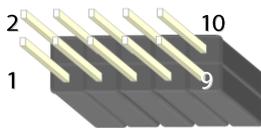
is

JCFast1: CFast card



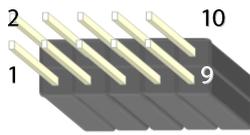
Pin	Description	Pin	Description
PC1	Tie to Pin17	S1	GND
PC2	GND	S2	SATA_TX_P0
PC3		S3	SATA_TX_N0
PC4		S4	GND
PC5		S5	SATA_RX_N0
PC6		S6	SATA_RX_P0
PC7	GND		
PC8	LED_CFAST#		
PC9			
PC10			
PC11			
PC12			
PC13	P3V3		
PC14	P3V3		
PC15	GND		
PC16	GND		
PC17	Tie to Pin1		

JCOMA1: COM PORT Connector



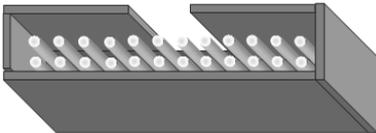
Pin	Description	Pin	Description
1	NDCD1	2	NDSR1
3	NRXD1	4	NRTS1
5	NTXD1	6	NCTS1
7	NDTR1	8	NRI1
9	GND	10	FP_RESET_N

COMB1: COM PORT Internal Connector



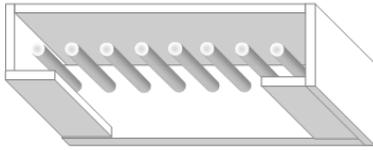
Pin	Description	Pin	Description
1	NDCD2-	2	NDSR2-
3	NRXD2	4	NRTS2-
5	NTXD2	6	NCTS2-
7	NDTR2	8	NRI2-
9	GND	10	

J23: LCM



Pin	Description	Pin	Description
1	VCC	2	GND
3	P_SLIN_N	4	VEE
5	P_AFD_N	6	P_INIT_N
7	LPD1	8	LPD0
9	LPD3	10	LPD2
11	LPD5	12	LPD4
13	LPD7	14	LPD6
15	LCD	16	VCC
17	KPA1	18	KPA2
19	KPA3	20	KPA4
21	FP_RESET#	22	CTR_GRN
23	CTR_YEW	24	HDD_LED#

CON3: PMBUS/TTL

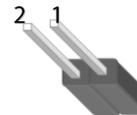


Pin	Description	Pin	Description
1	PSU_TTL1	2	PSU_TTL2
3		4	GND
5		6	PMBUS_CLK
7	PMBUS_DAT	8	PMBUS_ALERT#

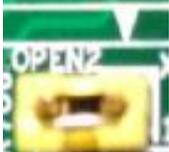
JOPEN1: Chassis Open Detect mainboard protection jumper. (a short-pin cap will be connected to the top compartment of the system chassis. When the top compartment is lifted/removed, the board functions will be disabled once the jumper cap is lifted along with the top compartment. This is to protect the board from being tampered by anyone who removes the top compartment.

JOPEN1: Case open

Pin	Description	Pin	Description
1	GND	2	CSOPEN#



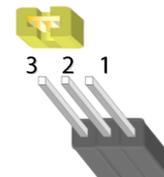
JOPEN2: MGT port SEL (IPMI/I210). This is the management port function selection jumper.



Pin	Description	Pin	Description
1	MGT_SEL	2	IPMI_DETECT#

JCMOS: Clear CMOS

Pin	Description	Pin	Description
1	VRTC	2	PCH_RTCRST#
3	GND		



J25: Burn CPLD (Complex Programmable Logic Device)



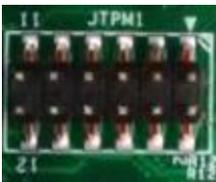
Pin	Description	Pin	Description
1	VCC	5	
2	JTAG_PLD_TPO	6	JTAG_PLD_TMS
3	JTAG_PLD_TD1	7	GND
4		8	JTAG_PLD_TCK

JGP1: External GPIO header



Pin	Description	Pin	Description
1	GPO_B_1	6	GPI_B_3
2	GPI_B_1	7	GPO_B_4
3	GPO_B_2	8	GPI_B_4
4	GPI_B_2	9	GND
5	GPO_B_3	10	GND

JTPM1: TPM connector



Pin	Description	Pin	Description
1	IRQ_SERIAL	2	LPC_FRAME#
3	LPC_LAD0	4	CLK_33M_PCI
5	LPC_LAD1	6	VCC
7	LPC_LAD2	8	
9	LPC_LAD3	10	VCC
11	PLT_RST#	12	GND

CHAPTER 4: HARDWARE SETUP

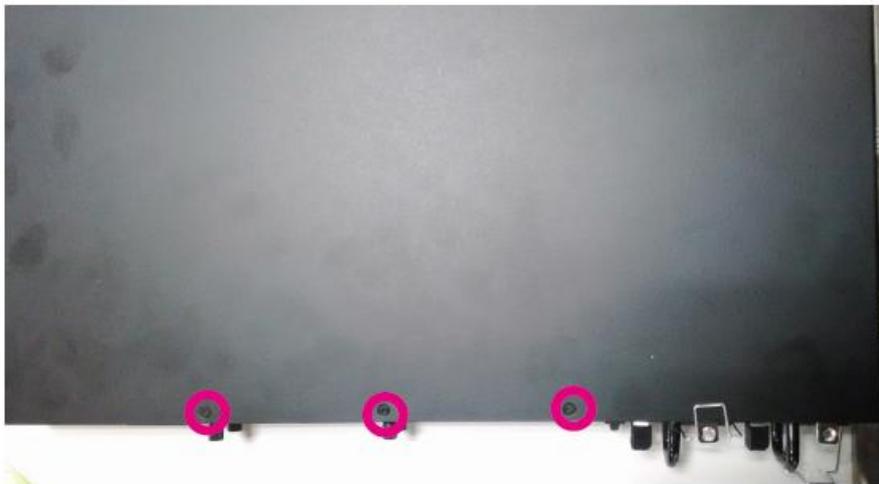
Preparing the Hardware Installation

To access some components and perform certain service procedures, you must perform the following procedures first.



Warning: 1. To reduce the risk of personal injury, electric shock, or damage to the equipment, please remove all power sources. 2. Please wear ESD protected gloves before conducting the following steps. 3. NOT pile any object onto the system.

1. Power off FW-8894 and make sure the power cord is disconnected from the device.
2. Remove the 3 circled screws at the rear of the top compartment and 2 from each side.



3. Gently pull the cover backward.

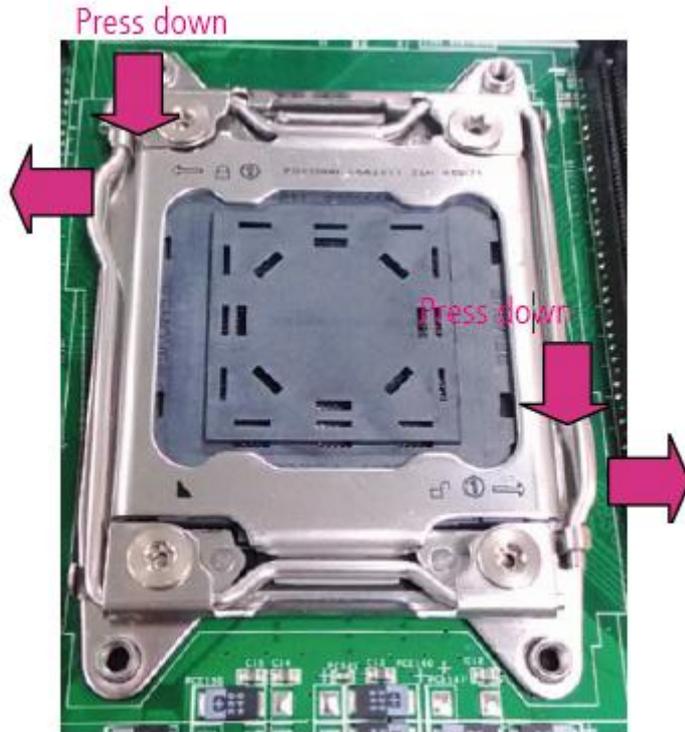


4. Open the cover from the side.

Installing CPU and the Heat Sink

Follow the procedures below for installing a CPU

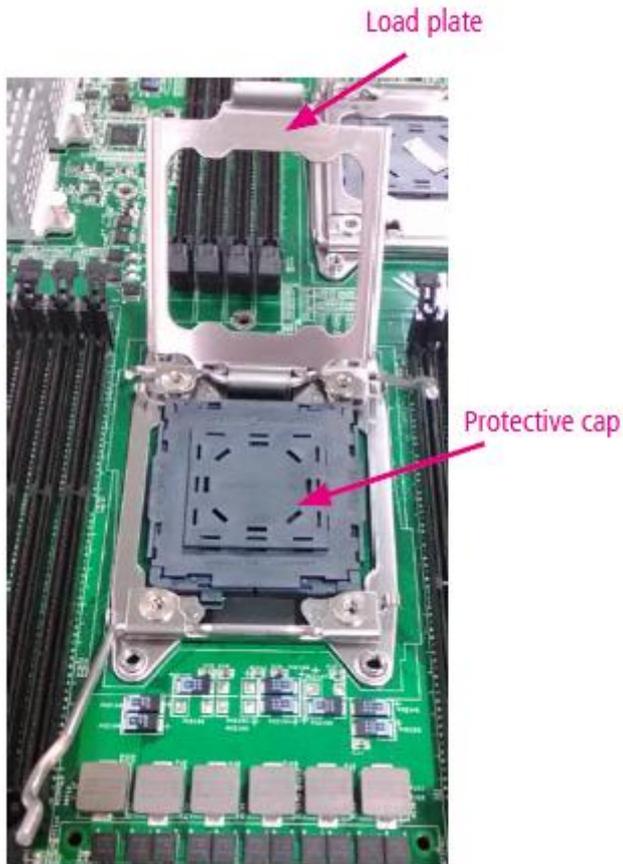
1. Locate the CPU socket(s)
2. Press the left load lever down, move it out of the retention tab. Then, do the same to the right. There are two levers for each CPU socket.



3. Lift the load levers.



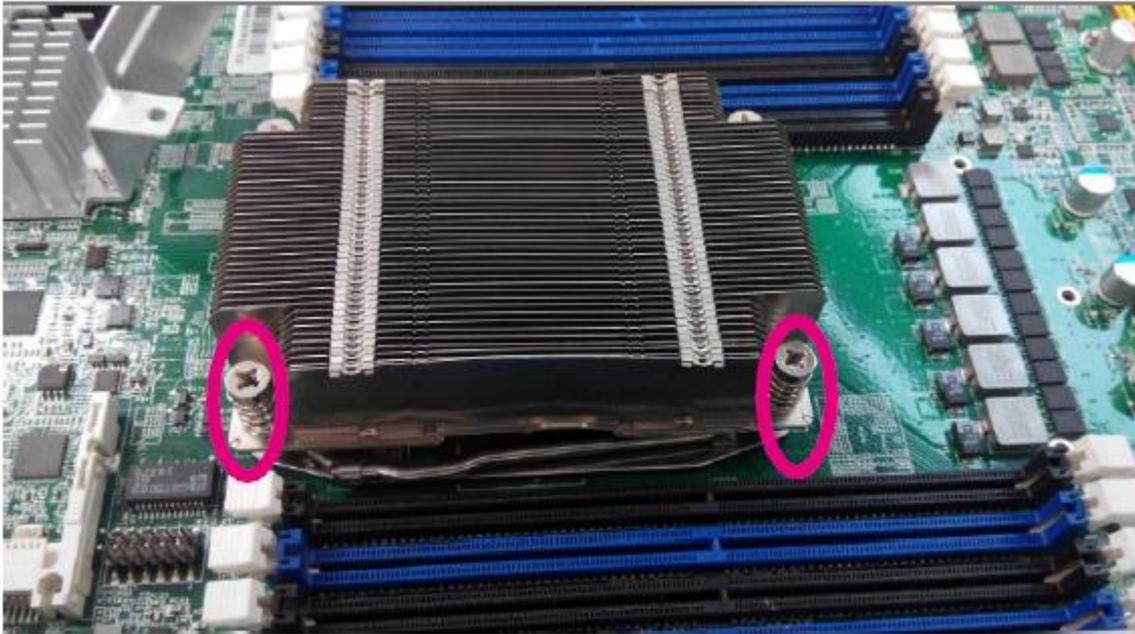
4. Open the load plate and also the protective cap.



5. Align the CPU and the notch on the socket. The CPU should fit perfectly into the socket. Note that the CPU fits in the socket in only one direction.
6. Put the protective cap onto the CPU. Close the load plate and push the load lever to lock it back to the retention tab.

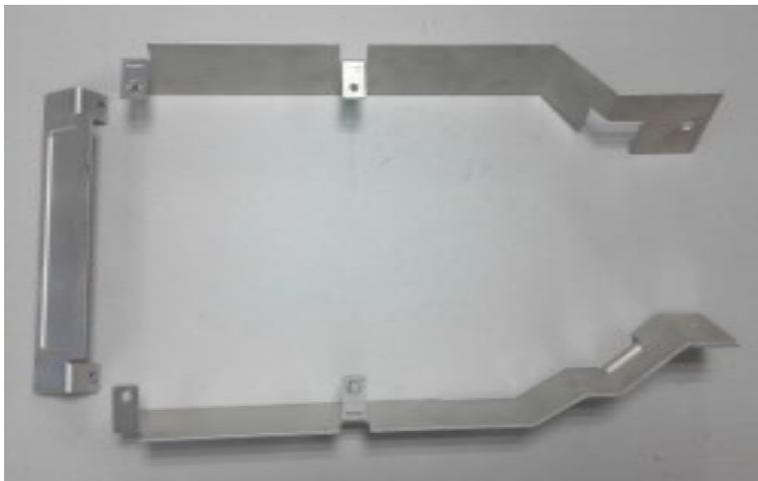


- Put the heat sink on top of the installed CPU and match the screws with the screw holes on the board. Fasten the screws which are opposite to each other at a time and then the other two. It is easier this way to avoid the force of spring.



Note: 1. If you have only one CPU, install it on the left side (CPU socket No.1 with the front panel facing you). Failure to do so will result in boot failure. 2. To protect the CPU socket pins, retain the CPU cap when the CPU is not installed.

- Prepare the fan duct set as the image below.



9. Align a side bracket to a CPU heatsink as shown in the image below. Make sure the screw holes are matched.



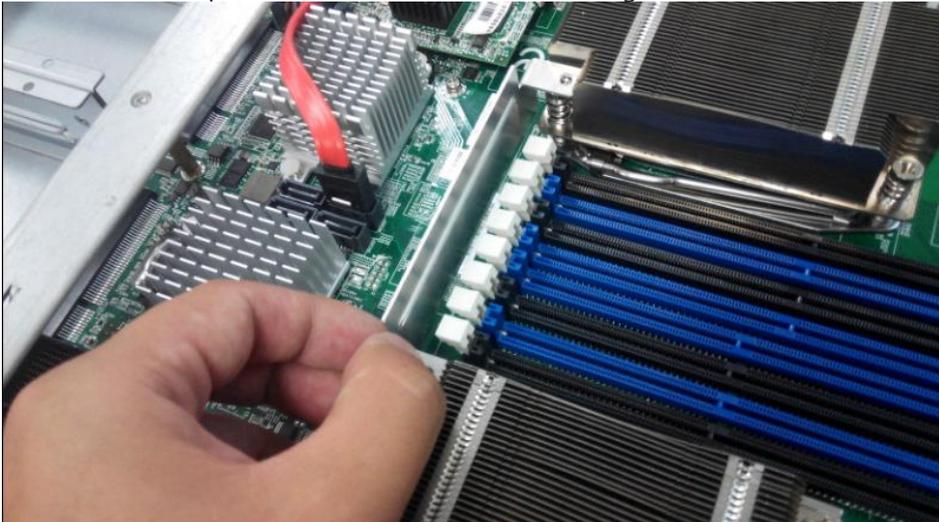
10. Fasten the screws.



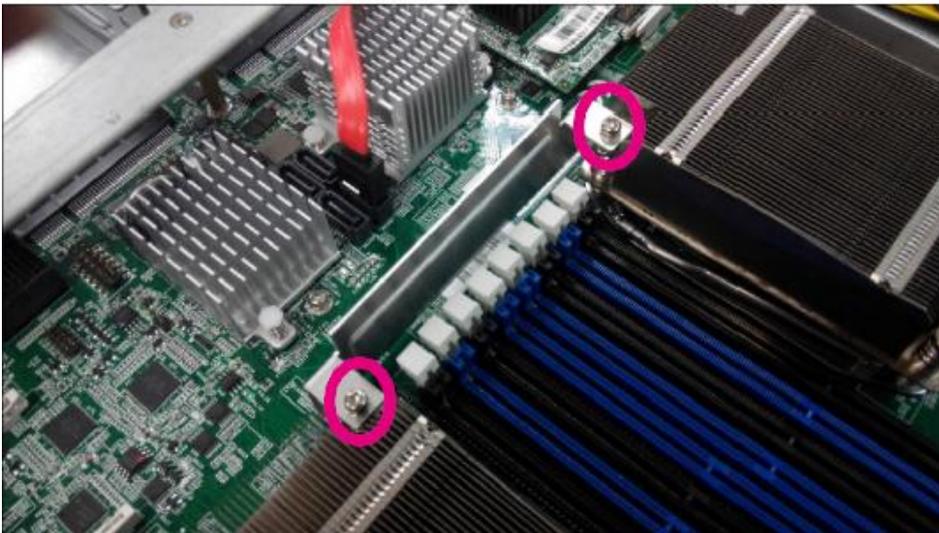
11. Do the same for another side bracket onto another CPU heatsink.



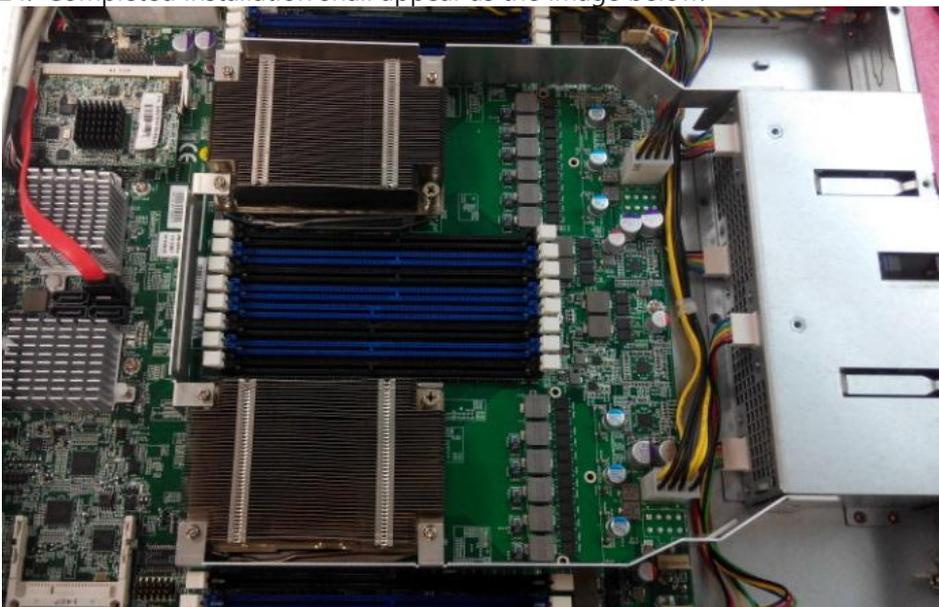
12. Place the last piece of the fan duct set as the image below.



13. Fasten the screws.



14. Completed installation shall appear as the image below.



Installing the System Memory

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

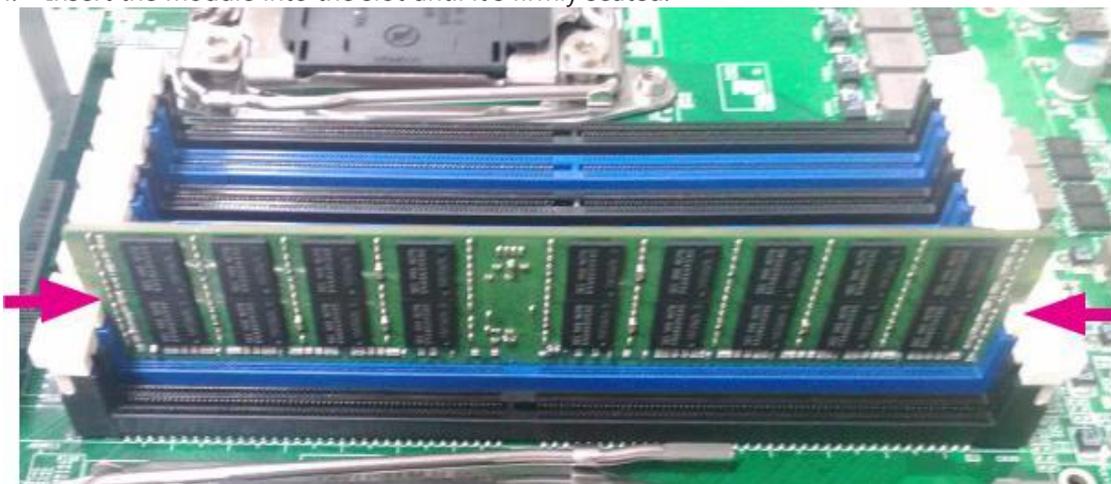
1. Power off the system.
2. Pull open the DIMM slot latches



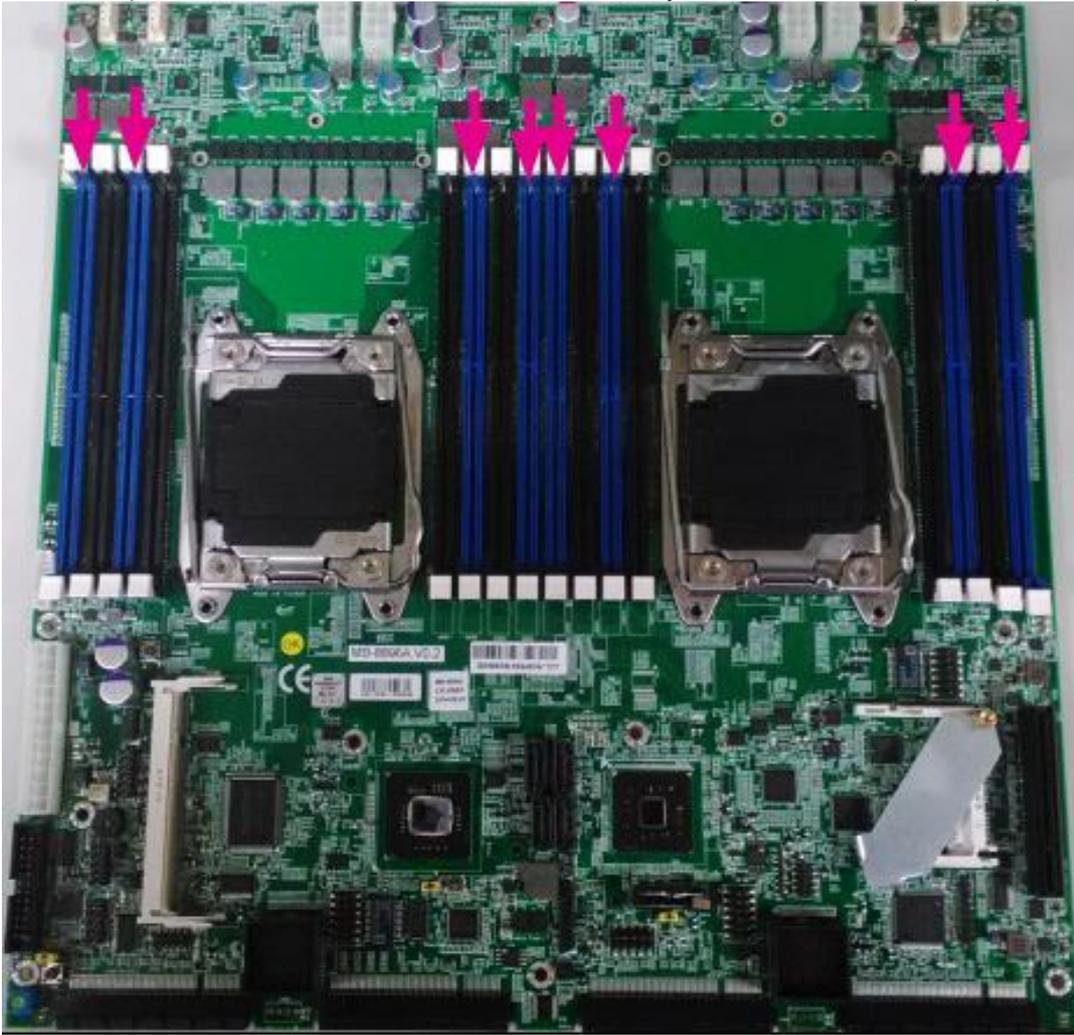
3. Align the DIMM module and make sure the notches of the module aligned with the socket keys in the slot.



4. Insert the module into the slot until it's firmly seated.



5. The motherboard of FW-8894 is designed with 16 DDR DIMM sockets. For users without 16 modules to fill up all the sockets, it is recommended to start by the blue ones for optimal performance



Installing the CFast Card

FW-8894 provides one CFast slot. Follow the procedures below for installing a CFast card.

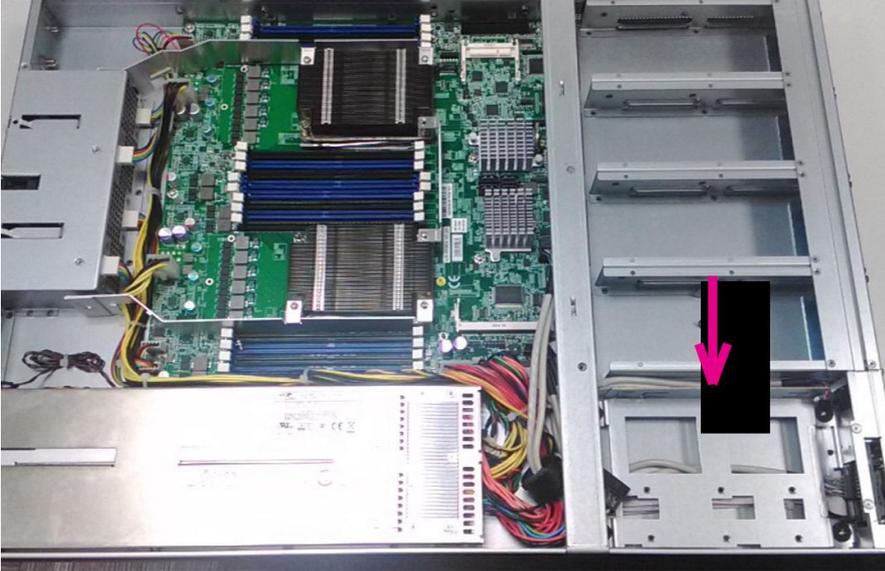
1. Locate the CFast socket.
2. Remove the protection cover.
3. Insert a CFast card until completely seated.



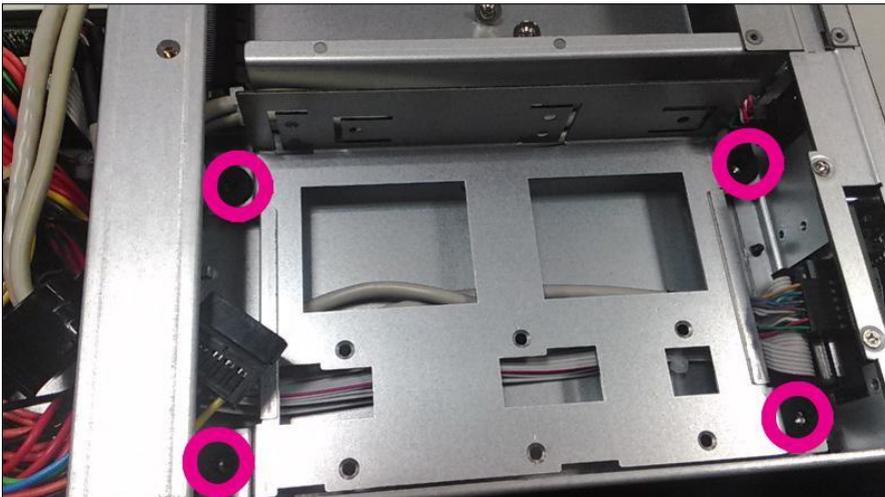
Installing the Disk Drive(s)

FW-8894 supports 1x3.5" or 2 x 2.5" SATA disk drives.
Please follow the steps below for instructions.

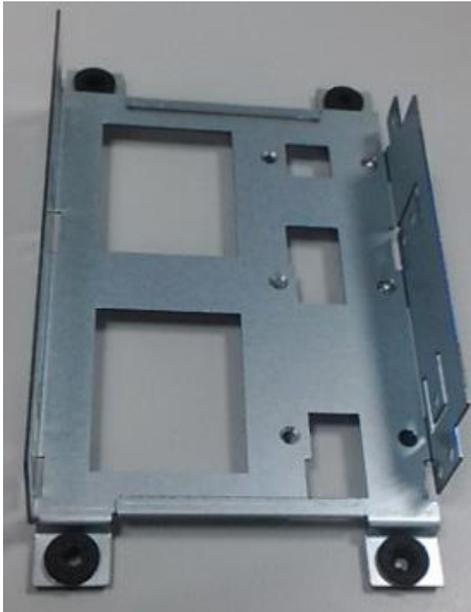
1. As shown in the image below, the disk drive bay is located at the top right corner inside FW-8894.



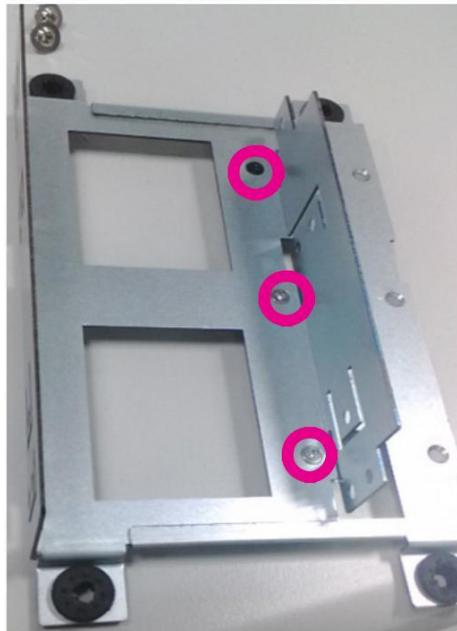
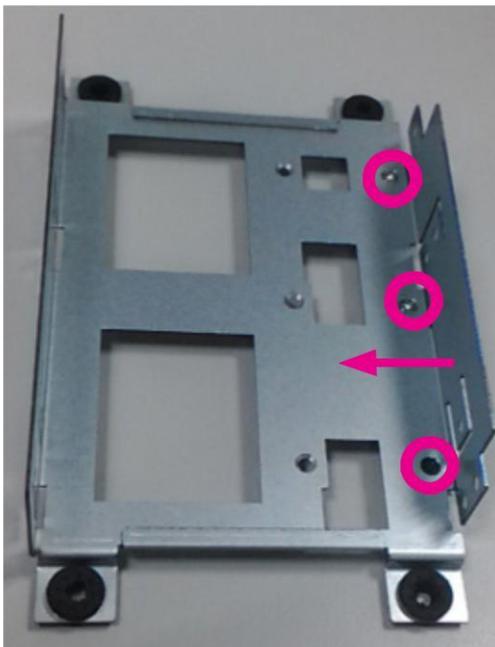
2. Remove the 4 footing-screws to take out the HDD/SSD bracket.



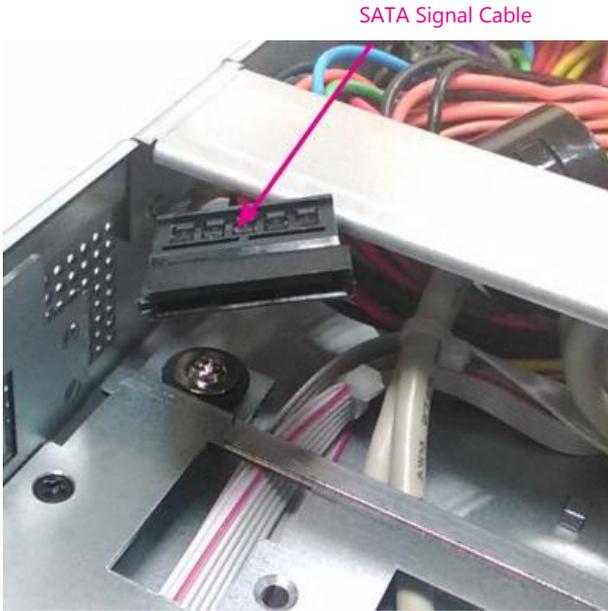
3. The disk drive bracket can be used as a 1 x 3.5" or 2 x 2.5" SATA HDD/SSD bay. The image below is to use it as a 1 x 3.5" SATA HDD/SSD bay.



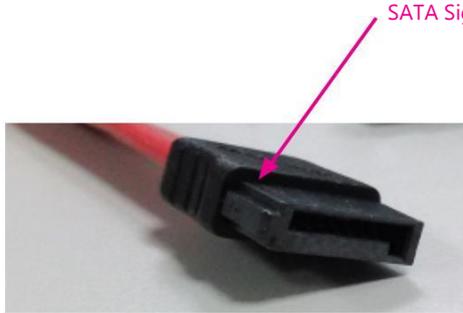
4. You may adjust it to be used for 2 x 2.5" SATA HDD/SSD. Just relocate the side bracket as shown below.



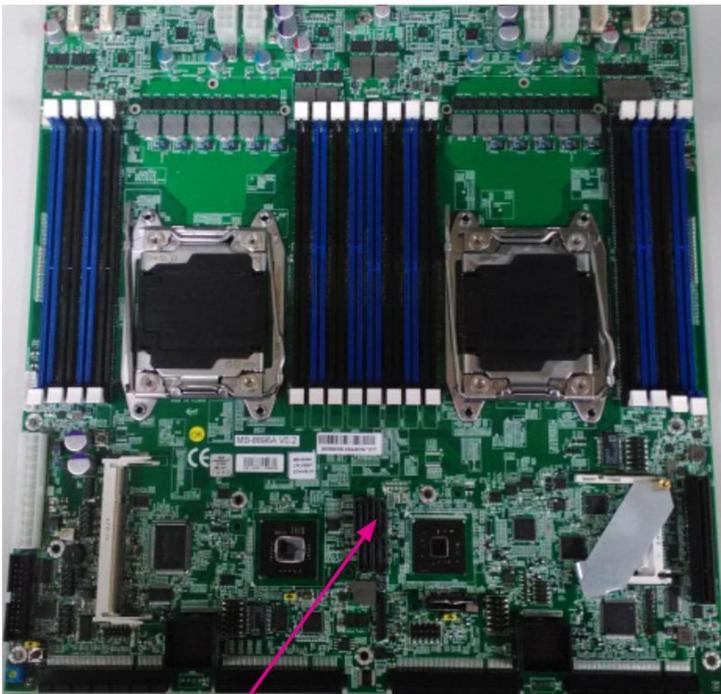
5. Use SATA cables to connect your HDD/SSD with the SATA connectors on the motherboard.



SATA Signal Cable



SATA Signal Cable



SATA Connectors on the motherboard

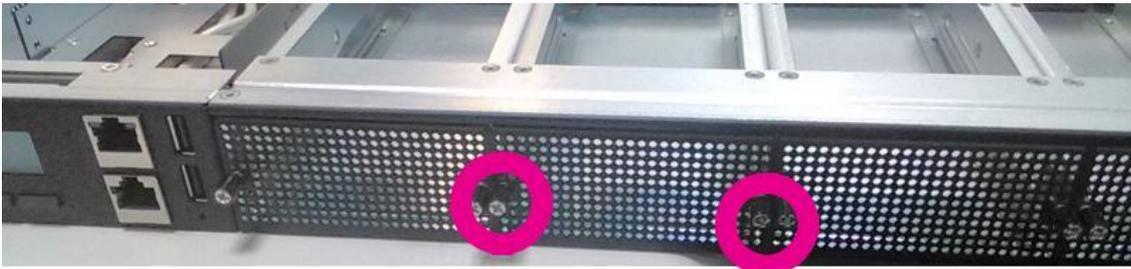
Installing the NIC Modules

FW-8894 series comes with 4 NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

1. Select a NIC Ethernet module slot.



2. Rotate and loosen the two lock-screws of the selected module slot.



3. Remove the door of the module slot and aim at the PCIe socket for module insertion.



4. Insert your NIC Ethernet module. (Note: the module shown in the image below is for reference only).



5. Once the module is firmly seated, rotate and tighten the two lock-screws.



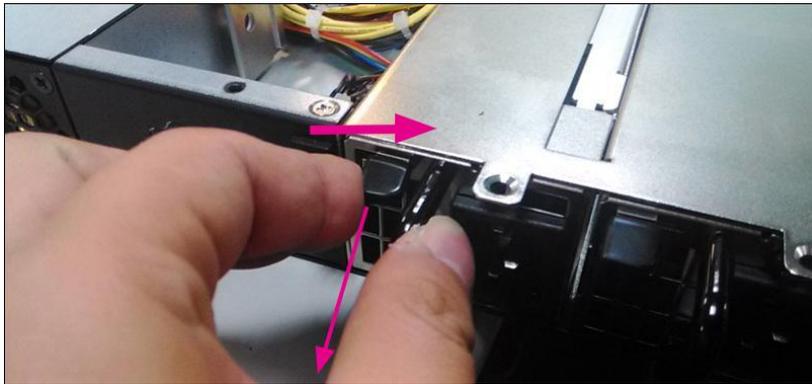
Replacing the Power Supply Units

Power supply units may wear down eventually. Please be noted that FW-8894 series supports 650W depending on the ordering preferences. Please prepare the power supply units matching this capacity.

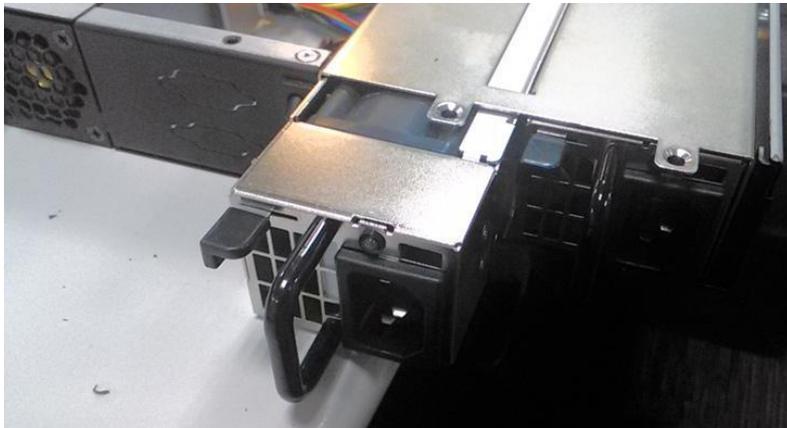
1. Locate the power supply units.



2. Pull the lock mechanism towards your left and hold the handle backward t



3. Hold the handle and pull it out.



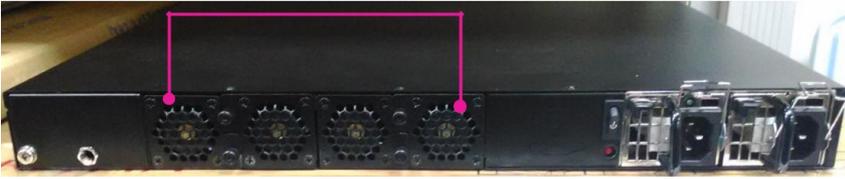
4. Prepare a new power supply unit (650W) and install it back onto FW-8894.



Replacing the Cooling Fans

Cooling fans may wear down eventually. Please refer to the steps below for replacing cooling fans.

1. Locate the cooling fans at the rear panel.



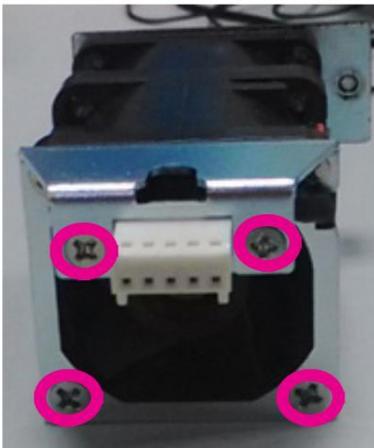
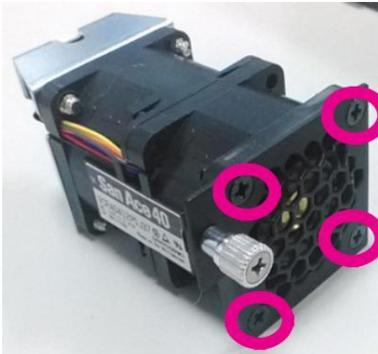
2. Loosen the lock-screw of the fan you would like to replace.



3. Hold onto the two lock-screws and pull it out.



4. Remove the screws that secure the fan.



Rack Mounting

Installation Precautions:

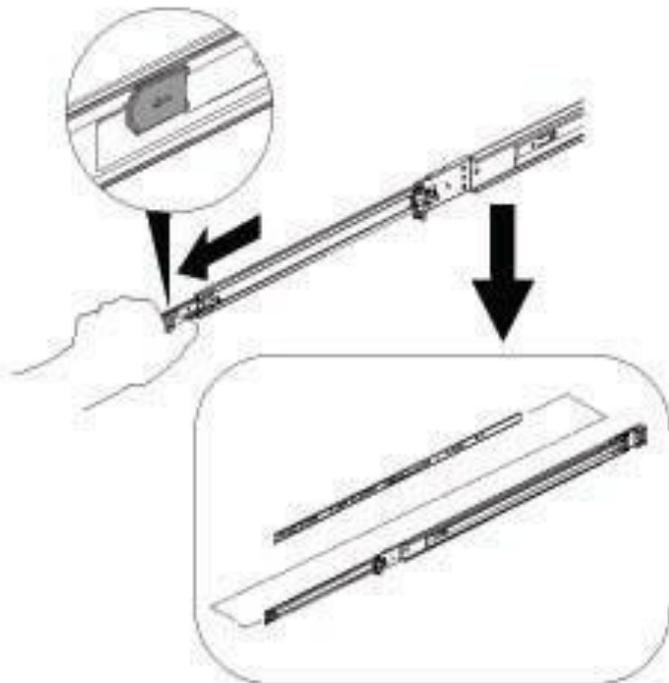
1. Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
2. Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow 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 created due to uneven mechanical loading.
3. 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 over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
4. Reliable Earthing - Reliable earthing 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)."



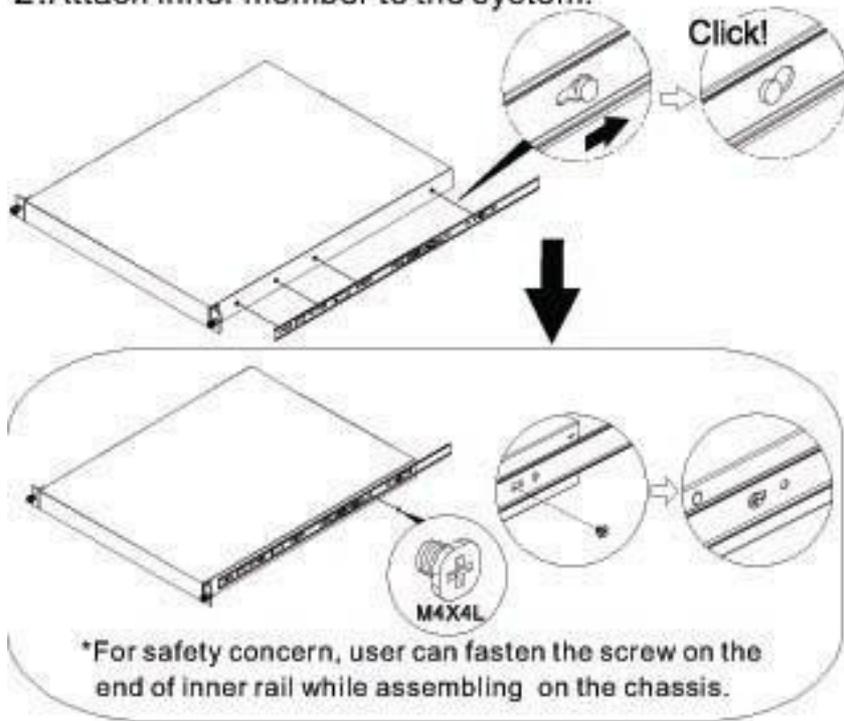
Slide/rail mounted equipment is not to be used as a shelf or a workspace.

Attaching the rails to the system

1. Release and detach the inner member from the slide.

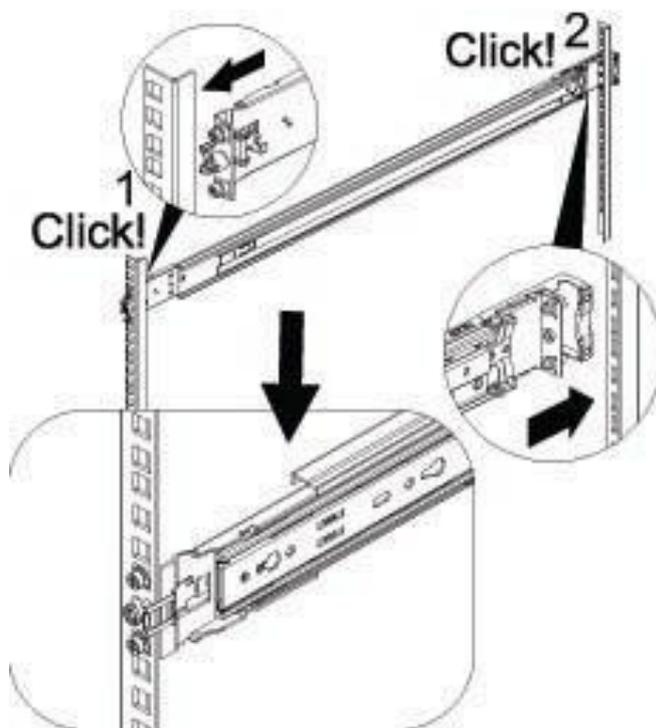


2. Attach inner member to the system.



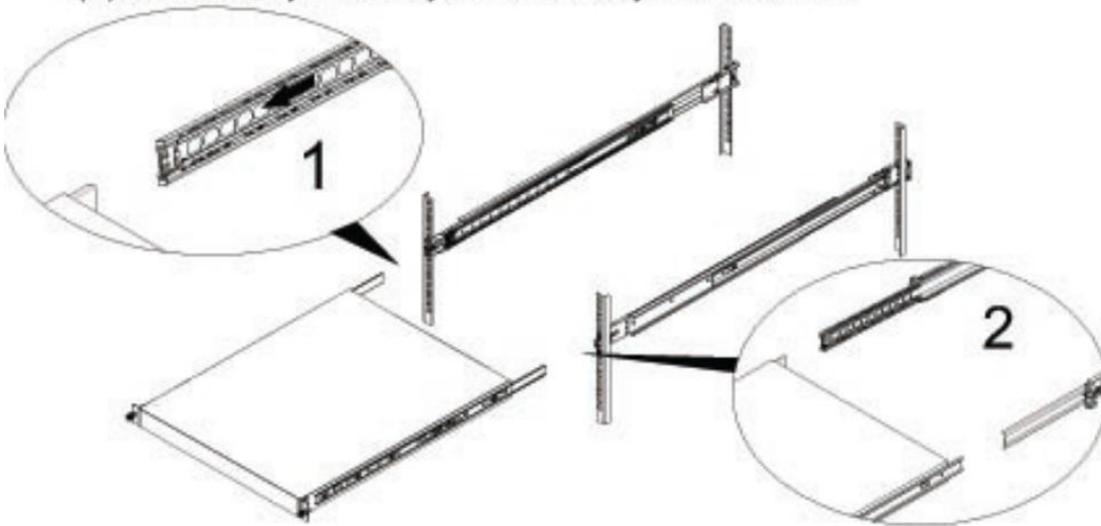
Mounting the outer rails to the rack

3. Attach outer member to the rack.

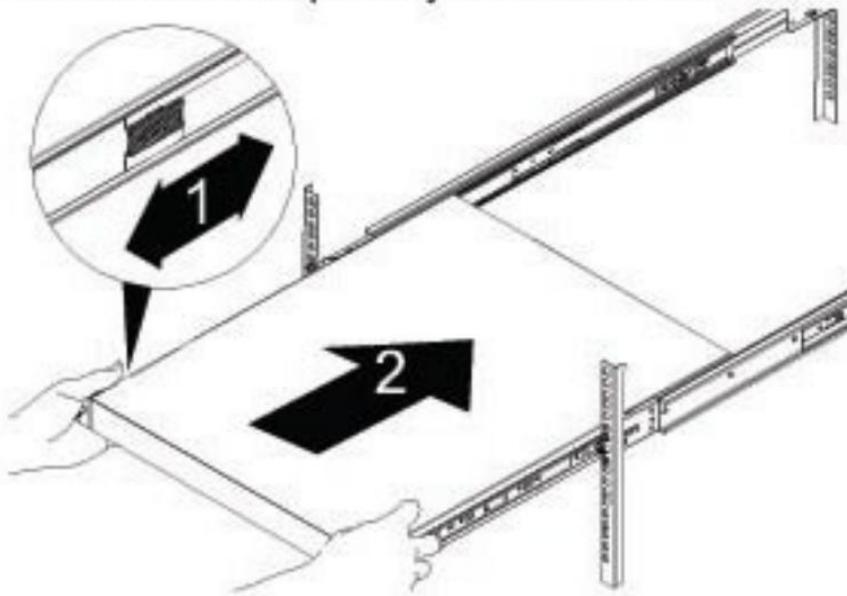


Installing the system to the rack

4. (1) CAUTION! Verify ball bearing retainer is locked forward.
(2) Horizontally install system half way into slide rail.



5. Slide release tab and push system into rack.



Notes for Step 5: it is strongly recommended that installing the system onto the rack is a 2-persons' job. Please avoid performing this task by oneself.

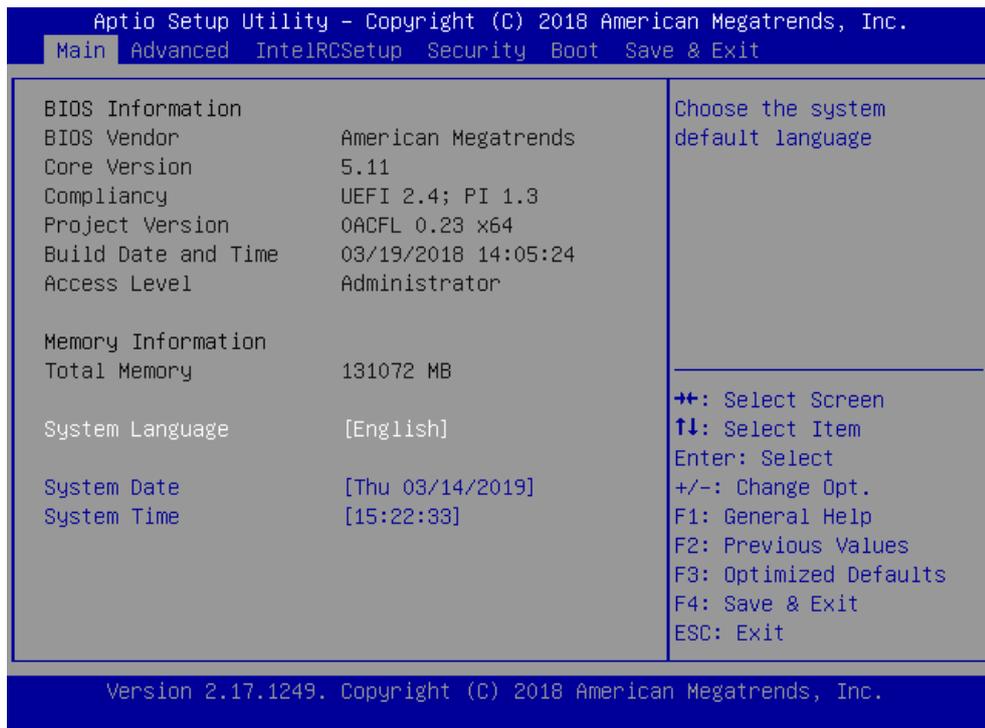
CHAPTER 5 BIOS SETUP

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

1. Boot up the system.
2. Pressing the **<Tab>** or **** key immediately allows you to enter the Setup utility, then you will be directed to the BIOS main screen. The instructions for BIOS navigations are as below:

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

Main Setup

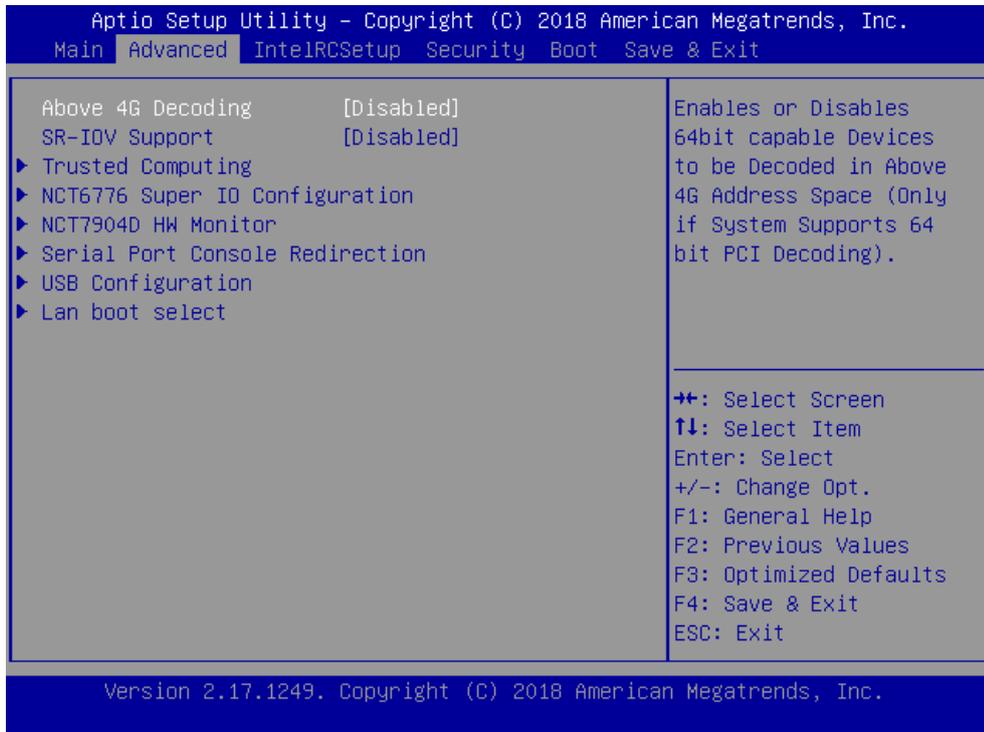


(The screenshots presented in this section are for reference only)

Item	Description
BIOS Information	<ul style="list-style-type: none"> ● BIOS Vendor: American Megatrends ● Core Version: AMI Kernel version, CRB code base, X64 ● Compliancy: UEFI version, PI version ● Project Version: BIOS release version ● Build Date and Time: MM/DD/YYYY ● Access Level: Administrator / User
System Language	English
System Date	To set the Date, use <Tab> to switch between Date elements. <ul style="list-style-type: none"> ●]Default Range of Year: 2005-2099 ● Default Range of Month: 1-12 ● Days: dependent on Month.
System Time	To set the Date, use <Tab> to switch between Date elements.

Advanced Setup

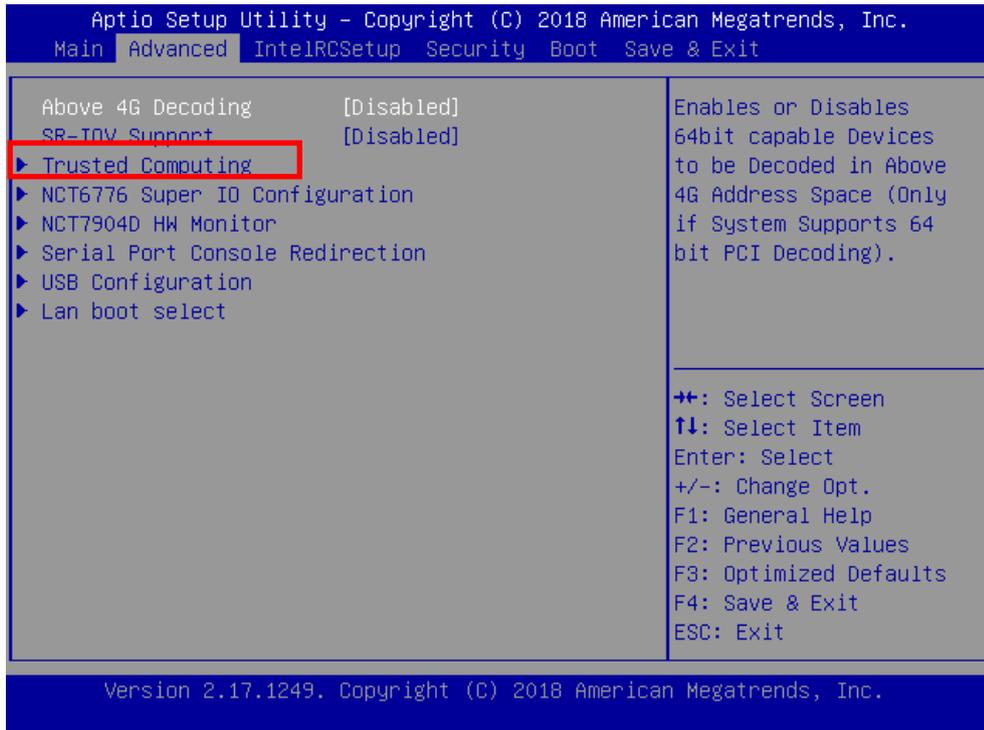
Use [→] or [←] to select [Advanced] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.



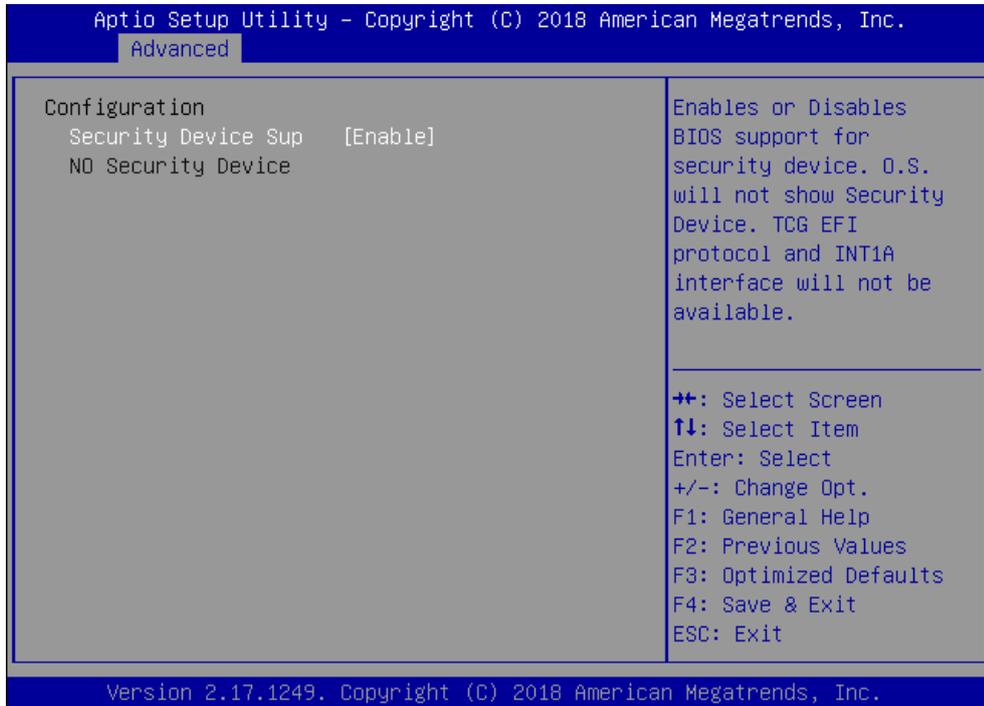
Item	Option	Description
Above 4G Decoding	Disabled Enabled	Enables or disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports 64 bit PCI Decoding)
SR-IOV Support	Disabled Enabled	If the system has SR-IOV capable PCIe Devices, this option enables or disables Single Root IO Virtualization Support.

Trusted Computing

This option allows you to configure parameters regarding BIOS support for security device.



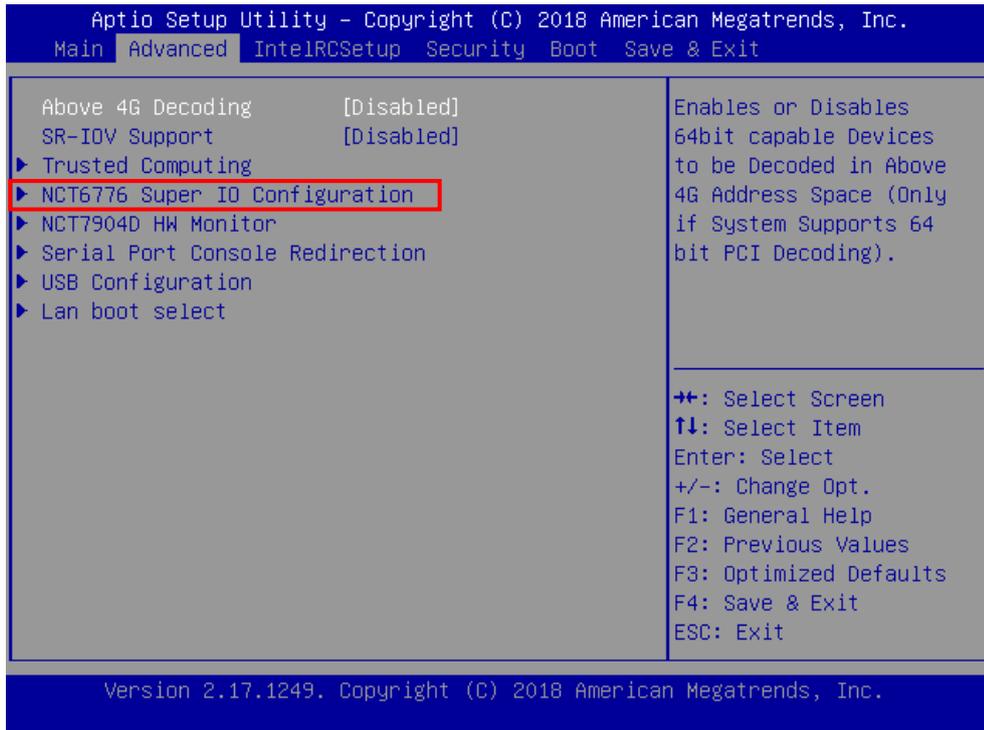
Press <Enter> to access the submenu.



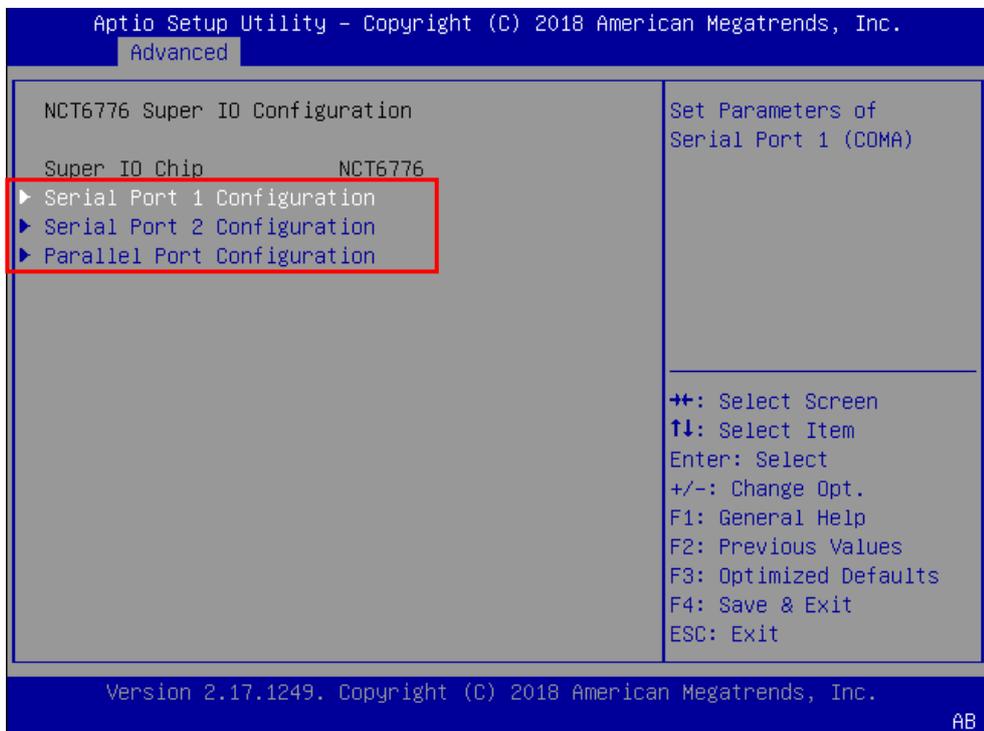
Item	Option	Description
Security Device Support	Enabled Disabled	Enables or disables BIOS support for security device. By disabling this function, OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

NT6776 Super IO Configuration

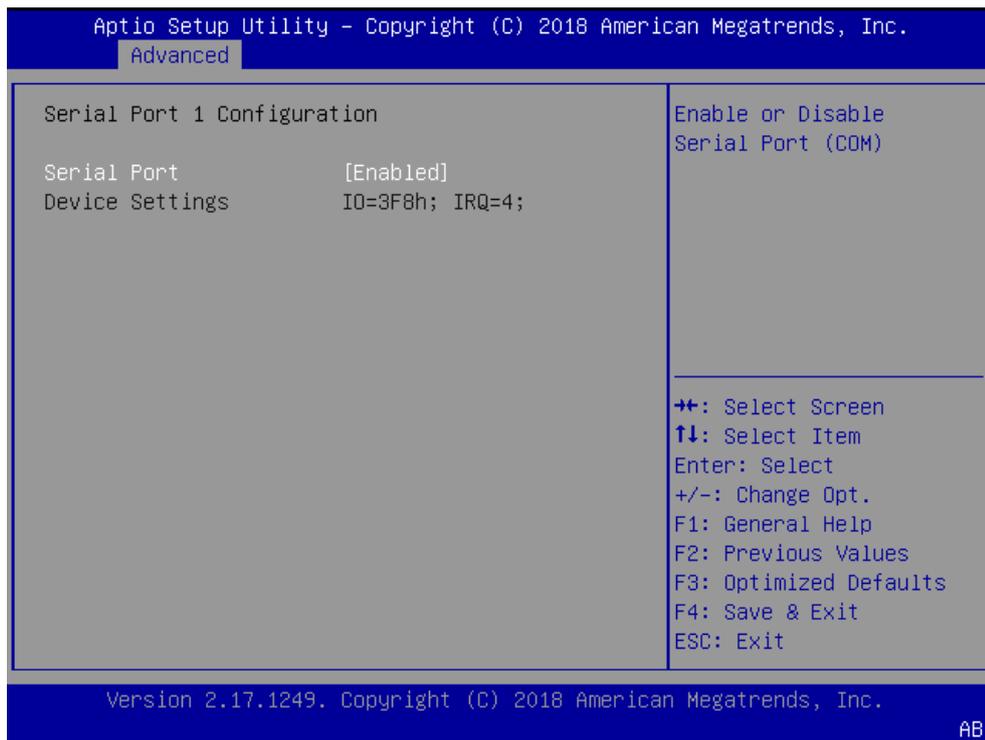
This option allows you to configure parameters about Super IO Chip.



Press <Enter> to access the submenu. Select "Serial Port 1 Configuration", "Serial Port 2 Configuration" or "Parallel Port Configuration" to enter sub setting screen.

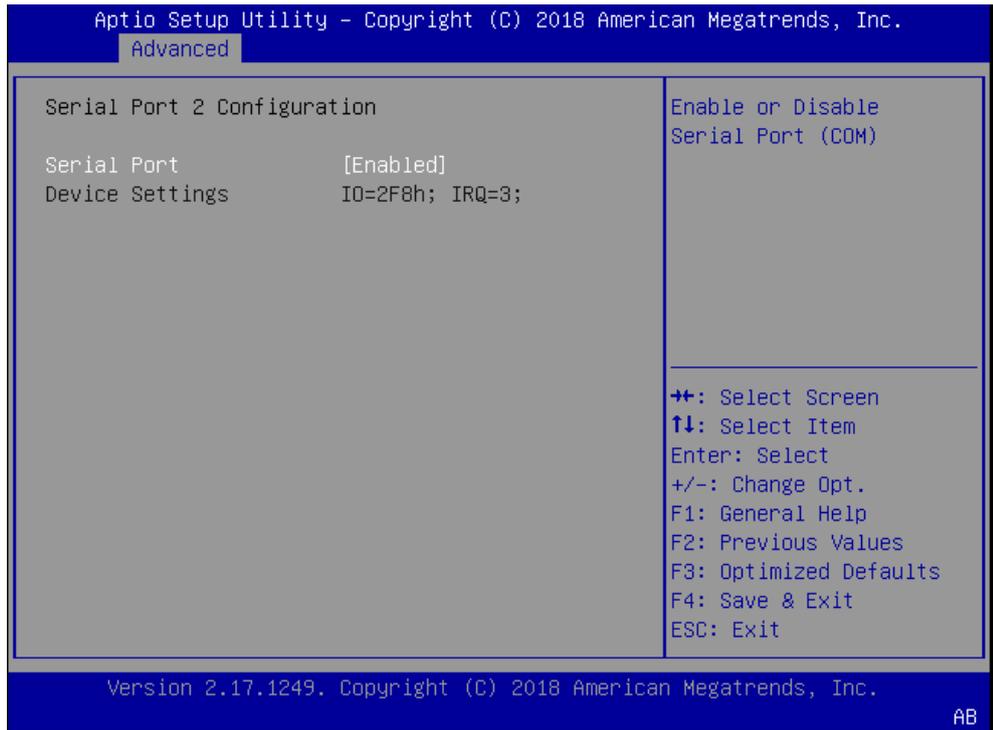


Serial Port 1 Configuration



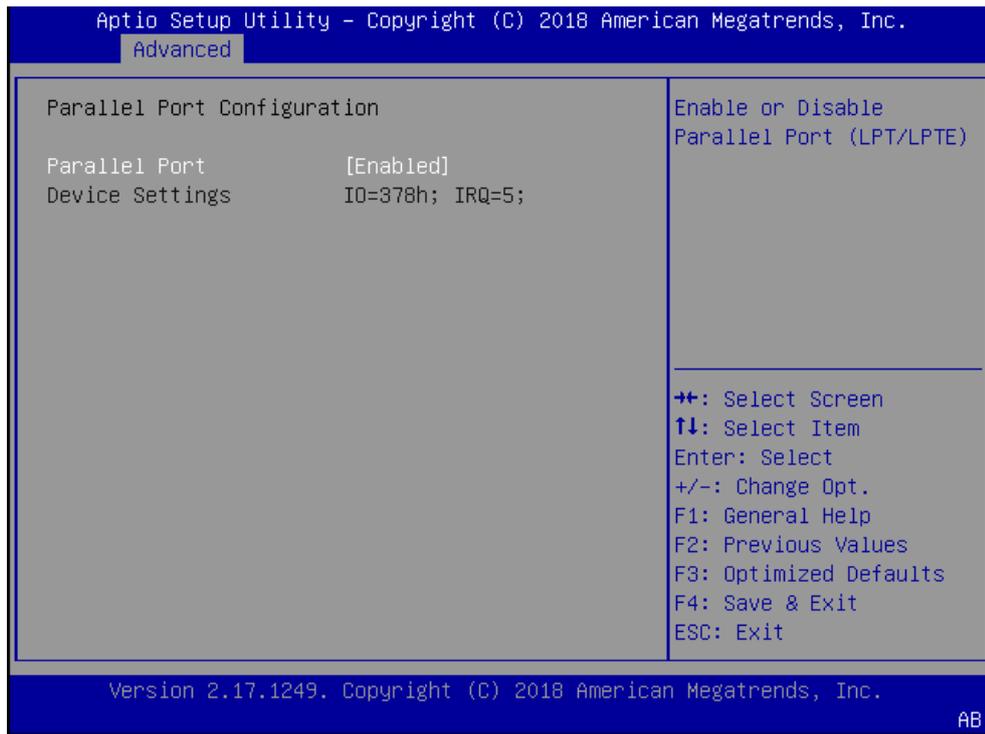
Item	Option	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=3F8h; IRQ = 4

Serial Port 2 Configuration



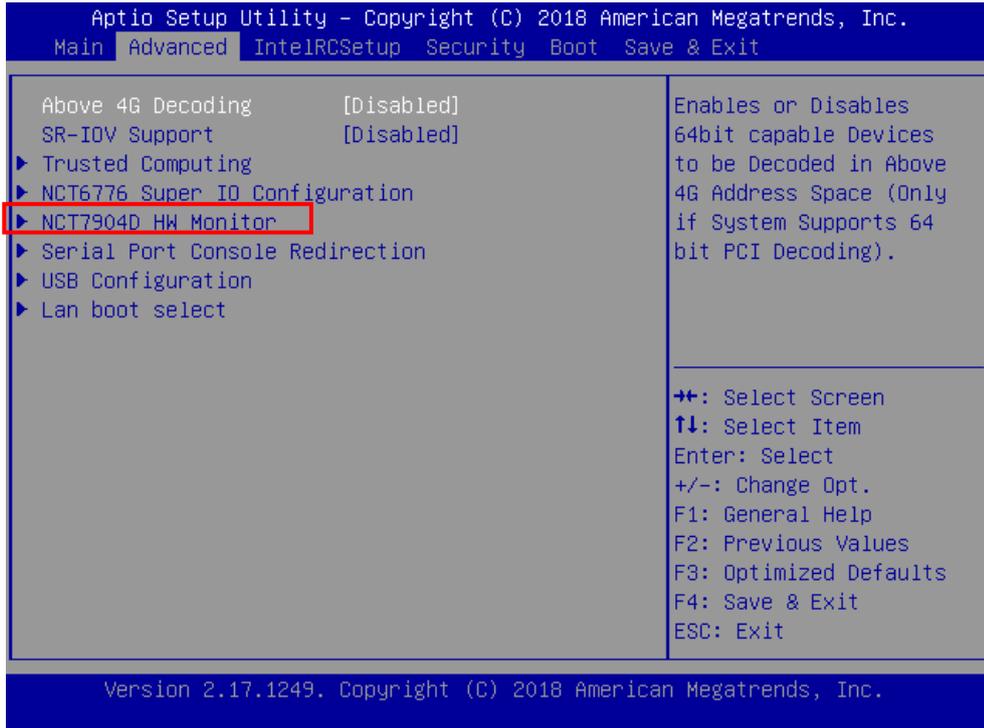
Item	Option	Description
Serial Port	Enabled Disabled	Enable or Disable Serial Port (COM)
Device Settings	NA	IO=2F8h; IRQ = 3

Parallel port Configuration

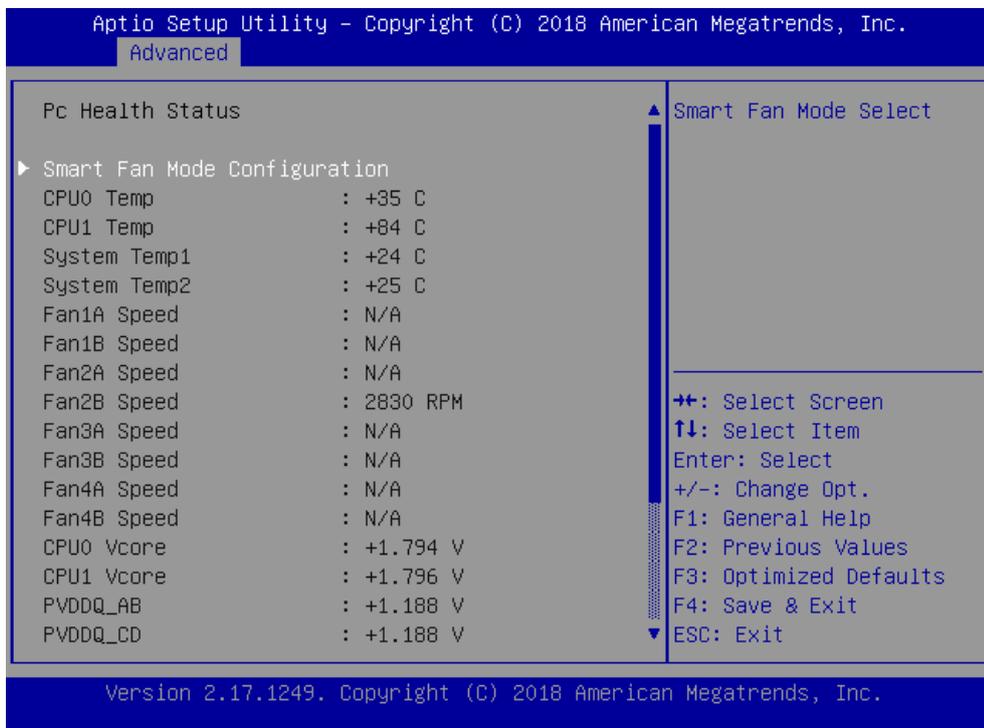


Item	Option	Description
Parallel Port	Enabled Disabled	Enable or Disable Parallel Port (LPT/LPTE)
Device Settings	NA	IO=378h; IRQ = 5

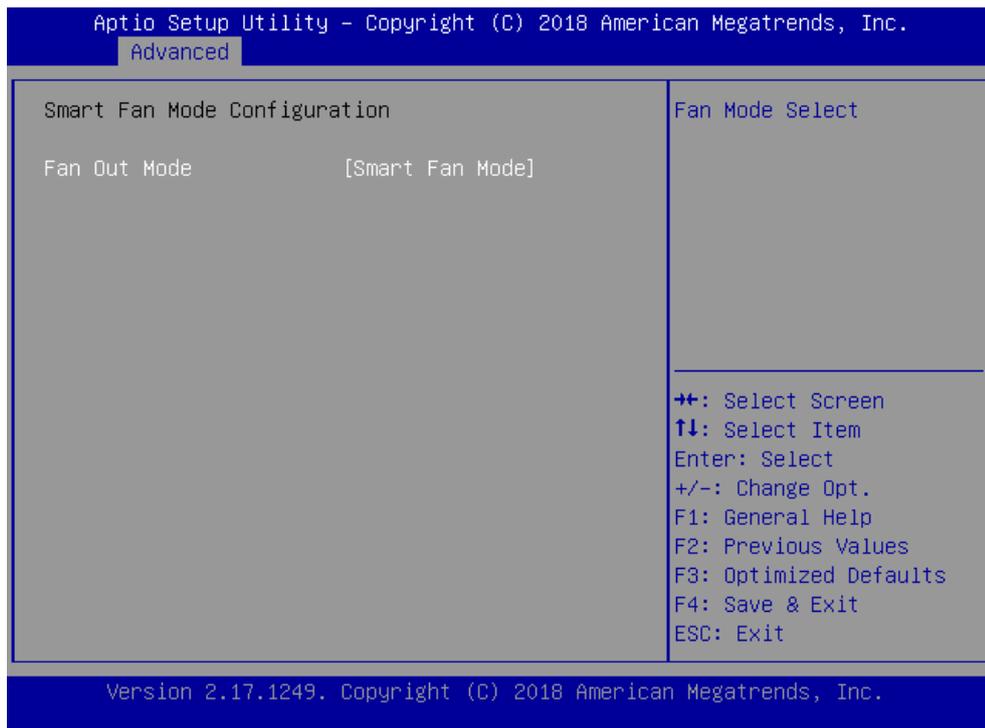
NCT7904D HW Monitor



Press <Enter> to access the submenu.

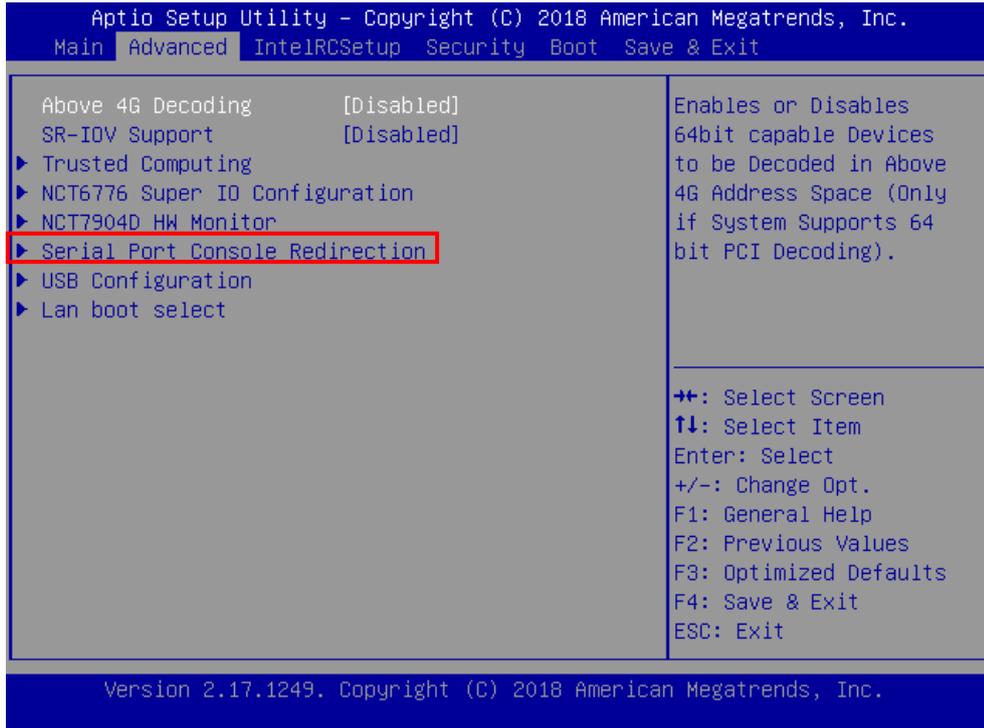


Smart Fan Mode Configuration

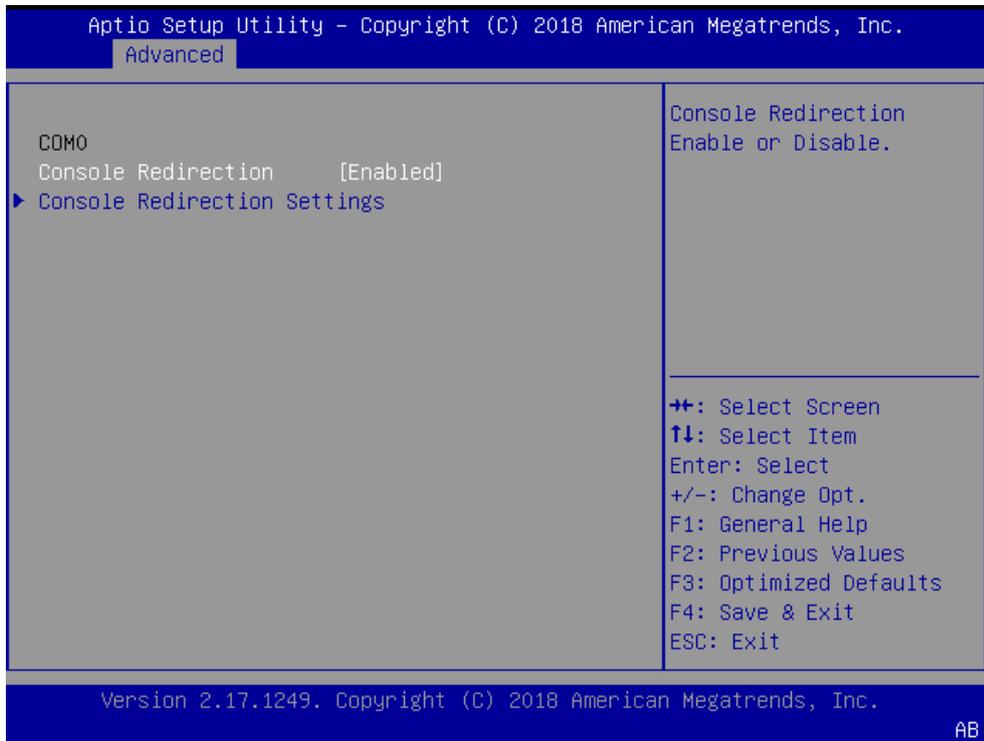


Feature	Options	Description
Fan Out Mode	Full Speed Mode Smart Fan Mode	Fan Mode Select

Serial Port Console Redirection

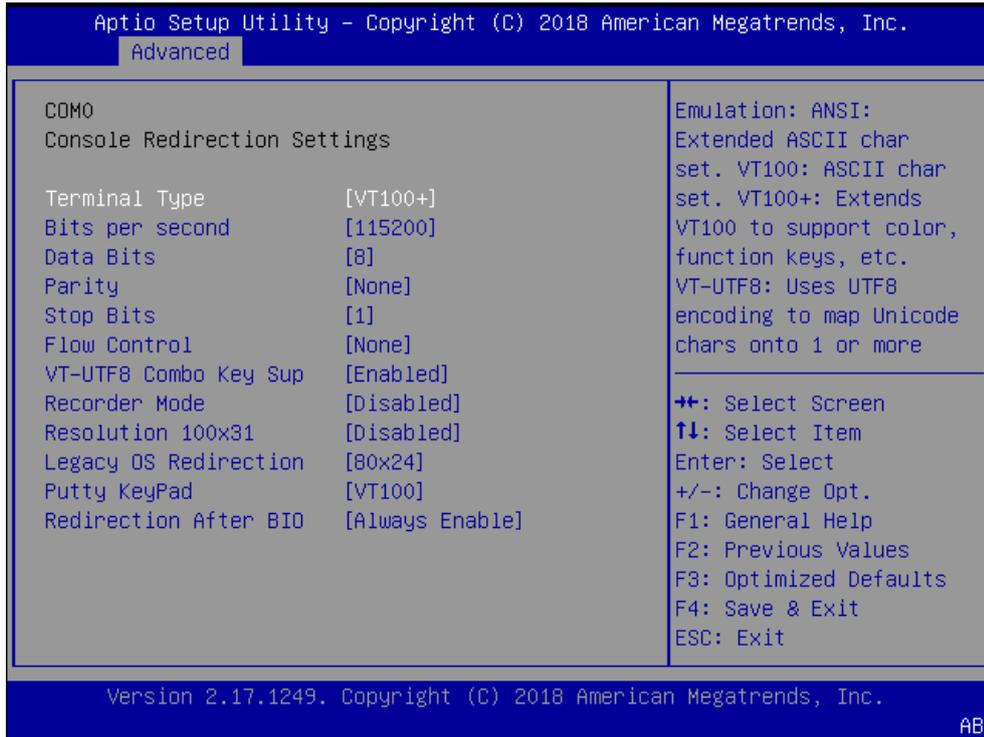


Press <Enter> to access the submenu.



Feature	Options	Description
COM0 Console Redirection	Enabled Disabled	Console Redirection Enable or Disable.

Console Redirection Settings

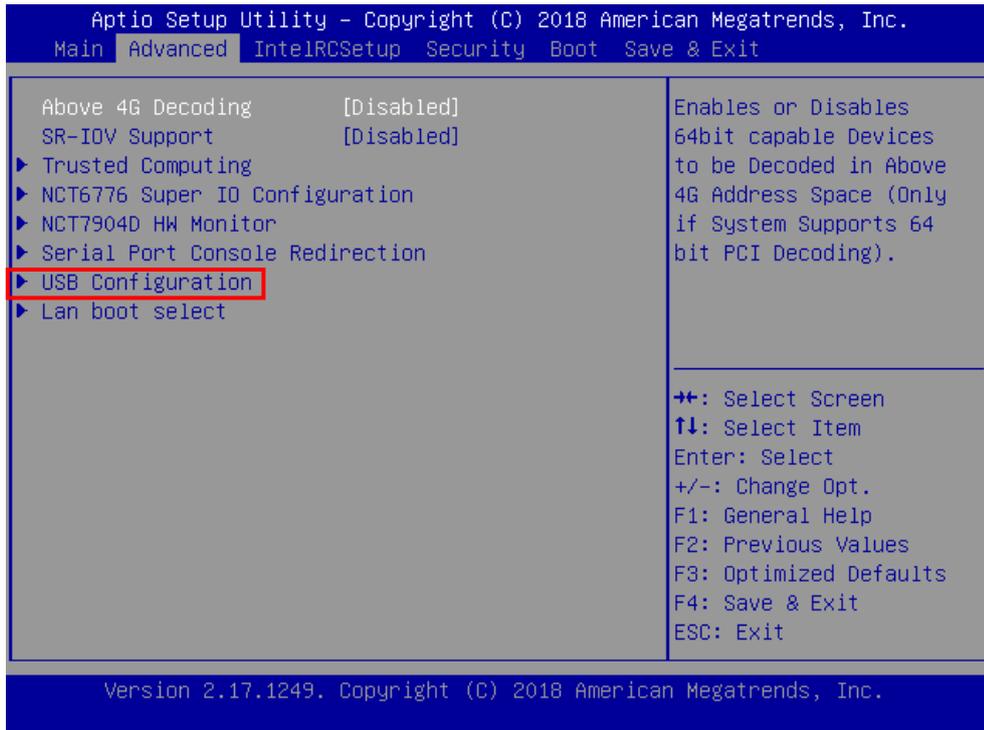


Feature	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	VT100: ASCII char set VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes ANSI: Extended ASCII char set
Bits per second	9600 19200 38400 57600 115200	Selects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

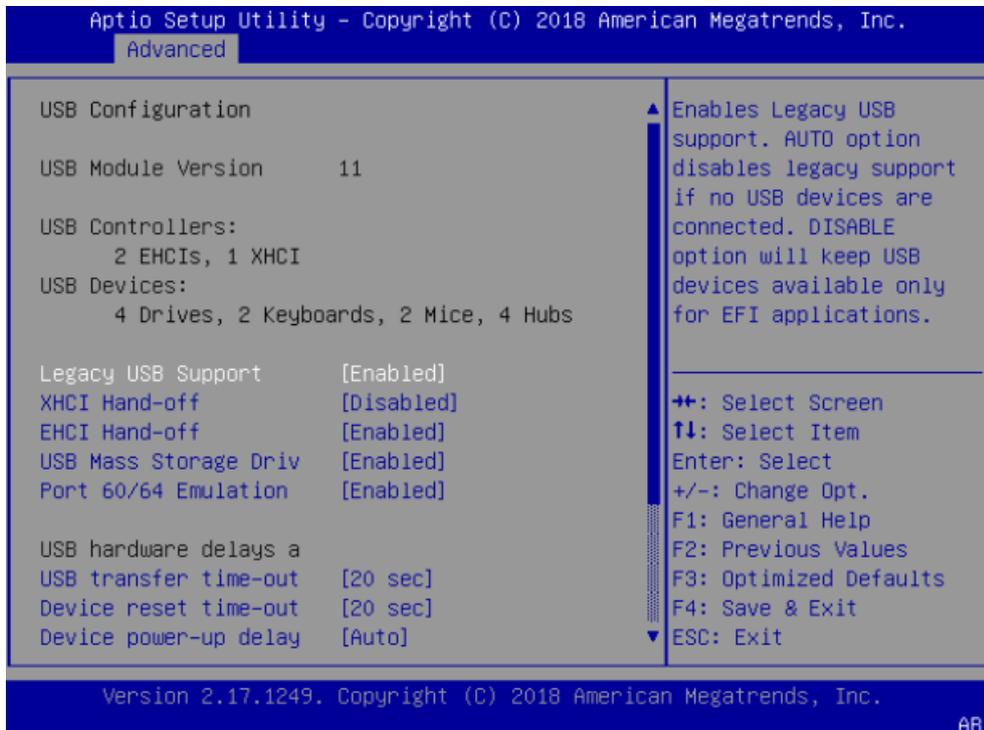
VT-UTF8 Combo Key Support	Disabled Enabled	Enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	Disabled Enabled	With this mode enabled, only text will be sent. This is to capture Terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution
Legacy OS Redirection Resolution	80x24 80x25	On Legacy OS, the Number of Rows and Columns supported redirection.
Putty KeyPad	VT100 LINUX XTERM86 SCO ESCN VT400	Selects FunctionKey and KeyPad on Putty.
Redirection After BIOS POST	Always Enable BootLoader	When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable.

USB Configuration

This option allows you to change USB configuration parameters.

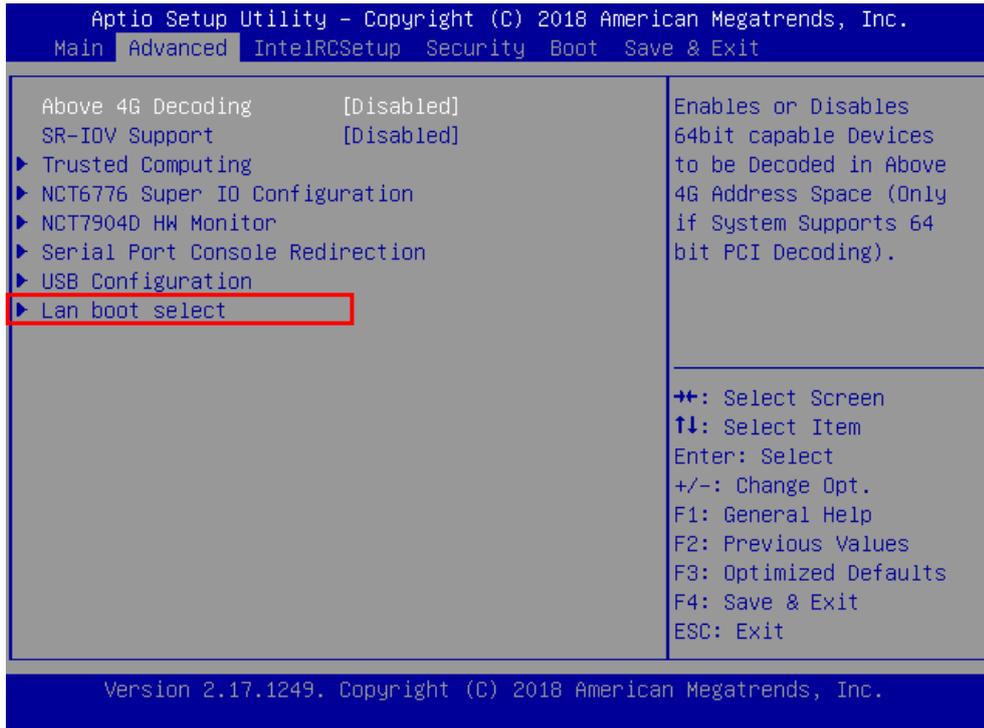


Press <Enter> to access the submenu.

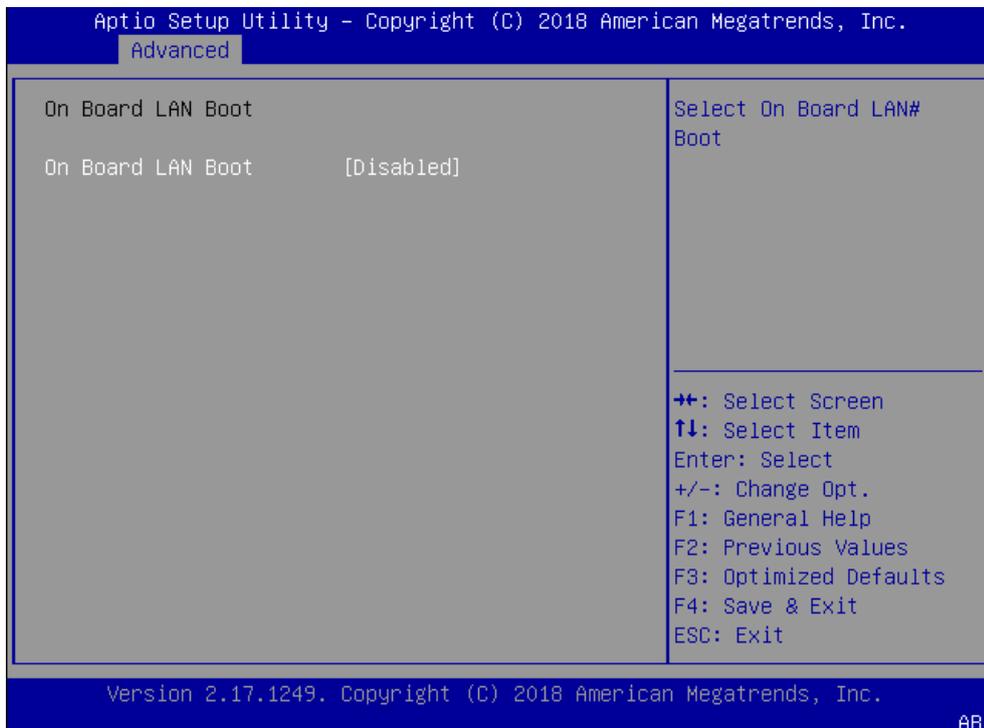


Item	Value	Description
Legacy USB Support	Enabled Disabled Auto	Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected; Disabled option will keep USB devices available only for EFI applications.
XHCI Hand-off	Enabled Disabled	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-off	Enabled Disabled	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
USB Mass Storage Driver Support	Enabled Disabled	Enables or disables USB Mass Storage Driver Support.
Port 60/64 Emulation	Enabled Disabled	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	The time-out value for Control, Bulk, and Interrupt transfers
Device reset time-out	1 sec 5 sec 10 sec 20 sec	USB mass storage device Start Unit command time-out
Device power-up delay	Auto Manual	Maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value: for a Root port, it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

LAN boot Select



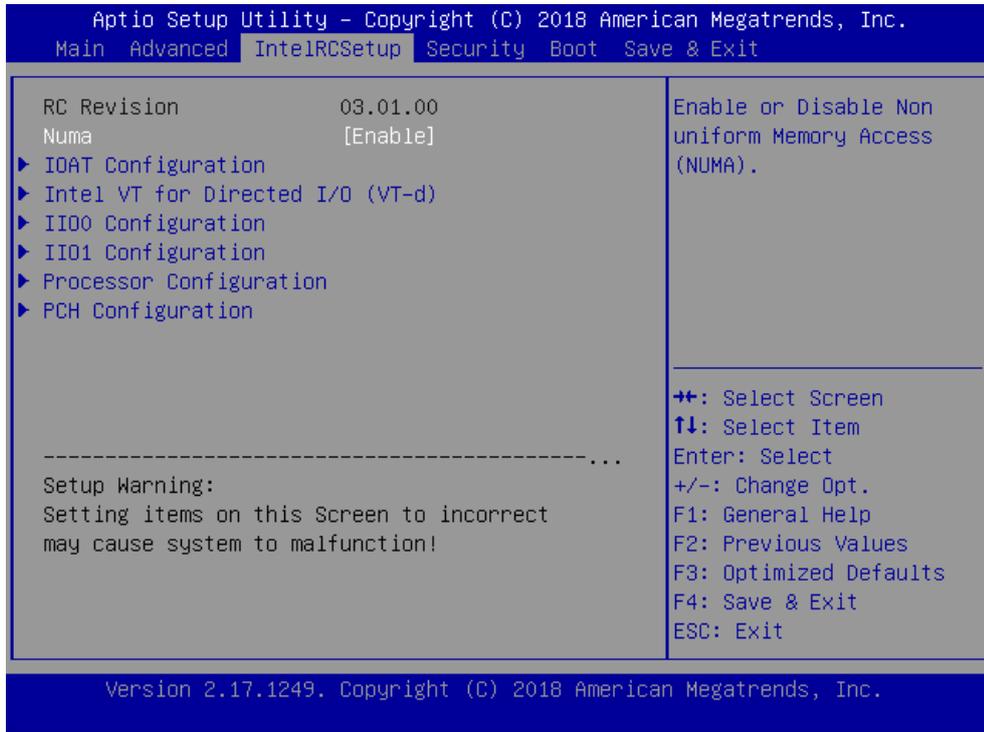
Press <Enter> to access the submenu.



Item	Value	Description
On Board LAN Boot	Disabled MGT1 MGT2	Select onboard LAN# boot.

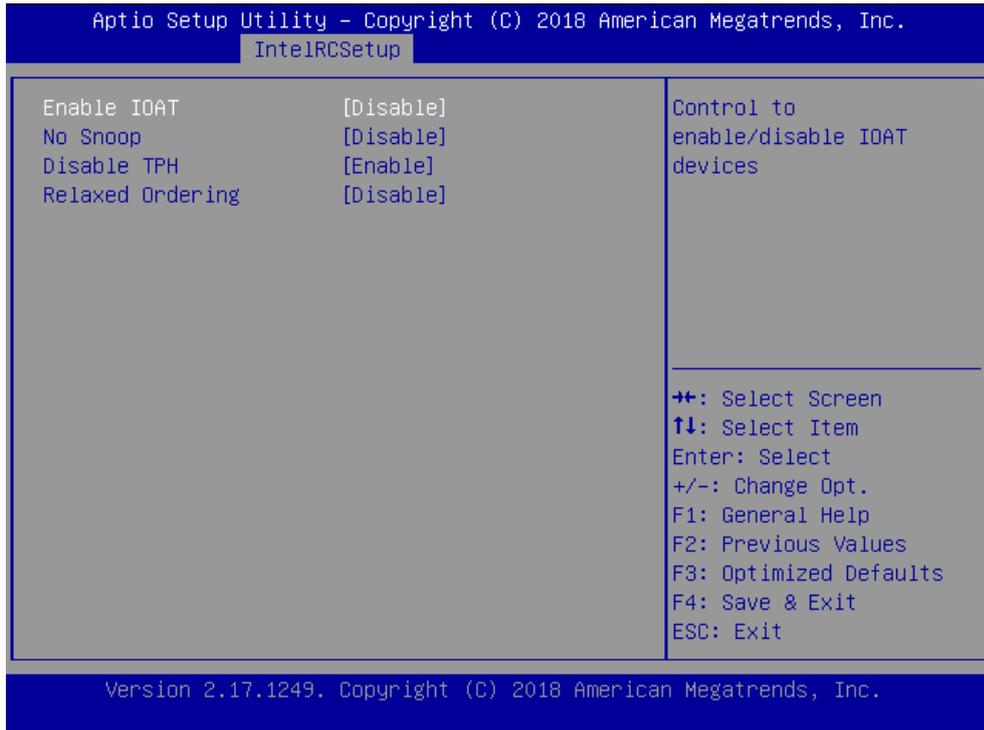
IntelRC Setup

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



Item	Value	Description
RC Revision	None	Displays RC revision information
Numa	Enable Disable	Enables or disables Non-Uniform Memory Access (NUMA)

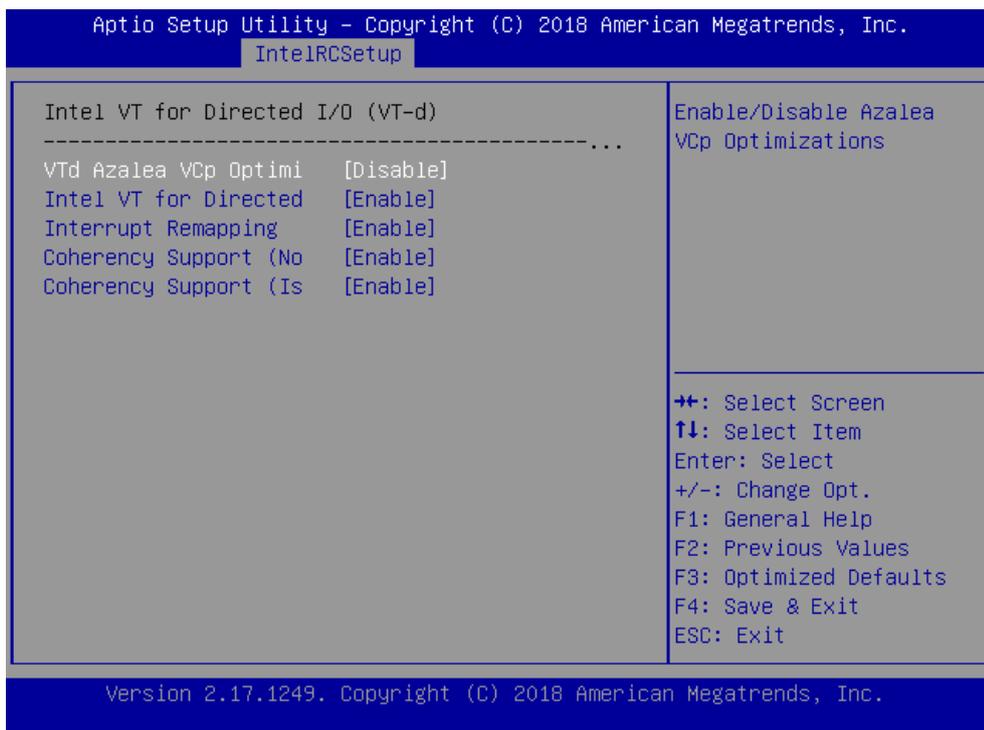
IOAT Configuration



Item	Value	Description
Enable IOAT	Enable Disable	Enables or disables IOAT devices. This function allows you to enable Intel I/O Acceleration Technology which benefits system data flows by reducing CPU overheads. The freed CPU resources will improve system responsiveness and avoid performance bottleneck.
No Snoop	Enable Disable	Enables or disables each CB device
Disable TPH	Enable Disable	Enables or disables TLP Processing Hint
Relaxed Ordering	Enable Disable	Enables or disables relaxed ordering.

Intel (R) VT for Directed I/O (VT-d)

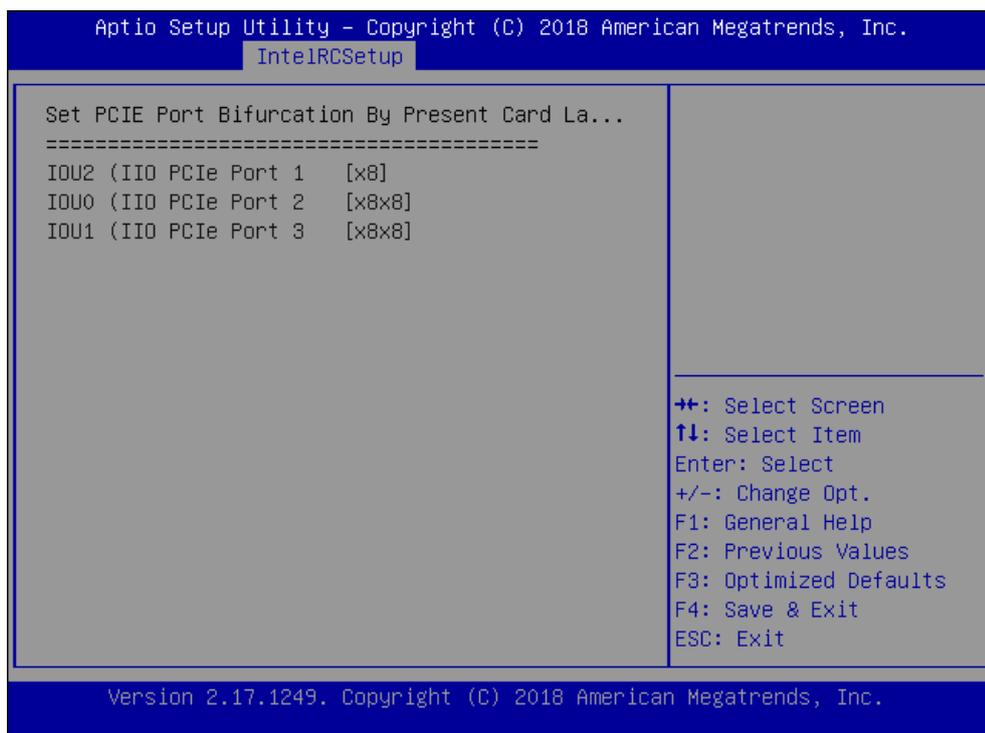
This option allows users to configure items of Intel Virtualization Technology for Directed I/O (VT-d).



Item	Value	Description
VTd Azalea VCp Optimization	Enable Disable	This option allows you to enable or disable Azalea VCp Optimization.
Intel VT for Directed	Enable Disable	Enable/Disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device assignment to VMM through DMAR ACPI Tables.
Interrupt Remapping	Enable Disable	Enables or disable VT-d Interrupt Remapping support.
Coherency Support (Non-Isoch)	Enable Disable	Enables or disable VT-d Engine Coherency support.
Coherency Support (Isoch)	Enable Disable	Enables or disable Isoch VT-d Engine Coherency support

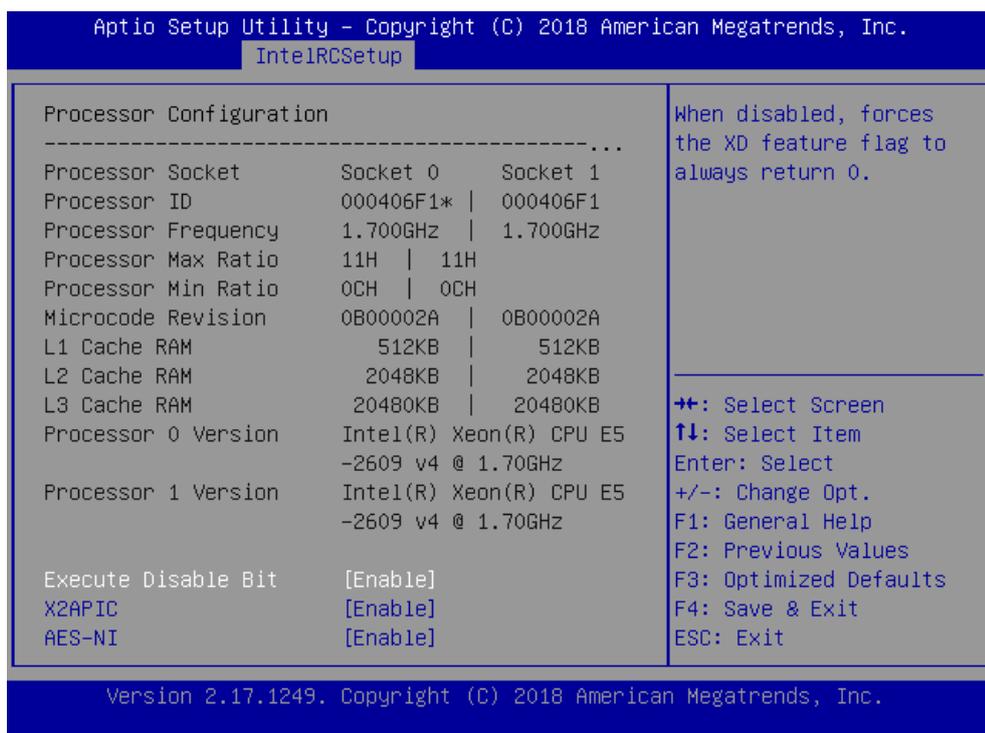
I/O Configuration

This function allows users to check PCIe port lane width switch status.



Processor Configuration

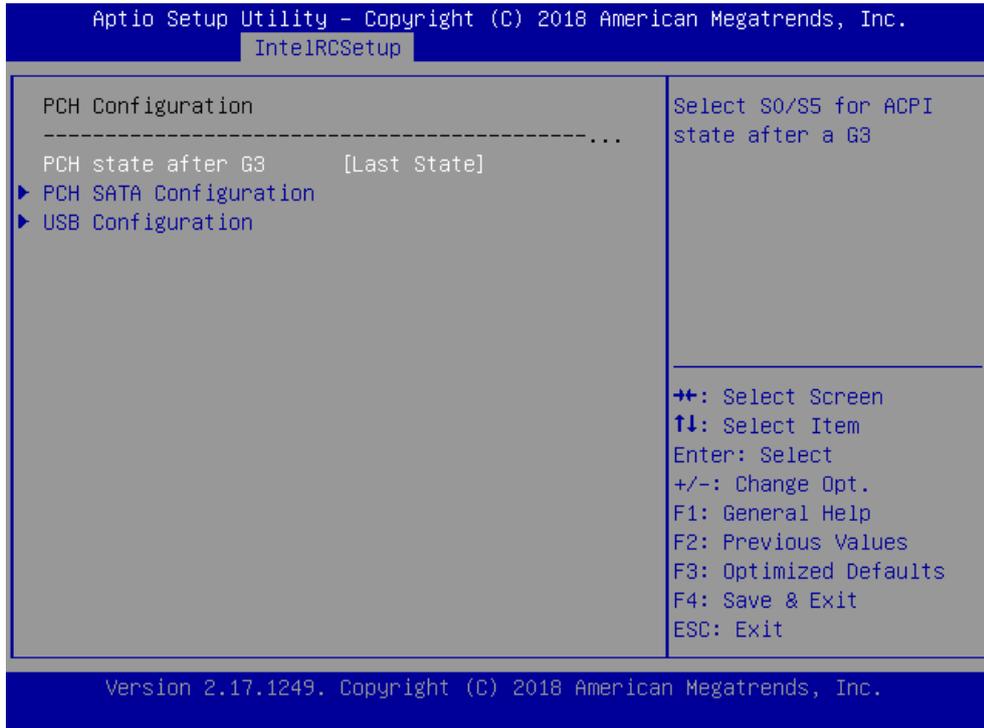
This function allows users to view and configure options that can change processor settings.



Feature	Options	Description
Execute Disable Bit	Disable Enable	An Intel hardware-based protection against malicious code. It will detect the memory in which a code can be executed or not. When enabled, it will prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. When disabled, it forces the XD feature flag to always return 0.
X2APIC	Disable Enable	Enables or disables extended APIC support.
AES-NI	Disable Enable	Enables or disables AES-NI (Advanced Encryption Standard - New Instruction) support.

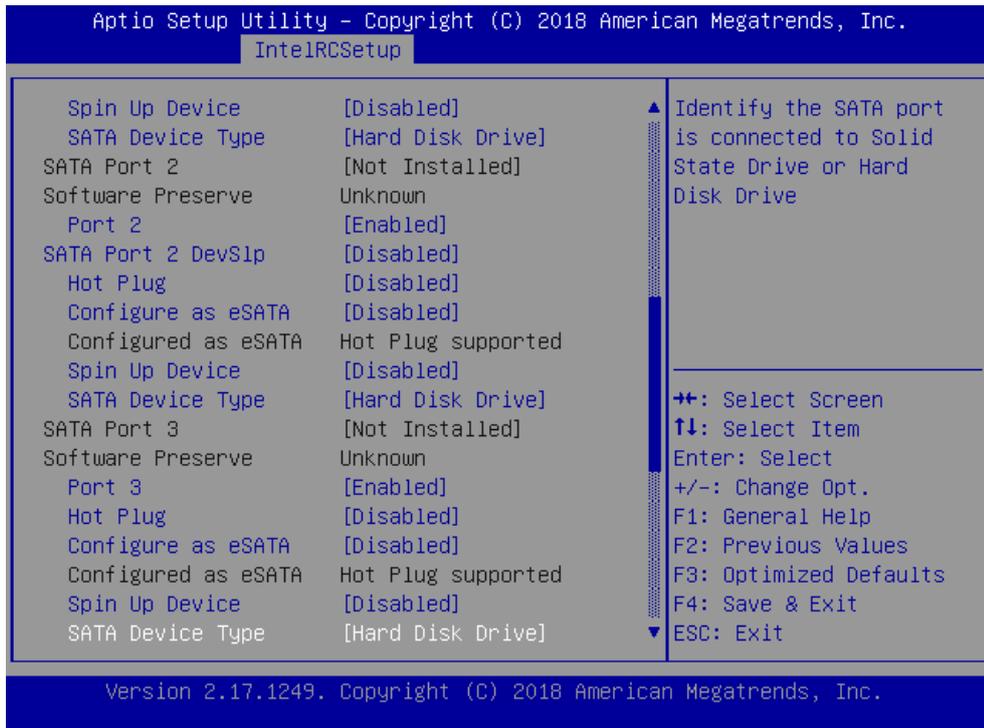
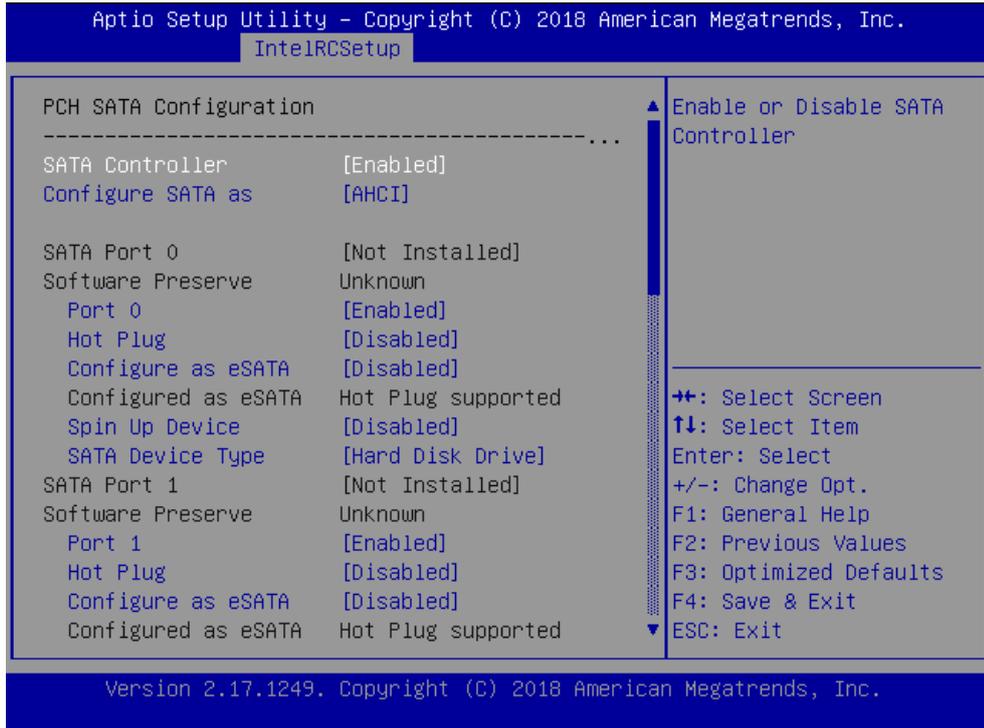
PCH Configuration

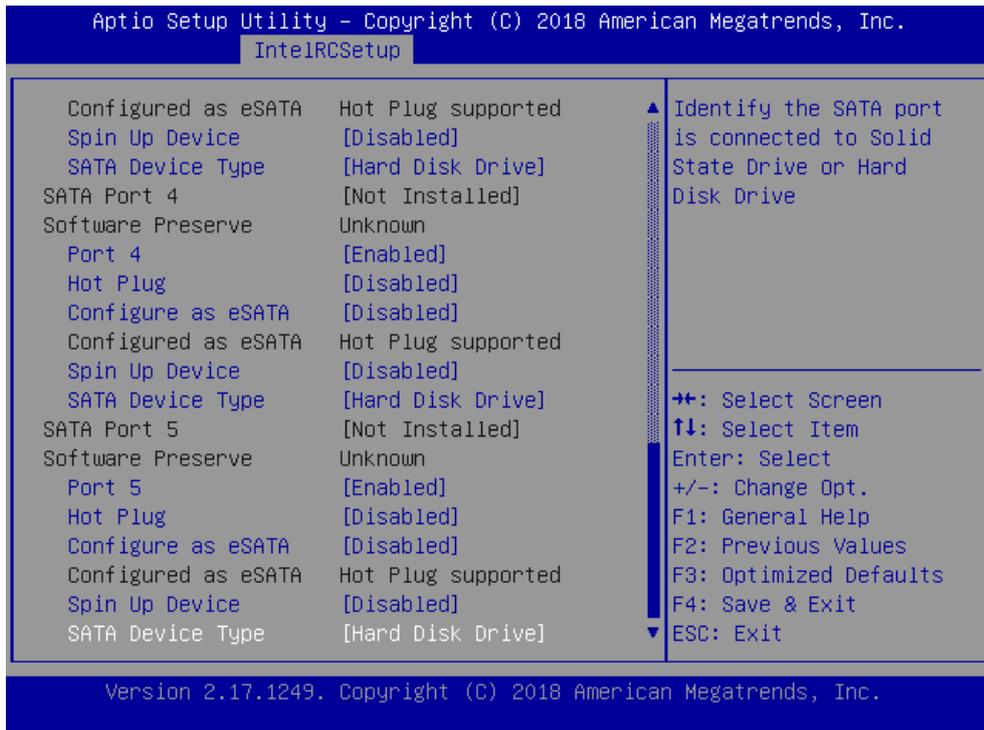
This function allows users to view and configure PCH settings.



Feature	Options	Description
PCH State after G3	S0	Select S0/S5 for ACPI state after a G3
	S5	
	Last State	

PCH SATA Configuration

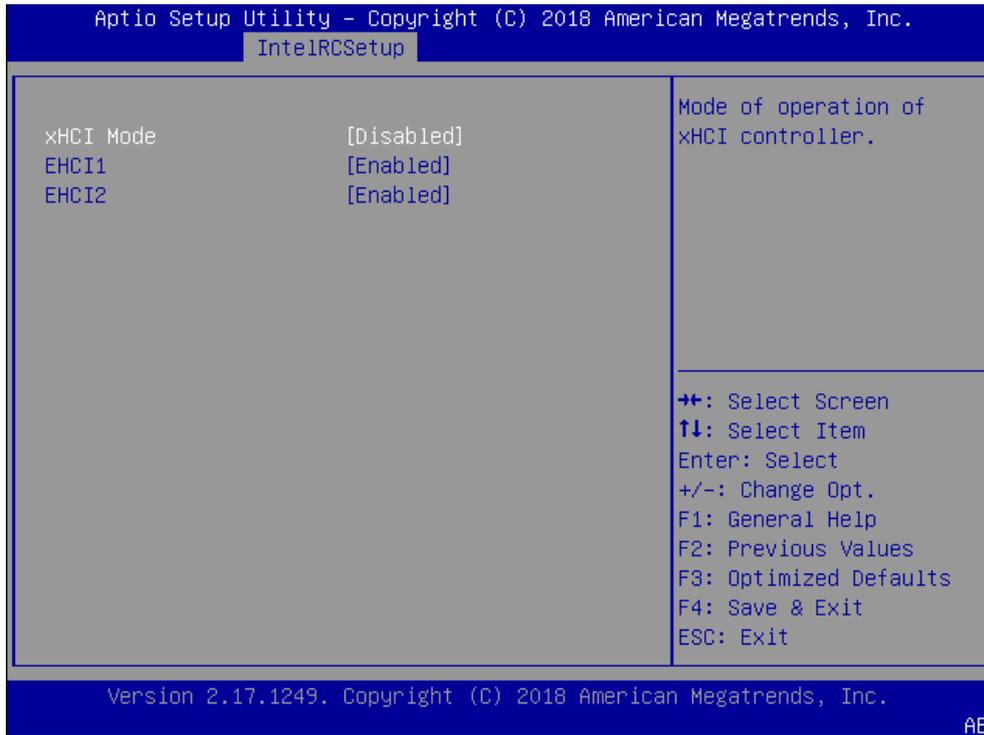




Feature	Options	Description
SATA Controller	Disable Enable	Enables or disables SATA controller
Configure SATA as	IDE AHCI RAID	This item identifies whether the SATA port is connected to an SSD and HDD. Select IDE, AHCI or RAID. The default is "AHCI".
SATA Port 0~5	--	Displays status of SATA port 0~5
Software Preserve	--	Displays information of Software Preserve value for SATA port 0~5
Port 0	Disable Enable	Enables or disable this SATA port
Hot Plug	Disable Enable	Designates this port as hot pluggable
Configured As eSATA	Disable Enable	Designates this port as eSATA
Spin Up Device	Disable Enable	If enabled for any of ports, Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise, all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identifies the SATA port is connected to SSD or HDD.

PCH USB Configuration

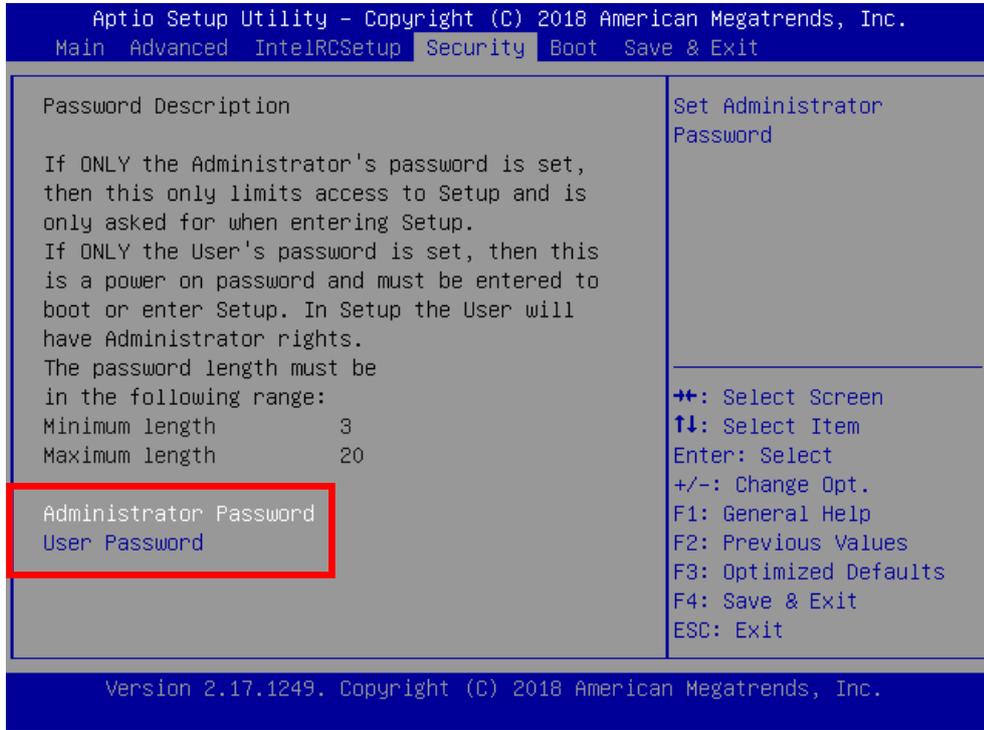
Press <Enter> to access items for USB configurations.



Feature	Options	Description
XHCI Mode	Smart Auto Auto Disable Enable	Mode of operation of XHCI controller
EHCI1	Disable Enable	Control the USB EHCI (USB 2.0) function. One EHCI controller must always be enabled.
EHCI2	Disable Enable	Control the USB EHCI (USB 2.0) function. One EHCI controller must always be enabled.

Security Setup

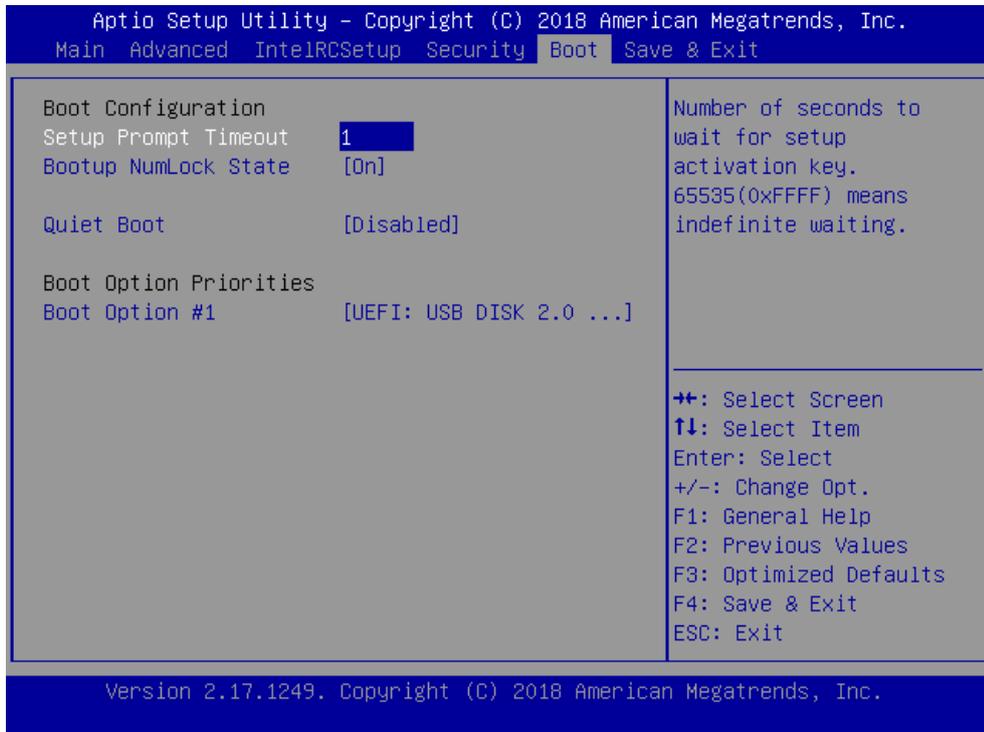
Use [←] / [→] to select [Security] setup screen. Under this screen, you may use [↑] [↓] to select an item you would like to configure.



Item	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.

Boot Setup

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

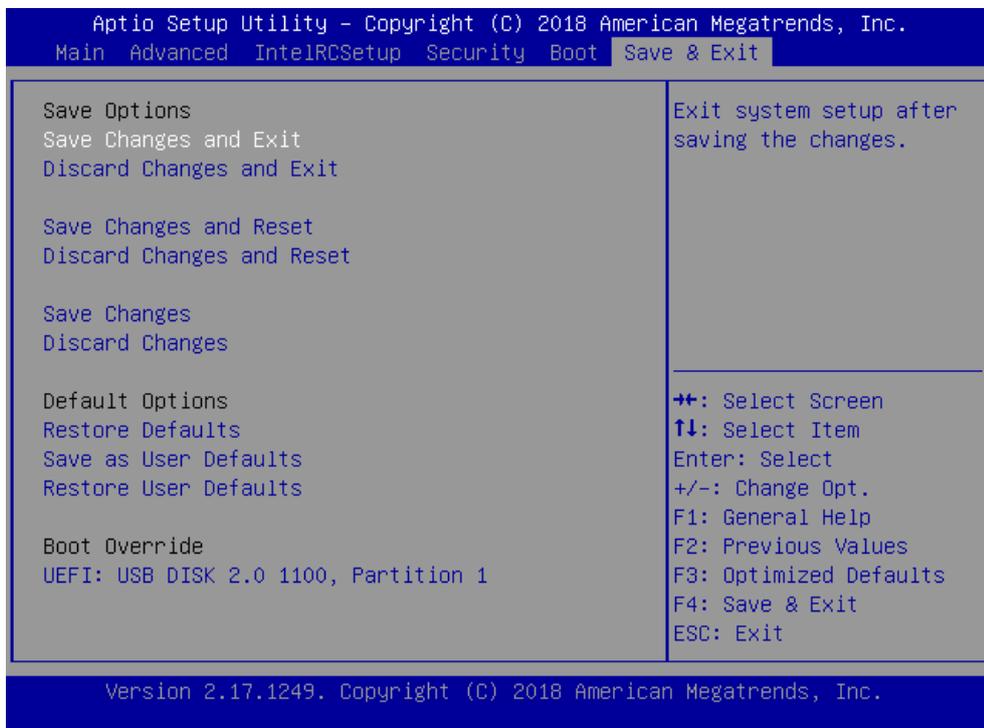


Item	Option	Description
Setup Prompt Timeout	1	The number of seconds to wait for setup activation key. 65535 means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state
Quiet Boot	Disabled Enabled	Enables or disables Quiet Boot option.

- Choose boot priority from boot option group.

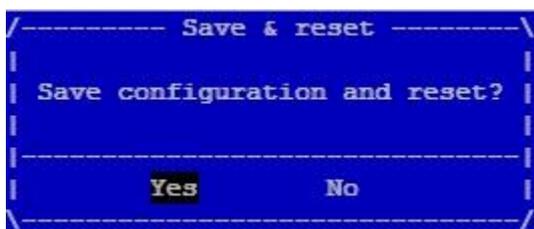
Save and Exit Setup

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



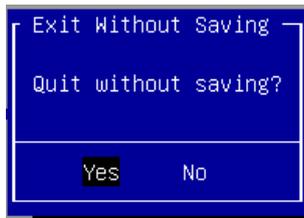
Save Changes and Reset

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 is selected. Select “**Yes**” to Save Changes and Exit Setup.



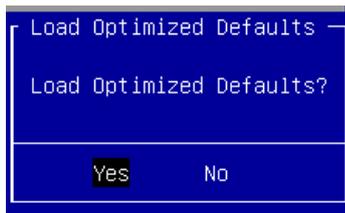
■ Discard Changes and Exit

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

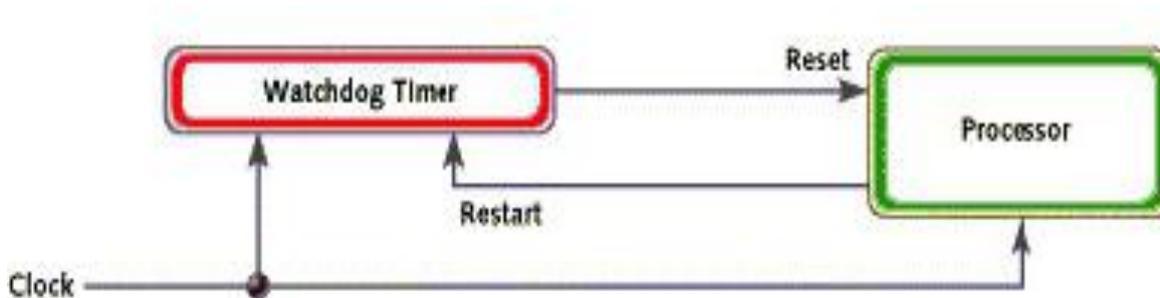


PS: The items shown under Boot Override will depend on devices connected to the system.

APPENDIX A: 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 presumed 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.

For sample watchdog code, please go to *the Lanner Support Website* at <http://www.lannerinc.com/download-center/> and browse the *download center*.



To execute the sample code: enter the number of seconds to start count down before the system can be reset. Press start to start the counter and stop to stop the counter..

```
Dwd_tst --swt xxx (Set Watchdog Timer 1-255 seconds)
```

```
wd_tst[*] --start (Start Watchdog Timer)
```

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

APPENDIX B: SETTING UP CONSOLE REDIRECTION

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. These 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 > Remote Access Configuration > Serial Port Mode > [115200, 8 , n ,1]
3. Configure Console Redirection on the client system. The following is an example on Windows platform:
 - a. Click the **Start** button, point to **Programs > Accessories > Communications** and select Hyper Terminal.
 - b. Enter any name for the new connection and select any icon.
 - c. Click **OK**.
 - d. From the "Connect to". Pull-down menu, select the appropriate Com port on the client system and click **OK**.
 - e. 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.

For items on the setup, please refer to the console redirection of the BIOS menu.

APPENDIX C: 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 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.

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

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 5~1275 seconds of timer interval.
 - Run-Time watchdog timer, used during run-time, has setting of 1~255 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 a port basis. By using dedicated watchdogs for different pairs of the 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 sample LAN bypass code and the Bypass Manual, go to *the Lanner Support Website* at <http://www.lannerinc.com/download-center/> and browse the *download center* and look for *Lanner LAN Bypass Watchdog User Manual* under the *Accessories* folder.

APPENDIX D: PROGRAMMING THE LCM

The LCD panel module (LCM) is designed to provide real-time operating status and configuration information for the system. For sample LCM code, please go to *the Lanner Support Website* at <http://www.lannerinc.com/download-center/> and browse the *download center* for the driver and the program library can also be found in the folder.

The system supports the following 2 kinds of LCM:

- Parallel Text-based LCM: The LCM connects to the motherboard's parallel port. The LCD screen can display 2 lines, 16 (or 20) characters per line.
- USB and Serial Text or Graphic-based LCM: Our next generation LCM. Lanner engineers design a common source code to be deployed on these two differently interfaced LCM modules. Jumpers are used to select between text and graphic types. See next section.

For Parallel Text-based LCM

Build

To build program source code on Linux platform, please use the following steps as a guideline:

1. Extract the source file:

```
# tar -xzvf plcm_drv_v0XX.tgz
```

(0XX is the version of the program.)

2. Change directory to the extracted folder:

```
# cd plcm_drv_v0XX
```

(0XX is the version of the program.)



Note: Apply our Parallel Text-based LCM to the environment of virtualization, please use the version 013 or above of the program.

3. Type "make" to build source code:

```
# make
```

After compiling, the executable programs (plcm_test, plcm_cursor_char, ppdev_test, Test) and the driver (plcm_drv.ko) will appear in the program's folder.



Note: The OS supported by Parallel Text-based LCM function includes platforms based on Linux Kernel series 2.4.x, Linux Kernel series 2.6.x and Linux Kernel series 3.0.x or above.

Install

Install the driver and create a node in the /dev directory by:

```
#insmod plcm_drv.ko
```

```
#mknod /dev/plcm_drv c 248 0
```



Note: If you cannot install the driver, check whether you have enabled the parallel port in the BIOS setting. Once the message of “insmod”: error inserting ‘plcm_drv.ko’: -1 Input/output error” appears, please check that whether the major number is repeated or not. The major number needed with the “mknod” command varies with different software versions; please look up the Readme file for this value.

Execute

This section contains sample executable programs that you could test on your platform. It demonstrates some useful functionality that the LCM provides. Note that the installation needs to be completed before proceeding with these executions.

To execute, run the command:

```
#!/plcm_test
```

Backlight Off/On turning off/on the backlight of the LCM display

Display Off turning off the LCM display

Cursor Off/On NOT showing/showing the cursor on the LCM display

Blinking off/On turning off/on the cursor blinking

Writing “Lanner@Taiwan” displaying the specific sentences

Reading “Lanner@Taiwan” reading the specific sentence

CGram Test displaying the user-stored characters

Keypad Testing Get the keypad input: the 1st button is read in as Left, the 2nd button is read in as Up, the 3rd button is read in as Right, and the 4th button is read in as Down)

Corresponding Commands for “plcm_test”

You can directly input the specific command to have its corresponding function worked on your LCM. This will be much more convenient once you would like to merely execute the keypad testing.

-On

— Turn on the backlight of the LCM display.

— To execute, please type:

```
#!/plcm_test -On
```

-Off

— Turn off the backlight of the LCM display.

— To execute, please type:

```
#!/plcm_test -Off
```

-LCM1

— Writing “Lanner@Taiwan” in line1.

— To execute, please type:

```
#!/plcm_test -LCM1
```

-LCM2

— Writing “2013-11-05” in line 2.

— To execute, please type:

```
#./plcm_test -LCM2
```

Keypad

— Get the keypad input: the 1st button is read in as Left, the 2nd button is read in as Up, the 3rd button is read in as Right, and the 4th button is read in as Down.

— To execute, please type:

```
#./plcm_test -Keypad
```

Commands for plcm_cursor_char

This Run this command for cursor shift & single text update

```
# ./plcm_cursor_char
```

Please read the options below

Insert line select Item 1 to set the starting line as either line 1 or line 2

Move cursor right select Item 2 to move the cursor to the right

Move cursor left select Item 3 to move the cursor to the left

Add a char select Item 4 to display a character on the LCM screen

Clean display select Item 5 to clear up the LCM display

Leave select Item 6 to exit the program

Test

This program is a testing script and runs through the following procedures in sequence:

— **rmmod plcm_drv** (remove the kernel mode driver module)

— **insmod plcm_drv.ko** (install the kernel mode driver module)

— **./plcm_test** (execute the driver testing program)

— **./plcm_test -stop** (stop executing the driver testing program)

— **rmmod plcm_drv** (remove the kernel mode driver module)

To execute, please type:

```
#./Test
```

Virtualization Implemented by Parallel

Port Pass Through

By the utilization of the parallel port pass through, the Parallel Text-based LCM implements the following three kinds of virtualization in the Guest OS.

- QEMU/KVM

- Xen

- VMWare Player

Here, we take the Fedora 20 x86_64 operation system, for instance, to explain 3 virtualizations respectively for parallel port pass through. Use the procedures listed below for step-by-step instructions separately based on your case.

In the case of QEMU/KVM or Xen, please use the following steps as a guideline to implement the virtualization:

1. Make sure that the Guest OS has been installed.
2. Add the following 4 lines into the xml file (for example, add to /etc/libvirt/qemu/<yourvirtualmachine>.xml in linux KVM):


```
<parallel type='dev' >
<source path='/dev/parport0' />
<target port='0' />
</parallel>
```
3. Open a terminal in the Guest OS and then issue the following commands to install Linux Kernel drivers.


```
# modprobe parport
# modprobe parport_pc
# modprobe ppdev
```
4. Check that whether the /dev/parport0 exists or not. You may not find proper /dev/parport0 in the device list, please reconfirm the setup of xml file in the Guest OS.
5. Reboot the Guest OS.



Note: It is necessary for you to install "insmod parport.ko", "parport_pc.ko" and "ppdev.ko" Linux Kernel drivers in virtualization environment before executing the "ppdev_test" testing program.

In the case of VMWare Player, please use the following steps as a guideline to implement the virtualization:

1. Make sure that the Guest OS has been installed.
2. To set up the parallel port pass through, please enter VMWare Player's --> Virtual Machine Setting --> VMWare Player's setting page to select /dev/parport0 as a parallel port device.
3. Open a terminal in the Guest OS and then issue the following commands to install Linux Kernel drivers.


```
# modprobe parport
# modprobe parport_pc
# modprobe ppdev
```
4. Check that whether the /dev/parport0 exists or not. You may not find proper "/dev/parport0" in the device list, please reconfirm the setup of VMWare Player's setting page described in Step 2.
5. Reboot the Guest OS.



Note: It is still necessary to install "insmod parport.ko", "parport_pc.ko" and "ppdev.ko" Linux Kernel drivers in virtualization environment before executing the "ppdev_test" testing program.

APPENDIX E: 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: <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