

Network Application Platforms

Hardware platforms for next generation networking infrastructure



FW-8896
V1.3

User's Manual
Release Date: 2016/05/11

Table of Contents

Overview	5
<hr/>	
Chapter 1: Introduction	9
<hr/>	
System Specifications	9
Package Contents	10
Ordering Information	10
Compatible Accessories	10
Front Panel Features (FW-8896 A/B/C/D)	11
Rear Panel Features (FW-8896 A/B/C/D)	12
Front Panel Features (FW-8896 E/F/G/H)	13
Rear Panel Features (FW-8896 A/B/C/D)	14
Chapter 2: Motherboard Information	15
<hr/>	
Block Diagram	15
Motherboard Layout	16
Internal Jumper & Connectors	17
Chapter 3: Hardware Setup	21
<hr/>	
Preparing the Hardware Installation	21
Installing the System Memory	22
Installing the CFast Card	23
Installing the Disk Drive(s)	24
Installing the NIC Modules	26
Replacing the Power Supply Units	27
Replacing the Cooling Fans	28
Rack Mounting	30

Chapter 5: BIOS Setup	33
Advanced	34
NCT6776 Super IO Configuration	35
NCT7904D HW Monitor	39
Serial Port Console Redirection	41
COM Console Redirection Settings	42
Trusted Computing	47
USB Configuration	48
LAN Boot Select	53
IntelRCSetup	54
IOAT Configuration	54
Intel (R) VT for Directed I/O (VT-d) Configuration	57
IIO0 Configuration	60
IIO1 Configuration	61
Processor Configuration	62
PCH Configuration	65
PCH SATA Configuration	66
PCH USB Configuration	74
Security	75
Boot	76
Save & Exit	78
Appendix A: Programming Watchdog Timer	79
Appendix B: Setting up Console Redirections	79
Appendix C: Programming Generation 3 LAN Bypass	80

Appendix D: Programming the LCM	81
Appendix E: On Linux	84
Appendix F: Terms and Conditions	85
Warranty Policy	85
RMA Service	85

Overview

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 check 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 exclamation point 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 on-line product information and technical support.

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

Copyright and Trademarks

This document is copyrighted © 2014. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, nor for any infringements upon the rights of third parties that may result from such use.

Acknowledgement

Intel® Atom™, Pentium®, Celeron®, and Xeon® are registered trademarks of Intel Corp.

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

Compliances

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. 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. 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 other 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).

Rack Mounting Installation Environment Precaution

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. Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. 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.
5. 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)."

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

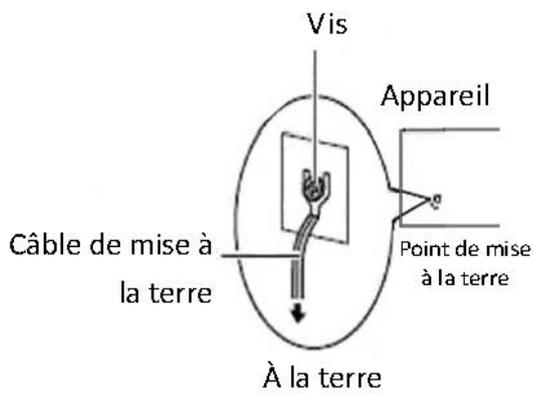
- Avant d'allumer l'appareil, reliez le câble de mise à la terre de l'équipement à la terre.
- Une bonne mise à la terre (connexion à la terre) est très importante pour protéger l'équipement contre les effets néfastes du bruit externe et réduire les risques d'électrocution en cas de foudre.
- Pour désinstaller 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

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
V0.1	2014/11/04	Preliminary
V0.2	2014/11/17	Updated hardware setup Updated mounting instructions
V0.3	2014/12/10	Updated pin assignments Modified hardware setups Added updated LCM instructions
V1.0	2015/06/04	Official release
V1.1	2015/07/06	Added BIOS chapter
V1.2	2015/12/09	Removed JVGA pinout Modified Serial bit per second description in BIOS
V1.3	2016/05/11	Modified power supply/input information Modified temperature specifications

Chapter 1:

Introduction

Thank you for choosing Lanner FW-8896. The FW-8896 is an upgrade platform of FW-8895. It delivers 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 64 GbE ports:

Lanner FW-8896 can fit in up to 8 Ethernet modules, with a total of up to 64 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 N+1 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 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.

- Watchdog Timer and Gen 2/3 LAN Bypass

System Specifications

Form Factor		2U Rackmount
Platform	Processor Options	2 x 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	16 x 288-pin DIMM
OS Support		Windows 7, 2008 Server, Linux kernel 2.6 or later
Storage	HDD Bays	For models A/B/C/D: 1 x 3.5" SATA HDD For models E/F/G/H: 2 x 2.5" SATA HDDs/SSDs
	NAND Flash	1 x CFast
Network-ing	Management Ports	For models A/B/C/D: 1 x RJ45 GbE port For models E/F/G/H: 2 x RJ45 GbE ports
	Bypass	Depending on Ethernet module specifications (support Lanner Gen 3 bypass)
	Controllers	2 x Intel® i210AT
	Ethernet Modules	up to 8 slim type modules (1xPCIe*8 or 2xPCIe*4)
	Console Ports	1 x RJ45 console port
	Security Acceleration	Intel ColettoCreek 8925
I/O Inter-face	LAN ports	Up to 64 GbE ports, depending on modules installed
	Reset Button	1 x reset button Software reset by default
	Console	1 x RJ45
	USB	2 x USB 2.0
Expansion	IPMI via OPMA slot	OPMA socket to support IPMI IAC-AST2300 1x 10/100/GbE
	PCIe	4x PCIe*8 connectors for front NIC 2x PCIe*16 ZD connectors for back-plane 1x PCIe*8 connector for riser card
Cooling	Processor	2 x CPU heat-sink (Passive)
	System	4 x independent hot-swappable cooling fans with smart fan control
Environ-mental Parameters	Temperature	Operating: 0 ~ 40° C Non-operating: -20~70° C
	Humidity (RH)	Operating: 5~90% non-condensing Non-operating: 5~95% non-condensing
Miscellaneous	LCD Module	1x character type LCM with 4 keypads (graphic optional)
	Watchdog	Yes
	Internal RTC with Li Battery	Yes
Physical	Dimensions	438 x 88 x 600, unit:mm
	Weight	25 kg
Power	Type / Watts	FW-8896A/B/E/F 100-240V~ /47-63Hz /9-4A FW-8896C/D/G/H 100-240V~ /47-63Hz /12-6A
	Certificate & Compliance	
		CE Class A, FCC Class A, RoHS

Package Contents

Your package contains the following items:

- FW-8896 Network Security Platform
- 2 power cables
- 1 Long Ear Rack mount kit with screws
- 1 Console cable
- 1 LAN cable (grey)

Optional:

- RC-8896 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 components is missing or damaged, please contact your dealer immediately for assistance.

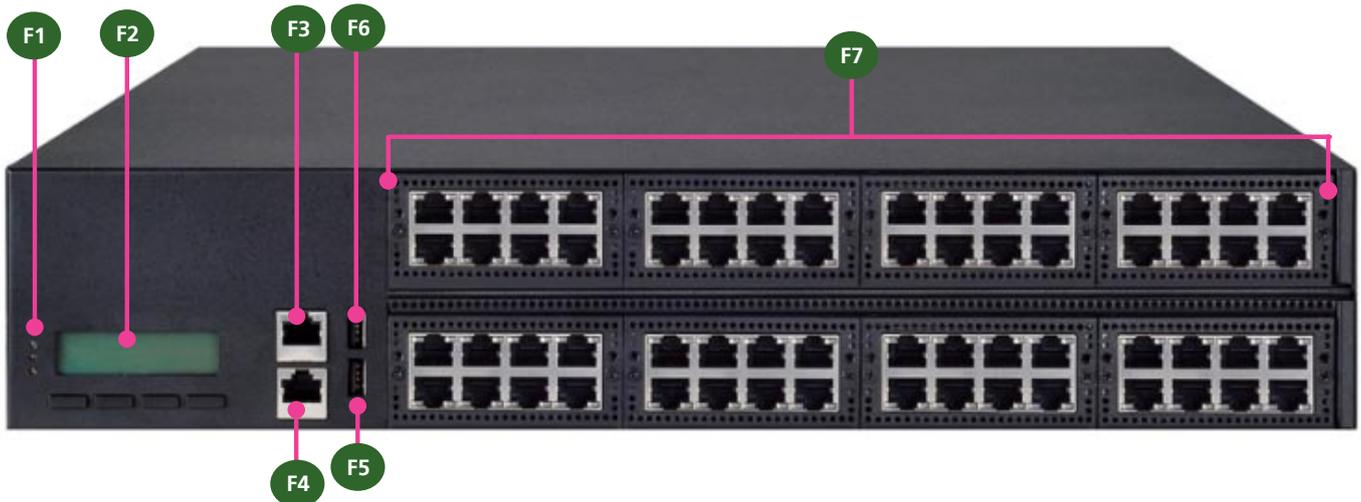
Ordering Information

FW-8896A	8 Ethernet modules, one internal 3.5" HDD space	with DH8925	600W PSU Support upto 2x 95W CPU
FW-8896B	8 Ethernet modules, one internal 3.5" HDD space	without DH8925	600W PSU Support upto 2x 95W CPU
FW-8896C	8 Ethernet modules, one internal 3.5" HDD space	with DH8925	800W PSU Support upto 2x 130W CPU
FW-8896D	8 Ethernet modules, one internal 3.5" HDD space	without DH8925	800W PSU Support upto 2x 130W CPU
FW-8896E	8 Ethernet modules, two external 2.5" HDD Tray	with DH8925	600W PSU Support upto 2x 95W CPU
FW-8896F	8 Ethernet modules, two external 2.5" HDD Tray	without DH8925	600W PSU Support upto 2x 95W CPU
FW-8896G	8 Ethernet modules, two external 2.5" HDD Tray	with DH8925	800W PSU Support upto 2x 130W CPU
FW-8896H	8 Ethernet modules, two external 2.5" HDD Tray	without DH8925	800W PSU Support upto 2x 130W CPU

Compatible Accessories

Models	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

Front Panel Features (FW-8896 A/B/C/D)



F1 Power/Status/HDD LED

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

F3 Management Port

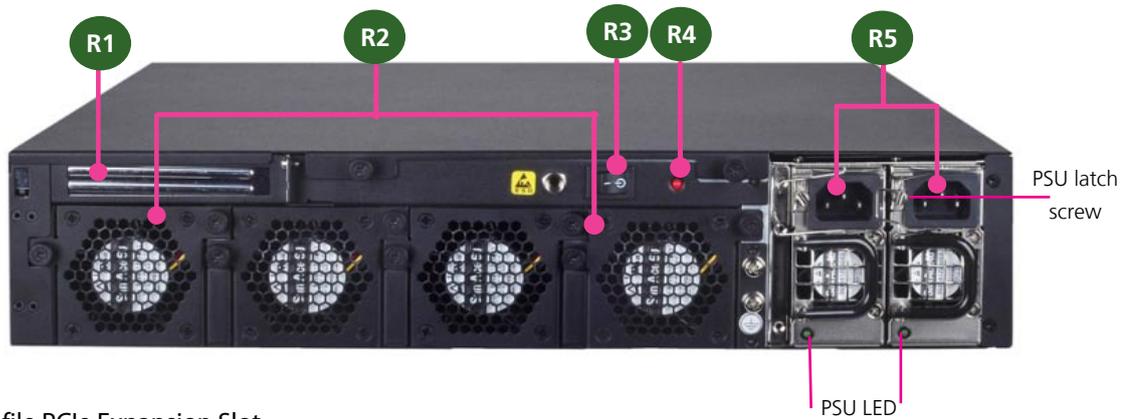
F4 Console Port

F5 Reset Switch

F6 Two USB 2.0 Ports

F7 Swappable Ethernet Modules (with LAN bypass model options)

Rear Panel Features (FW-8896 A/B/C/D)



R1 Low Profile PCIe Expansion Slot

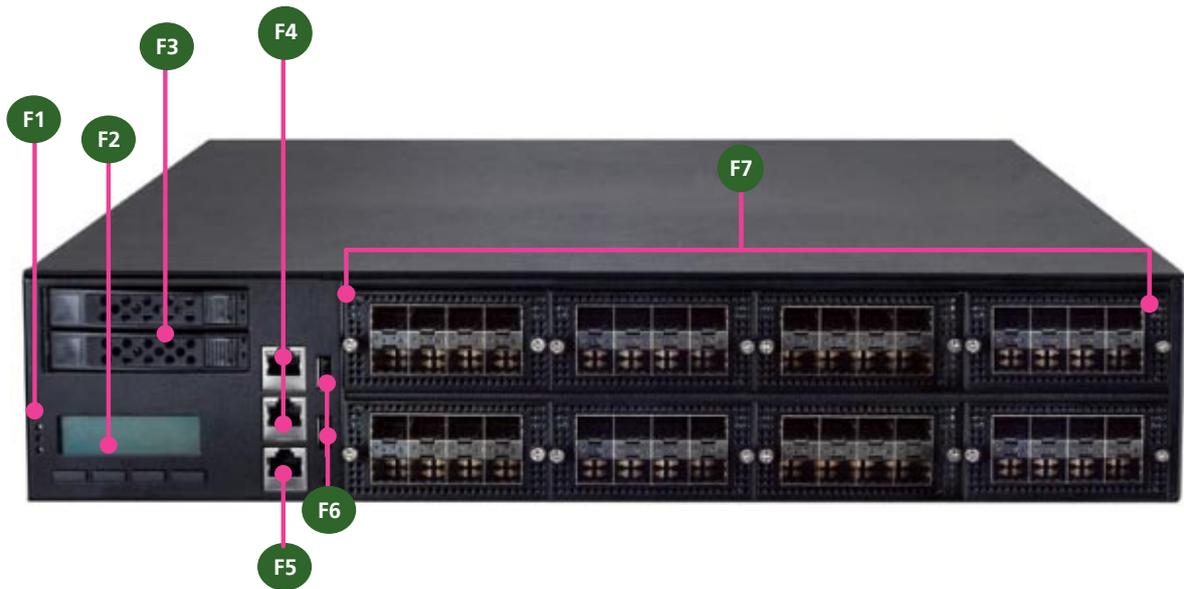
R2 4 x Modular Fans

R3 Power Switch

R4 Power Supply Alarm Switch

R5 Redundant Power Supply

Front Panel Features (FW-8896 E/F/G/H)



F1 Power/Status/HDD LED

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 keypads

F3 2 x External SATA 2.5" drive bays

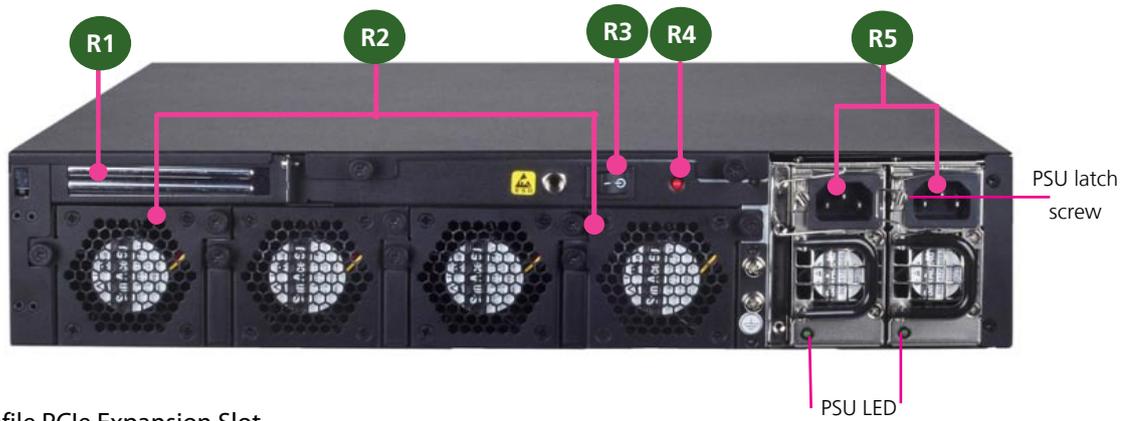
F4 2 x Management ports

F5 1 x Console port

F6 2 x USB ports

F7 8 x Ethernet NIC modules up to 64GbE (maximum 8 modules)

Rear Panel Features (FW-8896 A/B/C/D)



R1 Low Profile PCIe Expansion Slot

R2 4 x Modular Fans

R3 Power Switch

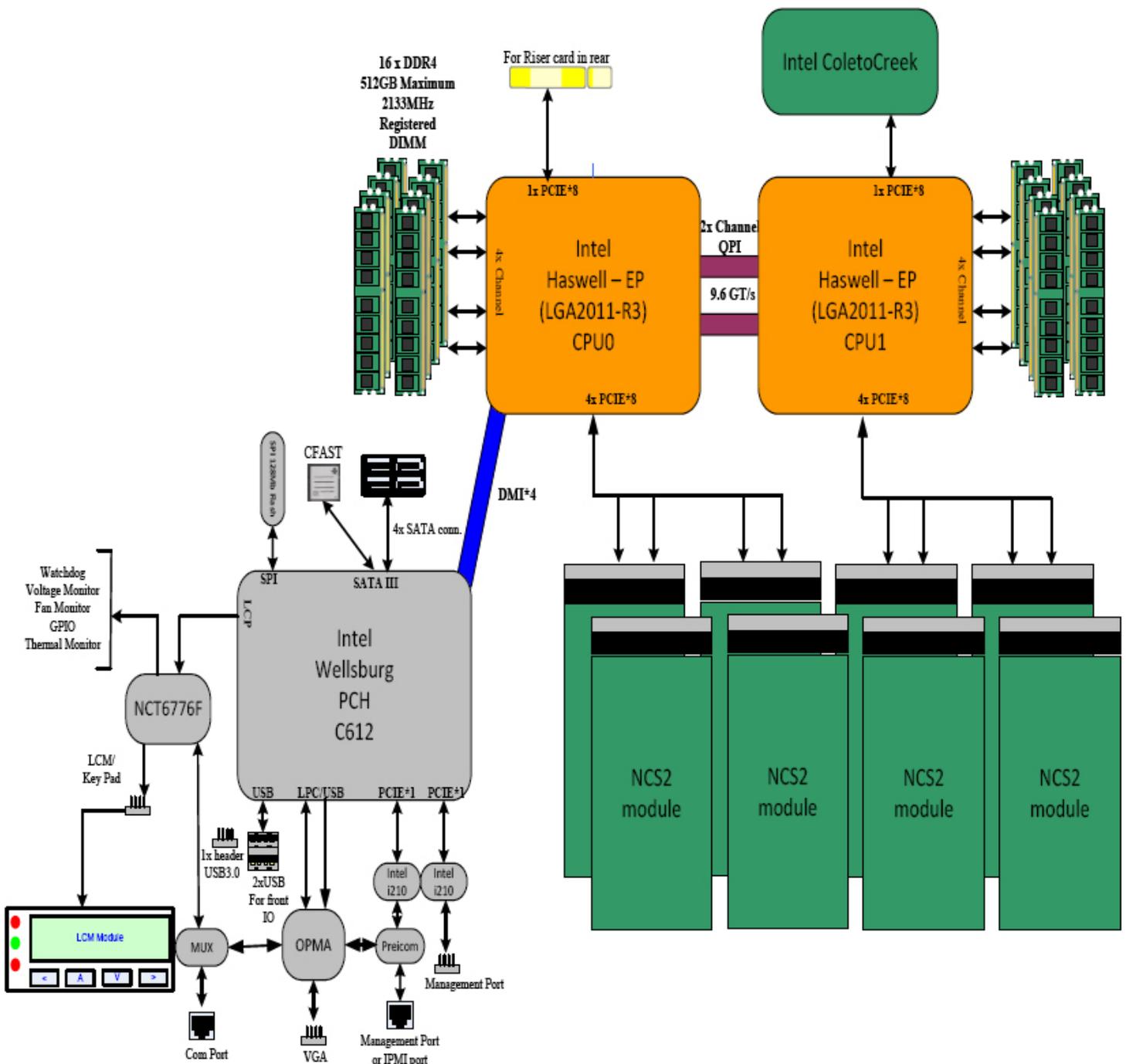
R4 Power Supply Alarm Switch

R5 Redundant Power Supply

Chapter 2: Motherboard Information

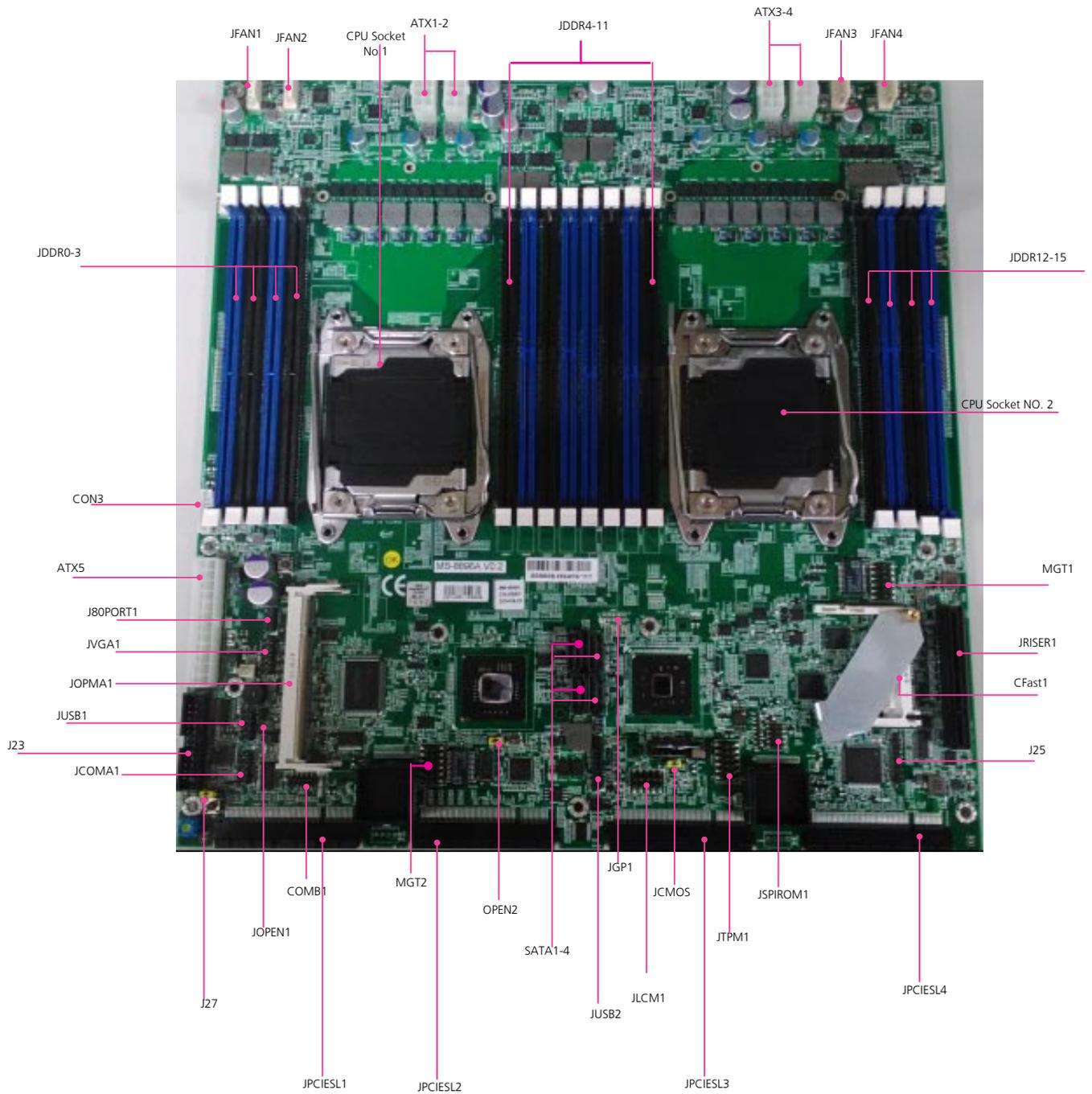
Block Diagram

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



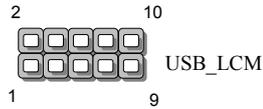
Motherboard Layout

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.



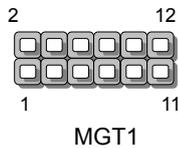
Internal Jumper & Connectors

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



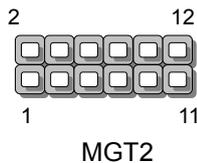
Pin	Description	Pin	Description
1	P5V_SB	2	P5V
3	USB20_N5	4	
5	USB20_P5	6	HDD_LED#
7	GND	8	GND
9	NTXD2	10	NRXD2

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



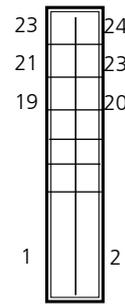
Pin	Description	Pin	Description
1	LAN2_MDX+0	2	LAN2_MDX-0
3	LAN2_MDX+1	4	LAN2_MDX-1
5	LAN2_MDX+2	6	LAN2_MDX-2
7	LAN2_MDX+3	8	LAN2_MDX-3
9	LAN2_100#	10	LAN2_ACTR#
11	LAN2_1000#	12	P3V3_AUX

MGT2: RJ 45 LAN management port connector



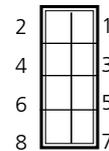
Pin	Description	Pin	Description
1	MGT_MDIP_0	2	MGT_MDIN_0
3	MGT MDIP 1	4	MGT MDIN 1
5	MGT MDIP 2	6	MGT MDIN 2
7	MGT MDIP 3	8	MGT MDIN 3
9	MGT_LAN_100#	10	MGT_LAN_ACT#
11	MGT_LAN_1G#	12	P3V3_AUX

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	20	+5V
21	+12V	22	+5V
23	3.3V	24	GND

ATX1~4: 8-Pin ATX Power Connector



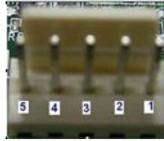
Pin	Description	Pin	Description
1	GND	2	+12V
3	GND	4	+12V
5	GND	6	+12V
7	GND	8	+12V

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.



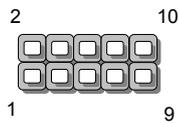
Pin	Description
1	Ground
2	12V
3	RPM Sense
4	RPM Sense
5	PWM Status

J27: Jumper for Reset



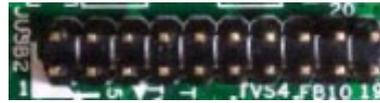
Pin	Description
Short Pin 1-2	Hardware reset
Short Pin 2-3	Software reset

JUSB1: USB 2.0 internal pin header



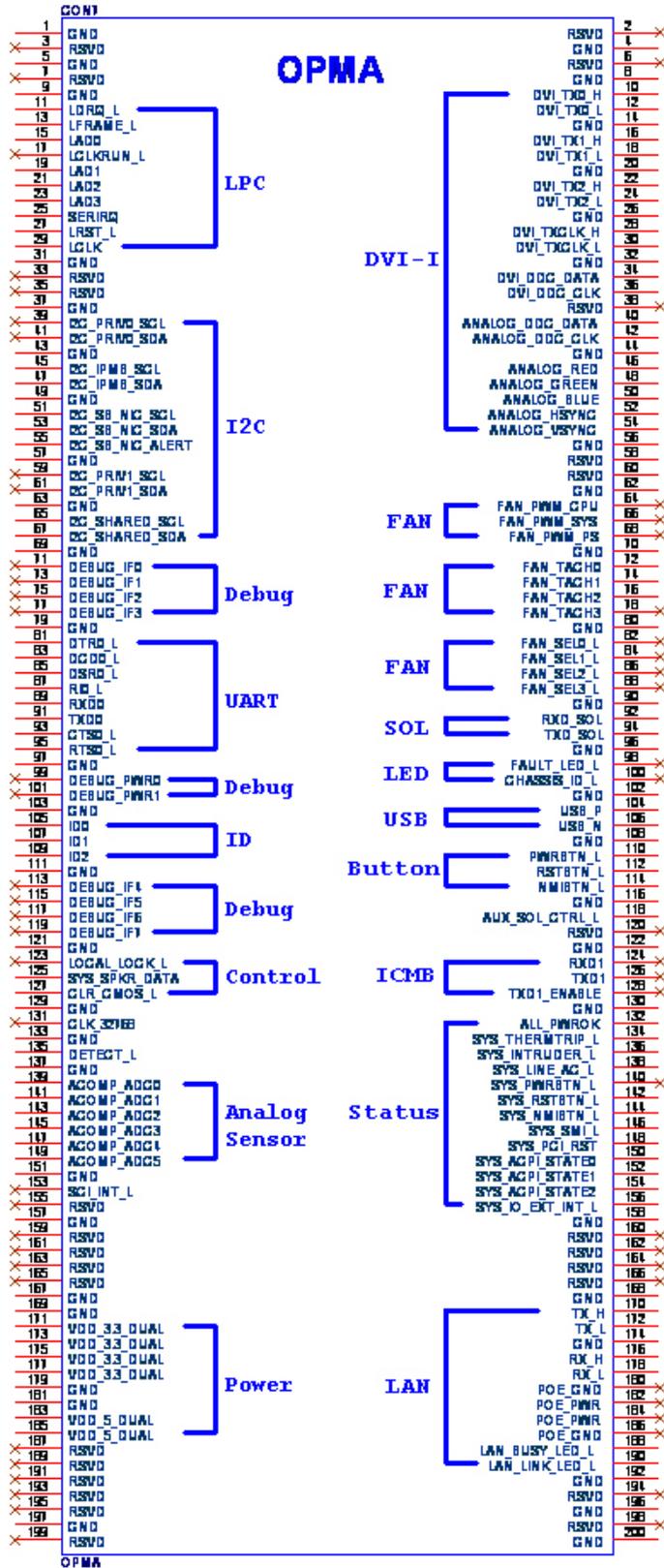
Pin	Description	Pin	Description
1	P5V_USB1	2	P5V_USB1
3	USB20_L_N0	4	USB20_L_N1
5	USB20_L_P0	6	USB20_L_P1
7	USBGND1	8	USBGND1
9	USBGND1	10	USBGND1

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	

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.

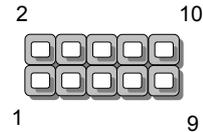


JCFast1: CFast card



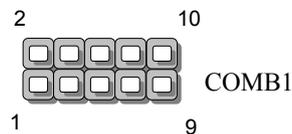
Pin	Function	Pin	Function
PC1	Tie to Pin17	S1	GND
PC2	GND	S2	SATA_TX_P0
PC3		S3	SATA_TX_N0
PC4		S4	GND
PC5		S5	SATA_RX_N0
PC6		S6	SATA_RX_P0
PC7	GND	S7	GND
PC8	LED_CFAST#		
PC9			
PC10			
PC11			
PC12			
PC13	P3V3		
PC14	P3V3		
PC15	GND		
PC16	GND		
PC17	Tie to Pin1		

JCOMA1: COM PORT Connector



Pin	Description	Pin	Description
1	NDCD1	2	NDSR1
3	NRXD1	4	NRTS1
5	NTXD1	6	NCTS1
7	NDTR1	8	NR11
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	NR12-
9	GND	10	

J23: LCM



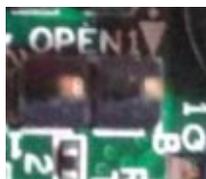
Pin	Description	Pin	Description
1	VCC	2	GND
3	P_SLIN_N	4	VEE
5	P_AFD_N	6	P_INIT_N
7	LPD1	8	LPD0
9	LPD3	10	LPD2
11	LPD5	12	LPD4
13	LPD7	14	LPD6
15	LCD	16	VCC
17	KPA1	18	KPA2
19	KPA3	20	KPA4
21	FP_RESET#	22	CTR_GRN
23	CTR_YEW	24	HDD_LED#

CON3: PMBUS/TTL



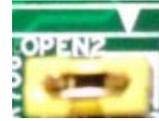
Pin	Description
1	PSU_TTL1
2	PSU_TTL2
3	
4	GND
5	
6	PMBUS_CLK
7	PMBUS_DAT
8	PMBUS_ALERT#

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 remove the top compartment.



Pin	Description
1	GND
2	CSOPEN#

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



Pin	Description
1	MGT_SEL
2	IPMI_DETECT#

JCMOS: Clear CMOS



Pin	Description
1	VRTC
2	PCH_RTCSRST#
3	GND

J25: Burn CPLD (Complex Programmable Logic Device)



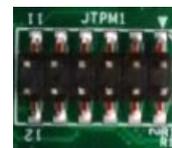
Pin	Description	Pin	Description
1	VCC	5	
2	JTAG_PLD_TPO	6	JTAG_PLD_TMS
3	JTAG_PLD_TD1	7	GND
4		8	JTAG_PLD_TCK

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 3: Hardware Setup

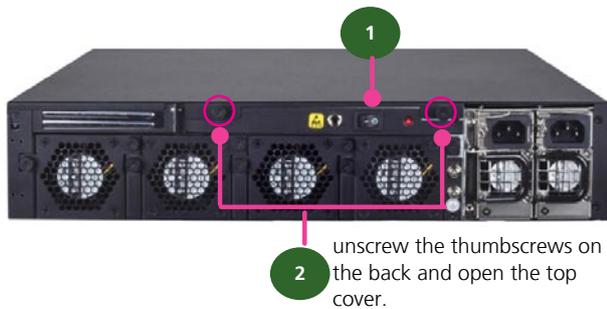
Preparing the Hardware Installation

WARNING:

To reduce the risk of personal injury, electric shock, or damage to the equipment, please remove all power connections to completely shut down the device.

Also, please wear ESD protection gloves to conduct the steps in this chapter.

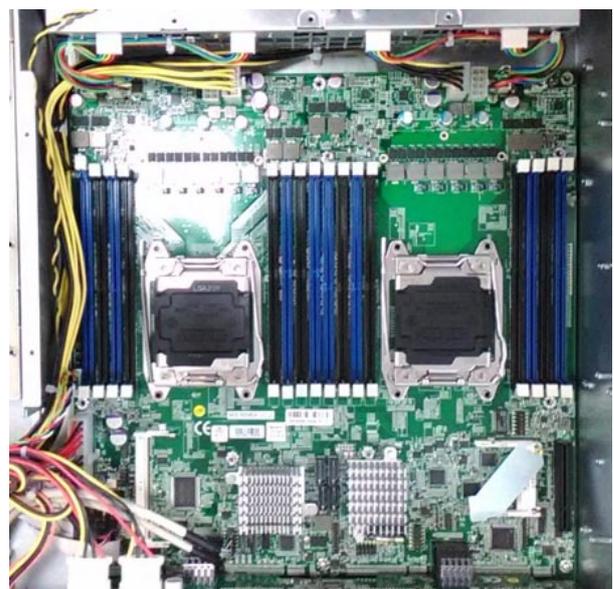
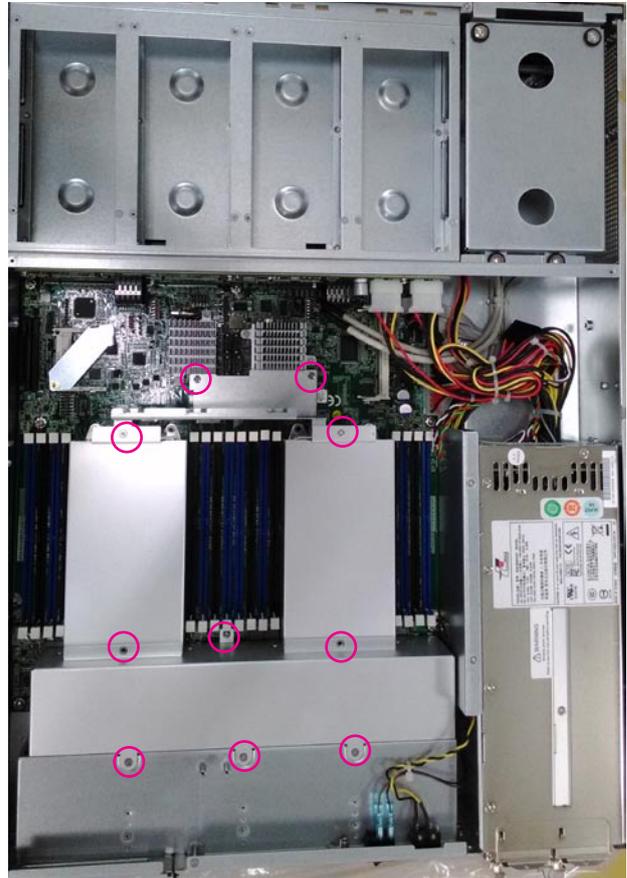
1. Power off the FW-8896 and make sure the power cord is disconnected from the device.
2. Loosen the 2 thumbscrews from the rear panel of the FW-8896 System.



3. Gently pull the cover backward
4. Open the cover from the side.



5. Removed the screws circled in the image below to take away the protection cover for CPUs and other connectors.



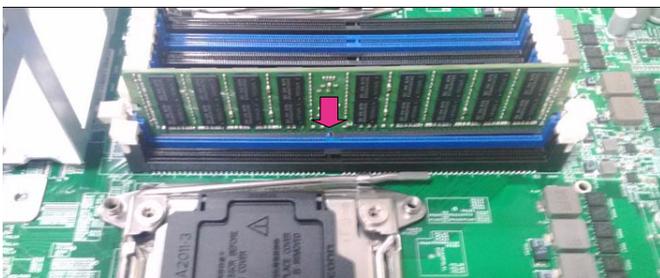
Installing the System Memory

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



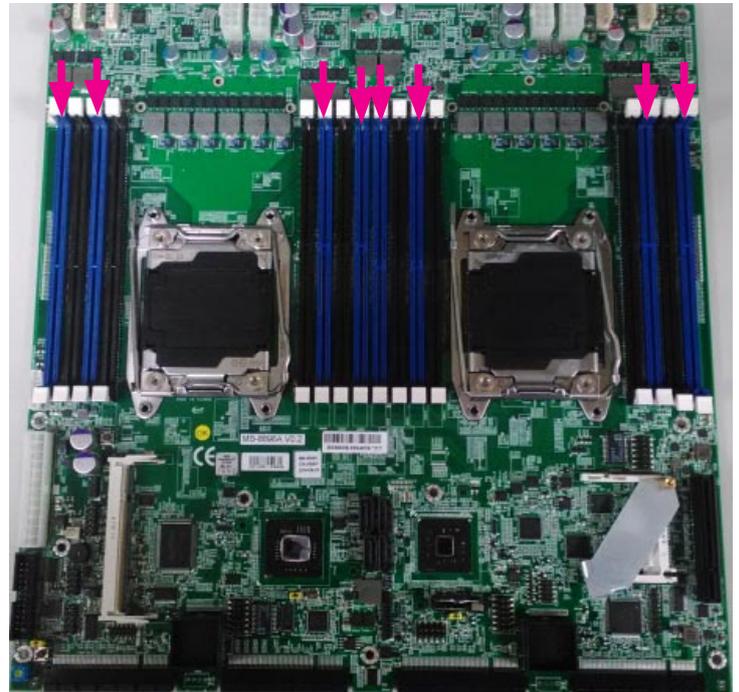
3. Align the DIMM module and make sure the notches of the module aligned with the socket keys in the slot.



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



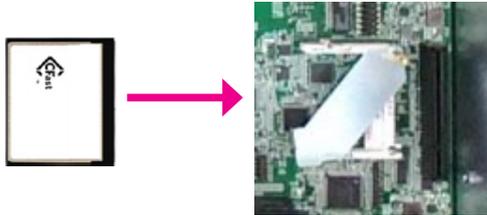
The motherboard of FW-8896 is designed with 16 DDR DIMM sockets. For users without 16 modules to fill up all the sockets, it is recommended to start by the blue ones for optimal performance.



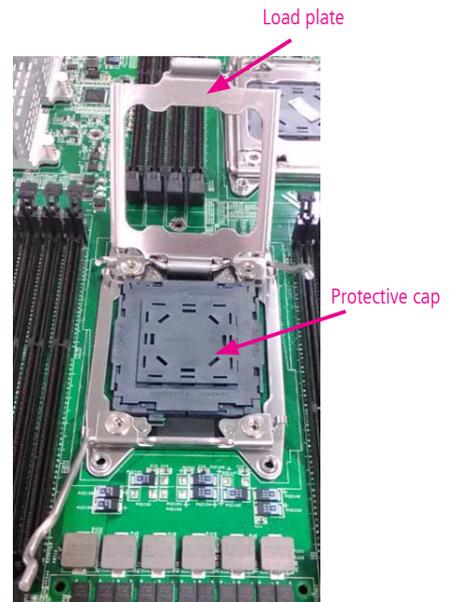
Installing the CFast Card

FW-8896 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.



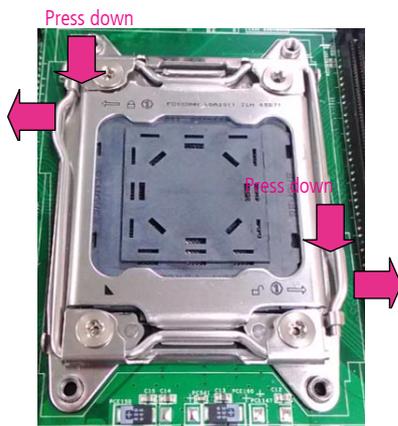
4. Open the load plate and also the protective cap.



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.



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.



7. Put the heat sink on the installed CPU and match the screws with the screw holes on the board. Fasten two 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.

Place the heat sink cover on top of the installed heat sink and fasten it with screws on the chassis.



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.

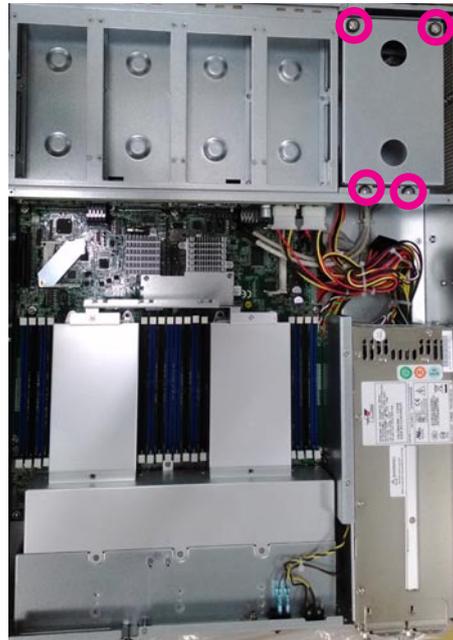
Installing the Disk Drive(s)

Please be noted that FW-8896 series comes with two different HDD/SSD designs. FW-8896 (A/B/C/D) is built with one 3.5" HDD/SSD slot (HDD preferred) while the E/F/G/H models come with two externally accessible 2.5" HDD/SSD drive bays. The following will discuss all the disk drive installation procedures based on their HDD/SSD designs.

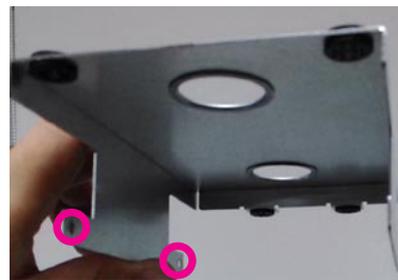
For FW-8896 A/B/C/D

FW-8896 A/B/C/D supports one 3.5" HDD/SSD. Please follow the guidelines below.

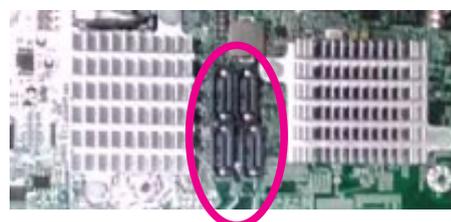
1. As illustrated below, the disk drive bay is located at the top right corner inside FW-8896. Loosen and remove the 4 screws circled.



2. Take the tray out and use the mounting holes on both sides to secure HDD.



3. Use SATA cables to connect both the HDD and the SATA connectors on the motherboard.



For FW-8896 E/F/G/H

FW-8896 E/F/G/H supports 2 x 2.5" HDDs/SSDs. Please follow the guidelines below.

1. Locate the two externally accessible 2.5" SATA drive bays on the front panel.



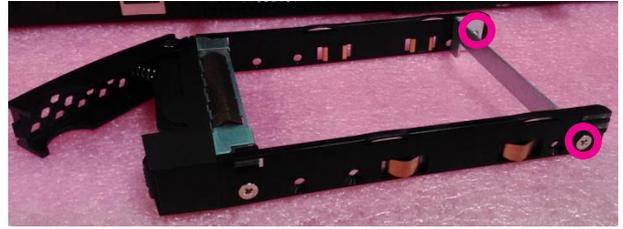
2. Put your finger on the tab and push it to the right, as illustrated in the image below.



3. The cage of the drive bay will be released. The drive bay can be taken out.



4. Remove the two screws circled in the image below to remove the slim bar.



5. Insert your SATA 2.5" HDD/SSD into the tray. Remember to put the storage device in the right direction as illustrated below. Align the drive with the 4 screw holes. Secure your disk drive with 4 screws.



6. Insert the drive with the tray into the external drive bay until it's firmly seated.



Installing the NIC Modules

FW-8896 series comes with 8 NIC Ethernet module slots for network bandwidth expansion. Please follow the steps for installation.

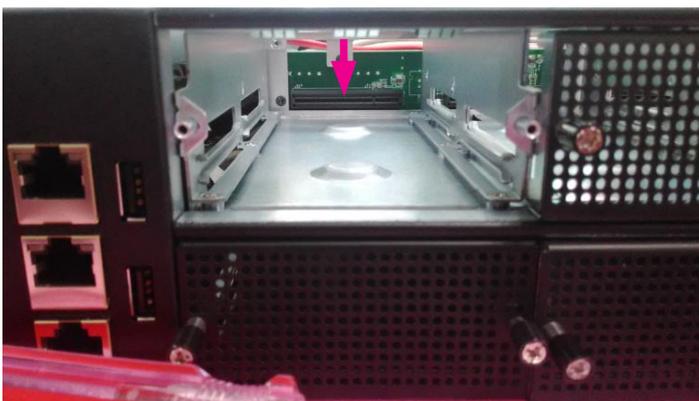
1. Select a NIC Ethernet module slot.



2. Rotate and loosen the two lock-screws.



3. Remove the door 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.



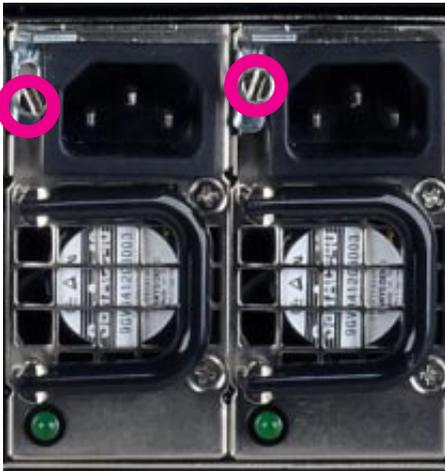
Replacing the Power Supply Units

Power supply units may wear down eventually. Please be noted that FW-8896 series supports 600W/800W depending on the ordering preferences. Please prepare the power supply units matching this capacity.

1. Locate the power supply units.



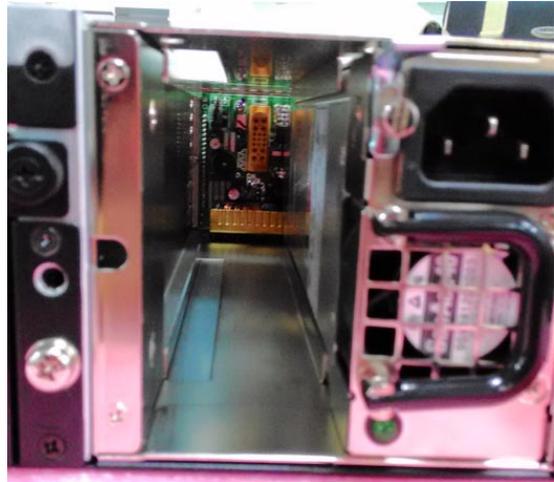
2. Loosen one of the lock-screws depending on which power supply unit is to be replaced.



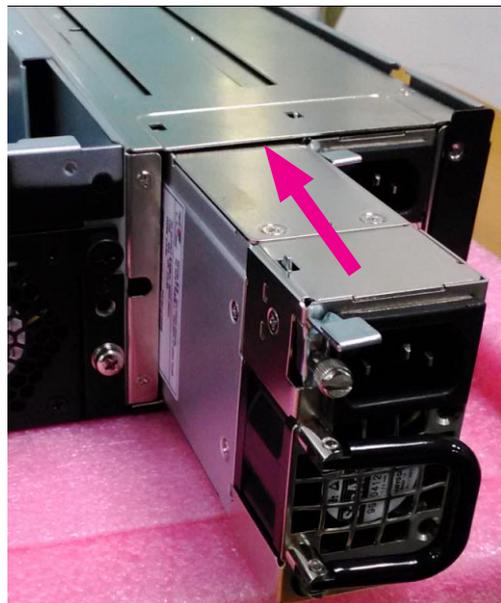
3. Hold the handle and pull it out.



4. Locate the internal connector of the power supply unit.



5. Insert a new power supply unit.



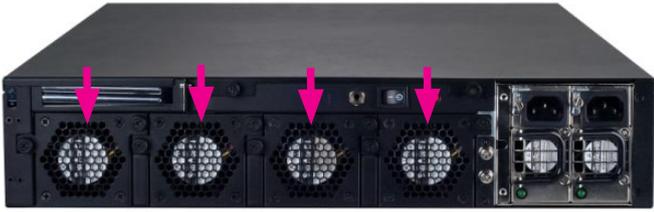
6. Remember to tighten the lock-screws.



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 two lock-screws of the fan you would like to replace.



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



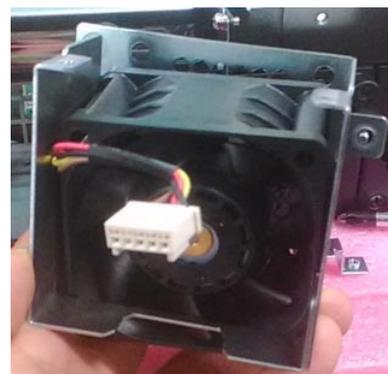
4. Remove the 4 screws that secure the fan.



5. Remove the 4 screws that enclose the fan.



6. Take the fan connector out of the enclosure.



7. Take the worn cooling fan out.



8. When using a new cooling fan, simply reverse the previous steps to install the fan back onto the enclosure and the system.

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 (Tma) 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)."



CAUTION :

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

3. Slide the inner bracket all the way up to end of the slide-rail assembly. You may hear a "click" sound.



4. Push the white slide-rail lock outwards as the arrow of direction below. Then pull the inner bracket out of the slide-rail assembly.

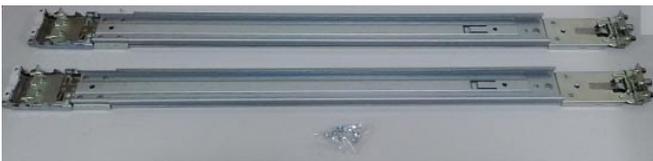


5. Release the inner bracket as shown below.



Beginning Rackmount Installation

1. Check the package contents. The supplied mounting kit shall include the following items:
2 x 438mm Slide-Rails
1 x pack of screws



6. Align the inner bracket to the side of the chassis and make sure the screw-holes are matched. Then secure the bracket onto the chassis with provided screws.



Attaching the Inner Brackets to the Chassis

2. Turn a slide rail upside down and release the inner bracket.



7. Repeat Steps 1 to 5 for another slide-rail and attach its inner bracket onto another side of the chassis.



Installing Slide Rails

1. In the previous section, you have already detached the inner brackets and attached them onto the chassis of your purchased model. By now, you shall install the slide-rail assemblies onto the rack.

As the image below, this slide-rail kit does NOT require screw-fixing. Simply aim at 3 available screw holes on the rack-front and lock it by clipping the slide-rail assembly to the rack-front as shown in the image below. You should hear a “click” sound once it is firmly attached.



3. Repeat Step 1 and 2 for another slide-rail assembly in order to install in onto the rack.



2. For the rear rack installation, also aim at 3 available holes and click the slide-rail assembly onto the rear rack.



Install Applicable Model Onto the Rack

Reminder: it is strongly recommended to carry out this procedure with two or three persons.

1. Hold the applicable model with its front facing you, lift the chassis and gently insert the model by aligning with the slide-rail assemblies, as shown in the image below. Then push the model as far as possible.



2. Simultaneously push the release tabs on both sides in the arrow of direction below, while pushing the appliance into the end of the rack.

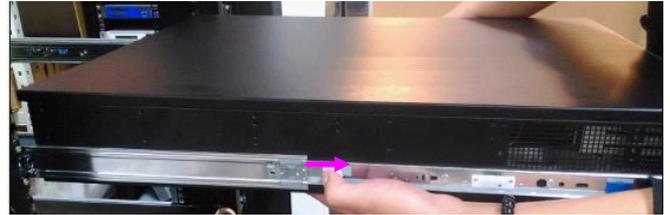
Caution: the appliance will be locked during the half way of sliding-in if the release tabs are not pushed.



3. Completed.



4. To slide the appliance out, gently pull it outwards. Then, press the slide-rail locks on both side and slide the appliance out.



Notes: the process of sliding-in and sliding-out should be smooth. If not, please adjust the mounting tips.

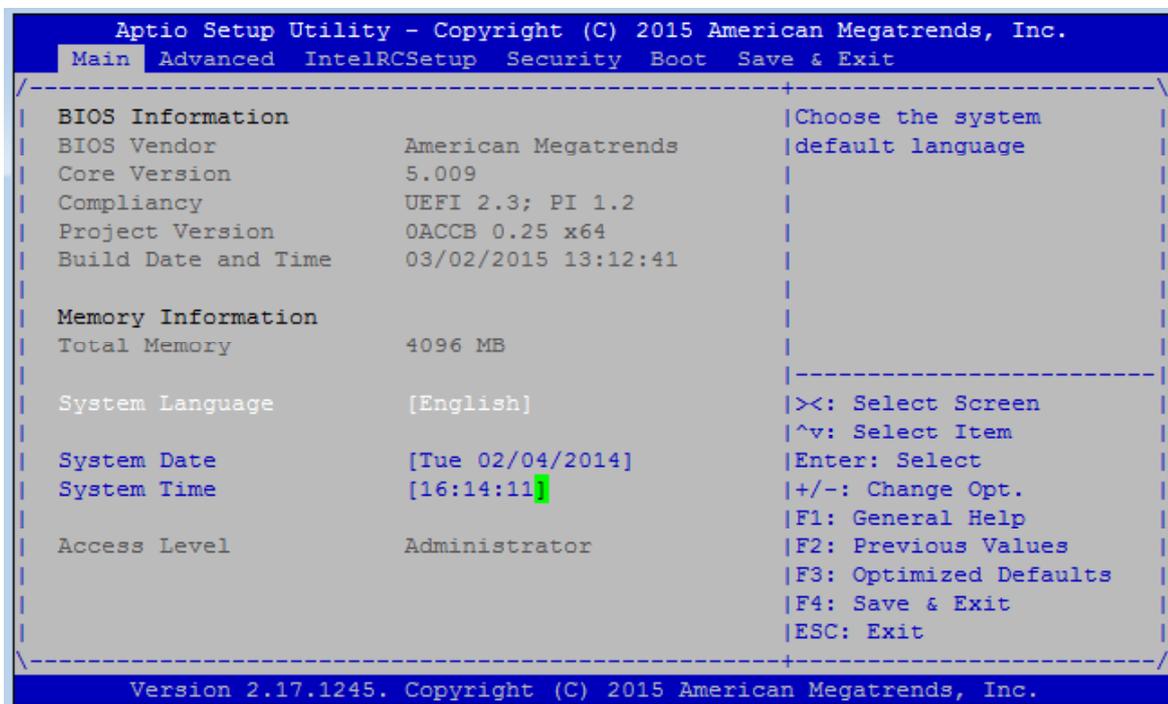
Chapter 5:

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 FW-8896. But if you connect a PC to FW-8896 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:
 - [<->] [-->]: select a setup screen, for instance, [Main], [Advanced], [Chipset], [Boot], [Security], and [Save & Exit]
 - [↑] [↓]: select an item/option on a setup screen
 - Enter: select an item/option or enter a sub-menu
 - ESC: exit the current screen
 - +/- = 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

Notes: the images in the following section are for reference only.



SRIOV Support

This option enables or disables SRIOV (Single Root I/O Virtualization) support. You may select "Enable" or "Disable".

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| Above 4G Decoding      [Disabled]      |If system has SR-IOV
| SR-IOV Support        [Disabled]      |capable PCIe Devices,
|> NCT6776 Super IO Configuration  |this option Enables or
|> NCT7904D HW Monitor    |Disables Single Root IO
|> Serial Port Console Redirection  |Virtualization Support.
|> Trusted Computing
|> USB Configuration
|> Lan boot select
|
|----- SR-IOV Support -----|
| Disabled
| Enabled
|-----|
|><: Select Screen
| ^v: Select Item
| Enter: Select
| +/-: Change Opt.
| F1: General Help
| F2: Previous Values
| F3: Optimized Defaults
| F4: Save & Exit
| ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

NCT6776 Super IO Configuration

Press "Enter" to access configuration sub-menu for super IO chip (NCT6776) parameters.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| Above 4G Decoding      [Disabled]      |System Super IO Chip
| SR-IOV Support        [Disabled]      |Parameters.
|> NCT6776 Super IO Configuration  |
|> NCT7904D HW Monitor    |
|> Serial Port Console Redirection  |
|> Trusted Computing
|> USB Configuration
|> Lan boot select
|
|-----|
|><: Select Screen
| ^v: Select Item
| Enter: Select
| +/-: Change Opt.
| F1: General Help
| F2: Previous Values
| F3: Optimized Defaults
| F4: Save & Exit
| ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```


Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.

Advanced

CPU0 Temp	: +72 C	^
CPU1 Temp	: +74 C	+
System Temp1	: +38 C	+
System Temp2	: +34 C	*
Fan1 Speed	: N/A	*
Fan2 Speed	: 21093 RPM	*
Fan3 Speed	: 8385 RPM	*
Fan4 Speed	: N/A	*
CPU0 Vcore	: +1.820 V	*
CPU1 Vcore	: +1.820 V	*
PVDDQ_AB	: +1.192 V	* ><: Select Screen
PVDDQ_CD	: +1.192 V	* ^v: Select Item
PVDDQ_EF	: +1.194 V	* Enter: Select
PVDDQ_GH	: +1.194 V	* +/-: Change Opt.
P5V_SB	: +5.100 V	* F1: General Help
P5V	: +5.046 V	* F2: Previous Values
P12V	: +11.952 V	* F3: Optimized Defaults
P3V3_VBAT	: +3.276 V	* F4: Save & Exit
P3V3	: +3.294 V	v ESC: Exit

Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

Serial Port Console Redirection

This option allows you to configure parameters about serial port console redirection. Press "Enter" to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| Above 4G Decoding      [Disabled]      | Serial Port Console |
| SR-IOV Support        [Disabled]      | Redirection         |
|> NCT6776 Super IO Configuration
|> NCT7904D HW Monitor
|> Serial Port Console Redirection
|> Trusted Computing
|> USB Configuration
|> Lan boot select
|
|><: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Console Redirection: select "Enabled" or "Disable" for COM port console redirection. The default is "Enabled".

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced
-----
| COM0
| Console Redirection [Enabled]
|> Console Redirection Settings
|
| Console Redirection
| Disabled
| Enabled
|
| Select Screen
| Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
-----
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Console Redirection Settings: select this item to enter the setting sub-menu.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Advanced
-----
| COM0
| Console Redirection [Enabled]
|> Console Redirection Settings
|
| The settings specify
| how the host computer
| and the remote computer
| (which the user is
| using) will exchange
| data. Both computers
| should have the same or
| compatible settings.
|
|><: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

COM Console Redirection Settings

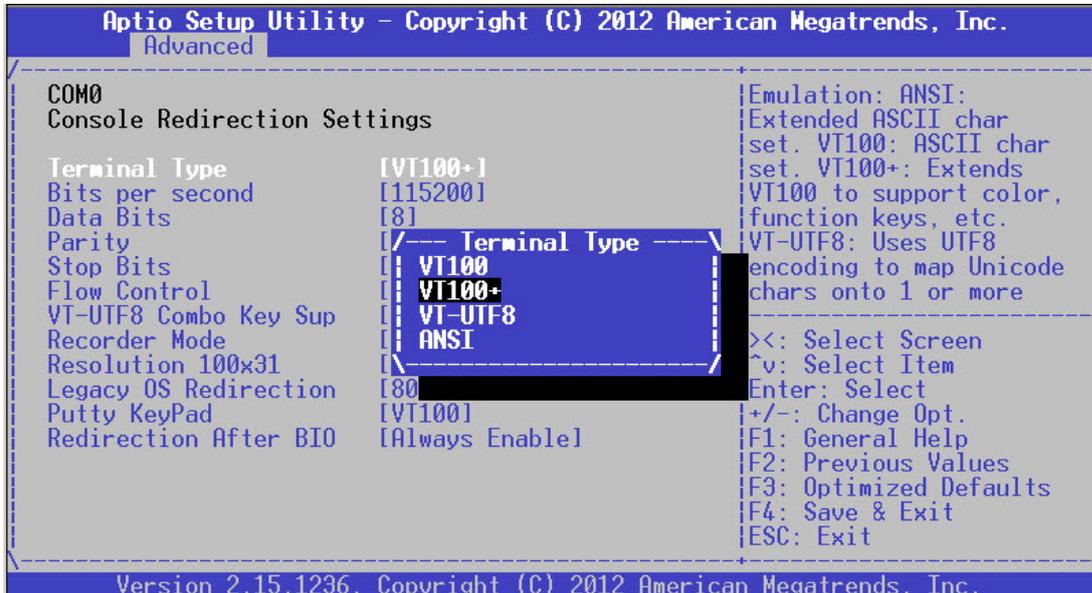
Terminal Type: the emulation configuration. Select "VT100", "VT100+", "VT-UTF8" or "ANSI".

ANSI: Extended ASCII character set

VT100: ASCII character set

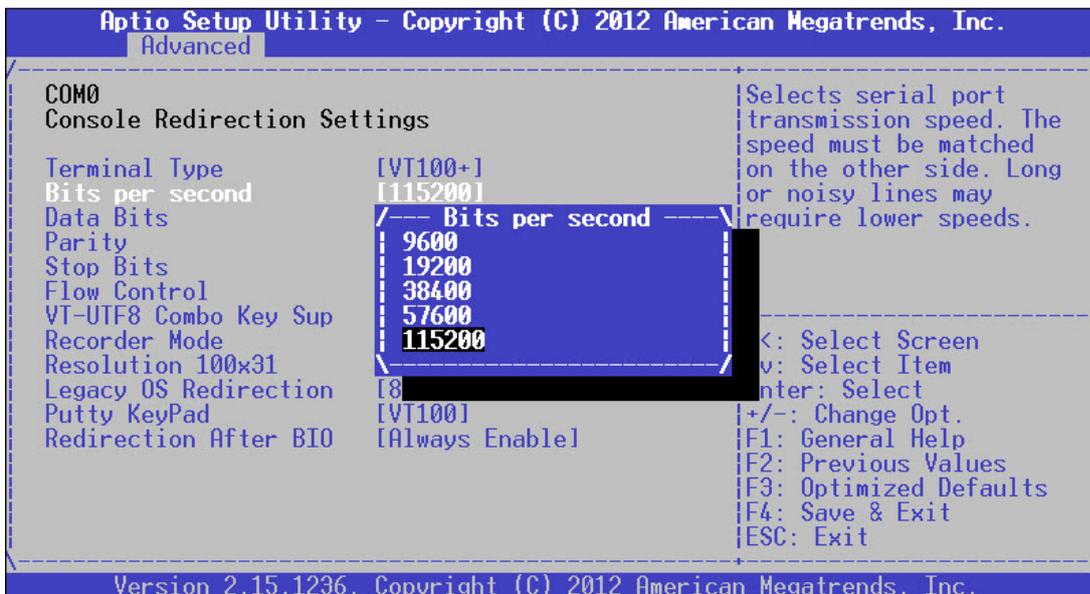
VT100+: extends VT100 to support color function keys

VT-UTF8: uses UTF8 encoding to map Unicode characters onto 1 or more

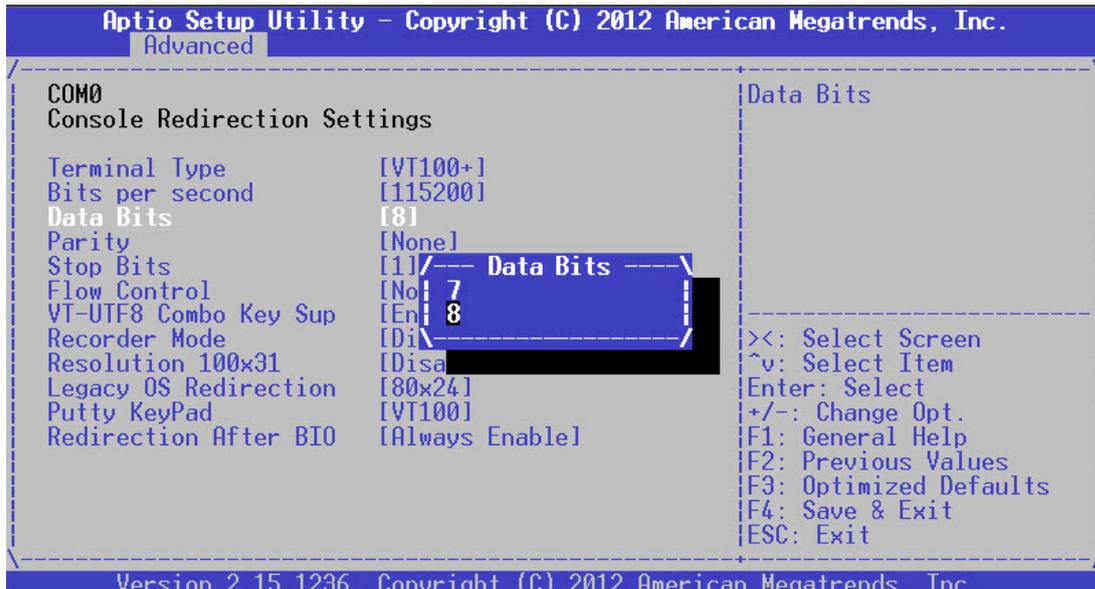


Bits per second: select "9600", "19200", "38400", "57600", or "115200" for bits per second. The Bps

will determine serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.



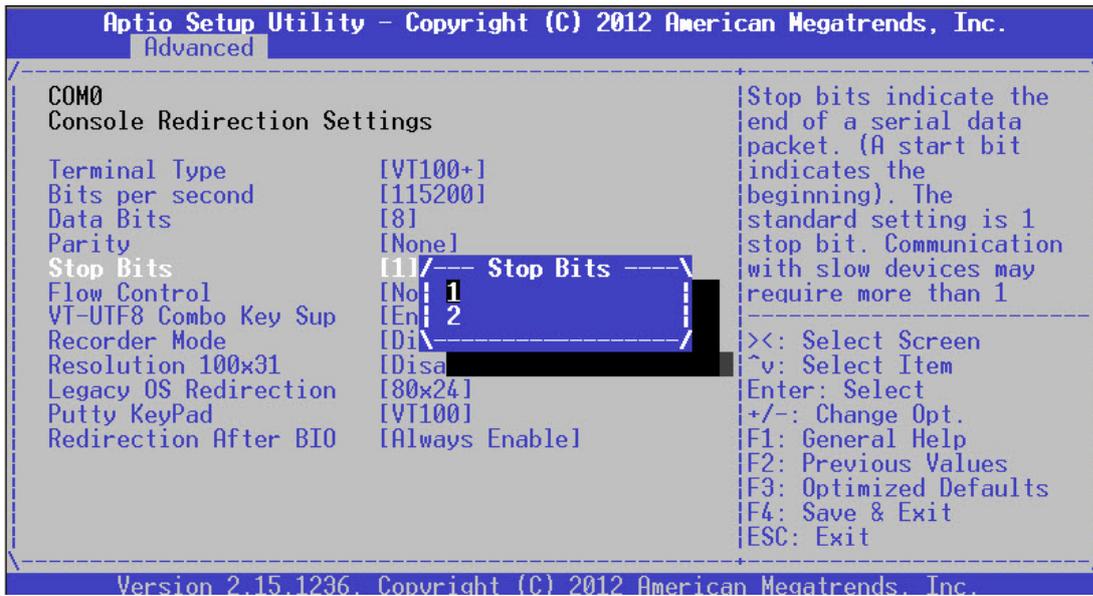
Data Bits: select the value for data bits. In this case, "7" or "8".



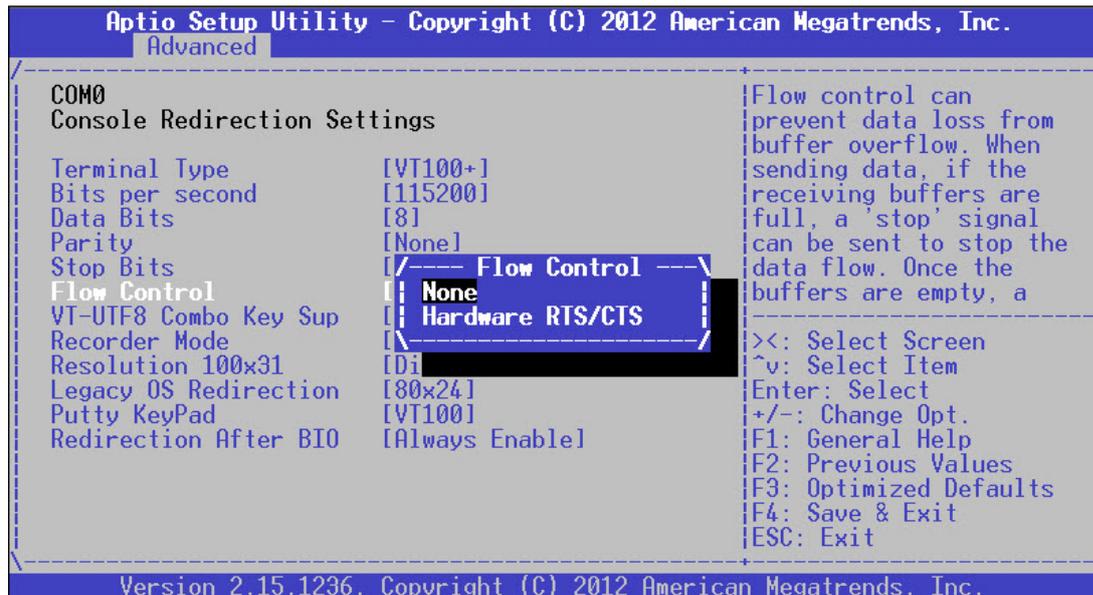
Parity Bits: a parity bit can be sent with the data bits to detect some transmission errors. Select "None", "Even", "Odd", "Mark" or "Space".



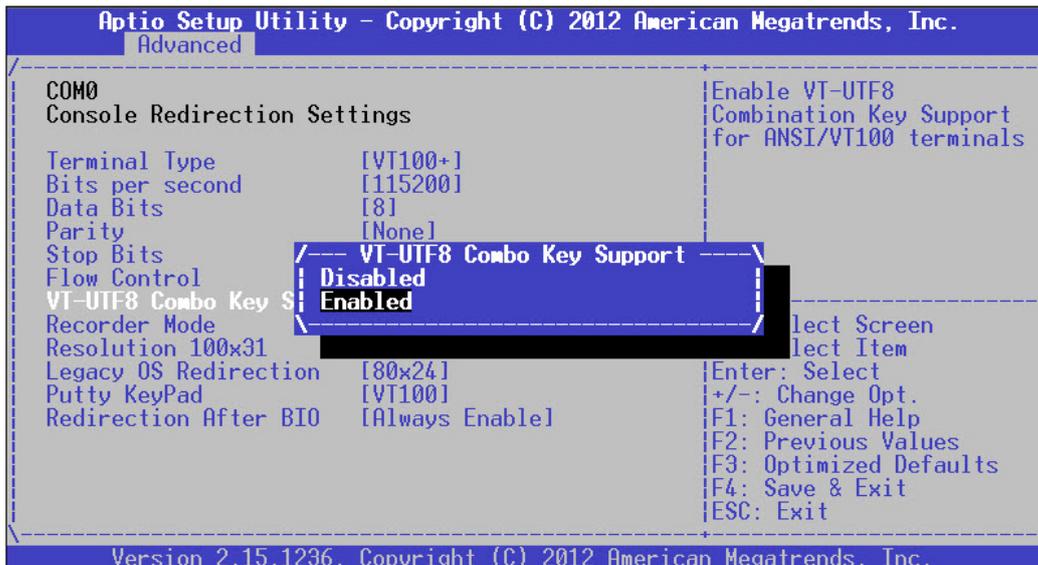
Stop Bits: stop bits indicate the end of a serial data packet. The standard is 1 stop bit. Communication with slow devices may require more than 1.



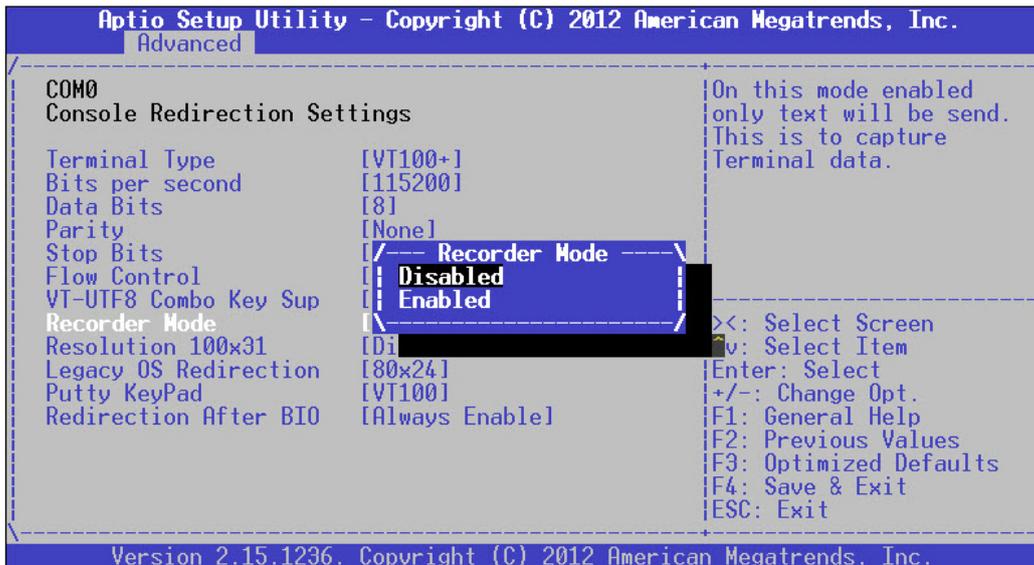
Flow Control: flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. You may select "None" or "Hardware RTS/CTS", depending on the circumstances.



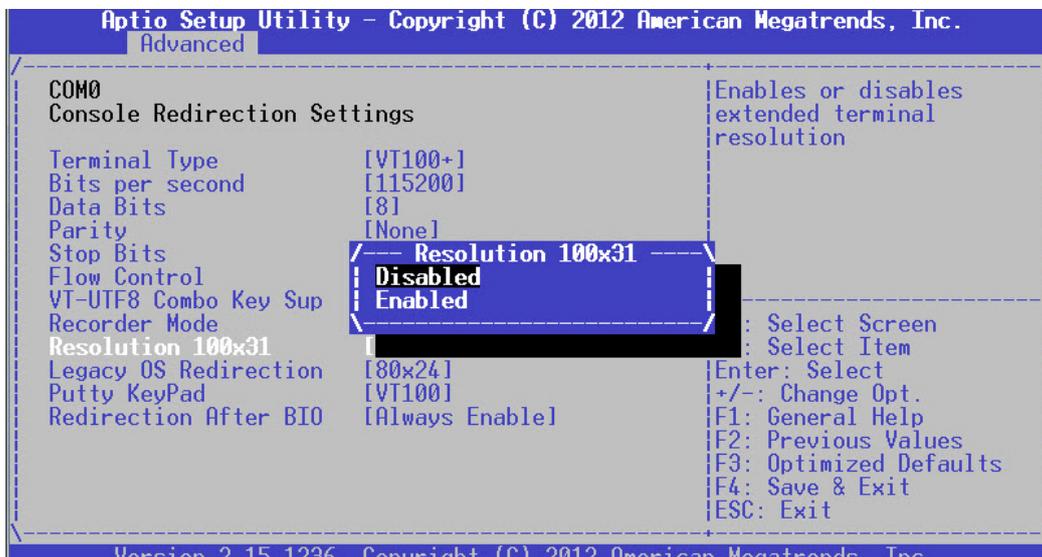
VT-UTF8 Combo Key Support: this option enables/disables VT-UTF8 combination key support for ANSI/VT100 terminals.



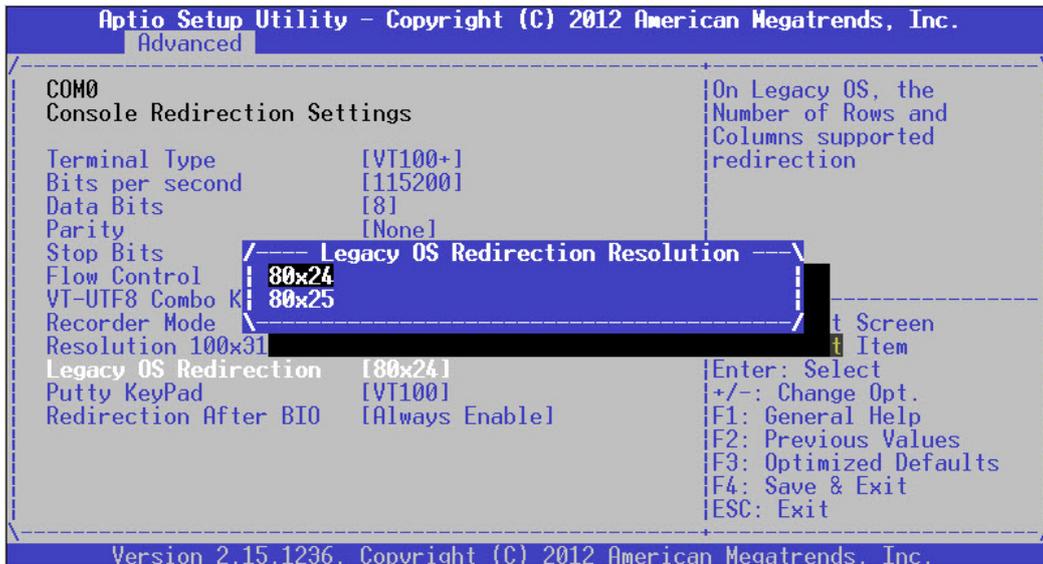
Recorder Mode: on this mode, when "Enabled", only text will be sent. This is to capture terminal data.



Resolution 100 x 31: select "Enable" or "Disable" for extended terminal resolution.



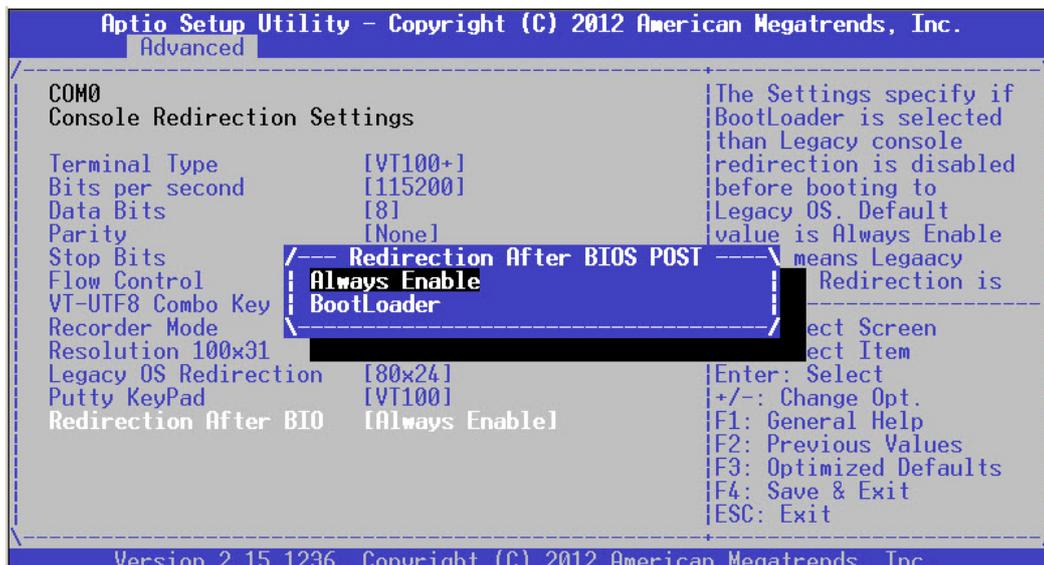
Legacy OS Redirection Resolution: select "80x24" or "80x25". The default for this case is "80x24".



Putty KeyPad: select Function Key and Key Pad on Putty. You may select "VT100", "LINUX", "XTERMR6", "SCO", "ESCN", or "VT400".



Redirection After BIOS POST: The settings specify if BootLoader is selected than Legacy console redirection is disabled before booting to Legacy OS. Default value is "Always Enable" which means Legacy OS console redirection is always enabled after BIOS.



USB Configuration

This option allows you to configure USB device Settings.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit

|-----|-----|
| Above 4G Decoding      [Disabled] | USB Configuration |
| SR-IOV Support        [Disabled] | Parameters         |
|> NCT6776 Super IO Configuration |                    |
|> NCT7904D HW Monitor  |                    |
|> Serial Port Console Redirection |                    |
|> Trusted Computing    |                    |
|> USB Configuration    |                    |
|> Lan boot select      |                    |
|                    |                    |
|                    |>: Select Screen  |
|                    |^v: Select Item   |
|                    |Enter: Select     |
|                    |+/-: Change Opt.  |
|                    |F1: General Help  |
|                    |F2: Previous Values |
|                    |F3: Optimized Defaults |
|                    |F4: Save & Exit   |
|                    |ESC: Exit         |
|-----|-----|

Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

USB Module Version: displays USB module version

USB Devices: displays USB devices

Legacy USB Support: this function enables or disables legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Advanced

|-----|-----|
| USB Configuration      ^| Enables Legacy USB |
|                        *| support. AUTO option |
| USB Module Version     8.11.02 *| disables legacy support |
|                        *| if no USB devices are |
| USB Devices:          *| connected. DISABLE  |
|   3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs *| option will keep USB |
|                        *| devices available only |
| Legacy USB Support     |----- Legacy USB Support -----| for EFI applications.
| XHCI Hand-off         | Enabled |
| EHCI Hand-off         | Disabled |
| USB Mass Storage Driv | Auto |
| Port 60/64 Emulation  |-----| : Select Screen
|                        | : Select Item
|                        *|Enter: Select
| USB hardware delays a *|+/-: Change Opt.
| USB transfer time-out [20 sec] *|F1: General Help
| Device reset time-out [20 sec] +|F2: Previous Values
| Device power-up delay [Auto] +|F3: Optimized Defaults
|                        +|F4: Save & Exit
| Mass Storage Devices: v|ESC: Exit
|-----|-----|

Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```


USB Mass Storage Driv: this option allows you to enable or disable USB mass storage driver. The default is "Enabled".

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----+-----
USB Configuration                               ^|Enable/Disable USB Mass
                                                *|Storage Driver Support.
USB Module Version      8.11.02                 *|
                                                *|
USB Devices:                                       *|
    3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs       *|
                                                *|
Legacy USB Support/--- USB Mass Storage Driver Support ---\
XHCI Hand-off         | Disabled                |
EHCI Hand-off         | Enabled                 |
USB Mass Storage Driver Support                   |
Port 60/64 Emulation |                        |
                                                *|Enter: Select
USB hardware delays a                               *|+/-: Change Opt.
USB transfer time-out [20 sec]                       *|F1: General Help
Device reset time-out [20 sec]                       +|F2: Previous Values
Device power-up delay [Auto]                         +|F3: Optimized Defaults
                                                +|F4: Save & Exit
Mass Storage Devices:                               v|ESC: Exit
-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Port 60/64 Emulation: 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.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----+-----
USB Configuration                               ^|Enables I/O port
                                                *|60h/64h emulation
USB Module Version      8.11.02                 *|support. This should be
                                                *|enabled for the
USB Devices:                                       *|complete USB keyboard
    3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs       *|legacy support for
                                                *|non-USB aware OSes.
Legacy USB Support /--- Port 60/64 Emulation ---\
XHCI Hand-off         | Disabled                |
EHCI Hand-off         | Enabled                 |
USB Mass Storage Driver Support                   |
Port 60/64 Emulation |                        |
                                                *|Enter: Select
USB hardware delays a                               *|+/-: Change Opt.
USB transfer time-out [20 sec]                       *|F1: General Help
Device reset time-out [20 sec]                       +|F2: Previous Values
Device power-up delay [Auto]                         +|F3: Optimized Defaults
                                                +|F4: Save & Exit
Mass Storage Devices:                               v|ESC: Exit
-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

USB transfer time-out: set USB time-out value (1, 5, 10 or 20 seconds) for Control, Bulk and Interrupt transfers.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----+-----
USB Configuration                               ^|The time-out value for
USB Module Version      8.11.02                 *|Control, Bulk, and
USB Devices:                                           *|
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs          *|
  |-----|-----|
  Legacy USB Support      | 1 sec
  XHCI Hand-off           | 5 sec
  EHCI Hand-off           | 10 sec
  USB Mass Storage Drive | 20 sec
  Port 60/64 Emulation    |-----|
  |-----|-----|
  USB hardware delays a  *|+/-: Change Opt.
  USB transfer time-out  [20 sec] *|F1: General Help
  Device reset time-out [20 sec]  +|F2: Previous Values
  Device power-up delay [Auto]    +|F3: Optimized Defaults
  |-----|-----|
  Mass Storage Devices:  v|ESC: Exit
  |-----|-----|
  Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Device reset time-out: set USB mass storage device Start Unit command time-out (10, 20, 30 or 40 seconds).

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----+-----
USB Configuration                               ^|USB mass storage device
USB Module Version      8.11.02                 *|Start Unit command
USB Devices:                                           *|
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs          *|
  |-----|-----|
  Legacy USB Support      | 10 sec
  XHCI Hand-off           | 20 sec
  EHCI Hand-off           | 30 sec
  USB Mass Storage Drive | 40 sec
  Port 60/64 Emulation    |-----|
  |-----|-----|
  USB hardware delays a  *|+/-: Change Opt.
  USB transfer time-out  [20 sec] *|F1: General Help
  Device reset time-out [20 sec]  +|F2: Previous Values
  Device power-up delay [Auto]    +|F3: Optimized Defaults
  |-----|-----|
  Mass Storage Devices:  +|F4: Save & Exit
  |-----|-----|
  Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Device power-up delay: set the maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value. For example, it is 100ms as a root port.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----+-----
USB Configuration                               ^|Maximum time the device
USB Module Version      8.11.02                 *|will take before it
USB Devices:                                           *|
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs          *|properly reports itself
  |-----|-----|
  Legacy USB Support      |-----|
  XHCI Hand-off           | Auto
  EHCI Hand-off           | Manual
  USB Mass Storage Drive |-----|
  Port 60/64 Emulation    |-----|
  |-----|-----|
  USB hardware delays a  *|Enter: Select
  USB transfer time-out  [20 sec] *|+/-: Change Opt.
  Device reset time-out [20 sec]  *|F1: General Help
  Device power-up delay [Auto]    +|F2: Previous Values
  |-----|-----|
  Mass Storage Devices:  +|F3: Optimized Defaults
  |-----|-----|
  Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

AMI Virtual CDROM 1.00: set mass storage device emulation type. "Auto" enumerates devices according to their media format. Please be noted that optical devices will be emulated as CD-ROM.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----
USB Devices:
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs      ^|Mass storage device
                                           +|emulation type. 'AUTO'
                                           +|enumerates devices
                                           +|according to their
XHCI Hand-off      [Enabled]                *|media format. Optical
EHCI Hand-off      [Enabled]                *|media format. Optical
USB Mass Storage Driv| Auto
Port 60/64 Emulation| Floppy
Forced FDD
USB hardware delays | Hard Disk
USB transfer time-out| CD-ROM
Device reset time-out|-----
Device power-up delay|-----
                                           : Select
                                           *|+/-: Change Opt.
                                           *|F1: General Help
Mass Storage Devices:
AMI Virtual CDROM 0 1. [Auto]                *|F2: Previous Values
AMI Virtual Floppy0 1 [Auto]                *|F3: Optimized Defaults
AMI Virtual HDISK0 1. [Auto]                *|F4: Save & Exit
                                           v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

```

AMI Virtual Floppy0 1.00: set mass storage device emulation type. "Auto" enumerates devices according to their media format. Please be noted that optical devices will be emulated as CD-ROM.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----
USB Devices:
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs      ^|Mass storage device
                                           +|emulation type. 'AUTO'
                                           +|enumerates devices
                                           +|according to their
XHCI Hand-off      [Enabled]                *|media format. Optical
EHCI Hand-off      [Enabled]                *|media format. Optical
USB Mass Storage Driv| Auto
Port 60/64 Emulation| Floppy
Forced FDD
USB hardware delays | Hard Disk
USB transfer time-out| CD-ROM
Device reset time-out|-----
Device power-up delay|-----
                                           : Select
                                           *|+/-: Change Opt.
                                           *|F1: General Help
Mass Storage Devices:
AMI Virtual CDROM 0 1. [Auto]                *|F2: Previous Values
AMI Virtual Floppy0 1 [Auto]                *|F3: Optimized Defaults
AMI Virtual HDISK0 1. [Auto]                *|F4: Save & Exit
                                           v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

```

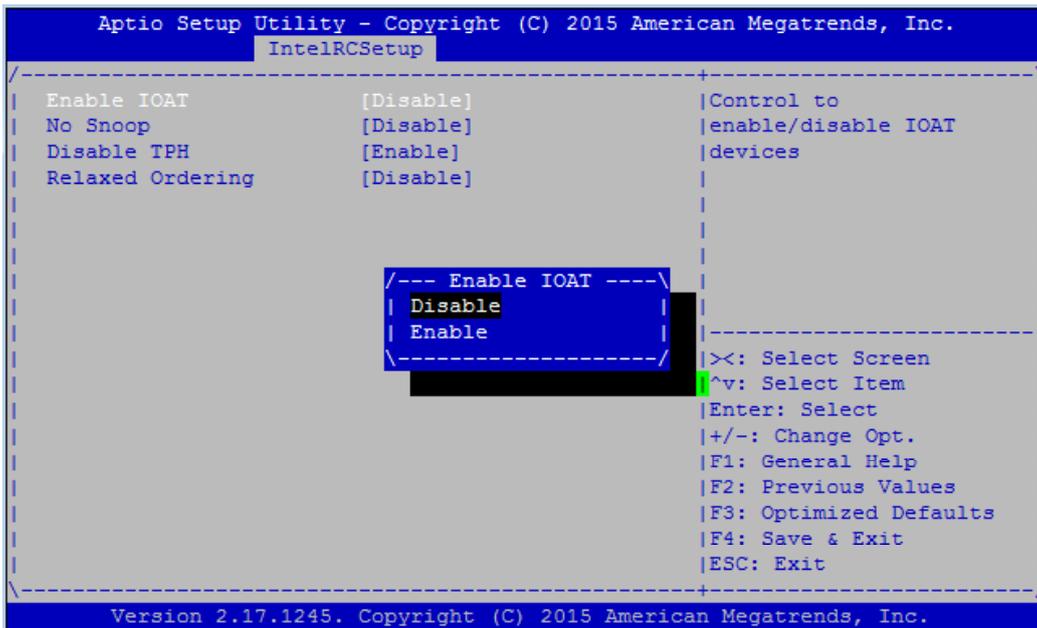
AMI Virtual HDisk0 1.00: set mass storage device emulation type. "Auto" enumerates devices according to their media format. Please be noted that optical devices will be emulated as CD-ROM.

```

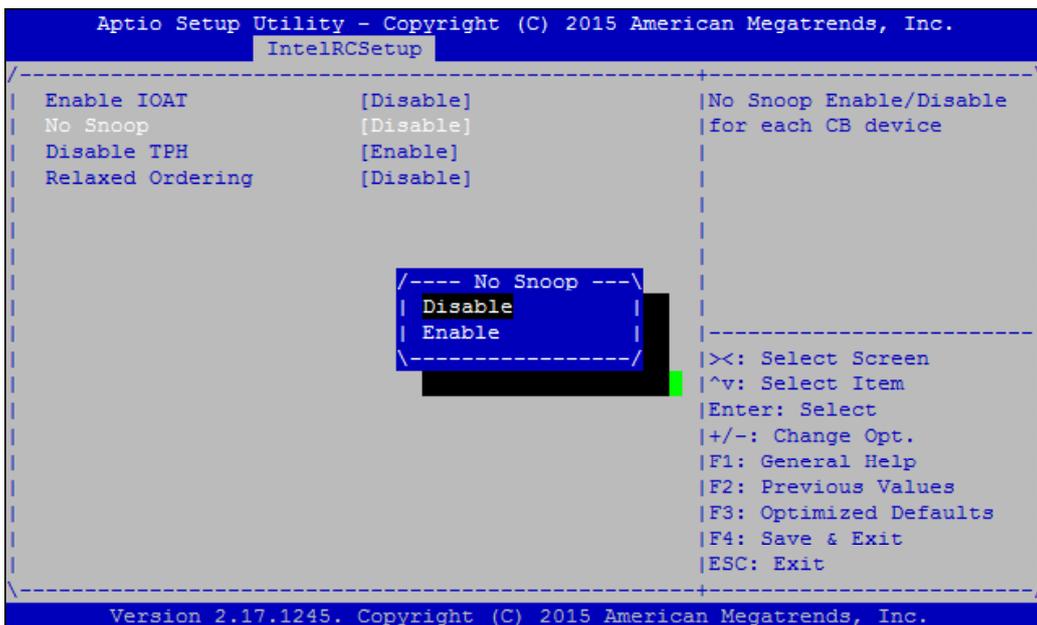
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Advanced
-----
USB Devices:
  3 Drives, 1 Keyboard, 1 Mouse, 3 Hubs      ^|Mass storage device
                                           +|emulation type. 'AUTO'
                                           +|enumerates devices
                                           +|according to their
XHCI Hand-off      [Enabled]                *|media format. Optical
EHCI Hand-off      [Enabled]                *|media format. Optical
USB Mass Storage Driv| Auto
Port 60/64 Emulation| Floppy
Forced FDD
USB hardware delays | Hard Disk
USB transfer time-out| CD-ROM
Device reset time-out|-----
Device power-up delay|-----
                                           : Select
                                           *|+/-: Change Opt.
                                           *|F1: General Help
Mass Storage Devices:
AMI Virtual CDROM 0 1. [Auto]                *|F2: Previous Values
AMI Virtual Floppy0 1 [Auto]                *|F3: Optimized Defaults
AMI Virtual HDISK0 1. [Auto]                *|F4: Save & Exit
                                           v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

```

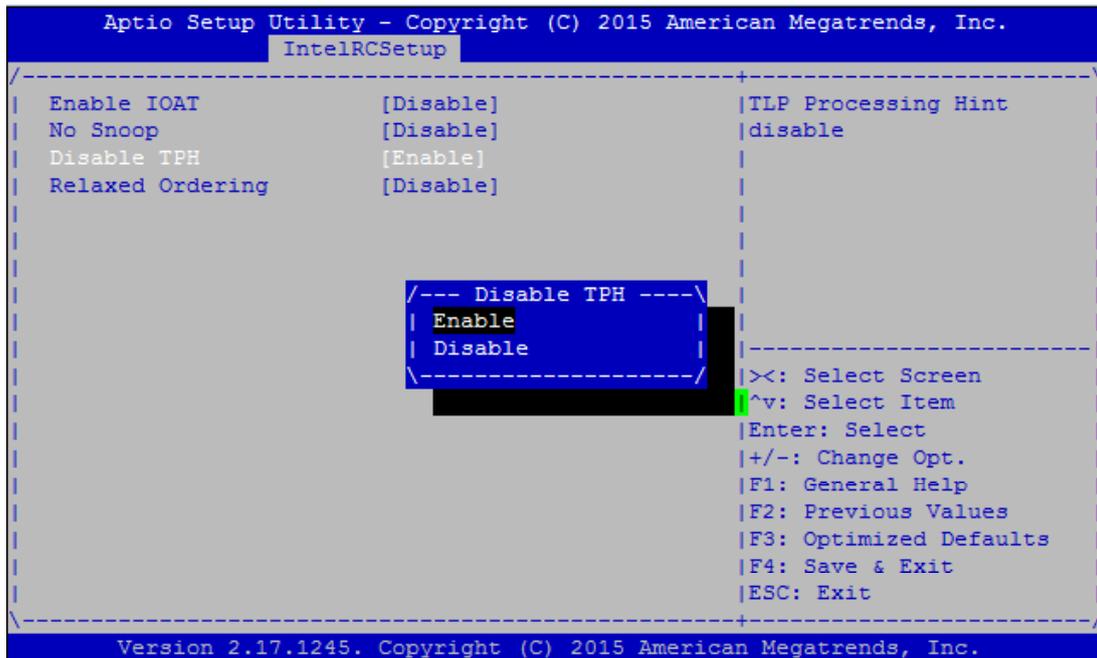

Enable IOAT: enables or disables IOAT devicesSelect. This function allows you to enable Intel I/O Acceleration Technology which benefits system data flows by reducing CPU overheads. The freed CPU resources will improve system responsiveness and avoid performance bottleneck.



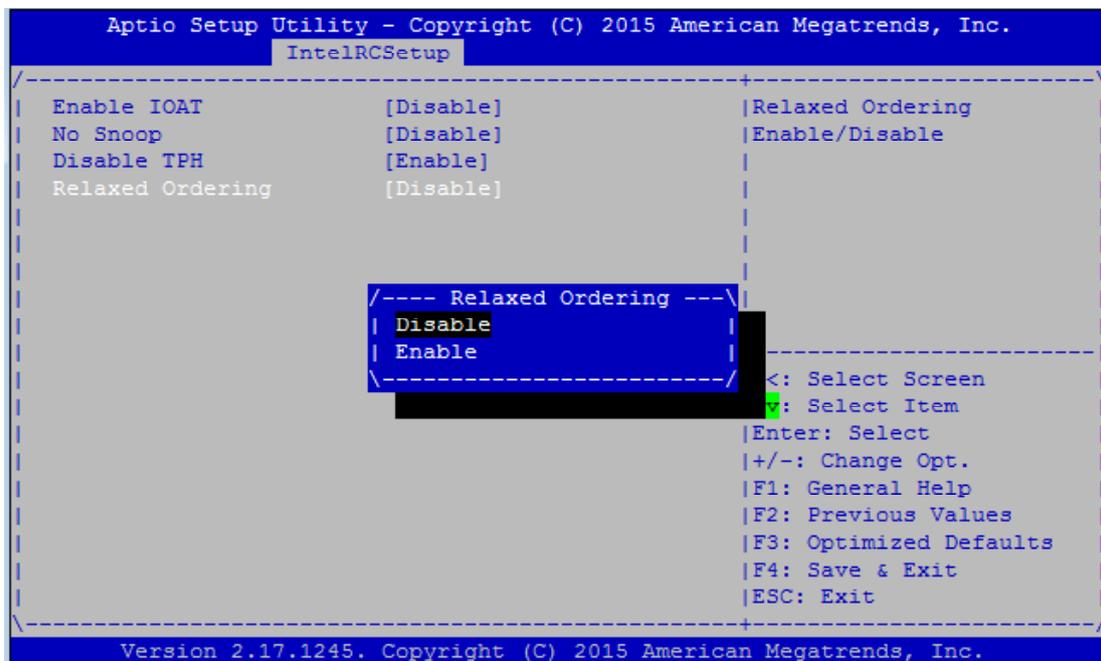
No Snoop: no snoop enable/disable for each CB device



Disable TPH: TLP Processing Hint disable



Relaxed Ordering: relaxed ordering enable/disable.



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

This option allows users to configure items of Intel Virtualization Technology for Directed I/O (VT-d). Press "Enter" to access its sub-menu.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit

-----
| RC Revision          1.0.8          |Press <Enter> to bring
| Numa                 [Enable]      |up the Intel VT for
|> IOAT Configuration |Directed I/O (VT-d)
|> Intel VT for Directed I/O (VT-d) |Configuration menu.
|> IIIO Configuration  |
|> IIO1 Configuration  |
|> Processor Configuration |
|> PCH Configuration    |
|                               |
|                               |-----
|                               |>X: Select Screen
|                               |^v: Select Item
|                               |Enter: Select
|                               |+/-: Change Opt.
| Setup Warning:          |F1: General Help
| Setting items on this  |F2: Previous Values
| Screen to incorrect    |F3: Optimized Defaults
| may cause system to   |F4: Save & Exit
| malfunction!          |ESC: Exit
|                               |
|                               |-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

VTd Azalea VcP Optimization: this option allows you to enable or disable Azalea VcP Optimization.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup

-----
| Intel VT for Directed I/O (VT-d) |Enable/Disable Azalea
|                               |VcP Optimizations
|-----
| VTd Azalea VcP Optimi  [Disable] |
| Intel VT for Directed  [Enable]   |
| Interrupt Remapping    [Enable]   |
| Coherency Support (No [Enable]   |
| Coherency Support (Is [Enable]   |
|                               |
|----- VTD Azalea VcP Optimizations -----|
| Disable |
| Enable  |
|-----
|                               |Select Screen
|                               |Select Item
|                               |Enter: Select
|                               |+/-: Change Opt.
|                               |F1: General Help
|                               |F2: Previous Values
|                               |F3: Optimized Defaults
|                               |F4: Save & Exit
|                               |ESC: Exit
|                               |
|-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Intel VT For Directed I/O (VT-d): enable or disable Intel Virtualization Technology for Directed I/O (VT-d) by reporting the I/O device to VMM through DMAR ACPI tables.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  IntelRCSetup
-----+-----
| Intel VT for Directed I/O (VT-d)          | Enable/Disable Intel
|-----+-----| Virtualization
| VtD Azalea VCp Optimi [Disable]          | Technology for Directed
| Intel VT for Directed [Enable]           | I/O (VT-d) by reporting
| Interrupt Remapping [Enable]             | the I/O device
| Coherency Support (No [Enable]           | assignment to VMM
| Coherency Support (Is [Enable]           | through DMAR ACPI
|-----+-----|
| /--- Intel VT for Directed I/O (VT-d) ---|
| | Enable |
| | Disable|
|-----+-----|
|                                           | Select Screen
|                                           | Select Item
|                                           |
| Enter: Select
| +/-: Change Opt.
| F1: General Help
| F2: Previous Values
| F3: Optimized Defaults
| F4: Save & Exit
| ESC: Exit
|-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Interrupt Remapping: enable or disable VT-d Interrupt Remapping support.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  IntelRCSetup
-----+-----
| Intel VT for Directed I/O (VT-d)          | Enable/Disable VT_D
|-----+-----| Interrupt Remapping
| VtD Azalea VCp Optimi [Disable]          | Support
| Intel VT for Directed [Enable]           |
| Interrupt Remapping [Enable]             |
| Coherency Support (No [Enable]           |
| Coherency Support (Is [Enable]           |
|-----+-----|
| /--- Interrupt Remapping ---|
| | Enable |
| | Disable|
|-----+-----|
|                                           | Select Screen
|                                           | Select Item
| Enter: Select
| +/-: Change Opt.
| F1: General Help
| F2: Previous Values
| F3: Optimized Defaults
| F4: Save & Exit
| ESC: Exit
|-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Coherency Support (Non-Isoch): enable or disable VT-d Engine Coherency support.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----+-----
Intel VT for Directed I/O (VT-d)          |Enable/Disable
-----+-----                          |Non-Isoch VT_D Engine
VTd Azalea VCp Optimi [Disable]           |Coherency support
Intel VT for Directed [Enable]            |
Interrupt Remapping [Enable]              |
Coherency Support (No [Enable]             |
Coherency Support (Is [Enable]            |
/--- Coherency Support (Non-Isoch) ---\
| Enable
| Disable
\-----+-----
                                           |Select Screen
                                           |Select Item
                                           |Enter: Select
                                           |+/-: Change Opt.
                                           |F1: General Help
                                           |F2: Previous Values
                                           |F3: Optimized Defaults
                                           |F4: Save & Exit
                                           |ESC: Exit
-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Coherency Support (Isoch): enable or disable Isoch VT-d Engine Coherency support

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----+-----
Intel VT for Directed I/O (VT-d)          |Enable/Disable Isoch
-----+-----                          |VT_D Engine Coherency
VTd Azalea VCp Optimi [Disable]           |support
Intel VT for Directed [Enable]            |
Interrupt Remapping [Enable]              |
Coherency Support (No [Enable]             |
Coherency Support (Is [Enable]            |
/--- Coherency Support (Isoch) ---\
| Enable
| Disable
\-----+-----
                                           |Select Screen
                                           |Select Item
                                           |Enter: Select
                                           |+/-: Change Opt.
                                           |F1: General Help
                                           |F2: Previous Values
                                           |F3: Optimized Defaults
                                           |F4: Save & Exit
                                           |ESC: Exit
-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

IIO0 Configuration

This function allows users to check PCIe port lane width switch status. Press Enter to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| RC Revision          1.0.8          | PCIe Port Lane Width
| Numa                 [Enable]       | Switch Status
|> IOAT Configuration
|> Intel VT for Directed I/O (VT-d)
|> IIO0 Configuration
|> IIO1 Configuration
|> Processor Configuration
|> PCH Configuration
|
|-----|
| Setup Warning:
| Setting items on this Screen to incorrect
| may cause system to malfunction!
|
|>: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
|-----|
| Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
|-----|
```

Set PCIe Port Difercation By Present Card Lane: displays PCIe port information and status

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
| Set PCIe Port Bifurcation By Present Card Lane
| =====
| IOU2 (IIO PCIe Port 1 [x8]
| IOU0 (IIO PCIe Port 2 [x8x8]
| IOU1 (IIO PCIe Port 3 [x8x8]
|
|-----|
|>: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
|-----|
| Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
|-----|
```


Processor Configuration

This function allows users to view and configure options that can change processor settings. Press Enter to access the sub-menu.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| RC Revision          1.0.8          |Displays and provides
| Numa                 [Enable]        |option to change the
|> IOAT Configuration |Processor Settings
|> Intel VT for Directed I/O (VT-d) |
|> IIO0 Configuration |
|> IIO1 Configuration |
|> Processor Configuration |
|> PCH Configuration   |
|
|-----|
| Setup Warning:
| Setting items on this Screen to incorrect
| may cause system to malfunction!
|
|>X: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
|
|-----|
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

```

Processor Configuration: displays processor status and information.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
| Processor Configuration |^|Enables Hyper Threading
|-----|*|(Software Method to
| Processor Socket       Socket 0   Socket 1   *|Enable/Disable Logical
| Processor ID           000306F2* | 000306F2  *|Processor threads.
| Processor Frequency    1.800GHz | 1.800GHz  *|
| Processor Max Ratio    12H   | 12H       *|
| Processor Min Ratio    0CH   | 0CH       *|
| Microcode Revision     0000002B | 0000002B  *|
| L1 Cache RAM           768KB   | 768KB     *|
| L2 Cache RAM           3072KB  | 3072KB    *|
| L3 Cache RAM           30720KB | 30720KB   *|
| Processor 0 Version    Intel(R) Xeon(R) CPU E5
|                        -2648L v3 @ 1.80GHz *|^v: Select Item
| Processor 1 Version    Intel(R) Xeon(R) CPU E5
|                        -2648L v3 @ 1.80GHz *|Enter: Select
|
| Hyper-Threading [ALL] [Enable] *|+/-: Change Opt.
| Execute Disable Bit   [Enable] *|F1: General Help
| X2APIC                 [Enable] *|F2: Previous Values
|                        *|F3: Optimized Defaults
|                        +|F4: Save & Exit
|                        v|ESC: Exit
|
|-----|
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.

```

Hyper-Threading [ALL]: enables or disables Hyper Threading. This is the software method to enable or disable logical processor threads.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  IntelRCSetup
-----
Processor Configuration                               ^|Enables Hyper Threading
*|(Software Method to
*|Enable/Disable Logical
*|Processor threads.
Processor Socket      Socket 0      Socket 1
Processor ID          000306F2* | 000306F2
Processor Frequency   1.800GHz | 1.800GHz
Processor Max Ratio   12H | 12H
Processor Min Ratio   0CH | 0CH
Microcode Revision    /--- Hyper-Threading [ALL] ---\
L1 Cache RAM          | Disable
L2 Cache RAM          | Enable
L3 Cache RAM          |-----
Processor 0 Version   -2648L v3 @ 1.80GHz
Processor 1 Version   Intel(R) Xeon(R) CPU E5
                    -2648L v3 @ 1.80GHz
Hyper-Threading [ALL] [Enable]
Execute Disable Bit   [Enable]
X2APIC                [Enable]
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
  
```

Execute Disable Bit: 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.

```

Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  IntelRCSetup
-----
Processor Configuration                               ^|When disabled, forces
*|the XD feature flag to
*|always return 0.
Processor Socket      Socket 0      Socket 1
Processor ID          000306F2* | 000306F2
Processor Frequency   1.800GHz | 1.800GHz
Processor Max Ratio   12H | 12H
Processor Min Ratio   0CH | 0CH
Microcode Revision    /--- Execute Disable Bit ---\
L1 Cache RAM          | Disable
L2 Cache RAM          | Enable
L3 Cache RAM          |-----
Processor 0 Version   -2648L v3 @ 1.80GHz
Processor 1 Version   Intel(R) Xeon(R) CPU E5
                    -2648L v3 @ 1.80GHz
Hyper-Threading [ALL] [Enable]
Execute Disable Bit   [Enable]
X2APIC                [Enable]
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
  
```

X2APIC: enables or disables extended APIC support.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----+-----
| Processor Configuration                               ^|Enable/disable extended
|-----+-----*|APIC support
| Processor Socket      Socket 0      Socket 1      *|
| Processor ID          000306F2* | 000306F2      *|
| Processor Frequency   1.800GHz | 1.800GHz      *|
| Processor Max Ratio   12H | 12H                *|
| Processor Min Ratio   0CH | 0CH                *|
| Microcode Revision    0000 | 0000          *|
| L1 Cache RAM          7 | 7              *|
| L2 Cache RAM          30 | 30            *|
| L3 Cache RAM          307 | 307           *|
| Processor 0 Version    Intel(R) Xeon(R) CPU E5-2648L v3 @ 1.80GHz *|
| Processor 1 Version    Intel(R) Xeon(R) CPU E5-2648L v3 @ 1.80GHz *|
| Hyper-Threading [ALL] [Enable]                       *|F1: General Help
| Execute Disable Bit   [Enable]                       *|F2: Previous Values
| X2APIC                 [Enable]                       *|F3: Optimized Defaults
|-----+-----+|F4: Save & Exit
|                                     v|ESC: Exit
|-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

AES-NI: enables or disables AES-NI (Advanced Encryption Standard - New Instruction) support.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----+-----
|                                     ^|Enable/disable AES-NI
|                                     +|support
| Processor Socket      Socket 0      Socket 1      *|
| Processor ID          000306F2* | 000306F2      *|
| Processor Frequency   1.800GHz | 1.800GHz      *|
| Processor Max Ratio   12H | 12H                *|
| Processor Min Ratio   0CH | 0CH                *|
| Microcode Revision    0000002B | 0000002B      *|
| L1 Cache RAM          7 | 7              *|
| L2 Cache RAM          30 | 30            *|
| L3 Cache RAM          307 | 307           *|
| Processor 0 Version    Intel(R) Xeon(R) CPU E5-2648L v3 @ 1.80GHz *|
| Processor 1 Version    Intel(R) Xeon(R) CPU E5-2648L v3 @ 1.80GHz *|
| Hyper-Threading [ALL] [Enable]                       *|F1: General Help
| Execute Disable Bit   [Enable]                       *|F2: Previous Values
| X2APIC                 [Enable]                       *|F3: Optimized Defaults
| AES-NI                 [Enable]                       *|F4: Save & Exit
|-----+-----+|ESC: Exit
|-----+-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

PCH Configuration

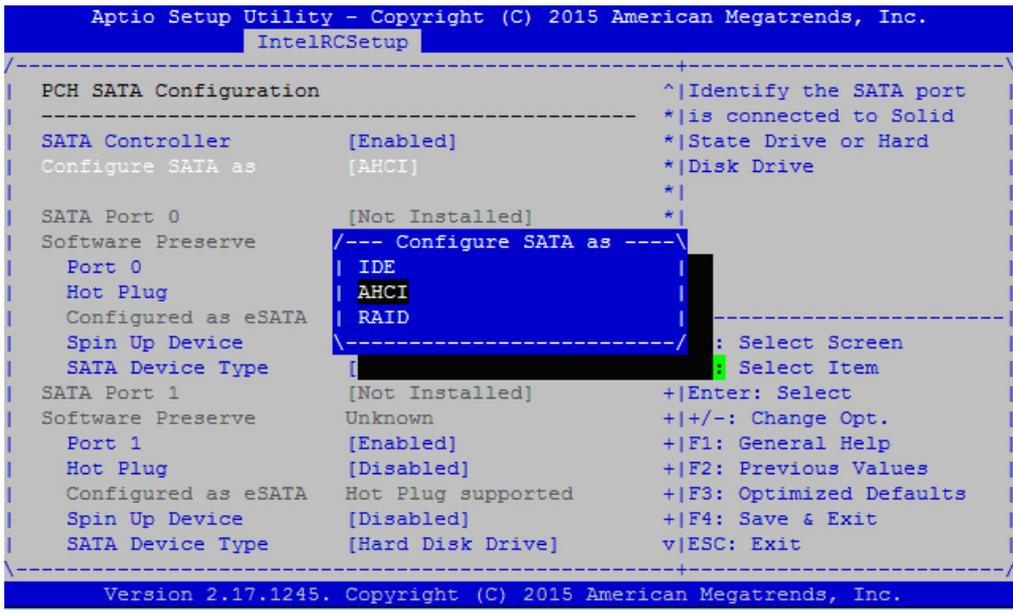
This function allows users to view and configure PCH settings. Press Enter to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit
-----
| RC Revision          1.0.8          | Displays and provides |
| Numa                 [Enable]       | option to change the  |
|> IOAT Configuration | PCH Settings         |
|> Intel VT for Directed I/O (VT-d) |                       |
|> IIO0 Configuration |                       |
|> IIO1 Configuration |                       |
|> Processor Configuration |                       |
|> PCH Configuration  |                       |
|                       |                       |
|-----|-----|
| Setup Warning:      |>X: Select Screen    |
| Setting items on this Screen to incorrect | ^v: Select Item     |
| may cause system to malfunction!         | Enter: Select       |
|                                           | +/-: Change Opt.   |
|                                           | F1: General Help   |
|                                           | F2: Previous Values|
|                                           | F3: Optimized Defaults|
|                                           | F4: Save & Exit    |
|                                           | ESC: Exit          |
|-----|-----|
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

PCH State after G3: select S0/S5 for ACPI state after a G3. The default is "Last State".

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
| PCH Configuration    | Select S0/S5 for ACPI | | |
|-----|-----|    | state after a G3     |
| PCH state after G3   | [Last State]          |
|> PCH SATA Configuration |                       |
|> USB Configuration   |                       |
|                       |                       |
|-----|-----|    |                       |
| PCH state after G3   |>X: Select Screen    |
| S0                   | ^v: Select Item     |
| S5                   | Enter: Select       |
| Last State           | +/-: Change Opt.   |
|                       | F1: General Help   |
|                       | F2: Previous Values|
|                       | F3: Optimized Defaults|
|                       | F4: Save & Exit    |
|                       | ESC: Exit          |
|-----|-----|
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

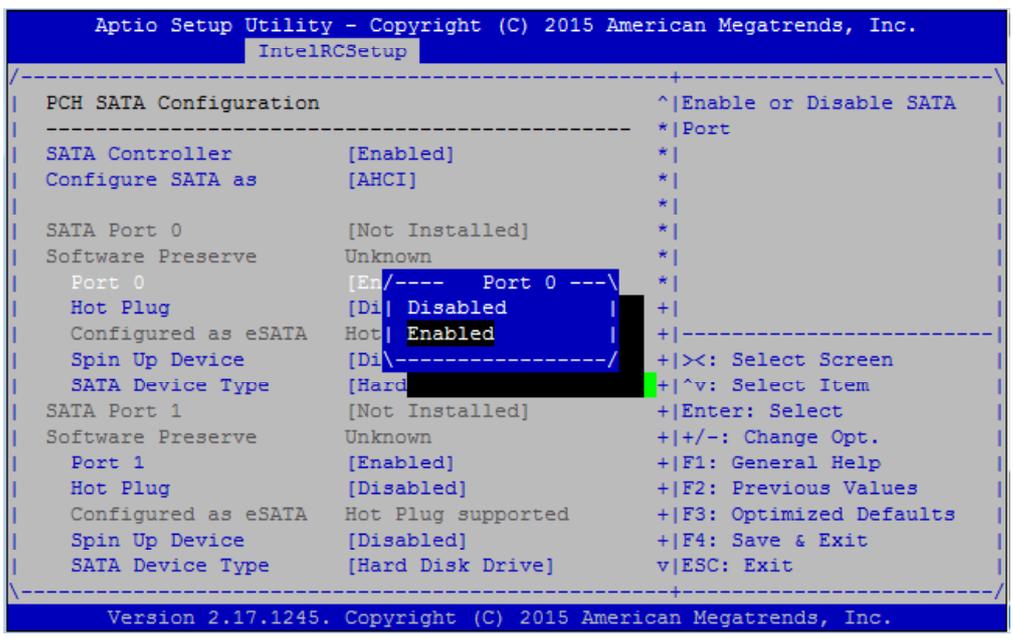

Configure SATA as: this item identifies whether the SATA port is connected to a SSD and HDD. Select IDE, AHCI or RAID. The default is "AHCI".



SATA Port 0: displays status of SATA port 0

Software Preserve: displays information of Software Preserve

Port 0: enable or disable this SATA port



Hot Plug: designates this port as hot pluggable

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
PCH SATA Configuration          ^|Designates this port as
                                *|Hot Pluggable.
SATA Controller                 [Enabled]
Configure SATA as               [AHCI]
SATA Port 0                     [Not Installed]
Software Preserve               Unknown
  Port 0                        [E/----- Hot Plug ----\
  Hot Plug                      [D| Disabled |
  Configured as eSATA           Ho| Enabled |
  Spin Up Device                [D\-----\
  SATA Device Type              [Har
SATA Port 1                     [Not Installed]
Software Preserve               Unknown
  Port 1                        [Enabled]
  Hot Plug                      [Disabled]
  Configured as eSATA           Hot Plug supported
  Spin Up Device                [Disabled]
  SATA Device Type              [Hard Disk Drive]
                                +|>: Select Screen
                                +|^v: Select Item
                                +|Enter: Select
                                +|+/-: Change Opt.
                                +|F1: General Help
                                +|F2: Previous Values
                                +|F3: Optimized Defaults
                                +|F4: Save & Exit
                                v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Spin Up Device: 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.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
PCH SATA Configuration          ^|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 Controller                 [Enabled]
Configure SATA as               [AHCI]
SATA Port 0                     [Not Installed]
Software Preserve               Unknown
  Port 0                        /----- Spin Up Device ----\
  Hot Plug                      | Disabled |
  Configured as eSATA           | Enabled |
  Spin Up Device                \-----\
  SATA Device Type              [
SATA Port 1                     [Not Installed]
Software Preserve               Unknown
  Port 1                        [Enabled]
  Hot Plug                      [Disabled]
  Configured as eSATA           Hot Plug supported
  Spin Up Device                [Disabled]
  SATA Device Type              [Hard Disk Drive]
                                <: Select Screen
                                ^v: Select Item
                                +|Enter: Select
                                +|+/-: Change Opt.
                                +|F1: General Help
                                +|F2: Previous Values
                                +|F3: Optimized Defaults
                                +|F4: Save & Exit
                                v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

SATA Device Type: identifies the SATA port is connected to SSD or HDD.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
| PCH SATA Configuration          ^|Identify the SATA port
|                               *|is connected to Solid
|                               *|State Drive or Hard
|                               *|Disk Drive
|                               *|
| SATA Controller                 [Enabled]
| Configure SATA as               [AHCI]
|                               *|
| SATA Port 0                    [Not Installed]
| Software Preserve               Unknown
|                               *|
|   Port 0                       /---- SATA Device Type ----\
|   Hot Plug                     | Hard Disk Drive |
|   Configured as eSATA           | Solid State Drive |
|   Spin Up Device                \-----/
|   SATA Device Type              : Select Screen
|                               : Select Item
| SATA Port 1                    [Not Installed]
| Software Preserve               Unknown
|                               +|Enter: Select
|   Port 1                       +|+/-: Change Opt.
|   Hot Plug                     +|F1: General Help
|   Configured as eSATA           +|F2: Previous Values
|   Spin Up Device                +|F3: Optimized Defaults
|   SATA Device Type              +|F4: Save & Exit
|                               v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

SATA Port 1: displays status of SATA port 0

Software Preserve: displays information of Software Preserve

Port 1: enable or disable this SATA port

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
| PCH SATA Configuration          ^|Enable or Disable SATA
|                               *|Port
|                               *|
|                               *|
| SATA Controller                 [Enabled]
| Configure SATA as               [AHCI]
|                               *|
| SATA Port 0                    [Not Installed]
| Software Preserve               Unknown
|                               *|
|   Port 0                       [En/---- Port 1 ----\
|   Hot Plug                     [Di| Disabled |
|   Configured as eSATA           Hot| Enabled |
|   Spin Up Device                [Di\-----/
|   SATA Device Type              [Hard
| SATA Port 1                    [Not Installed]
| Software Preserve               Unknown
|                               +|Enter: Select
|   Port 1                       +|+/-: Change Opt.
|   Hot Plug                     +|F1: General Help
|   Configured as eSATA           +|F2: Previous Values
|   Spin Up Device                +|F3: Optimized Defaults
|   SATA Device Type              +|F4: Save & Exit
|                               v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

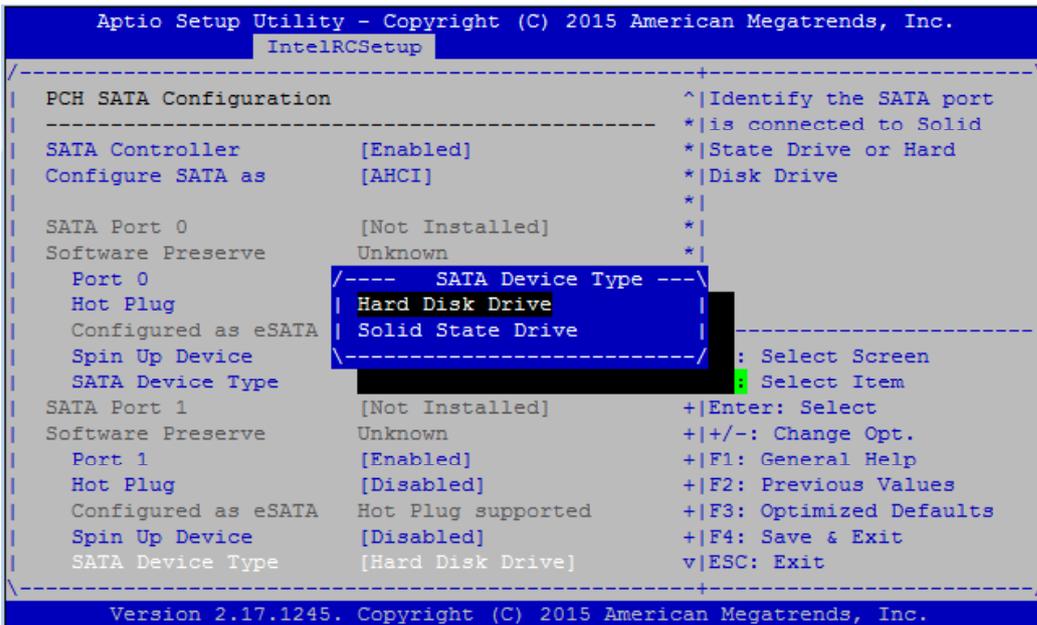
Hot Plug: designates this port as hot pluggable

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
PCH SATA Configuration                               ^|Designates this port as
-----                                           *|Hot Pluggable.
SATA Controller          [Enabled]                *|
Configure SATA as       [AHCI]                    *|
SATA Port 0              [Not Installed]           *|
Software Preserve       Unknown                    *|
  Port 0                  [E/---- Hot Plug ----\] *|
  Hot Plug                [D| Disabled            |] +|
  Configured as eSATA     Ho| Enabled              |] +|
  Spin Up Device          [D\-----/            |] +|>X: Select Screen
  SATA Device Type       [Har|                    |] +|^v: Select Item
SATA Port 1              [Not Installed]           +|Enter: Select
Software Preserve       Unknown                    +|+/-: Change Opt.
  Port 1                  [Enabled]                 +|F1: General Help
  Hot Plug                [Disabled]                +|F2: Previous Values
  Configured as eSATA     Hot Plug supported        +|F3: Optimized Defaults
  Spin Up Device          [Disabled]                 +|F4: Save & Exit
  SATA Device Type       [Hard Disk Drive]          v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Spin Up Device: 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.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
IntelRCSetup
-----
PCH SATA Configuration                               ^|If enabled for any of
-----                                           *|ports Staggered Spin Up
SATA Controller          [Enabled]                *|will be performed and
Configure SATA as       [AHCI]                    *|only the drives which
SATA Port 0              [Not Installed]           *|have this option
Software Preserve       Unknown                    *|enabled will spin up at
  Port 0                  /---- Spin Up Device ---\ |drives spin up at boot.
  Hot Plug                | Disabled            | |
  Configured as eSATA     | Enabled              | |
  Spin Up Device          |-----/            | |<: Select Screen
  SATA Device Type       [|                    |] |^v: Select Item
SATA Port 1              [Not Installed]           +|Enter: Select
Software Preserve       Unknown                    +|+/-: Change Opt.
  Port 1                  [Enabled]                 +|F1: General Help
  Hot Plug                [Disabled]                +|F2: Previous Values
  Configured as eSATA     Hot Plug supported        +|F3: Optimized Defaults
  Spin Up Device          [Disabled]                 +|F4: Save & Exit
  SATA Device Type       [Hard Disk Drive]          v|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

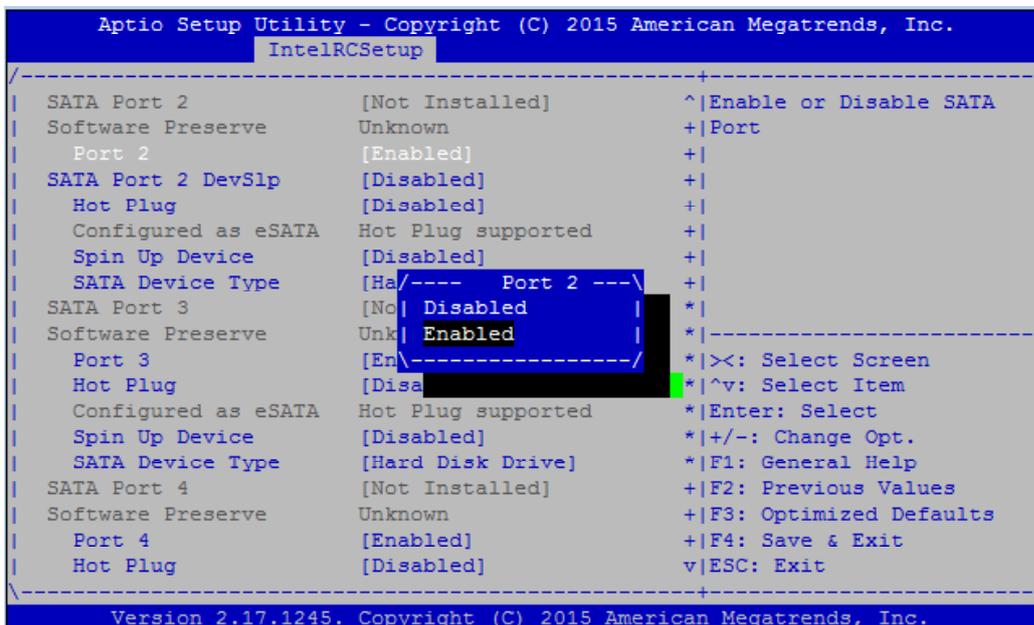
SATA Device Type: identifies the SATA port is connected to SSD or HDD.



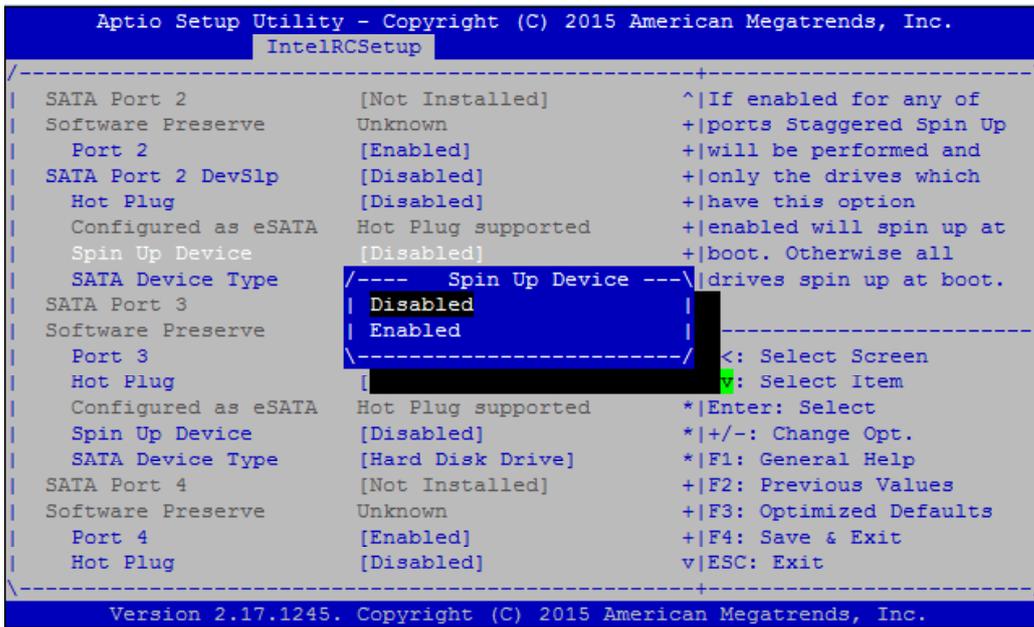
SATA Port 2: displays status of SATA port 0

Software Preserve: displays information of Software Preserve

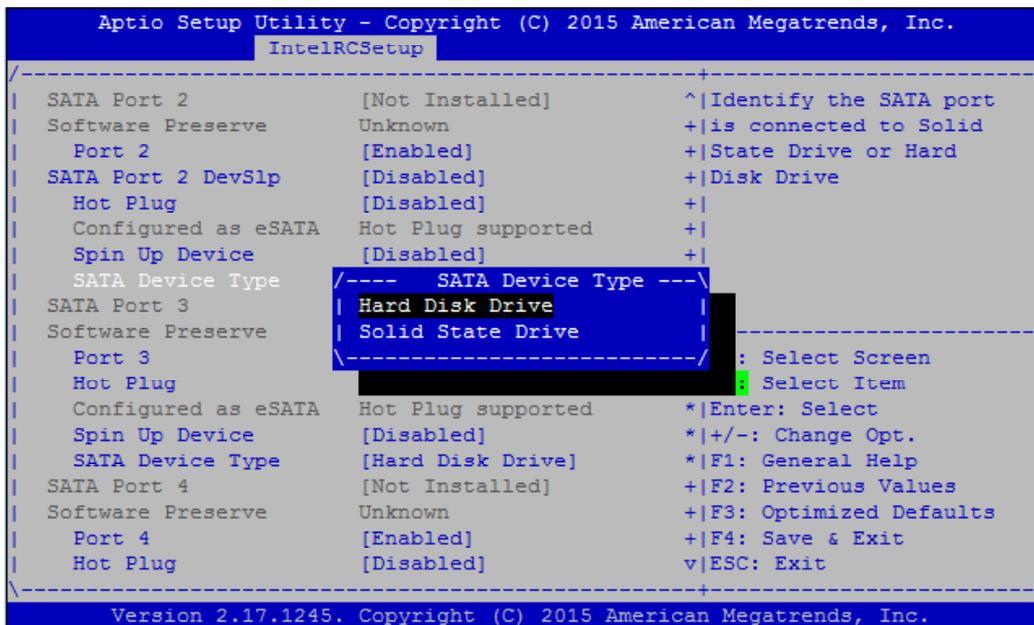
Port 2: enable or disable this SATA port



Spin Up Device: 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: identifies the SATA port is connected to SSD or HDD.



Notes:

The BIOS of FW-8896 supports SATA configurations up to 6 ports (SATA port 0~5). Only SATA port 2 is programmed with SATA Device Sleep feature.

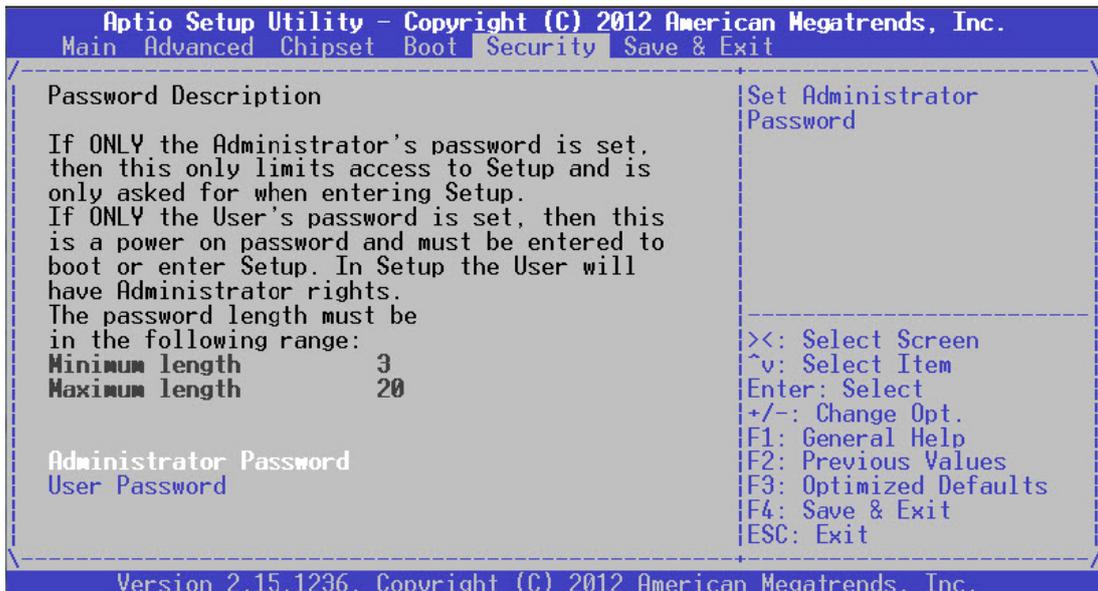
Therefore, SATA port 3~6 all share the same configurable items as described for SATA port 0~2.

Security

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

Administrator Password: set administrator password. Once set, then this only limits access to Setup and is only asked for when entering Setup.

User Password: set user password. Once 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.



Boot

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

Boot Configuration

Setup Prompt Timeout: number of seconds to wait for setup activation key. "65535 (0xFFFF)" means indefinite waitings.

```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit

-----
Boot Configuration
Setup Prompt Timeout      1
Bootup NumLock State     [On]
Quiet Boot                [Disabled]

Boot Option Priorities
Boot Option #1           [AMI Virtual CDROM0 ...]

USB Device BBS Priorities
-----
|>: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Bootup Numlock State: select the keyboard "Numlock" state

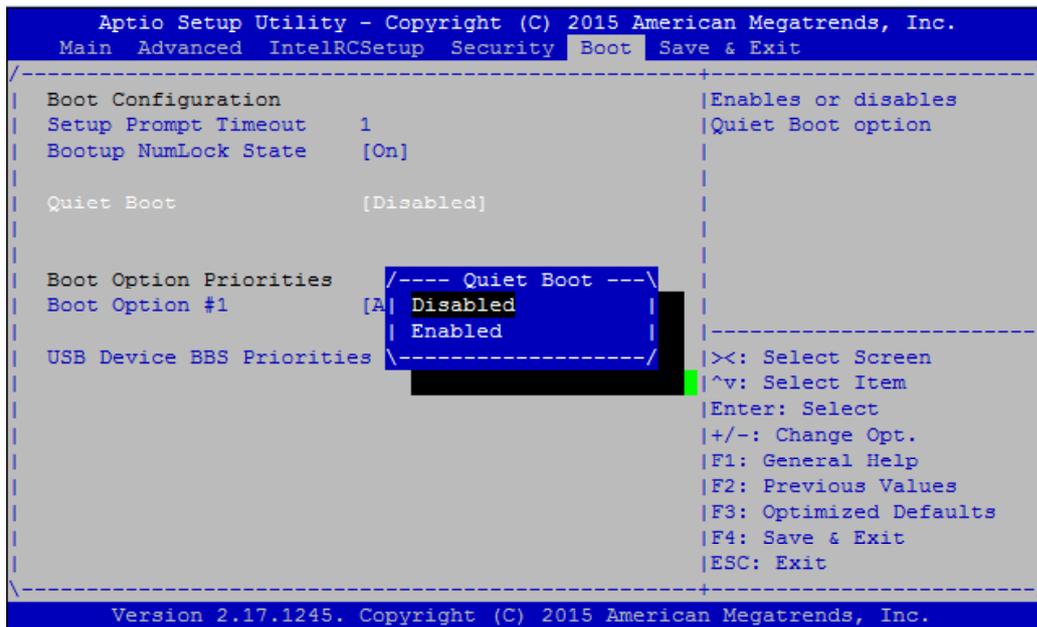
```
Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
Main  Advanced  IntelRCSetup  Security  Boot  Save & Exit

-----
Boot Configuration
Setup Prompt Timeout      1
Bootup NumLock State     [On]
Quiet Boot                [Disabled]

Boot Option Priorities
Boot Option #1           [AMI Virtual CDROM0 ...]

USB Device BBS Priorities
-----
|>: Select Screen
|^v: Select Item
|Enter: Select
|+/-: Change Opt.
|F1: General Help
|F2: Previous Values
|F3: Optimized Defaults
|F4: Save & Exit
|ESC: Exit
-----
Version 2.17.1245. Copyright (C) 2015 American Megatrends, Inc.
```

Quiet Boot: this option allows you to enable or disable "Quiet Boot". The default is "Disabled" based on Intel's server environment setting.



Boot Option #1: set devices as boot option #1

USB Device BBS Priorities: set USB device BBS priorities

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, see *watchdog* folder on the *Driver and Manual CD*



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)

For sample watchdog code, see *watchdog* folder on the *Driver and Manual CD*

Appendix B: Setting up Console Redirections

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

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 to control 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

Please refer to the LAN_Bypass_Watchdog folder on the Driver and Manual CD.

And the Lanner bypass possess 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 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 sample LAN bypass code and the Bypass Manual, see the LAN_Bypass folder on the Driver and Manual CD or 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.

For a description of the physical LAN ports equipped with this function, refer to *Front Panel Features* in *Chapter 1 Introduction*.

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, see *LCM folder* in the *Driver and Manual CD*. 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 -xvzf 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 line 1.
— 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 virtualization respectively for parallel port pass through. Use the procedures listed below for step-by-step instructions separately based on your case.

In 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 insmod parport.ko, parport_pc.ko and ppdev.ko linux kernel drivers in virtualization environment before executing the ppdev_test testing program.

In 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 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 for you to insmod parport.ko, parport_pc.ko and ppdev.ko linux kernel drivers in virtualization environment before executing the ppdev_test testing program.

Appendix E:

On Linux

Follow these instructions when installing the Intel® LAN controller base driver for the in Red Hat® and Linux operating system.

1. Insert the motherboard/system support CD to the optical drive and mount the optional drive in the Linux platform.
2. Copy the base driver tar file from the motherboard/system support CD to the directory of your local hard disk. The Intel® LAN driver for Linux OS is located in the following directory:

\Driver\LAN_Driver\PRO1000\LINUX. The name format of driver file is "e1000-<Version>.tar.gz". For example: the file name of driver version 7.0.38 is "e1000-7.0.38.tar.gz".

3. Untar/unzip the archive, where <x.x.x> is the version number for the driver tar file:

```
tar xzf e1000-<x.x.x>.tar.gz
```

4. Change to the driver src directory on your system, where <x.x.x> is the version number for the driver tar:

```
cd e1000-<x.x.x>/src/
```

5. Compile the driver module by typing the following command:

```
make install
```

6. The binary will be installed as:

```
/lib/modules/<kernel_version>/kernel/drivers/  
net/e1000.o
```

The install locations listed above are the default locations. They might not be correct for certain Linux distributions.

7. Load the module using either the insmod or modprobe command:

```
modprobe igb
```

```
insmod igb
```

Note that for 2.6 kernels the insmod command can be used if the full path to the driver module is specified. For example:

```
insmod /lib/modules/<KERNEL VERSION>/kernel/  
drivers/net/igb/igb.ko
```

With 2.6 based kernels also make sure that older igb drivers are removed from the kernel, before loading the new module:

```
rmmod igb; modprobe igb
```

8. Assign an IP address to the interface by entering the following, where <x> is the interface number:

```
ifconfig eth<x> <IP_address>
```

9. Verify that the interface works. Enter the following, where <IP_address> is the IP address for another machine on the same subnet as the interface that is being tested:

```
ping <IP_address>
```

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 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 a RMA#

6. To obtain a RMA number, simply fill out and fax the "RMA Request Form" to your supplier.
7. 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.
8. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
9. 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.