

Lanner

Network Application Platforms

Hardware platforms for next generation networking infrastructure



HCP-72i1 V1.0

User's Manual

Release Date: 2015/06/19

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

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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.

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

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).

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.

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Avertissement concernant la pile au lithium

- Risque d'explosion si la pile est remplacée par une autre d'un mauvais type.
- Jetez les piles usagées conformément aux instructions.
- L'installation doit être effectuée par un électricien formé ou une personne formée à l'électricité connaissant toutes les spécifications d'installation et d'appareil du produit.
- Ne transportez pas l'unité en la tenant par le câble d'alimentation lorsque vous déplacez l'appareil.
- La machine ne peut être utilisée qu'à un lieu fixe comme en laboratoire, salle d'ordinateurs ou salle de classe.

Sécurité de fonctionnement

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

partie métallique du châssis.

Vérifiez régulièrement la valeur de résistance du bracelet antistatique, qui doit être comprise entre 1 et 10 mégohms (Mohms).

Consignes de sécurité électrique

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

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

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

Cet appareil de protection doit être branché à la source d'alimentation avant l'alimentation CC.

- pour refroidir l'équipement à une température de fonctionnement acceptable sans circulation adaptée. Vérifiez que votre site propose une circulation d'air adéquate.
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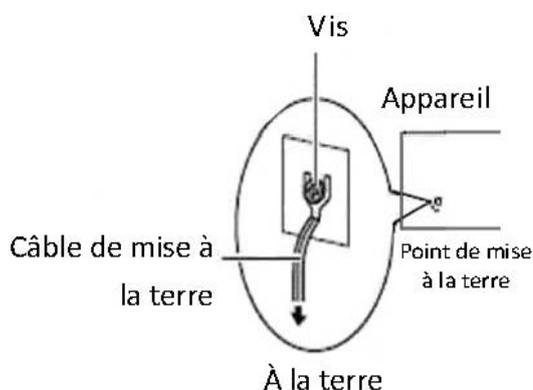
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Revision History

Version	Date	Descriptions
V0.1	2014/12/09	Preliminary
V1.0	2015/06/19	Official release

Table of Contents

Chapter 1: Introduction	10
System Specification	10
Package Contents	11
Block Diagram	12
Physical Architecture of Lanner's HybridTCA	13
Chapter 2: System Components	15
Mechanical Drawings	15
Front Components	16
Rear Components	17
Chapter 3: Motherboard Information	19
An Internal Glance of HCP-72i1	19
Jumper and Connector Location	21
Connectors and Jumpers List	22
Jumper Settings & Connectors Pin Definitions	23
Chapter 4: Hardware Installation	27
Preparing the Hardware Installation	27
Accessing the Components	27
Installing CPU and the Heat Sink	28
Installing the System Memory	29
Installing IPMI Card on OPMA Socket	29
Installing HDD/SSD	30
Replacing Network I/O Modules	31
Replacing Power Supply Units	31

Replacing Cooling Fans	32
Rack Mounting	33
Chapter 5: BIOS Setup	36
Main	37
Advanced	38
WHEA Configuration	40
CPU Configuration	41
SATA Configuration	46
USB Configuration	48
Hardware Monitor	51
LAN Module Hardware Monitor	52
LAN Boot Select	53
Serial Port Console Redirection	54
COM Console Redirection Settings	55
Chipset	60
IOH Configuration	61
Intel (R) VT for Directed I/O Configuration	62
Boot	68
Security	75
Save & Exit	76
Chapter 6: IPMI Navigation	78
Getting Started	78
Dashboard	79
Remote Control	79
Remote Control -- Launched	80
Introducing the Remote Control Functions	81

Configuration	87
DNS Server Settings	87
Mouse Mode Settings	88
Network Settings	89
Network Link Configuration	90
NTP Settings	91
Services	91
SSL Certificate Configuration	92
User Management	93
Remote Control	94
Console Redirection	94
Server Power Control	95
Maintenance	95
Firmware Update	96
Restore Factory Defaults	96
System Administrator	96
Chapter 7: About the PCIe-Switch Feature of HCP-72i1	98
Brief	98
Default Settings of PCI Express Switch	99
Demonstrating the Switching Methods for the PCIe Switch	99
Initializing the System for Re-planning the Arrangement of PCI Bus ID	100
Scenario 1: Bottom Board as Management Port, Device 2/3 Taken by Bottom Board	101
Scenario 2: Bottom Board as Management Port, Device 2/3 Returned to Upper Board	104
Description of PLX8748 Register	105
Management of the Control Register	105
Secondary Bus Reset	105
Virtual Switch	105

Appendix 1: About the Non-Transparent Bridge	106
Appendix 2: Programming Watchdog Timer	110
Appendix 3: Setting up Console Redirections	110
Appendix 4: Programming the LCM	111
Appendix 5: On Linux	114
Appendix 6: Terms and Conditions	115
Warranty Policy	115
RMA Service	115

Chapter 1

Introduction

Chapter 1:

Introduction

Thank you for choosing HCP-72i1. HCP-72i1 is a 2U rackmount network security appliance built with Lanner's unique Hybrid Telecommunications Computing Architecture (HybridTCA™).

HCP-72i1 integrates control, management and data processing in one system and is positioned as an ideal solution for datacenters and telecommunications carriers. It comes with two x86 mainboards, each supporting two Intel Xeon E5-2600 series "Ivy Bridge EP" processors on LGA2011.

HCP-72i1 can be fitted, via the three (max.) swappable I/O blades, with up to 36 1GbE network ports or 24 10GbE network ports in an array of SFP or copper combinations. This particular appliance also comes with 8 quad-channel DDR3 modules and 2 removable SAS/SATA HDD bays, future-proofing most of the expansion needs.

Features:

- Intel Sandy/Ivy Bridge EP Xeon® Processor E5-2697 v2 CPUs, with Patsburge-B 602 PCH
- 2 x86 CPU Blades in the rear, each blade support Ivy-Bridge E5-2600 v2 Family up to 130W CPU
- Dual Mainboard Communication is through NTB port up to 20 Gbs bi-way
- Each Blade Support 16x R-DIMM
- 3 network I/O Blades on the front
- IPMI Port for Remote Management
- Removable Fan Module
- NEBS Ready Design
- 2 x 2.5" HDD Bay
- Hinge LCD Module for Easy Diagnostics and Configuration

System Specification

Form Factor		2U Rackmount
Platform	Processor Options	Intel Sandy / Ivy Bridge EP (Intel® Xeon® Processor E5-2697 v2 (30M Cache, 2.70 GHz) Dual 2011 pin LGA sockets
	Chipset	Intel Patsburg-B 602
BIOS		64Mb Flash Memory with AMI® BIOS
System Memory	Technology	16 x 240-pin DIMM Sockets per board
	Max. Capacity	Up to 32GB DDR3 1600 ECC Registered DIMM
	Socket	16 x 240-pin DIMM Sockets
OS Support		Supports 32-bit/64-bit operating systems
Storage	HDD Bays	2 x SATA 2.5" HDD/SSD
Networking Outputs (per board)	Management Port	1 x RJ-45 Intel 82574L Gigabit supports 10BASE-T, 100BASE-T, and 1000BASE-T
	SYNC Port	1 x SFP+ port
	LOM Port	1 x RJ-45 at 10/100/1000 base-T speeds
	Console Port	1 x RJ-45 port
	Ethernet Expansion	3 x LAN I/O blades for network modules. Each I/O slot supports PCIe x8 Gen 3.0
I/O Interface (per board)	Reset Button	1 x reset button Software reset by default
	Console	1 x RJ45
	USB	1 x USB 2.0 1 x USB 2.0 pin header
	ESD	1 x ESD jack
	SATA	1 x internal SATA II connector 1 x mini PCIe connector (serving as mSATA)
Expansion (per board)	LCM	128 x 64 Graph LCM with 4 key pad Hinge LCM 1 LED for power, 1 LED for Status and 1 LED for HDD
	PCIe	3 x PCIe Gen3.0x8 (to front side module) 1 x PCIe Gen 3.0x8 (NTB) 1 x PCIe Gen2.0x4 (for front I/O) 1 x PCIe Gen2.0 (for Mgmt port)
	PCI	N/A
Power supply		AC redundant 1,200W hot-plug, auto-switching 85/264V, 13A DC redundant 1,010W hot-plug, auto-switching, -36 to -76V, 30A
System Cooling		5 x system fans each layer Supports smart fan feature
Environment	Operating Temperature	0° to 50° C
	Operating Humidity	5% to 95%
Dimensions		W 431 x H 88 x D 720(mm)
Certification		RoHS

Package Contents

Your package contains the following items:

- HCP-72i1 Network Security Platform
- 4 passive CPU heatsink
- 2 power cords
- 2 SATA cables
- 1 crossover Ethernet cable (1.8 meters)
- 1 straight-through Ethernet cable (1.8 meters)
- 1 RJ-45 to DB-9 female console cable
- Drivers and user's manual CD.

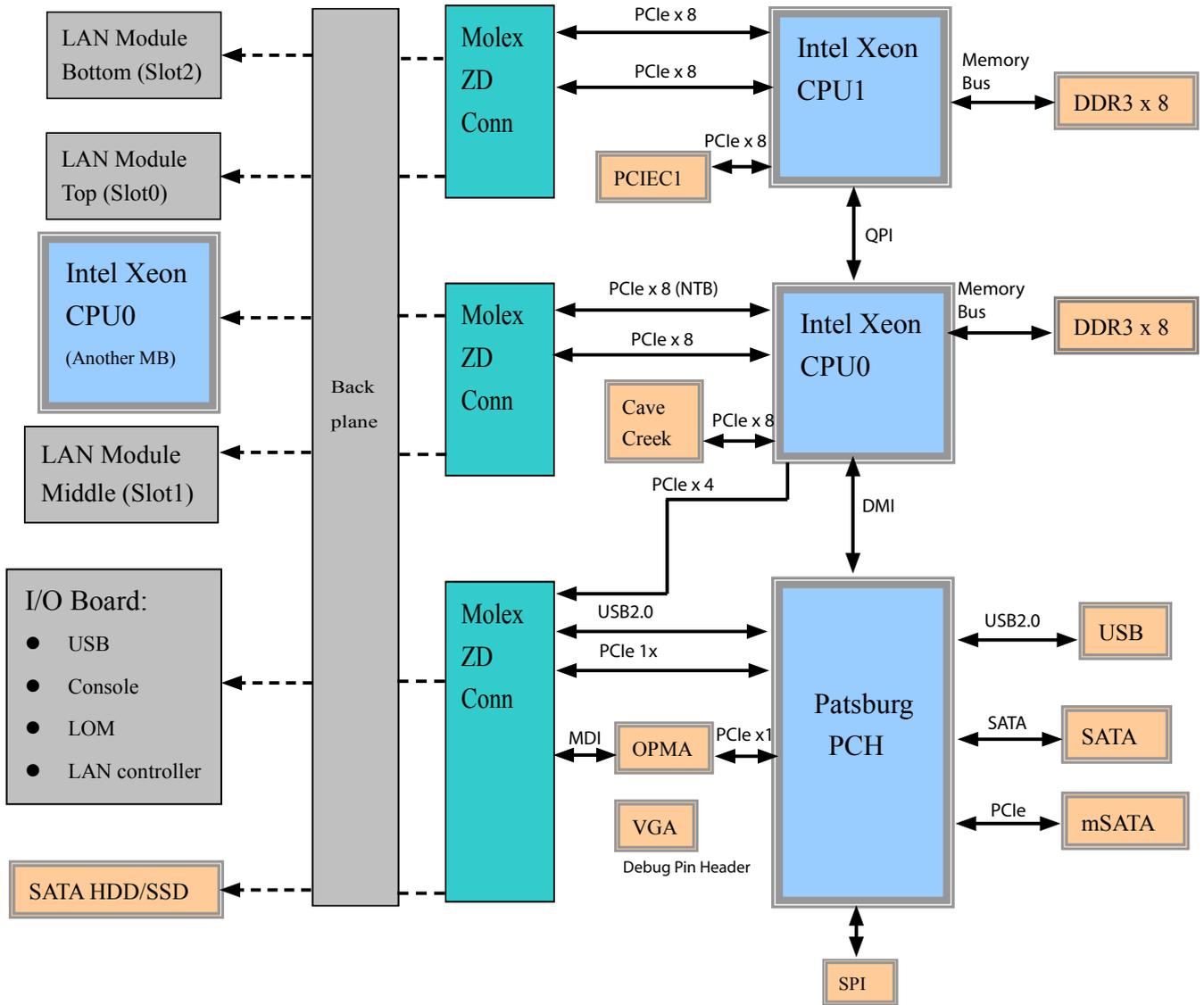
Ordering Information

HCP-72i1	HybridTCA. High-performance Network Appliance with 4 x Intel® Xeon® E5-2600 series, (Sandy/Ivy-Bridge-EP) processor + 2 bays for 2.5" HDD with 3 Ethernet modules
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Optional Accessories

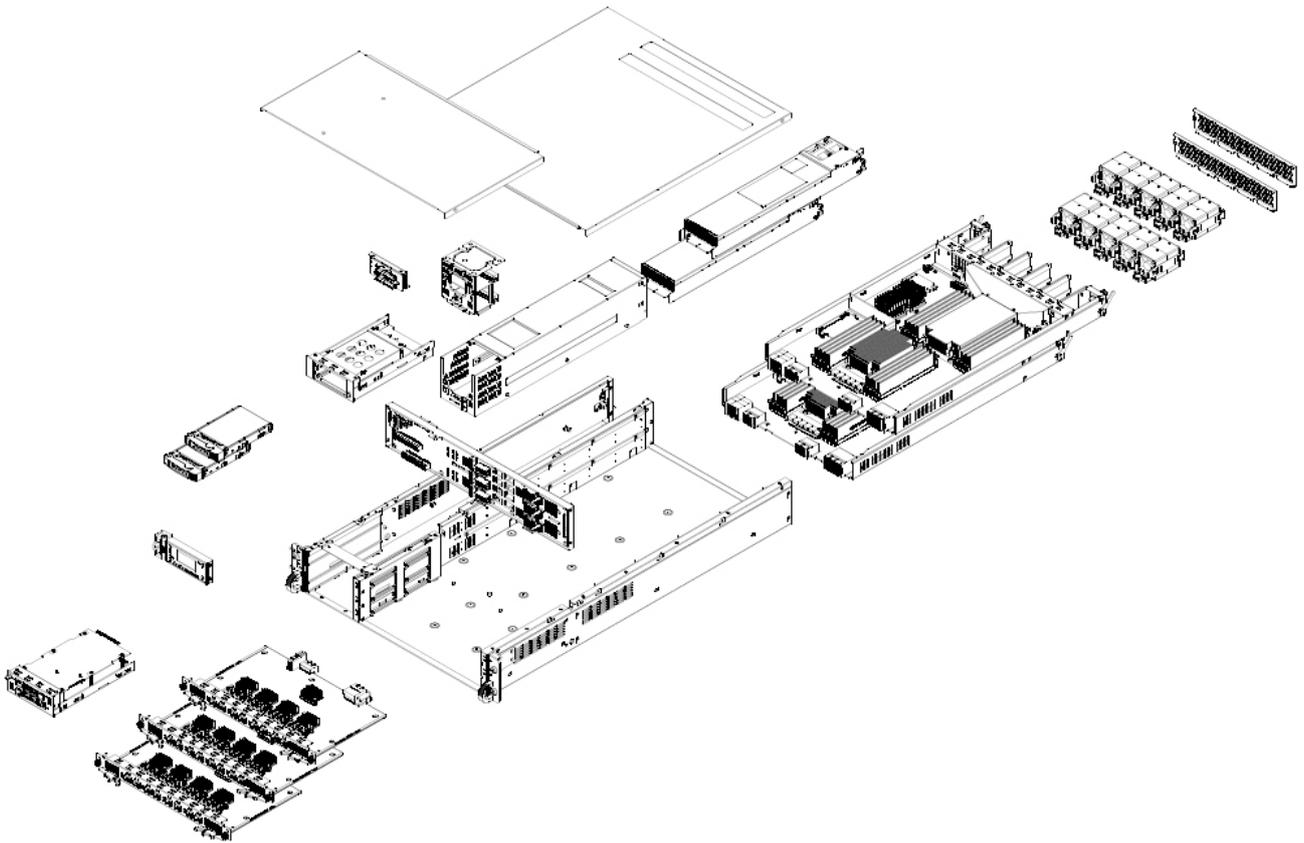
NCM-BPGC01A	12 ports GbE RJ-45, Gen 2 Bypass
NCM-BPGC01B	12 ports GbE RJ-45, Without Bypass
NCM-BPSC01A	12 ports GbE SFP, Without Bypass
NCM-BPX402A	4 ports 10G SFP+, Without Bypass
TCM-IXT801A	8 ports 10G SFP+, Without Bypass

Block Diagram



Physical Architecture of Lanner's HybridTCA

The diagram presents all necessary components of Lanner's Hybrid TCA architecture applied for HCP-72i1.



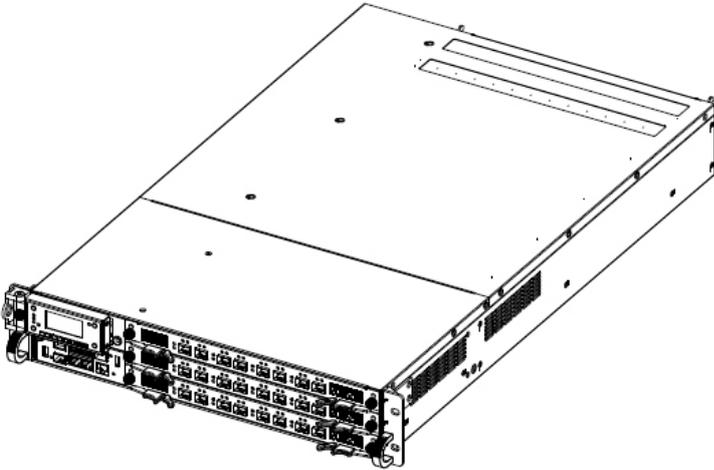
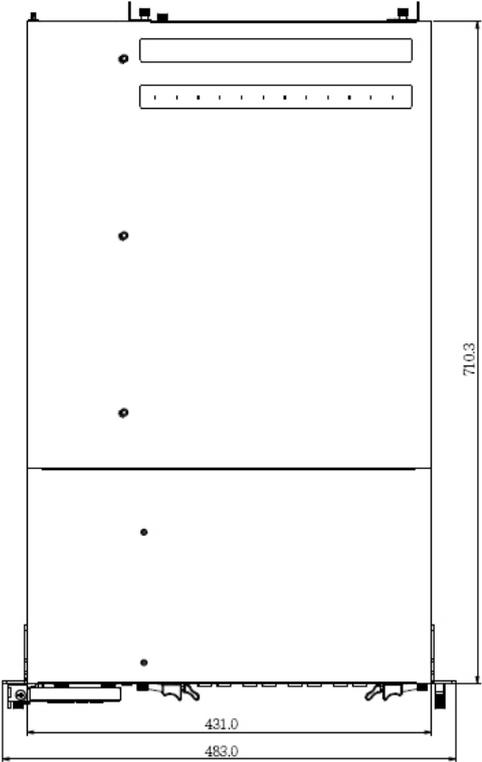
Chapter 2

System Components

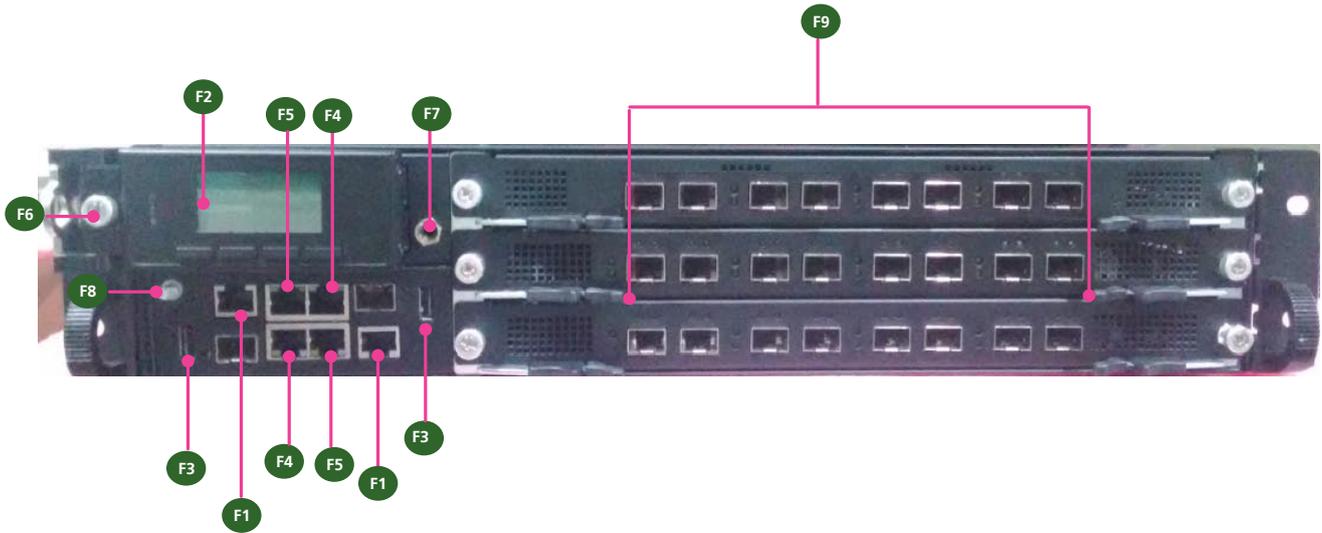
Chapter 2: System Components

Mechanical Drawings

Unit: mm

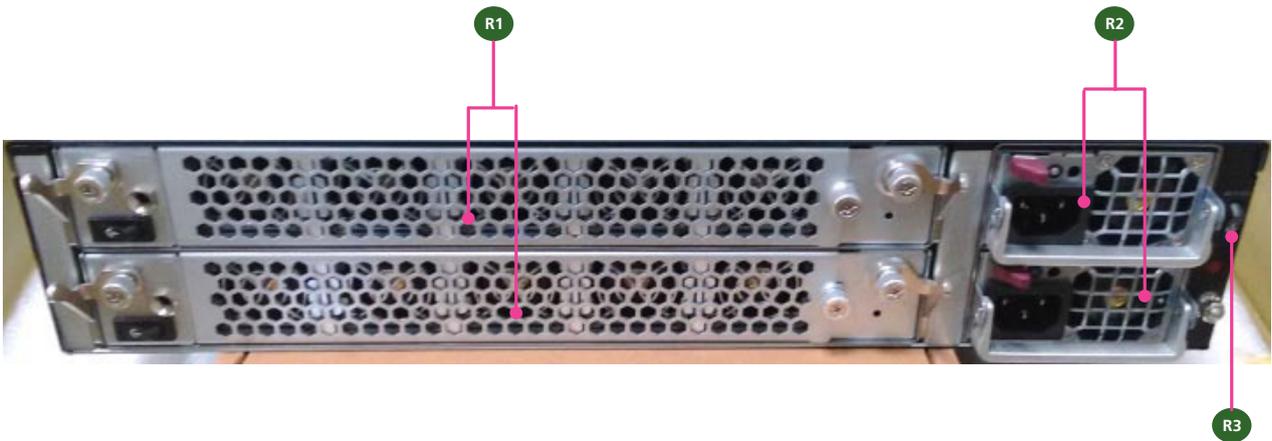


Front Components



Component	Description
F1 Console	RJ-45 console port for connecting to a computer terminal for local, out-of-band diagnostic or configuration purpose.
F2 LCM	<ul style="list-style-type: none"> • 128 x 64 Graph LCM with 4 key pad • Hinge LCM • 1 LED for power, 1 LED for Status and 1 LED for HDD
F3 USB 2.0 Ports	USB 2.0 type A connectors.
F4 Onboard Management Port	RJ-45 onboard management port
F5 IPMI ports	IPMI ports
F6 LCM Unlock Button	Push it to unlock LCM pad to access the two 2.5" drive bays
F7 ESD Jack	1 x ESD Jack
F8 GND	Ground
F9 Other RJ-45/SFP+ ports	Network ports (number and type of network ports may vary depending on the modules installed)

Rear Components



Component	Description
R1 Cooling fans	5x cooling fans each layer
R2 Power supply	Redundent power supply for each layer
R3 Power Switch	Turn on/off of the system

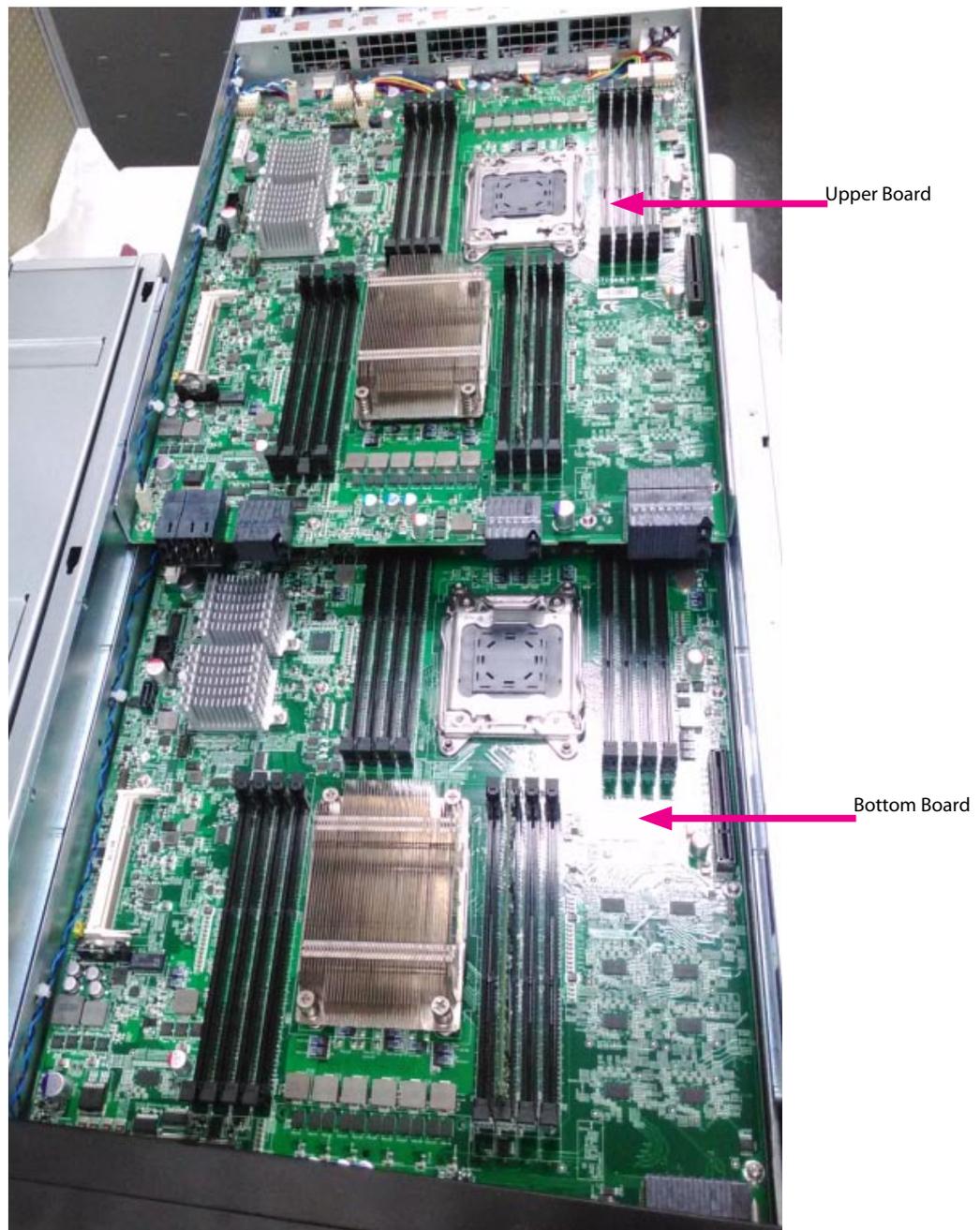
Chapter 3

Motherboard Information

Chapter 3: Motherboard Information

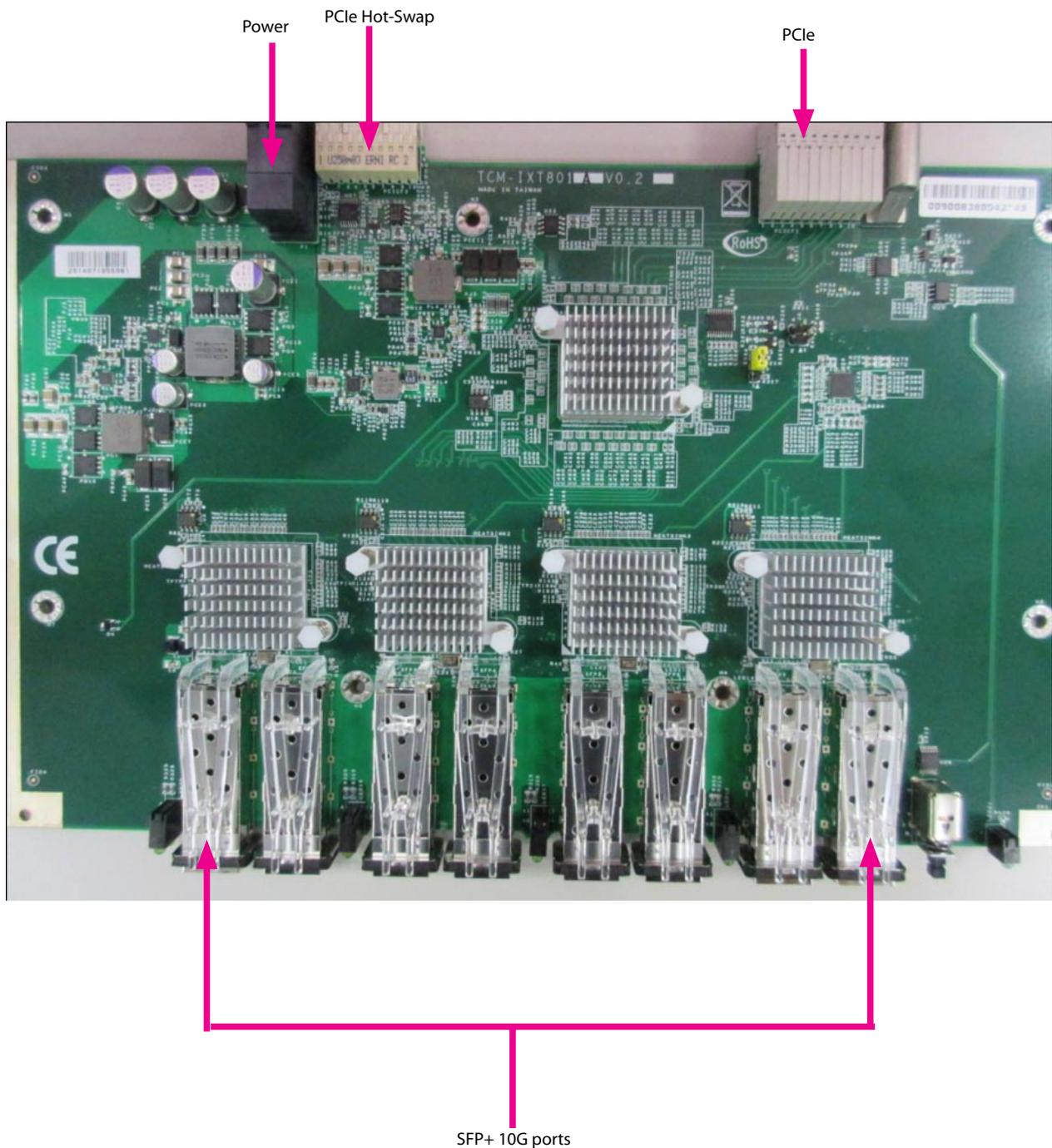
An Internal Glance of HCP-72i1

The inside of HCP-72i1 is designed based on Lanner's exclusive HybridTCA structure. This hybrid design integrates two identical, high-performance motherboards for optimal system boost.



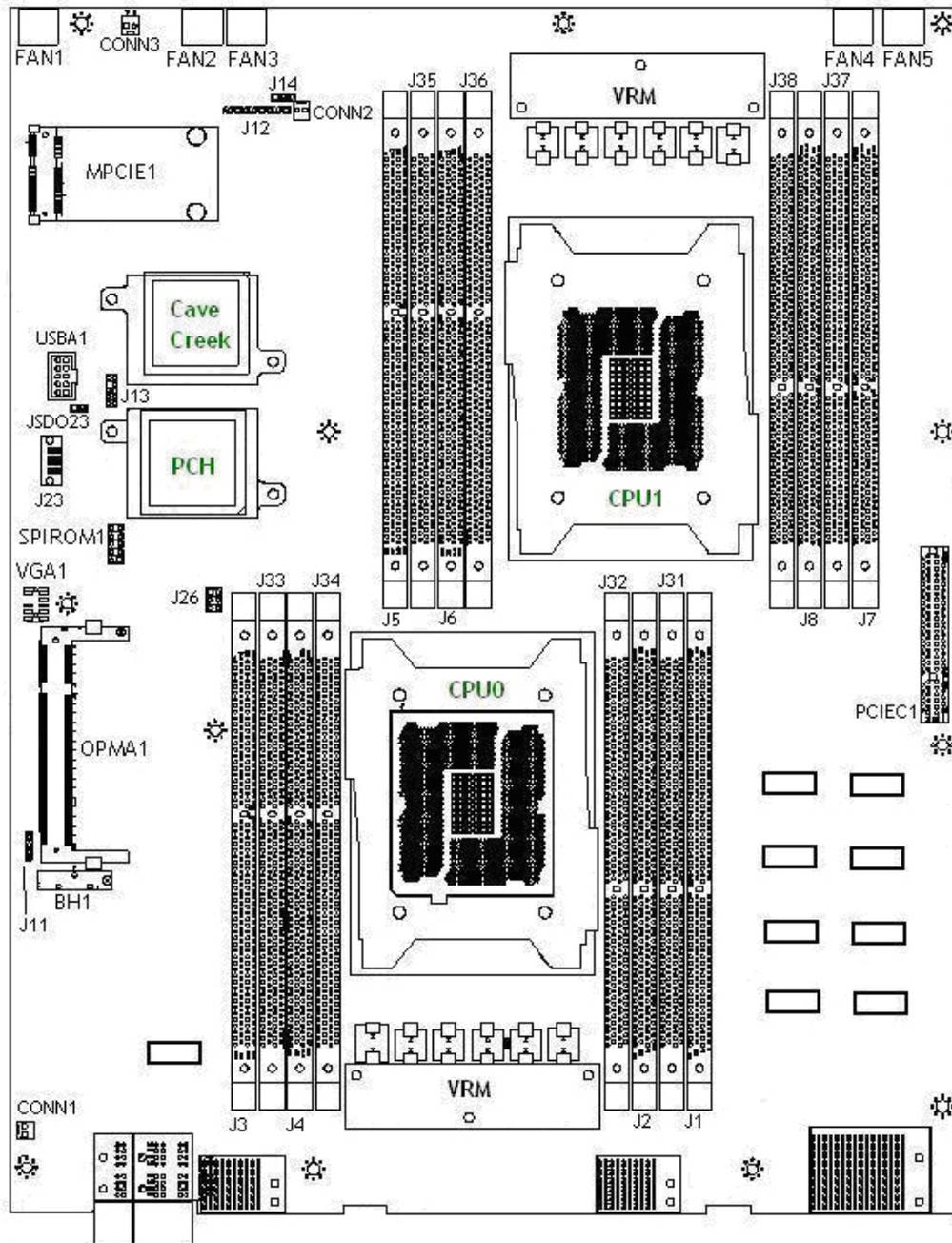
An Internal Glance of HCP-72i1

HCP-72i1 can be connected with up to 3 LAN modules for networking applications. The image below shows the LAN module "TCM-IXT801A".



Jumper and Connector Location

The illustration below presents the jumper and connector location of each board.



Connectors and Jumpers List

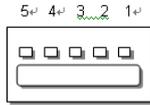
The tables below list the jumper and connector label of each board.

Labels	Function
FAN1~5	FAN connectors
J14	Front Panel Reset Button Setting
CONN2	Power-On Button Pin Header
J12	CPLD Flash Pin Header
MPCIE1	Mini PCIe Socket
USBA1	USB connector
JSDO23	Security Override
J13	LPC Port 80
SPIROM1	SPI Flash ROM Update Pin Header
J23	SATA Connector
J26	SATA Re-driver Value Flash Pin Header
J11	CMOS clear
VGA1	VGA connector
CONN3	Hot Swap LED Pin Header
CONN1	Hot Swap MRL (Manual Retention Latch) Pin Header

Jumper Settings & Connectors Pin Definitions

FAN connectors (FAN1~5):

Five-pin FAN connectors



FAN

FAN1

Pin	Description
1	HM_PWMOUT1
2	FAN_TECH_IN_FAN1
3	FAN_TECH_IN_FAN2
4	12V
5	GND

FAN2

Pin	Description
1	HM_PWMOUT2
2	FAN_TECH_IN_FAN7
3	FAN_TECH_IN_FAN8
4	12V
5	GND

FAN3

Pin	Description
1	HM_PWMOUT1
2	FAN_TECH_IN_FAN3
3	FAN_TECH_IN_FAN4
4	12V
5	GND

FAN4

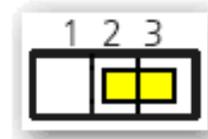
Pin	Description
1	HM_PWMOUT2
2	FAN_TECH_IN_FAN9
3	FAN_TECH_IN_FAN10
4	12V
5	GND

FAN5

Pin	Description
1	HM_PWMOUT3
2	FAN_TECH_IN_FAN5
3	FAN_TECH_IN_FAN6
4	12V
5	GND

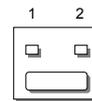
Front Panel Reset Button Setting(J14)

The jumper setting for selecting hardware reset or software reset. Software reset is the default option.



Pin	Description
1-2	Hardware reset
2-3	Software reset (default)

Power-On Button (CONN2)



CONN2

Pin	Description
1	GND
2	PWR_BUTTON

CPLD Flash Pin Header (J12):

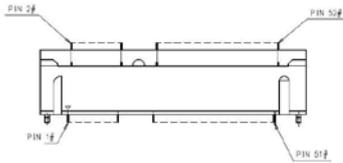
Complex Programmable Logic Device can be used to bridge JTAG and flash memory data interface



Pin	Description
1	3.3V standby
2	JTAG_PLD_TDO
3	JTAG_PLD_TDI
4	NC
5	NC
6	JTAG_PLD_TMS
7	GND
8	JTAG_PLD_TCK

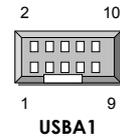
Mini-PCle socket (MPCIE1):

Serves as mSATA storage socket



Pin	Description	Pin	Description
1	NC	2	3.3V
3	NC	4	GND
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	PCle Clock_N	12	NC
13	PCle Clock_P	14	NC
15	GND	16	NC
Mechanical key			
17	NC	18	3.3V
19	NC	20	NC
21	GND	22	PCle Reset#
23	SATA_RX_N	24	3.3V
25	SATA_RX_P	26	GND
27	GND	28	NC
29	GND	30	NC
31	SATA_TX_N	32	NC
33	SATA_TX_P	34	GND
35	GND	36	NC
37	GND	38	NC
39	3.3V	40	GND
41	3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	NC
49	Active#/LED	50	GND
51	NC	52	3.3V

USB connector (USBA1)

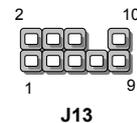


Pin	Description	Pin	Description
1	5V	2	5V
3	USB2-	4	USB3-
5	USB2+	6	USB3+
7	USB23GND	8	USB23GND
9	USB23GND	10	USB23GND

Security Override (JSDO23)

FLASH DESCRIPTOR SECURITY OVERRIDE WHEN HIGH
(Default Not Connect)

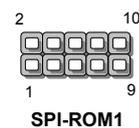
Port 80 (J13): This is the Port 80h, which is used as BIOS debug port. Once the system is initialized, BIOS will send POST (Power-On Self-Test) codes to Port 80. If POST fails, the last generated POST code will be left in Port 80. This is used for debug purpose. If a seven-segment display is connected, the hexadecimal BIOS debug code will appear.



Pin	Description	Pin	Description
1	CLK_33M_P80	2	LPC_LAD_1
3	RST_PORT80_N	4	LPC_LAD_0
5	LPC_FRAME_N	6	3.3V
7	LPC_LAD_3	8	X
9	LPC_LAD_2	10	GND

SPIROM1:

SPI ROM pin header



Pin	Description	Pin	Description
1	No Connect	2	No Connect
3	Dual_CS00_N	4	3.3V
5	SPI_MISO_DUAL	6	SPI_HOLD0_L
7	No Connect	8	SPI_CLK_DUAL
9	GND	10	SPI_MOSI_DUAL

SATA (J23): used to connect SATA disk drive



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

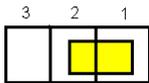
SATA Re-Driver value flash (J26)

SATA signal redriver and conditioner



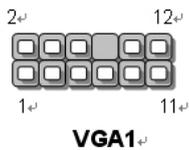
Pin	Description
1	PCIE_R_SDA2
2	3.3V
3	PCIE_R_SCL2
4	MOSI2
5	REST_MCU2#
6	GND

CMOS clear (J11): clear CMOS jumper



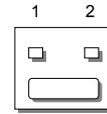
Pin	Description
Short 1-2 (default)	Normal
Short 2-3	Clear CMOS

VGA connector (VGA1): VGA display



Pin	Description	Pin	Description
1	RED	2	GND
3	GREEN	4	GND
5	BLUE	6	GND
7	HSYNC	8	X
9	VSYNC	10	GND
11	DDC_DATA_CONT	12	DDC_CLK_CONT

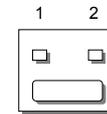
Hot swap LED(CONN3)



CONN3

Pin	Description
1	LED_P
2	LED_N

Hot swap MRL(Manual Retention Latch) pin header(CONN1)



CONN1

Pin	Description
1	Power Enable#
2	GND

Chapter 4

Hardware Installation

Chapter 4: Hardware Installation

Preparing the Hardware Installation

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

WARNING:

1. To avoid the risk of personal injury, electric shock, or damage to the equipment, please remove all power connections as well as all power sources.
2. Please wear ESD gloves to avoid potential injury or damage.

Accessing the Components

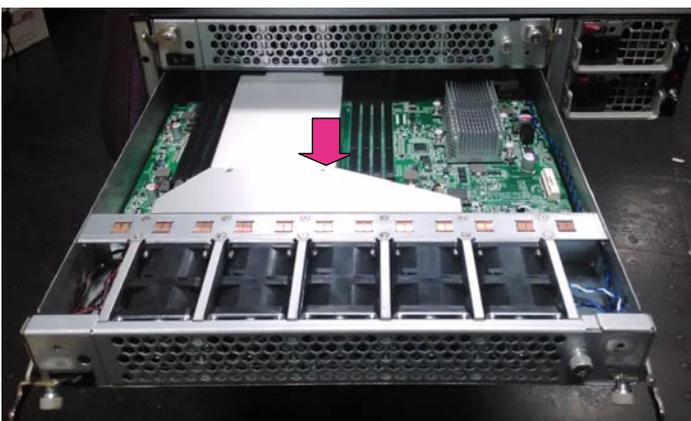
1. Due to the hybrid architecture of HCP-72i1, you may access the Upper Board or the Bottom Board. First, locate the rear lock-handles and lock-screws. There should be 2 pairs on each side: two for the Upper Board and the other two for the Bottom Board.



2. To access the Bottom Board, loosen the two lock-screws and then pull the two lock-handles.



3. Pull the blade out while holding the lock-handles.



4. To return the bottom blade to its original place, simply push it to the end and use the two lock-handles and lock-screws to secure it.

5. To access the Upper Board, use the same method from Step 2 and 3.



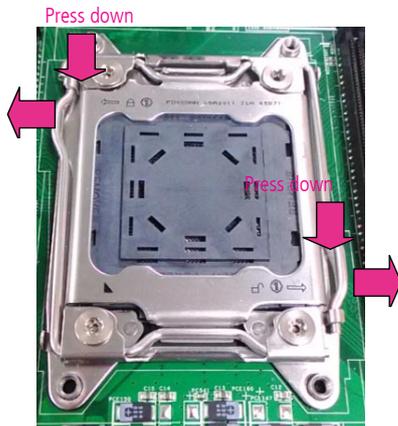
6. Pull the top blade out while holding the lock-handles.



Installing CPU and the Heat Sink

Follow the procedures below for installing a CPU

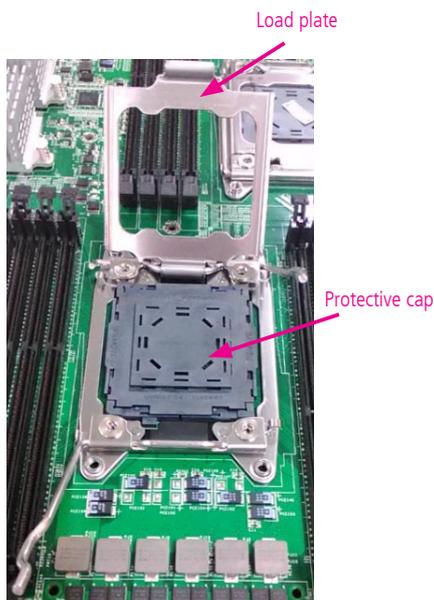
1. Locate the CPU socket(s)
2. Press the left load lever down, move it out of the retention tab. Then, do the same to the right. There are two levers for each CPU socket.



3. Lift the load levers.

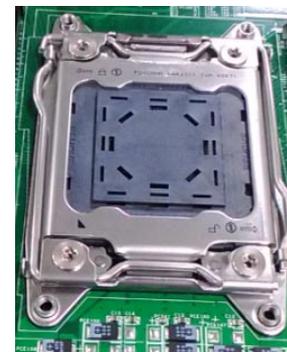


4. Open the load plate and also the protective cap.



5. Align the CPU and the notch on the socket. The CPU should fit perfectly into the socket. Note that the CPU fits in the socket in only one direction.

6. Put the protective cap onto the CPU. Close the load plate and push the load lever to lock it back to the retention tab.



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.



Installing the System Memory

The motherboard supports DDR3 memory to meet the higher bandwidth requirement of the latest operating system and Internet applications. It comes with two double data rate type three (DDR3) Small Outline Dual Inline Memory Modules (SO-DIMM) sockets.

1. Power off the system
2. Locate the DIMM socket



3. Pull open the latches



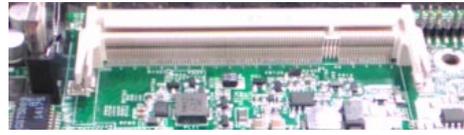
4. Align the module and the socket and then insert the module into the socket. Make sure the notches are aligned. Press the module until it's fully seated and close the latches.



Installing IPMI Card on OPMA Socket

The motherboard of HCP-7211 comes with a OPMA socket for IPMI card installation.

1. Locate the OPMA socket.



2. Insert your IPMI card. Make sure the notches between the card and the socket are aligned.

3. Your IPMI card may come with a display connector. You may use a cable for connections.

Installing HDD/SSD

The system is built to accommodate two 2.5" SATA disk drives. Please follow instructions below.

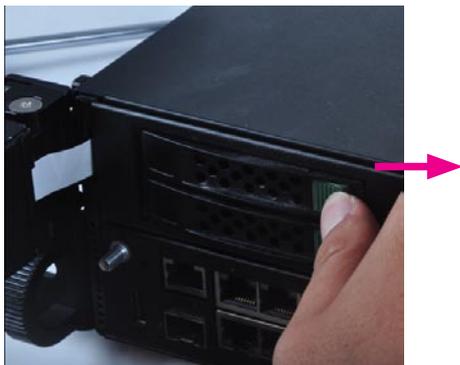
1. The two 2.5" SATA disk drives are located behind the hinge LCM. Rotate and loosen the lock-screw.



2. Open the hinge LCM and locate the HDD/SSD bays as the images shown below.



3. Push the disk drive lock as the arrow of direction in the image below. Then the disk drive bay will be released out.



4. Insert your HDD/SSD into the bay by aiming the SATA connector of the drive as the arrow of direction in the image shown below. Remember to use screws to fix both sides of the disk drives.



Replacing Network I/O Modules

Please follow the instructions below to replace network I/O modules. The images of network I/O modules below are based on Lanner TCM-IXT801A model.

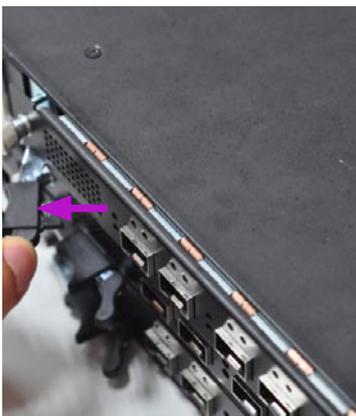
1. Loosen the lock-screw on two sides of the network I/O module.



2. Hold and press the lock-handle as the arrow of direction in the image below. Remember to do it for both lock-handles at the same time.



3. While pressing both lock-handles as instructed in the last step, then pull both lock-handles outwards at the same time.



4. Continue to apply force when removing the module. To install a module, just reverse the steps in this section.



Replacing Power Supply Units

Power supply units may have to be replaced when they reach the end of their lifetime. Please follow the instructions below to replace power supply units.

1. Locate the power supply units at the rear. Hold the handle and press the lock as the arrow of direction in the image below.



2. Pull the power supply unit out.



Replacing Cooling Fans

Cooling fans may have to be replaced as they may reach the end of their lifetime one day. Please follow the instructions below to replace cooling fans.

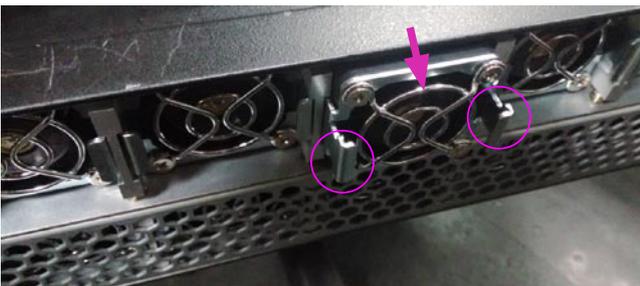
1. Loosen the lock-screw on the cover of the cooling fans array.



2. Slide the cover to the arrow of direction as shown in the image below.



3. Apply forces onto the two clips and pull the fan out.



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 :

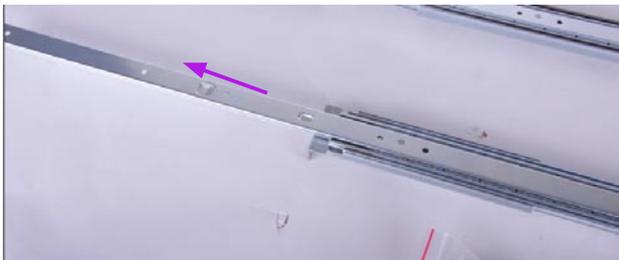
Slide/rail mounted equipment is not to be used as a shelf or a work space.

Prepare The Equipments

1. Prepare the slide rail equipments. In the package, you should have two slide rails and 1 bag of screws.



2. Extend the inner bracket of each slide rail.



3. Turn the slide rail upside down and push the black arrow-shaped slide rail lock as the arrow of direction below.



4. Press the security lock of the rail as well.



5. Separate the inner bracket from the slide rail.



6. Align the inner bracket to the side of the chassis. Make sure the screw holes of the inner bracket match with the ones on the side of the chassis.



7. Securely attach the inner bracket to the side of the chassis by applying screws.



8. Repeat step 1 to 7 for another slide rail and for the other side of the chassis.

Installing Slide Rails Onto the Rack

1. Install 2 cage nuts for both left and right of the rack, as well as front and rear of the rack. Remember to leave the middle hole open. You shall install a total number of 8 cage nuts: 4 on the front (2 for the left and 2 for the right), and 4 on the rear (2 for the left and 2 for the right).



2. Install the slide rails to each side of the rack as the image below. Make sure the screws are firmly applied.



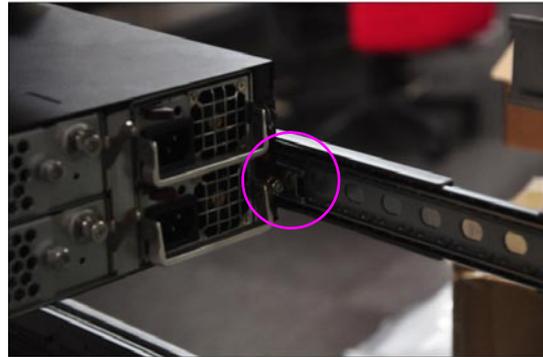
Installing HCP-72i1 Onto the Rack

1. Insert the network appliance with the front facing you. Make sure the chassis-attached inner brackets accurately match the slide rails installed on the rack.

Notes: it is strongly recommended to conduct this action with two or more persons.



2. Make sure the inner brackets on the chassis match the slide rails on the rack.



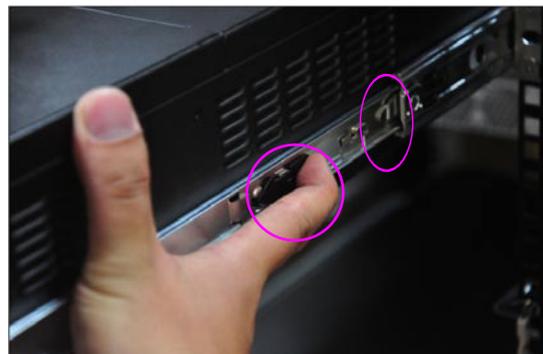
3. Gently push HCP-72i1 through the rails.

4. The device may be locked during the mid way. Remember to adjust the rail lock so that you can continue to push the appliance to the end of the rack.



5. To bring the appliance out of the rack, use the two locks on the rail circled in the image below. When sliding the device out, remember to do it slowly.

Notes: it is strongly recommended to conduct this action with two or more persons.



Chapter 5

BIOS Setup

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 HCP-72i1. But if you connect a PC to HCP-72i1 through console cable, then press <Tab>. Your system should be running POST (Power-On-Self-Test) upon booting up.

About the POST Information of HCP-72i1:

HCP-72i1 is built based on HTCA structure with two motherboards. You may access either or both of the boards depending on the connections established. You will see messages of whether you access the "Upper Board" or the "Bottom Board" during the booting-up process.

```
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.  
TAB Key on Remote Keyboard To Enter Setup Menu  
Press <DEL> or <ESC> to enter setup.  
MB-7220(HCP-72I1) Ver.AA0 12/09/2014 Bottom Board
```

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

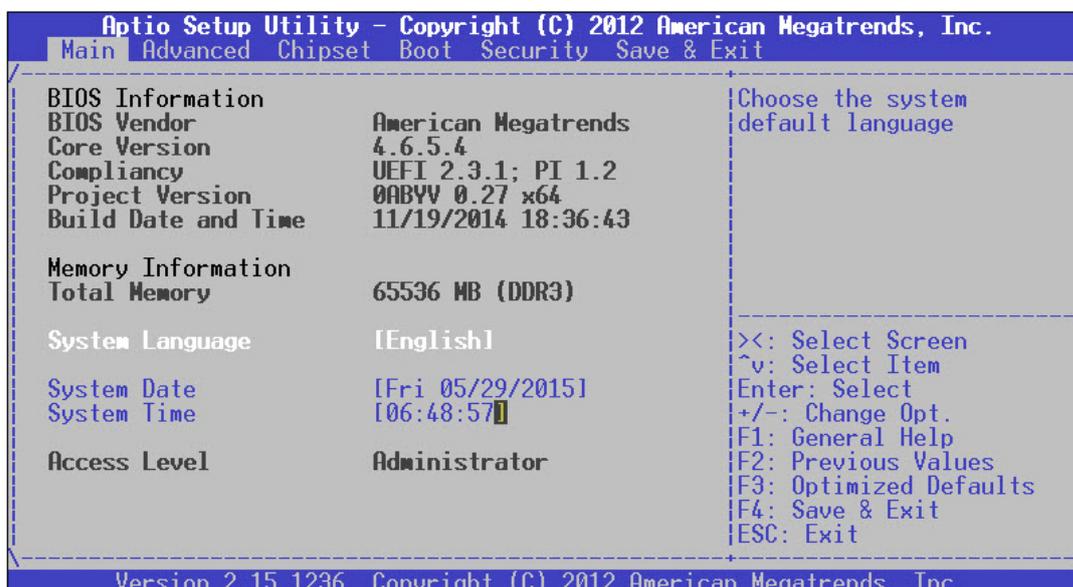
F1 = to display General Help screen

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.



Main

The [Main] is the first setup screen when you enter BIOS. The [Main] displays general system and BIOS information and you may configure the "System Language", "System Date", and "System Time".

BIOS Information

BIOS Vendor: displays BIOS vendor information

Core Version: displays the BIOS core version

Compliance: displays the BIOS compliance

Project Version: displays BIOS project version

Build Date and Time: displays the date and time the BIOS was built.

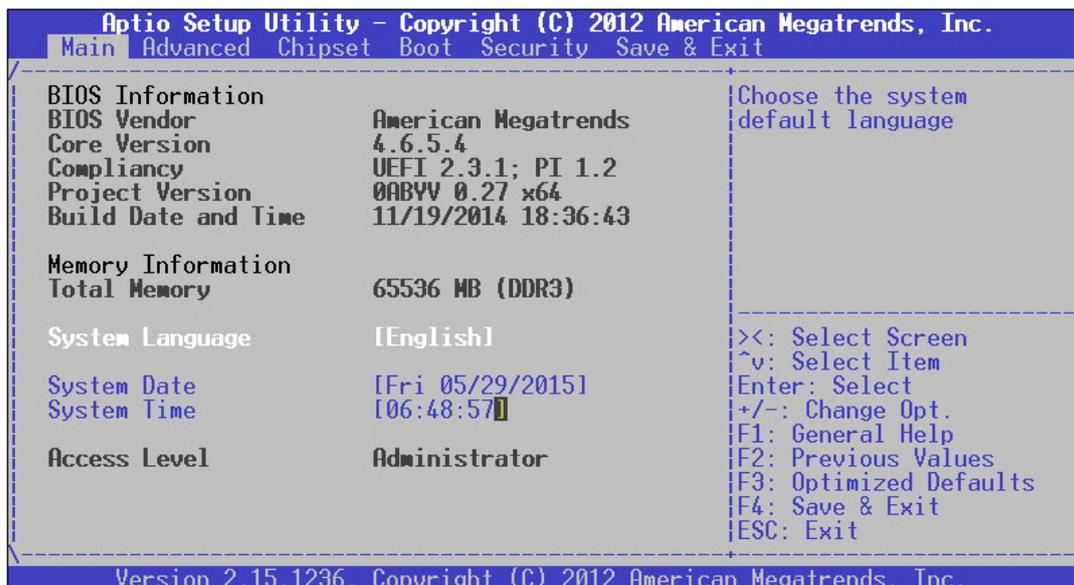
Press "Enter" if you want to configure "System Language", "System Date", and "System Time".

System Language: English

System Date: Day/Date/Year

System time: Hour/Minutes/Seconds

Access Level: Administrator by default



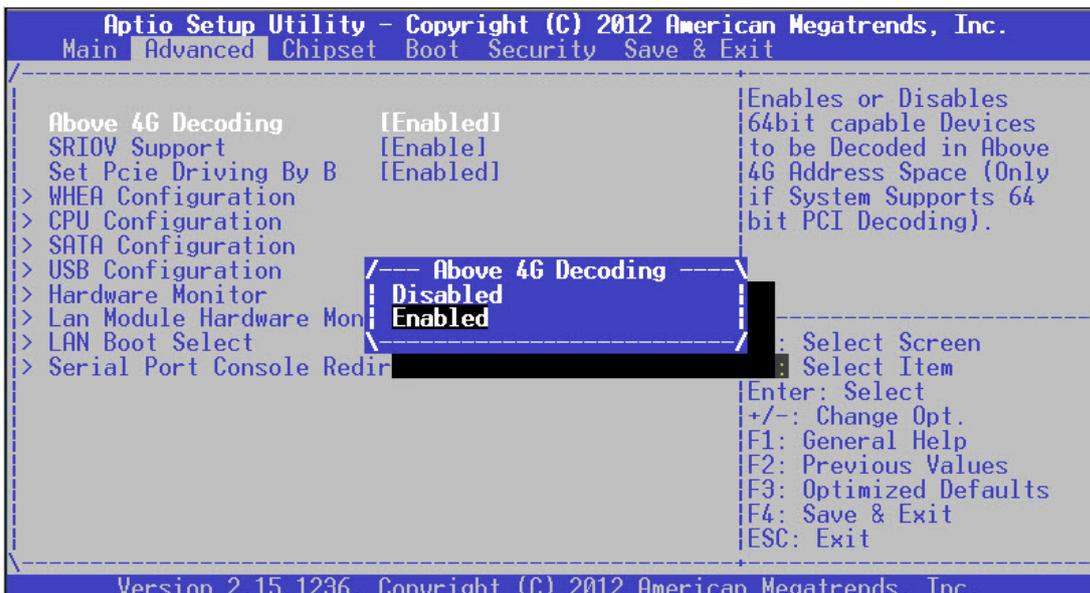
Advanced

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



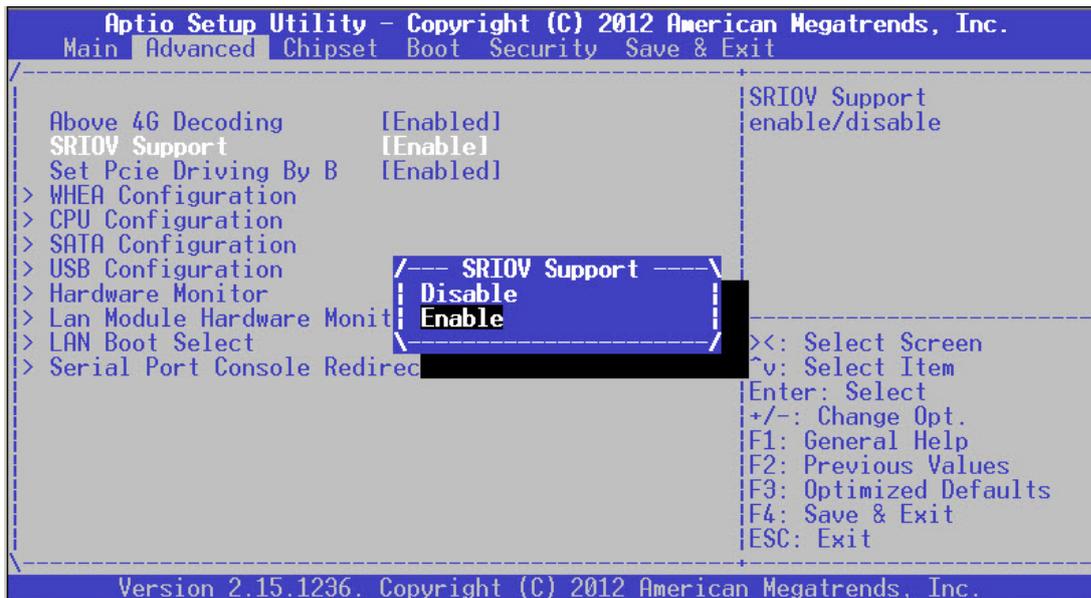
Above 4G Decoding

This option enables or disables 64bit capable devices to be decoded in above 4G address space (only if the system supports 64bit PCI decoding). You may select "Enabled" or "Disabled".



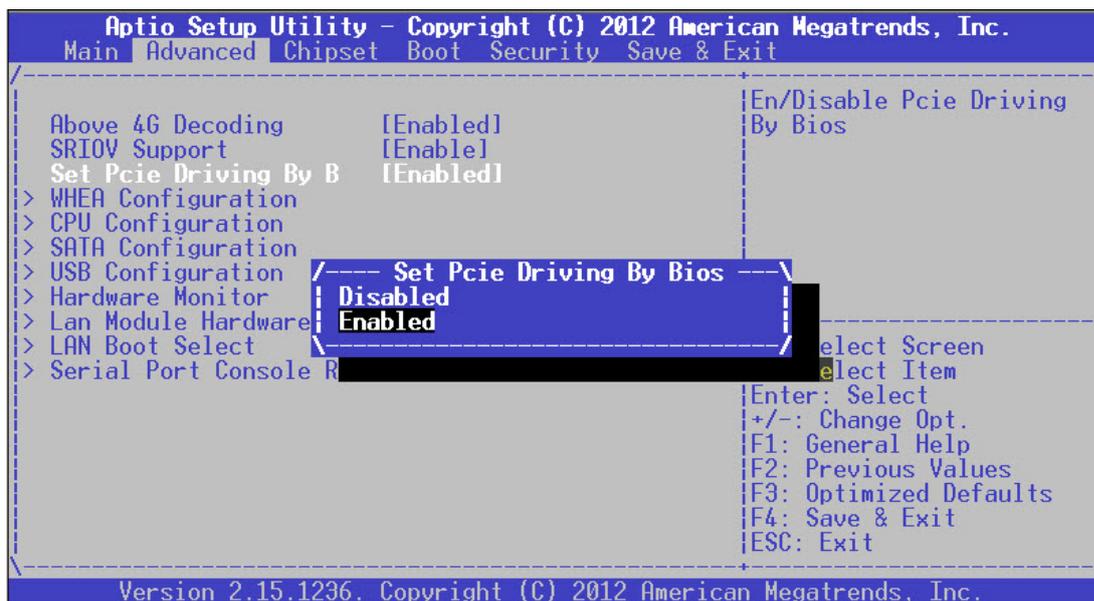
SRIOV

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



Set Pcie Driving By B

This option enables or disables PCIe driving by BIOS. You may select "Enabled" or "Disabled".



WHEA Configuration

This option allows you to conduct general WHEA (Windows Hardware Error Architecture) Configuration settings. Press "Enter" to enter its setting menu.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit

Above 4G Decoding      [Enabled]
SRIOV Support          [Enable]
Set Pcie Driving By B  [Enabled]
> WHEA Configuration
> CPU Configuration
> SATA Configuration
> USB Configuration
> Hardware Monitor
> Lan Module Hardware Monitor
> LAN Boot Select
> Serial Port Console Redirection

General WHEA
Configuration 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 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Then you may select "Enabled" or "Disabled" for WHEA support. The default is "Enabled".

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

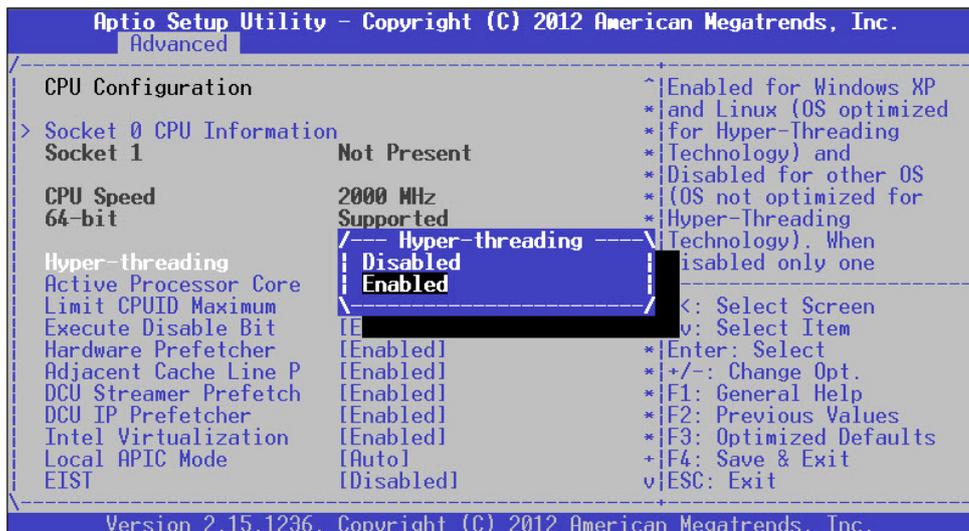
WHEA Support          [Enabled]

Enable or disable
Windows Hardware Error
Architecture.

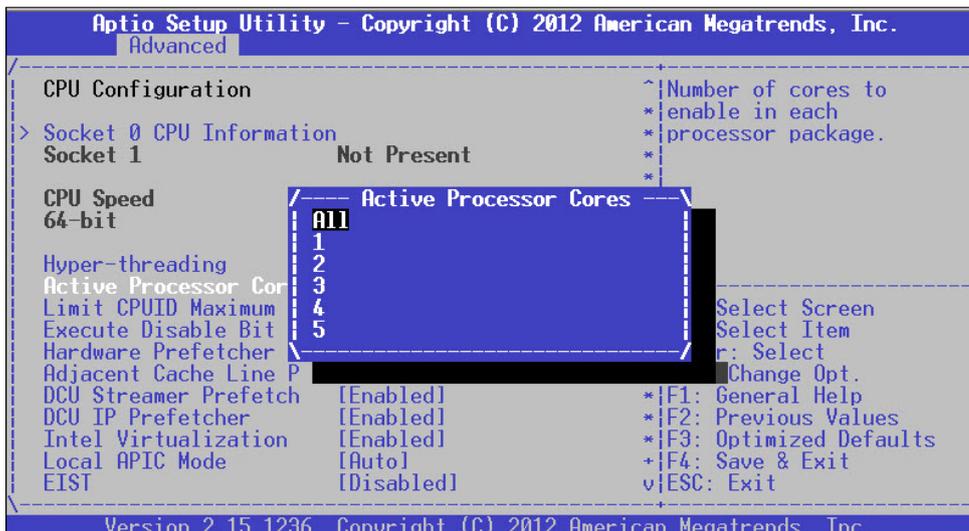
><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

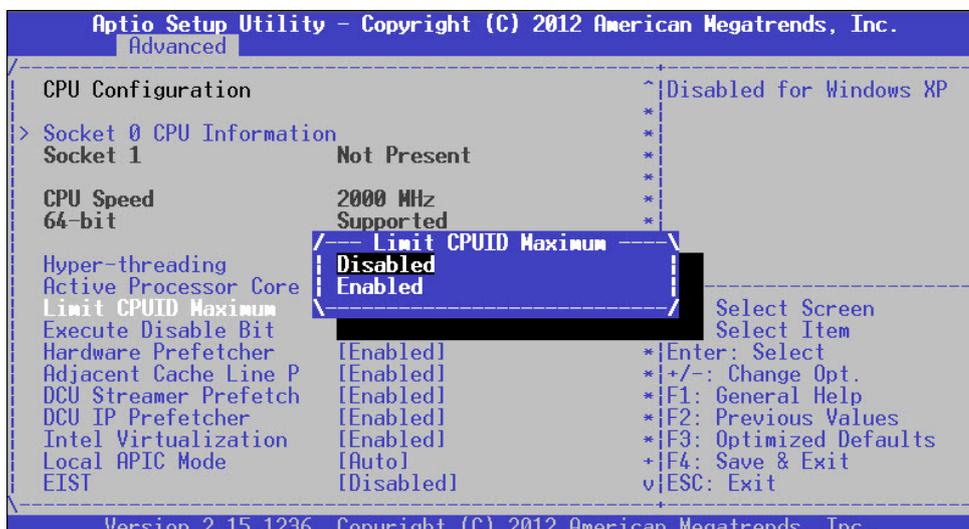

Hyper-threading: Hyper-threading is Intel's multi-threading technology which improves computer multi-tasking ability. This is frequently abbreviated as Intel® HT Technology. This enhancement design enables multiple threads to run on each processor core. As a result, this will boost performance and throughput.



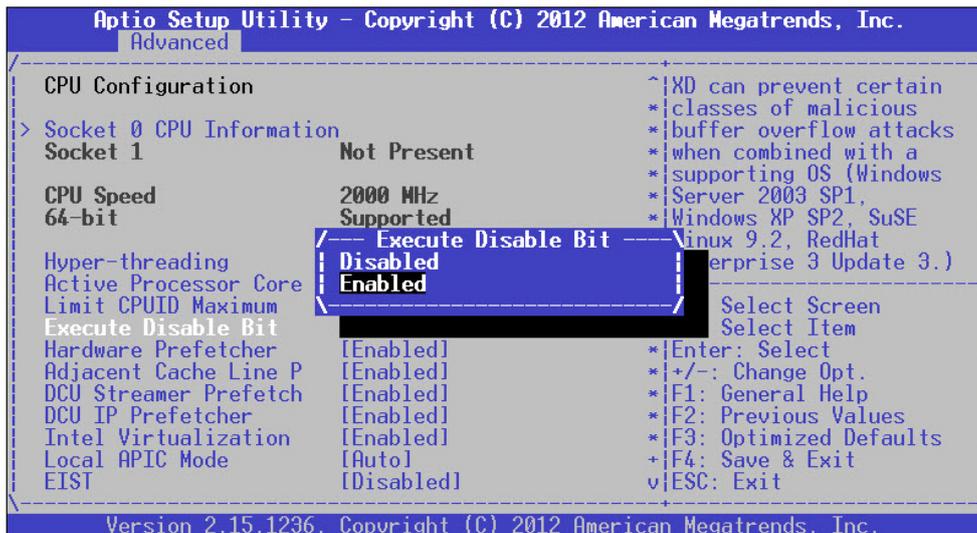
Active Processor Core: set the number of active processor cores.



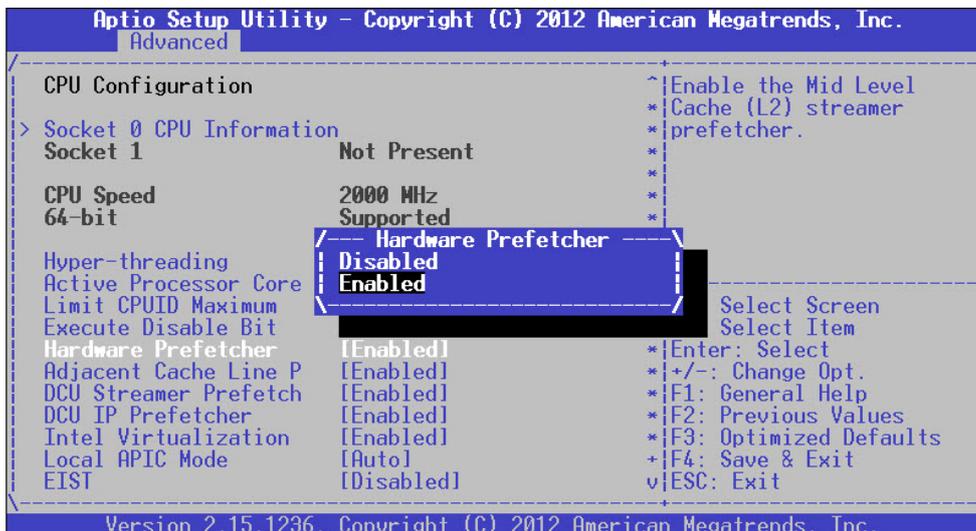
Limit CPUID Maximum: When "Enabled", the CPU will limit its maximum CPUID input value to 3 when the processor is queried. When "Disabled", the CPU will function with its actual maximum CPUID values. For this case, leave it as "Disabled".



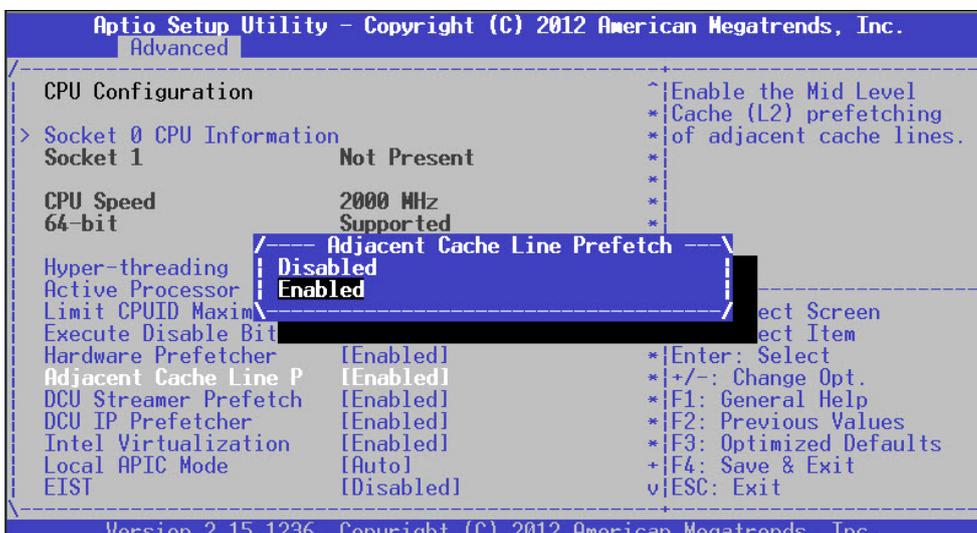
Execute Disable Bit: an Intel hardware-based protection against malicious code. It will detect the memory in which a code can be executed or not. When enabled, it will prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS.



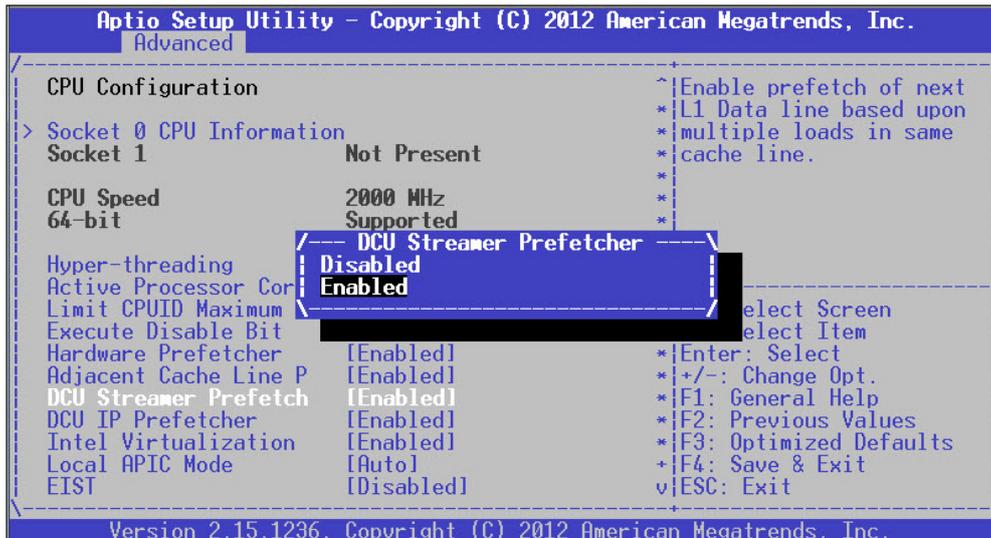
Hardware Prefetcher: when "Enabled", it will activate the mid level cache L2 streamer prefetcher.



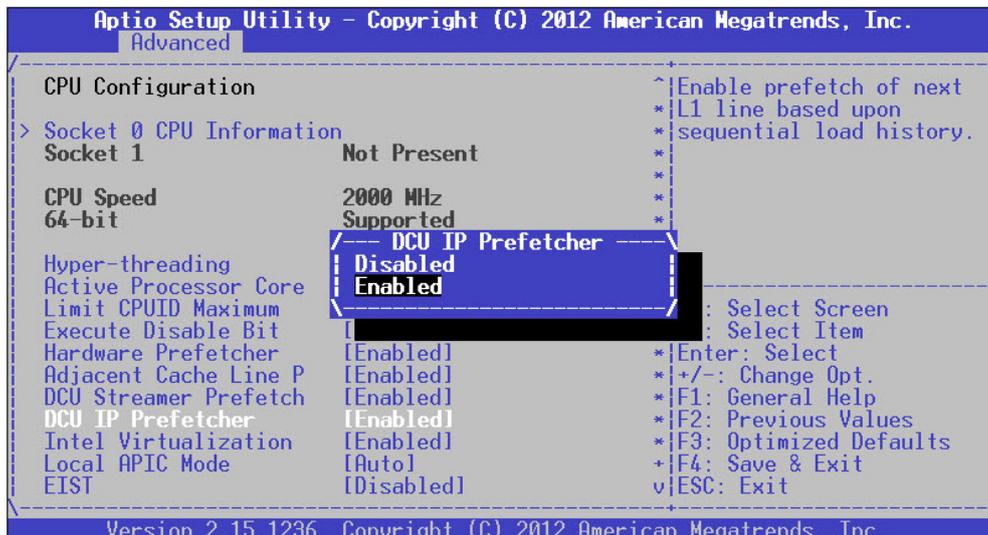
Adjacent Cache Line P: it is the Adjacent Cache-Line Prefetch. When "Enabled", the CPU fetches Cache 1 & 2 for 128 bytes. If "Disabled", the CPU only fetches one cache for just 64 byte. The default is "Enabled".



DCU Streamer Prefetch: When "Enabled", it will activate the prefetch of next L1 Data Line based upon multiple loads in same cache line.



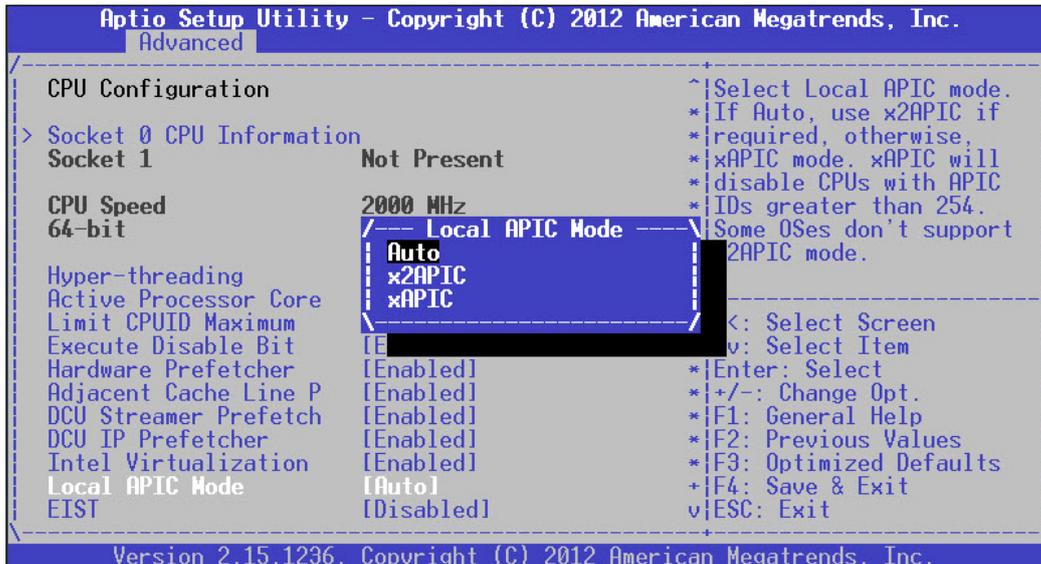
DCU IP Prefetch: this allows you to enable prefetch of next L1 line based upon sequential load history.



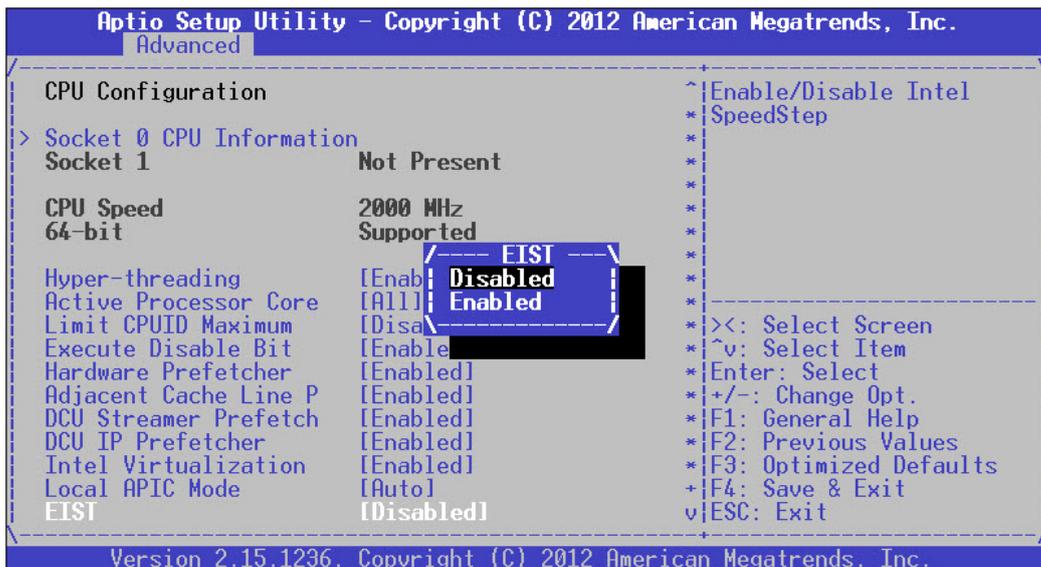
Intel Virtualization: Enables or disables Intel Virtualization Technology. On a server or firewall/UTM/IPS operating mode, it is recommended to enable this feature so that multiple operating systems and applications will run in independent partitions.



Local APIC Mode: select local APIC mode. If "Auto", use x2APIC if required; otherwise, xAPIC mode. The xAPIC mode will disable CPUs with APIC IDs greater than 254. Please be aware that some operating systems don't support x2APIC mode.



EIST: this option allows you to enable/disable Intel SpeedStep Technology.



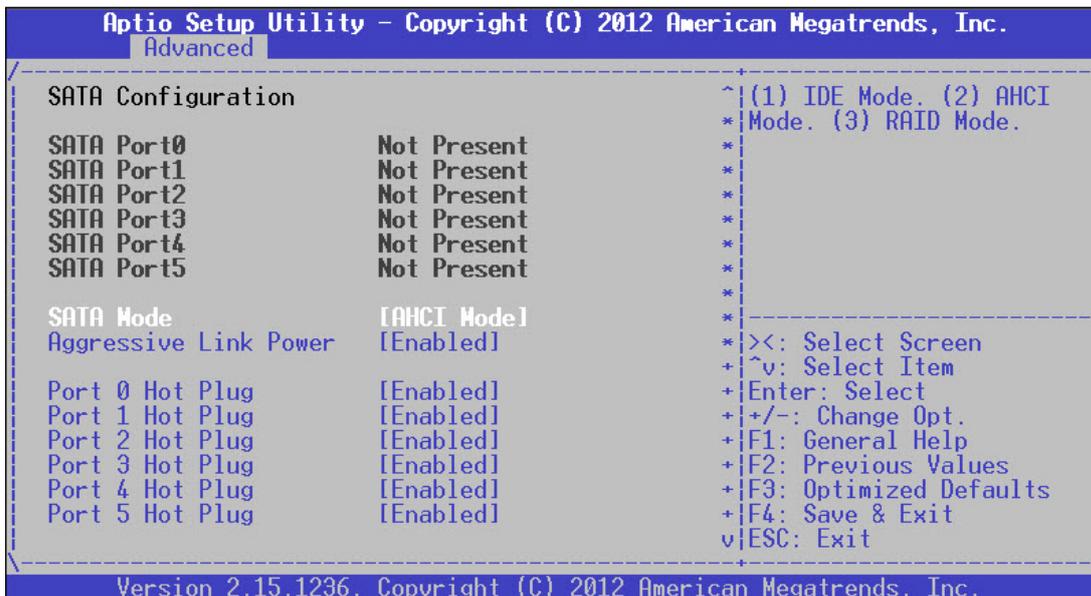
SATA Configuration

This option allows you to access SATA device configuration. Press "Enter" to access the sub-menu.

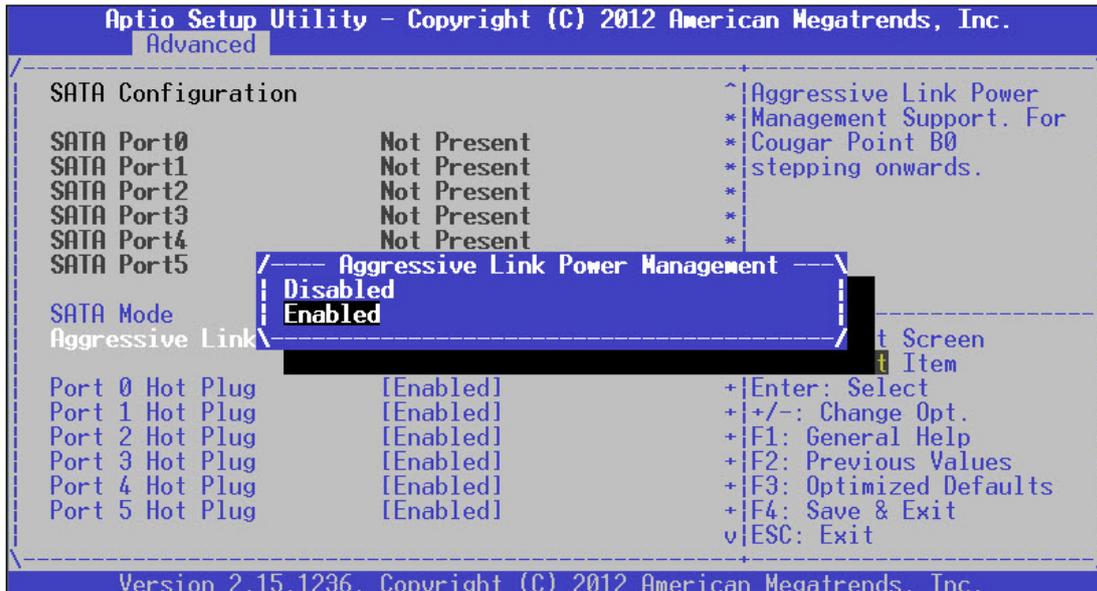


SATA Port 0 - 5: display SATA device information. If no device detected, it will show "Not Present".

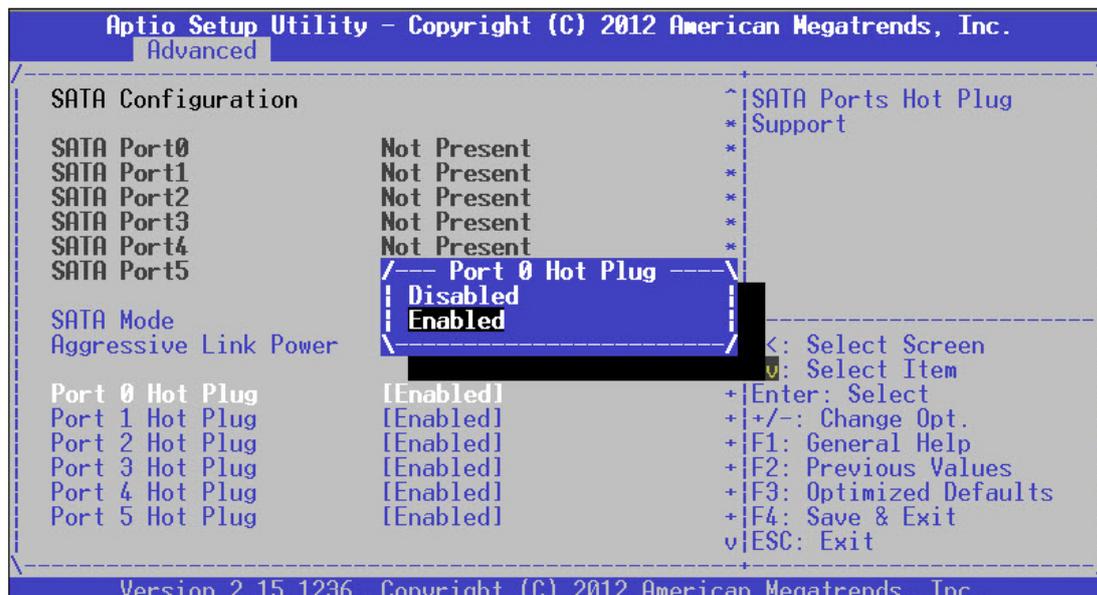
SATA Mode: select "IDE", "AHCI", or "RAID" mode for connected SATA storage devices. For RAID mode, your system must be pre-programmed with RAID mode support.



Aggressive Link Power: Aggressive Link Power Management for SATA devices complying with AHCI mode.



Port 0-5 Hot Plug: enable SATA hot plug for port 0-5.



USB Configuration

This option allows you to access USB configuration parameters. Press "Enter" to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main | Advanced | Chipset | Boot | Security | Save & Exit

Above 4G Decoding      [Enabled]
SRIOV Support          [Enable]
Set Pcie Driving By B  [Enabled]
> WHEA Configuration
> CPU Configuration
> SATA Configuration
> USB Configuration
> Hardware Monitor
> Lan Module Hardware Monitor
> LAN Boot Select
> Serial Port Console Redirection

USB Configuration
Parameters

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

USB Module Version: displays USB module version information

USB Devices: displays USB device information

Legacy USB Support: enables legacy USB support. "Auto" option disables legacy support if no USB devices are connected. "Disable" option will keep USB devices available only for EFT applications.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

USB Configuration
USB Module Version      8.10.27
USB Devices:
  1 Keyboard, 2 Hubs
Legacy USB Support      Enabled
EHCI Hand-off
USB Mass Storage Driv
USB hardware delays a
USB transfer time-out   [20 sec]
Device reset time-out  [20 sec]
Device power-up delay  [Auto]

Enables 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.

: 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.
```

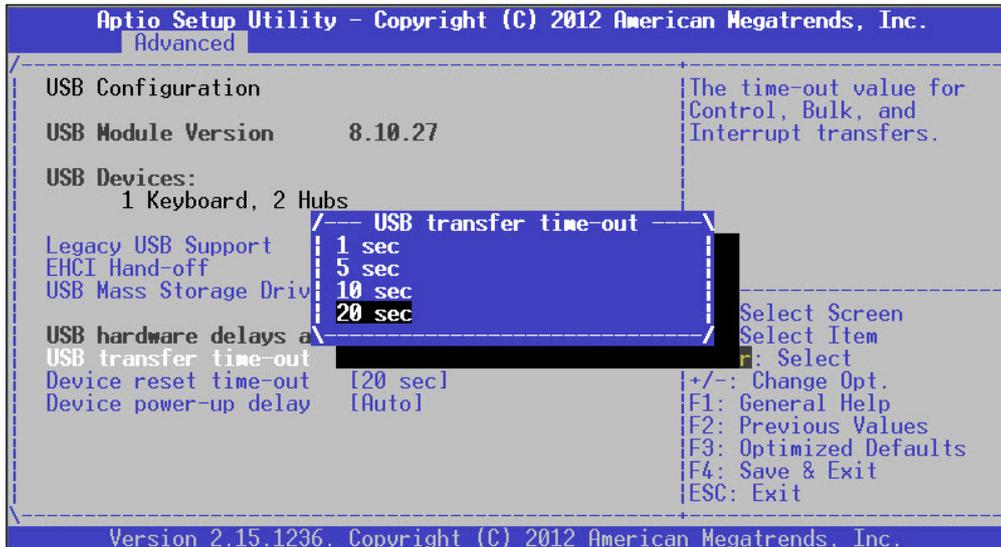
EHCI Hand-off: this is a workaround for operating systems without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.



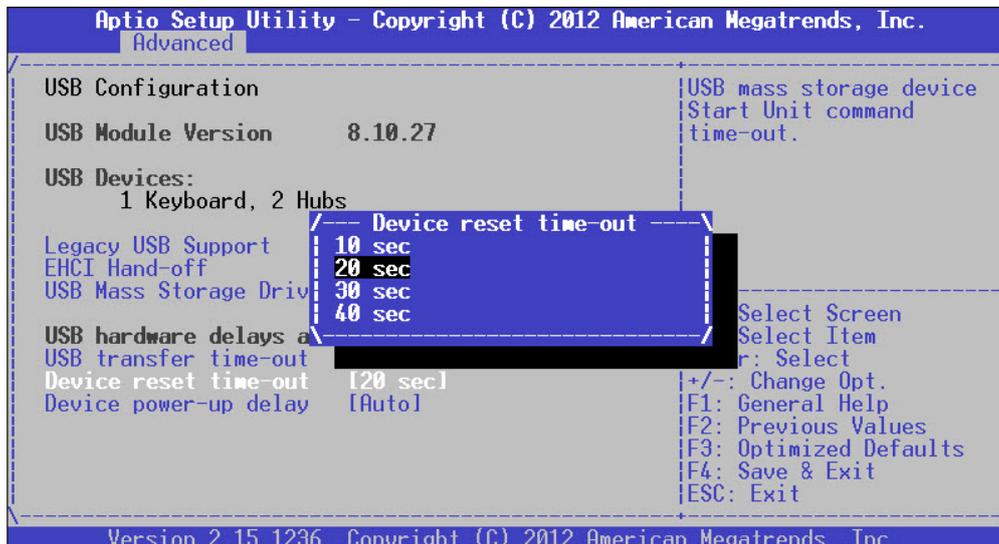
USB Mass Storage Driver: this option allows you to enable or disable USB mass storage driver. The default is "Enabled".



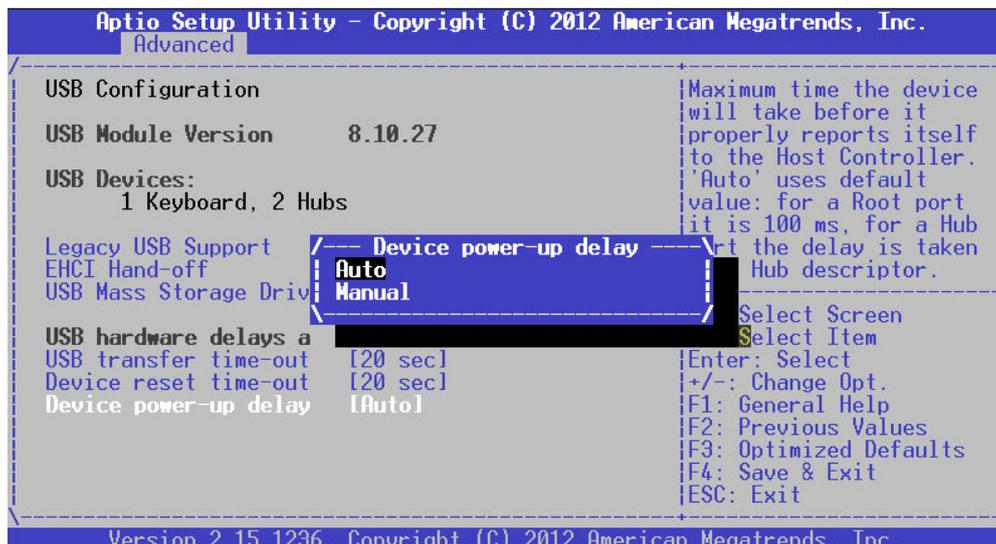
USB transfer time-out: set USB time-out value for control, Bulk and interrupt transfers.



Device reset time-out: set USB mass storage device Start Unit command time-out.



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.



Hardware Monitor

This option allows you to monitor hardware status. Press "Enter" to access the sub-menu.

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit

Above 4G Decoding      [Enabled]
SRIOV Support          [Enable]
Set Pcie Driving By B  [Enabled]
> WHEA Configuration
> CPU Configuration
> SATA Configuration
> USB Configuration
> Hardware Monitor
> Lan Module Hardware Monitor
> LAN Boot Select
> Serial Port Console Redirection

Monitor hardware status

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

Smart Fan Configuration: access smart fan parameters

CPU0/1 Temp: CPU(s) temperature

System Temp1/2: temperatures of system 1/2

FanXX Speed: the speed of each fan based on RPM

CPU0/1 Vcore: dispalys voltage information of CPU cores

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

Pc Health Status
> Smart Fan Configuration
CPU0 Temp      : +71 C
CPU1 Temp      : +61 C
System Temp1   : +46 C
System Temp2   : +44 C
Fan1A Speed    : 6783 RPM
Fan1B Speed    : 7105 RPM
Fan2A Speed    : 6923 RPM
Fan2B Speed    : 7180 RPM
Fan3A Speed    : 6750 RPM
Fan3B Speed    : 7142 RPM
Fan4A Speed    : 7068 RPM
Fan4B Speed    : 7297 RPM
Fan5A Speed    : 7068 RPM
Fan5B Speed    : 7258 RPM
CPU0 Vcore     : +0.918 V
CPU1 Vcore     : +0.942 V

Smart Fan Parameters

><: 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 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

LAN Module Hardware Monitor

This option allows you to monitor hardware status of connected LAN modules. Press "Enter" to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main  Advanced  Chipset  Boot  Security  Save & Exit

Above 4G Decoding      [Enabled]
SRIOV Support          [Enable]
Set Pcie Driving By B  [Enabled]
> WHEA Configuration
> CPU Configuration
> SATA Configuration
> USB Configuration
> Hardware Monitor
> Lan Module Hardware Monitor
> LAN Boot Select
> Serial Port Console Redirection

Monitor hardware status

<<: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

Once entered, you may view PCIe layer information for the connected LAN modules.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

Monitor hardware status

Pcie Layer1           : +1 C
Pcie Layer1(Swtich Tj) : +1 C
Pcie Layer2           : +2 C
Pcie Layer2(Swtich Tj) : +2 C
Pcie Layer3           : +4 C
Pcie Layer3(Swtich Tj) : +4 C

<<: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

LAN Boot Select

This option allows you to select one of the onboard LAN PXE boot. Press "Enter" to access the sub-menu.

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit

Above 4G Decoding      [Enabled]
SRIOV Support          [Enable]
Set Pcie Driving By B  [Enabled]
> WHEA Configuration
> CPU Configuration
> SATA Configuration
> USB Configuration
> Hardware Monitor
> Lan Module Hardware Monitor
> LAN Boot Select
> Serial Port Console Redirection

Select one of on board LAN PXE boot

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

On Board LAN Boot: the default is "Enable"

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

On Board LAN Boot
On Board LAN Boot      [Disable]

Select On Board LAN# Boot

><: Select Screen
^v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Advanced

On Board LAN Boot
On Board LAN Boot      [Enable]

Select On Board LAN# Boot

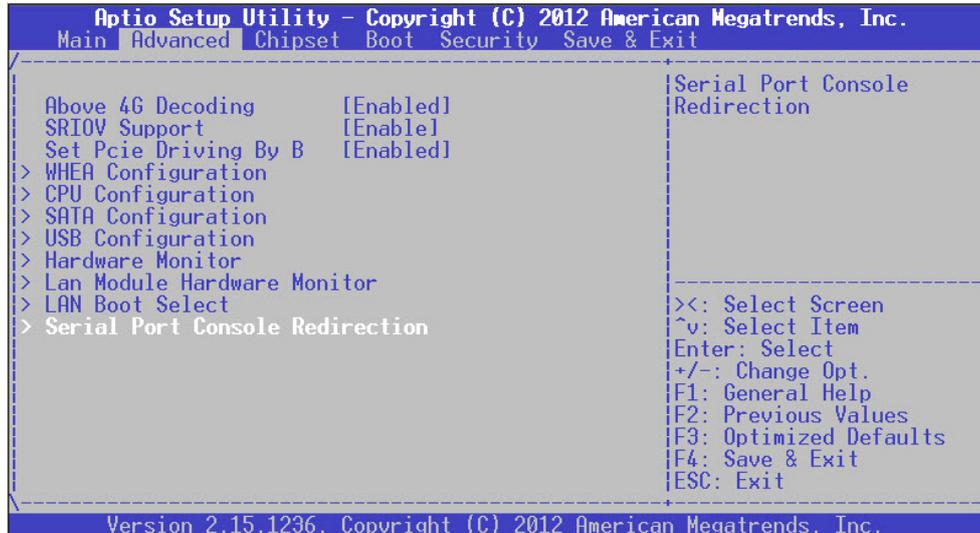
On Board LAN Boot
Disabled
Enable

: Select Screen
: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 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.



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



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



COM Console Redirection Settings

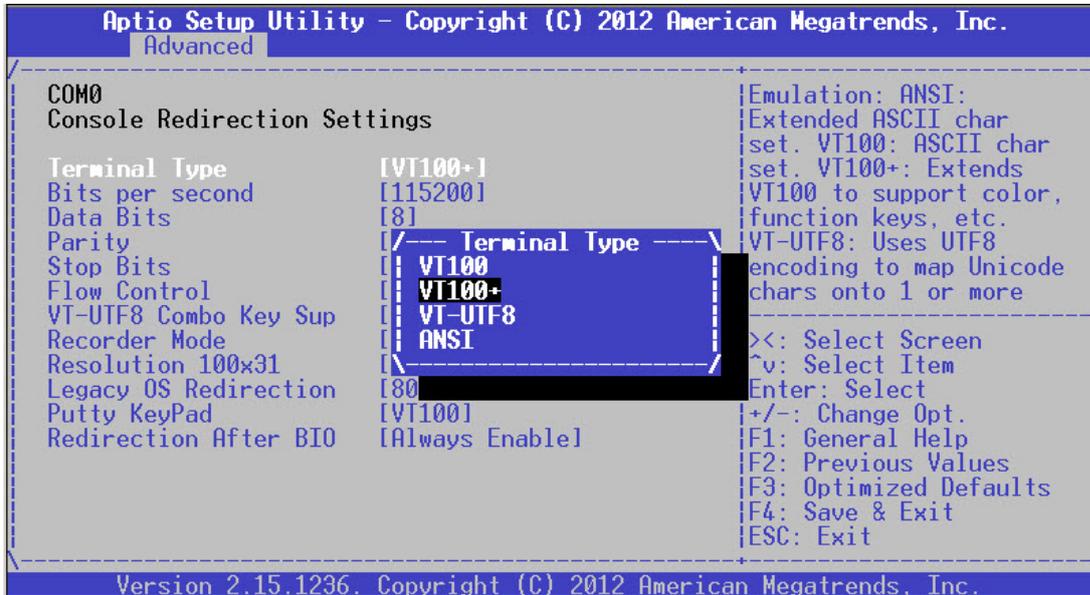
Terminal Type: the emulation configuration. Select "VT100", "VT100+", "VT-UTF8" or "ANSI".

ANSI: Extended ASCII character set

VT100: ASCII character set

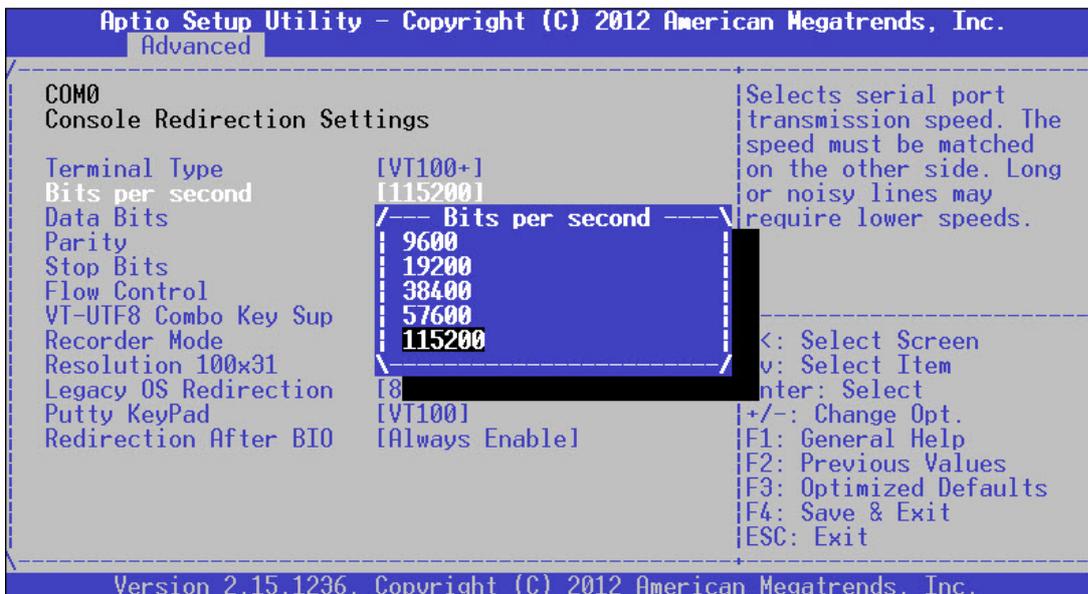
VT100+: extends VT100 to support color function keys

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

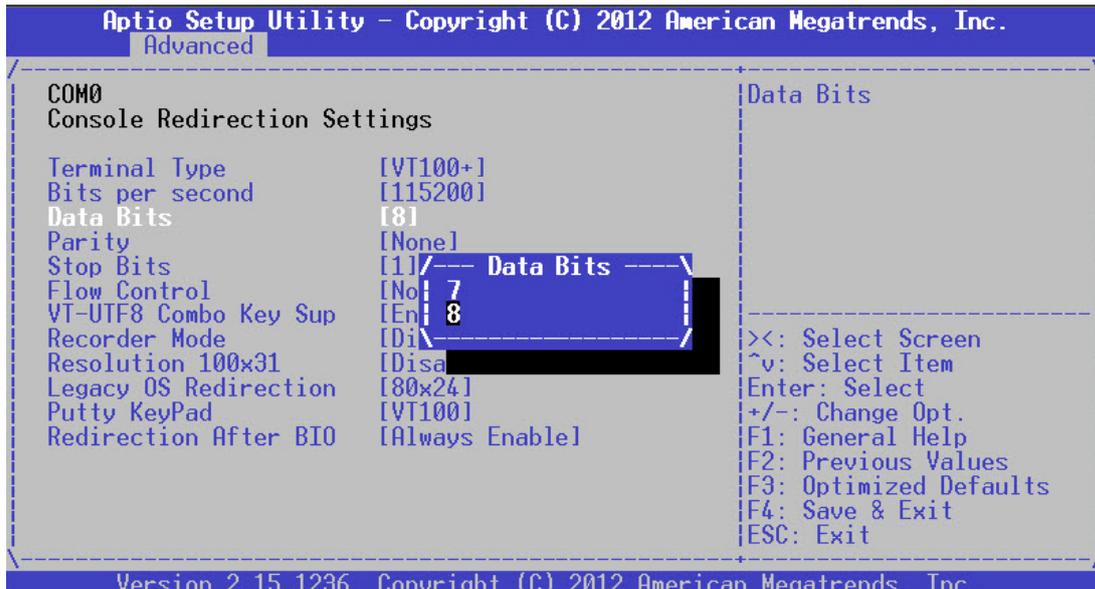


Bits per second: select "9600", "19700", "38400", "57600", or "115200" for bits per second. The Bps

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".



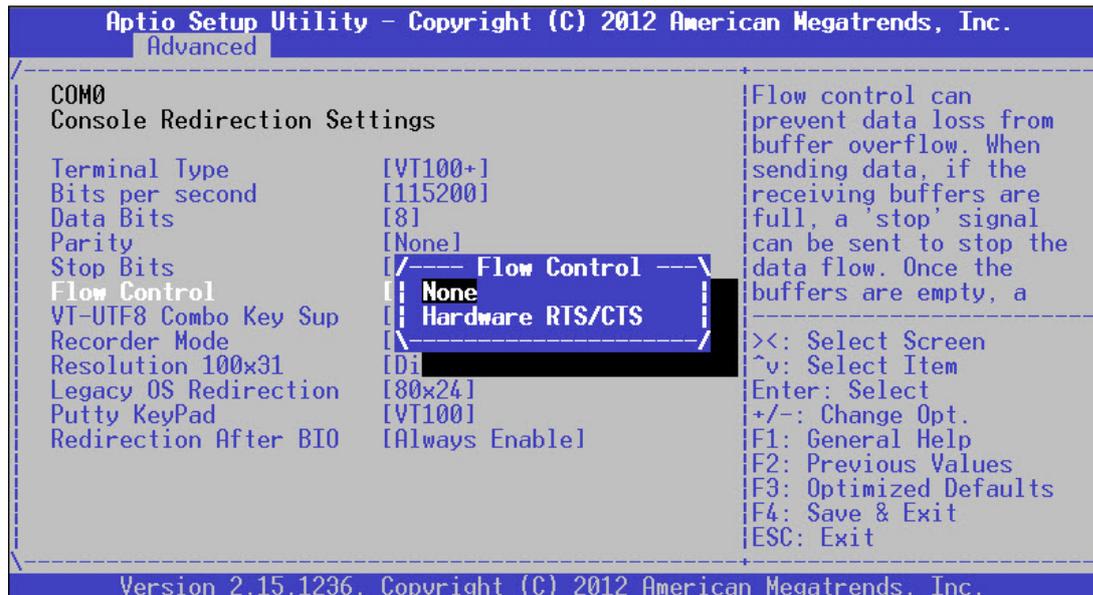
Parity Bits: a parity bit can be sent with the data bits to detect some transmission errors. Select "None", "Even", "Odd", "Mark" or "Space".



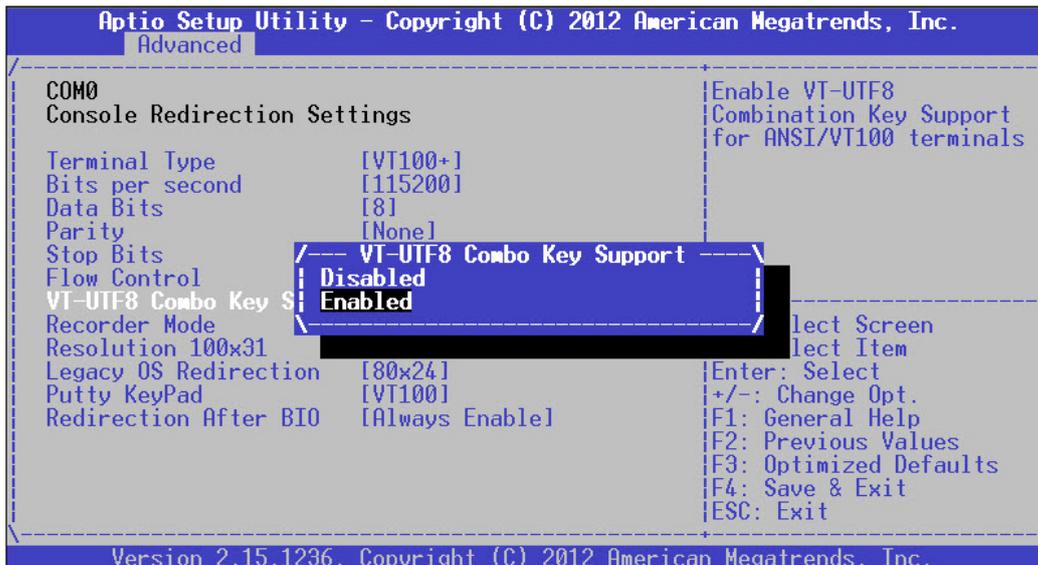
Stop Bits: stop bits indicate the end of a serial data packet. The standard is 1 stop bit. Communication with slow devices may require more than 1.



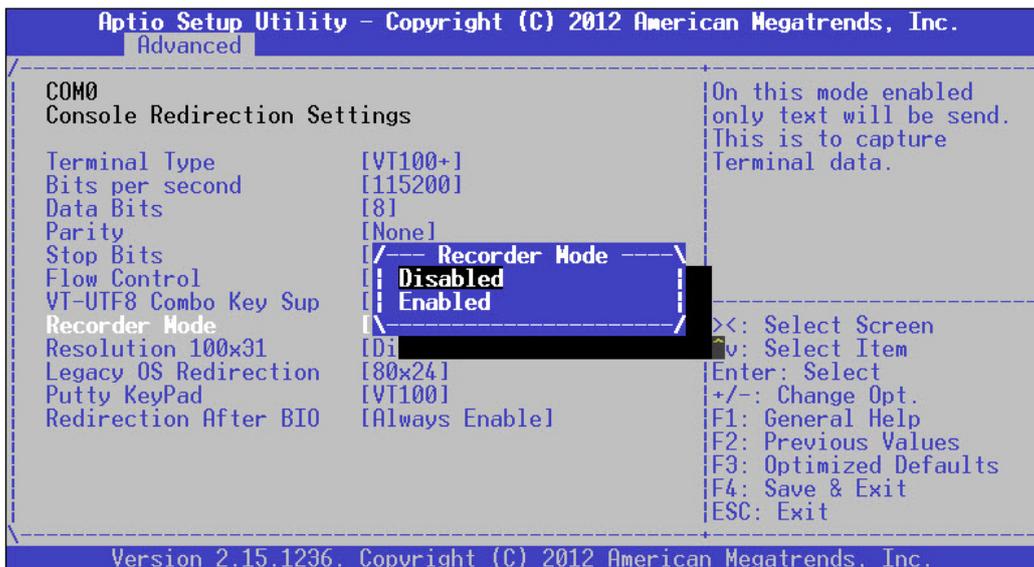
Flow Control: flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. You may select "None" or "Hardware RTS/CTS", depending on the circumstances.



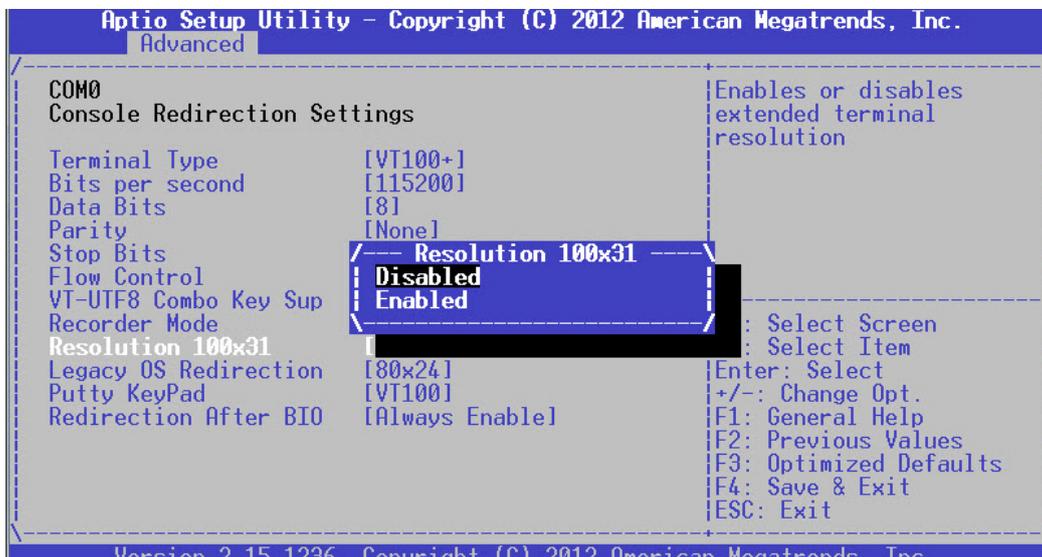
VT-UTF8 Combo Key Support: this option enables/disables VT-UTF8 combination key support for ANSI/VT100 terminals.



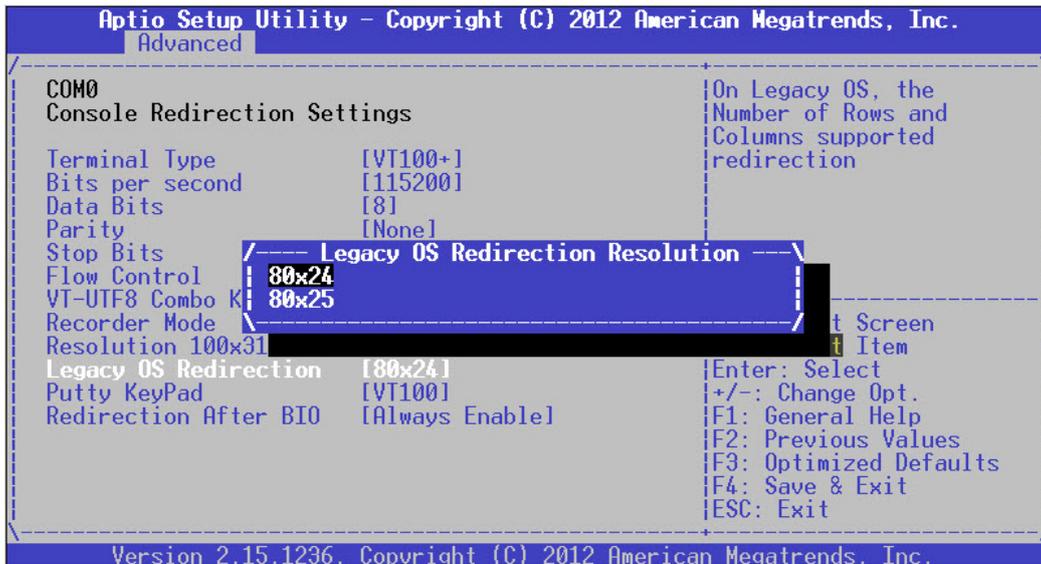
Recorder Mode: on this mode, when "Enabled", only text will be sent. This is to capture terminal data.



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



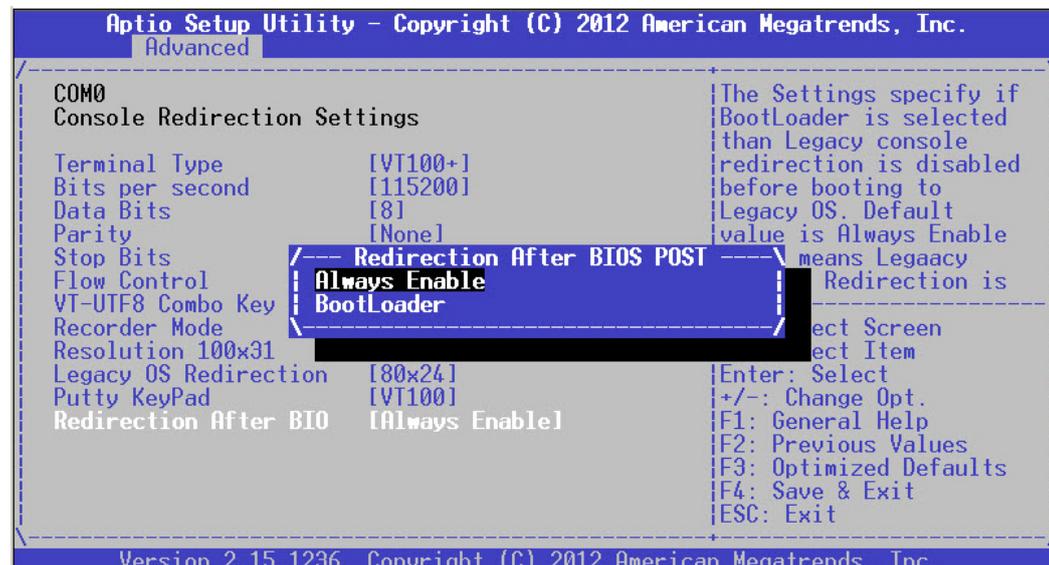
Legacy OS Redirection Resolution: select "80x24" or "80x25". The default for this case is "80x24".



Putty KeyPad: select Function Key and Key Pad on Putty. You may select "VT100", "LINUX", "XTERMR6", "SC0", "ESCN", or "V1400".



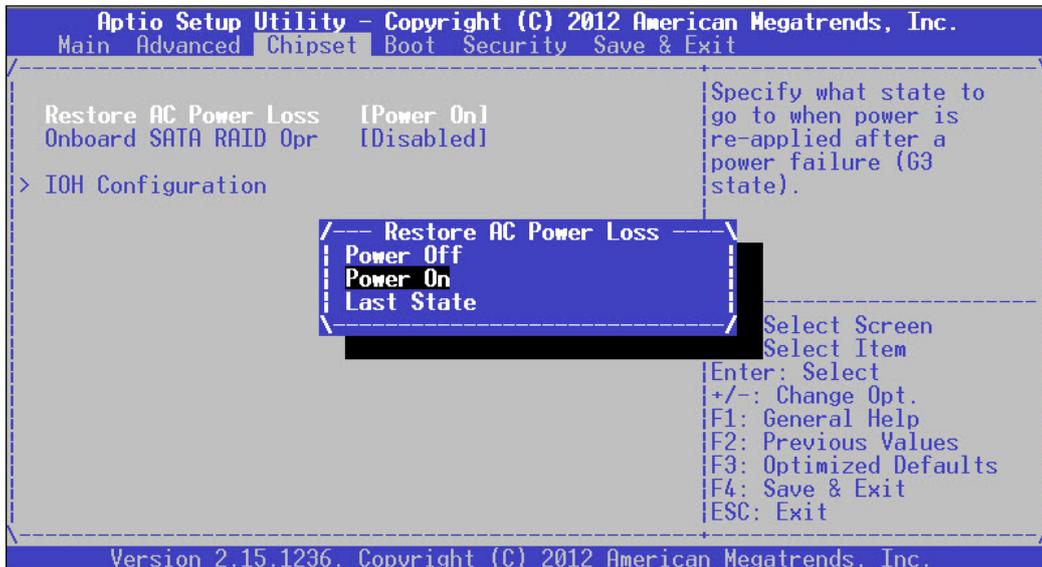
Redirection After BIOS POST: The settings specify if BootLoader is selected than Legacy console redirection is disabled before booting to Legacy OS. Default value is "Always Enable" which means Legacy OS console redirection is always enabled after BIOS.



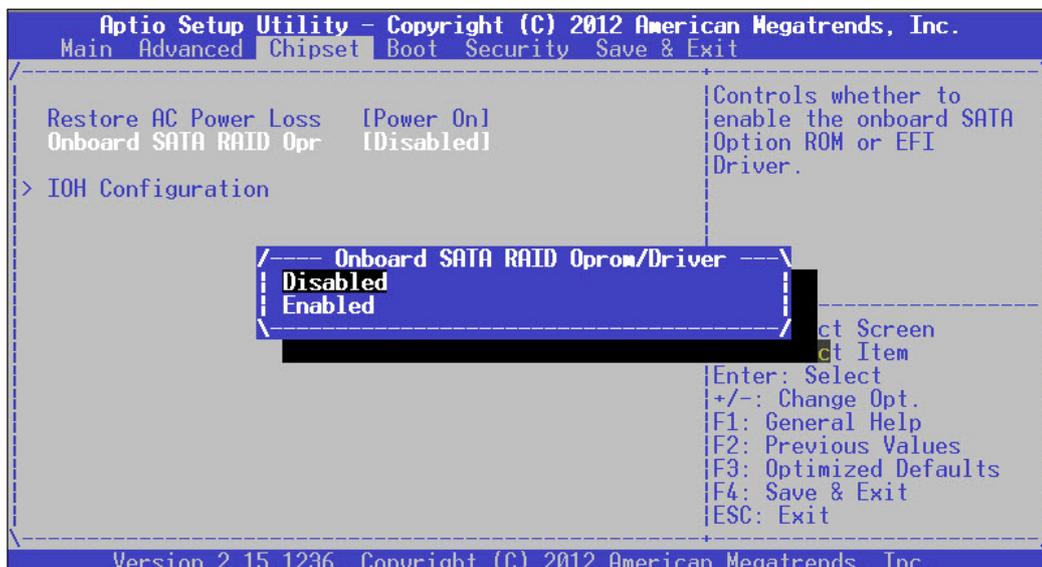
Chipset

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

Restore AC Power Loss: This option specifies what state to go to when power is re-applied after a power failure (G3 state). You may select "Power Off", "Power On" or "Last State". The default is "Power On".



Onboard SATA RAID OproM/Driver: controls whether to enable the onboard SATA Option ROM or EFI Driver.



IOH Configuration

Intel(R) NTB Configuration: press "Enter" to access the sub-menu for Intel Non-Transparent Bridge (NTB) configurations.

```

Apdio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
> Intel(R) NTB Configuration
> Intel(R) VT for Directed I/O Configuration

Intel(R) I/OAT           [Disabled]
IOH Resource Selectio   [Auto]
No Snoop Optimization   [VC1]
MMIOH Size              [64G]
MCFG BASE               [0x80000000]

IOH 0 PCIe port Bifurcation Control

IOU1 - PCIe Port        [x4x4]
PORT 1A Link Speed     [GEN3]
PORT 1B Link Speed     [GEN3]
IOU2 - PCIe Port        [x8x8]
PORT 2A Link Speed     [GEN3]

~ Setup Intel(R)
* Non-Transparent Bridge
* (NTB) Configuration
*
*
*
*
+>>: Select Screen
+^v: Select Item
+Enter: Select
+ +/-: Change Opt.
+F1: General Help
+F2: Previous Values
+F3: Optimized Defaults
+F4: Save & Exit
+v|ESC: Exit

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```

Then, you may select "TB", "NTB-NTR" or "NTB-RP" for the NTB configuration. Remember to set different NTB ports for "Crosslink Control" for the Upper Board and the Bottom Board. For instance, as the image below, the crosslink control is DSD/USP for the Upper Board while setting "USD/USP" for the Bottom Board.

```

Apdio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
IIO 0 NTB Config        [NTB to NTB]
Primary BAR 23 Size     22
Primary BAR 45 Size     22
Secondary BAR 23 Size   22
Secondary BAR 45 Size   22
Crosslink Control       [DSD/USP]

Non-Transparent Bridge
Configuration: Options
are TB, NTB-NTB, or
NTB-RP

~>>: Select Screen
~^v: Select Item
~Enter: Select
~ +/-: Change Opt.
~F1: General Help
~F2: Previous Values
~F3: Optimized Defaults
~F4: Save & Exit
~ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

```

Apdio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
IIO 0 NTB Config        [NTB to NTB]
Primary BAR 23 Size     22
Primary BAR 45 Size     22
Secondary BAR 23 Size   22
Secondary BAR 45 Size   22
Crosslink Control       [USD/DSP]

Configure NTB port as
DSP/USP, USD/DSP, or
use external pin

~>>: Select Screen
~^v: Select Item
~Enter: Select
~ +/-: Change Opt.
~F1: General Help
~F2: Previous Values
~F3: Optimized Defaults
~F4: Save & Exit
~ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

Intel (R) VT for Directed I/O Configuration

This option is enabled by Intel's virtualization technology. Press "Enter" to access the sub-menu.

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
> Intel(R) NTB Configuration
> Intel(R) VT for Directed I/O Configuration
Intel(R) I/OAT           [Disabled]
IOH Resource Selectio   [Auto]
No Snoop Optimization   [VC1]
MMIOH Size              [64G]
MMCFG BASE              [0x80000000]

IOH 0 PCIe port Bifurcation Control
IOU1 - PCIe Port        [x4x4]
PORT 1A Link Speed      [GEN3]
PORT 1B Link Speed      [GEN3]
IOU2 - PCIe Port        [x8x8]
PORT 2A Link Speed      [GEN3]

^ Setup Intel(R)
* Non-Transparent Bridge
* (NTB) Configuration
*
*
*
+><: 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 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
Intel(R) VT-d           [Enabled]
Coherency Support       [Disabled]
ATS Support             [Enabled]

Enable/Disable Intel(R)
Virtualization
Technology for Directed
I/O.

><: Select Screen
~v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

Intel (R) VT-d: this option allows you to enable or disable Intel Virtualization Technology for directed I/O. The default is "Enabled" as this enhances server/firewall performance.

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Chipset
-----
Intel(R) VT-d           [Enabled]
Coherency Support       [Disabled]
ATS Support             [Enabled]

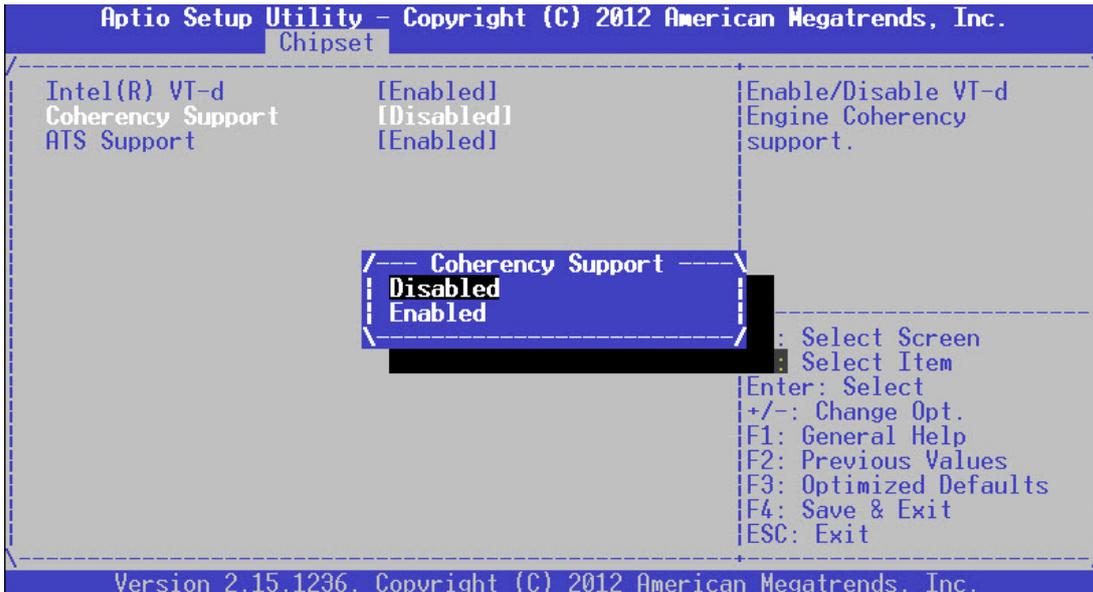
Enable/Disable Intel(R)
Virtualization
Technology for Directed
I/O.

----- Intel(R) VT-d -----
Disabled
Enabled

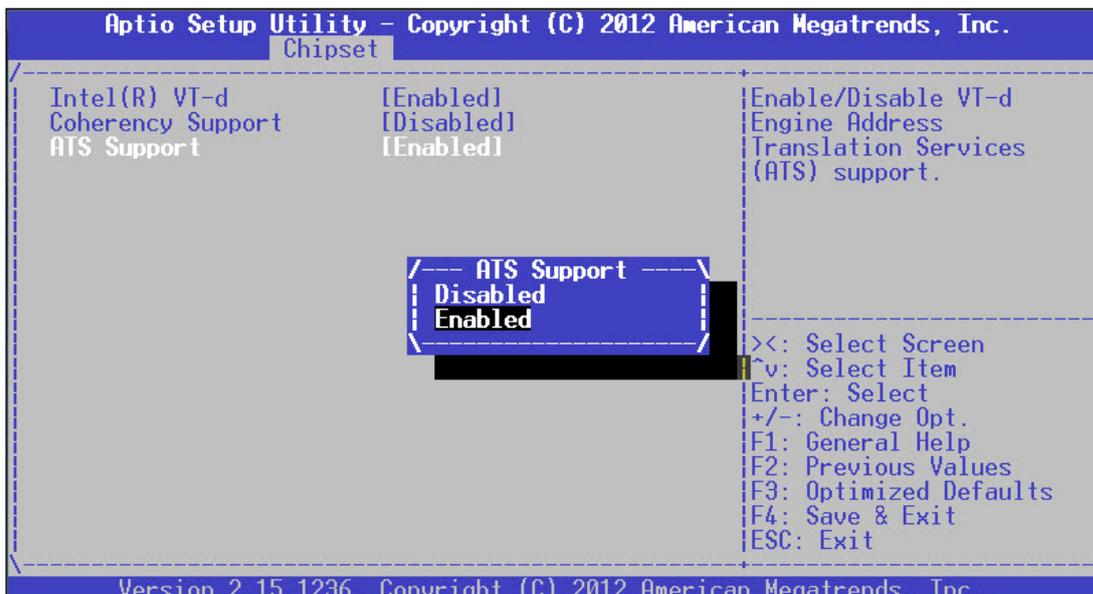
><: Select Screen
~v: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

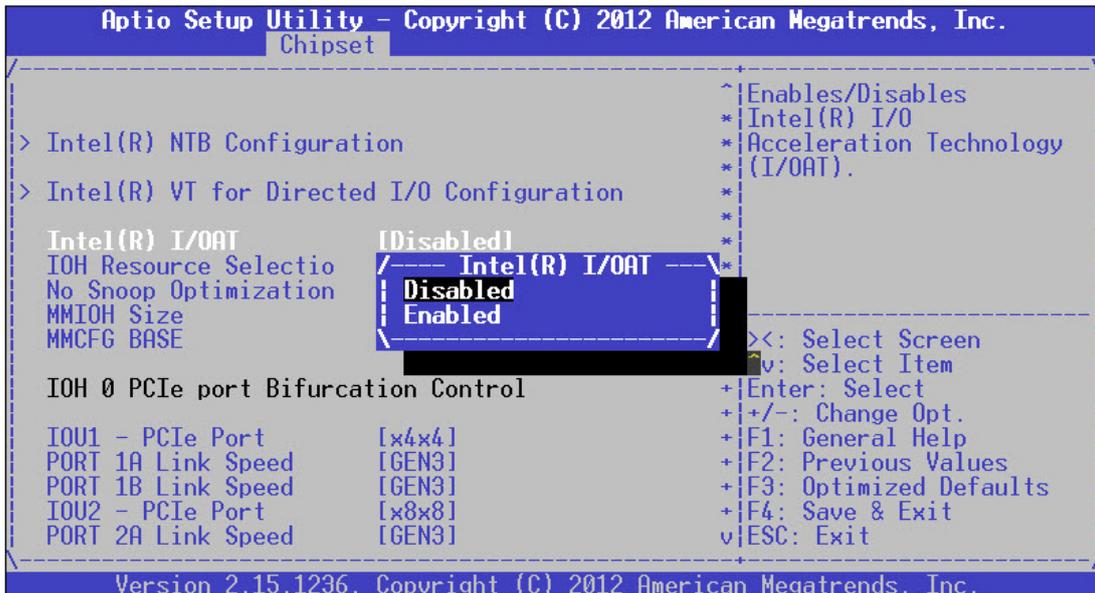
Coherency Support: enable it to enhance operational coherency, but might lower system performance. Therefore, this option is left as “Disabled” by default.



ATS Support: Address Translation Services. This function is enabled if “Intel(R) VT-d” is activated by default setting. Enabling it will improve DMA performance.



Intel (R) I/OAT: This option is enabled by Intel's virtualization technology. Press "Enter" to access the sub-menu. This is the Intel I/O Acceleration Technology option. Enable it to accelerate system performance in virtualization operation. However, for considerations regarding possible data loss under Linux operating systems, this is "Disabled" by default.



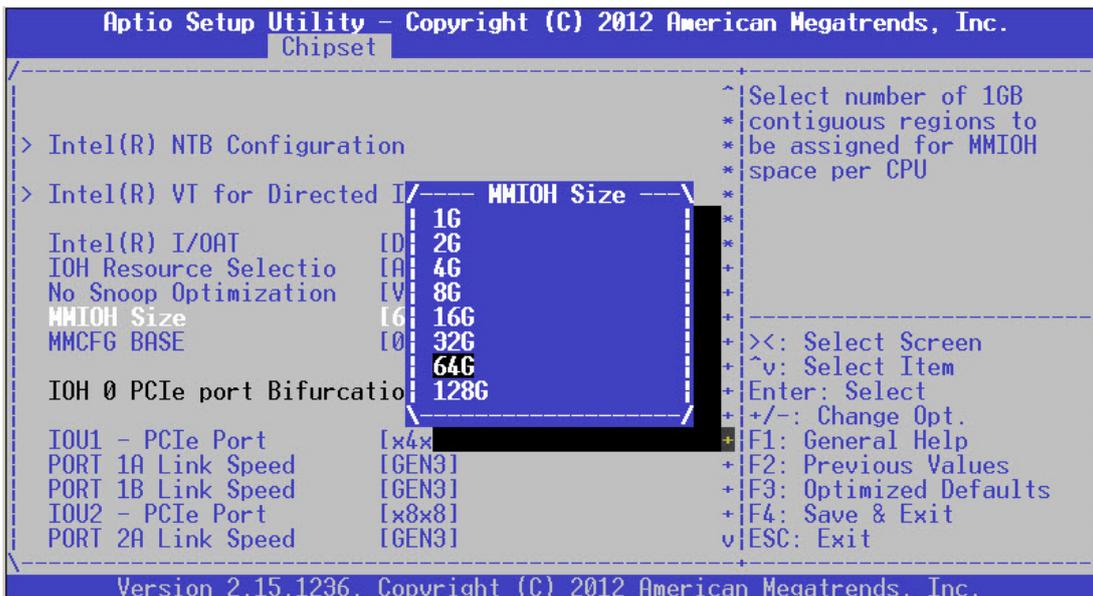
IOH Resource Selection: you may select "Auto" or "Manual" for your I/O hub (IOH) resource allocation. If you select "Auto", PCI resource allocation across multiple IOHs is optimized automatically based on the PCI devices present. Therefore, the default is set as "Auto" instead of "Manual".



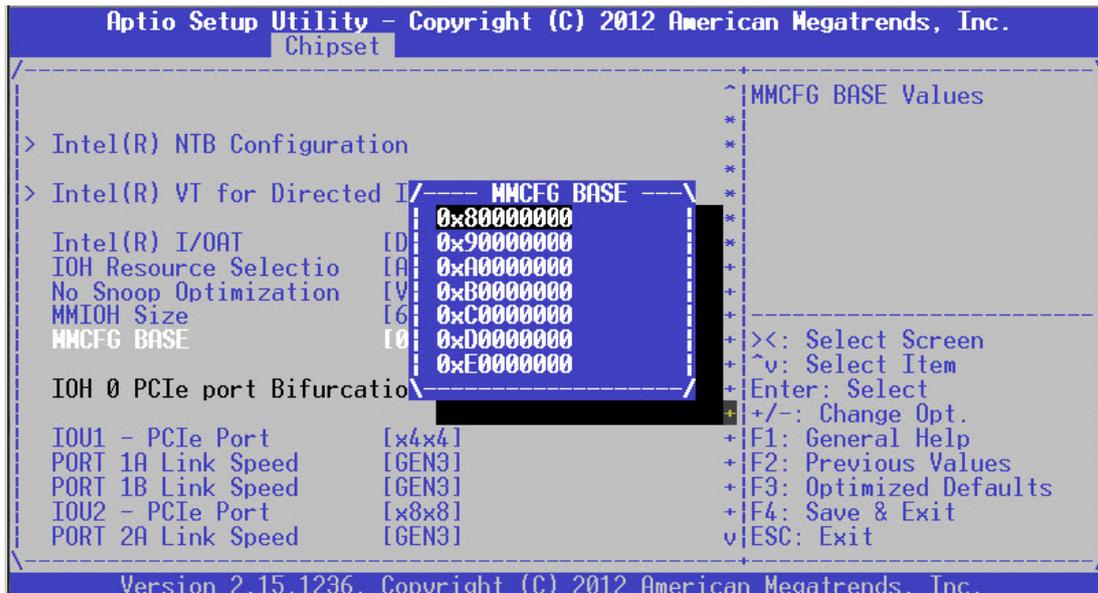
No Snoop Optimization: this option allows you to enable or disable Intel Virtualization Technology for directed I/O. The default is "Enabled" as this enhances server/firewall performance. This configuration requires that no snoop in PCI Express settings is enabled. It is recommended that this option is left at default, which is "VC1".



MMIOH Size: Configure the capacity size for memory-mapped I/O hub (MMIOH), from 1G to 128G.

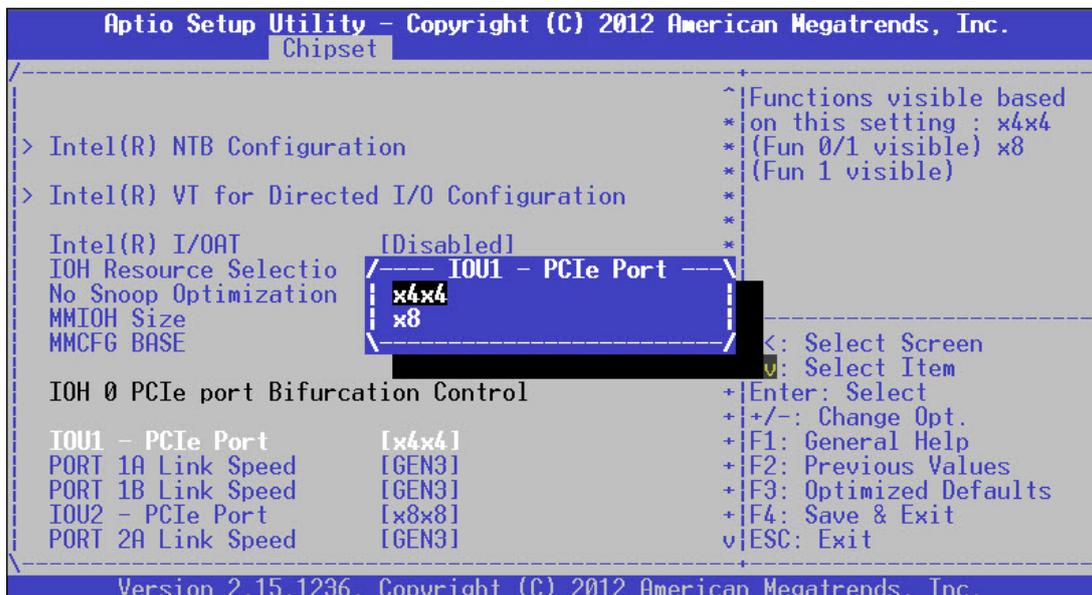


MMCFG BASE: select MMCFG Base values.

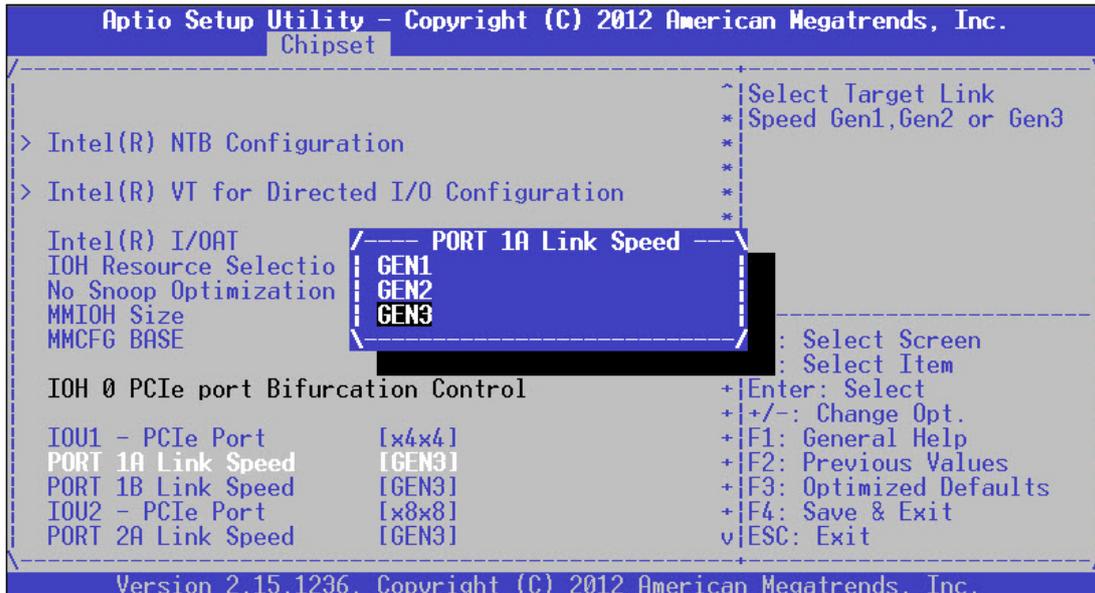


IOH PCIe port Bifurcation Control

IOU1-PCIe Port: functions visible based on these two options: "x4x4" (Function 0/1 visible) or "x8" (Function 1 visible)

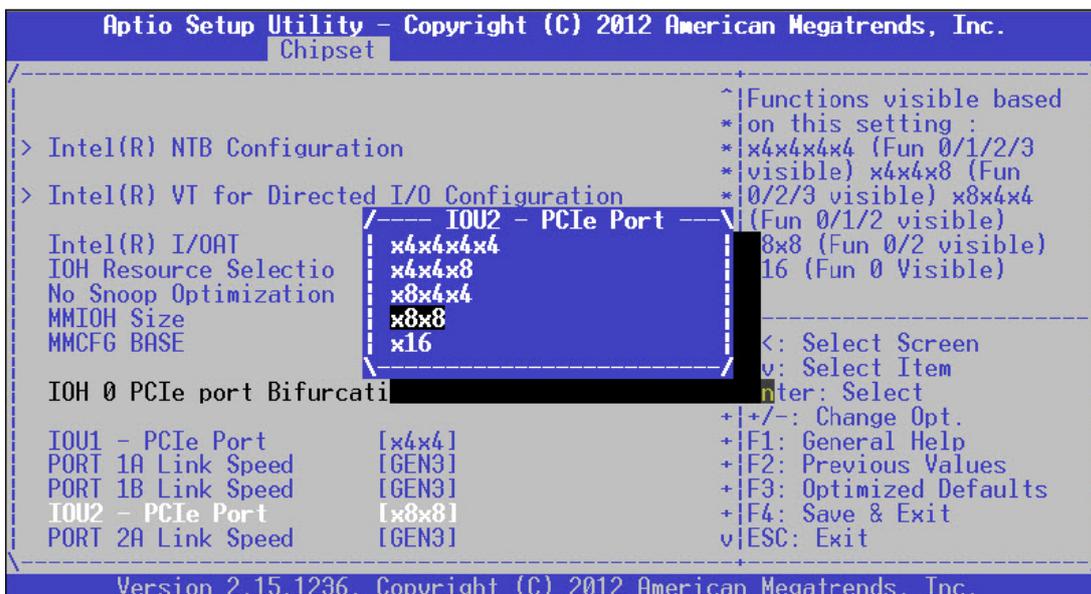


Port 1A/1B/2A Link Speed: select "GEN1","GEN2" or "GEN3" for the target link speed.



IOU2-PCIe Port: Functions visible based on the following options:

- x4x4x4x4: functions 0/1/2/3 visible
- x4x4x8: functions 0/2/3 visible
- x8x4x4: functions 0/1/2 visible
- x8x8: functions 0/2 visible
- x16: function 0 visible

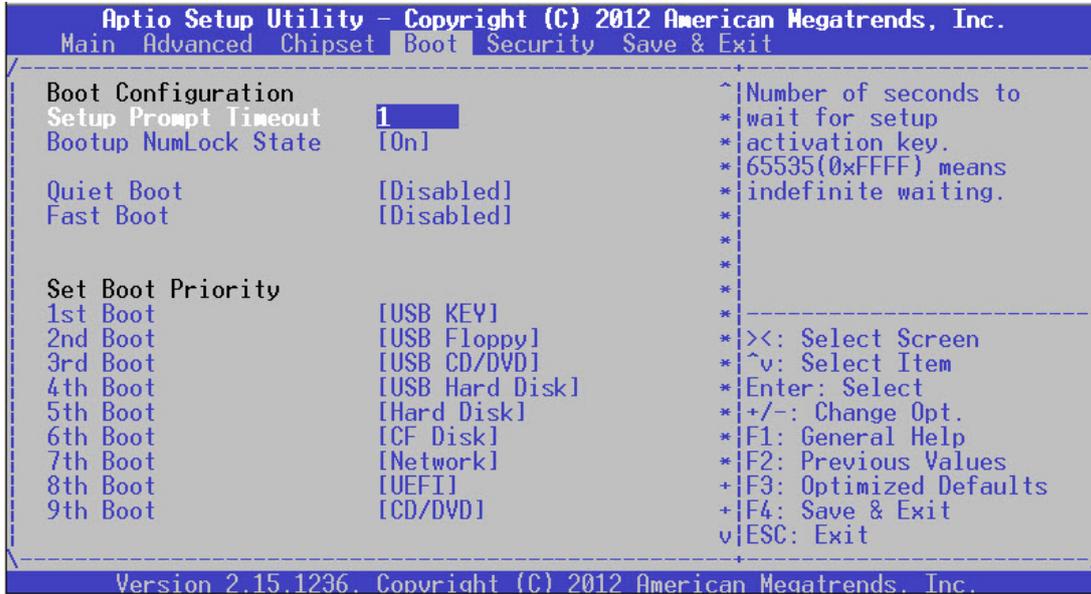


Boot

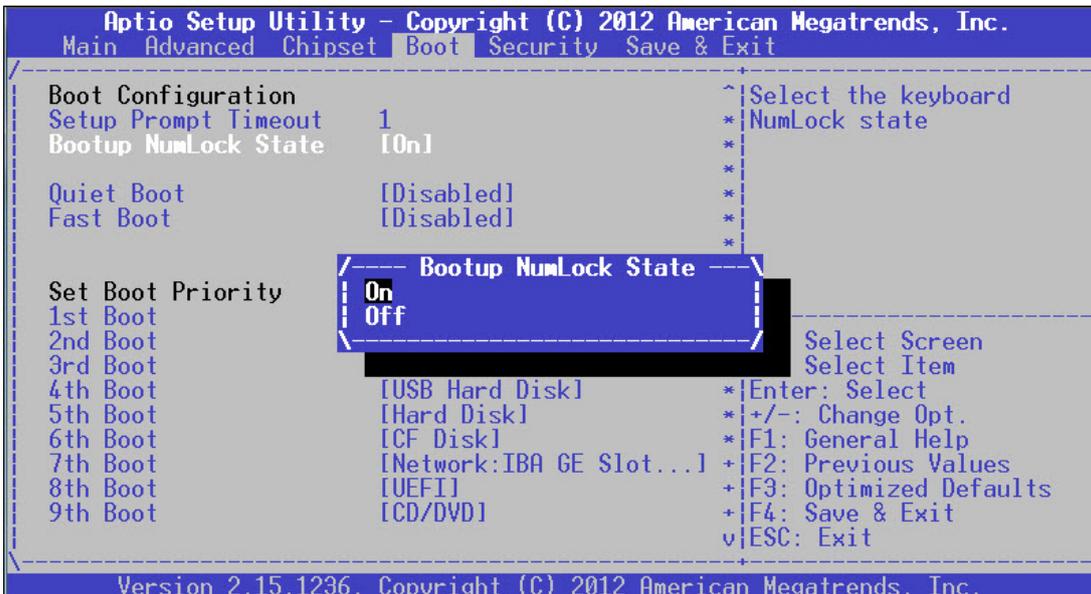
Use [←] / [→] to select [Boot] setup screen. Under this screen, you may use [↑] [↓] to select an item you want to configure.

Boot Configuration

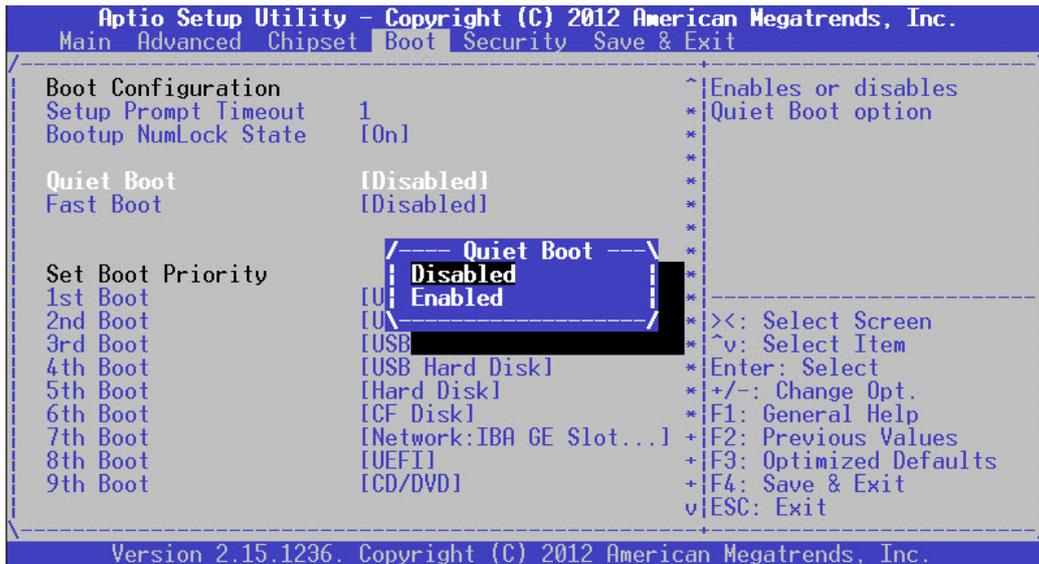
Setup Prompt Timeout: number of seconds to wait for setup activation key. "65535 (0xFFFF)" means indefinite waitings.



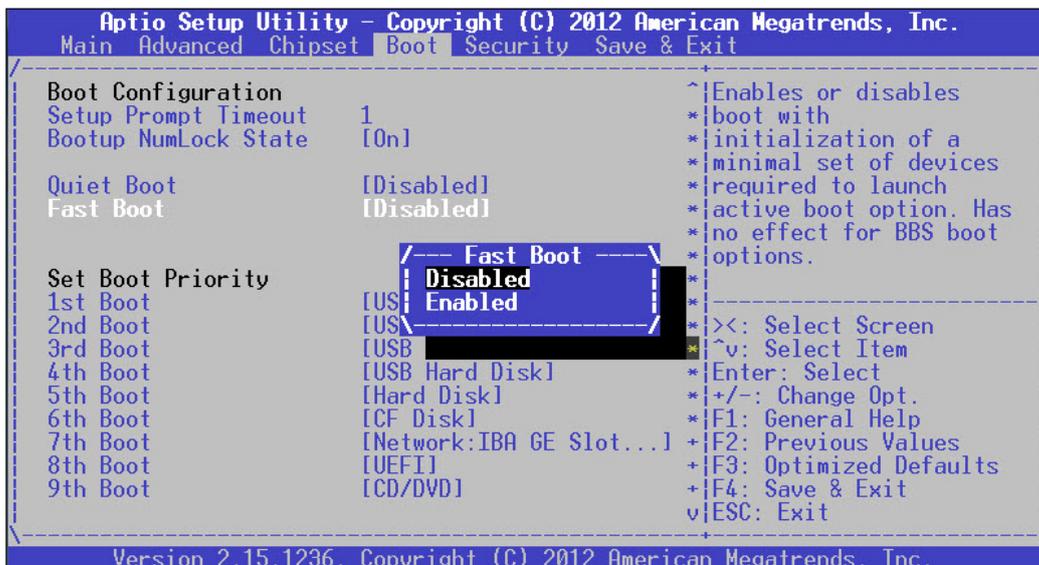
Bootup Numlock State: select the keyboard "Numlock" state



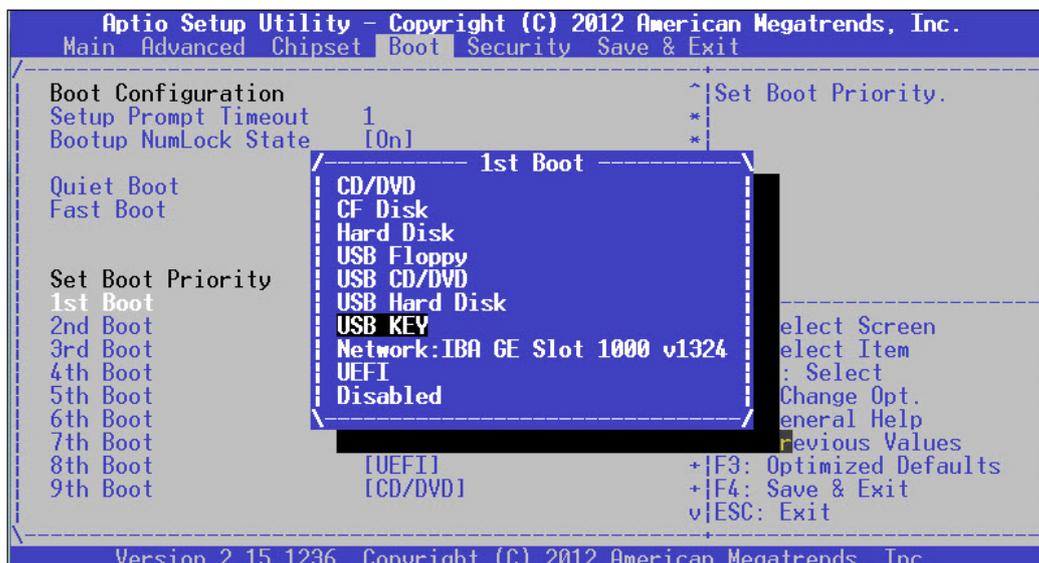
Quiet Boot: this option allows you to enable or disable "Quiet Boot". The default is "Disabled" based on Intel's server environment setting.



Fast Boot: select "Enabled" or "Disabled" for fast boot-up process. The default is "Disabled" based on Intel's server environment setting.



Set Boot Priority: the following allows you to configure the system boot sequence.



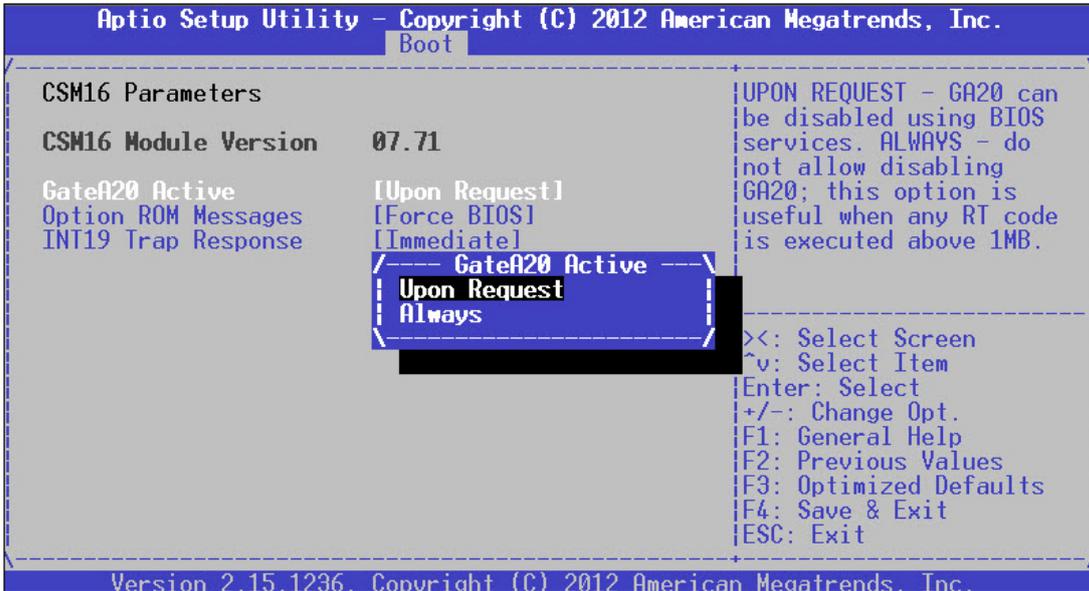
CSM16 Parameters:

CSM16 Module Version

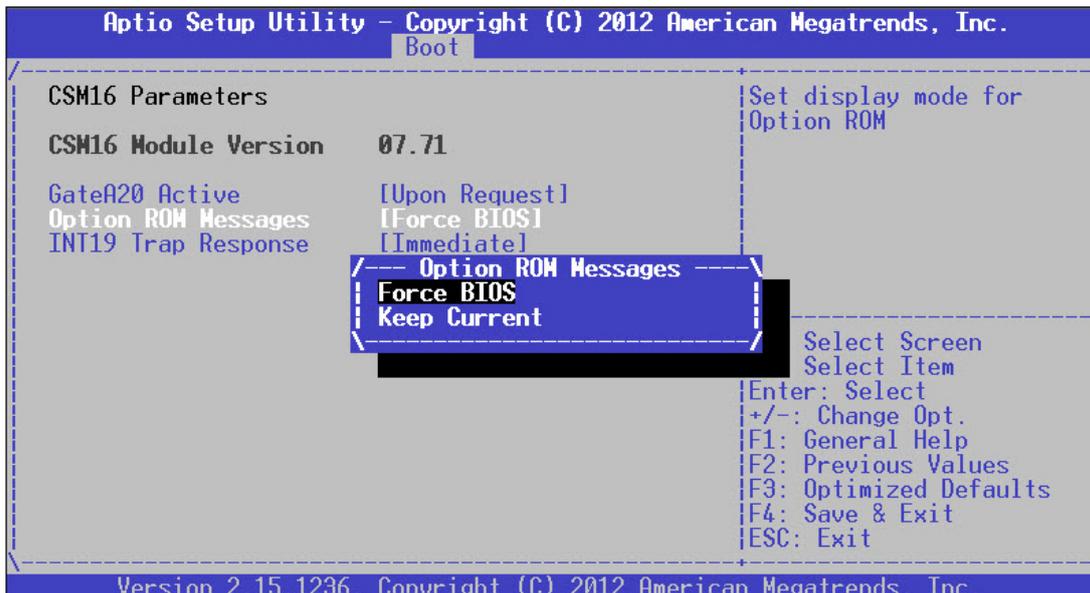
GateA20 Active: select "Upon Request" or "Always".

Upon Request -- GA20 can be disabled using BIOS services.

Always -- do not allow disabling GA20: this option is useful when any RT code is executed above 1MB



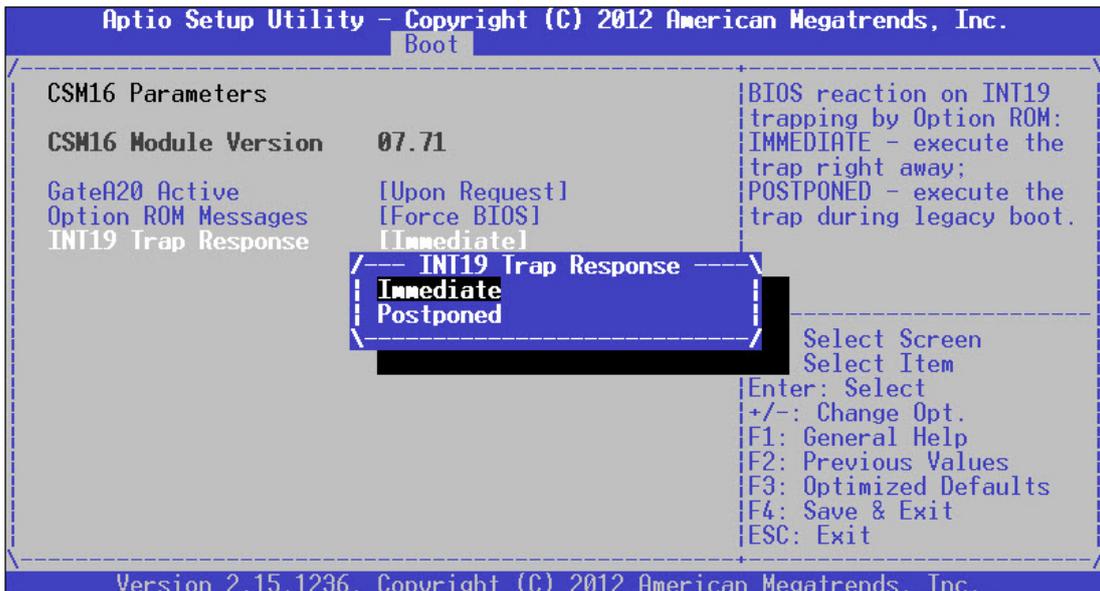
Option ROM Message: select "Force BIOS" or "Keep Current". This option sets display mode for Option ROM.



INT19 Trap Response: Select "Immediate" or "Postponed". This option sets BIOS reaction on INT19 Trapping by Option ROM:

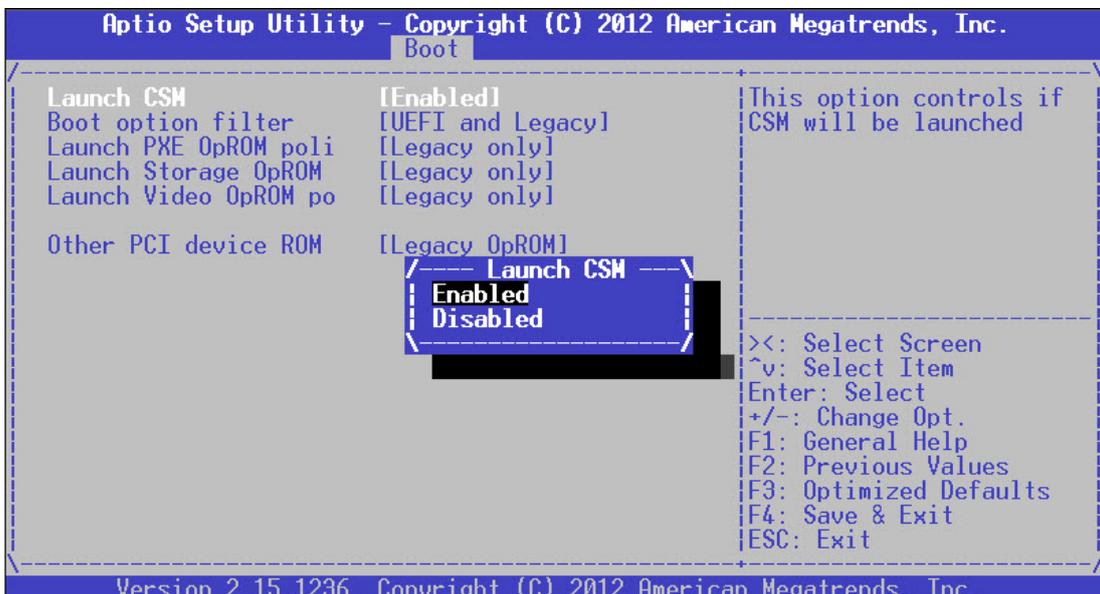
Immediate - execute the trap right away

Postponed - execute the trap during legacy boot

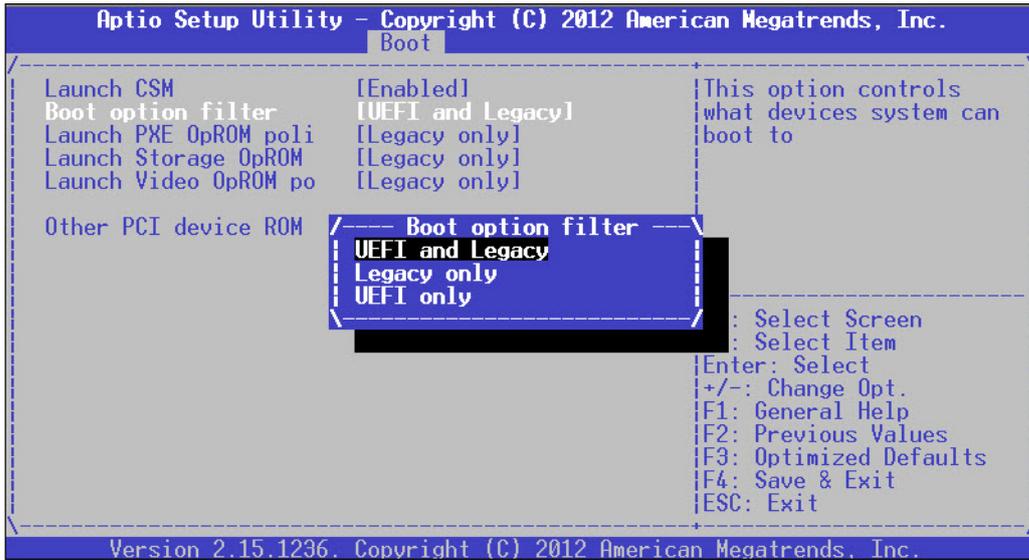


CSM Parameters

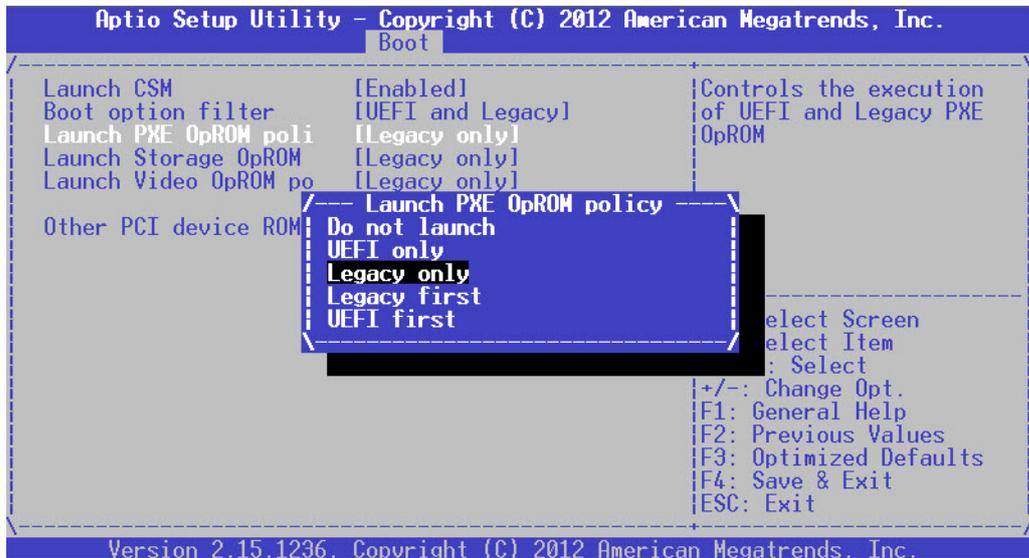
Launch CSM: this option controls if CSM will be launched



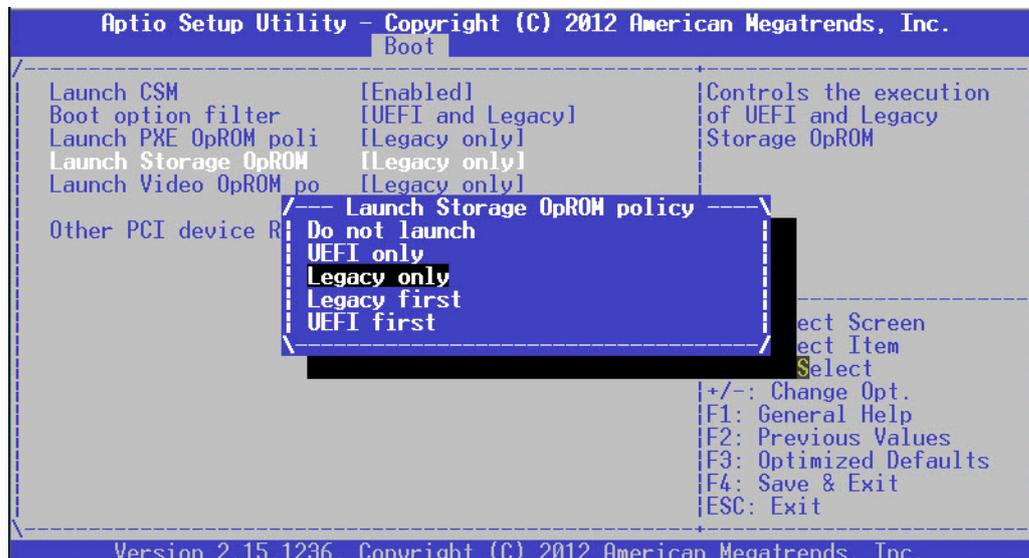
Boot Option Filter: Select “UEFI and Legacy”, “Legacy only” or “UEFI only”. This option controls what devices system can boot to.



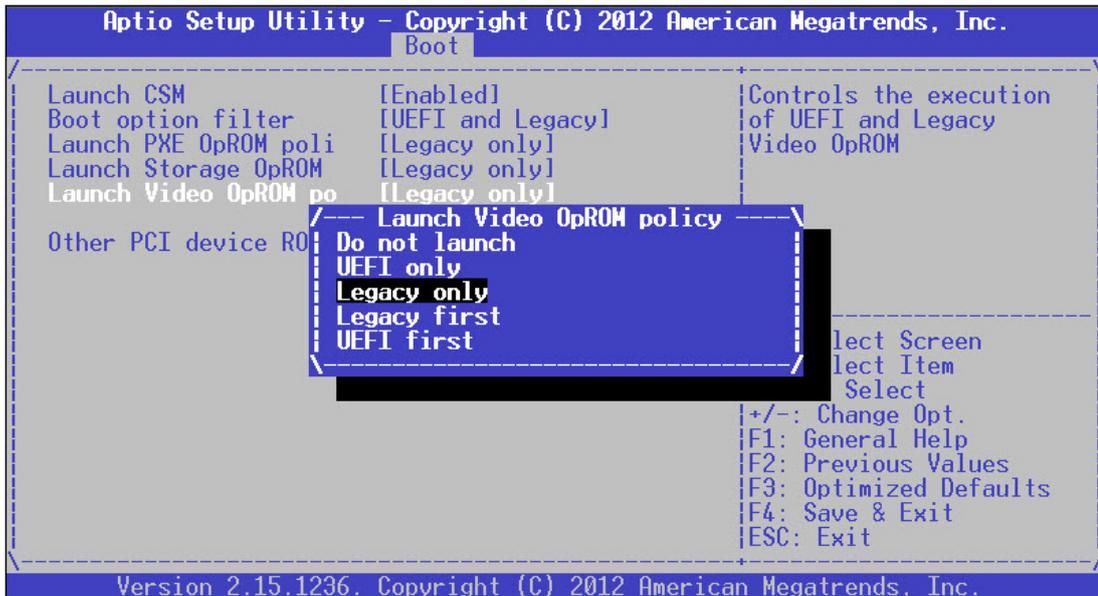
Launch PXE OpROM Policy: this option controls the execution of UEFI and Legacy PXE OpROM



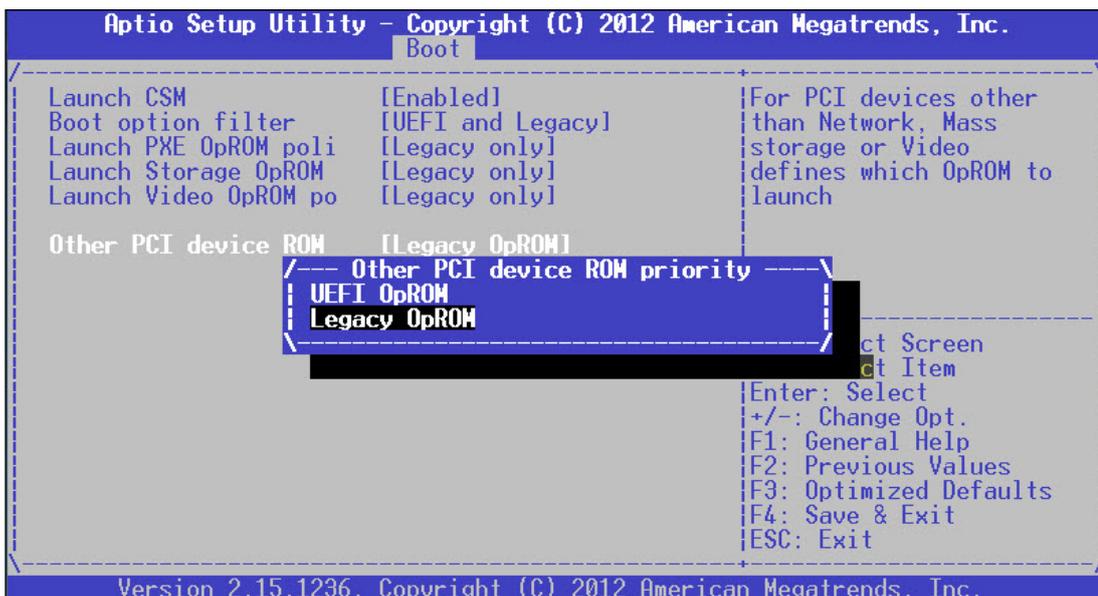
Launch Storage OpROM: select “Do not launch”, “UEFI only”, “Legacy only”, “Legacy first” or “UEFI first”. This option controls the execution of UEFI and legacy storage OpROM.



Boot Option Filter: select “Do not launch”, “UEFI only”, “Legacy only”, “Legacy first” or “UEFI first”. This option controls the execution of UEFI and legacy video OpROM.



Other PCI device ROM: select “UEFI OpROM” or “Legacy OpROM”. For PCI devices other than network, mass storage or video defines which OpROM to launch.



NETWORK Device BBS Priorities

```

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
-----
Fast Boot                [Disabled]                ^ Specifies the Boot
                                                              + Device Priority
                                                              + sequence from available
                          + NETWORK Drives.
Set Boot Priority
1st Boot                 [USB KEY]                 *
2nd Boot                 [USB Floppy]              *
3rd Boot                 [USB CD/DVD]              *
4th Boot                 [USB Hard Disk]          *
5th Boot                 [Hard Disk]                 *
6th Boot                 [CF Disk]                  *
7th Boot                 [Network:IBA GE Slot...] *
8th Boot                 [UEFI]                   *
9th Boot                 [CD/DVD]                  *
-----
> CSM16 Parameters
  CSM parameters
-----
> NETWORK Device BBS Priorities
-----
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

1st Boot: set boot priority

```

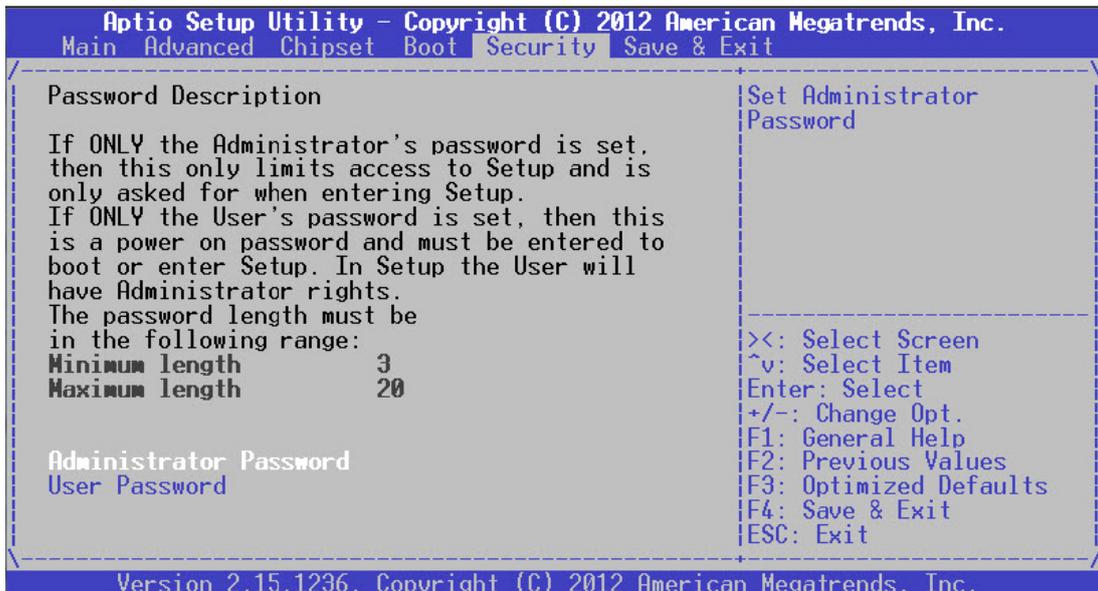
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
                          Boot
-----
NETWORK Device BBS Priorities
1st Boot                 [IBA GE Slot 1000 v1324]
                          Set Boot Priority.
-----
                          <: Select Screen
                          v: Select Item
                          Enter: Select
                          +/-: Change Opt.
                          F1: General Help
                          F2: Previous Values
                          F3: Optimized Defaults
                          F4: Save & Exit
                          ESC: Exit
-----
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
  
```

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.



Save & Exit

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

Save Changes and Exit: exit system setup after saving the configuration changes

Discard Changes and Exit: exit system setup without saving the configuration changes

Save Changes and Reset: reset the system after saving the configuration changes

Discard Changes and Reset: reset the system without saving the configuration changes

Save Options

Save Changes: save the configuration changes

Discard Changes: discard all the configuration changes

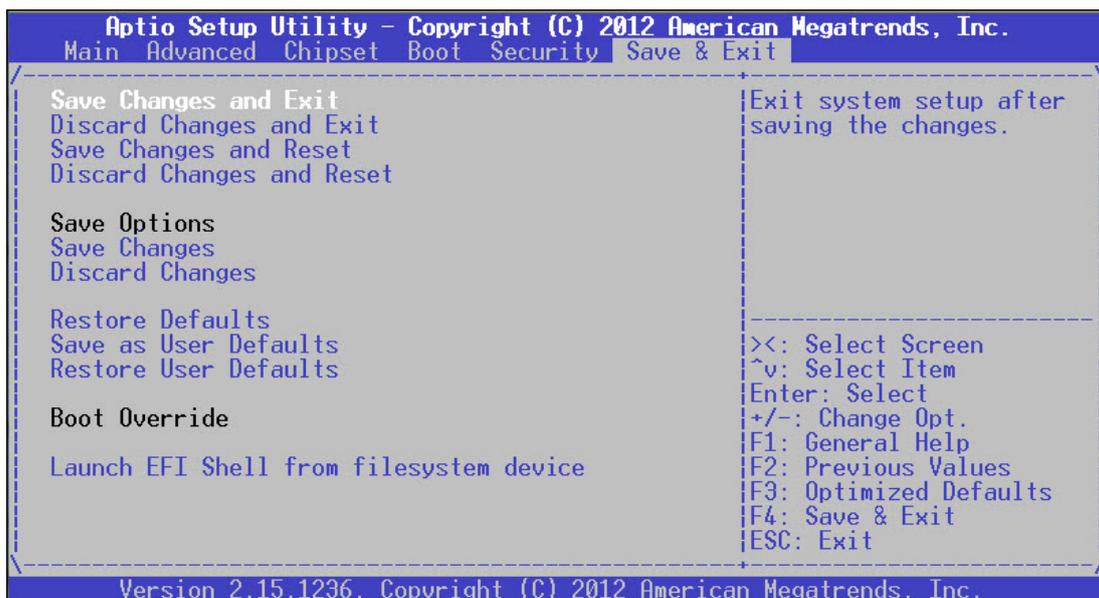
Restore Defaults: restore to factory default setting

Save as User Defaults: save changes as the new user default

Restore User Defaults: restore the user default

Boot Override

Launch EFI Shell from filesystem device: launch Extensive Firmware Interface which will allow you to input Shell commands



Chapter 6

IPMI Navigation

Chapter 6:

IPMI Navigation

IPMI, abbreviation of Intelligent Platform Management Interface, offers system administrators to manage and monitor computing platforms with standardized interface and protocol. Due to its messaging and hardware-based nature, IPMI works independently from the operating system, so that system administrators are able to remotely manage and monitor computing platform status.

Lanner's IPMI provides rich management features that will enable users to remote monitor their host machines, while configuring control options. These include:

- Remote control viewing options
- DNS configuration options
- SSL upload/generate/view options
- Network setting
- Firmware update
- User information management

The following will provide a simple walkthrough of Lanner's IPMI interface.

Reminder

The images shown in the following section are based on the latest version available at the time of this writing. Therefore, the images may or may not look identical to the screens on your computing systems.

The following interface images are based on web browser operation.

Before You Start

- Make sure the proper LAN connection to HCP-72i1.
- IPMI card has been properly installed.
- Prepare a desktop or laptop that is connecting to the same network. Start the computer. (Preferably a laptop).
- Make sure JAVA is installed in the computer you are using.

IP Configuration

- Configure the IP address on the computer you are using. Please input "192.168.0.100:80".
- Go to "JAVA" program, then go to "Exception Site List" and add a new location "192.168.0.100:80".

Getting Started

Open a web browser and input "192.168.0.100:80" to launch IPMI interface.

You will be required to enter "Username" and "Password". The default username and password are "admin" for both.



Username:

Password:

[Forgot Password?](#)

Required Browser Settings

1. Allow popups from this site
2. Allow file download from this site. (How to )
3. Enable javascript for this site
4. Enable cookies for this site

Dashboard

The “Dashboard” provides an overall information about the status of the device and remote server.

Device Information

Device Power Status: the power state of the monitored device

Firmware Revision: firmware revision information

Firmware Build Date: the date that the firmware was built

Network Information

MAC Address: displays MAC address information

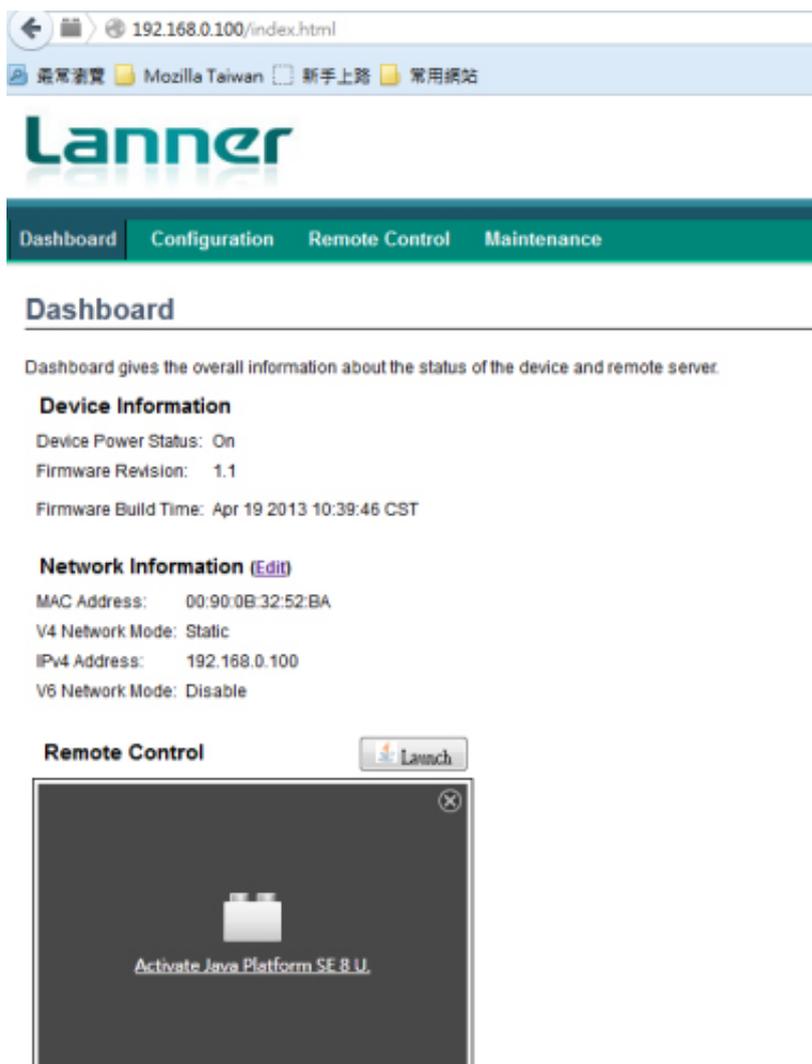
V4 Network Mode: the status of V4 network

IPv4 Address: the IP address information

V6 Network Mode: the status of V6 network

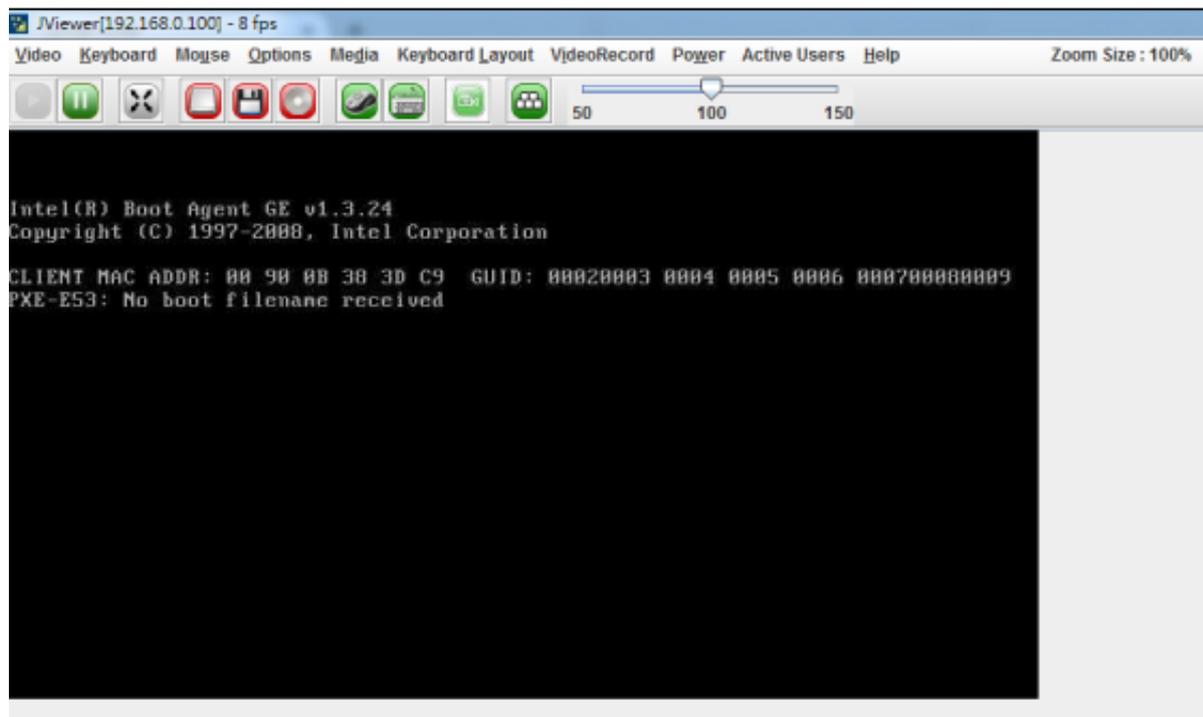
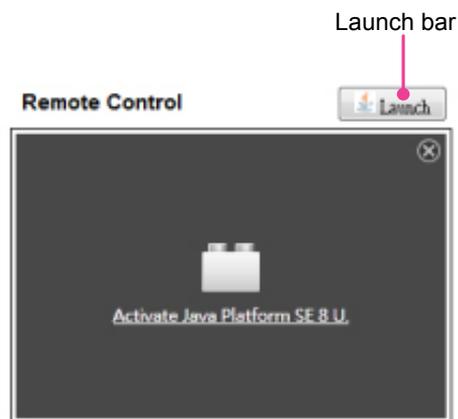
Remote Control

Click the “Launch” bar to display the remote console, which is the host machine being monitored. The operating system running on the host machine can be viewed as well.



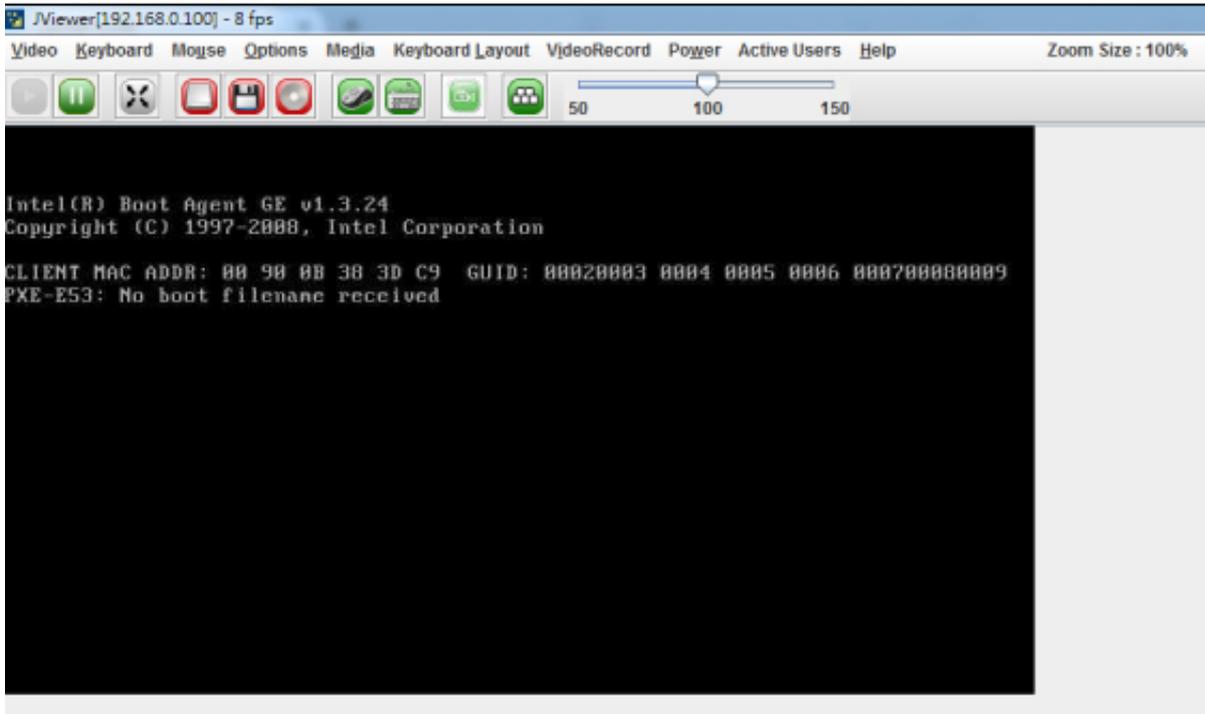
Remote Control -- Launched

Once you clicked the "Launch" bar, the remote control screen will be enlarged and the status of the remote console can be viewed.



Introducing the Remote Control Functions

The Remote Control interface comes with many handy functions for you to navigate the remote console operating system.



Video

Click "Video" on the task bar to open menu for video related options

Pause Redirection: pause the console redirection

Resume Redirection: resume the console redirection

Refresh Video: refresh the video image of remote console status

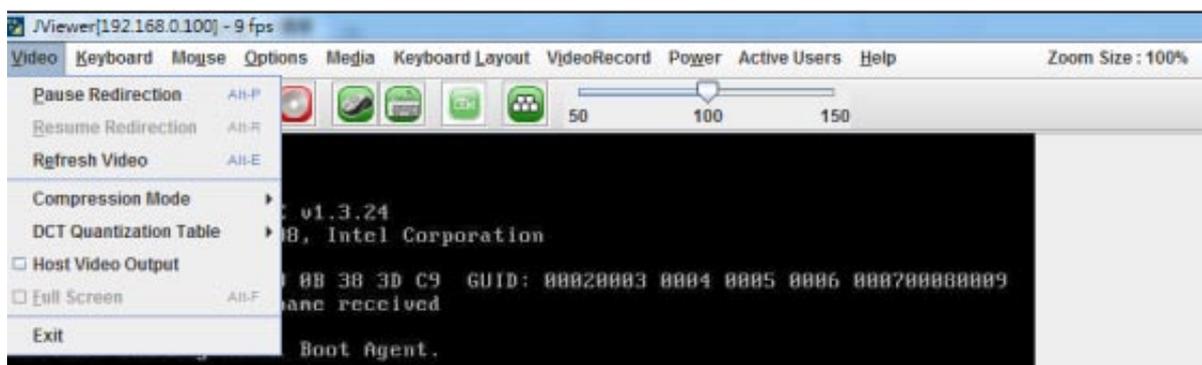
Compression Mode: select compression mode

DCT Quantization Table: view DCT Quantization Table

Host Video Output: host machine video output option

Full Screen: to enable full screen viewing option

Exit: to exit



Keyboard

Click "Keyboard" on the task bar to view keyboard related options:

Hold Right Ctrl Key

Hold Right Alt Key

Hold Left Ctrl Key

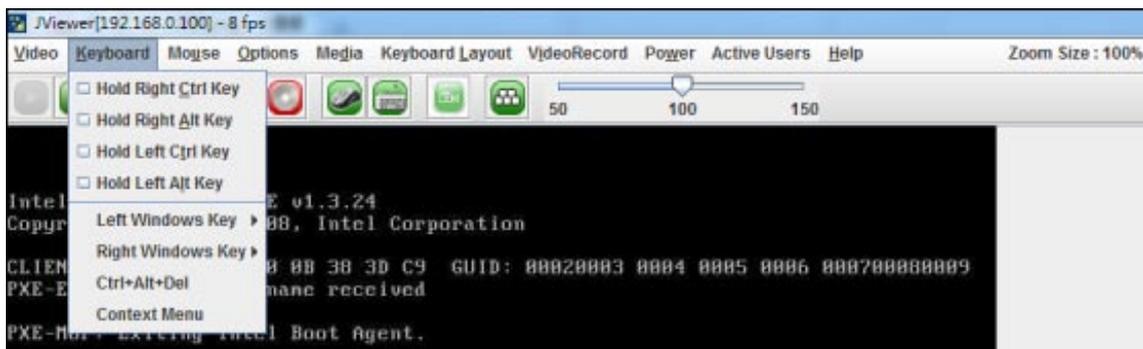
Hold Left Alt Key

Left Windows Key

Right Windows Key

Ctrl+Alt+Del

context Menu



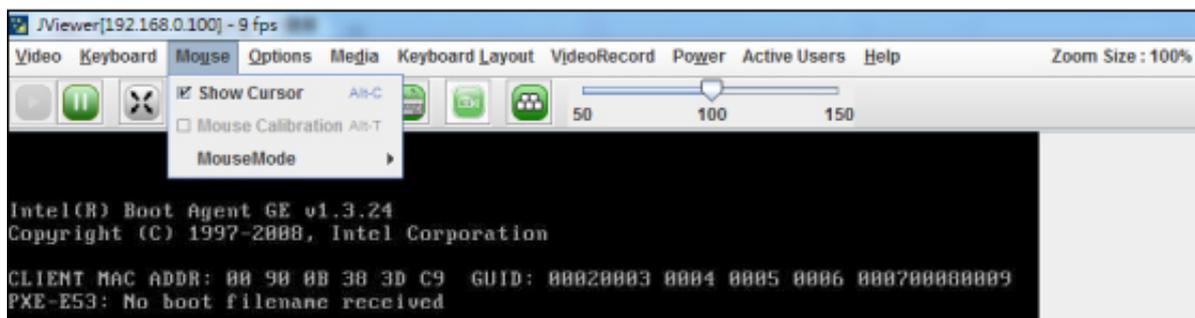
Mouse

Click "Mouse" on the task bar to open menu for mouse related options

Show Cursor: enable or disable mouse cursor

Mouse Calibration: set mouse calibration

Mouse Mode: select mouse modes



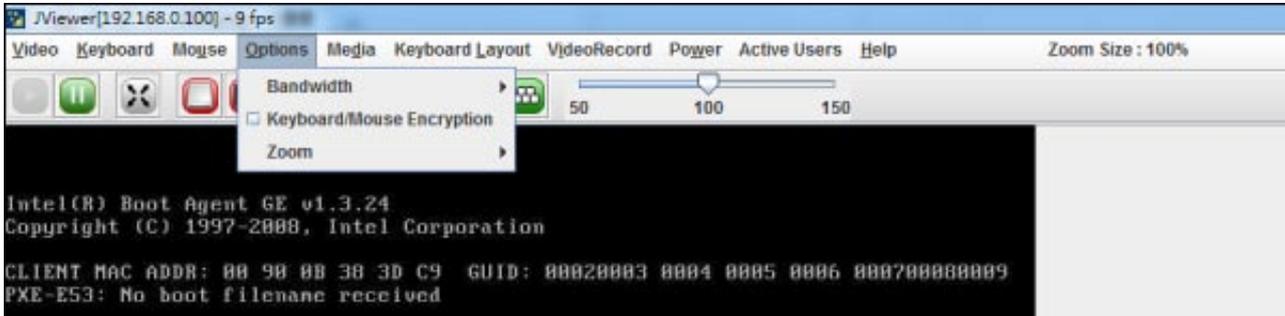
Options

Click "Options" on the task bar to view navigation options:

Bandwidth: set bandwidth

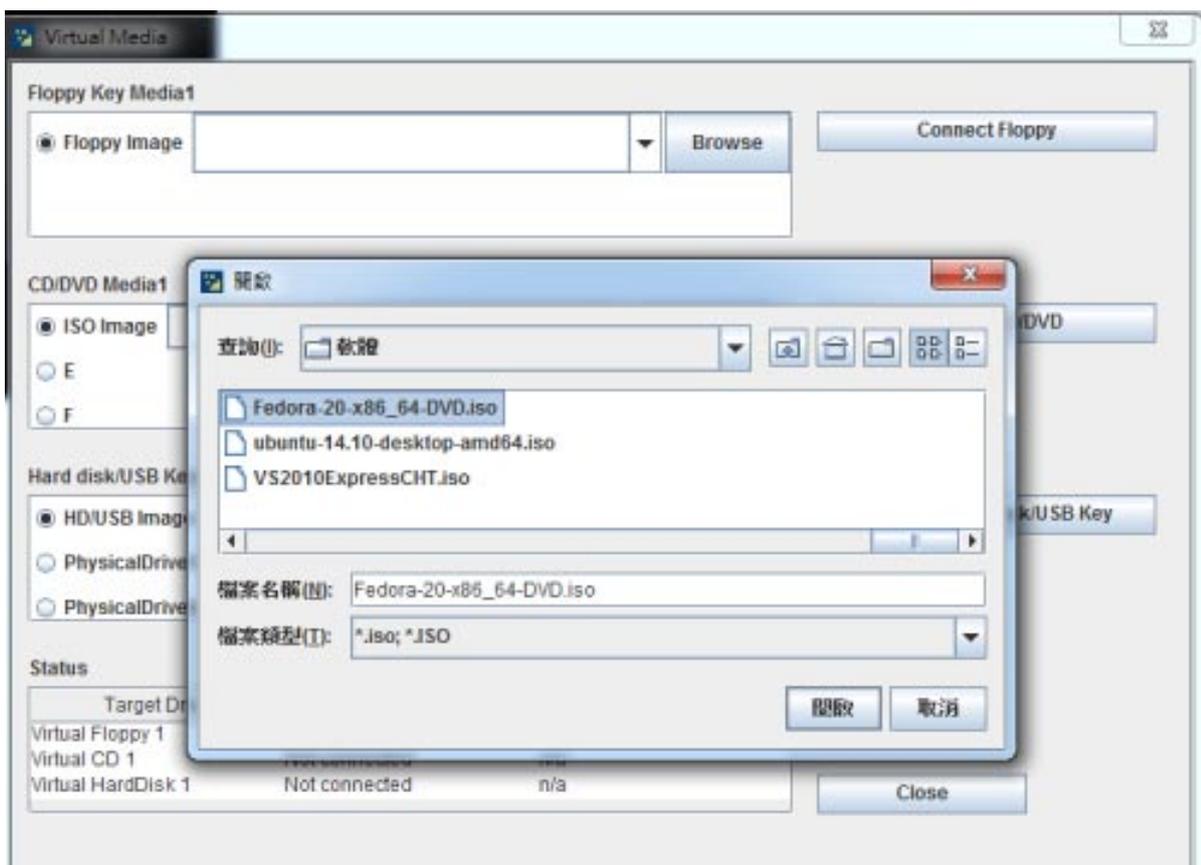
Keyboard/Mouse Encryption: enable or disable keyboard/mouse encryption

Zoom: set zooming options



Media

Click "Media" and the "Virtual Media" window will pop up. This will allow you to select and open .iso files from Floppy, CD/DVD or Hard Disk/USB devices.

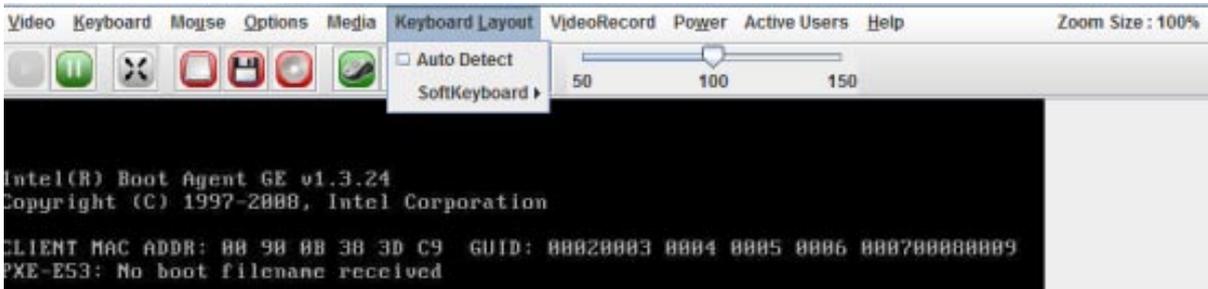


Keyboard Layout

Click "Keyboard Layout" on the task bar to view keyboard layout options:

Auto Detect: enable or disable "Auto Detect"

SoftKeyboard: select and open virtual soft keyboard



VideoRecord

Click "VideoRecord" on the task bar to view video recording options

Start Record: start recording the current conditions of the operating remote console

Stop Record: stop the recording process

Settings: view and select Setting options



Power

Click "Power" on the task bar to view power related options

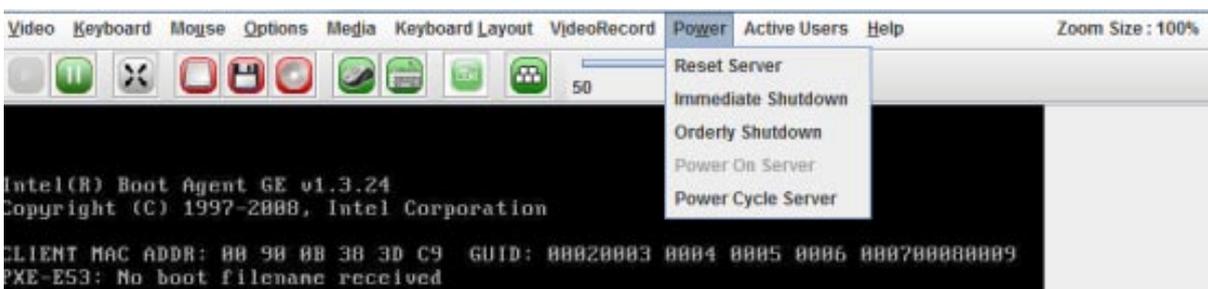
Reset Server: reset the remote server

Immediate Shutdown: shut down the system immediately

Orderly Shutdown: set shutdown order

Power On Server: power on the remote server

Power Cycle Server: the server will go through a cold boot and reset



Active Users

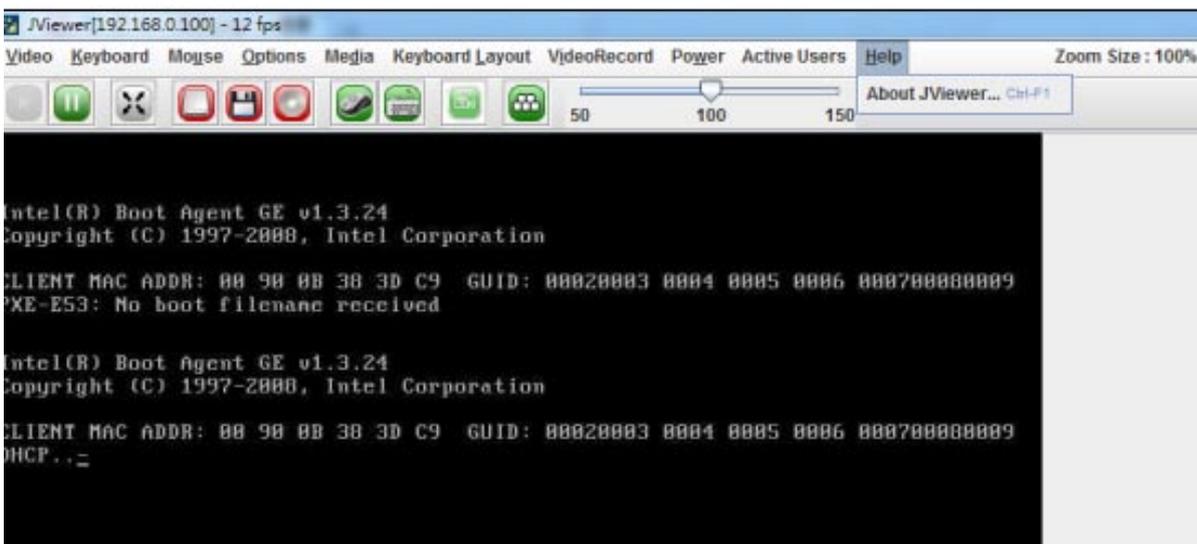
Click "Active Users" on the task bar to view the number of active users. The information will be shown by user name and IP address.



Help

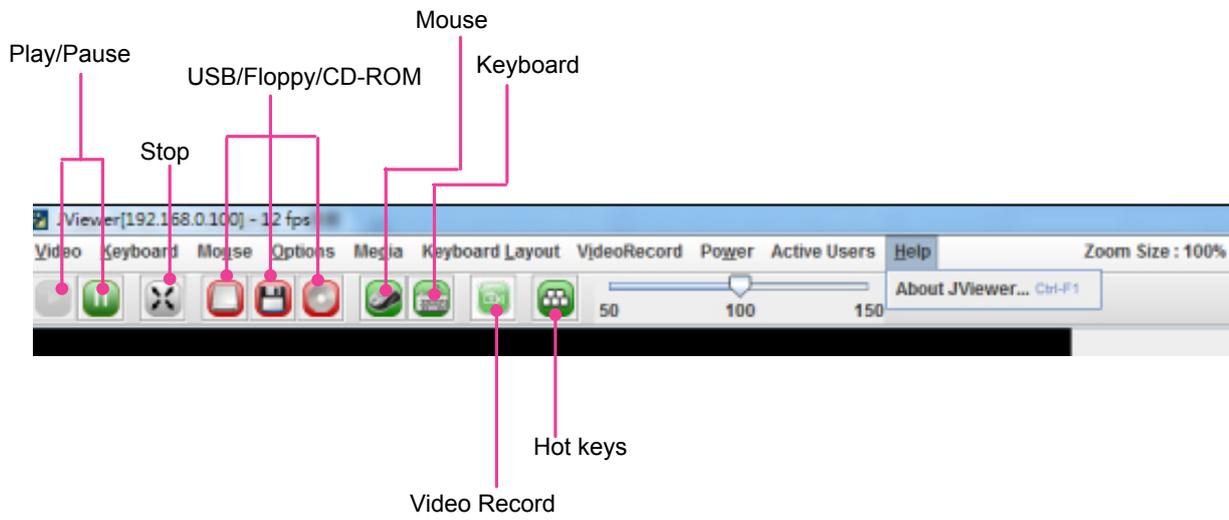
Click "Help" on the task bar to view other options

About JViewer: displays information about the software program of this remote control



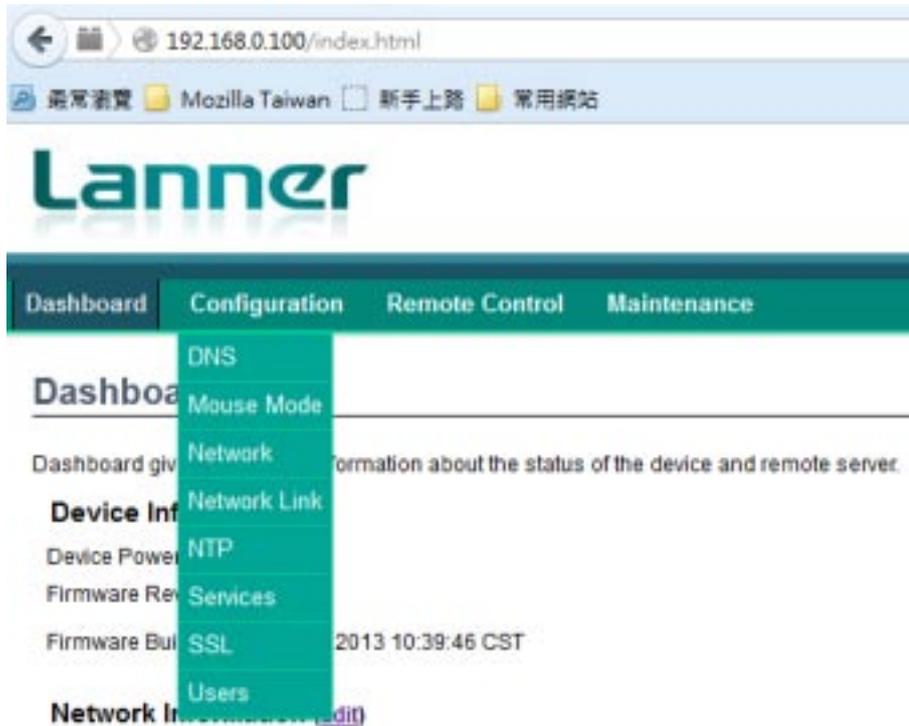
Icons on the Task Bar

There are useful icons on the task bar to activate certain functions.



Configuration

The “Configuration” provides setting options for “DNS”, “Mouse Mode”, “Network”, “Network Link”, “NTP”, “Services”, “SSL”, and “Users”.



DNS Server Settings

Click “DNS” under “Configuration” to access DNS (Domain Name System) setting options

A screenshot of the 'DNS Server Settings' page in the Lanner web interface. The page title is 'DNS Server Settings'. Below the title, there is a description: 'Manage DNS settings of the device.' The settings are organized into four sections: 1. 'Host Configuration' with 'Host Settings' set to 'Automatic' and 'Host Name' as 'AM100900B010203'. 2. 'Domain Name Configuration' with 'Domain Settings' set to 'Manual' and an empty 'Domain Name' field. 3. 'IPv4 Domain Name Server Configuration' with 'DNS Server Settings' set to 'Manual', 'Preferred DNS Server' as '0.0.0.0', and 'Alternate DNS Server' as '0.0.0.0'. 4. 'IPv6 Domain Name Server Configuration' with 'DNS Server Settings' set to 'Manual', 'Preferred DNS Server' as '::', and 'Alternate DNS Server' as '::'. Each setting is accompanied by a dropdown menu or an input field.

Manage DNS Setting of the device

Host Settings: select "Automatic" or "Manual"

Host Name: the host name is automatically displayed if you choose "Automatic" for Host Setting

Domain Name Configurations

Domain Settings: select domain setting mode

Domain Name: you may have to specify the domain name if "Manual" is chosen for DNS Server Settings

IPv4 Domain Name Server Configurations

DNS Server Settings: select "Automatic" or "Manual"

Preferred DNS Server: enter the IP address for the preferred DNS server, such as 192.168.0.100

Alternate DNS Server: enter the IP address for an alternative DNS server

IPv6 Domain Name Server Configurations

DNS Server Settings: select "Automatic" or "Manual"

Preferred DNS Server: enter the IP address for the preferred DNS server, such as 192.168.0.100

Alternate DNS Server: enter the IP address for an alternative DNS server



Save: Save configuration changes

Reset: Reset configurations

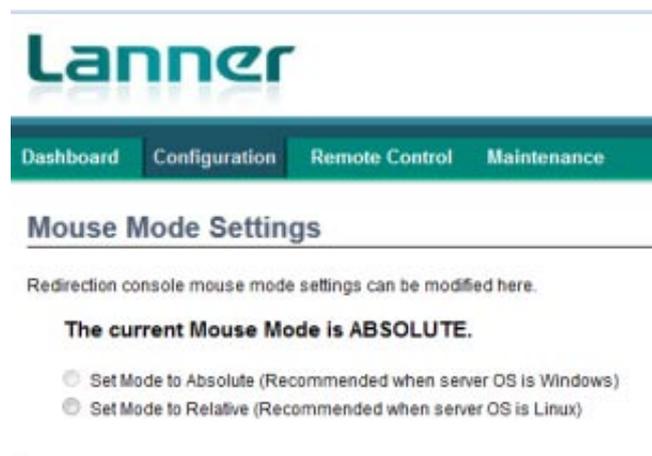
Mouse Mode Settings

Click on "Mouse Mode Settings" under "Configuration" to access redirection console mouse mode setting options.

Set Mode to Absolute (Recommended when server OS is Windows)

Set Mode to Relative (Recommended when server OS is Linux)

Select the mode based on the operating system of the remote console.





Save: Save configuration changes

Reset: Reset configurations

Network Settings

Click on “Network Settings” under “Configuration” to manage network settings of the remote device.

The screenshot shows the Lanner Network Settings page. At the top, there is a navigation bar with tabs for Dashboard, Configuration, Remote Control, and Maintenance. The Configuration tab is active. Below the navigation bar, the page title is "Network Settings". Underneath, there is a heading "Manage network settings of the device." followed by three sections: LAN Interface, IPv4 Configuration, and IPv6 Configuration. Each section contains several configuration options with corresponding input fields or checkboxes.

Section	Field Name	Value
LAN Interface	LAN Interface	LOM
	LAN Settings	<input checked="" type="checkbox"/> Enable
	MAC Address	00:90:0B:32:52:BA
IPv4 Configuration	Obtain an IP address automatically	<input type="checkbox"/> Use DHCP
	IPv4 Address	192.168.0.100
	Subnet Mask	255.255.255.0
	Default Gateway	192.168.0.1
IPv6 Configuration	IPv6 Settings	<input type="checkbox"/> Enable
	Obtain an IP address automatically	<input type="checkbox"/> Use DHCP
	IPv6 Address	-
	Subnet Prefix length	0
	Default Gateway	-

LAN Interface: configure the LAN interface

LAN Settings: click to enable the support of LAN settings

MAC Address: displays the MAC address of the device. This cannot be modified.

IPv4 Configuration

Obtain an IP address automatically: tick to enable the use of DHCP to automatically obtain an IP address

IPv4 Address: enter the IP address for IPv4 network if DHCP is not enabled

Subnet Mask: enter the “Subnet Mask” if DHCP is not enabled

Default Gateway: enter the “Default Gateway” address if DHCP is not enabled

IPv6 Configuration

IPv6 Settings: tick to enable IPv6 setting in order to enter values for IPv6 address, subnet prefix length and default gateway. If IPv6 is not in use, simply skip this setting.

Obtain an IP address automatically: tick to enable the use of DHCP to automatically obtain an IP address

IPv4 Address: enter the IP address for IPv6 network if DHCP is not enabled

Subnet Mask: enter the "Subnet Mask" if DHCP is not enabled

Default Gateway: enter the "Default Gateway" address if DHCP is not enabled

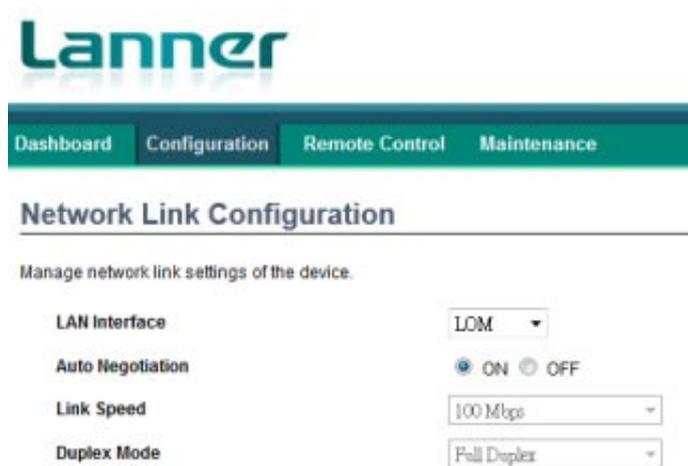


Save: Save configuration changes

Reset: Reset configurations

Network Link Configuration

Click "Network Link Configuration" under "Configuration" to manage network link settings of the device.



LAN Interface: configure the LAN interface

Auto Negotiation: enable it to configure the service configurations automatically. If this is "OFF", you may have to manually configure "Link Speed" and "Duplex Mode".

Link Speed: configure the link speed if "Auto Negotiation" is OFF

Duplex Mode: configure the Duplex Mode if "Auto Negotiation" is OFF



Save: Save configuration changes

Reset: Reset configurations

NTP Settings

Click "NTP Settings" under "Configuration" to either configure the NTP server or view and modify the device's date and time.

Date: configure the device's date setting

Time: configure the device's time setting in hour/minute/second format

UTC Timezone: configure the device's current time zone

NTP Server: configure the NTP (Network Time Protocol) server

You may tick on "Automatically synchronize Data & Time with NTP Server" so that the time and data information will be automatically updated once a NTP server is configured.



Refresh: click it to refresh NTP information

Save: save the configuration changes

Reset: reset the NTP setting

Services

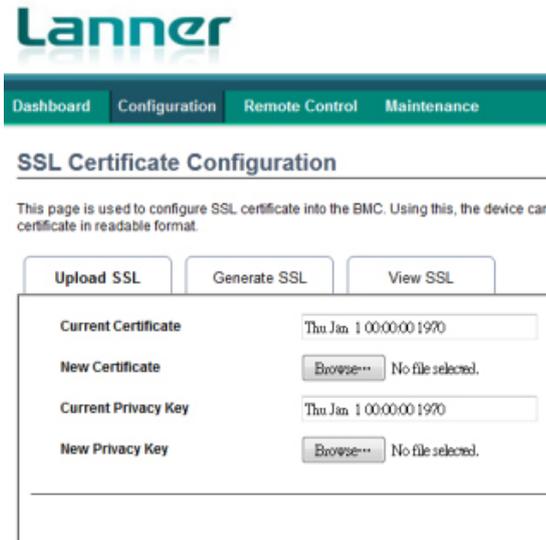
Click "Service" under "Configuration" to view and modify the list of services under BMC. The table presents current status of available services. You may click "Modify" at the bottom right to modify the information.

#	Service Name	Current State	Interfaces	Name/Service Port	Secure Port	Timeout	Maximize Sessions	Active Sessions
1	web	Active	LOM	80	443	1000	23	1
2	http	Active	LOM	7578	N/A	N/A	2	0
3	cs-media	Active	LOM	5120	N/A	N/A	1	0
4	fs-media	Active	LOM	5122	N/A	N/A	1	0
5	nfs-media	Active	LOM	5123	N/A	N/A	1	0
6	ssh	Active	N/A	N/A	22	600	N/A	N/A
7	telnet	Active	N/A	23	N/A	600	N/A	N/A

SSL Certificate Configuration

Click "SSL Certificate Configuration" under "Configuration" to configure SSL certificate into the BMC. With SSL, the device can be accessed in a secured mode.

Upload SSL: upload SSL certificate and provide key file into the BMC



The screenshot shows the Lanner web interface. At the top, there is a navigation bar with "Dashboard", "Configuration", "Remote Control", and "Maintenance". Below this is the "SSL Certificate Configuration" page header. A sub-header explains the page's purpose: "This page is used to configure SSL certificate into the BMC. Using this, the device can certificate in readable format." Three tabs are visible: "Upload SSL", "Generate SSL", and "View SSL". The "Upload SSL" tab is active, displaying a table with the following fields:

Field	Value
Current Certificate	Thu Jan 1 00:00:00 1970
New Certificate	<input type="button" value="Browse..."/> No file selected.
Current Privacy Key	Thu Jan 1 00:00:00 1970
New Privacy Key	<input type="button" value="Browse..."/> No file selected.

Generate SSL: generate SSL certificate based on configuration details



The screenshot shows the Lanner web interface with the "Generate SSL" tab selected. The page header and sub-header are the same as in the previous screenshot. The "Generate SSL" tab is active, displaying a form with the following fields:

Field	Value
Common Name(CN)	<input type="text"/>
Organization(O)	<input type="text"/>
Organization Unit(OU)	<input type="text"/>
City or Locality(L)	<input type="text"/>
State or Province(ST)	<input type="text"/>
Country(C)	<input type="text"/>
Email Address	<input type="text"/>
Valid for	<input type="text"/> days
Key Length	512 <input type="button" value="v"/> 960

View SSL: view the uploaded SSL

Upload SSL
Generate SSL
View SSL

Basic Information

Version: 3

Serial Number: F76E8C9068B63605

Signature Algorithm: sha1WithRSAEncryption

Public Key: (2048 bit)

Issued From

Common Name(CN): www.lannerinc.com

Organization(O): Lanner

Organization Unit(OU): Software Department II

City or Locality(L): Taipei

State or Province(ST): Taiwan

Country(C): TW

Email Address: nimo_hsieh@lannerinc.com

Validity Information

Valid From: Apr 19 02:37:34 2013 GMT

Valid To: Apr 19 02:37:34 2014 GMT

Issued To

Common Name(CN): www.lannerinc.com

Organization(O): Lanner

Organization Unit(OU): Software Department II

City or Locality(L): Taipei

State or Province(ST): Taiwan

User Management

Click "User Management" under "Configuration" to access current list of available users. You may add, modify or delete users on the list.

admin | Home | Logout | HELP

Dashboard
Configuration
Remote Control
Maintenance

User Management

The list below shows the current list of available users. To delete or modify a user, select their name in the list and press "Delete User" or "Modify User". To add a new user, select an unconfigured slot and press "Add User".

Number of configured users: 2

UserID	Username	User Access	Network Privilege	SNMP Status	Email ID
1	anonymous	Disabled	Administrator	Disabled	-
2	admin	Enabled	Administrator	Disabled	-
3	-	-	-	-	-
4	-	-	-	-	-
5	-	-	-	-	-
6	-	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	-	-	-	-	-
10	-	-	-	-	-
11	-	-	-	-	-
12	-	-	-	-	-

Add User
Modify User
Delete User

Server Power Control

Click “Server Power Control” under “Remote Control” to select power control options for the remote console. You may choose the following actions to perform for the host machine.

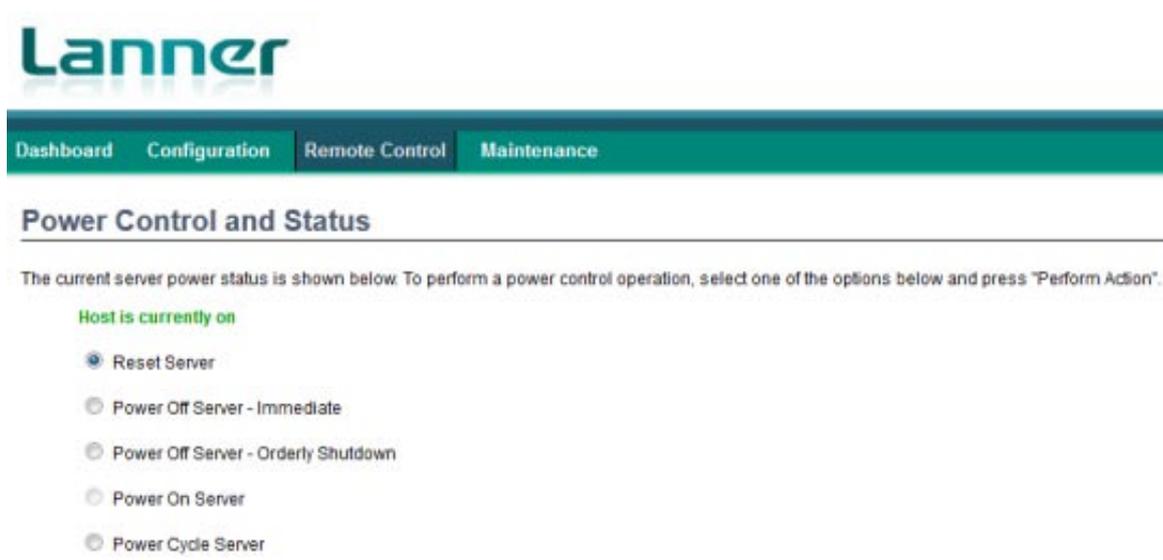
Reset Server: reset the remote console server

Power Off Server-Immediate: this will power off the remote console server immediately

Power Off Server – Orderly Shutdown: this will power off the remote console server in an orderly way

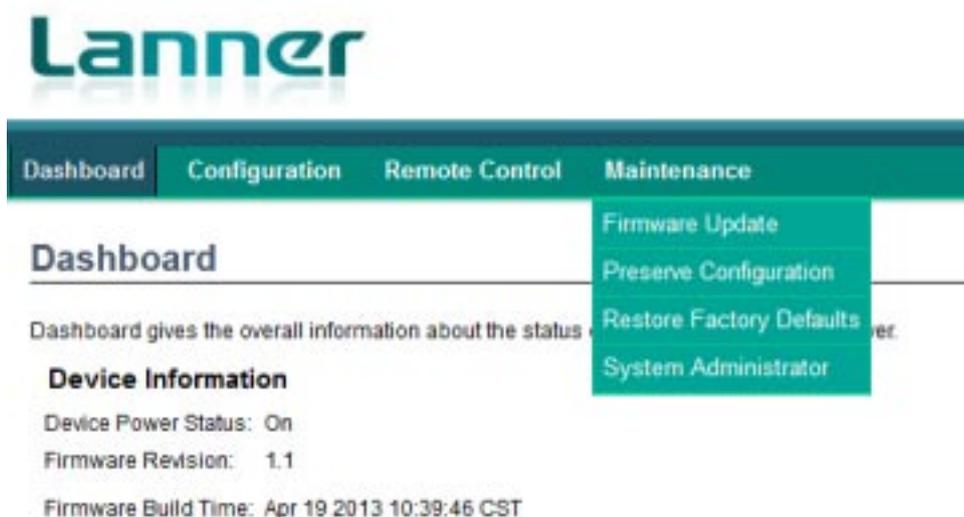
Power On Server: this will power on the remote console server

Power Cycle Server: if this is activated, the remote console server will experience a cold boot, which will shut it down first and then boot it up.



Maintenance

Click on “Maintenance” to view maintenance options, including “Firmware Update”, “Preserve Configuration”, “Restore Factory Defaults” and “System Administrator”.



Firmware Update

Click "Firmware Update" under "Maintenance" to update firmware.

Enter Update Mode: this will enable the device in update mode

Enter Preserve Configuration: this will preserve all configurations during firmware update process

#	Preserve Configuration Item	Preserve Status
1	SCR	Overwrite
2	SEL	Overwrite
3	IPSet	Overwrite
4	Network	Overwrite
5	NTP	Overwrite
6	Services	Overwrite

Restore Factory Defaults

Click "Restore Factory Defaults" under "Maintenance". This option will bring the device to original factory default setting. Please note that all the currently running services or web pages will not work once this function is enabled. All open widgets will close automatically. If the default restoring progress is cancelled during the process, the device will reset.

#	Preserve Configuration Item	Preserve Status
---	-----------------------------	-----------------

System Administrator

This page allows the user to enable or disable access and change the password for the system administrator account.

Username: sysadmin

User Access: Enable Change Password

Password: [text input]

Confirm Password: [text input]

Chapter 7

About the PCIe-Switch
Feature of HCP-72i1

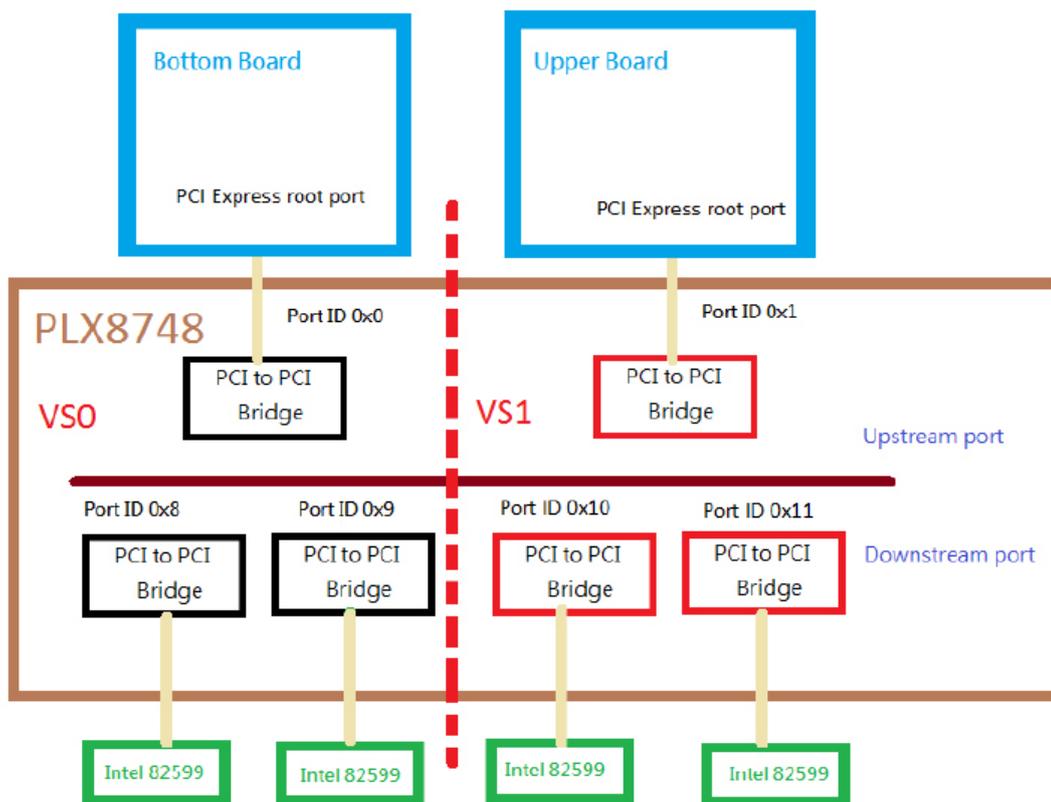
Chapter 7: About the PCIe-Switch Feature of HCP-72i1

Brief

HCP-72i1 is built with TCM-IXT801A network device card, which is programmed with PCIe switch functionality. Unlike traditional redundant system where one identical machine will take over the work from the main server until the main server crashes, Lanner's TCM-IXT801A will be able to avoid this indirect waste of efficiency of the backup server.

To maximize the performance, TCM-IXT801A allows two identical servers to deal with their own network packets separately in the normal condition. The network device(s) will be switched into the other system by dynamically transferring PCI Express bus via PLX8748 PCI Express switch to keep on the original server task and shorten the troubleshooting time while one machine is under malfunction. The network device(s) that has been switched will be returned to the original system when the information staff restarts the crashed server.

The following presents the structure of the PCIe-Switch mechanism of HCP-72i1.



Default Settings of PCI Express Switch

The following lists out the default settings of the PCI Express switch.

BIOS Version :

MB-7220(HCP-7211) Ver.AA0 12/30/2014 Bottom Board

MB-7220(HCP-7211) Ver.AA0 12/30/2014 Upper Board

PLX 8748 Virtual Switch Table :

VS0 : upstream port 0x0, downstream port 0x8 and 0x9

VS1 : upstream port 0x1, downstream port 0x10 and 0x11

Note:

- Upstream Port : The port that PCI Express bridge upward connects to the root port.
- Downstream Port : The port that PCI Express bridge downward connects to the device.

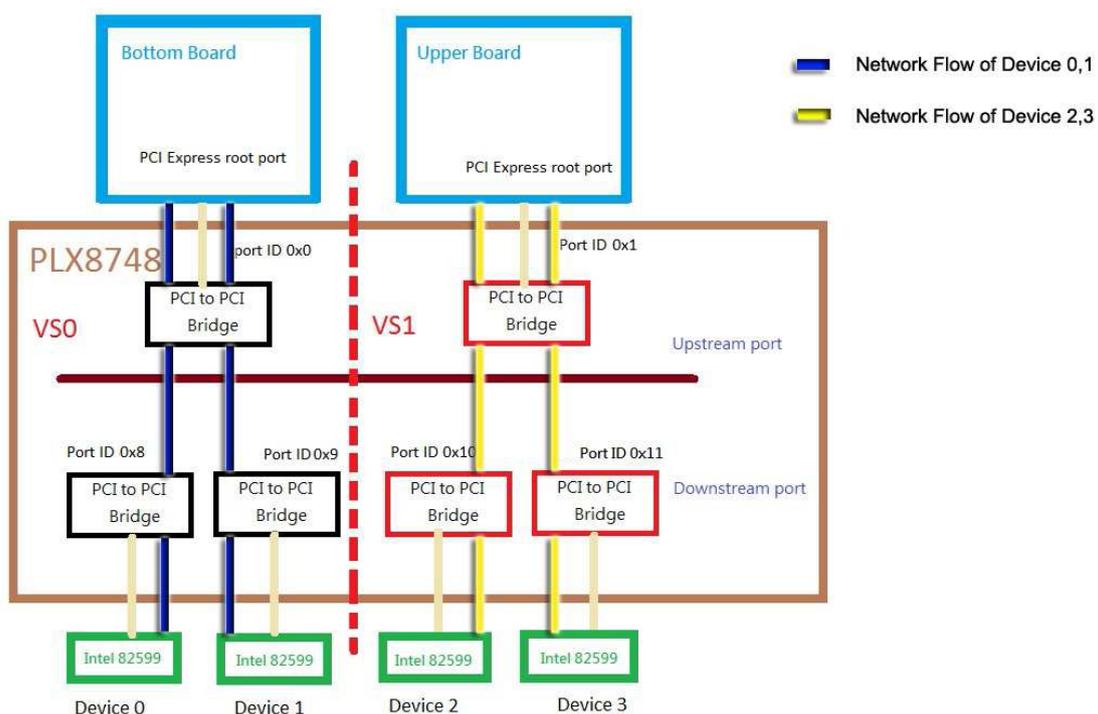
Kernel Patch Provided by Lanner :

1. Solve the issue of insufficient BAR size space for VS0 and VS1.
2. The setting of "Payload size = 256" for Intel 82599 will improve the performance.

Demonstrating the Switching Methods for the PCIe Switch

The following lists out the environmental setting for the demonstration:

- PCI root port on the Bottom Board connects to Port ID 0x0 of VS0.
- PCI root port on the Upper Board connects to Port ID 0x1 of VS1.
- The default Management Port is Port ID 0x0, therefore, only the Bottom Board can control PCI Express Switch. Others can control individual Port ID only.
- Port ID 0x8, 0x9, 0x10 and 0x11 connect one set of Intel 82599 PCI Express LAN device respectively.
- Device 0 and 1 connect VS0 to the Bottom Board.
- Device 2 and 3 connect VS1 to the Upper Board.



Initializing the System for Re-planning the Arrangement of PCI Bus ID

The Command for initializing the Bottom Board

```
~# sh ./pci_init.sh
```

The Command for initializing the Upper Board

```
~# sh ./pci_init.sh
```

Instructions of Commands:

```
<pci_init.sh>
```

Parameters: None

Function Description:

Re-plan the downstream Port BUS ID.

Main Commands of the Script:

```
~# remove ixgbe
```

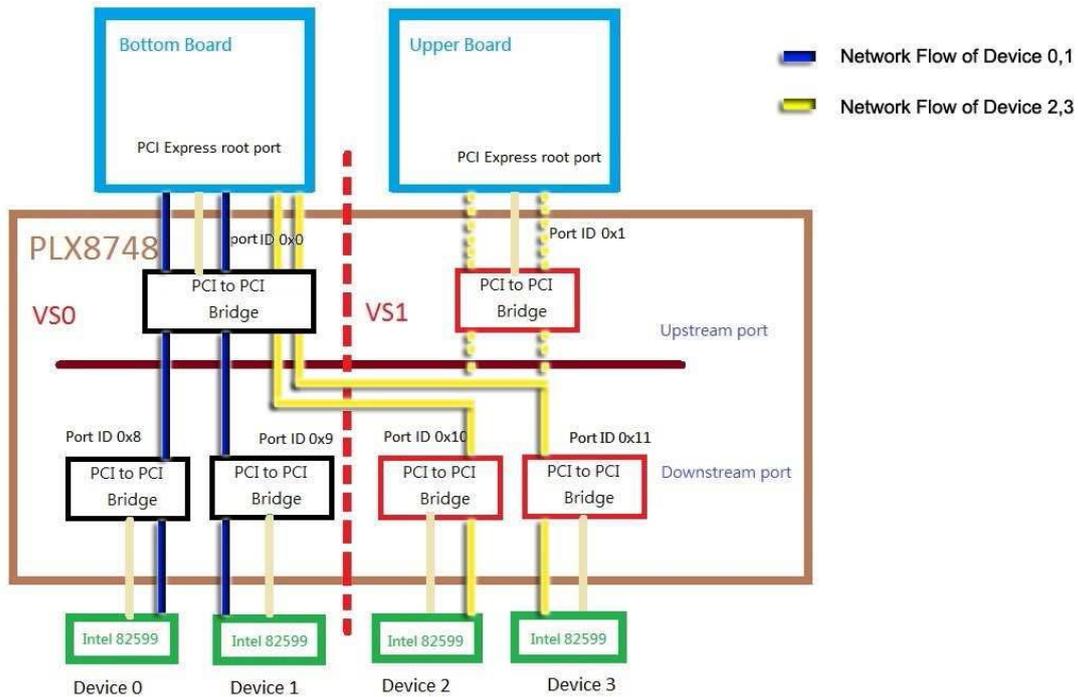
```
~# echo 1 > /sys/bus/pci/devices/"downstream port bus ID"/remove
```

```
~# echo 1 > /sys/bus/pci/rescan
```

```
~# insmod ixgbe.ko
```

Scenario 1: The Bottom Board as the Management Port, and the Device 2 and 3 Taken Over by the Bottom Board.

Please see the figure below.



Remove the driver from the Device 2 and 3

1. Remove the Device 2 and 3 from the Upper Board first.
2. For the Upper Board, please issue the following command:
`~# sh ./stop_lan_device.sh 0 all`

Instructions of Commands

<stop_lan_device.sh>

Parameters:

stop_lan_device.sh slot_number mode

slot_number : The slot that would like to be removed. Valid value: 0, 1, and 2.

mode : current (default port)

rescue (failover port)

all (all devices for the slot)

Function Description:

Remove the driver from the device, and delete it.

Main Commands of the Script:

~# ifconfig eth(N) 0.0.0.0 down

~# echo 1 > /sys/bus/pci/devices/"lan bus ID"/remove

~# echo 1 > /sys/bus/pci/devices/"downstream port bus ID"/remove

The Bottom Board takes over the Device 2 and 3 from the Upper Board

Shutdown the Port ID 0x10, 0x11 of the Upper Board forcibly, and switch them into the Bottom Board.

For the Bottom Board, please issue the following commands accordingly:

```
~#sh ./en_management.sh 0
```

```
~#sh ./failover_solt.sh 0
```

Instruction of Commands

```
<en_management.sh>
```

Parameters:

```
en_management.sh slot_number
```

Function Description:

Specify the PCI Express switch of the slot as the manager.

Main Commands of the Script:

```
~# ./vs_test "Upstream port BusID:DeviceID:FunctionID" --en_mana
```

```
<failover_solt.sh>
```

Parameters:

```
failover_solt.sh slot_number
```

Function Description:

For example, set VS0 = 0x8, 0x9 and VS1 = 0x10, 0x11

The Bottom Board connects with VS0, therefore, 0x10 and 0x11 will be forced to switch into the Bottom Board during the failover.

The Upper Board connects with VS1, therefore, 0x8 and 0x9 will be forced to switch into the Upper Board during the failover.

Main Commands of the Script:

```
~# ./vs_test "Upstream port BusID:DeviceID:FunctionID" VS_ID failover
```

```
~# echo 1 > /sys/bus/pci/rescan
```

Display the Current Network Device

After the Device 2 and 3 are switched, the corresponding devices will automatically be added to the system through the rescan command. Then, the drivers will activate these new devices. The following script is a tool provided for the users to search for the device name easily.

Display the Network Device Name of the slot.

For the Bottom Board, please issue the following command:

```
~# sh ./sort.sh 0
```

Instructions of Commands

```
<sort.sh>
```

Parameters:

```
sort.sh slot_number
```

Function Description:

Display the LAN device name of the slot.

Main Commands of the Script:

```
~# ls sys/bus/pci/device/
```

```
~# ls /proc/sys/net/ipv4/conf/
```

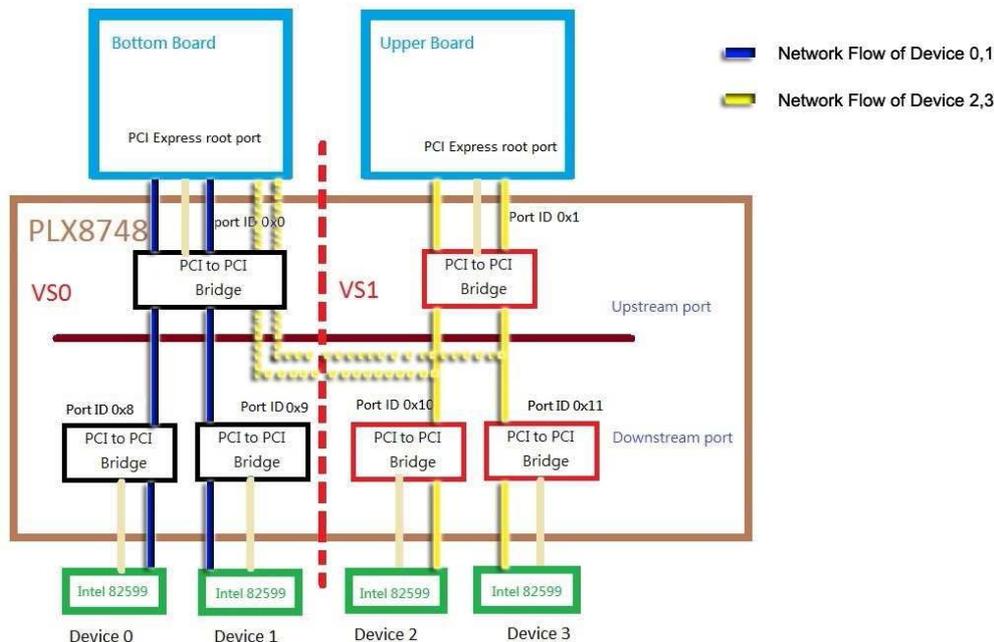
```
~# ethtool -i
```

Scenario 2: The Bottom Board Used as the Management Port, and Return the Device 2 and 3 to the Upper Board.

Remove the Device 2 and 3 from the Bottom Board

For the Bottom Board, please issue the following command:

```
~#sh ./stop_lan_device.sh 0 rescue
```



Switch the downstream port 0x10, 0x11 into the Upper Board.

For the Bottom Board, please issue the following commands accordingly:

```
~# sh ./en_management.sh 0
```

```
~# sh ./recover_slot.sh 0
```

The Upper Board rescans to see that if there is any new devices added or not.

In the Upper Board, please issue the following command:

```
~# echo 1 > /sys/bus/pci/rescan
```

Instructions of Commands

```
<recover_slot.sh>
```

Parameters:

```
recover_slot.sh slot_number
```

Function Description:

Return the devices that had been switched.

Main Commands of the Script:

```
~# ./vs_test "Upstream port BusID:DeviceID:FunctionID" VS_ID recover
```

Description of PLX8748 Register

Management of the Control Register

offset 0x354

bit 4:0 is the management port number.

bit 5 is an active management port.

bit 12:8 is the redundant management port number.

bit 13 is an active redundant management port.

Each PCI Express switch can merely own one management port. When it is crashed, only the redundant management port is allowed to be changed itself as the management port; in the meantime, the management port needs to become the redundant management port as well. Other port number cannot manage the switch.

Secondary Bus Reset

offset $0x1000 * \text{port_number} + 0x3c$

bit 22 Secondary Bus Reset

Downstream port register should be reset to default while the switch is doing the switching.

Virtual Switch

VS0 offset 0x380

Default value : 0x301

VS1 offset 0x384

Default value :0x30002

bit 0 : port 0

bit 1 : port 1

bit 2 : port 2

bit 3 : port 3

bit 8 : port 8

bit 9 : port 9

bit 10 : port 10

bit 11 : port 11

bit 16 : port 16

bit 17 : port 17

bit 18 : port 18

bit 19 : port 19

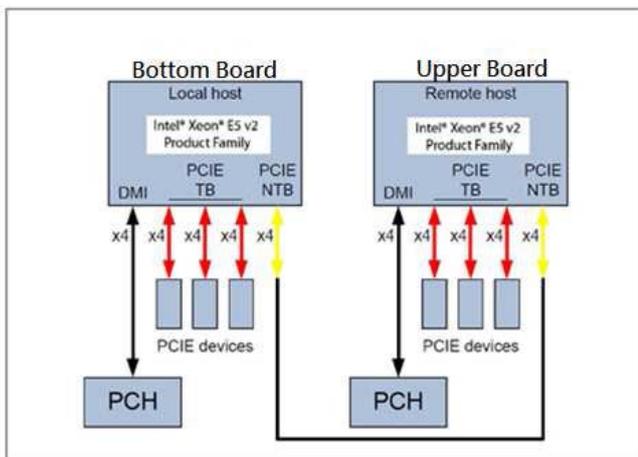
1 : enable 0 :disable

Appendix 1: About the Non-Transparent Bridge

The PCI-E Non-Transparent Bridge (NTB) hardware is a point-to-point PCI-E bus connecting 2 systems, the local and the remote systems. When configured, writes to the device's PCI mapped memory will be mirrored to a buffer on the remote system. The size of BAR is configured via BIOS. The NTB Linux driver uses this point-to-point communication as a method to transfer data from one system to the other. Some virtual device drivers will be developed to take advantage of NTB's communication and make it more usable to end users. For example, a virtual network driver has been developed to transfer Ethernet frames as well as TCP/IP packets to the remote system.

In Lanner's Main board, we use type 1 configuration. And PCIe link width supports Gen3 x8.

Diagram A: NTB Ports Connected Back-to-Back



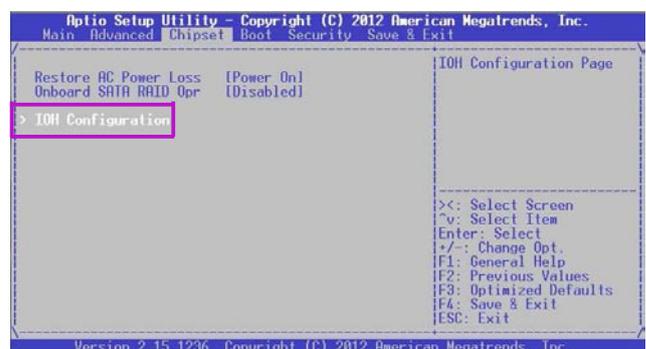
Configuring NTB under the BIOS

To enter the BIOS Setup Utility, press the TAB button when powering on the device, if you are using a PC to connect with the device.

Press "Delete" if you are using a keyboard with the device.

For BIOS navigation, please see "BIOS Setup".

1. Go to "Chipset" --> "IOH Configuration" and press "Enter".



2. You will see "Intel NTB Configuration". Press "Enter" to access its sub-menu.



Bottom Board Settings:

IIO 0 NTB Config -> NTB to NTB

Primary BAR 23 Size -> 22 (4MB)

Primary BAR 45 Size -> 22 (4MB)

Secondary BAR 23 Size -> 22 (4MB)

Secondary BAR 45 Size -> 22 (4MB)

Crosslink Control -> DSD/USP



Upper Board Settings:

IIO 0 NTB Configu -> NTB to NTB

Primary BAR 23 Size -> 22 (4MB)

Primary BAR 45 Size -> 22 (4MB)

Secondary BAR 23 Size -> 22 (4MB)

Secondary BAR 45 Size -> 22 (4MB)

Crosslink Control -> USD/ DSP



When you finish configurations, go to "Save & Exit" and select "Save Changes and Exit" option and press the Enter button. Choose "YES" to confirm for saving your new configuration and exiting the BIOS setting.

Kernel

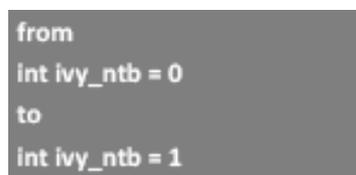
The tests below will be verified by Linux-3.15 version.

Kernel Update

Please issue the following commands accordingly to upgrade the kernel required:

```
~# tar xpvf linux-3.15.tar.gz
~# cd linux-3.15
~# patch -p1 < linux-3.15_plx_v02.patch
~# vim driver/pci/probe.c
```

Then, edit the file of **probe.c** as follows:



```
~# make menuconfig
```

- [*] PCI support
- [*] Support mmconfig PCI config space access
- [*] Networking support --->
 - Networking options --->
 - Network testing --->
 - <*> Packet Generator (USE WITH CAUTION)

Device Drivers --->

- [*] Network device support --->
- [*] Network core driver support
 - <M> Virtual Ethernet over NTB
 - <M> Intel Non-Transparent Bridge support

Note:

1. The value of NTB BAR size in BIOS settings should be the same as the NTB driver inside of the patch.
2. For the Ivy bridge, all PCIE devices belonging to CPU0 should be set as "MAX payload size=128" when CPU0 enables NTB. The user does not need to set up all PCIE devices belonging to CPU1 like that, however.

Performance Test

We use the pktgen and ntb_device built in the kernel to verify the maximum of efficiency that NTB can achieve currently. Regardless of the network MTU limit of 65536 in the general network program, pktgen can directly transmit the designated package size. The followings are the scripts we use for this test.

Initialization

The settings listed below for the pktgen and ntb driver are applied when executing the scripts below:

- count=10000 , pkt_size=1048500 (for pktgen)
- trnsport_mtu= 0x100000(for ntb driver)

It indicates that the script will automatically end when 10000 packets are transmitted, and calculate the transmission speed.

Initialize the Bottom Board

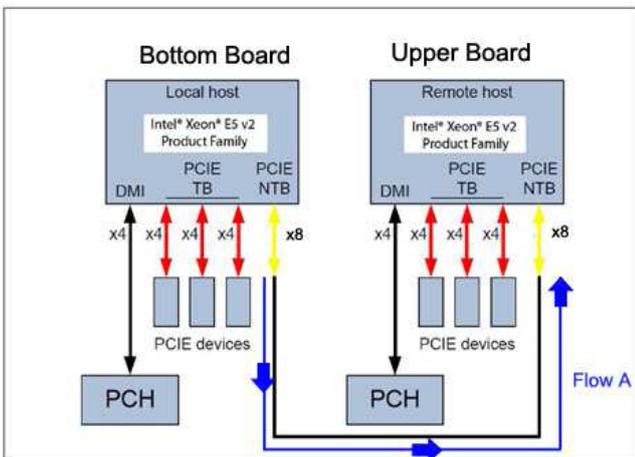
```
~# sh ./ntb_a.sh
```

Initialize the Upper Board

```
~# sh ./ntb_b.sh
```

The Transmission from the Bottom Board to the Upper Board.

Diagram B: Flow A



Start the Sending of Packets

In the Bottom Board, please issue the following command:

```
~# echo "start" >/proc/net/pktgen/pgctrl
```

Check the Packet Count and Speed of Transmission

In the Bottom Board, please issue the following command:

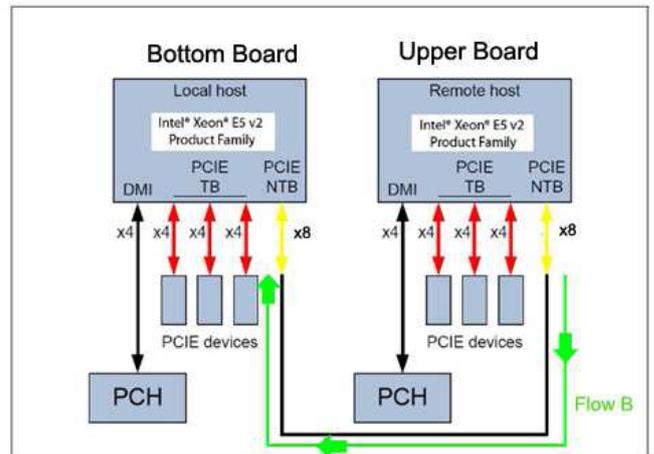
```
~# cat /proc/net/pktgen/eth0
```

To check that whether the Upper Board's NTB network device receives 10000 packets or not, please issue the following command:

```
~# ifconfig eth0
```

The Transmission from the Upper Board to the Bottom Board

Diagram C: Flow B



Start the Sending of Packets

In the Upper Board, please issue the following command:

```
~# echo "start" >/proc/net/pktgen/pgctrl
```

Check the Packet Count and Speed of Transmission

In the Upper Board, please issue the following command:

```
~# cat /proc/net/pktgen/eth0
```

To check that whether the Bottom Board's NTB network device receives 10000 packets or not, please issue the following command:

```
~# ifconfig eth0
```

Test Results

The Test with the Usage of Pktgen

Parameter Settings

ntb driver : transport_mtu = 1048576

pktgen : package size = 1048500

Test Result

CPU : Sandy bridge 2.6GHz

PCIE width x8 Gen2

Packet Throughput:

17.5Gbps in the bidirectional transmission test. (Transmit with both Flow A and Flow B simultaneously. See Diagram B and Diagram C)

17.5Gbps in the unidirectional transmission test. (Transmit with Flow A or Flow B. See Diagram B and Diagram C)

CPU : Sandy bridge 3.0GHz

PCIE width x8 Gen3

Packet Throughput:

Up to 30Gbps in the unidirectional transmission test. (For the transmission with Flow A or Flow B only. See Diagram B and Diagram C)

The Test with the Usage of Iperf

Parameter Settings

- ntb driver : transport_mtu = 65536
- pktgen : package size = 65500

Test Result

CPU : Sandy bridge 2.6GHz

PCIE width x8 Gen2

Packet Throughput:

12~13 Gbps in the bidirectional transmission test. (Transmit with both Flow A and Flow B simultaneously. See Diagram B and Diagram C)

12~13 Gbps in the unidirectional transmission test. (Transmit with Flow A or Flow B. See Diagram B and Diagram C)

References:

1. Intel® Xeon® Processor E5 v2 Product Family External Design Specification (EDS) - Volume Three
2. Intel® Xeon® Processor E5 v2 Product Family NDA Sightings Report Rev 1.16

Appendix 2: 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 3: 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 COM port. The 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 4:

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 5:

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>
```



Note: The system uses Intel 82574L Ethernet controllers, you could obtain the latest drivers at the Intel download center:

<http://downloadcenter.intel.com/>

Appendix 6:

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.

RMA Service Request Form

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

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

Item	Model Name	Serial Number	Configuration

Item	Problem Code	Failure Status

*Problem Code:

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

Request Party

Confirmed By Supplier

Authorized Signature / Date

Authorized Signature / Date