

Lanner

Telecom Datacenter Appliances

Hybrid TCA Platforms

HTCA-6600 User Manual

Version: 1.2

Date of Release: 2018-04-17

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.

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

Copyright and Trademarks

This document is copyrighted © 2018. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

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

Acknowledgement

Intel®, Intel logo and Intel® Xeon® are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries.

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

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

Compliances and Certification

CE

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

FCC Class A

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

EMC Notice

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

Safety Guidelines

Follow these guidelines to ensure general safety:

- ▶ Keep the chassis area clear and dust-free during and after installation.
- ▶ Do not wear loose clothing or jewelry that could get caught in the chassis. Fasten your tie or scarf and roll up your sleeves.
- ▶ Wear safety glasses if you are working under any conditions that might be hazardous to your eyes.
- ▶ Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- ▶ Disconnect all power by turning off the power and unplugging the power cord before installing or removing a chassis or working near power supplies
- ▶ Do not work alone if potentially hazardous conditions exist.

- ▶ Never assume that power is disconnected from a circuit; always check the circuit.

Lithium Battery Caution:

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

Operating Safety

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

Mounting Installation Precaution

Environment:

- ▶ Do not install and/or operate this unit in any place that flammable objects are stored or used in.
- ▶ If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T_{ma}) specified by the manufacturer.
- ▶ Installation of the equipment (especially in a rack) should consider the ventilation of the system's intake (for taking chilled air) and exhaust (for emitting hot air) openings so that the amount of air flow required for safe operation of the equipment is not compromised.
- ▶ To avoid a hazardous load condition, be sure the mechanical loading is even when mounting.
- ▶ Consideration should be given to the connection of the equipment to the supply circuit and the effect

that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

- ▶ Reliable earthing should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation & Operation:

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

Consignes de sécurité

Suivez ces consignes pour assurer la sécurité générale :

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

Avertissement concernant la pile au lithium

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

Sécurité de fonctionnement

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

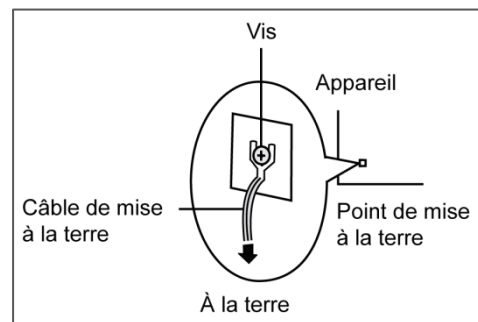
- ▶ Vérifiez que le couvercle du châssis est bien fixé. La conception du châssis permet à l'air de refroidissement de bien circuler. Un châssis ouvert laisse l'air s'échapper, ce qui peut interrompre et rediriger le flux d'air frais destiné aux composants internes.
- ▶ Les décharges électrostatiques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

Consignes de sécurité électrique

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

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

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



Revision History

Version	Date	Descriptions
1.0	2017/12/20	Official Release
1.1	2017/12/21	Add Mounting the System
1.2	2018/04/17	Modified System Specifications

Table of Contents

Chapter 1: Product Overview 10

- Package Content..... 10
- Ordering Information 11
- System Specifications 12
- Front Panel 13
- Rear Panel..... 14

Chapter 2: Motherboard Information 15

- Block Diagram..... 15
- Motherboard Layout 16
- Internal Jumper & Connectors 17

Chapter 3: Hardware Setup 22

- Accessing the CPU Blade(s) 22
- Installing the CPU and Heatsink 24
- Installing the System Memory..... 27
- Installing an IPMI Card..... 28
- Replacing Cooling Fans 29
- Installing Disk Drives..... 30
- Replacing Front Network I/O Blades & Switch Boards 31
- Replacing Power Supply Units 32
- Mounting the System 33

Chapter 4: BIOS Setup 37

- Main..... 38
- Advanced 39

Chipset.....	60
Security.....	64
Boot	65
Save & Exit.....	70
Appendix A: Programming Watchdog Timer.....	75
Appendix B: Setting up Console Redirections	76
Appendix D: Installing Intel® LAN Controller Driver for Linux	77
Appendix E: Programming the LCM	78
Appendix F: Terms and Conditions	82
Warranty Policy	82
RMA Service.....	82
RMA Service Request Form	83

CHAPTER 1: PRODUCT OVERVIEW

Thank you for choosing HTCA-6600. The network appliance is designed for high-availability telecommunication application. Built in 6U form factor chassis, HTCA-6600 supports up to 6 Intel x86 motherboards and 6 swappable, front-panel I/O blades. The blades can be configured to max. 5 line cards and/or max. 2 x switches. HTCA-6600 also integrates switch fabric for enhanced communications between motherboards.

Internally, each motherboard of HTCA-6600 is empowered by 2 x Intel Xeon E5-2600 series v3/v4 CPUs and 16 x DDR4 R-DIMMs. Storage wise, each motherboard supports 1 x SATA 3.5" disk drive bay, therefore, there will be a total of 6 HDD/SSD externally accessible drive bay for HTCA-6600. As designed for telecommunication application, HTCA-6600 is NEBS compliant.

Here is the summary of the key features:

- ▶ 2x Intel Xeon E5-2600 series v3/v4 CPUs for each motherboard
- ▶ PCH: Intel® C612
- ▶ 16x 288-pin DIMM DDR4 up to 2,400MHz registered DIMM sockets on each motherboard
- ▶ Dual 2011pin-R3 LGA sockets
- ▶ 6x externally accessible SATA 3.5" HDD/SSD drive bays
- ▶ Ethernet: 6x swappable I/O blades on front panel, supporting switch or nic module.
- ▶ Ethernet controller: Intel XL710
- ▶ Form factor: 6U rackmount supporting 6x motherboards

Package Content

Your package contains the following items:

- ▶ 1x HTCA-6600 System
- ▶ 2x Ethernet Cable
- ▶ 1x Console Cable
- ▶ 1x Ear Brackets
- ▶ 1x Slide Rail Kit
- ▶ 1x Screw Pack

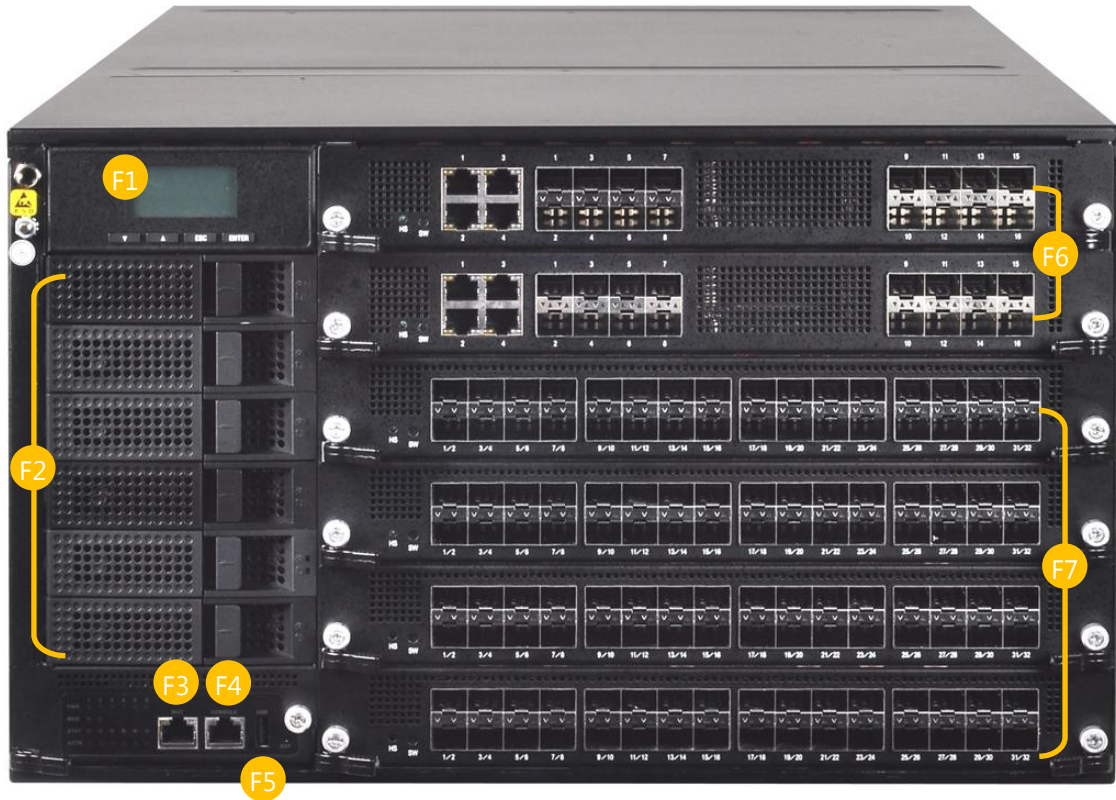
Ordering Information

Item	Model Name	Description
HTCA System	HTCA-6600A	HybridTCA™ high-performance chassis 6U telecom network appliance with 6x CPU blades with 12x Intel® Xeon® E5-2600 series v3/v4 processors + 6x bays for 3.5" HDDs with 6x I/O blades slots
Compute Node	HMB-1000A	x86 compute node with 2x Intel® Xeon® E5-2600 series v3/v4 processors and dual XL710
Switch Blade	HLM-1000A HLM-1020A HLM-1030A	4x port GbE RJ45, 16x port 10GbE SFP+ switch blade 2x port 100GbE CXP + 20x 10GbE SFP+ switch blade 6x port 100GbE QSFP28 + 4x port 40GbE QSFP, 16x 10GbE SFP+
Ethernet Blade	HLM-1001A	32x port 10GbE SFP+ Ethernet network interface blade

System Specifications

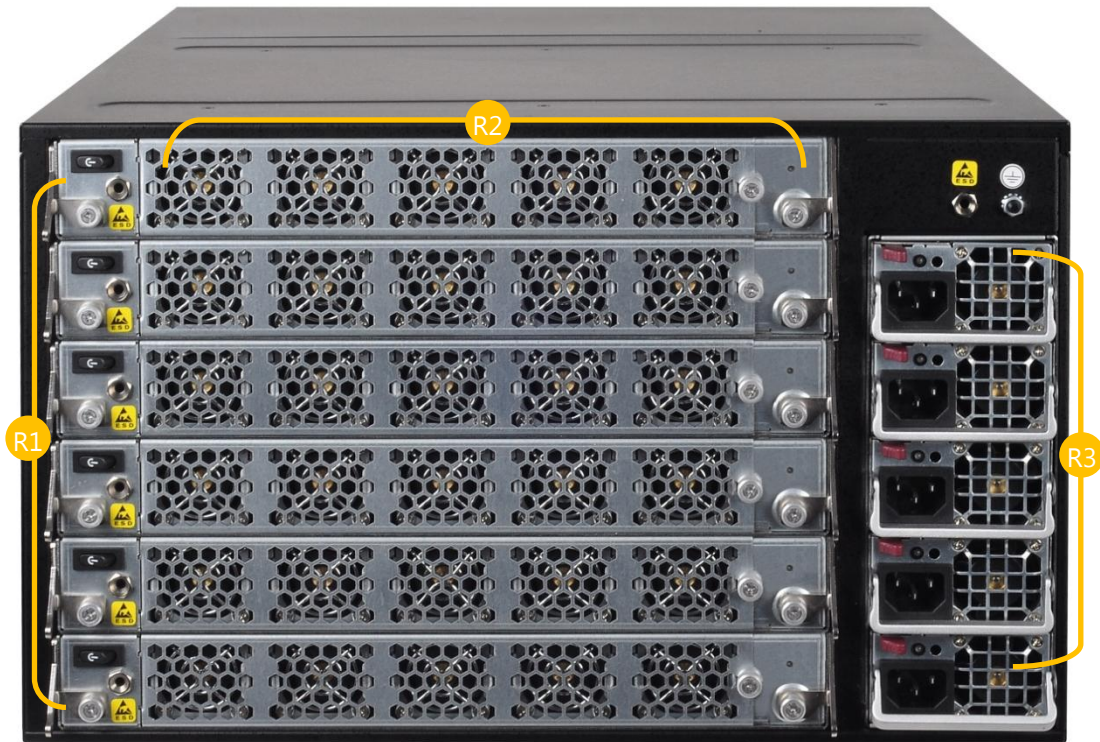
Form Factor		6U Rackmount
Platform	CPU Options	Intel® Xeon® processor E5-2600 v3/v4 Series
	Frequency	Up to 2.66GHz (E5-2690)
	Number of Cores	Up to 22 Cores
	Chipset	Intel C612 Chipset
BIOS		AMI SPI Flash BIOS
System Memory	Technology	Quad-channel DDR4 2400MHz (Registered)
	Max. Capacity	Up to 512GB (Registered) per M/B tray
	Socket	Up to 16x 288-pin DIMM per M/B tray
Switch Blade	Switch Fabric	100G/ 40G/ 10G/ 1G/ Optical fiber
	Speed	KR4, QSFP28, QSFP+, SFP+, SFP
	Interface	By SKU
Ethernet Blade	Controller	XL710
	Speed	10Gbps
	Interface	Up to 32x SFP+
Storage	Type	SATA III, 6Gb/s per port
	Installation	6x 3.5" swappable drive bays
	Type	CF
	Installation	1x CF socket per M/B tray
I/O	Reset Button	Yes
	Console	1x RJ45
	USB	1x type A
	IPMI	OPMA socket to support IPMI (IAC-AST2300)
Expansion	PCIe	N/A
	PCI	N/A
Cooling	Processor	CPU heatsinks
	System	Up to 5x independent hot-swappable cooling Fans with smart fan control,
Environment	Operating/Storage Temperature	0 to 40°C /-20 to 70°C
	Relative Humidity	5% to 90%, non-condensing
Miscellaneous	LCD Module	128 x 64 Dots Graphic Type
	Watchdog	Yes
	Internal RTC with Li Battery	Yes
Mechanical	Dimension (W x H x D)	438 x 177.3 x 685.8 mm
	Weight	55 kg
	Mounting	Rack mount
Power	Type / Watts	AC 1200 watt N+1 Redundant /each DC 1010 watt N+1 Redundant /each PM bus support, up to 5x PSU slots
	Input	AC 85~264V; DC -36~-72V
OS Support	Linux	Linux Kernel 2. 6 or above Linux Cent OS 7.2 or above
Certification	EMC	CE Class A, FCC Class A

Front Panel



No.	Description	
F1	LCM	LCM with 4x keypads
F2	Removable HDD/SSD Trays	6x 3.5" SATA HDD/SSD removable trays
F3	LOM	1x RJ-45 LOM port
F4	Console	1x RJ-45 Console port
F5	USB Port	1x USB 2.0 Type-A port
F6	Switch Blade	Max. 2x Switch Boards (swappable)
F7	LAN I/O Blades	Max. 5x LAN I/O Blades (swappable)

Rear Panel



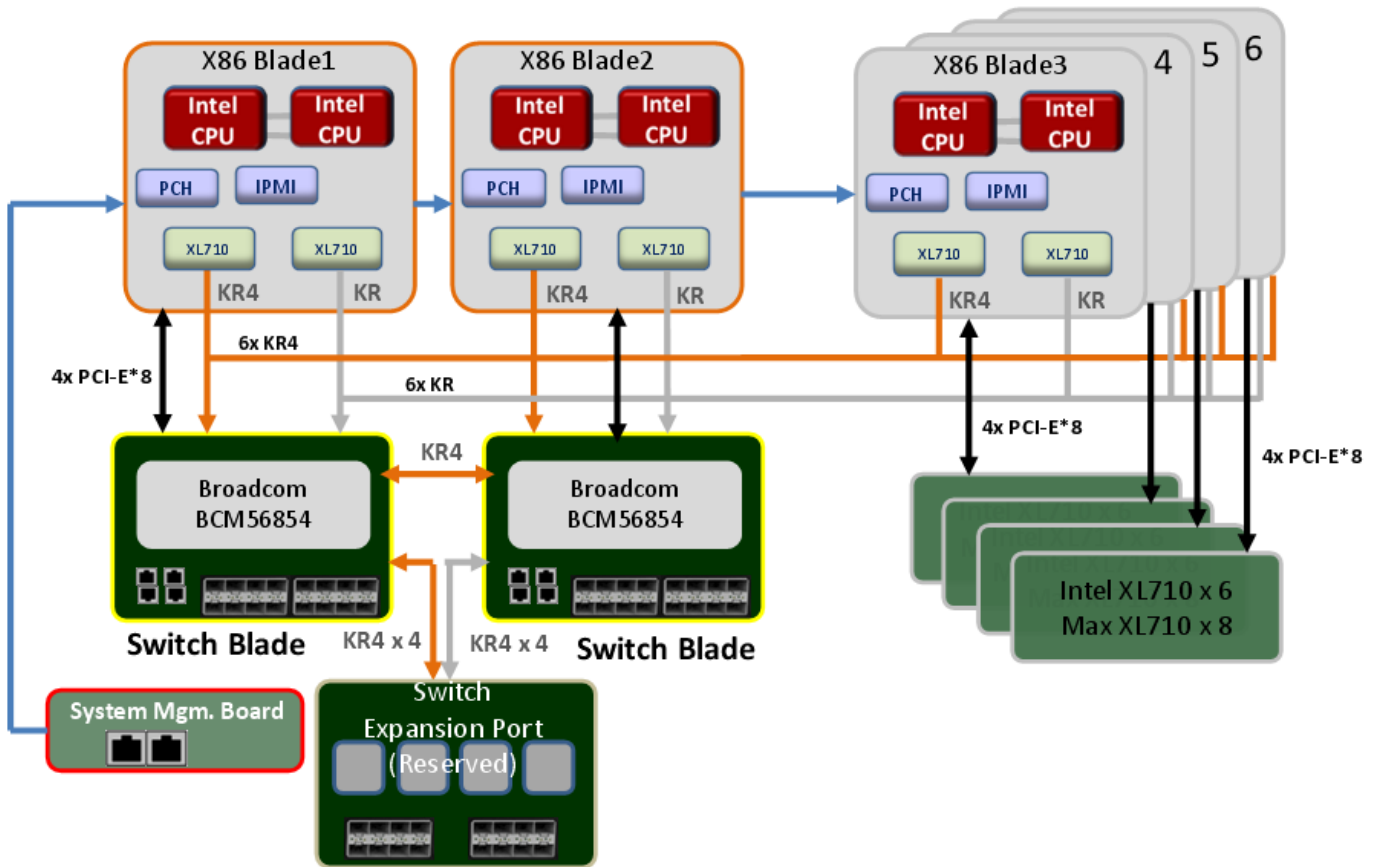
No.	Description	
R1	CPU Blades	6x Swappable CPU blades
R2	Cooling Fans	5x Cooling fans per CPU blade
R3	Power Supply	5x redundant power supply units

CHAPTER 2: MOTHERBOARD INFORMATION

Block Diagram

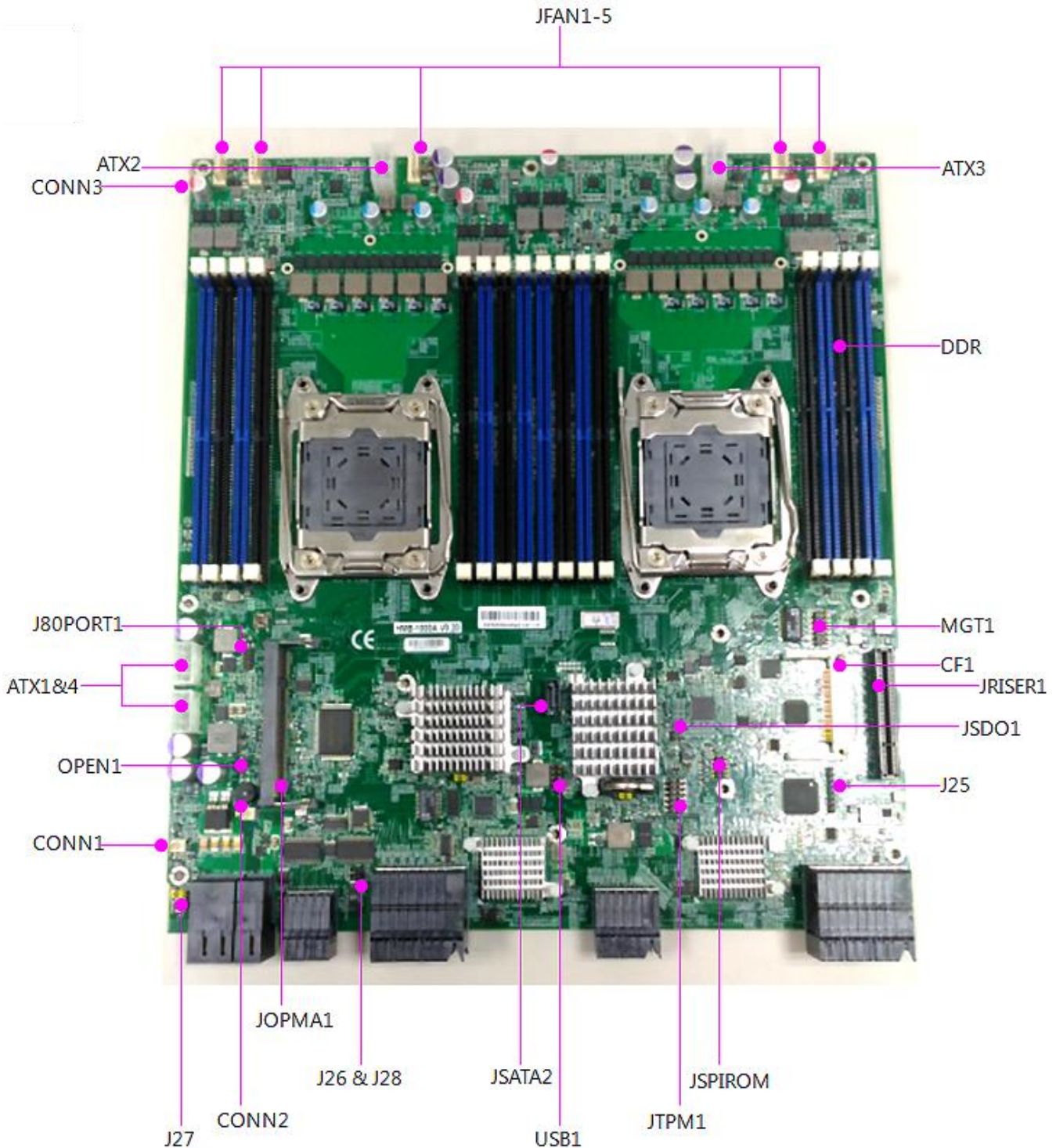
The block diagram indicates how data flows among components on the motherboard. Please refer to the following figure for your motherboard's layout design.

6U HTCA with Switch



Motherboard Layout

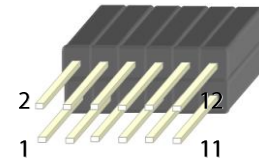
The motherboard layout shows the connectors and jumpers on the board. Refer to the following picture as a reference of the pin assignments and the internal connectors.



Internal Jumper & Connectors

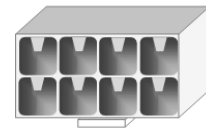
MGT1: 2x6 pin header for RJ-45 LAN management port

Pin	Description	Pin	Description
1	MGT2_MDIP_0	2	MGT2_MDIN_0
3	MGT2_MDIP_1	4	MGT2_MDIN_1
5	MGT2_MDIP_2	6	MGT2_MDIN_2
7	MGT2_MDIP_3	8	MGT2_MDIN_3
9	MGT_LAN2_100#	10	MGT_LAN2_ACT#
11	MGT_LAN2_1G#	12	P3V3_AUX



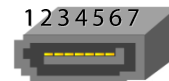
ATX1~ATX4: four 8-pin ATX power connectors

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



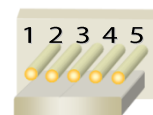
SATA1: 7-pin SATA signal connector for SATA storage device

Pin	Description	Pin	Description
1	GND	2	TX_P
3	TX_M	4	GND
5	RX_M	6	RX_P
7	GND		



FAN1~5: 5-pin FAN connectors

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



SW2: Reset Switch

Pin	Description
1-2	GND
3-4	FP_RST_SEL



SW1: PSON power switch for debug.

Pin	Description
1-2	GND
3-4	FP_SWIN_R

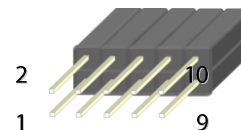


CONN2: PSON power switch

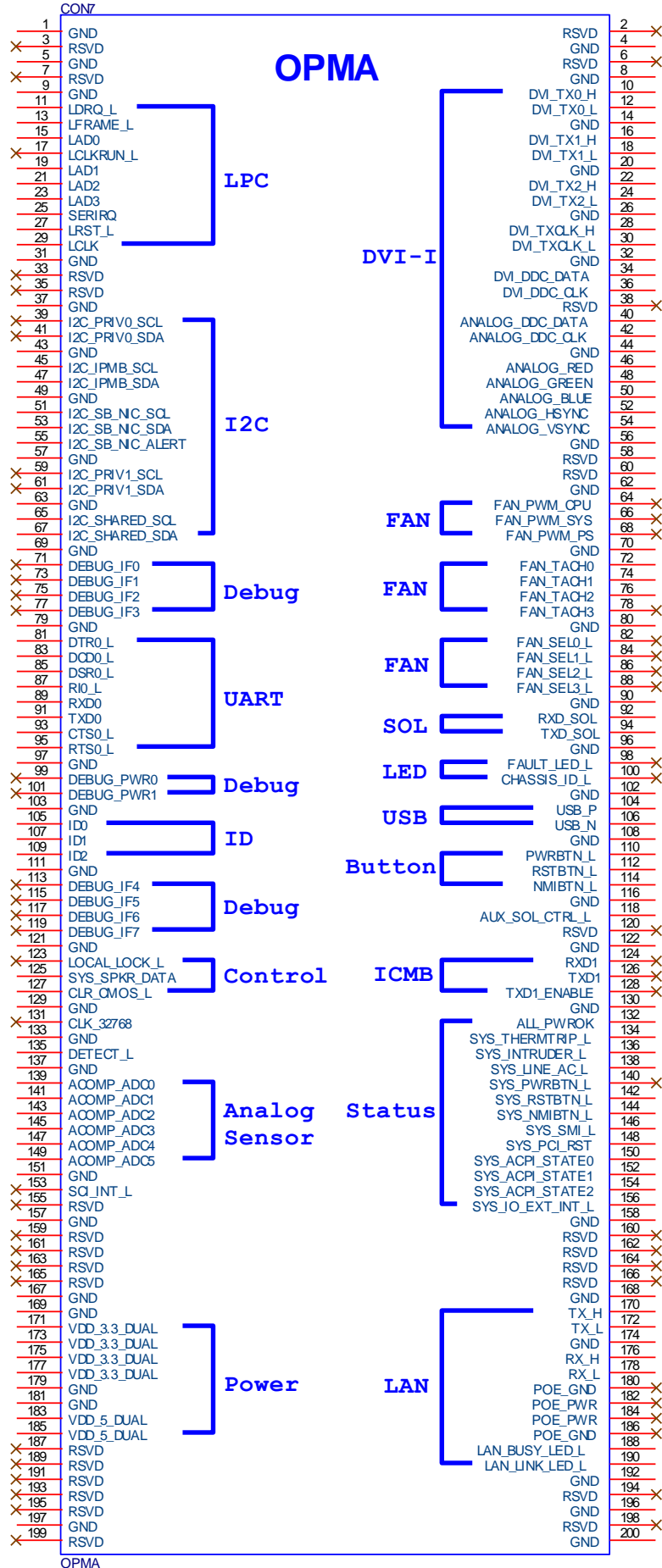
Pin	Description
1	GND
2	FP_SWIN_R

USB1: 2x5-pin internal USB pin header

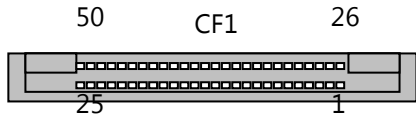
Pin	Description	Pin	Description
1	USB_VCC	2	USB_VCC
3	USBD0-	4	USBD1-
5	USBD0+	6	USBD1+
7	Ground	8	Ground
9	USB Port#1Ground	10	USB Port#2 Ground



OPMA1: OPMA socket for IPMI card.





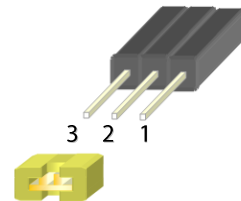
CF1: CompactFlash card slot



Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	GND	2	DATA3	3	DATA4	4	DATA5
5	DATA6	6	DATA7	7	CE1#	8	A10
9	OE#	10	A9	11	A8	12	A7
13	CFVCC3	14	A6	15	A5	16	A4
17	A3	18	A2	19	A1	20	A0
21	DATA0	22	DATA1	23	DATA2	24	WP
25	CD2-	26	CD1-	27	DATA11	28	DATA12
29	DATA13	30	DATA14	31	DATA15	32	CE2#
33	VS1#	34	IOR#	35	IOW#	36	WE#
37	READY#	38	CFVCC3	39	CSEL	40	VS2#
41	RESET	42	WAIT#	43	INPACK#	44	REG#
45	DASP#	46	DIAG#	47	DATA8	48	DATA9
49	DATA10	50	GND				



J27 Software reset: Select front panel reset option

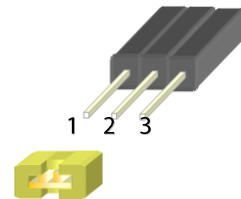
Pin	Description	Pin	Description
1.2  3 2 1	HW reset	2.3  3 2 1	SW reset (Default)



J24: CMOS Jumper

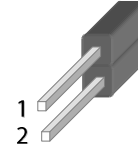
You may set jumper pins to clear CMOS

Pin	Description	Pin	Description
1.2  1 2 3	Normal (Default)	2.3  1 2 3	Clear CMOS



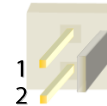
OPEN1: Chassis Open Detect mainboard protection jumper. (a short-pin cap will be connected to the top compartment of the system chassis. When the top compartment is lifted/removed, the board functions will be disabled once the jumper cap is lifted along with the top compartment. This is to protect the board from being tampered by anyone who removes the top compartment.

Pin	Description	Pin	Description
1	GND	2	FM_INTRUDER#



CONN3: HS pin header

Pin	Description	Pin	Description
1	HSWAP_ENABLE_N	2	GROUND



CHAPTER 3: HARDWARE SETUP

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

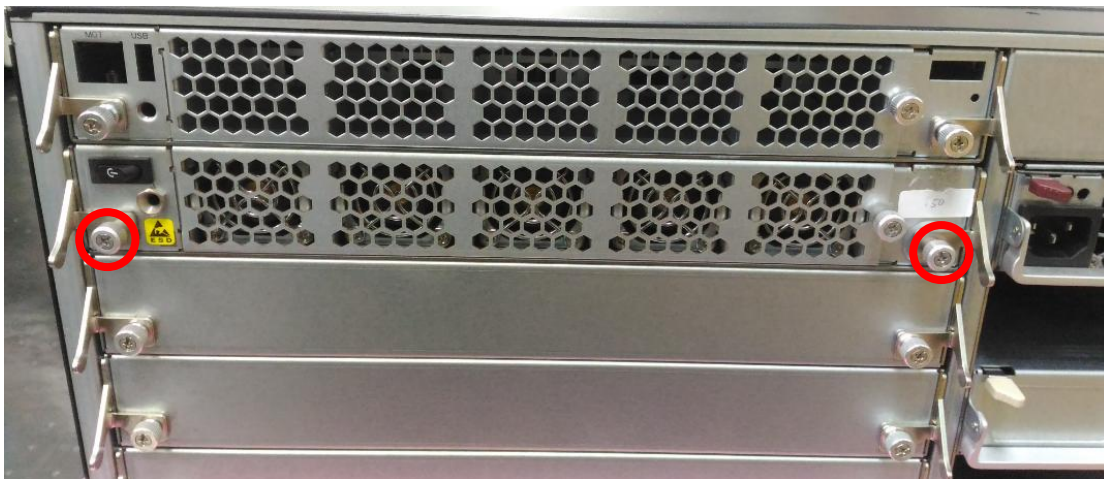


Warning: (1) To reduce the risk of personal injury, electric shock, or damage to the equipment, please remove all power sources. (2) Please wear ESD protected gloves before conducting the following steps. This exclamation point indicates that there is a caution or warning and it is something that could damage your property or product.

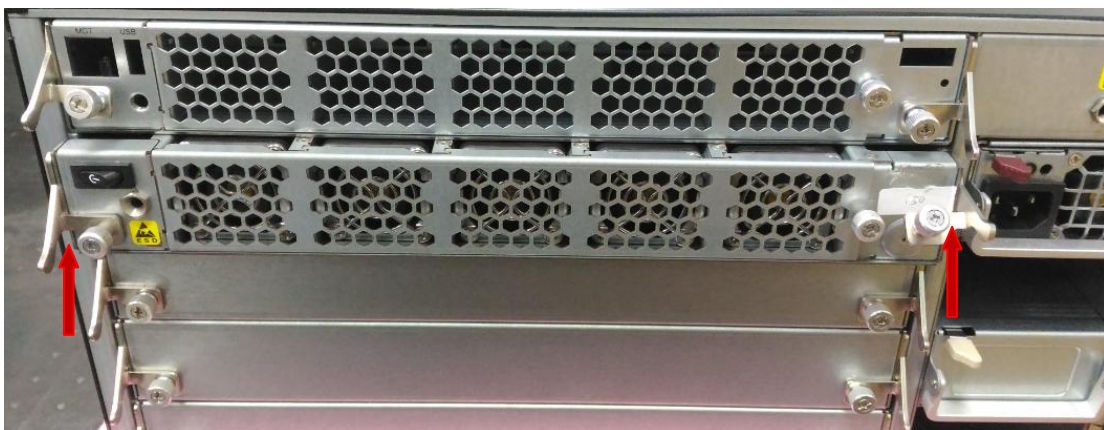
Accessing the CPU Blade(s)

You have to access the CPU blade(s) in order to install or replace CPUs, heatsinks and DDR memory DIMMs. Please follow the steps below to access CPU blades.

1. Select a CPU blade you wish to access the internal components.
2. Rotate and loosen the captive screws circled in the picture below. You may apply a screwdriver to conduct this task.



3. Hold onto both captive screws and handles and lift them upwards at the same time.



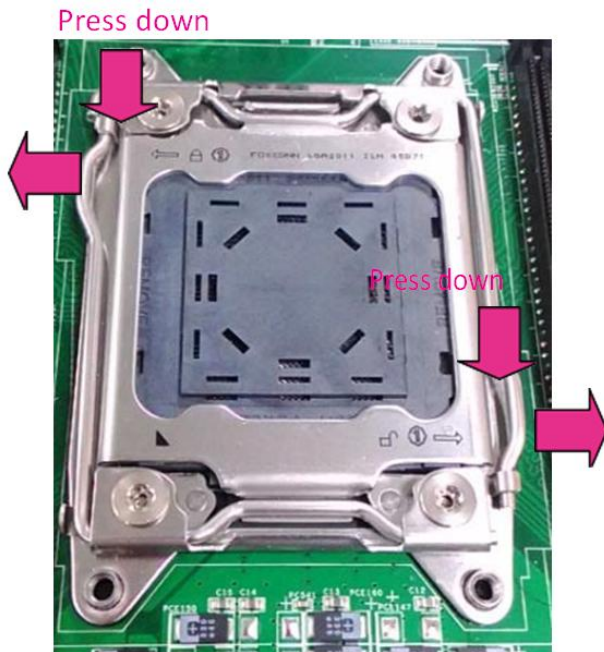
4. Apply some force to pull the CPU blade out.



Installing the CPU and Heatsink

Follow the procedures below for installing a CPU

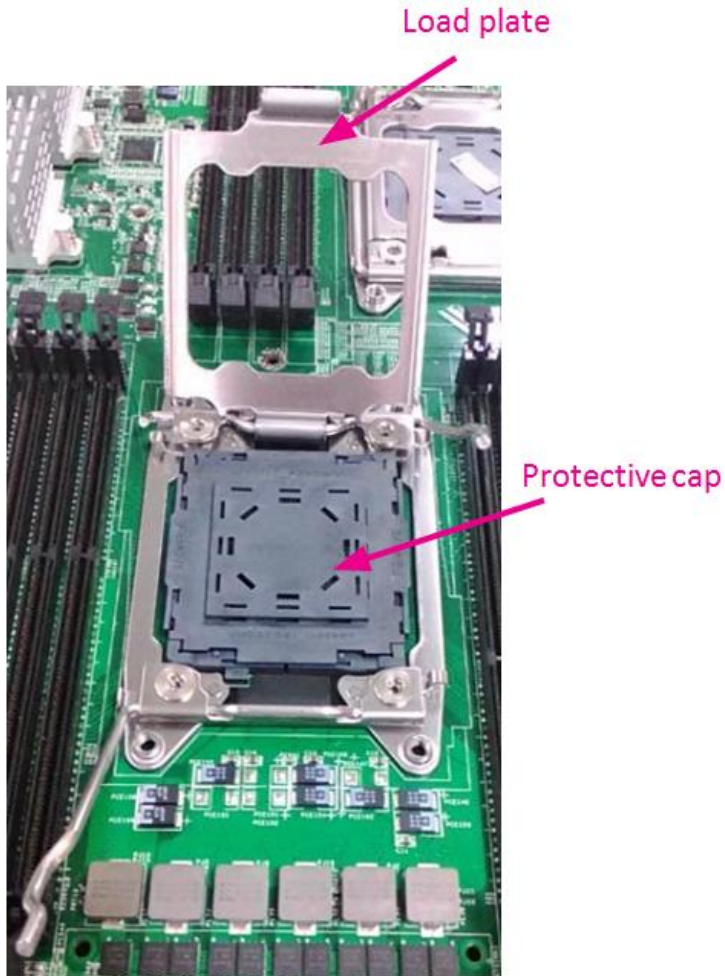
1. Locate the CPU socket(s)
2. Press the left load lever down, move it out of the retention tab. Then, do the same to the right. There are two levers for each CPU socket.



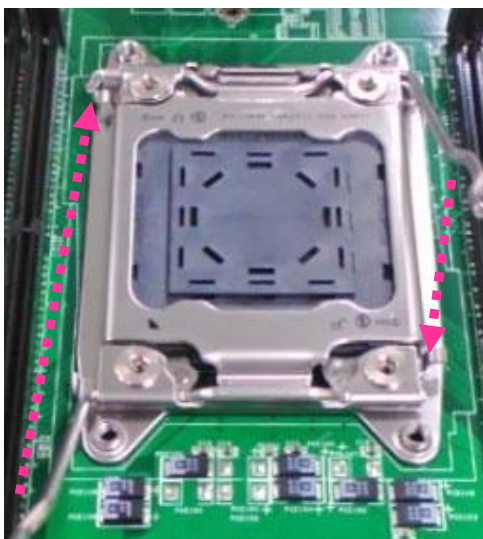
3. Lift the load levers.



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

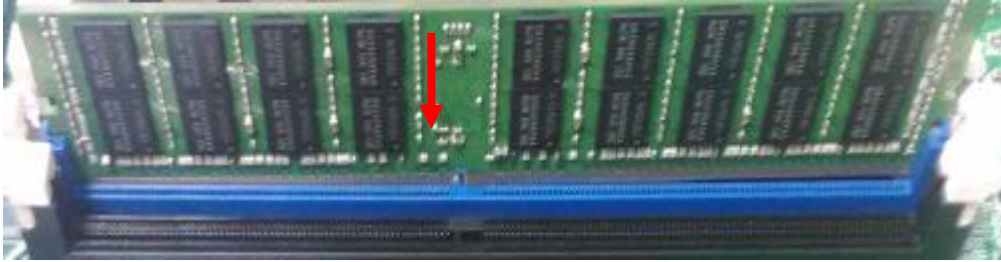


Note: (1) If you have only one CPU, install it on the left side (CPU socket No.1 with the front panel facing you). Failing to do so will result in boot failure. (2) To protect the CPU socket pins, retain the CPU cap when the CPU is not installed.

Installing the System Memory

Please follow the steps below to install the DIMM memory modules.

1. Power off the system and locate the DDR DIMM slot.
2. Pull open the DIMM slot latches
3. Align the DIMM module and make sure the notches of the module aligned with the socket keys in the slot.

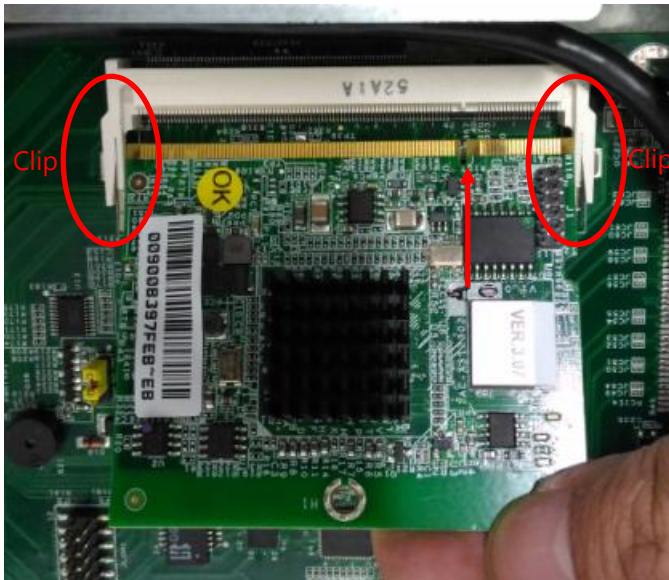


4. Insert the module into the slot until it's firmly seated and close the latches.

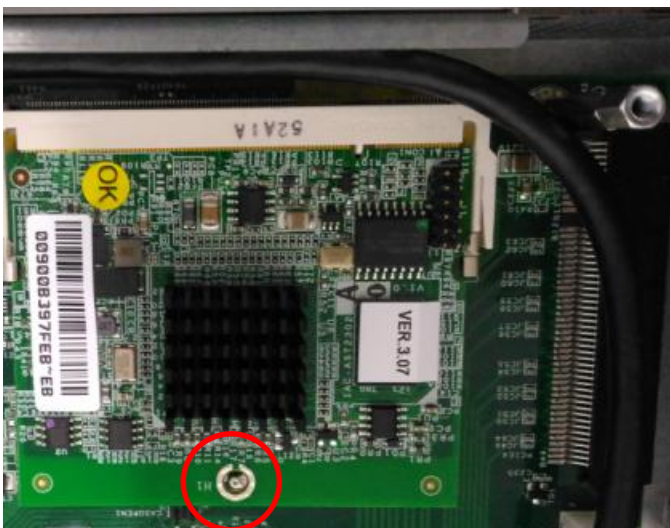
Installing an IPMI Card

The motherboard provides one OPMA socket which is used to install an IPMI card. Please follow the steps below for instructions.

1. Locate the OPMA socket.
2. Insert an IPMI card into the socket and then gently press it down. Remember to align the gold fingers and make sure the two clips securely secure the card.



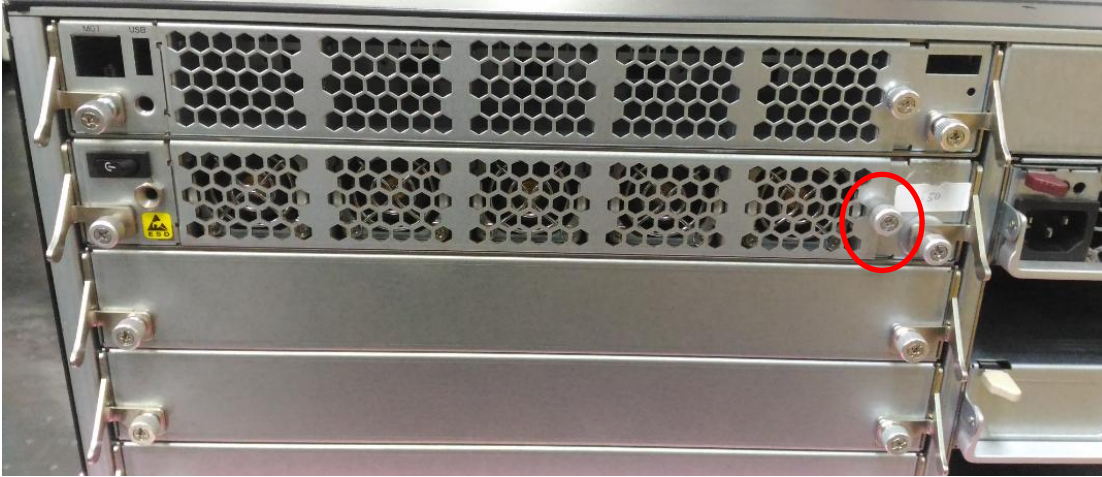
3. Apply a screw to secure the IPMI card.



Replacing Cooling Fans

Cooling fans are wearable components and may have to be replaced eventually. Please follow the steps below to replace cooling fans.

1. Locate the cooling fans at the rear of CPU blades. The fans are covered by a bezel.
2. Rotate and loosen the captive screw that locks the bezel for the cooling fans.



3. Hold onto the loosened captive screw and remove the bezel.



4. Take the worn-out fan out of its place and insert a new fan back into the system.



Installing Disk Drives

The system provides six externally accessible disk drive bays on the front panel. Notably, the system requires 3.5" SATA HDD/SSD. Please follow the steps below to install or replace disk drives. The pictures below demonstrate the hard disk installation method of horizontally-mounted disk trays, which is exactly the same as that of vertically mounted disk trays except for the orientation.

1. Select a drive bay for installation and hold the lock of the drive bay.



2. Open the lock outwards.



3. Pull the drive bay out and install a SATA disk drive. Please keep in mind that the SATA connector of your SATA disk drive should point to the inside of the system.



Replacing Front Network I/O Blades & Switch Boards

The system provides a total of six externally accessible LAN I/O blades and/or switch boards, varied depending on ordering configurations (the system supports up to 2 switch boards and up to 5 LAN I/O blades). To replace a new blade/board, please follow the steps below.

1. Rotate and loosen the two captive screws at both ends. You may use a screwdriver to conduct this task.



2. Pull the two locks towards the directions as shown in the arrows of directions below.



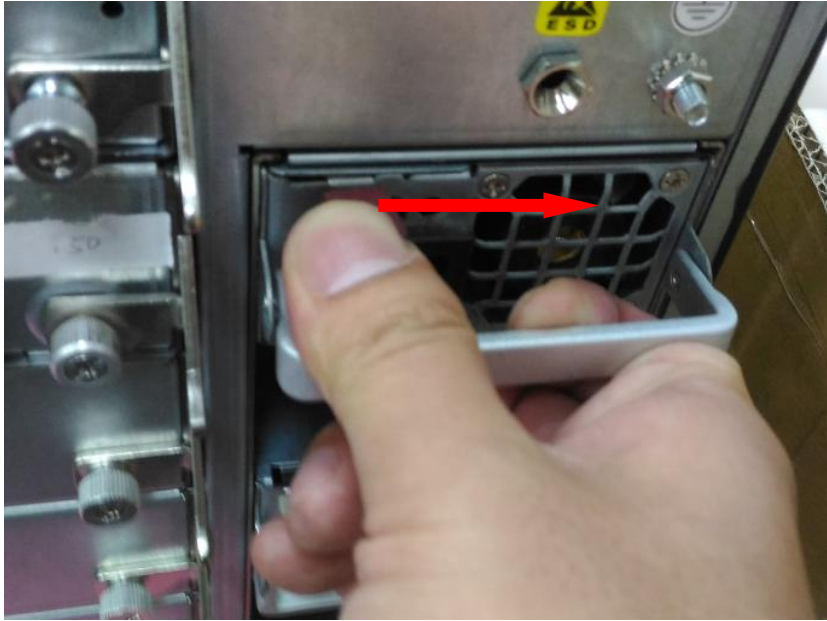
3. Gently pull the board/blade out.



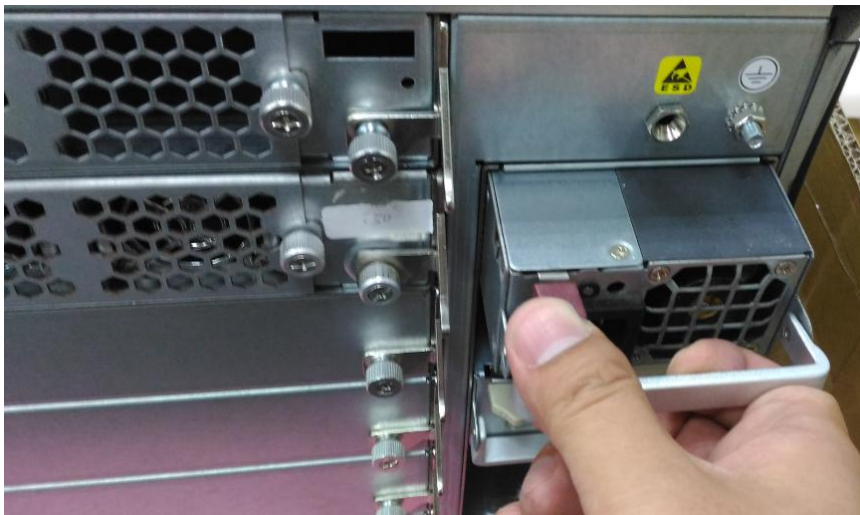
Replacing Power Supply Units

Power supply units may wear out eventually and have to be replaced. Please follow the steps below to replace a power supply unit.

1. Hold onto the handle of the power supply unit and pull the lock towards the right.

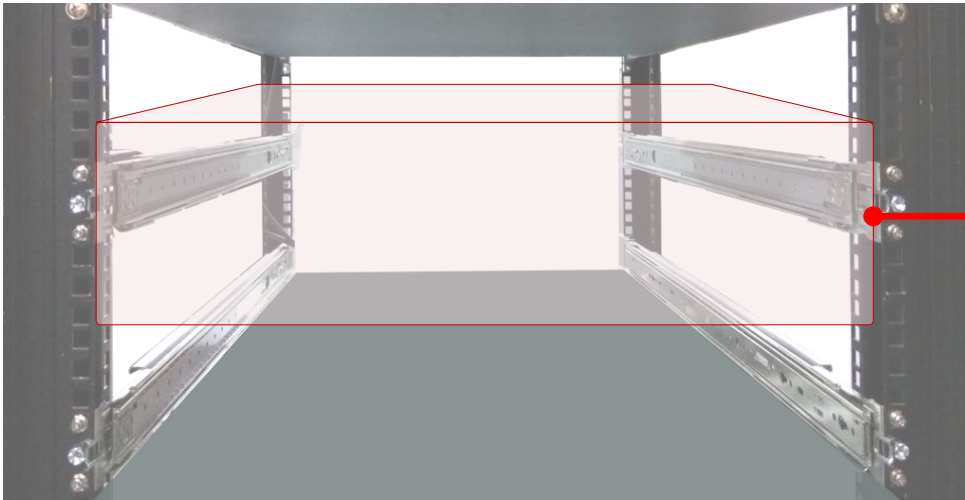


2. Pull the power supply unit out.



Mounting the System

The slidable rails allow you to access the system easily, while securing it in the rack solidly.



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

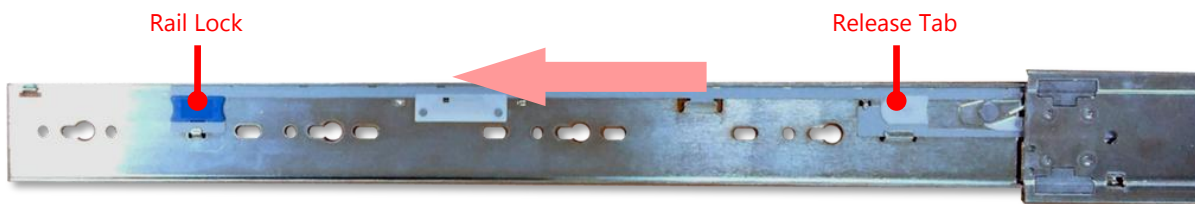
1. Check the package contents of the Slide Rail Kit. The kit shall include a pack of screws (for securing the Rails on the system) and a pair of Slide Rails



Outer Rail

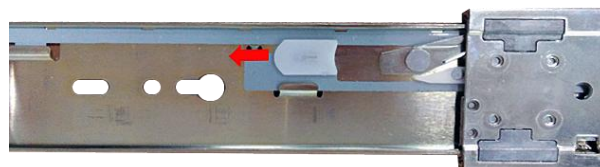


2. Pull out the Inner Rail and slide it all the way to the end.

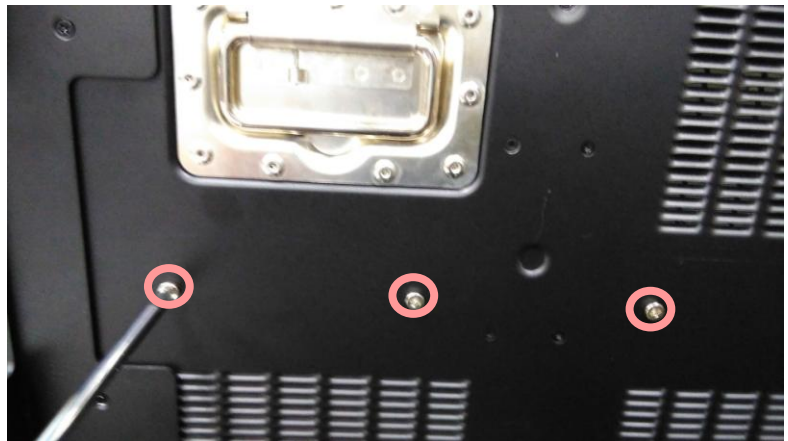


Inner Rail

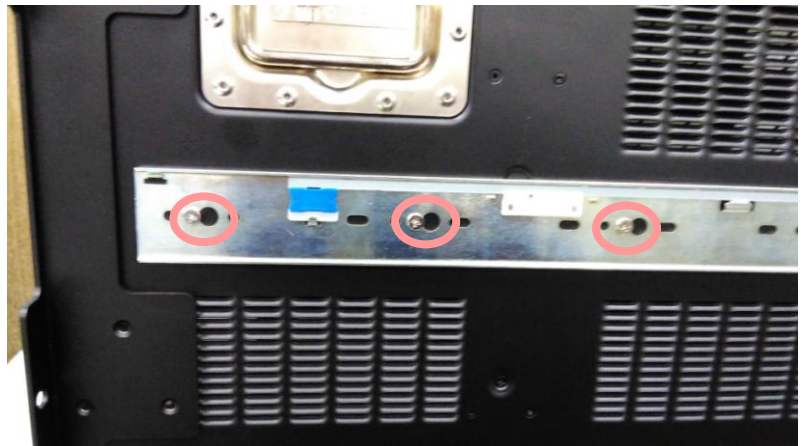
3. Push the Release Tab to detach the Inner Rail



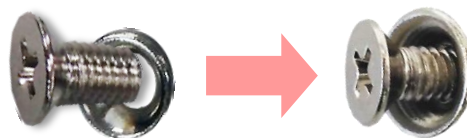
4. Attach the six Shoulder Screws on both side panes of the chassis.



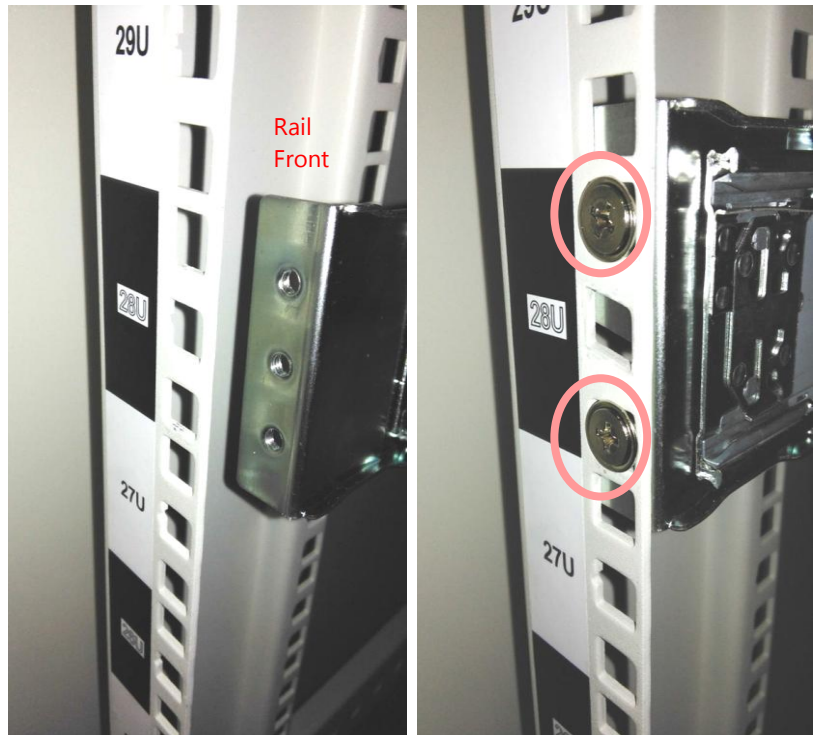
5. On each side, align the screw holes on Inner Rail to the shoulder screws on the chassis, and then secure it onto the chassis. You can loosen the screws a bit to fix the rail more easily.



6. Assemble the Washer and the rail screw.



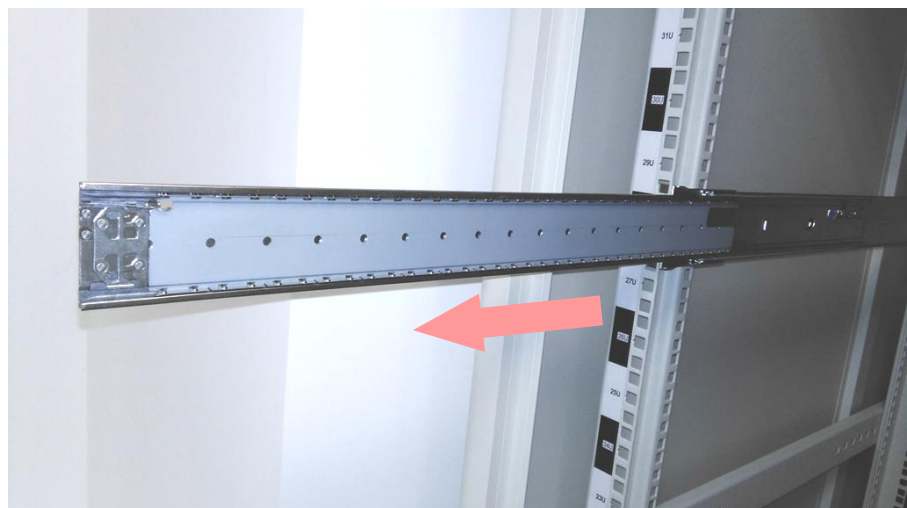
- Simply attach both Outer Rails to the front posts of the rack, and then secure the rails with the screw assemblies.



- On the rear posts, secure each rail with two screw assemblies.



- Pull out the rails.



10. Hold the system with its front facing you, lift the chassis and gently engage the Inner Rails on the system while aligning them with the Outer Rails as shown in the image.



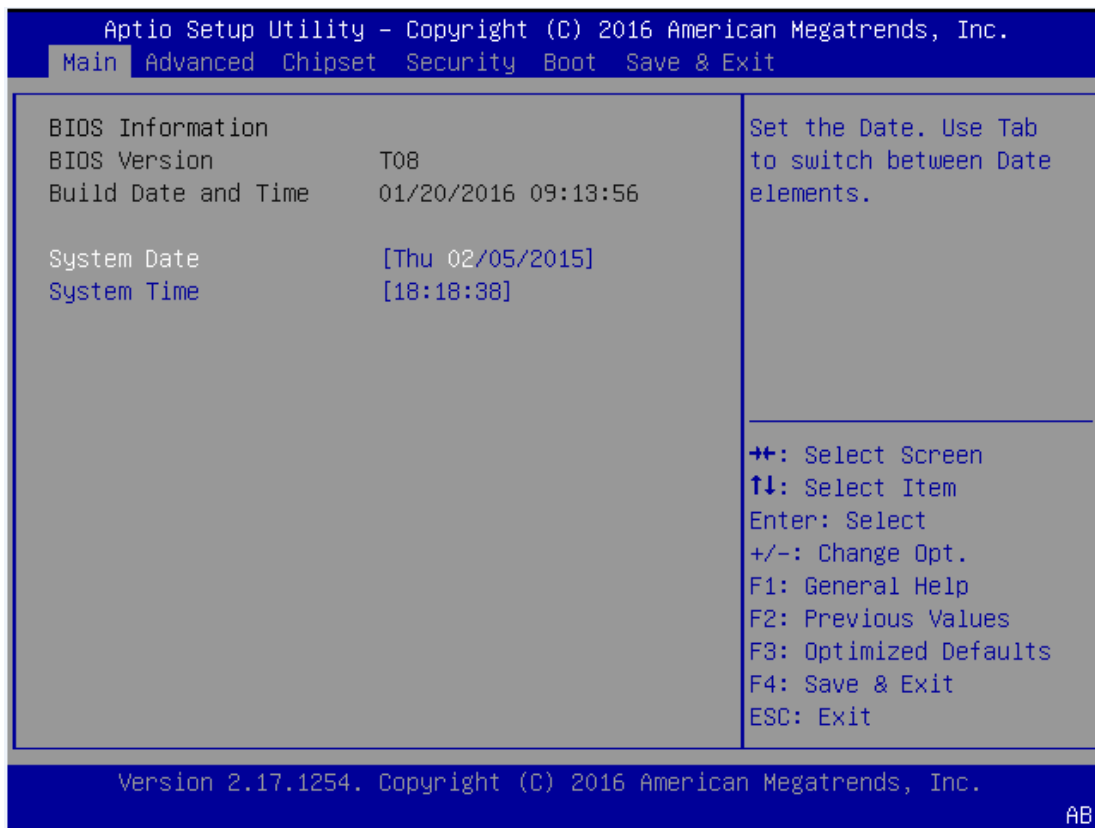
11. Push the chassis into the cabinet.



CHAPTER 4: 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. Your system should be running POST (Power-On-Self-Test) upon booting up.
3. Then you will be directed to the BIOS main screen.
4. Instructions of BIOS navigations:
 - [<--] [-->]: select a setup screen, for instance, **[Main]**, **[Advanced]**, **[Chipset]**, **[Boot]**, **[Security]**, and **[Save & Exit]**
 - [↑] [↓]: select an item/option on a setup screen
 - <Enter>**: select an item/option or enter a sub-menu
 - <ESC>**: exit the current screen
 - [+]**/**[-]** = to adjust values for the selected setup item/option
 - <F1>** = to display General Help screen
 - <F2>** = to retrieve previous values, such as the parameters configured the last time you had entered BIOS.
 - <F3>** = to load optimized default values
 - <F4>** = to save configurations and exit BIOS



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

Main

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

BIOS Information

BIOS Vendor: displays BIOS vendor information

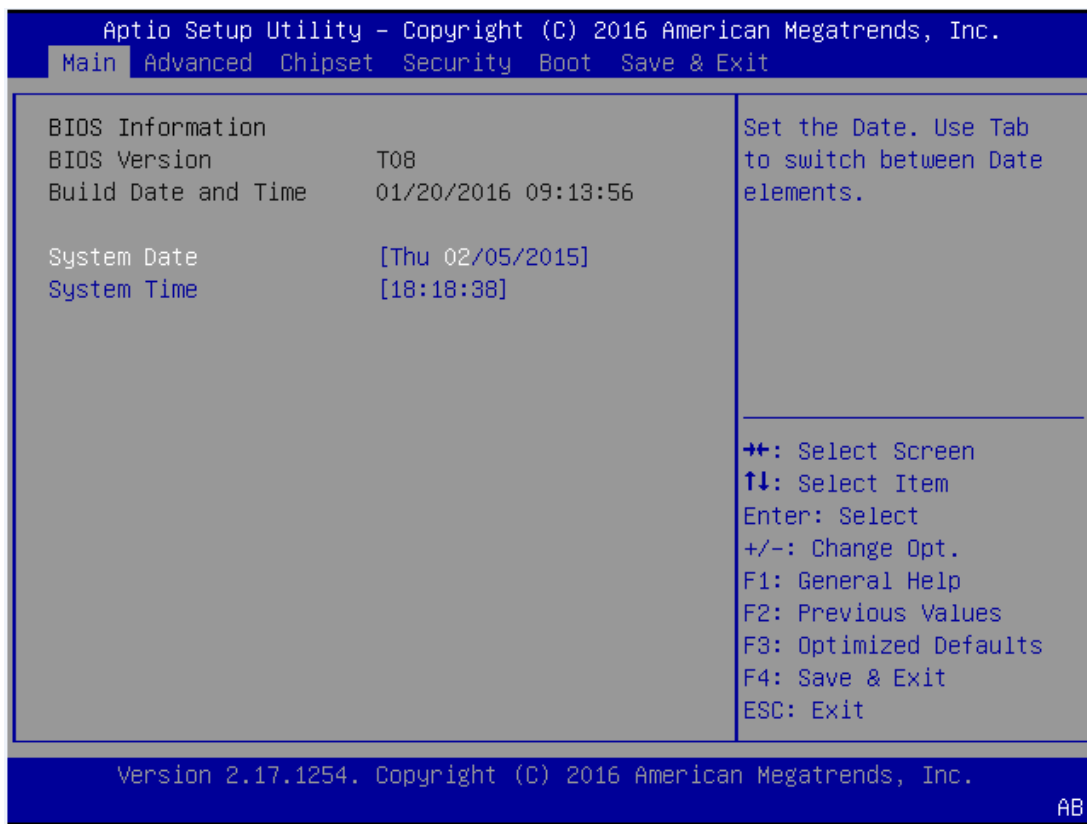
BIOS Version: displays BIOS version

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".

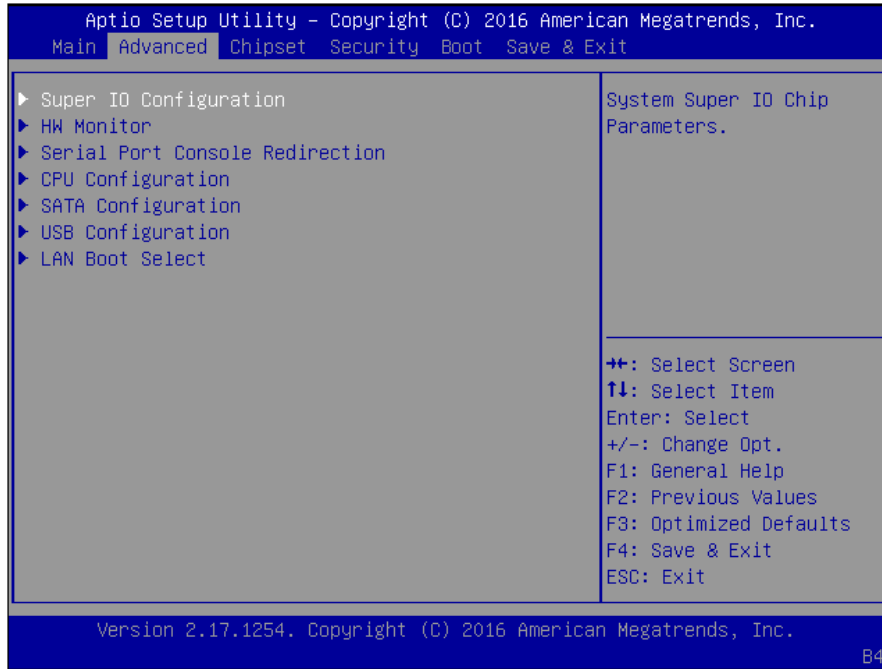
System Date: Day/Month/Year

System time: Hour/Minutes/Seconds



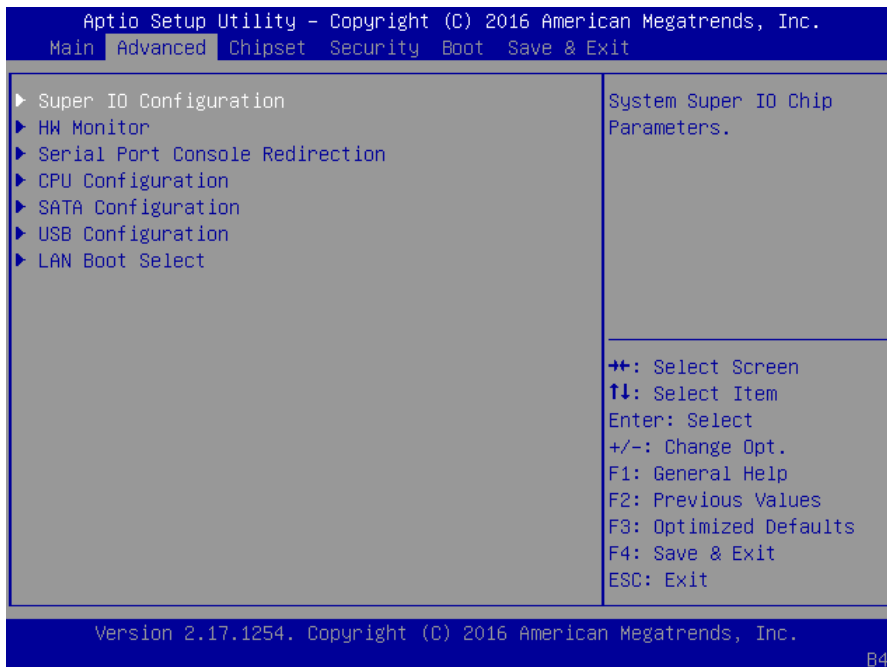
Advanced

Use [**<-->**] / [**-->**] to select [Advanced] setup screen. Under this screen, you may use [**↑**] [**↓**] to select an item you wish to configure.

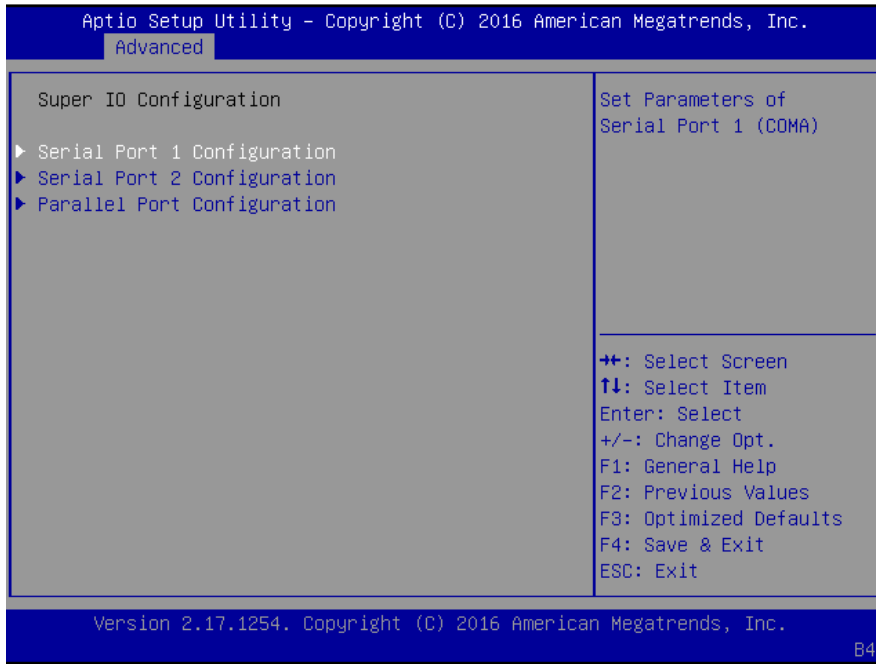


Super IO Configuration

Press **<Enter>** to access configuration sub-menu for super IO chip parameters. You may access settings for Serial Port 1 or 2 or the Parallel port.

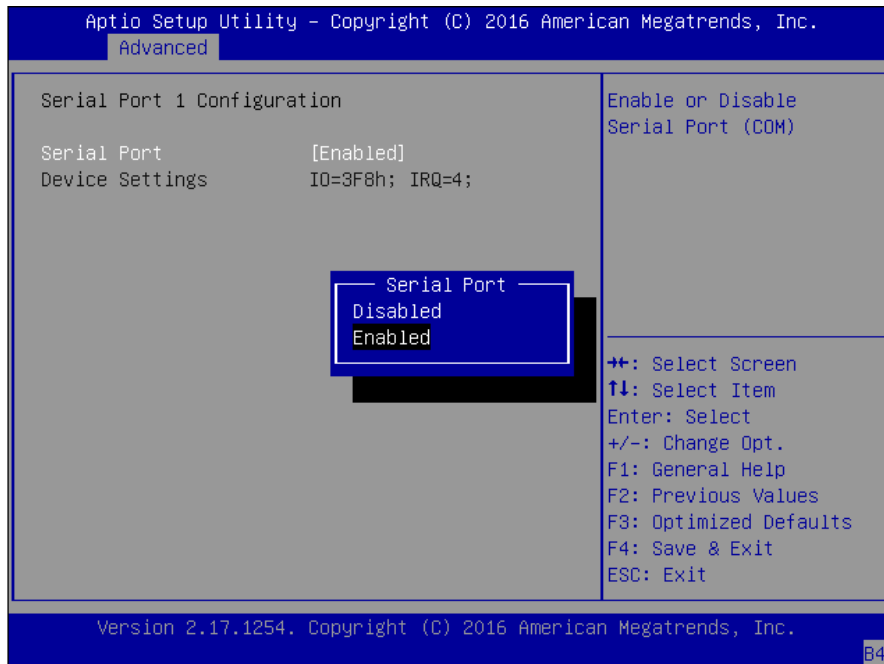


Once you have entered Super I/O configuration, you may choose to configure Serial Port 1 or 2, or the Parallel port.



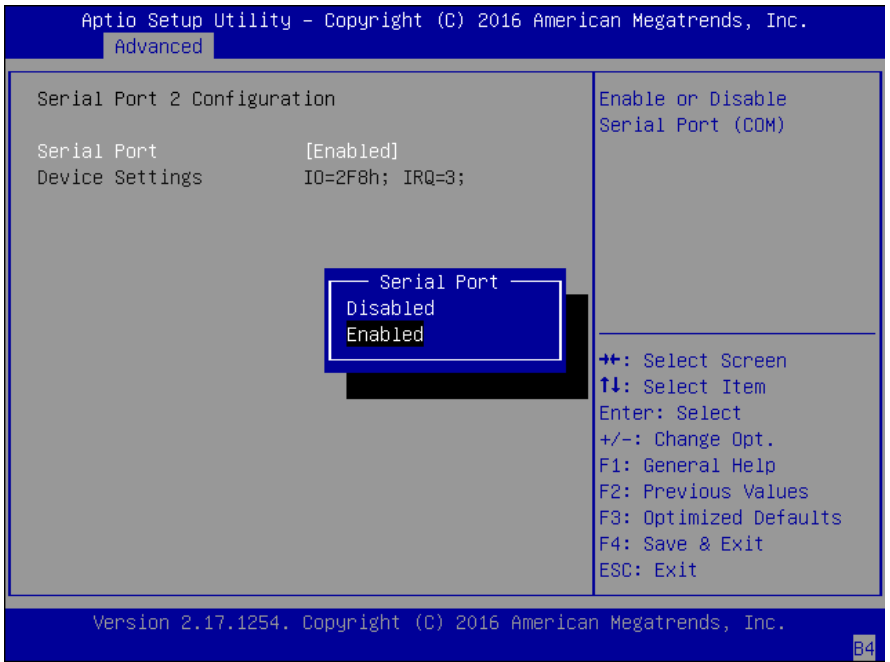
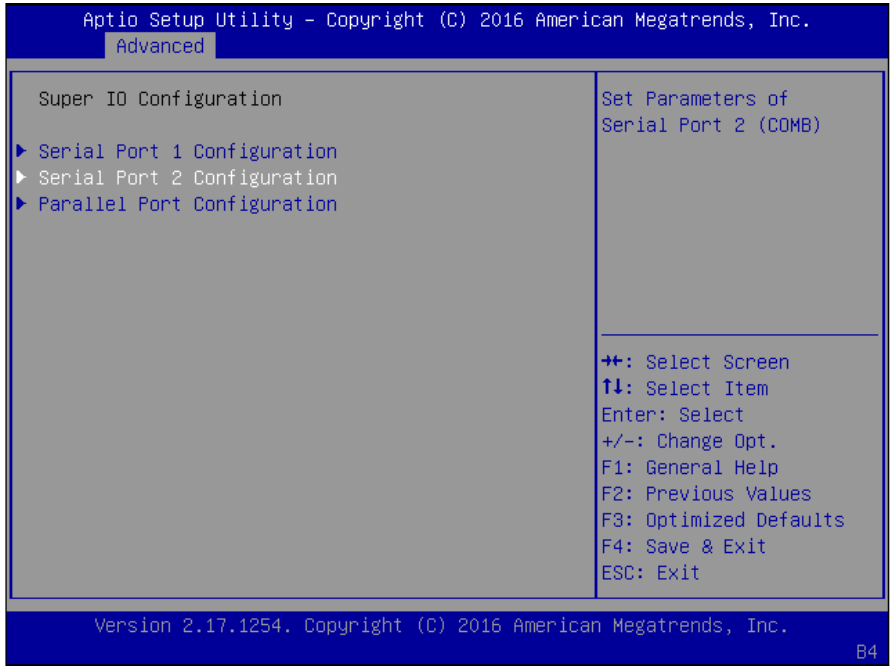
Super IO Configuration - Serial Port 1 Configuration

Press <Enter> to enable or disable the Serial Port 1 (COM). Device setting is fixed as default.



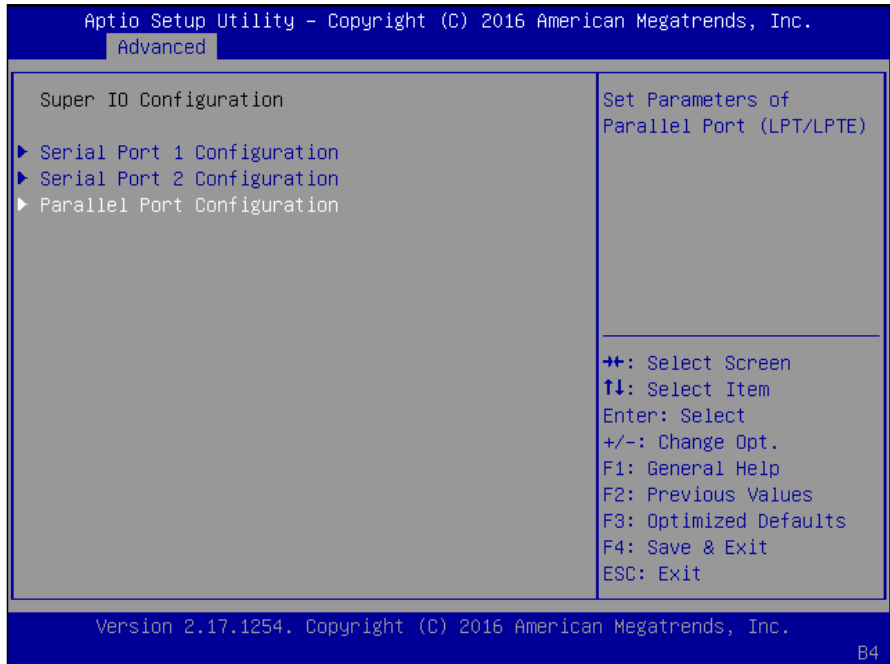
Super IO Configuration - Serial Port 2 Configuration

Once Serial Port 2 is accessed, you may press <Enter> to enable or disable the Serial Port 2 (COM). Device setting is fixed as default.

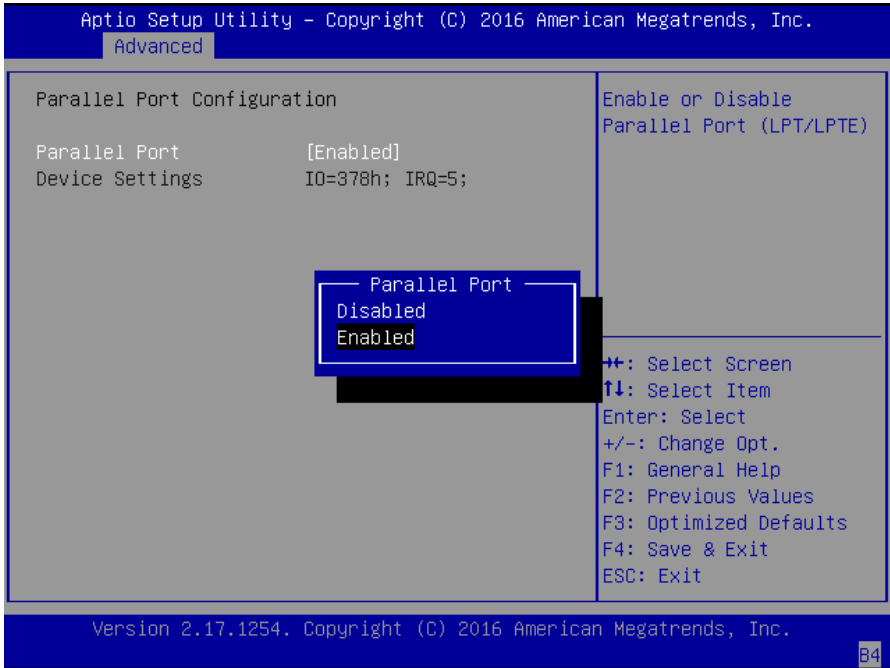


Parallel Port Configuration

This option allows you to set parameters for parallel port (LPT/LPTE).

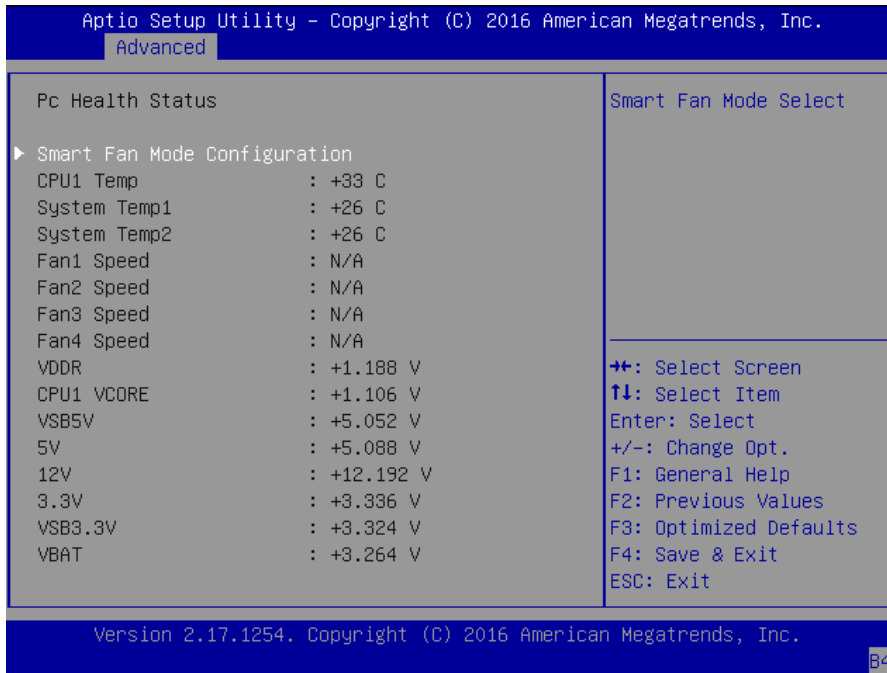
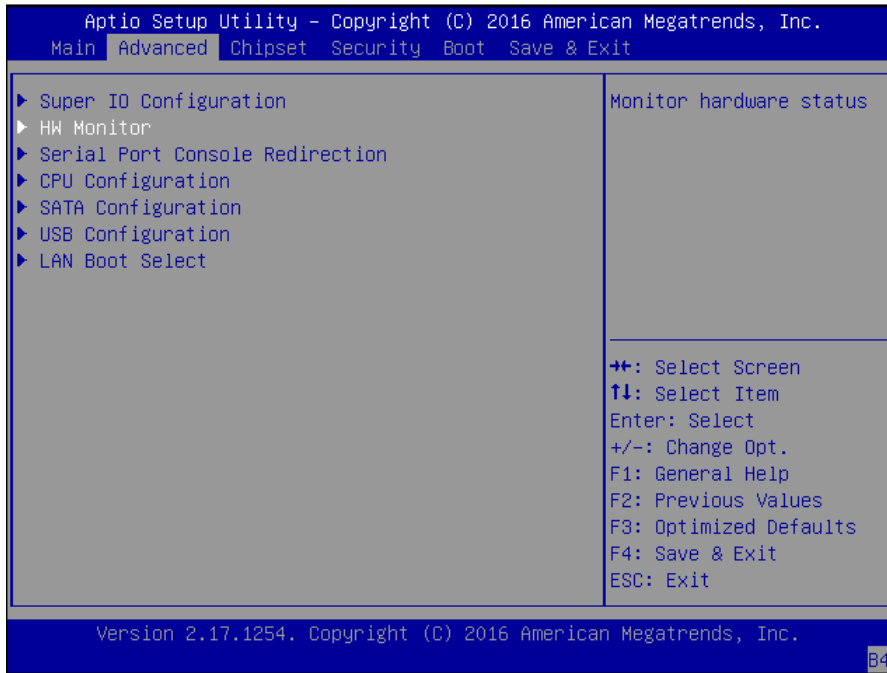


Once Parallel Port is accessed, you may press **<Enter>** to enable or disable the Parallel Port. Device setting is fixed as default.



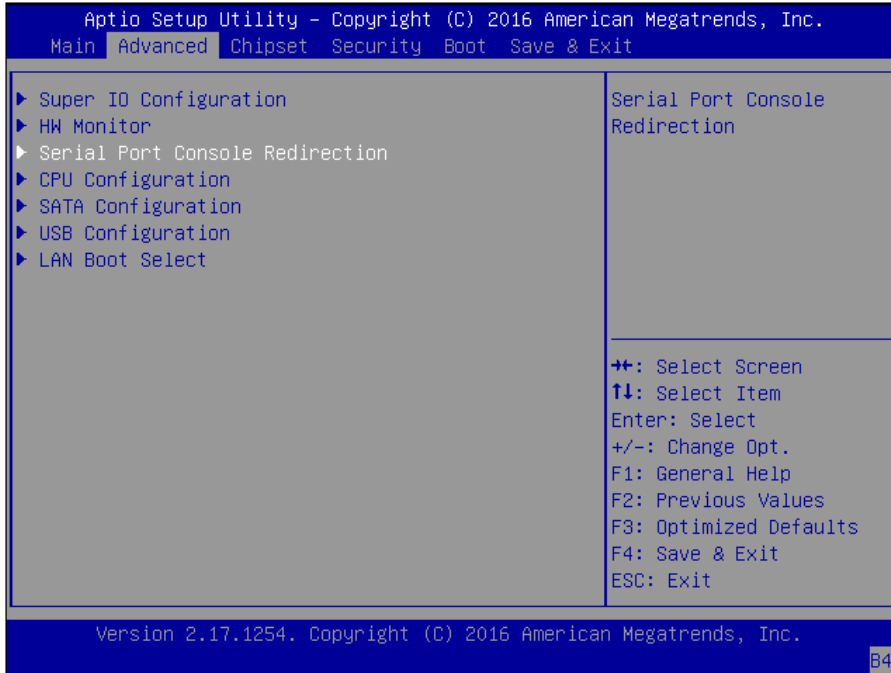
HW Monitor

This option allows you to view hardware health status.

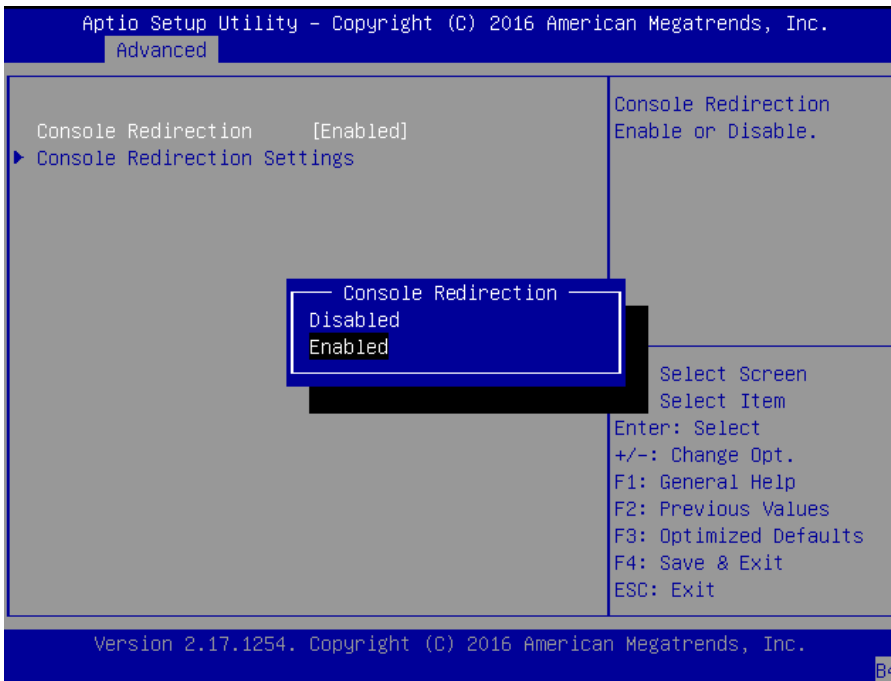


Serial Port Console Redirection

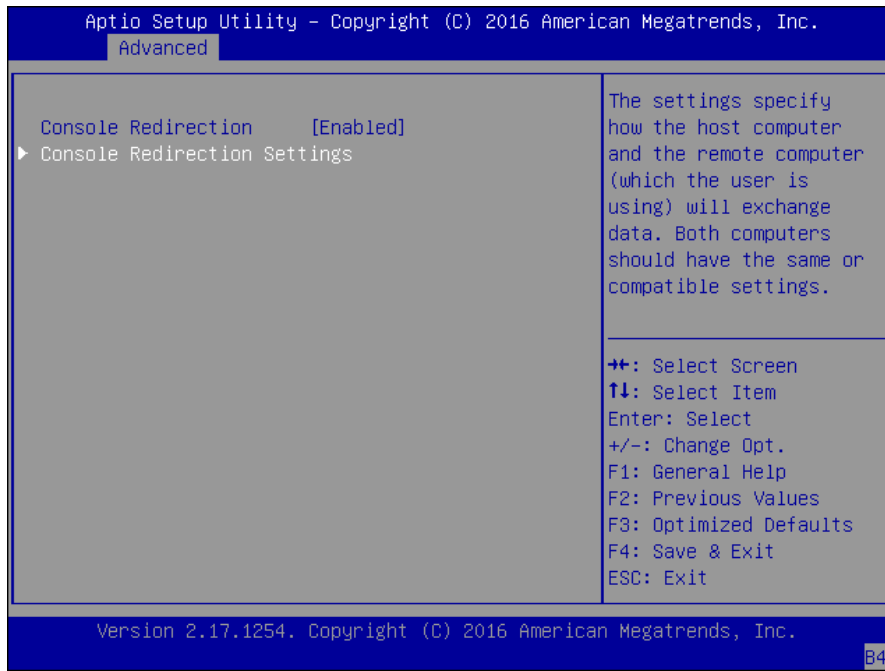
This option allows you to configure parameters about serial port console redirection. Press **<Enter>** to access the submenu.



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



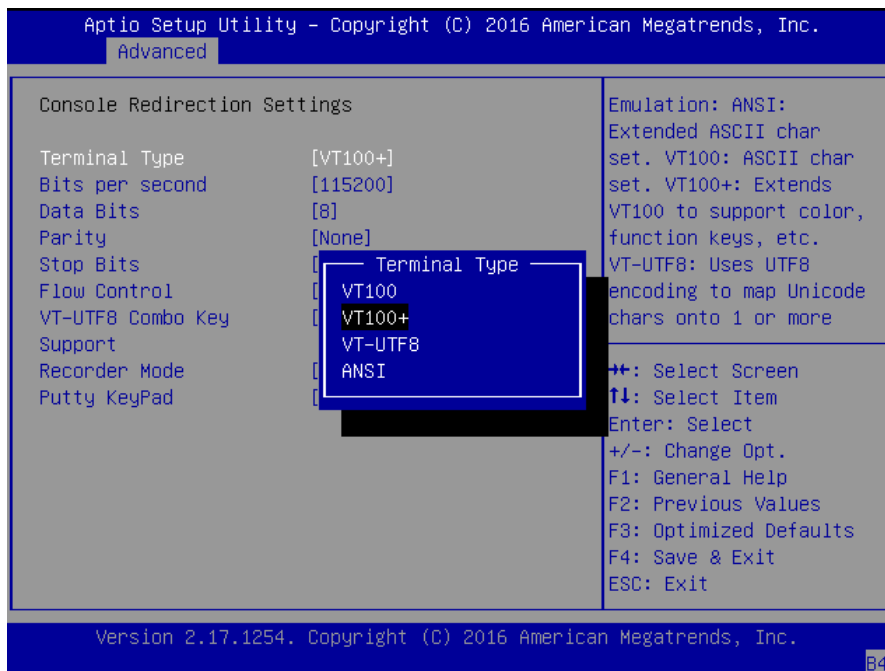
Console Redirection Settings: select this item to enter the setting sub-menu.



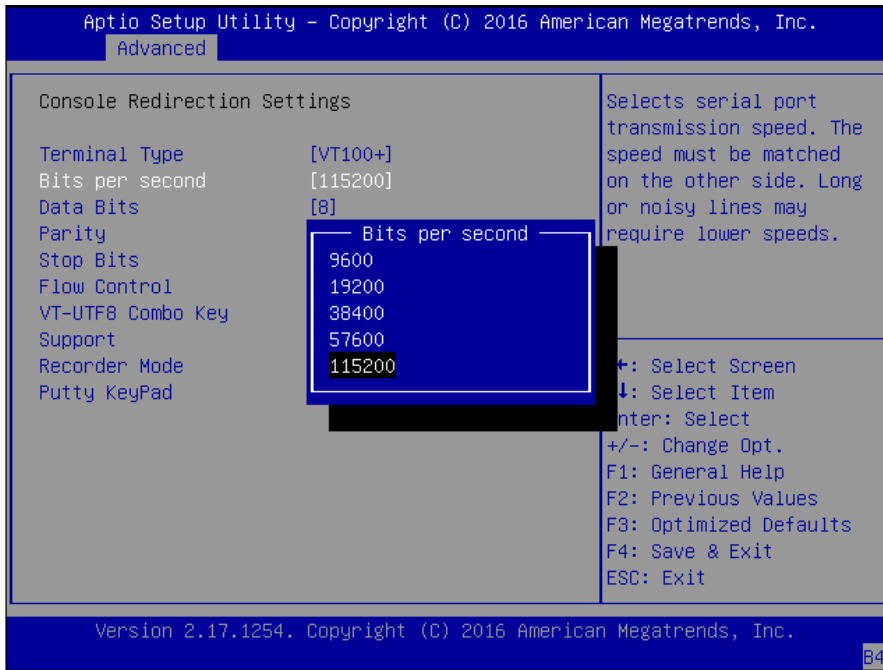
COM Console Redirection Settings

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

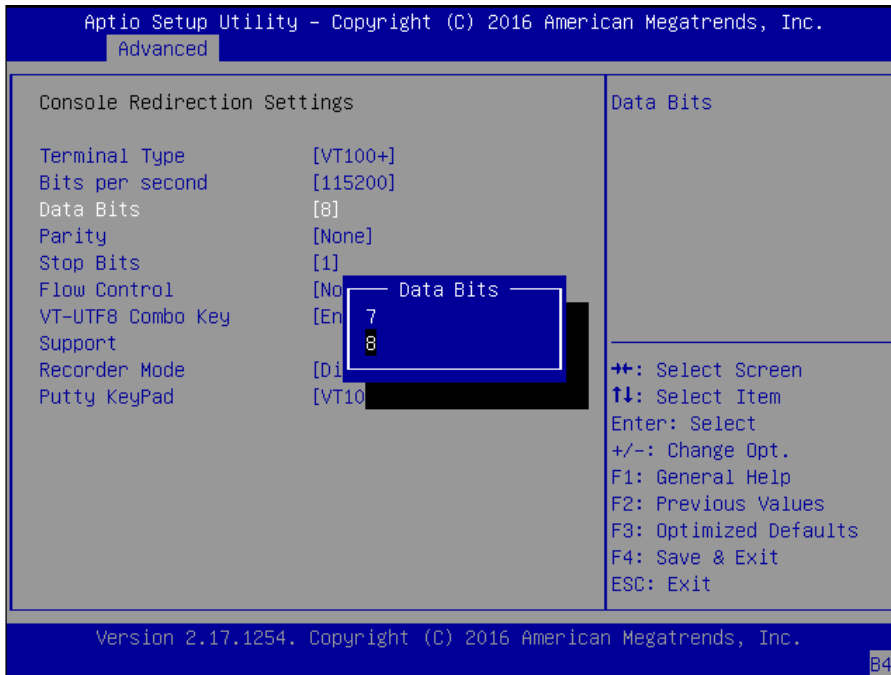
- **VT100:** ASCII character set
- **VT100+:** extends VT100 to support color function keys
- **VT-UTF8:** uses UTF8 encoding to map Unicode characters onto 1 or more
- **ANSI:** Extended ASCII character set



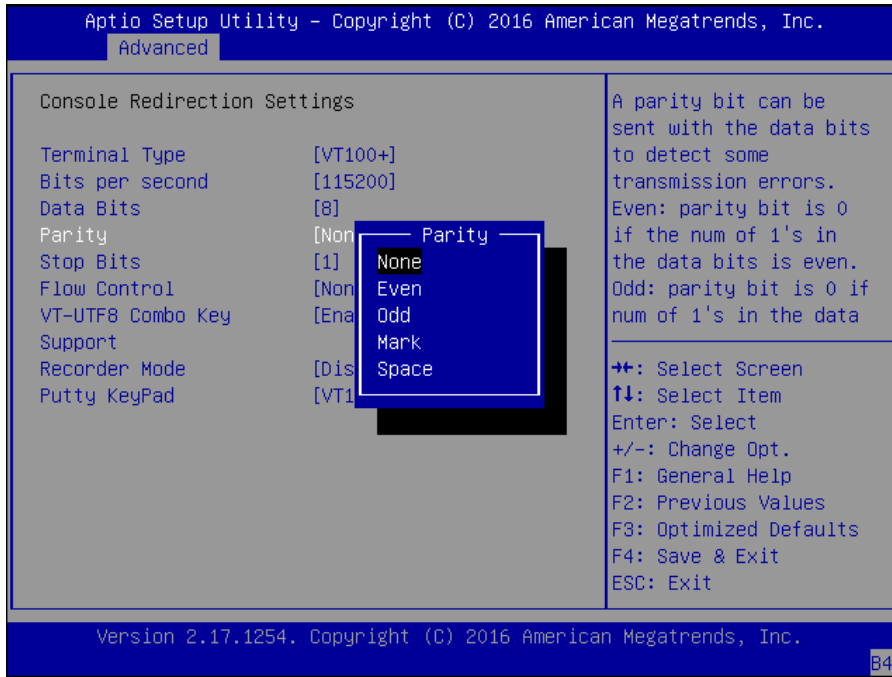
Bits per second: select "9600", "19200", "38400", "57600", or "115200" for bits per second. The Bps will determine serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds



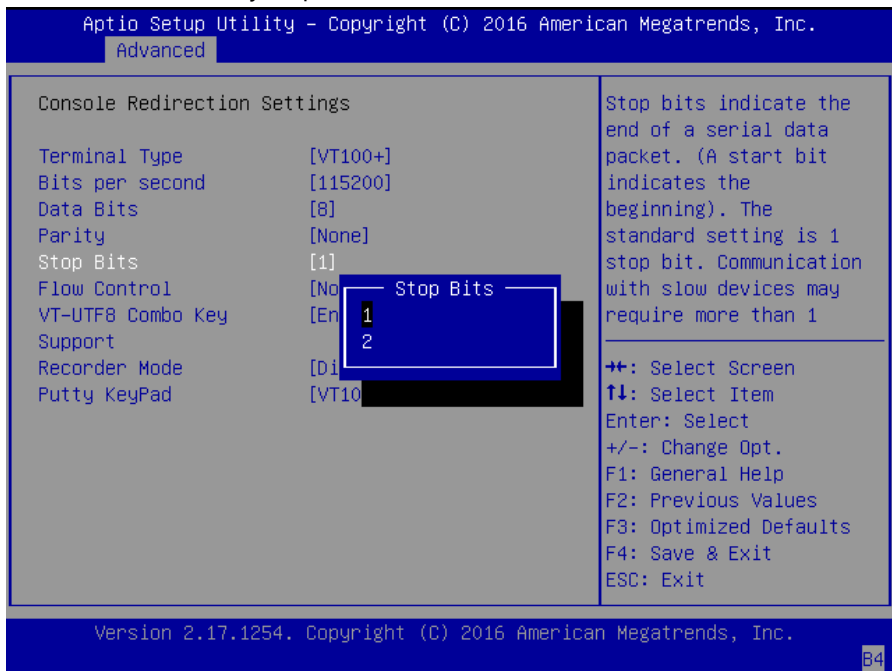
Data Bits: select the value for data bits. In this case, "7" or "8".



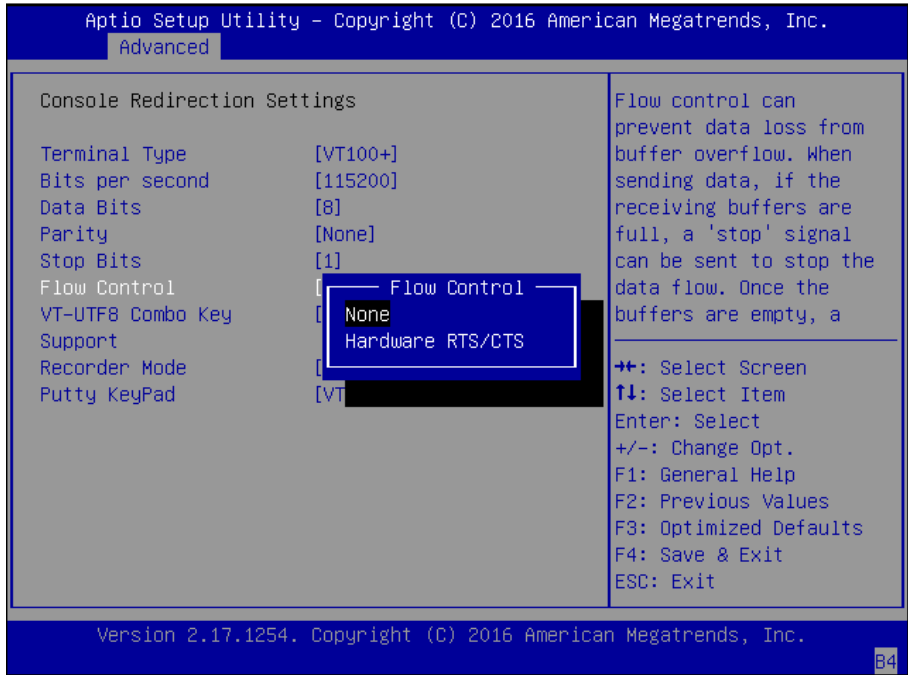
Parity Bits: a parity bit can be sent with the data bits to detect some transmission errors. Select "None", "Even", "Odd", "Mark" or "Space".



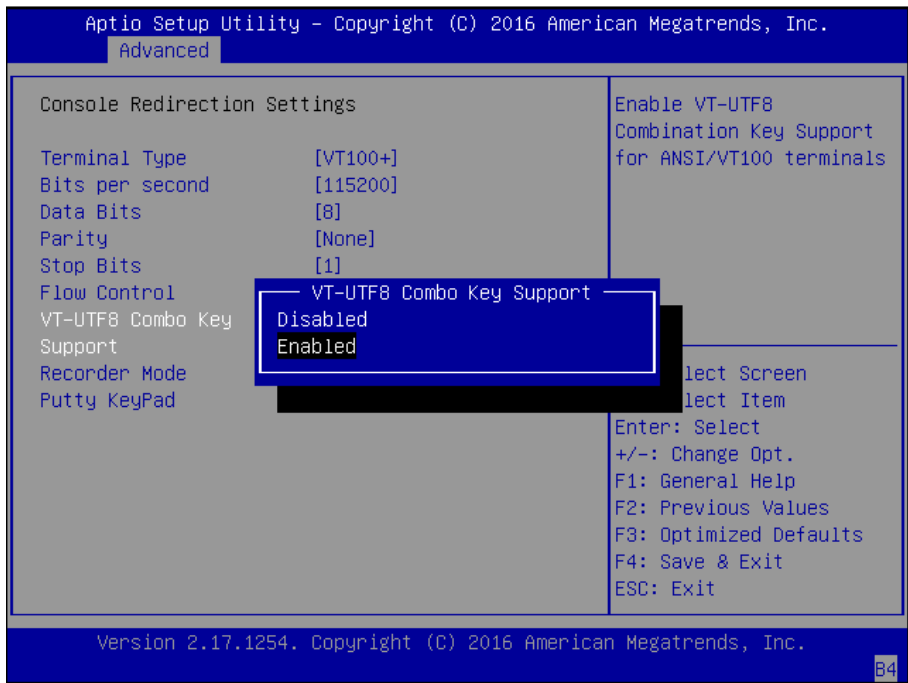
Stop Bits: stop bits indicate the end of a serial data packet. The standard is 1 stop bit. Communication with slow devices may require more than 1.



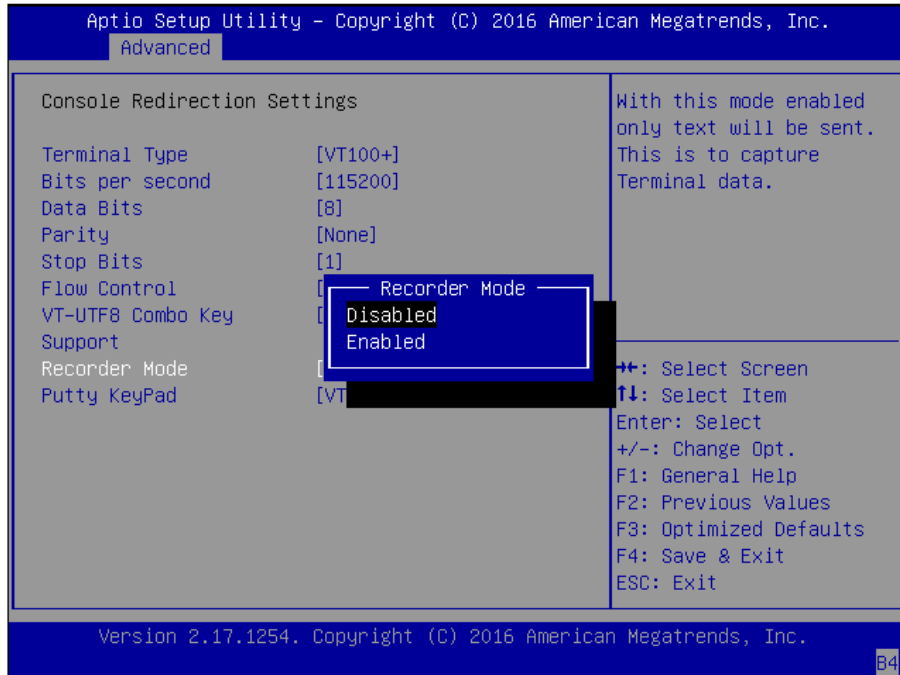
Flow Control: flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. You may select “None” or “Hardware RTS/CTS”, depending on the circumstances.



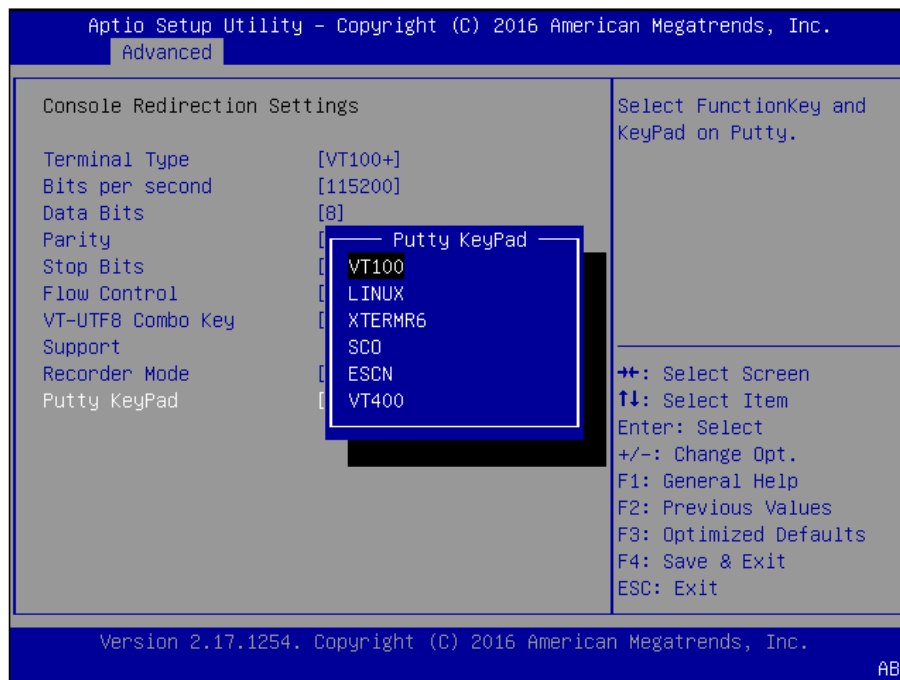
VT-UTF8 Combo Key Support: this option enables/disables VT-UTF8 combination key support for ANSI/VT100 terminals.



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

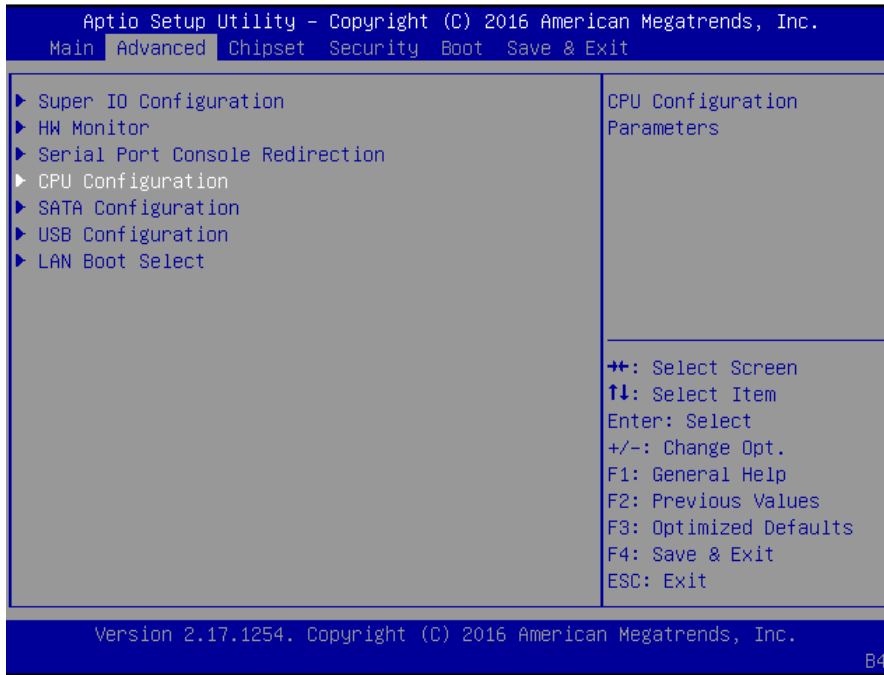


Putty KeyPad: select Function Key and Key Pad on Putty. You may select "VT100", "LINUX", "XTERMR6", "SCO", "ESCN", or "VT400".

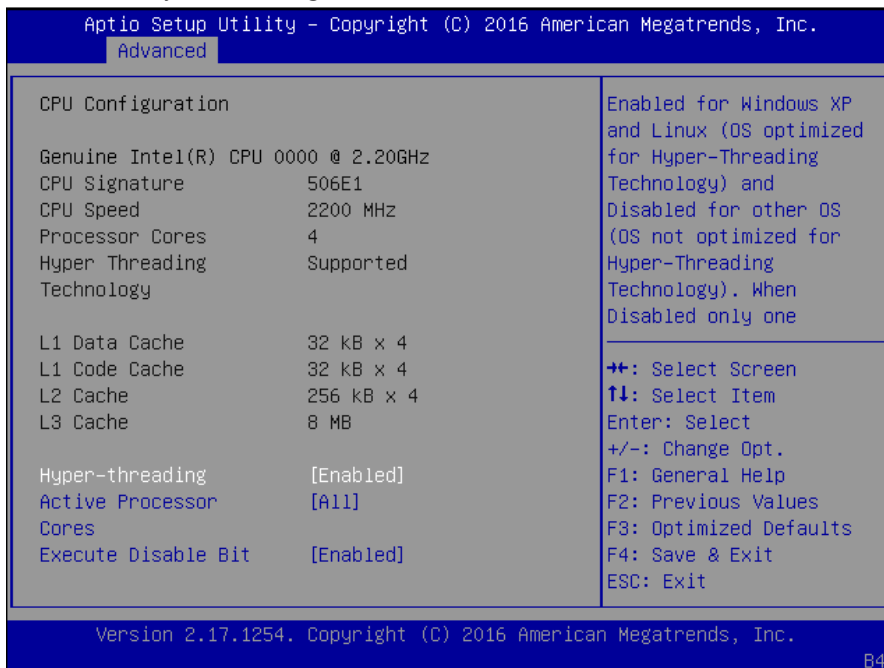


CPU Configuration

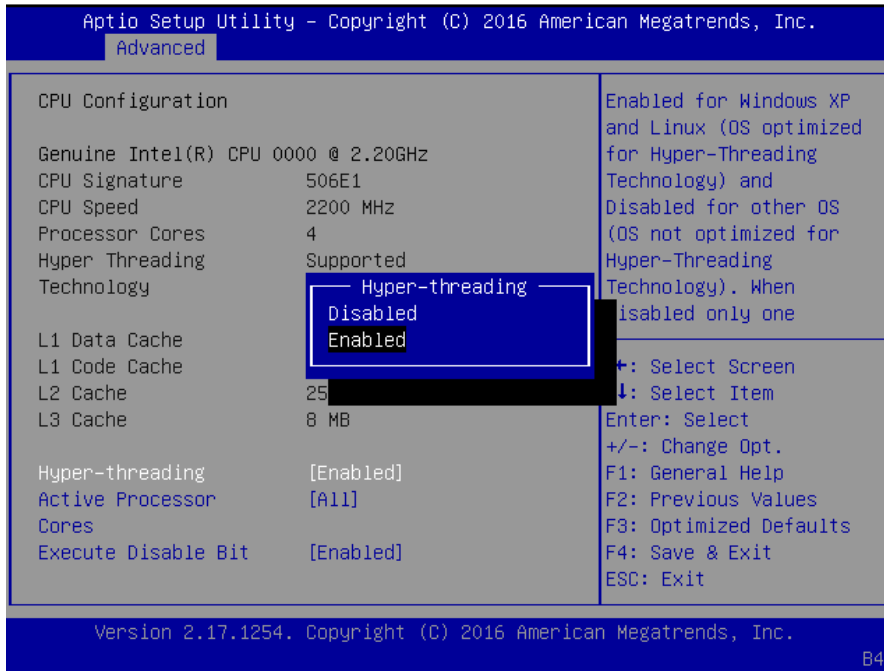
This option allows you to configure CPU parameters.



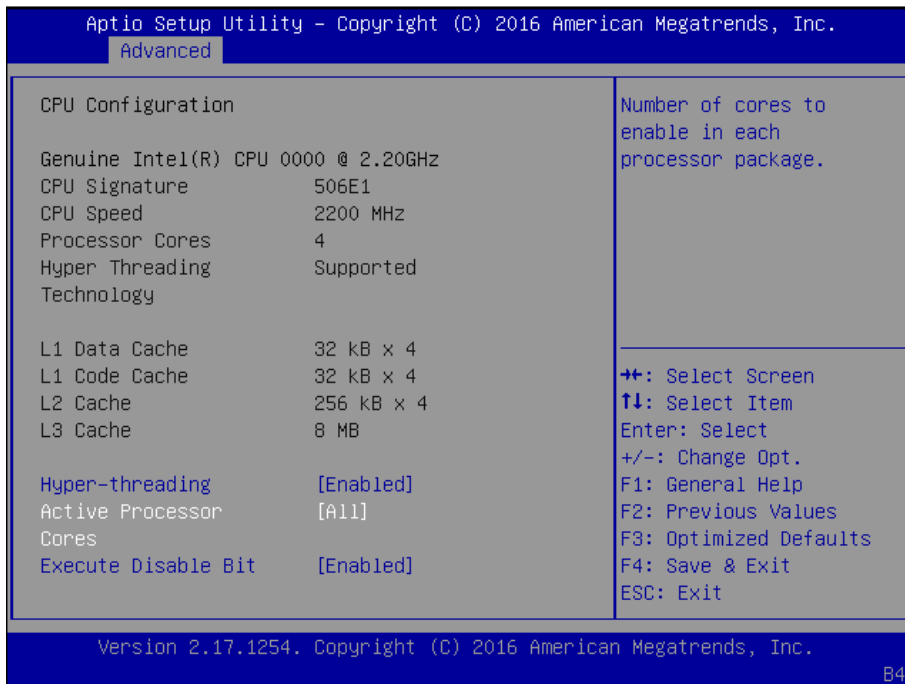
Hyper-threading: enabled for Windows XP and Linux (OS optimized for hyper-threading technology) and disabled for other OS that are not optimized for this feature. When enabled, multiple threads will run simultaneously on each logical core.



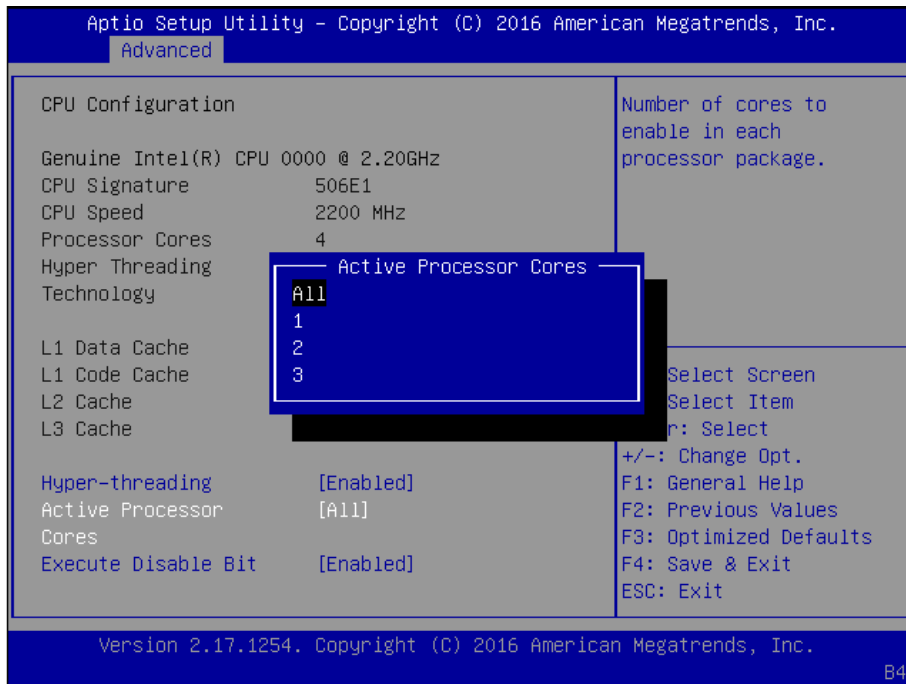
Press <Enter> to choose "Enabled" or "Disabled". It is recommended to select "Enabled".



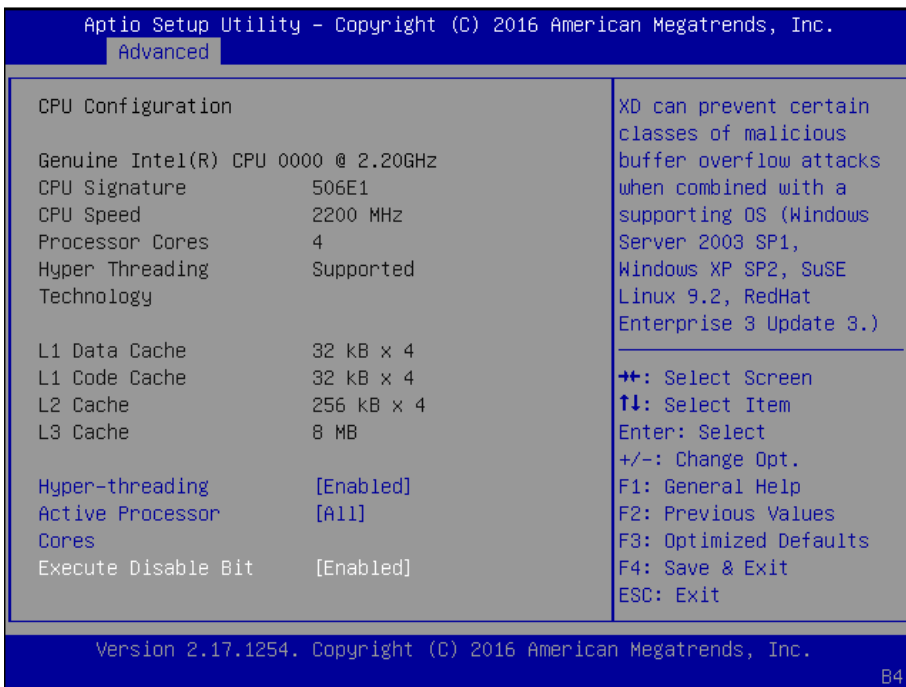
Active Processor Cores: number of cores to enable in each processor package. The default is "All" for optimization.



You may press <Enter> to select the number of cores to be enabled. It is recommended to select "All" for optimization.

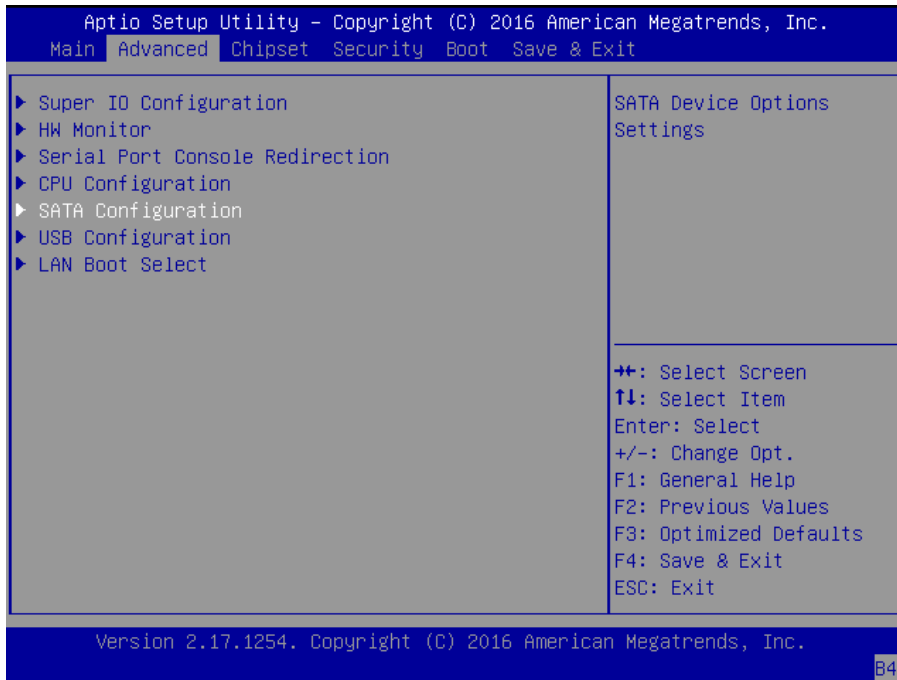


Execute Disable Bit: an Intel hardware-based protection against malicious code. It will detect the memory in which a code can be executed or not. When enabled, it will prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3). When disabled, it forces the XD feature flag to always return 0.

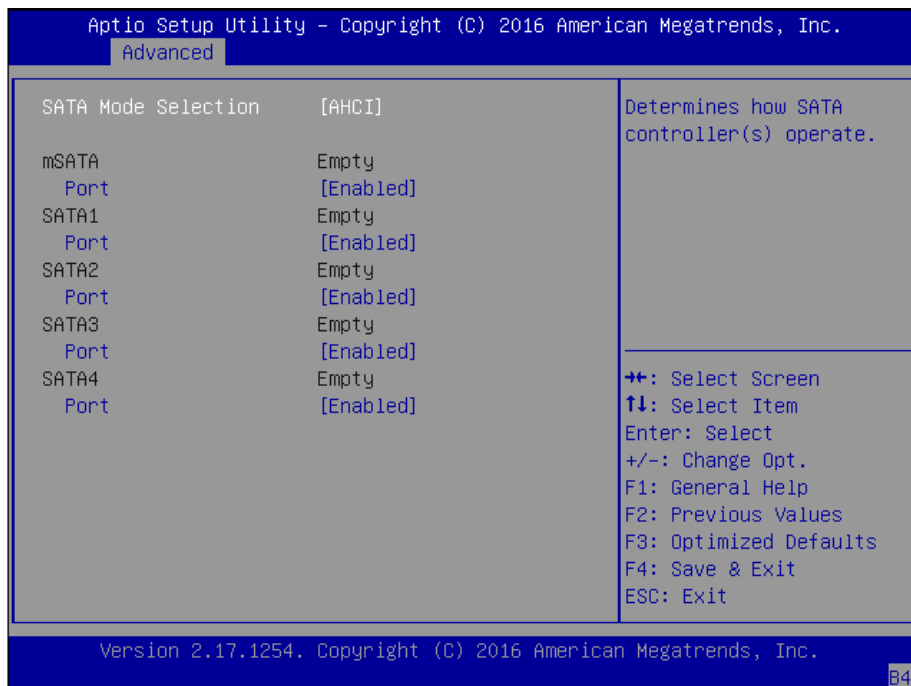


SATA Configuration

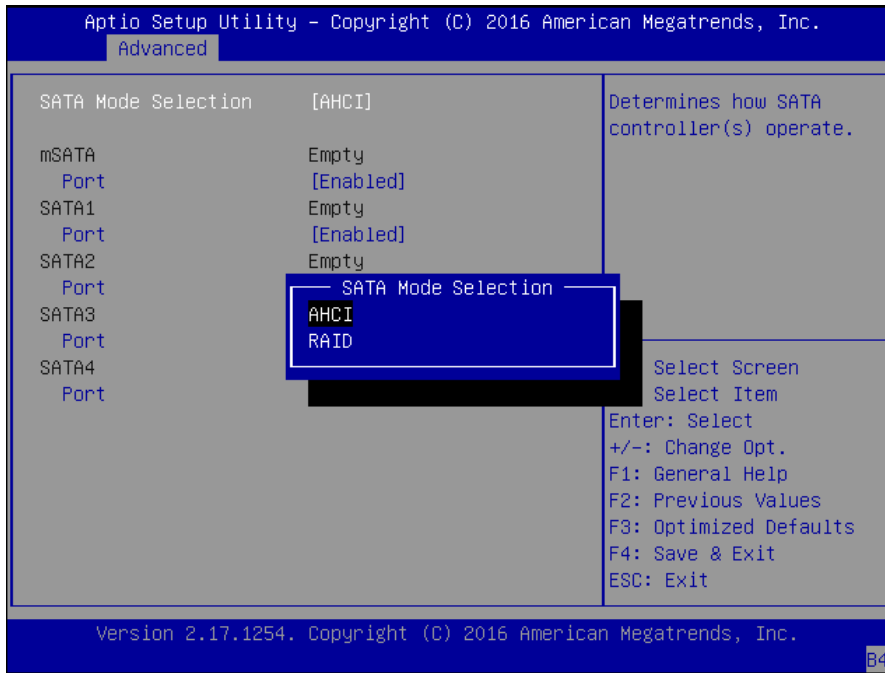
Press **<Enter>** to access items for SATA devices and settings.



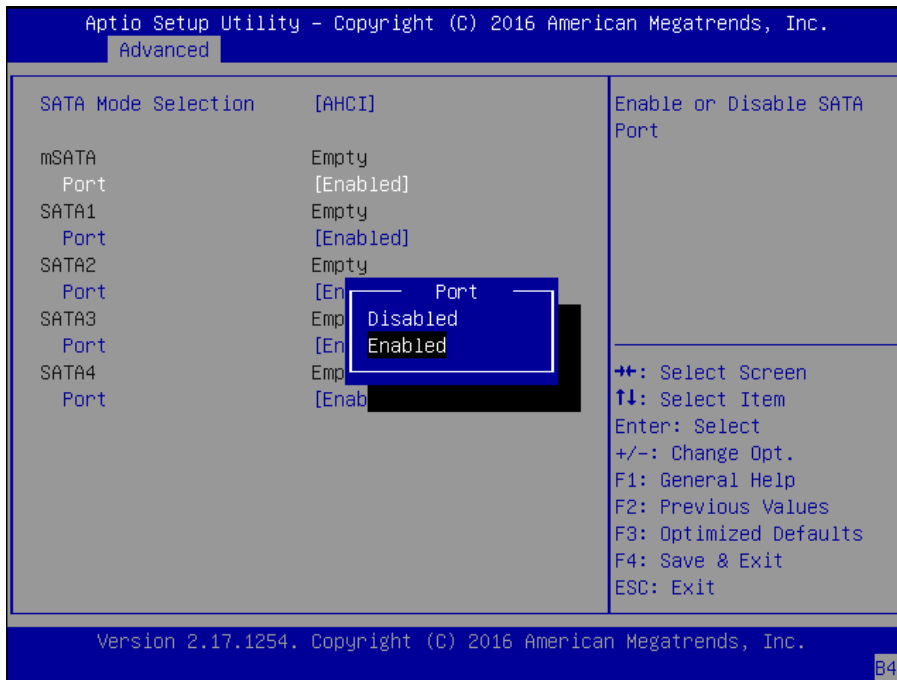
SATA Mode Selection: the selection to determine how SATA controllers operate.



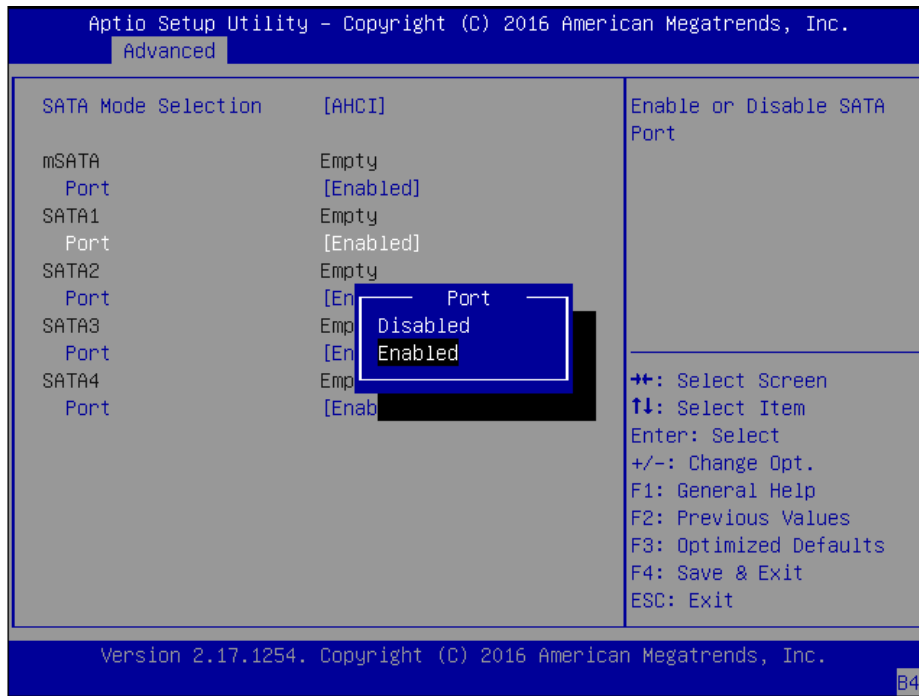
You may select "AHCI" or "RAID" mode. Please be noted that there must be two SATA disk drives installed in order to enable RAID mode.



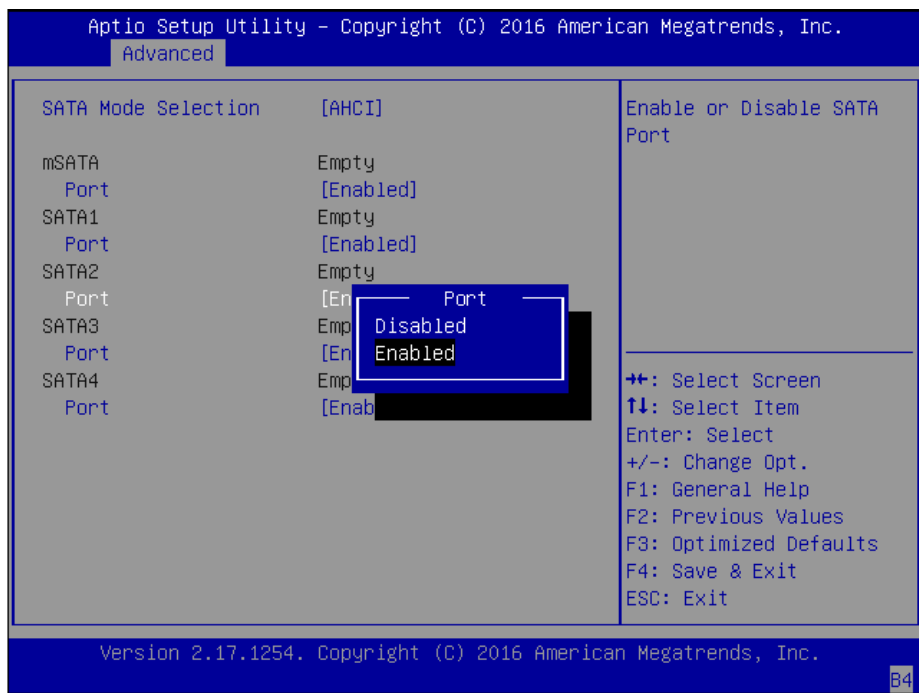
mSATA: enable or disable the mSATA port



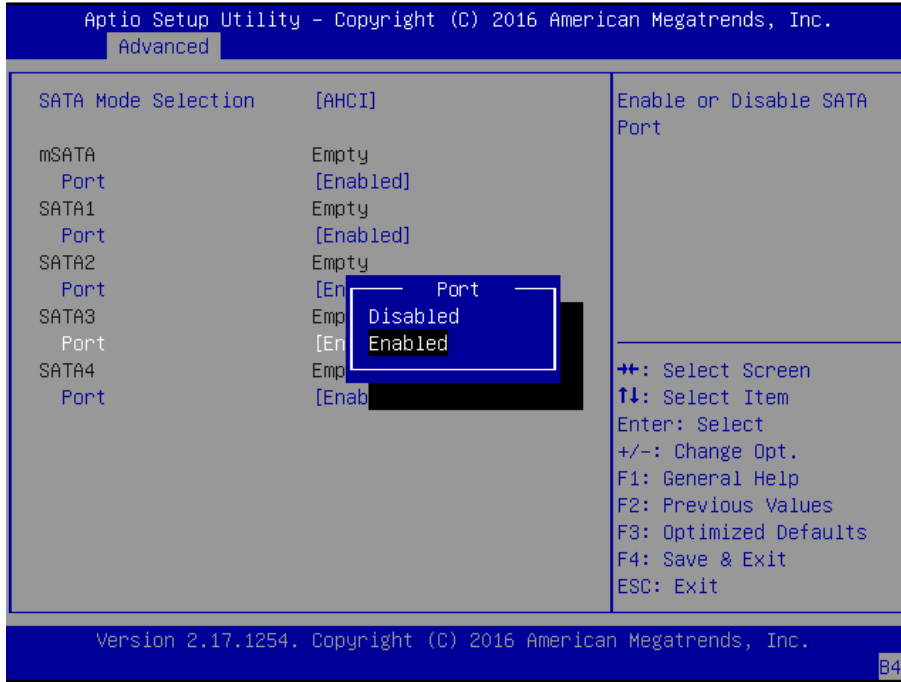
SATA1: enable or disable the SATA1 port



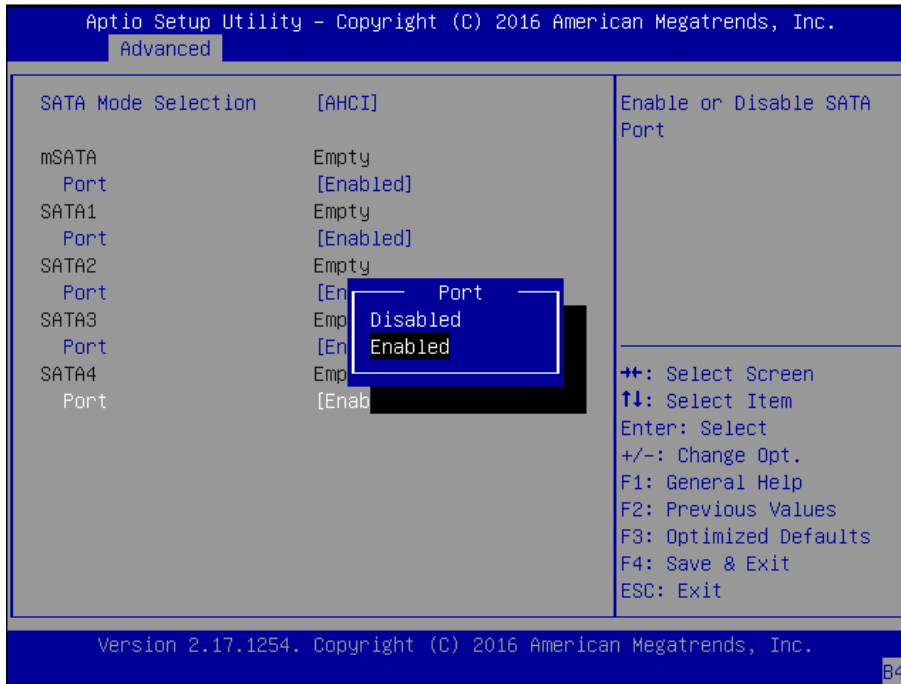
SATA2: enable or disable the SATA2 port



SATA3: enable or disable the SATA3 port

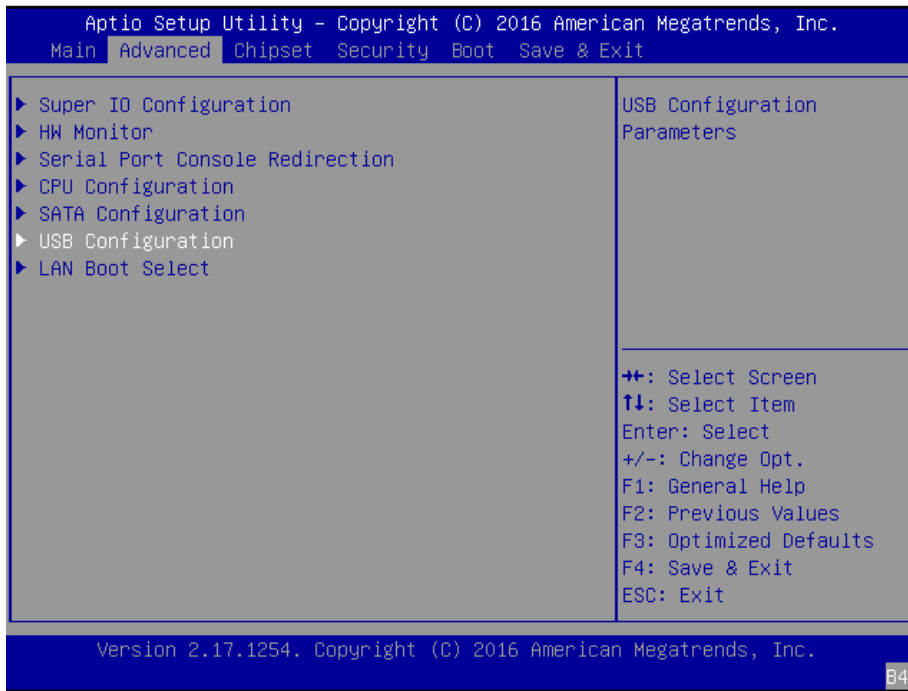


SATA4: enable or disable the SATA4 port



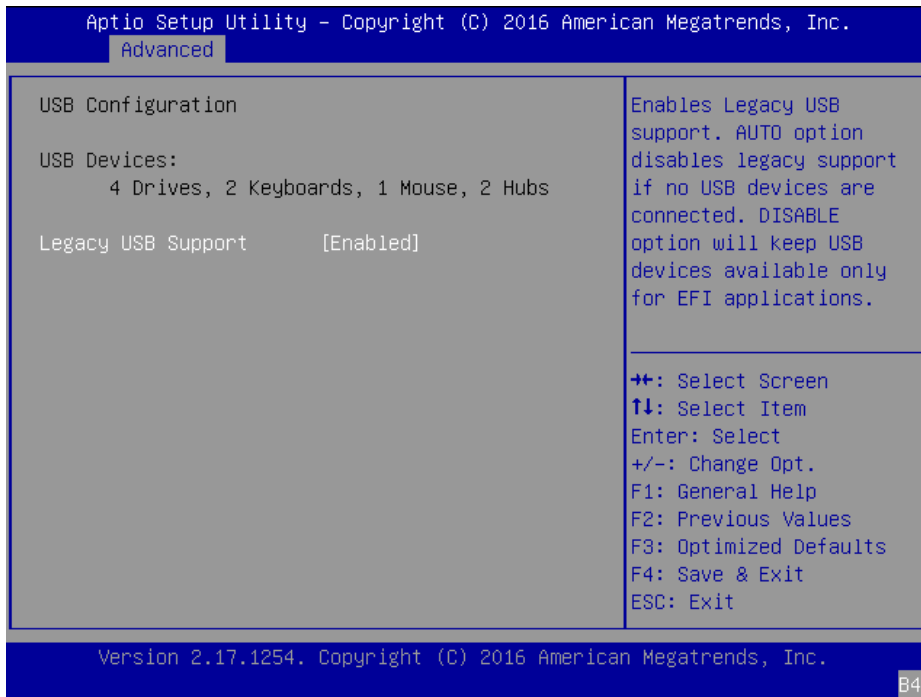
USB Configuration

This option allows you to configure USB device Settings.

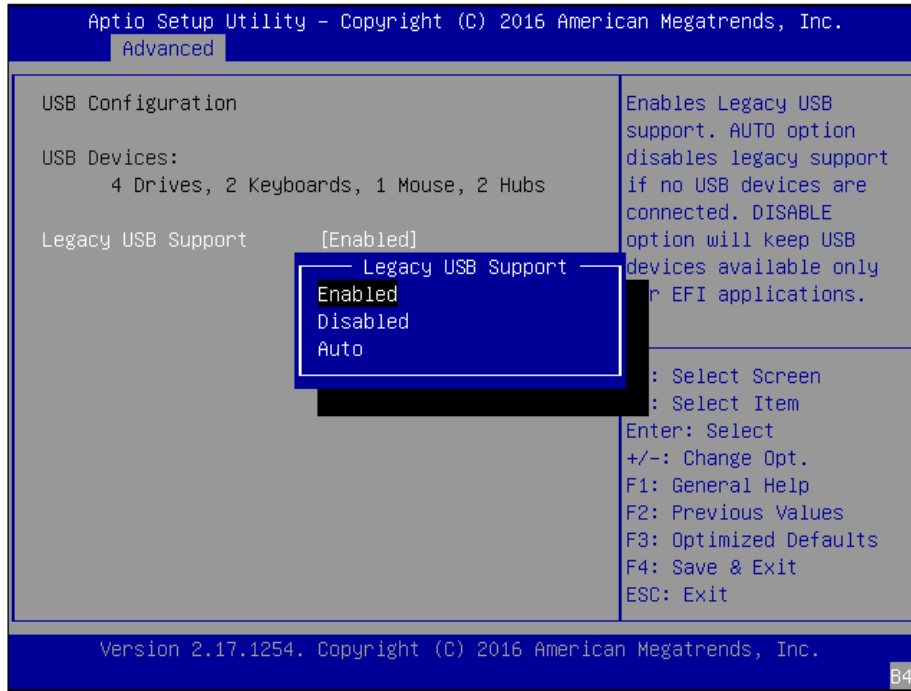


USB Devices: displays USB devices

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

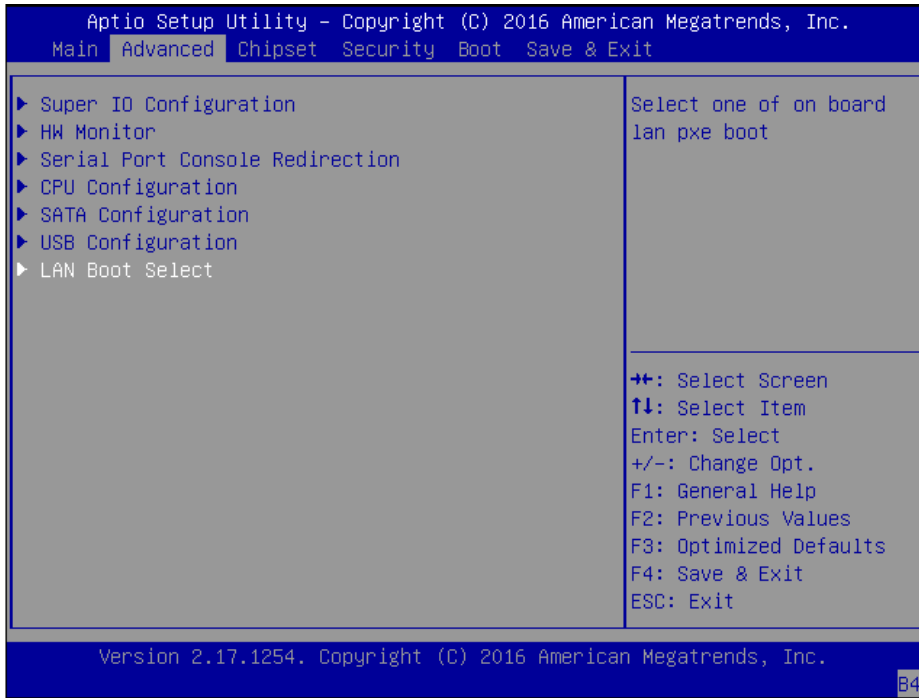


You may select "Enabled", "Disabled" or "Auto".

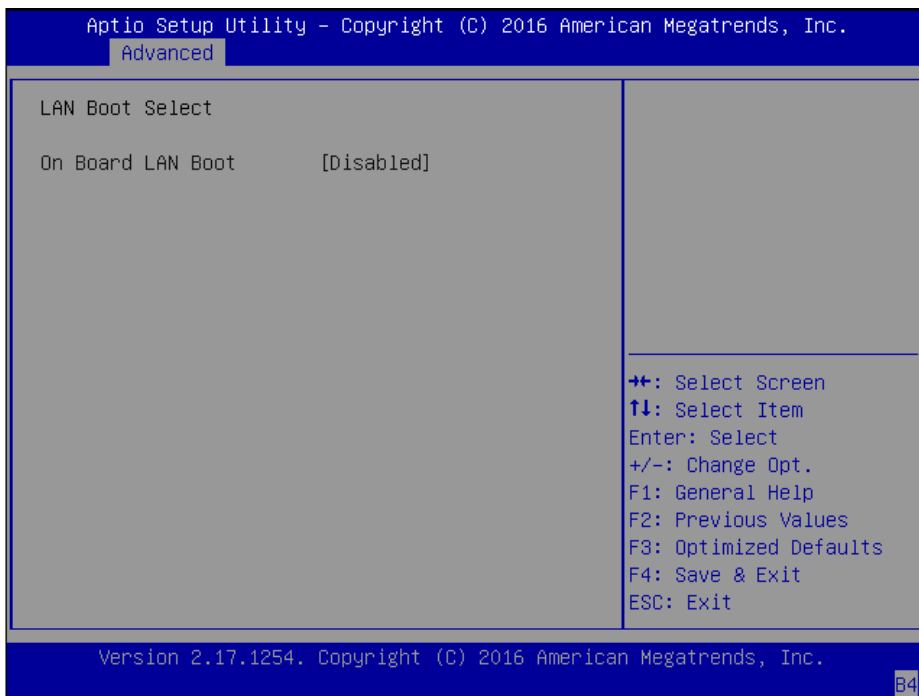


LAN Boot Select

This option allows you to select one of the onboard LAN boot. Press **<Enter>** to access the sub-menu.



On Board LAN Boot: the default is "Disabled"

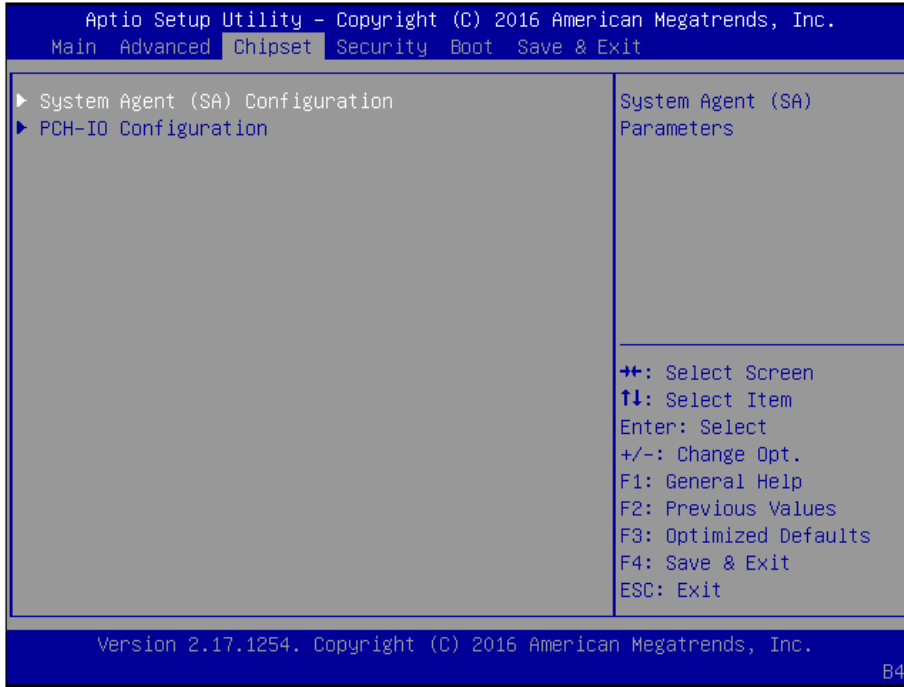


Chipset

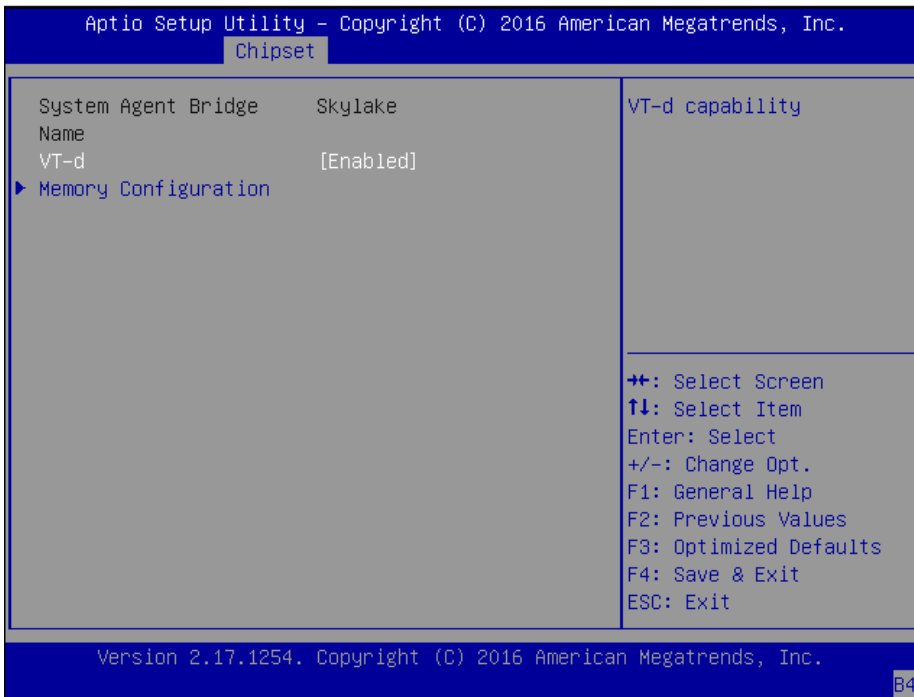
Use [**<--**] / [**-->**] to select [Chipset] setup screen. Under this screen, you may use [**↑**] [**↓**] to select "System Agent (SA) Configuration" or "PCH-IO Configuration".

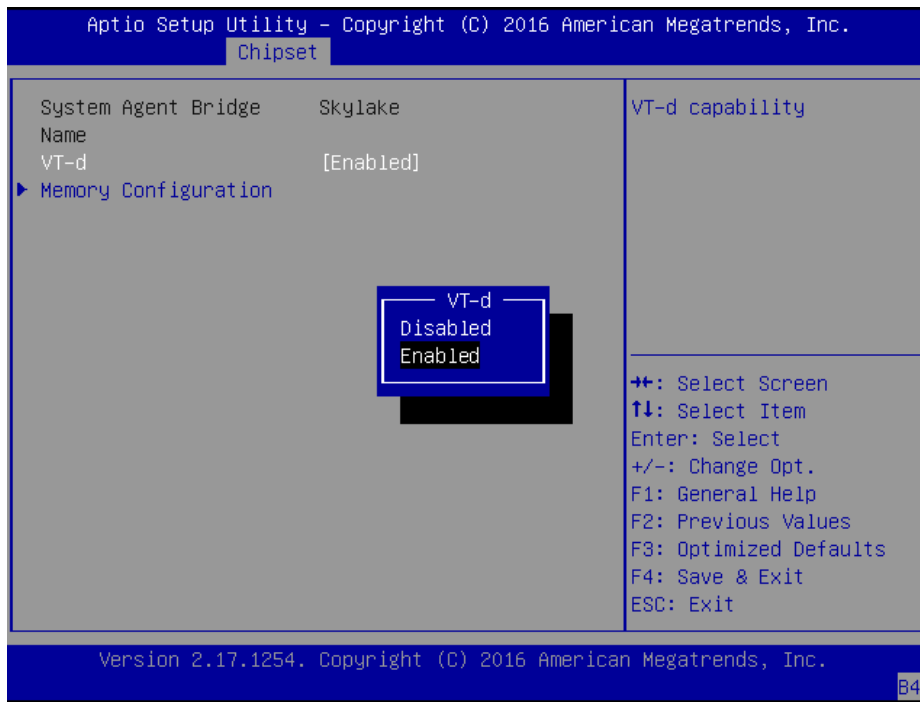
System Agent (SA) Configuration:

displays and provides options to configure system agent (SA) parameters



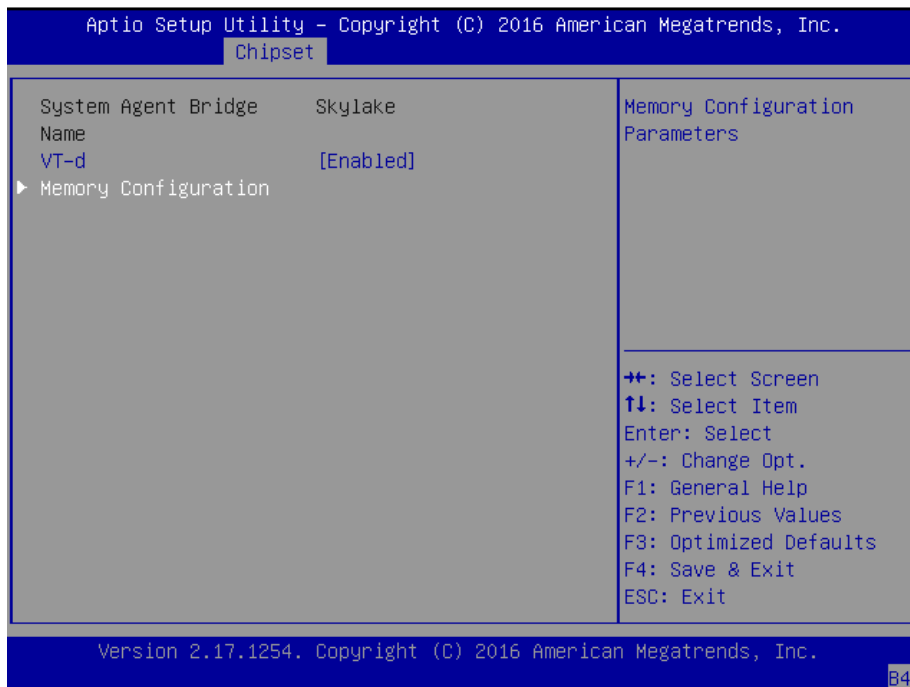
VT-d: select "Enabled" or "Disabled" for Intel VT-d virtualization function.



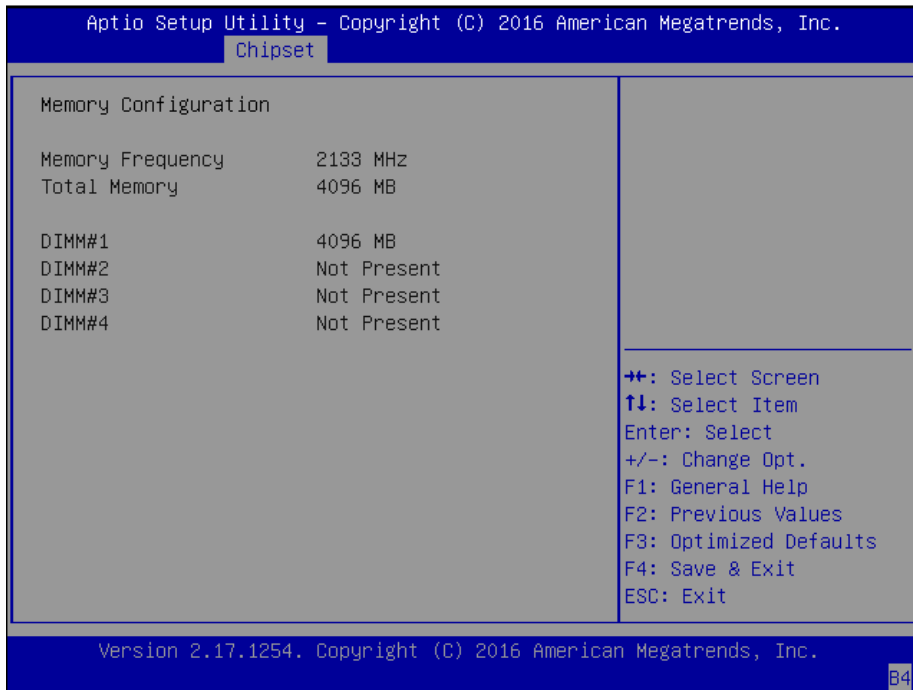


Memory Configuration

Memory Configuration provides memory configuration parameters.



Once accessed, information about memory frequency, total memory, and DIMM#1-4 status will be displayed.



PCH-IO Configuration

PCH-IO configuration provides PCH parameters.

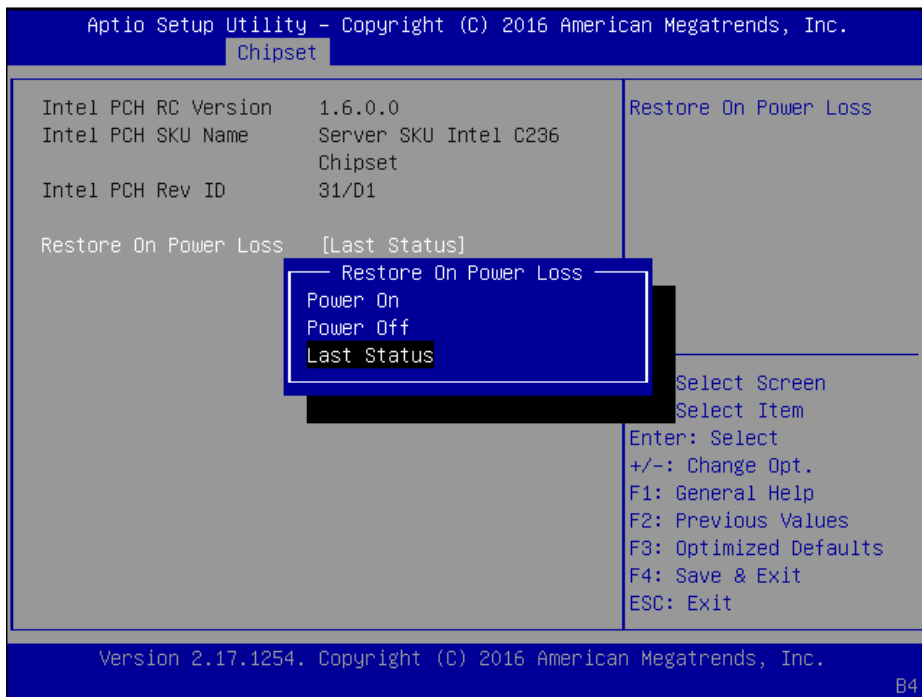
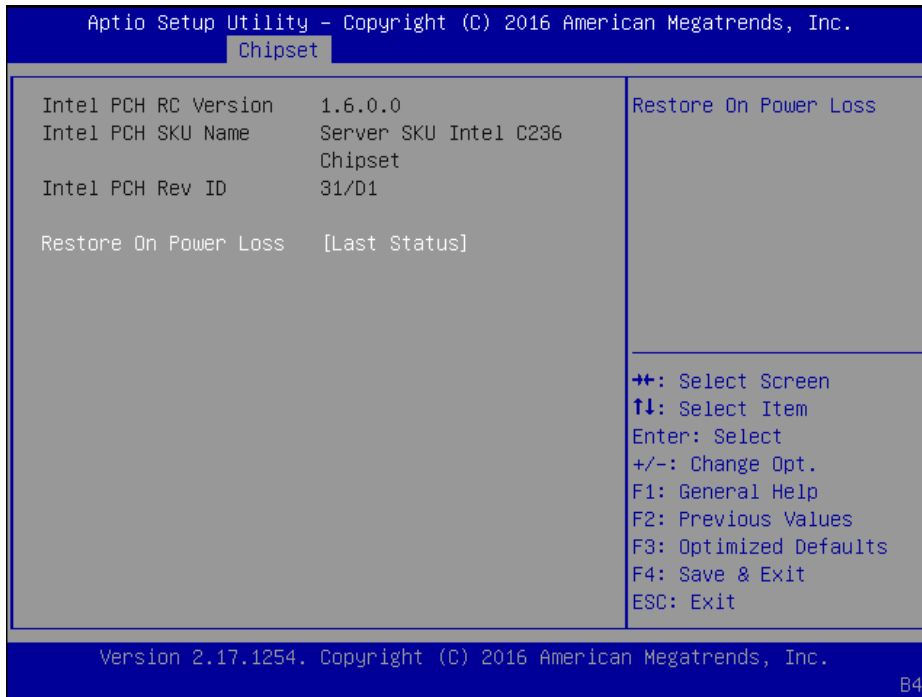


Intel PCH RC Version: displays Intel PCH RC version

Intel PCH SKU Name: displays PCH SKU name

Intel PCH Rev ID: displays Intel PCH revision ID

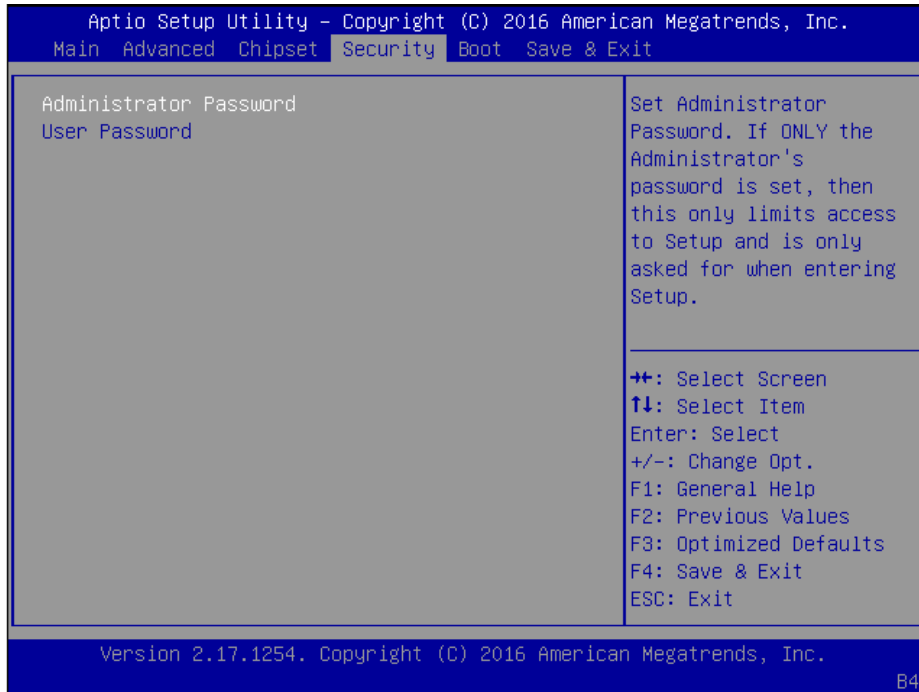
Restore On Power Loss: select "Restore On Power Loss" options: Power On, Power Off, or Last Status.



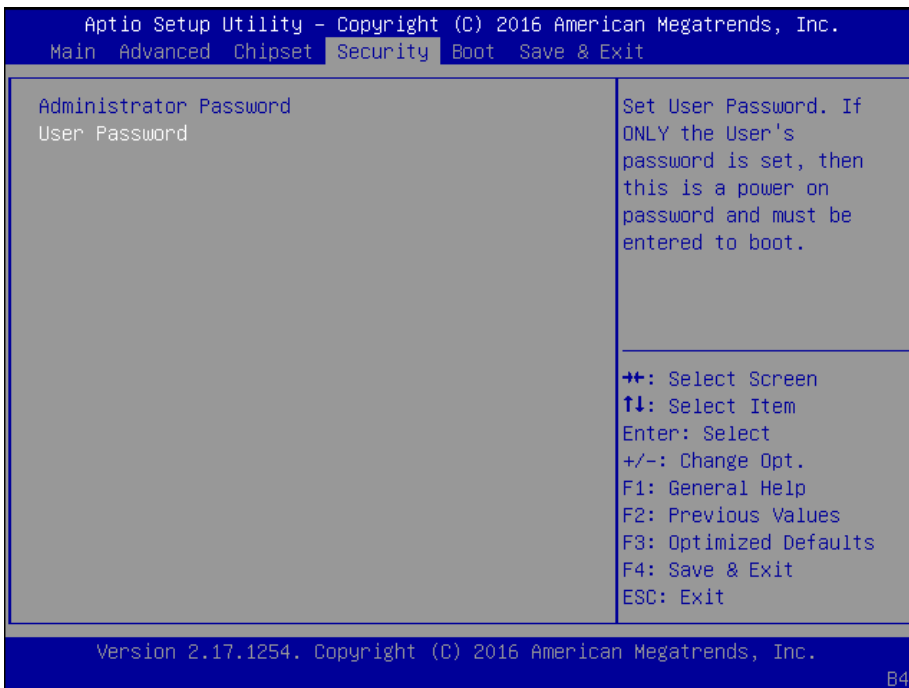
Security

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.



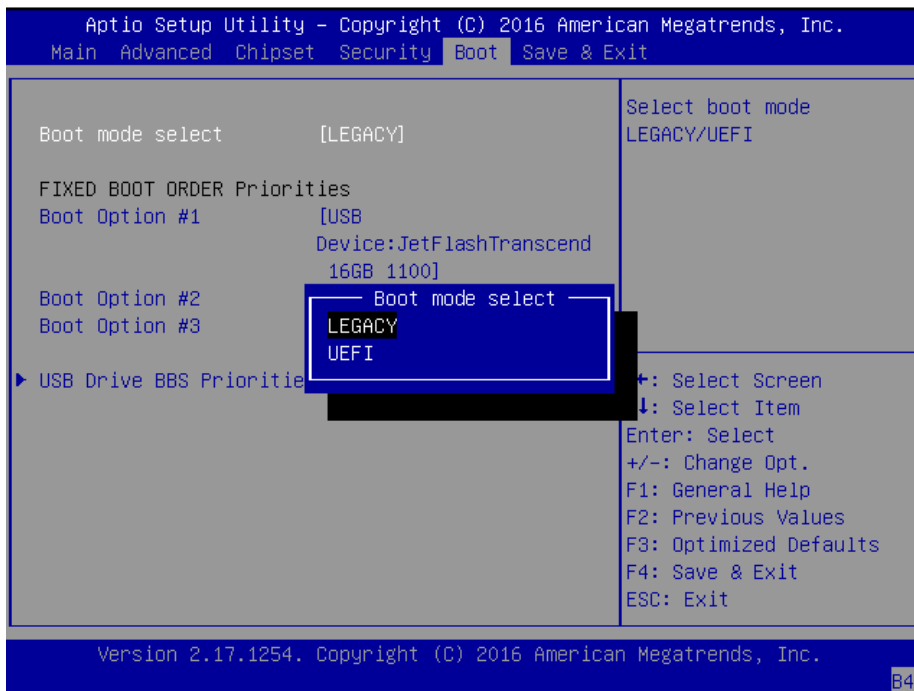
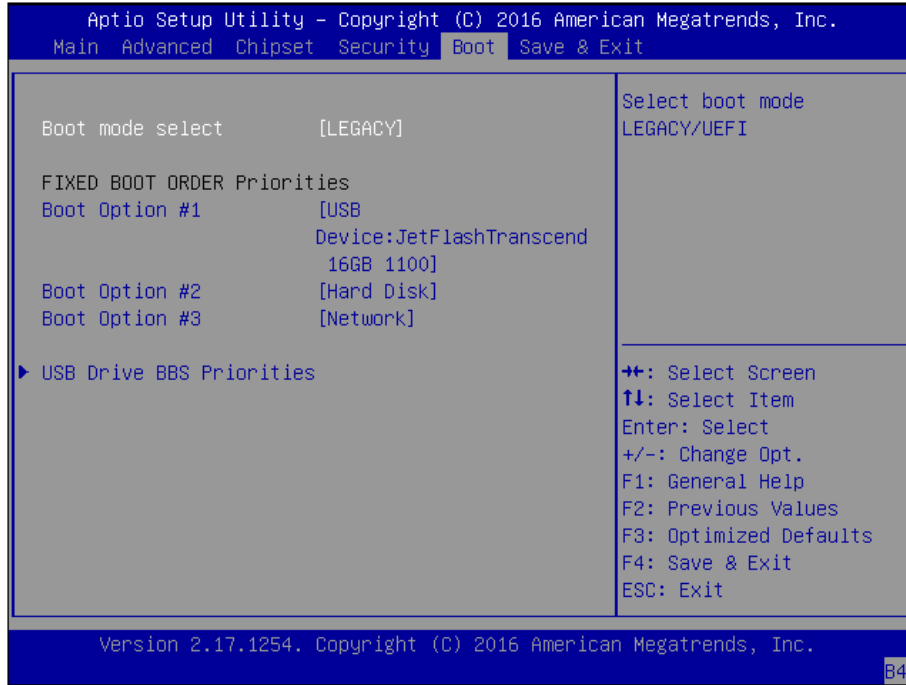
User Password: set user password. Once set, then this is a power-on password and must be entered to boot or enter Setup.



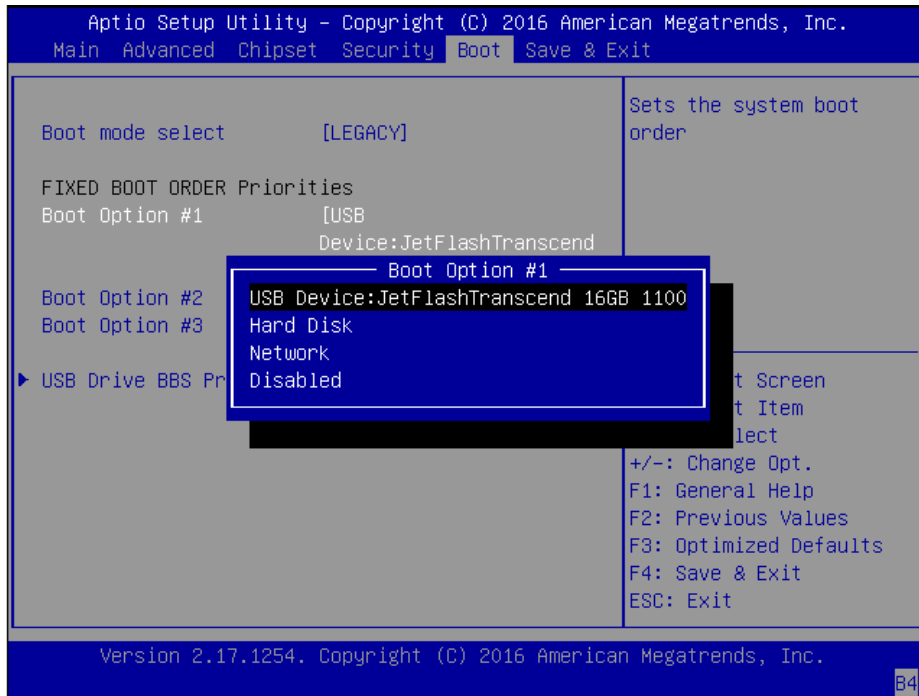
Boot

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

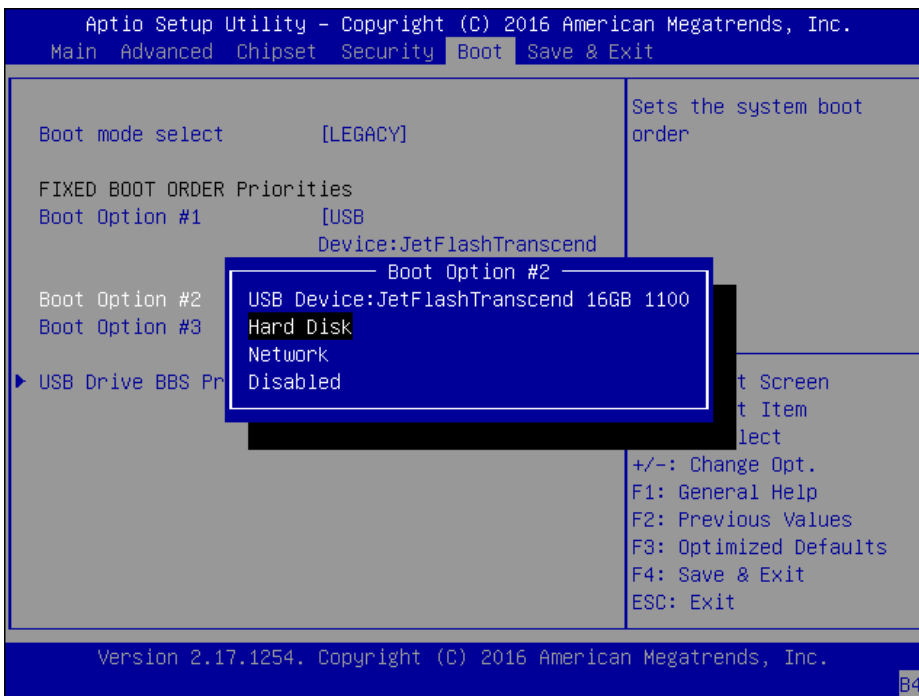
Boot mode select: select boot mode LEGACY or UEFI.



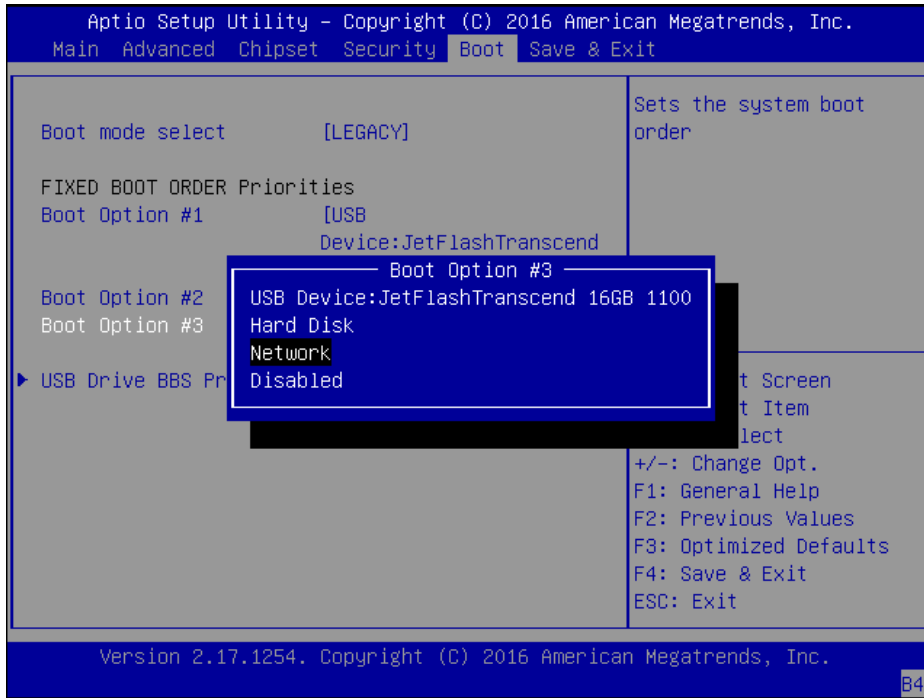
Boot Option #1: determine the device to be the first system boot device.



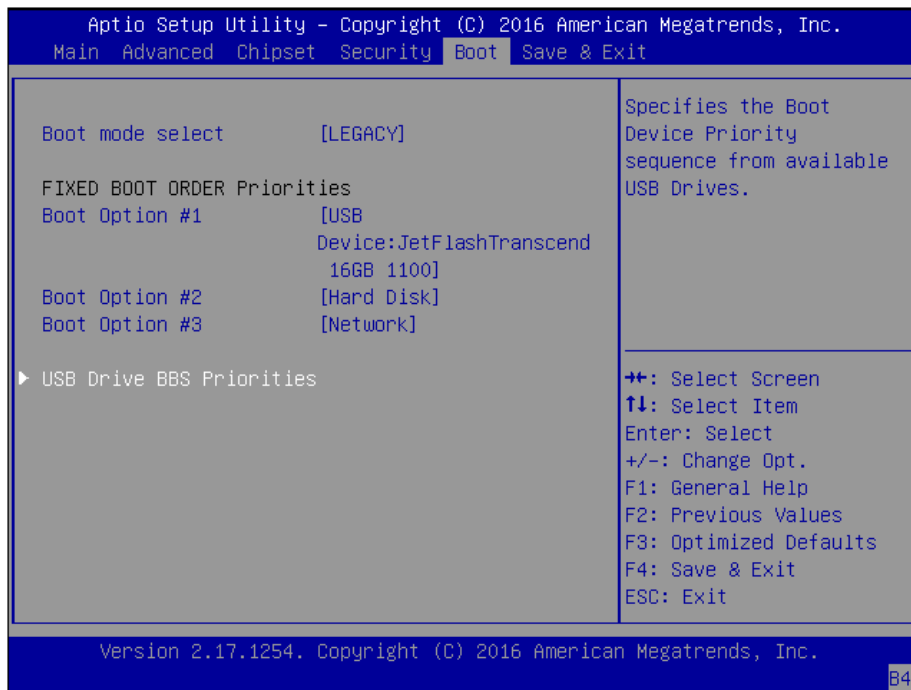
Boot Option #2: determine the device to be the second system boot device.



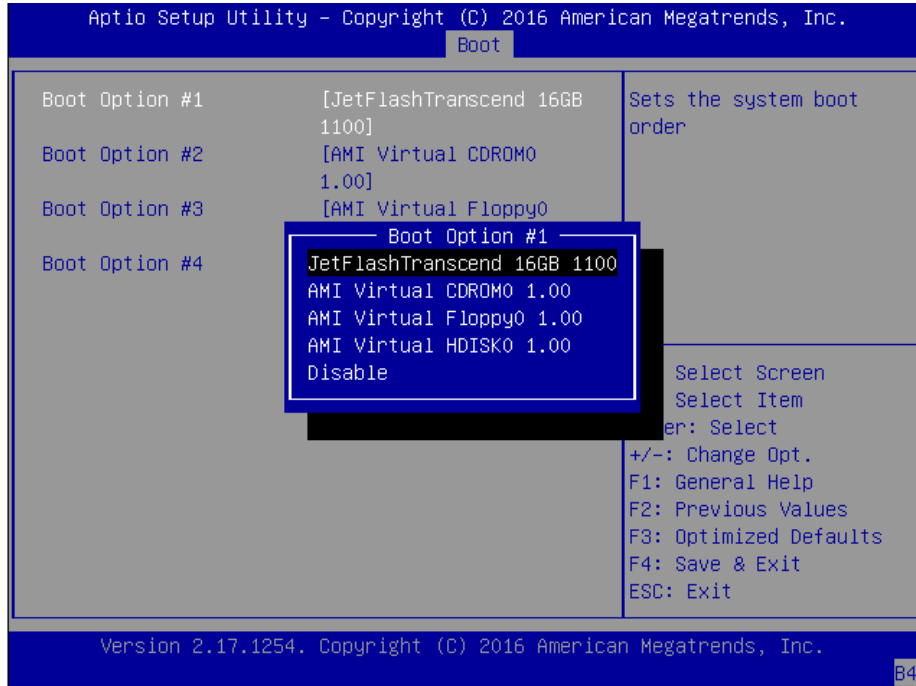
Boot Option #3: determine the device to be the third system boot device.



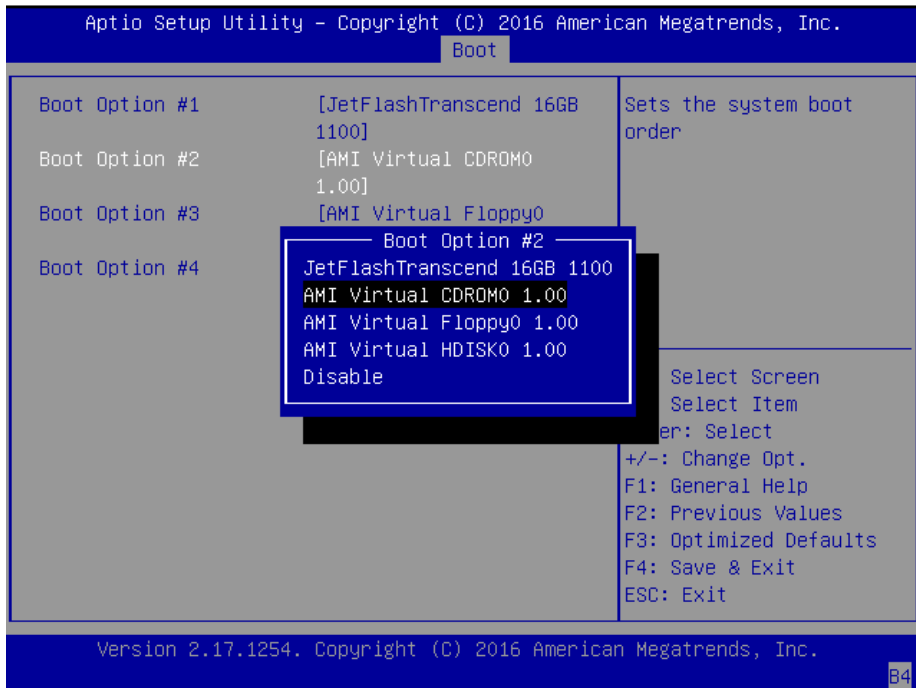
USB Device BBS Priorities: specifies the boot device priority sequence from available USB drives.



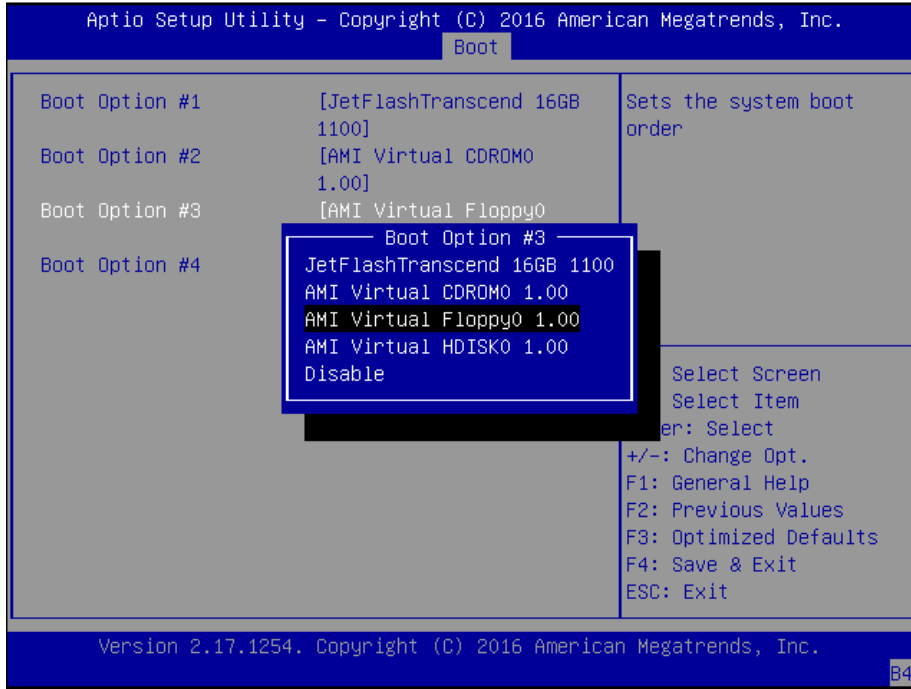
Boot Option #1: set the device to be the first system boot device.



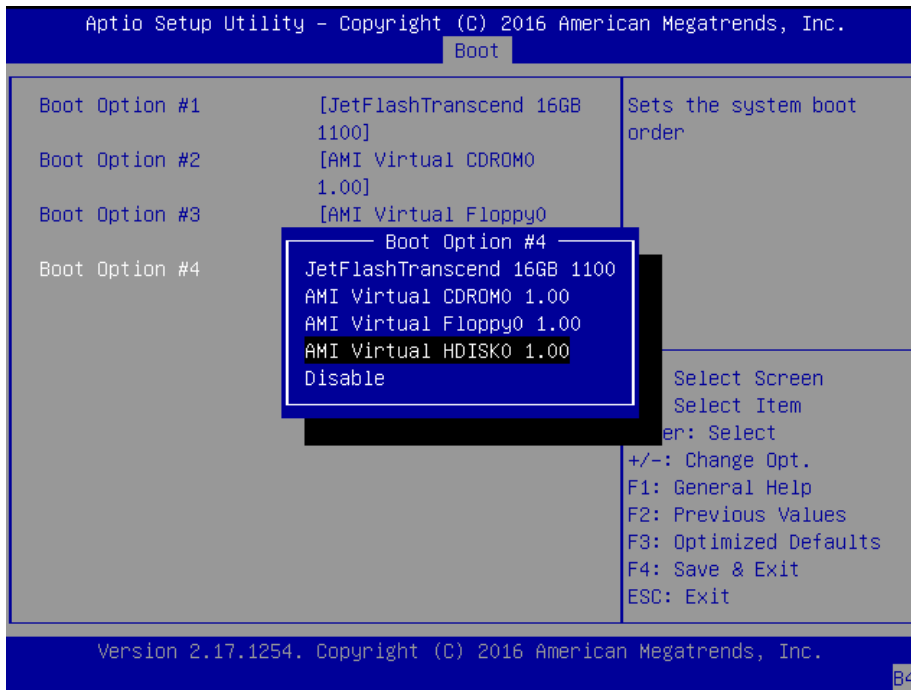
Boot Option #2: determine the device to be the second system boot device.



Boot Option #3: determine the device to be the third system boot device.



Boot Option #4: determine the device to be the fourth system boot device.



Save & Exit

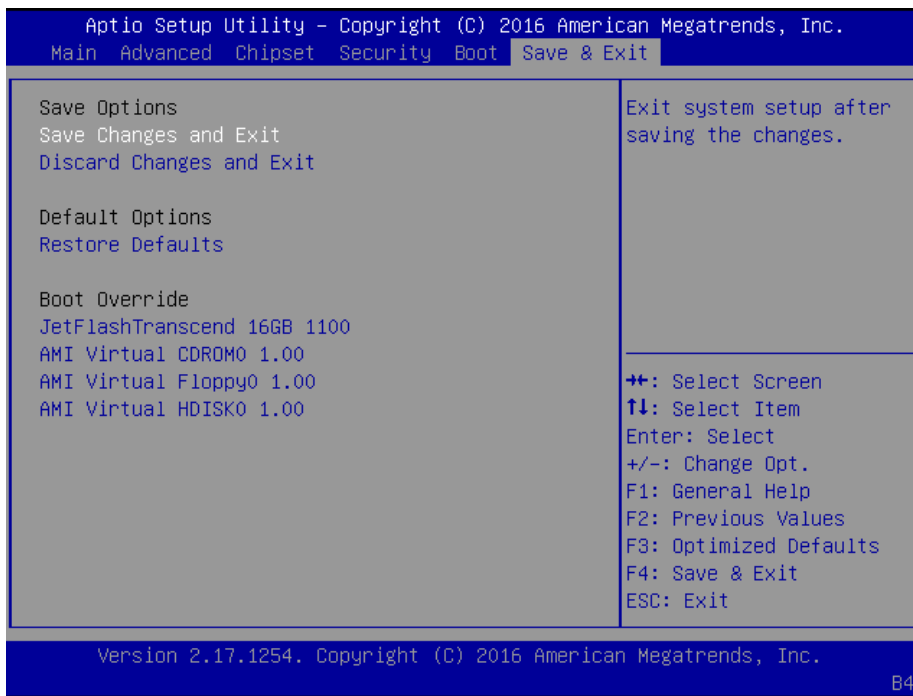
Use [**<**->] / [**>**->] to select [Save & Exit] setup screen. Under this screen, you may use [**F1**] [**F4**] to select an item you want to configure.

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

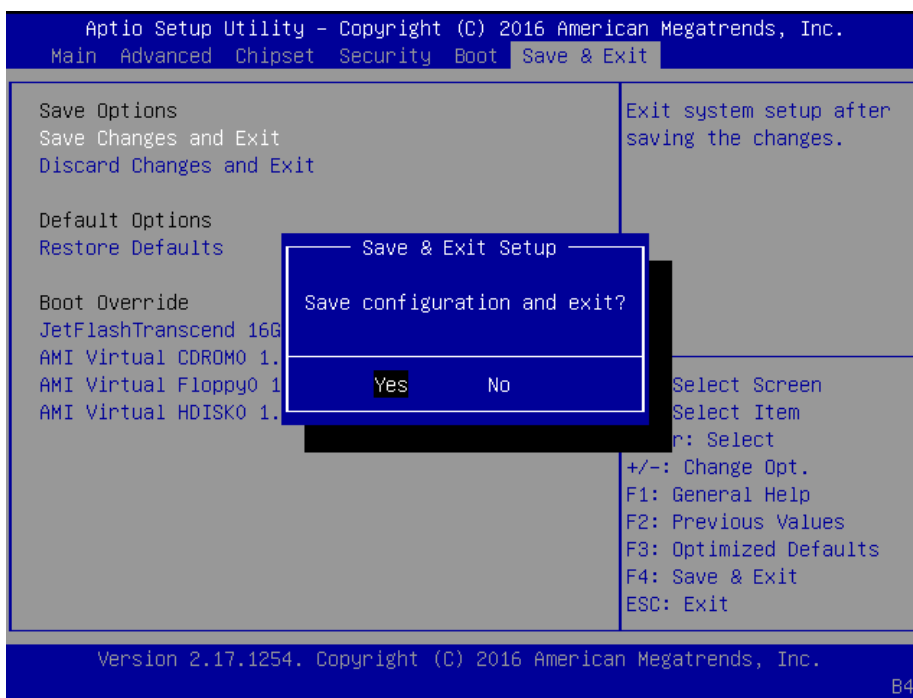
Discard Changes and Exit: exit system setup without saving the configuration changes

Restore Defaults: restore to factory default setting

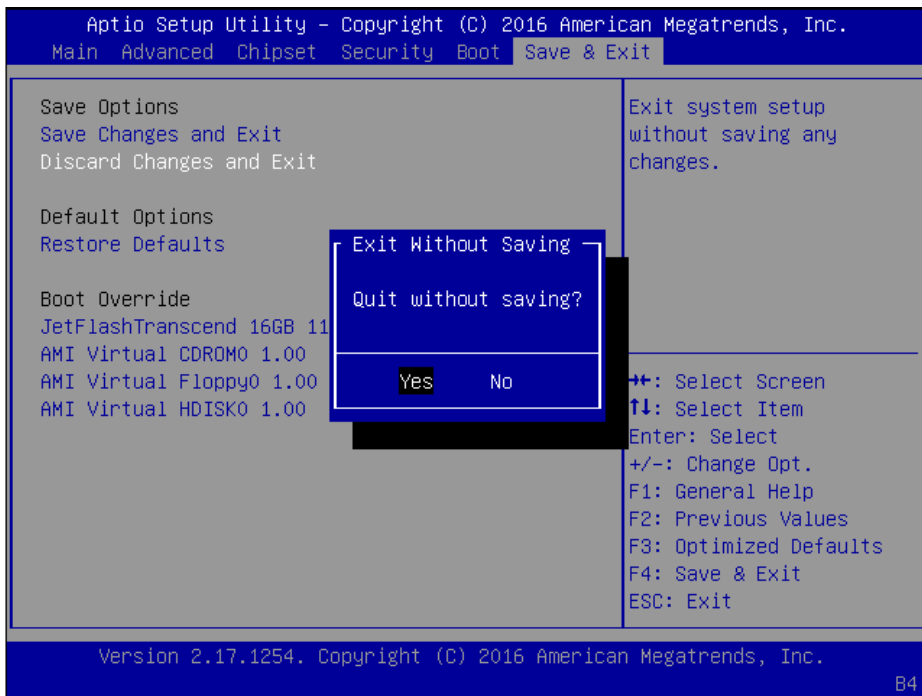
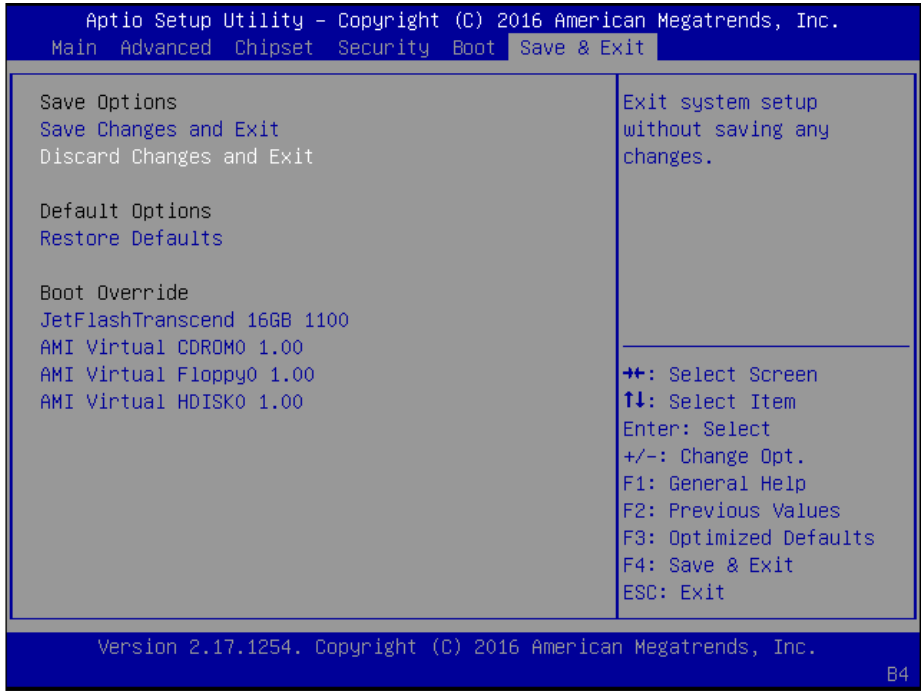
Boot Override



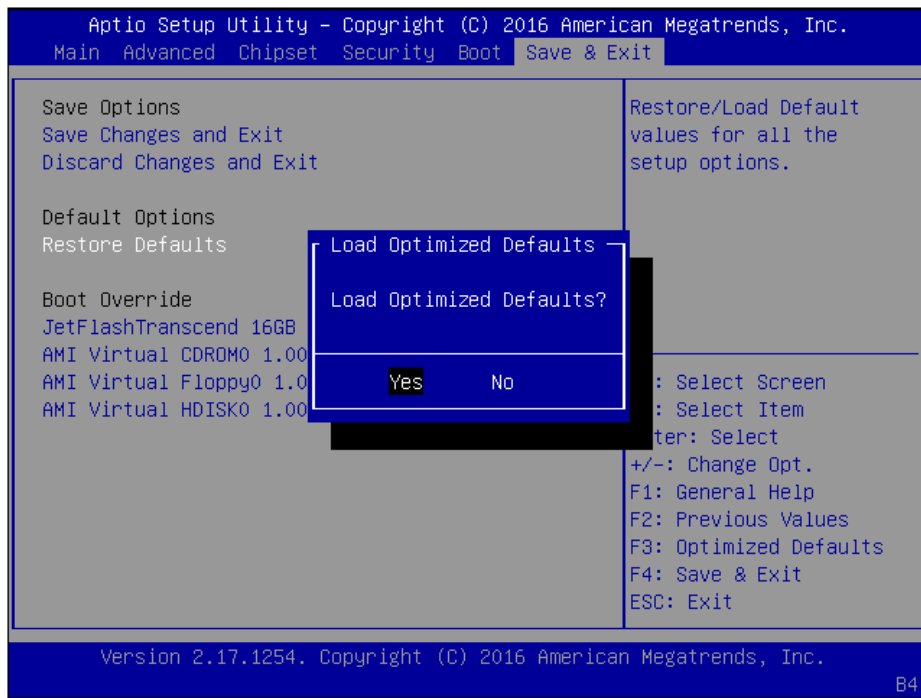
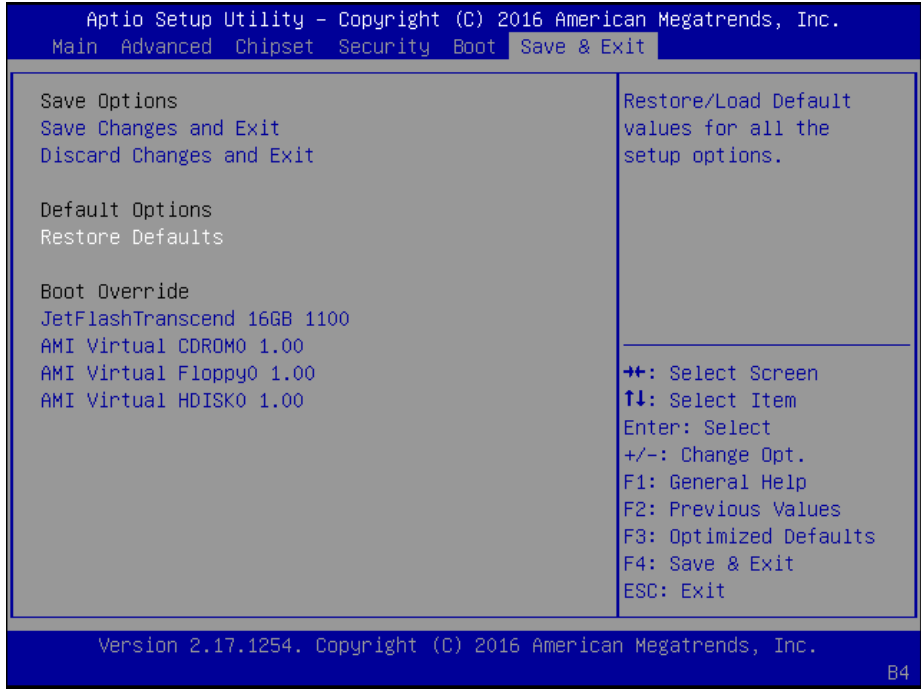
Save Changes and Exit: exit system setup after saving the configuration changes



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

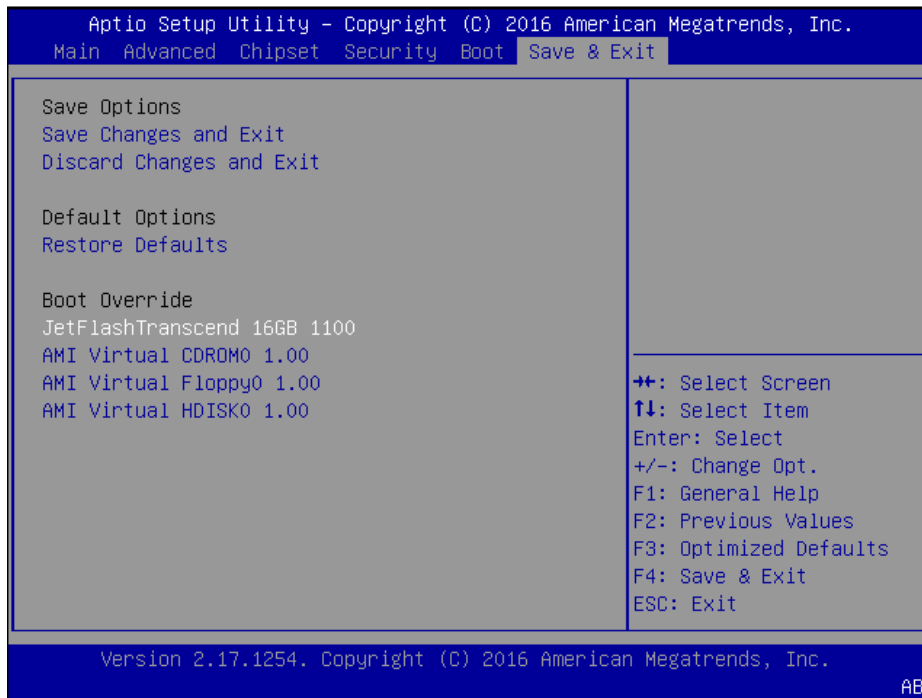


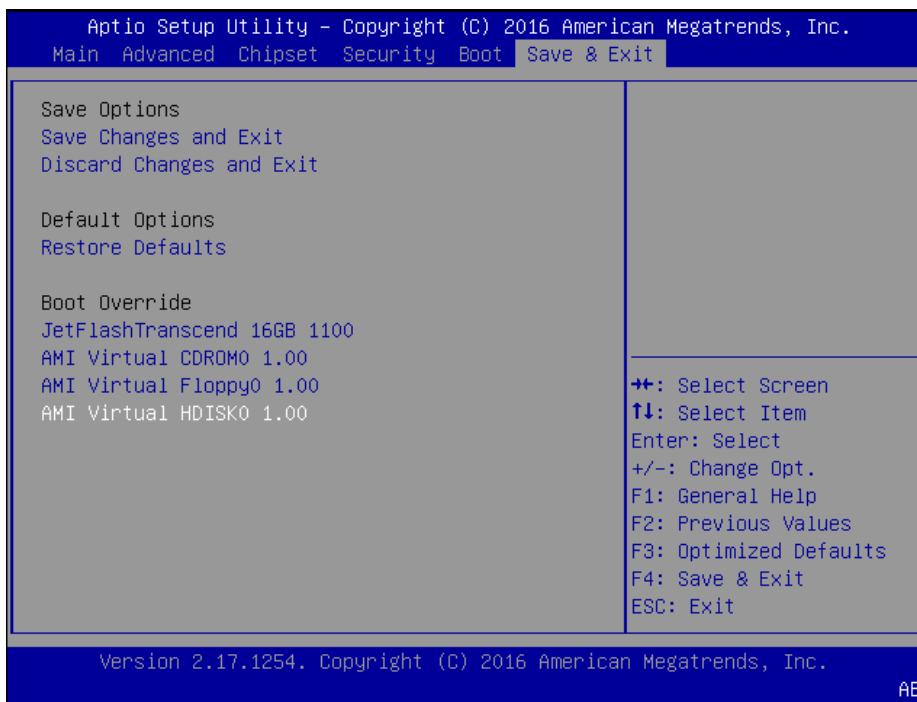
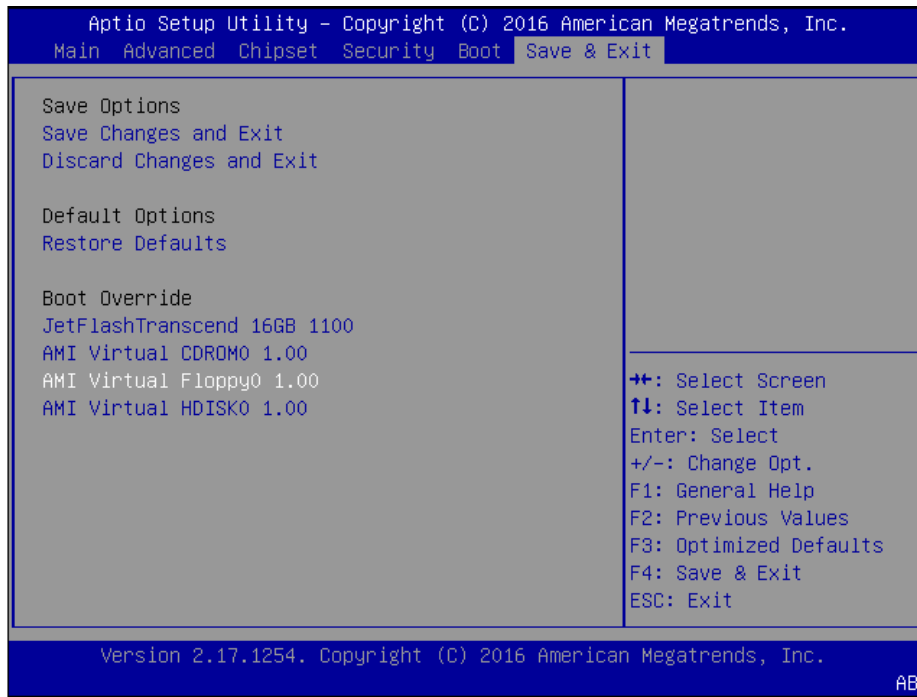
Restore Defaults: restore/load factory default setting for all setup parameters.



Boot Override

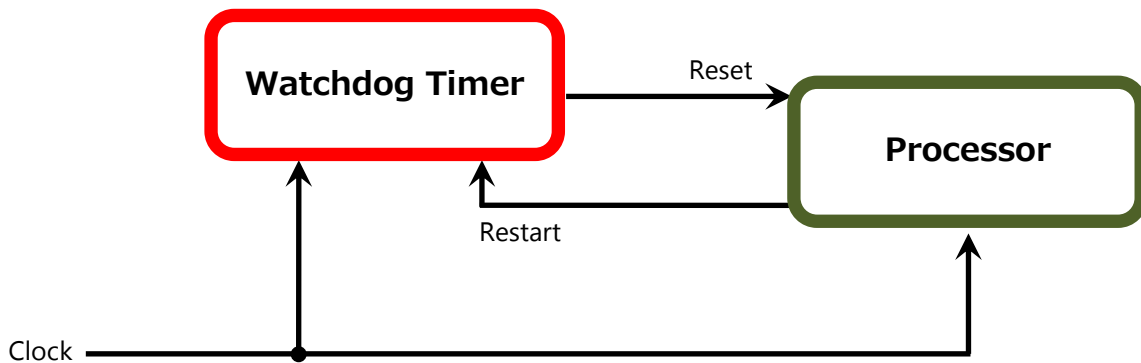
You may select a device under "Boot Override" for this function.





APPENDIX A: PROGRAMMING WATCHDOG TIMER

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



To execute the utility: enter the number of seconds to start countdown before the system can be reset. Press **start** to start the counter and stop to stop the counter.

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

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

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

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

APPENDIX B: SETTING UP CONSOLE REDIRECTIONS

Console redirection lets you monitor and configure a system from a remote terminal computer by re-directing keyboard input and text output through the serial port. The following steps illustrate how to use this feature. The BIOS of the system allows the redirection of the console I/O to a serial port. With this configured, you can remotely access the entire boot sequence through a console port.

1. Connect one end of the console cable to console port of the system and the other end to the serial port of the Remote Client System.
2. Configure the following settings in the BIOS Setup menu:
3. **BIOS > Advanced > Serial Port Console Redirection > Console Redirection Settings**, select **115200** for the Baud Rate, **None** for Flow control, **8** for the Data Bit, **None** for Parity Check, and **1** for the Stop Bit.
4. Configure console redirection related settings on the client system. You can use a terminal emulation program that features communication with serial COM ports such as *TeraTerm* or *Putty*. Make sure the serial connection properties of the client conform to those set in Step 1 for server.

APPENDIX D: INSTALLING INTEL® LAN CONTROLLER DRIVER FOR LINUX

To install the Intel® LAN controller base driver for the Red Hat® and Linux operating system, please visit <http://www.lannerinc.com/support/download-center/drivers>, enter the product category and download the utility package.

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

APPENDIX E: 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 -xzvf plcm_drv_v0XX.tgz
```

(0XX is the version of the program.)

2. Change directory to the extracted folder:

```
# cd plcm_drv_v0XX
```

(0XX is the version of the program.)



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

3. Type "make" to build source code:

```
# make
```

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



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

Install

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

```
#insmod plcm_drv.ko
```

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



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

Execute

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

To execute, run the command:

```
#!/plcm_test
```

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

Display Off turning off the LCM display

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

Blinking off/On turning off/on the cursor blinking

Writing “Lanner@Taiwan” displaying the specific sentences

Reading “Lanner@Taiwan” reading the specific sentence

CGram Test displaying the user-stored characters

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

Corresponding Commands for “plcm_test”

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

-On

— Turn on the backlight of the LCM display.

— To execute, please type:

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

```
-Off
```

— Turn off the backlight of the LCM display.

— To execute, please type:

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

```
-LCM1
```

— Writing “Lanner@Taiwan” in line1.

— To execute, please type:

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

```
-LCM2
```

— Writing "2013-11-05" in line 2.

— To execute, please type:

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

Keypad

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

— To execute, please type:

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

Commands for plcm_cursor_char

This Run this command for cursor shift & single text update

```
# ./plcm_cursor_char
```

Please read the options below

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

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

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

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

Clean display select Item 5 to clear up the LCM display

Leave select Item 6 to exit the program

Test

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

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

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

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

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

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

To execute, please type:

```
#./Test
```

Virtualization Implemented by Parallel

Port Pass Through

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

- QEMU/KVM

- Xen

- VMWare Player

Here, we take the Fedora 20 x86_64 operation system for instance to explain 3 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 install “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.

APPENDIX F: TERMS AND CONDITIONS

Warranty Policy

1. All products are under warranty against defects in materials and workmanship for a period of one year from the date of purchase.
2. The buyer will bear the return freight charges for goods returned for repair within the warranty period; whereas the manufacturer will bear the after service freight charges for goods returned to the user.
3. The buyer will pay for the repair (for replaced components plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.
4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service," RMA goods will be returned at customer's expense.
5. The following conditions are excluded from this warranty:
 - ▶ Improper or inadequate maintenance by the customer
 - ▶ Unauthorized modification, misuse, or reversed engineering of the product
 - ▶ Operation outside of the environmental specifications for the product.

RMA Service

Requesting an RMA#

1. To obtain an RMA number, simply fill out and fax the "RMA Request Form " to your supplier.
2. The customer is required to fill out the problem code as listed. If your problem is not among the codes listed, please write the symptom description in the remarks box.
3. Ship the defective unit(s) on freight prepaid terms. Use the original packing materials when possible.
4. Mark the RMA# clearly on the box.



Note: Customer is responsible for shipping damage(s) resulting from inadequate/loose packing of the defective unit(s). All RMA# are valid for 30 days only; RMA goods received after the effective RMA# period will be rejected.

RMA Service Request Form

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

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