RS300-E9-PS4
RS300-E9-RS4

1U Rackmount Server
User Guide

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received including interference that may cause undesired operation.

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.

The use of shielded cables for connection of the monitor to the graphics card is required to assure compliance with FCC regulations. Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Compliance Statement of Innovation, Science and Economic Development Canada (ISED)

This device complies with Innovation, Science and Economic Development Canada licence exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

CAN ICES-3(A)/NMB-3(A)

Déclaration de conformité de Innovation, Sciences et Développement économique Canada (ISED)

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

CAN ICES-3(A)/NMB-3(A)

Australia statement notice

From 1 January 2012 updated warranties apply to all ASUS products, consistent with the Australian Consumer Law. For the latest product warranty details, please visit https://www.asus.com/support/. Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.

If you require assistance please call ASUS Customer Service 1300 2787 88 or visit us at https://www.asus.com/support/.

REACH Information

Complying with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) regulatory framework, we publish the chemical substances in our products at ASUS REACH website at http://csr.asus.com/english/REACH.htm.

ASUS Recycling/Takeback Services

ASUS recycling and takeback programs come from our commitment to the highest standards for protecting our environment. We believe in providing solutions for you to be able to responsibly recycle our products, batteries, other components as well as the packaging materials. Please go to http://csr.asus.com/english/Takeback.htm for detailed recycling information in different regions.

DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

DO NOT throw the mercury-containing button cell battery in municipal waste. This symbol of the crossed out wheeled bin indicates that the battery should not be placed in municipal waste.

Safety information

Electrical Safety

- Before installing or removing signal cables, ensure that the power cables for the system unit and all attached devices are unplugged.
- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing any additional devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Any mechanical operation on this server must be conducted by certified or experienced engineers.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, ensure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.

> This product is equipped with a three-wire power cable and plug for the user's safety. Use the power cable with a properly grounded electrical outlet to avoid electrical shock.

Lithium-Ion Battery Warning

CAUTION! Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Heavy System

CAUTION! This server system is heavy. Ask for assistance when moving or carrying the system.

Optical Drive Safety Information

Laser Safety Information

CLASS 1 LASER PRODUCT

To prevent exposure to the optical drive's laser, do not attempt to disassemble or repair the optical drive by yourself. For your safety, contact a professional technician for assistance.

About this guide

Audience

This user guide is intended for system integrators, and experienced users with at least basic knowledge of configuring a server.

Contents

This guide contains the following parts:

1. **Chapter 1: Product Introduction**

   This chapter describes the general features of the server, including sections on front panel and rear panel specifications.

2. **Chapter 2: Hardware Information**

   This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

3. **Chapter 3: Installation Options**

   This chapter describes how to install optional components into the barebone server.

4. **Chapter 4: Motherboard Information**

   This chapter gives information about the motherboard that comes with the server. This chapter includes the motherboard layout, jumper settings, and connector locations.

5. **Chapter 5: BIOS Setup**

   This chapter tells how to change system settings through the BIOS Setup menus and describes the BIOS parameters.

6. **Chapter 6: RAID Configuration**

   This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

7. **Chapter 7: Driver Installation**

   This chapter provides instructions for installing the necessary drivers for different system components.

Conventions

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.
	Example: <Enter> means that you must press the Enter or Return key.
<Key1>+<Key2>+<Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).
	Example: <Ctrl>+<Alt>+<Del>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line: `format A:/S`

References

Refer to the following sources for additional information, and for product and software updates.

1. **ASUS Server Web-based Management (ASWM) user guide**

   This manual tells how to set up and use the proprietary ASUS server management utility.

2. **ASUS websites**

   The ASUS websites worldwide provide updated information for all ASUS hardware and software products. Refer to the ASUS contact information.

Product Introduction

1

This chapter describes the general features of the chassis kit. It includes sections on front panel and rear panel specifications.

1.1   System package contents

Check your system package for the following items.

Model Name	RS300-E9-PS4, RS300-E9-RS4
Chassis	ASUS R10E 1U Rackmount Chassis
Motherboard	ASUS P10S-C/4L/SYS Server Board
Component	1 x 400W Single Power Supply (RS300-E9-PS4) 1+1 450W Redundant Power Supply (RS300-E9-RS4) 4 x Hot-swap 3.5" HDD trays 1 x SAS/SATA Backplane (BP4LX12G-35-R10E) 1 x PCI Riser Card (RE16LE8R-R10A) 1 x Front I/O Board (FPB-R20D) 4 x System Fans (40 mm x 28 mm)
Accessories	1 x RS300-E9 Series Support DVD (with User's Guide) 1 x ASWM* Enterprise DVD 1 x Bag of Screws 1 x AC Power Cable (RS300-E9-PS4) 2 x AC Power Cable (RS300-E9-RS4)
Optional Items	ASUS PIKE II card ASUS ASMB8-iKVM Remote management card DVD-ROM/DVD-RW 1 x Friction Rail Kit

*ASUS System Web-based Management

If any of the above items is damaged or missing, contact your retailer.

1.2   Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxS0xxxxxxxx shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.
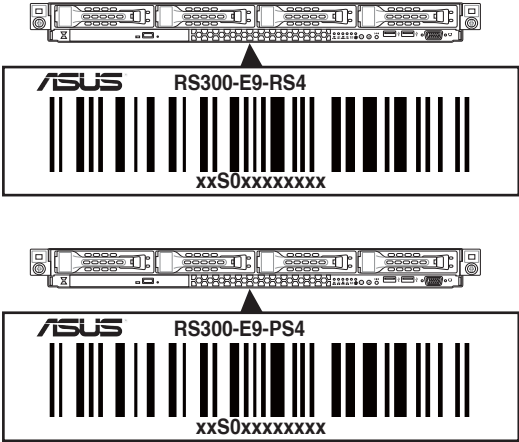
1.3   System specifications

The ASUS RS300-E9 Series is a 1U barebone server system featuring the ASUS P10S-C/4L/ SYS Server Board. The server supports Intel® LGA1150 Intel® Xeon® E3-1200 Processor v5 plus other latest technologies through the chipsets onboard.

Model Name		RS300-E9-PS4	RS300-E9-RS4
Processor / System Bus		1 x Socket LGA1151 Intel® Xeon® processor E3-1200 v5 product family	
Core Logic		Intel® C232 chipset	
Memory	**Total Slots**	4 (2 Channels)	
	Capacity	Maximum up to 64GB (UDIMM)	
	Memory Type	DDR4 2133 ECC / non-ECC UDIMM *** Refer to ASUS server AVL for the latest update**	
	Memory Size	16GB, 8GB, 4GB (UDIMM) *** Refer to ASUS server AVL for the latest update**	
Expansion Slots	**Total PCI/PCI-X/ PCI-E Slots**	2	
	Slot Type	1 x PCI-E x16 (x8 Gen3 link) 1 x PCI-E x8 (x8 Gen3 link)	
Disk Controller	**SATA Controller**	**Intel® C232** 6 x SATA 6Gb/s ports (4 by miniSAS HD) with 2 x M.2 (NGFF 2280/2260/2242, PCIE or SATA signal, gray SATA port will disable when M.2 is SATA signal) Intel® RSTe (Windows & Linux) (Supports software RAID 0, 1, 10, & 5)	
	SAS Controller	**Optional:** ASUS PIKE II 3008 8-port SAS 12G RAID Card ASUS PIKE II 3108 16-port SAS 12G RAID Card	
Storage Bays	**I = internal A or S will be hot- swappable**	4 x Hot-swap 3.5 in. HDD Bays 2 x SSD Bays	
Networking	**LAN**	4 x Intel® I210 + 1 x Management LAN	
Graphic	**VGA**	Aspeed AST2400 32MB	
Onboard I/O Connectors		1 x External Serial Port 5 x RJ-45 ports (1 for ASMB8-iKVM) 4 x USB 3.0 ports (Front x 2, Rear x 2) 2 x USB 2.0 ports (Rear x 2) 2 x VGA port (Front x 1, Rear x 1) 2 x Internal A-Type USB Port 1 x PS/2 keyboard/mouse combo port	

(continued on the next page)

Chapter 1: Product Introduction

Model Name		RS300-E9-PS4	RS300-E9-RS4
OS Support		Windows® Server 2012 R2 Windows® Server 2012 Windows® Server 2008 R2 RedHat® Enterprise Linux SuSE® Linux Enterprise Server CentOS VMware Citrix XenServer *** Refer to http://www.asus.com/ for the latest OS support.**	
Management Solution	Software	ASUS ASWM Enterprise	
	Out of Band Remote Management	Optional ASMB8-iKVM for KVM-over-IP	
Dimension (HH x WW x DD)		615 mm x 444 mm x 43.4 mm	
Net Weight Kg (CPU, DRAM & HDD not included)		8.98 Kg	10.64 Kg
Power Supply		Single 400W 80PLUS Gold Power Supply	1+1 Redundant 450W 80PLUS Gold Power Supply
Power Rating		100-240VAC, 6-3A, 50-60Hz, Class I	100-127/200-240V, 5.5/3A (x2), 50-60Hz, Class I
Environment		Operating temperature: 10°C ~ 35°C Non operating temperature: -40°C ~ 70°C Non operating humidity: 20% ~ 90% (Non condensing)	

*Specifications are subject to change without notice.

1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, slim type optical drive, and two USB ports are located on the front panel.

Refer to the **Front panel LEDs** section for the LED descriptions.

Rack screw
HDD 1
HDD 2
HDD 3
HDD 4
Rack screw

Optical drive (optional)
Asset tag
LAN 4 LED
LAN 3 LED
LAN 2 LED
LAN 1 LED
Message LED
HDD LED
VGA port
USB 3.0 ports
Reset button
Location switch
Power button
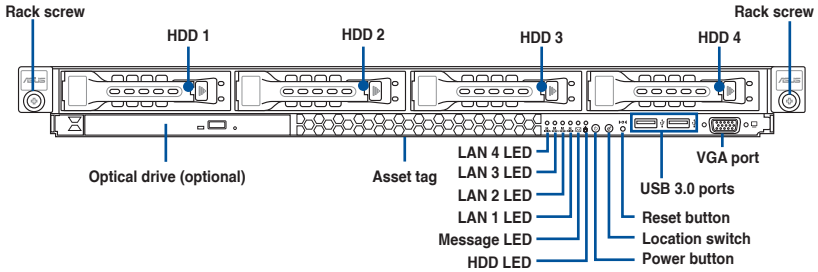
1.5 Rear panel features

The rear panel includes the expansion slots, system power socket, and rear fans. The middle part includes the I/O shield with openings for the rear panel connectors on the motherboard.

RS300-E9-RS4

PS/2 keyboard/mouse port
LAN port 5*
Q-Code LED

USB 2.0 ports
USB 3.0 ports
VGA port
Gigabit LAN port 4
Gigabit LAN port 3
Gigabit LAN port 2
Gigabit LAN port 1
Message LED
Power button

RS300-E9-PS4

PS/2 keyboard/mouse port
LAN port 5*
Q-Code LED

Serial port (optional)
USB 2.0 ports
USB 3.0 ports
VGA port
Gigabit LAN port 4
Gigabit LAN port 3
Gigabit LAN port 2
Gigabit LAN port 1
Message LED
Power button
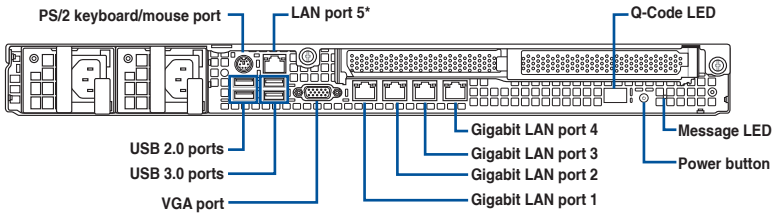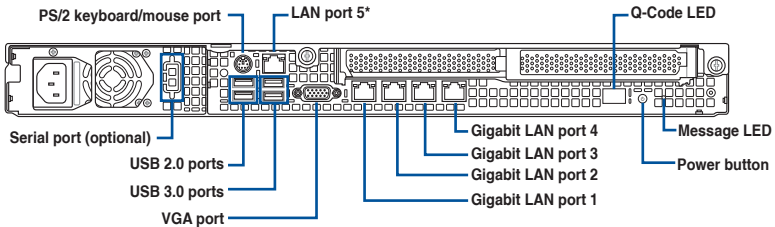
*This port is for ASUS ASMB8-iKVM controller card only.

1.6   Internal features

The barebone server includes the basic components as shown.

1.   Power supply and power fan

2.   PCI Express slot Riser Card

3.   ASUS P10S-C/4L/SYS Server Board

4.   System fans

5.   SAS / SATA backplane (hidden)

6.   HDD tray 1-4

7.   Front I/O boards (hidden)

8.   Slim-type optical drive

9.   SSD Cage

10.   Asset Tag
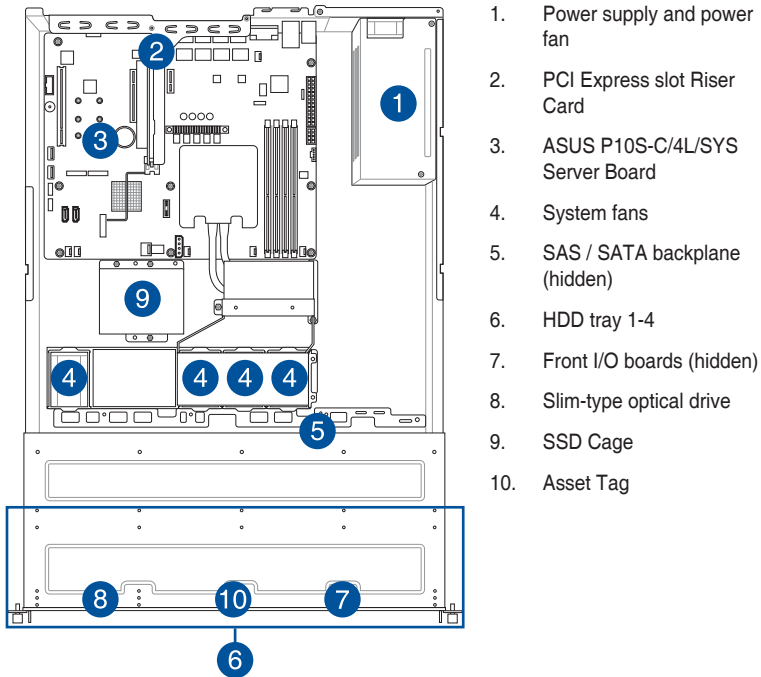
The barebone server does not include a floppy disk drive. Connect a USB floppy disk drive to any of the USB ports on the front or rear panel if you need to use a floppy disk.

Turn off the system power and detach the power supply before removing or replacing any system component.

```
                          WARNING
                   HAZARDOUS MOVING PARTS
          KEEP FINGERS AND OTHER BODY PARTS AWAY
```

1.7   LED information

1.7.1   Front panel LEDs

LAN 4 LED
LAN 3 LED
LAN 2 LED
LAN 1 LED

Location switch
Power button
Message LED
HDD LED
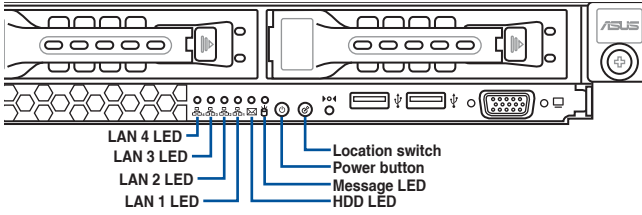
LED	Icon	Display status	Description
Power LED	⏻	ON	System power ON
HDD Access LED	🗄	OFF Blinking	No activity Read/write data into the HDD
Message LED	✉	OFF ON	System is normal; no incoming event A hardware monitor event is indicated
Location LED	🔗	OFF ON	Normal status Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	🖧	OFF Blinking ON	No LAN connection LAN is transmitting or receiving data LAN connection is present

1.7.2   LAN (RJ-45) LEDs
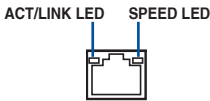
ACT/LINK LED   SPEED LED

ACT/LINK LED		SPEED LED	
Status	**Description**	**Status**	**Description**
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

1.7.3   HDD status LED

HDD status LED
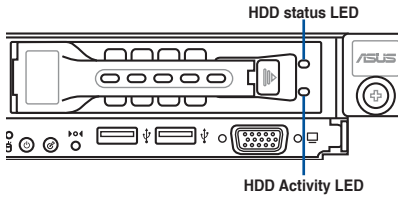
HDD Activity LED

SATA/SAS HDD LED Description			
HDD Status LED	GREEN	ON	SATA/SAS HDD power ON
	RED	ON	HDD has failed and should be swapped immediately
	GREEN/ RED	Blinking	RAID rebuilding
	GREEN/ RED	OFF	HDD not found
HDD Activity LED	GREEN	Blinking	Read/write data from/into the SATA/SAS HDD

Hardware Information

2

This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

2.1 Chassis cover

Removing the rear cover

1. Locate and remove the front side screws.

Front side screw
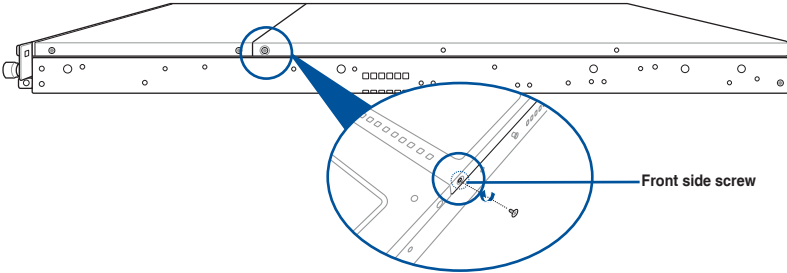
2. Loosen the two thumbscrews on the rear panel to release the rear cover from the chassis.

Thumbscrews
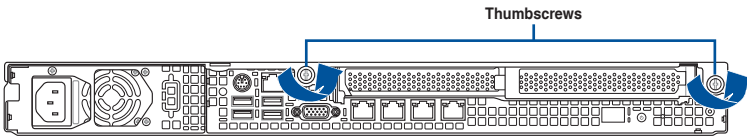
3. Firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.

4. Lift the cover from the chassis.

5. To reattach the rear cover, reverse step 1 to 4.
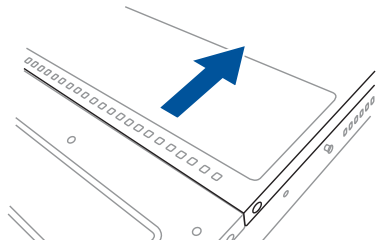
A protection film is pre-attached to the system cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.
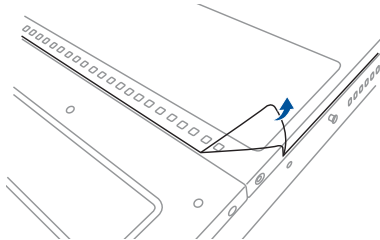
2.2 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1151 socket designed for the Intel® Xeon® E3-1200 v5 processor.

⚠️
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.

- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.2.1 Installing the CPU

To install the CPU:

1. Locate the CPU socket on the motherboard.

CPU1

P10S-C/4L/SYS CPU LGA1151
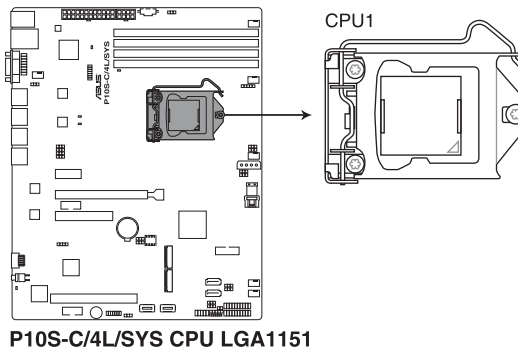
✏️ Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your right.

2. Press the load lever with your thumb (A), then move it to the right (B) until it is released from the retention tab.

Do not remove the PnP cap yet from the CPU socket. Doing so may bend the pins of the socket.

Load lever

A

B

Retention tab
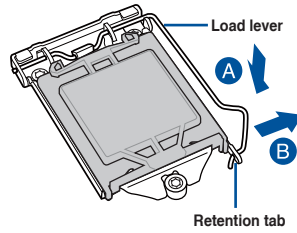
3. Lift the load lever until the load plate is completely lifted.

Load plate
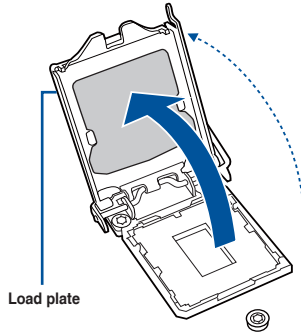
4. Position the CPU above the socket, ensuring that the gold triangle mark is on the bottom-left corner of the socket, then fit the CPU notches to the socket's alignment keys.

The CPU fits in only one orientation. DO NOT force the CPU into the socket to prevent bending the pins on the socket and damaging the CPU.

CPU notches

Gold triangle mark

Alignment key

Alignment key
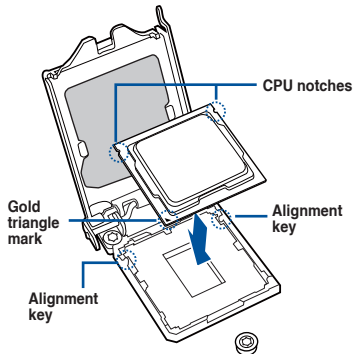
5. Close the load plate (A), ensuring that the front edge of the load plate slides under the retention lock (B) then push down the load lever (C).

Load lever

C

A

B
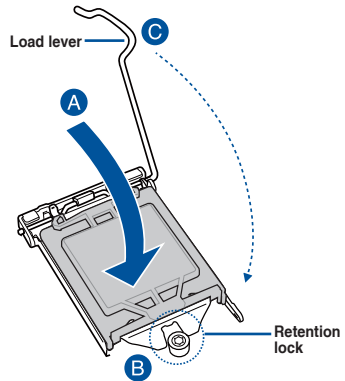
Retention lock

6. Insert the load lever under the retention tab to remove the PnP cap from the CPU socket.

Load lever

Retention tab
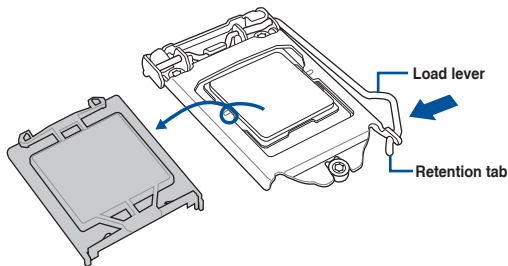
7. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is evenly spread in a thin layer.

Some heatsinks come with pre-applied Thermal Interface Material. If so, skip this step.

The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately and seek professional medical help.
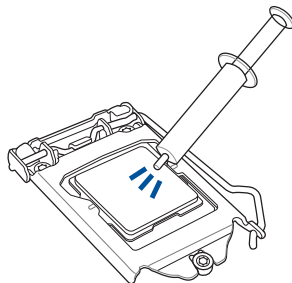
2.2.2 Installing the CPU heatsink and airduct

To install the CPU heatsink:

1. Remove the protection sticker on the back of the CPU heatsink.
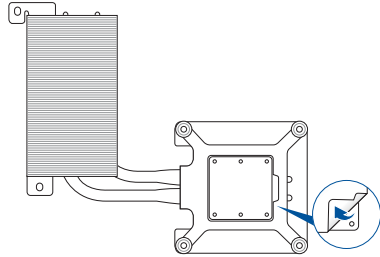
2. Place the heatsink on top of the installed CPU, ensuring that the four fasteners match the holes on the motherboard.
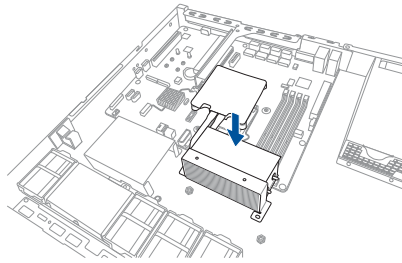
3. Twist each of the four screws with a Phillips (cross) screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.
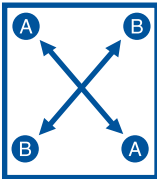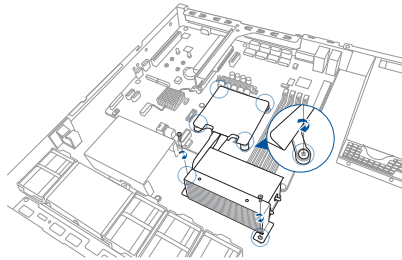
• Tighten the four heatsink screws in a diagonal sequence.

• Do not remove the mylar on the heatsink.

4. Secure the heat pipe and air duct to the server with two screws.
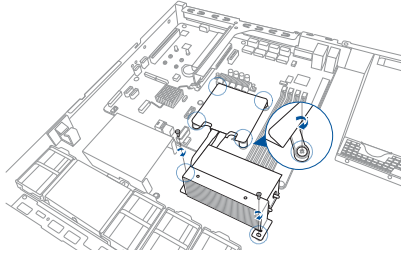
5. Insert the system fan mylar into the system fan, as shown in the right figure.
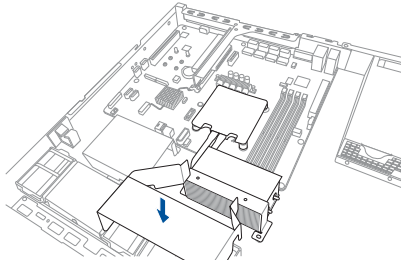
6. Insert the two tips of the system fan mylar into the CPU heatsink, as shown in the right figure.
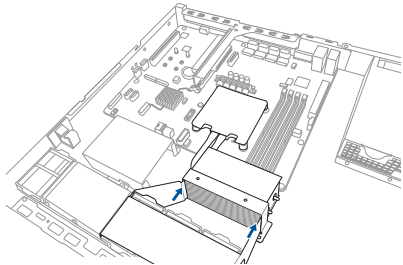
2.3 System memory

2.3.1 Overview

The motherboard comes with four Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

![warning icon] A DDR4 module is notched differently from a DDR, DDR2, or DDR3 module. DO NOT install a DDR, DDR2, or DDR3 memory module to the DDR4 slot.

The figure illustrates the location of the DDR4 DIMM sockets:
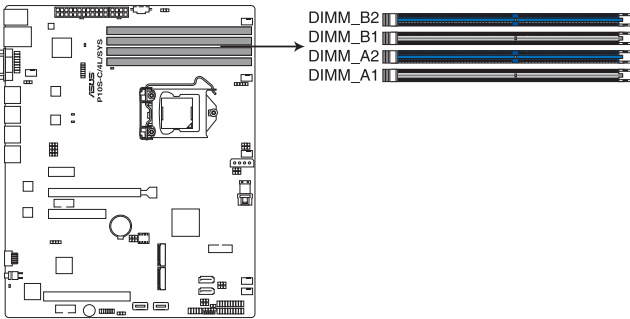
P10S-C/4L/SYS 288-pin DDR4 DIMM sockets

2.3.2 Memory configurations

You may install Unbuffered DDR4 DIMMs into the DIMM sockets using the memory configurations in this section.

UDIMM				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Unbuffered DDR4	2133	Single Rank, Dual Rank
2	2	Unbuffered DDR4	2133	Single Rank, Dual Rank

![note icon]
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- Start installing the DIMMs in slots A2 and B2 (Blue).

2.3.3 Installing a DIMM on a single clip DIMM socket

1. Unlock a DIMM socket by pressing the retaining clip outward.

2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.
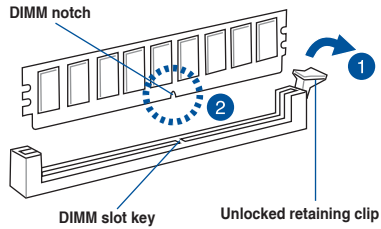
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

3. Hold the DIMM by both of its ends then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.
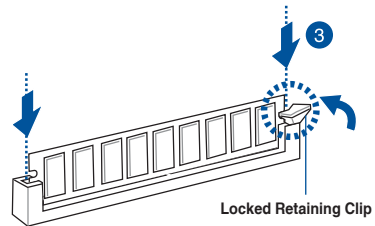
Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

- To install two or more DIMMs, refer to the user guide bundled in the motherboard package.

- Refer to the user guide for qualified vendor lists of the memory modules.

Removing a DIMM from a single clip DIMM socket

1. Press the retaining clip outward to unlock the DIMM.

2. Remove the DIMM from the socket.
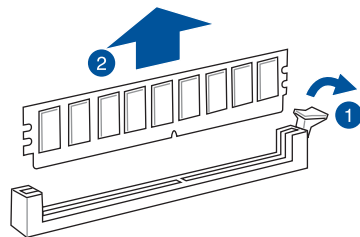
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

2.4   Hard disk drives

The system supports four hot-swap SATA/SAS hard disk drives. The hard disk drive installed on the drive tray connects to the motherboard SATA/SAS ports via the SATA/SAS backplane.

To install a hot-swap SATA/SAS HDD:

1.   Push the spring lock to the right (A) then pull the tray lever outward (B) to release the drive tray. The drive tray ejects slightly after you pull out the lever.

tray lever   **spring lock**
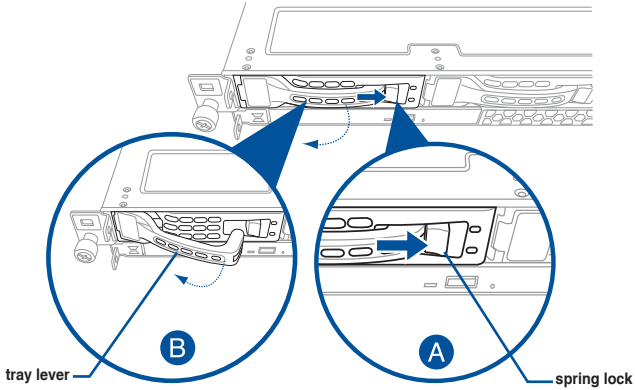
2.   Firmly hold the tray lever and pull the drive tray out of the bay.
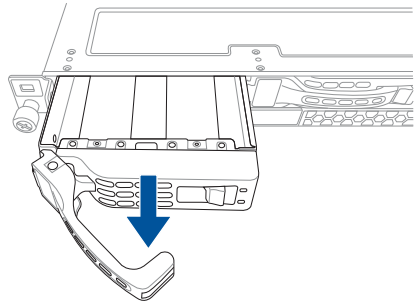
3.   Place the drive tray on a flat and stable surface.

4.   Prepare the SATA/SAS HDD and the bundled set of screws.
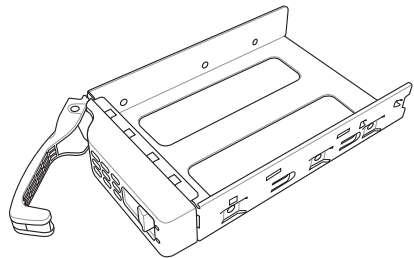
5.   Place the SATA/SAS HDD into the tray
      then secure it with four screws.
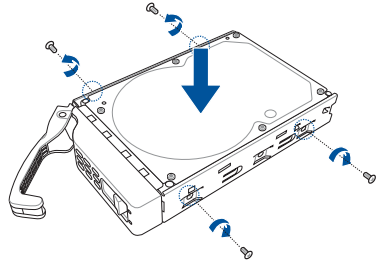
6.   Insert the drive tray and HDD assembly
      all the way into the depth of the bay
      until just a small fraction of the tray
      edge protrudes.
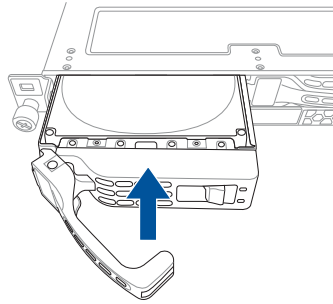
When installed, the SATA/SAS connector on the drive connects to the SATA/SAS interface
on the backplane.

7.   Push the tray lever until it clicks and
      secures the drive tray in place.

The drive tray is correctly placed
when its front edge aligns with the
bay edge.
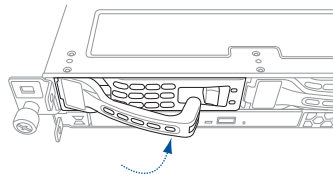
8.   Repeat steps 1 to 7 to install the other
      SATA/SAS HDDs.

2.5 Expansion slot

The barebone server comes with two PCIE slots - PCIE1 and PCIE2. These slots are pre-installed with a riser card bracket and a butterfly riser card bracket for installing PCIE expansion cards. You need to remove these expansion card brackets if you want to install PCIE expansion cards.

2.5.1 Installing an expansion card to the PCIE1 slot

The pre-installed riser card bracket on the PCIE1 slot supports Full-Height (FH), Half-Length (HL) PCIE x16 expansion cards.

To install a PCIE x16 (Gen3 x16 link), FH, HL card on the riser card bracket:

1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express x16 slot on the motherboard.

2. Place the riser card bracket on a flat and stable surface, then remove the screw from the slot bay.

3. Install a PCI Express x8 or x16 card to the bracket as shown.

4. Secure the card with a screw.
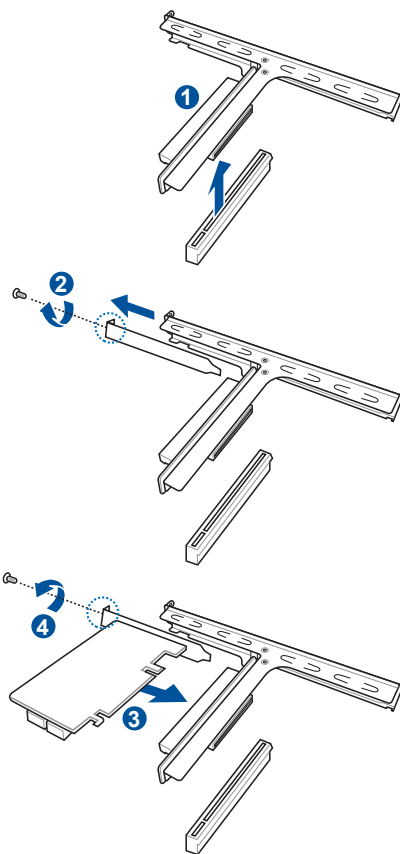
5. Install the riser card bracket and PCI Express card assembly back into the PCI Express x16 slot on the motherboard.
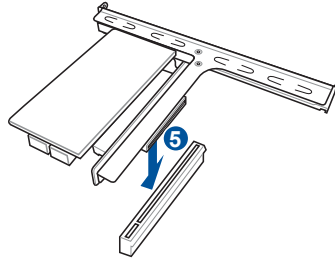
2.5.2 Configuring an expansion card

After installing the expansion card, configure the it by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.

2. Assign an IRQ to the card. Refer to the following tables.

3. Install the software drivers for the expansion card.

> When using PCI cards on shared slots, ensure that the drivers support "Share IRQ" or that the cards do not need IRQ assignments. Otherwise, conflicts will arise between the two PCI groups, making the system unstable and the card inoperable.

Standard Interrupt assignments

IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.
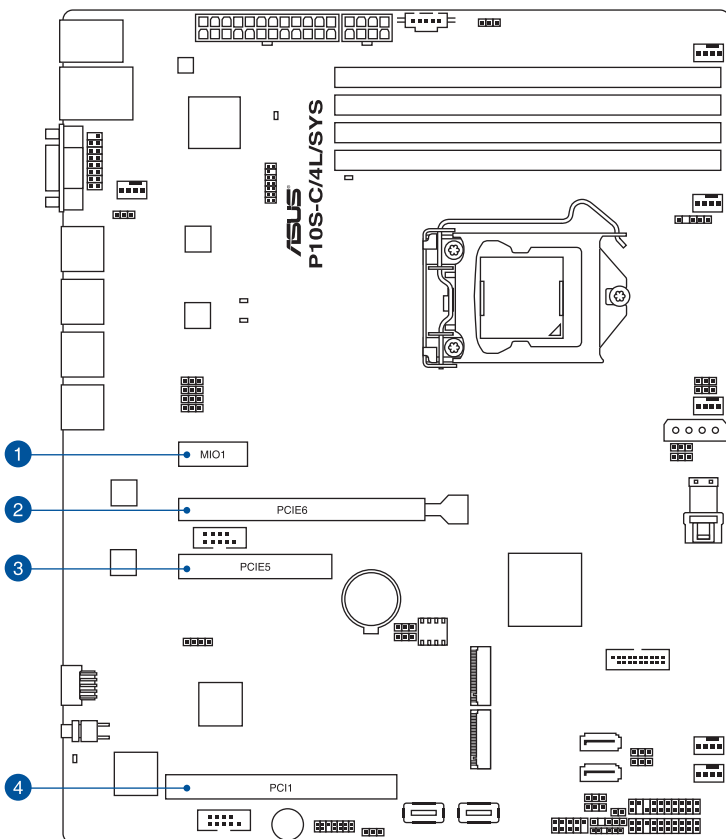
No.(Slot location)	Short Description	
1 (slot 7)	MIO1	MIO slot
2 (slot 6)	PCIE6	PCI-E x16 (x16 Gen3 link) (Auto switch to x8 link if slot 5 is occupied)
3 (slot 5)	PCIE5	PCI-E x8 (x8 Gen3 link)
4 (slot 1)	PCI1	PCI 32 bit / 33 MHz

2.5.3   Installing M.2 (NGFF) cards

To install an M.2 card:

1.   Locate the M.2 connector (NGFF1) on the motherboard.

2.   Remove the screw on the stand screw.

3.   Prepare the M.2 card.

4.   Align and insert the M.2 card into the M.2 connector (NGFF1).

5.   Secure the M.2 card with the screw you removed in step 2.
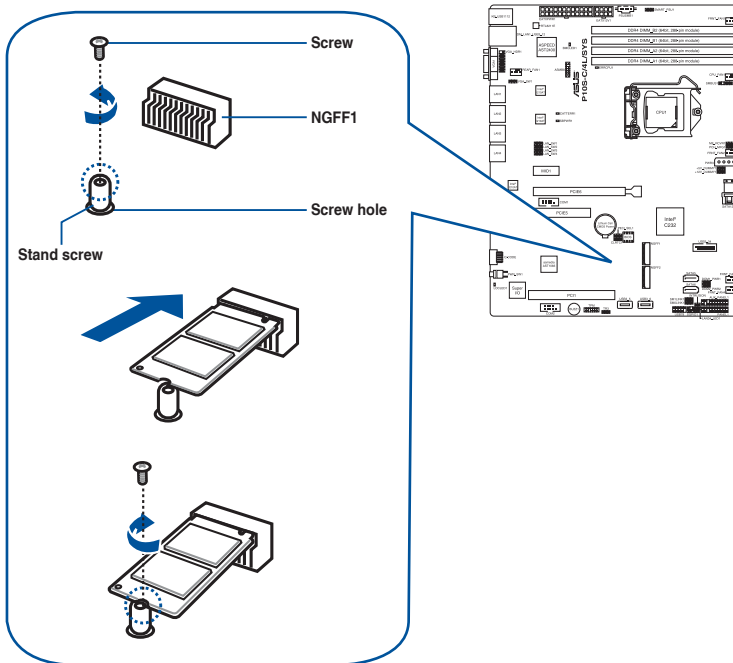
| | • | Please pay attention when removing the screw, the stand screw might be removed together with it. |
| | • | Ensure that the M.2 card is positioned between the screw and the stand screw before securing it. |

2.6 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you will remove pre-installed components to install additional devices.
- Refer to Chapter 4 for detailed information on the connectors.
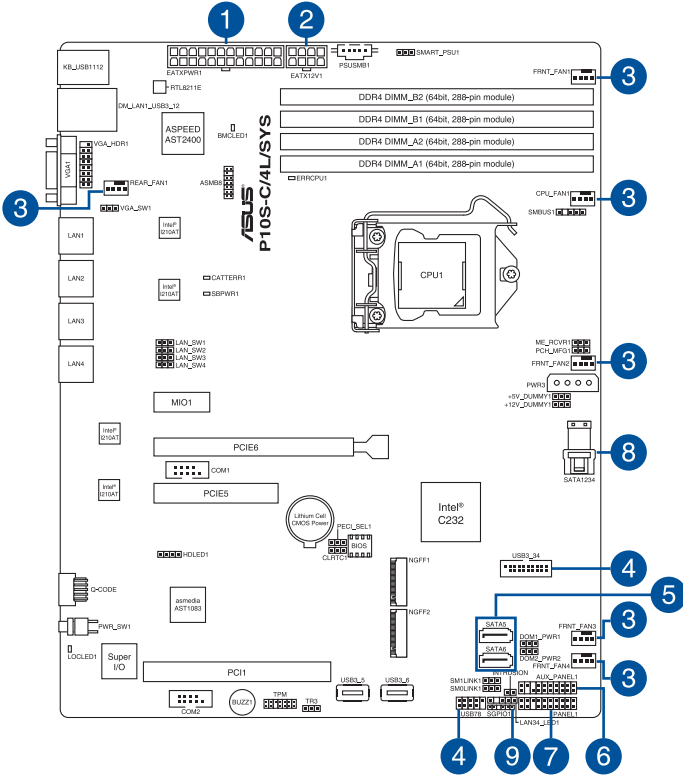
Pre-connected system cables

1. 24-pin ATX power connector (from power supply to motherboard)
2. 8-pin 12V power connector (from power supply to motherboard)
3. System fan connector (from system fan to motherboard)
4. USB connector (from motherboard to front I/O board)
5. SATA connectors (system default; from motherboard to SATA/SAS backplane)
6. System auxiliary panel connector (from motherboard to front I/O board)
7. System panel connector (from motherboard to front I/O board)
8. Mini-SAS HD connector (from motherboard to SATA/SAS backplane)
9. Serial General Purpose Input/Output connectors

2.7 SATA/SAS backplane cabling

RS300-E9-RS4

RS300-E9-PS4

**Connects a 8-pin plug
from power supply**

**Connects the data cable
connected to the motherboard**

Connects the SATA/SAS HDDs
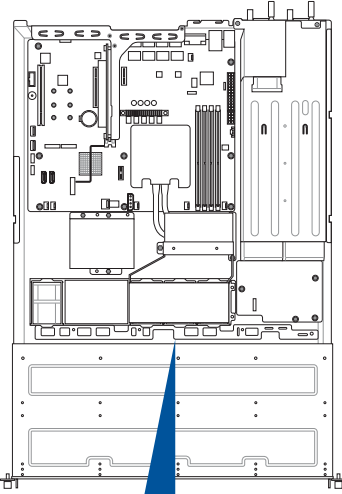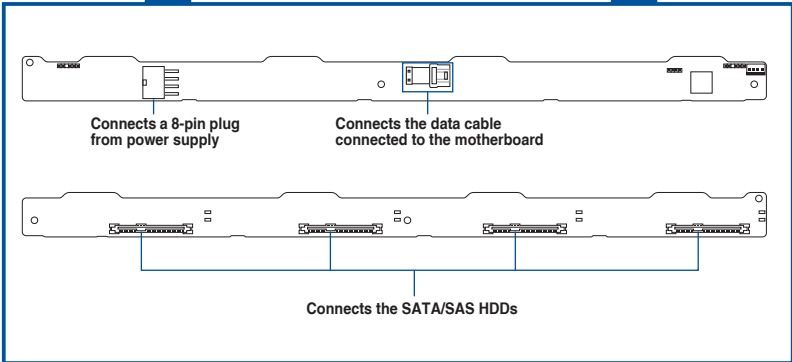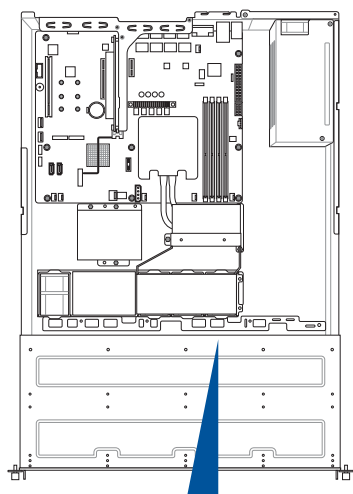
2.8 Removable/Optional components

You may need to remove previously installed system components when installing or removing system devices. Or you may need to install the optional components into the system. This section tells how to remove/install the following components:

1. System fans

2. ASUS PIKE RAID card (optional)

3. ASUS ASMB8-iKVM (optional)

4. SSD cage

Ensure that the system is turned off before removing any components.

You may need to remove previously installed component or factory shipped components when installing optional components.

2.8.1 System fans

To uninstall the system fans:

1. Remove the two tips of the system fan mylar out of the CPU heatsink, as shown in the right figure.
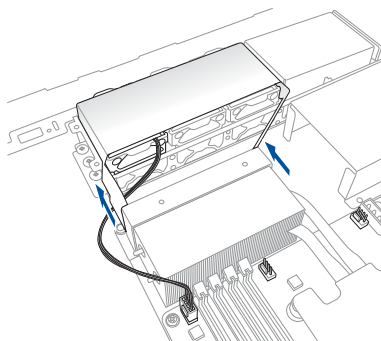
2. Remove the system fan mylar out of the system fan, as shown in the right figure.
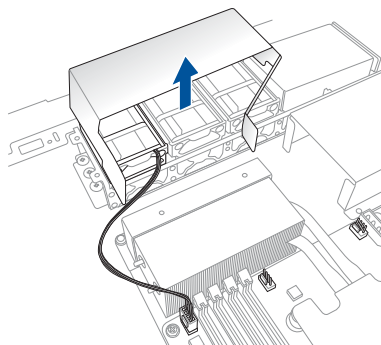
3. Disconnect the system fan cable from the fan connector on the motherboard.

4. Lift the fan, then set aside.

5. Repeat steps 3 to 4 to uninstall the other system fans.
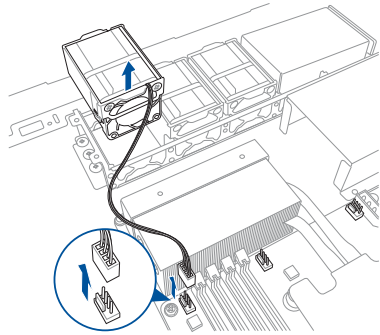
2.8.2   Installing ASUS PIKE II RAID card (optional)

Follow the steps below to install an optional ASUS RAID card on your motherboard.

1. Remove the default mini-SAS HD cable from the motherboard.
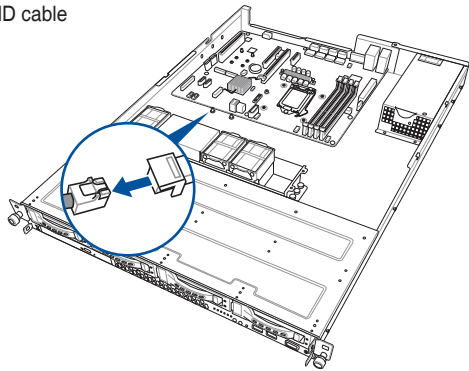
2. Connect the mini-SAS HD cable to the ASUS PIKE II card.
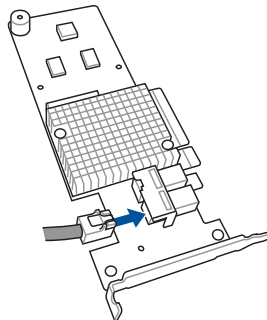
3. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express x16 slot on the motherboard.
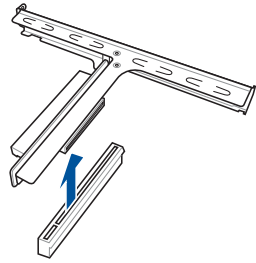
4. Place the riser card bracket on a flat and stable surface, then remove the screw from the slot bay.
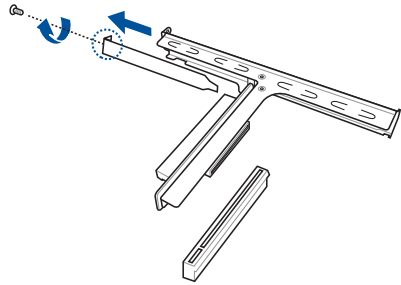
5. Install the ASUS PIKE II card x8 or x16 card to the bracket as shown.

6. Secure the card with a screw.
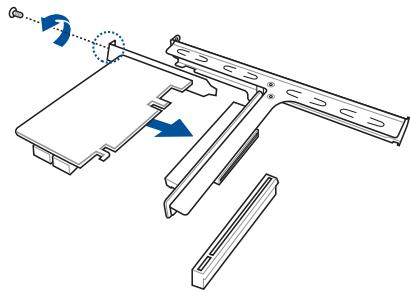
7. Install the riser card bracket and PCI Express card assembly back into the PCI Express x16 slot on the motherboard.
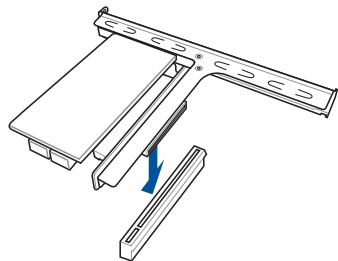
2.8.3   Redundant power supply module

To replace a failed redundant power supply module:

1.   Hold the power supply module lever
      and press the PSU latch (A) then pull
      the power supply module (B) out of the
      system chassis.

module lever   **PSU latch**
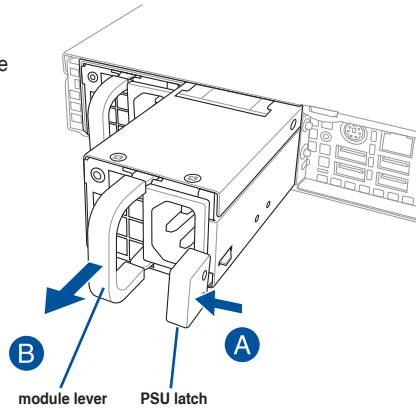
2.   Get the replacement power supply
      module.

3.   Insert the replacement power supply
      module into the chassis then push it
      inwards until the latch locks into place.
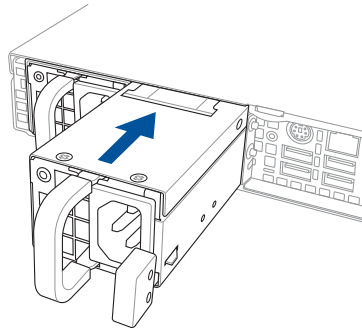
2.8.4 Installing the Baseboard Management Card (optional)

Follow the steps below to install an optional ASMB8 Management Card on your motherboard.

1. Locate the Baseboard Management Card header on the motherboard.
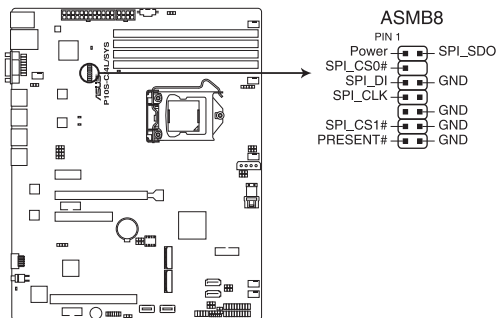
P10S-C/4L/SYS BMC connector

2. Orient and press the Management Card in place.
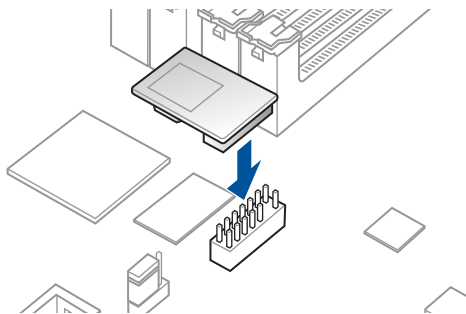
The motherboard illustration is for reference only. The motherboard layout and appearance may vary depending on the model, but the installation steps remain the same.

2.8.5   Installing the SSD cage

Follow the steps below to install the SSD cage on your server module.

1.   Remove the three screws on the side of the SSD cage.

2.   Lift the SSD cage and set aside.
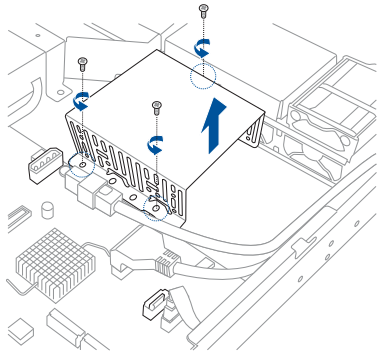
3.   With the SSD cage resting on a flat surface, insert the SSD card into the SSD cage.

> • The SSD Card fits in one orientation only.
>
> • You can place two SSD cards into the SSD cage.
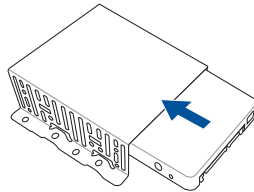
4.   Secure the SSD card into the SSD cage with the bundled screws.
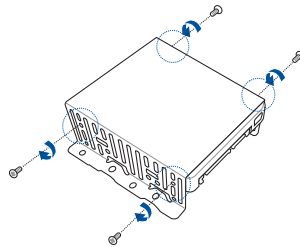
5.   Connect the SATA power cable and the SATA connector to the SSD card.

SATA connector
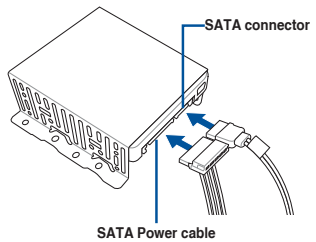
SATA Power cable

6. Secure the SDD cage to the server module using the bundled screws.
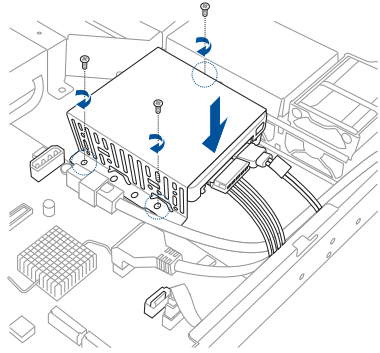
7. Connect the SATA cable connector to the onboard SATA connector.

8. Connect the Power cable to the connector on the motherboard.

You can install a second SSD Card by removing the optical drive and connecting the SATA cable connector to its onboard SATA connector.
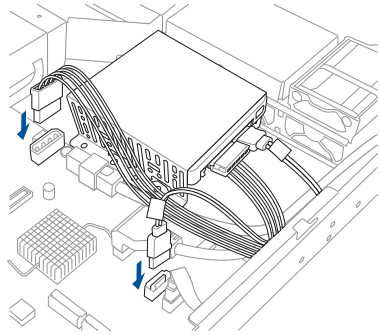
2.8.6   Replacing optical drive (optional)

This server system supports a slim-type optical disk drive.

To replace the optical disk drive:

1.   Remove the screw that secures the optical drive. Set aside.
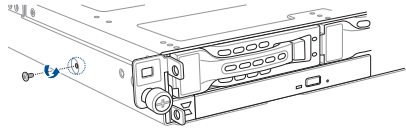
2.   Push the spring lock to the right (A) to remove the SATA/SAS drive tray then pull the tray lever outward (B).

     The drive tray ejects slightly after you pull out the lever (C).

spring lock
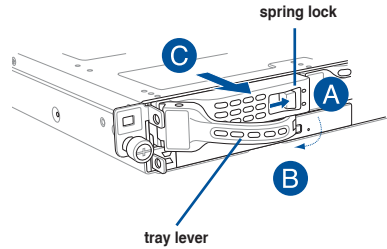
tray lever

3.   Hold the tray lever and pull the drive tray out of the bay.

4.   Pull the optical drive module.
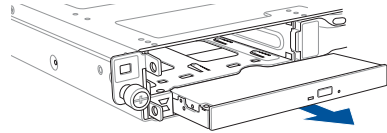
5.   Carefully insert the replacement optical disk drive module into the drive bay until it is securely seated in place.
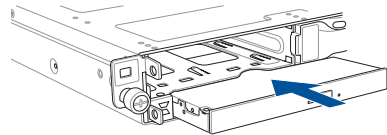
6.   Carefully insert the drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.
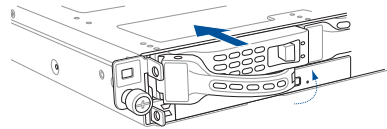
7.   Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.

8.   Secure the optical drive with the screw that you removed in step 1.
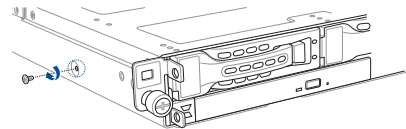
Installation Options

3

This chapter describes how to install the optional components and devices into the barebone server.

3.1 Tool-less Friction Rail Kit

The tool less design of the rail kit allows you to easily install the rack rails into the server rack without the need for additional tools. The kit also comes with a metal stopping bracket that can be installed to provide additional support and stability to the server.

The tool-less rail kit package includes:
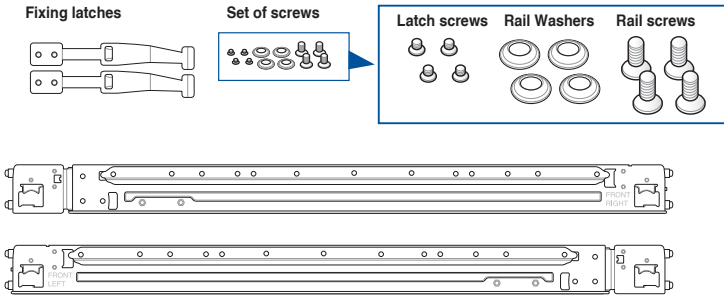
Installing the tool-less rack rail

To install the tool-less rack rails into the rack:

1. Secure the two fixing latches to the two sides of the server using the set of latch screws.

The locations of the screw holes vary with different server models. Refer to your server user manual for details.
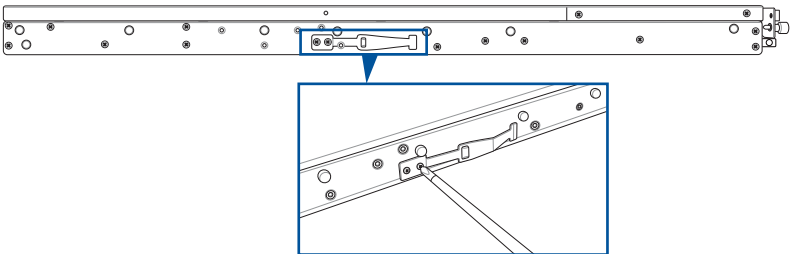
2. Select a desired space and place the appropriate rack rail (left and right) on opposite positions on the rack.
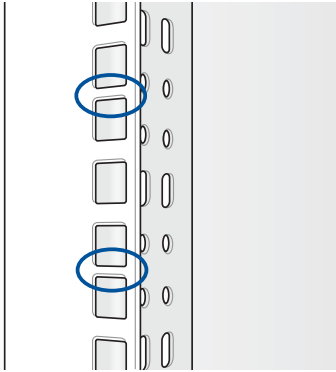
3. Press the spring lock then insert the studs into the selected square mounting holes on the rack post.

4. Press the spring lock on the other end of rail then insert the stud into the mounting hole on the rack post. Extend the rack rail, if necessary.

5. Perform steps 3 to 4 for the other rack rail.

6. Lift the server chassis and insert into the rack rail.

- Ensure that the rack rail cabinet and the rack posts are stable and standing firmly on a level surface.

- We strongly recommend that at least two able-bodied persons perform the steps described in this guide.

- We recommend the use an appropriate lifting tool or device, if necessary.
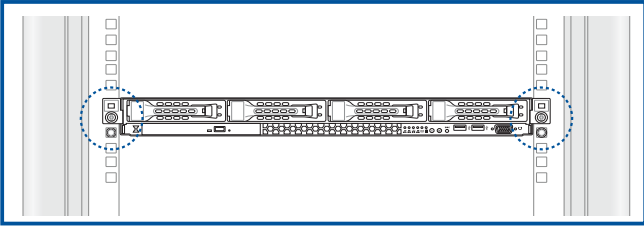
Ensure to include the side knots on the two sides of the server in the rack rail holders.

The illustrations shown above are for reference only.

Motherboard Information

4

This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.

4.1 Motherboard layout
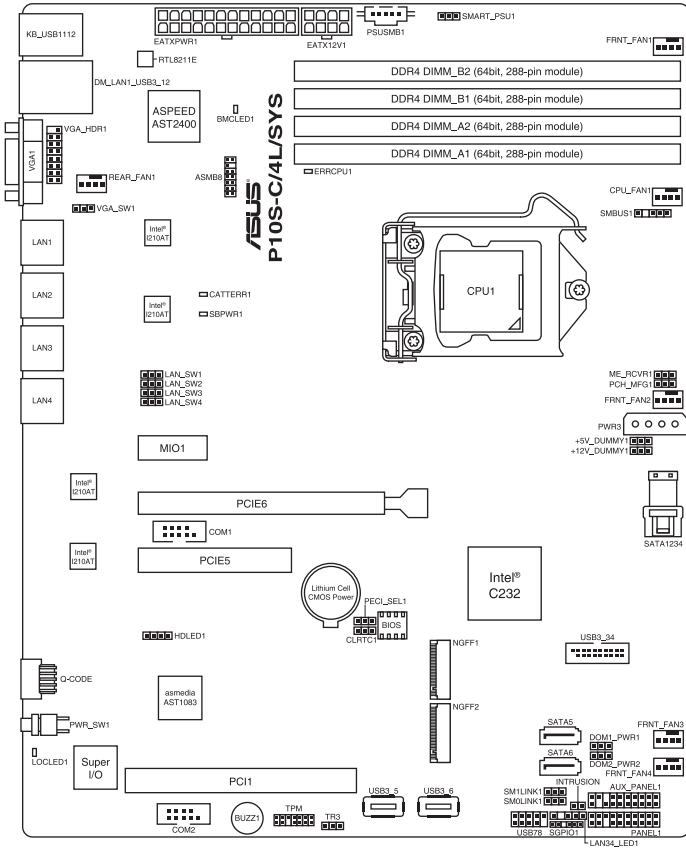
Layout contents

Onboard LEDs		Page
1.	Standby Power LED (SB_PWR1)	4-5
2.	Baseboard Management Controller LED (BMC_LED1)	4-5
3.	CPU Warning LED (ERR_CPU1)	4-6
4.	Message LED (LOCLED1)	4-6
5.	CATT ERR LED (CATTERR1)	4-7

Jumpers		Page
1.	Clear RTC RAM (3-pin CLRTC1)	4-8
2.	VGA controller setting (3-pin VGA_SW1)	4-9
3.	LAN controller setting (3-pin LAN_SW1-4)	7-6
4.	ME firmware force recovery setting (3-pin ME_RCVR1)	4-10
5.	PCH_MFG1 setting (3-pin PCH_MFG1)	4-10
6.	SATA DOM power setting (3-pin DOM1_PWR1, DOM2_PWR2)	4-11
7.	Smart Ride Through setting (3-pin SMART_PSU1)	4-11

Rear panel connectors		Page
1.	PS/2 keyboard/mouse port	4-12
2.	RJ-45 port for iKVM	4-12
3.	Video Graphics Adapter port	4-12
4.	RJ-45 ports for LAN	4-12
5.	Power-on Button	4-12
6.	Message LED	4-12
7.	USB 2.0 ports 1 and 2	4-12
8.	USB 3.0 ports 1 and 2	4-12

Internal connectors		Page
1.	Serial ATA 6 Gbps connectors (7-pin SATA 6 Gbps_5-6 connector [Gray])	4-15
2.	Mini-SAS HD connector (SATA1234)	4-15
3.	Hard disk activity LED connector (4-pin HDLED1)	4-16
4.	USB 2.0 connector (10-1 pin USB78)	4-16
5.	USB 3.0 connector (20-1 pin USB3_34)	4-17
6.	CPU, front and rear fan connectors (4-pin FRNT_FAN1-4, REAR_FAN1, CPU_FAN1)	4-17
7.	Serial General Purpose Input/Output connector (6-1 pin SGPIO1)	4-18
8.	Serial port connectors (10-1 pin COM1/COM2)	4-18
9.	Power Supply SMBus connector (5-pin PSUSMB1)	4-19
10.	Trusted Platform Module connector (14-1 pin TPM)	4-19
11.	SATA DOM power connector (4-pin PWR3)	4-20
12.	LAN34_LED connector (5-1 pin LAN34_LED1)	4-21
13.	VGA connector (16-1 pin VGA_HDR1)	4-21
14.	ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	4-22
15.	System panel connector (20-1 pin PANEL1)	4-22
16.	Auxiliary panel connector (20-2 pin AUX_PANEL1)	4-24
17.	M.2 (NGFF) card connector (NGFF1 & NGFF2)	4-25
18.	System Management Bus (SMBUS) connector (5-1 pin SMBUS1)	4-25
19.	Chassis intrusion connector (2-pin INTRUSION)	4-26

4.2 Onboard LEDs

1. **Standby Power LED (SB_PWR1)**

   The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.
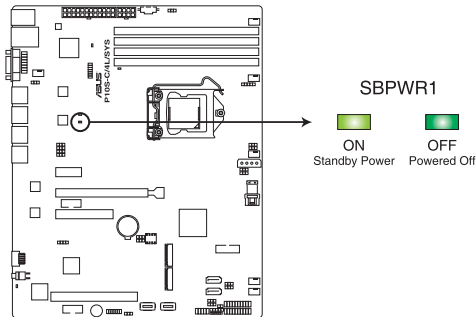
   P10S-C/4L/SYS Standby Power LED

2. **Baseboard Management Controller LED (BMC_LED1)**

   The green heartbeat LED blinks per second to indicate that the ASMB8 is working normally. The BMC LED works with the ASUS ASMB8 management device and indicates its initiation status. When the PSU is plugged and the system is OFF, ASUS ASMB8 management device starts system initiation for about one (1) minute. The BMC LED blinks after system initiation finishes.
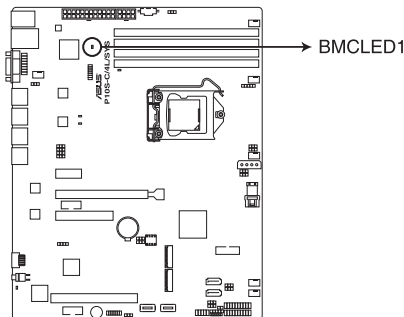
   P10S-C/4L/SYS BMC LED

   • The heartbeat LED functions only when you install the ASUS ASMB8 Management card.

   • Everytime after the AC power is replugged, you have to wait for about 60 seconds for the system to power up.

3. **CPU Warning LED (ERR_CPU1)**

   The CPU warning LED lights up to indicate that a CPU error or failure has occurred.
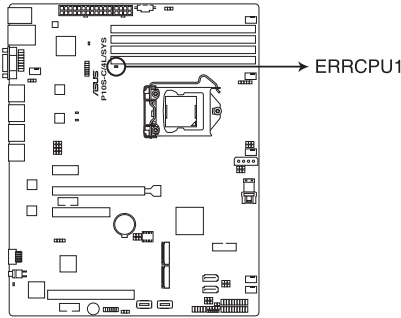
ERRCPU1

P10S-C/4L/SYS ERRCPU1 LED

The warning LED functions only when you install the ASUS ASMB8 Management card.

4. **Location LED (LOCLED1)**

   This onboard LED lights up when the Location button on the server is pressed or when triggered by a system management software. The Location LED helps visually locate and quickly identify the server in error on a server rack.

LOCLED1
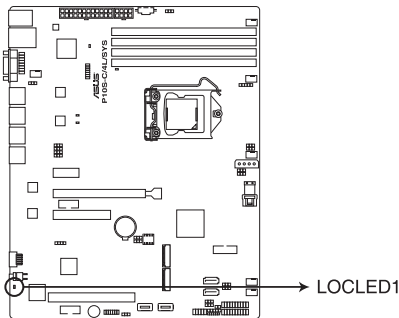
P10S-C/4L/SYS Location LED

5. **CATT ERR LED (CATTERR1)**

   The CATT ERR LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.
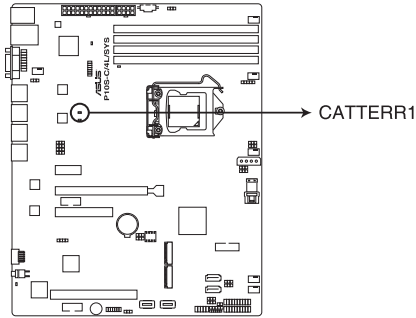
P10S-C/4L/SYS CATTERR1 LED

4.3   Jumpers

1.   **Clear RTC RAM (3-pin CLRTC1)**

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:

1.   Turn OFF the computer and unplug the power cord.

2.   Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.

3.   Plug the power cord and turn ON the computer.

4.   Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Except when clearing the RTC RAM, never remove the cap on CLRTC jumper default position. Removing the cap will cause system boot failure!

If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.

CLRTC1

1 2   2 3

Normal   Clear CMOS
(Default)
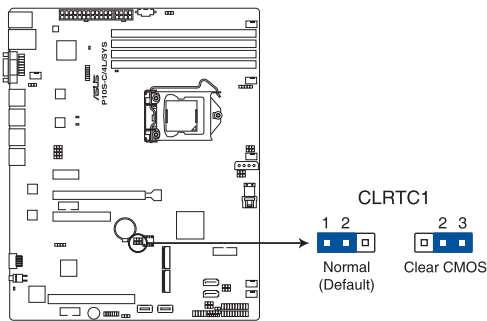
P10S-C/4L/SYS Clear RTC RAM

2.   **VGA controller setting (3-pin VGA_SW1)**

This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.
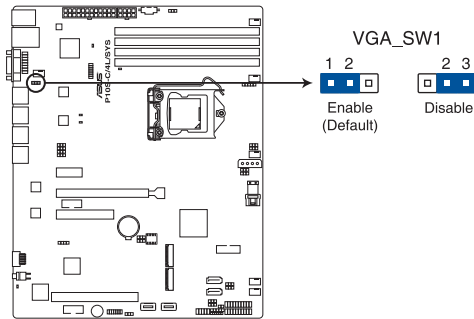
P10S-C/4L/SYS VGA setting

3.   **LAN controller setting (3-pin LAN_SW1-4)**

These jumpers allows you to enable or disable the onboard Intel® I210 Gigabit LAN controllers. Set to pins 1-2 to activate the Gigabit LAN feature.
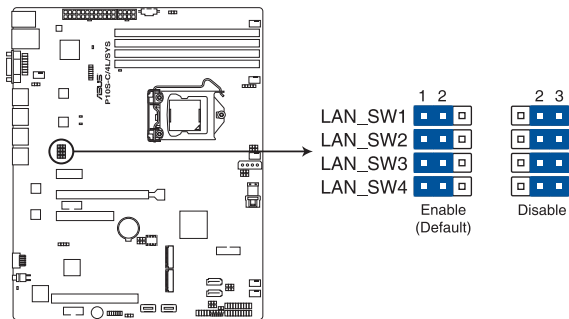
P10S-C/4L/SYS LAN setting

4. **ME firmware force recovery setting (3-pin ME_RCVR1)**

This jumper allows you to force Intel Management Engine (ME) boot from recovery mode when ME become corrupted.
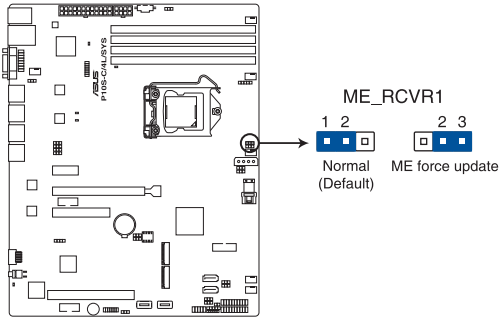
P10S-C/4L/SYS ME recovery setting

5. **PCH_MFG1 setting (3-pin PCH_MFG1)**

This jumper allows you to update the BIOS ME block select.
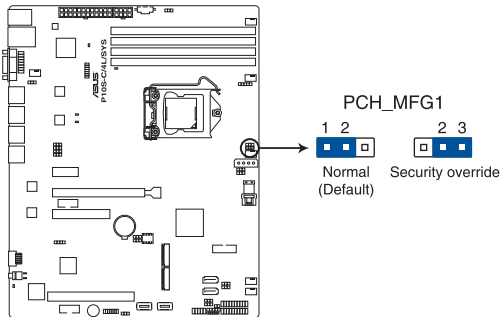
P10S-C/4L/SYS PCH_MFG setting

6. **SATA DOM power setting (3-pin DOM1_PWR1, DOM2_PWR2)**

   This jumper allows you to configure the DOM power setting.
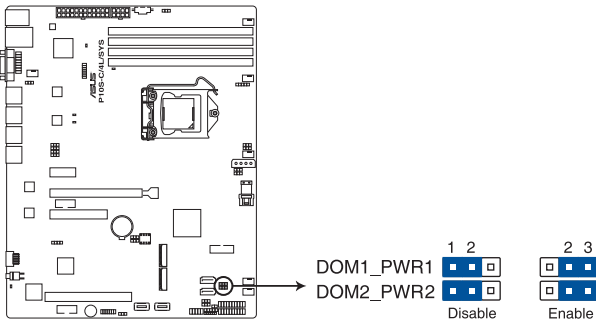
   P10S-C/4L/SYS DOM_PWR setting

7. **Smart Ride Through (SmaRT) setting (3-pin SMART_PSU1)**

   This jumper allows you to enable or disable the Smart Ride Through (SmaRT) function. This feature is disabled by default. Set to pins 1-2 to enable it. When enabled, SmaRT allows uninterrupted operation of the system during an AC loss event.
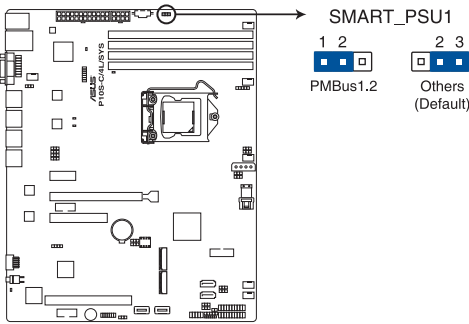
   P10S-C/4L/SYS PMBus 1.2 PSU setting

4.4 Connectors

4.4.1 Rear panel connectors
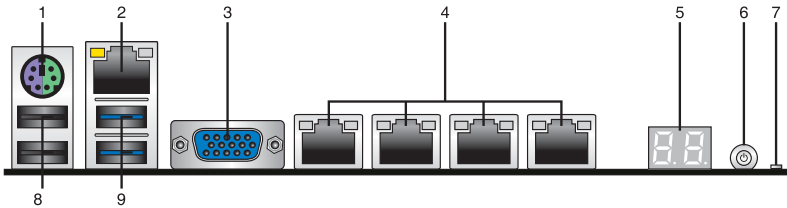
1. **PS/2 keyboard/mouse port (purple/green):** This port is for a PS/2 keyboard or mouse.

2. **RJ-45 port for iKVM:** This RJ-45 port functions only when you install ASMB8 management card.

3. **Video Graphics Adapter port:** This port is for a VGA monitor or other VGA-compatible devices.

4. **RJ-45 ports for LAN:** These ports allows Gigabit connection to a LAN (Local Area Network) through a network hub. Refer to the table below for the LAN port LED indications.

5. **Q-Code LED:** The Q-Code LED provides a 2-digit display that shows the status of your system. Refer to the **Q-Code table** of this user guide for more information about the 2-digit codes.

6. **Power-on Button:** Press this button to turn on the system.

7. **Message LED:** The Message LED is an onboard LED that lights up to indicate an abnormal event occurrence.

8. **USB 2.0 ports 1 and 2:** These two 4-pin USB (Universal Serial Bus) ports are available for connecting USB 2.0 devices.

9. **USB 3.0 ports 1 and 2:** These two 4-pin USB (Universal Serial Bus) ports are available for connecting USB 3.0 devices.

LAN port LED indications

Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection

ACT/LINK LED   SPEED LED
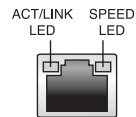
4.4.2 Q-Code table

Action	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	Security Phase	1	Progress	First post code(POWER_ON_POST_CODE)
		2	Progress	Load BSP microcode(MICROCODE_POST_CODE)
		3	Progress	Perform early platform initialization
		4	Progress	Set cache as ram for PEI phase(CACHE_ENABLED_POST_CODE)
		5	Progress	Establish Stack
		6	Progress	CPU Early init.(CPU_EARLY_INIT_POST_CODE)
	PEI (Pre-EFI initialization) phase	10	Progress	PEI Core Entry
		11	Progress	PEI cache as ram CPU initial
		15	Progress	NB initialize before installed memory
		19	Progress	SB initialize before installed memory
		0	MRC Progress	MRC_INITIALIZATION_START
		10	MRC Progress	MRC_CMD_PLOT_2D
		1B	MRC Progress	MRC_FAST_BOOT_PERMITTED
		1C	MRC Progress	MRC_RESTORE_NON_TRAINING
		1D	MRC Progress	MRC_PRINT_INPUT_PARAMS
		1E	MRC Progress	MRC_SET_OVERRIDES_PSPD
		20	MRC Progress	MRC_SPD_PROCESSING
		21	MRC Progress	MRC_SET_OVERRIDES
		22	MRC Progress	MRC_MC_CAPABILITY
		23	MRC Progress	MRC_MC_CONFIG
		24	MRC Progress	MRC_MC_MEMORY_MAP
		25	MRC Progress	MRC_JEDEC_INIT_LPDDR3
		26	MRC Progress	MRC_RESET_SEQUENCE
		27	MRC Progress	MRC_PRE_TRAINING
		28	MRC Progress	MRC_EARLY_COMMAND
		29	MRC Progress	MRC_SENSE_AMP_OFFSET
		2A	MRC Progress	MRC_READ_MPR
		2B	MRC Progress	MRC_RECEIVE_ENABLE
		2C	MRC Progress	MRC_JEDEC_WRITE_LEVELING
		2D	MRC Progress	MRC_LPDDR_LATENCY_SET_B
		2E	MRC Progress	MRC_WRITE_TIMING_1D
		2F	MRC Progress	MRC_READ_TIMING_1D
		30	MRC Progress	MRC_DIMM_ODT
		31	MRC Progress	MRC_EARLY_WRITE_TIMING_2D
		32	MRC Progress	MRC_WRITE_DS
		33	MRC Progress	MRC_WRITE_EQ
		34	MRC Progress	MRC_EARLY_READ_TIMING_2D
		35	MRC Progress	MRC_READ_ODT
		36	MRC Progress	MRC_READ_EQ
		37	MRC Progress	MRC_READ_AMP_POWER
		38	MRC Progress	MRC_WRITE_TIMING_2D
		39	MRC Progress	MRC_READ_TIMING_2D
		3A	MRC Progress	MRC_CMD_VREF
		3B	MRC Progress	MRC_WRITE_VREF_2D
		3C	MRC Progress	MRC_READ_VREF_2D
		3D	MRC Progress	MRC_POST_TRAINING
		3E	MRC Progress	MRC_LATE_COMMAND
		3F	MRC Progress	MRC_ROUND_TRIP_LAT
		40	MRC Progress	MRC_TURN_AROUND
		41	MRC Progress	MRC_CMP_OPT
		42	MRC Progress	MRC_SAVE_MC_VALUES
		43	MRC Progress	MRC_RESTORE_TRAINING
		44	MRC Progress	MRC_RMT_TOOL
		45	MRC Progress	MRC_WRITE_SR
		46	MRC Progress	MRC_DIMM_RON
		47	MRC Progress	MRC_RCVEN_TIMING_1D
		48	MRC Progress	MRC_MR_FILL
		49	MRC Progress	MRC_PWR_MTR
		4A	MRC Progress	MRC_DDR4_MAPPING
		4B	MRC Progress	MRC_WRITE_VOLTAGE_1D
		4C	MRC Progress	MRC_EARLY_RDMPR_TIMING_2D
		4D	MRC Progress	MRC_FORCE_OLTM
		50	MRC Progress	MRC_MC_ACTIVATE

(continued on the next page)

Action	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	PEI(Pre-EFI initialization) phase	51	MRC Progress	MRC_RH_PREVENTION
		52	MRC Progress	MRC_GET_MRC_DATA
		58	MRC Progress	MRC_RETRAIN_CHECK
		5A	MRC Progress	MRC_SA_GV_SWITCH
		5B	MRC Progress	MRC_ALIAS_CHECK
		5C	MRC Progress	MRC_ECC_CLEAN_START
		5D	MRC Progress	MRC_DONE
		5F	MRC Progress	MRC_CPGC_MEMORY_TEST
		60	MRC Progress	MRC_TXT_ALIAS_CHECK
		61	MRC Progress	MRC_ENG_PERF_GAIN
		68	MRC Progress	MRC_MEMORY_TEST
		69	MRC Progress	MRC_FILL_RMT_STRUCTURE
		70	MRC Progress	MRC_SELF_REFRESH_EXIT
		71	MRC Progress	MRC_NORMAL_MODE
		7D	MRC Progress	MRC_SSA_PRE_STOP_POINT
		7E	MRC Progress	MRC_NO_MEMORY_DETECTED
		7F	MRC Progress	MRC_SSA_STOP_POINT
		55	MRC Progress	MRC_MEM_INIT_DONE
		32	Progress	CPU Init.
		34	Progress	CPU Init.
		36	Progress	CPU Init.
		4F	Progress	DXE Initial Program Load(IPL)
	DXE(Driver Execution Environment) phase	60	Progress	DXE Core Started
		61	Progress	DXE NVRAM Init.
		62	Progress	SB run-time init.
		63	Progress	DXE CPU Init
		68	Progress	NB Init.
		69	Progress	NB Init.
		6A	Progress	NB Init.
		70	Progress	SB Init.
		71	Progress	SB Init.
		72	Progress	SB Init.
		78	Progress	ACPI Init.
		79	Progress	CSM Init.
	BDS(Boot Device Selection) phase	90	Progress	BDS started
		91	Progress	Connect device event
		92	Progress	PCI Bus Enumeration.
		93	Progress	PCI Bus Enumeration.
		94	Progress	PCI Bus Enumeration.
		95	Progress	PCI Bus Enumeration.
		96	Progress	PCI Bus Enumeration.
		97	Progress	Console outout connect event
		98	Progress	Console input connect event
		99	Progress	AMI Super IO start
		9A	Progress	AMI USB Driver Init.
		9B	Progress	AMI USB Driver Init.
		9C	Progress	AMI USB Driver Init.
		9D	Progress	AMI USB Driver Init.
		b2	Progress	Legacy Option ROM Init.
		b3	Progress	Reset system
		b4	Progress	USB hotplug
		b6	Progress	NVRAM clean up
		b7	Progress	NVRAM configuration reset
		A0	Progress	IDE, AHCI Init.
		A1	Progress	IDE, AHCI Init.
		A2	Progress	IDE, AHCI Init.
		A3	Progress	IDE, AHCI Init.
		FF~00	Progress	Wait BMC ready(duration: 120 seconds).
		A8	Progress	BIOS Setup Utility password verify
		A9	Progress	BIOS Setup Utility start
		AB	Progress	BIOS Setup Utility input wait
		AD	Progress	Ready to boot event
		AE	Progress	Legacy boot event
	Operating system phase	AA	Progress	APIC mode
		AC	Progress	PIC mode

4.4.3 Internal connectors

1. **Serial ATA 6.0 Gbps connectors (7-pin SATA 6 Gbps_5-6 connector [Gray])**

   Supported by the Intel® C232 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6Gb/s of data transfer rate. If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.
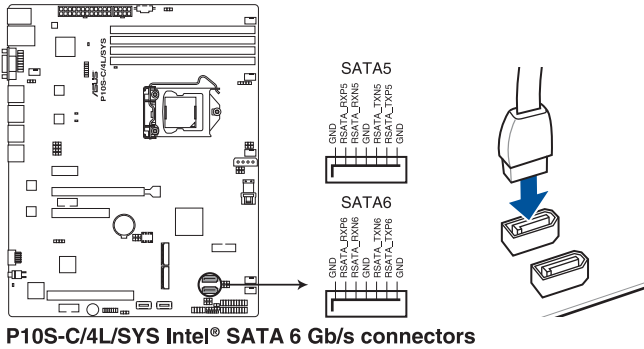
P10S-C/4L/SYS Intel® SATA 6 Gb/s connectors

- The actual data transfer rate depends on the speed of Serial ATA hard disks installed.
- When the M.2 connector is operating in SATA mode, SATA connector 5 and 6 (SATA 6 Gbps_5-6) will be disabled.

2. **Mini-SAS HD connector (SATA1234)**

   This motherboard comes with a mini Serial Attached SCSI (SAS) HD connector, the storage technology that supports Serial ATA. The connector supports up to four devices.
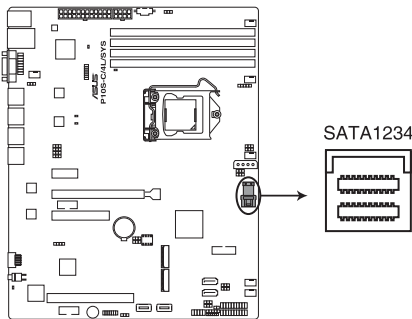
P10S-C/4L/SYS SATA1234 connector

3. **Hard disk activity LED connector (4-pin HDLED1)**

    This LED connector is for the storage add-on card cable connected to the SATA or SAS add-on card. The read or write activities of any device connected to the SATA or SAS add-on card causes the front panel LED to light up.
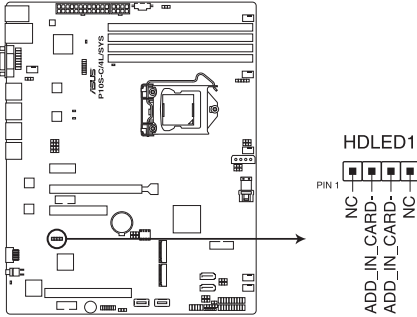
P10S-C/4L/SYS Hard disk activity LED connector

4. **USB 2.0 connector (10-1 pin USB78)**

    These connectors are for USB 2.0 ports. Connect the USB module cables to these connectors. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.
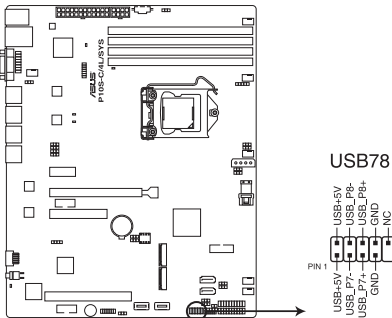
P10S-C/4L/SYS USB2.0 connector

5. USB 3.0 connector (20-1 pin USB3_34)

These connectors allow you to connect a USB 3.0 module for additional USB 3.0 front or rear panel ports. With an installed USB 3.0 module, you can enjoy all the benefits of USB 3.0 including faster data transfer speeds of up to 5 Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.

P10S-C/4L/SYS USB3.0 connectors
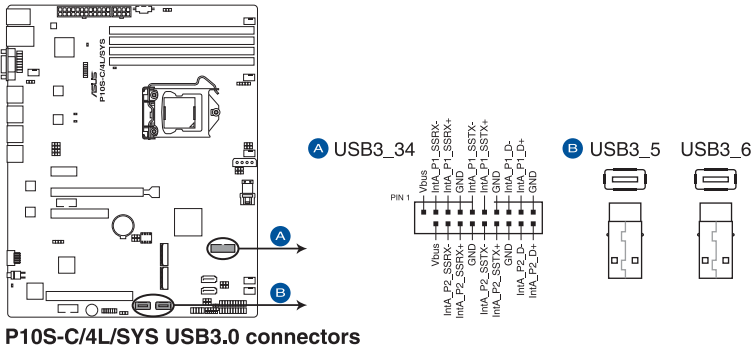
6. CPU, front, and rear fan connectors (4-pin FRNT_FAN1-4, REAR_FAN1, CPU_FAN1)

The fan connectors support cooling fans. Connect the fan cables to the fan connectors on the motherboard, ensuring that the black wire of each cable matches the ground pin of the connector.

> • DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
>
> • These are not jumpers! DO NOT place jumper caps on the fan connectors!
>
> • All fans feature the ASUS Smart Fan technology.

P10S-C/4L/SYS Fan connectors
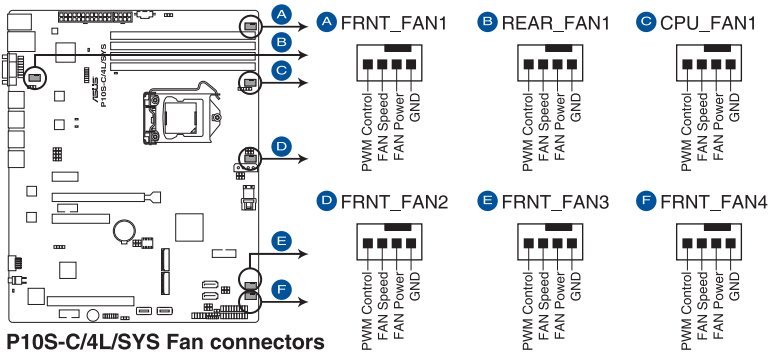
7. **Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**

The SGPIO 1 connector is used for the Intel Rapid Storage Technology Enterprise SGPIO interface that controls the LED pattern generation, device information, and general purpose data.
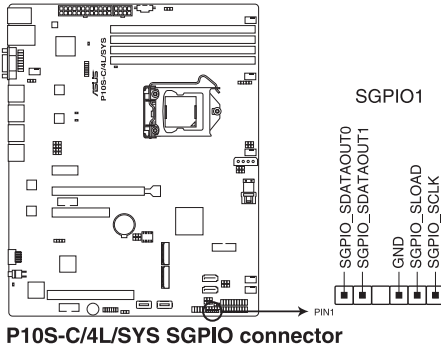
P10S-C/4L/SYS SGPIO connector

8. **Serial port connectors (10-1 pin COM1/COM2)**

These connectors are for the serial COM ports. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.
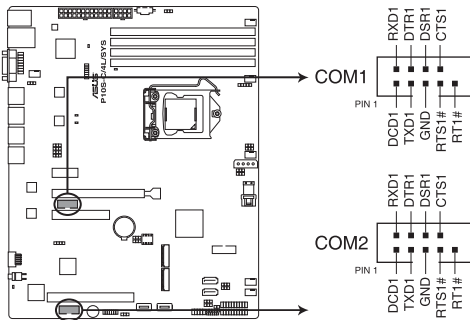
P10S-C/4L/SYS Serial port connector

9. **Power Supply SMBus connector (5-pin PSUSMB1)**

   This connector allows you to connect SMBus (System Management Bus) to the power supply unit to read PSU information. Devices communicate with an SMBus host and/or other SMBus devices using the SMBus interface.
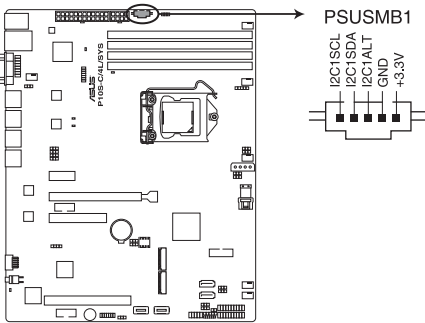
P10S-C/4L/SYS Power supply SMBus connector

This connector functions only when you install the ASUS ASMB8.

10. **Trusted Platform Module connector (14-1 pin TPM)**

   This connector supports a TPM (Trusted Platform Module) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.
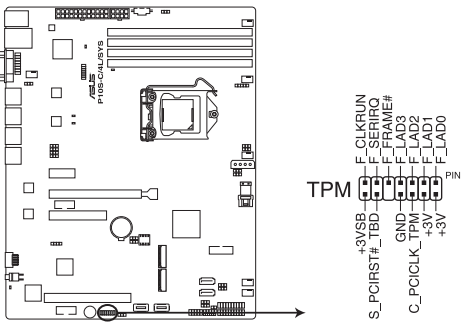
P10S-C/4L/SYS TPM connector

11. SATA DOM power connector (4-pin PWR3)

This 4-pin connector is for 5V power of a certain SATA DOM (Disk on Module) device when using an appropriate cable.
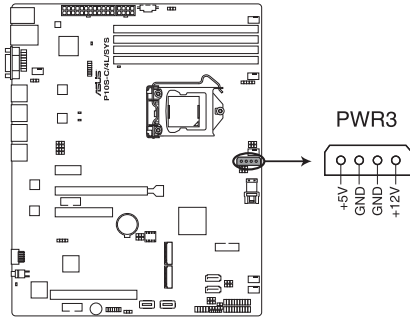
P10S-C/4L/SYS Power connector

• The SATA DOM power connector is for output power only. It has a maximum output current of 1A.

• Ensure that the power of the SATA DOM device that you will use is less than 1A.

12. LAN34_LED connector (5-1 pin LAN34_LED1)

These LEDs are for Gigabit LAN activity LEDs on the front panel. Connect the LAN LED cable to the backplane for LAN activity indication.

P10S-C/4L/SYS LAN3 & LAN4 LED
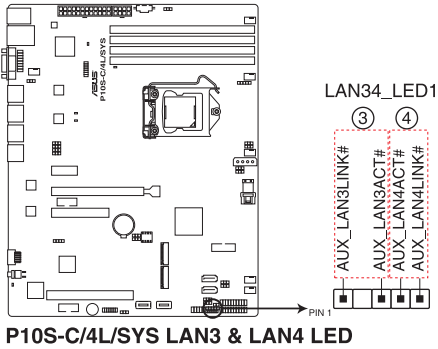
13. VGA connector (16-1 pin VGA_HDR1)

This connector supports the VGA High Dynamic-Range interface.

P10S-C/4L/SYS Internal VGA connector
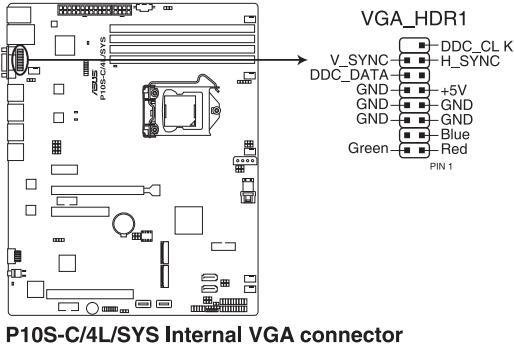
14. ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)

These connectors are for the ATX power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Find the proper orientation and push down firmly until the connectors completely fit.

- DO NOT forget to connect the 24-pin and the 8-pin power plugs; otherwise, the system will not boot up.

- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.

- This motherboard supports ATX2.0 PSU or later version.

- Ensure that your PSU can provide at least the minimum power required by your system.
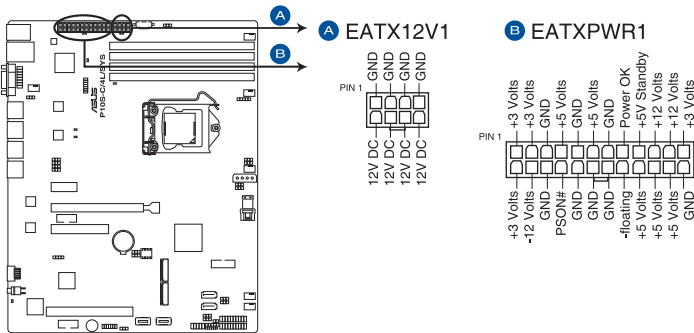
P10S-C/4L/SYS ATX power connectors

15.   System panel connector (20-1 pin PANEL1)

This connector supports several chassis-mounted functions.
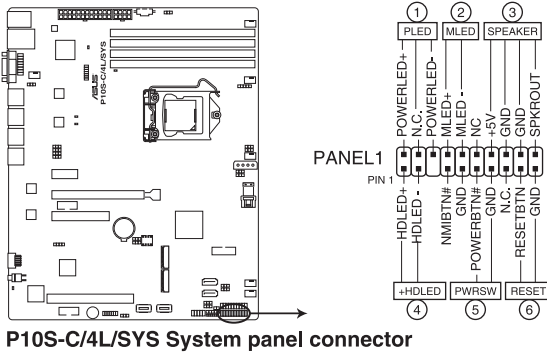
P10S-C/4L/SYS System panel connector

1.   System power LED (3-pin PLED)

This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

2.   Message LED (2-pin MLED)

This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurrence.

3.   System warning speaker (4-pin SPEAKER)

This 4-pin connector is for the chassis-mounted system warning speaker. The speaker allows you to hear system beeps and warnings.

4.   Hard disk drive activity LED (2-pin +HDLED)

This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

5.   Power button/soft-off button (2-pin PWRSW)

This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

6.   Reset button (2-pin RESET)

This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.

16. Auxiliary panel connector (20-2 pin AUX_PANEL1)

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.
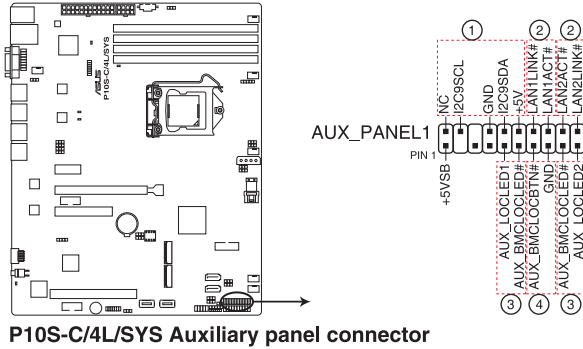
P10S-C/4L/SYS Auxiliary panel connector

1. Front panel SMB (6-1 pin FPSMB)

These connectors are for the front panel SMBus cable.

2. LAN activity LED (2-pin LAN1LINK and 2-pin LAN2LINK)

These connectors are for Gigabit LAN activity LEDs on the front panel.

3. Locator LED (2-pin AUX_LOCLED1 and 2-pin AUX_LOCLED2)

These connectors are for the locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connectors. The LEDs will light up when the Locator button is pressed.

4. Locator Button/Switch (2-pin AUX_BMCLOCBTN)

These connectors are for the locator button on the front panel. This button queries the state of the system locator.

17. M.2 (NGFF) card connector (NGFF1 & NGFF2)

This connector allows you to install an M.2 device.
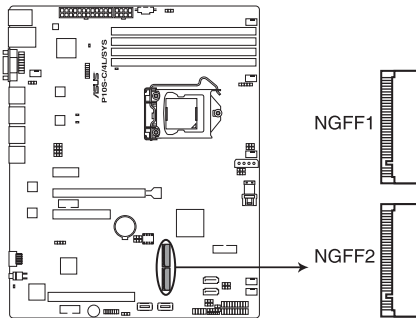
P10S-C/4L/SYS NGFF1 & NGFF2 connectors

- This connector supports type 2242/2260/2280 devices on both PCI-E and SATA interface.
- When the M.2 connector is operating in SATA mode, SATA connector 5 and 6 (SATA 6 Gbps_5-6) will be disabled.

The M.2 (NGFF) device is purchased separately.

18. System Management Bus (SMBUS) connector (5-1 pin SMBUS1)

This connector controls the system and power management-related tasks. This connector processes the messages to and from devices rather than tripping the individual control lines.
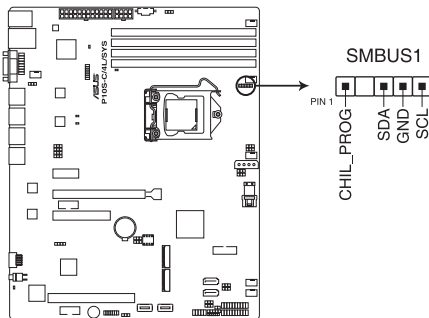
P10S-C/4L/SYS SMBUS connector

19. Chassis intrusion connector (2-pin INTRUSION)

This connector is for a chassis-mounted intrusion detection sensor or switch. Connect one end of the chassis intrusion sensor or switch cable to this connector. The chassis intrusion sensor or switch sends a high-level signal to this connector when a chassis component is removed or replaced. The signal is then generated as a chassis intrusion event.

By default, the pin labeled "Chassis Signal" and "Ground" are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.

P10S-C/4L/SYS Chassis Intrusion connector
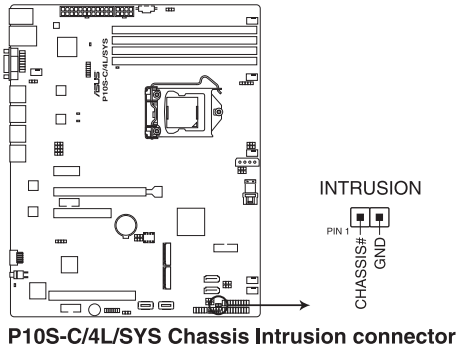
BIOS Setup

5

This chapter tells how to change the system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

5.1 Managing and updating your BIOS

The following utilities allow you to manage and update the motherboard Basic Input/Output System (BIOS) setup:

1. **ASUS CrashFree BIOS 3**

   To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.

2. **ASUS EzFlash**

   Updates the BIOS using a USB flash disk.

3. **BUPDATER**

   Updates the BIOS in DOS mode using a bootable USB flash disk drive.

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable USB flash disk drive in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the BUPDATER utility.

5.1.1 ASUS CrashFree BIOS 3 utility

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can update a corrupted BIOS file using a USB flash drive that contains the updated BIOS file.

> Prepare a USB flash drive containing the updated motherboard BIOS before using this utility.

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.

2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.

> DO NOT shut down or reset the system while recovering the BIOS! Doing so would cause system boot failure!

> The recovered BIOS may not be the latest BIOS version for this motherboard. Visit the ASUS website at www.asus.com to download the latest BIOS file.

5.1.2   ASUS EzFlash Utility

The ASUS EzFlash Utility feature allows you to update the BIOS using a USB flash disk without having to use a DOS-based utility.

> Download the latest BIOS from the ASUS website at www.asus.com before using this utility.

> The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

To update the BIOS using EzFlash Utility:

1.   Insert the USB flash disk that contains the latest BIOS file to the USB port.

2.   Enter the BIOS setup program. Go to the **Tool** menu to select ASUS EzFlash Utility and press <Enter> to enable it.

```
               ASUS Tek. EzFlash Utility

     Current Platform                New Platform
Platform : P10S-C/4L/SYS        Platform : P10S-C/4L/SYS
Version :   0200                Version :   0206
Build Date :12/04/2014          Build Date :07/01/2015

FS0        System Volume Information          <DIR>
           P10S-C/4L/SYS BIOS                 <DIR>
           Windows                            <DIR>




[Up/Down/Left/Right]:Switch [Enter]:Choose [q]:Exit
```
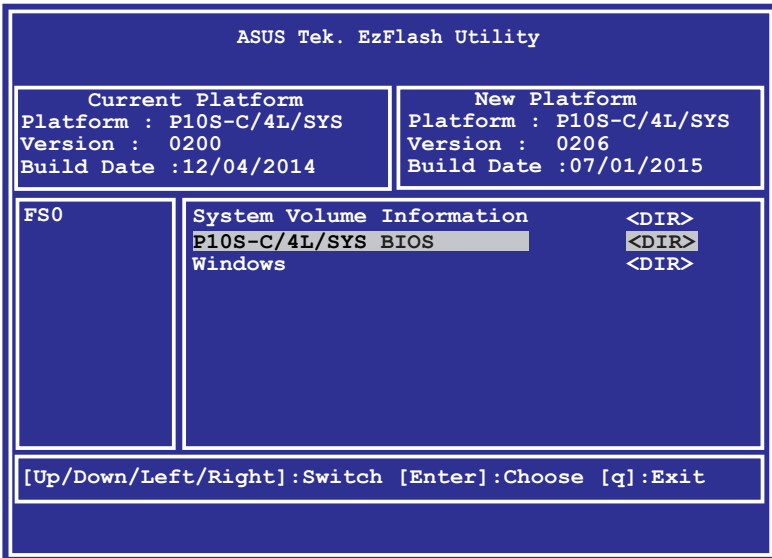
3.   Press <Tab> to switch to the **Drive** field.

4.   Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS then press <Enter>.

5.   Press <Tab> to switch to the **Folder Info** field.

6.   Press the Up/Down arrow keys to find the BIOS file then press <Enter>.

7.   Reboot the system when the update process is done.

- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.

- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

Ensure to load the BIOS default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

5.1.3 BUPDATER utility

The succeeding BIOS screens are for reference only. The actual BIOS screen displays may not be the same as shown.

The BUPDATER utility allows you to update the BIOS file in DOS environment using a bootable USB flash disk drive with the updated BIOS file.

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.

2. Download the BUPDATER utility (BUPDATER.exe) from the ASUS support website at https://www.asus.com/support/ to the bootable USB flash disk drive you created earlier.

3. Boot the system in DOS mode, then at the prompt, type:

   ```
   BUPDATER /i[filename].CAP
   ```

   where [filename] is the latest or the original BIOS file on the bootable USB flash disk drive, then press <Enter>.

   ```
   A:\>BUPDATER /i[file name]CAP
   ```

The utility verifies the file, then starts updating the BIOS file.

```
                    ASUS Tek. EzFlash Utility



          Current Platform                         New Platform
 Platform  : P10S-C/4L/SYS                 Platform  : P10S-C/4L/SYS
 Version   : 0200                          Version   : 0206
 Build date: 12/04/2014                    Build date: 07/01/2015


       Start Programming Flash.  DO NOT SHUTDOWN THE SYSTEM!!!

          Write
          75%
```

> ⚠ DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!

The utility returns to the DOS prompt after the BIOS update process is completed.

4.   Reboot the system from the hard disk drive.

```
    The BIOS update is finished! Please restart your system.
    C:\>
```

5.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **5.1 Managing and updating your BIOS**.

Use the BIOS Setup program when you are installing a motherboard, reconfiguring your system, or prompted to "Run Setup." This section explains how to configure your system using this utility.

Even if you are not prompted to use the Setup program, you can change the configuration of your computer in the future. For example, you can enable the security password feature or change the power management settings. This requires you to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the firmware chip.

The firmware chip on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. Press <Del> during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+<Del>, or by pressing the reset button on the system chassis. You can also restart by turning the system off then back on. Do this last option only if the first two failed.

The Setup program is designed to make it as easy to use as possible. Being a menu-driven program, it lets you scroll through the various sub-menus and make your selections from the available options using the navigation keys.

- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Press <F5> and select **Yes** to load the BIOS default settings.

- The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.

- Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.

5.2.1   BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

      BIOS Information                                          Choose the system default
      Model Name                    P10S-C Series               language
      BIOS Version                  0204 x64
      Build Date                    07/22/2015 03:11:04

      Processor Information
      Brand String                  Intel(R) Core(TM)
                                    i5-6400T CPU @ 2.20GHz
      Frequency                     2500 MHz
      Number of Processors          4Core(s) / 4Thread(s)

      Memory Information
      Total Memory                  4096 MB
      Memory Frequency              2133 MHz                   →←: Select Screen
                                                               ↑↓: Select Item
      System Language               [English]                 Enter: Select
                                                               +/-: Change Opt.
      System Date                   [Wed 07/29/2015]           F1: General Help
      System Time                   [18:56:38]                 F2: Previous Values
                                                               F5: Optimized Defaults
      Access Level                  Administrator              F10: Save Changes & Reset
                                                               ESC: Exit



                Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Navigation keys

5.2.2   Menu bar

The menu bar on top of the screen has the following main items:

Main   For changing the basic system configuration

Advanced   For changing the advanced system settings

Security   For changing the security settings

Boot   For changing the system boot configuration

Monitor   For displaying the system temperature, power status, and changing
                  the fan settings

Tool   For configuring options for special functions

Save & Exit   For selecting the save & exit options

Server Mgmt   For changing the server mgmt settings

Event Logs   For changing the event log settings

To select an item on the menu bar, press the right or left arrow key on the keyboard until the desired item is highlighted.

5.2.3   Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting **Main** shows the Main menu items. The other items (Advanced, Security, Boot, Monitor, Tool, Save & Exit, Server Mgmt, and Event Logs) on the menu bar have their respective menu items.

5.2.4   Submenu items

A solid triangle before each item on any menu screen means that the item has a submenu. To display the submenu, select the item and press <Enter>.

```
           Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

 ▶ Trusted Computing                                     Trusted Computing Settings
 ▶ Acoustic Management Configuration
 ▶ Chipset Configuration
 ▶ Platform Configuration
 ▶ CPU Configuration
```
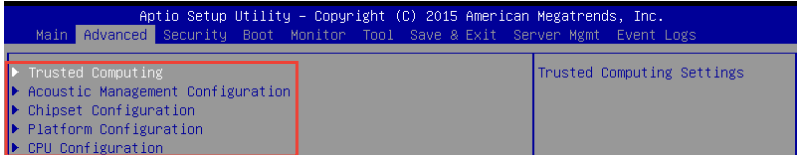
5.2.5   Navigation keys

At the bottom right corner of a menu screen are the navigation keys for the BIOS setup program. Use the navigation keys to select items in the menu and change the settings.

5.2.6   General help

At the top right corner of the menu screen is a brief description of the selected item.

5.2.7   Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable. A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

5.2.8   Pop-up window

Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

5.2.9   Scroll bar

A scroll bar appears on the right side of a menu screen when there are items that do not fit on the screen. Press the Up/Down arrow keys or <Page Up> / <Page Down> keys to display the other items on the screen.

5.3   Main menu

When you enter the BIOS Setup program, the Main menu screen appears. The Main menu provides you an overview of the basic system information, and allows you to set the system date and time.

```
            Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
  Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

  BIOS Information                                            Choose the system default
  Model Name                    P10S-C Series                language
  BIOS Version                  0204 x64
  Build Date                    07/22/2015 03:11:04

  Processor Information
  Brand String                  Intel(R) Core(TM)
                                i5-6400T CPU @ 2.20GHz
  Frequency                     2500 MHz
  Number of Processors          4Core(s) / 4Thread(s)

  Memory Information
  Total Memory                  4096 MB
  Memory Frequency              2133 MHz                      ➔←: Select Screen
                                                             ↑↓: Select Item
  System Language               [English]                    Enter: Select
                                                             +/-: Change Opt.
  System Date                   [Wed 07/29/2015]             F1: General Help
  System Time                   [19:25:18]                   F2: Previous Values
                                                             F5: Optimized Defaults
  Access Level                  Administrator                F10: Save Changes & Reset
                                                             ESC: Exit


            Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

5.3.1   System Date

Allows you to set the system date to **[Day mm/dd/yyyy]**.

Day = Day of the week

mm = month (numeric value)

dd = day (numeric value)

yyyy = year (numeric value)

5.3.2   System Time

Allows you to set the system time to **[hh/mm/ss]**.

hh = hour (numeric value)

mm = minutes (numeric value)

ss = seconds (numeric value)

5.4 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other system devices.

> ⚠ Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
   Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

▶ Trusted Computing                                     Trusted Computing Settings
▶ Chipset Configuration
▶ Platform Configuration
▶ CPU Configuration
▶ SATA Configuration
▶ Network Stack Configuration
▶ CSM Configuration

▶ iSCSI Configuration


                                                        ⇄: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F5: Optimized Defaults
                                                        F10: Save Changes & Reset
                                                        ESC: Exit


          Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

5.4.1   Trusted Computing

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

   Configuration                                              Enables or Disables BIOS
     Security Device Support        [Enable]                  support for security device.
     Device Select                  [Auto]                    O.S. will not show Security
                                                              Device. TCG EFI protocol and
                                                              INT1A interface will not be
   Current Status Information                                 available.
     NO Security Device Found
```

Security Device Support [Enable]

Allows you to enable or disable the BIOS support for security device.
Configuration options: [Disable] [Enable]

Device Select [Auto]

Allows you to restrict support to selected device. Auto will support both devices.
Configuration options: [TPM 1.2] [TPM 2.0] [Auto]

5.4.2   Chipset Configuration

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

 ▶ System Agent (SA) Configuration                           System Agent (SA) Parameters
 ▶ PCH-IO Configuration
 ▶ Intel Server Platform Services
 ▶ Intel TXT Information
 ▶ PCI/PCIE Subsystem Settings
```
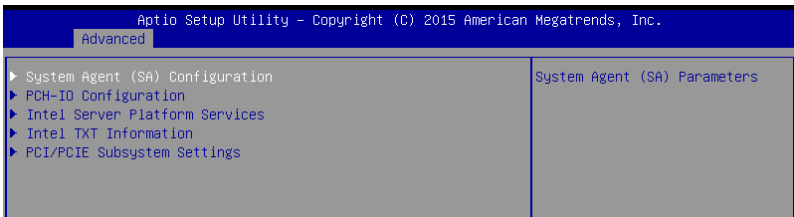
System Agent (SA) Configuration

This allows you to change System Agent (SA) parameters.

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

    System Agent Bridge Name        Skylake               Control various DMI functions.
    SA PCIe Code Version            1.2.0.0
    VT-d                            Supported

    VT-d                            [Enabled]
    Above 4GB MMIO BIOS assignment  [Disabled]

  ▶ DMI/OPI Configuration
  ▶ PEG Port Configuration
  ▶ Memory Configuration
```
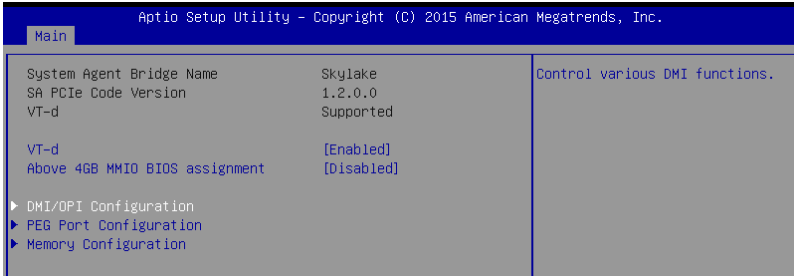
VT-d [Enabled]

Allows you to enable virtualization technology function on memory control hub.
Configuration options: [Enabled] [Disabled]

Above 4GB MMIO BIOS assignment [Disabled]

Allows you to enable or disable above 4GB MemoryMappedIO BIOS assignment.
When aperture size is set to 2048 MB, this is disabled automatically.
Configuration options: [Enabled] [Disabled]

DMI/OPI Configuration

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

   DMI/OPI Configuration                                              Set DMI Speed Gen1/Gen2/Gen3

   DMI                               X4  Gen3

   DMI Max Link Speed                [Auto]
   DMI Vc1 Control                   [Disabled]
   DMI Vcm Control                   [Enabled]
   DMI Link ASPM Control             [L1]
```
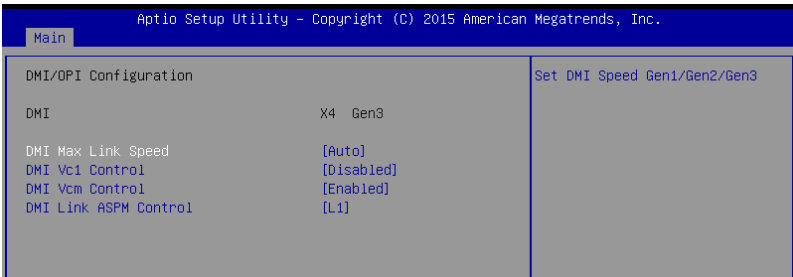
DMI Max Link Speed [Auto]
Allows you to set the DMI speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

DMI Vc1 Control [Disabled]
Allows you to enable or disable DMI Vc1.
Configuration options: [Enabled] [Disabled]

DMI Vcm Control [Enabled]
Allows you to enable or disable DMI Vcm.
Configuration options: [Enabled] [Disabled]

DMI Link ASPM Control [L1]
This item is for the control of the Active State Power Management on SA side of the DMI link.
Configuration options: [L1] [Disabled]

PEG Port Configuration

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

    PEG Port Configuration                                      Enable or Disable the Root Port

    PEG 0:1:0                          x16  Gen1
      Enable Root Port                 [Auto]
      Max Link Speed                   [Auto]
      Max Link Width                   [Auto]
      Power Down Unused Lanes          [Auto]
      ASPM                             [Auto]

    PEG 0:1:1                          Not Present
      Enable Root Port                 [Auto]
      Max Link Speed                   [Auto]
      Max Link Width                   [Auto]
      Power Down Unused Lanes          [Auto]            ↔: Select Screen
      ASPM                             [Auto]            ↑↓: Select Item
    PEG0 Max Payload size              [Auto]            Enter: Select
    PEG1 Max Payload size              [Auto]            +/-: Change Opt.
    Program PCIe ASPM after OpROM      [Disabled]        F1: General Help
                                                         F2: Previous Values
                                                         F5: Optimized Defaults
                                                         F10: Save Changes & Reset
                                                         ESC: Exit



                  Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

PEG 0:1:0

Enable Root Port [Auto]

Allows you to enable or disable the root port.
Configuration options: [Disabled] [Enabled] [Auto]

Max Link Speed [Auto]

Allows you to configure PEG 0:1:0 Max Speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

Max Link Width [Auto]

Allows you to force PEG link to retrain to X1/2/4/8.
Configuration options: [Auto] [Force X1] [Force X2] [Force X4] [Force X8]

Power Down Unused Lanes [Auto]

Allows you to power down unused lanes. When set to [Auto], Bios will power down unused lanes based on the max possible link width.
Configuration options: [Disabled] [Auto]

ASPM [Auto]

Allows you to control ASPM support for the PEG 0. This has no effect if PEG is not the currently active device.
Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1]
                                    [ASPM L0sL1]

PEG 0:1:1

Enable Root Port [Auto]
Allows you to enable or disable the root port.
Configuration options: [Disabled] [Enabled] [Auto]

Max Link Speed [Auto]
Allows you to configure PEG 0:1:1 Max Speed.
Configuration options: [Auto] [Gen1] [Gen2] [Gen3]

Max Link Width [Auto]
Allows you to force PEG link to retrain to X1/2/4/8.
Configuration options: [Auto] [Force X1] [Force X2] [Force X4]

Power Down Unused Lanes [Auto]
Allows you to power down unused lanes. When set to [Auto], Bios will
power down unused lanes based on the max possible link width.
Configuration options: [Disabled] [Auto]

ASPM [Auto]
Allows you to control ASPM support for the PEG 1. This has no effect if
PEG is not the currently active device.
Configuration options: [Disabled] [Auto] [ASPM L0s] [ASPM L1]
                                      [ASPM L0sL1]

PEG0 Max Payload size [Auto]
Allows you to set the PEG0 max payload size.
Configuration options: [Auto] [128 TLP] [256 TLP]

PEG1 Max Payload size [Auto]
Allows you to set the PEG1 max payload size.
Configuration options: [Auto] [128 TLP] [256 TLP]

Program PCIe ASPM after OpRom [Disabled]
Allows you to select when to program the PCIe ASPM.

[Disabled]   PCIe ASPM will be programmed before OpROM.

[Enabled]   PCIe ASPM will be programmed after OpROM.

Memory Configuration

Allows you to change memory information settings.

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

    Memory Configuration                                    Maximum Memory Frequency
                                                            Selections in MHz.
    Memory RC Version               1.3.0.0
    Memory Frequency                2133 MHz
    Total Memory                    4096 MB
    DIMM#0                          4096 MB
    DIMM#1                          Not Present
    DIMM#2                          Not Present
    DIMM#3                          Not Present

    Maximum Memory Frequency        [Auto]
    Max TOLUD                       [Dynamic]
    Memory Scrambler                [Enabled]                →←: Select Screen
    Memory Remap                    [Enabled]                ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F5: Optimized Defaults
                                                            F10: Save Changes & Reset
                                                            ESC: Exit



                Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Maximum Memory Frequency [Auto]

Allows you to set the maximum memory frequency.
Configuration options: [Auto] [1067] [1333] [1600] [1867]
[2133] [2400] [2667] [2933] [3200]

Max TOLUD [Dynamic]

Allows you to set the maximum value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller.
Configuration options: [Dynamic] [1 GB] [1.25 GB] [1.5 GB] [1.75 GB] [2 GB] [2.25 GB]
[2.5 GB] [2.75 GB] [3 GB] [3.25 GB] [3.5 GB]

Memory Scrambler [Enabled]

Set this item to enable or disable memory scrambler support.
Configuration options: [Disabled] [Enabled]

Memory Remap [Enabled]

Allows you to enable or disable memory remap above 4GB.
Configuration options: [Enabled] [Disabled]

PCH-IO Configuration

Allows you to set PCH-IO parameters.

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

    Intel PCH RC Version          1.3.0.0                  PCI Express Configuration
                                                           settings
  ▶ PCI Express Configuration
  ▶ USB Configuration

    CLKRUN# Logic                 [Enabled]
    Serial IRQ Mode               [Continuous]
    High Precision Timer          [Enabled]




                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F5: Optimized Defaults
                                                           F10: Save Changes & Reset
                                                           ESC: Exit



          Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

PCI Express Configuration

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

    PCI Express Configuration                              Enable or disable PCI Express
                                                           Clock Gating for each root
    PCI Express Clock Gating      [Enabled]                port.
    DMI Link ASPM Control         [Enabled]
```

PCI Express Clock Gating [Enabled]
Allows you to enable or disable PCI Express Clock Gating for each root port.
Configuration options: [Disabled] [Enabled]
DMI Link ASPM Control [Enabled]
Allows you to enable or disable the control of Active State Power Management on SA
side of the DMI link.
Configuration options: [Disabled] [Enabled]

USB Configuration

Allows you to set the USB Configuration settings.

```
                   Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
    Main

   USB Configuration                                                   Precondition work on USB host
                                                                       controller and root ports for
   USB Precondition                       [Disabled]                   faster enumeration.

   xDCI Support                           [Disabled]

   USB Port Disable Override              [Disabled]
```

USB Precondition [Disabled]
Allows you to precondition work on USB host controller and root ports for faster enumeration.
Configuration options: [Enabled] [Disabled]

xDCI Support [Disabled]
Allows you to enable or disable xDCI (USB OTG Device).
Configuration options: [Disabled] [Enabled]

USB Port Disable Override [Disabled]
Allows you to enable or disable the corresponding USB port from reporting a Device Connection to the controller.
Configuration options: [Disabled] [Select Per-Pin]

CLKRUN# Logic [Enabled]

Allows you to enable or disable the CLKRUN# logic to stop the PCI clocks.
Configuration options: [Disabled] [Enabled]

Serial IRQ Mode [Continuous]

Allows you to configure Serial IRQ mode.
Configuration options: [Quiet] [Continuous]

High Precision Timer [Enabled]

Allows you to enable or disable the High Precision Event Timer.
Configuration options: [Disabled] [Enabled]

Intel Server Platform Services

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

 Intel Server Platform Services Configuration
 ME BIOS Interface Ver             1.2
 SPS Version                       2308.0.3.36

 ME FW Status Value    :           0xF0345
 ME FW State           :           SPS ME FW Active
 ME FW Operation State :           M0 without UMA
 ME FW Error Code      :           No Error
 ME NM FW Status Value :           0x80000001
 BIOS Booting Mode     :           Performance Optmized
                                   mode
 Cores Disabled        :           0
 ME FW SKU Information :           NM + SiEn
 End-of-POST Status    :           EOP set during POST
                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F5: Optimized Defaults
                                                         F10: Save Changes & Reset
                                                         ESC: Exit


              Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Intel TXT Information

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

 Intel TXT Information

 Chipset                          Production Fused
 BiosAcm                          Production Fused
 Chipset Txt                      Supported
 Cpu Txt                          Supported
 Error Code                       None
   Class Code                     None
   Major Code                     None
   Minor Code                     None
```

PCI/PCIE Subsystem Settings

Allows you to configure PCI, PCI-X, and PCI Express Settings.

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

                                                               Value to be programmed into
     PCI Devices Common Settings:                              PCI Latency Timer Register.
     PCI Latency Timer                   [32 PCI Bus Clocks]
     PERR# Generation                    [Disabled]
     SERR# Generation                    [Disabled]
     Load RT32 Image                     [Enabled]
     VGA Priority                        [Offboard Device]




   ▶ PCIe slot opROM option
```
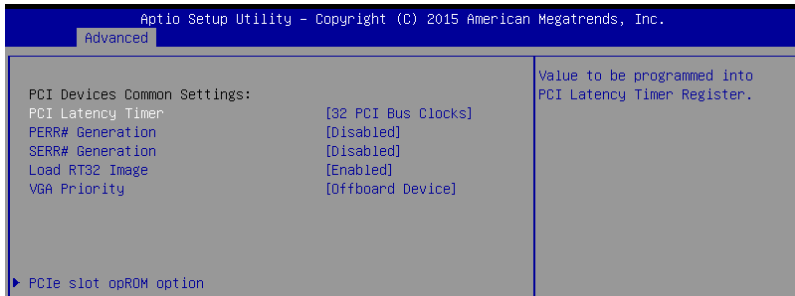
PCI Latency Timer [32 PCI Bus Clocks]

Allows you to set the value to be programmed into PCI Latency Timer Register.
Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks]
[128 PCI Bus Clocks] [160 PCI Bus Clocks]
[192 PCI Bus Clocks] [224 PCI Bus Clocks]
[248 PCI Bus Clocks]

PERR# Generation [Disabled]

Allows you to enable or disable PCI Device to Generate PERR#.
Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Allows you to enable or disable PCI Device to Generate SERR#.
Configuration options: [Disabled] [Enabled]

Load RT32 Image [Enabled]

Allows you to enable or disable RT32 Image Loading.
Configuration options: [Disabled] [Enabled]

VGA Priority [Offboard Device]

This allows you to prioritize between onboard and the first offboard video device found.
Configuration options: [Onboard Device] [Offboard Device]

PCIe slot opROM option

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

 PCIE Slot Option Rom Setting                          Enabled/Disabled PCIE6 Option
 PCIE6  Option Rom                  [Enabled]          Rom
 PCIE5  Option Rom                  [Enabled]
```

PCIE6/PCIE5 Option ROM [Enabled]
Allows you to enable or disable PCIE6/PCIE5/PCIE4 Option ROM.
Configuration options: [Disabled] [Enabled]

5.4.3   Platform Configuration

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

 ▶ USB Configuration                                   USB Configuration Parameters
 ▶ NVMe Configuration
 ▶ Onboard LAN Configuration
 ▶ Super IO Configuration
 ▶ Serial Port Console Redirection
 ▶ ACPI Settings
 ▶ APM
 ▶ SMART Settings
 ▶ WHEA Configuration
```

USB Configuration

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

   USB Configuration                                          Enables Legacy USB support.
                                                              AUTO option disables legacy
   USB Controllers:                                           support if no USB devices are
       1 XHCI                                                 connected. DISABLE option will
   USB Devices:                                               keep USB devices available
       1 Drive, 1 Keyboard                                    only for EFI applications.

   Legacy USB Support                        [Enabled]
   XHCI Hand-off                             [Disabled]
   USB Mass Storage Driver Support           [Enabled]
   Port 60/64 Emulation                      [Enabled]

   USB hardware delays and time-outs:
   USB transfer time-out                     [20 sec]        →←: Select Screen
   Device reset time-out                     [20 sec]        ↑↓: Select Item
   Device power-up delay                     [Auto]          Enter: Select
                                                             +/-: Change Opt.
   Mass Storage Devices:                                     F1: General Help
   JetFlashTranscend 4GB 8.07                [Auto]          F2: Previous Values
                                                             F5: Optimized Defaults
                                                             F10: Save Changes & Reset
                                                             ESC: Exit


                Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Legacy USB Support [Enabled]

Allows you to enable or disable the support for legacy USB devices. If no USB device are connected, the legacy USB support is disabled.
Configuration options: [Enabled] [Disabled] [Auto]

XHCI Hand-off [Disabled]

This functions as a workaround for OSes without XHCI hand-off support.
Configuration options: [Enabled] [Disabled]

USB Mass Storage Driver Support [Enabled]

This allows you to enable or disable the USB Mass Storage driver support.
Configuration options: [Disabled] [Enabled]

Port 60/64 Emulation [Enabled]

This allows you to enable the I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
Configuration options: [Disabled] [Enabled]

USB transfer time-out [20 sec]

Allows you to select the USB transfer time-out value.
Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

Device reset time-out [20 sec]

Allows you to select the USB device reset time-out value.
Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

Device power-up delay [Auto]

This allows you to set the maximum time the device will take before it properly reports
itself to the Host Controller.
Configuration options: [Auto] [Manual]

NVMe Configuration

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

 NVMe controller and Drive information
```

Onboard LAN Configuration

This allows you to enable or disable the onboard LAN.

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

 Onboard LAN Configuration                                     Intel LAN Enable/Disable

 INTEL LAN1 MAC:              00:E0:18:06:13:B4
 INTEL LAN2 MAC:              00:E0:18:06:13:B5
 INTEL LAN3 MAC:              00:E0:18:06:13:B6
 INTEL LAN4 MAC:              00:E0:18:06:13:B7
 Intel LAN1 Enable           [Enabled]
 Intel LAN ROM Type          [PXE]
 Intel LAN2 Enable           [Enabled]
 Intel LAN ROM Type          [Disabled]
 Intel LAN3 Enable           [Enabled]
 Intel LAN ROM Type          [Disabled]
 Intel LAN4 Enable           [Enabled]
 Intel LAN ROM Type          [Disabled]
                                                               ↔: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/−: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F5: Optimized Defaults
                                                               F10: Save Changes & Reset
                                                               ESC: Exit

                    Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Intel LAN1–4 Enable [Enabled]

Allows you to enable or disable the Intel LAN.
Configuration options: [Disabled] [Enabled]

Intel LAN ROM Type [PXE]/[Disabled]

Allows you to select the Intel LAN ROM type.
Configuration options: [Disabled] [PXE] [iSCSI]

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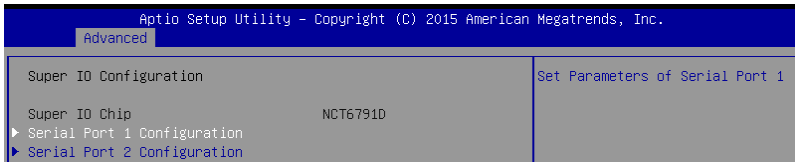
```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

  Super IO Configuration                                    Set Parameters of Serial Port 1

  Super IO Chip                      NCT6791D
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
```

Serial Port 1 Configuration

Allows you to set the parameters of Serial Port 1.
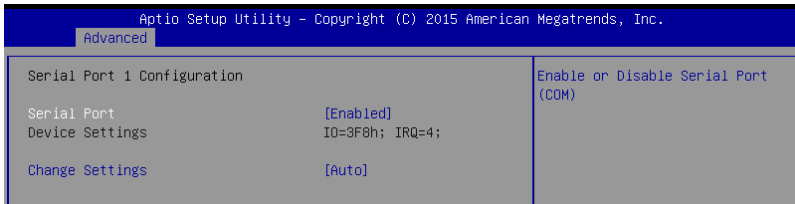
```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
        Advanced

  Serial Port 1 Configuration                               Enable or Disable Serial Port
                                                            (COM)
  Serial Port                        [Enabled]
  Device Settings                    IO=3F8h; IRQ=4;

  Change Settings                    [Auto]
```

Serial Port [Enabled]
Allows you to enable or disable Serial Port (COM).
Configuration options: [Disabled] [Enabled]

Change Settings [Auto]
Allows you to choose the setting for Super IO device.
Configuration options: [Auto] [IO=3F8h; IRQ=4;]
[IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

Serial Port 2 Configuration

Allows you to set the parameters of Serial Port 2.
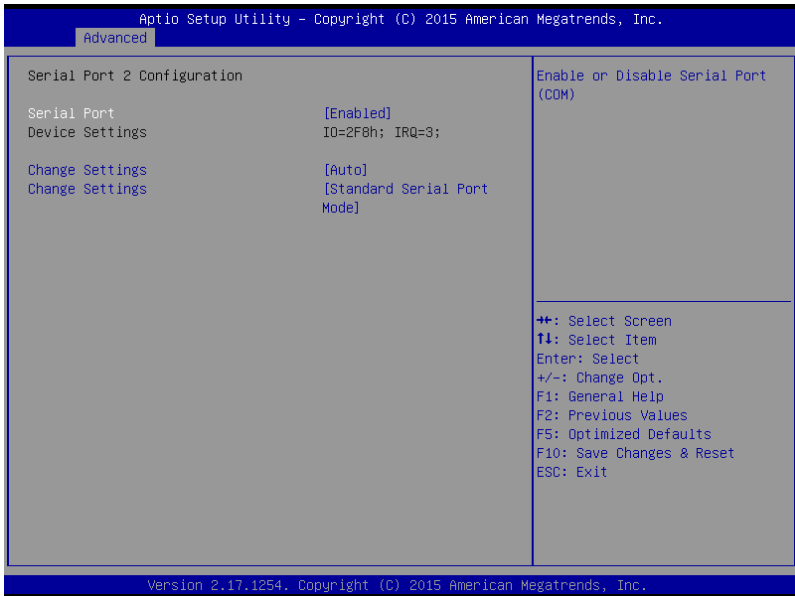
```
                   Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
            Advanced

    Serial Port 2 Configuration                               Enable or Disable Serial Port
                                                              (COM)
    Serial Port                       [Enabled]
    Device Settings                   IO=2F8h; IRQ=3;

    Change Settings                   [Auto]
    Change Settings                   [Standard Serial Port
                                       Mode]



                                                              →←: Select Screen
                                                              ↑↓: Select Item
                                                              Enter: Select
                                                              +/-: Change Opt.
                                                              F1: General Help
                                                              F2: Previous Values
                                                              F5: Optimized Defaults
                                                              F10: Save Changes & Reset
                                                              ESC: Exit



                    Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Serial Port [Enabled]

Allows you to enable or disable Serial Port (COM).

Configuration options: [Disabled] [Enabled]

Change Settings [Auto]

Allows you to choose the setting for Super IO device.

Configuration options: [Auto] [IO=2F8h; IRQ=3;]
[IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]
[IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;]

Change Settings [Standard Serial Port Mode]

Allows you to choose the setting for Super IO device.

Configuration options: [Standard Serial Port Mode] [IrDA Active pulse 1.6 uS]
[IrDA Active pulse 3/16 bit time] [ASKIR Mode]

Serial Port Console Redirection
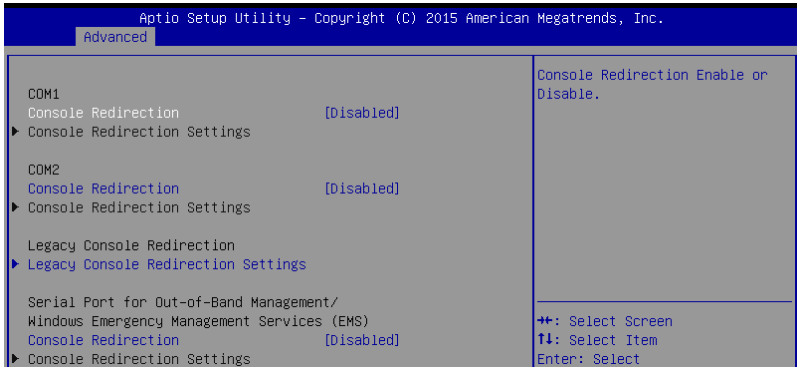
```
            Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
      Advanced

     COM1                                                   Console Redirection Enable or
     Console Redirection              [Disabled]            Disable.
   ▶ Console Redirection Settings

     COM2
     Console Redirection              [Disabled]
   ▶ Console Redirection Settings

     Legacy Console Redirection
   ▶ Legacy Console Redirection Settings

     Serial Port for Out-of-Band Management/
     Windows Emergency Management Services (EMS)            ➜←: Select Screen
     Console Redirection              [Disabled]            ↑↓: Select Item
   ▶ Console Redirection Settings                           Enter: Select
```

COM1/COM2 Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

> The **Console Redirection Settings** becomes configurable when **Console Redirection** is set to [Enabled].

Console Redirection Settings

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

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

     COM1                                                   Emulation: ANSI: Extended
     Console Redirection Settings                           ASCII char set. VT100: ASCII
                                                            char set. VT100+: Extends
     Terminal Type                   [VT-UTF8]              VT100 to support color,
     Bits per second                 [57600]               function keys, etc. VT-UTF8:
     Data Bits                       [8]                    Uses UTF8 encoding to map
     Parity                          [None]                 Unicode chars onto 1 or more
     Stop Bits                       [1]                    bytes.
     Flow Control                    [Hardware RTS/CTS]
     VT-UTF8 Combo Key Support       [Enabled]
     Recorder Mode                   [Disabled]
     Legacy OS Redirection Resolution [80x24]
     Putty KeyPad                    [VT100]
     Redirection After BIOS POST     [Always Enable]        ➜←: Select Screen
                                                            ↑↓: Select Item
```

Terminal Type [VT-UTF8]

Allows you to set the terminal type.

[VT100]   ASCII char set.

[VT100+]   Extends VT100 to support color, function keys, etc.

[VT-UTF8]   Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

[ANSI]   Extended ASCII char set.

Bits per second [57600]

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

Configuration options: [9600] [19200] [38400] [57600] [115200]

Data Bits [8]

Allows you to set the data bits.

Configuration options: [7] [8]

Parity [None]

Allows you to select the parity bit. A parity bit is sent with the data bits to detect transmission errors.

Configuration options: [None] [Even] [Odd] [Mark] [Space]

Stop Bits [1]

Stop bits indicate the end of a serial data packet (a start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

Configuration options: [1] [2]

Flow Control [Hardware RTS/CTS]

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. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

Configuration options: [None] [Hardware RTS/CTS]

VT-UTF8 Combo Key Support [Enabled]

This allows you to enable the VT-UTF8 Combination Key Support for ANSI/VT100 terminals.

Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

This allows you to enable or disable the Recorder Mode to capture Terminal data.

Configuration options: [Disabled] [Enabled]

Legacy OS Redirection Resolution [80x24]

This allows you to set the number of rows and columns supported on the Legacy OS.

Configuration options: [80x24] [80x25]

Putty Keypad [VT100]

This allows you to select the FunctionKey and Keypad on Putty.

Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

Redirection After BIOS POST [Always Enable]

This setting allows you to specify if BootLoader is selected then Legacy console redirection.

Configuration options: [Always Enable] [BootLoader]

Legacy Console Redirection Settings

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

  Legacy Serial Redirection Port        [COM1]                Select a COM port to display
                                                              redirection of Legacy OS and
                                                              Legacy OPROM Messages
```

Legacy Serial Redirection Port [COM1]
Allows you to select a COM port to display redirection of Legacy OS and Legacy OPROM Messages.
Configuration options: [COM1] [COM2]

Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.
Configuration options: [Disabled] [Enabled]

> The following item appears only when you set **Console Redirection** to [Enabled].

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

  Out-of-Band Mgmt Port         [COM1]              Microsoft Windows Emergency
  Terminal Type                 [VT-UTF8]           Management Services (EMS)
  Bits per second               [115200]            allows for remote management
  Flow Control                  [None]              of a Windows Server OS through
  Data Bits                     8                   a serial port.
  Parity                        None
  Stop Bits                     1
```

Console Redirection Settings

> **Out-of-Band Mgmt Port [COM1]**
> Allows remote management of a Windows Server OS through a serial port.
> Configuration options: [COM1] [COM2]

> **Terminal Type [VT-UTF8]**
> Allows you to set the terminal type for out-of-band management.
> Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

> **Bits per second [115200]**
> Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.
> Configuration options: [9600] [19200] [57600] [115200]

> **Flow Control [None]**
> Allows you to set the flow control to prevent data loss from buffer overflow.
> Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

ACPI Settings

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

 ACPI Settings                                                  Enables or Disables System
                                                                ability to Hibernate (OS/S4
 Enable Hibernation                    [Enabled]                Sleep State). This option may
 ACPI Sleep State                      [S3 (Suspend to RAM)]    be not effective with some OS.
```

Enable Hibernation [Enabled]

Allows you to enable or disable the ability of the system to hibernate (OS/S4 Sleep State).
Configuration options: [Disabled] [Enabled]

This option may be not be effective with some OS.

ACPI Sleep State [S3 (Suspend to RAM)]

Allows you to select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Configuration options: [Suspend Disabled] [S3 (Suspend to RAM)]

APM

Allows you to configure the Advance Power Management (APM) settings.

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

 Restore AC Power Loss                 [Last State]             Specify what state to go to
 Power On By PCI                       [Disabled]               when power is re-applied after
 Power On By PCIE                      [Disabled]               a power failure (G3 state).
 Power On By Ring                      [Disabled]
 Power On By RTC                       [Disabled]
```

Restore AC Power Loss [Last State]

Allows you to set the state the system will go to after an AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

Power On By PCI [Disabled]

You can use this option to enable or disable the Wake-on-LAN feature of the Intel LAN.
Configuration options: [Disabled] [Enabled]

Power On By PCIE [Disabled]

This allows you to enable or disable the PCIE devices to generate a wake event.
Configuration options: [Disabled] [Enabled]

Power On By Ring [Disabled]

This allows you to enable or disable the Ring devices to generate a wake event.
Configuration options: [Disabled] [Enabled]

This item functions only if there is a serial port (COM1) connector on a motherboard.

Power On By RTC [Disabled]

This item allows you to enable or disable RTC to generate a wake event. When set to [Enabled], the items **RTC Alarm Date (Days)** and **Hour/Minute/Second** becomes user-configurable where you can set values.
Configuration options: [Disabled] [Enabled]

SMART Settings

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

   SMART Settings                                              Run SMART Self Test on all
                                                               HDDs during POST.
   SMART Self Test                    [Enabled]
```

SMART Self Test [Enabled]

Allows you to run SMART Self Test on all HDDs during POST.
Configuration options: [Disabled] [Enabled]

WHEA Configuration

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

   WHEA Support                       [Enabled]              Enable or disable Windows
                                                             Hardware Error Architecture.
```

WHEA Support [Enabled]

Allows you to enable or disable the WHEA (Windows Hardware Error Architecture) support.
Configuration options: [Disabled] [Enabled]

5.4.4 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects. Some items may not appear if your CPU does not support the related functions.

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

  CPU Configuration                                     ▲    Enabled for Windows XP and
                                                             Linux (OS optimized for
  Intel(R) Xeon(R) CPU E3-1275 v5 @ 3.60GHz                  Hyper-Threading Technology)
  CPU Signature                    506E3                     and Disabled for other OS (OS
  Microcode Patch                  24                        not optimized for
  Max CPU Speed                    3600 MHz                  Hyper-Threading Technology).
  Min CPU Speed                    800 MHz                   When Disabled only one thread
  CPU Speed                        3700 MHz                  per enabled core is enabled.
  Processor Cores                  4
  Hyper Threading  Technology      Supported
  Intel VT-x Technology            Supported
  Intel SMX Technology             Supported
  64-bit                           Supported
  EIST Technology                  Supported                 ↔: Select Screen
  CPU C3 state                     Supported                 ↑↓: Select Item
  CPU C6 state                     Supported                 Enter: Select
  CPU C7 state                     Supported                 +/-: Change Opt.
                                                             F1: General Help
  L1 Data Cache                    32 kB x 4                 F2: Previous Values
  L1 Code Cache                    32 kB x 4                 F5: Optimized Defaults
  L2 Cache                         256 kB x 4                F10: Save Changes & Reset
  L3 Cache                         8 MB                      ESC: Exit

  Hyper-threading                  [Enabled]
  Active Processor Cores           [All]                ▼

                    Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Navigate to the second page of the screen to see the rest of items in this menu by pressing the Up or Down arrow keys.

To quickly go to the last item of the second page, press the **Page Down** button. Press the **Page Up** button to go back to the first item in the first page.

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

   L1 Data Cache              32 kB x 4               ▲  Enables or Disables Intel(R)
   L1 Code Cache              32 kB x 4                  TXT(LT) support.
   L2 Cache                   256 kB x 4
   L3 Cache                   8 MB

   Hyper-threading            [Enabled]
   Active Processor Cores     [All]
   Intel Virtualization Technology  [Enabled]
   Hardware Prefetcher        [Enabled]
   Adjacent Cache Line Prefetch     [Enabled]
   CPU AES                    [Enabled]
   Boot performance mode      [Turbo Performance]
   HardWare P states (HWP)    [Disabled]
   Intel(R) SpeedStep(tm)     [Enabled]                 →←: Select Screen
     Turbo Mode               [Enabled]                 ↑↓: Select Item
   CPU C states               [Enabled]                 Enter: Select
     Enhanced C-states        [Enabled]                 +/-: Change Opt.
     C-State Auto Demotion    [C1 and C3]               F1: General Help
     C-State Un-demotion      [C1 and C3]               F2: Previous Values
     Package C state demotion [Disabled]                F5: Optimized Defaults
     Package C state undemotion  [Disabled]             F10: Save Changes & Reset
   Cstate Pre-Wake            [Enabled]                 ESC: Exit
   Package C State limit      [AUTO]
   CFG lock                   [Enabled]
   Intel TXT(LT) Support      [Disabled]               ▼

              Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Hyper-threading [Enabled]

This item allows a hyper-threading processor to appear as two logical processors, allowing
the operating system to schedule two threads or processors simultaneously.
Configuration options: [Disabled] [Enabled]

Active Processor Cores [All]

Allows you to choose the number of CPU cores to activate in each processor package.
Configuration options: [All] [1] [2] [3]

Intel Virtualization Technology [Enabled]

When enabled, a VMM can utilize the additional hardware capabilities provided by
Vanderpool Technology.
Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the MLC streamer perfetcher.
Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable prefetching of adjacent cache lines.
Configuration options: [Disabled] [Enabled]

CPU AES [Enabled]

Allows you to enable or disable the CPU Advance Encryption Standard instructions.
Configuration options: [Disabled] [Enabled]

Boot performance mode [Turbo Performance]

This item allows you to select the performance state that the BIOS will set before OS handoff. Configuration options: [Max Non-Turbo Performance] [Turbo Performance]

HardWare P states (HWP) [Disabled]

Allows you to enable or disable HWP support.
Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep(tm) [Enabled]

Allows your system to adjust the CPU's voltage and cores frequency, resulting in decreased power consumption and heat production.
Configuration options: [Disabled] [Enabled]

The following item appear only when you set the Intel(R) SpeedStep(tm) to **[Enabled]**.

Turbo Mode [Enabled]
This item allows you to automatically set the CPU cores to run faster than the base operating frequency when it is below the operating power, current and temperature specification limit.
Configuration options: [Disabled] [Enabled]

CPU C states [Enabled]

Allows you to enable or disable the CPU C states.
Configuration options: [Disabled] [Enabled]

The following items appear only when you set the CPU C states to **[Enabled]**.

Enhanced C-States [Enabled]
This item allows you to enable or disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Configuration options: [Disabled] [Enabled]
C-State Auto Demotion [C1 and C3]
Allows you to enable or disable the Auto Demotion of C-State.
Configuration options: [Disabled] [C1] [C3] [C1 and C3]
C-State Un-demotion [C1 and C3]
Allows you to enable or disable the Un-demotion of C-State.
Configuration options: [Disabled] [C1] [C3] [C1 and C3]
Package C state demotion [Disabled]
Allows you to enable or disable the Package C state demotion.
Configuration options: [Disabled] [Enabled]
Package C state undemotion [Disabled]
Allows you to enable or disable the Package C state undemotion.
Configuration options: [Disabled] [Enabled]

CState Pre-Wake [Enabled]

Allows you to enable or disable the CState Pre-Wake. Selecting **[Disabled]** will set bit 30 of POWER_CTL MSR(0x1FC) to 1 to disable the CState Pre-Wake.
Configuration options: [Disabled] [Enabled]

Package C State limit [AUTO]

Allows you set the Package C State limit.
Configuration options: [C0/C1] [C2] [C3] C6] [C7] [C7s] [C8] [AUTO]

CFG lock [Enabled]

Allows you to configure MSR 0xE2[15], CFG lock bit.
Configuration options: [Disabled] [Enabled]

Intel TXT(LT) Support [Disabled]

Allows you to enable or disable the Intel(R) TXT(LT) support.
Configuration options: [Disabled] [Enabled]

5.4.5 SATA Configuration

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

 SATA Controller(s)                   [Enabled]           ▲  Enable or disable SATA Device.
 SATA Mode Selection                  [AHCI]
▶ Software Feature Mask Configuration

 SATA Port 1                          Empty
   Software Preserve                  Unknown
   Port 1                             [Enabled]
   Mechanical Presence Switch         [Enabled]
   Spin Up Device                     [Disabled]
   SATA Device Type                   [Hard Disk Drive]
   Device Sleep                       [Disabled]
   SATA DEVSLEP Idle Timeout Config   [Disabled]
 SATA Port 2                          Empty
   Software Preserve                  Unknown               ↔: Select Screen
   Port 2                             [Enabled]             ↑↓: Select Item
   Mechanical Presence Switch         [Enabled]             Enter: Select
   Spin Up Device                     [Disabled]            +/-: Change Opt.
   SATA Device Type                   [Hard Disk Drive]     F1: General Help
   Device Sleep                       [Disabled]            F2: Previous Values
   SATA DEVSLEP Idle Timeout Config   [Disabled]            F5: Optimized Defaults
 SATA Port 3                          Empty                 F10: Save Changes & Reset
   Software Preserve                  Unknown               ESC: Exit
   Port 3                             [Enabled]
   Mechanical Presence Switch         [Enabled]
   Spin Up Device                     [Disabled]          ▼

               Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

SATA Controller(s) [Enabled]

Allows you to enable or disable the SATA Device.
Configuration options: [Enabled] [Disabled]

SATA Mode Selection [AHCI]

This allows you to choose how SATA controller(s) should operate.
Configuration options: [AHCI] [RAID]

Software Feature Mask Configuration

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

 RAID0                                [Enabled]           Enable or disable RAID0
 RAID1                                [Enabled]           feature.
 RAID10                               [Enabled]
 RAID5                                [Enabled]
 Intel Rapid Recovery Technology      [Enabled]
 OROM UI and BANNER                   [Enabled]
 HDD Unlock                           [Enabled]
 LED Locate                           [Enabled]
 IRRT Only on eSATA                   [Enabled]
 Smart Response Technology            [Enabled]
 OROM UI Normal Delay                 [4 sec]
 RST Force Form                       [Disabled]
```

RAID0 [Enabled]

Allows you to enable or disable the RAID0 feature.

Configuration options: [Disabled] [Enabled]

RAID1 [Enabled]

Allows you to enable or disable the RAID1 feature.

Configuration options: [Disabled] [Enabled]

RAID10 [Enabled]

Allows you to enable or disable the RAID10 feature.

Configuration options: [Disabled] [Enabled]

RAID5 [Enabled]

Allows you to enable or disable the RAID5 feature.

Configuration options: [Disabled] [Enabled]

Intel Rapid Recovery Technology [Enabled]

Allows you to enable or disable the Intel Rapid Recovery Technology.

Configuration options: [Disabled] [Enabled]

OROM UI and BANNER [Enabled]

[Disabled]   No OROM banner or information will be displayed if all disks and
                    RAID volumes are Normal.

[Enabled]   OROM UI is shown.

HDD Unlock [Enabled]

Selecting **[Enabled]** will indicate that the HDD password unlock in the OS is enabled.

Configuration options: [Disabled] [Enabled]

LED Locate [Enabled]

Selecting **[Enabled]** will indicate that the LED/SGPIO hardware is attached and ping to
locate feature is enabled on the OS.

Configuration options: [Disabled] [Enabled]

IRRT Only on eSATA [Enabled]

[Disabled]   Any RAID volume can span internal and eSATA drives.

[Enabled]   Only IRRT volumes can span internal and eSATA drives.

Smart Response Technology [Enabled]

Allows you to enable or disable the Smart Response Technology.

Configuration options: [Disabled] [Enabled]

OROM UI Normal Delay [4 sec]

Allows you to select the delay time of the OROM UI Splash Screen in a normal status.

Configuration options: [2 sec] [4 sec] [6 sec] [8 sec]

RST Force Form [Disabled]

Allows you to enable or disable Form for Intel Rapid Storage Technology.

Configuration options: [Disabled] [Enabled]

SATA Port 1–6

Port 1–6 [Enabled]
Allows you to enable or disable the SATA port.
Configuration options: [Disabled] [Enabled]

Mechanical Presence Switch [Enabled]
Allows you to enable or disable reporting if the port has an Mechanical Presence Switch.
Configuration options: [Disabled] [Enabled]

Spin Up Device [Disabled]
Enable this option to start a COMERSET initialization sequence to the device on an edge detect from 0 to 1.
Configuration options: [Disabled] [Enabled]

SATA Device Type [Hard Disk Drive]
Allows you to set whether the SATA port is connected to Solid State Drive or Hard Disk Drive.
Configuration options: [Hard Disk Drive] [Solid State Drive]

Device Sleep [Disabled]
Allows you to enable or disable the mSata for RTD3.
Configuration Options: [Disabled] [Enabled]

SATA DEVSLEP Idle Timeout Config [Disabled]
Allows you to enable or disable SATA DTIO Config.
Configuration options: [Disabled] [Enabled]

5.4.6   Network Stack Configuration

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

  Network Stack                    [Disabled]            Enable/Disable UEFI Network
                                                         Stack
```
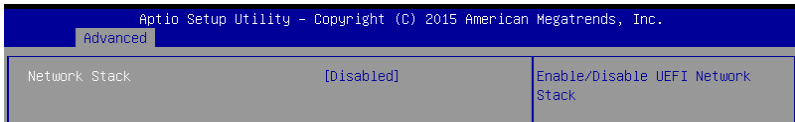
Network Stack [Disabled]

Allows you to enable or isable UEFI Network Stack.
Configuration options: [Disabled] [Enabled]

5.4.7   CSM Configuration

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

   Compatibility Support Module Configuration                          Enable/Disable CSM Support.

   CSM Support                        [Enabled]

   CSM16 Module Version               07.76

   GateA20 Active                     [Upon Request]
   Option ROM Messages                [Force BIOS]

   Boot option filter                 [Legacy only]

   Option ROM execution

   Network                            [Legacy]                       →←: Select Screen
   Storage                            [Legacy]                       ↑↓: Select Item
   Video                              [Legacy]                       Enter: Select
   Other PCI devices                  [Legacy]                       +/-: Change Opt.
                                                                     F1: General Help
                                                                     F2: Previous Values
                                                                     F5: Optimized Defaults
                                                                     F10: Save Changes & Reset
                                                                     ESC: Exit

                  Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

CSM Support [Enabled]

This option allows you to enable or disable CSM Support.
Configuration options: [Disabled] [Enabled]

GateA20 Active [Upon Request]

This allows you to set the GA20 option.
[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 Messages [Force BIOS]

This allows you to set the display mode for Option ROM.
Configuration options: [Force BIOS] [Keep Current]

Boot Option filter [Legacy only]

This option allows you to control the Legacy/UEFI ROMs priority.
Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

Network / Storage / Video [Legacy]

This option allows you to control the execution of UEFI and Legacy PXE/Storage/Video OpROM.
Configuration options: [UEFI] [Legacy]

Other PCI devices [Legacy]

This item determines the OPROM execution policy for devices other than Network, Storage, or Video.
Configuration options: [UEFI] [Legacy]

5.4.8   iSCSI Configuration

Allows you to configure the iSCSI parameters.

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

   iSCSI Initiator Name                              The worldwide unique name of
                                                     iSCSI Initiator. Only IQN
 ▶ Add an Attempt                                    format is accepted.Range is
                                                     from 4 to 223
 ▶ Delete Attempts

 ▶ Change Attempt Order
```
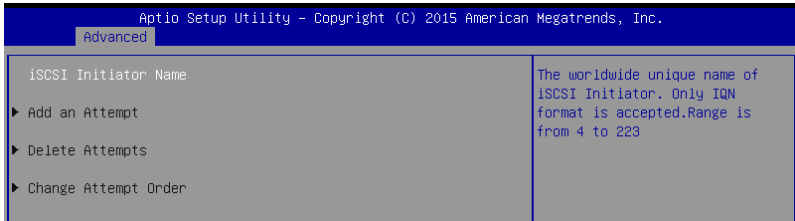
5.5 Security menu

This menu allows a new password to be created or a current password to be changed. The menu also enables or disables the Secure Boot state and lets the user configure the System Mode state.

```
                 Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
       Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs
  ┌─────────────────────────────────────────────────┬──────────────────────────────────────┐
  │  Password Description                            │  Set Administrator Password          │
  │                                                  │                                      │
  │  If ONLY the Administrator's password is set,    │                                      │
  │  then this only limits access to Setup and is    │                                      │
  │  only asked for when entering Setup.             │                                      │
  │  If ONLY the User's password is set, then this   │                                      │
  │  is a power on password and must be entered to   │                                      │
  │  boot or enter Setup. In Setup the User will     │                                      │
  │  have Administrator rights.                      │                                      │
  │  The password length must be                     │                                      │
  │  in the following range:                         │                                      │
  │  Minimum length               3                  │                                      │
  │  Maximum length               20                 │                                      │
  │                                                  │  →←: Select Screen                   │
  │                                                  │  ↑↓: Select Item                     │
  │  Administrator Password                          │  Enter: Select                       │
  │  User Password                                   │  +/-: Change Opt.                    │
  │                                                  │  F1: General Help                    │
  │                                                  │  F2: Previous Values                 │
  │  HDD Security Configuration:                     │  F5: Optimized Defaults              │
  │  P5:HDT722516DLA380                              │  F10: Save Changes & Reset           │
  │                                                  │  ESC: Exit                           │
  │ ▶ Secure Boot menu                               │                                      │
  │                                                  │                                      │
  │                                                  │                                      │
  └─────────────────────────────────────────────────┴──────────────────────────────────────┘
                 Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Administrator Password

To set an Administrator Password:

1.   Select the Administrator Password item and press <Enter>.

2.   From the Create New Administrator Password box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change an administrator password:

1.   Select the Administrator Password item and press <Enter>.

2.   From the Enter Current Administrator Password box, key in the current password, then press <Enter>.

3.   From the Create New Administrator Password box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

To clear the Administrator Password, follow the same steps as in changing an Administrator Password, but press <Enter> when prompted to create/confirm the password.

User Password

To set a User Password:

1.   Select the User Password item and press <Enter>.

2.   From the Create New User Password box, key in a password, then press <Enter>.

3.   Confirm the password when prompted.

To change a user password:

1.   Select the User Password item and press <Enter>.

2.   From the Enter Current User Password box, key in the current password, then press <Enter>.

3.   From the Create New User Password box, key in a new password, then press <Enter>.

4.   Confirm the password when prompted.

> To clear the User Password, follow the same steps as in changing a User Password, but press <Enter> when prompted to create/confirm the password.

Secure Boot Menu

This item allows you to customize the Secure Boot settings.

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

    System Mode                        Setup              Secure Boot can be enabled if
    Secure Boot                        Not Active         1.System running in User mode
    Vendor Keys                        Not Active         with enrolled Platform Key(PK)
                                                          2.CSM function is disabled
    Secure Boot                        [Disabled]
    Secure Boot Mode                   [Custom]
  ▶ Key Management
```
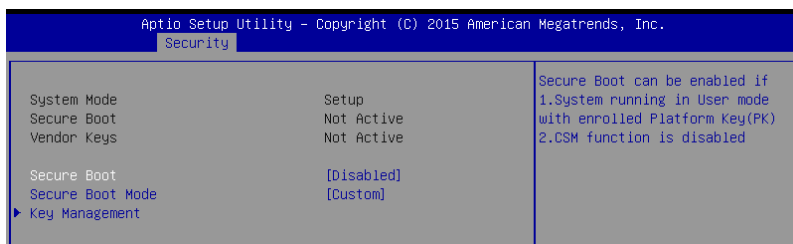
       Secure Boot [Disabled]

This item allows you to enable or disable the Secure Boot flow control.
Configuration options: [Disabled] [Enabled]

       Secure Boot Mode [Custom]

This item allows you to select the mode of the Secure Boot to change Image Execution policy and manage Secure Boot Keys.
Configuration options: [Standard] [Custom]

Key Management

This item only appears when you set the Secure Boot Mode to **[Custom]**. This allows you to modify Secure Boot variables and set Key Management page.

```
           Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
            Security

    Provision Factory Default keys        [Disabled]        Install factory default Secure
                                                            Boot keys when System is in
  ▶ Enroll all Factory Default keys                         Setup Mode
  ▶ Save  all Secure Boot variables

    Secure Boot variable  | Size| Key#| Key source
  ▶ Platform Key(PK)       |    0|    0|
  ▶ Key Exchange Keys      |    0|    0|
  ▶ Authorized Signatures  |    0|    0|
  ▶ Forbidden  Signatures  |    0|    0|
  ▶ Authorized TimeStamps  |    0|    0|
```

Provision Factory Default Keys [Disabled]
Configuration options: [Disabled] [Enabled]
Enroll All Factory Default Keys
This item will ask you if you want to install all Factory Default secure variables. Select Yes if you want to load the default secure variables, otherwise select No.
Platform Key (PK)
Configuration options: [Set New Key] [Delete Key]
Key Exchange Keys / Authorized Signatures
/ Forbidden Signatures / Authorized TimeStamps
Configuration options: [Set New Key] [Append Key] [Delete Key]

5.6   Boot menu

The Boot menu items allow you to change the system boot options.

```
           Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc.
    Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

    Boot Configuration                                      Select the keyboard NumLock
    Bootup NumLock State              [On]                  state

    Boot Logo Display                 [Disabled]
      POST Report                     [5 sec]

    Chassis Intrusion Message         [Warning]

    Boot Option Priorities
    Boot Option #1                    [SATA P5 :
                                      HDT722516DLA380]
    Boot Option #2                    [IBA GE Slot 0600 v1556]

                                                            →←: Select Screen
                                                            ↑↓: Select Item
    Network Device BBS Priorities                           Enter: Select
    Hard Drive BBS Priorities                               +/-: Change Opt.
```

Bootup NumLock State [On]

Allows you to select the power-on state for the NumLock.
Configuration options: [On] [Off]

Boot Logo Display [Disabled]

Allows you to enable or disable the full screen logo display feature.
[Auto]   Auto adjustment for Windows requirements.
[Full Screen]   Maximize the boot logo size.
[Disabled]   Hide the logo during POST.

POST Report [5 sec]
Allows you to set the desired POST Report waiting time from 1 to 10 seconds.
Configuration options: [1 sec] – [10 sec] [Until Press ESC]

Chassis Intrusion Message [Warning]

Allows you to set an action when chassis intrusion has occurred.
[Warning]   Warning beep and pause at intrusion message for 3 seconds.
[Halt]   Halt at intrusion message.

Boot Option Priorities

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system.

- To select the boot device during system startup, press <F8> when ASUS Logo appears.
- To access Windows OS in Safe Mode, please press <F8> after POST.

CD/DVD ROM Drive BBS Priorities

These items appear only when you connect SATA ODD to the SATA ports and allow you to set the booting order of the SATA devices.

Network Device BBS Priorities

These items appear only when you connect SATA ODD or hard drive to the SATA ports and allow you to set the booting order of the SATA devices.

Hard Drive BBS Priorities

These items appear only when you connect SATA ODD or hard drive to the SATA ports and allow you to set the booting order of the SATA devices.

5.7 Monitor menu

The Monitor menu displays the system temperature/power status, and allows you to change the fan settings.

```
          Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
    Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

  CPU1 Temperature              : +45˚C / 138˚F          Low Speed/Generic/High
  CPU_FAN1 Speed                : N/A                    Speed/Full Speed
  FRNT_FAN1 Speed               : 1670 RPM
  FRNT_FAN2 Speed               : N/A
  FRNT_FAN3 Speed               : N/A
  FRNT_FAN4 Speed               : N/A
  REAR_FAN1 Speed               : N/A
  +VCORE1 Voltage               : +1.192 V
  +VDDQ_AB_CPU1 Voltage         : +1.248 V
  +VCCIO Voltage                : +0.968 V
  +12V Voltage                  : +11.904 V
  +5V Voltage                   : +4.720 V
  +3V Voltage                   : +2.992 V
  +5VSB Voltage                 : +4.760 V          →←: Select Screen
  +3VSB Voltage                 : +3.312 V          ↑↓: Select Item
  VBAT Voltage                  : +3.232 V          Enter: Select
  +VCCSA                        : +1.064 V          +/-: Change Opt.
                                                    F1: General Help
  FAN Speed Control                 [Generic Mode]  F2: Previous Values
                                                    F5: Optimized Defaults
```
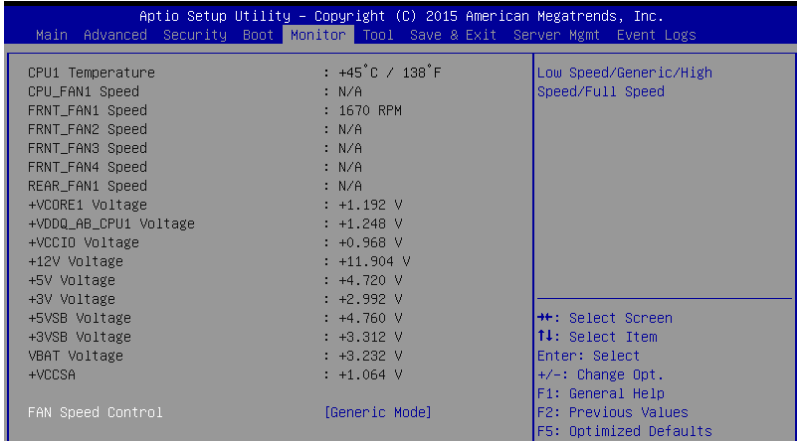
Fan Speed Control [Generic Mode]

Allows you to configure the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation.
Configuration options: [Generic Mode] [High Speed Mode] [Full Speed Mode]

5.8 Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.

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

  Start EzFlash                                     Press ENTER to run the utility
                                                    to select and update BIOS.
```
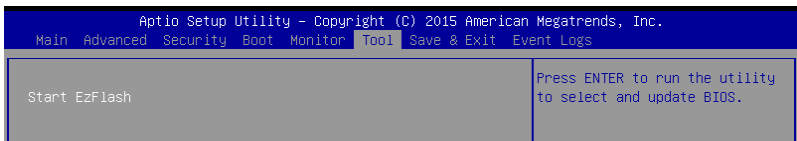
ASUS EZ Flash

Allows you to run the Start EzFlash utility. For more information, see section **5.1.2 ASUS EzFlash Utility**.

5.9   Save & Exit menu

The Exit menu items allow you to save or discard your changes to the BIOS items.

```
              Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
      Main   Advanced   Security   Boot   Monitor   Tool   Save & Exit   Server Mgmt   Event Logs

   Discard Changes and Exit                              Exit system setup without
   Save Changes and Reset                                saving any changes.

   Restore Defaults

   Boot Override
   JetFlashTranscend 4GB 8.07
   IBA GE Slot 0600 v1556
   IBA GE Slot 0700 v1556
   IBA GE Slot 0800 v1556
   IBA GE Slot 0500 v1556

   Launch EFI Shell from filesystem device
```

Pressing <Esc> does not immediately exit this menu. Select one of the options from this menu or <F10> from the legend bar to exit.

Discard Changes and Exit

Exit System setup without saving any changes.

Save Changes and Reset

Reset the system setup after saving the changes.

Restore Defaults

Restore/Load default values for all the setup options.

Boot Override

These items display the available devices. The device items that appear on the screen depend on the number of devices installed in the system. Click an item to start booting from the selected device.

Launch EFI Shell from filesystem device

Attempts to launch EFI Shell application (Shell.efi) from one of the available filesystem devices.

5.10 Server Mgmt menu

The Server Management menu displays the server management status and allows you to change the settings.
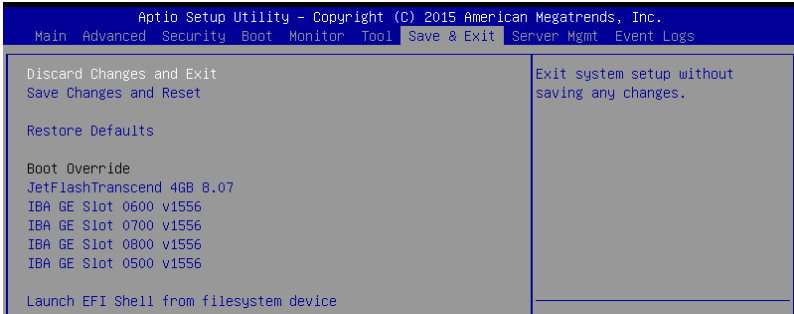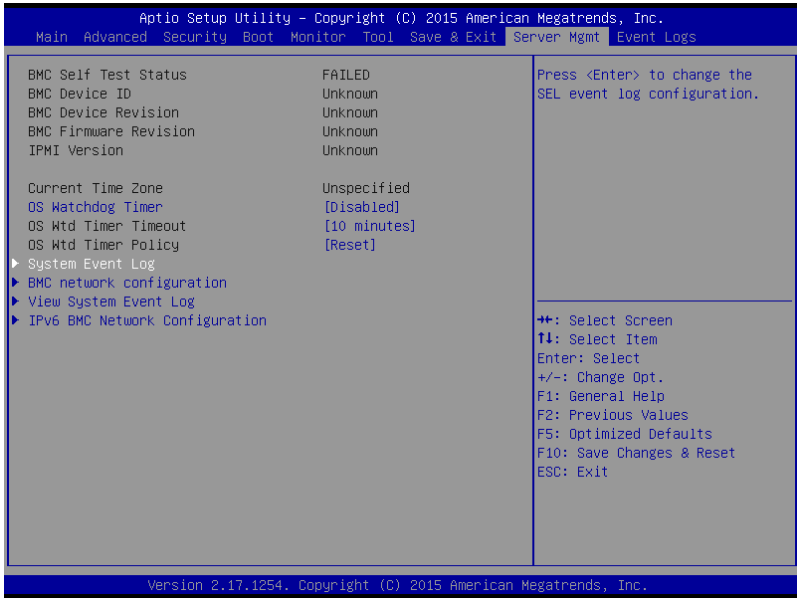
```
             Aptio Setup Utility - Copyright (C) 2015 American Megatrends, Inc.
     Main  Advanced  Security  Boot  Monitor  Tool  Save & Exit  Server Mgmt  Event Logs

    BMC Self Test Status           FAILED                  Press <Enter> to change the
    BMC Device ID                  Unknown                 SEL event log configuration.
    BMC Device Revision            Unknown
    BMC Firmware Revision          Unknown
    IPMI Version                   Unknown

    Current Time Zone              Unspecified
    OS Watchdog Timer              [Disabled]
    OS Wtd Timer Timeout           [10 minutes]
    OS Wtd Timer Policy            [Reset]
  ▶ System Event Log
  ▶ BMC network configuration
  ▶ View System Event Log                                  ⭰⭢: Select Screen
  ▶ IPv6 BMC Network Configuration                         ⭡⭣: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F5: Optimized Defaults
                                                           F10: Save Changes & Reset
                                                           ESC: Exit


             Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

OS Watchdog Timer [Disabled]

This item allows you to start a BIOS timer which can only be shut off by Management Software after the OS loads.
Configuration options: [Enabled] [Disabled]

> The following items is configurable only when the OS Watchdog Timer is set to **[Enabled]**.

OS Wtd Timer Timeout [10 minutes]

Allows you to configure the length for the OS Boot Watchdog Timer.
Configuration options: [5 minutes] [10 minutes] [15 minutes] [20 minutes]

OS Wtd Timer Policy [Reset]

This item allows you to configure how the system should respond if the OS Boot Watch Timer expires.
Configuration options: [Do Nothing] [Reset] [Power Down] [Power Cycle]

System Event Log

Allows you to change the System Event Log configuration.

> • The following items appears only when you set SEL Components to **[Enabled]**.
>
> • All values changed here do not take effect until computer is restarted.

SEL Components [Enabled]
Allows you to enable or disable all features of system Event Logging during boot.
Configuration options: [Disabled] [Enabled]

Erase SEL [No]
Allows you to choose options for erasing SEL.
Configuration options: [No] [Yes, On next reset] [Yes, On every reset]
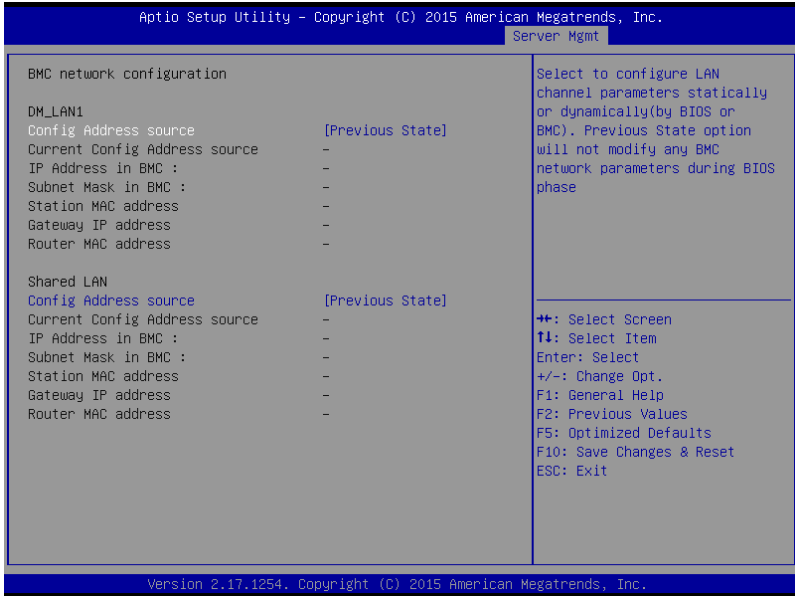
When SEL is Full [Do Nothing]
Allows you to choose options for reactions to a full SEL.
Configuration options: [Do Nothing] [Erase Immediately]

Log EFI Status Codes [Error code]
Disable the logging of EFI Status Codes, or log only error code, or only progress code, or both.
Configuration options: [Disabled] [Both] [Error code] [Progress code]

BMC network configuration

The sub-items in this configuration allow you to configure the BMC network parameters.

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

  BMC network configuration                          Select to configure LAN
                                                     channel parameters statically
  DM_LAN1                                            or dynamically(by BIOS or
  Config Address source          [Previous State]   BMC). Previous State option
  Current Config Address source  -                   will not modify any BMC
  IP Address in BMC :            -                   network parameters during BIOS
  Subnet Mask in BMC :           -                   phase
  Station MAC address            -
  Gateway IP address             -
  Router MAC address             -


  Shared LAN
  Config Address source          [Previous State]
  Current Config Address source  -                   ++: Select Screen
  IP Address in BMC :            -                   ↑↓: Select Item
  Subnet Mask in BMC :           -                   Enter: Select
  Station MAC address            -                   +/-: Change Opt.
  Gateway IP address             -                   F1: General Help
  Router MAC address             -                   F2: Previous Values
                                                     F5: Optimized Defaults
                                                     F10: Save Changes & Reset
                                                     ESC: Exit



          Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

Config Address source DM_LAN1 / Shared LAN [Previous State]
This item allows you to configure LAN channel parameters statistically or dynamically (by BIOS or BMC). Previous State option will not modify any BMC network parameters during BIOS phase.
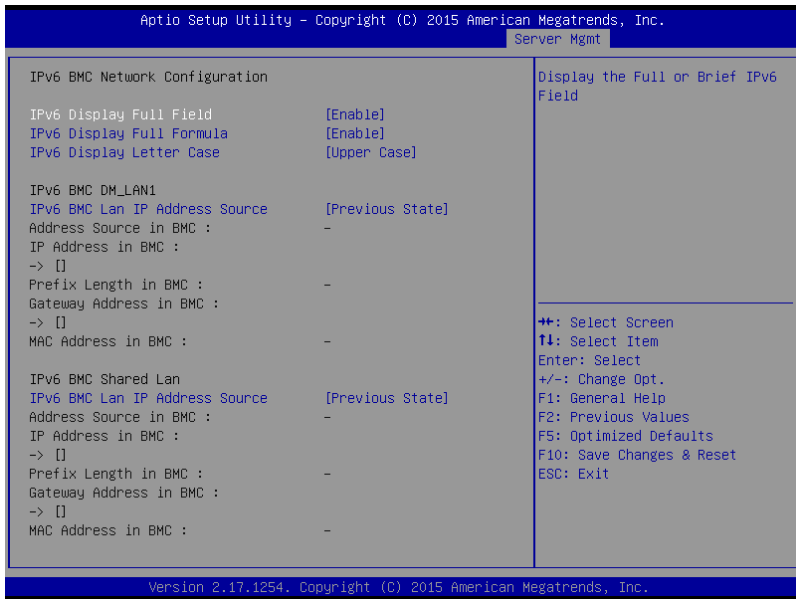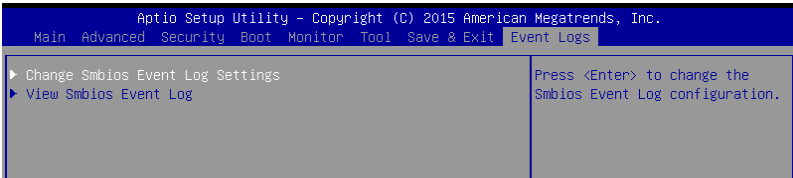Configuration options: [Previous State] [Static] [DynamicBmcDhcp]

View System Event Log

This item allows you to view the System Event Log Records.

IPv6 BMC Network Configuration

This item allows you to configure the parameter settings of IPv6 BMC network.

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

   IPv6 BMC Network Configuration                        Display the Full or Brief IPv6
                                                         Field
   IPv6 Display Full Field           [Enable]
   IPv6 Display Full Formula         [Enable]
   IPv6 Display Letter Case          [Upper Case]

   IPv6 BMC DM_LAN1
   IPv6 BMC Lan IP Address Source    [Previous State]
   Address Source in BMC :           -
   IP Address in BMC :
   -> []
   Prefix Length in BMC :            -
   Gateway Address in BMC :
   -> []                                                 ++: Select Screen
   MAC Address in BMC :              -                   ↑↓: Select Item
                                                         Enter: Select
   IPv6 BMC Shared Lan                                   +/-: Change Opt.
   IPv6 BMC Lan IP Address Source    [Previous State]    F1: General Help
   Address Source in BMC :           -                   F2: Previous Values
   IP Address in BMC :                                   F5: Optimized Defaults
   -> []                                                 F10: Save Changes & Reset
   Prefix Length in BMC :            -                   ESC: Exit
   Gateway Address in BMC :
   -> []
   MAC Address in BMC :              -

            Version 2.17.1254. Copyright (C) 2015 American Megatrends, Inc.
```

IPv6 Display Full Field [Enable]
Displays the Full or Brief IPv6 Field.
Configuration options: [Disable] [Enable]
IPv6 Display Full Formula [Enable]
Displays the Full or Brief IPv6 Formula.
Configuration options: [Disable] [Enable]
IPv6 Display Letter Case [Upper Case]
Displays the uppercase or lowercase letters of the alphabet.
Configuration options: [Lower Case] [Upper Case]
IPv6 BMC LAN IP Address source [Previous State]
Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC).
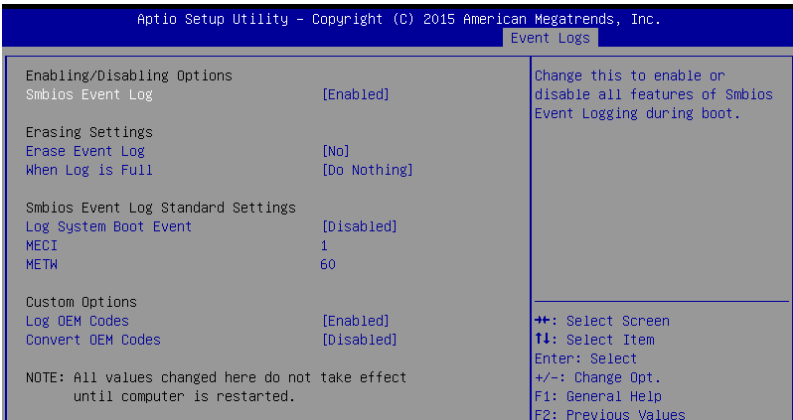Configuration options: [Previous State] [Static]
                                  [Dynamic-Obtained by BMC running DHCP]

5.11   Event Logs menu

The Event Logs menu items allow you to change the event log settings and view the system event logs.

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

  ▶ Change Smbios Event Log Settings                    Press <Enter> to change the
  ▶ View Smbios Event Log                               Smbios Event Log configuration.
```

Change Smbios Event Log Settings

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

   Enabling/Disabling Options                           Change this to enable or
   Smbios Event Log               [Enabled]             disable all features of Smbios
                                                        Event Logging during boot.
   Erasing Settings
   Erase Event Log                [No]
   When Log is Full               [Do Nothing]

   Smbios Event Log Standard Settings
   Log System Boot Event          [Disabled]
   MECI                           1
   METW                           60

   Custom Options
   Log OEM Codes                  [Enabled]             ↔: Select Screen
   Convert OEM Codes              [Disabled]            ↑↓: Select Item
                                                        Enter: Select
   NOTE: All values changed here do not take effect     +/-: Change Opt.
         until computer is restarted.                   F1: General Help
                                                        F2: Previous Values
```

Smbios Event Log [Enabled]
Change this to enable or disable all features of Smbios Event Logging during boot.
Configuration options: [Disabled] [Enabled]

Erase Event Log [No]
Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset.
Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

When Log is Full [Do Nothing]
Allows you to choose options for reactions to a full Smbios Event Log.
Configuration options: [Do Nothing] [Erase Immediately]

Log System Boot Event [Disabled]

Allows you to enable or disable logging of System boot event.

Configuration options: [Enabled] [Disabled]

MECI [1]

Allows you to set the value for the number of occurrences of a duplicate event that must pass before the multiple-event counter of log entry is updated. Use the <+> and <-> keys to adjust the value.

Configuration options: [1] - [255]

METW [60]

Allows you to set the value for the number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. Use the <+> and <-> keys to adjust the value.

Configuration options: [0] - [99]

Log OEM Codes [Enabled]

Allows you to enable or disable the logging of EFI Status Codes as OEM codes (if not already converted to legacy).

Configuration options: [Disabled] [Enabled]

Convert OEM Codes [Disabled]

Allows you to enable or disable the converting of EFI Status Codes to Standard Smbios Types (not all may be translated).

Configuration options: [Disabled] [Enabled]

RAID Configuration

6

This chapter provides instructions for setting up, creating, and configuring RAID sets using the available utilities.

6.1 Setting up RAID

The motherboard comes with the Intel® C232 controller that supports **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows® OS only).

6.1.1 RAID definitions

RAID 0 *(Data striping)* optimizes two identical hard disk drives to read and write data in parallel, interleaved stacks. Two hard disks perform the same work as a single drive but at a sustained data transfer rate, double that of a single disk alone, thus improving data access and storage. Use of two new identical hard disk drives is required for this setup.

RAID 1 *(Data mirroring)* copies and maintains an identical image of data from one drive to a second drive. If one drive fails, the disk array management software directs all applications to the surviving drive as it contains a complete copy of the data in the other drive. This RAID configuration provides data protection and increases fault tolerance to the entire system. Use two new drives or use an existing drive and a new drive for this setup. The new drive must be of the same size or larger than the existing drive.

RAID 10 is data striping and data mirroring combined without parity (redundancy data) having to be calculated and written. With the RAID 10 configuration you get all the benefits of both RAID 0 and RAID 1 configurations. Use four new hard disk drives or use an existing drive and three new drives for this setup.

RAID 5 stripes both data and parity information across three or more hard disk drives. Among the advantages of RAID 5 configuration include better HDD performance, fault tolerance, and higher storage capacity. The RAID 5 configuration is best suited for transaction processing, relational database applications, enterprise resource planning, and other business systems. Use a minimum of three identical hard disk drives for this setup.

- If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive.

- Please refer to Chapter 2 for how to select the RAID configuration utility. Move the jumper to choose between LSI MegaRAID and Intel® Rapid RAID.

6.1.2 Installing hard disk drives

The motherboard supports Serial ATA for RAID set configuration. For optimal performance, install identical drives of the same model and capacity when creating a disk array.

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.

2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.

3. Connect a SATA power cable to the power connector on each drive.

6.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by Intel® C612 chipset.

To do this:

1. Enter the BIOS Setup during POST.

2. Go to the **Advanced** Menu > **PCH SATA Configuration**, then press <Enter>.

3. Set **SATA Mode** to [RAID]

4. Press <F10> to save your changes and exit the BIOS Setup.

> Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

6.1.4 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the **Intel® Rapid Storage Technology enterprise SATA Option ROM Utility** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C232 chipset.

6.2 Intel® Rapid Storage Technology enterprise SATA/SSATA Option ROM Utility

The Intel® Rapid Storage Technology enterprise SATA/SSATA Option ROM utility allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

Before you proceed, ensure that you have installed the Serial ATA hard disk drives, have set the correct jumper settings of the motherboard, and have set the correct SATA mode in the BIOS setup. You can refer to the **Installing hard disk drives, Setting Jumpers**, and **Setting the RAID mode sections in BIOS** for more information.

To launch the Intel® Rapid Storage Technology enterprise SATA/SSATA Option ROM utility:

1. Turn on the system.

2. During POST, press <Ctrl>+<I> to display the utility main menu.

```
    Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
          Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
    ───────────────────────────[ MAIN MENU ]───────────────────────────
           1. Create RAID Volume            3. Reset Disks to Non-RAID
           2. Delete RAID Volume            4. Exit

    ──────────────────────[ DISK/VOLUME INFORMATION]──────────────────────
        RAID Volumes:
        None defined.

        Physical Disks:
        ID  Drive Model    Serial #              Size    Type/Status(Vol ID)
        0   ST3300656SS    HWAS0000991753TR      279.3GB     Non-RAID Disk
        1   ST3300656SS    37VN00009846RAJ1      279.3GB     Non-RAID Disk
        2   ST3300656SS    397600009846UEDY      279.3GB     Non-RAID Disk
        3   ST3300656SS    GWC50000991756G6      279.3GB     Non-RAID Disk




        [↑↓]-Select            [ESC]-Exit          [ENTER]-Select Menu
```

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.

The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

6.2.1   Creating a RAID set

To create a RAID set:

1.   From the utility main menu, select **1. Create RAID Volume** and press <Enter>.

2.   Key in a name for the RAID set and press <Enter>.

```
        Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
                Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
    ┌─────────────────────────[ CREATE VOLUME MENU ]─────────────────────────┐
    │                          Name:  Volume0                                 │
    │                    RAID Level:  RAID0(Strips)                           │
    │                         Disks:  Select Disks                            │
    │                    Strip Size:  128KB                                   │
    │                      Capacity:  0.0  GB                                 │
    │                          Syne:  N/A                                     │
    │                                 Create Volume                           │
    │                                                                         │
    ├────────────────────────────────[ HELP ]────────────────────────────────┤
    │                                                                         │
    │                                                                         │
    │                                                                         │
    │        Enter a unique volume name that has no special characters and is │
    │                         16 characters or less.                          │
    │                                                                         │
    │                                                                         │
    │                                                                         │
    │                                                                         │
    └─────────────────────────────────────────────────────────────────────────┘
        [↑↓]Change         [TAB]-Next        [ESC]-Previous Menu       [ENTER]-Select
```

3.   Press the up/down arrow keys to select a RAID Level that you wish to create then press <Enter>.

4.   From the **Disks** item field, press <Enter> to select the hard disk drives that you want to include in the RAID set.

```
    ┌──────────────────────────[ SELECT DISKS ]──────────────────────────┐
    │                                                                     │
    │  Port  Drive Model   Serial #              Size        Status       │
    │  0     ST3300656SS   HWAS0000991753TR      279.3GB     Non-RAID Disk │
    │  1     ST3300656SS   37VN00009846RAJ1      279.3GB     Non-RAID Disk │
    │  2     ST3300656SS   397600009846UEDY      279.3GB     Non-RAID Disk │
    │  3     ST3300656SS   GWC50000991756G6      279.3GB     Non-RAID Disk │
    │                                                                     │
    │        Select 1 Master and 1 Recovery disk to create volume.        │
    │                                                                     │
    └─ [↑↓]-Prev/Next [TAB]-(M)aster [SPACE]-(R)ecovery [ENTER]-Done ─────┘
```

5.   Use the up/down arrow keys to move the selection bar then press <Space> to select a disk. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

---

6. Use the up/down arrow keys to select the stripe size for the RAID array (for RAID 0, 10 and 5 only) then press <Enter>. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB

We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

7. In the **Capacity** field item, key in the RAID volume capacity that you want to use and press <Enter>. The default value field indicates the maximum allowed capacity.

8. Press <Enter> to start creating the RAID volume.

9. From the following warning message, press <Y> to create the RAID volume and return to the main menu, or press <N> to go back to the **CREATE VOLUME** menu.

```
WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

Are you sure you want to create this volume? (Y/N):
```

6.2.2   Deleting a RAID set

> ⚠️ Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1.   From the utility main menu, select **2. Delete RAID Volume** and press <Enter>.

2.   From the Delete Volume Menu, press the up/down arrow keys to select the RAID set you want to delete then press <Del>.

```
    Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
          Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
   ═══════════════════════════════ [ DELETE VOLUME MENU ] ═══════════════════════

    Name         Level          Drives      Capacity       Status      Bootable
    Volume0      RAID0(Stripe)     2          298.0GB       Normal        Yes




   ═══════════════════════════════════ [ HELP ] ═════════════════════════════════

             Deleting a volume will reset the disks to non-RAID

                   WARNING: ALL DISK DATA WILL BE DELETED.
                   (This does not apply to Recovery volumes)




       [↑↓]-Select              [ESC]-Previous Menu        [DEL]-Delete Volume
```

3.   Press <Y> to confirm deletion of the selected RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

```
   ══════════════════════ [ DELETE VOLUME VERIFICATION ] ═══════════
                   ALL DATA IN THE VOLUME WILL BE LOST!
                   (This does not apply to Recovery volumes)

        Are you sure you want to delete volume "Volume0"? (Y/N):
```
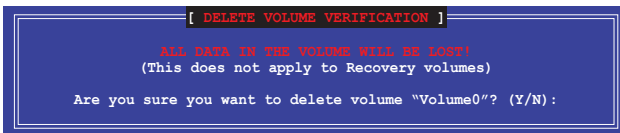
6.2.3   Resetting disks to Non-RAID

Take caution before you reset a RAID volume hard disk drive to non-RAID. Resetting a RAID volume hard disk drive deletes all internal RAID structure on the drive.

To reset a RAID set:

1.   From the utility main menu, select **3. Reset Disks to Non-RAID** and press <Enter>.

2.   Press the up/down arrow keys to select the drive(s) or disks of the RAID set you want to reset, then press <Space>. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

```
══════════════════[ RESET RAID DATA ]══════════════════
         Resetting RAID disk will remove its RAID structures
         and revert it to a non-RAID disk.

    WARNING: Resetting a disk causes all data on the disk to be lost.
    (This does not apply to Recovery volumes)

    Port  Drive Model   Serial #          Size      Status
    0     ST3300656SS   HWAS0000991753TR  279.3GB   Member Disk
    1     ST3300656SS   37VN00009846RAJ1  279.3GB   Member Disk

             Select the disks that should be reset.

══ [↑↓]-Previous/Next [SPACE]-Selects [ENTER]-Selection Complete ══
```

3.   Press <Y> in the confirmation window to reset the drive(s) or press <N> to return to the utility main menu.

6.2.4 Exiting the Intel® Rapid Storage Technology enterprise SATA/SSATA Option ROM utility

To exit the utility:

1. From the utility main menu, select **4. Exit** then press <Enter>.

2. Press <Y> to exit or press <N> to return to the utility main menu.

```
========================[ CONFIRM EXIT ]========================

                  Are you sure you want to exit? (Y/N):

```
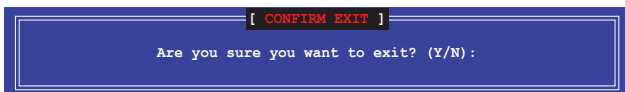
6.2.5 Rebuilding the RAID

This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

If any of the SATA hard disk drives included in the RAID 1 array failed, the system displays the status of the RAID volume as "**Degraded**" during POST. You can rebuild the RAID array with other installed non-RAID disks.

To rebuild the RAID with other non-RAID disk:

1. During POST, press <Ctrl>+<I> at the prompt to enter the Intel Rapid Storage Technology option ROM utility.

2. If there is a non-RAID SATA Hard Disk available, the utility will prompt you to rebuild the RAID. Press the up/down arrow keys to select the destination disk then Press <Enter> to start the rebuilding process, or press <ESC> to exit.

```
==================[ DEGRADED VOLUME DETECTED ]==================

 "Degraded" volume and disk available for rebuilding detected. Selecting
 a disk initiates a rebuild. Rebuild completes in the operating system.

    Select the port of destination disk for rebuilding (ESC to exit):
    Port  Drive Model   Serial #          Size
    X     XXXXXXXXXXX   XXXXXXXX          XXX.GB



==============[↑↓]-Previous/Next [ENTER]-Select [ESC]-Exit======
```
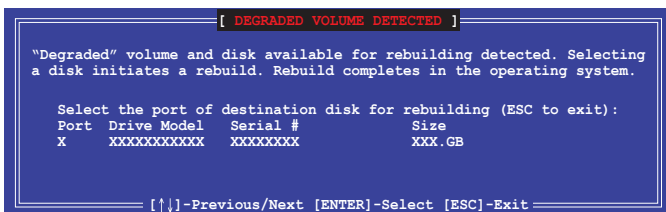
Select a destination disk with the same size as the original hard disk.

3.	The utility immediately starts rebuilding after the disk is selected. When done, the status of the degraded RAID volume is changed to **"Rebuild"**.

```
Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
          Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
━━━━━━━━━━━━━━━━━━━━━━━[ MAIN MENU ]━━━━━━━━━━━━━━━━━━━━━━━
         1. Create RAID Volume            3. Reset Disks to Non-RAID
         2. Delete RAID Volume            4. Exit


━━━━━━━━━━━━━━━━━━[ DISK/VOLUME INFORMATION]━━━━━━━━━━━━━━━
    RAID Volumes:                              *=Data is Encrypted
    ID   Name      Level1        Strip      Size    Status    Bootable
    1    Volume0   RAID1(Mirror) N/A        149.0GB Rebuild   Yes

    Physical Devices:
    Port  Drive Model    Serial #          Size    Type/Status(Vol ID)
    1     ST3160812AS    9LS0F4HL          149.0GB Member Disk(0)
    2     ST3160812AS    3LS0JYL8          149.0GB Member Disk(0)



    Volumes with "Rebuild" status will be rebuilt within the operating system.

      [↑↓]-Select              [ESC]-Exit          [ENTER]-Select Menu
```

4.	Press <Esc> to exit Intel Rapid Storage Technology and reboot the system.

5.	Select **Start > Programs > Intel Rapid Storage > Intel Rapid Storage Console** or click the **Intel Rapid Storage Technology** tray icon to load the Intel Rapid Storage Manager utility.

6.	From the **View** menu, select **Advanced Mode** to display the details of the Intel Rapid Storage Console.

7.	From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to "**Normal**".

Rebuilding the RAID with a new hard disk

If any of the SATA hard disk drives included in the RAID array failed, the system displays the status of the RAID volume as "**Degraded**" during POST. You may replace the disk drive and rebuild the RAID array.

To rebuild the RAID with a new hard disk:

1.	Remove the failed SATA hard disk and install a new SATA hard disk of the same specification into the same SATA Port.

Select a destination disk with the same size as the original hard disk.

2.	Reboot the system then follow the steps in section **Rebuilding the RAID with other non-RAID disk**.

6.2.6   Setting the Boot array in the BIOS Setup Utility

You can set the boot priority sequence in the BIOS for your RAID arrays when creating multi-RAID using the Intel® Rapid Storage Technology enterprise SATA Option ROM utility.

To set the boot array in the BIOS:

Set at least one of the arrays bootable to boot from the hard disk.

1.   Reboot the system and press <Del> to enter the BIOS setup utility during POST.

2.   Go to the **Boot** menu and select the boot option priority.

3.   Use up/down arrow keys to select the boot priority and press <Enter>. See the **Boot menu** section of Chapter 4 for more details.

4.   From the **Exit** menu, select **Save Changes & Exit**, then press <Enter>.

5.   When the confirmation window appears, select **Yes**, then press <Enter>.

6.3 Intel® Rapid Storage Technology enterprise (Windows)

The Intel® Rapid Storage Technology enterprise allows you to create RAID 0, RAID 1, RAID 10 (RAID 1+0), and RAID 5 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

> You need to manually install the Intel® Rapid Storage Technology enterprise utility on a Windows® operating system. Please refer to the installation instructions in Chapter 6.

To enter the Intel® Rapid Storage Technology enterprise utility under Windows operating system:

1. Turn on the system and go to the windows desktop.

2. Click the **Intel® Rapid Storage Technology enterprise** icon to display the main menu.

   Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.
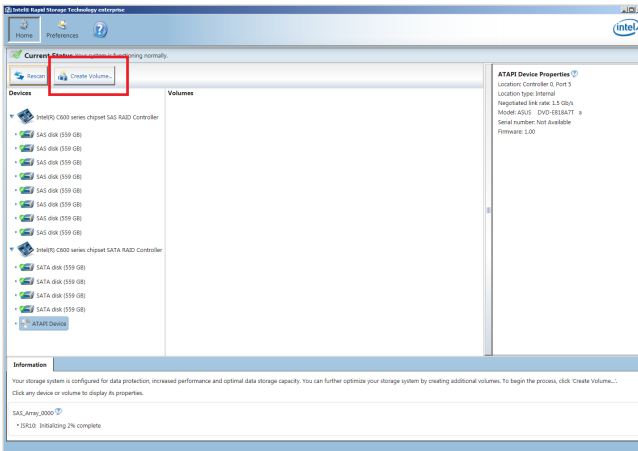
> You can click **Rescan** to re-scan any attached hard disks.

6.3.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select **Create Volume** and select volume type.

2. Click **Next**.
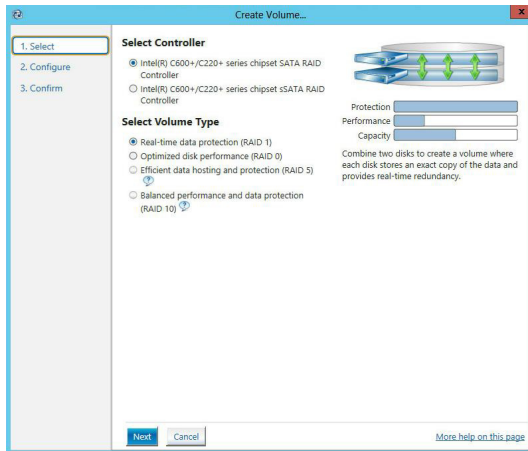
3. Enter a name for the RAID set, then select the array disks.

4. Select **Volume Size** tab, you can drag the bar to decide the volume size.

5. Click **Next**.
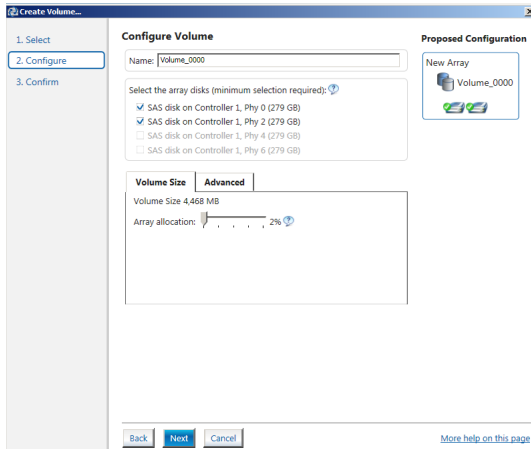
• If you do not want to keep the data on one of the selected disks, select **NO** when prompted.

• If you want to **Enable volume write-back cache** or **Initialize volume**, click **Advanced**.

6. Confirm the volume creation, than click **Create Volume** to continue.

> This process could take a while depending on the number and size of the disks. You can continue using other applications during this time.
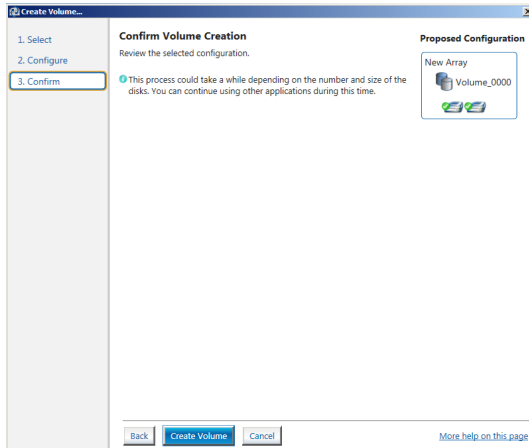
7. Wait until the process is completed, then click **OK** when prompted.
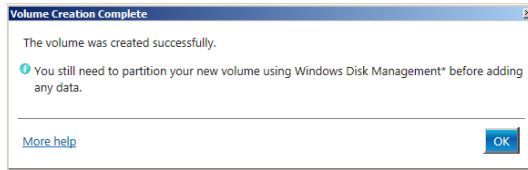
> You still need to partition your new volume using Windows Disk Management before adding any data.

The RAID set is displayed in the **Volumes** list and you can change the settings in **Volume Properties**.
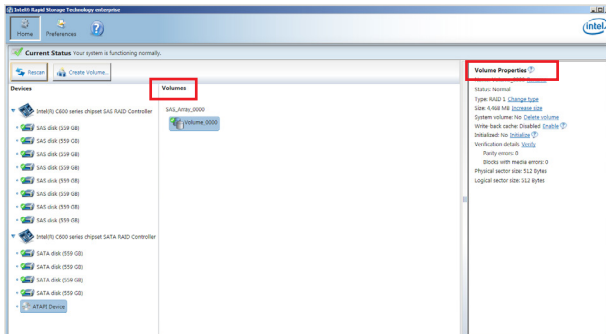
6.3.2   Changing a Volume Type

To change the volume type in **Volume Properties**:

1.   Click the SATA array items you want to change in **Volumes** field.

2.   From the **Volume Properties** field, select **Type:RAID 1 Change type**.
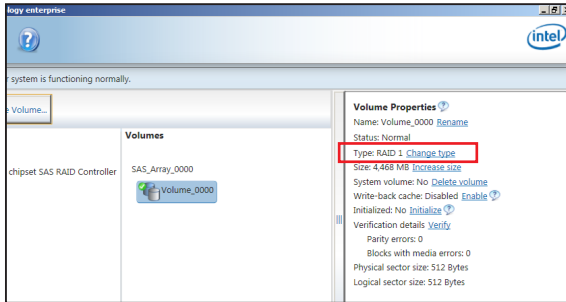
3.   You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

4.   Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only), and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB
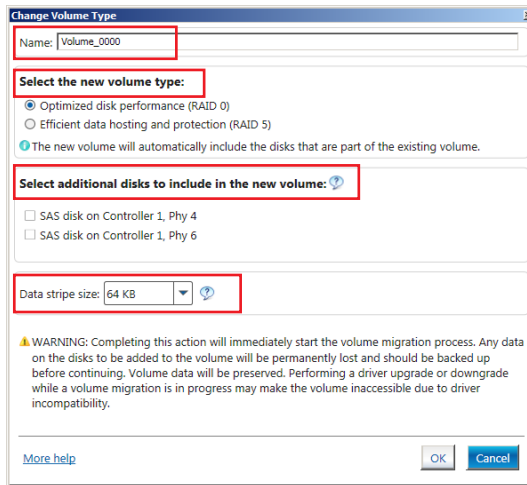
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

6.3.3 Deleting a volume

Be cautious when deleting a volume. You will lose all data on the hard disk drives. Before you proceed, ensure that you back up all your important data from your hard drives.

To delete a volume:

1. From the utility main menu, select the volume (exp. Volume_0000) in **Volumes** field you want to delete.
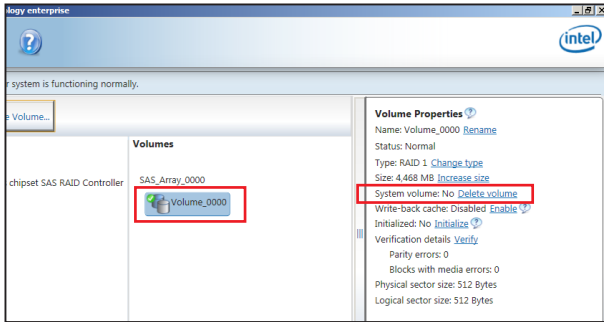
2. Select **Delete volume** in **Volume Properties** field. The following screen appears.
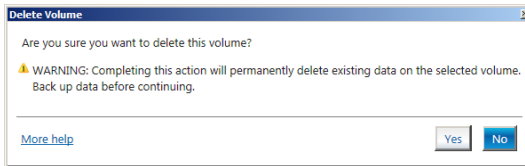
3. Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

6.3.4   Preferences

System Preferences

Allow you to set to show the notification area icon and show system information, warning, or errors here.
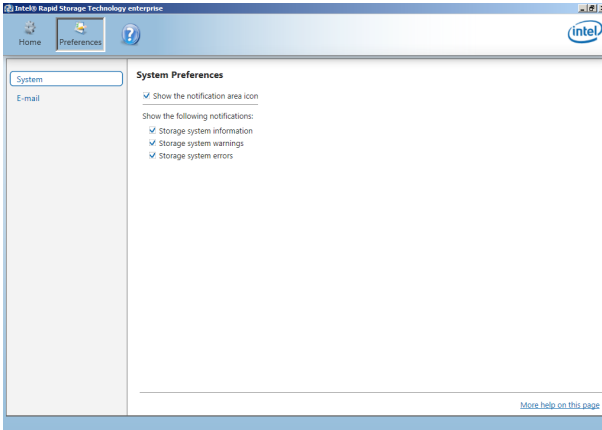
E-Mail Preferences

Allow you to set to sent e-mail of the following events:
*   Storage system information
*   Storage system warnings
*   Storage system errors
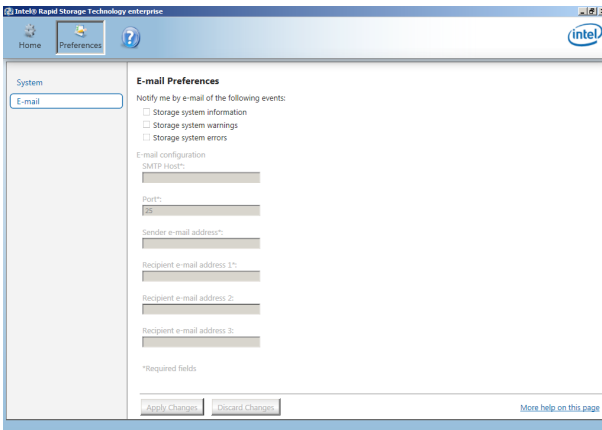
Driver Installation

7

This chapter provides the instructions for installing the necessary drivers for different system components in both Linux® and Windows® Operating Systems.

7.1 RAID driver installation

After creating the RAID sets for your server system, you are now ready to install an operating system to the independent hard disk drive or bootable array. This part provides the instructions on how to install the RAID controller drivers during OS installation.

7.1.1 Creating a RAID driver disk

> The system does not include a floppy drive. You have to use a USB floppy drive when creating a SATA RAID driver disk.

A floppy disk with the RAID driver is required when installing Windows® or Red Hat® Enterprise operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support DVD).

To create a RAID driver disk in DOS environment:

1.   Place the motherboard support DVD in the optical drive.

2.   Restart your computer.

3.   Enter the BIOS Setup.

4.   Select the optical drive as the first boot priority to boot from the support DVD. Save your changes.

5.   Exit the BIOS Setup and restart your computer.

       The following Makedisk menu appears.

6.   Select the **C23x INTEL RAID Driver** and press <Enter> to go to the sub-menu.

```
Create Driver Diskette Menu
C23x INTEL RAID Driver
Write DMI
FreeDOS command prompt
```

7.   From the C23x Intel RAID Driver sub-menu, use the Up or Down arrow keys to select the driver and press <Enter> to create the RAID driver disk.

```
       C23x INTEL RAID Driver
Windows 32 bit (AHCI / AHCI RAID)
Windows Server 2012 64 bit (AHCI / AHCI RAID)
Back
Exit
```

8. Select YES from the following warning message then press <Enter>.

```
WARNING !!!
ALL DATA ON THE FLOPPY DISKETTE WILL BE DELETED !!
DO YOU WANT TO CONTINUE ?

                              NO      YES
```

9. On the following Important message, select YES if an ASMB7 is installed, otherwise select **NO**, then press <Enter>.

```
<Important>
Please ensure ASMB7-iKVM is well installed on the
motherboard.

                              NO      YES
```

10. Insert the formatted diskette into the disk drive and press <Enter> to write the image to the disk.

11. Press any key to continue when prompted.

    The Create Driver Diskette Menu appears after the creation of the diskette is finished.

To create a RAID driver disk in Windows® environment:

1. Start Windows®.

2. Place the motherboard support DVD into the optical drive.

3. Go to the **Make disk** menu, then select the type of RAID driver disk you want to create.

4. Insert a floppy disk into the USB floppy disk drive.

5. Follow succeeding screen instructions to complete the process.

Write-protect the floppy disk to avoid computer virus infection.

7.1.2 Installing the RAID controller driver

During Windows® Server 2008 OS installation

To install the RAID controller driver when installing Windows® Server 2008 OS:

1.	Boot the computer using the Windows® Server 2008 OS installation disc. Follow the screen instructions to start installing Windows Server 2008.

2.	When prompted to choose a type of installation, click **Custom (advanced)**.
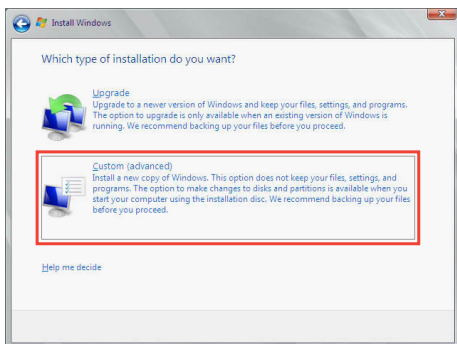
3.	Click **Load Driver**.
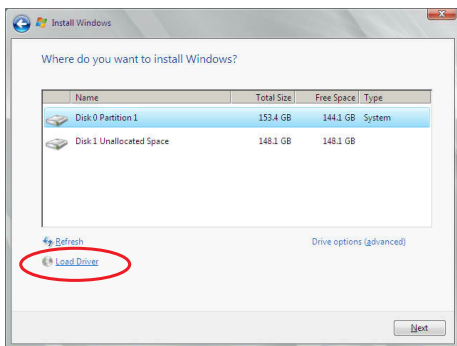
4. A message appears reminding you to insert the installation media containing the driver of the RAID controller driver. If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD into the optical drive. Click **Browse** to continue.
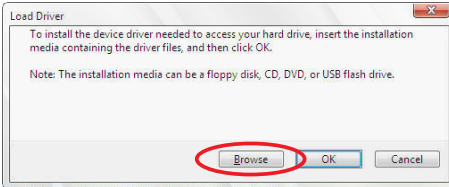
5. Locate the driver in the corresponding folder of the Support DVD, and then click **OK** to continue.

6. Select the RAID controller driver you need from the list and click **Next**.

7. When the system finishes loading the RAID driver, replace the motherboard Support DVD with the Windows Server installation disc. Select the drive to install Windows and click **Next**.
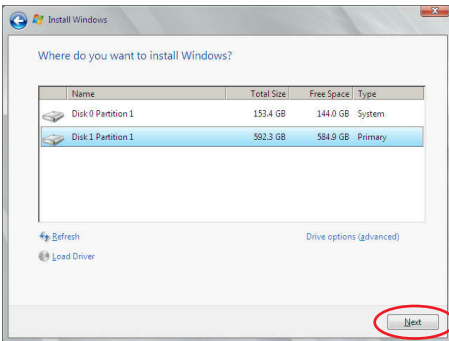
8. Follow succeeding screen instructions to continue.

7.2 Management applications and utilities installation

The support DVD that is bundled with your motherboard contains drivers, management applications, and utilities that you can install to maximize the features of your motherboard.

1. The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.

2. The support DVD is supported on Windows® Server 2008 R2 and Windows® Server 2012.

7.3 Running the Support DVD

When you place the support DVD into the optical drive, the DVD automatically displays the main screen if Autorun is enabled in your computer. By default, the Drivers tab is displayed.
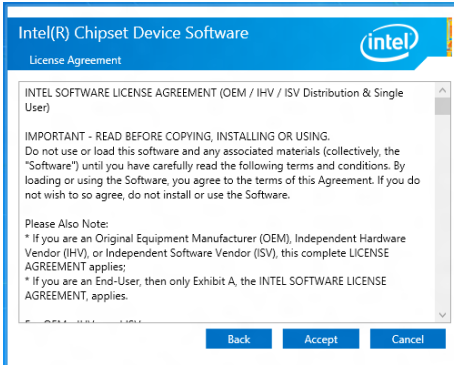
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

The main screen of the Support DVD contains the following tabs:

1. Drivers

2. Utilities

3. Manual

4. Contact

The main screen of the Support DVD looks exactly the same on the Windows® Server 2008 R2 and on the Windows® Server 2012 Operating System (OS).

7.3.1 Drivers menu tab

The Drivers Menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

7.3.2 Utilities menu tab

The Utilities menu displays the software applications and utilities that the motherboard supports.

7.3.3   Manual menu tab

You need an internet browser installed in your OS to view the User Guide.

7.3.4   Contact information menu

The Contact menu displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard.

7.3.5   Installing the Intel® Chipset device Software driver

This section provides the instructions on how to install the Intel® chipset device software on the system. You need to manually install the Intel® chipset device software on a Windows® Operating System. To install the Intel® chipset device software on Windows® Server 2008 R2:

1.   Restart the computer.

2.   Log in with **Administrator** privileges.

3.   Insert the Motherboard Support DVD to the optical drive.

       The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.   Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5.   The **Intel® Chipset Device Software** window appears. Click **Next** to start installation.
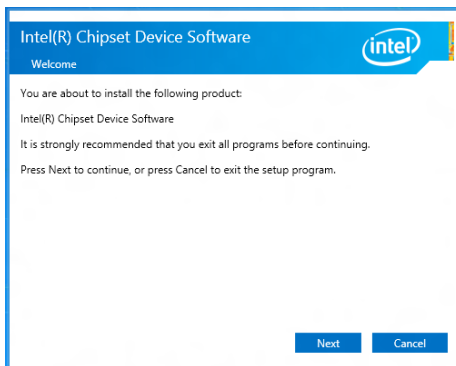
6.   Select **Yes** to accept the terms of the **License Agreement** and continue the process.

7.   Read the **Readme File Information** and press **Install** to continue the installation.
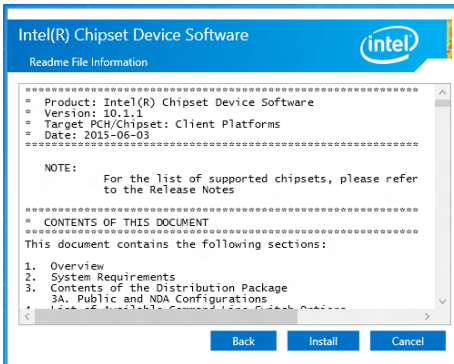
8.   Press **Restart Now** to complete the setup process.
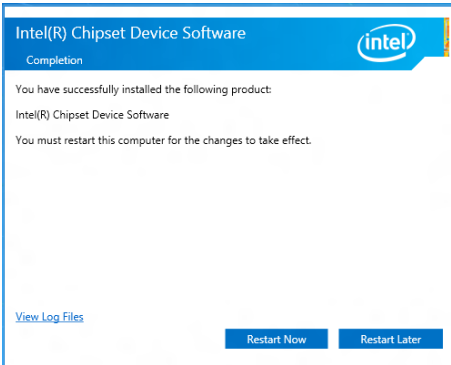
7.4 Installing the Intel® I210 Gigabit Adapters driver

This section provides the instructions on how to install the **Intel® I210 Gigabits Adapter Driver** on the system.

To install the **Intel® I210 Gigabit Adapters Driver** on the Windows® operating system:

1. Restart the computer.

2. Log on with **Administrator** privileges.

3. Insert the motherboard/system support DVD to the optical drive.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® I210 Gigabit Adapters Drivers** in the **Drivers** menu of the main screen to start the installation.

5. Click **Install Drivers and Software** option to begin installation.
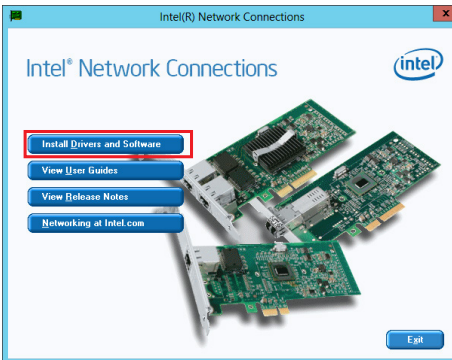
6. Click **Next** when the **Intel(R) Network Connections–InstallShield Wizard** window appears.
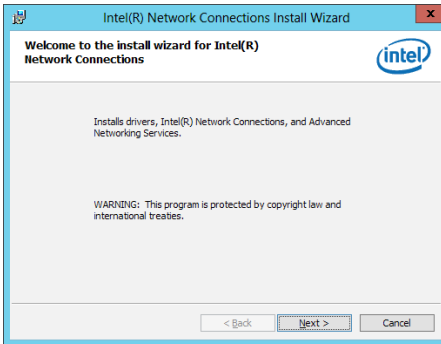
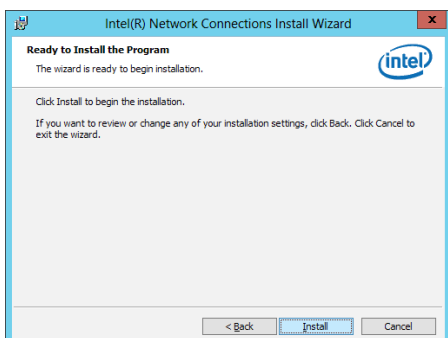7. Tick **I accept the terms in the license agreement** and click **Next** to continue.
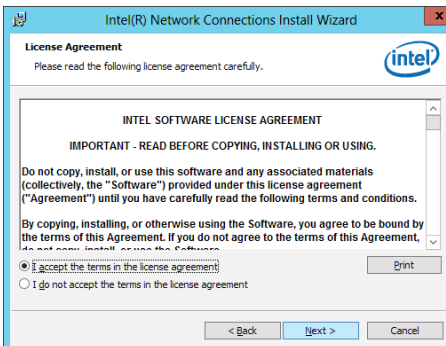
8. From the **Setup Options** window, click **Next** to start the installation.
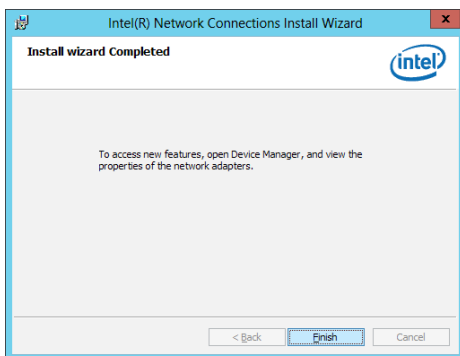
By default, **Intel(R) PROSet for Windows Device Manager** and Windows PowerShell Module are ticked.
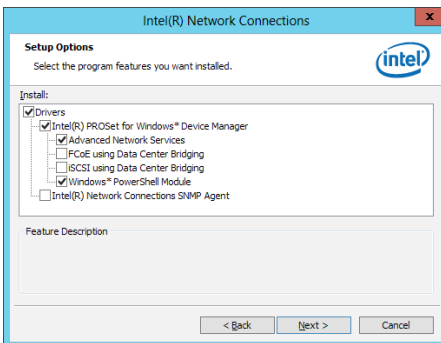
9.	Click **Install** to start the installation.

10.	When the installation is done, press **Finish** to complete the installation.

7.5   Installing the VGA driver

This section provides the instructions on how to install the **ASPEED Video Graphics Adapter** (**VGA**) driver.

To install the **ASPEED VGA** driver:

1.   Restart the computer.

2.   Log in with **Administrator** privileges.

3.   Insert the Motherboard Support DVD to the optical drive.

      The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.
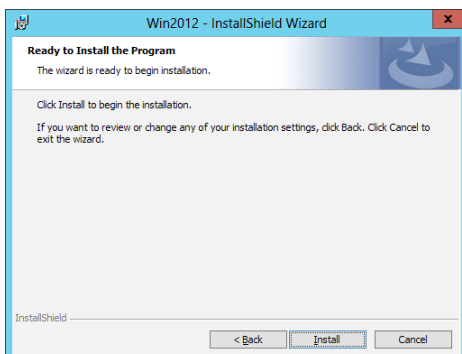
---

4.   From the **Main Menu**, click **ASPEED AST1400/AST2400 Display Driver** on the **Drivers** tab to start the installation.
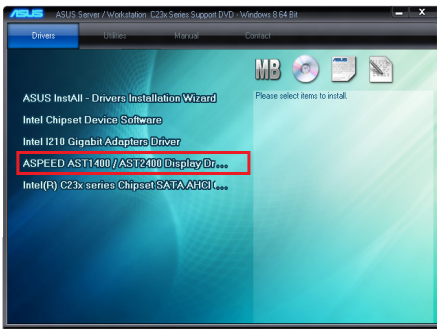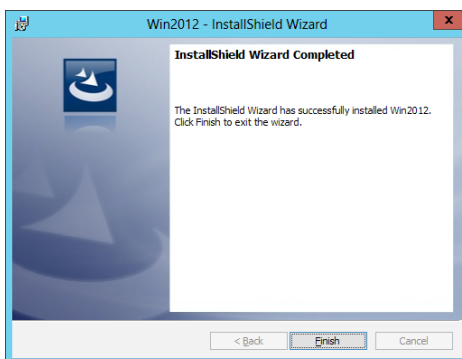

5.   From the installation window, click **Next** to start the installation.

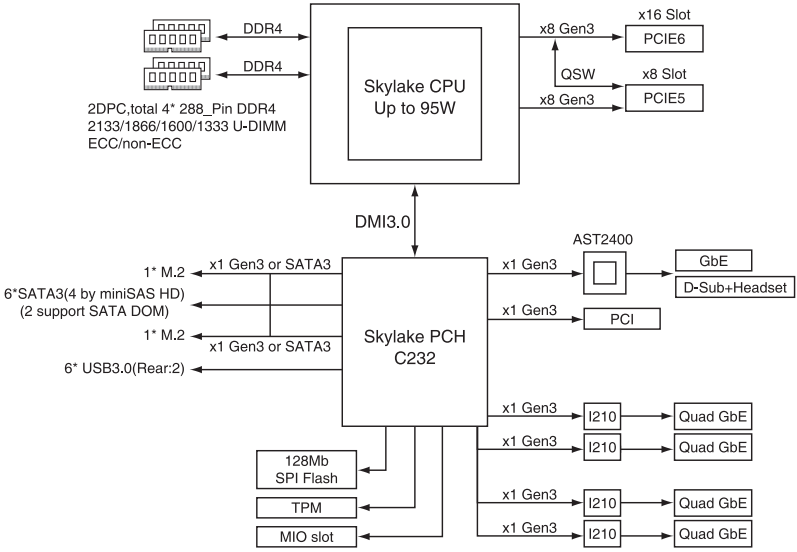6.   Click **Install** to proceed with the installation.

7.   Click **Finish** to complete the installation.

Appendix

A

P10S-C/4L/SYS block diagram

ASUS contact information

ASUSTeK COMPUTER INC.

Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
Web site	https://www.asus.com

Technical Support

Telephone	+86-21-38429911
Fax	+86-21-58668722 ext: 9101
Online Support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=en

ASUSTeK COMPUTER INC. (Taiwan)

Address	4F, No. 150, Li-Te Rd., Peitou, Taipei 112, Taiwan
Telephone	+886-2-2894-3447
Fax	+886-2-2890-7798
Web site	https://www.asus.com/tw/

Technical Support

Telephone	+886-2-2894-3447 (0800-093-456)
Online Support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=zh-tw

ASUSTeK COMPUTER INC. (China)

Address	No. 5077, Jindu Road, Minhang District, Shanghai, China
Telephone	+86-21-5442-1616
Fax	+86-21-5442-0099
Web site	https://www.asus.com.cn

Technical Support

Telephone	+86-20-2804-7506 (400-620-6655)
Online Support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=zh-cn

ASUS contact information

ASUS COMPUTER INTERNATIONAL (America)

Address	800 Corporate Way, Fremont, CA 94539, USA
Fax	+1-510-608-4555
Web site	https://www.asus.com/us/

Technical Support

Support fax	+1-812-284-0883
General support	+1-812-282-2787
Online support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=en-us

ASUS COMPUTER GmbH (Germany and Austria)

Address	Harkort Str. 21-23, 40880 Ratingen, Germany
Fax	+49-2102-959911
Web site	https://www.asus.com/de/

Technical Support

Telephone	+49-1805-010923
Support Fax	+49-2102-959911
Online support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=de-de

ASUS Czech Service s.r.o. (Europe)

Address	Na Rovince 887, 720 00 Ostrava – Hrabová, Czech Republic
Telephone	+420-596766888
Web site	https://www.asus.com/cz/

Technical Support

Telephone	+420-596-766-891
Fax	+420-596-766-329
E-mail	advance.rma.eu@asus.com
Online Support	https://www.asus.com/support/Product/ContactUs/Services/questionform/?lang=cs-cz

ASUS contact information

ASUS Holland BV (The Netherlands)

Address   Marconistraat 2, 7825GD EMMEN, The Netherlands
Web site   https://www.asus.com/nl/

Technical Support

Telephone   +31-(0)591-5-70292
Fax   +31-(0)591-666853
E-mail   advance.rma.eu@asus.com
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=nl-nl

ASUS Polska Sp. z o.o. (Poland)

Address   Ul. Postępu 6, 02-676 Warszawa, Poland
Web site   https://www.asus.com/pl/

Technical Support

Telephone   +48-225718033
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=pl-pl

ASK-Service (Russia and CIS)

Address   г.Москва, ул. Орджоникидзе, д.10, Россия
Telephone   (495) 640-32-75
Web site   https://www.asus.com/ru/

Technical Support

Telephone   008-800-100-ASUS (008-800-100-2787)
Online Support   https://www.asus.com/support/Product/ContactUs/Services/
                 questionform/?lang=ru-ru

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com