# RS520-E8-RS8 V2
# RS520-E8-RS12-EV2

# Server User Guide

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# 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 B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

*   Reorient or relocate the receiving antenna.
*   Increase the separation between the equipment and receiver.
*   Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
*   Consult the dealer or an experienced radio/TV technician for help.

> WARNING! 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.

## Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class A digital apparatus complies with Canadian ICES-003.

## REACH

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.

# 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.

CD-ROM Drive Safety Warning
**CLASS 1 LASER PRODUCT**

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

**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.

## 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 http://support.asus.com. 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 http://support.asus.com

# 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 Information**

   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 motherboard features and the new technologies it supports.

# 1.1 System package contents

Check your system package for the following items.

| Model Name | RS520-E8-RS12-EV2 | RS520-E8-RS8 V2 |
|---|---|---|
| Chassis | ASUS 2U Rackmount Chassis | ASUS F 2U Rackmount Chassis |
| Motherboard | ASUS Z10PR-D16 Server Board | |
| Component | 1 x 770W Redundant Power Supply<br>12 x Hot-swap 3.5-inch HDD Trays<br>2 x Hot-swap 2.5-inch SSD Trays<br>1 x SATA/SAS back panel<br>1 x Front I/O Board<br>1 x Front USB Board<br>4 x System Fans (80 mm x 38 mm)<br>1 x Power sharing Board<br>1 x Air duct | 1 x 770W Redundant Power Supply<br>8 x Hot-swap 3.5-inch HDD Trays<br>1 x SATA/SAS back panel<br>1 x Front I/O Board<br>4 x System Fans (80 mm x 38 mm)<br>1 x Power sharing Board<br>1 x Air duct |
| Accessories | 1 x Support DVD<br>1 x ASWM* Enterprise DVD<br>1 x ASMB8 DVD<br>2 x Bag of Screws<br>2 x AC Power Cable | 1 x Support DVD<br>1 x ASWM* Enterprise DVD<br>1 x ASMB8 DVD<br>1 x Bag of Screws<br>2 x AC Power Cable |
| Optional Items | 2 x CPU Heatsink (Quantity may vary depending on the request of each area/country)<br>1 x Tool-less Friction Rail Kit<br>Additional 770W Redundant Power Supply | 2 x CPU Heatsink (Quantity may vary depending on the request of each area/country)<br>1 x Tool-less Friction Rail Kit<br>1 x Slim DVD<br>Additional 770W Redundant Power Supply |

**\*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.

**RS520-E8-RS8 V2**

xxS0xxxxxxxx

**RS520-E8-RS12-EV2**

xxS0xxxxxxxx

# 1.3    System specifications

The ASUS RS520-E8-RS8 V2, RS520-E8-RS12-EV2 is a 1U barebone server system featuring the ASUS Z10PR-D16 Server Board. The server supports Intel® LGA2011-3 Intel® Xeon® E5-2600 Processor v3 plus other latest technologies through the chipsets onboard.

| Model Name | | RS520-E8-RS12-EV2 | RS520-E8-RS8 V2 |
|---|---|---|---|
| Processor Support / System Bus | | 2 x Socket R3 LGA 2011-3 Intel® Xeon® Processor E5-2600 v3 Family | |
| | | QPI 6.4 / 8.0 / 9.6GT/s | |
| Core Logic | | Intel® C612 PCH Chipset | |
| Memory | Total Slots | 16 (4 Channels per CPU, 8 DIMMS per CPU) | |
| | Capacity | Maximum up to 1024 GB | |
| | Memory Type | DDR4 2133 / 1866 / 1600 / 1333 RDIMM / LR-DIMM/ NVDIMM | |
| | | **Refer to www.asus.com for the latest memory AVL update.** | |
| | Memory Size | 32GB, 16GB, 8GB and 4GB (RDIMM) | |
| | | 64GB, 32GB (LRDIMM) | |
| | | **Refer to www.asus.com for the latest memory AVL update.** | |
| Expansion Slots (follow SSI Location #) | Total PCI/PCI-E Slots | 3+1 | |
| | Slot Type | Low-profile | |
| | | 1 x PCI-E Gen3 x16 (x8 link) | |
| | | 2 x PCI-E Gen3 x8 (x8 link) | |
| | | 1 x PCI-E Gen3 x8 (x8 Gen3 link) (for OCP Mezzanine*) | |
| | | **\* Supports MCB-10G series (10 Gigabit/s series Gigabit Ethernet LAN card) (Optional)** | |
| Storage | SATA Controller | **Intel® C612** | |
| | | 9 x SATA 6 Gbps ports (8 x 2 mini-SAS connectors) | |
| | | 1 x discrete M.2 socket | |
| | | Intel® RSTe (for Windows only; supports software RAID 0, 1, 10 and 5) | |
| | | LSI® MegaRAID driver supports RAID 0, 1 and 10) (for Linux and Windows) | |
| | SAS Controller | ASUS PIKE II 3008 8-port SAS HBA card | Optional items: |
| | | ASUS PIKE II 3108 8-port SAS HW card (Default with ASUS HBA/RAID card) | ASUS PIKE II 3008 8-port SAS HBA card |
| | | | ASUS PIKE II 3108 8-port SAS HW RAID card |
| HDD Bays | I = internal A or S = hot-swappable | 12 x Hot-swap 3.5-inch HDD Bays | 8 x Hot-swap 3.5-inch HDD Bays |
| | | 2 x Hot-swap 2.5-inch SSD Bays | |
| System Fans | | 4 x System Fan (80 mm x 38 mm) | |

*(continued on the next page)*

| Model Name | | RS520-E8-RS12-EV2 | RS520-E8-RS8 V2 |
|---|---|---|---|
| Networking | LAN | 2 x Intel® I210T + 1 x Management LAN | |
| | | 1 x Mezzanine 10G dual port LAN card | |
| Graphic | VGA | Aspeed AST2400 32MB | |
| Onboard I/O Connectors / LED indicators | | 2 x RJ-45 GbE port | |
| | | 1 x RJ-45 management port | |
| | | 2 x USB 3.0 ports | |
| | | 1 x VGA port | |
| | | 1 x PS/2 keyboard/mouse combo port | |
| OS Support | | Windows® Server 2012 R2 | |
| | | Windows® Server 2012 | |
| | | Windows® Server 2008 R2 | |
| | | RedHat® Enterprise Linux | |
| | | CentOS | |
| | | Unbuntu | |
| | | VMWare | |
| | | Citrix XenServer | |
| | | **\* Support versions are subject to change without notice. Refer to www.asus.com for updates.** | |
| Management Solution | Software | ASWM Enterprise | |
| | Out of Band Remote Management | ASMB8-iKVM for KVM-over-Internet | |
| Dimension (HH x WW x DD) | | 615 mm x 444 mm x 88 mm | |
| Net Weight Kg (CPU, DRAM & HDD not included) | | 23 Kg | |
| Power Supply | | 1+1 renundant  770W 80PLUS Gold Power Supply | |
| Power Rating | | 100-127/200-240VAC, 10A/5A, 50-60Hz, Class I | |
| Environment | | Operating temperature: 10°C – 35°C | |
| | | Non operation temperature: -40°C – 70°C | |
| | | Non operation 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, and USB ports for each Node are located on the front panel.

Refer to the **1.7.1 Front panel LEDs** section for the LED descriptions.

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

**RS500-E8-RS8 V2**
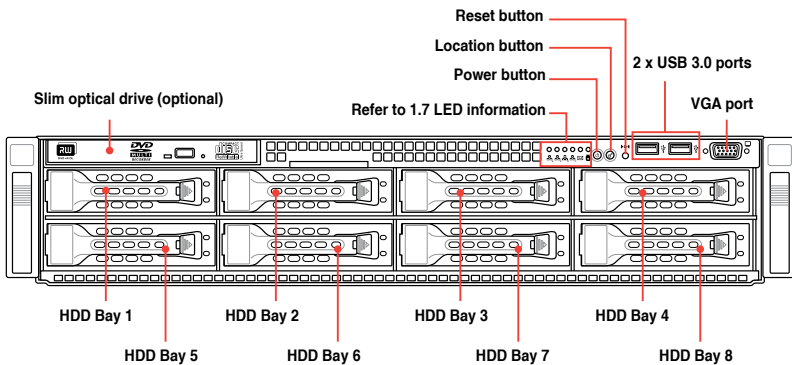


**RS520-E8-RS12-EV2**
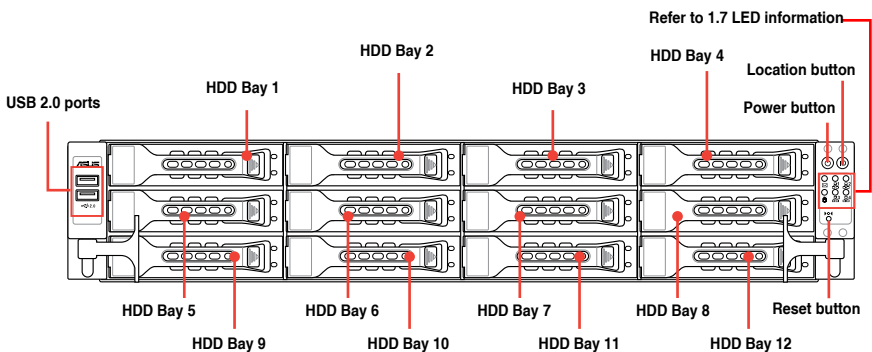
# 1.5    Rear panel features

The rear panel includes the expansion slots, system power sockets, and rear fans. The I/O shields with openings for the rear panel connectors on the motherboard are also placed in the rear panel.

**RS520-E8-RS8 V2**

PS/2 keyboard/mouse cpmbo port

LAN port 2

VGA port

Serial port (optional)

Redundant power supply

Mezzanine 10G dual-port LAN card (optional)

DM management LAN port*

Power connector

2 x USB 3.0 ports

LAN port 1

**RS520-E8-RS12-EV2**

2.5-inch SSD Bay 2

PS/2 keyboard/mouse cpmbo port

2.5-inch SSD Bay 1

LAN port 2

VGA port

Serial port (optional)

Redundant power supply

Mezzanine 10G dual-port LAN card (optional)

DM management LAN port*

Power connector

2 x USB 3.0 ports

LAN port 1

| | * | This port is for ASUS ASMB8-iKVM controller and for technicians only. |

**Asset tag**

The Asset tag is a simple but useful device that is conveniently located on the front panel of the server that you can pull out or easily slide back in. It has a piece of paper that allows you to write down important information about the server.

**RS520-E8-RS8 V2**
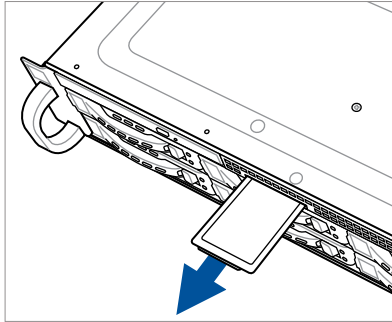
**RS520-E8-RS12-EV2**
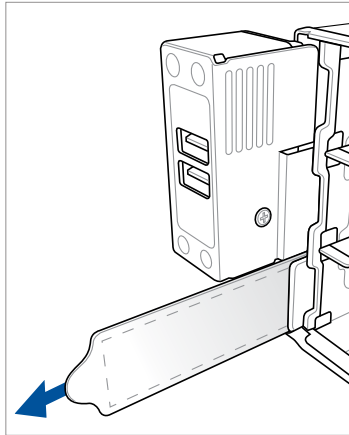
# 1.6    Internal features

The barebone server includes the basic components as shown.

**RS520-E8-RS8 V2**
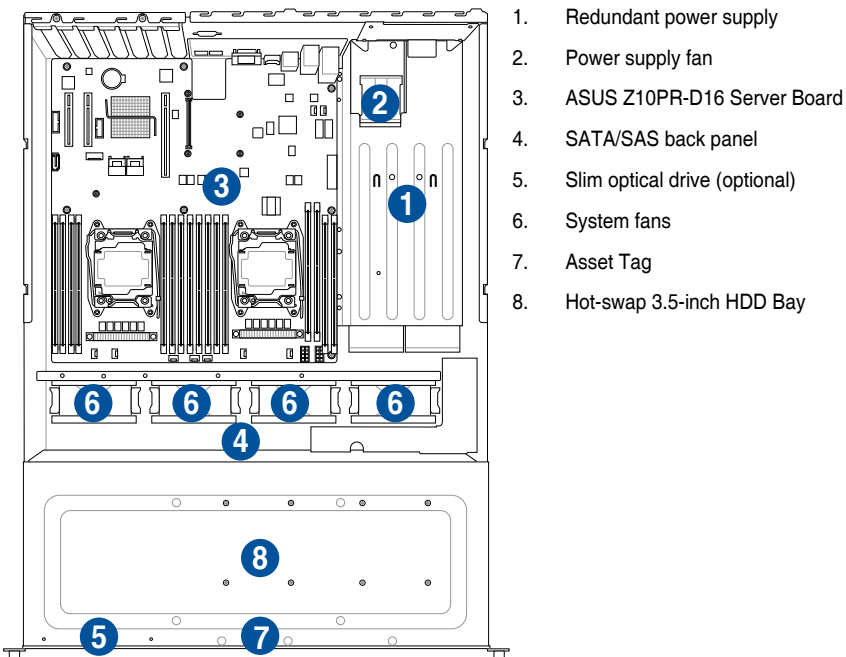


1.    Redundant power supply

2.    Power supply fan

3.    ASUS Z10PR-D16 Server Board

4.    SATA/SAS back panel

5.    Slim optical drive (optional)

6.    System fans

7.    Asset Tag

8.    Hot-swap 3.5-inch HDD Bay

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

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.

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

## RS520-E8-RS12-EV2
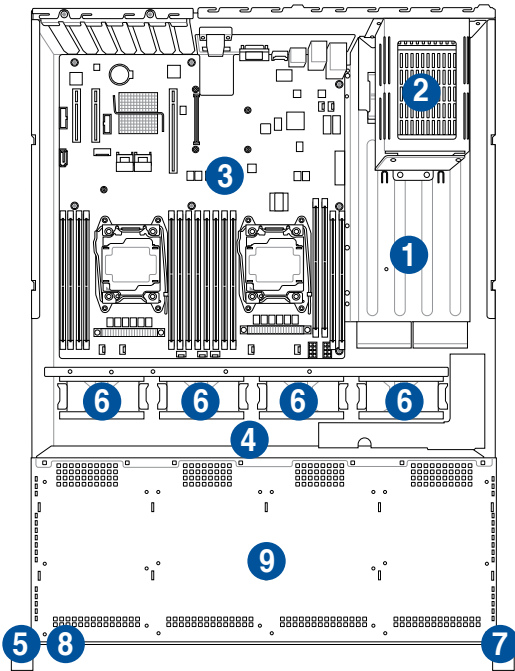


1. Redundant power supply
2. Hot-swap 2.5-inch SSD Bay
3. ASUS Z10PR-D16 Server Board
4. SAS back panel
5. Front USB I/O panel
6. System fans
7. Front LED panel
8. Asset Tag
9. Hot-swap 3.5-inch HDD Bay

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

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.

# 1.7    LED information

## 1.7.1    Front panel LEDs
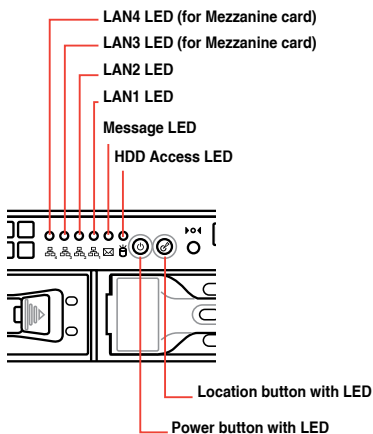
**RS520-E8-RS8 V2**                                    **RS520-E8-RS12-EV2**
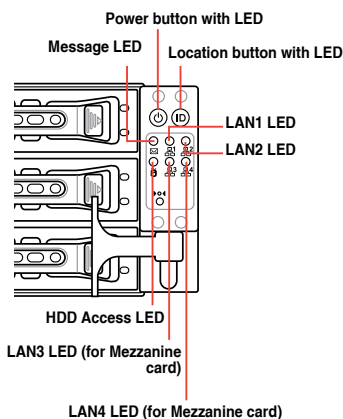


| LED | Icon | Display status | Description |
|-----|------|----------------|-------------|
| Power LED | ⏻ | ON | System power ON |
| HDD Access LED | 🖴 | OFF | No activity |
|  |  | Blinking | Read/write data into the HDD |
| Message LED | ✉ | OFF | System is normal; no incoming event |
|  |  | ON | With the onboard ASMB8-iKVM: a hardware monitor event is indicated |
| LAN LEDs | 🖧₁ | OFF | No LAN connection |
|  | 🖧₂ | Blinking | LAN is transmitting or receiving data |
|  |  | ON | LAN connection is present |
|  | 🖧₃ 🖧₄ | Blinking | LAN is transmitting or receiving data |
| Location LED | ⊘ | ON | Location switch is pressed |
|  | ID | OFF | Normal status (Press the location switch again to turn off) |

## 1.7.2    LAN (RJ-45) LEDs
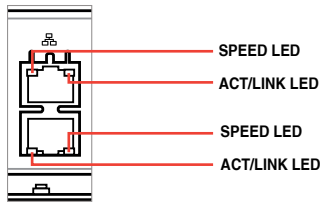


| ACT/LINK LED | | SPEED LED | |
|---|---|---|---|
| **Status** | **Description** | **Status** | **Description** |
| OFF | No link | OFF | 10 Mbps connection |
| GREEN | Linked | ORANGE | 100 Mbps connection |
| BLINKING | Data activity | GREEN | 1 Gbps connection |

## 1.7.3    HDD status LED
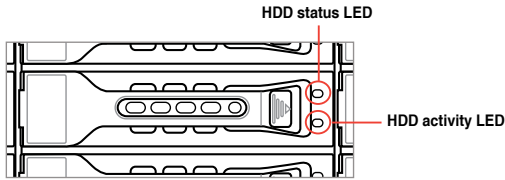


| HDD LED Description | | |
|---|---|---|
| HDD Status LED | GREEN | Power ON (HDD detected) |
| | RED | RAID disk has failed and should be swapped immediately (Error detected in the installed HDD) |
| | Blinking GREEN/RED | RAID rebuilding |
| | OFF | No HDD installed |
| HDD Activity LED | Blinking GREEN | Read/write data from/to 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

## 2.1.1 Removing the rear cover

1. Loosen the two thumbscrews on the rear panel to release the rear cover from the chassis. There is no need to remove the thunbscrews, just loose them.

**Screws**
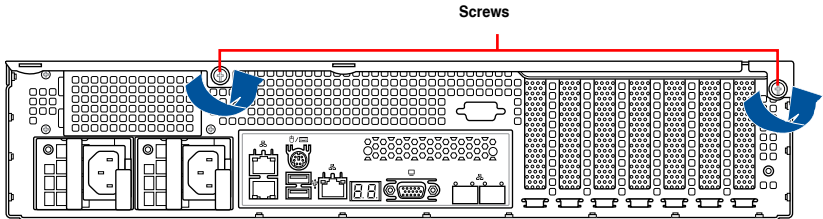
2. Firmly hold the rear cover and slide it towards the back panel for about half an inch to the front cover.

**Front cover side thumbscrew**
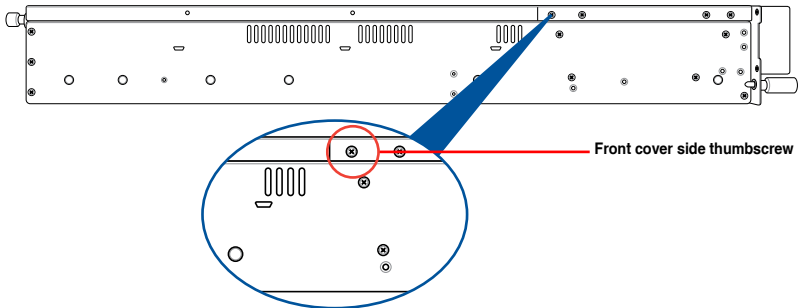
3. Remove the rear cover from the chassis.

The chassis is covered with a layer of film. Before starting up the system, remove the film to avoid overheating.
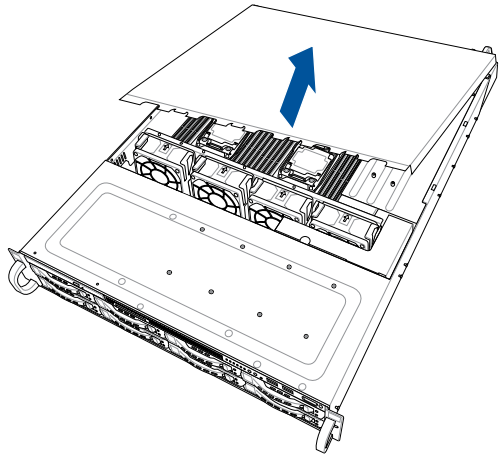
# 2.2 Central Processing Unit (CPU)

The motherboard comes with two surface mount LGA 2011-3 sockets designed for the Intel® Xeon E5-2600 v3 processor family.

Ensure that all power cables are unplugged before installing the CPU.

- 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 shoulders the repair cost only if the damage is shipment/transit-related.

- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA 2011-3 socket.

- 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 a CPU:**

1. There is a screw at the left corner on the illustration below to secure the air duct (the three spots beside are for the position of the air duct). Remove the screw with a Philip screw driver and then remove the air duct.
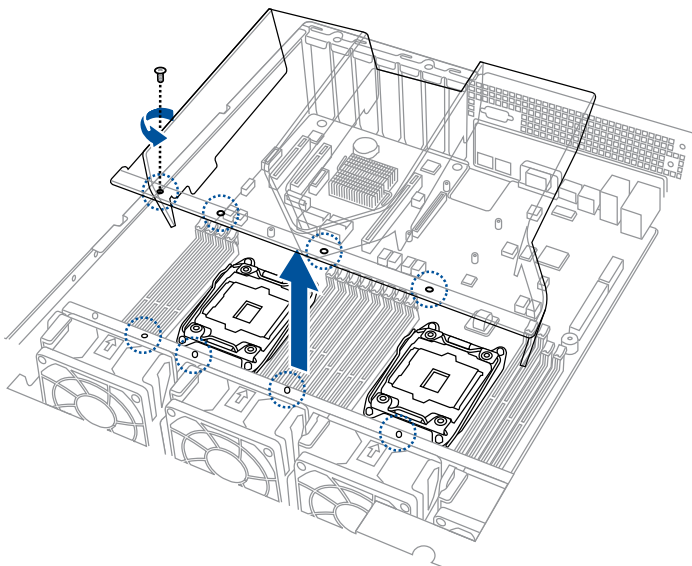
2.    Locate the CPU socket on the motherboard.



CPU2

CPU1
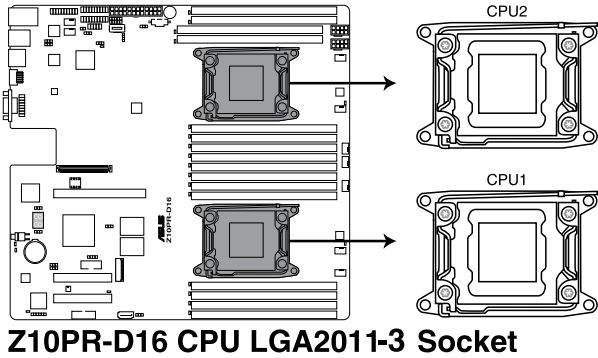
**Z10PR-D16 CPU LGA2011-3 Socket**

Before installing the CPU, ensure that the socket box is facing toward you and the triangle mark is on the lower-left position.



Triangle mark
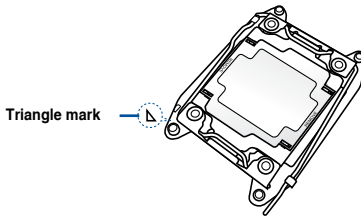
3.    Press the right load lever down (A) then move it to the left (B) until it is released from the retention tab (C).



A

B

C
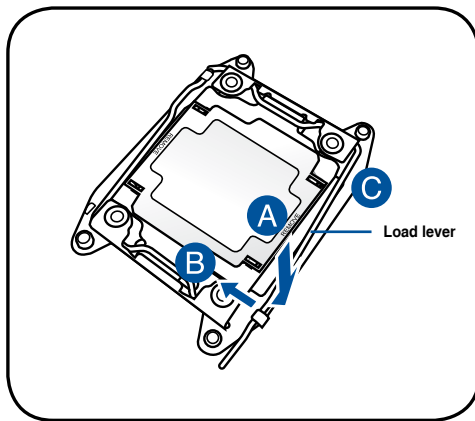
Load lever

4.    Press the left load lever (D), move it to the right (E) until it is released from the retention tab (F), then gently pull it until it is fully extended.
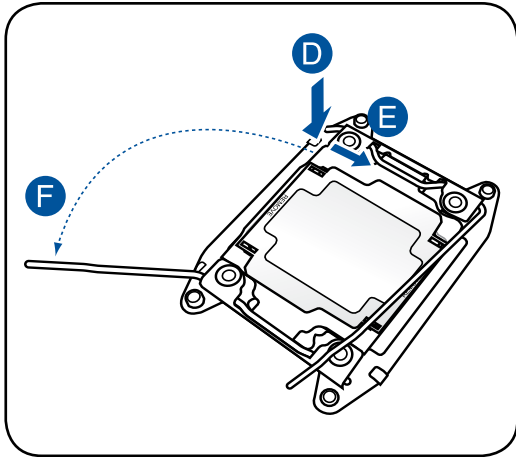


5.    Gently push the right load lever down to slightly lift the load plate (G).

Do not insert the load lever into the retention tab.

6.    Hold the edge then gently lift the load plate (H).
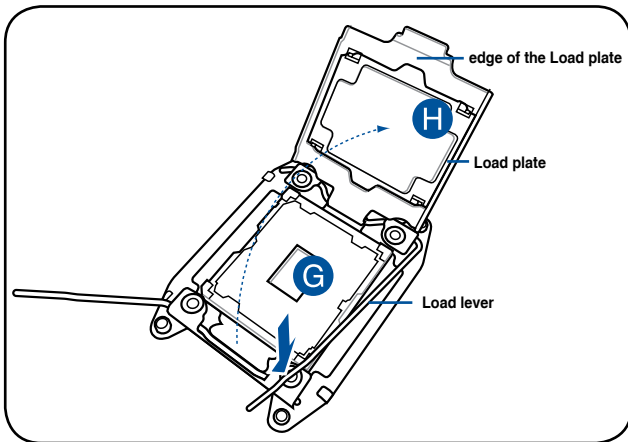
7.    Get the CPU.

8.    Align and position the CPU over the socket ensuring that the triangle mark on the CPU matches the triangle mark on the socket box.

9.    Install the CPU into the slot.

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



**Triangle mark**
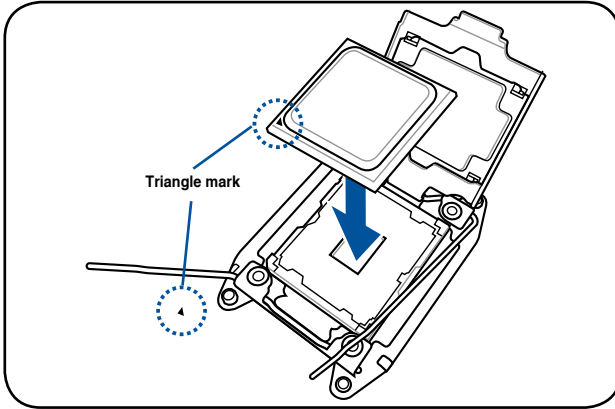
10    Gently push the load plate just enough to let it sit on top of the CPU.
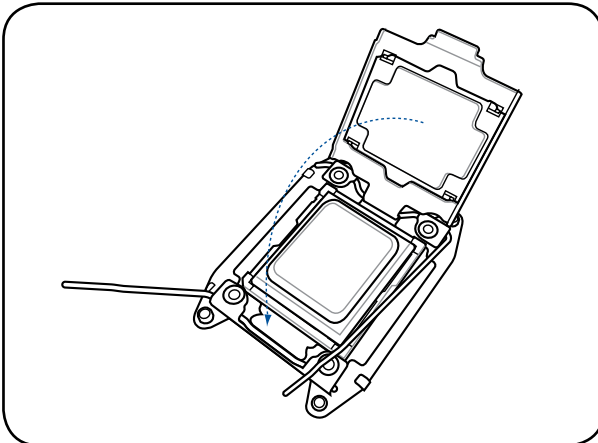
11. Push the left load lever down (I) ensuring that the edge of the load plate is fixed and tucked securely under the lever (J), then the PnP cap will eject automatically.



PnP cap
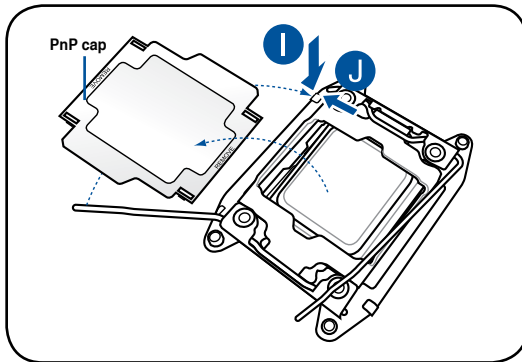
12. Push the right load lever down (K) ensuring that the edge of the load plate is fixed and tucked securely under the lever (L), then insert the right load lever under the retention tab (M).



edge of load plate

Load lever

Retention tab
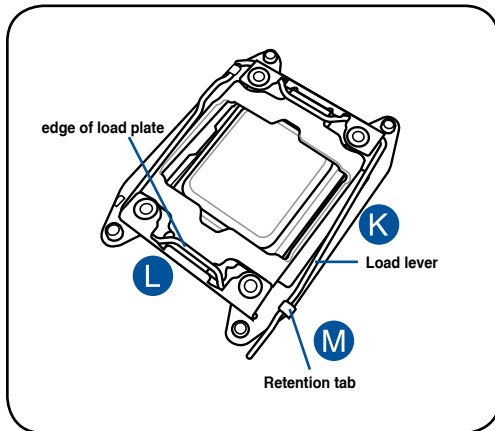
13.	Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with.



•	Ensure that the Thermal Interface Material is spread in an even thin layer.

•	Some heatsinks come with pre-applied Thermal Interface Material. If so, skip this step.
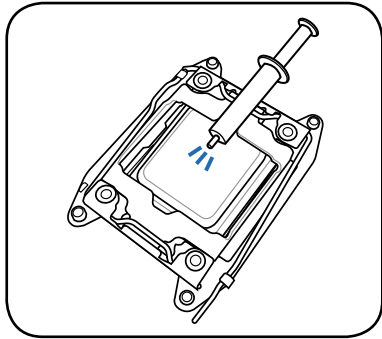
The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

14.	Install the heatsink according to the illustrations below.
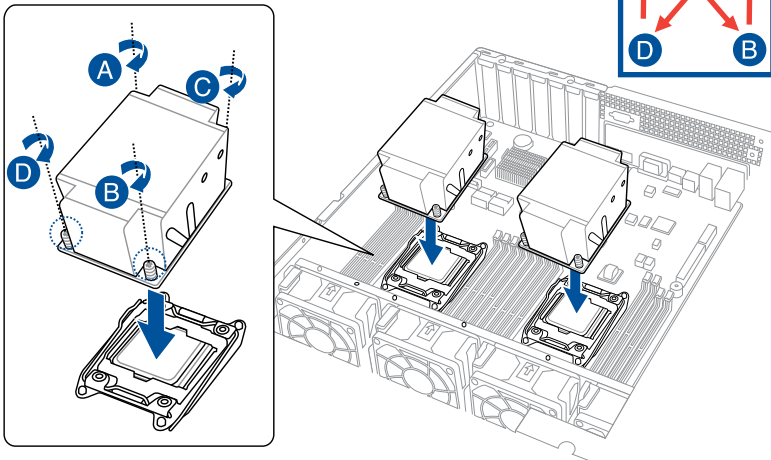


15.	Recover the air duct when the CPU and DIMMs are installed.

## 2.3 System memory

### 2.3.1 Overview

The motherboard comes with sixteen (16) Double Data Rate 4 (DDR4) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR4 DIMM sockets:
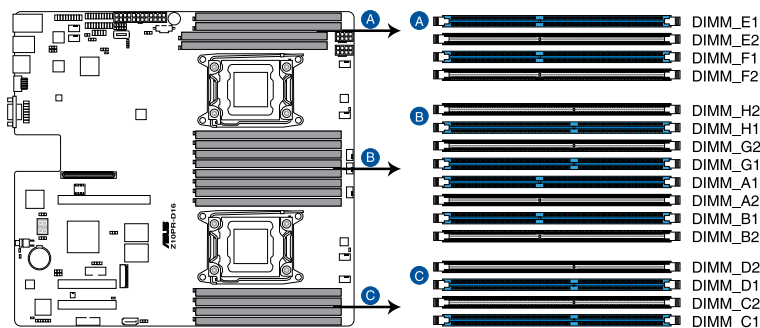


**Z10PR-D16 288-pin DDR4 DIMM sockets**

### 2.3.2 Memory Configurations

You may install 4 GB, 8 GB, 16 GB, and 32 GB RDIMMs or 32 GB, 64 GB LR-DIMMs and NVDIMM into the DIMM sockets using the memory configurations in this section.

• 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 or B2.

**Single CPU configuration**

You can refer to the following recommended memory population for a single CPU configuration.

| Single CPU configuration (must be installed on CPU1) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | DIMM | | | | | | | |
| | A2 | A1 | B2 | B1 | C2 | C1 | D2 | D1 |
| **1 DIMM** | | ✓ | | | | | | |
| **1 DIMM** | | | | ✓ | | | | |
| **2 DIMMs** | | ✓ | | ✓ | | | | |
| **4 DIMMs** | | ✓ | | ✓ | | ✓ | | ✓ |
| **8 DIMMs** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

**Dual CPU configuration**

You can refer to the following recommended memory population for a dual CPU configuration.

| Dual CPU configuration | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DIMM (CPU1) | | | | | | | | DIMM (CPU2) | | | | | | | |
| | A2 | A1 | B2 | B1 | C2 | C1 | D2 | D1 | E2 | E1 | F2 | F1 | G2 | G1 | H2 | H1 |
| **2 DIMMs** | | ✓ | | | | | | | | ✓ | | | | | | |
| **4 DIMMs** | | ✓ | | ✓ | | | | | | ✓ | | ✓ | | | | |
| **8 DIMMs** | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ |
| **12 DIMMs** | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ |
| **16 DIMMs** | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## 2.3.3    Installing a DIMM

Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

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

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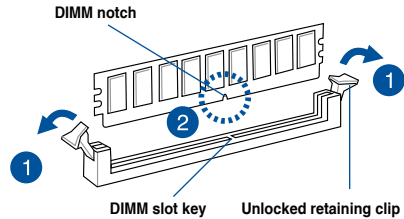
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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 clips snaps back into place.

Ensure that the DIMM is sitting firmly on the DIMM slot.
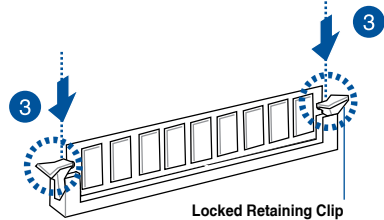
Always insert the DIMM into the socket VERTICALLY to prevent DIMM notch damage.

## 2.3.4    Removing a DIMM

1.    Simultaneously press the retaining clips outward to unlock the DIMM.

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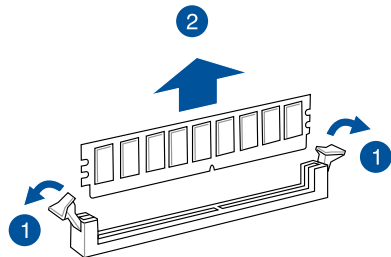
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it flips out with extra force.

# 2.4 Hard disk drives

The system supports 8 (RS520-E8-RS8 V2) or 12 (RS520-E8-RS12-EV2) hot-swap 3.5-inch SATAII/SAS hard disk drives. Two hot-swap 2.5-inch hard disk drives are supported on the rear panel of RS520-E8-RS12-EV2. The hard disk drive installed on the drive tray connects to the motherboard SATAII/SAS ports via SATAII/SAS backplane.

## 2.4.1 Installing a 3.5-inch HDD

To install a 3.5-inch HDD:

1. Press the spring lock to release to the tray lever.

2. Firmly hold the tray lever then pull the drive tray out of the bay.



**Spring lock**

**Tray lever**
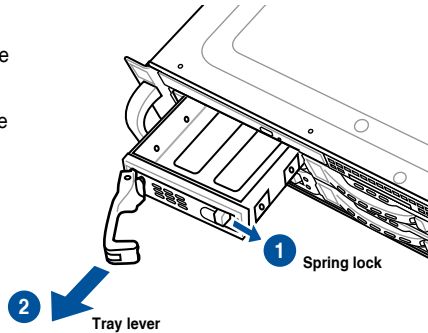
3. Slide the HDD into the drive tray with the SATA port facing towards the back of the expansion slot.

   Ensure that the screw holes on the HDD matches the screw holes on the tray.
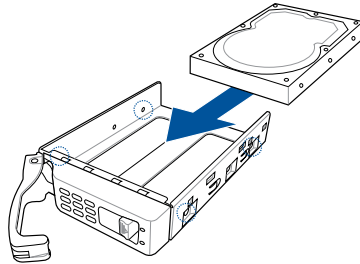


4. Secure the HDD in the HDD tray with four screws (two on each side).
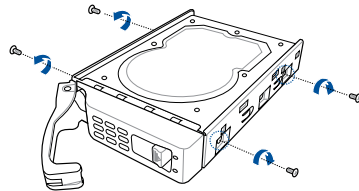
5.    Insert the drive tray and HDD assembly
      all the way into the depth of the bay ( **A**
      ) and push the tray lever until it clicks
      and secures the drive tray in place ( **B**
      ). The drive tray is correctly placed when
      its front edge aligns with the bay edge.
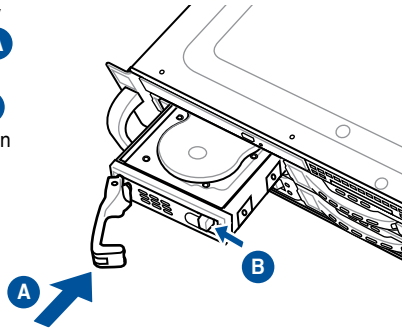


When installed, the SATA II/SAS connector on the drive connects to the SATA II/SAS interface on the backplane.

6.    Repeat steps 1 to 5 to install other 3.5-inch SATA II/SAS HDDs.

## 2.4.2    Installing a 2.5-inch SSD (RS520-E8-RS12-EV2 only)

To install a 2.5-inch SSD:

1.    Press the spring lock to release the tray lever.



Tray lever

Spring lock
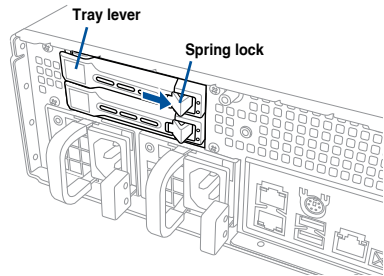
2.    Firmly hold the tray lever then pull the
      drive tray out of the bay.

3.  Release the screws on each side of the drive tray to release the drive tray metal beam.



support beam
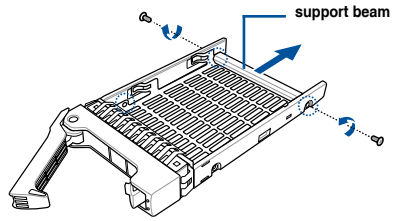
4.  Orient and place the SSD into the tray.

    Ensure that the SSD is fitted firmly inside the drive tray and that the four screws of the SSD matches the four screws holes of the drive tray.



SSD screw hole

Drive tray screw hole
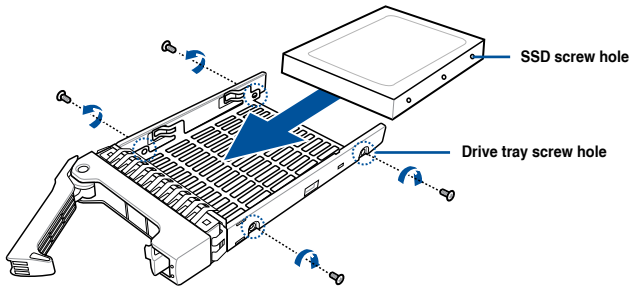
5.  Carefully insert the drive tray and push it all the way to the depth of the bay ( **A** ).

    Lock the secure tab to secure the drive tray in place ( **B** ).
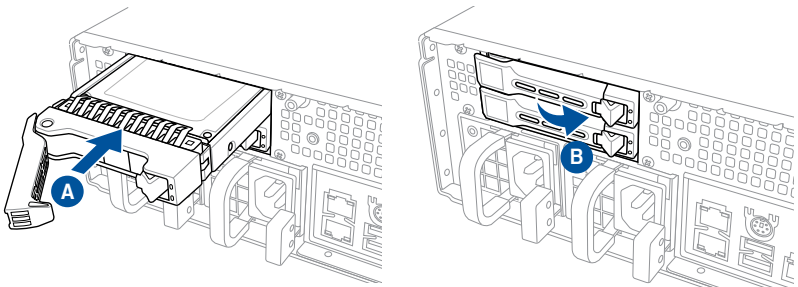


When installed, the connector on the drive connects to the connector on the backplane.

6.  Repeat steps 1 to 5 to install other 2.5-inch SSDs.

# 2.5 Expansion slot

The barebone server comes with two riser card brackets allowing you to install Low-Profile PCI Express expansion cards.

> The steps below are only for RS520-E8-RS8 V2.

## 2.5.1 Installing an expansion card to the PCI-E slot

To install an expansion card:

1. Remove two screws on the bracket and put it aside.
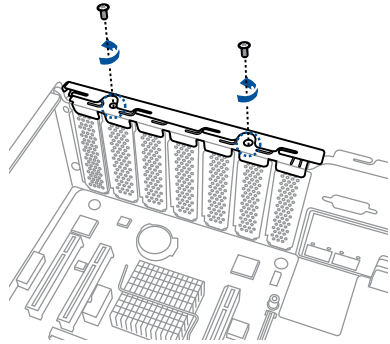
2. Remove the screws that secure the metal cover to the chassis.
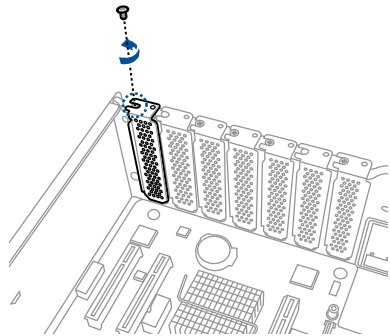
3. Remove the metal cover then set it aside for future use.
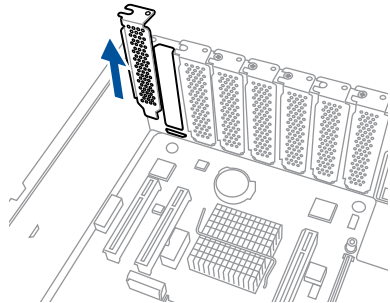
4.  Insert the expansion card into the PCI-E slot. Ensure that the golden fingers are totally inserted into the slot. Secure it with the screws removed before.
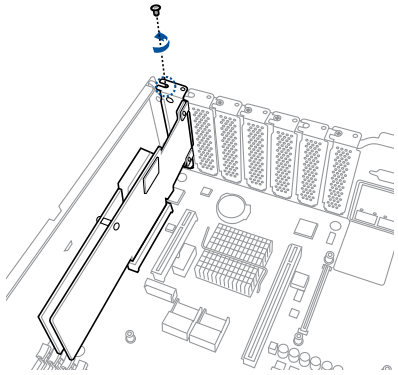
5.  Reinstall the bracket. Secure it with two screws to complete the installation.
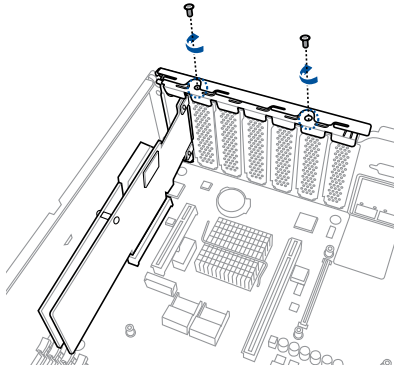
## 2.5.2    Installing an ASUS PIKE II card (RS520-E8-RS8 only)

You can install an ASUS PIKE II card on the provided PCI-E slot onboard.

To install an ASUS PIKE II card:

1.    Remove the default cable from the motherboard and the backplane.
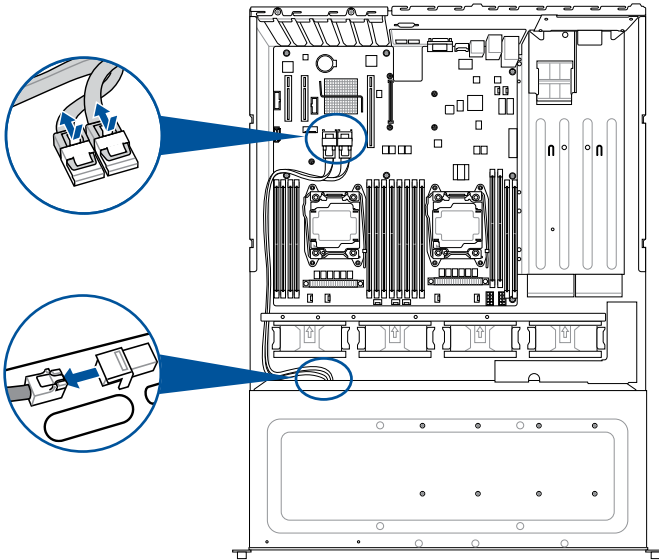


2.    Remove two screws on the bracket and put it aside.
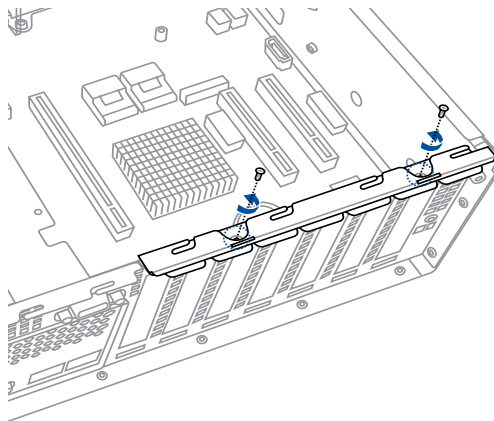
3    Remove the bracket and remove the screws that secure the metal cover to the chassis.
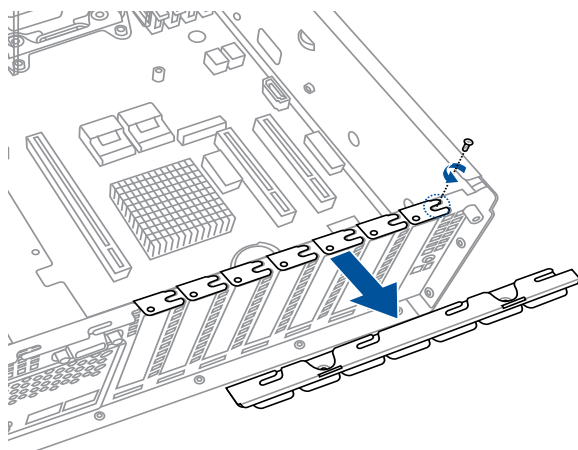


4.    Remove the metal cover then set it aside for future use.
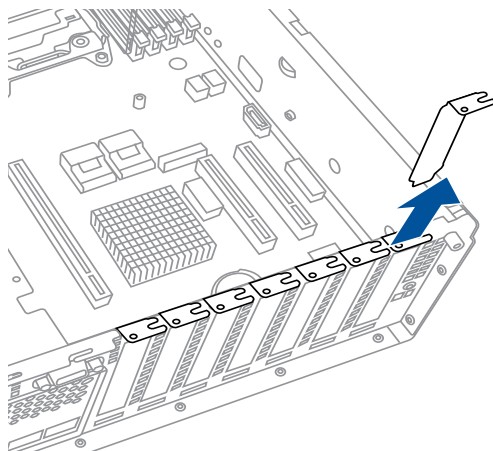
5. Prepare your ASUS PIKE II card.

6. Insert the expansion card into the PCI-E slot. Ensure that the golden fingers are totally inserted into the slot.
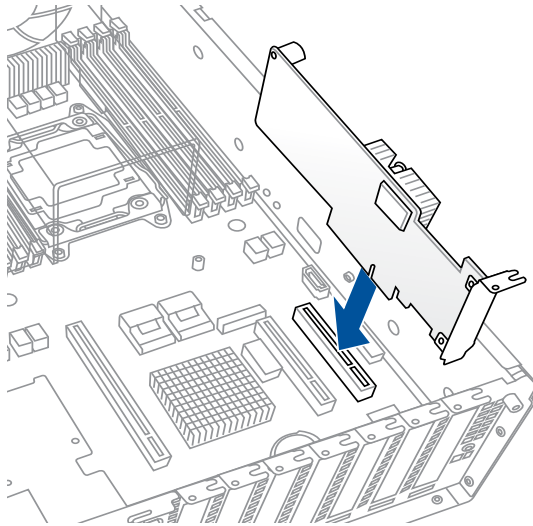


7. Secure the ASUS PIKE II card with the screw removed before and reinstall the bracket, then connect the two mini-SAS HD cables to the ASUS PIKE II card.



connect to ASUS PIKE II connector 2

connect to ASUS PIKE II connector 1
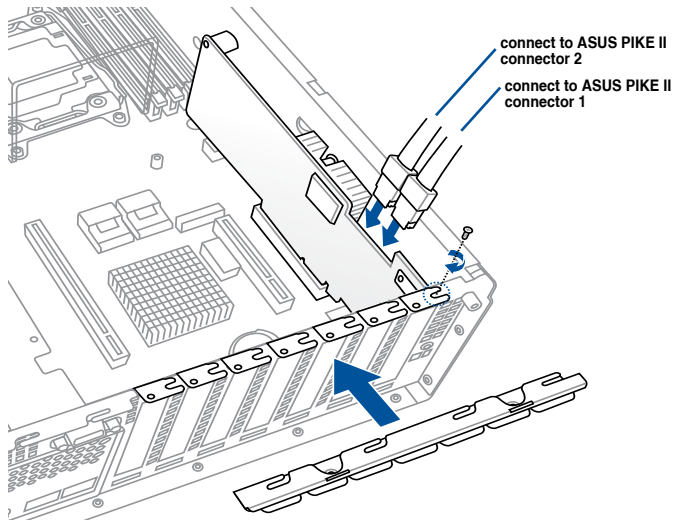
8. Secure the bracket with the two bracket screws removed before.
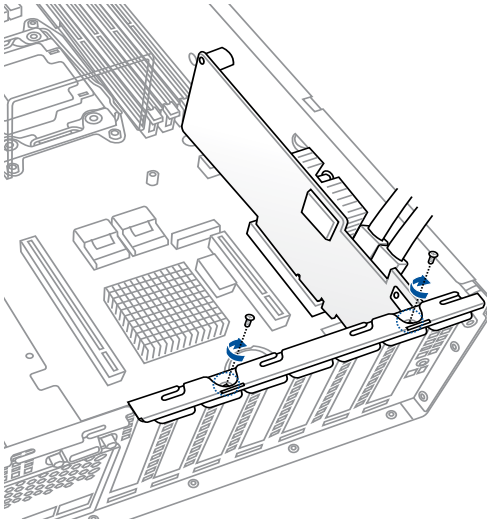


9. Connect connector 1 on the ASUS PIKE II card to connector 1 on the backplane and connector 2 on the ASUS PIKE II card to connector 2 on the backplane using two mini-SAS HD cables.



Backplane connector 1

Backplane connector 2
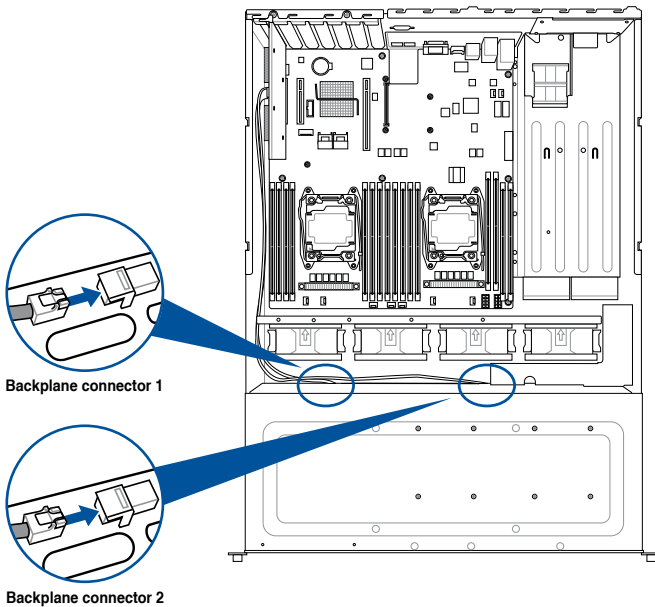
## 2.5.3    Installing an M.2 expansion card

You can install an M.2 expansion card on the provided M.2 slot onboard.

To install an M.2 expansion card:

1.    Remove the screw on the M.2 socket and put it aside.

2.    Prepare your M.2 expansion card.

3.    Align and insert the M.2 card into the M.2 slot onboard as shown.
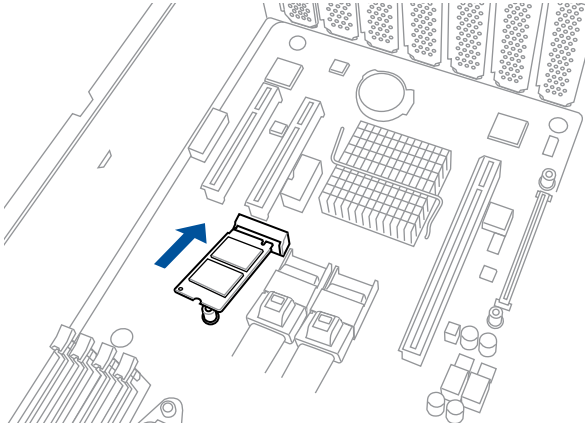


4.    Secure the M.2 card with a screw to complete the installation.
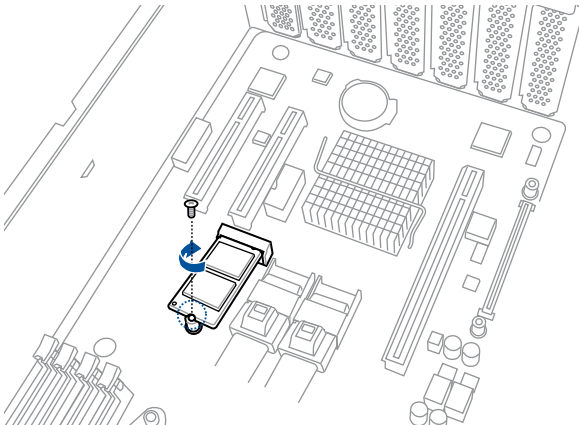


- Please pay attention when removing the screw, the stand screw might be removed together with it.

- Ensure that the M.2 card is positioned between the screw and the stand screw before securing it.

## 2.5.4    Installing a Mezzanine card

You can install a supported Mezzanine card on the onboard slot.

To install a Mezzanine card:

1.    Remove the slot bay from the Mezzanine card expansion slot.
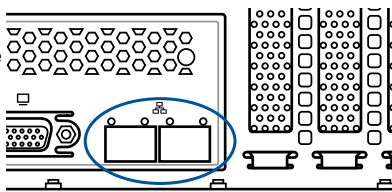
2.    Prepare your Mezannine card and the signal cable. Connect the signal transmission end (white) to the AUXLED_CON header on the card.

AUXLED_CON1
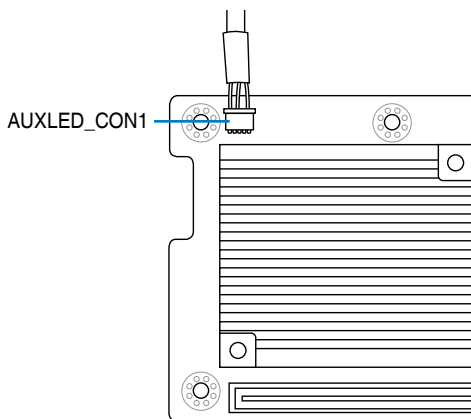
3.    Match and insert the four (4) screw holes on the Mezzanine card into the four (4) stand screws on the chassis, then insert the Mezzanine card to the slot on the motherboard.
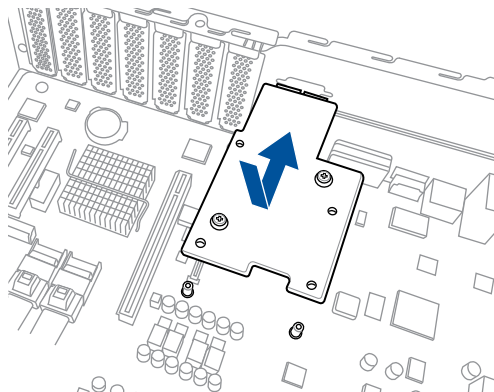
4.    Secure the Mezzanine card with the four (4) bundled screws.
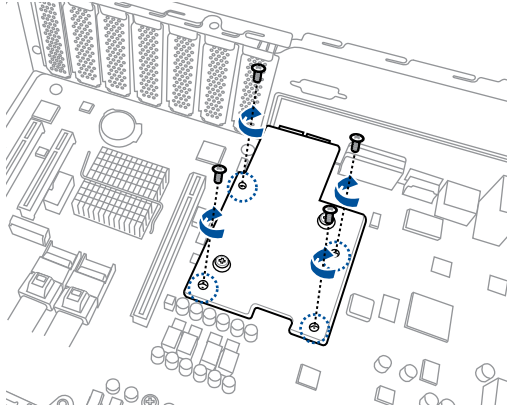


5.    Connect the signal end (black) to the OCP_LED1 header on the motherboard.
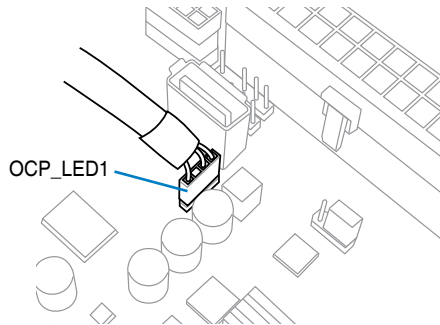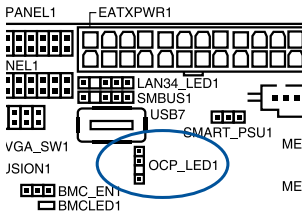


The two ends of the signal cable are different in size and color for easy recognition. Please refer to your exact cable.

## 2.5.5    Configuring an expansion card

After installing the expansion card, configure 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.


**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.**

# 2.6 Cable connections

- The bundled system cables are pre-connected before shipment. You do not need to disconnect these cables unless you need to remove pre-installed components to install additional devices.

- Refer to Chapter 4 for detailed information on the connectors.
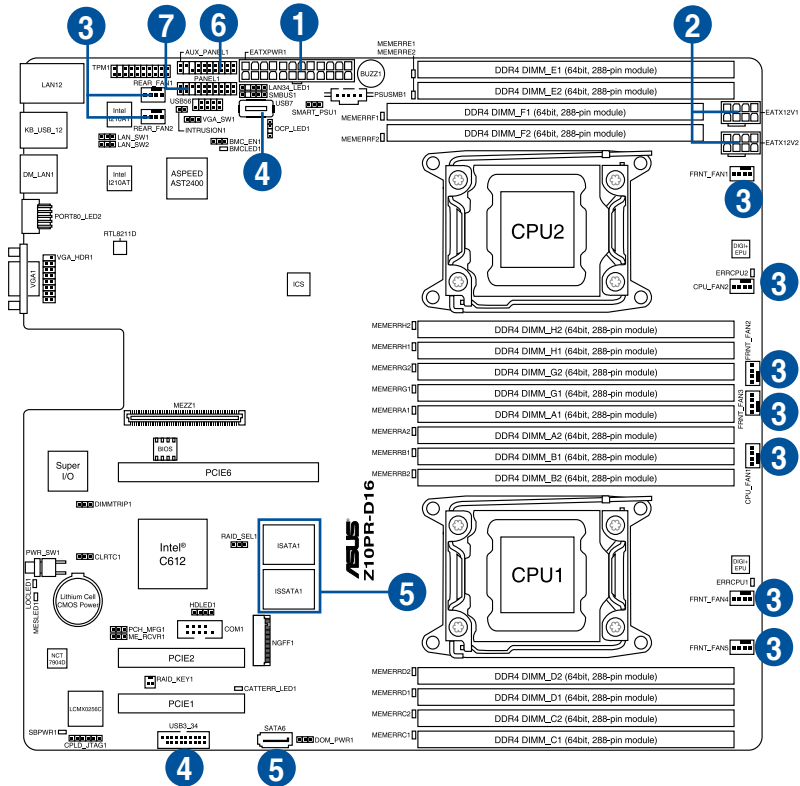


## Standard cables connected to the motherboard

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 ports 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)

## 2.7 Backplane cabling

**RS520-E8-RS8 V2**



**connect to the 8-pin power connector**

**connect to mini-SAS HD connectors 1 and 2 on the backplane. With two mini-SAS HD cables connected, a total number of 8 SAS/SATA HDDs can be supported (SAS/SATA expander on the rear panel).**

MSAS_HD1

BP8LX12G-35-R20E

MSAS_HD2

# RS520-E8-RS12-EV2



**connect to the 8-pin power connector**

**connect to mini-SAS HD connectors 1 and 2 on the backplane. With two mini-SAS HD cables connected, a total number of 12 SAS/SATA HDDs can be supported (SAS/SATA expander on the rear panel).**

MSAS_HD1

MSAS_HD2

EP12EX12G-35-R2DF
MSAS_HD3

**Reserved for future expansions**

AUX_PANEL1

PIN 1

① ② ③

③ ⑥ ④

| | | |
|---|---|---|
| +3VSB_SB | NC | +3V_SCL |
| | GND | +3V_SDA |
| AUX_LOCLED1# | AUX_BMCLOCBTN# | LAN1LINK# |
| AUX_LOCLED2# | AUX_BMCLOCBTN# | LAN1ACT# |
| | AUX_SMBCLOCKED1# | LAN2ACT# |
| | AUX_LOCLED2# | LAN2LINK# |

**Z10PR-D16 Auxiliary panel connector**

**BPSMB1: connect to the SMB(6-1 pin FPSMB) connector on the auxiliary panel**

# 2.8     Removable/optional components

This section explains how to install optional components into the system and covers the following components:

1.     System fans

2.     Slim type optical drive (optional)

3.     Redundant power supply module (optional)

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

## 2.8.1     System fans

To uninstall the system fans:

1.     Hold two levers on both sides of the fan, then lift the fan to remove.

2.     Repeat steps 1 to uninstall the other system fans.
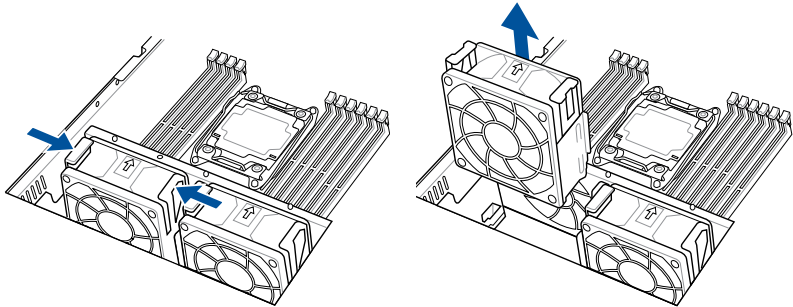
To reinstall the system fans

1.     Insert the fan into the fan cage. The airflow directional arrow on the fan side should point towards the CPU heatsink.
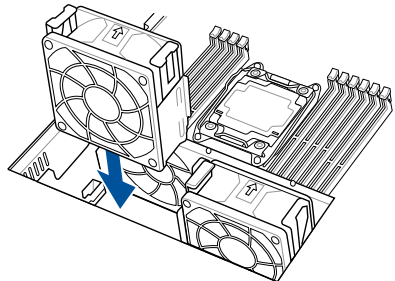
## 2.8.2    Slim optical drive (optional, for RS520-E8-RS8 V2 only)

To install the optional optical drive:

1.    Remove 2 screws that secure the slim optical drive cover to the chassis.
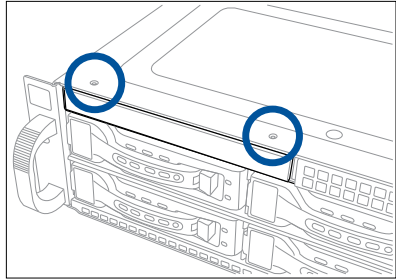
2.    Secure two screws on each side of the optical drive to secure it into the expansion bracket.
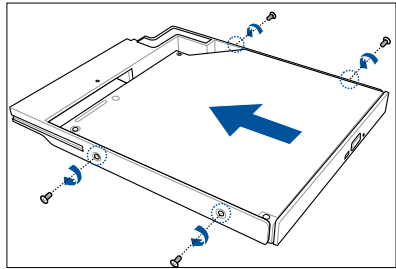
3.    Place the slim optical drive into the expansion bay.

4.    Ensure the expansion tray is completely inserted into the bay. (The drive tray is correctly placed when its front edge aligns with the bay edge.)
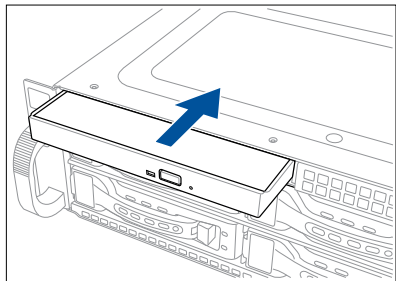
To remove or uninstall the slim type optical disk drive:

1.  Locate the optical drive eject latch at the back of the optical drive bay.
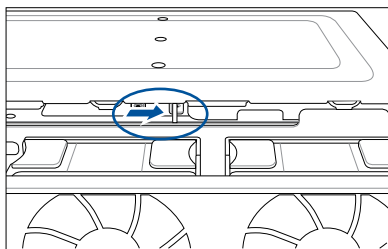
2.  Press the optical drive eject latch to the right then push the slim type optical drive towards the front panel.
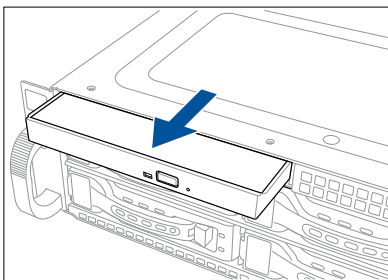
## 2.8.3    Redundant power supply module

To replace a failed redundant power supply module:

1.    Press the secure tab to the left using your thumb, and hold the power supply module lever using other fingers.
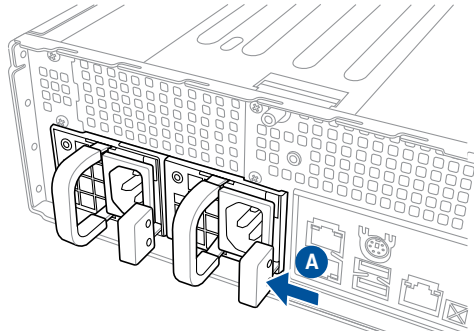
2.    Pull the power supply module out of the system chassis ( **B** ).
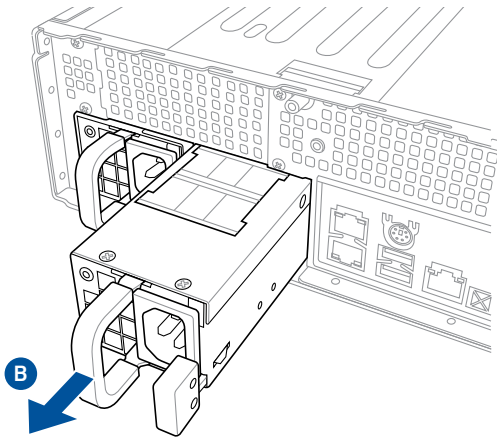
3.    Insert the replacement power supply module into the chassis.

# 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:

**Set of screws**

**Fixing latches**  **Rail components (screws included)**

**Latch screws**  **Rail Washers**  **Rail screws**
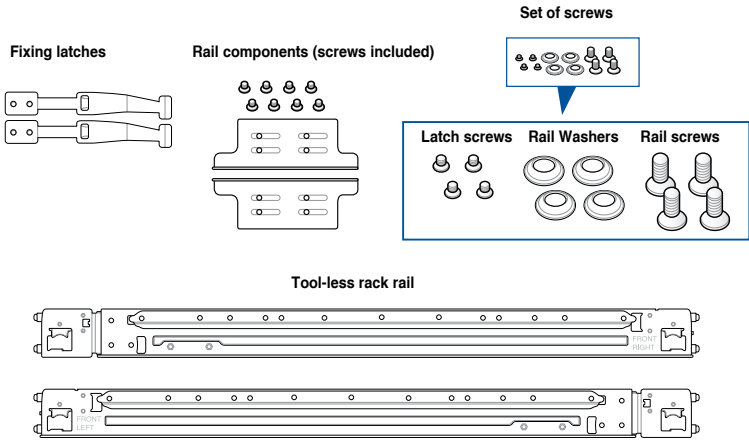
**Tool-less rack rail**

## 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.
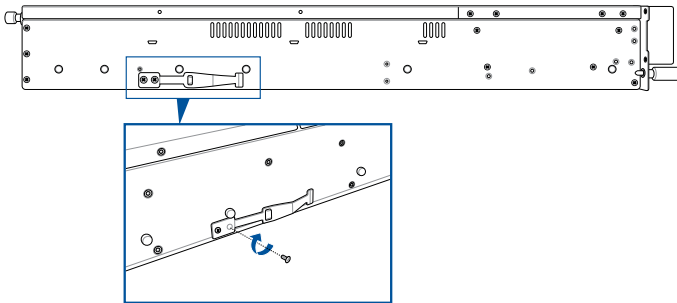
2. Select a desired space and place the appropriate rack rail (left and right) on opposite positions on the rack.

A 1U space is consists of three square mounting holes with two thin lips on the top and the bottom.
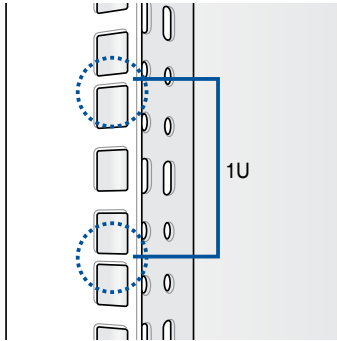


3. Secure the rail components to the rail using the bundled screws.

4 Press the spring lock ( A ) then insert the studs into the selected square mounting holes on the rack post.

5. 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.

6. (Optional) Use the rail screw and rail washer ( B ) that comes with the kit to secure the rack rail to the rack post.

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

Ensure that the installed rack rails (left and right) are aligned, secured, and stable in place.
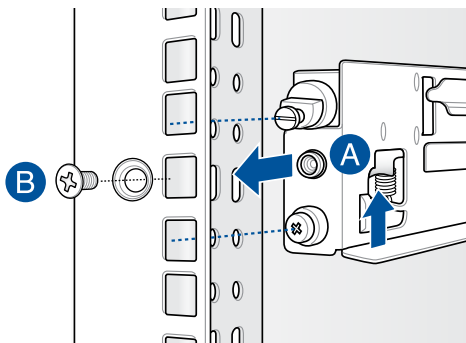


8. Lift the server chassis and insert into the rack rail.

- 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.

## RS520-E8-RS8 V2 Front View
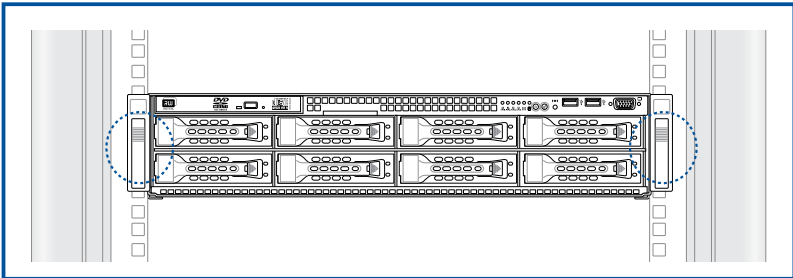


## RS520-E8-RS12-EV2 Front View
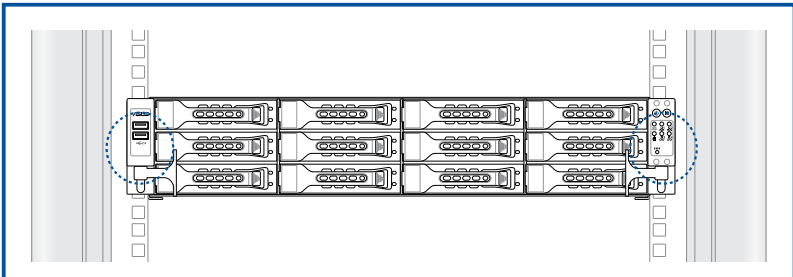
# Motherboard Information

4

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

# 4.1 Motherboard layout
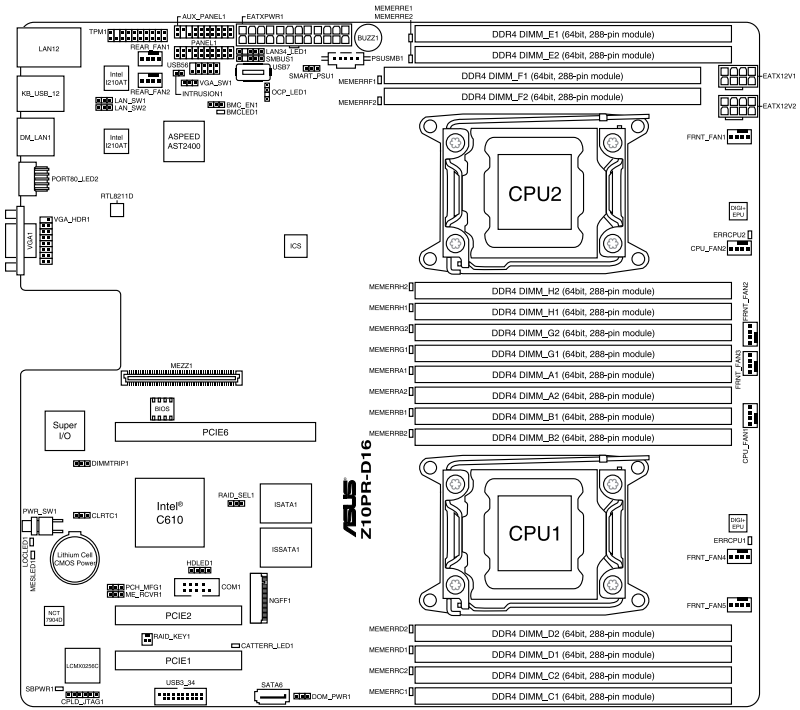


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# 4.2    Jumpers

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 includes 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 the default pins 1–2 to pins 2–3. Keep the cap on pins

      2–3 for about 5 to 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.

DO NOT remove the cap on CLRTC jumper default position except when clearing the RTC RAM. 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)
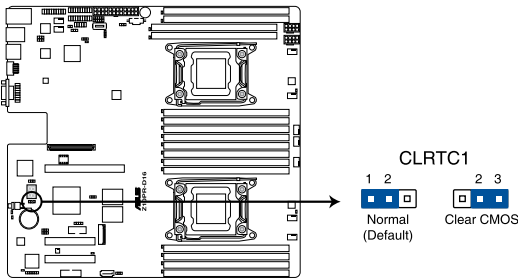
**Z10PR-D16 Clear RTC RAM**

## 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.



**Z10PR-D16 VGA setting**
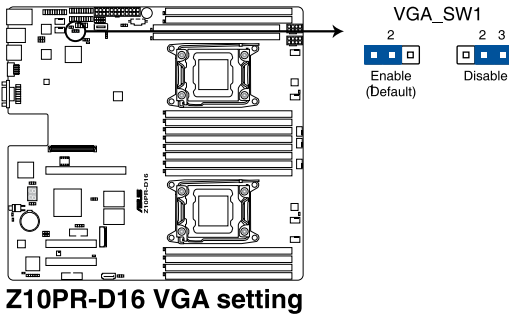
## 3. LAN controller setting (3-pin LAN_SW1, LAN_SW2)

These jumpers allow you to enable or disable the onboard LAN_SW1 or LAN_SW2. Set to pins 1–2 to activate the Gigabit LAN feature.



**Z10PR-D16 LAN setting**
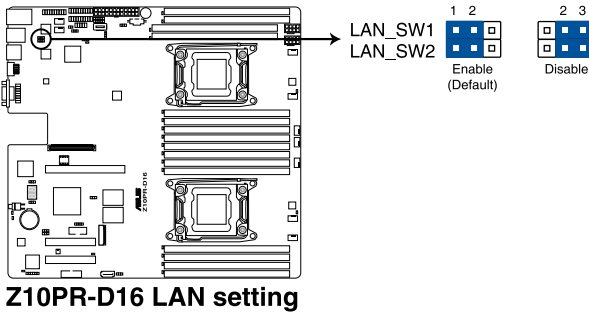
4.    **ME firmware force recovery setting (3-pin ME_RCVR1)**

This jumper allows you to force Intel® Management Engine (ME) boot from recovery mode when ME becomes corrupted.

ME_RCVR1

| 1 2 | | 2 3 |
| Normal (Default) | | ME Recovery |
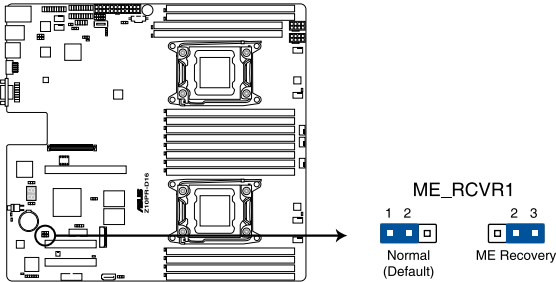
**Z10PR-D16 ME recovery setting**

5.    **DDR4 thermal event setting (3-pin DIMMTRIP1)**

This jumper allows you to enable or disable DDR4 DIMM thermal sensing event pin.

DIMMTRIP1

| 1 2 | | 2 3 |
| Enable (Default) | | Disable |
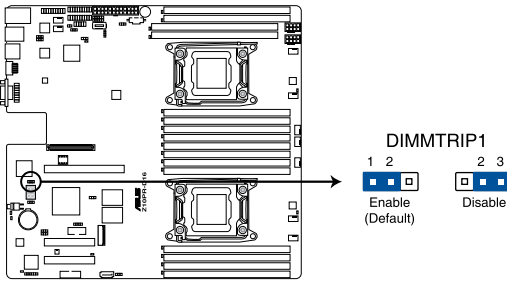
**Z10PR-D16 Thermaltrip setting**

6.    **RAID configuration utility selection (3-pin RAID_SEL1)**

This jumper allows you to select the RAID configuration utility to use when you create disk arrays. Place the jumper caps over pins 1–2 to use the third party software LSI MegaRAID software RAID Configuration Utility; otherwise, place the jumper caps to pins 2–3 to use the Intel® Rapid Storage Technology enterprise SATA Option ROM Utility.

RAID_SEL1

3ʳᵈ Party (Default)    Intel

**Z10PR-D16 RAID setting**
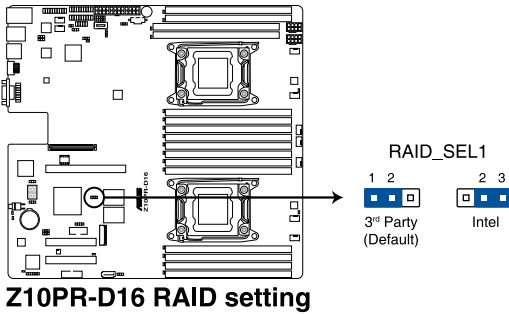
7.    **BMC Setting (3-pin BMC_EN1)**

This jumper allows you to enable or disable the Baseboard Management Controller (ASMB8).

BMC_EN1

Enable (Default)    Disable

**Z10PR-D16 BMC setting**
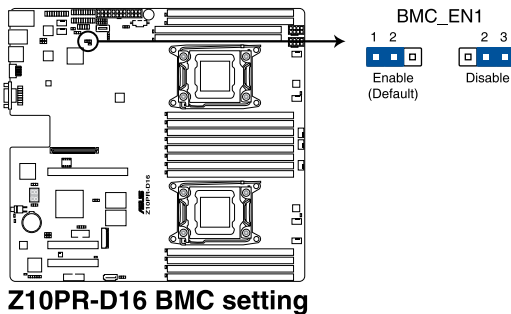
## 4.3 Internal connectors

**1. Serial ATA 6.0 / 3.0 Gbps connector (7-pin SATA6 [Light Blue])**

Supported by the Intel® 610 series Chipset, this connector is for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6 Gbps of data transfer rate.

**Z10PR-D16 SATA connectors**
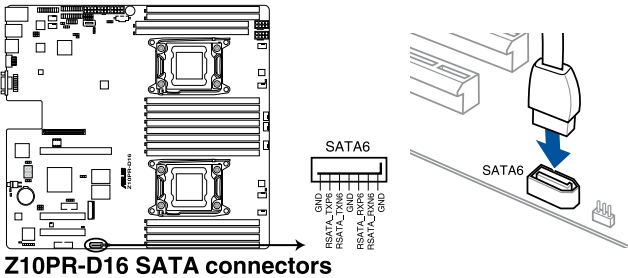
The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

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

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

**Z10PR-D16 Power supply SMBus connector**
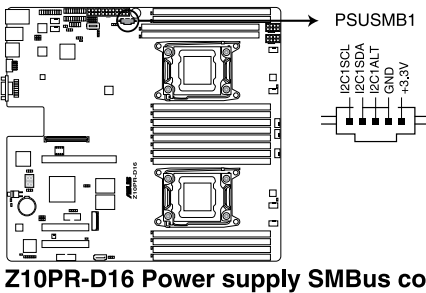
This connector functions only when you install the ASUS ASMB8.

**3. USB 2.0 connector (10-1 pin USB56; USB7)**

These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB56. These USB connectors comply with USB 2.0 specification that supports up to 480 Mb/s connection speed.
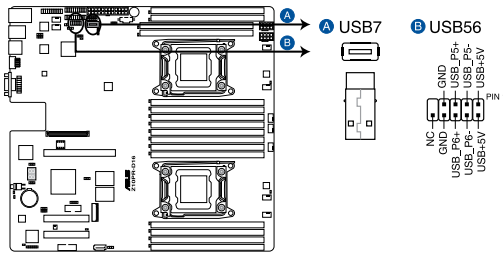
**Z10PR-D16 USB 2.0 connectors**

**4. USB 3.0 connector (20-1 pin USB3_34)**

This connector allows 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 5Gbps, faster charging time for USB-chargeable devices, optimized power efficiency, and backward compatibility with USB 2.0.
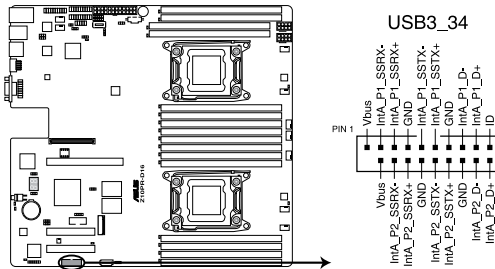
**Z10PR-D16 USB 3.0 connector**

5. **CPU, front, and rear fan connectors (4-pin CPU_FAN1, CPU_FAN2, FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4, FRNT_FAN5, REAR_FAN1, REAR_FAN2)**

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.



**Z10PR-D16 FAN connectors**
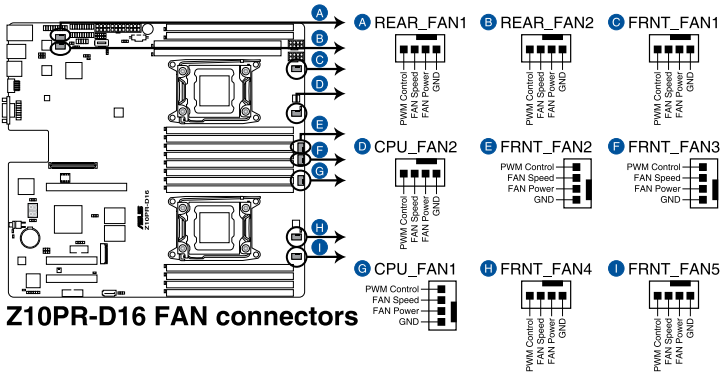
6. **LAN Activity LED connector (5-1 pin LAN34_LED1)**

These leads are for 10G LAN activity LEDs on the front panel. Connect the LAN LED cable to the backplane for LAN activity indication.



**Z10PR-D16 LAN3 & LAN4 LED**
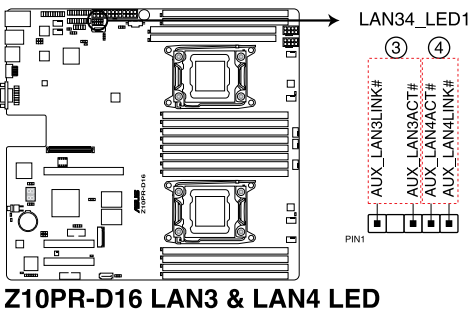
**7. Serial port connector (10-1 pin COM1)**

This connector is for the serial COM port. 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.
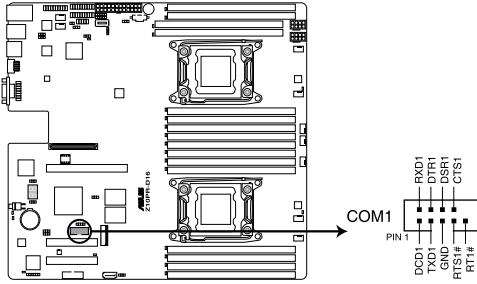
**Z10PR-D16 Serial port connector**

COM1

RXD1
DTR1
DSR1
CTS1

PIN 1

DCD1
TXD1
GND
RTS1#
RT1#

**8. Trusted Platform Module connector (20-1 pin TPM1)**

This connector supports a Trusted Platform Module (TPM) 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.
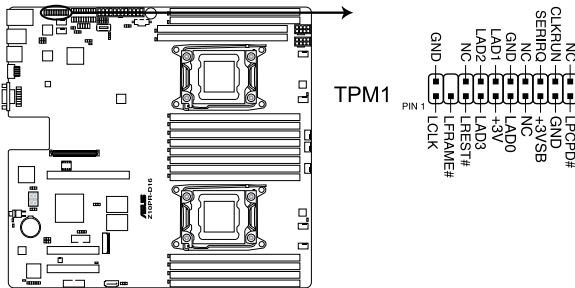
**Z10PR-D16 TPM connector**

TPM1

PIN 1

GND
NC
LAD2
LAD1
GND
SERIRQ
CLKRUN
NC

LCLK
LFRAME#
NC
LAD3
LAD0
+3V
NC
+3VSB
GND
LPCPD#

9.  **ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1, 8-pin EATX12V2)**

    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.
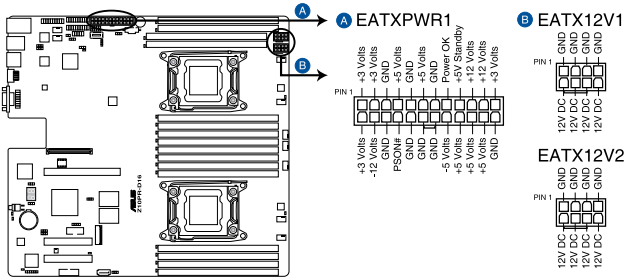


**Z10PR-D16 ATX power connectors**

**10.    System panel connector (20-1 pin PANEL1)**

This connector supports several chassis-mounted functions.
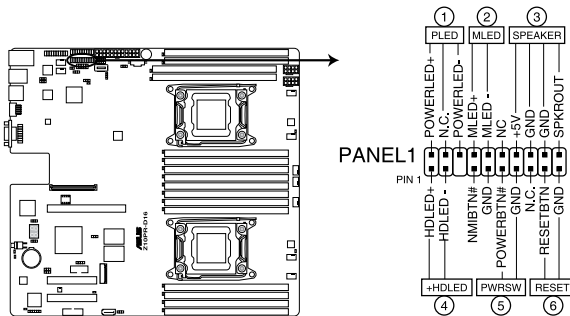


**Z10PR-D16 System panel connector**

**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 HD 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.

**11. 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.
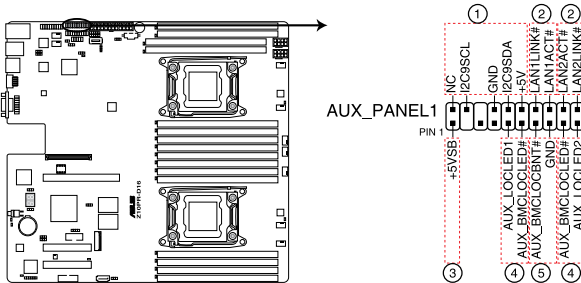
**Z10PR-D16 Auxiliary panel connector**

**1. Front panel SMB (10-2 pin FPSMB)**

These connectors are for the front panel SMBus cable.

**2. LAN activity LED (2-pin LAN1_LINKACTLED, LAN2_LINKACTLED)**

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

**3. Locator LED (2-pin LOCATORLED1, LOCATORLED2)**

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

**4. Locator Button/Switch (2-pin LOCATORBTN#)**

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

**12.  VGA connector (10-1 pin VGA_HDR1)**

This connector supports the VGA High Dynamic-Range interface.

VGA_HDR1

DDC_CLK
V_SYNC — H_SYNC
DDC_DATA
GND — +5V
GND — GND
GND — GND
— Blue
Green — Red

PIN 1
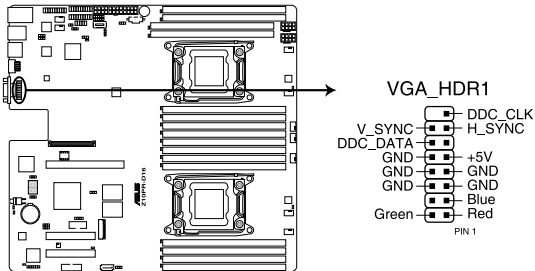
**Z10PR-D16 Internal VGA connector**

**13.  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.

NC
ADD_IN_CARD-
ADD_IN_CARD-
NC

HDLED1
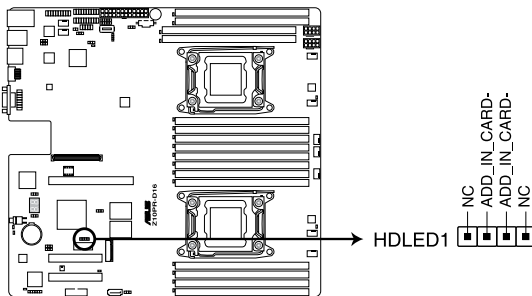
**Z10PR-D16 Hard disk activity LED connector**

14. **Chassis Intrusion  (2-pin INTRUSION1)**

   These leads are for the intrusion detection feature for chassis with intrusion sensor or microswitch. When you remove any chassis component, the sensor triggers and sends a high level signal to these leads to record a chassis intrusion event. The default setting is short CASEOPEN and GND pin by jumper cap to disable the function.
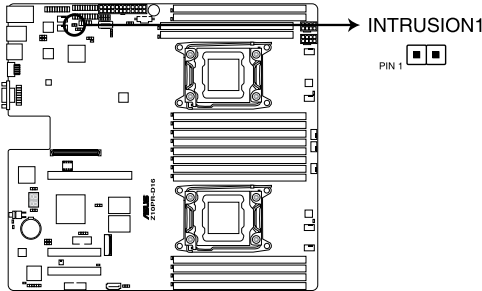


**Z10PR-D16 INTRUSION1 connector**

15. **ISATA & ISSATA connectors (ISATA; ISSATA)**

   The ISATA connector (AHCI) supports 4 SATA 6Gb/s ports and Intel RAID/LSI MegaRAID.

   The ISSATA connector (AHCI) supports 4 SATA 6Gb/s ports and Intel RAID.
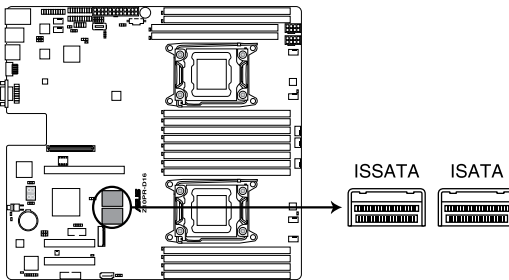


**Z10PR-D16 ISATA & ISSATA connectors**

16.    **M.2 (NGFF) connector (NGFF1)**

This connector allows you to install an M.2 device.
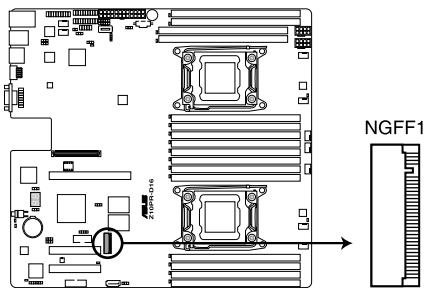


**Z10PR-D16 NGFF1 connector**

This connector supports type 2242 devices on both PCI-E and SATA interface.

The M.2 (NGFF) device is purchased separately

17.    **Mezzanine PCI card connector (MEZZ1)**

The MEZZ1 connector supports Open Compute Project (OCP) cards.
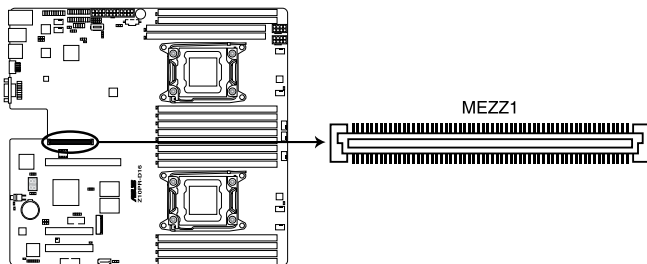


**Z10PR-D16 MEZZ1 connector**

# 4.4 Onboard LEDs

1. **Standby Power LED (SBPWR1)**

   The motherboard comes with a standby power LED. The green LED lights up to indicate that the standby mode of the system is ON, the system is in sleep mode, or the system is 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.

   SBPWR1

   ON
   Standby Power

   OFF
   Powered Off

   **Z10PR-D16 Standby Power LED**
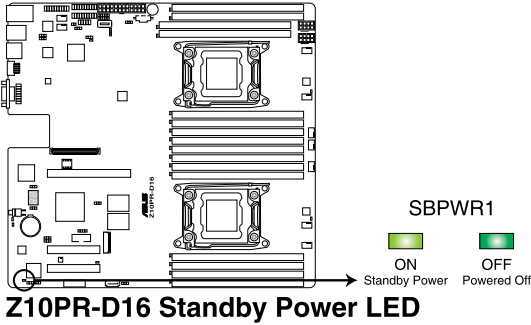
2. **Baseboard Management Controller LED (BMCLED1)**

   The green heartbeat LED blinks per second to indicate that the ASMB8 is working normally.

   BMCLED1

   **Z10PR-D16 BMC LED**
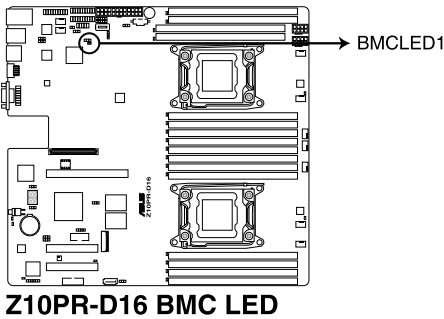
   The heartbeat LED functions only when you install the ASUS ASMB8.

3. **CPU Warning LED (ERRCPU1, ERRCPU2)**

   The CPU warning LEDs light up to indicate failure on either CPU1, CPU2, or both.
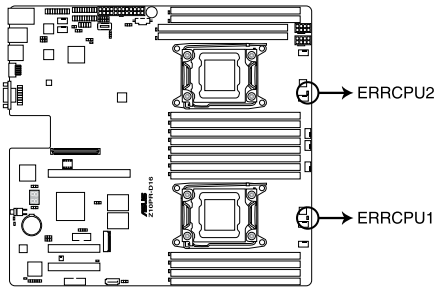
   ERRCPU2

   ERRCPU1

   **Z10PR-D16 ERR CPU LED**

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
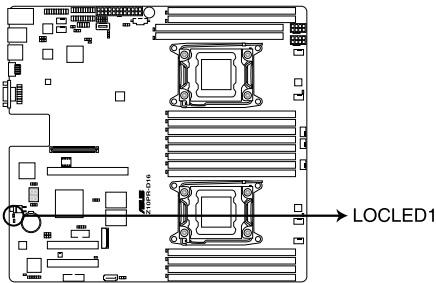
   **Z10PR-D16 Location LED**

5.  **Memory error LED (MEMERRA1, MEMERRA2,  MEMERRB1, MEMERRB2, MEMERRC1, MEMERRC2,  MEMERRD1, MEMERRD2,  MEMERRE1, MEMERRE2, EMERRF1, MEMERRF2,  MEMERRG1, MEMERRG2, MEMERRH1, MEMERRH2)**

The DIMM warning LEDs light up to indicate failure on the corresponding DIMMs.



**Z10PR-D16 MEMERR LED**
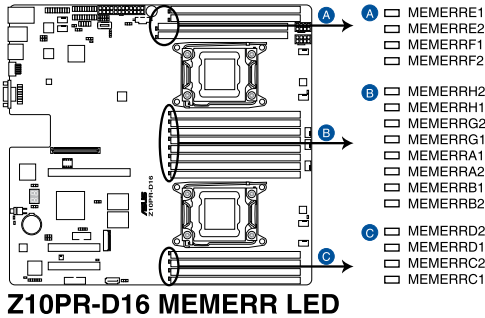
The warning LEDs only functions when you enable the ASUS ASMB8.

6.  **CATT LED (CATTERR_LED1)**

The CATT LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.



**Z10PR-D16 CATTERR_LED**
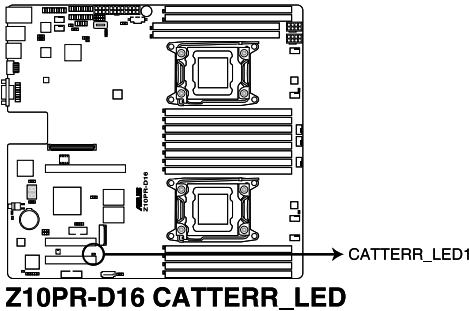
7.    **Message LED (MESLED1)**

This onboard LED lights up to red when there is temperature warning or a BMC event log is generated.
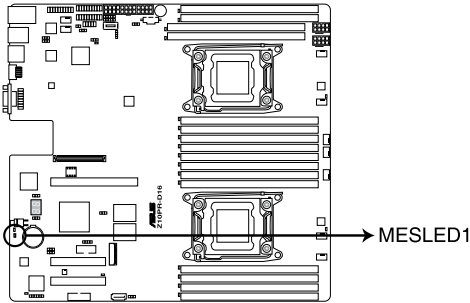
**Z10PR-D16 Message LED**

MESLED1

8.    **OCPLAN Activity LED connector (4-pin OCP_LED1)**

OCPLAN LED connector supports ASUS MCB-10G-2S OCP card Active LED.
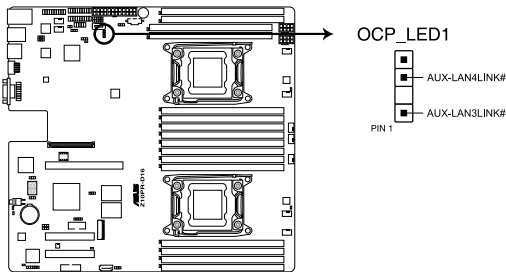
**Z10PR-D16 OCP_LED1 connector**

OCP_LED1

AUX-LAN4LINK#

AUX-LAN3LINK#

PIN 1

# 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 EZ Flash 2 Utility

The ASUS EZ Flash 2 Utility feature allows you to update the BIOS without having to use a DOS-based utility.

> Before you start using this utility, download the latest BIOS from the ASUS website at www.asus.com.

To update the BIOS using EZ Flash 2 Utility

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

2.    Enter the BIOS setup program. Go to the **Tool** menu then select **ASUS EZ Flash 2 Utility**. Press <Enter>.

```
                    ASUS Tek. EzFlash Utility

        Current Platform                    New Platform
  Platform : Z10PR-D16               Platform : Z10PR-D16
  Version  :  0020                   Version  :  0022
  Build Date :04/25/2014             Build Date :05/05/2014

  FS0           System Volume Information          <DIR>
                Z10PR-D16 BIOS                     <DIR>
                Windows                            <DIR>




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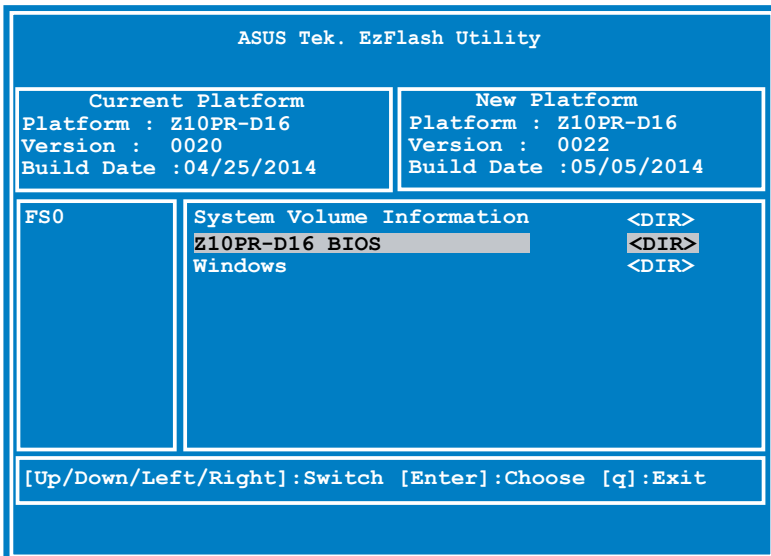
3.    Press <Tab> to switch to the **Drive** field.

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, and then press <Enter> to perform the BIOS update process. 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 the 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. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com 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
```

4. The utility verifies the file, then starts updating the BIOS file.
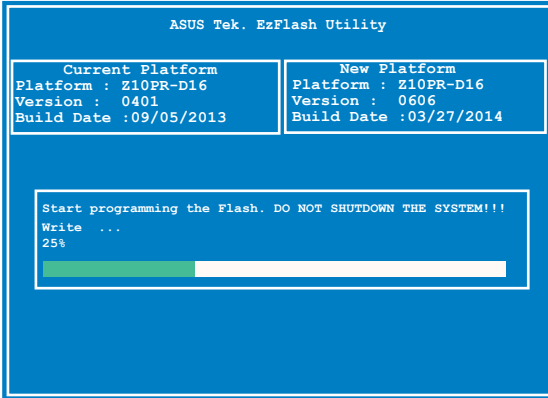
```
                    ASUS Tek. EzFlash Utility

      Current Platform                New Platform
Platform : Z10PR-D16           Platform : Z10PR-D16
Version  :  0401               Version  :  0606
Build Date :09/05/2013         Build Date :03/27/2014



 Start programming the Flash. DO NOT SHUTDOWN THE SYSTEM!!!
 Write  ...
 25%
```

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

5. The utility returns to the DOS prompt after the BIOS update process is completed. Reboot the system from the hard disk drive.

```
The BIOS update is finished! Please restart your system.

C:\>
```
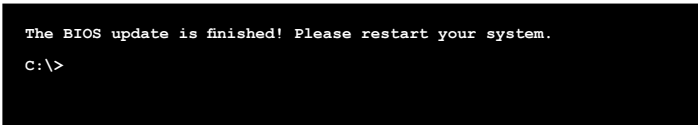
## 5.2 BIOS setup program

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+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and 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) 2013 American Megatrends, Inc.
   Main  Advanced  IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit

   BIOS Information
   BIOS Vendor                      American Megatrends       Choose the system default
   Core Version                     5.009                     language
   Compliancy                       UEFI 2.3; PI 1.2
   BIOS Version                     0303 x64
   Build Date                       05/09/2014

   Memory Information
   Total Memory                     8192 MB

   System Language                  [English]

   System Date                      [Tuesday 05/13/2014]
   System Time                      [10:30:11]               →←: Select Screen
                                                             ↑↓: Select Item
   Access Level                     Administrator            Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F5: Optimized Defaults
                                                             F10: Save Changes & Reset
                                                             ESC: Exit


              Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.          B4
```

**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 |
| **IntelRCSetup** | For changing the Intel RC settings |
| **Server Mgmt** | For changing the Server Mgmt settings |
| **Event Logs** | For changing the event log settings |
| **Monitor** | For displaying the system temperature, power status, and changing the fan settings |
| **Security** | For changing the security settings |
| **Boot** | For changing the system boot configuration |
| **Tool** | For configuring options for special functions |
| **Exit** | For selecting the exit options |

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 (Event Logs, Advanced, Monitor, Boot, Tool, and Exit) 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 then press <Enter>.

### 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, time, language, and security settings.

```
          Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
     Main  Advanced  Server Mgmt  Event Logs  Boot  Monitor  Security  Tool  Exit

     BIOS Information                                            Set the Date. Use Tab to
     BIOS Vendor                  American Megatrends            switch between Date elements.
     Core Version                 4.6.5.3
     Compliancy                   UEFI 2.3; PI 1.2
     BIOS Version                 5013 x64
     Build Date                   05/06/2013

     System Date                  [Mon 04/08/2013]
     System Time                  [18:18:25]

     Access Level                 Administrator

     Memory Information                                          →←: Select Screen
     Usage Memory                 2048 MB (DDR3)                 ↑↓: Select Item
                                                                 Enter: Select
     Processor                                                   +/-: Change Opt.
     CPU Speed                    2000 MHz                       F1: General Help
     Count:                       1                              F2: Previous Values
                                                                 F5: Optimized Defaults
     Onboard SFP+1 MAC:           00:10:18:01:12:14              F10: Save & Exit
     Onboard SFP+2 MAC:           00:10:18:01:12:16              ESC: Exit
     Onboard LAN1 MAC:            00:E0:18:02:26:0E
     Onboard LAN2 MAC:            00:E0:18:02:26:0F

```

### 5.3.1    System Date [Day xx/xx/xxxx]

Allows you to set the system date.

### 5.3.2    System Time [xx:xx:xx]

Allows you to set the system time.

## 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) 2013 American Megatrends, Inc.
      Main   Advanced   IntelRCSetup   Server Mgmt   Event Logs   Monitor   Security   Boot   Tool   Exit

  ▶ ACPI Settings                                            System ACPI Parameters.
  ▶ SMART Settings
  ▶ NCT6779D Super IO Configuration
  ▶ Intel LAN I210 Configuration
  ▶ Serial Port Console Redirection
  ▶ APM
  ▶ PCI Subsystem Settings
  ▶ Network Stack Configuration
  ▶ CSM Configuration
  ▶ Trusted Computing
  ▶ USB 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 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

## 5.4.1　ACPI Settings

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced
  ┌─────────────────────────────────────────────────┬─────────────────────────────┐
  │ ACPI Settings                                    │ Enables or Disables BIOS ACPI│
  │                                                  │ Auto Configuration.          │
  │ Enable ACPI Auto Configuration    [Disabled]     │                              │
  │                                                  │                              │
  │ Enable Hibernation                [Enabled]      │                              │
  │                                                  │                              │
  │                                                  │                              │
  │                                                  │                              │
  └─────────────────────────────────────────────────┴─────────────────────────────┘
```

**Enable ACPI Auto Configuration [Disabled]**

Allows you to enable or disable the BIOS ACPI Auto Configuration.

Configuration options: [Disabled] [Enabled]

**Enable Hibernation [Enabled]**

Allows you to enable or disable the ability of the system to hibernate (OS/Sleep State).

Configuration options: [Disabled] [Enabled]

> This option may be not effective with some OS.

## 5.4.2　Smart Settings

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced
  ┌─────────────────────────────────────────────────┬─────────────────────────────┐
  │ SMART Settings                                   │ Run SMART Self Test on all   │
  │                                                  │ HDDs during POST.            │
  │ SMART Self Test                   [Disabled]     │                              │
  │                                                  │                              │
  │                                                  │                              │
  │                                                  │                              │
  │                                                  │                              │
  │                                                  │                              │
  └─────────────────────────────────────────────────┴─────────────────────────────┘
```
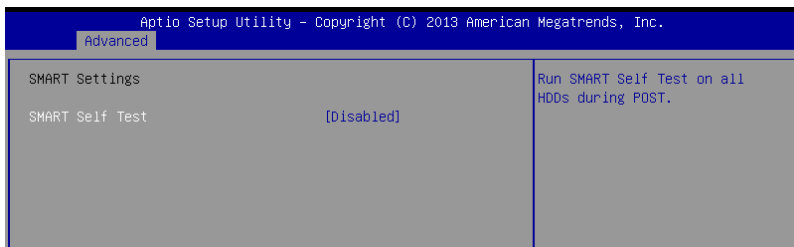
**SMART Self Test [Disabled]**

Allows you to run SMART Self Test on all HDDs during POST.

Configuration options: [Disabled] [Enabled]

## 5.4.3    NCT6779D Super IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Advanced

 NCT6779D Super IO Configuration                          Set Parameters of Serial Port
                                                          1 (COM1)
 Super IO Chip                           NCT6779D
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
```
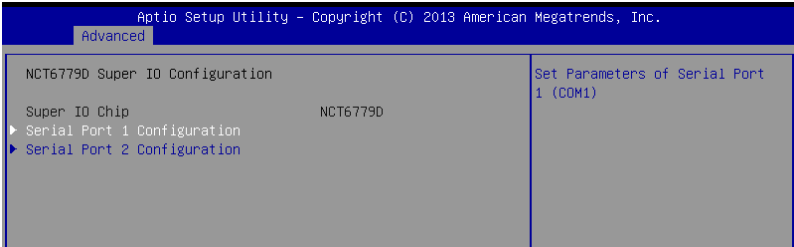
### Serial Port 1 / Serial Port 2 Configuration

Allows you to set the parameters of Serial Port 1/ Serial Port 2.

### Serial Port [Enabled]

Allows you to enable or disable Serial Port.

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;]

## 5.4.4    Intel LAN I210 Configuration

```
                  Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced
 ┌──────────────────────────────────────────────────────────────┬──────────────────────────────┐
    Intel LAN I210 Configuration                                   Intel LAN Enable/Disable

    INTEL I210 LAN1 MAC:            00:E0:18:02:21:16
    INTEL I210 LAN2 MAC:            00:E0:18:02:21:17
    Intel I210 Lan1 Enable          [Enabled]
    Intel LAN ROM Type              [PXE]
    Intel I210 Lan2 Enable          [Enabled]
    Intel LAN ROM Type              [PXE]



                                                                   ↑↓: Select Screen
```
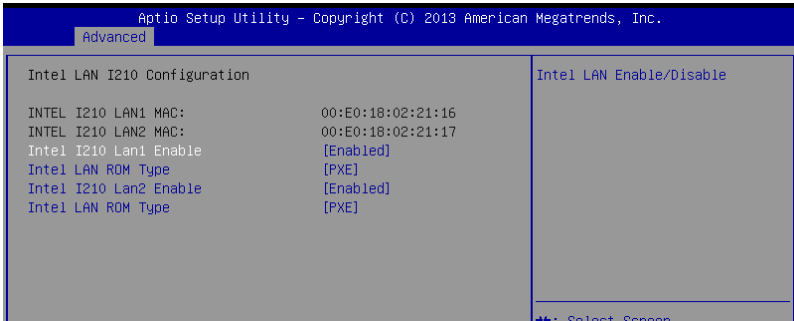
**Intel I210 Lan1 Enable/ Intel I210 Lan2 Enable [Enabled]**

Allows you to enable or disable the Intel LAN.

Configuration options: [Disabled] [Enabled]

**Intel LAN ROM Type [PXE]**

Allows you to select the Intel LAN ROM type.

Configuration options: [Disabled] [PXE] [iSCSI]

## 5.4.5    Serial Port Console Redirection

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced

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

   COM2
   Console Redirection              [Enabled]
 ▶ Console Redirection Settings

   Serial Port for Out-of-Band Management/
   Windows Emergency Management Services (EMS)
   Console Redirection              [Disabled]
 ▶ Console Redirection Settings
                                                        �t↓: Select Screen
```

**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].

**Console Redirection Settings**

This item becomes configurable only when you enable the **Console Redirection** item. 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.

**Terminal Type [VT-UTF8]**

Allows you to set the terminal type.

| | |
|---|---|
| [VT100] | ASCII char set. |
| [VT100+] | Extends VT100 to support color, function keys, et. |
| [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]**

Configuration options: [7] [8]

**Parity [None]**

A parity bit can be sent with the data bits to detect some transmission errors. [Mark]
and [Space] parity do not allow for error detection.

| | |
|---|---|
| [None] | None |
| [Even] | parity bit is 0 if the num of 1's in the data bits is even |
| [Odd] | parity bit is 0 if num of 1's in the data bits is odd |
| [Mark] | parity bit is always 1 |
| [Space] | parity bit is always 0 |

**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]**

With this mode enabled only text will be sent. This is 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 than Legacy console redirection. Configuration options: [Always Enable] [Bootloader]

## Serial Port for Out-of-Band Management/ Windows Emergency Management Services (EMS)

## 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].

**Console Redirection Settings**

**Out-of-Band Mgmt Port [COM1]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [COM1] [COM2]

**Terminal Type [VT-UTF8]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

**Bits per second [115200]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [9600] [19200] [57600] [115200]

**Flow Control [None]**

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.
Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

## 5.4.6 APM

```
                    Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced

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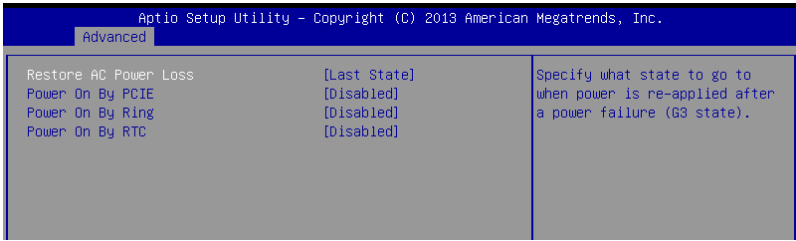
**Restore AC Power Loss [Last State]**

When set to [Power Off], the system goes into off state after an AC power loss. When set to [Power On], the system will reboot after an AC power loss. When set to [Last State], the system goes into either off or on state, whatever the system state was before the AC power loss.
Configuration options: [Power Off] [Power On] [Last State]

**Power On By PCIE [Disabled]**

[Disabled]          Disables the PCIE devices to generate a wake event.

[Enabled]           Enables the PCIE devices to generate a wake event.

**Power On By Ring [Disabled]**

[Disabled]          Disables the PCIE devices to generate a wake event.

[Enabled]           Enables the PCIE devices to generate a wake event.

**Power On By RTC [Disabled]**

[Disabled]          Disables RTC to generate a wake event.

[Enabled]           When set to [Enabled], the items **RTC Alarm Date (Days)** and **Hour/Minute/Second** will become user-configurable with set values.

## 5.4.7 PCI Subsystem Settings

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
        Advanced

  PCI Bus Driver Version              A5.01.05                    Enables or Disables RT32 Image
                                                                  Loading.
  PCI Devices Common Settings:
  Load RT32 Image                     [Enabled]
  Above 4G Decoding                   [Disabled]
  SR-IOV Support                      [Disabled]
```
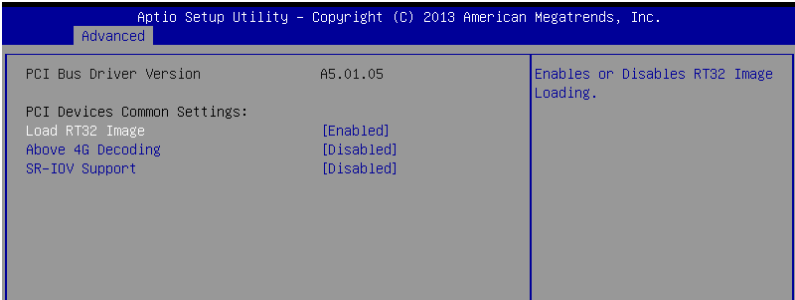
### Load RT32 Image [Enabled]

Allows you to enable or disable RT32 Image Loading.

Configuration options: [Disabled] [Enabled]

### Above 4G Decoding [Disabled]

Allows you to enable or disable 64-bit capable devices to be decoded in above 4G address space. It only works if the system supports 64-bit PCI decoding.
Configuration options: [Disabled] [Enabled]

### SR-IOV Support [Disabled]

This option enables or disables Single Root IO Virtualization Support if the system has SR-IOV capable PCIe devices.
Configuration options: [Disabled] [Enabled]

## 5.4.8 Network Stack Configuration

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
     Advanced

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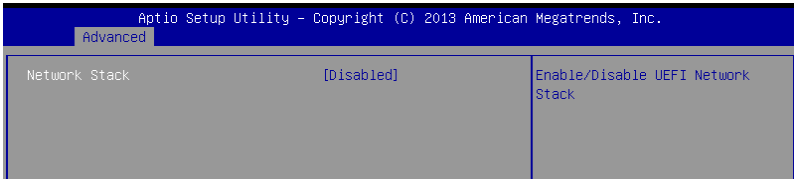
**Network stack [Disabled]**

Enables or disables the network stack feature. Configuration options: [Disable] [Enable]

> The following item appears only when **Network stack** is set to [Enabled].

**Ipv4 PXE Support [Enabled]**

Enables or disables the Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created. Configuration options: [Disabled] [Enabled].

**Ipv6 PXE Support [Enabled]**

Enables or disables the Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created. Configuration options: [Disabled] [Enabled].

**PXE boot wait time [0]**

Wait time to press ESC key to abort the PXE boot.

**Media detect time [0]**

Wait time (in seconds) to detect media.

## 5.4.9    CSM Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
   Advanced

   Compatibility Support Module Configuration          Determines OpROM execution
                                                       policy for devices other than
   CSM Support                    [Enabled]            Network, Storage, or Video

   CSM16 Module Version           07.71

   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
```

### 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.

Configuration options: [Upon Request] [Always]

### 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 device [Legacy]

This item determines the OpROM execution policy for devices other than Network, Storage, or Video.

Configuration options: [UEFI ] [Legacy]

## 5.4.10 Trusted Computing

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
       Advanced

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

**Configuration**

**Security Device Support [Disabled]**

Allows you to enable or disable the BIOS support for security device.

Configuration options: [Disabled] [Enabled]

## 5.4.11　USB Configuration

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                   IntelRCSetup

     xHCI Mode                          [Auto]                      Mode of operation of xHCI
     USB Ports Per-Port Disable Control [Disabled]                  controller.

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

                  Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

### Legacy USB Support [Enabled]

Allows you to enable or disable Legacy USB device support.

Configuration options: [Enabled] [Disabled] [Auto]

### XHCI Hand-off [Enabled]

This is a workaround for 0Ses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

Configuration options: [Disabled] [Enabled]

### EHCI Hand-off [Disabled]

This is a workaround for 0Ses without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

Configuration options: [Disabled] [Enabled]

### USB Mass Storage Driver Support [Enabled]

Allows you to enable or disable the USB Mass Storage drvier 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 hardware delays and time-outs

### USB transfer time-out [20 sec]

The time-out value for control, bulk, and interrupt transfer.

Configuration options: [1 sec] [5 sec] [10 sec] [20 sec]

### Device reset time-out [20 sec]

USB mass storage device start unit command time-out.

Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

### Device power-up delay [Auto]

This is the maximum time the device will take before it properly reports itself to the host controller.

Configuration options: [Auto] [Manual]

## 5.4.12    iSCSI Configuration

Allows you to configure the iSCSi parameters.

```
                 Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
      Advanced

   iSCSI Initiator Name                                    The worldwide unique name of
                                                           iSCSI Initiator. Only IQN
 ▶ Add an Attempt                                          format is accepted.

 ▶ Delete Attempts

 ▶ Change Attempt Order
```

## 5.5    IntelRCSetup menu

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
    Main  Advanced   IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit
  ┌─────────────────────────────────────────────────────┬─────────────────────────────────┐
  │► Processor Configuration                             │ Displays and provides option    │
  │► Advanced Power Management Configuration             │ to change the Processor         │
  │► Common RefCode Configuration                        │ Settings                        │
  │► QPI Configuration                                   │                                 │
  │► Memory Configuration                                │                                 │
  │► IIO Configuration                                   │                                 │
  │► PCH Configuration                                   │                                 │
  │► Miscellaneous Configuration                         │                                 │
  │► Server ME Configuration                             │                                 │
  │► Runtime Error Logging                               │                                 │
  │                                                      │                                 │
  │                                                      │                                 │
  │  ---------------------------------------------       │ →←: Select Screen               │
  │  Setup Warning:                                      │ ↑↓: Select Item                 │
  │  Setting items on this Screen to incorrect values    │ Enter: Select                   │
  │  may cause system to malfunction!                    │ +/-: Change Opt.                │
  │                                                      │ F1: General Help                │
  │                                                      │ F2: Previous Values             │
  │                                                      │ F5: Optimized Defaults          │
  │                                                      │ F10: Save Changes & Reset       │
  │                                                      │ ESC: Exit                       │
  └─────────────────────────────────────────────────────┴─────────────────────────────────┘
              Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

## 5.5.1 Processor Configuration

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
             IntelRCSetup

 Processor Configuration                                  ▲  Change Per-Socket Settings
 -------------------------------------------------
▶ Per-Socket Configuration
  Processor Socket            Socket 1    Socket 2
  Processor ID                000306F2  |   N/A
  Processor Frequency         2.300GHz  |   N/A
  Processor Max Ratio              17H  |   N/A
  Processor Min Ratio              0CH  |   N/A
  Microcode Revision          0000001D  |   N/A
  L1 Cache RAM                   896KB  |   N/A
  L2 Cache RAM                  3584KB  |   N/A
  L3 Cache RAM                 35840KB  |   N/A
  Processor 1 Version         Intel(R) Xeon(R) CPU E5
                              -2695 v3 @ 2.30GHz        ┼──────────────────────────
  Processor 2 Version         Not Present               →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
  Hyper-Threading             [Enabled]                 +/-: Change Opt.
  Execute Disable Bit         [Enabled]                 F1: General Help
  Enable Intel TXT Support    [Disabled]                F2: Previous Values
  VMX                         [Enabled]                 F5: Optimized Defaults
  Enable SMX                  [Disabled]                F10: Save Changes & Reset
  Hardware Prefetcher         [Enabled]                 ESC: Exit
  Adjacent Cache Prefetch     [Enabled]
  DCU Streamer Prefetcher     [Enabled]                ▼

              Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

### Per Socket Configuration

Allows you to set the number of cores to enable. 0 means all cores. Total of 14 cores available.

### Hyper Threading [Enabled]

Allows you to enable or disable the Intel® Hyper-Threading Technology function. When disabled, only one thread per activated core is enabled.
Configuration options: [Disabled] [Enabled]

### Execute Disable Bit [Enabled]

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, Redhat Enterprise 3 Update 3).
Configuration options: [Disabled] [Enabled]

### Enable Intel TXT Support [Disabled]

Forces the XD feature log to always return 0 when disabled.

Configuration options: [Disabled] [Enabled]

### VMX [Enabled]

Enables the Vanderpool Technology. Takes effect after reboot.

Configuration options: [Disabled] [Enabled]

**Enable SMX [Disabled]**

Enables the Safer Mode Extensions

Configuration options: [Disabled] [Enabled]

**Hardware Prefetcher [Enabled]**

This Item allows you to turn on/off the mid level cache(L2) streamer prefetcher.

Configuration options: [Disabled] [Enabled]

**Adjacent Cache Prefetch [Enabled]**

This Item allows you to turn on/off prefetching of adjacent cache lines.

Configuration options: [Disabled] [Enabled]

**DCU Streamer Prefetcher [Enabled]**

This Item allows you to enable or disable prefetcher of next L1 data line.

Configuration options: [Disabled] [Enabled]

**DCU IP Prefetcher [Enabled]**

This Item allows you to enable or disable prefetch of next L1 line based upon sequential load history.

Configuration options: [Disabled] [Enabled]

**DCU Mode [32K 8Way Without ECC]**

Configuration options: [32K 8Way Without ECC] [16K 4Way With ECC]

**Direct Cache Access (DCA) [Auto]**

This Item allows you to enable or disable Direct Cache Access.

Configuration options: [Auto] [Disabled] [Enabled]

**DCA Prefetch Delay [32]**

This Item allows you to set the time for the DCA Prefetch delay Help.

Configuration options: [Disabled] [8] [16] [24] [32] [40] [48] [56] [64] [72] [80] [88] [96] [104] [112]

**X2APIC [Enabled]**

This Item allows you to enable or disable the extended APIC support.

Configuration options: [Disabled] [Enabled]

**AES-NI [Enabled]**

This Item allows you to enable or disable the AES-NI support.

Configuration options: [Disabled] [Enabled]

**Down Stream PECI [Disabled]**

This Item allows you to enable the PCIe Down Stream PECI writer.

Configuration options: [Disabled] [Enabled]

## 5.5.2 Advanced Power Management Configuration

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          IntelRCSetup

 Advanced Power Management Configuration                    Enable the power management
 ------------------------------------------------          features.
 Power Technology                    [Energy Efficient]
 Config TDP                          [Disabled]
 ▶ CPU P State Control
 ▶ CPU C State Control
 ▶ CPU T State Control
 ▶ CPU Advanced PM Tuning
```
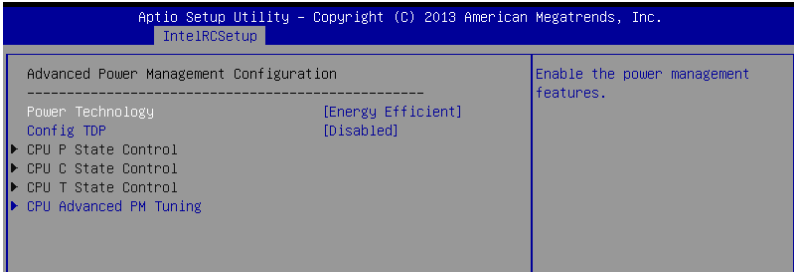
### Power Technology [Energy Efficient]

This item allows you to enable power management features.
Configuration options: [Disabled] [Energy Efficient] [Custom]

### Config TDP [Disabled]

This item allows you to enable/disable the Config TDP.

Configuration options: [Disabled] [Enabled]

### CPU Advanced PM Turning

This item allows you to set additional CPU Power Management settings.

### Energy Perf BIAS

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
          IntelRCSetup

 Energy Perf BIAS                                           Selects whether BIOS or
                                                            Operating System chooses
 Energy Performance Tuning           [Disabled]             energy peformance bias tunning.
 Energy Performance BIAS setting.    [Balanced Performance]
 Power/Performance Switch            [Enabled]
 Workload Configuration              [Balanced]
 Averaging Time Window               23
 P0 TotalTimeThreshold Low           35
 P0 TotalTimeThreshold High          58
```

**Energy Performance Tuning [Disabled]**

Allows your system to select from BIOS or operating system to choose enable energy performance bias tuning.
Configuration options: [Disabled] [Enabled]

**Energy Performance Bias setting [Balanced Performance]**

Allows you to set the Energy Performance Bias which overrides the OS setting.
Configuration options: [Performance] [Balanced Performance] [Balanced Power] [Power]

**Power/Performance Switch [Enabled]**

Allows you to switch between Power or performance.
Configuration options: [Disabled] [Enabled]

**Workload Configuration [Balanced]**

Optimization for the workload characterization.
Configuration options: [Balanced] [I/O sensitive]

**Averaging Time Window [23]**

This is used to control the effective window of the average for CO and PO time.

**PO TotalTimeThreshold Low [35]**

The HW switching mechanism disables the performance setting (0) when the total PO time is less than this threshold.

**PO TotalTimeThreshold High [58]**

The HW switching mechanism enables the performance setting (0) when the total PO time is greater than this threshold.

## 5.5.3    Common RefCode Configuration

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

  Common RefCode Configuration                               Enable or Disable Non uniform
  ------------------------------------------------           Memory Access (NUMA).
  Numa                            [Enabled]
```
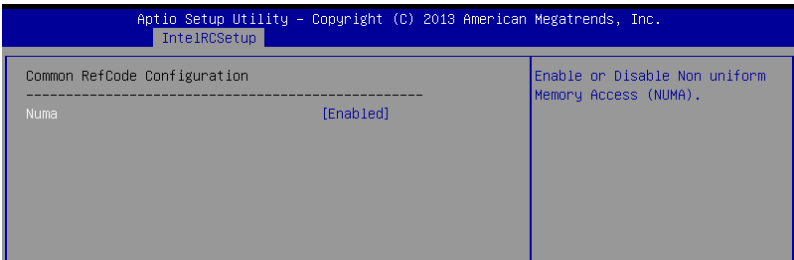
**Numa [Enabled]**

This item enables or disables the Non uniform Memory Access (NUMA).

Configuration options: [Disabled] [Enabled]

## 5.5.4 QPI Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                   IntelRCSetup

  QPI General Configuration                                     QPI Status Help
  ----------------------------------------------------
▶ QPI Status
  Link Speed Mode                     [Fast]
  Link Frequency Select               [Auto]
  Link L0p Enable                     [Enable]
  Link L1 Enable                      [Enable]
```
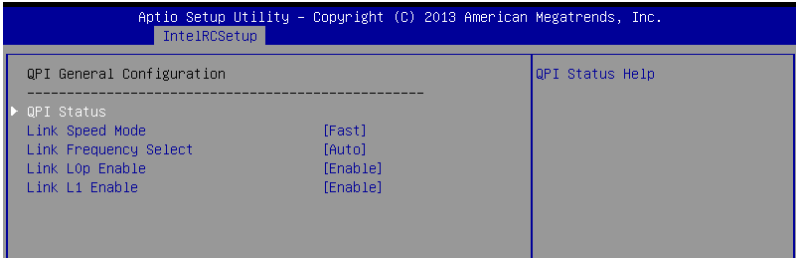
### QPI General Configuration

### QPI Status

This item displays information about the QPI status.

### Link Speed Mode [Fast]

This item allows you to select the QPI link speed as either the fast mode or slow mode.

Configuration options: [Slow] [Fast]

### Link Frequency Select [Auto]

This item allows you for selecting the QPI link frequency
Configuration options: [Auto] [6.4 GT/s] [8.0 GT/s] [9.6 GT/s]

### QPI Link0p Enable [Enable]

Configuration options: [Disable] [Enable]

### QPI Link1 Enable [Enable]

Configuration options: [Disable] [Enable]

### QPI Status

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                   IntelRCSetup

  QPI Status
  ----------------------------------------------------
  Number of CPU                       1
  Number of IIO                       1
  Current QPI Link Speed              Slow
  Current QPI Link Frequency          Unknown GT/s
  QPI Global MMIO Low Base / Limit    90000000 / FBFFFFFF
  QPI Global MMIO High Base / Limit   00000000000 / 000FFFFFFF
  QPI Pci-e Configuration Base / Siz  80000000 / 10000000
```

## 5.5.5    Memory Configuration

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

                                                              Enable to enforce POR
                                                              restrictions for DDR4
      ------------------------------------------------        frequency and voltage
      Integrated Memory Controller (iMC)                      programming
      ------------------------------------------------
      Enforce POR                          [Auto]
      Memory Frequency                     [Auto]
      Halt on mem Training Error           [Enabled]
      ECC Support                          [Auto]
      Enhanced Log Parsing                 [Disabled]
      Data Scrambling                      [Auto]
      Enable ADR                           [Disabled]
      C/A Parity Enable                    [Auto]
    ▶ Memory Topology                                         ↔: Select Screen
    ▶ Memory Thermal                                          ↑↓: Select Item
    ▶ Memory Map                                              Enter: Select
    ▶ Memory RAS Configuration                                +/-: Change Opt.
                                                              F1: General Help
```

### Enforce POR [Auto]

Allows you to enforce POR restrictions for DDR4 frequency adn voltage programming.
Configuration options: [Auto] [Enforce POR] [Disabled] [Enforce Stretch Goals]

### Memory Frequency [Auto]

Allows you to select the memory frequency setting.

Configuration options: [Auto] [1333] [1600] [1866] [2133]

### Halt on mem Training Error [Enabled]

Allows you to enable or disable halt on mem Training Error.

Configuration options: [Disabled] [Enabled]

### ECC Support [Auto]

Allows you to enable or disable the ECC support.

Configuration options: [Auto] [Disabled] [Enabled]

### Enhanced Log Parsing [Disabled]

Allows you to enable or disable the Enhanced Log Parsing.

Configuration options: [Auto] [Disabled] [Enabled]

### Data Scrambling [Auto]

Allows you to enable/disable data scrambling.

Configuration options: [Auto] [Disabled] [Enabled]

### Enable ADR [Disabled]

Allows you to set the detecting and enabling of ADR.

Configuration options: [Disabled] [Enabled]

## C/A Parity Enable [Auto]

Allows you to enable or disable the DDR4's command address parity.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                      IntelRCSetup

          ------------------------------------------------
          Socket1.Ch0.Dimm0: 2133MT/s Micron SRx4 8GB RDIMM
```
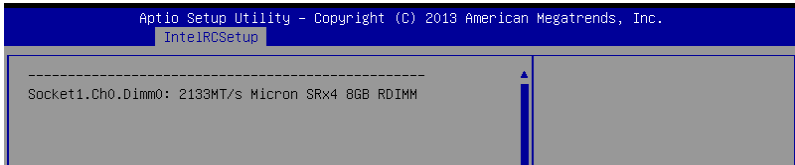
Configuration options: [Auto] [Disabled] [Enabled]

## Memory Topology

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                      IntelRCSetup

    Set Throttling Mode                    [Disabled]          Configure Thermal Throttling
    OLTT Peak BW %                         50                  Mode.
    DIMM Temp Stat                         92                  Select OLTT or CLTT mode.
    Memory Power Savings Mode              [Auto]
  ▶ Memory Power Savings Advanced Options
    MDLL Off                               [Auto]
    MEMHOT Throttling Mode                 [Input-only]
    Mem Electrical Throttling              [Disabled]
```
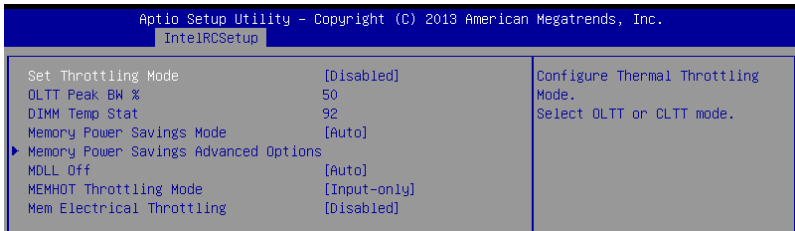
Displays memory topology with DIMM population information.

## Memory Thermal

Allows you to configure thermal settings.

### Set Throttling  Mode [Disabled]

Configuration options: [Disabled] [OLTT] [CLTT]

### OLLT Peak BW [xxx]

Allows you to set the peak allowed bandwidth for OLTT. This is in percentage and valid offset values is from 25-100.

### DIMM Tem Stat [xx]

Allows you to select DIMMTEMPSTAT as temp_mid or tem_hi.

### Memory Power Savings Mode [Auto]

Allows you to configure the CKE and other related Memory Power Savings features.
Configuration options: [Auto] [Disabled] [APD On] [User Defined] [Reserve] [Reserved]

### Memory Power Savings Advanced Options

*CK in SR [Auto]*
Configuration options: [Auto] [Driven] [Tri-State] [Pulled Low] Pulled High]

### MDLL Off [Auto]

Allows you to shutdown MDLL during SR when enabled.
Configuration options: [Auto] [Disabled] [Enabled]

### MEMHOT Throttling Mode [Input-only]

Allows you to shutdown MDLL during SR when enabled.
Configuration options: [Disabled] [Input-only] [Output-only]

**Mem Electrical Throttling [Disabled]**

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                      IntelRCSetup

   Channel Interleaving                [Auto]           Select Channel Interleaving
   Rank Interleaving                   [Auto]           setting
```
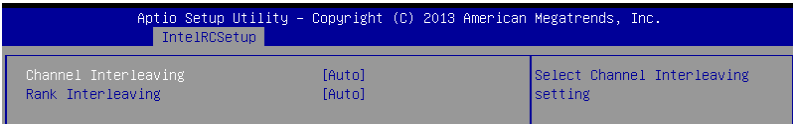
Allows you to configure Memory Electrical throttling.
Configuration options: [Disabled] [Enabled] [Auto]

## Memory Map

**Channel Interleaving [Auto]**

Select different channel interleaving setting.
Configuration options: [Auto] [1-way Interleave] [2-way Interleave] [3-way Interleave] [4-way Interleave]

**Rank Interleaving [Auto]**

Select different rank interleaving setting.
Configuration options: [Auto] [1-way Interleave] [2-way Interleave] [4-way Interleave] [8-way Interleave]

## Memory RAS Configuration

```
            Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                      IntelRCSetup

                                                        Enable/Disable RAS modes.
   -----------------------------------------------      Enabling Sparing and Mirroring
   Memory RAS Configuration Setup                       is not supported. Incase if
   -----------------------------------------------      enabled, Sparing will be
   RAS Mode                            [Disabled]       selected.
   Memory Rank Sparing                 [Disabled]
   Correctable Error Threshold         32767
   Patrol Scrub                        [Enabled]
   Demand Scrub                        [Enabled]
```
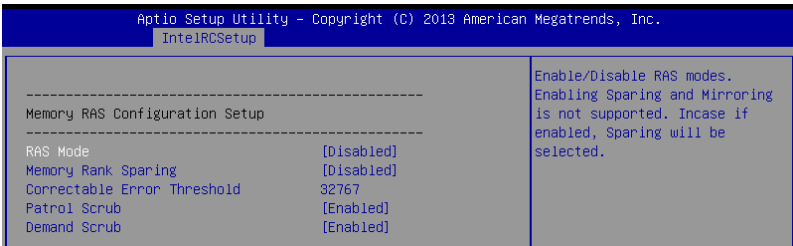
**RAS Mode [Disabled]**

Allows you to enable or disable RAS Modes. Enabling Sparing and Mirroring is not supported. In case enabled, Sparing will be selected.
Configuration options: [Disabled] [Mirror] [Lockstep Mode]

**Memory Rank Sparing [Disabled]**

Allows you to enable or disable Memory Rank Sparing.
Configuration options: [Disabled] [Enabled]

**Correctable Error Threshold [32767]**

Allows you to set the Correctable Error Threshold used for sparing, tagging, and leaky bucket. The range is from 1 to 32767.

**Patrol Scrub [Enabled]**

Allows you to enable or disable Patrol Scrub.
Configuration options: [Disabled] [Enabled]

**Demand Scrub [Enabled]**

Allows you to enable or disable Demand Scrub.
Configuration options: [Disabled] [Enabled]

## 5.5.6 IIO Configuration

```
Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                IntelRCSetup

IIO Configuration                                    Set this option to allow DFX
-------------------------------------------------    Lock Bits to remain clear
EV DFX Features                    [Disabled]
▶ PCIE Slot Option Rom Configuration
▶ Intel VT for Directed I/O (VT-d)

PCI Express Global Options
=====================================
TX EQ WA                           [Enabled]
PCI-E ASPM Support (Global)        [L1 Only]
```
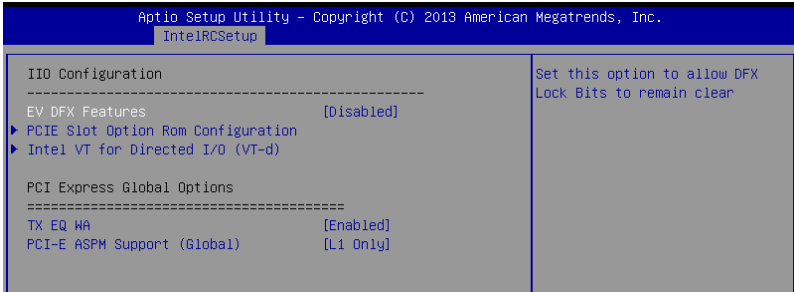
### EV DFX Features [Disabled]

Set this option to allow DFX Lock Bits to remain clear.

Configuration options: [Disabled] [Enabled]

### PCIE Slot Option ROM Configuration

```
Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                IntelRCSetup

PCIE1 Option Rom                   [Enabled]    Enabled/Disabled PCIE1 Option
PCIE2 Option Rom                   [Enabled]    Rom
PCIE3 Option Rom                   [Enabled]
PCIE4 Option Rom                   [Enabled]
PCIE6 Option Rom                   [Enabled]
```
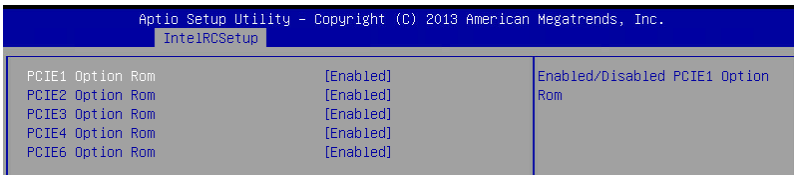
#### PCIE1/ PCIE2/ PCIE3/ PCIE4/ PCIE6 Option ROM [Disabled]

Allows you to enable or disable the PCIE1/ PCIE2/ PCIE3/ PCIE4/ PCIE6 Option ROM.
Configuration options: [Disabled] [Enabled]

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

```
Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                IntelRCSetup

Intel VT for Directed I/O (VT-d)                     Enable/Disable Intel
-------------------------------------------------    Virtualization Technology for
Intel VT for Directed I/O (VT-d)   [Enabled]         Directed I/O (VT-d) by
                                                     reporting the I/O device
                                                     assignment to VMM through DMAR
                                                     ACPI Tables.
```
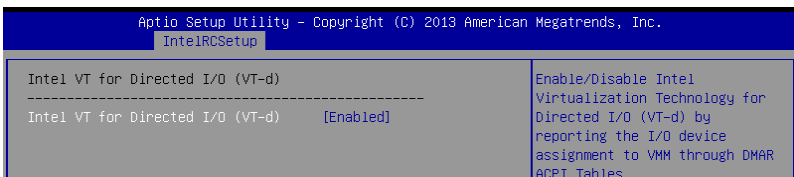
#### Intel VT for Directed I/O (VT-d) [Enabled]

Allows you to enable or disable the Intel Virtualization Technology for Directed I/O.
Configuration options: [Disabled] [Enabled]

### PCI Express Global Options

#### TX EQ WA [Enabled]

Use special table for TX_EQ and vendor specific cards.
Configuration options: [Disabled] [Enabled]

**PCI-E ASPM Support (Global) [L1 Only]**

> This option enables or disables the ASPM support for all downstream devices.
> Configuration options: [Disabled] [L1 Only]

# 5.5.7    PCH Configuration

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup
┌──────────────────────────────────────────────────────┬─────────────────────────┐
│  PCH Configuration                                     │  Enable/Disable Intel(R) IO │
│  ----------------------------------------------        │  Controller Hub devices │
│ ▶ PCH Devices                                          │                         │
│ ▶ PCI Express Configuration                            │                         │
│ ▶ PCH sSATA Configuration                              │                         │
│ ▶ PCH SATA Configuration                               │                         │
│ ▶ USB Configuration                                    │                         │
│ ▶ Platform Thermal Configuration                       │                         │
│                                                        │                         │
└──────────────────────────────────────────────────────┴─────────────────────────┘
```

**PCH Devices**

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup
┌──────────────────────────────────────────────────────┬─────────────────────────┐
│  DeepSx Power Policies            [Disabled]           │  configure the DeepSx Mode │
│                                                        │  configuration.         │
│                                                        │                         │
│                                                        │                         │
│                                                        │                         │
│                                                        │                         │
│                                                        │                         │
└──────────────────────────────────────────────────────┴─────────────────────────┘
```
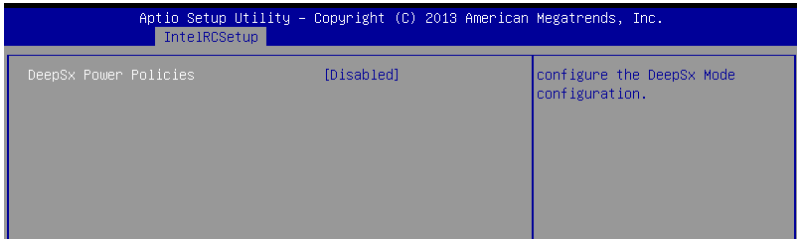
**DeepSx Power Policies [Disabled]**

> Allows you to configure the DeepSx Mode configuration.
> Configuration options: [Disabled] [Enabled in S5] [Enabled in S4 and S5]

**PCI Express Configuration**

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup
┌──────────────────────────────────────────────────────┬─────────────────────────┐
│                                                        │  PCH DMI ASPM Setting   │
│  PCH DMI ASPM                     [Enabled]            │                         │
│                                                        │                         │
│ ▶ PCI Express Root Port 1                              │                         │
│ ▶ PCI Express Root Port 2                              │                         │
│ ▶ PCI Express Root Port 3                              │                         │
│ ▶ PCI Express Root Port 4                              │                         │
│ ▶ PCI Express Root Port 5                              │                         │
│ ▶ PCI Express Root Port 6                              │                         │
│ ▶ PCI Express Root Port 7                              │                         │
│ ▶ PCI Express Root Port 8                              │                         │
└──────────────────────────────────────────────────────┴─────────────────────────┘
```
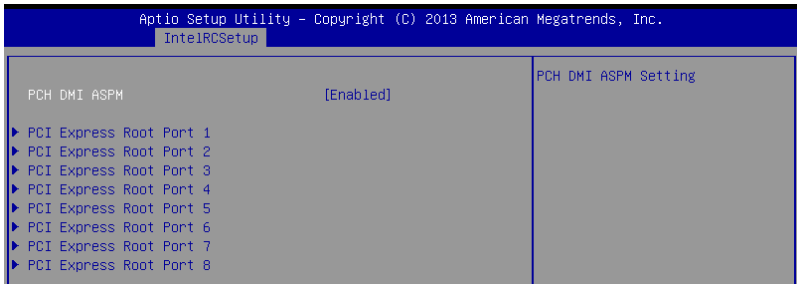
**PCH DMI ASPM [Enabled]**

> Allows you to configure the PCH DMI ASPM.
>
> Configuration options: [Disabled] [Enabled]

**PCI Express Root Port 1 to Port 8**

> Allows you to configure the PCI Express Root port settings.
>
> > **PCIE ASMP** *[Disable ASPM]*
> >
> > **Allows you to configure the PCH DMI ASPM.**
> >
> > Configuration options: [Disable ASPM] [ASPM L0s] [ASPM L1] [ASPM L0sL1] [ASPM Auto]

## PCH sSATA Configuration

```
             Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                 IntelRCSetup

   PCH sSATA Configuration                                  Enable or Disable SATA
   ------------------------------------------------         Controller

   sSATA Controller                    [Enabled]
   Configure sSATA as                  [AHCI]
 ▶ SATA Mode options
   Support Aggressive Link Power Mana  [Enabled]

   SATA Port 1                         [Not Installed]
     Port 1                            [Enabled]
   SATA Port 2                         [Not Installed]
     Port 2                            [Enabled]
   SATA Port 3                         [Not Installed]
     Port 3                            [Enabled]            ↔: Select Screen
   SATA Port 4                         [Not Installed]      ↑↓: Select Item
     Port 4                            [Enabled]            Enter: Select
                                                            +/-: Change Opt.
```

## sSATA Controller [Enabled]

Allows you to enable or disable the sSATA Controller.

Configuration options: [Disabled] [Enabled]

## Configure sSATA as [AHCI]

Allows you to identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

Configuration options: [IDE] [AHCI] [RAID]

## SATA Mode options

**SATA LED locate [Enabled]**

> If enabled, LED/SGPIO hardware is attached.
>
> Configuration options: [Disabled] [Enabled]

## Support Aggressive Link Power Management [Enabled]

Allows you to enable or disable the Support Aggressive Link Power (SALP) Management.

Configuration options: [Disabled] [Enabled]

**SATA Port 1/ SATA Port 2/ SATA Port 3/ SATA Port 4**

**Port 1/ Port 2/ Port 3/ Port 4**

> Allows you to enable or disable the SATA port
> Configuration options: [Disabled] [Enabled]

## PCH SATA Configuration

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

   PCH SATA Configuration                                           Enable or Disable SATA
   ------------------------------------------------                 Controller
   SATA Controller                       [Enabled]
   Configure SATA as                     [AHCI]
   Support Aggressive Link Power Mana     [Enabled]

   SATA Port 1                           Hitachi HTS543 - 320.0 G
     Port 1                              [Enabled]
   SATA Port 2                           ASUS    DRW-24 - ATAPI
     Port 2                              [Enabled]
   SATA Port 3                           [Not Installed]
     Port 3                              [Enabled]
   SATA Port 4                           [Not Installed]
     Port 4                              [Enabled]         ++: Select Screen
   SATA Port 5                           [Not Installed]   ↑↓: Select Item
     Port 5                              [Enabled]         Enter: Select
   SATA Port 6                           [Not Installed]   +/-: Change Opt.
     Port 6                              [Enabled]         F1: General Help
                                                           F2: Previous Values
                                                           F5: Optimized Defaults
```

### SATA Controller [Enabled]
Allows you to enable or disable the SATA Controller.

Configuration options: [Disabled] [Enabled]

### Configure SATA as [AHCI]
Allows you to identify the SATA port is connected to Solid State Drive or Hard Disk Drive.

Configuration options: [IDE] [AHCI] [RAID]

### Support Aggressive Link Power Management [Enabled]
Allows you to enable or disable the Suport Aggressive Link Power (SALP) Management.

Configuration options: [Disabled] [Enabled]

### SATA Port 1~6

**Port 1/ Port 2/ Port 3/ Port 4/ Port 5/ Port 6 [Enabled]**

> Allows you to enable or disable the SATA port
> Configuration options: [Disabled] [Enabled]

## USB Configuration

### xHCI Mode [Auto]
Allows you to enable or disable the mode of operation of xHCI controller.

Configuration options: [Auto] [Disabled] [Enabled]

**USB Ports Per-Port Disable Control [Disabled]**

```
              Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
          IntelRCSetup

                                                          Mode of operation of xHCI
  xHCI Mode                        [Auto]                 controller.
  USB Ports Per-Port Disable Control  [Disabled]




                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F5: Optimized Defaults
```
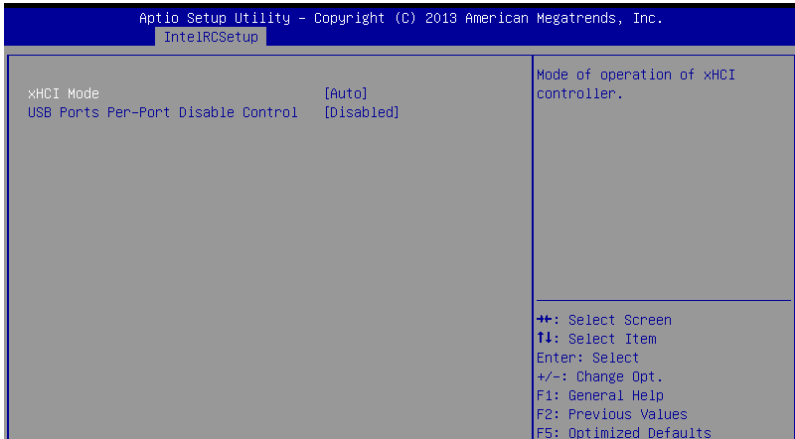
Allows you to control each of the USB ports 1 to 8 disabling.

Configuration options: [Disabled] [Enabled]

The following items appears only when the USB Ports Per-Port Disable Control is set to [Enabled].

**USB Port #1/ #2/ #3/ #4 [Enabled]**

Configuration options: [Disabled] [Enabled]

**USB 3.0 Port #1/ #2 [Enabled]**

Configuration options: [Disabled] [Enabled]

**Platform Thermal Configuration**

**PCH Thermal Device [Auto]**
Allows you to enable or disable the PCH Thermal Device (D31:F6).

Configuration options: [Auto] [Disabled] [Enabled]

**Alert Enable Lock [Disabled]**

Allows you to lock all Alert Enable settings.

Configuration options: [Disabled] [Enabled]

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

 PCH Thermal Device                      [Auto]              Enable/Disable PCH Thermal
 Alert Enable Lock                       [Disabled]          Device(D31:F6)




```

## 5.5.8    Miscellaneous Configuration

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

 Miscellaneous Configuration                                 Select active Video type
 --------------------------------------------------
 Active Video                           [Offboard Device]



```
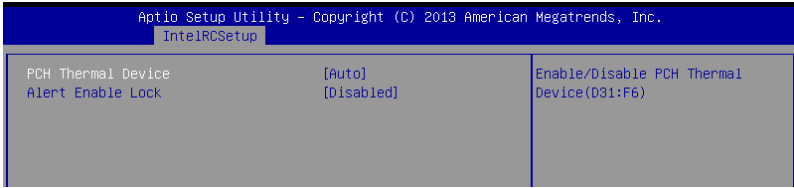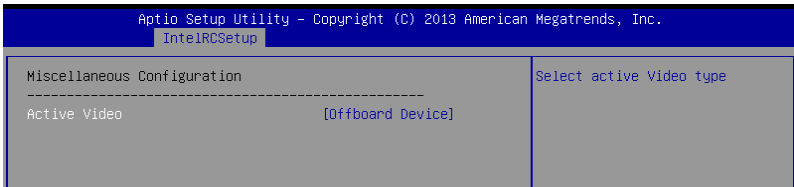
**Active Video [Offboard Device]**

Allows you to select the video type.

Configuration options: [Onboard Device] [Offboard Device]

## 5.5.9    Server ME Configuration

Displays the Server ME Technology parameters on your system.

```
              Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                    IntelRCSetup

 General ME Configuration
 Operational Firmware Version          3.0.5.402
 Recovery Firmware Version             3.0.5.402
 ME Firmware Features                  SiEn
 ME Firmware Status #1                 0x000F0382
 ME Firmware Status #2                 0x10408008
   Current State                       Recovery
   Error Code                          No Error



```
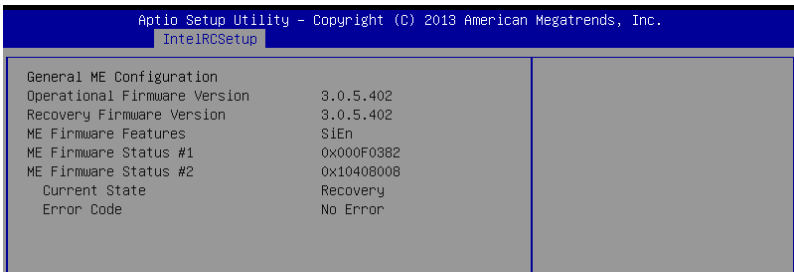
## 5.5.10    Runtime Error Logging Support

```
                 Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                      IntelRCSetup

   Runtime Error Logging                                        When Enabled S/W Error
   -------------------------------------------------            Injection is supported by
   S/W Error Injection Support          [Disabled]              unlocking MSR 0x790
 ▶ Whea Settings :
```
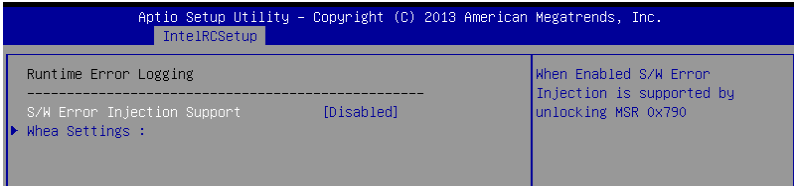
**Runtime Error Logging**

**Whea Support [Disabled]**

This item allows you to enable or disable the WHEA support.

Configuration options: [Disabled] [Enabled]

## 5.6    Server Mgmt menu

The Server Management menu displays the server management status and allows you to change the settings.

```
                 Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
      Main   Advanced   IntelRCSetup   Server Mgmt   Event Logs   Monitor   Security   Boot   Tool   Exit

   BMC Self Test Status           PASSED                 If enabled, starts a BIOS
   BMC Device ID                  32                     timer which can only be shut
   BMC Device Revision            1                      off by Intel Management
   BMC Firmware Revision          1.03                   Software after the OS loads.
   IPMI Version                   2.0                    Helps determine that the OS
                                                         successfully loaded or follows
   Current Time Zone              -05:00                 the OS Boot Watchdog Timer
   OS Watchdog Timer              [Disabled]             policy.
   OS Wtd Timer Timeout           [10 minutes]
   OS Wtd Timer Policy            [Reset]
   Serial Mux                     [Disabled]
 ▶ 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
```

**OS Watchdog Timer [Disabled]**

This item allows you to start a BIOS timer which can only be shut off by Intel Management Software after the OS loads.

Configuration options: [Disabled] [Enabled]

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 the how the system should respond if the OS Boot Watch Timer expires.

Configuration options: [Do Nothing] [Reset] [Power Down]

### Serial Mux [Disabled]

This item allows you to enable or disable Serial Mux configuration.

Configuration options: [Disabled] [Enabled]

### System Event Log
Allows you to change the SEL event log configuration.

```
                Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                                     Server Mgmt

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

   Custom EFI Logging Options
   Log EFI Status Codes              [Error code]

   NOTE: 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]

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

**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) 2013 American Megatrends, Inc.
                              Server Mgmt

 BMC network configuration                                  Select to configure LAN
                                                            channel parameters statically
 DM_LAN1                                                    or dynamically(by BIOS or
                                                            BMC). Unspecified option will
 DM_LAN1 IP Address in BMC :          192.168.254.020       not modify any BMC network
 DM_LAN1 Subnet Mask in BMC :         255.255.255.000       parameters during BIOS phase
 DM_LAN1 Gateway Address in BMC :     000.000.000.000
 DM_LAN1 MAC Address in BMC :         00.E1.E2.3A.3B.3C
 DM_LAN1 Address Source in BMC :      Static Mode
 Configuration Address source         [Previous State]

 LAN1

 LAN1 IP Address in BMC :             000.000.000.000       ++: Select Screen
 LAN1 Subnet Mask in BMC :            000.000.000.000       ↑↓: Select Item
 LAN1 Gateway Address in BMC :        000.000.000.000       Enter: Select
 LAN1 MAC Address in BMC :            00.E1.E2.4A.4B.4C      +/-: Change Opt.
 LAN1 Address Source in BMC :         DHCP Mode              F1: General Help
 Configuration Address source         [Previous State]      F2: Previous Values
                                                            F5: Optimized Defaults
```

### Configuration Address source DM_LAN1/LAN1 [Previous State]

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

## 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.

### 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 Option [Enable]

This item allows you to enable or disable the IPv6 BMC LAN channel function. Disabling this item will not modify any BMC network during BIOS phase.
Configuration options: [Disable] [Enable]

**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]

```
              Aptio Setup Utility - Copyright (C) 2013 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 Option                  [Enable]
  IPv6 BMC Lan IP Address Source       [Previous State]
  DM_LAN1 IP Address in BMC :
   ->              0:0:0:0:0:0:0:0
  DM_LAN1 Prefix Length in BMC :       0
  DM_LAN1 Gateway Address in BMC :
   ->              0:0:0:0:0:0:0:0                          ↔↔: Select Screen
  DM_LAN1 MAC Address in BMC :         00.E1.E2.3A.3B.3C   ↑↓: Select Item
  DM_LAN1 Address Source in BMC :      DHCP Mode            Enter: Select
                                                            +/-: Change Opt.
  IPv6 BMC LAN1:                                            F1: General Help
  IPv6 BMC Lan Option                  [Enable]             F2: Previous Values
  IPv6 BMC Lan IP Address Source       [Previous State]     F5: Optimized Defaults
  LAN1 IP Address in BMC :                                  F10: Save Changes & Reset
   ->              0:0:0:0:0:0:0:0                          ESC: Exit
  LAN1 Prefix Length in BMC :          0
  LAN1 Gateway Address in BMC :
   ->              0:0:0:0:0:0:0:0                       ▼
```

> 🖊 The following items appear only when you set **IP BMC Lan IP Address Source** to [Static].

**IPv6 BMC LAN IP Address**

Allows you to input IPv6 BMC Lan IP address.

**IPv6 BMC LAN IP Prefix Length**

Allows you to input IPv6 BMC Lan IP Prefix Length.

**IPv6 BMC LAN Default Gateway**

Allows you to input IPv6 BMC Lan Default Gateway.

**IPv6 BMC LAN DNS  Settings**

Allows you to enter IPv6 BMC LAN DNS Settings.

**IPv6 BMC LAN Link IP Address**

Allows you to enter IPv6 BMC LAN Link IP address.

**IPv6 BMC LAN Link IP Prefix Length**

Allows you to input IPv6 BMC Lan Link IP Prefix Length.

### IPv6 BMC Lan Option [Enable]

This item allows you to enavle IPv6 BMC LAN channel function. Disabling this option will not modify any BMC network during BIOS phase.

The following item appears only when you set **IP BMC Lan Option** to [Enable].

**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]

The following items appear only when you set **IP BMC Lan IP Address Source** to [Static].

**IPv6 BMC LAN IP Address**
Allows you to input IPv6 BMC Lan IP address.

**IPv6 BMC LAN IP Prefix Length**
Allows you to input IPv6 BMC Lan IP Prefix Length.

**IPv6 BMC LAN Default Gateway**

Allows you to input IPv6 BMC Lan Default Gateway.

**IPv6 BMC LAN DNS  Settings**
Allows you to enter IPv6 BMC LAN DNS Settings.

**IPv6 BMC LAN Link IP Address**
Allows you to enter IPv6 BMC LAN Link IP address.

**IPv6 BMC LAN Link IP Prefix Length**
Allows you to input IPv6 BMC Lan Link IP Prefix Length.

# 5.7     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) 2013 American Megatrends, Inc.
   Main  Advanced  IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit

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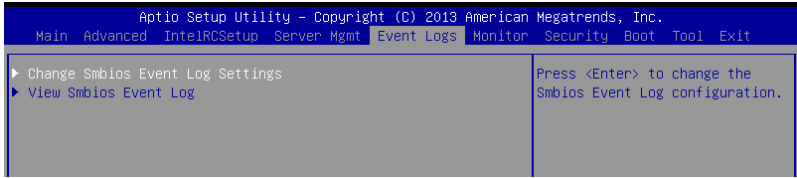
## 5.7.1     Change Smbios Event Log Settings

Press <Enter> to change the Smbios Event Log configuration.

```
            Aptio Setup Utility - Copyright (C) 2013 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
```

All values changed here do not take effect until computer is restarted.

**Enabling/Disabling Options**

### Smbios Event Log [Enabled]

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

**Erasing Settings**

### 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]

**Smbios Event Log Standard Settings**

**Log System Boot Event [Disabled]**

Allows you to choose options to enable/disable logging of System boot event. Configuration options: [Enabled] [Disabled]

**MECI [1]**

Mutiple Event Count Increment (MECI). The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range 1 to 255.

**METW [60]**

Mutiple Event Time Windows (METW). The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

**Custom Option**

**Log OEM Codes [Enabled]**

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]**

Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).
Configuration options: [Disabled] [Enabled]

# 5.7.2    View Smbios Event Log

Press <Enter> to view all smbios event logs.

## 5.8 Monitor menu

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

```
              Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
       Main   Advanced   IntelRCSetup   Server Mgmt   Event Logs   Monitor   Security   Boot   Tool   Exit

   CPU1 Temperature                        [ 63.5°C/146.3°F]      ▲ CPU1 Temperature
   CPU2 Temperature                        [ N/A ]
   CPU FAN1 Speed                          [ 2700 RPM ]
   CPU FAN2 Speed                          [ N/A ]
   FRNT FAN1 Speed                         [ N/A ]
   FRNT FAN2 Speed                         [ N/A ]
   FRNT FAN3 Speed                         [ N/A ]
   FRNT FAN4 Speed                         [ N/A ]
   FRNT FAN5 Speed                         [ N/A ]
   REAR FAN1 Speed                         [ N/A ]
   REAR FAN2 Speed                         [ N/A ]
   +VCCIO                                  [ +1.076 V ]
   +VCORE1                                 [ +1.792 V ]
   +VCORE2                                 [ N/A ]            →←: Select Screen
```

> Scroll down to view the other items

### CPU1/2 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the CPU temperatures.

### CPU FAN1/2 Speed; FRNT FAN1–5 Speed; REAR FAN1/2 Speed [xxxx RPM] or [N/A]

The onboard hardware monitor automatically detects and displays the speed of CPU fans, front fans, and rear fan in rotations per minute (RPM). If the fan is not connected to the motherboard, the field shows N/A.

### +VCCIO, VCORE1/2 Voltage, +VDDQ_AB_CPU1 Voltage, +VDDQ_CD_CPU1 Voltage, +VDDQ_EF_CPU2 Voltage, +VDDQ_GH_CPU2 Voltage, +5VSB Voltage, +5V Voltage, +12V Voltage, +3.3V Voltage, VBAT Voltage, +3.3VSB Voltage

The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

### CPU FAN1&2 FRNT FAN1 mode [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] [Manual Mode]

#### Duty % [50]

This item appears only when CPU FAN1&2 FRNT FAN1 mode is set to [Manual Mode]. This item allows you to configure the fan duty setting from 10% to 100%.

### FRNT FAN2&3/4&5; REAR FAN1&2 mode [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] [Manual Mode]

# 5.9 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) 2013 American Megatrends, Inc.
    Main   Advanced   IntelRCSetup   Server Mgmt   Event Logs   Monitor   Security   Boot   Tool   Exit

   Password Description                                      To clear the administrator
                                                            password,
   If ONLY the Administrator's password is set,             key in the current password in
   then this only limits access to Setup and is             the
   only asked for when entering Setup                       Enter Current Password box,
   If ONLY the User's password is set, then this            and then press <Enter> when
   is a power on password and must be entered to            prompted to create/confirm the
   boot or enter Setup. In Setup the User will              password.
   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.
   Clear User Password                                      F1: General Help
                                                            F2: Previous Values
                                                            F5: Optimized Defaults
  ▶ Secure Boot menu                                        F10: Save Changes & Reset
                                                            ESC: Exit
```

## Administrator Password

To set an administrator password:

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

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

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

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

4. Confirm the password when prompted.

To clear a user password:

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

2. Select **Yes** from the Warning message window then press <Enter>.

**Secure Boot Menu**

This item allows you to customize the Secure Boot settings.
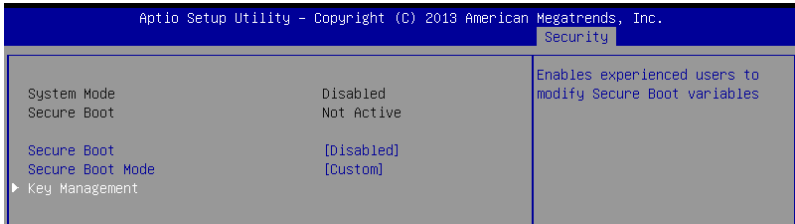


**Secure Boot [Disabled]**

Secure Boot can be enabled if the system is running in User mode with enrolled platform Key (EPK) or if the CSM function is disabled.
Configuration options: [Disabled] [Enabled]

**Secure Boot Mode [Custom]**

Allows you to set the Secure Boot selector.
Configuration options: [Custom] [Standard]

**Key Management**

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

```
             Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.
                                                                    Security

   Default Key Provision           [Disabled]          Install Factory default Secure
                                                       Boot Keys when System is in
 ▶ Enroll All Factory Default Keys                     Setup Mode.
 ▶ Save   All Secure Boot Variables

   Platform Key                    NOT INSTALLED
 ▶ Delete  PK
 ▶ Set new PK

   Key Exchange Key                NOT INSTALLED
 ▶ Delete  KEK
 ▶ Set new KEK
 ▶ Append  KEK
   Authorized Signatures           NOT INSTALLED       ←→: Select Screen
 ▶ Delete  DB                                          ↑↓: Select Item
 ▶ Set new DB                                          Enter: Select
 ▶ Append  DB                                          +/–: Change Opt.
   Authorized TimeStamps           NOT INSTALLED       F1: General Help
 ▶ Delete  DBT                                         F2: Previous Values
 ▶ Set new DBT                                         F5: Optimized Defaults
 ▶ Append  DBT                                         F10: Save Changes & Reset
   Forbidden Signatures            NOT INSTALLED       ESC: Exit
 ▶ Delete  DBX
 ▶ Set new DBX
 ▶ Append  DBX


             Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

**Default Key Provision [Disabled]**

Configuration options: [Disabled] [Enabled]

**Enroll All Factory Default Keys**

This item will ask you if you want to Install Factory Default secure keys. Select Yes if you want to load the default secure keys, otherwise select No.

**Save All Secure Boot Variables**

This item will ask you if you want to save all secure boot variables. Select Yes if you want to save all secure boot variables, otherwise select No.

**Platform Key (PK)/ Key Exchange Key (KEK)/ Authorized Signatures (DB)/Authorized TimeStamps (DBT)/ Forbidden Signatures (DBX)**

Configuration options: [Delete] [Set New] [Append]

## 5.10    Boot menu

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

```
             Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
      Main  Advanced  IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit

      Boot Configuration                                       Number of seconds to wait for
      Setup Prompt Timeout               1                     setup activation key.
      Bootup NumLock State               [On]                  65535(0xFFFF) means indefinite
                                                               waiting.
      Boot Logo Display                  [Auto]
        POST Report                      [5 sec]

      Chassis Intrusion Message          [Warning]

      Boot Option Priorities
      Boot Option #1                     [UEFI: Generic 8.07]
      Boot Option #2                     [Generic 8.07]
      Boot Option #3                     [IBA XE Slot 0300 v2311]

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



                  Version 2.16.1243. Copyright (C) 2013 American Megatrends, Inc.
```

### Setup Prompt Timeout [xx]

Use the <+> and <-> keys to adjust the number of seconds to wait for setup activation key.

### Bootup NumLock State [On]

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

### Boot Logo Display [Auto]

Allows you to enable or disable the full screen logo display feature.
Configuration options: [Auto] [Full Screen] [Disabled]

#### 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 [Warning]

Allows you to set an action when chassis intrusion has occurred.
Configuration options: [Warning] [Halt]

### 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.

### Set the booting order of network devices.

#### Boot Option #1/#2 [SATA  P2: ASUS ...]

Configuration options: [SATA  P2: ASUS    ...] [SATA  P3: WDC WD80...] [AMI Virtual Floppy...] [IBA GE Slot 0700 v...]

#### CD/DVD ROM Drive BBS Priorities

### Hard Drive BBS Priorities / 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.

## 5.11    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) 2013 American Megatrends, Inc.
   Main  Advanced  IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit

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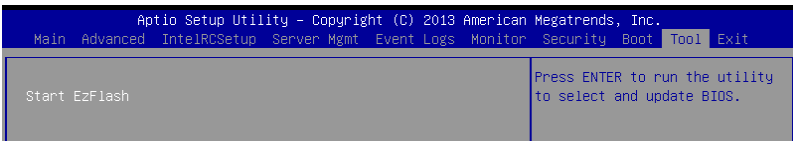
### ASUS EZ Flash

Allows you to run ASUS EZ Flash BIOS ROM Utility when you press <Enter>. Refer to the ASUS EZ Flash Utility section for details.

# 5.12 Exit menu

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

```
          Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Main  Advanced  IntelRCSetup  Server Mgmt  Event Logs  Monitor  Security  Boot  Tool  Exit

  Save Changes & Exit                                    Exit system setup after saving
  Discard Changes & Exit                                 the changes.
  Save Changes & Reset
  Discard Changes & Reset

  Save Options
  Save Changes
  Discard Changes

  Restore Defaults
  Save as User Defaults
  Restore User Defaults

  Boot Override                                          →←: Select Screen
  IBA XE Slot 0300 v2311                                 ↑↓: Select Item
  IBA XE Slot 0301 v2311                                 Enter: Select
  IBA GE Slot 0400 v1543                                 +/-: Change Opt.
  IBA GE Slot 0401 v1543                                 F1: General Help
  UEFI: Generic 8.07                                     F2: Previous Values
  Generic 8.07                                           F5: Optimized Defaults
```

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

**Save Changes & Reset**

Exit System setup after saving the changes.

**Discard Changes & Exit**

Exit System setup without saving any changes.

**Save Changes & Reset**

Reset the system setup after saving the changes.

**Discard Changes & Reset**

Reset system setup without saving any changes.

**Save Options**

**Save Changes**

Save changes done so far to any of the setup options.

**Discard Changes**

Discard changes done so far to any of the setup options.

**Restore Defaults**

Restore/load default values for all the setup options.

**Save as User Defaults**

Save the changes done so far as User Defaults.

**Restore User Defaults**

Restore the User Defaults to all the setup options.

**Boot Override**

These items displays the available devices. The device items that appears on the screen depends 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 (shellx64.efi) from one of the available filesystem devices.

# 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 supports the following SATA RAID solutions:

- **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® C602 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 Mode]

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

Refer to Chapter 4 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** if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C602 chipset.

Refer to the succeeding section for details on how to use the RAID configuration utility.

## 6.2 LSI Software RAID Configuration Utility

The LSI MegaRAID software RAID configuration utility allows you to create RAID 0, RAID 1, or RAID 10 set(s) from SATA hard disk drives connected to the SATA connectors supported by the motherboard southbridge chip.

To enter the LSI MegaRAID software RAID configuration utility:

1.  Turn on the system after installing all the SATA hard disk drives.

2.  During POST, the LSI MegaRAID software RAID configuration utility automatically detects the installed SATA hard disk drives and displays any existing RAID set(s). Press <Ctrl> + <M> to enter the utility.

```
LSI MegaRAID Software RAID BIOS Version A.10 09231523R
LSI SATA RAID Found at PCI Bus No:00 Dev No:1F
Device present at Port 0      ST3160812AS      152114MB
Device present at Port 1      ST3160812AS      152114MB
Device present at Port 2      ST3160812AS      152114MB
Device present at Port 3      ST3160812AS      152114MB
Press Ctrl-M or Enter to run LSI Software RAID Setup Utility.
```

- The LSI MegaRAID software RAID configuration utility automatically configures to RAID 1 when the SATA to RAID Mode is enabled.

- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.

- When you create RAID sets with the LSI MegaRAID software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

3.  The utility main window appears. Use the arrow keys to select an option from the **Management Menu** and then press <Enter>. Refer to the Management Menu descriptions on the next page.

    At the bottom of the screen is the legend box. The keys on the legend box allow you to navigate through the setup menu options or execute commands. The keys on the legend box vary according to the menu level.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                       BIOS Version  A.10.09231523R


      ┌─Management Menu─┐
      │Configure        │
      │Initialize       │
      │Objects          │
      │Rebuild          │
      │Check Consistency│
      └─────────────────┘




                        ┌──────────────────┐
                        │ Configure VD(s)  │
                        └──────────────────┘
   Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```
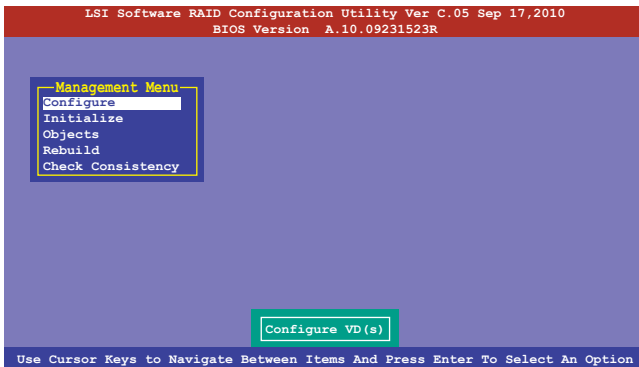
| Menu | Description |
|------|-------------|
| **Configure** | Allows you to create RAID 0, RAID 1 or RAID 10 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive |
| **Initialize** | Allows you to initialize the virtual drives of a created RAID set |
| **Objects** | Allows you to initialize virtual drives or change the virtual drive parameters |
| **Rebuild** | Allows you to rebuild failed drives |
| **Check Consistency** | Allows you to check the data consistency of the virtual drives of a created RAID set |

## 6.2.1    Creating a RAID set

The LSI Software RAID Configuration Utility allows you to create a RAID 0, RAID 1, or RAID 10 set using two types of configurations: **Easy** and **New**.

In **Easy Configuration**, the virtual drive parameters are set automatically.

In **New Configuration**, you manually set the virtual drive parameters.

### Using Easy Configuration

To create a RAID set using the **Easy Configuration** option:

1.    From the **Management Menu**, select **Configure > Easy Configuration**, and then press <Enter>.
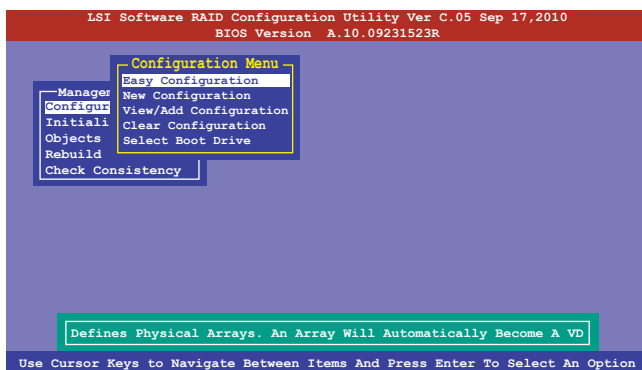
2. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Use the up/down arrow keys to select the drives you want to include in the RAID set, and then press <Space>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R


        ┌Managem┌─── Easy Configuration - ARRAY SELECTION MENU ───┐
        │Configure│              PORT #
        │Initializ│        ┌──────────────────────┐
        │Objects  │      0 │ ONLIN A00-00         │
        │Rebuild  │        ├──────────────────────┤
        │Check Con│      1 │ ONLIN A00-01         │
                          ├──────────────────────┤
                        2 │ READY                │
                          ├──────────────────────┤
                        3 │ READY                │
                          └──────────────────────┘


       ┌Port # 2 DISK  74.74GB HDS728080PLA380                05.01C05┐
        SPACE-Sel,ENTER-EndArray,F10-Configure,F2-Drive Info,F3-Virtual Drives,F4-HSP
```

- The information of the selected hard disk drive displays at the bottom of the screen.

- You need at least two identical hard disk drives when creating a RAID 1 set.

- You need at least four identical hard disk drives when creating a RAID 10 set.

3. Select all the drives required for the RAID set, and then press <F10> to configure array setting.

4. Press <Space> to select the configurable array.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R


        ┌Managem┌─── Easy Configuration - ARRAY SELECTION MENU ───┐
        │Configure│        Select Configurable Array(s)
        │Initializ│
        │Objects  │    ┌─ A-0 ─┐
        │Rebuild  │    │ SPAN-1│
        │Check Con│    └───────┘




        Cursor Keys, SPACE-(De)Select F2-Chidinfo F3-SlotInfo F10-Configure Esc-Quit
```

5. Press <F10> again, the virtual drive information appears including a **Virtual Drive** menu that allows you to change the virtual drive parameters.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                      BIOS Version  A.10.09231523R
                    ┌── Virtual Drive(s) Configured ──
              LD      RAID     Size      #Stripes    StripSz    Status
     ┌─Manage
     │Configu  0       1     148.580GB      2         64KB      ONLINE
     │Initial
     │Objects
     │Rebuild
     │Check C  ┌── Virtual Drive 0 ──
              │RAID = 1
              │Units= MB
              │Size = 152146MB
              │DWC  = OFF
              │RA   = On
              │Accept
              │SPAN = NO

                   ┌── Choose RAID Level For This VD ──
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

6. Select **RAID** from the **Virtual Drive** sub-menu, and then press <Enter>.

7. Select the **RAID** level from the menu, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                      BIOS Version  A.10.09231523R
                    ┌── Virtual Drive(s) Configured ──
              LD      RAID     Size      #Stripes    StripSz    Status
     ┌─Manage
     │Configu  0       1     148.580GB      2         64KB      ONLINE
     │Initial
     │Objects
     │Rebuild
     │Check C  ┌── Virtual Drive 0 ──  ┌── RAID Level ──
              │RAID = 1                │RAID 0
              │Units= MB               │RAID 1
              │Size = 152146MB
              │DWC  = OFF
              │RA   = On
              │Accept
              │SPAN = NO

                   ┌── Choose RAID Level For This VD ──
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

8.  Select **Units** from the **Virtual Drive** sub-menu, and then press <Enter>.

9.  Select the units for virtual drive size from the menu, and then press <Enter>.



```
          LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R
                        ┌──────── Virtual Drive(s) Configured ────────┐
                        LD     RAID     Size      #Stripes     StripSz     Status
     ┌─Manage
     │Configu              0      1     148.580GB     2          64KB      ONLINE
     │Initial
     │Objects                                    ┌─Select Units For VD Size─┐
     │Rebuild                                    │ MB                        │
     │Check C        ┌──── Virtual Drive 0 ────┐ │ GB                        │
                     │ RAID = 1                │ │ TB                        │
                     │ Units= MB               │
                     │ Size = 152146MB         │
                     │ DWC  = OFF              │
                     │ RA   = On               │
                     │ Accept                  │
                     │ SPAN = NO               │
                     └─────────────────────────┘
                        ┌───────────────────────────┐
                        │ Select Units For VD Size  │
                        └───────────────────────────┘
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

10. When creating a **RAID 1** or a **RAID 10** set, select **DWC** from the **Virtual Drive** menu, and then press <Enter>.

    When creating a **RAID 0** set, proceed to step 12.

11. Select **On** to enable the **Disk Write Cache** setting, and then press <Enter>.



```
          LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R
                        ┌──────── Virtual Drive(s) Configured ────────┐
                        LD     RAID     Size      #Stripes     StripSz     Status
     ┌─Manage
     │Configu              0      1     148.580GB     2          64KB      ONLINE
     │Initial
     │Objects                                    ┌──── Change DWC ────┐
     │Rebuild                                    │ Off                 │
     │Check C        ┌──── Virtual Drive 0 ────┐ │ On                  │
                     │ RAID = 1                │
                     │ Units= MB               │
                     │ Size = 152146MB         │
                     │ DWC  = OFF              │
                     │ RA   = On               │
                     │ Accept                  │
                     │ SPAN = NO               │
                     └─────────────────────────┘
                        ┌───────────────────────────────┐
                        │ Disk Write Cache Setting of VD │
                        └───────────────────────────────┘
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

Enabling DWC can improve the performance, but with the risk of data loss.

12. When finished setting the selected virtual drive configuration, select **Accept** from the menu, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R

                         Virtual Drive(s) Configured
      ┌─Manage    LD      RAID    Size       #Stripes    StripSz     Status
      │Configu
      │Initial    0        1     148.580GB      2          64KB      ONLINE
      │Objects
      │Rebuild
      │Check C   ┌─── Virtual Drive 0 ───┐
                 │RAID = 1               │
                 │Units= MB              │
                 │Size = 152146MB        │
                 │DWC  = OFF             │
                 │RA   = On              │
                 │Accept                 │
                 │SPAN = NO              │
                 └───────────────────────┘

                 ┌────────────────────────────────────────────────┐
                 │ Accept This VD Configuration And Go To Next VD  │
                 └────────────────────────────────────────────────┘
        Cursor Keys, SPACE-(De) Select F2-ChIdInfo F3-SlotInfo F10-Configure Esc-Quit
```

13. Follow step 2 to 12 to configure additional virtual drives.

14. Press <Esc> to finish RAID configuration. When prompted to save configuration, select **Yes** from the menu, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R
                     ┌─ Configuration Menu ─┐    ┌─ Save Configuration? ─┐
                     │Easy Configuration    │    │Yes                    │
      ┌─Management Menu─│New Configuration  │    │No                     │
      │Configure        │View/Add Configuration  └───────────────────────┘
      │Initialize       │Clear Configuration │
      │Objects          │Select Boot Drive   │
      │Rebui         ─ Virtual Drive(s) Configured ─┘
      │Check   LD      RAID    Size        #Stripes    StripSz    Status

                0        1     148.580GB       2          64KB     ONLINE

                 ┌────────────────────────┐
                 │    Select Yes Or No    │
                 └────────────────────────┘
       Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

## Using New Configuration

When a RAID set already exists, using the **New Configuration** command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the **View/Add Configuration** command to view or create another RAID configuration.
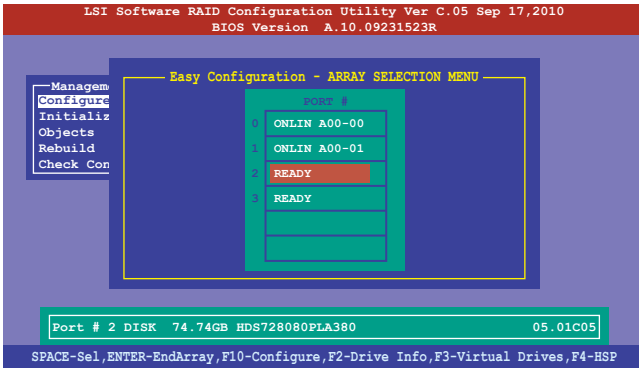
To create a RAID set using the **New Configuration** option

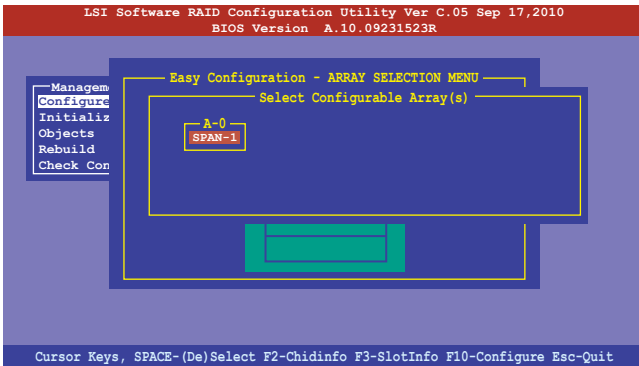1.   From the **Management Menu**, select **Configure > New Configuration,** and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version  A.10.09231523R

                         ┌─ Configuration Menu ─┐
                         │ Easy Configuration   │
        ┌─ Management Me ─┤ New Configuration    │
        │ Configure       │ View/Add Configuration│
        │ Initialize      │ Clear Configuration  │
        │ Objects         │ Select Boot Drive    │
        │ Rebuild         └──────────────────────┘
        │ Check Consistency │




            ┌────────────────────────────────────────────────────┐
            │ Clear Existing Configuration And Start A New Configuration │
            └────────────────────────────────────────────────────┘
        Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2.   Follow step 2 to 9 of the previous section: **Using Easy Configuration**.

3.   Select **Size** from the **Virtual Drive** menu, and then press <Enter>.

4.   Key-in the desired virtual drive size, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version  A.10.09231523R
                    ┌──── Virtual Drive(s) Configured ────┐
        ┌─Manage    │ LD    RAID    Size    #Stripes   StripSz   Status │
        │ Configu   │                                                   │
        │ Initial   │ 0      1     148.580GB   2         64KB     ONLINE │
        │ Objects   │                                                   │
        │ Rebuild   │                                                   │
        │ Check C   └─────────────────────────────────────────────┐
            ┌─ Enter VD Size: 152146_ ─────────────────┐
            │ Units= MB                                  │
            │ Size = 152146MB                            │
            │ DWC  = OFF                                 │
            │ RA   = On                                  │
            │ Accept                                     │
            │ SPAN = NO                                  │
            └────────────────────────────────────────────┘
                    ┌────────────────┐
                    │ Enter VD Size: │
                    └────────────────┘
        Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```
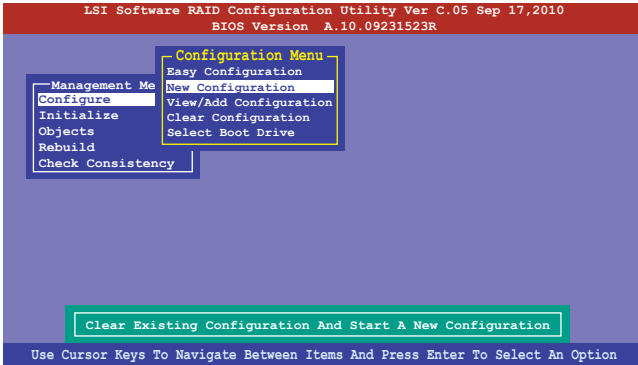
5.   Follow step 10 to 14 of the previous section: **Using Easy Configuration** to create the RAID set.

## 6.2.2 Adding or viewing a RAID configuration

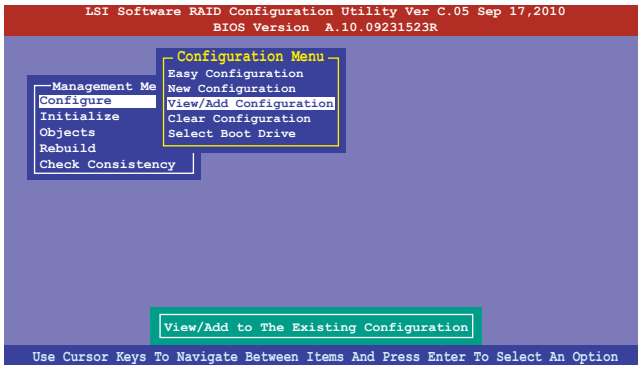You can add a new RAID configuration or view an existing configuration using the **View/Add Configuration** command.
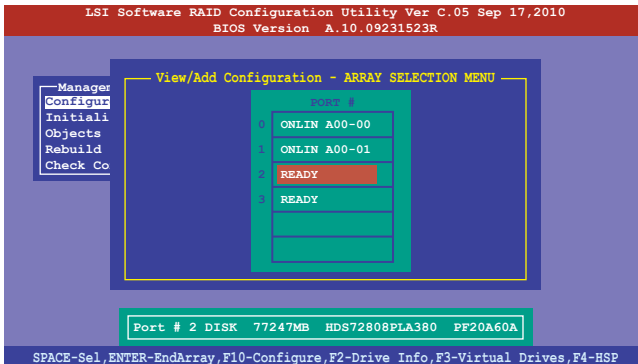
### Adding a new RAID configuration

To add a new RAID configuration:

1. From the **Management Menu**, select **Configure > View/Add Configuration**, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R

                    ┌─ Configuration Menu ─┐
                    │ Easy Configuration   │
      ┌─Management Me│ New Configuration    │
      │Configure     │ View/Add Configuration│
      │Initialize    │ Clear Configuration  │
      │Objects       │ Select Boot Drive    │
      │Rebuild       └──────────────────────┘
      │Check Consistency│
      └─────────────────┘



                    ┌──────────────────────────────────────┐
                    │ View/Add to The Existing Configuration│
                    └──────────────────────────────────────┘
         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

2. The **ARRAY SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive(s) you want to include in the RAID set, then press <Space>. When selected, the drive indicator changes from **READY** to **ONLIN A[X]-[Y]**, where X is the array number, and Y is the drive number.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R

      ┌─Manager  ┌─ View/Add Configuration - ARRAY SELECTION MENU ─┐
      │Configur  │              ┌──── PORT # ────┐                  │
      │Initiali  │            0 │ ONLIN A00-00   │                  │
      │Objects   │              │                │                  │
      │Rebuild   │            1 │ ONLIN A00-01   │                  │
      │Check Co  │              │                │                  │
      └─────────│            2 │ READY          │                  │
                 │              │                │                  │
                 │            3 │ READY          │                  │
                 │              │                │                  │
                 │              └────────────────┘                  │
                 └───────────────────────────────────────────────────┘

                    ┌──────────────────────────────────────────┐
                    │ Port # 2 DISK  77247MB  HDS72808PLA380  PF20A60A│
                    └──────────────────────────────────────────┘
      SPACE-Sel,ENTER-EndArray,F10-Configure,F2-Drive Info,F3-Virtual Drives,F4-HSP
```

The information of the selected hard disk drive displays at the bottom of the screen.

3. Follow step 3 to 12 of section **6.2.1 Creating a RAID set: Using Easy Configuration** to add a new RAID set.
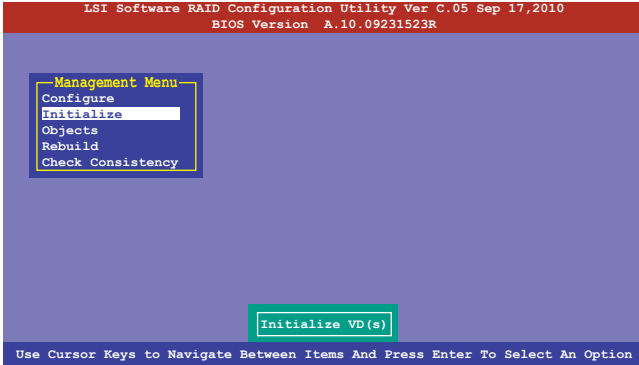
## 6.2.3    Initializing the virtual drives

After creating the RAID set(s), you must initialize the virtual drives. You may initialize the virtual drives of a RAID set(s) using the **Initialize** or **Objects** command on the **Management Menu**.
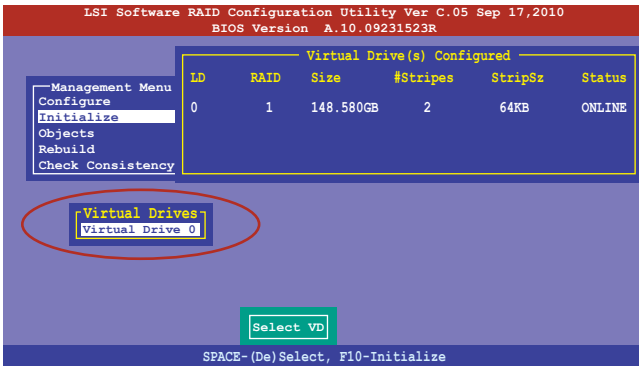
### Using the Initialize command

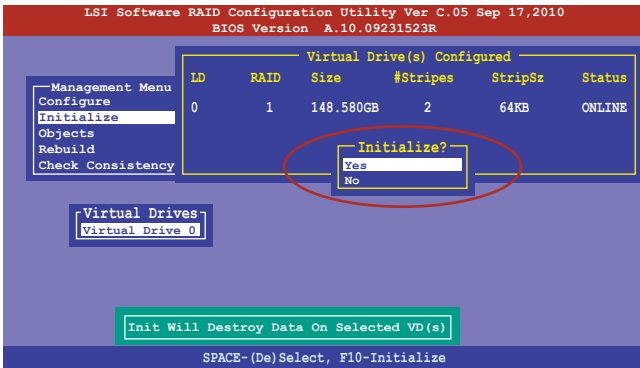To initialize the virtual drive using the Initialize command

1.    From the **Management Menu**, select **Initialize**, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                      BIOS Version  A.10.09231523R


      ┌─Management Menu─┐
      │ Configure       │
      │ Initialize      │
      │ Objects         │
      │ Rebuild         │
      │ Check Consistency│
      └─────────────────┘




                           ┌──────────────────┐
                           │ Initialize VD(s) │
                           └──────────────────┘

      Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

2.    The screen displays the available RAID set(s) and prompts you to select the virtual drive to initialize. Use the arrow keys to select the virtual drive from the **Virtual Drive** selection, and then press <Space>.
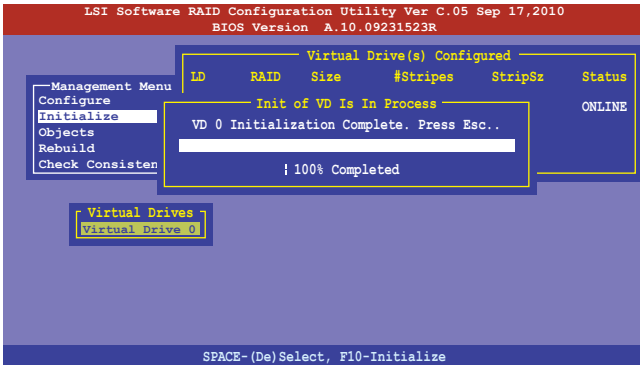
```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                      BIOS Version  A.10.09231523R
                         ┌──── Virtual Drive(s) Configured ─────┐
      ┌─Management Menu─┐ │ LD    RAID    Size      #Stripes   StripSz   Status │
      │ Configure       │ │                                                      │
      │ Initialize      │ │ 0      1     148.580GB    2          64KB      ONLINE │
      │ Objects         │ │                                                      │
      │ Rebuild         │ │                                                      │
      │ Check Consistency│ └──────────────────────────────────────────────────────┘

        ┌─Virtual Drives─┐
        │ Virtual Drive 0│
        └────────────────┘


                           ┌───────────┐
                           │ Select VD │
                           └───────────┘
                      SPACE-(De)Select, F10-Initialize
```

3. Press <F10> to start initialization. When prompted, select **Yes** from the **Initialize?** dialog box, and then press <Enter>.

```
LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                  BIOS Version  A.10.09231523R

                       Virtual Drive(s) Configured
                    LD    RAID    Size     #Stripes    StripSz    Status
  Management Menu
 Configure
 Initialize          0      1    148.580GB     2          64KB      ONLINE
 Objects
 Rebuild                            Initialize?
 Check Consistency                  Yes
                                    No

  Virtual Drives
 Virtual Drive 0




         Init Will Destroy Data On Selected VD(s)
               SPACE-(De)Select, F10-Initialize
```

Initializing a virtual drive erases all data on the drive.

4. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.

```
LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                  BIOS Version  A.10.09231523R

                       Virtual Drive(s) Configured
                    LD    RAID    Size     #Stripes    StripSz    Status
  Management Menu
 Configure                  Init of VD Is In Process          ONLINE
 Initialize
 Objects           VD 0 Initialization Complete. Press Esc..
 Rebuild
 Check Consisten
                               100% Completed

  Virtual Drives
 Virtual Drive 0




               SPACE-(De)Select, F10-Initialize
```

## Using the Objects command

To initialize the virtual drives using the **Objects** command

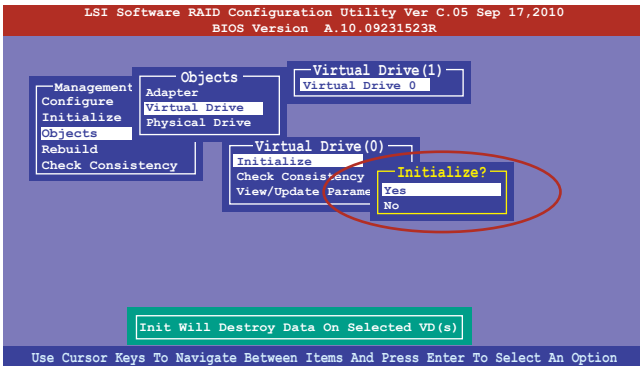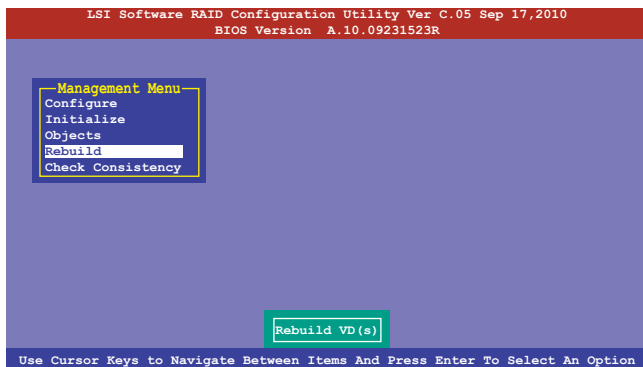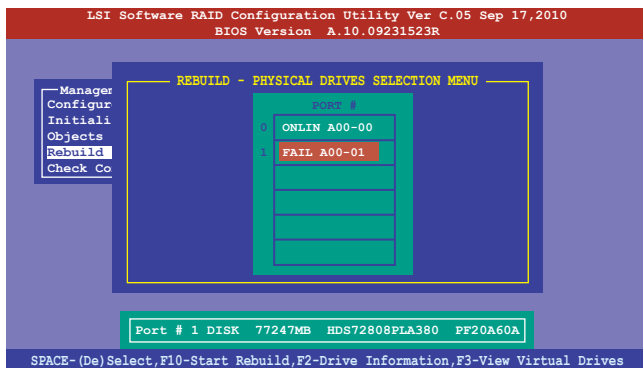1. From the **Management Menu**, select **Objects > Virtual Drive**, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                       BIOS Version  A.10.09231523R

            ┌─Management        ┌───── Objects ─────┐
            │ Configure         │ Adapter           │
            │ Initialize        │ Virtual Drive     │
            │ Objects           │ Physical Drive    │
            │ Rebuild           └───────────────────┘
            │ Check Consistency
            └──────────────────




                            ┌──────────────────────┐
                            │  Change VD Parameters │
                            └──────────────────────┘
        Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```
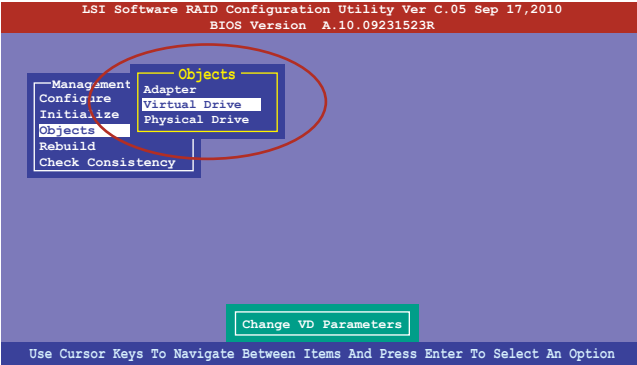
2. Select the virtual drive to initialize from the **Virtual Drives** sub-menu, and then press <Enter>.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                       BIOS Version  A.10.09231523R

                           ┌───── Objects ─────┐ ┌── Virtual Drive(1) ──┐
            ┌─Management    │ Adapter           │ │ Virtual Drive 0      │
            │ Configure     │ Virtual Drive     │ └──────────────────────┘
            │ Initialize    │ Physical Drive    │
            │ Objects       └───────────────────┘
            │ Rebuild
            │ Check Consistency
            └──────────────────




                            ┌──────────┐
                            │ Select VD │
                            └──────────┘
              Press ENTER To Select A VD, <Del> To Delete A VD
```
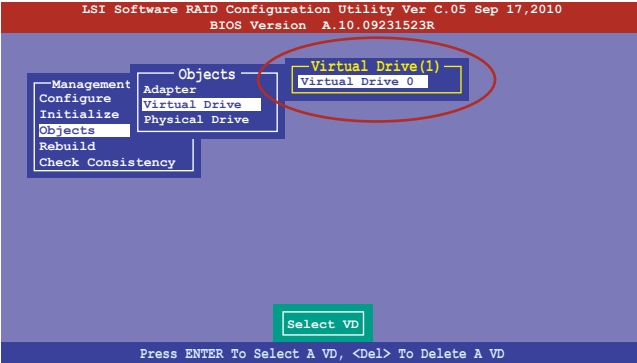
3. Select **Initialize** from the pop-up menu, and then press <Enter> to start initialization.

```
LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                  BIOS Version  A.10.09231523R

                       Objects        Virtual Drive(1)
        Management    Adapter         Virtual Drive 0
        Configure     Virtual Drive
        Initialize    Physical Drive
        Objects                      Virtual Drive(0)
        Rebuild                      Initialize
        Check Consistency            Check Consistency
                                     View/Update Parameters



                                Initialize VD
   Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

4. When prompted, press the <Space> to select **Yes** from the **Initialize?** dialog box, and then press <Enter>.

```
LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                  BIOS Version  A.10.09231523R

                       Objects       Virtual Drive(1)
        Management    Adapter        Virtual Drive 0
        Configure     Virtual Drive
        Initialize    Physical Drive
        Objects                      Virtual Drive(0)
        Rebuild                      Initialize
        Check Consistency            Check Consistency
                                     View/Update Parame   Initialize?
                                                          Yes
                                                          No


                        Init Will Destroy Data On Selected VD(s)
   Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

5. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.

## 6.2.4    Rebuilding failed drives

You can manually rebuild failed hard disk drives using the **Rebuild** command in the **Management Menu**.

To rebuild a failed hard disk drive

1.    From the **Management Menu**, select **Rebuild**, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version  A.10.09231523R


       ┌─Management Menu─┐
       │ Configure       │
       │ Initialize      │
       │ Objects         │
       │ Rebuild         │
       │ Check Consistency│
       └─────────────────┘






                              ┌──────────────┐
                              │ Rebuild VD(s)│
                              └──────────────┘
      Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

2.    The **PHYSICAL DRIVES SELECTION MENU** displays the available drives connected to the SATA ports. Select the drive you want to rebuild, and then press <Space>.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version  A.10.09231523R


    ┌─Manager┌── REBUILD - PHYSICAL DRIVES SELECTION MENU ──┐
    │ Configur│                  PORT #                      │
    │ Initiali│                                              │
    │ Objects │        0 │ ONLIN A00-00 │                    │
    │ Rebuild │        1 │ FAIL A00-01  │                    │
    │ Check Co│          │              │                    │
    └─────────│          │              │                    │
              │          │              │                    │
              │          │              │                    │
              │          │              │                    │
              └──────────────────────────────────────────────┘


             ┌──────────────────────────────────────────────┐
             │ Port # 1 DISK  77247MB  HDS72808PLA380  PF20A60A│
             └──────────────────────────────────────────────┘
      SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Virtual Drives
```

3.  After selecting the drive to rebuild, press <F10>. When prompted, press <Y> to rebuild the drive.

```
      LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                    BIOS Version  A.10.09231523R

    ┌─Manager         REBUILD - PHYSICAL DRIVES SELECTION MENU ─┐
    │Configur                      PORT #                       │
    │Initiali         0 │ ONLIN A00-00 │                        │
  ┌─────────────────────────────────────────────────────────────┐
  │ Rebuilding of Drive Will Take A Few Minutes. Start Rebuilding Drive (Y/N)? │
  └─────────────────────────────────────────────────────────────┘




        Port # 1 DISK  77247MB  HDS72808PLA380  PF20A60A
    SPACE-(De)Select,F10-Start Rebuild,F2-Drive Information,F3-View Virtual Drives
```

4.  When rebuild is complete, press any key to continue.

## 6.2.5    Checking the drives for data consistency

You can check and verify the accuracy of data redundancy in the selected virtual drive. The utility can automatically detect and/or detect and correct any differences in data redundancy depending on the selected option in the **Objects > Adapter** menu.

The **Check Consistency** command is available only for virtual drives included in a RAID 1 or RAID 10 set.

### Using the Check Consistency Command

To check data consistency using the **Check Consistency** command

1.    From the **Management Menu**, select **Check Consistency**, and then press <Enter>.
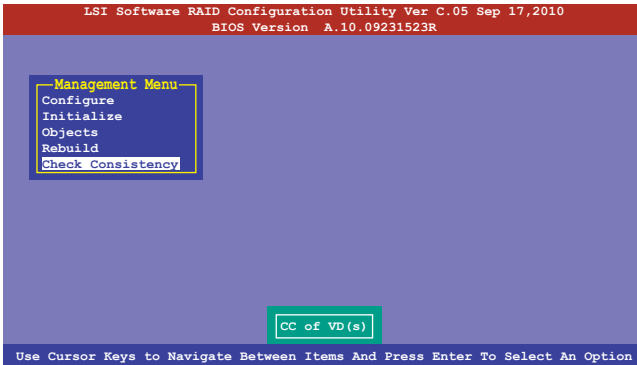
```
          LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version   A.10.09231523R


          ┌─Management Menu─┐
          │Configure        │
          │Initialize       │
          │Objects          │
          │Rebuild          │
          │Check Consistency│
          └─────────────────┘




                              ┌────────────┐
                              │ CC of VD(s)│
                              └────────────┘
          Use Cursor Keys to Navigate Between Items And Press Enter To Select An Option
```

2.    The screen displays the available RAID set(s) and prompts you to select the virtual drive to check. Press <Space> to select the virtual drive from the **Virtual Drive** sub-menu, and then press <F10>.

```
          LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                         BIOS Version   A.10.09231523R
                              ┌─── Virtual Drive(s) Configured ───┐
          ┌─Management Menu─┐ │ LD    RAID    Size    #Stripes   StripSz    Status │
          │Configure        │ │                                                    │
          │Initialize       │ │ 0     1     148.580GB    2        64KB     ONLINE  │
          │Objects          │ │                                                    │
          │Rebuild          │ │                                                    │
          │Check Consistency│ └────────────────────────────────────────────────────┘
          └─────────────────┘

          ┌─Virtual Drives─┐
          │Virtual Drive 0 │
          └────────────────┘


                              ┌───────────┐
                              │ Select VD │
                              └───────────┘
                         SPACE-(De)Select, F10-Initialize
```
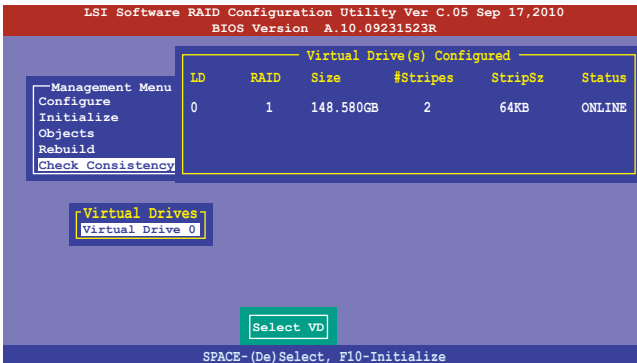
3. When prompted, use the arrow keys to select **Yes** from the **Consistency Check?** dialog box, and then press <Enter>.

```
      LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                    BIOS Version  A.10.09231523R

                       ┌─── Virtual Drive(s) Configured ───┐
                        LD     RAID   Size     #Stripes   StripSz    Status
  ┌─Management Menu      0      10    154494MB  2          64KB       ONLINE
   Configure
   Initialize
   Objects            ┌──── Consistency Check? ────┐
   Rebuild             Yes
  │Check Consistency   No


  ┌─ Virtual Drives ─┐
   Virtual Drive 0




                    ┌ Select VD(s) ┐

                  ──── SPACE-(De)Select, F10-Initialize ────
```

A progress bar appears on screen.

```
      LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                    BIOS Version  A.10.09231523R

                       ┌─── Virtual Drive(s) Configured ───┐
                        LD     RAID   Size     #Stripes   StripSz    Status
  ┌─Management Menu    ┌──── CC Under Process ────┐        ONLINE
   Configure
   Initialize          VD 0 Consistency Check. Press Esc to Abort.
   Objects
   Rebuild
  │Check Consistency          ¦85% Completed


  ┌─ Virtual Drives ─┐
   Virtual Drive 0



                ┌ The Data On The Drives Is Inconsistency. Repair Done! ┐

                  ──── SPACE-(De)Select, F10-Initialize ────
```

4. While checking the disk consistency, press <Esc> to display the following options.

- **Stop** - Stops the consistency check. The utility stores the percentage of disk checked, and when you restart checking, it continues from the last percentage completed rather than from zero percent.

- **Continue** - Continues the consistency check.

- **Abort** - Aborts the consistency check. When you restart checking, it continues from zero percent.

5. When checking is complete, press any key to continue.

**Using the Objects command**

To check data consistency using the **Objects** command

1.  From the **Management Menu**, select **Objects**, and then select **Virtual Drive** from the sub-menu.

2.  Use the arrow keys to select the virtual drive you want to check, and then press <Enter>.

3.  Select **Check Consistency** from the pop-up menu, and then press <Enter>.

4.  When prompted, use the arrow keys to select **Yes** from the dialog box to check the drive.

5.  When checking is complete, press any key to continue.

## 6.2.6    Deleting a RAID configuration

To delete a RAID configuration

1.    From the **Management Menu**, select **Configure** > **Clear Configuration**, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                          BIOS Version  A.10.09231523R

                      ┌ Configuration Menu ┐
                      │ Easy Configuration  │
         ┌Management Me│ New Configuration   │
         │Configure    │ View/Add Configuration│
         │Initialize   │ Clear Configuration │
         │Objects      │ Select Boot Drive   │
         │Rebuild      └─────────────────────┘
         │Check Consistency



                      ┌ Clear Existing Configuration ┐

         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```
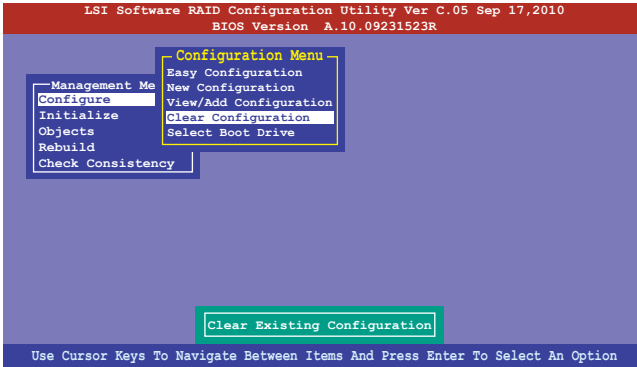
2.    When prompted, use the arrow keys to select **Yes** from the **Clear Configuration?** dialog box, and then press <Enter>.

```
         LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                          BIOS Version  A.10.09231523R

                    ┌ Configuration Menu ┐
                    │ Easy Configuration  │
         ┌Management Me│ New Configuration   │
         │Configure    │ View/Add Configuration│
         │Initialize   │ Clear ┌ Clear Configuration? ┐
         │Objects      │ Select│ Yes                  │
         │Rebuild      └───────│ No                   │
         │Check Consistency    └──────────────────────┘



                      ┌ Clear Existing Configuration ┐

         Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

The utility clears all the current array(s).

3.    Press any key to continue.

## 6.2.7 Selecting the boot drive from a RAID set

You must have created a new RAID configuration before you can select the boot drive from a RAID set. See section **6.2.1 Creating a RAID set: Using New Configuration** for details.

To select the boot drive from a RAID set

1. From the **Management Menu**, select **Configure** > **Select Boot Drive**, and then press <Enter>.
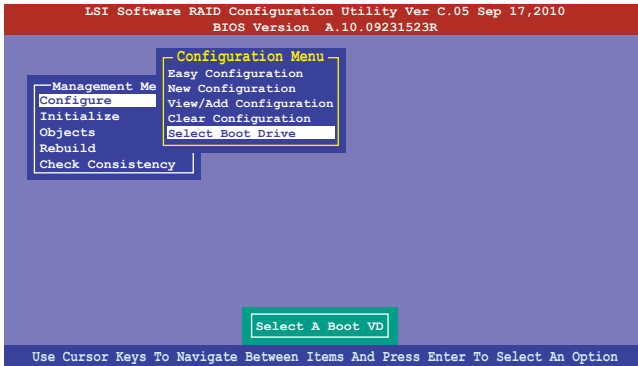


2. When prompted, use the arrow keys to select the bootable virtual drive from the list, then press <Enter>.
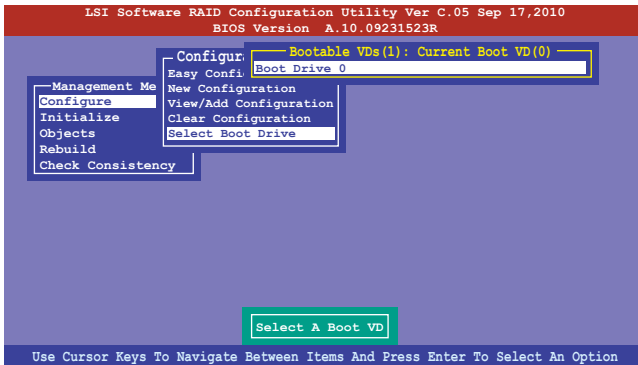


3. The virtual drive is selected as boot drive. Press any key to continue.

## 6.2.8 Enabling WriteCache

You may manually enable the RAID controller's WriteCache option after creating a RAID set to improve the data transmission performance.

When you enable WriteCache, you may lose data when a power interruption occurs while transmitting or exchanging data among the drives.

The WriteCache function is recommended for RAID 1 and RAID 10 sets.

To enable WriteCache

1. From the **Management Menu**, select **Objects** > **Adapter**, select an existing adapter, and then press <Enter> to display the adapter properties.

2. Select **Disk WC**, and then press <Enter> to turn on the option.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R

                                    ┌──────── Adapter 0 ────────┐
                    ┌── Objects ─   Rebuild Rate    = 30
     ┌─Management   Adapter         Chk Const Rate  = 30
     Configure      Virtual Drive   FGI Rate        = 30
     Initialize     Physical Driv   BGI Rate        = 30
     Objects                        Disk WC         = Off
     Rebuild                        Read Ahead      = On
     Check Consistency              Bios State      = Enable
                                    Cont On Error   = Yes
                                    Fast Init       = Enable
                                    Auto Rebuild    = On
                                    Auto Resume     = Enable
                                    Disk Coercion   = 1GB
                                    Factory Default

         ┌─────────────────────────────────────────────────────────┐
         │ Disk Write Cache - Off(Write Through or On(Write Back)   │
         └─────────────────────────────────────────────────────────┘
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

3. From the **Management Menu**, select **Objects** > **Virtual Drive**, select an existing adapter and press <Enter>. Select **View/Update Parameters** and press <Enter> to display the adapter properties.

4. Select **Disk WC**, and then press <Enter> to turn on the option.

```
        LSI Software RAID Configuration Utility Ver C.05 Sep 17,2010
                        BIOS Version  A.10.09231523R

                                    ┌──────── Virtual Drive ────────┐
                    ┌── Objects ─   RAID        = 0
     ┌─Management   Adapter         Size        = 148.580GB
     Configure      Virtual Drive   Stripe Size = 64KB
     Initialize     Physical Driv   #Stripes    = 2
     Objects                        State       = OPTIMAL
     Rebuild                        Spans       = 1
     Check Consistency              Disk WC     = On
                                    Read Ahead  = On

         ┌─────────────────────────────────────────────────────────┐
         │ Disk Write Cache Setting of VD                          │
         └─────────────────────────────────────────────────────────┘
     Use Cursor Keys To Navigate Between Items And Press Enter To Select An Option
```

5. When finished, press any key to continue.

## 6.3 Intel® Rapid Storage Technology enterprise SATA Option ROM Utility

The Intel® Rapid Storage Technology enterprise SATA 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 sections **Installing hard disk drives**, **Setting Jumpers**, and **Setting the RAID mode in BIOS** for more information.

To launch the Intel® Rapid Storage Technology enterprise SATA 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.

## 6.3.1    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 ═══
```
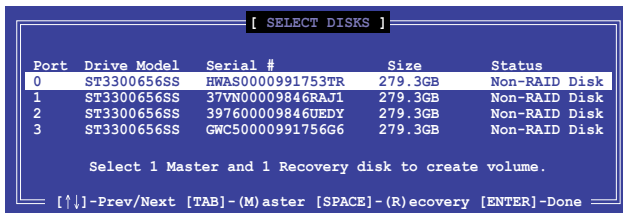
5.    Use the up/down arrow keys to move the selection bar then press <Space> to select a disk. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

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):
```
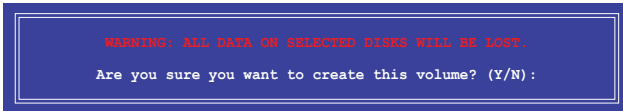
## 6.3.2 Deleting a RAID set

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):
```

## 6.3.3    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.

## 6.3.4    Exiting the Intel® Rapid Storage Technology enterprise SATA 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):
```
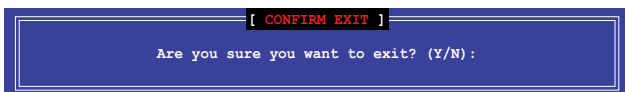
## 6.3.5    Rebuilding the RAID

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. Selectign
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     XXXXXXXXXX     XXXXXXXX           XXX.GB


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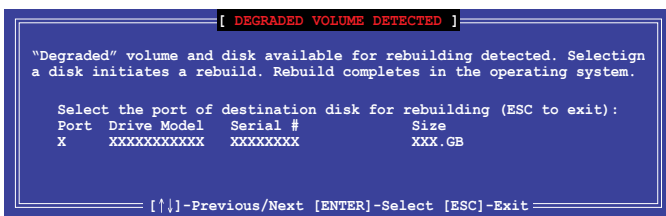
Select a destination disk with the same size as the original hard disk.

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**.

## 6.3.6    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>.

## 6.4 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.
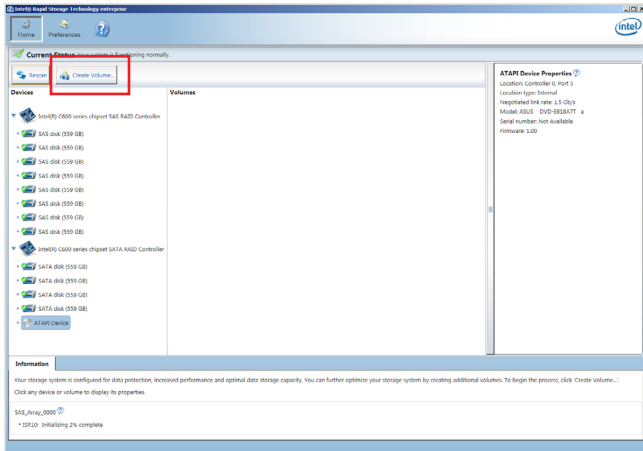


You can click **Rescan** to re-scan any attached hard disks.

## 6.4.1    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**.
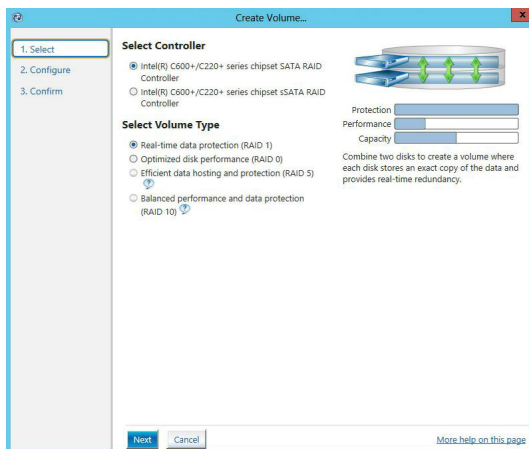


3.    Enter a name for the RAID set, then select the array disks.

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

5.    Click **Next**.
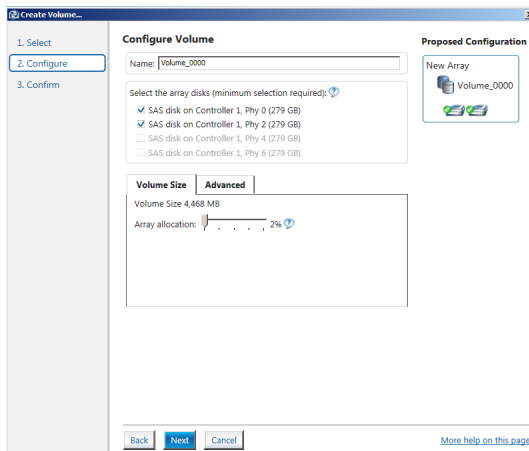


- •    If you do not want to keep the data on one of the selected disks, select **NO** when prompted.

- •    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.
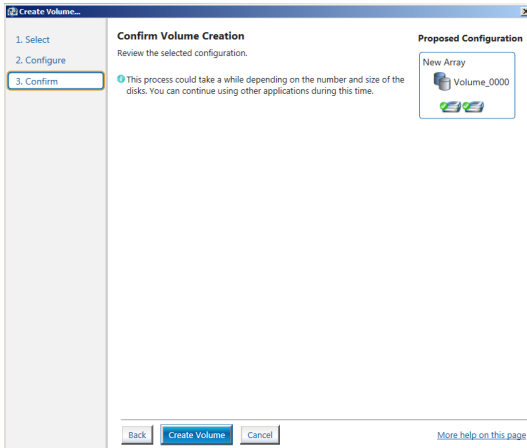


7.   Wait until the process is completed, then click **OK** when prompted.
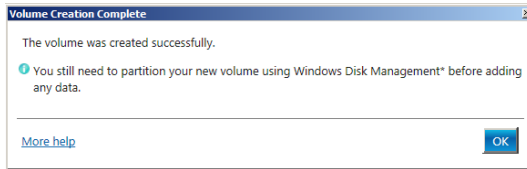


> You still need to partition your new volume using Windows Disk Management before adding any data.

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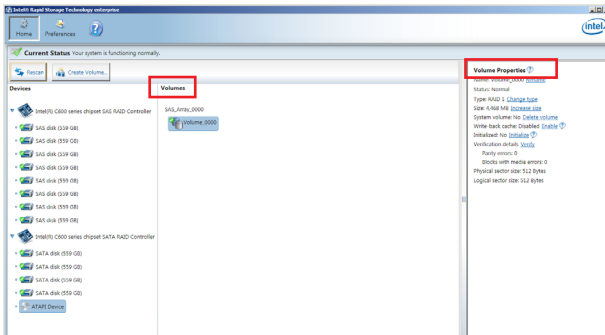
## 6.4.2    Changing a Volume Type

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**.
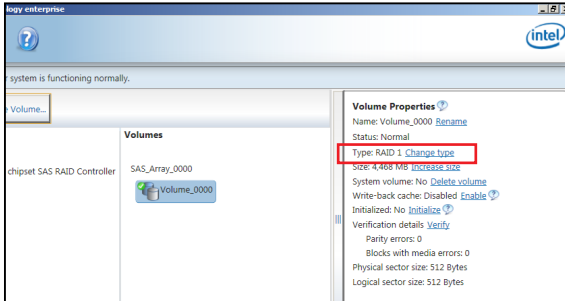


3.    You can change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

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
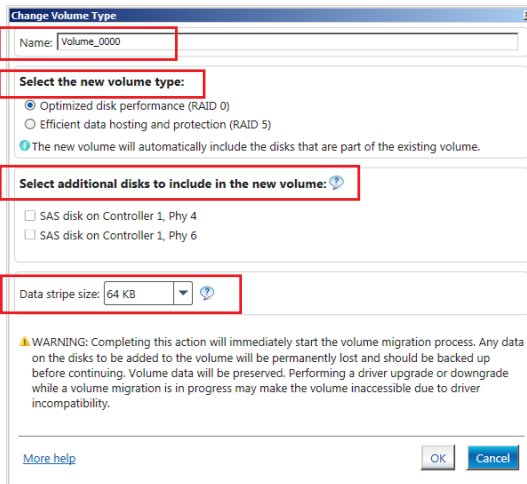


We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

## 6.4.3    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.
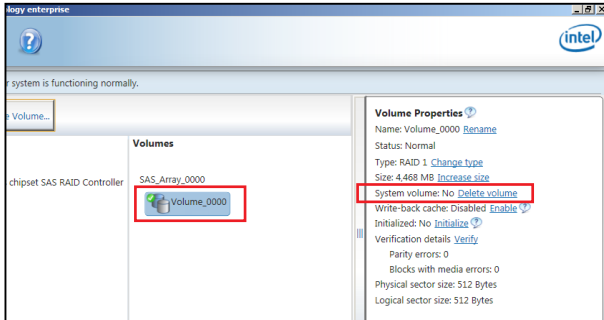


2.    Select **Delete volume** in **Volume Properties** field. The following screen appears.
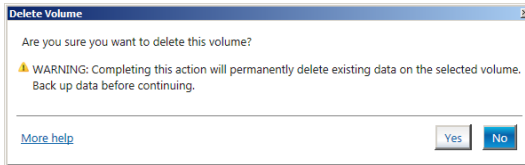


3.    Click **Yes** to delete the volume and return to the utility main menu, or click **No** to return to the main menu.

## 6.4.4 Preferences

**System Preferences**

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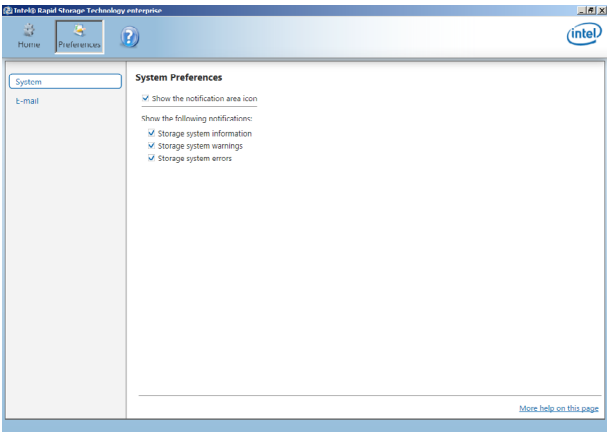


**E-Mail Preferences**

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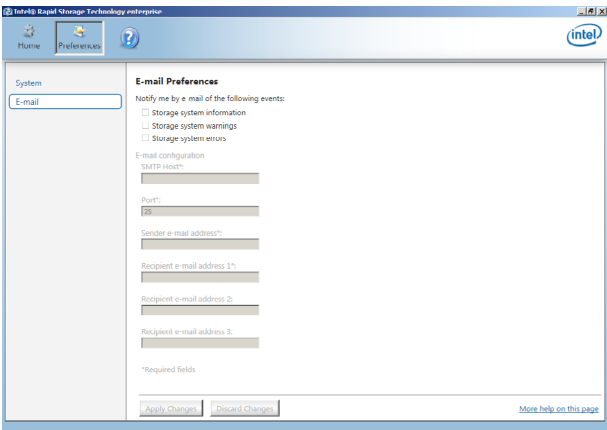
# Driver Installation

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.

If you have created RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical disk drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

A floppy disk with the RAID driver is required when installing Windows® XP / Server 2003 or Linux 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 the computer, and then enter the BIOS Setup.

3. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes, and then exit the BIOS Setup.

4. Restart the computer.

5. From the **Create Driver Diskette Menu, u**se the arrow keys to select a sub-menu. To create the RAID driver disk, select **C610 INTEL RAID Driver** then press <Enter>.

```
Create Driver Diskette Menu
C610 INTEL RAID Driver
Write DMI
FreeDOS command prompt
```
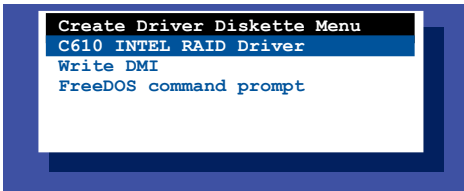
6. Locate the RAID driver you need then place a blank, high-density floppy disk to the floppy disk drive.

7. Press <Enter>.

8. Follow screen instructions to create the driver disk.

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, and 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.

To create a RAID driver disk in Red Hat® Enterprise Linux server environment

1.    Insert a blank formatted high-density floppy disk to the USB floppy disk drive.

2.    Type `dd if=XXX.img of=/dev/fd0` to decompress the file into the floppy disk from the following path in the support DVD:

      For LSI MegaRAID Driver

            **\Drivers\C60x LSI RAID\Driver\makedisk\Linux**

3.    Eject the floppy disk.

## 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)**.
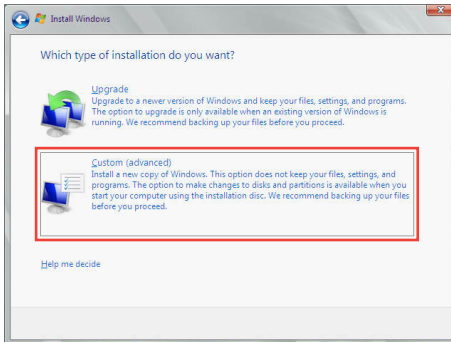


3.  Click **Load Driver**.
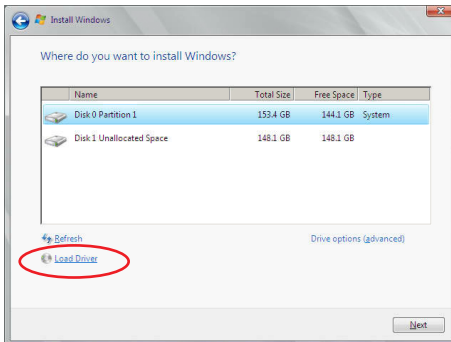
4.    A message appears, reminding you to insert the installation media containing the driver of the RAID controller driver. If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD into the optical drive. Click **Browse** to continue.
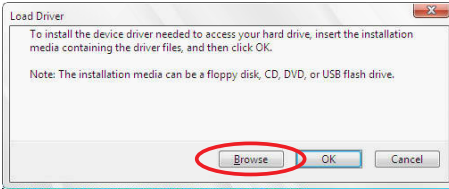


5.    Locate the driver in the corresponding folder of the Support DVD then click **OK** to continue.

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**.
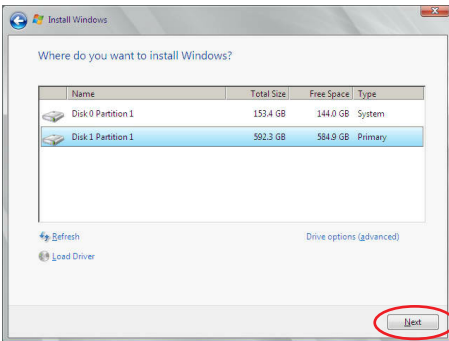


8.    Setup then proceeds with the OS installation. Follow screen instructions to continue.

## Red Hat® Enterprise Linux OS 5.6

To install the LSI MegaRAID controller driver when installing Red Hat® Enterprise OS:

1.  Boot the system from the Red Hat® OS installation CD.

2.  At the `boot:`, type `linux dd noprobe=ata1 noprobe=ata2...`, then press <Enter>.

The number of ata varies with the hard disk drive number you have when building a RAID set. For example, if you want to build a RAID set with 6 hard disk drives, type command line: **linux dd noprobe=ata1 noprobe=ata2 noprobe=ata3 noprobe=ata4 noprobe=ata5 noprobe=ata6**.

```
-   To install or upgrade in graphical mode, press the <ENTER> key.
-   To install or upgrade in text mode, type: linux text <ENTER>.
-   Use the function keys listed below for more information.
[F1-Main] [F2-Options] [F3-General] [F4-Kernel] [F5-Rescue]
boot: linux dd noprobe=ata1 noprobe=ata2
```

3.  Select **Yes** using the <Tab> key when asked if you have the driver disk, then press <Enter>.
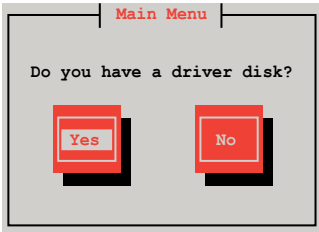
```
┤ Main Menu ├

  Do you have a driver disk?

    Yes              No
```

4.  Insert the Red Hat® Enterprise RAID driver disk to the USB floppy disk drive, select **OK**, then press <Enter>.

```
┤ Insert Driver Disk ├

  Insert your driver disk into /dev/fd0
  and press "OK" to continue.

    OK              Back
```

The drivers for the RAID card are installed to the system.

5. When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>.

```
┤ More Driver Disks? ├

 Do you wish to load any more
 driver disks?




    Yes              No
```
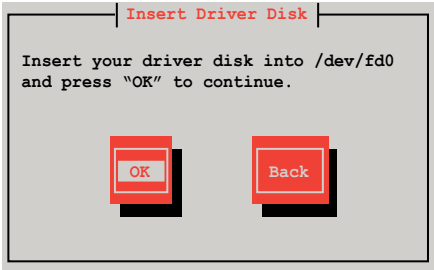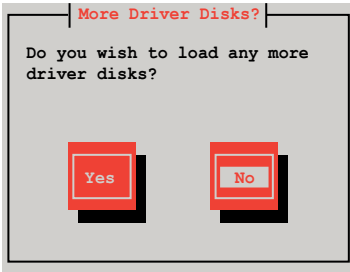
6. Follow the onscreen instructions to finish the OS installation.

7. When the installation is completed, DO NOT click **Reboot**. Press <Ctrl> + <Alt> + <F2> to switch to the command-line interface from graphic user interface.

8. Type the following commands when using a Legacy floppy.

**mkdir /mnt/driver**
**mount /dev/fd0 /mnt/driver**
**cd /mnt/driver**
**sh replace_ahci.sh**
**reboot**

## Red Hat® Enterprise Linux OS 6.1

To install the LSI MegaRAID controller driver when installing Red Hat® Enterprise OS:

1.    Boot the system from the Red Hat® OS installation CD.

2.    Press <Tab> to edit options.

```
            Welcome to Red Hat Enterprise Linux 6.1!

    Install or upgrade an existing system
    Install system with basic video driver
    Rescue installed system
    Boot from local drive
    Memory test








            Press [Tab] to edit options
```
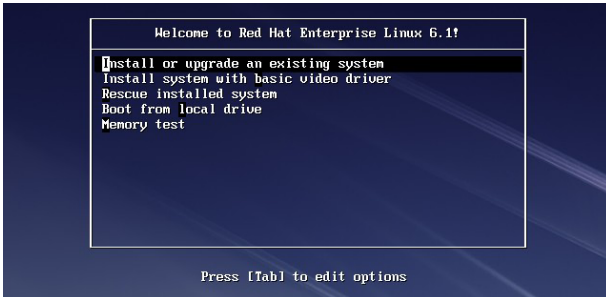
3.    While booting from DVD, press <ESC> to give the third party driver. Enter the following command at the boot: **Linux dd blacklist=isci blacklist=ahci nodmraid**, then press <ENTER>.
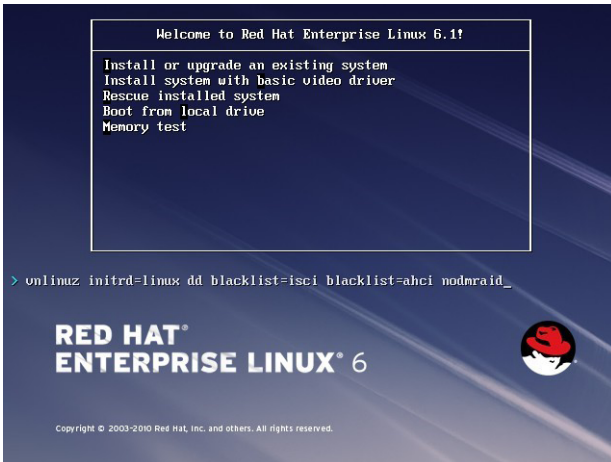
```
            Welcome to Red Hat Enterprise Linux 6.1!

    Install or upgrade an existing system
    Install system with basic video driver
    Rescue installed system
    Boot from local drive
    Memory test




> vmlinuz initrd=linux dd blacklist=isci blacklist=ahci nodmraid_
```

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**ENTERPRISE LINUX® 6**

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4.	Select Yes using the <Tab> key when asked if you have the driver disk, then press <Enter>.

```
┌──────────────┤ Main Menu ├──────────────┐
│                                          │
│  Do you have a driver disk?              │
│                                          │
│                                          │
│                                          │
│      ┌─────────┐      ┌─────────┐        │
│      │   Yes   │      │   No    │        │
│      └─────────┘      └─────────┘        │
│                                          │
└──────────────────────────────────────────┘
```
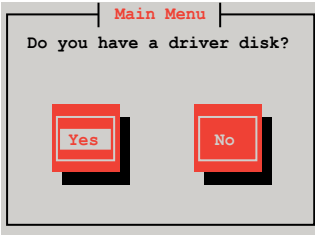
5	.	You have multiple devices which could serve as source for a driver disk. Choose one you like to use and select **OK**, then press <Enter>.
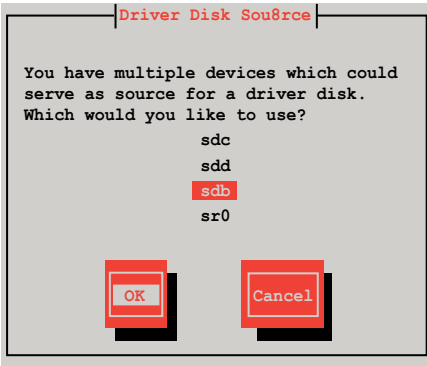
```
┌───────────────┤ Driver Disk Sou8rce ├───────────────┐
│                                                      │
│  You have multiple devices which could              │
│  serve as source for a driver disk.                 │
│  Which would you like to use?                       │
│                  sdc                                 │
│                  sdd                                 │
│                  sdb                                 │
│                  sr0                                 │
│                                                      │
│                                                      │
│       ┌─────────┐          ┌─────────┐               │
│       │   OK    │          │ Cancel  │               │
│       └─────────┘          └─────────┘               │
│                                                      │
└──────────────────────────────────────────────────────┘
```

6.  Insert the Red Hat® Enterprise RAID driver disk to the USB floppy disk drive, select **OK**, then press <Enter>.

```
┤ Insert Driver Disk ├

Insert your driver disk into /dev/sdb
and press "OK" to continue.


        OK              Back
```
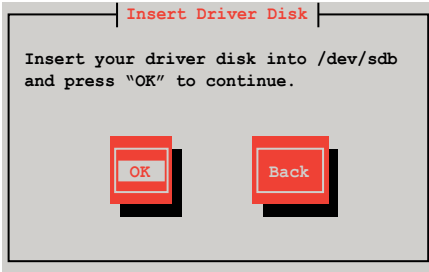
The drivers for the RAID card are installed to the system.

7.  When asked if you will load additional RAID controller drivers, select **No**, then press <Enter>.

```
┤ More Driver Disks? ├

Do you wish to load any more
driver disks?


      Yes             No
```
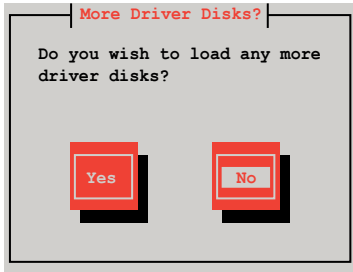
8.  Follow the onscreen instructions to finish the OS installation.

## Preparing the Linux Driver

Ensure that there is another computer with a Linux-based OS to create the RAID driver. When creating the RAID driver, you may refer to the examples below which uses a 64bit SUSE Linux system to create a 64bit RAID driver for SUSE11 sp1.

1.  Copy the image file into the Linux system.

    Example: `megasr-15.00.0120.2012-1-sles11-ga-x86_64.img`

2.  Create a folder.

    Example: `image`

3.  Mount the image file into the image folder using this command format:

    `mount -oloop [image file name] image`

    Example: `mount -oloop megasr-15-15.00.0120.2012-1-sles11-ga-x86__64.img image`
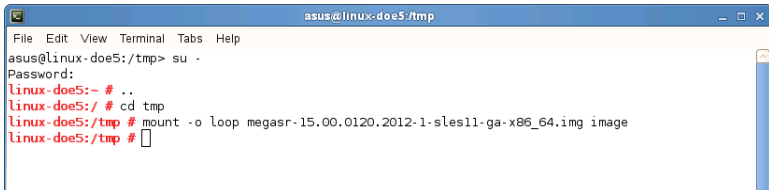


4.  Copy the contents of the image directory, labeled as **01**, into  a FAT32 USB drive.
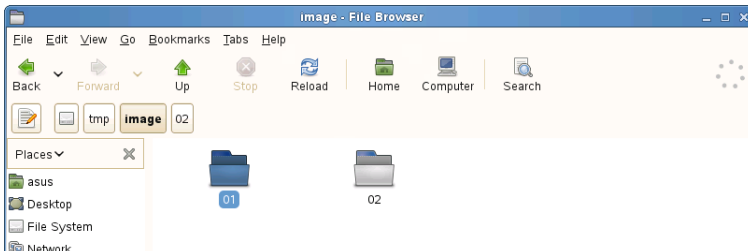


5.  Rename the **01** folder to **CD Image**.
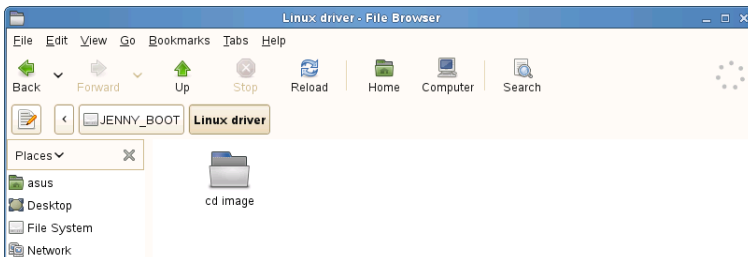
## Installing SUSE 11 Linux OS

To install the LSI MegaRAID controller driver when installing SUSE Linux Enterprise Server OS:

1.    Boot the system from the SUSE OS installation CD.

2.    Use the arrow keys to select **Installation** from the **Boot Options** menu.



3.    Press <F6>, then select **Yes** from the menu. Press <Enter>.
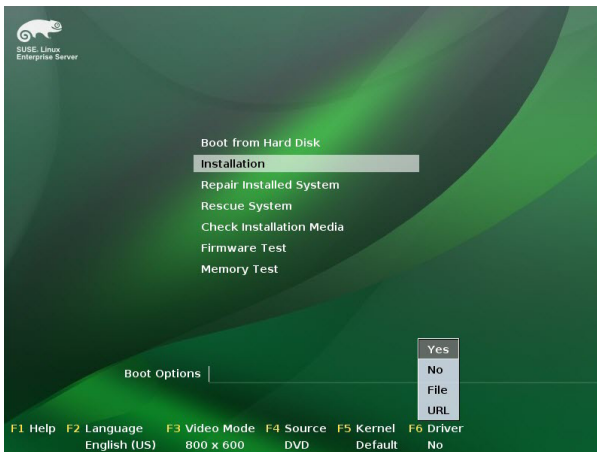
4. Use the USB drive to provide the third-party driver during the OS installation. Type the command **brokenmodules=ahci** in **Boot Options** field, and press <Enter>.



5. When below screen appears, select the USB floppy disk drive (sda) as the driver update medium. Select **OK**, then press <Enter>.
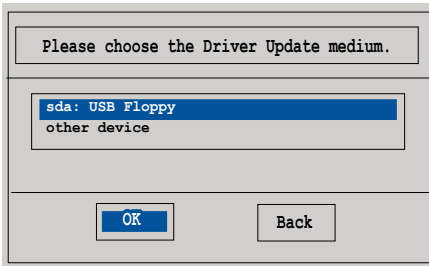


6. Select **Back** and follow the onscreen instructions to finish the installation.

## 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.  MakeDisk

4.  Manual

5.  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.
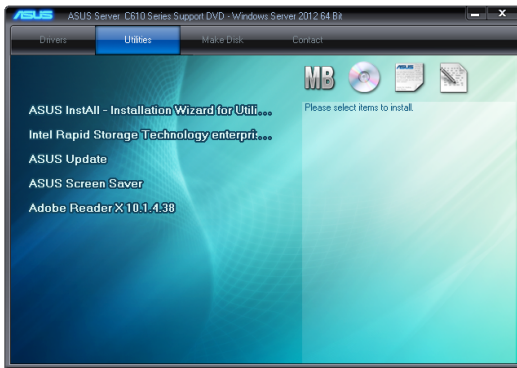
### 7.3.3 MakeDisk menu tab

The MakeDisk menu contains items to create the Intel RAID driver disks.

Press the arrow down button in the lower part of the menu to view more items.
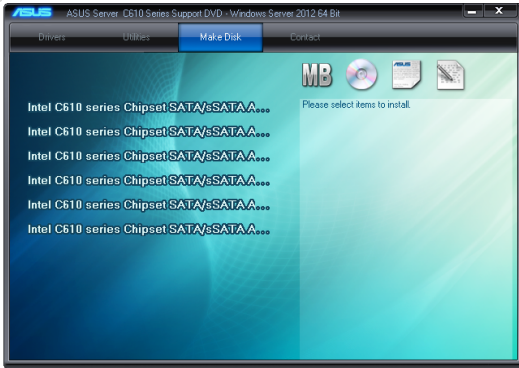
### 7.3.4 Manual menu

The Manual menu provides the link to the Broadcom NetXtreme II Network Adapter user guide.

You need an internet browser installed in your OS to view the User Guide.
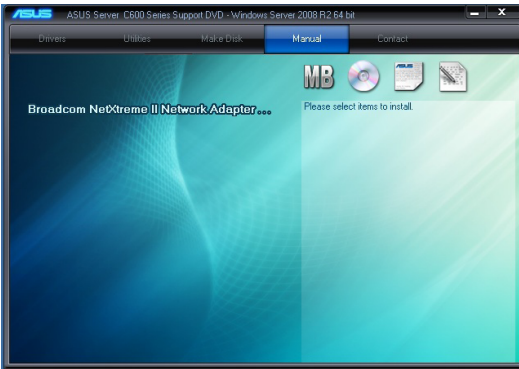
### 7.3.5     Contact information menu

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.
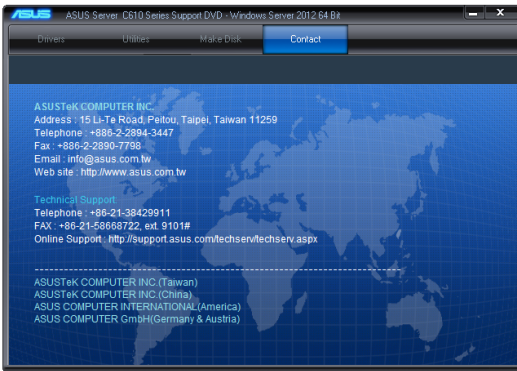
## 7.4 Intel® chipset device software installation

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:

1. Restart the computer, and then log on with **Administrator** privileges.

2. Insert the motherboard/system 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.

3. Click the item **Intel Chipset Device Software** from the menu.



4. The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.

5.	Select **Yes** to accept the terms of the **License Agreement** and continue the process.



6.	Read the **Readme File Information** and press **Next** to continue the installation.
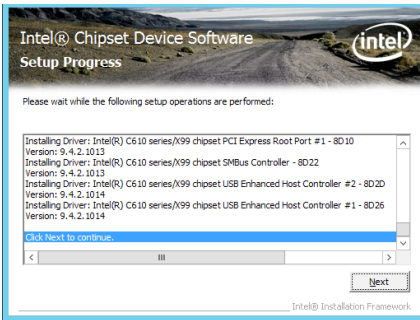


7.	Toggle **Yes, I want to restart the computer now** and click **Finish** to complete the setup process.

## 7.5 Installing the Intel® I350-AM1/I350-AM2/I210 X540-BT2 Gigabit Adapters driver

This section provides the instructions on how to install the **Intel® I350-AM1/I350-AM2/ I210/X540-BT2 Gigabits Adapter Driver** on the system.

To install the **Intel® I350-AM1/I350-AM2/I210/X540-BT2 Gigabi**t **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® I350-AM1/I350-AM2/I210/X540-BT2 Gigabit Adapters Drivers** in the **Drivers** menu of the main screen to start the installation.
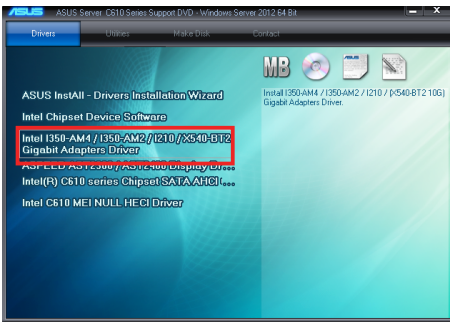


5. Click **Install Drivers and Software** option to begin installation.
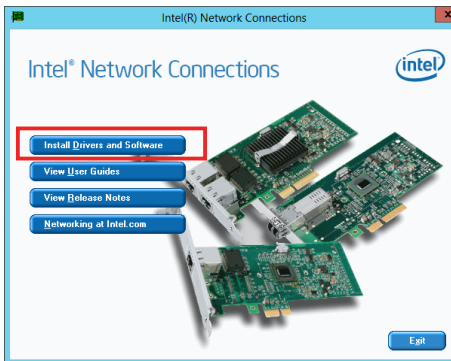
6.  Click **Next** when the **Intel(R) Network Connections–InstallShield Wizard** window appears.
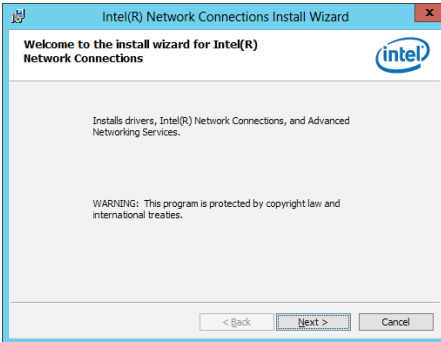


7.  Tick **I accept the terms in the license agreement** and click **Next** to continue.
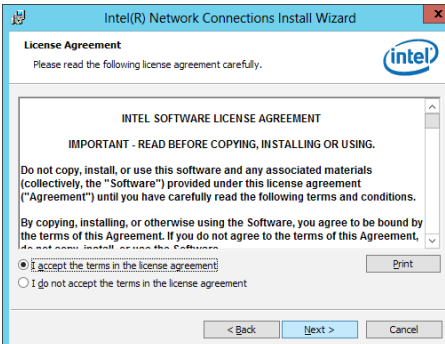


8.  From the **Setup Options** window, click **Next** to start the installation.

    By default, **Intel(R) PROSet for Windows Device Manager** and Windows PowerShell Module are ticked.
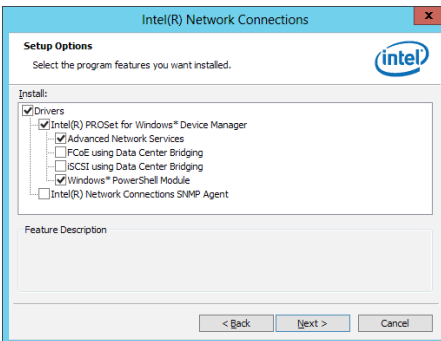
9.  Click **Install** to start the installation.
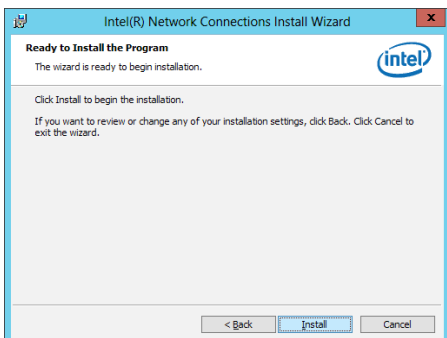
    

10. When the installation is done, press **Finish** to complete the installation.
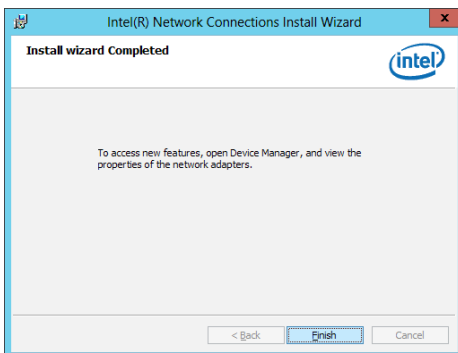
# 7.6    VGA driver installation

This section provides the instructions on how to install the ASPEED Video Graphics Adapter (VGA) driver.

You need to manually install the ASPEED VGA driver on a Windows® operating system.

To install the ASPEED VGA driver:

1.    Restart the computer, and then log on with **Administrator** privileges.

2.    Insert the motherboard/system 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.

3.    Click the **ASPEED AST2300 / AST2400 Display Driver** to begin installation.
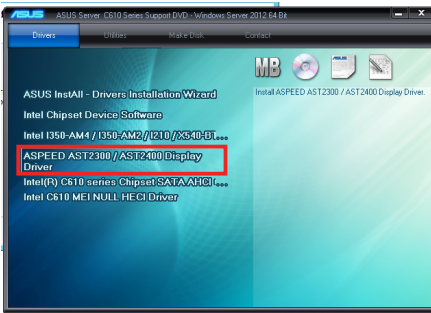


4.    From the installation window, click **Next** to start the installation.

5.    Click **Install** to proceed with the installation.
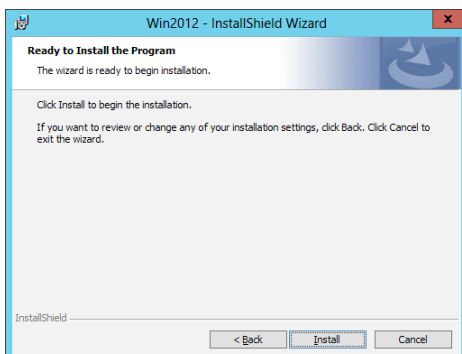


6.    Click **Finish** to complete the installation.
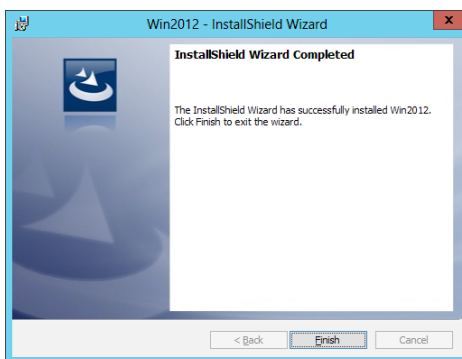
## 7.7 Intel® Rapid Storage Technology enterprise 4.0 installation

This section provides the instructions on how to install the Intel® Rapid Storage Technology enterprise 4.0 on the system.

You need to manually install the Intel® Rapid Storage Technology enterprise 4.0 utility on a Windows® operating system.

To install the Intel® Rapid Storage Technology enterprise 4.0 utility:

1.  Restart the computer, and then log on with **Administrator** privileges.

2.  Insert the motherboard/system support DVD to the optical drive, and find the utility menu.

3.  Click the **Intel® Rapid Storage Technology enterprise 4.0** to begin installation.
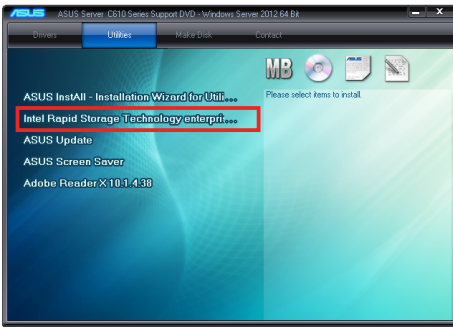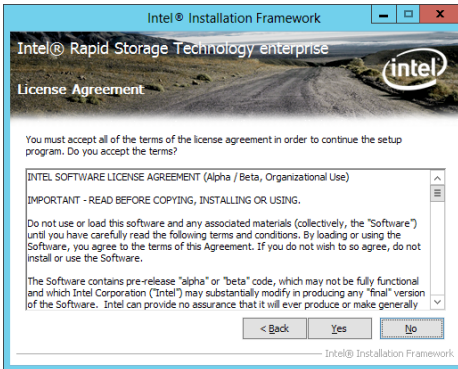


4.  When the **Welcome to the Setup Program** appears, click **Next** to start the installation.
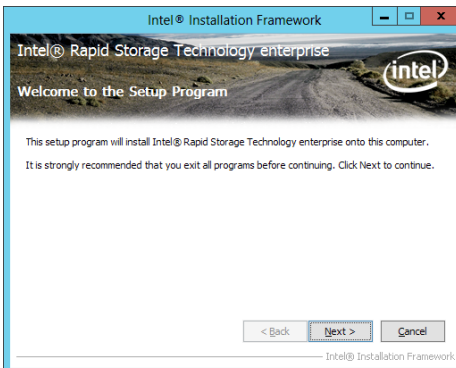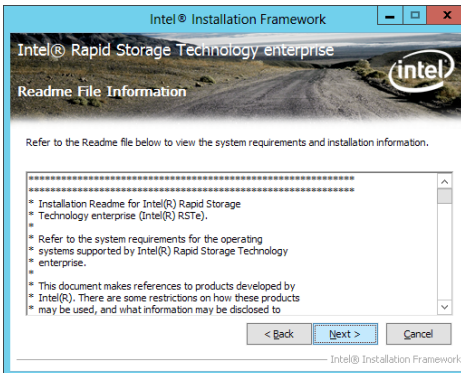
5. Read the **Warning** message and click **Next** to continue.
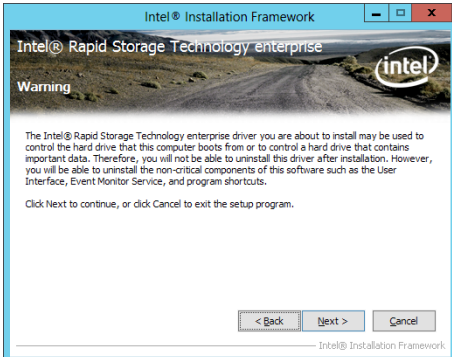


6. Read the **License Agreement** and click **Yes** to continue.



7. Read the **Readme File Information** and click **Next** to continue.

8.    After completing the installation, click **Next** to complete the setup process.

9.    Select **Yes, I want to restart my computer now** and click **Finish** to restart your computer before using the program.

# Contact Information

A

# ASUS contact information

## ASUSTeK COMPUTER INC.

| | |
|---|---|
| Address | 15 Li-Te Road, Peitou, Taipei, Taiwan 11259 |
| Telephone | +886-2-2894-3447 |
| Fax | +886-2-2890-7798 |
| E-mail | info@asus.com.tw |
| Web site | http://www.asus.com.tw |

### Technical Support

| | |
|---|---|
| Telephone | +86-21-38429911 |
| Fax | +86-21-58668722 ext: 9101 |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASUSTeK COMPUTER INC. (Taiwan)

| | |
|---|---|
| Address | 15 Li-Te Road, Peitou, Taipei, Taiwan 11259 |
| Telephone | +886-2-2894-3447 |
| Fax | +886-2-2890-7798 |
| E-mail | info@asus.com.tw |
| Web site | http://www.asus.com.tw |

### Technical Support

| | |
|---|---|
| Telephone | +886-2-2894-3447 (0800-093-456) |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASUSTeK COMPUTER INC. (China)

| | |
|---|---|
| Address | No.508, Chundong Road, Xinzhuang Industrial Zone, Minhang District, Shanghai, China. |
| Telephone | +86-21-5442-1616 |
| Fax | +86-21-5442-0099 |
| Web site | http://www.asus.com.cn |

### Technical Support

| | |
|---|---|
| Telephone | +86-21-3407-4610 (800-820-6655) |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

# ASUS contact information

## ASUS COMPUTER INTERNATIONAL (America)

| | |
|---|---|
| Address | 800 Corporate Way, Fremont, CA 94539, USA |
| Fax | +1-510-608-4555 |
| Web site | http://usa.asus.com |

### *Technical Support*

| | |
|---|---|
| Support fax | +1-812-284-0883 |
| General support | +1-812-282-2787 |
| Online support | http://support.asus.com/techserv/techserv.aspx |

## ASUS COMPUTER GmbH (Germany and Austria)

| | |
|---|---|
| Address | Harkort Str. 21-23, D-40880 Ratingen, Germany |
| Fax | +49-2102-959911 |
| Web site | http://www.asus.de |
| Online contact | http://www.asus.de/sales |

### *Technical Support*

| | |
|---|---|
| Telephone | +49-1805-010923 |
| Support Fax | +49-2102-959911 |
| Online support | http://support.asus.com/techserv/techserv.aspx |

## ASUS Czech Service s.r.o. (Europe)

| | |
|---|---|
| Address | Na Rovince 887, 720 00   Ostrava – Hrabová, Czech Republic |
| Telephone | +420-596766888 |
| Web site | http://www.asus.cz |

### *Technical Support*

| | |
|---|---|
| Telephone | +420-596-766-891 |
| Fax | +420-596-766-329 |
| E-mail | advance.rma.eu@asus.com |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

# ASUS contact information

## ASUS Holland BV (The Netherlands)

| | |
|---|---|
| Address | Marconistraat 2, 7825GD EMMEN, The Netherlands |
| Web site | http://www.asus.com |

### *Technical Support*

| | |
|---|---|
| Telephone | +31-(0)591-5-70292 |
| Fax | +31-(0)591-666853 |
| E-mail | advance.rma.eu@asus.com |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASUS Polska Sp. z o.o. (Poland)

| | |
|---|---|
| Address | Ul. Postępu 6, 02-676 Warszawa, Poland |
| Web site | http://pl.asus.com |

### *Technical Support*

| | |
|---|---|
| Telephone | +48-225718033 |
| Online Support | http://support.asus.com/techserv/techserv.aspx |

## ASK-Service (Russia and CIS)

| | |
|---|---|
| Address | г.Москва, ул. Орджоникидзе, д.10, Россия |
| Telephone | (495) 640-32-75 |
| Web site | http://ru.asus.com |

### *Technical Support*

| | |
|---|---|
| Telephone | 008-800-100-ASUS (008-800-100-2787) |
| Online Support | http://vip.asus.com/eservice/techserv.aspx?SLanguage=ru |