RS100-E8-PI2

1U Rackmount Server

User Guide

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

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

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

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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 B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class B 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://green.asus.com/english/REACH.htm.

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 at 1300 2787 88 or visit us at http://support.asus.com.

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, contact a qualified service technician or your dealer. 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 service.

- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.

- Before operating the server, carefully read all the manuals included with the server package.

- Before using the server, make sure 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.

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 overview**

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

2. **Chapter 2: Hardware setup**

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

3. **Chapter 3: Rackmount installation**

   This chapter describes how to install the rackmount rail kit to the barebone server

4. **Chapter 4: Motherboard information**

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

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

7. **Chapter 7: Driver installation**

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

Conventions

To make sure 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 completing a task.

CAUTION: Information to prevent damage to the components when completing 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>+<D>
`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.

Chapter 1

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

1.1   System package contents

Check your system package for the following items.

Model Name	RS100-E8-PI2
Chassis	ASUS R09 1U Rackmount Chassis
Motherboard	ASUS P9D-M Server Board
Component	1 x 250W Single Power Supply 2 x SATA Cables 1 x PCI Express x16 Riser Card (RE16L-R9A) 1 x Front I/O Board (FPB-R20D) 2 x System Fans (40mm x 28mm) 1 x Fan Duct
Accessories	1 x RS100-E8-PI2 User's Guide 1 x RS100-E8-PI2 Support CD 1 x Bag of Screws 1 x AC Power Cable 1 x CPU Heatsink
Optional Items	ASUS ASMB7-iKVM Remote management card Slim-type Optical Device Ball Bearing Rail Kit 1 x SSD drive tray with Power and SATA cable

> 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, take note of the product's 14-character serial number as seen in the example xxS0xxxxxxxxxx below. With the correct serial number of the product, ASUS Technical Support team members can quickly identify the server model and provide a satisfactory solution to your technical issue.

1.3   System specifications

The ASUS RS100-E8-PI2 is a 1U barebone server system featuring the ASUS P9D-M server board.

Model Name		RS100-E8/PI2
Processor / System Bus		1 x Socket LGA1150
		Intel® Xeon® E3-1200 v3 Processor Family
Core Logic		Intel® C224 Chipset
ASUS Features	**Smart Fan**	√
	ASWM Enterprise	√
Memory	**Total Slots**	4 (2 Channels)
	Capacity	Maximum up to 32GB
	Memory Type	DDR3 1333 / 1600 Unbuffered DIMM with ECC
	Memory Size	2GB, 4GB, 8GB
Expansion Slots	**Total PCI/PCI-X/ PCI-E Slots**	1
	Slot Type	1 x PCI-E 3.0 x16 slot (x8 link) (Full-Height/HL)
Storage		4 x SATA3 6Gb/s 2 x SATA2 3Gb/s Intel® RSTe supports software RAID 0,1
HDD Bays	**I = internal A or S = hot-swappable**	2 x Internal 3.5-inch SATA3 HDD bay Or 1 x internal 3.5-inch SATA3 HDD bay + 1 x internal SSD bay* (Optional) ***Can support up to two 2.5-inch SSDs.**
Networking	**LAN**	2 x Intel® I210AT 1 x Mgmt LAN
Graphic	**VGA**	Aspeed® AST2300 32MB
Auxiliary Storage FDD / CD / DVD		1 x Slim-type Optical Device Bay (Options: No ODD / DVD-ROM / DVD-RW)
Onboard I/O		1 x External Serial Port 3 x RJ-45 ports (1 for ASMB7-iKVM) 4 x USB 3.0 ports (Front x 2, Rear x 2) 1 x VGA port 2 x USB 2.0 port (Rear x2) 1 x PS/2 keyboard/mouse port

OS Support	Windows® Server 2012 64-bit Windows® 8 64-bit Windows® Server 2008 Enterprise SP2 64-bit Windows® Server 2008 Enterprise R2 SP1 64-bit RedHat® Enterprise Linux AS 5.8 / 6.2 / 6.3 U8 64-bit CentOS 5.8 / 6.2 / 6.3 64-bit Ubuntu 12.04 LTS 64-bit ***Supported OS versions are subject to change without notice**	
Anti-virus Software	Optional anti-virus CD Pack	
Management Solution	Out of Band Remote Hardware	Optional ASMB7-iKVM for KVM-over-IP support
	Software	ASUS ASWM Enterprise®
Net Weight Kg (CPU, DRAM & HDD not included)	6.5 Kg	
Dimensions (DD x WW x HH)	380mm x 430mm x 43.4mm	
Power Supply	250W Single Power Supply	
Power Rating	Input: 100-240Vac, 4A, 50-60Hz, Class I	
Environment	Operation temperature: 10°C–40°C Non-operating temperature: -40°C–70°C Non-operation humidity: 20%–90% (Non-condensing)	

*Specifications are subject to change without notice.

1.4   Front panel features

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

Refer to section **1.7.1 Front panel LEDs** for the LED descriptions.
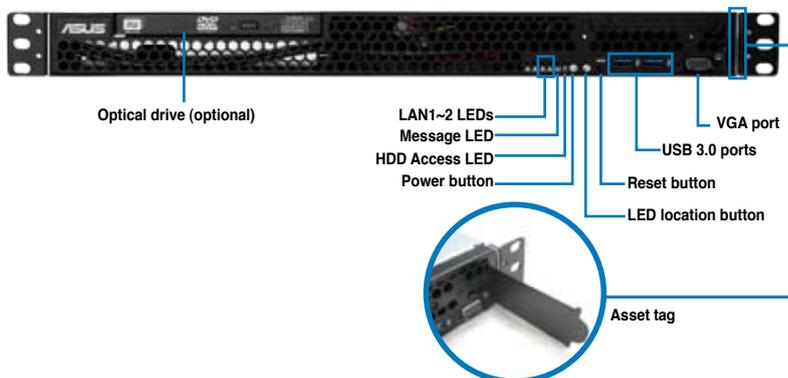
Optical drive (optional)

LAN1~2 LEDs
Message LED
HDD Access LED
Power button

VGA port

USB 3.0 ports

Reset button

LED location button

Asset tag

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

1.5   Rear panel features

The rear panel has the AC power socket and access to any added expansion cards. The I/O shield with openings for the rear panel connectors on the motherboard are also found in the rear panel.

PS/2 mouse/keyboard combo port

LAN port 3*

USB 3.0 ports

AC power socket

USB 2.0 ports

LAN ports 1~2

Serial port

VGA port
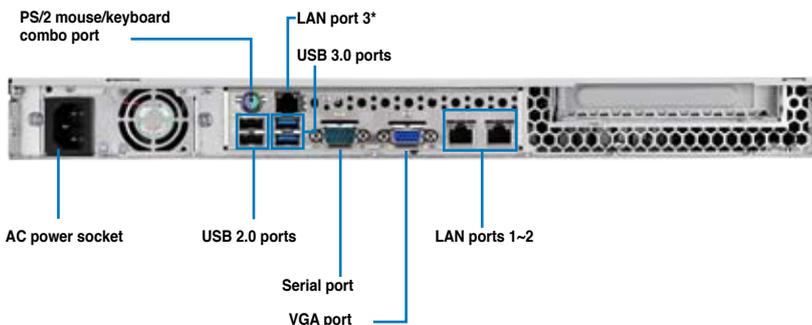
- • The ports for the PS/2 mouse/keyboard combo, USB 2.0 / USB 3.0, VGA, COM port, and Gigabit LAN do not appear on the rear panel if the motherboard is not installed.

- • *This port is for an ASUS ASMB7-iKVM controller card only.

1.6   Internal features

The barebone server includes the basic components as shown.
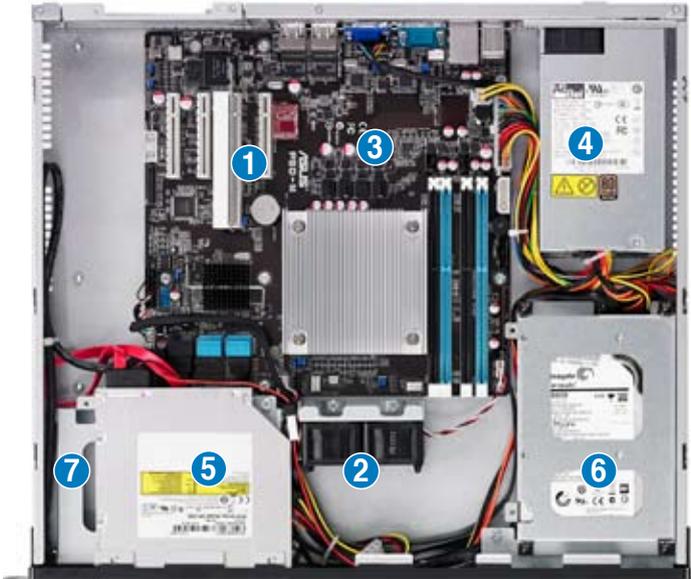
1.   PCI Express x16 Riser Card (at x8 link)

2.   System Fan (x2)

3.   ASUS P9D-M Server board

4.   Power Supply

5.   Slim-type Optical Drive (Optional)

6.   HDD Tray 1

7.   HDD Tray 2 (partly hidden)

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

This 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

1.7 LED information

1.7.1 Front panel LEDs

LAN1~2 LED

Message LED

HDD Access LED

Location LED
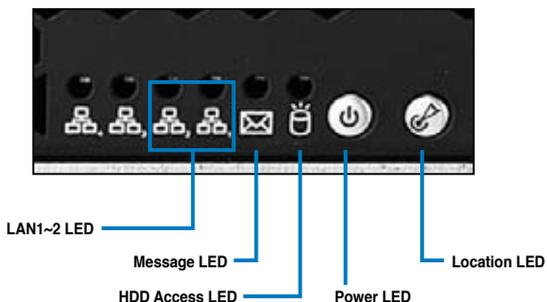
Power LED

LED	Icon	Display status	Description
Power LED	⏻	ON	System power ON
HDD Activity LED		OFF	No activity
		Blinking	Read/write data activity from the HDD
Message LED		OFF	System is normal; indicates no incoming event
		ON	1. Without ASMB7-iKVM installed: CPU over-heated 2. With ASMB7-iKVM installed: indicates a hardware monitor event
LAN LEDs		OFF	No LAN connection
		Blinking	LAN is transmitting or receiving data
		ON	LAN connection is present
Location LED		ON	Location switch is pressed.
		OFF	Normal status. (Press the location switch again to turn off.)

1.7.2 LAN (RJ-45) LEDs
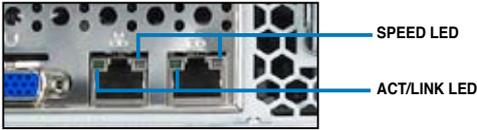
SPEED LED

ACT/LINK LED

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

Chapter 2

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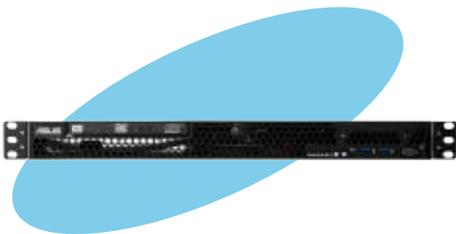
2.1 Chassis cover

2.1.1 Removing the chassis cover

⚠ • Unplug the power cord before removing the chassis cover.

• Take extra care when removing the chassis cover. Keep your fingers away from components inside the chassis that can cause injury, such as the CPU fan, rear fan, and parts with sharp or protruding edges.

• The images of the barebone server shown in this section are for reference purposes only and may not exactly match the model you purchased.

To remove the chassis cover:

1. Use a Phillips screwdriver to remove the three screws on the chassis cover.

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

3. Lift the cover from the chassis.

2.1.2   Reinstalling the chassis cover

To reinstall the chassis cover:

1.   Position the cover on top of the chassis with the hooks aligned to the side tabs of the chassis.

Side tabs

2.   Slide the cover toward the front until it snaps in place.

3.	Secure the cover with three screws.

2.2 Central Processing Unit (CPU)

This server motherboard comes with a surface mount LGA1150 socket designed for the Intel® Xeon® E3-1200 v3.

> • Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
>
> • Keep the PnP cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1150 socket.
>
> • The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or a lost/improper removal of the PnP cap.

2.2.1 Installing the CPU

To install the CPU:

1. Locate the CPU socket on the motherboard.

P9D-M CPU LGA1150
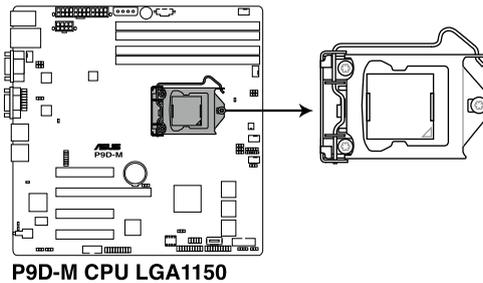
> Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your right.

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

![warning icon] Do not remove the PnP cap yet from the CPU socket. Doing so may bend the pins of the socket.

Load lever

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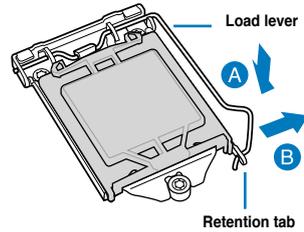
3.	Lift the load lever until the load plate is completely lifted.

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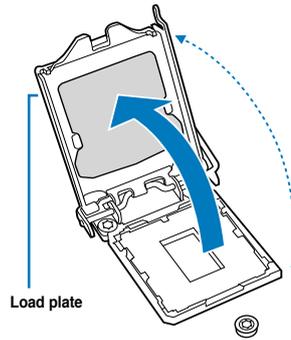
4.	Position the CPU above the socket, ensuring that the gold triangle mark is on the bottom-left corner of the socket, then fit the CPU notches to the socket's alignment keys.

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

CPU notches

Gold triangle mark

Alignment key

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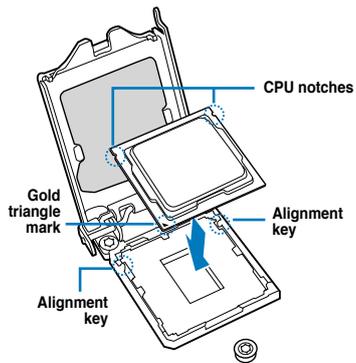
5.   Close the load plate (A), ensuring that
     the front edge of the load plate slides
     under the retention lock (B) then push
     down the load lever (C).

Load lever

C

A

**Retention
lock**

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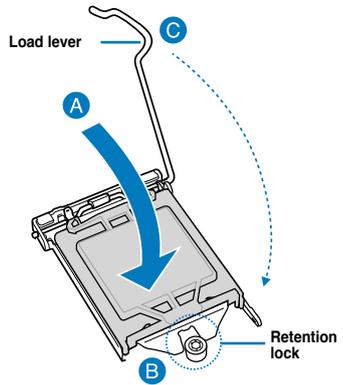
6.   Insert the load lever under the retention tab to remove the PnP cap from the CPU
     socket.

Load lever

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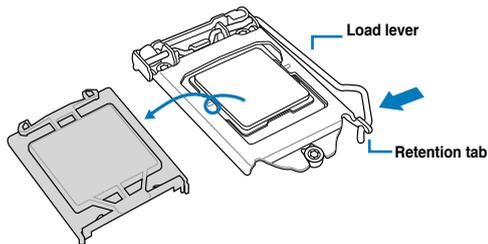
7.   Apply some Thermal Interface Material
     to the exposed area of the CPU that
     the heatsink will come in contact with,
     ensuring that it is evenly spread in a thin
     layer.

If the heatsink comes with pre-applied
Thermal Interface Material skip this
step.

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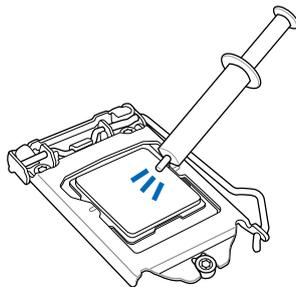
2.2.2   Installing the CPU heatsink

To install the CPU heatsink:

1.   Remove the protection sticker from the
      back of the CPU heatsink.

2.   Place the heatsink on top of the installed
      CPU, ensuring that the four fasteners
      match the holes on the motherboard.
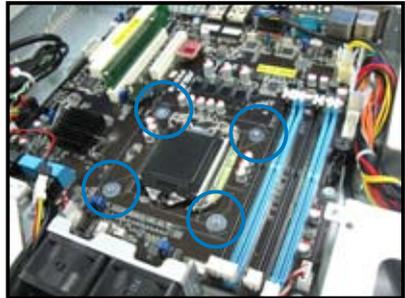
3.   Using a Philips screwdriver, lightly screw
      on the heatsink onto the motherboard
      using all four screws. Once all four
      screws are attached, tighten the four
      heatsink screws in a diagonal sequence
      until the heatsink is secure on the
      motherboard.
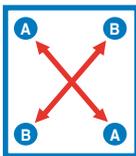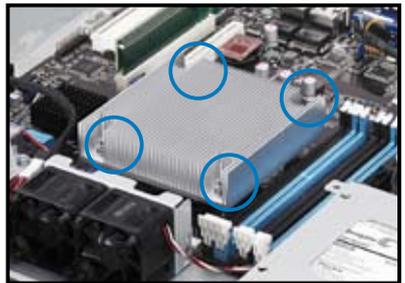
To install the airduct:

1. Locate and remove the screw for the airduct from the motherboard.
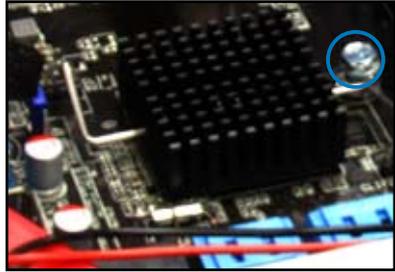
2. Place the airduct over the heatsink. The fastener on the airduct should align with the screwhole on the motherboard.

3. Replace the screw and secure the airduct onto the motherboard.
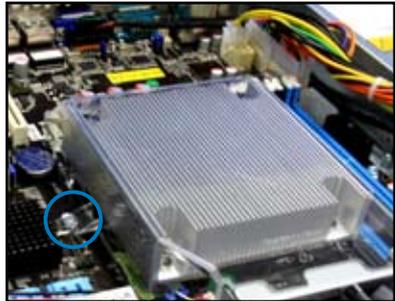
2.3   System memory

2.3.1   Overview

The motherboard comes with four Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

A DDR3 module has the same physical dimensions as a DDR2 DIMM but is notched differently to prevent installation on a DDR2 DIMM socket. DDR3 modules are developed for better performance with less power consumption.

The figure illustrates the location of the DDR3 DIMM sockets:
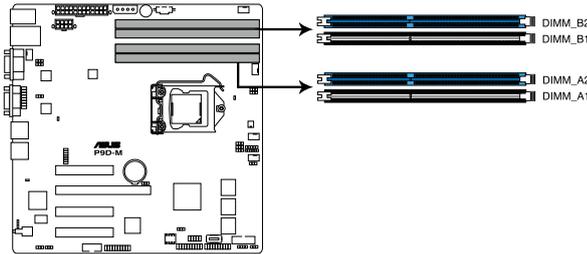
P9D-M 240-pin DDR3 DIMM sockets

2.3.2   Memory Configurations

You may install 2 GB, 4 GB, and 8 GB Unbuffered with ECC DDR3 DIMMs into the DIMM sockets using the memory configurations in this section.

UDIMM				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Unbuffered DDR3	1333/1600	Single Rank Dual Rank
2	2	Unbuffered DDR3	1333/1600	Single Rank Dual Rank

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

2.3.3   Installing a DIMM on a single clip DIMM socket

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

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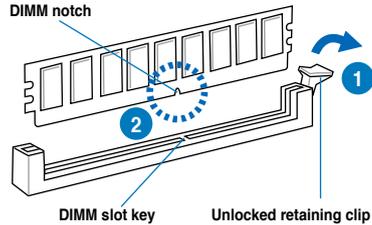
A DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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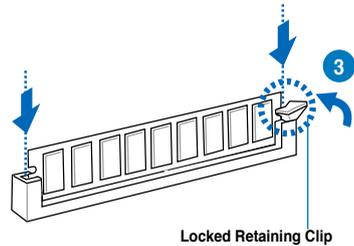
Always insert the DIMM into the socket vertically to prevent DIMM notch damage.

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

•   Refer to the user guide for the Qualified Vendor List (QVL) of the memory modules.

Removing a DIMM from a single clip DIMM socket

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

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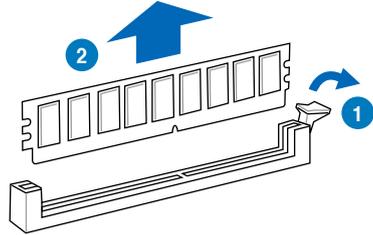
Support the DIMM lightly with your fingers when pressing the retaining clips. The DIMM might get damaged when it pops out with extra force.

2.4 Hard disk drives

The server chassis has two HDD bays for installing HDDs to the system. Both HDD bays can support 3.5-inch Serial ATA HDD.

2.4.1 Installing a 3.5-inch Serial ATA HDD to HDD bay 1

To install a 3.5-inch Serial ATA HDD to HDD bay 1:

1.   Locate the HDD bay 1 in the chassis.

2.   Release the four screws that secures the HDD drive tray to the chassis and set aside.

3.   Remove the HDD drive tray then set aside.

HDD drive tray

HDD bay 1

4.   Prepare a 3.5-inch Serial ATA HDD and the set of bundled screws.

5.   Insert the 3.5-inch Serial ATA HDD into the HDD drive tray and secure it using the bundled set of screws (as shown).

      Ensure that the 3.5-inch SATA HDD is seated securely in place.

6. Connect the SATA signal cable and a power from the power supply to the 3.5-inch HDD.

> Use an L-type SATA connector to connect the 3.5-inch SATA HDD to the motherboard.

7. Place and orient the HDD tray and 3.5-inch SATA HDD assembly in such a way that the SATA cable and power connector is aligned towards the rear (as shown).
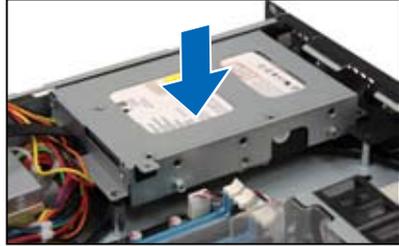
8. Secure the 3.5-inch SATA HDD and HDD drive tray assembly to the HDD bay 1 using the screws removed in step 2.

Ensure that the SSD drive tray is seated securely in place.

2.4.2   Installing 2.5-inch SSDs on HDD bay 1 (Optional)

To replace an installed 3.5-inch Serial ATA HDD with two 2.5-inch SSDs in HDD bay 1:

1   Locate the 3.5-inch Serial ATA (SATA) HDD and the HDD drive tray assembly in the chassis.

2.   Disconnect the SATA cable and the power cable from the 3.5-inch SATA HDD.

3.   Release the four screws that secure the HDD drive tray and 3.5-inch SATA HDD assembly to HDD bay 1 and set aside.

HDD drive tray

HDD bay 1

4.   Remove the HDD drive tray and 3.5-inch SATA HDD assembly.

5.   Prepare the SSD drive tray.

6.   Get one 2.5-inch SSD and orient it in such a way that the SATA connector of the 2.5-inch SSD is exposed as shown.

Ensure that the screw holes on the underside of the 2.5-inch SSD matches the screw holes on the SSD drive tray.

7.   Fasten the 2.5-inch SSD to the SSD drive tray using four screws.

SSD drive tray
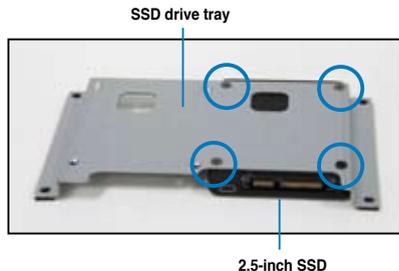
2.5-inch SSD

8.   Repeat step 6 - 7 to install the other 2.5-inch SSD.

9.   Prepare the SATA power cable and the SATA signal cable bundled with the SSD drive tray.

SSD drive tray
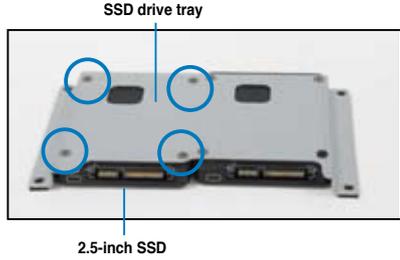
2.5-inch SSD

10.   Get a SATA power cable and connect it to the 2.5-inch SSD as shown.

Use the SATA power cable that comes with the SSD drive tray as an add-on accessory.

SATA power cable

11.   Get a SATA signal cable and connect it to the 2.5-inch SSD as shown.

12.   Connect the other end of the SATA signal cable to the SATA connector on the motherboard.

Use the SATA signal cable that comes with the SSD drive tray as an add-on accessory.

SATA signal cable
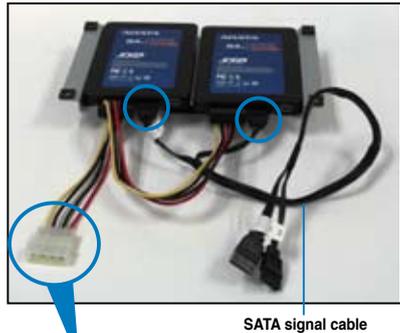
13.   Connect the 4-pin power connector of the power cable to the 4-pin power connector from the power supply.

from the SSD power cable

from the power supply

4-pin power connector
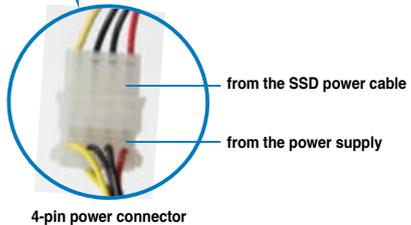
14. Align and orient the 2.5-inch SSD and the SSD drive tray assembly into the HDD bay 1 (as shown) matching the four screw holes on the drive tray with the four screw holes on the HDD bay.

15. Carefully place the 2.5-inch SSD and the SSD drive tray assembly into HDD bay 1.

    Ensure that no cables or connectors are out-of-place.

16. Secure the 2.5-inch SSD and SSD drive tray assembly to the HDD bay 1 using the screws removed in step 3.

    Ensure that the SSD drive tray is seated securely in place.

2.4.3   Installing a hard disk drive to the HDD bay 2

To install a 3.5-inch Serial ATA HDD to HDD bay 2:

1.   If you have an Optical Disc Drive (ODD) installed, remove it first before installing a 3.5-inch Sertial ATA HDD to HDD bay 2.

To remove the ODD:

1.a   Locate the ODD in the server chassis.

ODD cable

HDD bay 2

HDD drive tray   Optical Disc Drive
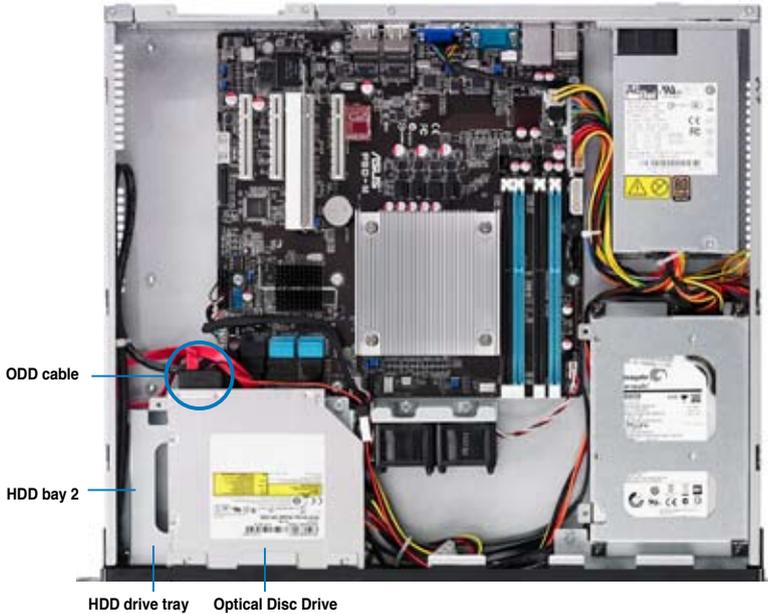
1.b   Disconnect the SATA and power cable on the ODD.

1.c   Release the screw that secures the ODD to the chassis and set aside.

ODD cable

1.d   Remove the ODD as shown and
        set aside.
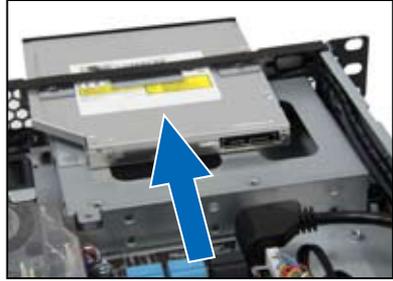
2.   Release the four screws that secures
        the HDD drive tray to the chassis.

        Set aside for later use.

3.   Remove the HDD drive tray.
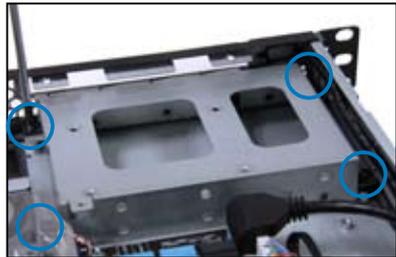
4.   Get a 3.5-inch Serial ATA HDD and
        the set of bundled screws.

5.   Orient the 3.5-inch SATA HDD in
        such a way that the SATA and power
        connector are exposed.

        Secure the 3.5-inch Serial ATA HDD
        to the HDD drive tray using the
        bundled set of screws as shown.

6.   Connect a SATA signal cable and a
        power cable from the power supply to
        the 3.5-inch SATA HDD.

        Use an L-type SATA connector to
        connect the 3.5-inch SATA HDD to
        the motherboard.

7. Carefully place the 3.5-inch Serial ATA HDD and HDD drive tray assembly into the drive bay.

   Ensure that no cables or connectors is out-of-place.

8. Secure the HDD drive tray and the 3.5-inch SATA HDD assembly to the HDD bay 2 using the four screws removed in step 2

   Ensure that screw holes on the HDD drive tray and the 3.5-inch SATA HDD assembly matches the screw holes on the HDD bay 2 .

9. Get the ODD and slide it back into the optical disc drive slot.

10. Secure the ODD and the HDD drive tray to the HDD bay 2 using the screw removed in step 1.c.

11. Connect the ODD signal cable and power cable to the optical disk drive.
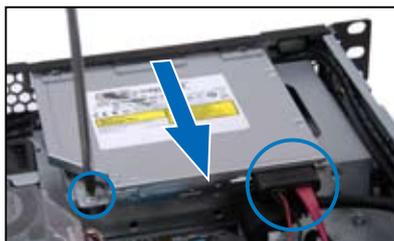
2.5 Expansion card

This system comes with a riser card. You need to remove the riser card and the expansion slot bracket if you want to install an expansion card.

⚠ Unplug the power cord before installing or removing an expansion card. Failure to do so may cause severe damage to the motherboard and other system components!

2.5.1 Installing an expansion card

To install an expansion card:

1. Hold the riser card and pull it upwards to detach it from the PCI Express slot on the motherboard.

2. Remove the screw to release the expansion card bracket from the chassis.
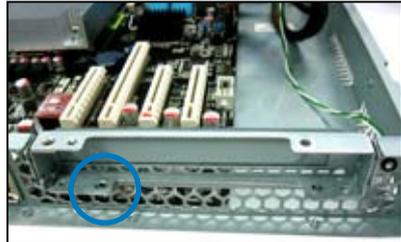
3. Remove one more screw to release the metal slot cover from the expansion card bracket.

Separate the slot cover from the expansion card bracket.

4. Insert the riser card into the PCI Express slot until the golden connectors completely fit the slot and the bracket aligns with the rear panel.

5. Secure the expansion card to the bracket with a screw.

6. Secure the assembly to the chassis with a screw.

2.5.2   Configuring an expansion card

After installing the expansion card, configure the software settings if needed.

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

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

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 set up before shipping. You do not need to disconnect these cables unless you will remove pre-installed components to install additional hardware components.

• Refer to **Chapter 4** for detailed information on the connectors.
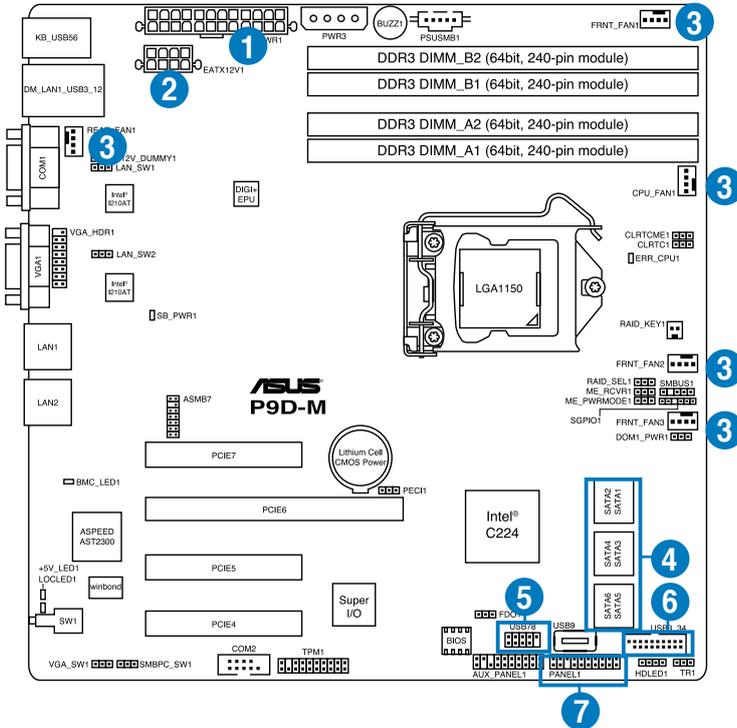
Standard cables connected to the motherboard

1. 24-pin ATX power connector (from power supply to motherboard)

2. 8-pin ATX 12V power connector (from power supply to motherboard)

3. System fan and CPU fan connectors (from system fan to motherboard)

4. SATA conectors (system default; from motherboard to SATA devices)

5. USB 2.0 connector (from motherboard to front I/O board)

6. USB 3.0 connector (from motherboard to front I/O board)

7. System panel connectors (from motherboard to front I/O board)

2.7 Removable/optional components

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

1. System fans
2. Optical disk drive (optional)
3. ASUS ASMB7-iKVM (optional)

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

2.7.1 Chassis fans

To install the system fans:

1. Locate the screw holes for the system fans on the chassis. They are located just next to the heatsink.
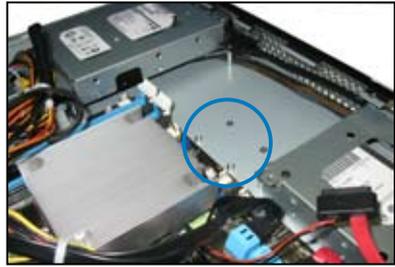
2. Position the chassis fans to match the screw holes on the chassis. Secure the fans onto the chassis using the provided screws.
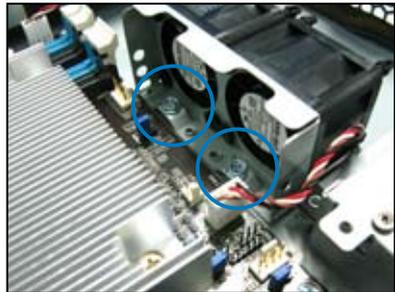
3. Connect the chassis fan cables to the onboard fan connectors labeled FRNT_FAN2, and FRNT_FAN3.
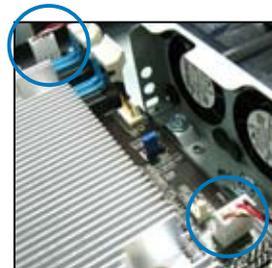
2.7.2   Optical disk drive (ODD)

To install the optical disk drive:

1.   Slide in the optical disk drive into the
       drive slot.

       Optical disk drive slot

2.   Align the screw hole of the ODD
       bracket with the screw hole on the
       chassis. Secure the ODD with a
       screw.

3.   Connect the ODD cable to the
       optical disk drive.

2.7.3 Installing ASMB7 series management card (optional)

Follow the steps below to install an optional ASMB7 series management card on your motherboard.

1. Locate the ASMB7 header on the motherboard.
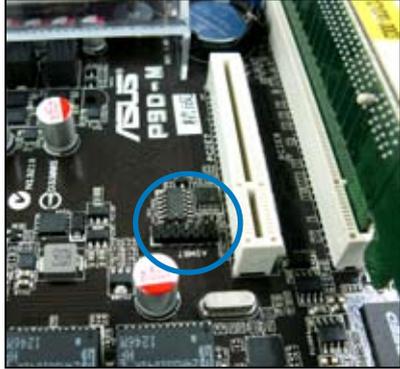
2. Firmly fit the ASMB7 management card to the header. Do not force the pins when connecting the card to the motherboard header.

3. Insert the LAN cable plug to the LAN port 3 (dedicated LAN) or LAN port 1 (shared LAN) for server management.

LAN port 3

LAN port 1~2

Chapter 3

This chapter describes how to install the rackmount rail kit to the barebone server.

Rackmount installation

3.1   Rackmount rail kit items

The rackmount rail kit contains two pairs of rails (one pair for each side of the server system), six (6) pieces of inner rail screws, and two (2) pieces of rack screws.

3.2   Attaching the rails to the rack

To attach the rack rails:

1.   Attach the inner rail to the correspoding side of the chassis and secure with three inner rail screws. Make sure the rail is oriented as shown.
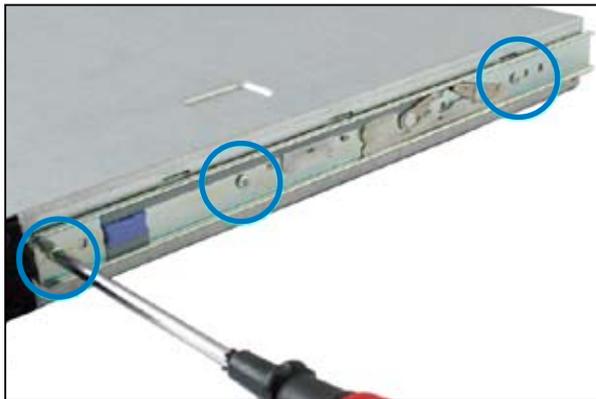
2. Attach the second inner rail to the other side of the chassis and secure with three inner rail screws.

3. Select one unit of space (1U) on the rack where you wish to install the server.

4. Place three (3) nuts on the front and three at the back. Do the same to the corresponding side of the rack.

Nuts
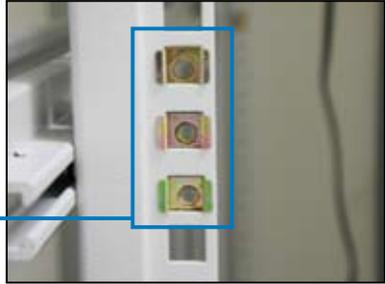
5. Adjust the length of the outer rail to fit the length of the rack cabinet, then fasten the two screws.

6. Secure the outer rail with two screws at the front and rear of the rack cabinet .

7. Find the corresponding 1U space on the other side of the rack cabinet then repeat steps 5 and 6 to attach the other outer rail.

8.   Firmly hold the server on both sides. Slide the latches on the inner rack rails to the direction indicated below. Hold the latches, and insert the rear side of the server to the front end of the outer rack rail.

Make sure that the inner rails are properly aligned with the outer rails.
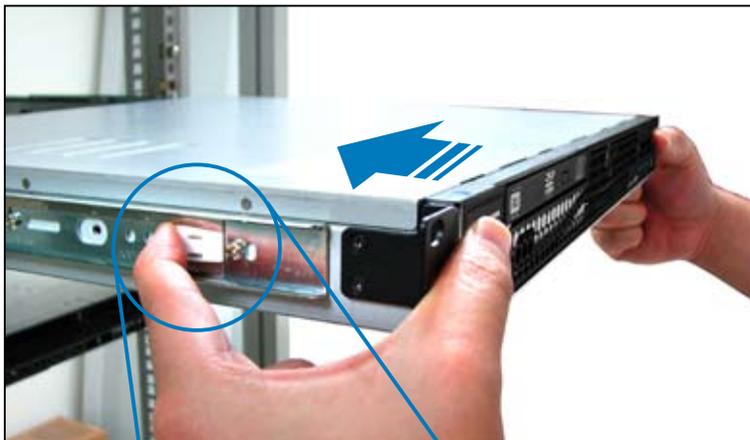
9.   Carefully push the server all the way to the back until the front panel fits the front end of the rack.

10. Secure the server to the rack with one rack screw at one side. Secure the other side as well.

Rack screw

Chapter 4

This chapter includes the motherboard layout and brief descriptions of the jumpers and internal connectors.
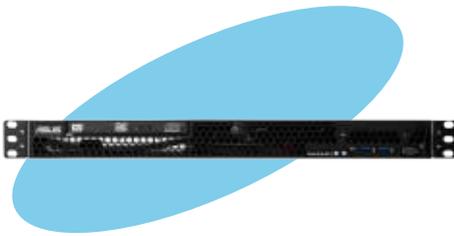
4.1 Motherboard layout
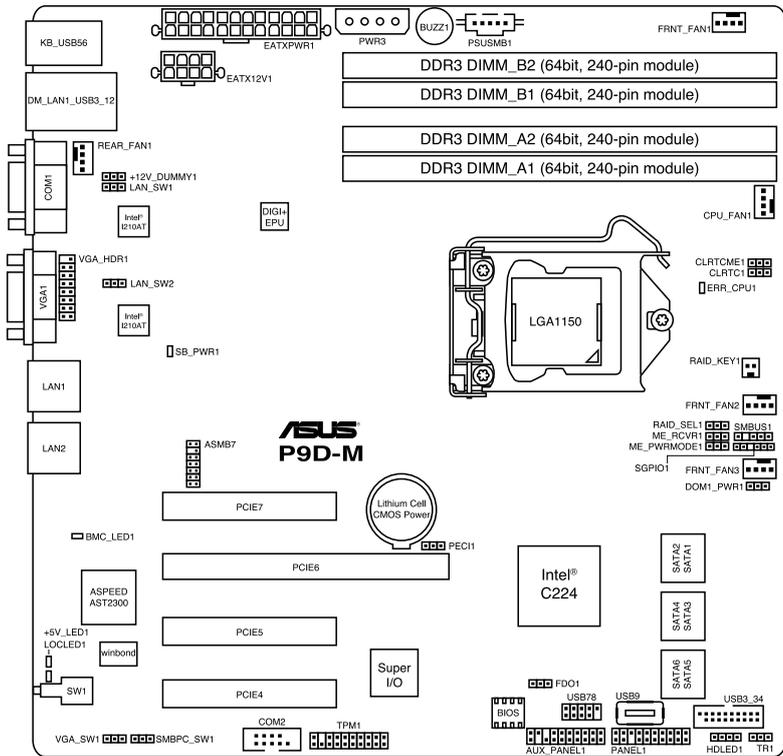
Layout contents

Onboard LEDs		Page
1.	Standby Power LED (SB_PWR1)	4-5
2.	+5V Power LED (+5V_LED)	4-5
3.	Location LED (LOC_LED1)	4-5
4.	CPU Warning LED (ERR_CPU1)	4-6
5.	Baseboard Management Controller LED (BMC_LED1)	4-6

Jumpers		Page
1.	Clear RTC RAM (CLRTC1)	4-7
2.	VGA controller setting (3-pin VGA_SW1)	4-8
3.	LAN controller setting (3-pin LAN_SW1, LAN_SW2,)	4-8
4.	RAID configuration utility selection (3-pin RAID_SEL1)	4-8
5.	Platform Environmental Control Interface Setting (3-pin PECI1)	4-9
6.	ME firmware force recovery setting (3-pin ME_RCVR1)	4-9
7.	VGA connector (16-1 pin VGA_HDR1)	4-9

Rear panel connectors		Page
1.	PS/2 keyboard/mouse port (purple/green)	4-10
2.	RJ-45 port for iKVM	4-10
3.	COM1 port	4-10
4.	Video Graphics Adapter port	4-10
5.	RJ-45 ports for LAN	4-10
6.	LOCLED1	4-10
7.	+5V_LED	4-10
8.	Power-on Button	4-10
9.	USB 2.0 ports 1 and 2	4-10
10.	USB 3.0 ports 1 and 2	4-10

Internal connectors		Page
1.	Serial ATA 6.0/3.0 Gbps connectors	4-11
2.	Hard disk activity LED connector (4-pin HDLED1)	4-11
3.	USB 2.0 connector (10-1 pin USB78, 10-1 pin USB1011, A-Type USB9)	4-12
4.	USB 3.0 connector (20-1 pin USB3_34)	4-12
5.	Thermal sensor cable connectors (3-pin TR1)	4-14
6.	CPU, front, and rear fan connectors (4-pin FRNT_FAN1, REAR_FAN1, CPU_FAN1, FRNT_FAN2, FRNT_FAN3)	4-13
7.	Serial General Purpose Input/Output connector (6-1 pin SGPIO1)	4-14
8.	Serial port connectors (10-1 pin COM2)	4-15
9.	Trusted Platform Module connector (20-1 pin TPM1)	4-15
10.	4-pin power connector (4-pin PWR3)	4-16
11.	ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	4-16
12.	System panel connector (20-1 pin PANEL1)	4-17
13.	Auxiliary panel connector (20-2 pin AUX_PANEL1)	4-18

4.2 Onboard LEDs

1. Standby Power LED (SB_PWR1)

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

SB_PWR1

ON
Standby Power

OFF
Powered Off

P9D-M Standby power LED
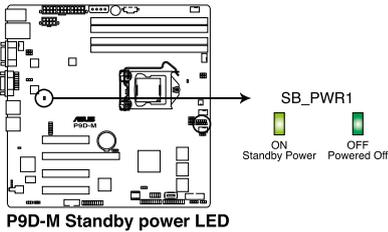
2. +5V Power LED (+5V_LED1)

This LED lights up when the Power-on button is pressed and the system is on.

+5V_LED1

P9D-M +5V Power LED
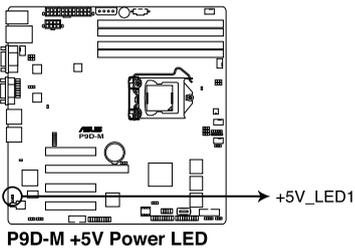
3 Locator LED (LOCLED1)

The Locator LED is a user-activated LED on the front of the server module that can be remotely turned on or off. It is used to find a specific server module within a chassis.

LOCLED1

P9D-M Location LED
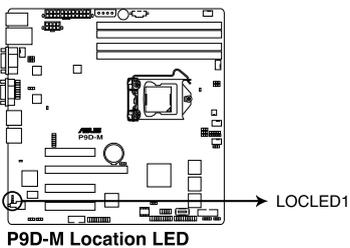
4.   **CPU Warning LED (ERR_CPU1)**

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

ERR_CPU1

P9D-M ERR_CPU LED
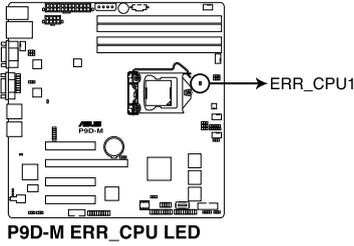
5.   **Baseboard Management Controller LED (BMC_LED1)**

The green heartbeat LED blinks per second to indicate that the ASMB7 is working normally.

BMC_LED1

P9D-M BMC LED
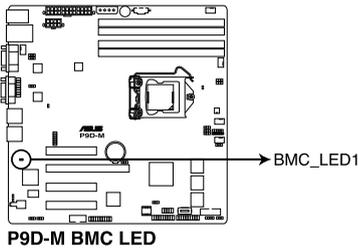
4.3 Jumpers

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

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

    To erase the RTC RAM:

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

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

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

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

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

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

P9D-M Clear RTC RAM
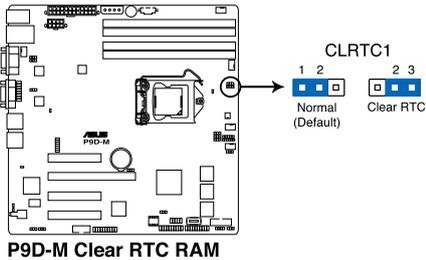
2. **VGA controller setting (3-pin VGA_SW1)**

   This jumper allows you to enable or disable the onboard VGA controller. Set to pins 1–2 to activate the VGA feature.

   VGA_SW1

   1 2   2 3

   Enable   Disable
   (Default)

   P9D-M VGA setting
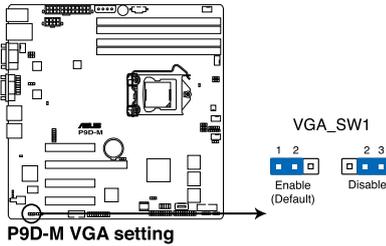
3. **LAN controller setting (3-pin LAN_SW1, LAN_SW2)**

   These jumpers allows you to enable or disable the onboard Intel® I210AT Gigabit LAN controllers. Set to pins 1-2 to activate the Gigabit LAN feature.

   Ⓐ LAN_SW1

   1 2   2 3

   Enable   Disable
   (Default)

   Ⓑ LAN_SW2

   1 2   2 3

   Enable   Disable
   (Default)

   P9D-M LAN setting
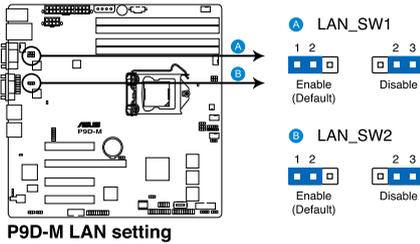
4. **RAID configuration utility selection (3-pin RAID_SEL1)**

   This jumper allows you to select the RAID configuration utility for creating disk arrays. Place the jumper caps over pins 1–2 if you want to use a Third-Party Setup Utility (default). Otherwise, place the jumper caps to pins 2–3 to use the Intel® Rapid Storage Technology.

   RAID_SEL1

   1 2   2 3

   3RD Party   Intel
   (Default)

   P9D-M RAID setting
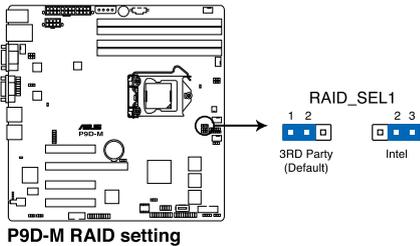
5. Platform Enviromental Control Interface Setting (3-pin PECI1)

When ASMB7-iKVM is installed, set to pins 2-3 for correct sensor information of the Platform Environmental Control Interface (PECI). Set to pins 1-2 if ASMB7-iKVM is not installed.

P9D-M PECI setting
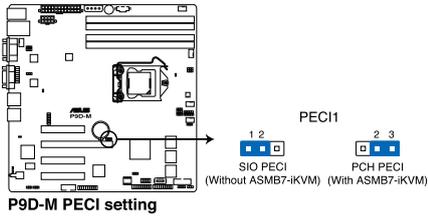
6. ME firmware force recovery setting (3-pin ME_RCVR1)

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

P9D-M ME firmware setting
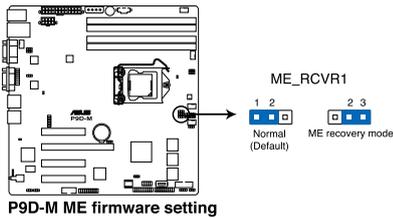
7. VGA connector (16-1 pin VGA_HDR1)

This connector supports VGA High Dynamic-Range interface HDR1.

P9D-M VGA_HDR1 connector
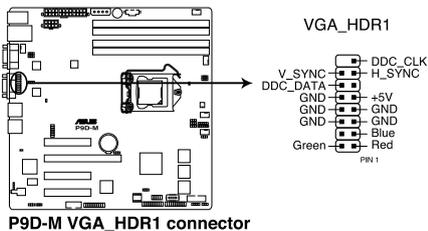
4.4 Connectors

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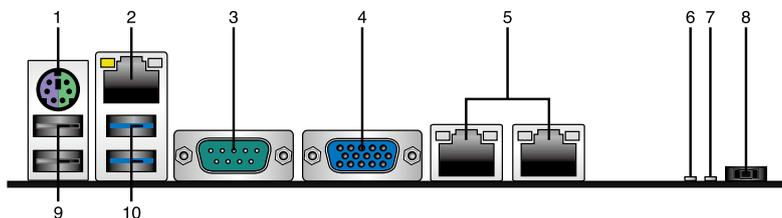
1. **PS/2 keyboard/mouse port (purple/green).** This port is for a PS/2 keyboard or mouse.

2. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install an ASMB7 management card.

3. **Serial port.** This port connects a modem, or other devices that conform with serial specification.

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

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

6. **+5V_LED.** This LED lights up when the Power-on button is pressed and the system is on.

7. **LOCLED1.** The Locate LED is a user-activated LED on the front of the server module that can be remotely turned on or off. It is used to find a specific server module within a chassis.

8. **Power-on Button.** Press this button to power on the system.

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

10. **USB 3.0 ports 1 and 2.** These two 4-pin USB ports are available for connecting USB 3.0 devices.

LAN port LED indications

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

ACT/LINK LED   SPEED LED
LED

LAN port
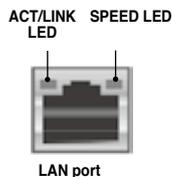
4.4.2   Internal connectors

1.   **Serial ATA 6.0/3.0 Gbps connectors**

    • **7-pin SATA 6Gbps_1-4 connector [Light Blue])**
    • **7-pin SATA 3Gbps_5-6 connector [Black])**

Supported by the Intel® C224 chipset, these connectors support up to 6Gbps of data transfer rate to Serial ATA hard disk drives.
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.

P9D-M SATA connectors

SATA1
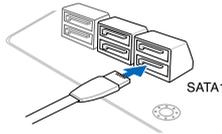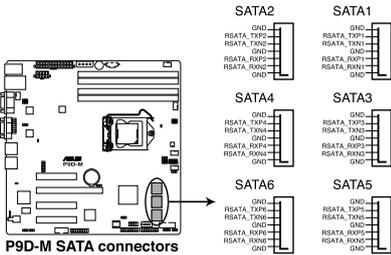
The actual data transfer rate depends on the speed of the Serial ATA hard disks installed.

2.   **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.

P9D-M Hard disk activity connector
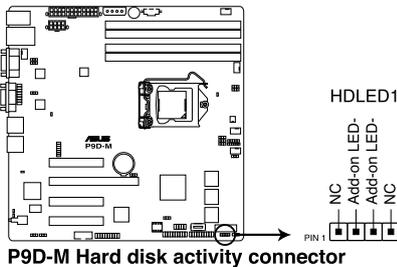
3. **USB 2.0 connector (10-1 pin USB78, A-Type USB9)**

These connectors are for USB 2.0 ports. Connect the USB module cables to the USB78 connector. These USB connectors comply with USB 2.0 specifications and supports up to 480 Mbps connection speed.

P9D-M USB 2.0 connectors
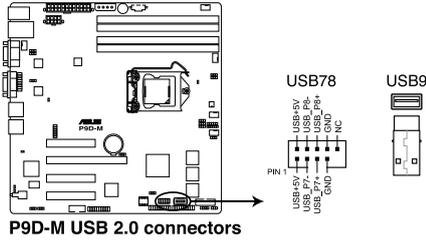
4. **USB 3.0 connector (20-1 pin USB3_34)**

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

P9D-M USB 3.0 connector
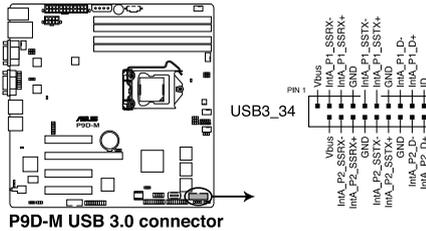
5. **CPU, front, and rear fan connectors**

   (4-pin FRNT_FAN1, REAR_FAN1, CPU_FAN1, FRNT_FAN2, FRNT_FAN3)

   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.

P9D-M FAN connectors
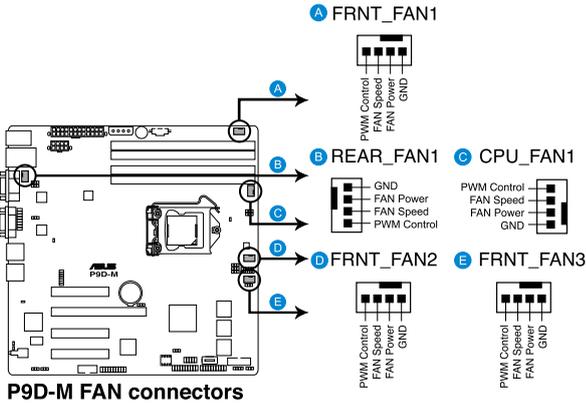
6. **Thermal sensor cable connectors (3-pin TR1)**

This connector allows you to connect a Thermal sensor cable that is used for temperature monitoring. Connect the Thermal sensor cable to the connector and place its probe to the device that you want to check the temperature.
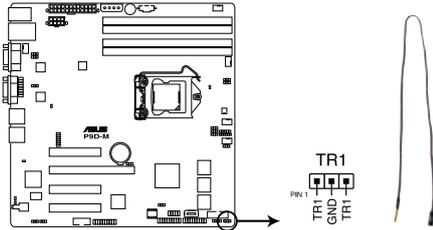
P9D-M Thermal sensor cable connector

7. **Serial General Purpose Input/Output connector (6-1 pin SGPIO1)**
The SGPIO 1 connectors are used for the Intel® Rapid Storage Technology Enterprise SGPIO interface that manages LED pattern generation, device information, and general purpose data.
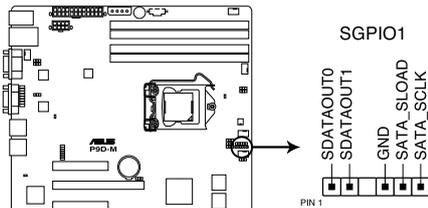
P9D-M SGPIO1 connector

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

These connectors are for the serial COM2 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.

P9D-M Serial port connectors
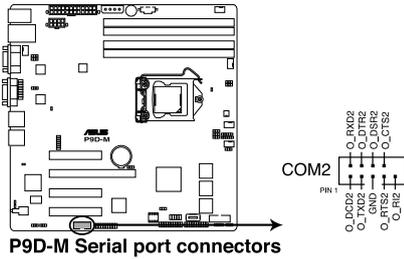
9.   Trusted Platform Module connector (20-1 pin TPM1)

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.

P9D-M TPM connector
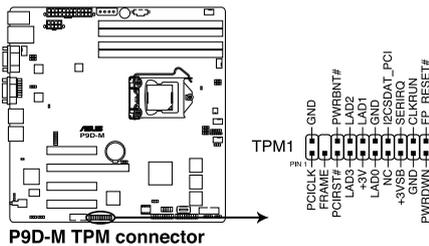
10. 4-pin power connector (4-pin PWR3)

This 4-pin connector provides 5V to an installed SATA DOM (Disk on Module). You can also use this 4-pin connector to connect to the PSU to increase power by 12V.
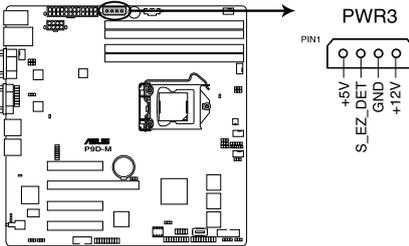
P9D-M 4-pin power connector

11. ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)

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

- Do not forget to connect the 24-pin and 8-pin power plugs or 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 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.
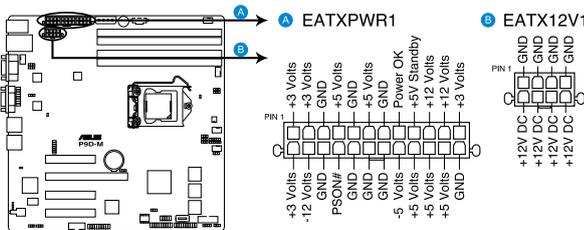
P9D-M 24+8 pin power connectors

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

This connector supports several chassis-mounted functions.

P9D-M System panel connector
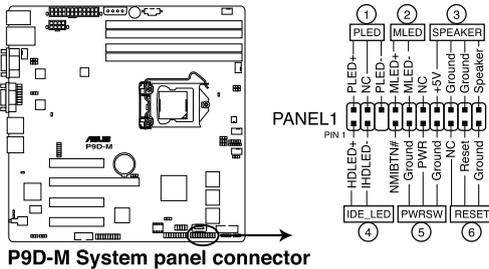
1.   System power LED (3-pin PLED)
This 3-pin connector is for the system power LED. Connect the chassis power LED cable to this connector. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.

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 indicates any detected abnormal activity in the hardware.

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

4.   Hard disk drive activity LED (2-pin +HDLED)
This 2-pin connector is for the HDD Activity LED. Connect the HDD Activity LED cable to this connector. The IDE LED lights up or flashes when data is read from or written to the HDD.

5.   Power button/soft-off button (2-pin PWRSW)
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

6.   Reset button (2-pin RESET)
This 2-pin connector is for the chassis-mounted reset button. Press this button to reboot the system without turning off the system power.

13. 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.

P9D-M Auxiliary panel connector
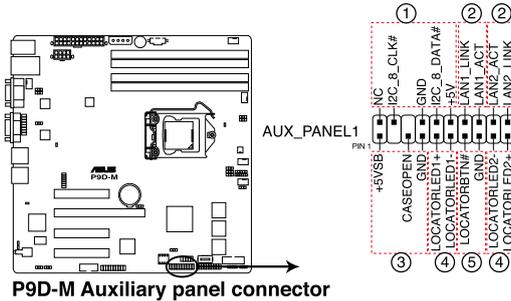
1. Front panel SMB (6-1 pin FPSMB)
These leads connect to the front panel SMBus cable.

2. LAN activity LED (2-pin LAN1LINK and 2-pin LAN2LINK)
These leads are for Gigabit LAN activity LEDs on the front panel.

3. Chassis intrusion (4-1 pin AUX_CHASSIS)
These leads are for the intrusion detection feature for chassis with an 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.

4. Locator LED (2-pin AUX_LOCLED1 and 2-pin AUX_LOCLED2)
These leads are for the Locator LED1 and LED2 on the front panel. Connect the Locator LED cables to these 2-pin connectors. The LEDs will light up when the Locator button is pressed.

5. Locator Button/Switch (2-pin AUX_BMCLOCBNT)
These leads are for the locator button on the front panel. This button queries the state of the system locator.

Chapter 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 EasyFlash Utility**

    Updates the BIOS using a USB flash disk.

3. **BUPDATER utility**.

    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 Easy Flash Utility

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

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

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

To update the BIOS using Easy Flash Utility:

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

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

```
                    ASUSTek. Easy Flash Utility

       Current Platform                 New Platform
  Platform : P9D-M              Platform : P9D-M
  Version :  0051               Version :  0060
  Build Date :11/26/2012        Build Date :03/03/2013

  FS0       System Volume Information            <DIR>
            P9D-M Bios                           <DIR>
            Windows                              <DIR>



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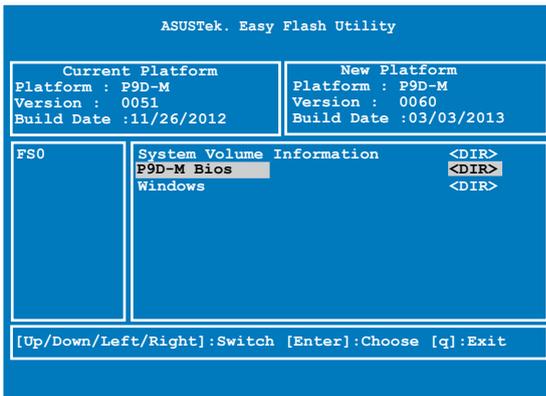
3. Press <Tab> to switch to the **Drive** field.

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

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

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

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

- This feature supports USB flash disks formatted using FAT 32/16 on a single partition only.

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

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 a DOS environment using a bootable USB flash disk drive with the updated BIOS file.

Updating the BIOS file
To update the BIOS file using the BUPDATER utility:

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

2. Download the BUPDATER utility (BUPDATER.exe) from the ASUS support website at 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
```

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

```
        ASUSTek BIOS Update for DOS V1.06 (09/08/04)
FLASH TYPE: MXIC 25L1605A
         Current ROM                      Update ROM
   BOARD: P9D-M                      BOARD: P9D-M
   VER: 0202                         VER: 0212
   DATE: 12/01/2012                  DATE: 03/09/2013
PATH:

          WARNING! Do not turn off power during flash BIOS

      Note
    Writing BIOS:
```

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

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

4.   Reboot the system from the hard disk drive.

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

C:\>
```

5.2 BIOS setup program

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

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

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

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

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

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

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

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

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

5.2.1   BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

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

   BIOS Information
   BIOS Vendor              American Megatrends        Set the Date, Use Tab to
   BIOS Version             4.6.5.4                    switch between Data elements
   Compliancy               UEFI 2.3.1; PI 1.2
   BIOS Version             0212 x64
   Build Date               3/20/2013



   System Date              [Mon 01/06/2013]
   System Time              [15:07:28]


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



          Version 2.15.1234. Copyright (C) 2013 American Megatrends, Inc.
```

Navigation keys

4.2.2   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

Event Logs For changing the event log settings

Boot   For changing the system boot configuration

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

Security   For changing the security settings

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 (Advanced, Event Logs, Boot, Monitor, Security, 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 and press <Enter>.

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

  ▶ PCI Subsystem Settings               PCI, PCI-X and PCI Express
                                         Settings.
  ▶ ACPI Settings

  ▶ Trusted Computing
```
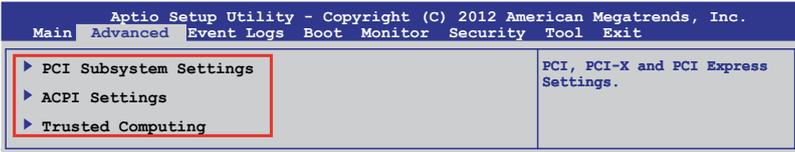
5.2.5   Navigation keys

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 basic system information, and allows you to set the system date and time.

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

  BIOS InformationBIOS Vendor        American Megatrends          Set the Date, Use Tab to
  BIOS Version                       4.6.5.4                      switch  between  Data
  Compliancy                         UEFI 2.3.1; PI 1.2           elements.
  BIOS Version                       0212 x64
  Build Date                         03/26/2013


  System Date                        [Mon 3/26/2013]
  System Time                        [15:07:28]
```
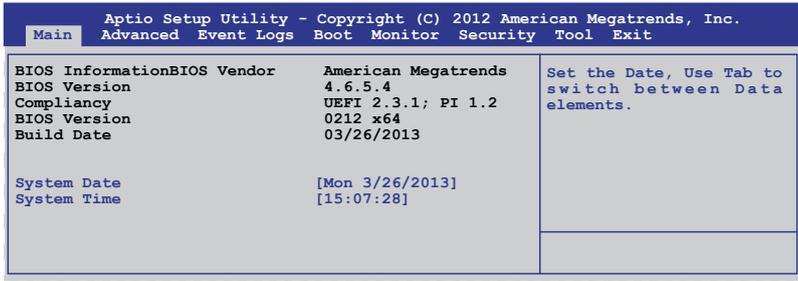
5.3.1 System Date

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

Where:

   Day = Day of the week
   mm = month (numeric value)
   dd = day (numeric value)
   yyyy = year (numeric value)

5.3.2 System Time

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

Where:

   hh = hour (numeric value)
   mm = minutes (numeric value)
   ss = seconds (numeric value)

5.4 Advanced menu

The Advanced menu items allow you to change the settings for the CPU and other hardware components.

> ⚠ 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   Event Logs   Boot   Monitor   Security   Tool   Exit

 ▶ CPU Configuration                              PCI, PCI-X and PCI
 ▶ PCH-IO Configuration                           Express Settings.
 ▶ SATA Configuration
 ▶ Systems Agent (SA) Configuration
 ▶ PCI Subsystem Settings
 ▶ USB Configuration
 ▶ TPM
 ▶ ACPI Settings
 ▶ WHEA Configuration
 ▶ NCT6779D Super IO Configuration
 ▶ Intel Server Platform Services
 ▶ Onboard LAN Configuration
 ▶ Serial Port Console Redirection
 ▶ Runtime Error Logging
 ▶ APM
 ▶ Network Stack
 ▶ Intel RC Drivers Version Detail
```

5.4.1 CPU Configuration

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

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

  CPU Configuration                                    Enabled for WIndows XP and
                                                       Linux  (OS  optimized  for
  Genuine Intel (R) CPU 0000 @ 2.50GHz                 Hyper-Threading Technology)
  CPU Signature               306c2                    and  Disabled  for  other OS
  Microcode Patch             ffff0006                 (OS not optimized for Hyper-
  Max CPU Speed               2500 MHz                  Threading   Technology).
  Min CPU Speed               800 MHz                   When  Disabled  only  one
  Processor Cores             4                         thread per enabled core is
  Intel HT Technology         Supported                 enabled.
  Intel VT-x Technology       Supported
  Intel SMX Technology        Supported
  64-bit                      Supported
  EIST Technology             Supported
  CPU C3 State                Supported
  CPU C6 State                Supported
  CPU C7 State                Supported

  L1 Data Cache               32 kB x 4
  L1 Code Cache               32 kB x 4               →←: Select Screen
  L2 Cache                    256 kB x 4              ↑↓:  Select Item
  L3 Cache                    8192 kB                 Enter: Select Item
                                                      +/-: Change Opt.


                Version 2.15.1234. Copyright (C) 2013 American Megatrends, Inc.
```

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

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

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

  Hyper-threading                  [Enabled]          →←: Select Screen
  Active Processor Cores           [All]              ↑↓:  Select Item
  Overclocking lock                [Disabled]         Enter: Select Item
  Execute Disable Bit              [Enabled]          +/-: Change Opt.
  Intel Virtualization Technology  [Enabled]          F1: General Help
  Hardware Prefetcher              [Enabled]          F2: Previous Values
  Adjacent Cache Line Prefetch     [Enabled]          F5: Optimized Defaults
  CPU AES                          [Enabled]          F10: Save & Exit
  Boot performance mode            [Turbo Performance] ESC: Exit
  EIST                             [Enabled]
  Turbo Mode                       [Enabled]
  Energy Performance               [Performance]
  CPU C states                     [Enabled]
       Enhanced C1 state           [Enabled]
       CPU C3 Report               [Enabled]
       CPU C6 report               [Enabled]
       CPU C7 report               [CPU C7s]
       C1 state auto demotion      [Enabled]
       C3 state auto demotion      [Enabled]
       Package C State demotion    [Disabled]
       C1 state auto undemotion    [Enabled]
       C3 state auto undemotion    [Enabled]
       Package C State undemotion  [Disabled]
       C state Pre-Wake            [Enabled]
  CFG lock                         [Enabled]
  Package C State limit            [AUTO]
  LakeTiny Feature                 [Disabled]
  Intel TXT (LT) Support           [Disabled]
  ACPI T State                     [Enabled]

                Version 2.15.1234. Copyright (C) 2013 American Megatrends, Inc.
```

Hyper-threading [Enabled]

Allows you to enable or disable the Intel® Hyper-Threading Technology. Configuration options: [Enabled] [Disabled]

Active Processor Cores [All]

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

Overclocking lock [Disabled]

Allows you to enable or disable the overclocking lock. Configuration options: [Disabled] [Enabled]

Execute Disable Bit [Enabled]

Allows you to enable or disable the XD feature that can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS. Configuration options: [Enabled][Disabled]

Intel® Virtualization Technology [Enabled]

Allows you to utilize the additional hardware capabilities provided by Intel® VT-x for x86 platform (previously called "Vanderpool").Configuration options: [Enabled] [Disabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the Mid Level Cache (L2) streamer. Configuration options: [Enabled] [Disabled]

Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable the Mid Level Cache (L2) prefetching of adjacent cache lines. Configuration options: [Enabled] [Disabled]

CPU AES [Enabled]

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

Boot performance mode [Turbo Performance]

Select the performance state BIOS will set before OS handoff. Configuration options: [Max Non-Turbo Performance] [Max Battery] [Turbo Peformance]

EIST [Enabled]

Allows you to enable or disable the Enhanced Intel® SpeedStep Technology (EIST). Configuration options: [Enabled] [Disabled]

Turbo Mode [Enabled]

This item appears only when you set the EIST item to [Enabled]. This allows you to enable or disable the Intel® Turbo Mode Technology. Configuration options: [Enabled] [Disabled]

Energy Performance [Performance]

Allows you to optimize between performance and power savings. Configuration options: [Performance] [Balanced Performance] [Balanced Energy] [Energy Efficient]

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

This following items appears only when you set the CPU C states to [Enabled].

Enhanced C1 State [Enabled]
This item allows you to enable or disable the Enhanced C1 state. Configuration options: [Enabled] [Disabled]

CPU C3 Report [Enabled]
Allows you to enable or disable the CPU C3 report to OS. Configuration options: [Enabled] [Disabled]

CPU C6 Report [Enabled]
Allows you to enable or disable the CPU C6 report to OS. Configuration options: [Disabled] [Enabled]

CPU C7 Report [CPU C7s]
Allows you to enable or disable the CPU C7 report to OS. Configuration options: [Disabled] [CPU C7] [CPU C7s]

C1 state auto demotion [Enabled]
Allows you to enable or disable the demotion of the C3/C6/C7 request to C1 based on uncore auto-demote information. Configuration options: [Disabled] [Enabled]

C3 state auto demotion [Enabled]
Allows you to enable or disable the demotion of the C6/C7 request to C3 based on uncore auto-demote information. Configuration options: [Disabled] [Enabled]

Package C state demotion [Disabled]
Allows you to enable or disable the Package C state demotion. Configuration options: [Disabled] [Enabled]

C1 state auto undemotion [Enabled]
Un-demotion from demoted C1. Configuration options: [Disabled] [Enabled]

C3 state auto undemotion [Enabled]
Un-demotion from demoted C3. Configuration options: [Disabled] [Enabled]

Package C state undemotion [Disabled]
Allows you to enable or disable the Package C state undemotion. Configuration options: [Disabled] [Enabled]

C state Pre-Wake [Enabled]
Allows you to enable or disable the C state Pre-Wake feature. Configuration options: [Disabled] [Enabled]

CFG lock [Enabled]

Allows you to enable or disable CFG lock. Configuration options: [Disabled] [Enabled]

Package C State limit [AUTO]

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

LakeTiny Feature [Disabled]

Allows you to enable or disable LakeTiny for C state configuration. Configuration options: [Disabled] [Enabled]

Intel TXT (LT) Suppot [Disabled]

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

ACPI T State [Enabled]

Allows you to enable or disable the ACPI T state. Configuration options: [Disabled] [Enabled]

5.4.2 PCH-IO Configuration

Allows you to configure PCH parameters.

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

 Intel PCH RC Version          1.3.0.0          USB  Configuration
 Intel PCH SKU Name            C224             settings.
 Intel PCH Rev ID              04/C1

 ▶ USB Configuration
```
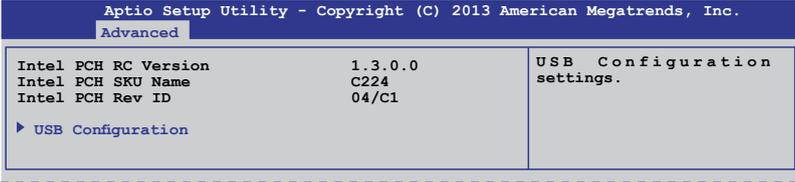
USB Configuration

Allows you to set the USB Configuration settings.

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

 USB Configuration                              Mode of operation of xHCI
 XHCI Mode                 [Auto]               controller.
 BTCG                            [Disabled]

 EHCI1                     [Enabled]
 EHCI2                     [Enabled]

 USB Ports Per-Port Disable Control [Disabled]
```
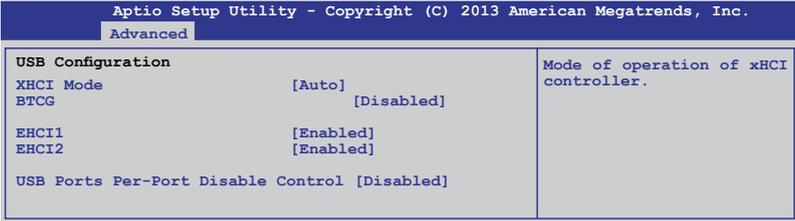
XHCI Mode [Auto]

Allows you to set the mode of operation of the xHCI controller. Configuration options: [Auto] [Enabled] [Disabled]

BTCG [Disabled]

Allows you to enable or disable trunk clock gating. Configuration options: [Enabled] [Disabled]

EHCI1 / EHCI2 [Enabled]

Allows you to control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled. Configuration options: [Disabled] [Enabled]

USB Ports Per-Port Disable Control [Disabled]

Allows you to control the disabling of the USB ports (0-13).

These items only appear when you set the USB Ports Per-Port Disable Control to [Enabled]

USB Port #0-#13 Disabled [Enabled]
This item allows you to enable/disable each of the USB ports (0-13).
Configuration options: [Disabled] [Enabled]

5.4.3 SATA Configuration

While entering Setup, the BIOS automatically detects the presence of SATA devices. The SATA Port items show Not Present if no SATA device is installed to the corresponding SATA port.

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

 SATA Controller(s)          [Enabled]              Enable or disable SATA
 SATA Mode Selection         [AHCI]                 Device.
 S.M.A.R.T. Status Check     [Enabled]

 Serial ATA Port 1           HardDisk   (250.0GB)
   Software Preserve         SUPPORTED
   Port 1                    [Enabled]
   Hot Plug                  [Enabled]
   SATA Device Type          [Hard Disk Drive]
   Spin Up Device            [Disabled]
 Serial ATA Port 2           HardDisk   (250.0GB)
   Software Preserve         SUPPORTED
   Port 2                    [Enabled]
   Hot Plug                  [Enabled]
   SATA Device Type          [Hard Disk Driver]
   Spin Up Device            [Disabled]
 Serial ATA Port 3           HardDisk   (250.0GB)
   Software Preserve         SUPPORTED
   Port 3                    [Enabled]
   Hot Plug                  [Enabled]
   SATA Device Type          [Hard Disk Driver]
   Spin Up Device            [Disabled]
```

SATA Controller(s) [Enabled]

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

SATA Mode Selection [AHCI]

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

S.M.A.R.T. Status Check [Enabled]

Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) is a monitor system. When read/write of your hard disk errors occur, this feature allows the hard disk to report warning messages during the POST. Configuration options: [Enabled] [Disabled]

Compatible Mode [Disabled]

This item only appears when you set the SATA Mode Selection to [IDE]. This item allow you to enable or disable the Compatible mode. Configuration options: [Disabled] [Enabled]

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

 SATA Controller(s)          [Enabled]             Determines   how
 SATA Mode Selection         [IDE]                 SATA  controller(s)
 Compatible Mode             [Disabled]            operate.
 S.M.A.R.T. Status Check     [Enabled]

 Serial SATA Port 0          HardDisk   (250.0GB)
      Software Preserve       SUPPORTED
 Serial SATA Port 1          HardDisk   (250.0GB)
      Software Preserve       SUPPORTED
 Serial SATA Port 2          HardDisk   (250.0GB)
      Software Preserve       SUPPORTED
 Serial SATA Port 3          HardDisk   (250.0GB)
      Software Preserve       SUPPORTED
 Serial SATA Port 4          HardDisk   (250.0GB)
      Software Preserve       SUPPORTED
 Serial SATA Port 5          ASUS DVD-E8 ATAPI
      Software Preserve       SUPPORTED
```

5.4.4   System Agent (SA) Configuration

This allows you to change System Agent parameters.

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


    System Agent Bridge Name     Haswell            Check  to  enable  VT-d
    System Agent RC Version      1.3.0.0            function  on  MCH.
    VT-d Capability              Supported

    VT-d                         [Enabled]
    Enable NB Card               [Disabled]
    BDAT ACPI Table Support      [Disabled]
    VGA Priority                 [Offboard]

  ▶ Memory Configuration
```

VT-d [Enabled]

This allows you enable or disable VT-d function on MCH. Configuration options: [Enabled] [Disabled]

Enable NB CRID [Disabled]

This allows you enable or disable NB CRID WorkAround. Configuration options: [Enabled] [Disabled]

BDAT ACPI Table Support [Disabled]

This allows you enable or disable support for the BDAT ACPI table. Configuration options: [Enabled] [Disabled]

VGA Priority [Offboard]

This allows you to prioritize between onboard and offboard video hardware.Configuration options: [Onboard] [Offboard]

Memory Configuration

This allows you to change memory information settings.

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

    Memory Information                                            Maximum   Memory
                                                                  Frequency  Selections
    Memory RC Version              1.3.0.0                        in MHz.
    Memory Frequency               1333 MHz
    Usage Memory                   4096 MB (DDR3)
    DIMM_A1                        Not Present
    DIMM_A2                        Not Present
    DIMM_A3                        Not Present
    DIMM_A4                        4096 MB (DDR3)
    CAS Latency (tCL)              9
    Minimum delay time
       CAS to RAS (tRCDmin)        9
       Row Precharge (tRPmin)      9
       Active to Precharge (tRASmin)  24

    Memory Frequency Limiter       [Auto]
    Memory Scrambler               [Enabled]
    Memory Remap                   [Enabled]
    GDXC Support                   [Disabled]

    - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

Memory Frequency Limiter [Auto]

This allows you to set the memory frequency in MHz. Configuration options: [1333] [1600]

Memory Scrambler [Enabled]

This allows you to enable or disable Memory Scrambler support. Configuration options: [Enabled] [Disabled]

Memory Remap [Enabled]

This allows you to enable or disable Memory Remap above 4G. Configuration options: [Enabled] [Disabled]

GDXC Support [Disabled]

This allows you to enable or disable GDXC feature. Configuration options: [Enabled] [Disabled]

5.4.5 PCI Subsystem Settings

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

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

     PCI Bus Driver Version          V 2.05.02          Change PCI Express Devices
                                                        Settings.
     PCI 64bit Resources Handling
     Above 4G Decoding          [Disabled]

     PCI Common Settings
     Load RT32 Image            [Enabled]

   ▶ PCI Express Settings
   ▶ PCIE Slot Configuration
```
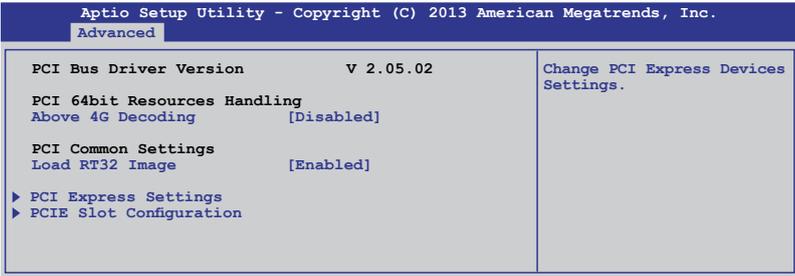
Above 4G Decoding [Disabled]

This item allows you to enable or disable 64-bit processing above the 4G Address Space if your system supports 64-bit PCI decoding. Configuration Options: [Disabled][Enabled]

Load RT32 Image [Enabled]

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

PCI Express Settings

Allows you to change the settings of the PCI Express Devices.

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

     PCI Express Device Register Setting                Set  the  ASPM  Level:  Force
                                                        L0s  -  Force  all  links  to
     PCI Express Device Register Settings               L0s  State:  AUTO  -  BIOS
     ASPM Support                   [Disabled]          auto  configure  :DISABLE  -
     WARNING: Enabling ASPM may cause some PCIE devices  Disables ASM
              to fail
```
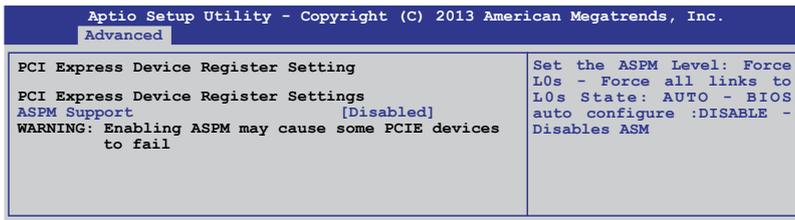
ASPM Support [Disabled]

This item allows you to enable or disable support for Active State Power Management (ASPM). ASPM is a power management protocol that is used to extend battey life.

Configuration options:

[Disabled]   Disables ASMP
[Auto]   BIOS auto configure
[Force L0s]   Force all links to L0s State

PCIE Slot Configuration

Allows you to perform PCIE slot configurations.

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

   PCIE Slot Configuration                              Enabled/Disabled PCIE3
                                                        Option Rom
   PCIE4                            Not Present
   PCIE4 Option Rom                 [Enabled]
   PCIE5                            Not Present
   PCIE5 Option Rom                 [Enabled]
   PCIE6                            Not Present
   PCIE6 Option Rom                 [Enabled]
   PCIE7                            Not Present
   PCIE7 Option Rom                 [Enabled]




   ------------------------------------------------------------------------------
```
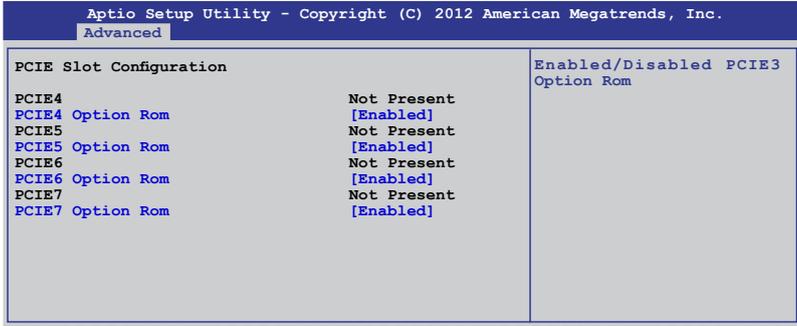
PCIE Option Rom 3 - 7 [Enabled]

Allows you to enable or disable PCIE slots. Configuration Options: [Disabled][Enabled]

5.4.6 USB Configuration

This area allows you to configure USB settings.

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

   USB Configuration                                    Enables  Legacy  USB
                                                        support.  AUTO  option
   USB Devices                                          disables legacy support
        1 mouse,2 Hubs                                  if  no  USB  devices  are
                                                        connected.   DISABLE
   Legacy USB Support          [Enabled]                option  will  keep  USB
   USB3.0 Support              [Enabled]                devices available only
   XHCI Hand-off               [Enabled]                for  EFI  applications.
   EHCI Hand-off               [Disabled]
   USB Mass Storage Driver Support [Enabled]
   Port 60/64 Emulation        [Enabled]

   USB hardware delays and time-outs:
   USB transfer time-out       [20 sec]
   Device reset time-out       [20 sec]
   Device power-up delay       [Auto]

   ------------------------------------------------------------------------------
```

The **USB Devices** item shows the auto-detected values. If no USB device is detected, the item shows **None**.

Legacy USB Support [Enabled]

Allows you to enable or disable support for legacy USB devices. Setting to [Auto] allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled] [Enabled] [Auto]

USB3.0 Support [Enabled]

Enables or disables the USB3.0 (XHCI) controller support. Configuration options: [Disabled] [Enabled]

XHCI Hand-off [Enabled]

This setting provides support for operating systems without XHCI hand-off support. Configuration options: [Disabled] [Enabled]

EHCI Hand-off [Enabled]

This setting provides support for operating systems without EHCI hand-off support. Configuration options: [Disabled] [Enabled]

USB Mass Storage Driver Support [Enabled]

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

Port 60/64 Emulation [Enabled]

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

USB transfer time-out [20 sec]

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

Device reset time-out [20 sec]

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

Device power-up delay [Auto]

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

5.4.7   TPM

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

    Configuration                                      Enables or Disables BIOS
        TPM Support              [Disabled]            support for security
                                                       device.O.S. will not show
    Current Status Information                         Security Device. TCG
        SUPPORT TURNED OFF                             EFI protocol and INT1A
                                                       interface will not be
                                                       available.
```

Security Device Support [Disabled]

Allows you to enable or disable BIOS support for security devices. Configuration options: [Disabled] [Enabled]

5.4.8   ACPI Settings

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

    ACPI Settings                                      Enables or Disables
    Enable Hibernation        [Enabled]                System ability to
    ACPI Sleep State          [Both S1 and S3 avai...]  Hibernate (OS/S4 Sleep
                                                       State). This option may
                                                       not be effective with
                                                       some OS.
```

Enable Hibernation [Enabled]

Allows you to enable or disable Hibernation features (OS/S4 sleep state).

Configuration options: [Disabled] [Enabled]

ACPI Sleep State [Both S1 and S3 available for OS to choose from]

Allows you to set the ACPI Sleep state. Configuration options: [Suspend Disabled]

[S1 only (CPU Stop Clock)] [S3 only (Suspend to RAM)]

[Both S1 and S3 available for OS to choose from]

5.4.9 WHEA Support

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

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

WHEA [Enabled]

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

5.4.10 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)
 ▶ Serial Port 1 Configuration
 ▶ Serial Port 2 Configuration
```

Serial Port 1/2 Configuration

The sub-items in this menu allow you to set the parameters of the Serial Port 1 (COM1) and the Serial Port 2 (COM2).

Serial Port [Enabled]

Allows you to enable or disable the serial port (COM 1/2). Configuration options: [Enabled] [Disabled]

Change Settings [Auto]

This item only appears when you set the Serial Port to [Enabled]. This item allows you to select the serial port base address. Configuration options:

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

5.4.11   Intel® Server Platform Services

This item displays information on the Intel® Server Platform Services configured in the system.

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

    Intel Sever Platform Services Configuration

    ME BIOS Interface Ver :        1.0

    SPS Version                    3.0.4.118

    ME FW Status Value    :        0xf0345

    ME FW State           :        SPS ME FW Active

    ME FW Operation State :        M0 without UMA

    ME FW Error Code      :        No Error

    ME NM FW Status Value :        0x80000001

    BIOS Booting Mode     :        Power Optimized Mode

    Cores Disabled        :        0

    ME FW SKU Information :        Node Manager

    End-of-POST Status    :        EOP disabled in POST
```

5.4.12   Onboard LAN Configuration

This area allows you to configure the onboard LAN.

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

    Onboard LAN Configuration                                INTEL I210 LAN Disable/
                                                             Enable
    INTEL I210 LAN1 MAC:                 00:E0:18:10:18:E8
    INTEL I210 LAN2 MAC:                 00:E0:18:10:18:E9


    INTEL I210 LAN1 Enable       [Enabled]
    INTEL I210 LAN1 OpROM        [PXE]
    INTEL I210 LAN2 Enable       [Enabled]
    INTEL I210 LAN2 OpROM        [PXE]
```

INTEL I210 LAN1 - LAN2 Enable [Enabled]
Allows you to enable or disable the INTEL I210 LAN function in the system. Configuration Options: [Enabled] [Disabled]

INTEL I210 LAN1 - LAN2 OpROM
Allows you to launch the Intel I210 LAN OpROM. Configuration options: [Disabled] [PXE] [iSCSI]

5.4.13 Serial Port Console Redirection

```
       Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
           Advanced
                                                        Console Redirection
    COM1                                                Enable or 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
 -------------------------------------------------------------------------
```
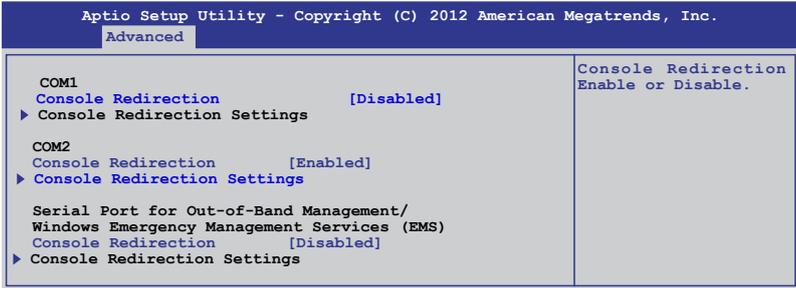
COM1/COM2 Console Redirection [Disabled/Enabled]
Allows you to enable or disable the console redirection feature. Configuration options: [Disabled] [Enabled]

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

COM1/COM2 Console Redirection Settings
These settings specify how the host computer and the remote computer 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 character set.
[VT100+]	Extends VT100 to support color, function keys, etc.
[VT-UTF8]	Uses UTF8 encoding to map Unicode characters onto 1 or more bytes
[ANSI]	Extended ASCII character set

Bits per second [57600]
Selects serial port transmission speed. The speed must match the recipient. Long or noisy lines may require lower speeds. Configuration options: [9600] [19200] [38400] [57600] [115200]

Data Bits [8]
Allows you to set the data bits. Configuration options: [7] [8]

Parity [None]
Allows you to select the parity bit. A parity bit is sent with the data bits to detect transmission errors. Configuration options: [None] [Even] [Odd] [Mark] [Space]

Stop Bits [1]
Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning.) The standard setting is 1 stop bit. Communication with slow hardware may require more than 1 stop bit. Configuration options: [1] [2]

Flow Control [Hardware [Hardware RTS/CTS]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a "stop" signal can be sent to stop the data flow. Once the buffers are empty, a "start" signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals. Configuration options: [None] [Hardware RTS/CTS]

VT -UTF8 Combo Key Support [Enabled]

This allows you to enable the VT -UTF8 Combination Key Support for ANSI/VT100 terminals. Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

This allows you to enable or disable the Recorded mode to capture Terminal data. Configuration options: [Disabled] [Enabled]

Resolution 100x31 [Enabled]

This allows you to enable or disable the extended terminal resolution. 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 Function Key and Keypad on Putty. Configuration options: [VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

Redirection After BIOS POST [Bootloader]

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) Settings

These settings specify how the host computer and the remote computer will exchange data. Both computers should have the same or compatible settings.

Out-of-Band Mgmt Port [COM1]

This item only appears when you set the Console Redirection to [Enabled]. Allows remote management of a Windows Server OS through a serial port. Configuration options: [COM1] [COM2]

Terminal Type [VT-UTF8]

This item only appears when you set the Console Redirection to [Enabled]. Allows you to set the terminal type for out-of-band management. Configuration options:

[VT100]	ASCII character set.
[VT100+]	Extends VT100 to support color, function keys, etc.
[VT-UTF8]	Uses UTF8 encoding to map Unicode characters onto 1 or more bytes
[ANSI]	Extended ASCII character set

Bits per second [115200]

This item only appears when you set the Console Redirection to [Enabled]. 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]

Flow Control [None]

This item only appears when you set the Console Redirection to [Enabled]. Allows you to set the flow control to prevent data loss from buffer overflow. Configuration options: [None] [Hardware RTS/CTS] [Software Xon/Xoff]

5.4.14 Runtime Error Logging Support

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

 Runtime Error Logging Support          [Disabled]          Specify what state
                                                            to go to when power
                                                            is re-applied after
                                                            a power failure (G3
                                                            state).
```

Runtime Error Logging Support [Disabled]

Allows you to enable or disable the Runtime Error Logging Support. Configuration options: [Disabled] [Enabled]

5.4.15 APM

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

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

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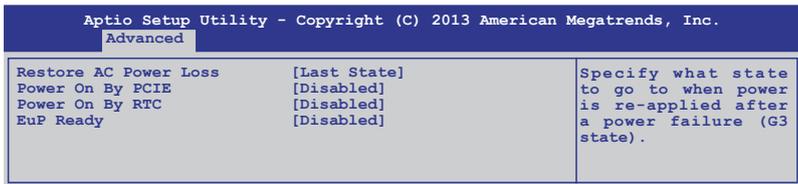
Restore AC Power Loss [Last State]

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

Power On By PCIE [Disabled]

This allows you to enable or disable PCIE devices for waking up the system. Configuration options: [Disabled] [Enabled]

Power On By RTC [Disabled]

This item allows you to enable or disable RTC to generate a wake event. When set to [Enabled], the items RTC Alarm Date (Days) and Hour/Minute/Second become available, allowing you to set specific values.

EUP Ready [Disabled]

This item allows you to switch off some power at S5 to get the system ready for EuP requirement. Configuration options: [Enabled] [Disabled]

5.4.16   Network Stack

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

   Network stack                  [Disabled]                    Enable/Disable  the
                                                                network  stack  (Pxe
                                                                and UEFI)
```
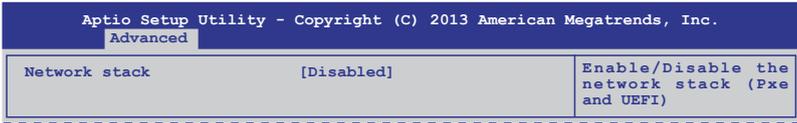
Network stack [Disabled]

Enables or disables the network stack feature. Configuration options: [Disabled] [Enabled]

> These items only appear when you set Network stack to [Enabled]

Ipv4/Ipv6 PXE Support [Enabled]

Allows you to enable or disable the Ipv4/Ipv6 PXE boot option. Configuration options: [Disabled] [Enabled]

5.4.17   Intel RC Drivers Version Detail

This item displays the version string of the Intel® RC Drivers.

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

   Intel CPU RC Version                1.3.0.0
   Memory RC Version                   1.3.0.0
   Intel SA RC Version                 1.3.0.0
   Intel PCH RC Version                1.3.0.0
```
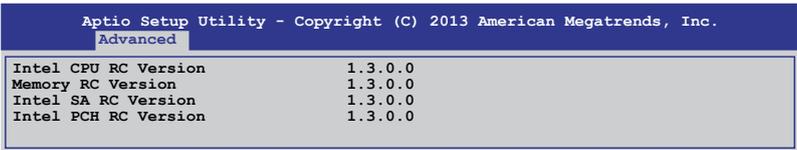
5.5   Event Logs menu

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

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
Main  Advanced  Event Logs  Boot  Monitor  Security  Tool  Exit
▶ Change Smbios Event Log Settings                  Press <Enter> to change
▶ View Smbios Event Log                             the Smbios Event Log
▶ View System Event Log                             configuration.
```

Change Smbios Event Log Settings

```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
                 Event Logs
Enabling/Disabling Options                          Change this to enable
Smbios Event Log             [Enabled]              or disable all features
                                                    of Smbios Event Logging
Erasing Settings                                    during boot.
Erase Event Log              [No]
When Log is Full             [Do Nothing]

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

Smbios Event Log [Enabled]
Allows you to enable or disable all features of Smbios event logging during boot. Configuration options: [Disabled] [Enabled]

Erase Event Log [No]
This item only appears when Smbios Event Log is set to [Enabled]. This item allows you to select the options for erasing Smbios event log. Configuration options: [No] [Yes, Next reset] [Yes, Every reset]

When Log is Full [Do Nothing]
This item only appears when Smbios Event Log is set to [Enabled]. This item allows you to select an action when the event logs are full. Configuration options:
[Do Nothing] [Erase Immediately]

5.6   Boot menu

The items in Boot menu allows you to change the options on how the system will boot.

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

    Boot Configuration                                    Number  of  seconds
    Setup Prompt Timeout       1                          to  wait  for  setup
    Bootup NumLock State       [On]                       activation key.
    Full Screen Logo           [Enabled]                  65535(0xFFFF)  means
    CSM16 Module Version                07.69             indefinite waiting.

    GateA20 Active             [Upon Request]
    Option ROM Messages        [Force BIOS]
    INT19 Trap Response        [Immediate]
    Boot Device Seeking        [Endless PXE]

    Boot Option Priorities
    Boot Option #1             [P0: DVD          ]
    Boot Option #2             [P4: Harddisk 2.50G]
    Boot Option #3             [Windows Boot Man..]

    CD/DVD ROM Drive BBS Priorities
    Network Device BBS Priorities
    Hard Drive BBS Priorities
  ▶ CSM parameters

 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

Setup Prompt Timeout [xx]
This item allows you to adjust the number of seconds to wait for setup activation key. Use the <+> and <-> keys to specify the values.

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

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

> Set this item to [Enabled] to use the ASUS MyLogo2™ feature.

GateA20 Active [Upon Request]
This item is useful when any RT code above 1MB is executed. When set to [Upon Request], the GA20 can be disabled using BIOS services. When set to [Always], disabling of GA20 is not allowed. Configuration options: [Upon Request] [Always]

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

INT19 Trap Response [Immediate]
This item allows you to set the BIOS action on INT19 trapping by Option ROM. Configuration options: [Immediate] [Postponed]

Boot Device Seeking [Endless PXE]
This allows you to enable Boot Device Seeking.

[Endless PXE]   Continuosly seek remote boot image until boot image is found or the operation is aborted (<Ctrl>+<Alt>+<Del> is pressed by the user).

[Normal]   Seek remote boot image once then stop.

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

> •   To select the boot device during system startup, press <F8> when ASUS Logo appears.
>
> •   To access Windows® OS in Safe Mode, do any of the following:
>   - Press <F5> when ASUS Logo appears.
>   - Press <F8> after POST.

CD/DVD ROM Drive BBS Priorities / Network Device BBS Priorities / Hard Drive BBS Priorities
This allows you to set the order of the legacy devices in this group.

CSM Parameters

This allows you to set OpROM execution, boot options filter, and other OpROM settings settings.

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

Launch CSM                    [Enabled]            This  option  controls  if
Boot Option filter            [Legacy only]        CSM will be launched.
Launch PXE OpROM policy       [Legacy only]
Launch Storage OpRom policy   [Legacy only]
Launch Video OpRom policy     [Legacy only]

Other PCI device ROM priority   [Legacy OpROM]
```

Launch CSM [Enabled]
This option allows you to enable or disable the launch of CSM. Configuration options: [Disabled] [Enabled]

Boot Option filter [Legacy only]
This option allows you to control what devices the system can boot to. Configuration options: [UEFI and Legacy] [Legacy only] [UEFI only]

Launch PXE OpROM policy [Legacy only]
This option allows you to control the execution of UEFI and Legacy PXE OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

Launch Storage OpROM policy [Legacy only]
This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

Launch Video OpROM policy [Legacy only]
This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [Do not launch] [UEFI only] [Legacy only] [Legacy first] [UEFI first]

Other PCI device ROM priority [Legacy OpROM]
This option allows you to control the execution of UEFI and Legacy Storage OpROM. Configuration options: [UEFI OpROM] [Legacy OpROM]

5.7   Monitor menu

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

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

  CPU Temperature                    :+58°C/ +162°F          Whisper/Generic/High/
  MB1 Temperature                    :+52°C/ +151°F          Speed/Full Speed
  TR1 Temperature                    :N/A
  CPU_FAN1 Speed                     :1054 RPM
  REAR_FAN1 Speed                    :N/A
  FRNT_FAN1 Speed                    :N/A
  FRNT_FAN2 Speed                    :N/A
  FRNT_FAN3 Speed                    :N/A
  VCORE1                             :+1.800 V
  +12V                               :+12.288 V
  +5V                                :+5.040 V
  +VDDQ                              :+1.504 V
  +3VSB                              :+3.408 V
  +3.3V                              :+1.296 V
  VBAT                               :+3.344 V

  FAN Speed Control          [Generic Mode]
```

CPU/MB1/TR1 Temperature [xxxºC/xxxºF]
The onboard hardware monitor automatically detects and displays the CPU and motherboard component temperatures.

CPU_FAN1 Speed; FRNT_FAN1–3 Speed; REAR_FAN1 Speed
[xxxx RPM] or [Ignore] / [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**.

VCORE1 Voltage: +12V, +5V, +VDDQ, +3VSB, +3.3V, and VBAT
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators.

Fan Speed Control [Generic Mode]
Allows you to configure the ASUS Smart Fan feature to adjust fan speed for a more efficient system operation. Configuration options: [Low Speed Mode] [Generic Mode] [High Speed Mode] [Full Speed Mode]

5.8 Security

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   Event Logs   Boot   Monitor   Security   Tool   Exit

   Password Description                                    Set Setup Administrator
                                                           Password
   If ONLY the Administrator's password is set, then
   this only limits access to Setup and is only asked
   for when entering Setup.
   If ONLY the User's password is set, then this
   is a power on password and must be entered to
   boot or enter Setup. In Setup the User will have
   Administrator rights.
   The password length must be
   in the following range:
   Minimum length               3
   Maximum length               20

   Administrator Password
   User Password
   Clear User Password

 ▶ Secure Boot Menu
```

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

Secure Boot Menu
This item allows you to customize the Secure Boot settings.

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

    Platform Mode              Setup               Secure  Boot  flow  control.
    Secure Boot                Disabled            Secure   Boot  can  be
                                                   enabled   only  when
    Secure Boot Control        [Enabled]           Platform  Key  (PK)  is
                                                   enrolled  and  Platform is
    Secure Boot Mode           [Standard]          operating in User mode.
  ▶ Image Execution Policy
  ▶ Key Management

  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
```

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

Secure Boot Mode [Standard]
This item allows you to select the mode of the Secure boot to change Execution policy and Secure Boot Key management. Configuration options: [Standard] [Custom]

Image Execution Policy

This item only appears when you set the Secure Boot Mode to [Custom]. This allows you to manage the Image Policy on Security Violation.

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

 Interval FV                 [Always Execute]        Image  Execution  Policy
 Option ROM                  [Deny Execute]          per  device  path  on
 Removable Media             [Deny Execute]          Security Violation.
 Fixed Media                 [Deny Execute]
```

Internal FV [Always Execute]
Configuration options: [Always Execute]

Option ROM/Removable Media/Fixed Media [Deny Execute]
Configuration options: [Always Execute] [Always Deny] [Allow Execute] [Defer Execute] [Deny Execute] [Query User]

Key Management

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

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

   Factory Default Key Provisioning      [Disabled]     Install  Factory  default
                                                        Secure  Boot  Keys  when
 ▶ Install All Factory Default Keys                     System is in Setup Mode

 Platform Key (PK)                     NOT INSTALLED
 ▶ Set new PK
 ▶ Delete PK

 Key Exchange Key Database (KEK)       NOT INSTALLED
 ▶ Set new KEK
 ▶ Delete KEK
 ▶ Append Var to KEK

 Authorized Signature Database (DB)    NOT INSTALLED
 ▶ Set new DB
 ▶ Delete DB
 ▶ Append Var to DB

 Forbidden Signature Database (DBX)    NOT INSTALLED
 ▶ Set new DBX
 ▶ Delete DBX
 ▶ Append Var to DBX
```

Factory Default Key Provisioning [Disabled]
Configuration options: [Disabled] [Enabled]
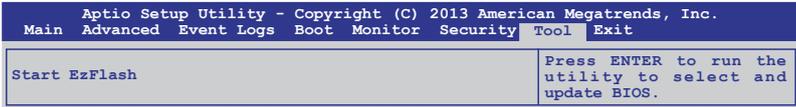
Install All Factory Default Keys
This item will ask you if you want to Install Factory Default secure variables. Select Yes if you want to load the default secure variables, otherwise select No.

Platform Key (PK)/Key Exchange Key Database (KEK)/Authorized Signature Database (DB)/ Forbidden Signature Database (DBX)
Configuration options: [Set New] [Delete] [Append]

5.9   Tool menu

The Tool menu items allow you to configure options for special functions. Select an item then press <Enter> to display the submenu.
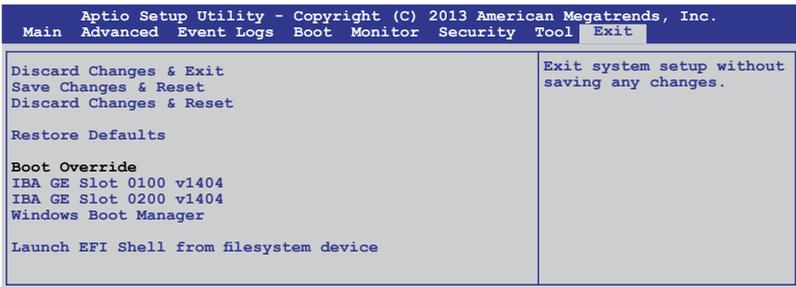
```
        Aptio Setup Utility - Copyright (C) 2013 American Megatrends, Inc.
  Main  Advanced  Event Logs  Boot  Monitor  Security  Tool  Exit

 Start EzFlash                                    Press  ENTER  to  run  the
                                                  utility  to  select  and
                                                  update BIOS.
 -----------------------------------------------------------------------
```

Start EzFlash utility

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

5.10   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  Event Logs  Boot  Monitor  Security  Tool  Exit

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

 Restore Defaults

 Boot Override
 IBA GE Slot 0100 v1404
 IBA GE Slot 0200 v1404
 Windows Boot Manager

 Launch EFI Shell from filesystem device

 -----------------------------------------------------------------------
```

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

Discard Changes & Exit

This option allows you to exit the Setup program without saving your changes. When you select this option or if you press <Esc>, a confirmation window appears. Select **Yes** to discard changes and exit.

Save Changes & Reset

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved. When you select this option or if you press <F10>, a confirmation window appears. Select Yes to save changes and exit.

Discard Changes & Reset

This option allows you to reset without saving your changes. When you select this option or if you press <ENTER>, a confirmation window appears. Select Yes to discard changes and reset.

Restore Defaults

This option allows you restore or load the default values for all the setup options. When you select this option, a confirmation window appears. Select **Yes** to apply the default values or press <Esc> to exit.

Launch EFI Shell from filesystem device

This option allows you to launch the EFI Shell application (shellx64.efi) from one of the available filesystem devices. Select Yes to proceed, or No to cancel, and then press <Enter>.

Chapter 6

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

RAID configuration

6.1 Setting up RAID

The motherboards come with either an Intel® C224 controller (P9D-M) or Intel® C222 controller (P9D-MV and P9D-MX) that supports **Intel® Rapid Storage Technology enterprise Option ROM Utility** with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows® OS only).

6.1.1 RAID definitions

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

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

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

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

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

6.1.2   Installing hard disk drives

The motherboards support 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 Jumpers

> Ensure to turn off power before setting the jumpers on the motherboard.

You must set the jumper settings of your motherboard to activate the embedded RAID utilities. To set the jumper settings for **Intel® Rapid Storage Technology enterprise Option ROM Utility,** set the 3-pin RAID_SEL1 jumper to pins 2-3.

For more information about the jumper settings of 3-pin RAID_SEL1, you may refer to the **RAID configuration utility** section on page 2-28 of this user manual.

6.1.4   Setting the RAID mode in BIOS

You must set the RAID mode in the BIOS Setup to be able to launch the RAID utilities before you can create a RAID set from the SATA hard disk drives attached to the SATA connectors.

To do this:

1.   Enter the BIOS Setup during POST.

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

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

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

> Refer to **Chapter 4** for details on entering and navigating through the BIOS Setup.

6.1.5   RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded on each RAID controller. The P9D-M Series motherboards support **Intel® Rapid Storage Technology** for setting up RAID.

6.2 Intel® Rapid Storage Technology Enterprise Option ROM Utility

The Intel® Rapid Storage Technology enterprise Option ROM utility 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.

> 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 **5.1.2 Installing hard disk drives**, **5.1.3 Setting Jumpers**, and **5.1.4 Setting the RAID mode in BIOS** for more information.

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

1. Turn on the system.

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

> You may have to press <Ctrl>+<I> more than once to enter the main menu.

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


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

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




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

The navigation keys at the bottom of the screen allow you to move through the menus and select the menu options.
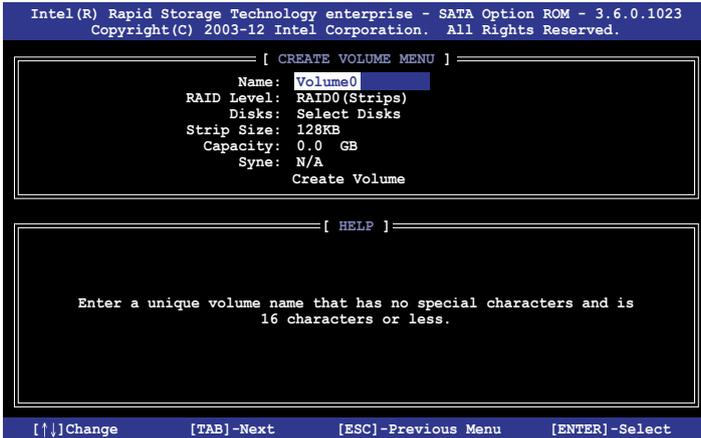
> The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.
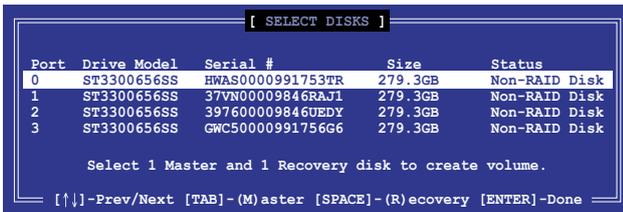
6.2.1 Creating a RAID set

To create a RAID set:

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

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

```
  Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
           Copyright(C) 2003-12 Intel Corporation.  All Rights Reserved.
  ═══════════════════════════[ CREATE VOLUME MENU ]═══════════════════════════
                       Name:   Volume0
                 RAID Level:   RAID0(Strips)
                      Disks:   Select Disks
                 Strip Size:   128KB
                   Capacity:   0.0  GB
                       Syne:   N/A
                              Create Volume

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



         Enter a unique volume name that has no special characters and is
                           16 characters or less.




  [↑↓]Change          [TAB]-Next         [ESC]-Previous Menu      [ENTER]-Select
```

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

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

```
  ═════════════════════════════════[ SELECT DISKS ]═══════════════════════════

  Port  Drive Model   Serial #             Size        Status
  0     ST3300656SS   HWAS0000991753TR     279.3GB     Non-RAID Disk
  1     ST3300656SS   37VN00009846RAJ1     279.3GB     Non-RAID Disk
  2     ST3300656SS   397600009846UEDY     279.3GB     Non-RAID Disk
  3     ST3300656SS   GWC50000991756G6     279.3GB     Non-RAID Disk

        Select 1 Master and 1 Recovery disk to create volume.

  ═══ [↑↓]-Prev/Next [TAB]-(M)aster [SPACE]-(R)ecovery [ENTER]-Done ═══
```

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

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

RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB

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

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

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

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

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

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

6.2.2 Deleting a RAID set

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

To delete a RAID set:

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

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

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

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




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

              Deleting a volume will reset the disks to non-RAID

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



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

3. From the following warning message, press <Y> to delete the RAID set and return to the utility main menu, or press <N> to return to the **DELETE VOLUME** menu.

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

        Are you sure you want to delete volume "Volume0"? (Y/N):
```

6.2.3 Resetting disks to Non-RAID

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

To reset a RAID set hard disk drive:

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

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

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

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

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

                Select the disks that should be reset.

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

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

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

To exit the utility:

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

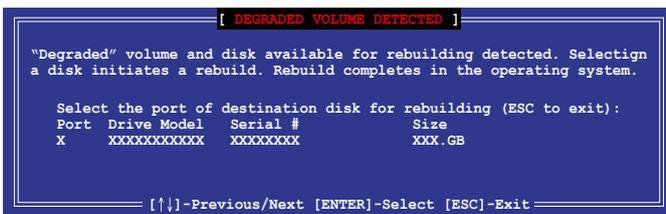2.   From the following warning message, press <Y> to exit or press <N> to return to the utility main menu.

```
                              [ CONFIRM EXIT ]

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

6.2.5 Rebuilding the RAID

This option is only for the RAID 1 set.

Rebuilding the RAID with another 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 another 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     XXXXXXXXXXX   XXXXXXXX            XXX.GB



                [↑↓]-Previous/Next [ENTER]-Select [ESC]-Exit
```

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

3. The utility immediately starts rebuilding after the disk is selected. 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. 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 another non-RAID disk**.

6.2.6 Setting the Boot array in the BIOS Setup Utility

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

To set the boot array in the BIOS:

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

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

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

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

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

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

6.3 Intel® Rapid Storage Technology enterprise (Windows® only)

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 a Windows operating system:

1.   Power on the system to a Windows desktop.

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

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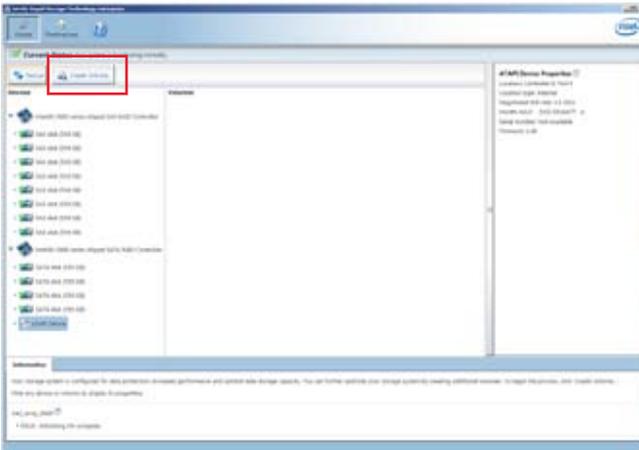
You can click **Rescan** to re-scan any attached hard disks.

6.3.1   Creating a RAID set

To create a RAID set:

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

2.   Key in a name for the RAID set, then select the array disks.

3.   Select the **Volume Size** tab then drag the bar to set 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**.

5. Confirm volume creation, then 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.
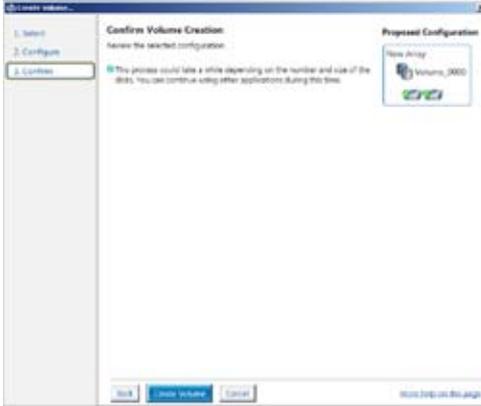
6. Wait until the process is complete, then click **OK** when prompted.

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

The created RAID set is displayed in the **Volumes** list. If you wish to change the settings, go to **Volume Properties**.
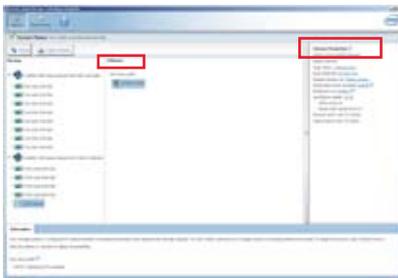
6.3.2   Changing a Volume Type

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

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

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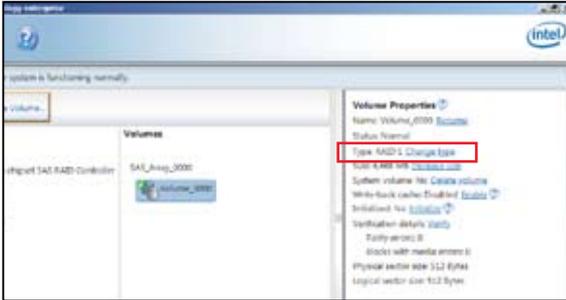
3.   You can also change the **Name**, **Select the new volume type**, and **Select additional disks to include in the new volume** if needed.

4.   Select the **Data stripe size** for the RAID array (for RAID 0, 10 and 5 only) and click **OK**. The available stripe size values range from 4 KB to 128 KB. The following are typical values:

RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB
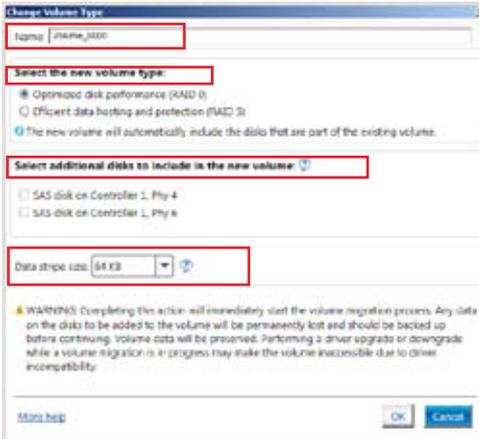
We recommend a lower stripe size for server systems, and a higher stripe size for multimedia computer systems used mainly for audio and video editing.

6.3.3 Deleting a volume

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

To delete a volume:

1.   From the **Volumes** field in the utility main menu, select the volume that you want to delete.
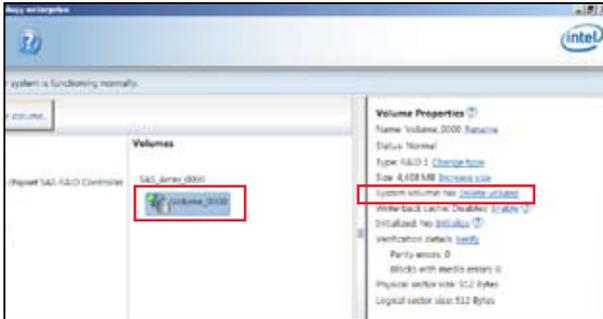
2.   From the **Volume Properties** field, select **Delete volume**.

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

6.3.4 Preferences

System Preferences

Allows you to configure displayed storage system notifications.
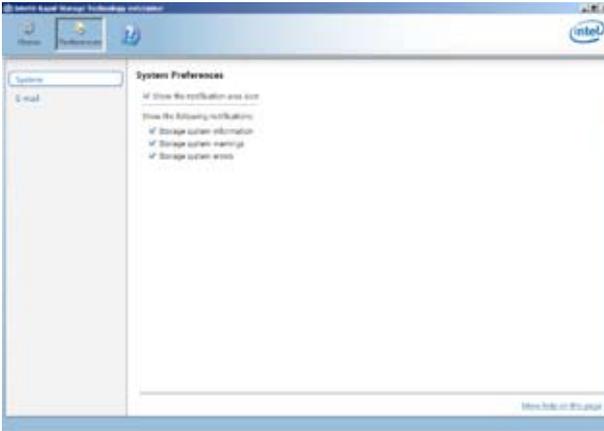
E-Mail Preferences

Allows you to setup e-mail notifications for the following storage system events:

- Storage system information
- Storage system warnings
- Storage system errors
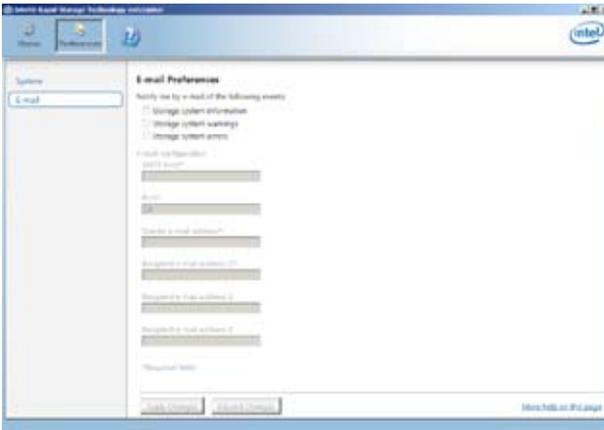
Chapter 7

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

7.1 RAID driver installation

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

7.1.1 Creating a RAID driver disk

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

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

To create a RAID driver disk in a DOS environment:

1.   Place the motherboard support DVD in the optical drive.

2.   Restart your computer.

3.   Enter the BIOS Setup.

4.   Select the optical drive as the first boot priority to boot from the support DVD. Save your changes.

5.   Exit the BIOS Setup and restart your computer.

     The Makedisk menu appears.

6.   Select the **C22x INTEL RAID Driver** and press <Enter> to go to the sub-menu.

```
Create Driver Diskette Menu
C22x INTEL RAID Driver
Write DMI
FreeDOS command prompt
```

7.   From the C22x Intel RAID Driver sub-menu, use the Up or Down arrow keys to select the driver and press <Enter> to create the RAID driver disk.

C22x INTEL RAID Driver

```
        C22x INTEL RAID Driver
Windows 32 bit(also support AHCI)
Windows 64 bit(also support AHCI)
Back
Exit
```

6.   Select **YES** from the following warning message then press <Enter>.

```
WARNING !!!
ALL DATA ON THE FLOPPY DISKETTE WILL BE DELETED !!
DO YOU WANT TO CONTINUE ?

                                          NO        YES
```

7.   On the following **Important** message, select **YES** if an ASMB7 is installed, otherwise select **NO**, then press <Enter>.

```
<Important>
Please ensure ASMB7-iKVM is well installed on the
motherboard.

                                          NO        YES
```

8.   Insert the formatted diskette into the disk drive and press <Enter> to write the image to the disk.

9.   Press any key to continue when prompted.

      The Create Driver Diskette Menu appears after the creation of the diskette is finished.

To create a RAID driver disk in a Windows® environment:

1.   Start Windows®.

2.   Place the motherboard support DVD in the optical drive.

3.   Go to the **Make disk** menu, then select the type of RAID driver disk you want to create.

4.   Insert a floppy disk into the USB floppy disk drive.

5.   Follow succeeding screen instructions to complete the process.

      Write-protect the floppy disk to avoid computer virus infection.

7.1.2 Installing the RAID controller driver

During Windows® Server 2008 OS installation

To install the RAID controller driver when installing Windows® Server 2008 OS

1. Boot the computer using the Windows® Server 2008 OS installation disc. Follow the screen instructions to start installing Windows Server 2008.

2. When prompted to choose a type of installation, click **Custom (advanced)**.
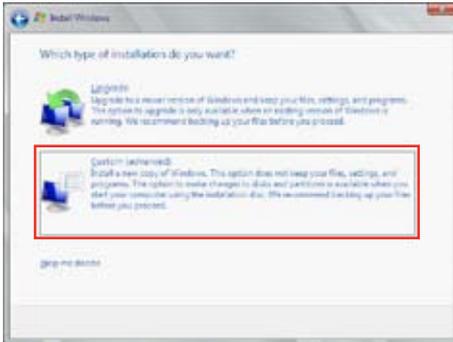
3. Click **Load Driver**.
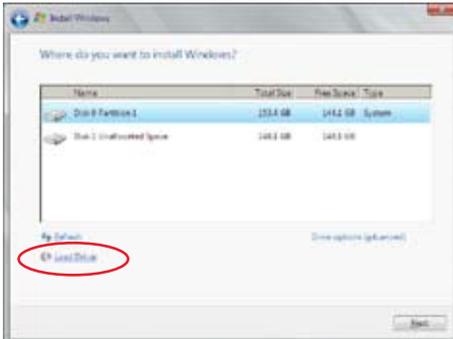
4. A message appears reminding you to insert the installation media containing the driver of the RAID controller driver. If you have only one optical drive installed in your system, eject the Windows OS installation disc and replace with the motherboard Support DVD in the optical drive. Click **Browse** to continue.
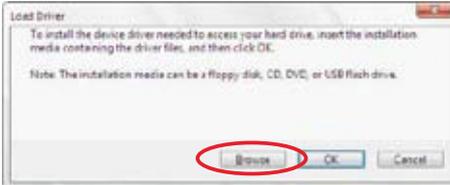
5. Locate the driver in the corresponding folder of the Support DVD, and then click **OK** to continue.

6. Select the RAID controller driver you need from the list and click **Next**.

7. When the system finishes loading the RAID driver, replace the motherboard Support DVD with the Windows Server installation disc. Select the drive to install Windows and click **Next**.
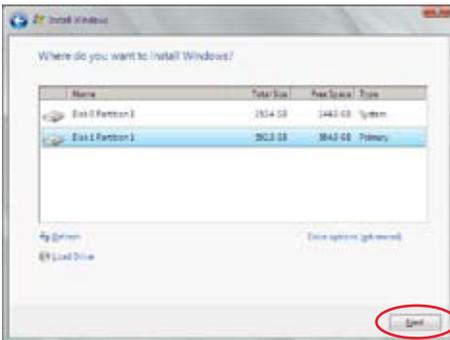
8. Follow succeeding screen instructions to continue.

7.2   Management applications and utilities installation

The support DVD that is bundled with your motherboard contains drivers, management applications, and utilities that you can install to maximize the features of your motherboard.

> • 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.
>
> • The DVD is supported on Windows® Server 2008 R2 and Windows® Server 2012.

7.3   Running the Support DVD

When you place the support DVD in 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

7.3.3   MakeDisk menu tab

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

> You have to press the arrow down button in the lower part of the screen several times if you want to see all of the items of the MakeDisk menu.

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 tab displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard. This information can also be found on the inside front cover of this user guide.

7.3.6   Installing the Intel® Chipset device Software driver

This section provides the instructions on how to install the Intel® chipset device software on the system.

You need to manually install the Intel® chipset device software on a Windows® Operating System.

To install the Intel® chipset device software on Windows® Server 2008 R2:

1.   Restart the computer.

2.   Log in with **Administrator** privileges.

3.   Insert the Motherboard Support DVD to the optical drive.

      The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.   Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5.	The **Intel® Chipset Device Software** appears. Click **Next** to start the installation.

6.	Select **Yes** to accept the terms in the **License Agreement** window to continue the process**.**

7.	Read the Readme File information and click **Next** to continue.

8.   Click **Install** in the **Windows Security**
      window.

The Windows Security window may appear more than once and you may have to click **Install** several times to continue with the installation.

---

9.   When finished, click **Next.**

10.   When prompted to restart the computer, select **Yes, I want to restart this computer now** then click **Finish** to complete the installation.

To install the Intel® Chipset device software on Windows® Server 2012:

1.   Restart the computer.

2.   Log in with **Administrator** privileges.

3.   Insert the Motherboard Support DVD to the optical drive.

      The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.   Click **Intel® Chipset Device Software** from the Drivers menu to start the installation.

5.   From the **Intel® Chipset Device Software**, click **Next.**

6.   In the **License Agreement** window, click **Yes** to continue the process**.**

7. Read the Readme File information and click **Next** to continue.

8. When done, click **Finish** to complete the installation.

7.4   Installing the LAN driver

This section provides the instructions on how to install the **Intel® Network Connections Software** drivers on the system.

You need to manually install the LAN controller driver on a Windows® operating system.

To install the **LAN** controller device on Windows® Server 2008 R2:

1.   Restart the computer.

2.   Log in with A**dministrator** privileges.

3.   Insert the Motherboard Support DVD to the optical drive.

    The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.   Click **Intel® Network Connections Software** on the **Drivers menu** to start the installation.

5.   From the **Intel® Network Connections** window, click **Install Drivers and Software**.

6.   Click **Next** in the **Welcome to the InstallShield Wizard for Intel(R) Network Connections**.

7.   From the **License Agreement** window, select **I accept the terms in the license agreement** then click **Next.**

8.   Select the drivers you want to install in the **Setup Options** window and click **Next**.
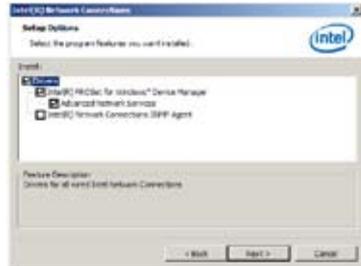
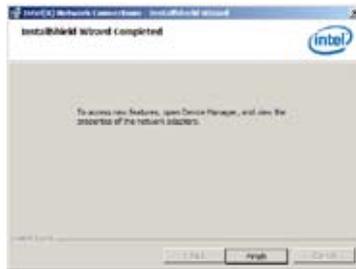9.   From the **Ready to Install the Program** window, click **Install.**
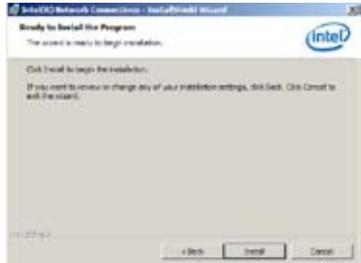
10. Click **Yes** when the **Microsoft Management Console** dialog box appears**.**

> The **Microsoft Management Console** dialog box appears when the system detects open or running applications that needs to be closed. You have to terminate open or running applications specified in the dialog box to proceed with the installation.

11. When done, click **Finish** to complete the installation.

To install the **LAN** controller device on Windows® Server 2012:

1. Restart the computer.

2. Log in with A**dministrator** privileges.

3. Insert the Motherboard Support DVD in the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® Network Connections Software** on the **Drivers menu** to start the installation.

5. From the **Intel® Network Connections** window, click **Install Drivers and Software**.

6. Click Next in the **Welcome to the InstallShield Wizard for Intel(R) Network Connections** window.

7. Select the drivers you want to install in the **Setup Options** window and click **Next**.

8.   Click **Install** to continue.
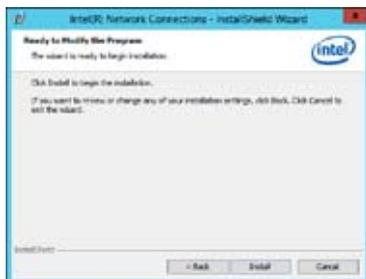
9.   When done, click **Finish** to complete the installation.

7.5 Installing the VGA driver

This section provides instructions on installing the **ASPEED Video Graphics Adapter (VGA)** driver.

To install the **ASPEED VGA** driver on Windows® Server 2008 R2:

1. Restart the computer.

2. Log in with A**dministrator** privileges.

3. Insert the Motherboard Support DVD in the optical drive.

   The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

   If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

   ---

4. From the **Main Menu**, click **ASPEED AST2300/AST1300 Display Driver** on the **Drivers** tab to start the installation.

5. From the **License Agreement** window, select **I accept the terms** and click **Nex**t.

6. Key in a username and organization then click **Next**.

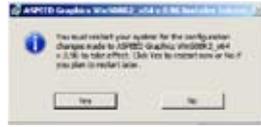7. Select **Complete** in the **Setup Type window** then click **Next**.

8. Click **Install** to begin the installation.

9. When done, click **Finish**.

10.	When prompted to restart the computer, click **Yes**.

To install the **ASPEED VGA** driver on Windows® Server 2012:

1.	Restart the computer.

2.	Log in with A**dministrator** privileges.

3.	Insert the Motherboard Support DVD to the optical drive.

	The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.

	If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.	Click **ASPEED AST2300/AST1300 Display Driver** on the **Drivers** menu to start the installation.

5.	Click **OK** in the Driver Information window.

	Wait for the loading of drivers to finish.

6.	Click **OK** to complete the installation.

7.6 Installing the Intel® C22x MEI NULL HECI driver

This section provides the instructions on how to install the Intel® C22x MEI NULL HECI driver on the motherboard.

To install the **Intel® C22x MEI NULL HECI** driver in Windows:

1. Restart the computer.

2. Log in 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® C22x MEI NULL HECI** on the **Drivers** menu of the main screen to start the installation.

5. From the **Welcome to the Setup Program** window, click **Next.**

6. Click **Yes** in the **License Agreement** window to continue with the installation.

7. Click **NEXT** when the installation of driver is complete.

8. Click **Finish** to complete the installation.

7.7 Installing the Intel® I210 Gigabit Adapter driver

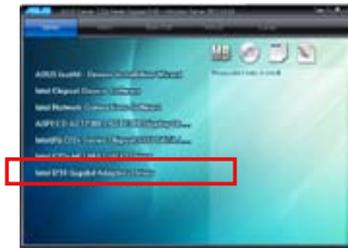This section provides instructions on installing the **Intel® I210 Gigabit Adapter** driver on the system.

To install the **Intel® I210 Gigabit Adapter** driver on Windows® Server 2008 R2:

1. Restart the computer.

2. Log in with **Administrator** privileges.

3. Insert the motherboard/system support DVD to the optical drive.

If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4. Click **Intel® I210 Gigabit Adapter Driver** in the **Drivers** menu of the main screen to start the installation.
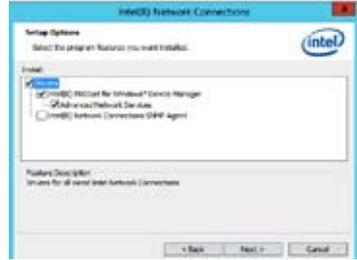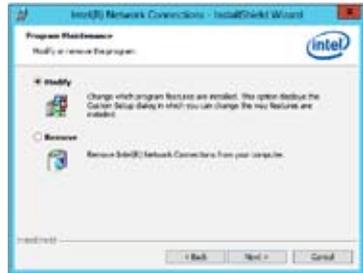
5. Click **Next** to continue.

6. From the **Program Maintenance** window, select **Modify** then click **Next.**

7. Select the options you want to install then click **Next** to continue.

8. Click **Install** in the **Ready to Modify the Program** window to begin with the loading of the selected options.

9. When done, click **Finish**.

To install the **Intel® I210 Gigabit Adapter** driver on Windows® Server 2012:

1.   Restart the computer.

2.   Log in with **Administrator** privileges.

3.   Insert the motherboard/system support DVD to the optical drive.

> If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

4.   Click **Intel® I210 Gigabit Adapter Driver** in the **Drivers** menu of the main screen to start the installation.
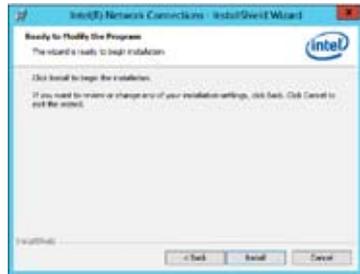
5.   Click **Next** to continue.

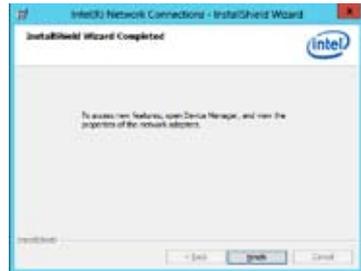6.   From the **Program Maintenance** window, select **Modify** then click **Next.**

7.   Select the options you want to install then click **Next** to continue.

8. In the **Ready to Modify the Program** window, click **Install** to load the options you selected.

9. When done, click **Finish**.

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 (400-620-6655)
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