



RS720-E7-RS24-EG

***2U Rackmount Server
User Guide***

E8411
First Edition
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Notices

Federal Communications Commission Statement

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

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

This equipment has been tested and found to comply with the limits for a Class 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 A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

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

REACH

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

Safety information

Electrical Safety

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

Operation Safety

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



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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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



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



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

Australia statement notice

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

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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. Chapter 1: Product introduction

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

2. Chapter 2: Hardware setup

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

3. Chapter 3: Installation options

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

4. Chapter 4: Motherboard information

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

5. Chapter 5: BIOS information

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

6. Chapter 6: RAID configuration

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

7. Chapter 7: Driver installation

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

Conventions

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key.

Example: <Enter> means that you must press the Enter or Return key.

<Key1>+<Key2>+<Key3>

If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

Example: <Ctrl>+<Alt>+

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 chassis kit. It includes sections on front panel and rear panel specifications.

Product introduction

1.1 System package contents

Check your system package for the following items.

Model Name	RS720-E7-RS24-EG
Chassis	ASUS R20B 2U Rackmount Chassis
Motherboard	Z9PE-D16-10G/DUAL Server Board
Component	1 x 770W Redundant Power Supply (80 PLUS Gold) 1 x SAS/SATA Backplane Board 1 x Front I/O Board 1 x Front USB Card 1 x Power Sharing Board 4 x Easy-swap System Fans 24 x Hot-swap 2.5-inch HDD tray 2 x Hot-swap 2.5-inch SSD tray
Accessories	1 x RS720-E7-RS24-EG User's Guide 1 x RS720-E7-RS24-EG Support CD 1 x ASWM Enterprise Support CD 1 x ASMB6 - iKVM Support DVD 1 x ASMB6 - iKVM Manual 2 x CPU Heatsink 2 x Bag of Screws 2 x AC Power Cables
Optional Items	1 x Friction Rail Kit 1 x 770W Redundant Power Supply (80 PLUS Gold) 1 x ASUS PIKE 2108-32PD HW RAID card 1 x ASUS PIKE 2208 8-port HW RAID card 1 x ASUS PIKE 2308 8-port RAID card

*ASUS System Web-based Management



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

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 14 characters such as xxS0xxxxxxxxxx shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



1.3 System specifications

The ASUS RS720-E7-RS24-EG is a 2U barebone server system featuring the Z9PE-D16-10G/DUAL server board. The server supports two Intel® LGA 2011 Intel® Xeon® processor E5-2600 / E5-2600 V2 product family plus other latest technologies through the chipsets onboard.

Model Name		RS720-E7-RS24-EG
Processor Support / System Bus		2 x Socket LGA 2011 Intel® Xeon® processor E5-2600 / E5-2600 V2 product family QPI 6.4 / 7.2 / 8.0 GT/s
Core Logic		Intel® C602-A
Form Factor		EEB, 12 in. x 13 in.
Memory	Total Slots	16 (4 channels per CPU, 8 DIMM per CPU)
	Capacity	Maximum up to 128GB (UDIMM) Maximum up to 512GB (RDIMM) Maximum up to 512GB (LRDIMM)
	Memory Type	DDR3 800/1066/1333/1600 RDIMM DDR3 1066/1333 ECC UDIMM/Non-ECC UDIMM DDR3 1066/1333 LR-DIMM
	Memory Size	2GB, 4GB, 8GB, 16GB, 32GB* (RDIMM) 2GB, 4GB, 8GB* (UDIMM) 8GB, 16GB, 32GB* (LRDIMM)
Expansion Slots (follow SSI Location #)	Total PCI/PCI-E Slots	5
	Slot Location 1	1 x PCI-E x8 (x4 Gen2 link)
	Slot Location 2	1 x PCI-E x16 (x16 Gen3 link)
	Slot Location 3	1 x PCI-E x8 (x8 Gen3 link)
	Slot Location 4	1 x PCI-E x16 (x16 Gen3 link)
	Slot Location 6	1 x PCI-E x16 (x16 Gen3 link)
	Additional Slot 1	1 x PIKE Slot for Storage expansion
Networking	LAN	2 x Intel® I210AT controller + 1 Management LAN 1 x Dual port Broadcom 57840S 10GbE controller
Storage	SATA Controller	Intel® C602-A: <AHCI> 4 SATA 3Gb/s ports; 2 SATA 6Gb/s ports Intel® RSTe (for Windows only) (Support software RAID 0, 1, 10, and 5) LSI® MegaRAID driver (Support software RAID 0, 1, and 10) (Linux/Windows)
	SAS Controller	ASUS PIKE 2108-32PD 8-port SAS 6G HW RAID card ASUS PIKE 2208 8-port SAS 6G HW RAID card ASUS PIKE 2308 8-port SAS 6G RAID card Default with PIKE 2108-32PD, or PIKE 2208, or PIKE 2308.

* Refer to www.asus.com for the complete list of supported memory modules.

(continued on the next page)

Model Name		RS720-E7-RS24-EG
HDD Bays	I = Internal A or S will be hot-swappable	24 x Hot-swap 2.5-inch HDD bays 2 x Hot-swap 2.5-inch HDD bays (Rear)
Graphic	VGA	Aspeed AST2300 16MB
Onboard I/O Connectors	TPM Header	1
	USB Connectors	1 x USB connector (Type A USB socket) 2 x USB pin header (up to 4 devices)
	Fan Header	9 x 4 pin headers
	SMBus	2
	Chassis Intruder	1
	Front LAN LED	2
	Serial Port Header	1
Rear I/O Connectors	SFP+	2
	VGA Port	1
	External USB Port	4 x USB 2.0 ports (2 x Front, 2 x Rear)
	RJ-45	2 x GbE LAN 1 Management LAN (ASMB6-iKVM for KVM-over-IP)
	PS/2 Keyboard	1
	PS/2 Mouse	1
Management Solution	Software	ASWM Enterprise
	Out of Band Remote Management	ASMB6-iKVM for KVM-over-Internet
Dimension (HH x WW x DD)		615mm x 444mm x 87mm (2U)
Net Weight Kg (CPU, DRAM, and HDD not inclu ded)		23Kg
Power Supply		1+1 Redundant 770W 80 PLUS Gold Power Supply Rating: 100-127Vac/200-240Vac, 10A/5A. 79A ,50-60Hz, Class I Power supply rating and configuration may vary depending on the region.
Environment		Operation temperature: 10°C ~ 35°C / Non operation temperature: -40°C ~ 70°C Non operation humidity: 20% ~ 90% (Non condensing)

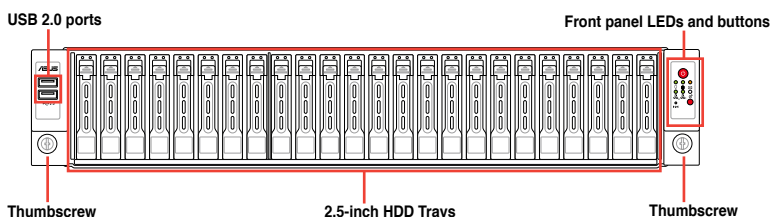
** Specifications are subject to change without notice.

1.4 Front panel features

The front panel of the RS720-E7-RS24-EG features a simple yet stylish design. The twenty four (24) 2.5-inch hot-swappable Serial ATA (SATA)/SAS HDD bays, two USB 2.0 ports, LEDs and buttons are all located on the front of the server for easy access.



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

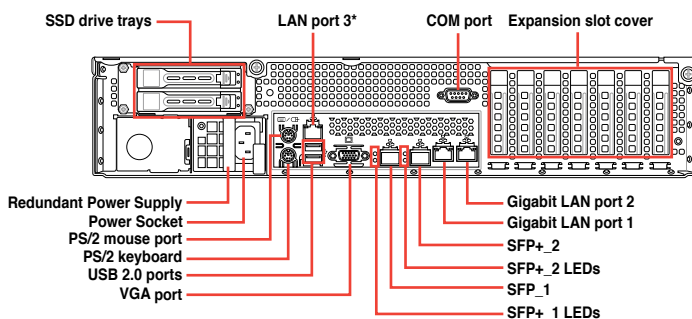


1.5 Rear panel features

The rear panel of RS720-E7-RS24-EG includes two hot-swappable SSD trays, expansion slots, I/O ports, SFP+ 10G ports, and system power sockets.



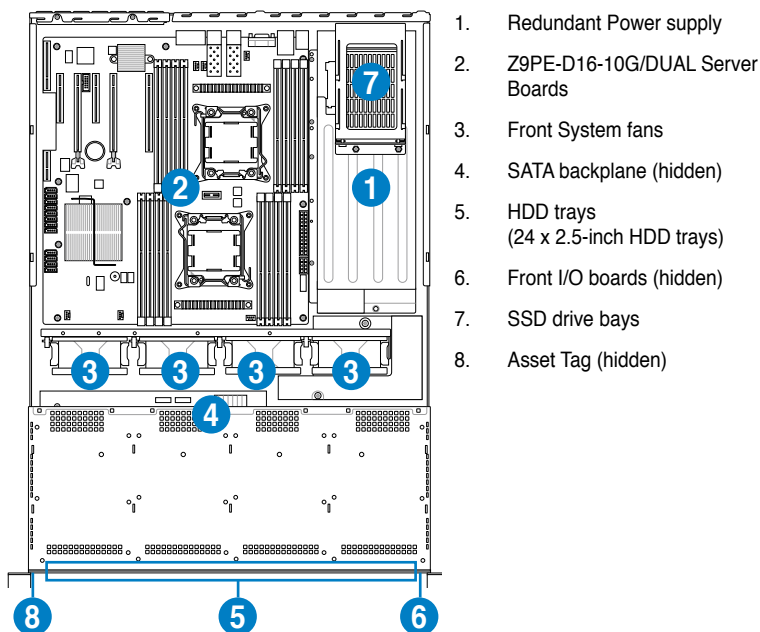
The ports for the USB, VGA, and Gigabit LANs do not appear on the rear panel if the motherboard is not present.



*The LAN port 3 is for ASUS ASMB6-iKVM controller only.

1.6 Internal features

The barebone server includes the basic components as shown.



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

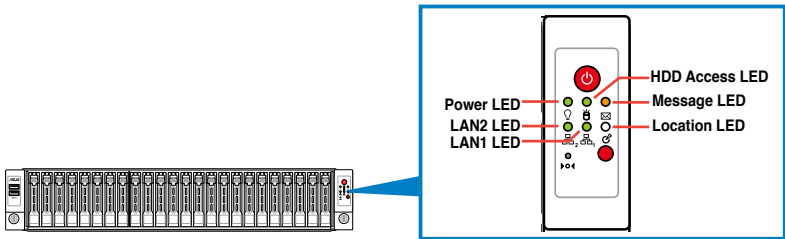


The barebone server does not include a floppy disk drive. Connect a USB floppy disk drive to any of the USB ports on the front or rear panel if you need to use a floppy disk.

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

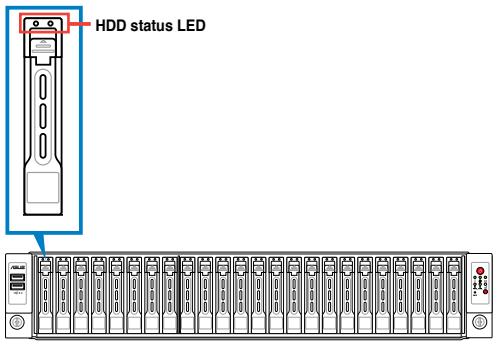
1.7 LED information

1.7.1 Front panel LEDs



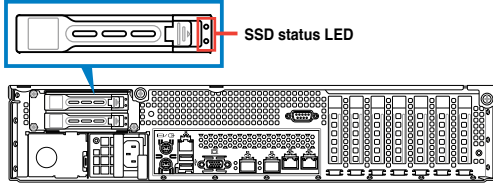
LED	Icon	Display status	Description
Power LED		ON	System power ON
Message LED		OFF	System is normal; no incoming event
		ON	A hardware monitor event is indicated
LAN LEDs		OFF	No LAN connection
		Blinking	LAN is transmitting or receiving data
		ON	LAN connection is present
Location LED		ON	Location switched is pressed
		OFF	Normal status. (Press the location switch again to turn off.)
HDD Access LED		Green	Data is being read/written into the HDD
		OFF	HDD failure or no HDD is installed

1.7.2 HDD status LEDs



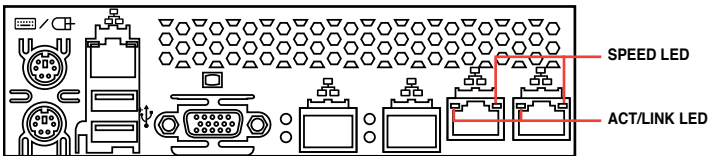
HDD LED	Description
GREEN	The installed HDD is in good condition
OFF	SSD failure or no HDD is installed

1.7.3 SSD status LEDs



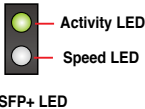
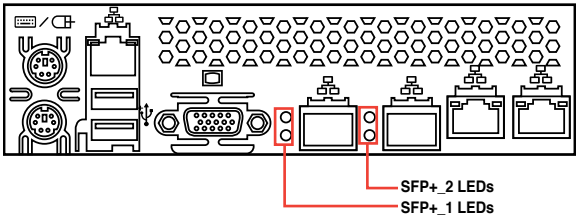
SSD LED	Description
GREEN	The installed SSD is in good condition
OFF	SSD failure or no SSD is installed

1.7.4 LAN (RJ-45) LEDs



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

1.7.5 SFP+ status LEDs



Activity LED		Speed LED	
Status	Description	Status	Description
OFF	No activity	OFF	-
BLINKING	Data activity	AMBER	1 Gbps connection
		GREEN	10 Gbps connection

Chapter 2

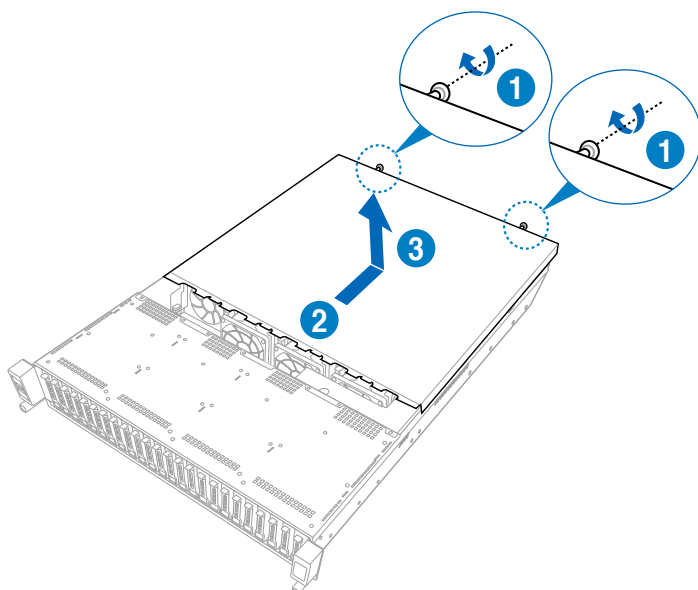
This chapter lists the hardware setup procedures that you have to perform when installing or removing system components.

Hardware setup

2.1 Chassis cover

Removing the top cover

1. Release the two (2) thumbscrews on the rear of the chassis.
2. Slide the chassis cover towards the rear to disengage it from the chassis.
3. Lift the chassis cover to completely remove it from the chassis.



A protection film is pre-attached to the system cover before shipping. Please remove the protection film before turning on the system for proper heat dissipation.

2.2 Air Duct

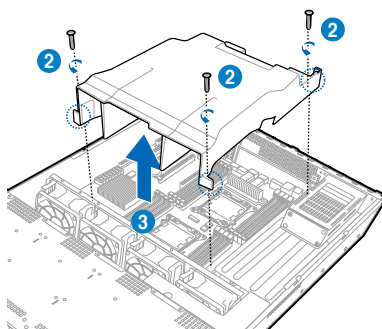
The RS740-E7-RS24-EG server system comes with a motherboard fan air duct to enable better air flow inside the motherboard while the system is running.

Removing the air duct

To remove the air duct:

1. Remove the chassis cover. Refer to section 2.1 **Chassis cover** for the instructions.
2. Remove the three screws securing the air duct.

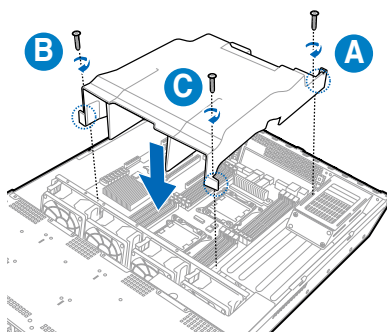
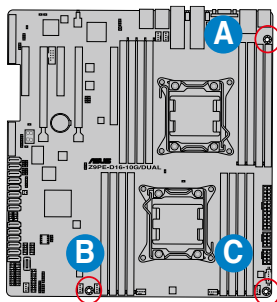
Set the three (3) screws aside for later use.
3. Carefully lift the air duct out of the chassis.



Installing the air duct

To install the air duct:

1. Position the air duct on top of the motherboard matching the three (3) screw holes on the air duct to the three (3) holes on the motherboard as indicated in the illustration below.



2. Tighten the screws one by one with a Phillips screwdriver. Use just enough force to attach the air duct to the motherboard.



- Do not over tighten the screws to avoid damaging the motherboard and the air duct.
- Ensure that the air duct is firmly fitted to the motherboard.

2.3 Central Processing Unit (CPU)

The motherboard comes with two (2) surface mount LGA2011 socket designed for the Intel® Xeon E5-2600 / E5-2600 V2 product family processor.

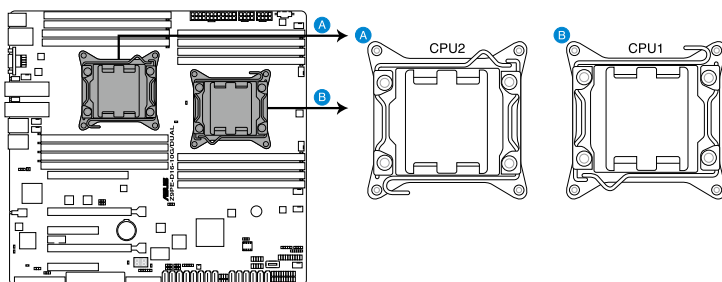


- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA2011 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.



Z9PE-D16-10G/DUAL CPU LGA2011 Socket

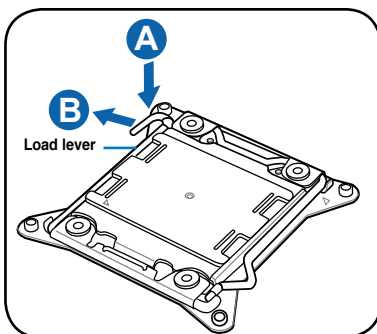


Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your left.

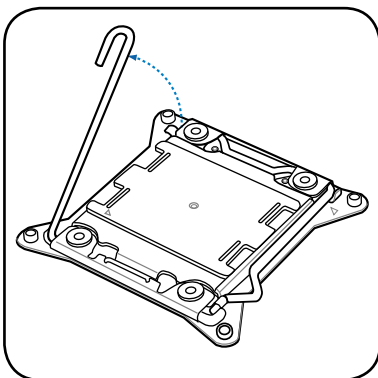
2. Press the left load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.



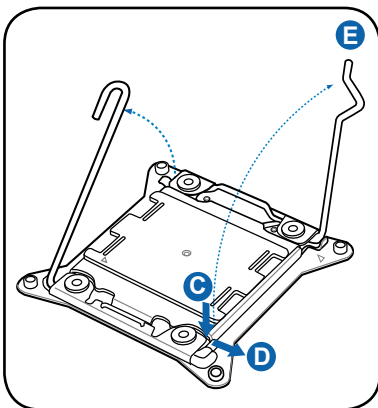
To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.



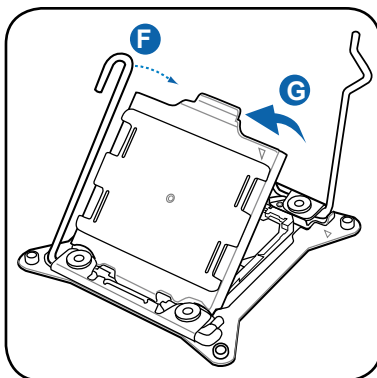
3. Slightly lift the load lever in the direction of the arrow.



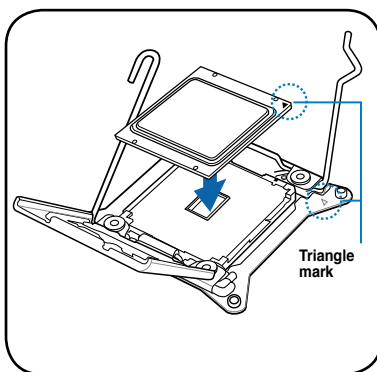
4. Press the right load lever with your thumb (C), then move it to the right (D) until it is released from the retention tab. Lift the load lever in the direction of the arrow (E).



5. Push the left load lever (F) to lift the load plate (G).

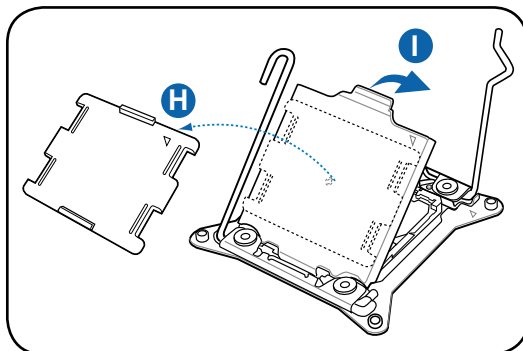


6. Position the CPU over the socket, ensuring that the triangle mark is on the top-right corner of the socket.

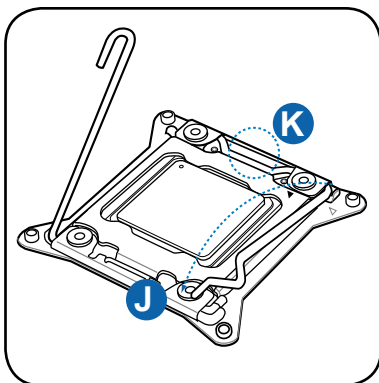


The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

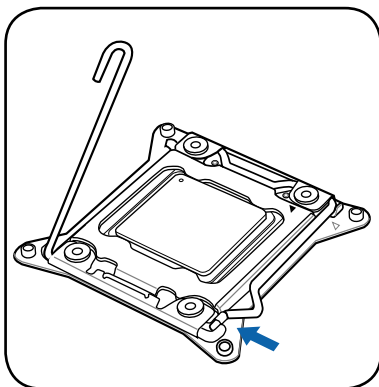
7. Remove the PnP cap (H) from the CPU socket and close the load plate (I).



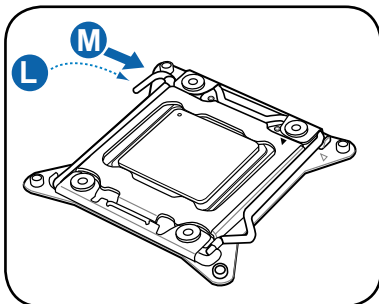
8. Push down the right load lever (J), ensuring that the edge of the load plate is fixed by the lever (K).



9. Insert the right load lever under the retention tab.



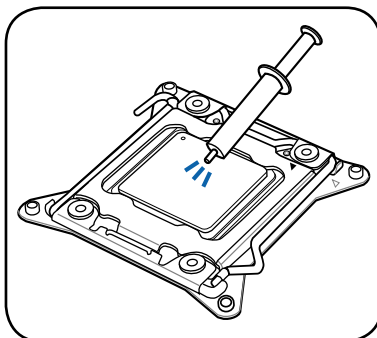
10. Push down the left load lever (L), and then insert the lever under the retention tab (M).



11. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

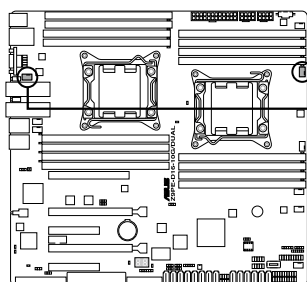


Some heatsinks come with pre-applied thermal paste. If so, skip this step.

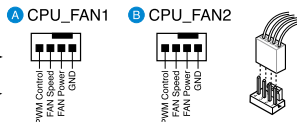


The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.

12. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN1 / CPU_FAN2.



Z9PE-D16-10G/DUAL CPU fan connectors

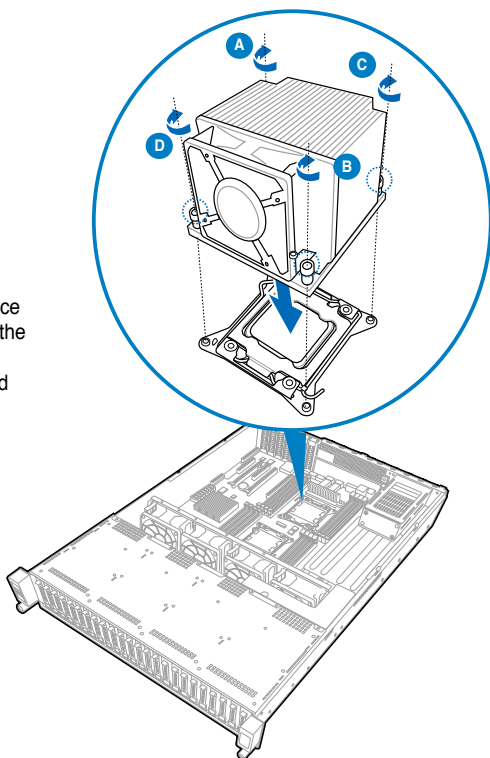
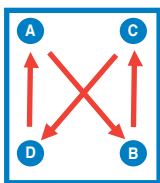


DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.2 Installing the CPU heatsink

To install the CPU heatsink:

1. Place the heatsink on top of the installed CPU, ensuring that the four screws match the holes on the motherboard.
2. Tighten each of the screws with a Phillips screwdriver just enough to attach the heatsink to the motherboard.
3. When attached, tighten the screws one-by-one in a criss-cross sequence and secure the CPU heatsink onto the socket. Ensure an even distribution of contact between the heatsink and CPU.



Fasten the screws to just about the proper tightness to avoid damaging the motherboard, CPU, or heatsink.

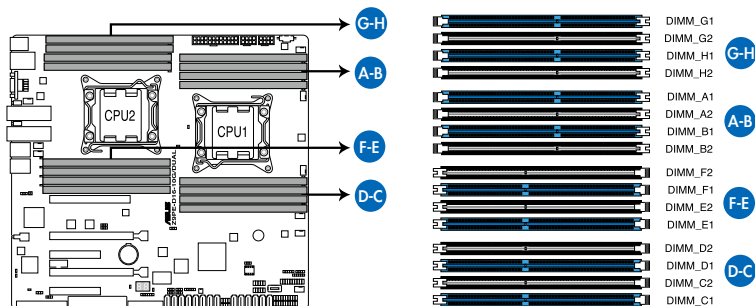
2.4 System memory

2.4.1 Overview

The motherboard comes with sixteen (16) 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:



Z9PE-D16-10G/DUAL 240-pin DDR3 DIMM sockets

2.4.2 Memory Configurations

You may install 2GB, 4GB, 8GB, 16GB, and 32GB RDIMMs or 2GB, 4GB and 8GB with ECC/ Non-ECC UDIMMs or 8GB, 16GB and 32GB LR-DIMMs into the DIMM sockets using the memory configurations in this section.

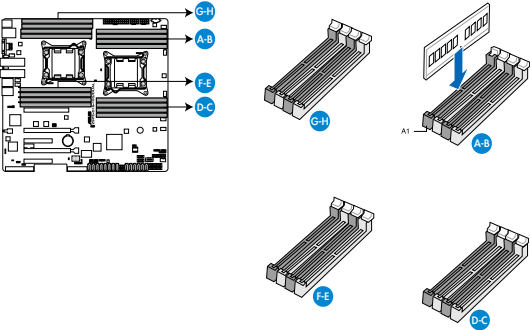


- Remove the chassis cover and the air duct first if you wish to install additional DIMMs. Refer to section 2.1 Chassis cover and 2.1.1 Air duct for details.
- Install a DIMM beginning with either slot DIMM_A1 or DIMM_E1.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

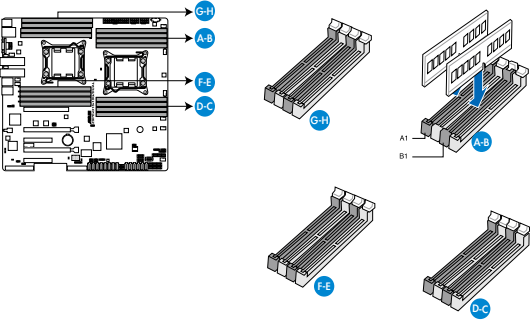
Single CPU configuration

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

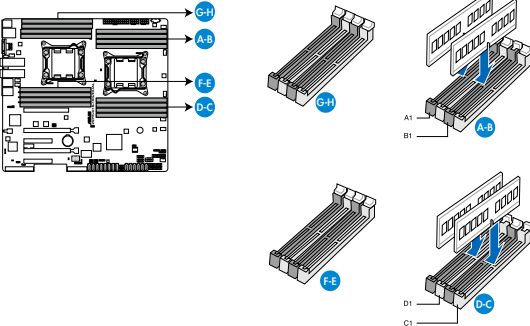
One (1) DIMM population



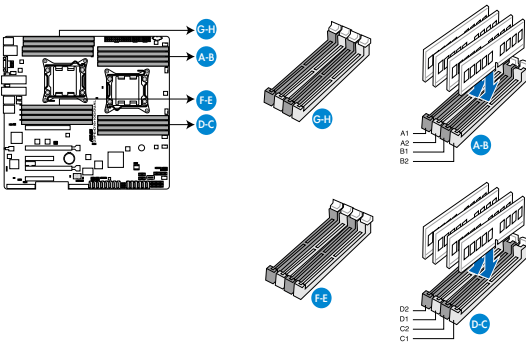
Two (2) DIMMs population



Four (4) DIMMs population



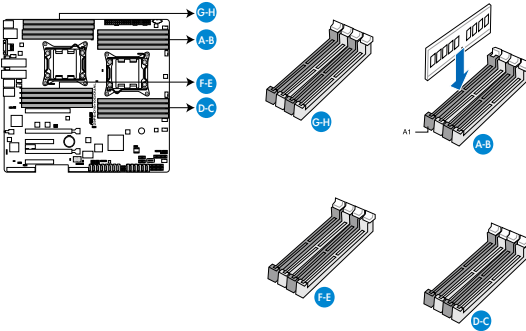
Eight (8) DIMMs population



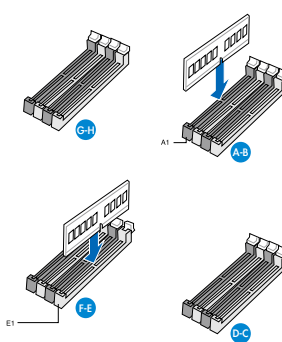
Dual CPU configuration

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

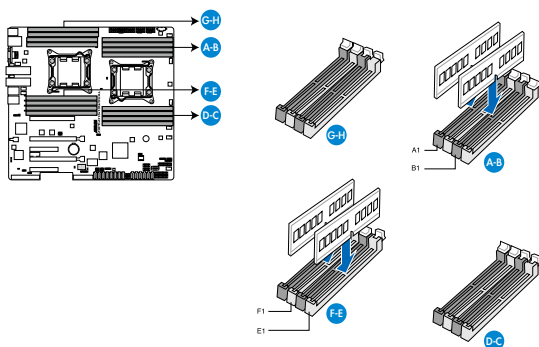
One (1) DIMM population



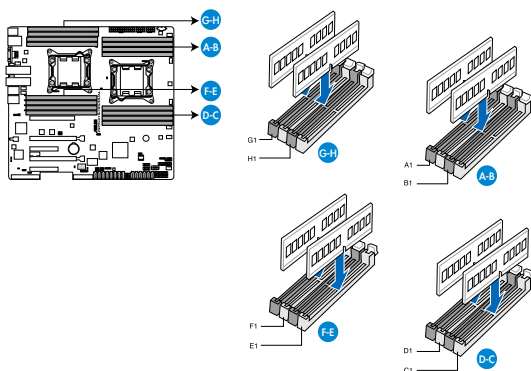
Two (2) DIMMs population



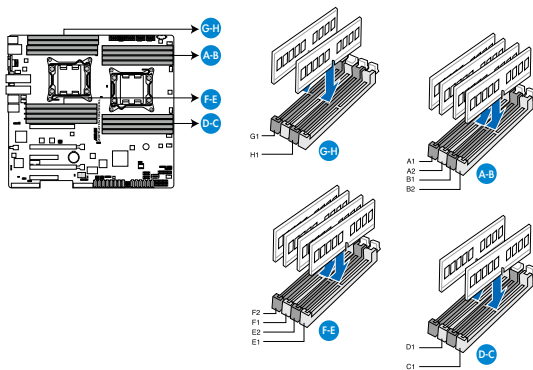
Four (4) DIMMs population



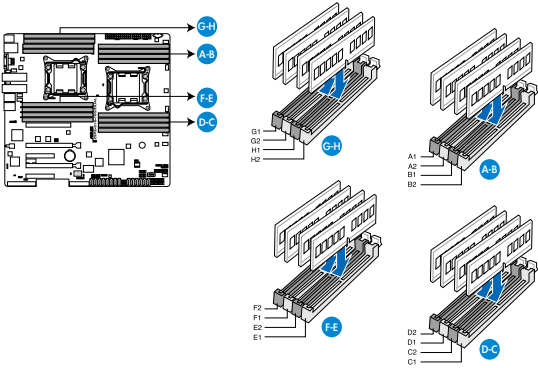
Eight (8) DIMMs population



Twelve (12) DIMMs population

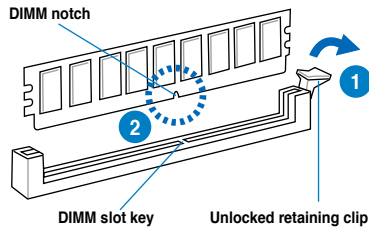


Sixteen (16) DIMMs population



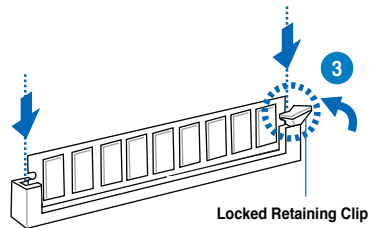
2.4.3 Installing a DIMM on a single clip DIMM socket

1. Unlock a DIMM socket by pressing the retaining clip outward.
2. Align a DIMM on the socket such that the notch on the DIMM matches the DIMM slot key on the socket.



A DIMM is keyed with a notch so that it fits in only one direction. **DO NOT** force a DIMM into a socket in the wrong direction to avoid damaging the DIMM.

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



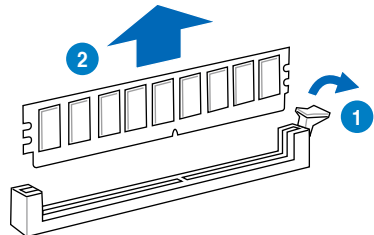
Always insert the DIMM into the socket **VERTICALLY** to prevent DIMM notch damage.



- To install two or more DIMMs, refer to the user guide bundled in the motherboard package.
- Refer to the user guide for qualified vendor lists of the memory modules.

Removing a DIMM from a single clip DIMM socket

1. Press the retaining clip outward to unlock the DIMM.
2. Remove the DIMM from the socket.



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

2.5 Hard disk drives (HDDs)

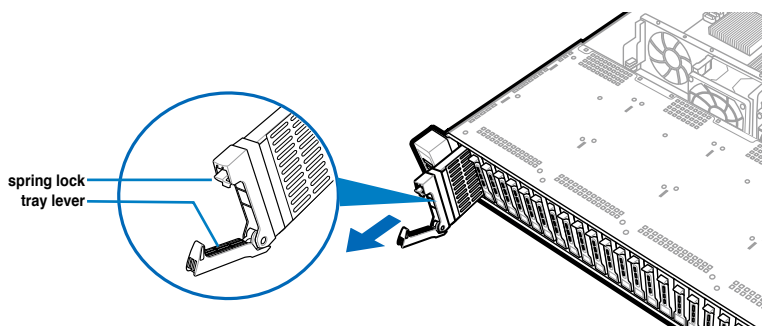
The compact design of the server allows you to install up to twenty-four (24) 2.5-inch HDDs and two (2) 2.5-inch HDDs on the rear panel.

Refer to the succeeding steps to install the HDDs.

Installing the 2.5-inch Serial ATA HDDs

To install a 2.5-inch HDD:

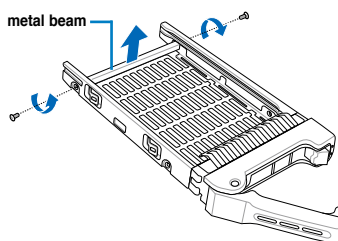
1. Press the spring lock to release the tray lever and to partially eject the tray from the bay.
2. Firmly hold the tray lever and carefully pull the drive tray out of the bay. Place the drive tray in a clean and flat surface.



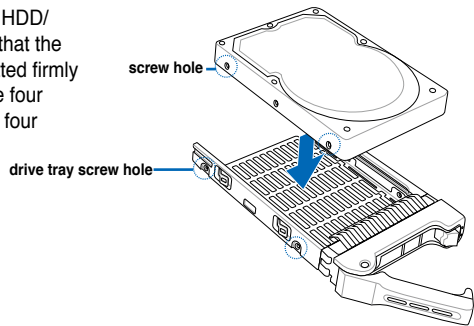
3. Release the screws on each side of the drive tray to release the drive tray metal beam.



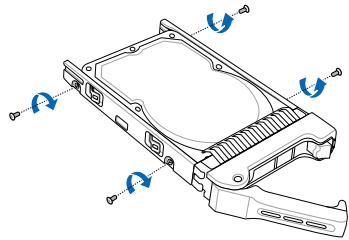
The drive tray metal beam provides horizontal support to the empty drive tray and prevents the drive tray from being bent or deformed.



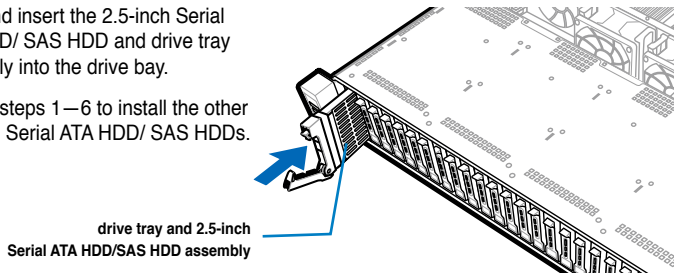
4. Orient and place the Serial ATA HDD/ SAS HDD into the tray. Ensure that the Serial ATA HDD/ SAS HDD is fitted firmly inside the drive tray and that the four screws of the SSD matches the four screw holes of the drive tray.



5. Secure the Serial ATA HDD/ SAS HDD to the drive tray with four bundled screws.



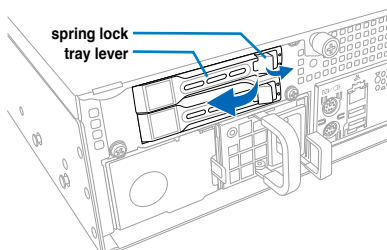
6. Align and insert the 2.5-inch Serial ATA HDD/ SAS HDD and drive tray assembly into the drive bay.
7. Repeat steps 1—6 to install the other 2.5-inch Serial ATA HDD/ SAS HDDs.



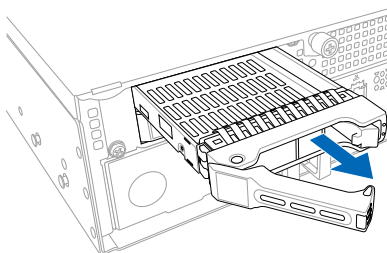
Installing the SSD

To install a 2.5-inch SSD:

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



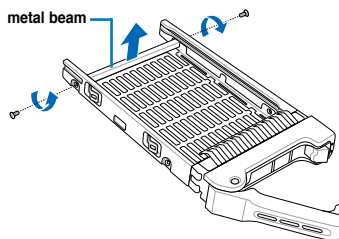
2. Firmly hold the tray lever then pull the drive tray out of the bay.



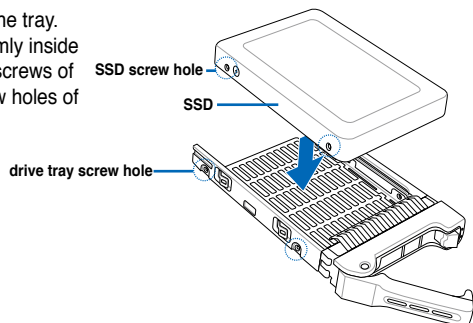
3. Release the screws on each side of the drive tray to release the drive tray metal beam.



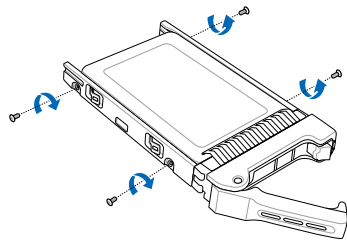
The drive tray metal beam provides horizontal support to the empty drive tray and prevents the drive tray from being bent or deformed.



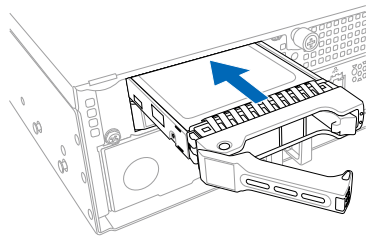
4. Orient and place the SSD into the tray. Ensure that the SSD is fitted firmly inside the drive tray and that the four screws of the SSD matches the four screw holes of the drive tray.



5. Secure the SSD to the drive tray with four screws that is bundled with the server.



6. Align and insert the drive tray and SSD assembly into the drive bay until it is securely fitted in place.



7. Repeat steps 1—6 if you want to install the second SSD drive.

2.6 Expansion slot

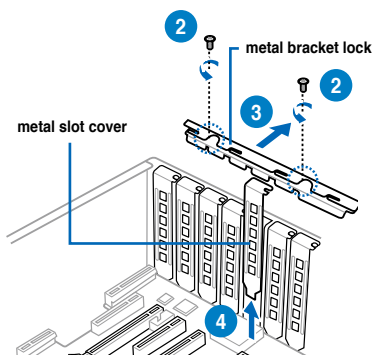
2.6.1 Installing an expansion card

To install an expansion card:

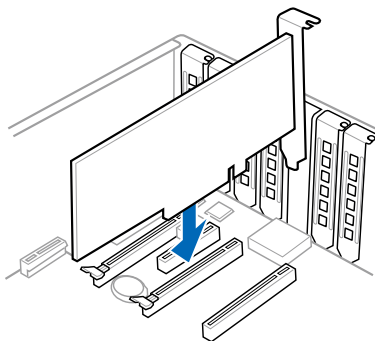
1. Remove the chassis cover. Refer to section 2.1 **Chassis cover** for details.
2. Release the two screws on the metal bracket lock.

Set aside the screws for later use.

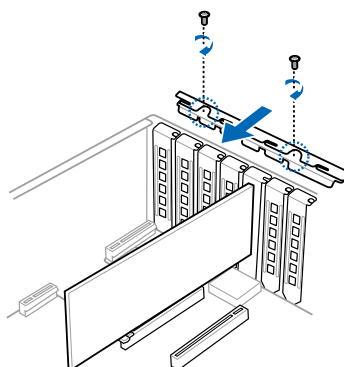
3. Detach the metal bracket lock.
4. Remove the metal slot cover where you wish to install the expansion card.



5. Align and insert the PCIe card into PCIe slot of the motherboard. Ensure that the PCIe card is seated firmly in place.



6. Replace the metal bracket lock.
7. Secure the metal bracket lock with the screw that you removed earlier in step 2.



2.6.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 5 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the following tables.
3. Install the software drivers for the expansion card.

Standard Interrupt assignments

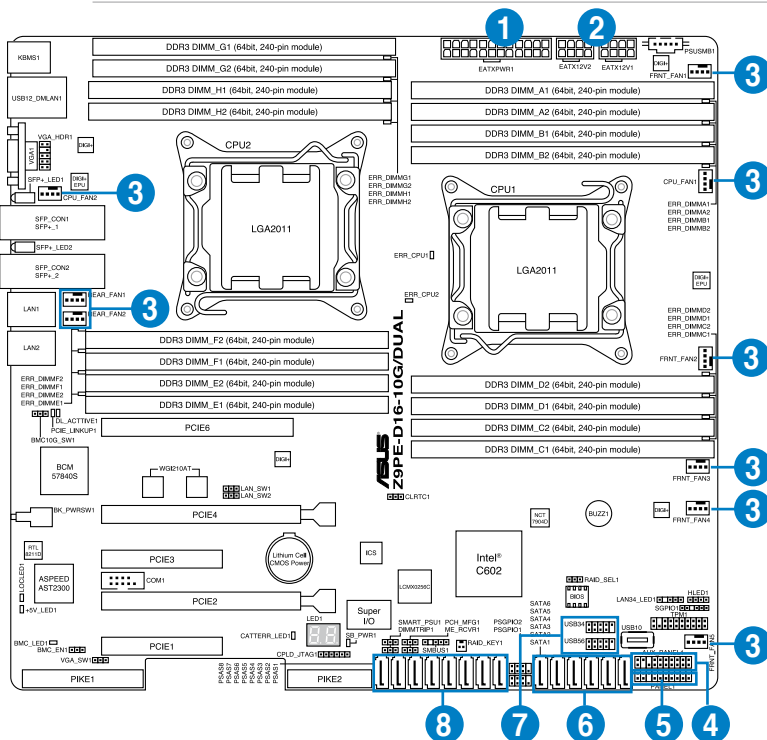
IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering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

2.7 Cable connections



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



Standard cables connected to the motherboard

1. 24-pin ATX power connector (from power supply to motherboard)
2. 8-pin 12V power connector (from power supply to motherboard)
3. System and CPU fan connectors (from system fan to motherboard)
4. System auxiliary panel connector (from motherboard to front I/O board)
5. System panel connector (from motherboard to front I/O board)
6. SATA connectors (system default; from motherboard to SSD backplane)
7. USB connector (from motherboard to front I/O board)
8. SAS connectors (from motherboard to SATA/SAS backplane)

2.8 System fans

The server have four (4) easy-swap system fans for optimum heat dissipation and efficient cooling solution.

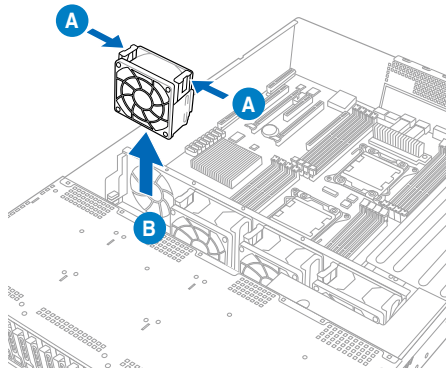


- Ensure that the system is turned off before removing any components.
- Discharge static electricity by touching any metal surface.
- Use the same model, size, and type of fans.

Replacing the system fan

To replace a system fan:

1. Locate the front system fan that you want to replace.
2. Press both fan locks (A) to disengage the fan from the fan slot then pull the fan up (B) to remove.

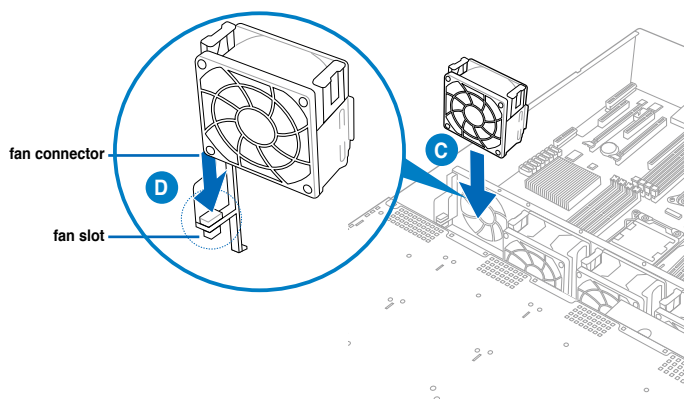


3. Prepare a replacement fan of the same type and size.

4. Orient the fan in such a way that the arrow indicator is pointing towards the rear of chassis (C) then insert the fan into the slot (D) ensuring that the fan connector is connected securely into the slot.



The system fan fits into the fan slot in one orientation only. If it does not fit, try reversing it.



2.9 ASUS PIKE card (Optional)

The PIKE slot allows you to choose and change your preferred SAS solution easily. Install an optional ASUS PIKE RAID card based on your needs.



- Ensure that the system is turned off before removing any components.
- Discharge static electricity by touching any metal surface.

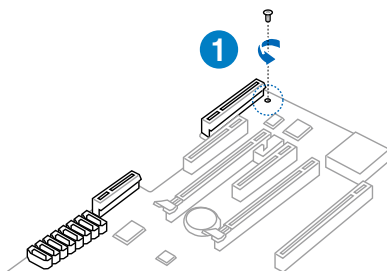


Refer to section **4.3 Internal Connectors** for the PIKE SAS/SATA connector location.

To install a PIKE card:

1. Release the screw on the motherboard adjacent to the PIKE card slot.

Set aside the screw for later use.

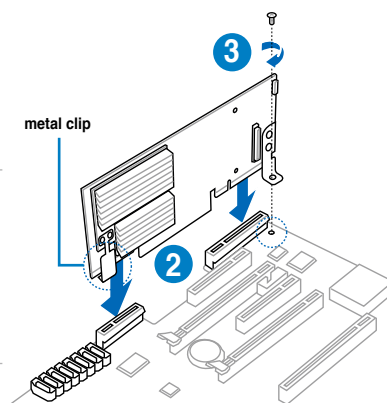


2. Align and insert the PIKE RAID card into the PIKE RAID card slot.

Ensure that the PIKE RAID card is completely seated on the card slot.



- The PIKE RAID card fits to the PIKE RAID card slot in one orientation only.
- Ensure that the metal clip on the PIKE card is firmly clamped in the motherboard's PIKE card slot.



3. Secure the PIKE RAID card to the motherboard using the screw that you removed in Step 1.

2.10 Redundant power supply module (Optional)

The RS740-E7-RS24-EG server comes with one (1) 770W 80 PLUS Gold Redundant power supply. You have an option to install a second power supply module on the available redundant power supply slot.

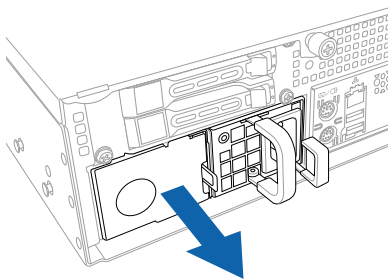


- Ensure that the system is turned off before removing any components.
- Discharge static electricity by touching any metal surface.
- Use the same model and type of Redundant Power supply module.

Installing the second redundant power supply module (Optional)

To install the second redundant power supply module:

1. Remove the dummy cover of the redundant power supply.

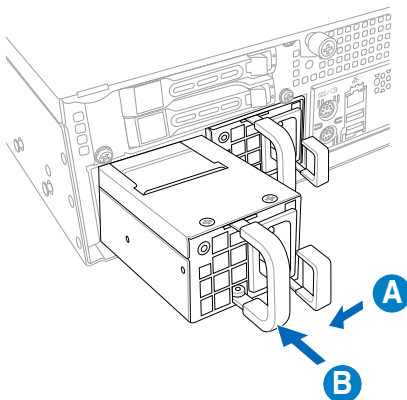


2. Prepare the second power supply module.



Ensure to remove the plastic cover before installing the module.

3. Carefully insert the second power supply module all the way into the bay.
4. Press the lock (A) then push the power supply module until it is securely seated in place (B).



Replacing a redundant power supply module

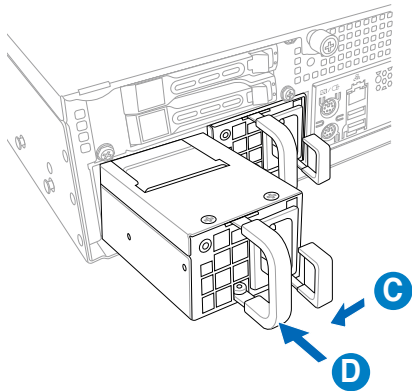
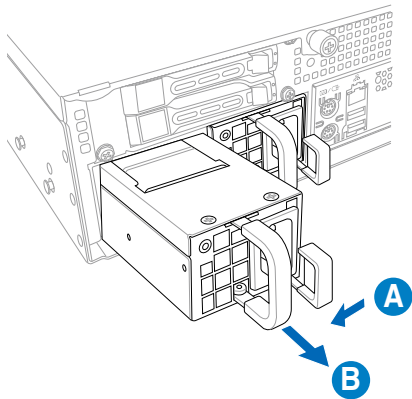
To replace a redundant power supply module:

1. Select the redundant power supply module that you wish to replace.
2. Press the lock (A) then pull the power supply module via the metal pull handle (B). As you remove the power supply module from the bay, use your other hand to support the power supply module.
3. Prepare the replacement power supply module.



Ensure to remove the plastic covering the power supply module before installing the module.

4. Carefully insert the replacement power supply module all the way into the bay.
5. Press the lock (C) then push the power supply module until it is securely seated in place (D).



Chapter 3

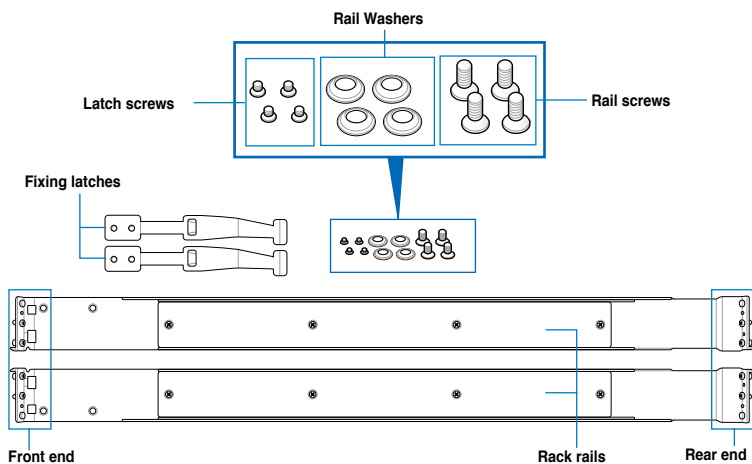
This chapter describes how to install the optional components and devices into the barebone server.

Installation options

3.1 Friction Rail Kit Installation Guide

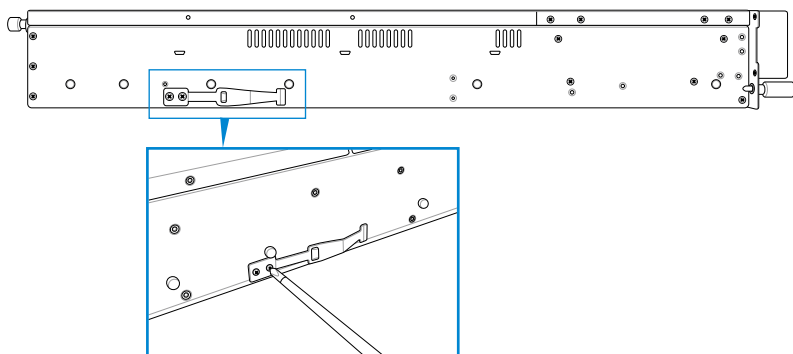
Your friction rail kit package contains:

- One pair of rack rails
- One pair of fixing latches
- 4 latch screws, 4 rail screws and 4 rail washers (2 more for each buffer)



3.1.1 Attaching the fixing latches to the server

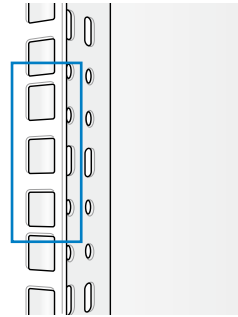
1. Secure the two fixing latches to the two sides of the server with the four latch screws.



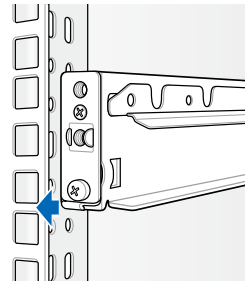
2. Select a 2U space on the rack where you want to install the rack rail.

A 2U space consists of three square mounting holes with two thin lips on the top and the bottom.

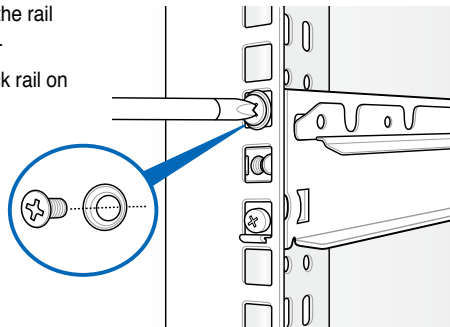
3. Adjust the rack rail to fit the depth of the rack.



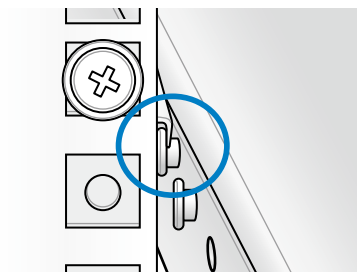
4. From inside the rack, place the rear rail hook on the bottom thin lip of the rear mounting hole, then place the front rail hook on the bottom thin lip of the front mounting hole.



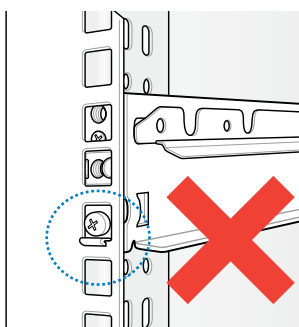
5. Secure the front and rear ends of the rail with two rack screws and washers.
6. Repeat step 3–5 to attach the rack rail on the other side of the rack.



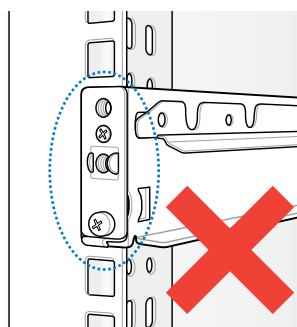
7. When mounting the server to the rack, ensure to include the side knots on the two sides of the server in the rack rail holders.



Do not install the rail kit in the following situation:



DO NOT place the rail hook on a thick lip of the mounting hole.



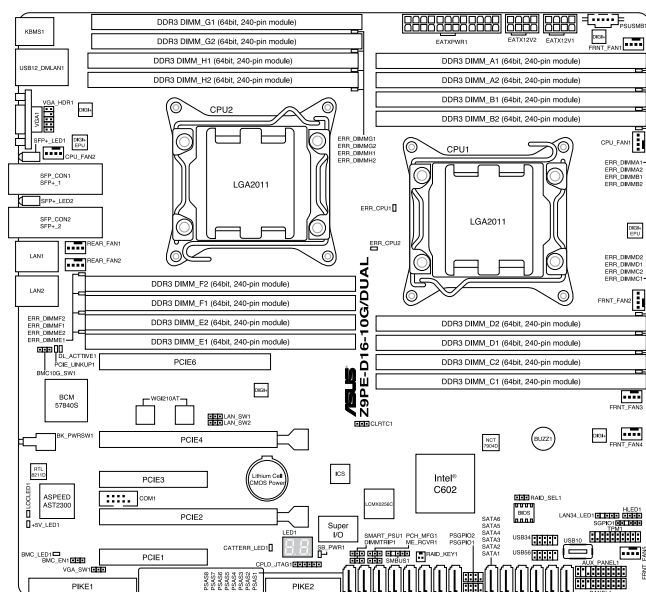
DO NOT install the rail to the outer side of the server rack.

Chapter 4

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

Motherboard Info

4.1 Motherboard layout



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4.2 Jumpers

1. Clear RTC RAM (3-pin CLRTC1)

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

To erase the RTC RAM:

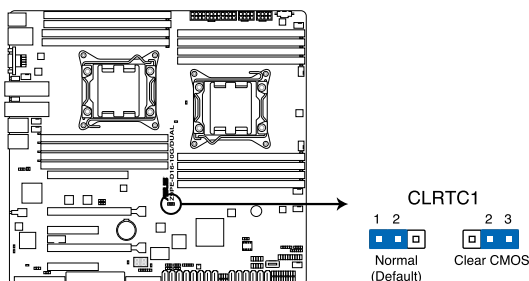
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and turn ON the computer.
4. Hold down the key during the boot process and enter 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!



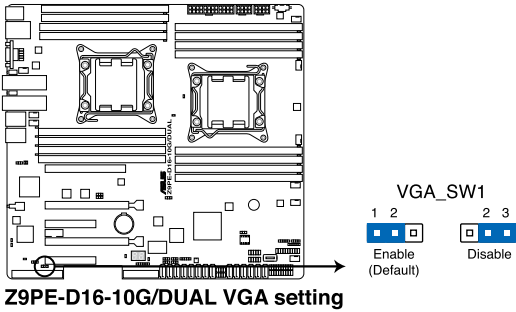
If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



Z9PE-D16-10G/DUAL Clear RTC RAM

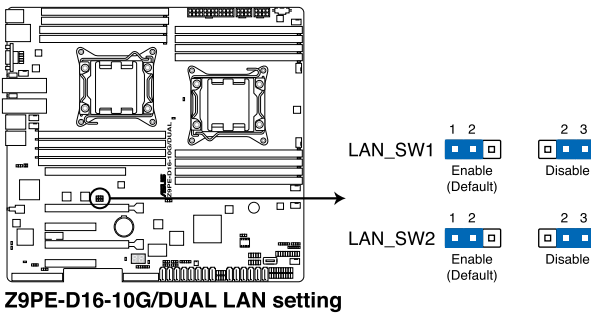
2. VGA controller setting (3-pin VGA_SW1)

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



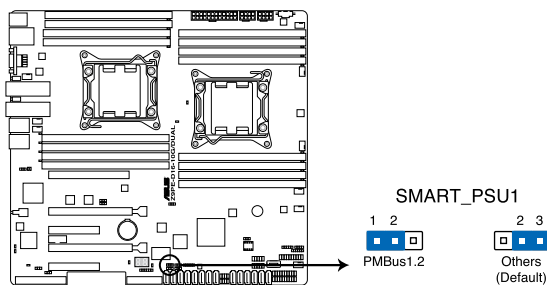
3. LAN controller setting (3-pin LAN_SW1, LAN_SW2)

These jumpers allow you to enable or disable the onboard Intel® I210 Gigabit LAN controllers. Set to pins 1-2 to activate the Gigabit LAN feature.



4. PMBus 1.2 PSU select jumper (3-pin SMART_PSU1)

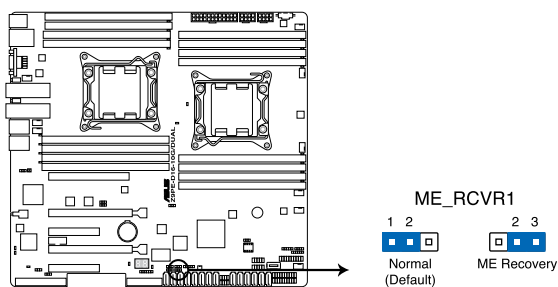
This jumper allows you to select PSU PMBus version, Set to pins 1-2 for PMBus, set to pins 2-3 for Others.



Z9PE-D16-10G/DUAL PMBus 1.2 PSU setting

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

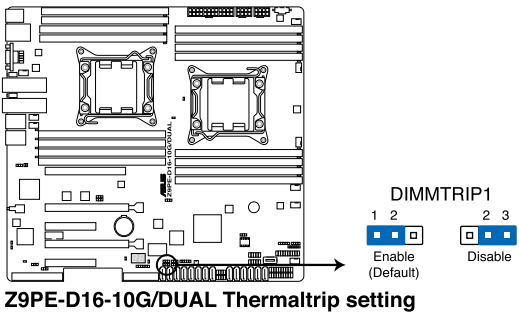
This jumper allows you to force Intel Management Engine (ME) boot from recovery mode when ME become corrupted.



Z9PE-D16-10G/DUAL ME recovery setting

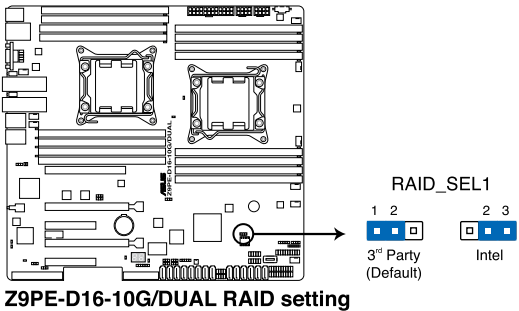
6. DDR3 thermal event setting (3-pin DIMMTRIP1)

This jumper allows you to enable/disable DDR3 DIMM thermal sensing event pin.



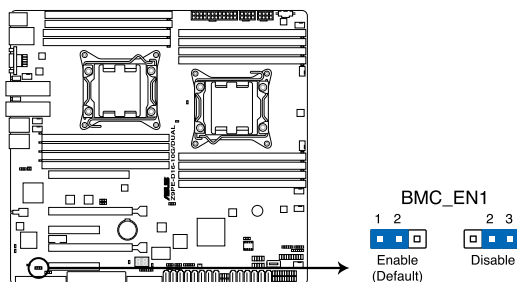
7. RAID configuration utility selection (3-pin RAID_SEL1)

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



8. BMC Setting (3-pin BMC_EN1)

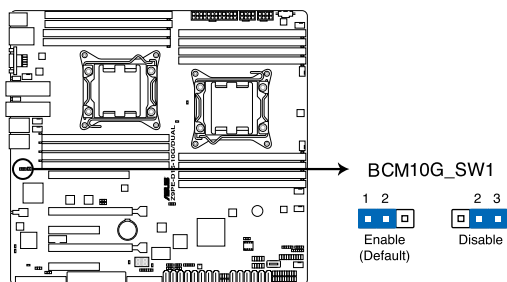
This jumper allows you to enable(default) or disable the Baseboard Management Controller.



Z9PE-D16-10G/DUAL BMC setting

9. Broadcom 10GbE controller setting (3-pin BCM10G_SW1)

This jumper allows you enable or disable the Broadcom 10Gb chip. The Broadcom 10Gb chip is a converged controller that enables convergence of all the possible network communications in a server such as data network. Set to pins 1-2 to enable, otherwise set to pins 2-3 to disable the Broadcom 10Gb chip.



Z9PE-D16-10G/DUAL BCM10G_SW1 setting

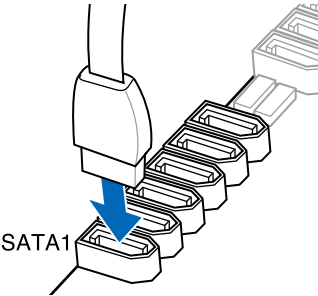
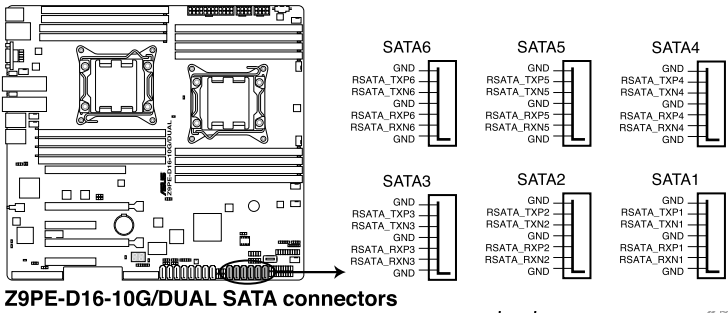
4.3 Internal connectors

1. Serial ATA 6.0/3.0 Gb/s connectors

(7-pin SATA6G_1-2 [Blue]) (7-pin SATA3G_3-6 [black])

Supported by the Intel® 602 Chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 6Gb/s of data transfer rate.

If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.



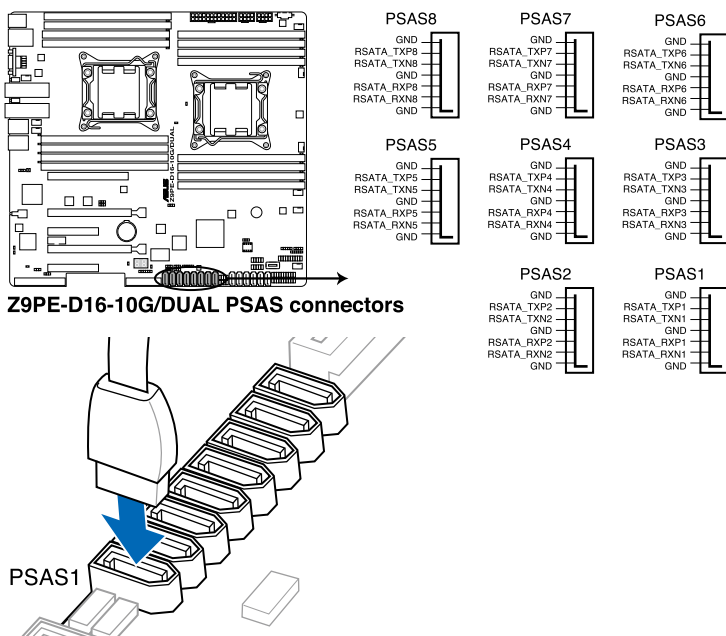
The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

2. PSAS connectors (7-pin PSAS1, PSAS2, PSAS3, PSAS4, PSAS5, PSAS6, PSAS7, PSAS8 [Blue])

This motherboard comes with eight (8) PIKE Serial Attached SCSI (PSAS) connectors that supports both Serial Attached SCSI (SAS) and Serial ATA (SATA). Each connector supports one device.

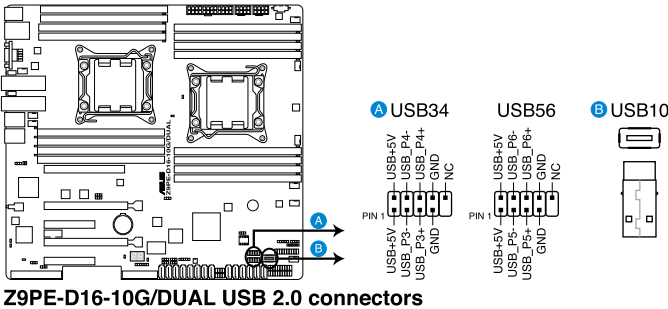


These connectors function only when you install a PIKE RAID card.



3. **USB 2.0 connector (10-1 pin USB34, USB56; A-Type USB10)**

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



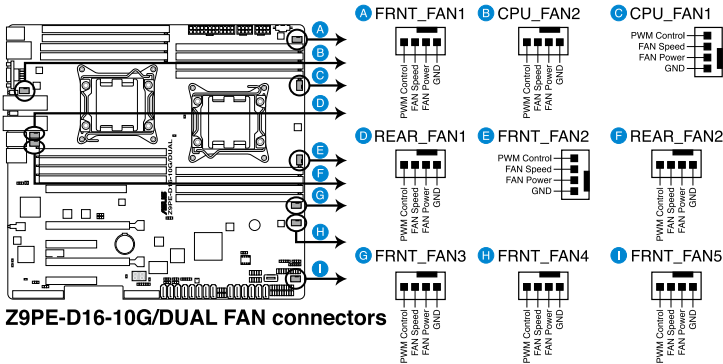
4. **CPU, front, and rear fan connectors**

(4-pin CPU_FAN1-2, FRNT_FAN1-5, REAR_FAN1-2)

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.

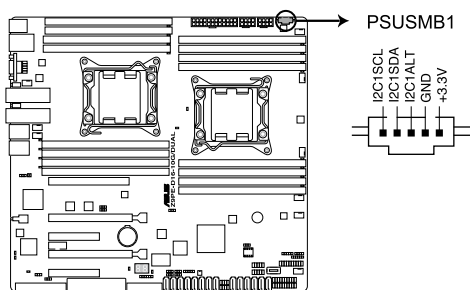


- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Smart Fan technology.



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

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



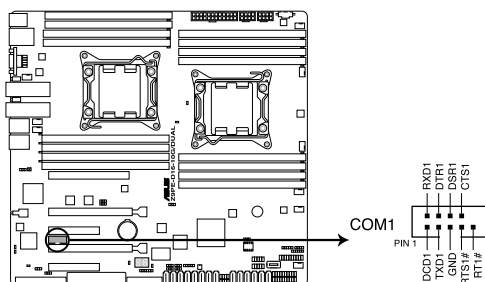
Z9PE-D16-10G/DUAL Power supply SMBus connector



This connector functions only when you install the ASUS ASMB6.

6. Serial port connector (10-1 pin COM1)

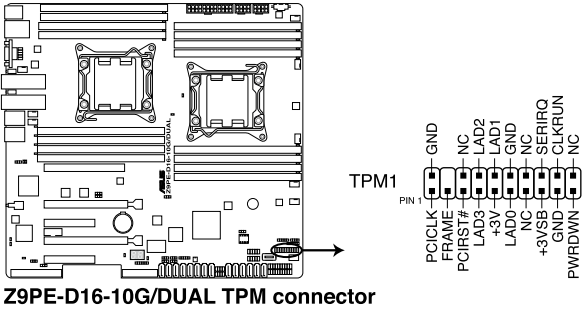
This connector is for the serial COM port. Connect the serial port module cable to one of these connectors, then install the module to a slot opening at the back of the system chassis.



Z9PE-D16-10G/DUAL Serial port connectors

7. **Trusted Platform Module connector (20-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.

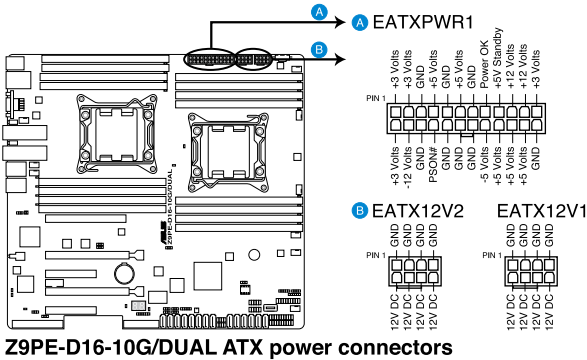


8. **ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1, 8-pin EATX12V2)**

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

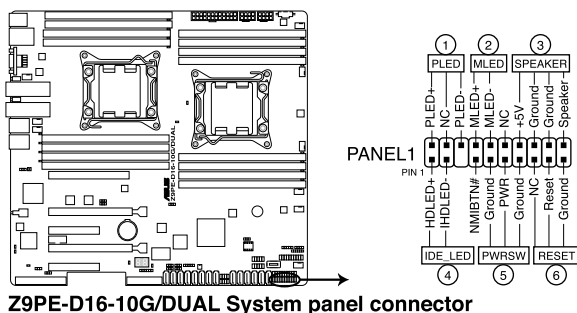


- DO NOT forget to connect the 24-pin and the 8-pin power plugs; otherwise, the system will not boot up.
- Use of a power supply unit (PSU) with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- This motherboard supports ATX2.0 PSU or later version.
- Ensure that your PSU can provide at least the minimum power required by your system.



9. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



Z9PE-D16-10G/DUAL System panel connector

1. System power LED (3-pin PLED)

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

2. Message LED (2-pin MLED)

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

3. System warning speaker (4-pin SPEAKER)

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

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

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

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

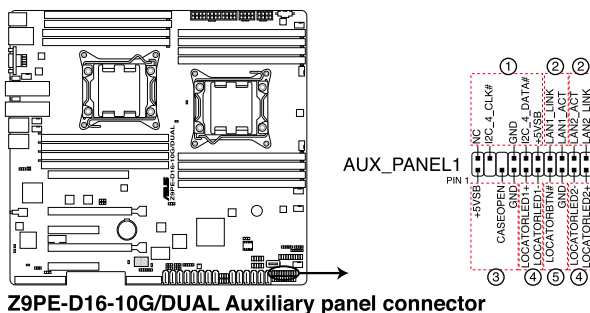
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

6. Reset button (2-pin RESET)

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

10. 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.



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

These leads connect the front panel SMBus cable.

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

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

3. Chassis intrusion (4-1 pin CASEOPEN)

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

4. Locator LED (2-pin LOCATORLED1, LOCATORLED2)

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

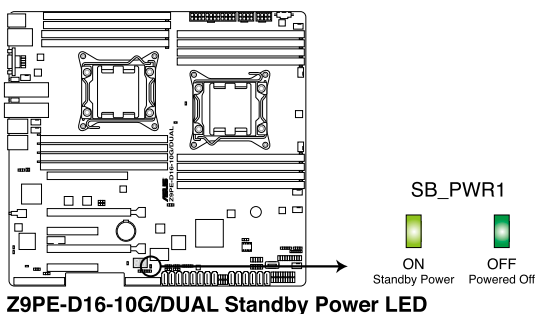
5. Locator Button/Switch (2-pin LOCATORBTN#)

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

4.4 Onboard LEDs

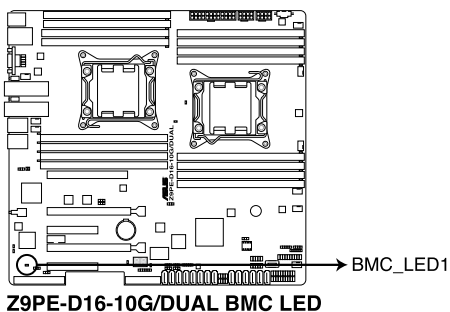
1. Standby Power LED (SB_PWR1)

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.



2. Baseboard Management Controller LED (BMC_LED1)

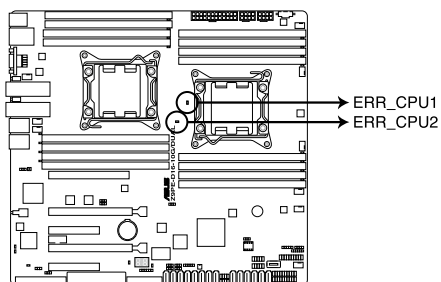
The green heartbeat LED blinks per second to indicate that the ASMB6 is working normally.



The heartbeat LED functions only when you install the ASUS ASMB6.

3. CPU Warning LED (ERR_CPU1)

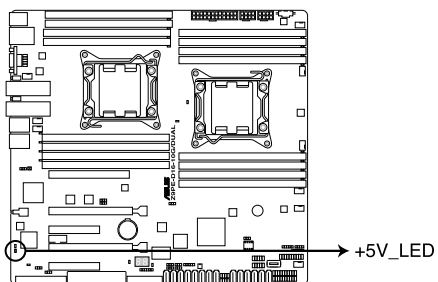
The CPU warning LEDs light up to indicate impending failure of the CPU.



Z9PE-D16-10G/DUAL ERR CPU LED

4. Power LED (+5V_LED1)

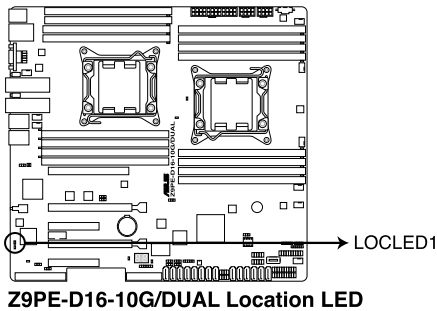
This LED lights up when you turn on the system using the Power-on button.



Z9PE-D16-10G/DUAL +5V Power LED

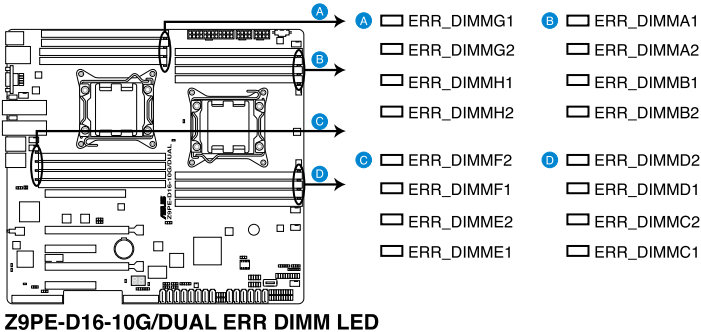
5. **Location LED (LOCLED1)**

This LED lights for you to conveniently locate the system in error.



6. **DIMM warning LED (ERR_DIMMA1/2; ERR_DIMMB1/2; ERR_DIMMC1/2; ERR_DIMMD1/2; ERR_DIMME1/2; ERR_DIMMF1/2; ERR_DIMMG1/2; ERR_DIMMH1/2)**

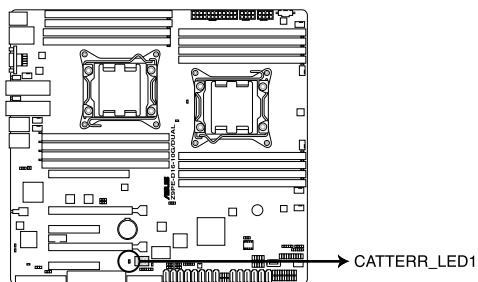
The DIMM warning LEDs light up to indicate an impending failure of the corresponding DIMMs.



The warning LEDs function only when you enable the ASUS ASMB6.

7. CATT LED (CATTERR_LED1)

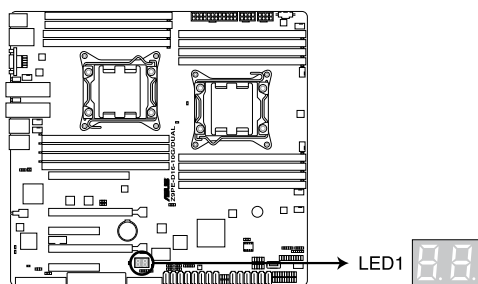
The CATT LED indicates that the system has experienced a fatal or catastrophic error and cannot continue to operate.



Z9PE-D16-10G/DUAL CATTERR_LED

8. Q-Code LEDs

The Q-Code LED provides you a 2-digit display that shows the system status. Refer to the following Q-Code table more details.



Z9PE-D16-10G/DUAL Q_Code LED

Q-Code table

Action	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	Security Phase	01	Progress	First post code(POWER_ON_POST_CODE)
		02	Progress	Load BSP microcode(MICROCODE_POST_CODE)
		03	Progress	Set cache as ram for PEI phase(CACHE_ENABLED_POST_CODE)
		06	Progress	CPU Early init.(CPU_EARLY_INIT_POST_CODE)
		04	Progress	initializes South bridge for PEI preparation
	PEI(Pre-EFI initialization) phase	10	Progress	PEI Core Entry
		15	Progress	NB initialize before installed memory
		19	Progress	SB initialize before installed memory
		78-00	Progress	Wait BMC ready(duration: 120 seconds).
		A1	MRC Progress	QPI initialization
		A3	MRC Progress	QPI initialization
		A7	MRC Progress	QPI initialization
		A8	MRC Progress	QPI initialization
		A9	MRC Progress	QPI initialization
		AA	MRC Progress	QPI initialization
		AB	MRC Progress	QPI initialization
		AC	MRC Progress	QPI initialization
		AD	MRC Progress	QPI initialization
		AE	MRC Progress	QPI initialization
		AF	MRC Progress	QPI initialization Complete
		2F	Progress	Memory Init.
		B0	MRC Progress	Memory Init.
		B1	MRC Progress	Memory Init.
		AF	MRC Progress	RC Reset if require
		B4	MRC Progress	Memory Init.
		B2	MRC Progress	Memory Init.
		B3	MRC Progress	Memory Init.
		B5	MRC Progress	Memory Init.
		B6	MRC Progress	Memory Init.
		B7	MRC Progress	Memory Init.
		B8	MRC Progress	Memory Init.
		B9	MRC Progress	Memory Init.
		BA	MRC Progress	Memory Init.
		BB	MRC Progress	Memory Init.
		BC	MRC Progress	Memory Init.
		BF	MRC Progress	Memory Init. Done
		5A	MRC Progress	Other config. After RC end
		31	Progress	Memory already installed.
		32	Progress	CPU Init.
		34	Progress	CPU Init.
		36	Progress	CPU Init.
		4F	Progress	DXE Initial Program Load(IPL)

(continued on the next page)

Action	PHASE	POST CODE	TYPE	DESCRIPTION
Normal boot	DXE(Driver Execution Environment) phase	60	Progress	DXE Core Started
		61	Progress	DXE NVRAM Init.
		62	Progress	SB run-time init.
		63	Progress	DXE CPU Init
		68	Progress	NB Init.
		69	Progress	NB Init.
		6A	Progress	NB Init.
		70	Progress	SB Init.
		71	Progress	SB Init.
		72	Progress	SB Init.
		78	Progress	ACPI Init.
		79	Progress	CSM Init.
	BDS(Boot Device Selection) phase	90	Progress	BDS started
		91	Progress	Connect device event
		92	Progress	PCI Bus Enumeration.
		93	Progress	PCI Bus Enumeration.
		94	Progress	PCI Bus Enumeration.
		95	Progress	PCI Bus Enumeration.
		96	Progress	PCI Bus Enumeration.
		97	Progress	Console output connect event
		98	Progress	Console input connect event
		99	Progress	AMI Super IO start
		9A	Progress	AMI USB Driver Init.
		9B	Progress	AMI USB Driver Init.
		9C	Progress	AMI USB Driver Init.
		9D	Progress	AMI USB Driver Init.
		b2	Progress	Legacy Option ROM Init.
		b3	Progress	Reset system
		b4	Progress	USB hotplug
		b6	Progress	NVRAM clean up
		b7	Progress	NVRAM configuration reset
		A0	Progress	IDE, AHCI Init.
		A1	Progress	IDE, AHCI Init.
		A2	Progress	IDE, AHCI Init.
		A3	Progress	IDE, AHCI Init.
		A8	Progress	BIOS Setup Utility password verify
		A9	Progress	BIOS Setup Utility start
		AB	Progress	BIOS Setup Utility input wait
		AD	Progress	Ready to boot event
		AE	Progress	Legacy boot event
	Operating system phase	17	Progress	ME event for Node Manager
		18	Progress	ME event for Node Manager
		19	Progress	ME event for Node Manager
		20	Progress	ME event for Node Manager
		21	Progress	ME event for Node Manager
		22	Progress	ME event for Node Manager
		23	Progress	ME event for Node Manager
		24	Progress	ME event for Node Manager
		25	Progress	ME event for Node Manager

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.

BIOS setup

5.1 Managing and updating your BIOS

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

1. **ASUS CrashFree BIOS 3**

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

2. **ASUS EzFlash**

Updates the BIOS using a USB flash disk.

3. **BUPDATER**

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

Refer to the corresponding sections for details on these utilities.



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

5.1.1 **ASUS CrashFree BIOS 3 utility**

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



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

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

1. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
2. The utility will automatically recover the BIOS. It resets the system when the BIOS recovery finished.



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



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

5.1.2 ASUS EZ Flash 2 Utility

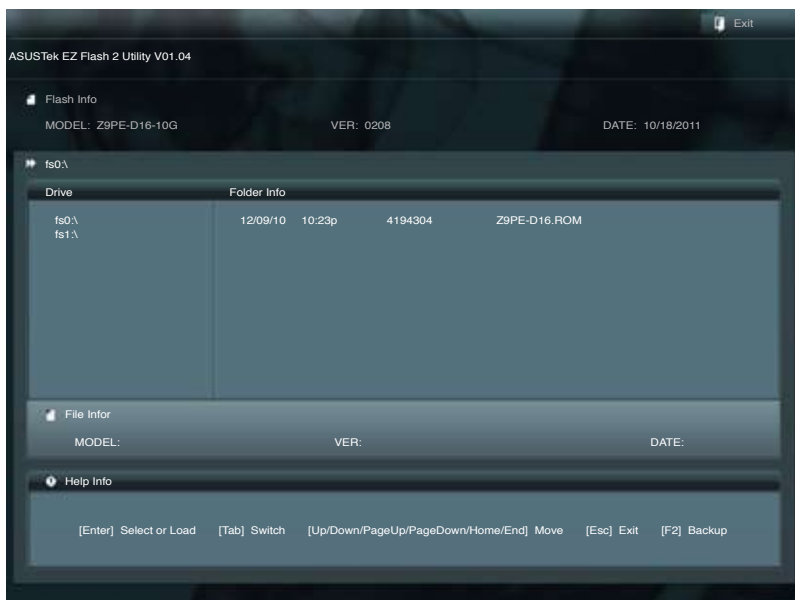
The ASUS EZ Flash 2 Utility feature allows you to update the BIOS without having to use a DOS-based utility.



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

To update the BIOS using EZ Flash 2 Utility

1. Insert the USB flash disk that contains the latest BIOS file into the USB port.
2. Enter the BIOS setup program. Go to the **Tool** menu then select **ASUS EZ Flash 2 Utility**. Press <Enter>.



3. Press <Tab> to switch to the **Drive** field.
4. Press the Up/Down arrow keys to find the USB flash disk that contains the latest BIOS, then press <Enter>.
5. Press <Tab> to switch to the **Folder Info** field.
6. Press the Up/Down arrow keys to find the BIOS file, and then press <Enter> to perform the BIOS update process. Reboot the system when the update process is done.



- This function can support devices such as a USB flash disk with FAT 32/16 format and single partition only.
- DO NOT shut down or reset the system while updating the BIOS to prevent system boot failure!



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

5.1.3 BUPDATER utility



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

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

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

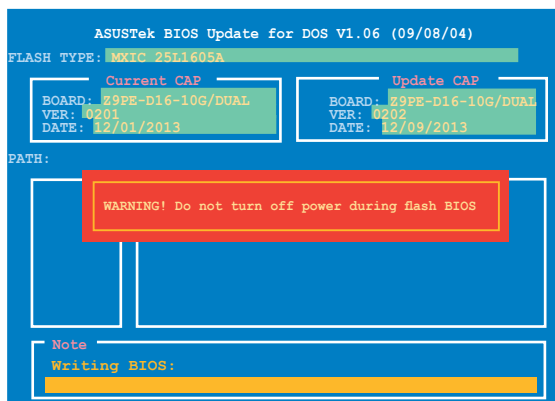
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.
3. Boot the system in DOS mode, then at the prompt, type:

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

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

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

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



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 during the Power-On Self-Test (POST) to enter the Setup utility; otherwise, POST continues with its test routines.

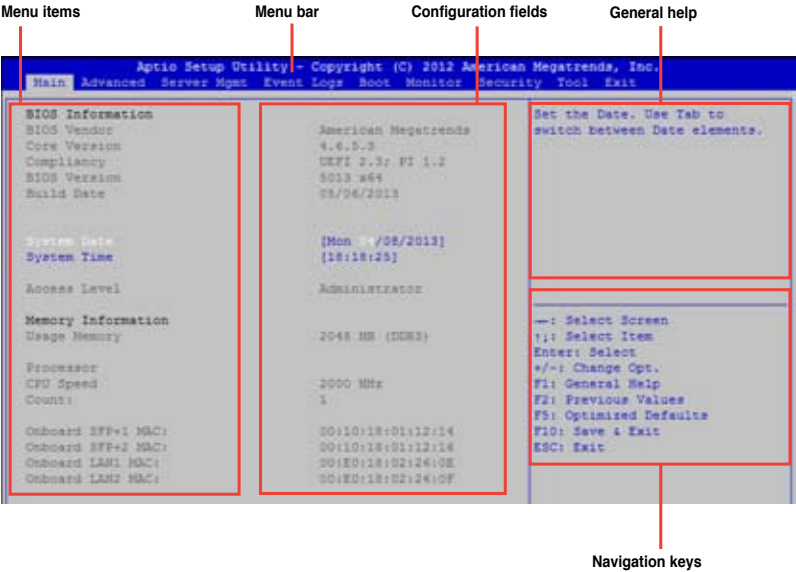
If you wish to enter Setup after POST, restart the system by pressing <Ctrl>+<Alt>+, or by pressing the reset button on the system chassis. You can also restart by turning the system off then back on. Do this last option only if the first two failed.

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



5.2.2 Menu bar

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

- | | |
|-------------|--|
| Main | For changing the basic system configuration |
| Advanced | For changing the advanced system settings |
| Server Mgmt | For changing the Server Mgmt settings |
| Event Logs | For changing the event log settings |
| Monitor | For displaying the system temperature, power status, and changing the fan settings |
| Security | For changing the security settings |
| Boot | For changing the system boot configuration |
| Tool | For configuring options for special functions |
| Exit | For selecting the exit options |

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

5.2.3 Menu items

The highlighted item on the menu bar displays the specific items for that menu. For example, selecting Main shows the Main menu items.

The other items (Event Logs, Advanced, Monitor, Boot, Tool, and Exit) on the menu bar have their respective menu items.

5.2.4 Submenu items

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

5.2.5 Navigation keys

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

5.2.6 General help

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

5.2.7 Configuration fields

These fields show the values for the menu items. If an item is user-configurable, you can change the value of the field opposite the item. You cannot select an item that is not user-configurable.

A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it and press <Enter> to display a list of options.

5.2.8 Pop-up window

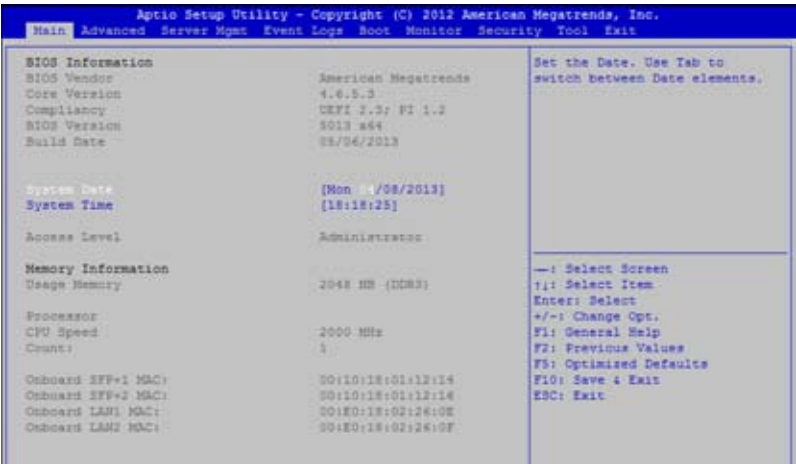
Select a menu item and press <Enter> to display a pop-up window with the configuration options for that item.

5.2.9 Scroll bar

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

5.3 Main menu

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



5.3.1 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.2 System Time [xx:xx:xx]

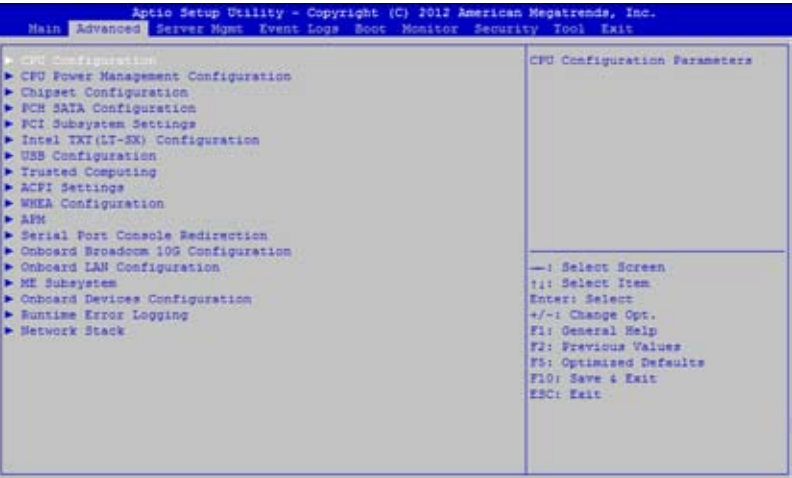
Allows you to set the system time.

5.4 Advanced menu

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



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



5.4.1 CPU Configuration



Socket 1 CPU Information

Enter to view socket specific CPU Information.



Hyper Threading [Enabled]

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

Active Processor Cores [All]

Configuration options: [All] [1] [2] [3] [4] [5] [6] [7]

Limit CPUID Maximum [Disabled]

Setting this item to [Enabled] allows legacy operating system to boot even without support for CPUs with extended CPUID functions.
Configuration options: [Disabled] [Enabled]

90 Bit [Enabled]

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

Server Class [Custom]

Use Intel® recommended prefetch settings.
Configuration options: [Enterprise] [High Performance(HPC)] [Custom]

Hardware Prefetcher [Enabled]

This Item allows you to turn on/off the mid level cache(L2) streamer prefetcher. Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

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

Configuration options: [Disabled] [Enabled]

DCU Streamer Prefetcher [Enabled]

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

Configuration options: [Disabled] [Enabled]

DCU IP Prefetcher [Enabled]

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

Configuration options: [Disabled] [Enabled]

Intel® Virtualization Technology [Enabled]

When this item is enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Configuration options: [Disabled] [Enabled]

Local APIC Mode [Auto]

Select Local APIC mode. If Auto, use x2APIC if required. Otherwise, use xAPIC mode. xAPIC will disable CPUs with APIC IDs greater than 254. Some OS do not support x2APIC mode.

Configuration options: [Disabled] [Enabled]

5.4.2 CPU Power Management Configuration



Power Technology [Custom]

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

EIST [Enabled]

This item allows you to enable/disable Intel® SpeedStep.
Configuration options: [Disabled] [Enabled]

Turbo Mode [Enabled]

Configuration options: [Disabled] [Enabled]

P-STATE Coordination [HW_ALL]

This item allows you to change P-STATE Coordination type.
Configuration options: [HW_ALL] [SW_ALL] [SW_ANY]

CPU C3 Report [Disabled]

This item allows you to enable/disable CPU C3(ACPI C2) report.
Configuration options: [Disabled] [Enabled]

CPU C6 Report [Enabled]

This item allows you to enable/disable CPU C6(ACPI C3) report.
Configuration options: [Disabled] [Enabled]

Package C State limit [C6]

This item allows you to set package C State limit.
Configuration options: [C0] [C2] [C6] [C7] [No Limit]

Energy Performance [Balanced Performance]

This item allows you to optimize between performance and power savings. Windows 2008 and later operating systems override this value according to this power plan.
Configuration options: [Performance] [Balanced Performance] [Balanced Energy] [Energy Efficient]

Factory long duration power limit 95 Watts

Long duration power limit 0

Allows you to set long duration power limit in watts. Use the number keys to set the value.

Factory long duration maintained 10 s

Long duration power limit 0

Allows you to set time window which the long duration power is maintained. Use the number keys to set the value.

Recommended short duration power 1 1.2 * Long Duration

Short duration power limit 0

Allows you to set short duration power limit in watts. Use the number keys to set the value.

5.4.3 Chipset Configuration



QPI Configuration



Isoc [Enabled]

Configuration options: [Disabled] [Enabled]

QPI Link Speed Mode [Fast]

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

Configuration options: [Slow] [Fast]

QPI Link Frequency Select [Auto]

This item allows for selecting the QPI link frequency

Configuration options: [Auto] [6.4 GT/s] [7.2 GT/s (Fast Mode Only)] [8.0 GT/s (Fast Mode Only)]

QPI Link0s [Disabled]

Configuration options: [Disabled] [Enabled]

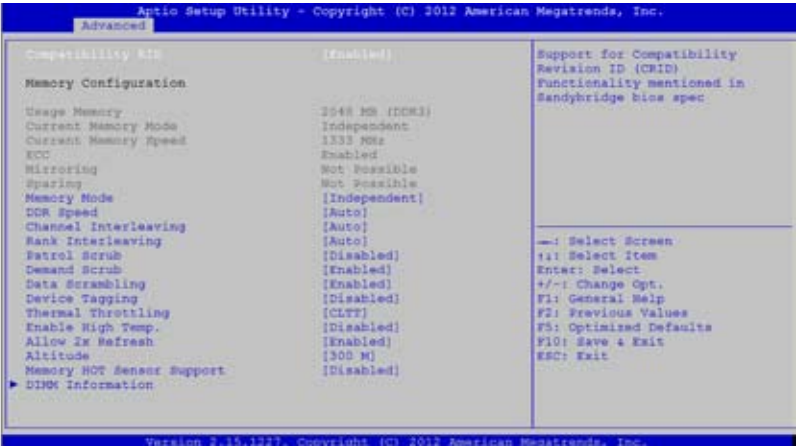
QPI Link0p [Disabled]

Configuration options: [Disabled] [Enabled]

QPI Link1 [Enabled]

Configuration options: [Disabled] [Enabled]

Memory Configuration



Compatibility RID [Enabled]

Support for compatibility revision ID (CRID) functionality mentioned in Sandybridge BIOS spec. Configuration options: [Enabled] [Disabled]

Memory Mode [Independent]

Select the mode for memory initialization.
Configuration options: [Independent] [Mirroring] [Lock Step] [Sparring]

DDR Speed [Auto]

Force DDR speed.
Configuration options: [Auto] [Force DDR3 800] [Force DDR3 1066] [Force DDR3 1333] [Force DDR3 1600] [Force DDR3 1866]

Channel Interleaving [Auto]

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

Rank Interleaving [Auto]

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

Patrol Scrub [Disabled]

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

Demand Scrub [Enabled]

Allows you to enable/disable demand scrubbing feature.
Configuration options: [Enabled] [Disabled]

Data Scrambling [Enabled]

Allows you to enable/disable data scrambling.

Configuration options: [Enabled] [Disabled]

Device Tagging [Disabled]

Allows you to enable/disable device tagging.

Configuration options: [Enabled] [Disabled]

Thermal Throttling [CLTT]

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

Enable High Temp [Disabled]

Configuration options: [Disabled] [Enabled]

Allow 2x Refresh [Enabled]

Configuration options: [Disabled] [Enabled]

Altitude [300 M]

The system altitude above the sea level in meters.

Configuration options: [Auto] [300 M] [900 M] [1500 M] [3000 M]

Memory Hot sensor support [Disbled]

Configuration options: [Disabled] [Enabled]

DIMM Information

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Advanced		
CPU1 DIMM Information		
Node 0 Ch0 Dimm A1	Present	2048 MB (DDR3)
Node 0 Ch0 Dimm A2	Not Present	
Node 0 Ch1 Dimm B1	Not Present	
Node 0 Ch1 Dimm B2	Not Present	
Node 0 Ch2 Dimm C1	Not Present	
Node 0 Ch2 Dimm C2	Not Present	
Node 0 Ch3 Dimm D1	Not Present	
Node 0 Ch3 Dimm D2	Not Present	
CPU2 DIMM Information		

CPU I/O Bridge Configuration



Intel(R) I/OAT [Disabled]

Allows you to enable or disable Intel® I/O acceleration technology.

Configuration options: [Disabled] [Enabled]

DCA Support [Enabled]

Allows you to enable or disable the direct cache access support.

Configuration options: [Disabled] [Enabled]

VGA Priority [offboard]

Allows you to prioritize between onboard and 1st offboard video device found.

Configuration options: [Onboard] [Offboard]

No Snoop Optimization [VC1]

Due to severe performance degradation, it is not recommended that this bit be set except in debug mode.

Configuration options: [VC0/VCP/VC1] [VC1]

PCH Configuration



PCH Compatibility RID [Disabled]

Support for PCH compatibility.

Configuration options: [Disabled] [Enabled]

Deep Sx [Disabled]

Configuration options: [Disabled] [Enabled in S5] [Enabled in S4 and S5]



Mobile platforms support deep S4/S5 in DC only and desktop platforms support deep S4/S5 in AC only.

Onboard SATA RAID Oprom [Enabled]

Allows you to enable/disable onboard SATA RAID option rom if Launch Storage Oprom is enabled.

Configuration options: [Disabled] [Enabled]

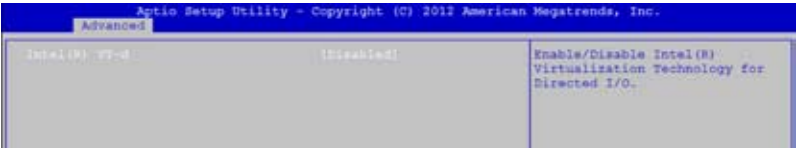
High Precision Event Timer Configuration

High Precision Timer [Enabled]

Allows you to enable/disable High Precision Event Timer.

Configuration options: [Disabled] [Enabled]

Intel(R) VT for Directed I/O Configuration



Intel(R) VT-d [Disabled]

Allows you to enable or disable Intel® VT-d.

Configuration options: [Enabled] [Disabled]



The following item appears only when you set Intel(R) VT-d to [Enabled].

Coherency Support [Disabled]

Allows you to enable/disable VT-d Engine Coherency support.

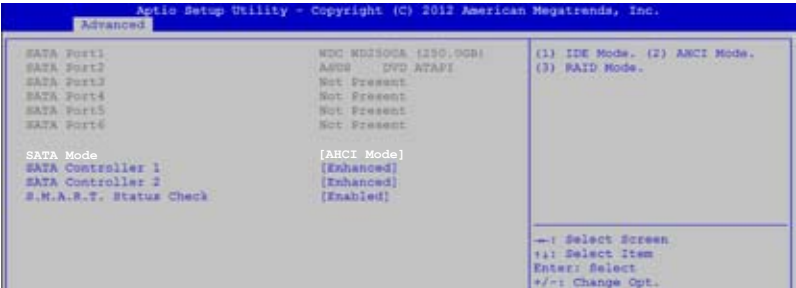
Configuration options: [Disabled] [Enabled]

ATS Support [Disabled]

Allows you to enable/disable VT-d Engine address translation services (ATS) support.

Configuration options: [Disabled] [Enabled]

5.4.4 PCH SATA Configuration



SATA Mode [AHCI Mode]

Allows you to set the SATA configuration.

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



- If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, set this item to [IDE Mode].
- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), keep the default setting [AHCI Mode]. The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.
- If you want to create RAID sets with LSI MegaRAID utility, or Intel® Rapid Storage Technology Enterprise from the Serial ATA hard disk drives, set this item to [RAID Mode].

SATA Controller 1 [Enhanced]

This item appears only when you set the SATA Mode item to [IDE Mode]. Set to [Enhanced] to support two SATA 6.0 Gb/s and two SATA 3.0 Gb/s devices. Set to [Compatible] when using Windows 98/NT/2000/MS-DOS. Up to four SATA devices are supported under these operating systems.

Configuration options: [Disabled] [Enhanced] [Compatible]

SATA Controller 2 [Enhanced]

This item appears only when you set the SATA Mode item to [IDE Mode]. Set to [Enhanced] to support two SATA 3.0 Gb/s devices.

Configuration options: [Disabled] [Enhanced]

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

S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) 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]

5.4.5 PCI Subsystem Settings



Above 4G Decoding [Disabled]

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

Configuration options: [Disabled] [Enabled]

PCI Latency Timer [32 PCI Bus Clocks]

Value to be programmed into PCI latency timer register

Configuration options: [32 PCI Bus Clocks] [64 PCI Bus Clocks] [96 PCI Bus Clocks] [128 PCI Bus Clocks] [160 PCI Bus Clocks] [192 PCI Bus Clocks] [224 PCI Bus Clocks] [248 PCI Bus Clocks]

VGA Palette Snoop [Disabled]

Allows you to enable or disable VGA palette registers snooping.

Configuration options: [Disabled] [Enabled]

PERR# Generation [Disabled]

Allows you to enable or disable PCI device to generate PERR#.

Configuration options: [Disabled] [Enabled]

SERR# Generation [Disabled]

Allows you to enable or disable PCI device to generate SERR#.

Configuration options: [Disabled] [Enabled]

Load RT32 Image [Enabled]

Allows you to enable or disable RT32 Image Loading.

Configuration options: [Disabled] [Enabled]

PCI Express Settings



PCI Express Link Register Settings

ASPM Support [Disabled]

Allows you to set the ASPM level.

Configuration options: [Disabled] [Auto] [Force L0s]

[Force L0s] Force all links to L0s state.

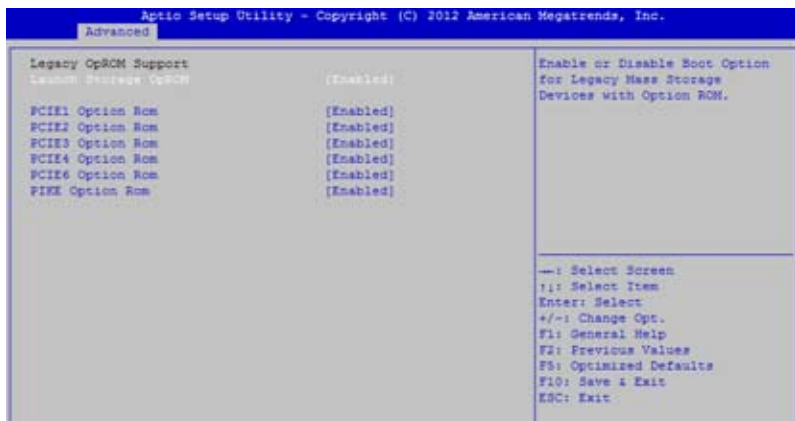
[Auto] BIOS auto configure.

[Disabled] Disabled ASPM.

Link Training Timeout (us) 5000

Use the <+> or <-> keys to adjust the value.

PCIe Slot Option Rom Configuration



Launch Storage OpROM [Enabled]

Allows you to enable or disable boot option for legacy mass storage device with option ROM.

Configuration options: [Disabled] [Enabled]

PCIe1 Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

PCIe2 Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

PCIe3 Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

PCIe4 Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

PCIe6 Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

PIKE Option Rom [Enabled]

Configuration options: [Disabled] [Enabled]

5.4.6 Intel TXT(LT-SX) Configuration

The Intel® TXT(LT-SX) configuration automatically detects and displays the Intel®TXT(LT-SX) hardware support.



5.4.7 USB Configuration



Legacy USB Support [Enabled]

Allows you to enable or disable Legacy USB device support.

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

EHCI Hand-off [Disabled]

This is a workaround for OSes without EHCI. Ownership change should be claimed by EHCI driver. Configuration options: [Disabled] [Enabled]

Port 60/64 Emulation [Enabled]

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

USB hardware delays and time-outs

USB transfer time-out [20 sec]

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

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

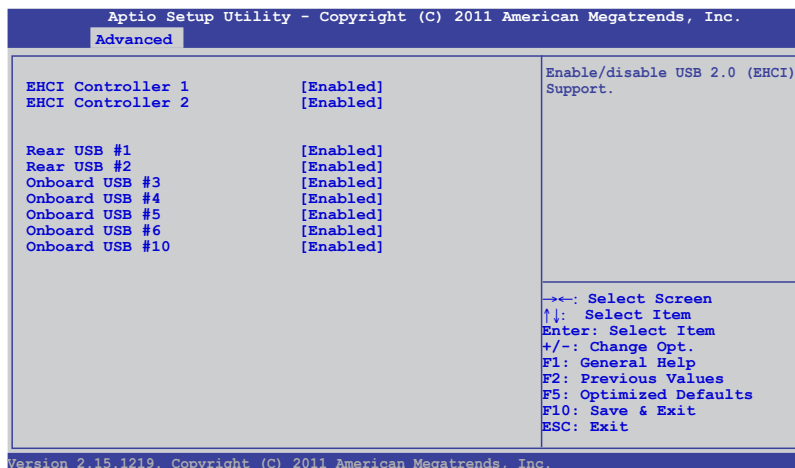
Device reset time-out [20 sec]

USB mass storage device start unit command time-out.

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

USB Ports Configuration

USB Ports Configuration



EHCI Controller 1/2 [Enabled]

Allows you to enable or disable USB (EHCI) Support.

Configuration options: [Disabled] [Enabled]

Rear USB #1 and #2 [Enabled]

Allows you to enable or disable rear USB #1 and #2.

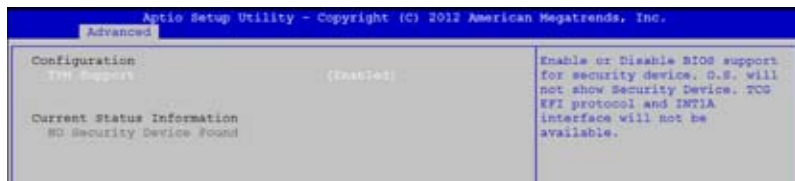
Configuration options: [Disabled] [Enabled]

Onboard USB #3/#4/#5/#6/#10 [Enabled]

Allows you to enable or disable Onboard USB #3 / #4 / #5 / #6 / #10.

Configuration options: [Disabled] [Enabled]

5.4.8 Trusted Computing



TPM Support [Enabled]

Allows you to enable or disable the TPM support.

Configuration options: [Disabled] [Enabled]

5.4.9 ACPI Settings



Enable ACPI Auto Configuration [Disabled]

Allows you to enable or disable BIOS ACPI Auto Configuration.
Configuration options: [Disabled] [Enabled]



The following item appears only when you set Enabled ACPI Auto Configuration to [Disabled].

Enable Hibernation [Enabled]

Allows you to enable or disable system ability to Hibernate (OS/S4 sleep state). This option may be not effective with some OS.
Configuration options: [Disabled] [Enabled]

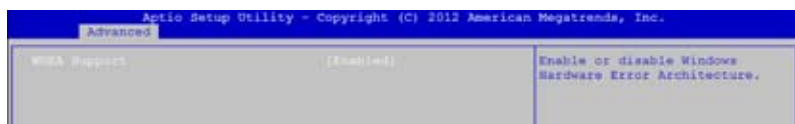
ACPI Sleep State [S1 (CPU Stop Clock)]

Allows you to set the ACPI Sleep State.
Configuration options: [Suspend Disabled] [S1 (CPU Stop Clock)]

Lock Legacy Resources [Disabled]

Allows you to enable or disable Lock Legacy Resources.
Configuration options: [Disabled] [Enabled]

5.4.10 WHEA Configuration



WHEA Support [Enabled]

Allows you to enable or disable the Windows Hardware Error Architecture support.

Configuration options: [Disabled] [Enabled]

5.4.11 APM



Restore AC Power Loss [Last State]

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

Configuration options: [Power Off] [Power On] [Last State]

Power On By PCIE [Disabled]

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

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

Power On By RTC [Disabled]

[Disabled] Disables RTC to generate a wake event.

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

5.4.12 Serial Port Console Redirection



COM1/COM2

Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]



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

Console Redirection Settings

This item becomes configurable only when you enable the Console Redirection item. The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Terminal Type [VT-UTF8]

Allows you to set the terminal type.

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

Bits per second [57600]

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

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

Data Bits [8]

Configuration options: [7] [8]

Parity [None]

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

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

Stop Bits [1]

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

Flow Control [Hardware RTS/CTS]

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Once the buffers are empty, a “start” signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

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

VT -UTF8 Combo Key Support [Enabled]

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

Configuration options: [Disabled] [Enabled]

Recorder Mode [Disabled]

With this mode enabled only text will be sent. This is to capture Terminal data.

Configuration options: [Disabled] [Enabled]

Legacy OS Redirection Resolution [80x24]

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

Configuration options: [80x24] [80x25]

Putty Keypad [VT100]

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

[VT100] [LINUX] [XTERMR6] [SCO] [ESCN] [VT400]

Redirection After BIOS POST [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) Console Redirection [Disabled]

Allows you to enable or disable the console redirection feature.

Configuration options: [Disabled] [Enabled]



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

Console Redirection Settings

Out-of-Band Mgmt Port [COM1]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

Configuration options: [COM1] [COM2]

Terminal Type [VT-UTF8]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

Configuration options: [VT100] [VT100+] [VT-UTF8] [ANSI]

Bits per second [115200]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

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

Flow Control [None]

Microsoft Windows Emergency Management Services (EMS) allow for remote management of a Windows Server OS through a serial port.

Configuration options: [VT100] [Hardware RTS/CTS] [Software Xon/Xoff]

5.4.13 Onboard Broadcom 10G Configuration

Allows you to configure the onboard LAN BCM57840S.



Broadcom 10G Enable [Enabled]

Allows you to enable or disable the onboard Broadcom 10G.

Configuration options: [Enabled] [Disabled]

5.4.14 Onboard LAN Configuration



INTEL I210 LAN1 Enable [Enabled]

Allows you to enable or disable the onboard INTEL LAN1. Configuration options: [Enabled] [Disabled]

INTEL I210 LAN1 OpROM [PXE]

Allows you to disable INTEL LAN1 OpROM or select between iSCSI or PXE. Configuration options: [Disabled] [PXE] [iSCSI]

INTEL I210 LAN2 Enable [Enabled]

Allows you to enable or disable the onboard INTEL LAN2. Configuration options: [Enabled] [Disabled]

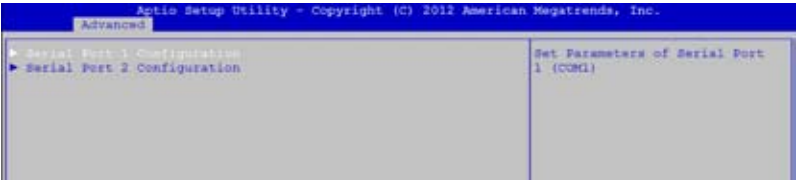
INTEL I210 LAN2 OpROM [PXE]

Allows you to disable INTEL LAN2 OpROM or select between iSCSI or PXE. Configuration options: [Disabled] [PXE] [iSCSI]

5.4.15 ME Subsystem



5.4.16 Onboard Devices Configuration



Serial Port Configuration

The sub-items in this menu allow you to set the serial port configuration.



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

Serial Port [Enabled]

Allows you to enable or disable the serial port (COM).

Configuration options: [Enabled] [Disabled]

Change Settings [IO=3F8h; IRQ=4]

Allows you to select the Serial Port base address.

Configuration options: [IO=3F8h; IRQ=4] [IO=2F8h; IRQ=3] [IO=3E8h; IRQ=4]
[IO=2E8h; IRQ=3]

5.4.17 Runtime Error Logging Support



Runtime Error Logging Support [Disabled]

This item allows you to enable or disable Runtime Error Logging Support.

Configuration options: [Disabled] [Enabled]



The following item appears only when you set Runtime Error Logging Support to [Enabled].

PCI Error Logging Support [Disabled]

Allows you to enable or disable PCI Error Logging.

Configuration options: [Disabled] [Enabled].

5.4.18 Network Stack



Network stack [Disable]

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



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

Ipv4 PXE Support [Enabled]

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

Ipv6 PXE Support [Enabled]

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

IPSEC Certificate:

Support to Enables/Disables the IPSEC certificate for Ikev. Configuration options: [Disabled] [Enabled].

IPv6 Delay Time:

Set seconds of delay before IPv6 PXE Boot. Default 0 seconds.

5.5 Server Mgmt menu

The Server Mgmt menu displays the server mgmt status, and allows you to change the settings.



The Server Mgmt menu appears only when you install ASMB card on the motherboard.



O/S Watchdog Timer [Disabled]

If enabled, starts a BIOS timer which can only be shut off by Intel Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the O/S Boot Watchdog Timer Policy.

Configuration options: [Enabled] [Disabled]



The following two items allow you to set only when you set O/S Watchdog Timer to [Enabled].

O/S Wtd Timer Timeout [10 minutes]

Allows you to configure the length of the O/S Boot Watchdog Timer. Not available if O/S Boot Watchdog Timer is disabled.

Configuration options: [5 minutes] [10 minutes] [15 minutes] [20 minutes]

O/S Wtd Timer Policy [Reset]

Allows you to configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if O/S Boot Watchdog Timer is disabled.

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

5.5.1 System Event Log



SEL Components [Disabled]

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



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

Erase SEL [No]

Allows you to choose options for erasing SEL.
Configuration options: [No] [Yes, On next reset] [Yes, On every reset]

When SEL is Full [Do Nothing]

Allows you to choose options for reactions to a full SEL.
Configuration options: [Do Nothing] [Erase Immediately]

5.5.2 BMC network configuration



Configuration Address source [Previous State]

Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC).
Unspecified option will not modify any BMC network parameters during BIOS phase.
Configuration options: [Previous State] [Static Mode] [DHCP Mode]



- The following items appears only when you set Configuration Address source to [Static Mode].

Station IP address [0.0.0.0]

Allows you to input Station IP address.

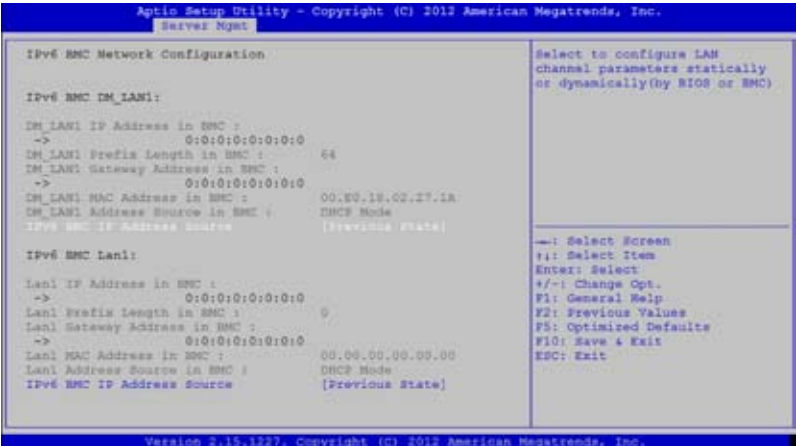
Subnet mask [0.0.0.0]

Allows you to input Subnet mask.

Gateway IP address [0.0.0.0]

Allows you to input Gateway IP address.

5.5.3 IPv6 BMC Network configuration



IPv6 BMC IP Address source [Previous State]

Select to configure LAN channel parameters statically or dynamically (by BIOS or BMC).
Configuration options: [Previous State] [Static Mode] [DHCP Mode]



The following items appear only when you set Configuration Address source to [Static Mode].

IPv6 BMC DM_LAN1 IP Address

Allows you to input IPv6 BMC Lan IP address.

IPv6 BMC DM_LAN1 IP Prefix Length

Allows you to input IPv6 BMC Lan IP Prefix Length.

IPv6 BMC DM_LAN1 Default Gateway

Allows you to input IPv6 BMC Lan Default Gateway.

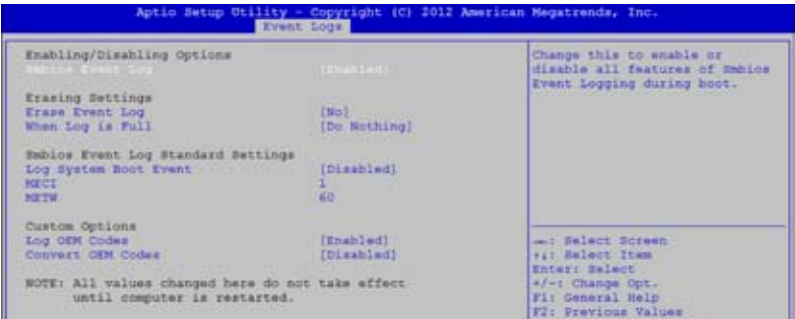
5.6 Event Logs menu

The Event Logs allows you to change or view the event log settings.



5.6.1 Change Smbios Event Log Settings

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



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

Enabling/Disabling Options

Smbios Event Log [Enabled]

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

Erasing Settings

Erase Event Log [No]

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

When Log is Full [Do Nothing]

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

Smbios Event Log Standard Settings

Log System Boot Event [Disabled]

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

MECI [1]

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

METW [60]

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

Custom Option

Log OEM Codes [Enabled]

Enable or disable the logging of EFI Status Codes as OEM Codes (if not already converted to legacy). Configuration options: [Disabled] [Enabled]

Convert OEM Codes [Disabled]

Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

Configuration options: [Disabled] [Enabled]

5.6.2 View Smbios Event Log

Press <Enter> to view all smbios event logs.

5.6.3 View System Event Log

Press <Enter> to view all system event logs.

5.7 Boot menu

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



Setup Prompt Timeout [xx]

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

Bootup NumLock State [On]

Allows you to select the power-on state for the NumLock.

Configuration options: [Off] [On]

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 is execute above 1MB. 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 reaction on INT19 trapping by Option ROM.

Configuration options: [Immediate] [Postponed]

Boot Device Seeking [Endless PXE]

[Endless PXE] Continuous seek remote boot image until boot image found or user abort (press Ctrl+Alt+Del).

[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, please press <F8> after POST.

Set the booting order of network devices.

Boot Option #1/#2/#3/#4 [SATA P2: ASUS ...]

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

CD/DVD ROM Drive BBS Priorities

Floppy Drive BBS Priorities

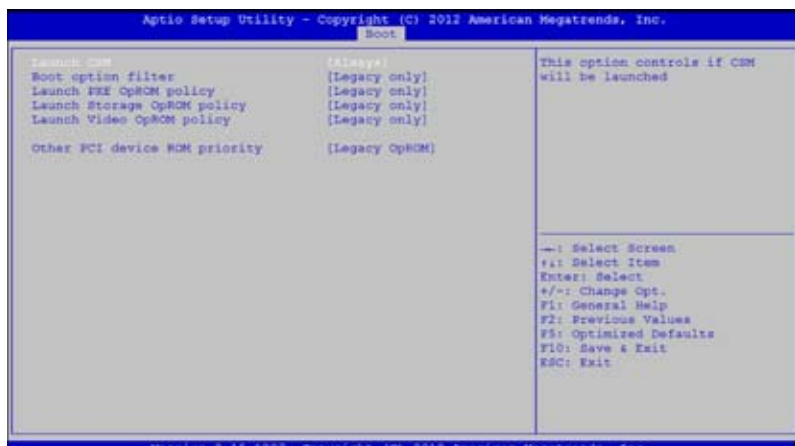
Network Device BBS Priorities

Hard Drive BBS Priorities

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

CSM Parameters

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



Launch CSM [Always]

This option allows you to enable or disable the launch of CSM. Configuration options: [Always] [Never]

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]

5.8 Monitor menu

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



Scroll down to display the following items:



CPU 1/2; TR1 1/2 Temperature [xxx°C/xxx°F]

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

CPU FAN1/2 Speed; FRNT FAN1–4 Speed; REAR FAN1/2 Speed [xxxx RPM] or [N/A]

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

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

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

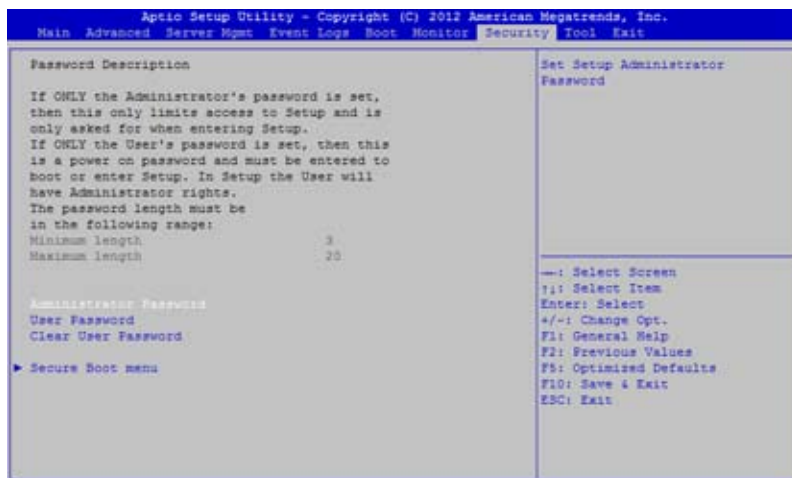
FAN Speed Control [Generic Mode]

Allows you to configure the ASUS Smart Fan feature that smartly adjusts the fan speeds for more efficient system operation.

Configuration options: [Generic Mode] [High Speed Mode] [Full Speed Mode]

5.9 Security menu

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



Administrator Password

To set an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change an administrator password:

1. Select the Administrator Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.



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

User Password

To set a user password:

1. Select the User Password item and press <Enter>.
2. From the Create New Password box, key in a password, then press <Enter>.
3. Confirm the password when prompted.

To change a user password:

1. Select the User Password item and press <Enter>.
2. From the Enter Current Password box, key in the current password, then press <Enter>.
3. From the Create New Password box, key in a new password, then press <Enter>.
4. Confirm the password when prompted.

To clear a user password:

1. Select the Clear User Password item and press <Enter>.
2. Select Yes from the Warning message window then press <Enter>.

Secure Boot Menu

This item allows you to customize the Secure Boot settings.



Secure Boot 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) 2012 American Megatrends, Inc.		
Security		
Internal FV	[Always Execute]	Image Execution Policy per device path on Security Violation.
Option ROM	[Deny Execute]	
Removable Media	[Deny Execute]	
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) 2012 American Megatrends, Inc.		
Security		
Factory Default Key Provisioning	[Disabled]	Install Factory default Secure Boot Keys when System is in Setup Mode
► Install All Factory Default Keys		
► Save All Secure Boot Variables		
Platform Key (PK)	NOT INSTALLED	
► Delete PK		
► Set new PK		
Key Exchange Key Database(KEK)	NOT INSTALLED	
► Delete KEK		
► Set new KEK		
► Append Cer to KEK		
Authorized Signature Database(DB)	NOT INSTALLED	
► Delete DB		
► Set new DB		
► Append Cer to DB		
Forbidden Signature Database(DBX)	NOT INSTALLED	
► Delete DBX		
► Set new DBX		
► Append Cer to DBX		

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

Factory Default Key Provisioning [Disabled]

Configuration options: [Disabled] [Enabled]

Install All Factory Default Keys

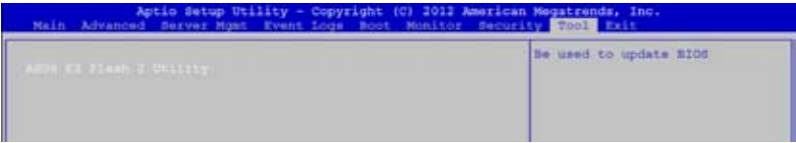
This item will ask you if you want to Install Factory Default secure variables. Select Yes if you want to load the default secure variables, otherwise select No.

Platform Key (PK)/Key Exchange Key Database (KEK)/Authorized Signature Database (DB)/ Forbidden Signature Database (DBX)

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

5.10 Tool menu

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



ASUS EZ Flash 2 Utility

Allows you to run ASUS EZ Flash BIOS ROM Utility when you press <Enter>. Check section 5.1.2 ASUS EZ Flash 2 Utility for details.

5.11 Exit menu

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



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

Boot Override

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

Launch EFI Shell from filesystem device

Attempts to launch EFI Shell application (shellx64.efi) from one of the available filesystem devices.

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 the Setup program without saving your changes. When you select this option, a confirmation window appears. Select Yes to discard changes and reset.

Restore Defaults

This option allows you to restore/load defaults values for all the setup options. When you select this option, a confirmation window appears. Select Yes to load optimized defaults.

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 motherboard supports the following SATA RAID solutions:

- LSI MegaRAID software RAID Configuration Utility with RAID 0, RAID 1, and RAID 10 support (for both Linux and Windows OS).
- Intel® Rapid Storage Technology enterprise Option ROM Utility with RAID 0, RAID 1, RAID 10, and RAID 5 support (for Windows OS only).

6.1.1 RAID definitions

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

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

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

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



-
- If you want to boot the system from a hard disk drive included in a created RAID set, copy first the RAID driver from the support DVD to a floppy disk before you install an operating system to the selected hard disk drive.
 - Please refer to chapter 2 for how to select the RAID configuration utility. Move the jumper to choose between LSI MegaRAID and Intel® Rapid RAID.
-

6.1.2 Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

1. Install the SATA hard disks into the drive bays following the instructions in the system user guide.
2. Connect a SATA signal cable to the signal connector at the back of each drive and to the SATA connector on the motherboard.
3. Connect a SATA power cable to the power connector on each drive.

6.1.3 Setting the RAID item in BIOS

You must set the RAID item in the BIOS Setup before you can create a RAID set from SATA hard disk drives attached to the SATA connectors supported by Intel® C602 chipset. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the Advanced Menu > PCH SATA Configuration, then press <Enter>.
3. Set SATA Mode to [RAID Mode]
4. Press <F10> to save your changes and exit the BIOS Setup.



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

6.1.4 RAID configuration utilities

Depending on the RAID connectors that you use, you can create a RAID set using the utilities embedded in each RAID controller. For example, use the LSI Logic Embedded SATA RAID Setup Utility or the Intel® Rapid Storage Technology if you installed Serial ATA hard disk drives on the Serial ATA connectors supported by the Intel® C602 chipset.

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

6.2 LSI Software RAID Configuration Utility

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

To enter the LSI MegaRAID software RAID configuration utility:

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

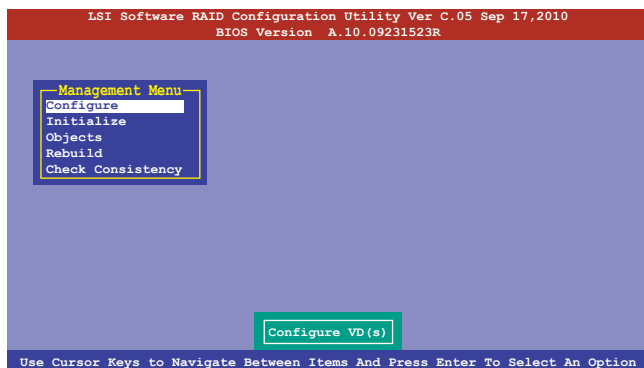
```
LSI MegaRAID Software RAID BIOS Version A.10 09231523R
LSI SATA RAID Found at PCI Bus No:00 Dev No:1F
Device present at Port 0      ST3160812AS      152114MB
Device present at Port 1      ST3160812AS      152114MB
Device present at Port 2      ST3160812AS      152114MB
Device present at Port 3  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



- The LSI MegaRAID software RAID configuration utility automatically configures to RAID 1 when the SATA to RAID Mode is enabled.
- The RAID setup screens shown in this section are for reference only and may not exactly match the items on your screen due to the controller version difference.
- When you create RAID sets with the LSI MegaRAID software RAID configuration utility, the boot priority of the SATA optical drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

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

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



Menu	Description
Configure	Allows you to create RAID 0, RAID 1 or RAID 10 set using the Easy Configuration or the New Configuration command. This menu also allows you to view, add, or clear RAID configurations or select the boot drive
Initialize	Allows you to initialize the virtual drives of a created RAID set
Objects	Allows you to initialize virtual drives or change the virtual drive parameters
Rebuild	Allows you to rebuild failed drives
Check Consistency	Allows you to check the data consistency of the virtual drives of a created RAID set

6.2.1 Creating a RAID set

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

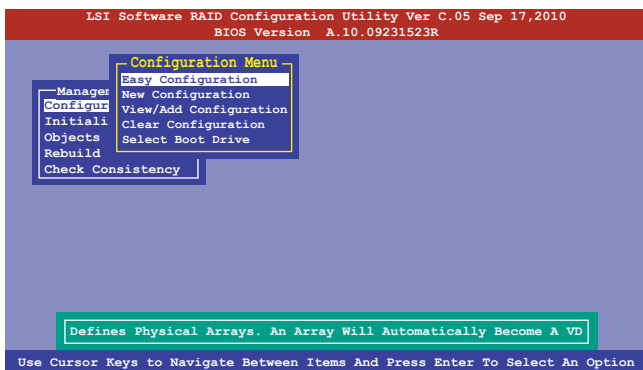
In Easy Configuration, the virtual drive parameters are set automatically.

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

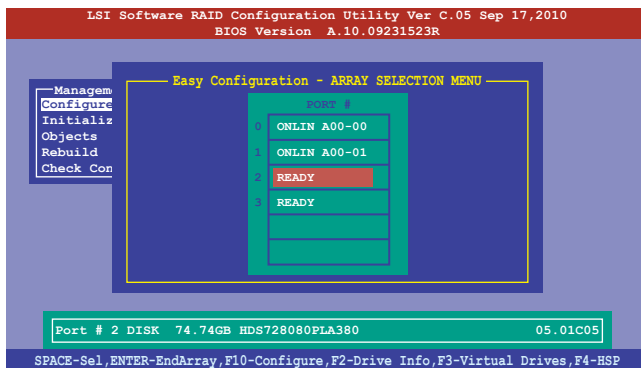
Using Easy Configuration

To create a RAID set using the Easy Configuration option:

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

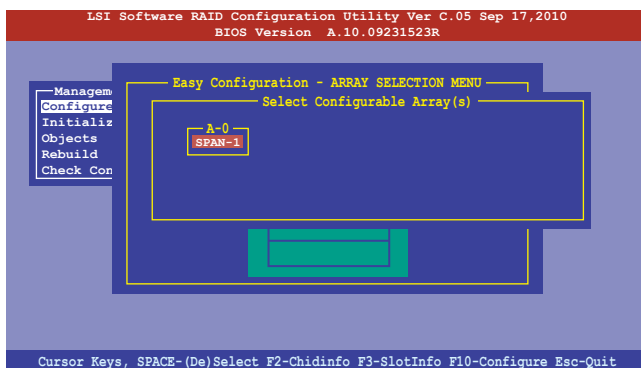


- The ARRAY SELECTION MENU displays the available drives connected to the SATA ports. Use the up/down arrow keys to select the drives you want to include in the RAID set, and then press <Space>. When selected, the drive indicator changes from READY to ONLIN A[X]-[Y], where X is the array number, and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

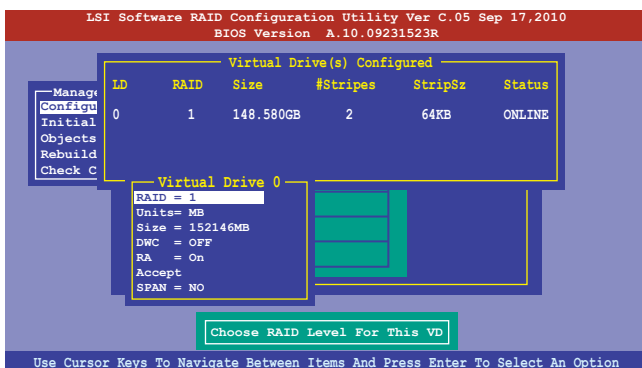


- The information of the selected hard disk drive displays at the bottom of the screen.
- You need at least two identical hard disk drives when creating a RAID 1 set.
- You need at least four identical hard disk drives when creating a RAID 10 set.

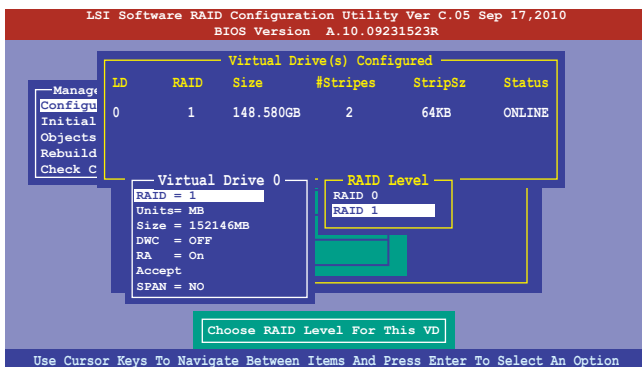
- Select all the drives required for the RAID set, and then press <F10> to configure array setting.
- Press <Space> to select the configurable array.



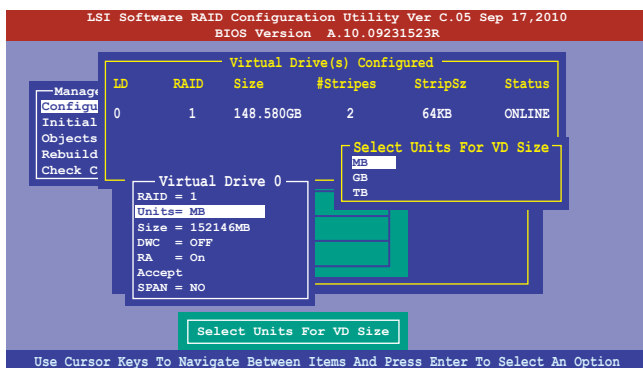
5. Press <F10> again, the virtual drive information appears including a **Virtual Drive** menu that allows you to change the virtual drive parameters.



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



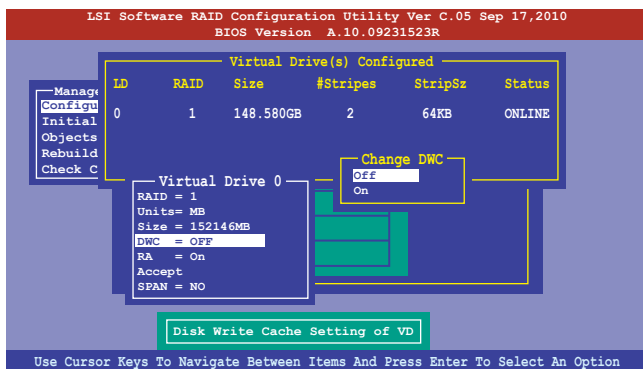
8. Select **Units** from the **Virtual Drive** sub-menu, and then press <Enter>.
9. Select the units for virtual drive size from the menu, and then press <Enter>.



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

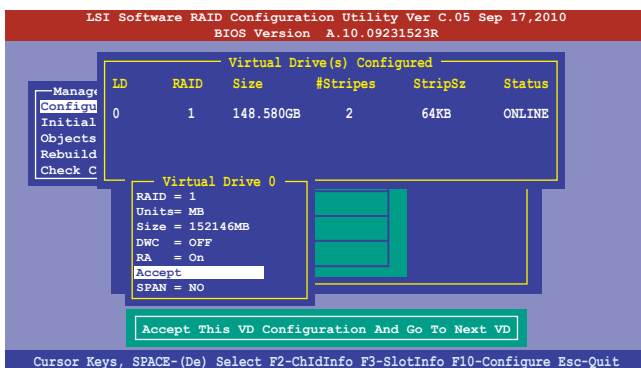
When creating a **RAID 0** set, proceed to step 12.

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

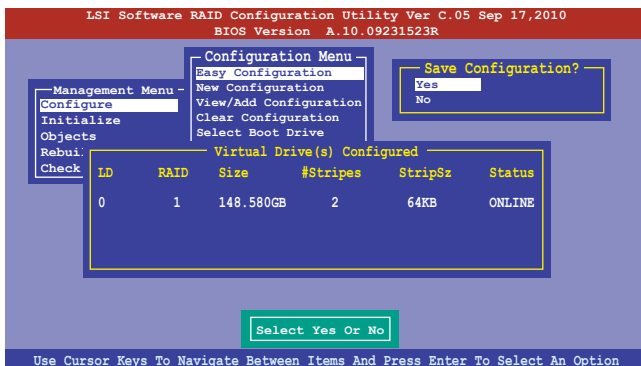


Enabling DWC can improve the performance, but with the risk of data loss.

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



13. Follow step 2 to 12 to configure additional virtual drives.
14. Press <Esc> to finish RAID configuration. When prompted to save configuration, select Yes from the menu, and then press <Enter>.



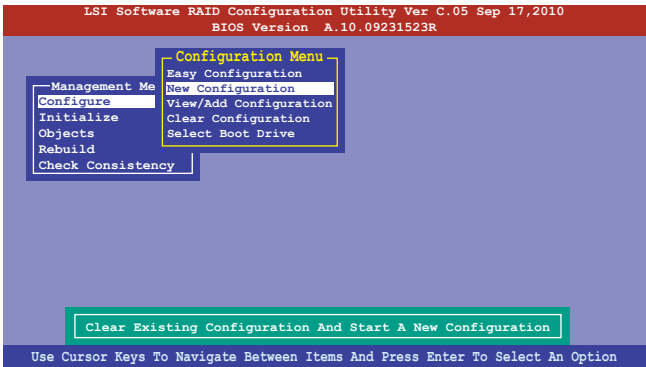
Using New Configuration



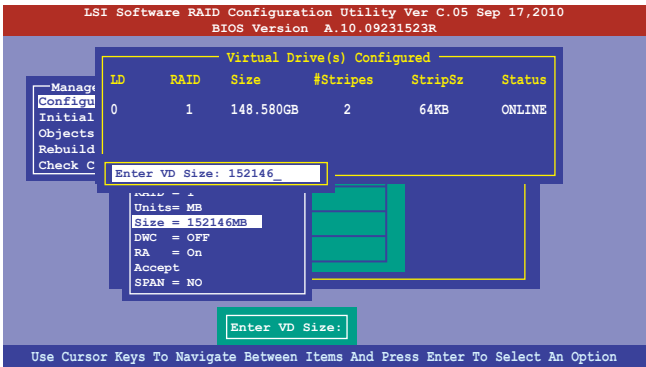
When a RAID set already exists, using the New Configuration command erases the existing RAID configuration data. If you do not want to delete the existing RAID set, use the View/Add Configuration command to view or create another RAID configuration.

To create a RAID set using the New Configuration option

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



2. Follow step 2 to 9 of the previous section: Using Easy Configuration.
3. Select Size from the Virtual Drive menu, and then press <Enter>.
4. Key-in the desired virtual drive size, and then press <Enter>.



5. Follow step 10 to 14 of the previous section: Using Easy Configuration to create the RAID set.

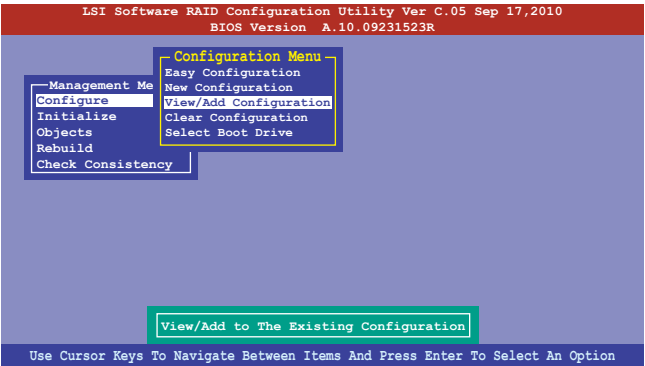
6.2.2 Adding or viewing a RAID configuration

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

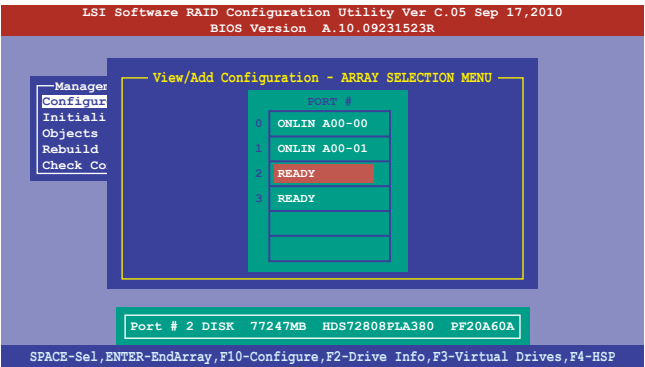
Adding a new RAID configuration

To add a new RAID configuration:

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



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



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

3. Follow step 3 to 12 of section 6.2.1 Creating a RAID set: Using Easy Configuration to add a new RAID set.

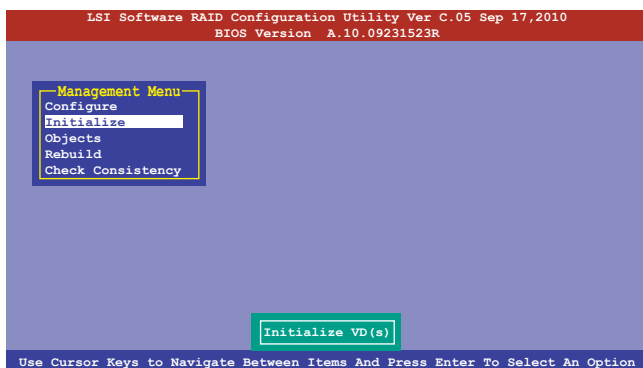
6.2.3 Initializing the virtual drives

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

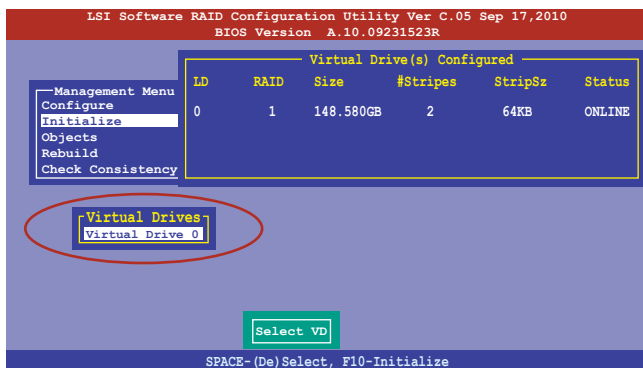
Using the Initialize command

To initialize the virtual drive using the Initialize command

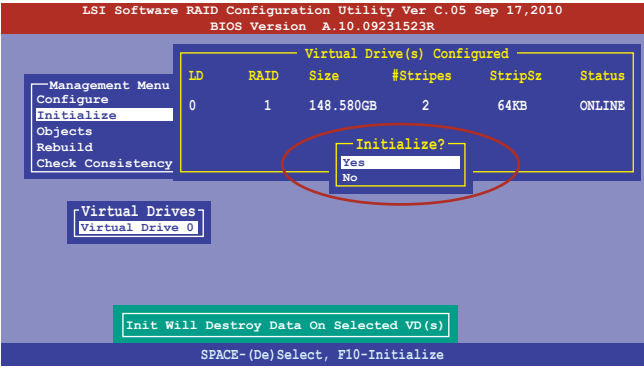
1. From the Management Menu, select Initialize, and then press <Enter>.



2. The screen displays the available RAID set(s) and prompts you to select the virtual drive to initialize. Use the arrow keys to select the virtual drive from the Virtual Drive selection, and then press <Space>.

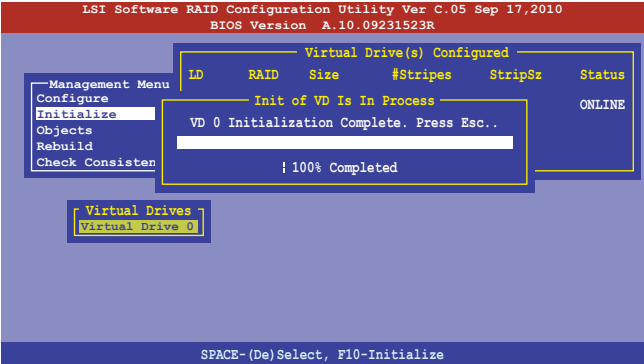


3. Press <F10> to start initialization. When prompted, select Yes from the Initialize? dialog box, and then press <Enter>.



Initializing a virtual drive erases all data on the drive.

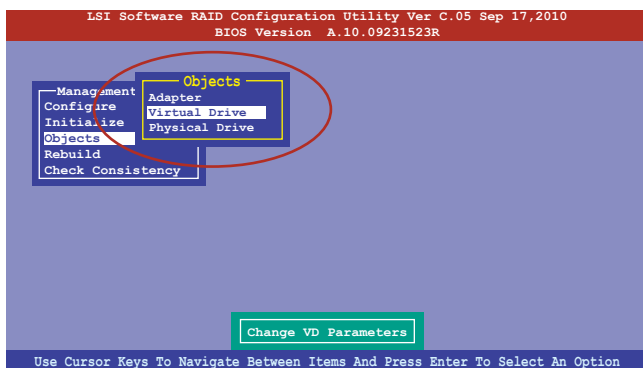
4. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.



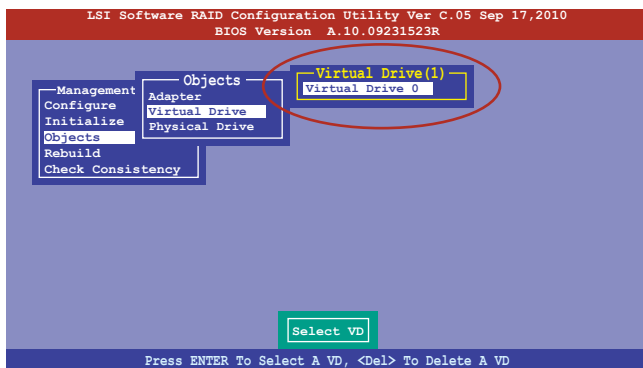
Using the Objects command

To initialize the virtual drives using the Objects command

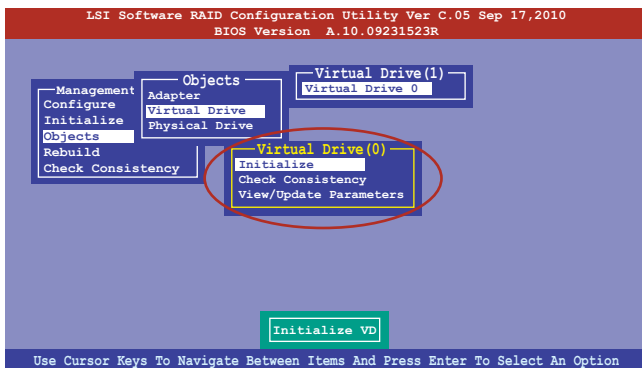
1. From the Management Menu, select Objects > Virtual Drive, and then press <Enter>.



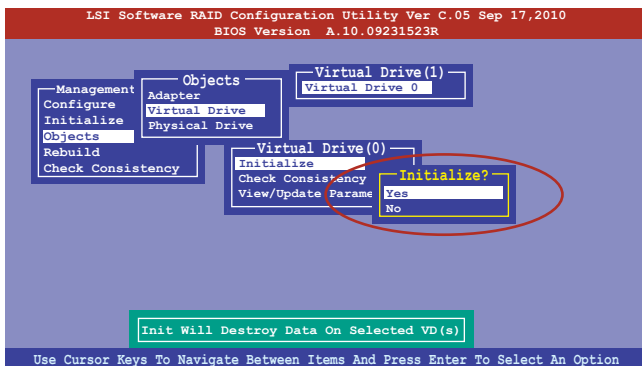
2. Select the virtual drive to initialize from the Virtual Drives sub-menu, and then press <Enter>.



3. Select Initialize from the pop-up menu, and then press <Enter> to start initialization.



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



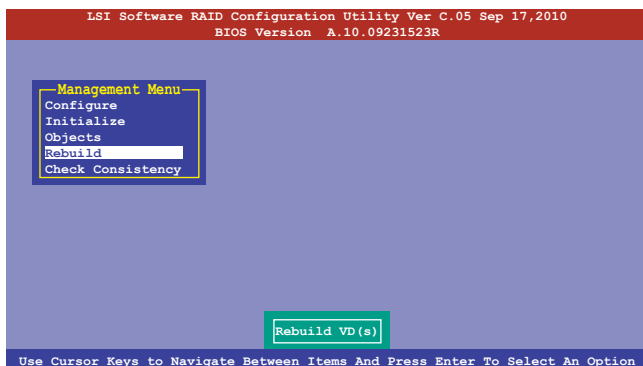
5. A progress bar appears on screen. If desired, press <Esc> to abort initialization. When initialization is completed, press <Esc>.

6.2.4 Rebuilding failed drives

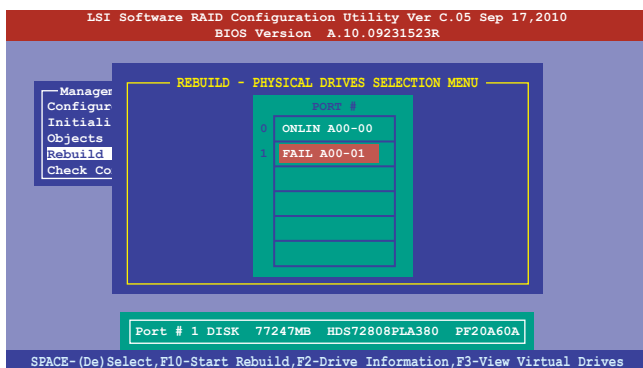
You can manually rebuild failed hard disk drives using the Rebuild command in the Management Menu.

To rebuild a failed hard disk drive

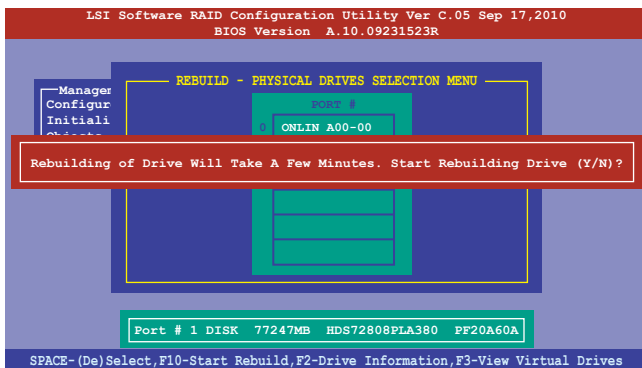
1. From the Management Menu, select Rebuild, and then press <Enter>.



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



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



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

6.2.5 Checking the drives for data consistency

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

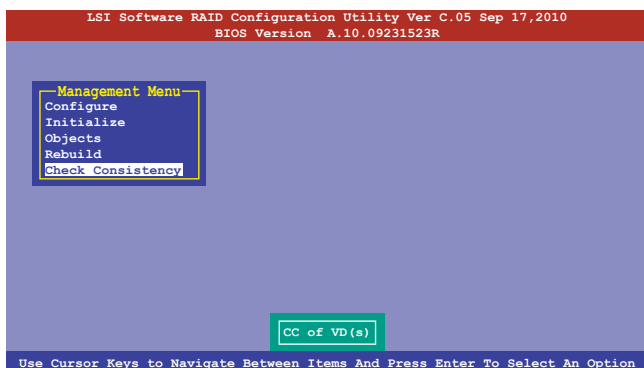


The Check Consistency command is available only for virtual drives included in a RAID 1 or RAID 10 set.

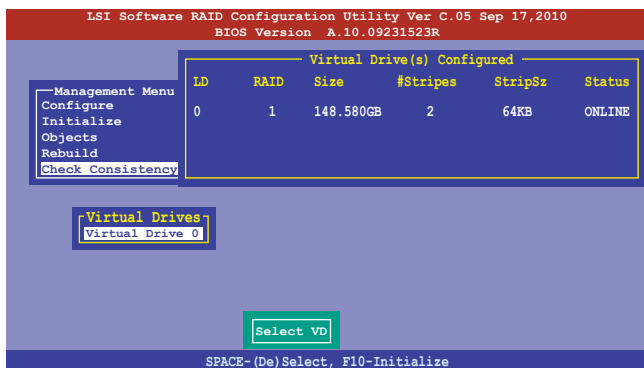
Using the Check Consistency Command

To check data consistency using the Check Consistency command

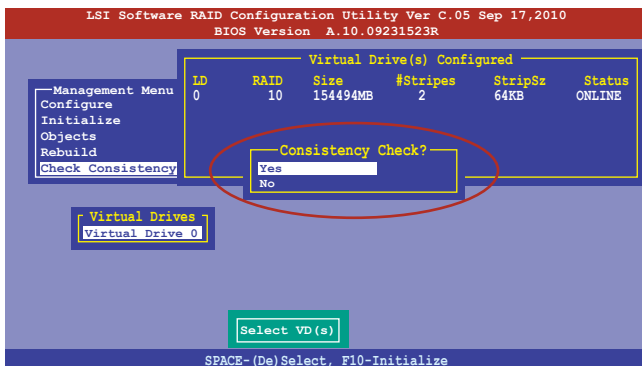
1. From the Management Menu, select Check Consistency, and then press <Enter>.



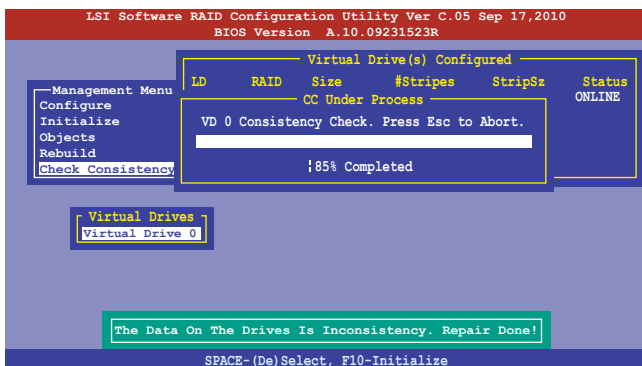
2. The screen displays the available RAID set(s) and prompts you to select the virtual drive to check. Press <Space> to select the virtual drive from the Virtual Drive sub-menu, and then press <F10>.



- When prompted, use the arrow keys to select Yes from the Consistency Check? dialog box, and then press <Enter>.



A progress bar appears on screen.



- While checking the disk consistency, press <Esc> to display the following options.
 - Stop - Stops the consistency check. The utility stores the percentage of disk checked, and when you restart checking, it continues from the last percentage completed rather than from zero percent.
 - Continue - Continues the consistency check.
 - Abort - Aborts the consistency check. When you restart checking, it continues from zero percent.
- When checking is complete, press any key to continue.

Using the Objects command

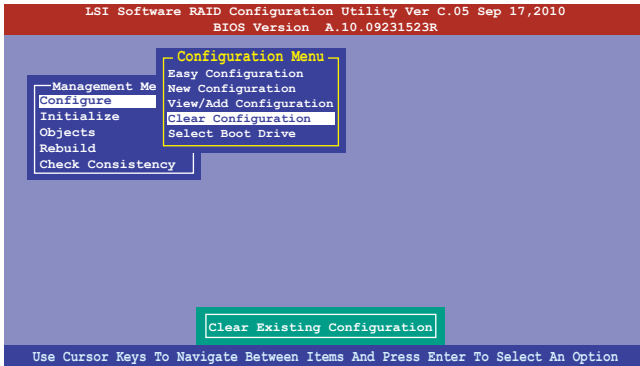
To check data consistency using the Objects command

1. From the Management Menu, select Objects, and then select Virtual Drive from the sub-menu.
2. Use the arrow keys to select the virtual drive you want to check, and then press <Enter>.
3. Select Check Consistency from the pop-up menu, and then press <Enter>.
4. When prompted, use the arrow keys to select Yes from the dialog box to check the drive.
5. When checking is complete, press any key to continue.

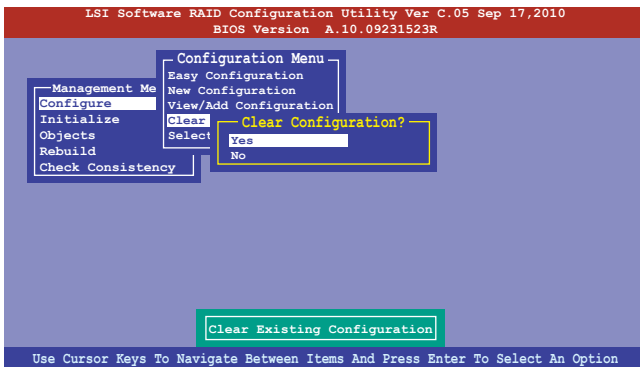
6.2.6 Deleting a RAID configuration

To delete a RAID configuration

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



2. When prompted, use the arrow keys to select Yes from the Clear Configuration? dialog box, and then press <Enter>.



The utility clears all the current array(s).

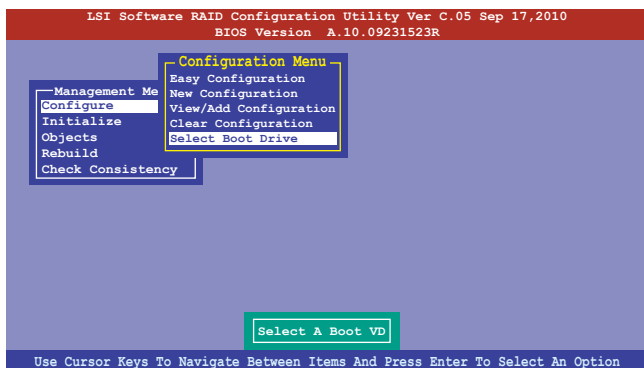
3. Press any key to continue.

6.2.7 Selecting the boot drive from a RAID set

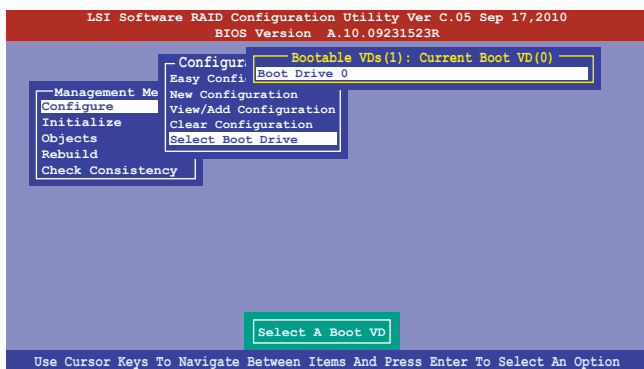
You must have created a new RAID configuration before you can select the boot drive from a RAID set. See section 6.2.1 Creating a RAID set: Using New Configuration for details.

To select the boot drive from a RAID set

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



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



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

6.2.8 Enabling WriteCache

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



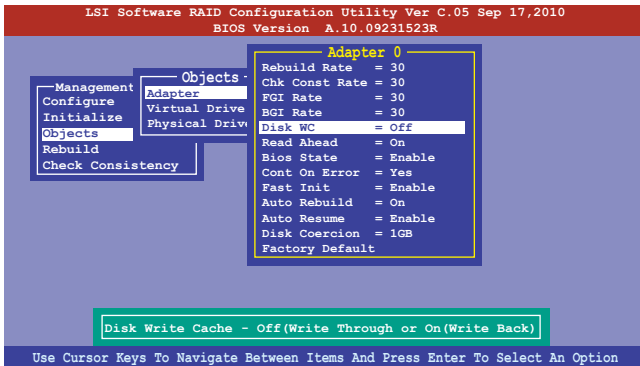
When you enable WriteCache, you may lose data when a power interruption occurs while transmitting or exchanging data among the drives.



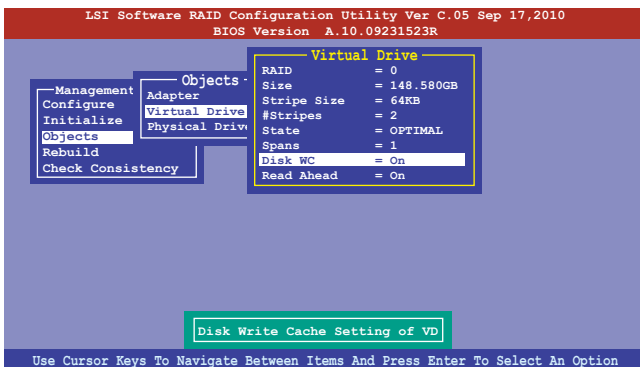
The WriteCache function is recommended for RAID 1 and RAID 10 sets.

To enable WriteCache

1. From the Management Menu, select Objects > Adapter, select an existing adapter, and then press <Enter> to display the adapter properties.
2. Select Disk WC, and then press <Enter> to turn on the option.



3. From the Management Menu, select Objects > Virtual Drive, select an existing adapter and press <Enter>. Select View/Update Parameters and press <Enter> to display the adapter properties.
4. Select Disk WC, and then press <Enter> to turn on the option.



5. When finished, press any key to continue.

6.3 Intel® Rapid Storage Technology enterprise SATA Option ROM Utility

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



Before you proceed, ensure that you have installed the Serial ATA hard disk drives, have set the correct jumper settings of the motherboard, and have set the correct SATA mode in the BIOS setup. You can refer to sections **6.1.2 Installing hard disk drives**, **6.1.3 Setting Jumpers**, and **6.1.4 Setting the RAID mode in BIOS** for more information.

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

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

```
Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]
1. Create RAID Volume      3. Reset Disks to Non-RAID
2. Delete RAID Volume     4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
None defined.

Physical Disks:
ID  Drive Model      Serial #              Size   Type/Status(Vol ID)
0   ST3300656SS      HWS0000991753TR      279.3GB Non-RAID Disk
1   ST3300656SS      37VN00009846RAJ1     279.3GB Non-RAID Disk
2   ST3300656SS      397600009846UEDY     279.3GB Non-RAID Disk
3   ST3300656SS      GWC50000991756G6     279.3GB Non-RAID Disk

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

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

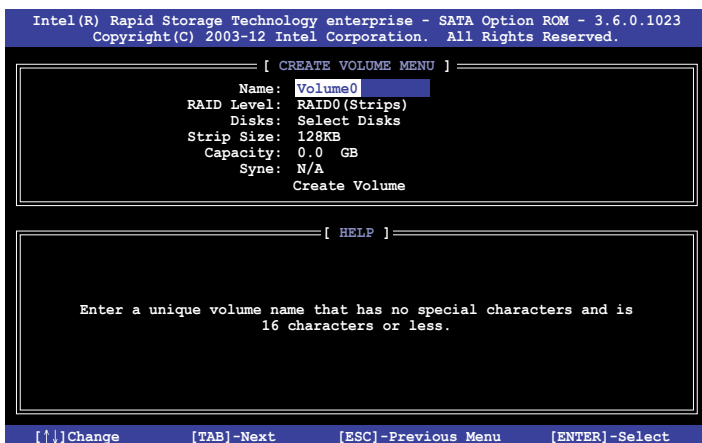


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

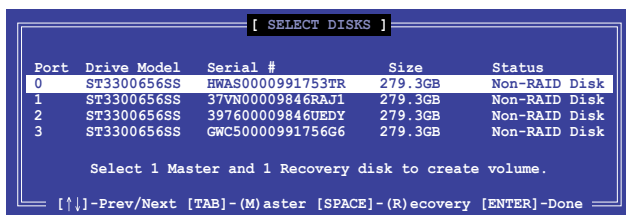
6.3.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select 1. Create RAID Volume and press <Enter>.
2. Key in a name for the RAID set and press <Enter>.



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.



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

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



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

7. In the Capacity field item, key in the RAID volume capacity that you want to use and press <Enter>. The default value field indicates the maximum allowed capacity.
8. Press <Enter> to start creating the RAID volume.
9. From the following warning message, press <Y> to create the RAID volume and return to the main menu, or press <N> to go back to the CREATE VOLUME menu.

WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.

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

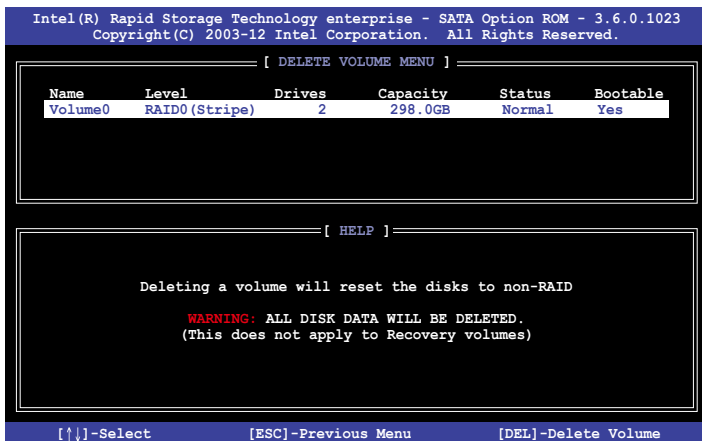
6.3.2 Deleting a RAID set



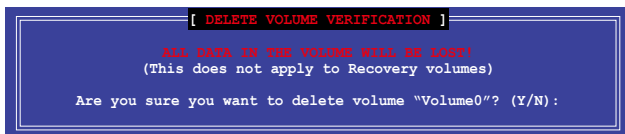
Take caution when deleting a RAID set. You will lose all data on the hard disk drives when you delete a RAID set.

To delete a RAID set:

1. From the utility main menu, select 2. Delete RAID Volume and press <Enter>.
2. From the Delete Volume Menu, press the up/down arrow keys to select the RAID set you want to delete then press .



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



6.3.3 Resetting disks to Non-RAID



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

To reset a RAID set:

1. From the utility main menu, select 3. Reset Disks to Non-RAID and press <Enter>.
2. Press the up/down arrow keys to select the drive(s) or disks of the RAID set you want to reset, then press <Space>. A small triangle before the Port number marks the selected drive. Press <Enter> when you are done.

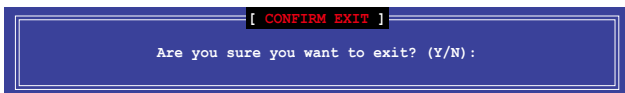


3. Press <Y> in the confirmation window to reset the drive(s) or press <N> to return to the utility main menu.

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

To exit the utility:

1. From the utility main menu, select 4. Exit then press <Enter>.
2. Press <Y> to exit or press <N> to return to the utility main menu.



6.3.5 Rebuilding the RAID



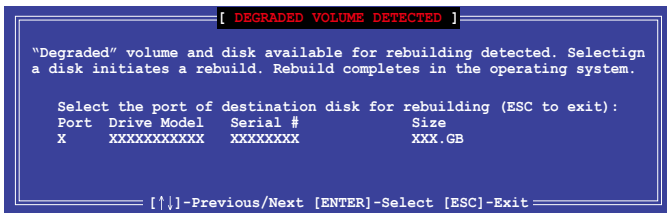
This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

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

To rebuild the RAID with other non-RAID disk:

1. During POST, press <Ctrl>+<I> at the prompt to enter the Intel Rapid Storage Technology option ROM utility.
2. If there is a non-RAID SATA Hard Disk available, the utility will prompt you to rebuild the RAID. Press the up/down arrow keys to select the destination disk then Press <Enter> to start the rebuilding process, or press <ESC> to exit.



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

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

```

Intel(R) Rapid Storage Technology enterprise - SATA Option ROM - 3.6.0.1023
Copyright(C) 2003-12 Intel Corporation. All Rights Reserved.

[ MAIN MENU ]

1. Create RAID Volume          3. Reset Disks to Non-RAID
2. Delete RAID Volume         4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
ID  Name      Levell   Strip    Size    Status  Bootable
1   Volume0   RAID1(Mirror)  N/A     149.0GB Rebuild  Yes

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

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

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

```

4. Press <Esc> to exit Intel Rapid Storage Technology and reboot the system.
5. Select Start > Programs > Intel Rapid Storage > Intel Rapid Storage Console or click the Intel Rapid Storage Technology tray icon to load the Intel Rapid Storage Manager utility.
6. From the View menu, select Advanced Mode to display the details of the Intel Rapid Storage Console.
7. From the Volumes view option, select RAID volume to view the rebuilding status. When finished, the status is changed to "Normal".

Rebuilding the RAID with a new hard disk

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

To rebuild the RAID with a new hard disk:

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



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

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

6.3.6 Setting the Boot array in the BIOS Setup Utility

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

To set the boot array in the BIOS:



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

1. Reboot the system and press to enter the BIOS setup utility during POST.
2. Go to the Boot menu and select the boot option priority.
3. Use up/down arrow keys to select the boot priority and press <Enter>. See the Boot menu section of Chapter 4 for more details.
4. From the Exit menu, select Save Changes & Exit, then press <Enter>.
5. When the confirmation window appears, select Yes, then press <Enter>.

6.4 Intel® Rapid Storage Technology enterprise (Windows)

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

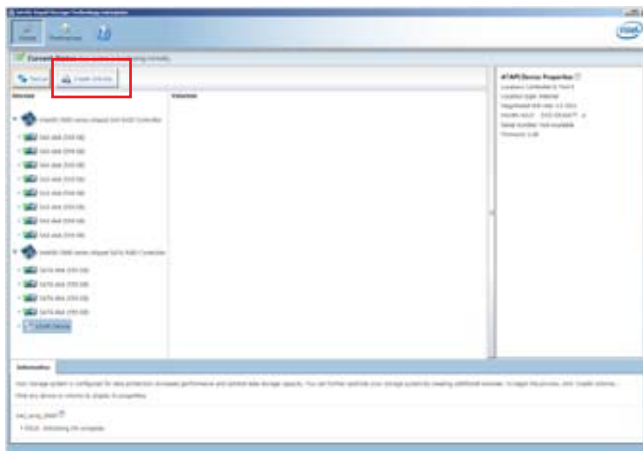


You need to manually install the Intel® Rapid Storage Technology enterprise utility on a Windows® operating system. Please refer to the installation instructions in Chapter 6.

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

1. Turn on the system to windows desktop.
2. Click the Intel® Rapid Storage Technology enterprise icon to display the main menu.

Your storage system is configured for data protection, increased performance and optimal data storage capacity. You can create additional volumes to further optimize your storage system.

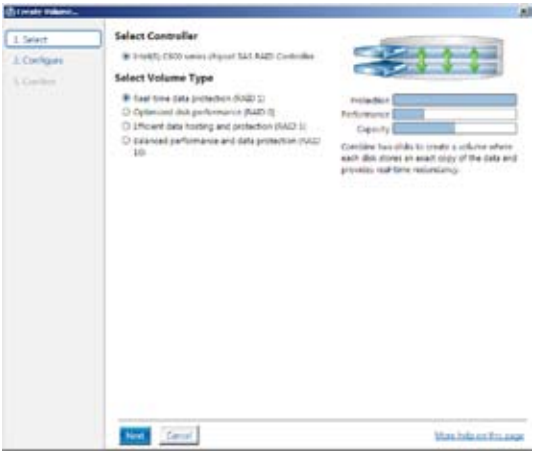


You can click Rescan to re-scan any attached hard disks.

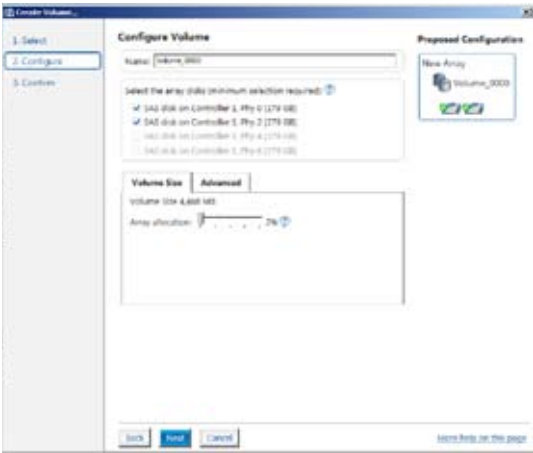
6.4.1 Creating a RAID set

To create a RAID set:

1. From the utility main menu, select Create Volume and select volume type.
2. Click Next.



3. Enter a name for the RAID set, then select the array disks.
4. Select Volume Size tab, you can drag the bar to decide the volume size.
5. Click Next.

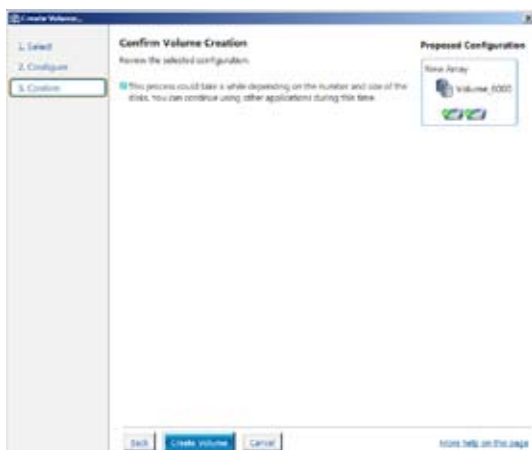


- If you do not want to keep the data on one of the selected disks, select NO when prompted.
- If you want to Enable volume write-back cache or Initialize volume, click Advanced.

6. Confirm the volume creation, 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.

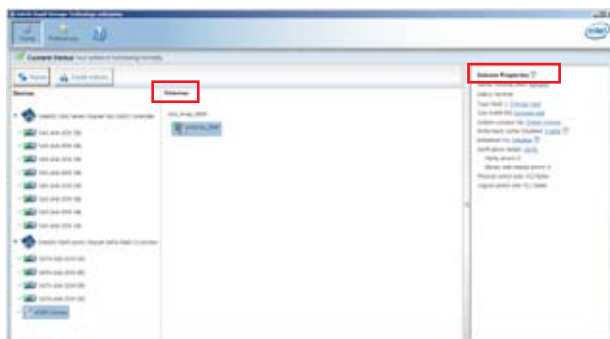


- Wait until the process is completed, then click OK when prompted.



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

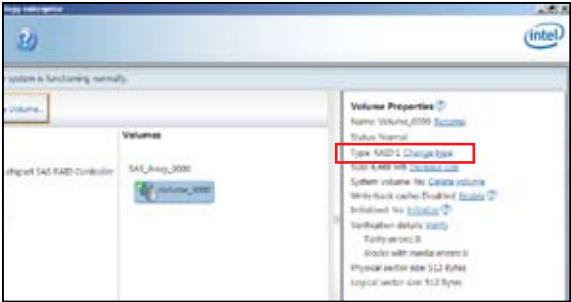
The RAID set is displayed in the Volumes list and you can change the settings in Volume Properties.



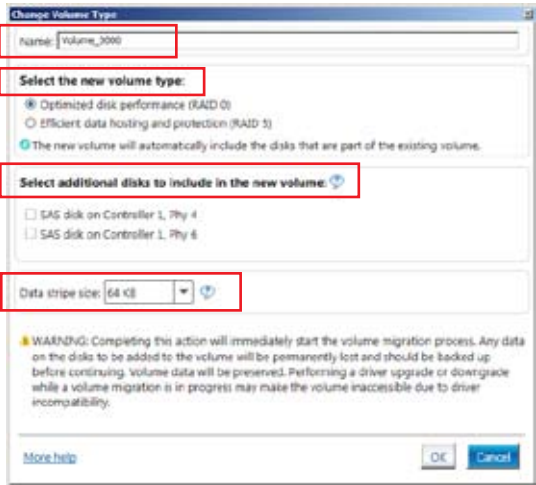
6.4.2 Changing a Volume Type

To change the volume type in Volume Properties:

1. Click the SATA array items you want to change in Volumes field.
2. From the Volume Properties field, select Type:RAID 1 Change type.



3. You can change the Name, Select the new volume type, and Select additional disks to include in the new volume if needed.
4. Select the Data stripe size for the RAID array (for RAID 0, 10 and 5 only), and click OK. The available stripe size values range from 4 KB to 128 KB. The following are typical values:
RAID 0: 128KB
RAID 10: 64KB
RAID 5: 64KB



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

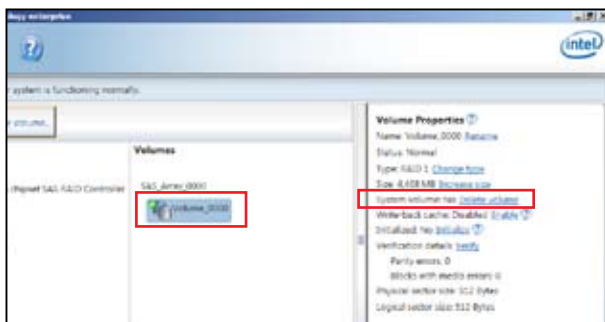
6.4.3 Deleting a volume



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

To delete a volume:

1. From the utility main menu, select the volume (exp. Volume_0000) in Volumes field you want to delete.



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

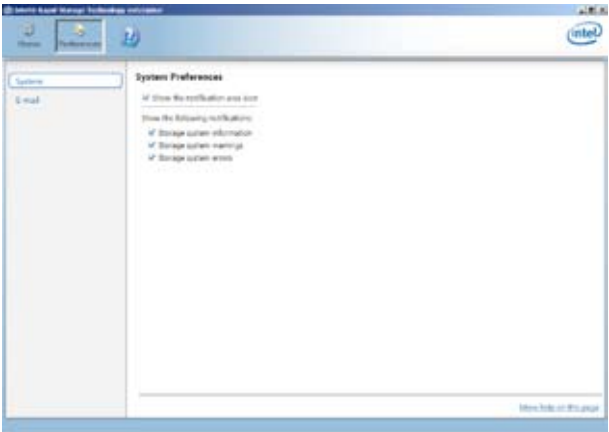


3. Click Yes to delete the volume and return to the utility main menu, or click No to return to the main menu.

6.4.4 Preferences

System Preferences

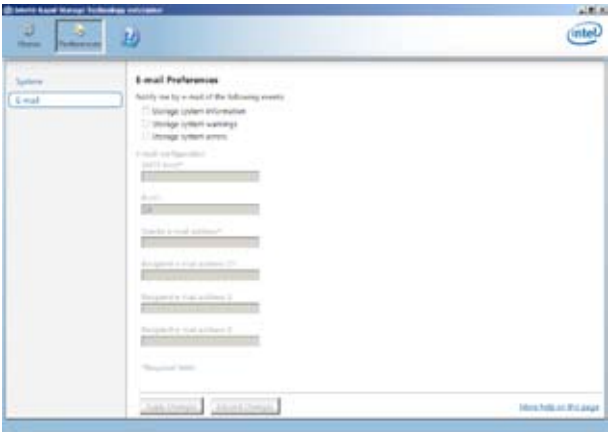
Allow you to set to show the notification area icon and show system information, warning, or errors here.



E-Mail Preferences

Allow you to set to sent e-mail of the following events:

- Storage system information
- Storage system warnings
- Storage system errors



[illegible]

Chapter 7

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

Driver installation

7.1 RAID driver installation

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

7.1.1 Creating a RAID driver disk



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

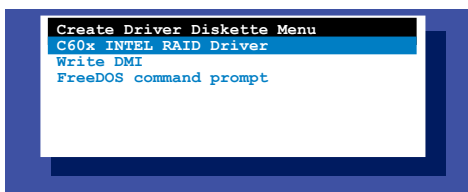


If you have created RAID sets with the LSI Software RAID configuration utility, the boot priority of the SATA optical disk drive has to be manually adjusted. Otherwise, the system will not boot from the connected SATA ODD.

A floppy disk with the RAID driver is required when installing Windows® XP / Server 2003 or Linux operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support DVD).

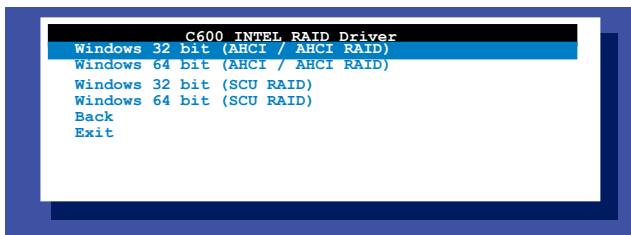
To create a RAID driver disk in DOS environment:

1. Place the motherboard support DVD in the optical drive.
2. Restart the computer, and then enter the BIOS Setup.
3. Select the optical drive as the first boot priority to boot from the support DVD. Save your changes, and then exit the BIOS Setup.
4. Restart the computer. The Makedisk menu appears.



5. Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

C60x INTEL RAID Driver



6. Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.
7. Press <Enter>.
8. Follow screen instructions to create the driver disk.

To create a RAID driver disk in Windows® environment

1. Start Windows®.
2. Place the motherboard support DVD into the optical drive.
3. Go to the Make disk menu, and then select the type of RAID driver disk you want to create.
4. Insert a floppy disk into the USB floppy disk drive.
5. Follow succeeding screen instructions to complete the process.



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

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

1. Insert a blank formatted high-density floppy disk to the USB floppy disk drive.
2. Type `dd if=XXX.img of=/dev/fd0` to decompress the file into the floppy disk from the following path in the support DVD:

For LSI MegaRAID Driver

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

3. Eject the floppy disk.

7.1.2 Installing the RAID controller driver

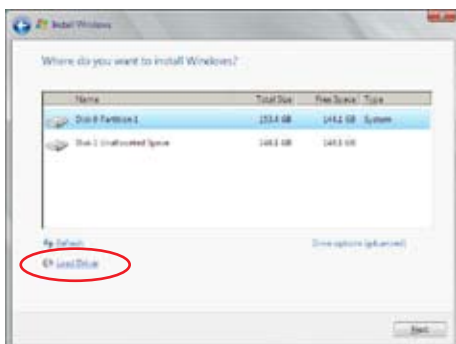
During Windows® Server 2008 OS installation

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

1. Boot the computer using the Windows® Server 2008 OS installation disc. Follow the screen instructions to start installing Windows® Server 2008.
2. When prompted to choose a type of installation, click Custom (advanced).



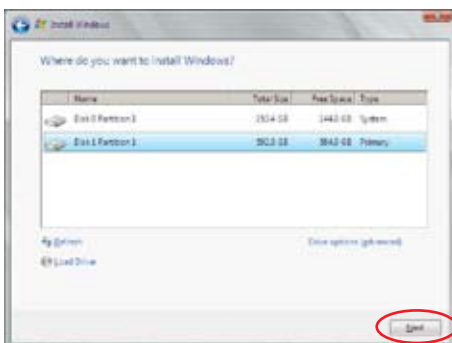
3. Click Load Driver.



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



5. Locate the driver in the corresponding folder of the Support DVD, 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. Setup then proceeds with the OS installation. Follow screen instructions to continue.

Red Hat® Enterprise Linux OS 5.6

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

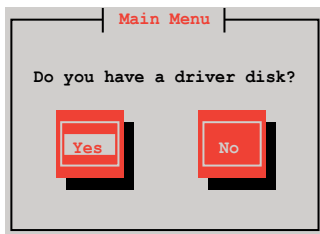
1. Boot the system from the Red Hat® OS installation CD.
2. At the boot:, type `linux dd noprobe=ata1 noprobe=ata2...`, then press <Enter>.



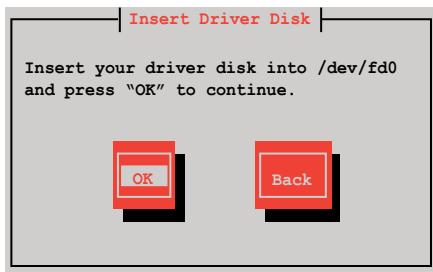
The number of ata varies with the hard disk drive number you have when building a RAID set. For example, if you want to build a RAID set with 6 hard disk drives, type command line: `linux dd noprobe=ata1 noprobe=ata2 noprobe=ata3 noprobe=ata4 noprobe=ata5 noprobe=ata6`.

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

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

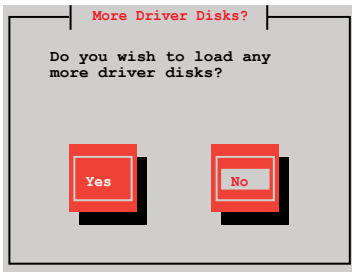


4. Insert the Red Hat® Enterprise RAID driver disk to the USB floppy disk drive, select **OK**, then press <Enter>.



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

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



6. Follow the onscreen instructions to finish the OS installation.
7. When the installation is completed, DO NOT click Reboot. Press <Ctrl> + <Alt> + <F2> to switch to the command-line interface from graphic user interface.
8. Type the following commands when using a legacy floppy.

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

Red Hat® Enterprise Linux OS 6.1

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

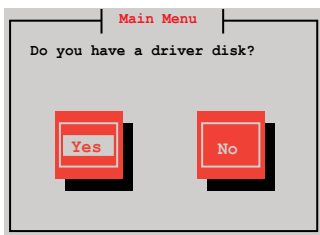
1. Boot the system from the Red Hat® OS installation CD.
2. Press <Tab> to edit options.



3. While booting from DVD, press <ESC> to give the third party driver. Enter the following command at the boot: `Linux dd blacklist=iscsi blacklist=ahci nodmraid`, then press <ENTER>.



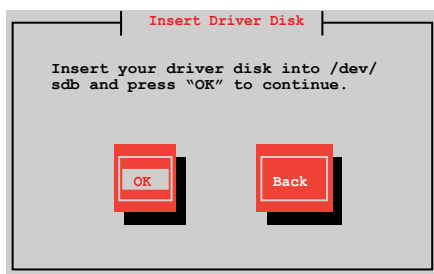
4. Select Yes using the <Tab> key when asked if you have the driver disk, then press <Enter>.



- 5 . You have multiple devices which could serve as source for a driver disk. Choose one you like to use and select OK, then press <Enter>.

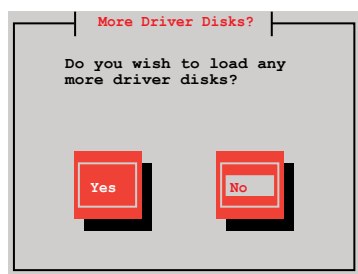


6. Insert the Red Hat® Enterprise RAID driver disk to the USB floppy disk drive, select OK, then press <Enter>.



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

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



8. Follow the onscreen instructions to finish the OS installation.

Preparing the Linux Driver

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

1. Copy the image file into the Linux system.

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

2. Create a folder.

Example: image

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

`mount -o loop [image file name] image`

Example: `mount -o loop megasr-15.00.0120.2012-1-sles11-ga-x86_64.img image`



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



5. Rename the 01 folder to CD Image.



Installing SUSE 11 Linux OS

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

1. Boot the system from the SUSE OS installation CD.
2. Use the arrow keys to select Installation from the Boot Options menu.



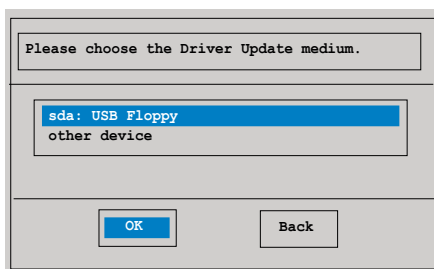
3. Press <F6>, then select Yes from the menu. Press <Enter>.



4. Use the USB drive to provide the third-party driver during the OS installation. Type the command `brokenmodules=ahci` in Boot Options field, and press <Enter>.



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



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

7.2 Intel® chipset device software installation

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

You need to manually install the Intel® chipset device software on a Windows operating system.

To install the Intel® chipset device software:

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.



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

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



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



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



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



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



7.3 Intel® Network Connections Software installation

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

You need to manually install the Intel® Network Connections Software on a Windows® operating system. To install the Intel® Network Connections Software:

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.



- Windows® automatically detects the LAN controllers and displays a New Hardware Found window. Click Cancel to close this window.
- 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 DVD.

3. Click the Intel® Network Connections Software to begin installation.



4. Click Install Drivers and Software option to begin installation.



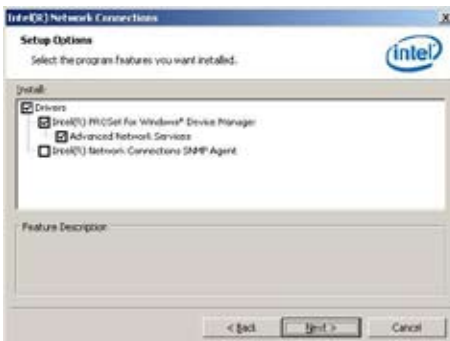
- Click Next when the Intel(R) Network Connections–InstallShield Wizard window appears.



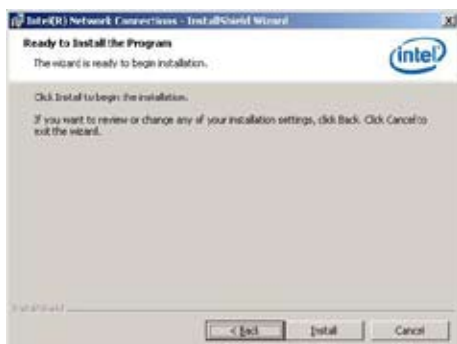
- Toggle I accept the terms in the license agreement and click Next to continue.



- Click the Intel(R) PROSet for Windows Device Manager box, and then click Next to start the installation.



8. Follow the screen instructions to complete installation.



9. When finished, press Finish to continue.



7.4 VGA driver installation

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

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

To install the ASPEED VGA driver:

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.



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

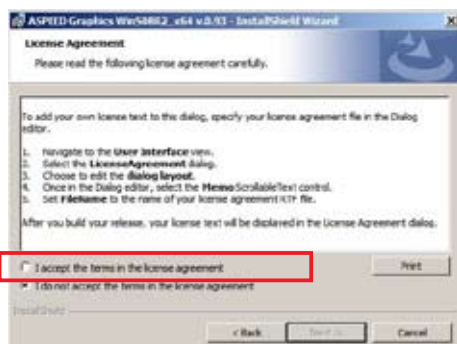
3. Click the ASPEED AST2300 Display Driver to begin installation.



4. When the ASPEED Graphics installation wizard appears, click Next to start the installation.



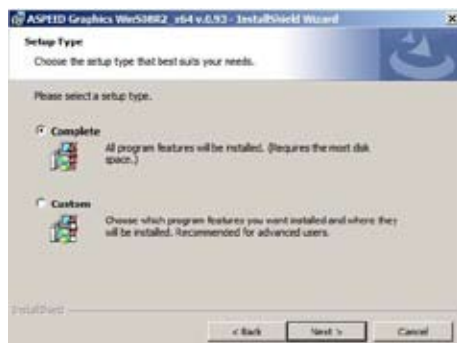
5. Toggle I accept the terms in the license agreement and click Next to continue.



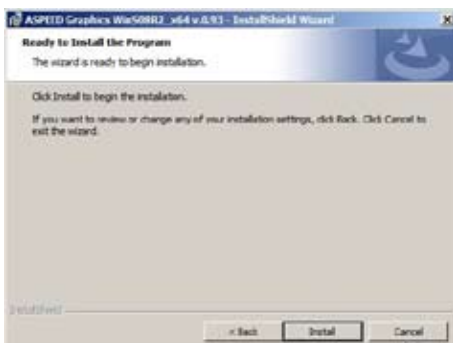
6. Enter the user information and click Next to continue.



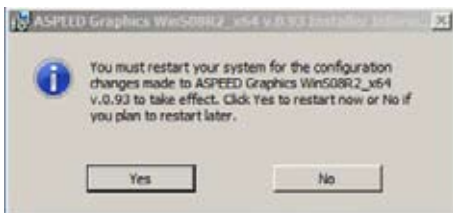
7. Select a setup type and click Next to continue.



8. Click Install to start driver installation.



9. When the installation completes, click Finish to restart your computer before using the program.



7.5 Installing the Intel® I350-AM4/I350-AM2/I210 Gigabit Adapter driver

This section provides the instructions on how to install the Intel® I350-AM4/I350-AM2/I210 Gigabit Adapter driver on the system.

To install the Intel® I350-AM4/I350-AM2/I210 Gigabit Adapter driver on Windows® Server 2008 R2:

1. Restart the computer.
2. Log on with Administrator privileges.
3. Insert the motherboard/system support DVD to the optical drive.



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

4. Click Intel® I350-AM4/I350-AM2/I210 Gigabit Adapter Driver in the Drivers menu of the main screen to start the installation.



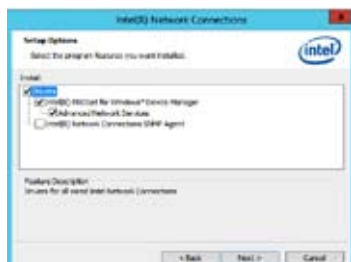
5. Click Next to continue.



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® I350-AM4/I350-AM2/I210 Gigabit Adapter driver on Windows® Server 2012:

1. Restart the computer.
2. Log on with Administrator privileges.
3. Insert the motherboard/system support DVD to the optical drive.

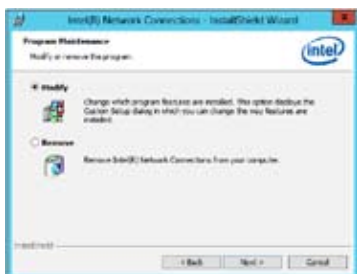


If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file **ASSETUP.EXE** from the **BIN** folder. Double-click the **ASSETUP.EXE** to run the support DVD.

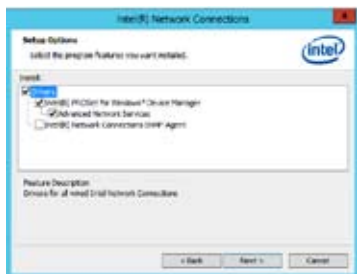
4. Click Intel® I350-AM4/I350-AM2/I210 Gigabit Adapter Driver in the Drivers menu of the main screen to start the installation.
5. Click Next to continue.



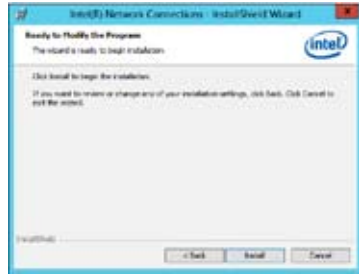
6. From the Program Maintenance window, select Modify then click Next.



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.

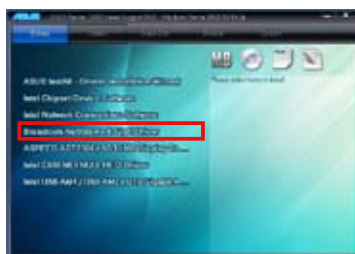


7.6 Installing the Broadcom 10G driver

This section provides instructions on how to install the Broadcom 10G driver on the system. You have to manually locate the driver for the Broadcom 10G in the support DVD provided.

To install the Broadcom 10G driver:

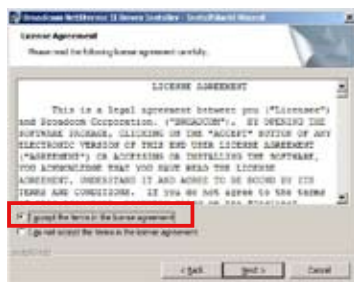
1. Restart the computer.
2. Log on with Administrator privileges.
3. Insert the motherboard/system support DVD into the optical drive.
4. Click the Broadcom NetXtreme II GigE Driver to begin installation.



5. From the Broadcom NetXtreme II Driver Installer window, click Next.



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



7. Click Install to start installing the drivers.



8. When done, click Finish.



7.7 Management applications and utilities installation

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



1. The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website (www.asus.com) for the latest updates on software and utilities.
2. The support DVD is supported on Windows® Server 2008 R2 and Windows® Server 2012.

7.8 Running the Support DVD

When you place the support DVD into the optical drive, the DVD automatically displays the main screen if Autorun is enabled in your computer. By default, the Drivers tab is displayed.



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

The main screen of the Support DVD contains the following tabs:

1. Drivers
2. Utilities
3. MakeDisk
4. Manual
5. Contact



The main screen of the Support DVD looks exactly the same on the Windows® Server 2008 R2 and on the Windows® Server 2012 Operating System (OS).

7.8.1 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.



7.8.2 Utilities menu tab

The Utilities menu displays the software applications and utilities that the motherboard supports.



7.8.3 **MakeDisk menu tab**

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



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



7.8.4 **Manual menu**

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

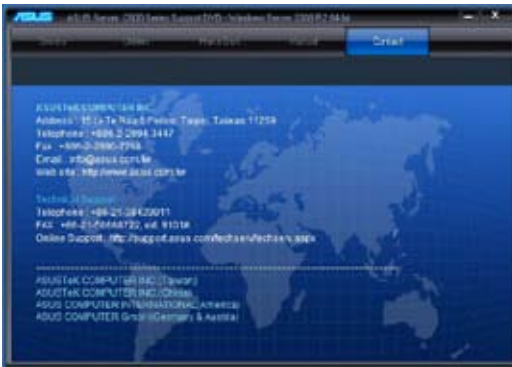


You need an internet browser installed in your OS to view the User Guide.



7.8.5 Contact information menu

The Contact menu displays the ASUS contact information, e-mail addresses, and useful links if you need more information or technical support for your motherboard.



7.9 Microsoft .NET Framework 3.5 SP1

This section provides the instructions on how to install the Microsoft .NET Framework 3.5 SP1 software on the system.

You need to manually install the Intel® Microsoft .NET Framework 3.5 SP1 software on a Windows operating system.

To install the drivers:

1. Restart the computer, and then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive, and find the utility menu.
3. Click the item Microsoft .NET Framework 3.5 SP1 software from the menu, and then follow the onscreen instructions to complete the installation.



5. Read the Warning message and click Next to continue.



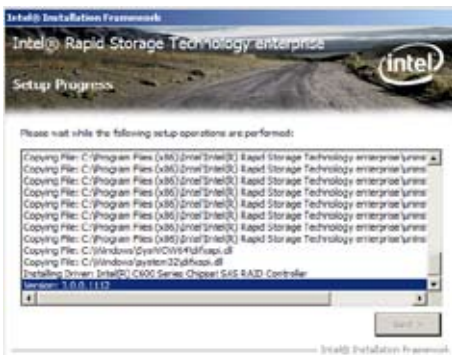
6. Read the License Agreement and click Yes to continue.



7. Read the Readme File Information and click Next to continue.



8. After completing the installation, click **Next** to complete the setup process.



9. Select **Yes, I want to restart my computer now** and click **Finish** to restart your computer before using the program.



ASUS contact information

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Technical Support

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Technical Support

Support fax +1-812-284-0883
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Online Support <http://support.asus.com/techserv/techserv.aspx>

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