

ASUS[®]

RS700DA-E6/PS4

RS704DA-E6/PS4

*1U Rackmount Server
User Guide*



E6166

Second Edition (V2)

October 2010

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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, contact a qualified service technician or your dealer. Ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you service.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your dealer.

Operation Safety

- Servicing of this product or units is to be performed by trained service personnel only.
- Before operating the server, carefully read all the manuals included with the server package.
- Before using the server, make sure all cables are correctly connected and the power cables are not damaged. If any damage is detected, contact your dealer as soon as possible.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Place the server on a stable surface.



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

Lithium-Ion Battery Warning

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

CD-ROM Drive Safety Warning

CLASS 1 LASER PRODUCT

Heavy System

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



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



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

About this guide

Audience

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

Contents

This guide contains the following parts:

1. Chapter 1: Product 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 the optional components and devices into the barebone server.

4. Chapter 4: Motherboard information

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

5. Chapter 5: BIOS information

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

6. Chapter 6: RAID configuration

This chapter 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 make sure that you perform certain tasks properly, take note of the following symbols used throughout this manual.



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1+Key2+Key3>

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

Example: <Ctrl+Alt+Del>

Command

Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.

Example: At the DOS prompt, type the command line: **format A:/S**

References

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

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

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

2. **ASUS websites**

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

Chapter 1

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



ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

Product introduction

1.1 System package contents

Check your system package for the following items.

Model Name	RS700DA-E6/PS4	RS704DA-E6/PS4
Chassis	ASUS R12C 1U Rackmount Chassis	
Motherboard	2 x ASUS KGNH-D16 Server Board	2 x ASUS KGMH-D16/QDR Server Board
Component	1 x 1400W Easy Swap Single Power Supply 4 x Hot-swap 3.5" HDD trays (by region) 1 x SAS/SATA2 Backplane (ASUS BP4LX-R12C) 2 x PCI Riser Card (ASUS RE16R-R12B) 2 x Front I/O Board (ASUS FPB-AR14) 1 x Power Supply Power Distribution Board (ASUS PDB-R12C) 8 x System Fans (40mm x 56mm)	
Accessories	1 x RS700DA-E6/PS4, RS704DA-E6/PS4 User's Guide 1 x ASUS ASWM 2.0 User's Guide 1 x RS700DA-E6/PS4, RS704DA-E6/PS4 Support CD (including ASWM*) 1 x Mellanox driver disc (RS704DA-E6/PS4 only**) 1 x Bag of Screws 1 x AC Power Cable 1 x Friction Rail Kit	
Optional Items	CPU Heatsink (by region) ASUS ASMB4-iKVM Remote management card ASUS PIKE Riser Card (RE16R-R12B-PIKE) ASUS PIKE RAID Card Anti-virus Software CD Semi-ball Bearing Rail Kit	

* ASUS System Web-based Management

** The Mellanox driver is included in the motherboard support DVD or in an individual driver disc, depending on the shipping sequence. This is subjected to change without notice.



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

1.2 Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the product's serial number containing 12 characters such as xxS0xxxxxxx 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 RS700DA-E6/PS4 is a 1U barebone server system featuring the ASUS KGNH-D16 server board. The ASUS RS704DA-E6/PS4 is a 1U barebone server system featuring the ASUS KGMH-D16/QDR server board. The servers support AMD® Socket G34 (LGA1944) Opteron™ 6100 series processors, plus other latest technologies through the chipsets onboard.

Model Name		RS700DA-E6/PS4	RS704DA-E6/PS4
Processor / System Bus		2 x Socket G34 (LGA1944) per Node	
		8/12 Core AMD® Opteron™ 6100 Series (up to ACP: 85W)	
		HyperTransport™ Technology 3.0, 6.4 GT/s per link (dual link)	
Core Logic		<ul style="list-style-type: none"> - AMD® SR5650 - AMD® SP5100 	<ul style="list-style-type: none"> - AMD® SR5670 - AMD® SP5100 - Infiniband MT25408B0-FCC-QIS
Memory	Total Slots	16 DIMMs per Node (4-channel per CPU, 8 DIMMs per CPU)	
	Capacity	Maximum up to 256GB (RDIMM) per Node Maximum up to 64GB (UDIMM) per Node	
	Memory Type	DDR3 800 / 1066 / 1333 UDIMM with ECC / non-ECC DDR3 800 / 1066 / 1333 RDIMM	
	Memory Size	1GB, 2GB, 4GB, 8GB and 16GB (RDIMM) 1GB, 2GB and 4GB (UDIMM)	
Expansion Slots	Total PCI/PCI-X/PCI-E Slots	1 per Node	
	Slot Type	1 x PCI-E 2.0 x16 slot (x16 link) (Low profile / HL) per Node	
Storage	SATA Controller	AMD SP5100: 6 x SATA2 300MB/s ports PROMISE® RAID (for Linux/Windows, supports RAID 0, 1, 10, 5)	
	SAS Controller	Optional: ASUS PIKE 1064E 4-port SAS RAID card* ASUS PIKE 1078 8-port SAS HW RAID card* ASUS PIKE 2008 8-port SAS2 6G RAID card* ASUS PIKE 2008/IMR 8-port SAS2 6G RAID card* * Must installed on the optional ASUS PIKE Riser Card	
HDD Bays	I = internal A or S will be hot-swappable	2 x Hot-swap 3.5" HDD Bays per Node (Total 4 x 3.5" HDD in 1U)	
Networking	LAN	2 x Intel® 82574L PCIe GbE LAN + 1 x Mgmt LAN per Node	2 x Intel® 82574L PCIe GbE LAN + 1 x Mgmt LAN per Node 1 x Single Port Mellanox ConnectX QDR InfiniteBand with QSFP interface
		Graphic	VGA

(continued on the next page)

Model Name		RS700DA-E6/PS4	RS704DA-E6/PS4
Onboard I/O		Per Node: - 3 x RJ-45 ports (1 for ASMB4-iKVM) - 3 x USB 2.0 ports (Front x 1, Rear x 2) - 1 x VGA port - 1 x Internal A-type USB Port	Per Node: - 3 x RJ-45 ports (1 for ASMB4-iKVM) - 3 x USB 2.0 ports (Front x 1, Rear x 2) - 1 x VGA port - 1 x Internal A-type USB Port - 1 x QSFP Port
OS Support		Windows® Server 2008 R2 Windows® Server 2008 Enterprise 32 / 64-bit Windows® Server 2003 R2 Enterprise 32 / 64-bit RedHat® Enterprise Linux AS5.0 32 / 64-bit SuSE® Linux Enterprise Server 10 32 / 64-bit (Subject to change without any notice)	
Anti-virus Software		Optional CA® eTrust™ 7.1 anti-virus software	
Management Solution	Out of Band Remote Hardware	Optional ASMB4-iKVM for KVM-over-IP support	
	Software	ASUS ASWM 2.0	
Dimension (HH x WW x DD)		712mm x 444mm x 43.6mm (1U)	
Net Weight Kg (CPU, DRAM & HDD not inclu ded)		18 Kg	
Power Supply		1400W (80+) Single Power Supply (Gold-Level)	
Power Rating		100–140Vac/180–240Vac, 13.5–9.5A/9.5–7.0A, 50–60Hz	
Environment		Operation temperature: 10°C–35°C Non operation temperature: -40°C–70°C Non operation humidity: 20%–90% (Non-condensing)	

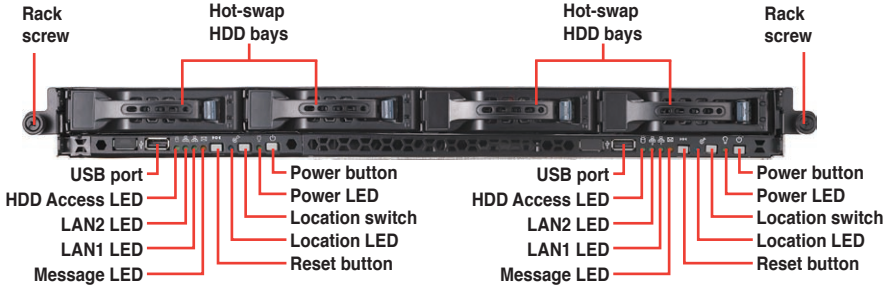
*Specifications are subject to change without notice.

1.4 Front panel features

The barebone server displays a simple yet stylish front panel with easily accessible features. The power and reset buttons, LED indicators, and USB port for each Node are located on the front panel.



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



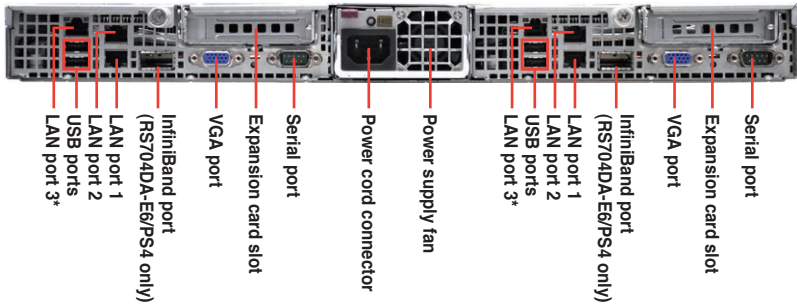
Turn off the system power and detach the power supply before removing or replacing any system component.

1.5 Rear panel features

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



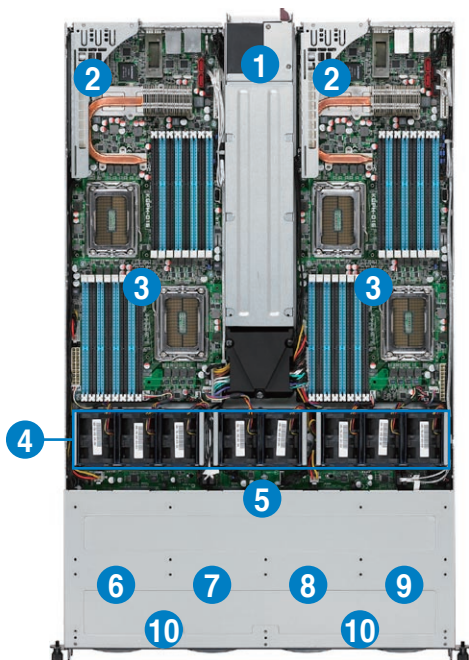
The ports for the USB, VGA, and Gigabit LANs do not appear on the rear panel if the motherboards are not present.



* These ports are for ASUS ASMB4-iKVM controller cards only.

1.6 Internal features

The barebone server includes the basic components as shown.



1. Power supply and power fan
2. PCI Express x16 slot Riser Cards (at x16 link)
3. ASUS KGHN-D16 server board (RS700DA-E6/PS4); ASUS KGMH-D16/QDR server board (RS704DA-E6/PS4)
4. System fans
5. SATA/SAS backplane (hidden)
- 6/7. Hot-swap HDD tray 1/2—Connect to SATA port 1/2 of Left-System.
- 8/9. Hot-swap HDD tray 3/4—Connect to SATA port 1/2 of Right-System.
10. Front I/O boards (hidden)



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



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.

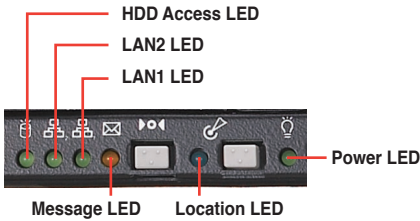


The barebone server does not include a floppy disk drive and an optical disc drive. Connect a USB floppy disk drive or a USB ODD to any of the USB ports on the front or rear panel if you need to use a floppy disk or an optical disc.

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

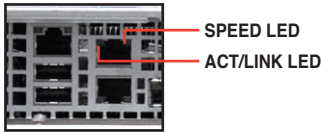
1.7 LED information

1.7.1 Front panel LEDs



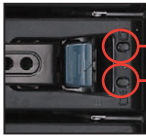
LED	Icon	Display status	Description
Power LED	💡	ON	System power ON
HDD Access LED	💿	OFF	No activity
		Blinking	Read/write data into the HDD
Message LED	✉	OFF	System is normal; no incoming event
		ON	1. Without ASMB4-iKVM installed: CPU over-heated 2. With ASMB4-iKVM installed: a hardware monitor event is indicated
Location LED	📍	OFF	Normal status
		ON	Location switch is pressed (Press the location switch again to turn off)
LAN LEDs	📶 1 2	OFF	No LAN connection
		Blinking	LAN is transmitting or receiving data
		ON	LAN connection is present

1.7.2 LAN (RJ-45) LEDs



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

1.7.3 HDD status LED



HDD Power / Fail Status LED (Green/Red)

HDD Activity LED (Green)

LED	LED Status	Description
HDD Power / Fail Status LED	Green Light ON	Power ON (Detection HDD Present)
	Red Light ON	RAID HDD Failed (HDD plug-in ready but detection error)
	Green / Red Blinking	RAID Rebuilding
	OFF	HDD Not Found
HDD Activity LED	Green Blinking	Data Read / Write to HDD

Chapter 2

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



ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

Hardware setup

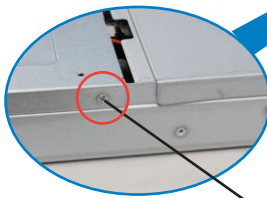
2.1 Chassis cover

Removing the rear cover

1. Loosen the two thumbscrews on the rear panel to release the rear cover from the chassis.



2. Remove the front side screws, and then firmly hold the cover and slide it toward the rear panel for about half an inch until it is disengaged from the chassis.



Front side screw

3. Lift the cover from the chassis.
4. To recover the rear cover, reverse step 1 to 3.



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



2.2 Central Processing Unit (CPU)

The motherboard comes with dual surface mount LGA 1944 Socket designed for the AMD® Opteron™ 6100 series CPU in the Land Grid Array (LGA) package.



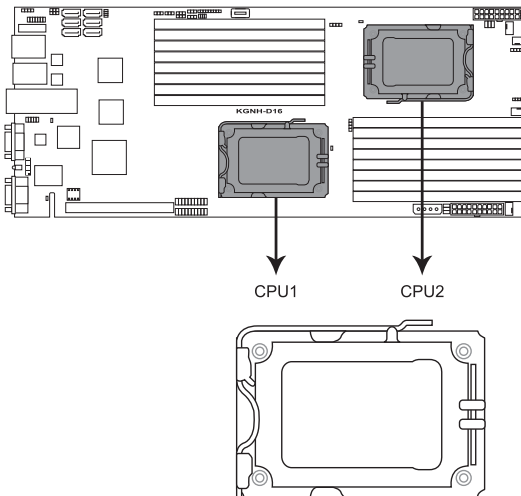
- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS shoulders the repair cost only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the Socket 1944.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.2.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

KGN(M)H-D16 Series CPU LGA1944 Socket

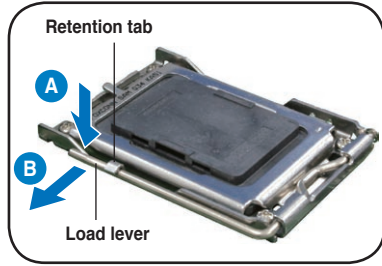


Before installing the CPU, ensure that the socket box is facing towards you and the load lever is on your left.

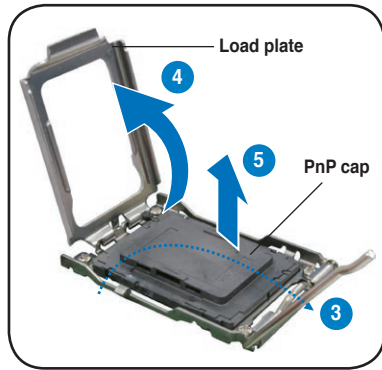
2. Press the load lever with your thumb (A), then move it to the left (B) until it is released from the retention tab.



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



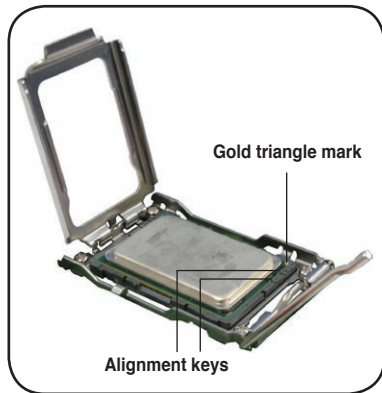
3. Lift the load lever in the direction of the arrow to a 135° angle.
4. Lift the load plate with your thumb and forefinger to a 100° angle.
5. Remove the PnP cap from the CPU socket.



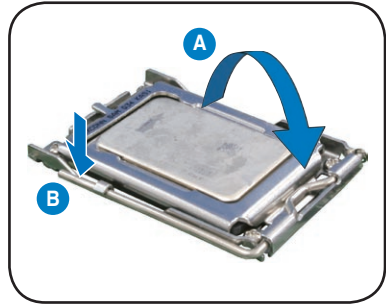
6. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-right corner of the socket, and then fit the socket alignment key into the CPU notch.



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. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.

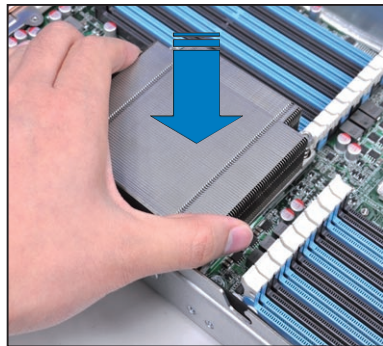


Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer. Some heatsinks come with pre-applied Thermal Interface Material. If so, skip this step.

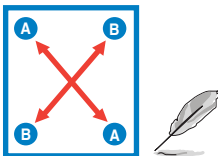
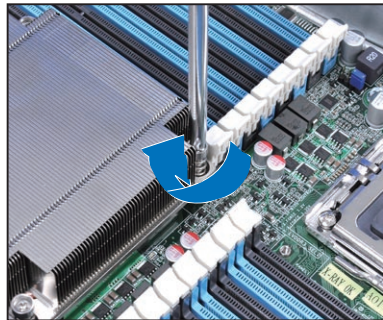
2.2.2 Installing the CPU heatsink and airduct

To install the CPU heatsink:

1. Place the heatsink on top of the installed CPU, ensuring that the four fasteners match the holes on the motherboard.



2. Twist each of the four screws with a Philips (cross) screwdriver just enough to attach the heatsink to the motherboard. When the four screws are attached, tighten them one by one to completely secure the heatsink.



Tighten the four heatsink screws in a diagonal sequence.

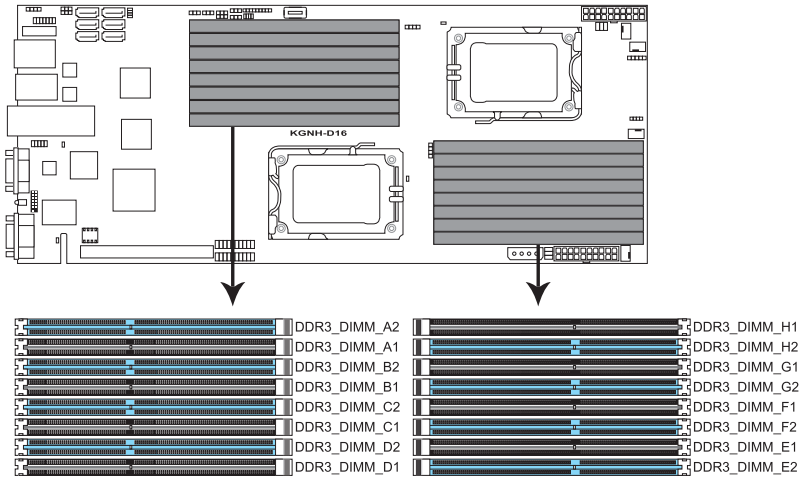
2.3 System memory

2.3.1 Overview

The motherboard comes with sixteen (16) Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the DDR3 DIMM sockets:

KG(N)H-D16 Series 240-pin DDR3 DIMM sockets



2.3.2 Memory Configurations

You may install 1 GB, 2 GB, 4 GB, 8GB and 16GB registered DDR3 DIMMs or 1 GB, 2 GB, and 4 GB ECC/non-ECC, unbuffered DDR3 DIMMs into the DIMM sockets using the memory configurations in this section.

Memory population table

For UDIMM (Single Rank, Dual Ranks)																
CPU 1 Configuration																
	A2	A1	B2	B1	C2	C1	D2	D1	-	-	-	-	-	-	-	
2 DIMMs	●				●											
4 DIMMs	●		●		●		●									
6 DIMMs	●	●	●		●	●	●									
8 DIMMs	●	●	●	●	●	●	●	●								
CPU 1 + 2 Configuration																
	A2	A1	B2	B1	C2	C1	D2	D1	E2	E1	F2	F1	G2	G1	H2	H1
2 DIMMs	●								●							
4 DIMMs	●				●				●				●			
6 DIMMs	●		●		●				●		●		●			
8 DIMMs	●		●		●		●		●		●		●		●	
10 DIMMs	●	●	●		●		●		●	●	●		●		●	
12 DIMMs	●	●	●		●	●	●		●	●	●		●	●	●	
14 DIMMs	●	●	●	●	●	●	●		●	●	●	●	●	●	●	
16 DIMMs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

For RDIMM (Single Rank, Dual Ranks & Quad Ranks)																
CPU 1 Configuration																
	A2	A1	B2	B1	C2	C1	D2	D1	-	-	-	-	-	-	-	
2 DIMMs	●				●											
4 DIMMs	●		●		●		●									
6 DIMMs	●	●	●		●	●	●									
8 DIMMs	●	●	●	●	●	●	●	●								
CPU 1 + 2 Configuration																
	A2	A1	B2	B1	C2	C1	D2	D1	E2	E1	F2	F1	G2	G1	H2	H1
2 DIMMs	●								●							
4 DIMMs	●				●				●				●			
6 DIMMs	●		●		●				●		●		●			
8 DIMMs	●		●		●		●		●		●		●		●	
10 DIMMs	●	●	●		●		●		●	●	●		●		●	
12 DIMMs	●	●	●		●	●	●		●	●	●		●	●	●	
14 DIMMs	●	●	●	●	●	●	●		●	●	●	●	●	●	●	
16 DIMMs	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●



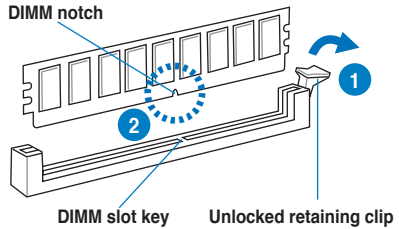
-
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
 - For CPU1, install DIMMs to the blue slots in the order of: DIMM_A2 -> DIMM_C2 -> DIMM_B2 -> DIMM_D2. For CPU1+CPU2, install DIMMs to the blue slots in the order of: DIMM_A2 -> DIMM_E2 -> DIMM_C2 -> DIMM_G2.
 - For Quad Rank DIMMs, when installing less than or equal to four DIMMs, install them to the blue slots in the order of: DIMM_A2 -> DIMM_C2 -> DIMM_B2 -> DIMM_D2. For CPU1+CPU2, install DIMMs to the blue slots in the order of: DIMM_A2 -> DIMM_E2 -> DIMM_C2 -> DIMM_G2.
 - For Quad Rank DIMMs, when installing more than four DIMMs, install them to the blue slots in the order of: DIMM_A2 -> DIMM_C2 -> DIMM_B2 -> DIMM_D2 -> DIMM_A1 -> DIMM_C1 -> DIMM_B1 -> DIMM_D1. For CPU1+CPU2, install them to the blue slots in the order of: DIMM_A2 -> DIMM_E2 -> DIMM_C2 -> DIMM_G2 -> DIMM_B2 -> DIMM_F2 -> DIMM_D2 -> DIMM_H2 -> DIMM_A1 -> DIMM_E1 -> DIMM_C1 -> DIMM_G1 -> DIMM_B1 -> DIMM_F1 -> DIMM_D1 -> DIMM_H1.
-

2.3.3 Installing a DIMM



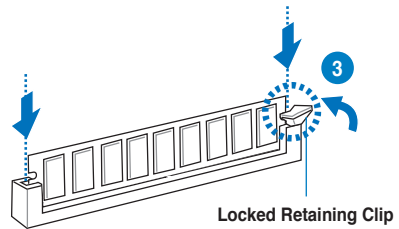
Ensure to unplug the power supply before adding or removing DIMMs or other system components. Failure to do so may cause severe damage to both the motherboard and the components.

1. Unlock a DIMM socket by pressing the retaining 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.

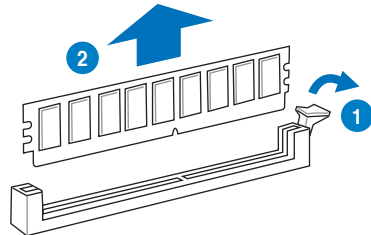
3. Hold the DIMM by both of its ends, then insert the DIMM vertically into the socket. Apply force to both ends of the DIMM simultaneously until the retaining clip snaps back into place, and the DIMM cannot be pushed in any further to ensure proper sitting of the DIMM.



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

2.3.4 Removing a DIMM

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

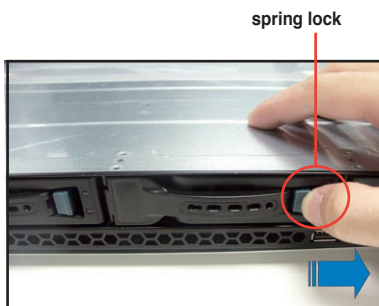


2.4 Hard disk drives

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

To install a hot-swap SATAII/SAS HDD:

1. Release a drive tray by pushing the spring lock to the right, then pulling the tray lever outward. The drive tray ejects slightly after you pull out the lever.



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



3. Take note of the drive tray holes. Each side has three holes to fit different types of hard disk drives. Use two screws on each side to secure the hard disk drive.



4. Place a SATAII/SAS hard disk drive on the tray, then secure it with four screws.



- Carefully insert the drive tray and push it all the way to the depth of the bay until just a small fraction of the tray edge protrudes.



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

- Push the tray lever until it clicks, and secures the drive tray in place. The drive tray is correctly placed when its front edge aligns with the bay edge.
- Repeat steps 1 to 6 if you wish to install a second SATAII/SAS drive.



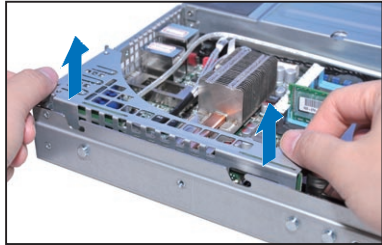
2.5 Expansion slot

2.5.1 Installing an expansion card to the riser card bracket

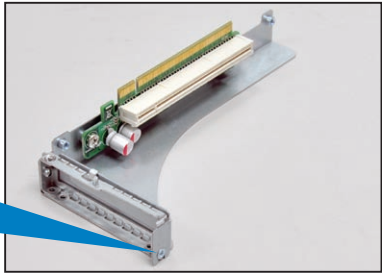
The barebone server comes with a riser card bracket. You need to remove the bracket if you want to install PCI Express x16 expansion cards.

To install a PCI Express x16 card

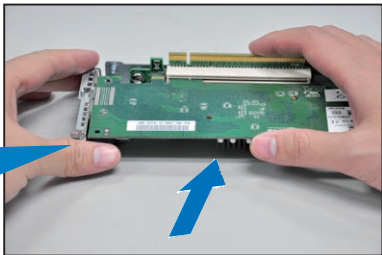
1. Firmly hold the riser card bracket, and then pull it up to detach it from the PCI Express x16 slot on the motherboard.



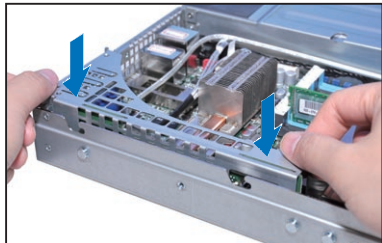
2. Place the riser card bracket on a flat and stable surface, and then remove the screw from the slot bay.



3. Install a PCI Express x16 card to the bracket as shown, and then secure the card with a screw.



4. Press the riser card bracket until the golden connectors completely fit the slot and the bracket aligns with the rear panel.
5. Connect the cable(s) to the card, if applicable.



2.5.2 Configuring an expansion card

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

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

Standard Interrupt assignments

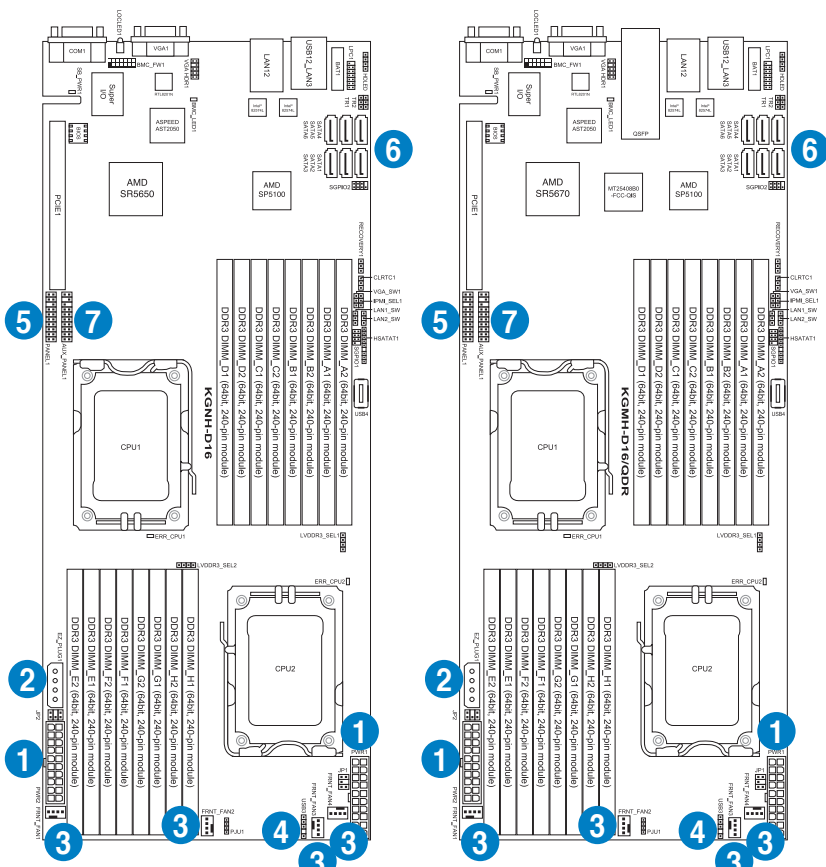
IRQ	Priority	Standard function
0	1	System Timer
1	2	Keyboard Controller
2	-	Programmable Interrupt
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering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

* These IRQs are usually available for ISA or PCI devices.

2.6 Cable connections



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



Pre-connected system cables

- 20-pin proprietary power connector (from power supply to motherboard)
- 4-pin proprietary power connector (from motherboard to backplane board)
- System fan connectors (from motherboard FRNT_FAN1, FRNT_FAN2, FRNT_FAN3 and FRNT_FAN4 to system fans)
- USB connector (from motherboard to front I/O board via backplane board)
- Panel connector (from motherboard to front I/O board via backplane board)
- SATA connectors (from motherboard to SATAII/SAS backplane board)
- Auxiliary panel connector (from motherboard to front I/O board via backplane board)

2.7 Removable/optional components

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

1. System fans
2. Power supply units
3. ASUS ASMB4-iKVM (optional)
4. ASUS PIKE Riser card (optional)

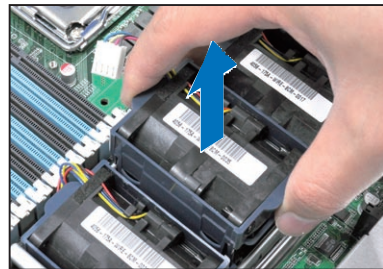
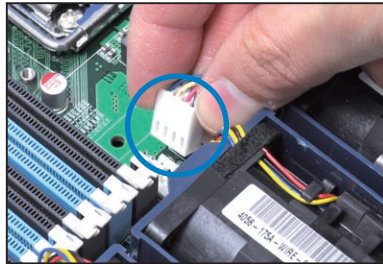


Ensure that the system is turned off before removing any components.

2.7.1 Replacing system fans

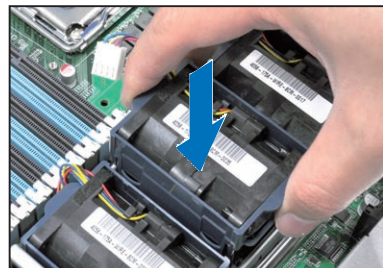
To uninstall the system fans:

1. Disconnect the system fan cable from the fan connector on the motherboard.
2. Lift the fan, and then set aside.
3. Repeat step 1 to 2 to uninstall the other system fans.

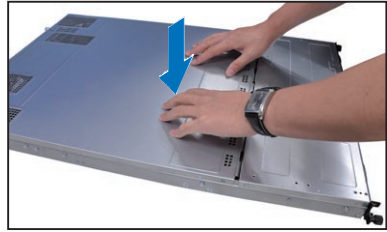


To reinstall the system fans

1. Insert the fan to the fan cage. The airflow directional arrow on the fan side should point towards the system rear panel.
2. Connect the system fan cable to the fan connector on the motherboard.



3. Recover the rear cover. Press down gently on the location above the system fans to ensure proper fan installation, as shown in the right figure.

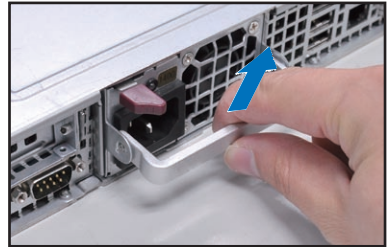


2.7.2 Replacing power supply units

Follow the steps below to replace the failed power supply unit (PSU).

To remove the failed PSU

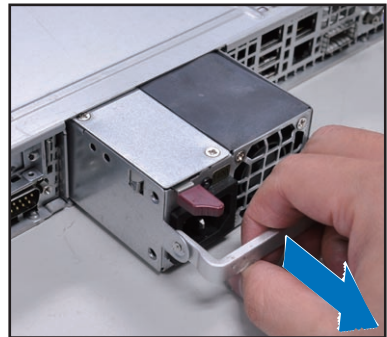
1. Lift up the PSU lever.



2. Hold the PSU lever and press the PSU latch.



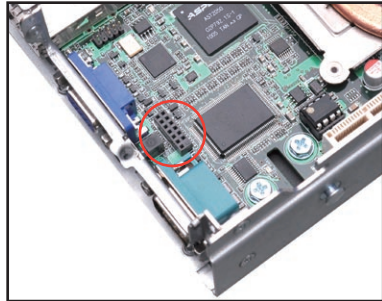
3. Firmly pull the failed PSU out of the server chassis.



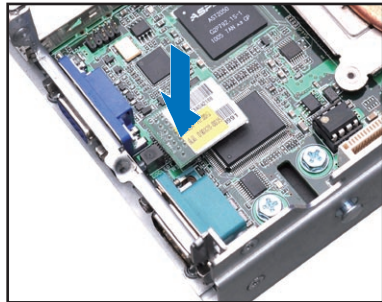
2.7.3 Installing ASMB4 series management board (optional)

Follow the steps below to install an optional ASMB4 series management board on your motherboard.

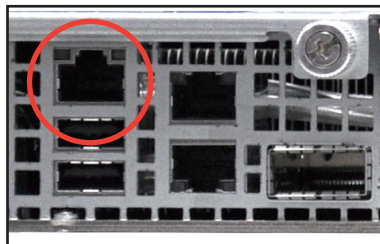
1. Locate the BMC_FW1 header on the motherboard.



2. Orient and press the ASMB4 management card in place.



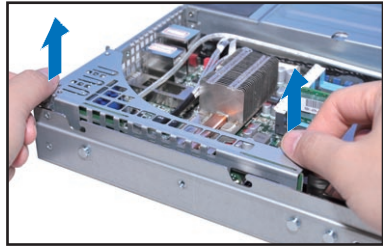
3. Insert the LAN cable plug to the LAN3 port for server management.



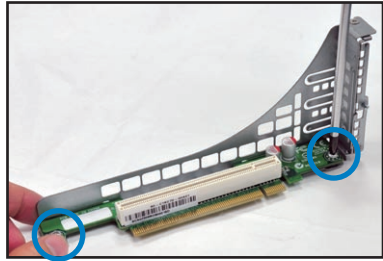
2.7.4 Installing ASUS PIKE SAS RAID Card (optional)

Follow the steps below to install the optional ASUS PIKE SAS RAID card to the ASUS PIKE riser card.

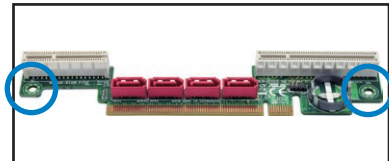
1. Firmly hold the riser card bracket, then pull it up to detach it from the PCI Express x16 slot on the motherboard.



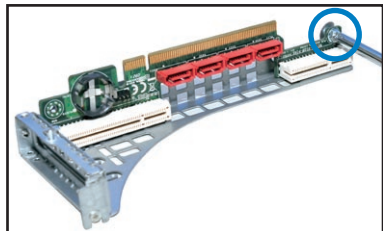
2. Locate the two screws on the riser card bracket, then remove the screws from the bracket.



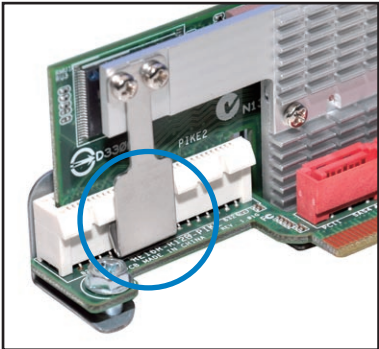
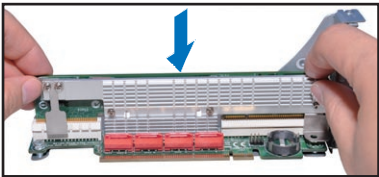
3. Locate the two screw holes on the PIKE riser card.



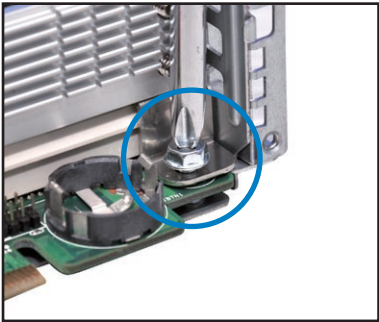
4. For PIKE 1064E RAID card, secure the riser card to the bracket with two screws. For PIKE 1078, 2008 and 2008/IMR cards, secure only one screw as shown in the right figure.



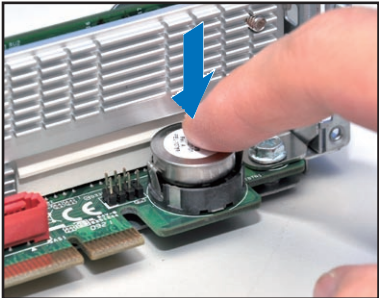
- 5. Align and insert the golden fingers of the PIKE SAS RAID card into the card slot on the PIKE raiser card. Ensure the card is completely seated on the slot. For PIKE 1078, 2008 and 2008/IMR cards, ensure the heatsink latch is completely hooked to the edge of the card slot.



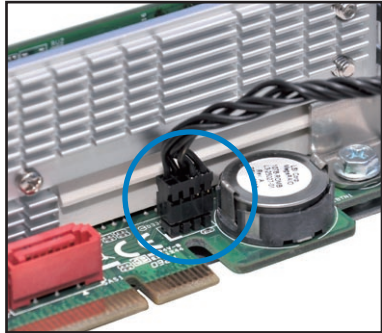
- 6. For PIKE 1078, 2008 and 2008/IMR cards, secure the PIKE card through the screw hole of the riser card to the card bracket.



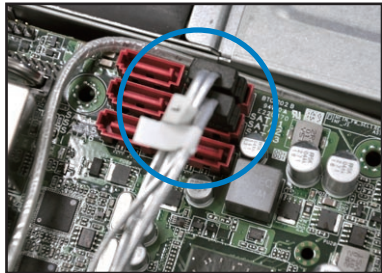
- 7. For PIKE 1078 SAS RAID card, snap the i Button into the i Button slot on the PIKE raiser card.



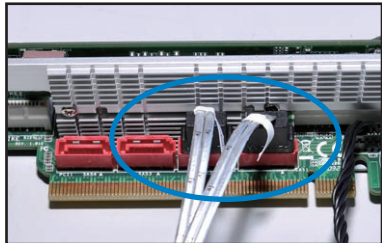
8. Connect the SGPIO cable (pre-installed to the barebone server) to the SGPIO connector on the PIKE Riser card.



9. Remove the SATA/SAS cables from the onboard SATA1-2 connectors.



10. Connect the SATA/SAS cables to the SAS1-2 connectors on the PIKE riser card.



11. Align the riser card bracket to the PCI Express x16 slot on the motherboard.
12. Press the riser card bracket until the golden fingers completely fit the slot and the bracket aligns with the rear panel.



Chapter 3

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



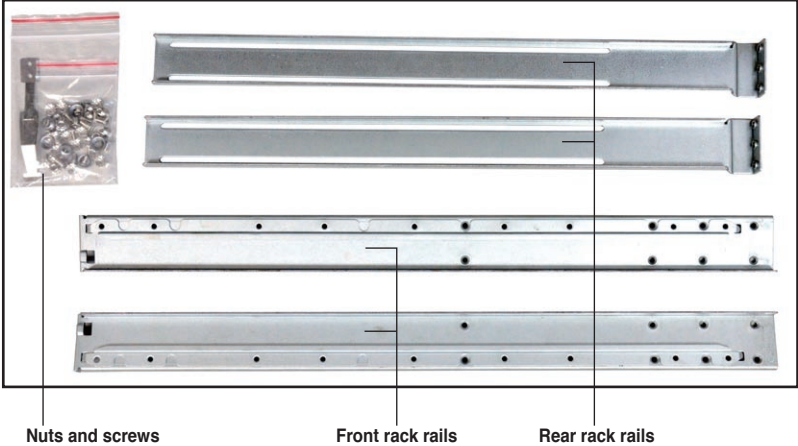
ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

Installation options

3.1 Installing friction rail kit items

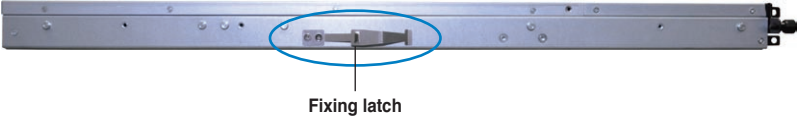
Your friction rail kit package contains:

- Two pairs of rack rails (for the rack)
- Nut-and-bolt type screws and one pair of server latches



3.1.1 Attaching the fixing latches to the server

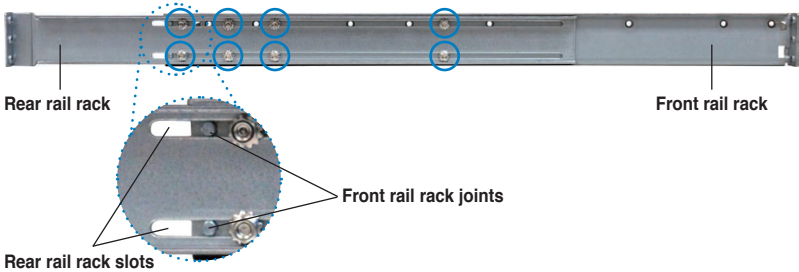
Refer to the image below for the locations to attach the two fixing latches to the two sides of the server with four screws.



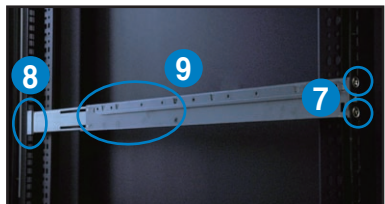
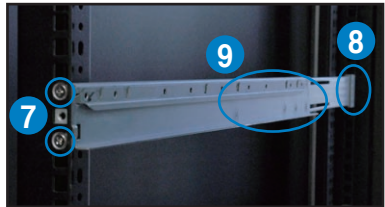
3.1.2 Attaching the rack rails

To attach the rack rails

1. Place the two front rail rack joints into the rear rail rack slots, as shown in the following figure.
2. Attach the front and rear rail racks with eight screws and nuts, as shown in the following figure. Do not secure the screws too tight so that you can still adjust the length of the rack rails to meet the depth of the server rack.



3. Select one unit of space (1U) on the rack where you want to install the barebone server.
4. Measure the depth of the rack to determine the length of the rack rails.
5. Adjust the rack rail to ensure that it fits the rack.
6. Position the rack rail to the 1U space on the rack. Ensure that the front end of the rack rail goes to the front of the rack space.
7. Secure the front end of the rail with two rack screws, as shown in the right figure.
8. Secure the rear end of the rail with two rack screws, as shown in the right figure.
9. Fasten the eight screw you secure in step 2, as shown in the right figure.
10. Repeat steps 6 to 9 to assemble and attach the rack rail on the other side.



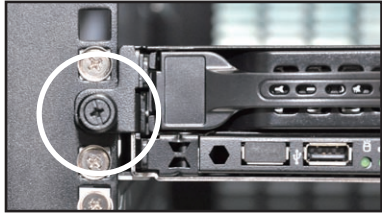
3.1.3 Mounting the server to the rack

To mount the server to the rack

1. Place the server on the rack rails, and then push the server all the way to the depth of the rack.



2. Tighten the two rack screws to secure the server in place.



To uninstall the server from the rack

1. Loosen the rack screws that secured the server to the rack.
2. Pull the server from the rack.



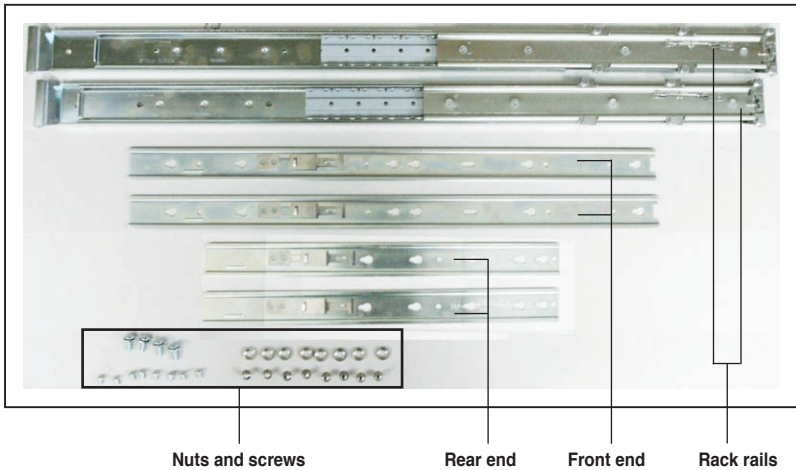
Remember to press the latches on both sides to release the server from the rack.



3.2 Installing optional ball-bearing rail kit items

Your optional ball-bearing rail kit package contains:

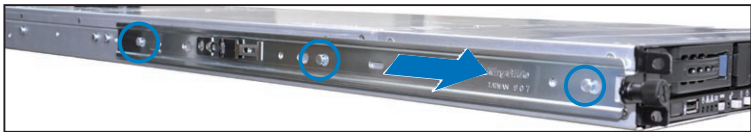
- two pair of server rails (for the server)
- two pairs of rack rails (for the rack)
- Nut-and-bolt type screws



3.2.1 Attaching the rails to the server

To attach the server rails:

1. Attach the front end of the server rail to the side of the chassis, matching each of the three hooks to the holes on the rail. Then slide the rail toward the front panel until it locks in place.



2. Secure the front end of the server rail to the side of the chassis with one screw.



3. Attach the rear end of the server rail to the side of the chassis, matching each of the three hooks to the holes on the rail. Then slide the rail toward the front panel until it locks in place.



4. Secure the rear end of the server rail to the side of the chassis with one screw.



5. Repeat steps 1 to 4 to attach the second server rail to the other side of the chassis.

3.2.2 Attaching the rack rails

To attach the rack rails:

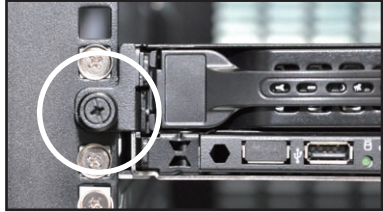
1. Select one unit of space (1U) on the rack where you want to install the barebone server.
2. Install the nuts on the holes of the 1U space on the rack front.
3. Install the nuts on the holes of the 1U space on the corresponding rack rear.
4. Measure the depth of the rack to determine the length of the rack rails.
5. Measure the rack rail when assembled to ensure that it fits the rack.
6. Position the rack rail to the 1U space on the rack. Ensure that the front end of the rack rail goes to the front of the rack space.
7. Secure the front end of the rail with two rack screws.
8. Secure the rear end of the rail with two rack screws.
9. Repeat steps 5 to 8 to assemble and attach the second rack rail.



3.2.3 Mounting the server to the rack

To mount the server to the rack:

1. Align the server rails with the rack rails, then push the server all the way to the depth of the rack.
2. Tighten the two rack screws to secure the server in place.



To uninstall the server from the rack:

1. Loosen the rack screws that secured the server to the rack.
2. Pull the server from the rack.



Remember to press the latches on both sides to release the server from the rack.



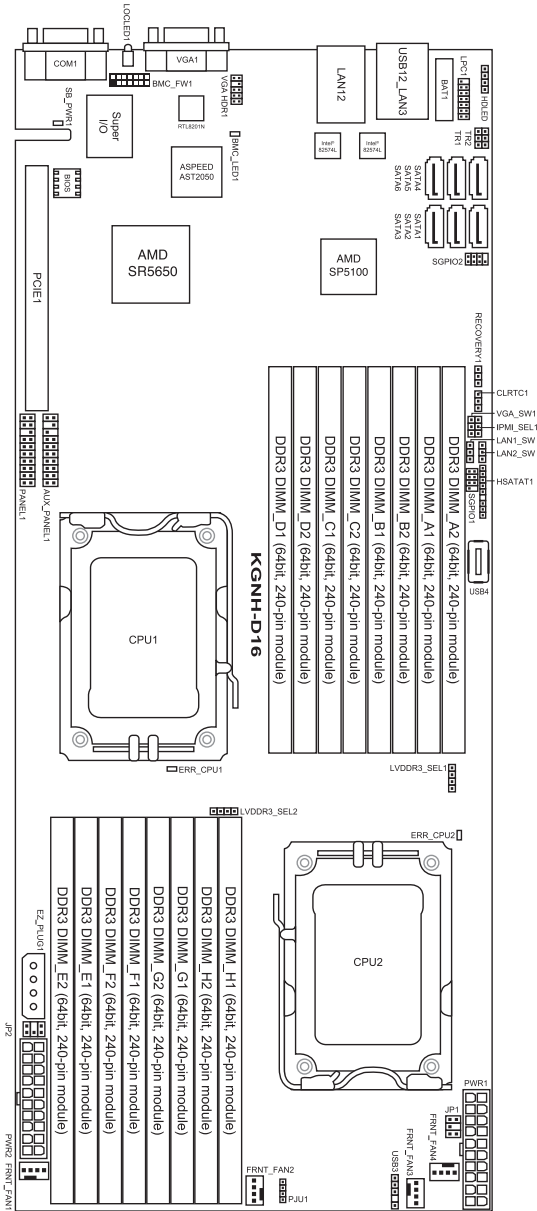
Chapter 4

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

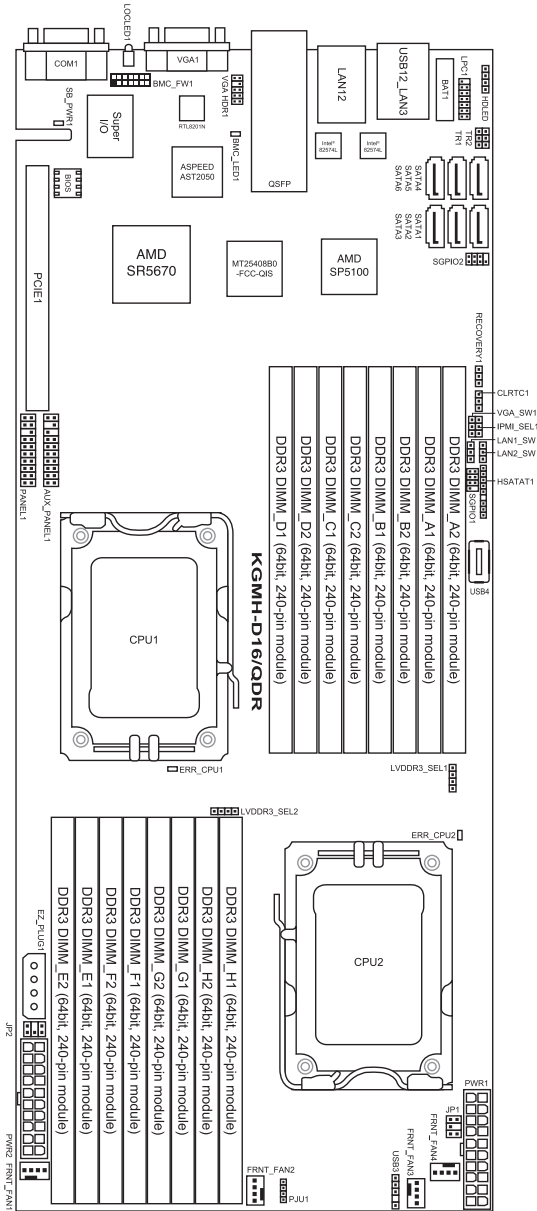


4.1 Motherboard layout

KGNH-D16 (For RS700DA-E6/PS4)



KGMH-D16/QDR (For RS704DA-E6/PS4)



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Internal connectors		Page
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6.	Serial General Purpose Input/Output connector (8-1 pin SGPIO1, SGPIO2)	4-15
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4.2 Jumpers

1. Clear RTC RAM (CLRRTC1)

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.

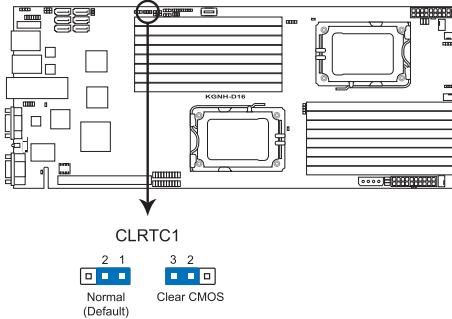


Except when clearing the RTC RAM, never remove the cap on CLRRTC1 jumper default position. Removing the cap will cause system boot failure!



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.

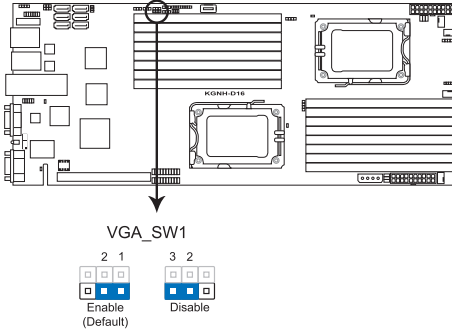
KGN(M)H-D16 Series Clear RTC RAM



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.

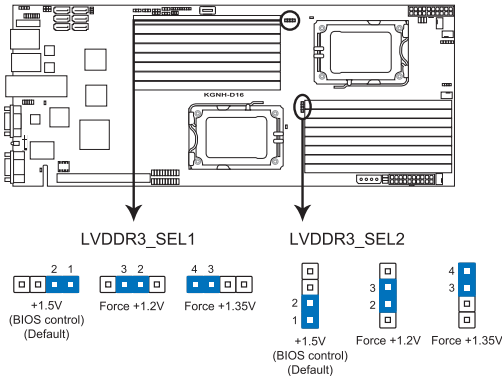
KG(M)H-D16 Series VGA setting



3. DDR3 voltage control setting (4-pin LVDDR3_SEL1; LVDDR3_SEL2)

These jumpers allow you to adjust the DIMM voltage. Use LVDDR3_SEL1 to adjust the DIMM voltage for CPU 1, and use LVDDR3_SEL2 to adjust the DIMM voltage for CPU 2. Set to pins 1–2 to select +1.5V BIOS control, pins 2–3 to select Force +1.2V, or pins 3–4 to select Force +1.35V.

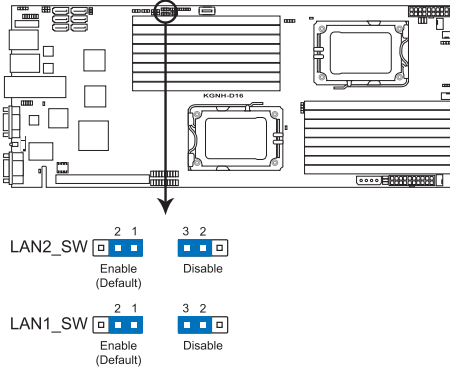
KG(M)H-D16 Series LVDDR3 setting



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

These jumpers allow you to enable or disable the onboard Intel® Intel 82574L Gigabit LAN controllers. Set to pins 1–2 to activate the Gigabit LAN feature.

KGN(M)H-D16 Series LAN setting

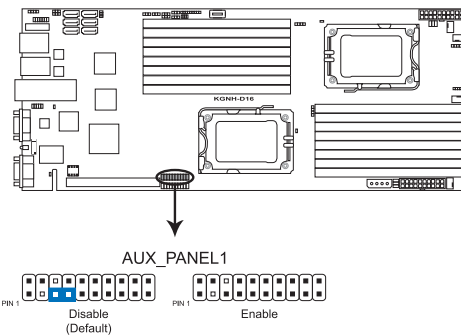


5. Chassis intrusion connector (2 pin CHASSIS)

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

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

KGN(M)H-D16 Series Chassis intrusion connector



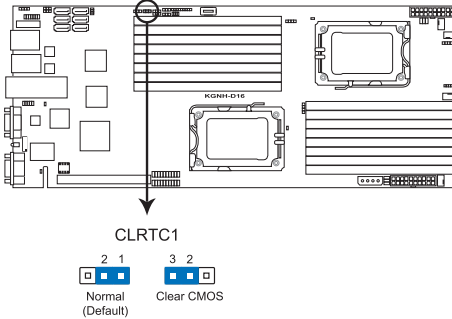
6. Force BIOS recovery setting (3-pin RECOVERY1)

This jumper allows you to quickly update or recover the BIOS settings when it becomes corrupted.

To update the BIOS:

1. Prepare a USB flash disk that contains the original or latest BIOS for the motherboard.
2. Set the jumper to pins 2–3.
3. Insert the USB flash and turn on the system to update the BIOS.
4. Shut down the system.
5. Set the jumper back to pins 1–2.
6. Turn on the system.

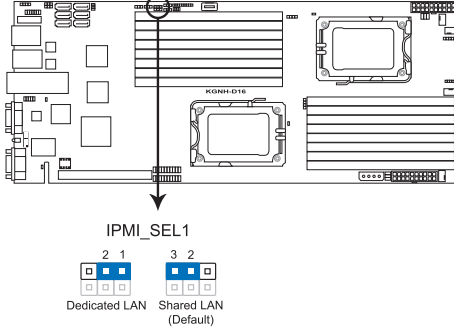
KGN(M)H-D16 Series Clear RTC RAM



7. IPMI setting (3-pin IPMI_SEL1)

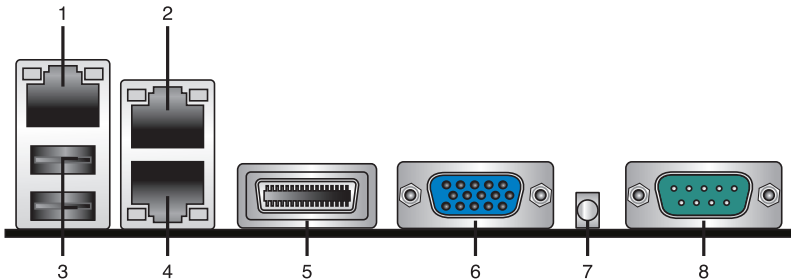
This jumper allows you to use the IPMI feature through the dedicated LAN or share LAN. Place the jumper caps on pins 1–2 if you want to use IPMI through the dedicated LAN (default). Or you can place the jumper caps on pins 2–3 to use IPMI through the shared LAN.

KGN(M)H-D16 Series IPMI setting



4.3 Connectors

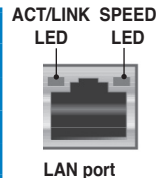
4.3.1 Rear panel connectors



1. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install ASMB4 management card.
2. **LAN 2 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.
3. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
4. **LAN 1 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

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



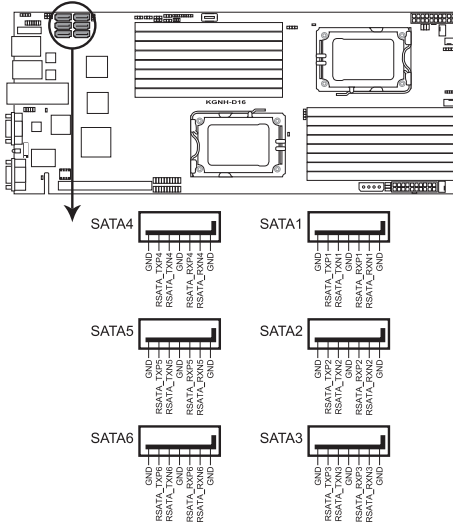
5. **InfiniBand (QSFP).** (*KGMH-D16/QDR only*) This port allows connection with a QSFP cable to an InfiniBand switch.
6. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.
7. **Location LED.** This LED lights up for you to conveniently locate the system in error.
8. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.

4.3.2 Internal connectors

1. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4, SATA5, SATA6)

Supported by the AMD SP5100 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 300 Mb/s of data transfer rate.

KGN(M)H-D16 Series SATA connectors

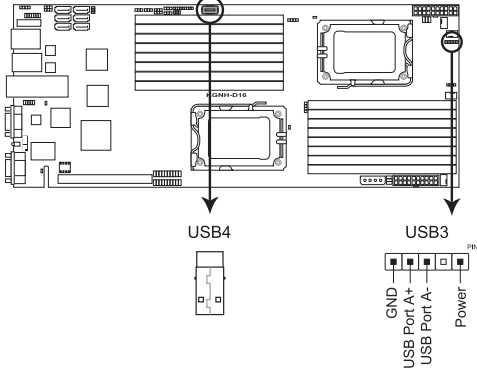


The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

2. USB connectors (5-1 pin USB3; A-Type USB4)

These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB3, then install the modules to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.

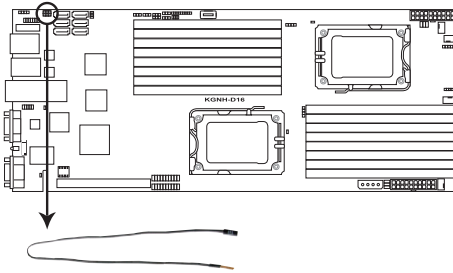
KGN(M)H-D16 Series USB 2.0 connectors



3. Thermal sensor cable connectors (3-pin TR1, TR2)

These connectors are for temperature monitoring. Connect the thermal sensor cables to these connectors and place the other ends to the devices, which you want to monitor temperature.

KGN(M)H-D16 Series Thermal sensor cable connectors



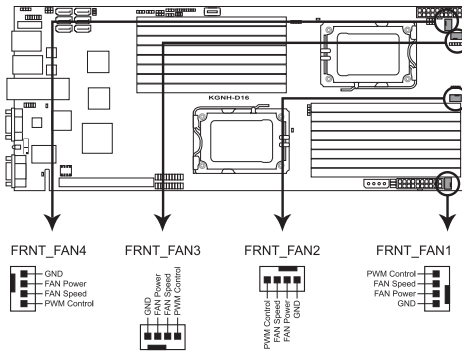
4. Front fan connectors (4-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, FRNT_FAN4)

The fan connectors support cooling fans of 350mA–1.75 A (21W max.) or a total of 1.4A–7A (84W max.) at +12V. 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.

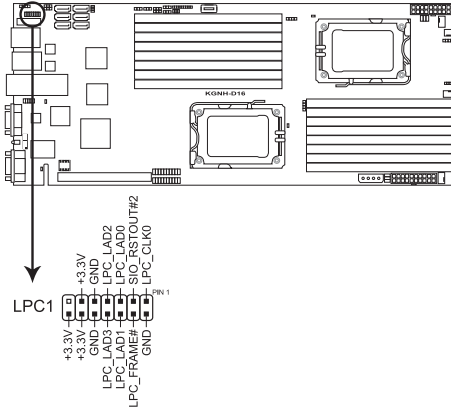
KG(M)H-D16 Series FAN connectors



5. **LPC debug card connector (14-1 pin LPC1)**

This is a low pin count interface used to plug in the LPC debug card.

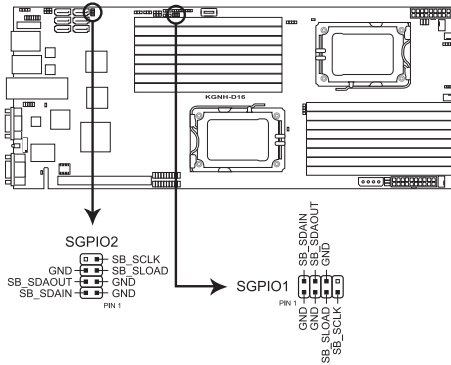
KGN(M)H-D16 Series LPC connector



6. **Serial General Purpose Input/Output connector (8-1 pin SGPIO1, SGPIO2)**

This connector connects to the SGPIO connector on the SATA HDD backplane.

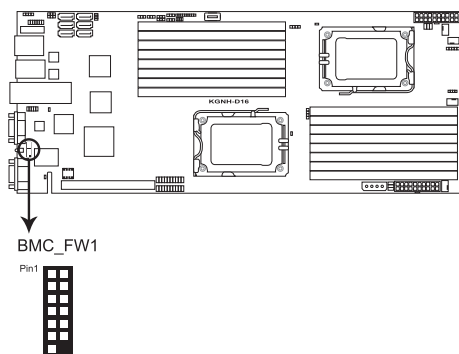
KGN(M)H-D16 Series SGPIO connector



7. BMC header (BMC_FW1)

The BMC connector on the motherboard supports an ASUS® Server Management Board 4 Series (ASMB4).

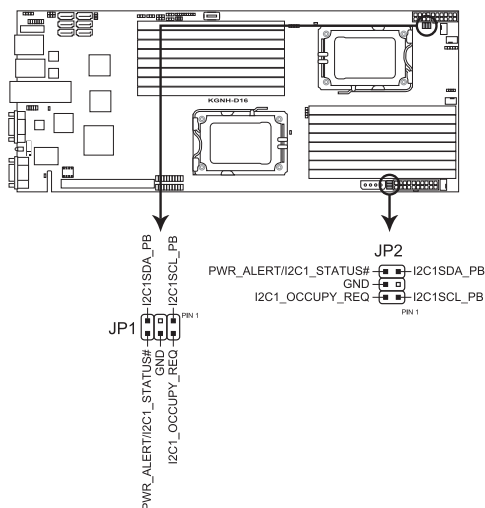
KGN(M)H-D16 Series BMC connector



8. Power Supply SMBus connectors (6-1 pin JP1; JP2)

These connectors allow 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.

KGN(M)H-D16 Series JP connectors



9. Proprietary power connectors (20-pin PWR1, 20-pin PWR2, 4-pin PWR3)

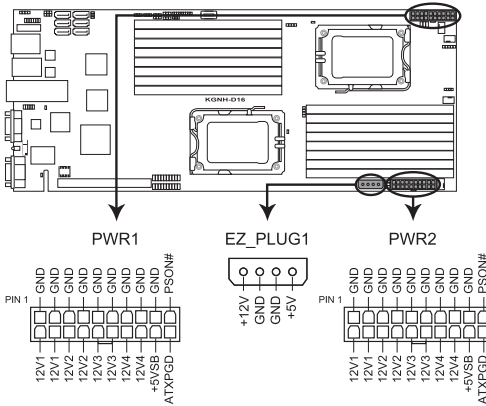
These connectors are for Proprietary power supply plugs. The power supply plugs are designed to fit these connectors in only one orientation. Orient the connectors and push down firmly until they completely fit.

The 4-pin EZ_PLUG is designed for hard disk drives power supply. **DO NOT** connect other 4-pin power connectors of the power supply unit (PSU) to this connector.



- Connect either one of the 20-pin power connectors to boot up the system.
- Use of a 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.
- **USE THE PROPRIETARY POWER SUPPLY ONLY;** otherwise you may damage the motherboard. Ensure that your PSU can provide at least the minimum power required by your system.

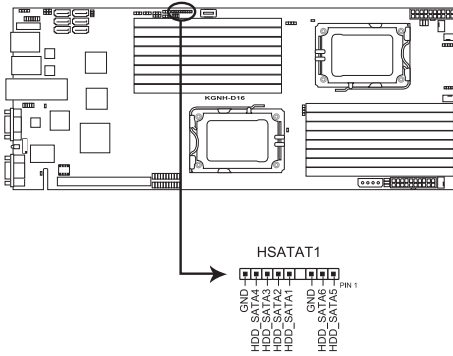
KG(M)H-D16 Series Proprietary power connectors



10. HDD status indicator header (9-1 pin HSATAT1)

This connector is for the indicators at the back panel. The indicator lights up when the corresponding SATA hard disk functions abnormally.

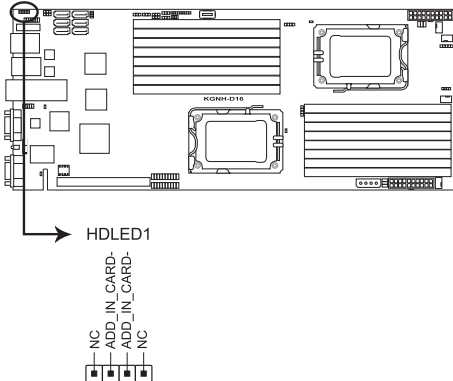
KGN(M)H-D16 Series HSATAT connector



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

This connector is used to connect to a hard disk drive active LED connector on the SCSI or RAID card.

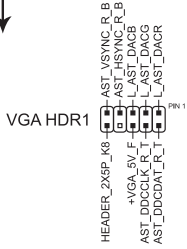
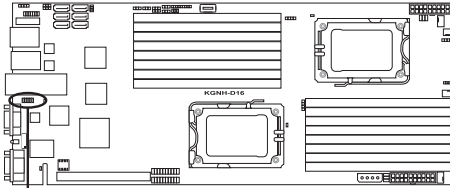
KGN(M)H-D16 Series Hard disk activity LED connector



12. Internal VGA Header (10-1 pin VGA_HDR1)

This connector is used to connect an internal VGA output connector.

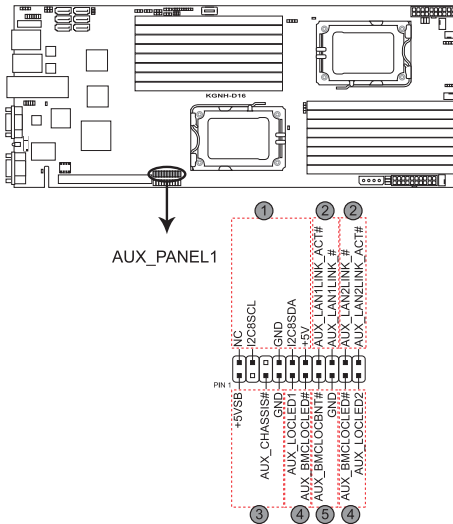
KGN(M)H-D16 VGA header



13. Auxiliary panel connector (20-pin AUX_PANEL1)

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.

KGN(M)H-D16 Series Auxiliary panel connector

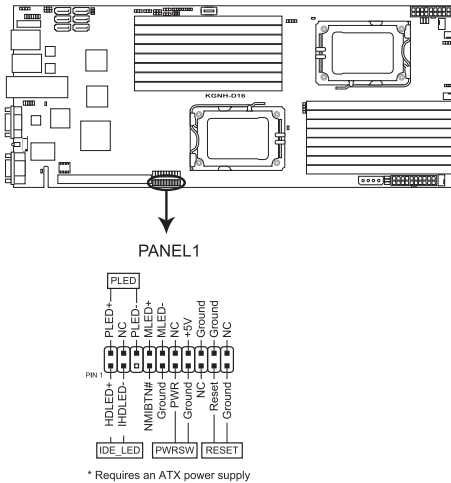


- 1. Front panel SMB (6-1 pin FPSMB)**
These leads connect the front panel SMBus cable.
- 2. LAN activity LED (2-pin LAN1_LED, LAN2_LED)**
These leads are for Gigabit LAN activity LEDs on the front panel.
- 3. Chassis intrusion (4-1 pin CHASSIS)**
These leads are for the intrusion detection feature for 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 and 2-pin 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.

14. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.

KG(N)H-D16 Series System panel connector



- **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.

- **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.

- **Hard disk drive activity LED (2-pin HDDLED)**

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.

- **Proprietary 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.

- **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.

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.



ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

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 EZ Flash 2** (Updates the BIOS using a USB flash disk.)
2. **BUPDATER utility** (Updates the BIOS in DOS mode using a bootable USB flash disk drive.)
3. **ASUS CrashFree BIOS 3** (To recover the BIOS using a bootable USB flash disk drive when the BIOS file fails or gets corrupted.)

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 EZ Flash 2 utility

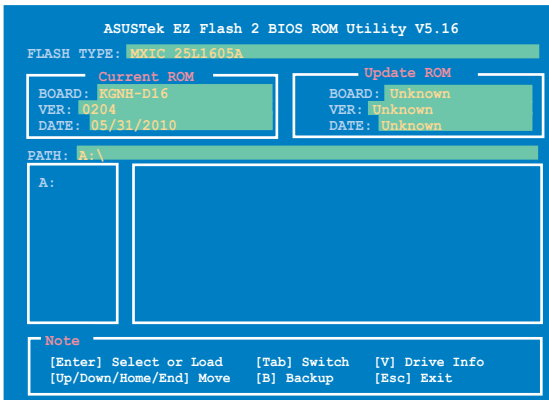
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a DOS-based utility.



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

1. Insert the USB flash disk that contains the latest BIOS file to the USB port.
2. Enter the BIOS setup program. Go to the **Tools** menu to select **EZ Flash 2** and press <Enter> to enable it.
Or, press <Alt> + <F2> during the POST to enable EZ Flash 2.



3. Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when 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. Select the **Load Setup Defaults** item under the **Exit** menu. See section **5.9 Exit Menu** for details.

5.1.2 BUPDATER utility



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

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

Updating the BIOS file

To update the BIOS file using the BUPDATER utility:

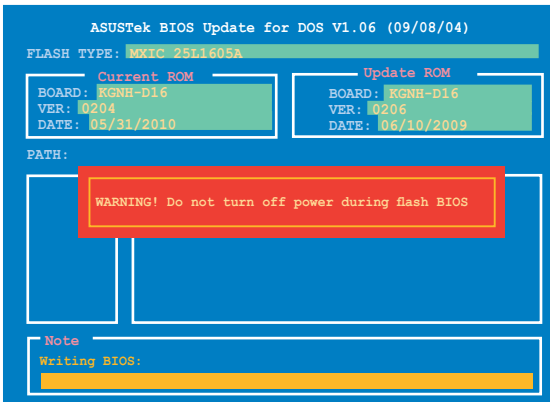
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.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

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

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

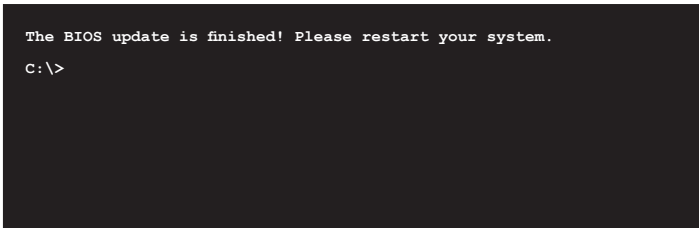
```
A:\>BUPDATER /i [file name] .ROM
```

- 4. 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!

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



5.1.3 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. Remove any floppy disk from the floppy disk drive and turn the system on.
2. Insert the USB flash drive with the original or updated BIOS file to one USB port on the system.
3. 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.

5.2 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.

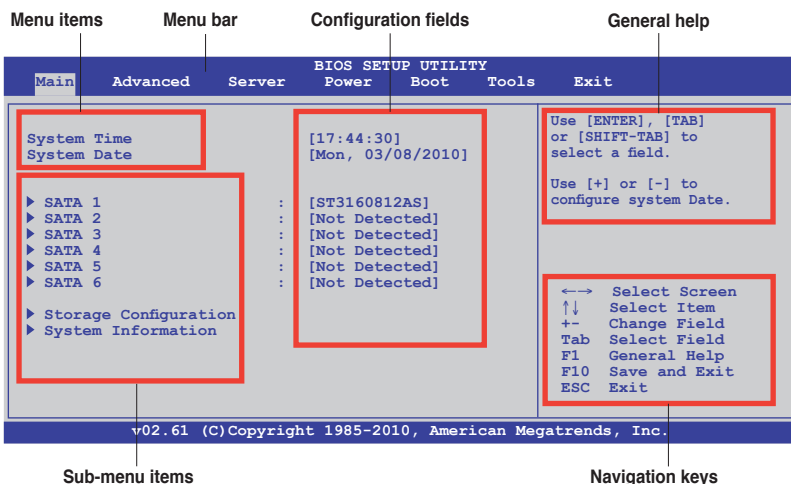
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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



-
- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section 5.9 **Exit Menu**.
 - 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 at 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	For changing the advanced server settings
Power	For changing the advanced power management (APM) configuration
Boot	For changing the system boot configuration
Tools	For configuring options for special functions
Exit	For selecting the exit options and loading default settings

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

5.2.3 Navigation keys

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



Some of the navigation keys differ from one screen to another.

5.2.4 Menu items

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

The other items (Advanced, Power, Boot, and Exit) on the menu bar have their respective menu items.

5.2.5 Sub-menu items

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

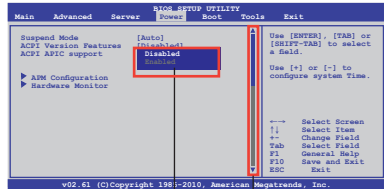
5.2.6 Configuration fields

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 then press <Enter> to display a list of options. Refer to 5.2.7 Pop-up window.

5.2.7 Pop-up window

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



Scroll bar
Pop-up window

5.2.8 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.

5.2.9 General help

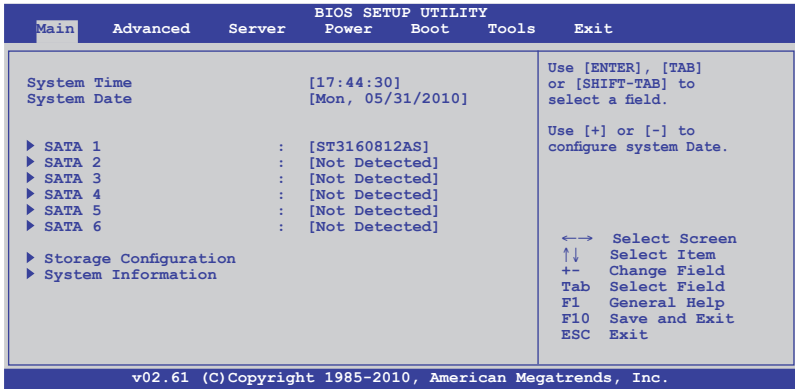
At the top right corner of the menu screen is a brief description of the selected item.

5.3 Main menu

When you enter the BIOS Setup program, the Main menu screen appears, giving you an overview of the basic system information.



Refer to section **5.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.



5.3.1 System Time [xx:xx:xx]

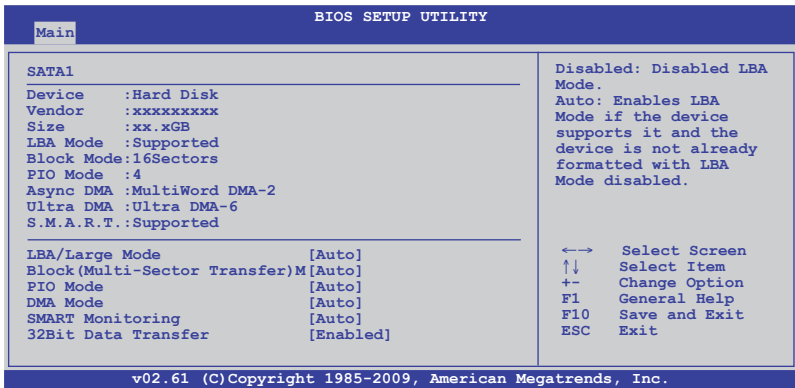
Allows you to set the system time.

5.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

5.3.3 SATA1-6

While entering Setup, the BIOS automatically detects the presence of IDE/SATA devices. There is a separate submenu for each IDE/SATA device. Select a device item then press <Enter> to display the SATA device information.



The BIOS automatically detects the values opposite the dimmed items (Device, Vendor, Size, LBA Mode, Block Mode, PIO Mode, Async DMA, Ultra DMA, and S.M.A.R.T. monitoring). These values are not user-configurable. These items show N/A if no IDE device is installed in the system.

LBA/Large Mode [Auto]

Enables or disables the LBA mode. Setting to [Auto] enables the LBA mode if the device supports this mode, and if the device was not previously formatted with LBA mode disabled. Configuration options: [Disabled] [Auto]

Block (Multi-Sector Transfer) M [Auto]

Enables or disables data multi-sectors transfers. When set to [Auto], the data transfer from and to the device occurs multiple sectors at a time if the device supports multi-sector transfer feature. When set to [Disabled], the data transfer from and to the device occurs one sector at a time.

Configuration options: [Disabled] [Auto]

PIO Mode [Auto]

Allows you to select the data transfer mode.

Configuration options: [Auto] [0] [1] [2] [3] [4]

DMA Mode [Auto]

Sets the DMA mode.

Configuration options: [Auto] [SWDMA0] [SWDMA1] [SWDMA2] [MWDMA0]

[MWDMA1] [MWDMA2] [UDMA0] [UDMA1] [UDMA2] [UDMA3] [UDMA4] [UDMA5]

SMART Monitoring [Auto]

Sets the Smart Monitoring, Analysis, and Reporting Technology.

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

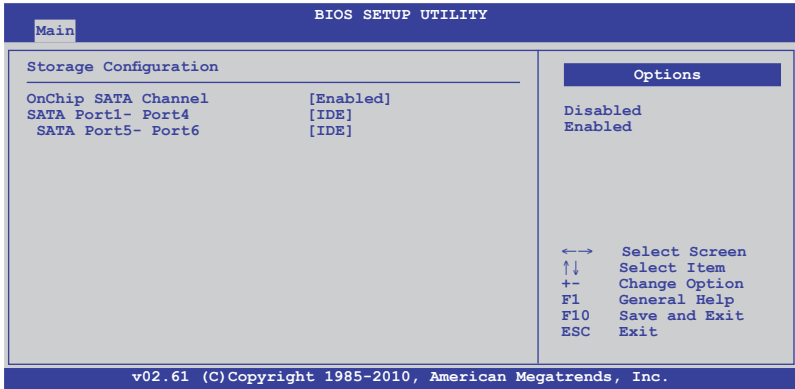
32Bit Data Transfer [Enabled]

Enables or disables 32-bit data transfer.

Configuration options: [Disabled] [Enabled]

5.3.4 Storage Configuration

The items in this menu allow you to set or change the configurations for the IDE/SATA devices installed in the system. Select an item then press <Enter> if you wish to configure the item.



OnChip SATA Channel [Enabled]

Configuration options: [Disabled] [Enabled]

SATA Port1-Port4 [IDE]

Allows you to set the SATA configuration.

- [IDE] Set to [IDE] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices.
- [RAID] Set to [RAID] when you want to create a RAID configuration from the SATA hard disk drives.
- [AHCI] Set to [AHCI] when you want the SATA hard disk drives to use the AHCI (Advanced Host Controller Interface). 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.

SATA Port5-Port6

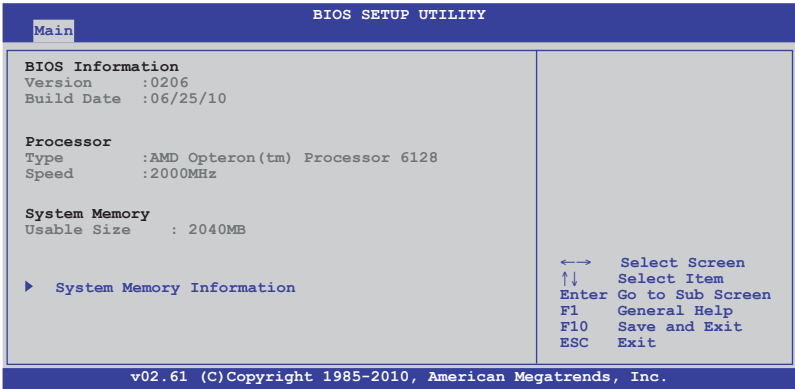
Setting this item to [IDE] instead of [RAID] or [AHCI] allows the system to recognize the optical drives connected to the SATA connectors 5 or 6 when installing OS.



If SATA Port1-Port4 is set to [IDE], SATA Port5-Port6 can only be configured as [IDE]

5.3.5 System Information

This menu gives you an overview of the general system specifications. The BIOS automatically detects the items in this menu.



BIOS Information

Displays the auto-detected BIOS information.

Processor

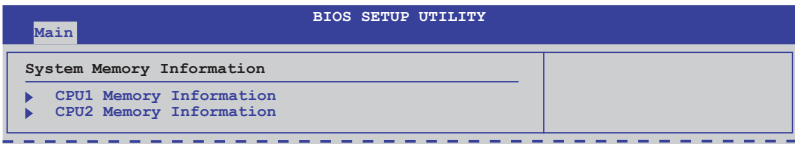
Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

System Memory Information

Displays system memory information.



CPU1/2 Memory Configuration

Allows you to check information of installed memory (8 DIMMs per CPU).

CPU1/2 Memory Configuration

Displays the auto-detected memory specification.

Main		BIOS SETUP UTILITY	
CPU1 Memory Configuration			
Node0 Speed	DDR3	1067	
Node1 Speed	N/A		
DIMM_A1	N/A		
DIMM_A2	2048 MB, 1R,	1067	
DIMM_B1	N/A		
DIMM_B2	N/A		
DIMM_C1	N/A		
DIMM_C2	N/A		
DIMM_D1	N/A		
DIMM_D2	N/A		

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.

```
BIOS SETUP UTILITY
Main  Advanced  Server  Power  Boot  Tools  Exit
-----
Configure CPU.

▶ CPU Configuration
▶ Chipset
▶ Onboard Device Configuration
▶ USB Configuration
▶ PCIPnP

←→ Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

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```

5.4.1 CPU Configuration

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

```
BIOS SETUP UTILITY
Advanced
-----
CPU Configuration
Module Version:5.1102.1
Physical Count:2
Logical Count :8
-----
AMD Opteron(tm) Processor 6128
Revision: D1
Cache L1: 1024KB
Cache L2: 4096KB
Cache L3: 12MB
Speed : 2000MHz, NB Clk: 1800MHz
Able to Change Freq. : Yes
uCode Patch Level : 0x1000C4
GART Error Reporting [Disabled]
Microcode Updation [Enabled]
Secure Virtual Machine Mode [Enabled]
PowerNow [Enabled]
PowerCap [P-state 0]
ACPI SRAT Table [Enabled]
C1E Support [Enabled]
CPU2 [Enabled]

This option should remain disabled for the normal operation. The driver developer may enable it for tetsting purpose.

←→ Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

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```

GART Error Reporting [Disabled]

Configuration options: [Disabled] [Enabled]

Microcode Updation [Enabled]

Configuration options: [Disabled] [Enabled]

Secure Virtual Machine Mode [Enabled]

Allows you to enable or disable the Secure Virtual Machine Mode (SVM).

Configuration options: [Disabled] [Enabled]

PowerNow [Enabled]

Allows you to enable or disable the generation of ACPI_PPC, ACPI_PSS, and ACPI_PCT objects. Configuration options: [Disabled] [Enabled]

PowerCap [P-state 0]

Allows you to decide the highest performance P-state in OS.

Configuration options: [P-state 0] [P-state 1] [P-state 2] [P-state 3] [P-state 4]

ACPI SRAT Table [Enabled]

Enables or disables the building of ACPI SRAT Table.

Configuration options: [Disabled] [Enabled]

C1E Support [Enabled]

Allows you to enable or disable Enhanced Halt State support.

Configuration options: [Disabled] [Enabled]

CPU2 [Enabled]

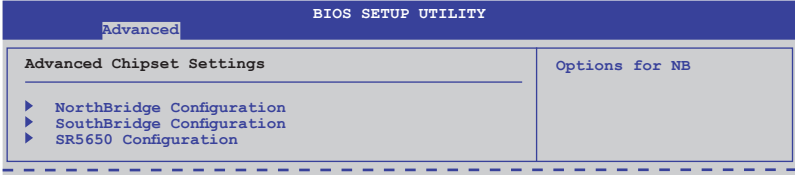
Allows you to enable or disable the CPU2 function.

Configuration options: [Disabled] [Enabled]

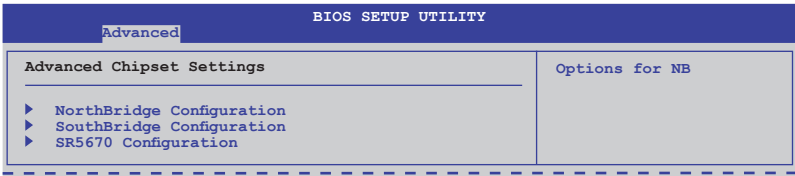
5.4.2 Chipset Configuration

The Chipset configuration menu allows you to change advanced chipset settings. Select an item then press <Enter> to display the sub-menu.

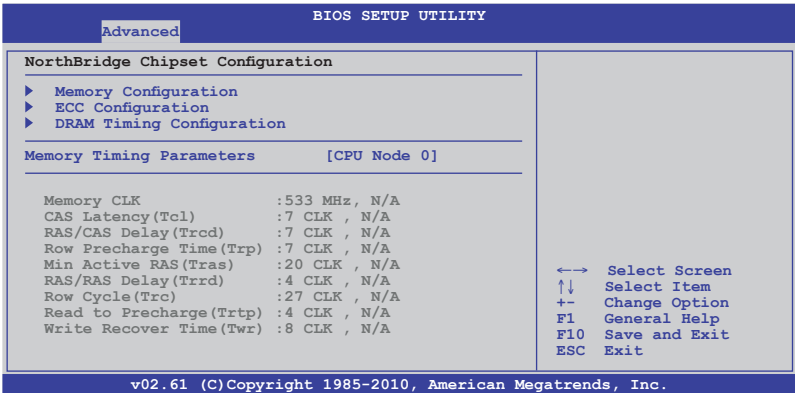
For KGNH-D16:



For KGMH-D16/QDR:



NorthBridge Configuration



Memory Configuration

Advanced		BIOS SETUP UTILITY
Memory Configuration		
Bank Interleaving	[Auto]	
Node Interleaving	[Disabled]	
Channel Interleaving	[Auto]	
CS Sparing Enabled	[Disabled]	
Bank Swizzle Mode	[Enabled]	

Rank Interleaving [Auto]

Allows you to set the rank memory interleaving setting.

Configuration options: [Disabled] [Auto]

Node Interleaving [Disabled]

Allows you to set the node memory interleaving setting.

Configuration options: [Disabled] [Auto]

Channel Interleaving [Auto]

Allows you to set the channel memory interleaving setting.

Configuration options: [Disabled] [Auto]

CS Sparing Enable [Disabled]

Allows you to reserve a spare memory rank in each node.

Configuration options: [Disabled] [Enabled]

Bank Swizzle Mode [Enabled]

Allows you to enable or disable the bank swizzle mode.

Configuration options: [Disabled] [Enabled]

ECC Configuration

Advanced		BIOS SETUP UTILITY
ECC Configuration		
ECC Mode	[Basic]	
DRAM ECC Enable	[Enabled]	
DRAM SCRUB REDIRECT	[Disabled]	
4-Bit ECC Mode	[Enabled]	
DRAM BG Scrub	[Disabled]	
Data Cache BG Scrub	[Disabled]	
L2 Cache BG Scrub	[Disabled]	
L3 Cache BG Scrub	[Disabled]	

ECC Mode [Disabled]

Disables or sets the DRAM ECC mode that allows the hardware to report and correct memory errors.

[Disabled] Disables the DRAM ECC mode.

[Basic] Set to [Basic] to adjust ECC mode automatically.

[Good] Set to [Good] to adjust ECC mode automatically.

- [Super] Set to [Super] to adjust the DRAM BG Scrub sub-item manually.
- [Max] Set to [Max] to adjust ECC mode automatically.
- [User] Set to [User] to adjust all the subitems manually.



The following items become user-configurable when you set **ECC Mode** to [User]

DRAM ECC Enable [Enabled]

[Enabled] Enables the DRAM ECC that allows the hardware to report and correct memory errors automatically.

[Disabled] Disables this function.

DRAM SCRUB REDIRECT [Disabled]

[Enabled] Allows the system to correct the DRAM ECC errors immediately when they occur.

[Disabled] Disables this function.

4-Bit ECC Mode [Disabled]

[Enabled] Enables ECC chip kill feature.

[Disabled] Disables this function.

DRAM BG SCRUB [Disabled]

Disables or sets the DRAM BG Scrub.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

Data Cache BG Scrub [Disabled]

Disables or sets the Data Cache BG Scrub. This item allows the data cache BG Scrub RAM to be corrected when idle.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

L2 Cache BG Scrub [Disabled]

Disables or sets the L2 Cache BG Scrub. This item allows the cache RAM to be corrected when idle.

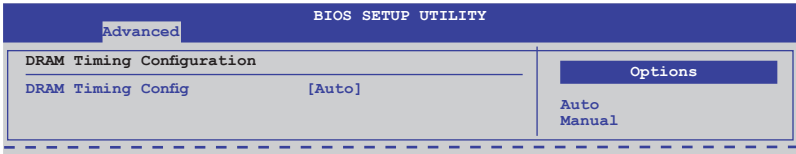
Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

L3 Cache BG Scrub [Disabled]

Disables or sets the L3 Cache BG Scrub. This item allows the cache RAM to be corrected when idle.

Configuration options: [Disabled] [40ns] [80ns] [160ns] [320ns] [640ns] [1.28us] [2.56us] [5.12us] [10.2us] [20.5us] [41.0us] [81.9us] [163.8us] [327.7us] [655.4us] [1.31ms] [2.62ms] [5.24ms] [10.49ms] [20.97ms] [42.00ms] [84.00ms]

DRAM Timing Configuration



DRAM Timing Config [Auto]

Configuration options: [Auto] [Manual]

Memory Clock Speed [400 MHz]

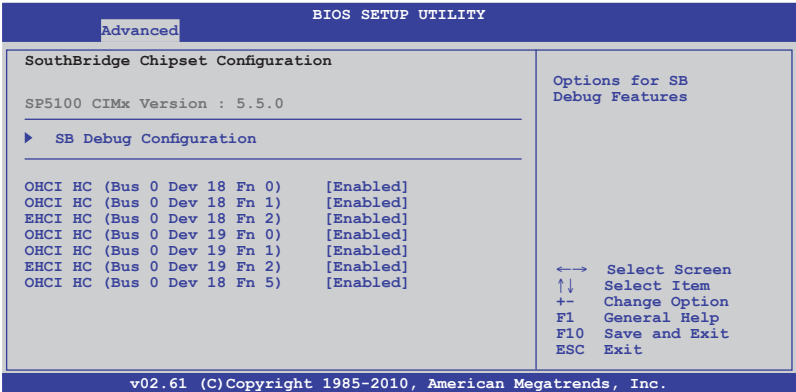
Allows you to set the memory clock frequency. This item available only when you set **DRAM Timing Config** to [Manual].

Configuration options: [400 MHz] [533 MHz] [667 MHz]

Memory Timing Parameters [CPU Node 0]

Allows you to select which node's timing parameters to display.

SouthBridge Configuration



SB Debug Configuration

Advanced		SouthBridge Debug Configuration	
A15 ECOs	[Disabled]	<div style="background-color: #4a7ebb; color: white; padding: 5px; text-align: center;">Options</div> Disabled Enabled	
Port 0 ESP	[ISP]		
Port 1 ESP	[ISP]		
Port 2 ESP	[ISP]		
Port 3 ESP	[ISP]		
Port 4 ESP	[ISP]		
Port 5 ESP	[ISP]		
Dis #THRMTRIP Before KBRst	[Enabled]		
SATA-IDE Ports Auto Clk Ctrl	[Disabled]		
SATA-AHCI Ports Auto Clk Ctrl	[Disabled]		
SATA PORT0 MODE	[Auto]		
SATA PORT1 MODE	[Auto]		
SATA PORT2 MODE	[Auto]		
SATA PORT3 MODE	[Auto]		
SATA PORT4 MODE	[Auto]		
SATA PORT5 MODE	[Auto]		

A15 ECOs [Disabled]

Configuration options: [Disabled] [Enabled]

Port 0–5 ESP [ISP]

Allows you to decide the ESP help. Configuration options: [ISP] [ESP]

Dis #THRMTRIP Before KBRst [Enabled]

Configuration options: [Disabled] [Enabled]

SATA-IDE Ports Auto Clk Ctrl [Disabled]

When set to [Enabled], the clocks for unused SATA ports in IDE will be shut down and the system saves some power.

Configuration options: [Disabled] [Enabled]

SATA-AHCI Ports Auto Clk Ctrl [Disabled]

When set to [Enabled], the clocks for unused SATA ports in AHCI mode will be shut down and the system saves some power, but the hotplug function for those ports will be unavailable Configuration options: [Disabled] [Enabled]

SATA PORT 0–5 MODE [Auto]

When set to [GEN1], the SATA ports are forced to run at the GEN1 mode.

When set to [Auto], the SATA port runs at the default mode.

Configuration options: [Auto] [GEN1]

OHCI HC (Bus 0 Dev 18 Fn 0); OHCI HC (Bus 0 Dev 18 Fn 1); EHCI HC (Bus 0 Dev 18 Fn 2); OHCI HC (Bus 0 Dev 19 Fn 0); OHCI HC (Bus 0 Dev 19 Fn 1); EHCI HC (Bus 0 Dev 19 Fn 2); OHCI HC (Bus 0 Dev 18 Fn 5) [Enabled]

Configuraiton options: [Disabled] [Enabled]

SR5650 Configuration (For KGNH-D16)

BIOS SETUP UTILITY	
Advanced	
SR5650 Configuration	PCI Express Configuration
▶ PCI Express Configuration	
▶ Hyper Transport Configuration	
IOMMU [Disabled]	
VGA ROM BOOT PRIORITY [PCIE VGA CARD]	
▶ Debug Options	

SR5670 Configuration (For KGMH-D16/QDR)

BIOS SETUP UTILITY	
Advanced	
SR5670 Configuration	PCI Express Configuration
▶ PCI Express Configuration	
▶ Hyper Transport Configuration	
IOMMU [Disabled]	
VGA ROM BOOT PRIORITY [PCIE VGA CARD]	
▶ Debug Options	

PCI Express Configuration

PCIe Slot 1 Features

Gen2 High Speed Mode [Auto]

Configuration options: [Auto] [Disabled] [Software Initiated] [Advertised RC]

Link ASPM [Disabled]

Configuration options: [Disabled] [L0s] [L1] [L0s & L1] [L0s Downstream] [L0s Downstream + L1]

Compliance Mode [Disabled]

Configuration options: [Disabled] [Enabled]

Lane Reversal [Disabled]

Configuration options: [Disabled] [Enabled]

NB-SB Port Features

NB-SB Link ASPM [L1]

Configuration options: [Disabled] [L1]

NP NB-SB VC1 Traffic Support [Disabled]

Configuration options: [Disabled] [Enabled]

Compliance Mode [Disabled]

Configuration options: [Disabled] [Enabled]

PCIE Slot 1 Core Setting

Powerdown Unused lanes [Enabled]

Configuration options: [Disabled] [Enabled]

Turn Off PLL During L1/L23 [Enable]

Configuration options: [Disabled] [Enabled]

TX Drive Strength [Auto]

Configuration options: [Auto] [26mA] [20mA] [22mA] [24mA]

TXCLK Clock Gating in L1 [Enabled]

Configuration options: [Disabled] [Enabled]

LCLK Clock Gating in L1 [Enabled]

Configuration options: [Disabled] [Enabled]

SB Core Setting

TX Drive Strength [Auto]

Configuration options: [Auto] [26mA] [20mA] [22mA] [24mA]

TXCLK Clock Gating in L1 [Enable]

Configuration options: [Disabled] [Enabled]

LCLK Clock Gating in L1 [Enable]

Configuration options: [Disabled] [Enabled]

Hyper Transport Configuration

HT Extended Address [Disabled]

Configuration options: [Auto] [Disabled] [Enable]

HT3 Link Power State [Auto]

Configuration options: [Auto] [LS0] [LS1] [LS2] [LS3]

UnitID Clumping [Auto]

Configuration options: [Auto] [Disabled] [UnitID 2/3] [UnitID B/C]
[UnitID 2/3&B/C]

HT Link Tristate [Auto]

Configuration options: [Auto] [Disabled] [CAD/CTL] [CAD/CTL/CLK]

NB Deempasies Level [Disabled]

Configuration options: [Disabled] [-0.4dB] [-1.32dB] [-2.08dB] [-3.1dB]
[-4.22dB] [-5.50dB] [-7.05dB]

IOMMU [Disabled]

Configuration options: [Disabled] [Enabled]

VGA ROM BOOT PRIORITY [PCIE VGA CARD]

Allows you to select the graphics controller to use as the primary boot device.
Configuration options: [PCIE VGA CARD] [ONBOARD VGA]

Debug Option

Memory Decode on Sec. GFX [Disabled]

Configuration options: [Disabled] [Force]

IOC Peer-to-Peer Mode [Auto]

Configuration options: [Auto] [Default] [Mode 1] [Mode 2]

Northbridge interrupt pin [Disabled]

Configuration options: [Disabled] [Enabled]

5.4.3 Onboard Devices Configuration

The items in this menu allows you to change related parameters of onboard devices. Select an item then press <Enter> to display the configuration options.

Advanced		BIOS SETUP UTILITY
Onboard Devices Configuration		Allows BIOS to Select Serial Port1 Base Addresses.
Serial Port1 Address	[3F8/IRQ4]	
Serial Port2 Address	[2F8/IRQ3]	
Onboard LAN1 Chip	[Enabled]	
Onboard LAN2 Chip	[Enabled]	
Onboard LAN1 Boot	[PXE]	
Onboard LAN2 Boot	[PXE]	

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.
Configuration options: [Disabled] [3F8/IRQ4] [3E8/IRQ4] [2E8/IRQ3]

Serial Port2 Address [2F8/IRQ3]

Allows you to select the Serial Port2 base address.
Configuration options: [Disabled] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

Onboard LAN1/2 Chip [Enabled]

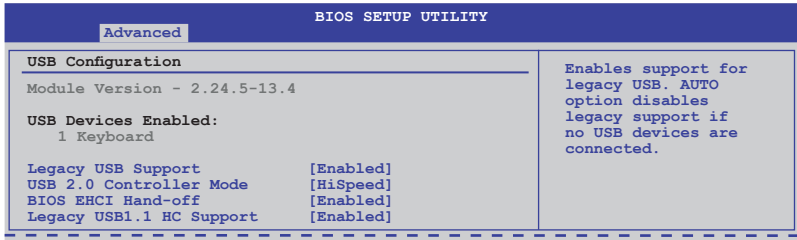
Allows you to enable or disable the onboard LAN1/2 chip.
Configuration: [Disabled] [Enabled]

Onboard LAN1/2 Boot [PXE]

Allows you to configure the onboard LAN1/2 boot mode.
Configuration: [Disabled] [PXE] [iSCSI]

5.4.4 USB Configuration

The items in this menu allows you to change the USB-related features. Select an item then press <Enter> to display the configuration options.



Legacy USB Support [Enabled]

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



The following item appears only when you set **Legacy USB Support** to [Enabled].

USB 2.0 Controller Mode [HiSpeed]

Allows you to set the USB 2.0 controller to HiSpeed (480Mbps) or FullSpeed (12Mbps). Configuration options: [FullSpeed] [HiSpeed]

BIOS EHCI Hand-Off [Enabled]

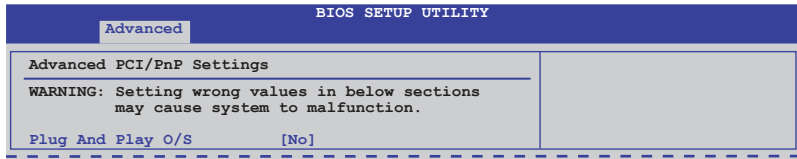
Enables or disables the BIOS EHCI hand-off support. Configuration options: [Disabled] [Enabled]

Legacy USB1.1 HC Support [Enabled]

Enables or disables the legacy USB1.1 HC support. Configuration options: [Disabled] [Enabled]

5.4.5 PCIPnP

The PCI PnP menu items allow you to change the advanced settings for PCI/PnP devices.

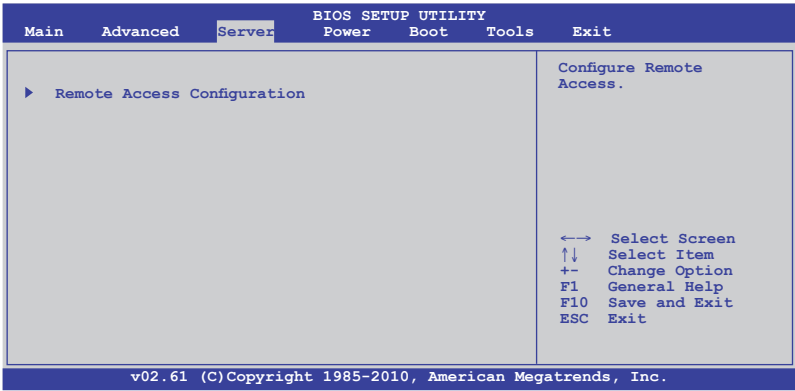


Plug And Play O/S [No]

[Yes] When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.

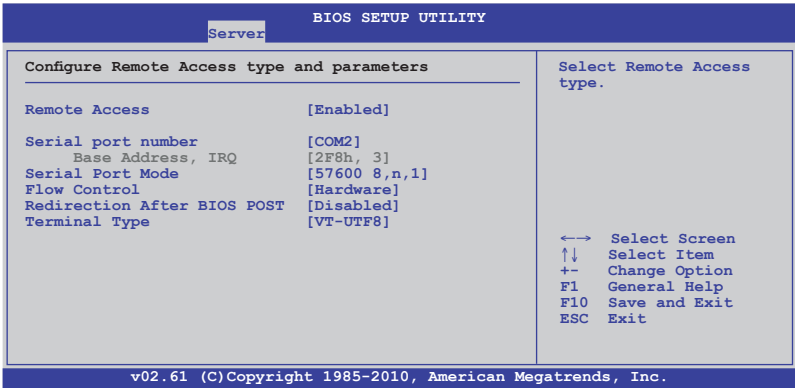
[No] When set to [No], BIOS configures all the devices in the system.

5.5 Server menu



Remote Access Configuration

The items in this menu allows you to configure the Remote Access features. Select an item then press <Enter> to display the configuration options.



Remote Access [Enabled]

Enables or disables the remote access feature.

Configuration options: [Disabled] [Enabled]



The following items appear only when **Remote Access** is set to [Enabled].

Serial port number [COM2]

Selects the serial port for console redirection.

Configuration options: [COM1] [COM2]

Base Address. IRQ [2F8h, 3]

This item is not user-configurable and changes with the configuration of Serial port number.

Serial Port Mode [57600 8,n,1]

Sets the Serial port mode.

Configuration options: [115200 8,n,1] [57600 8,n,1] [38400 8,n,1] [19200 8,n,1] [09600 8,n,1]

Flow Control [Hardware]

Allows you to select the flow control for console redirection.

Configuration options: [None] [Hardware] [Software]

Redirection After BIOS POST [Disabled]

Sets the redirection mode after the BIOS Power-On Self-Test (POST). Some operating system may not work when set to [Always].

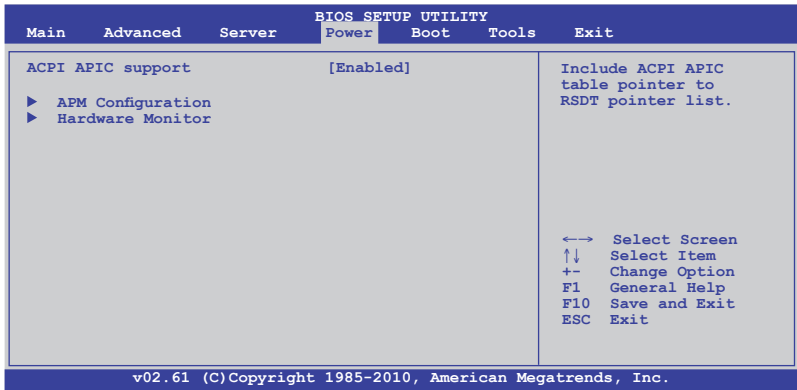
Configuration options: [Disabled] [Boot Loader] [Always]

Terminal Type [VT-UTF8]

Allows you to select the target terminal type.

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

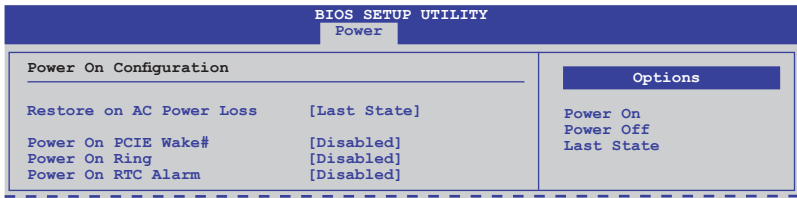
5.6 Power menu



5.6.1 ACPI APIC Support [Enabled]

Allows you to enable or disable the Advanced Configuration and Power Interface (ACPI) support in the Advanced Programmable Interrupt Controller (APIC). When set to [Enabled], the ACPI APIC table pointer is included in the RSDT pointer list. Configuration options: [Disabled] [Enabled]

5.6.2 APM Configuration



Restore on 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 PCIE Wake# [Disabled]

Allows you to enable or disable the PCIE devices to generate a wake event.

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

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

Power On Ring [Disabled]

Allows you to enable or disable the Ring to generate a wake event.

[Disabled] Disables the Ring to generate a wake event.

[Enabled] Enables the Ring to generate a wake event.

Power On By RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake-up event.

Configuration options: [Disabled] [Enabled]



The following items appear only when the **Resume On RTC Alarm** item is set to [Enabled].

RTC Alarm Date [15]

To set the alarm date, highlight this item and press the <+> or <-> key to make the selection.

System Time [12:30:30]

Use the <ENTER>, <TAB> or <SHIFT-TAB> key to select a field. Use the <+> or <-> key to configure alarm time.

5.6.3 Hardware Monitor

BIOS SETUP UTILITY	
Power	
Hardware Monitor	
CPU1 Temperature	[35°C/ 94°F]
CPU2 Temperature	[35°C/ 94°F]
TR1 Temperature	[N/A]
TR2 Temperature	[N/A]
Front Fan1 Speed	[N/A]
Front Fan2 Speed	[N/A]
Front Fan3 Speed	[N/A]
Front Fan4 Speed	[N/A]
Fan Speed Control	[Generic Mode]
VCore1	[1.052 V]
VCore2	[1.180 V]
P1DDR3 Voltage	[1.180 V]
P2DDR3 Voltage	[1.204 V]
P1_+1.2V Voltage	[1.204 V]
P2_+1.2V Voltage	[1.204 V]
P1_VDDNB Voltage	[1.090 V]
+1.8V Voltage	[1.826 V]
+1.2V Voltage	[1.170 V]
v02.61 (C) Copyright 1985-2010, American Megatrends, Inc.	

Scroll down to display the following items:

+1.1V Voltage	[1.084 V]
+12V Voltage	[11.952 V]
+5V Voltage	[5.043 V]
+3.3V Voltage	[3.228 V]
+5VSB Voltage	[5.075 V]
+3.3VSB Voltage	[3.240 V]
VBAT Voltage	[3.000 V]
v02.61 (C) Copyright 1985-2010, American Megatrends, Inc.	

CPU1/CPU2/TR1/TR2 Temperature [xxx°C/xxx°F]

The onboard hardware monitor automatically detects and displays the motherboard component and CPU temperatures. Select [Ignored] if you do not wish to display the detected temperatures.

Front Fan1–4 Speed [xxxxRPM] or [Ignored] / [N/A]

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

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.

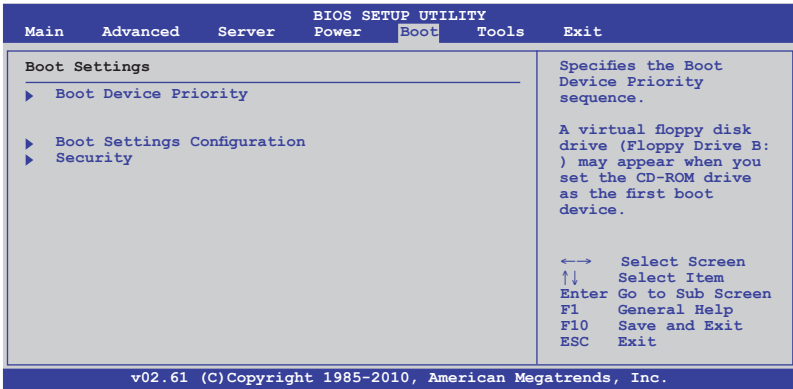
Configuration options: [Full Speed Mode] [High Density Mode] [Generic Mode] [Whisper Mode]

VCORE1/2, P1DDR3 Voltage, P2DDR3 Voltage, P1_+1.2V Voltage, P2_+1.2V Voltage, P1_VDDNB Voltage, +1.8V Voltage, +1.2V Voltage, +1.1V Voltage, +12V Voltage, +5V Voltage, +3.3V Voltage, +5VSB Voltage, +3.3VSB Voltage, VBAT Voltage

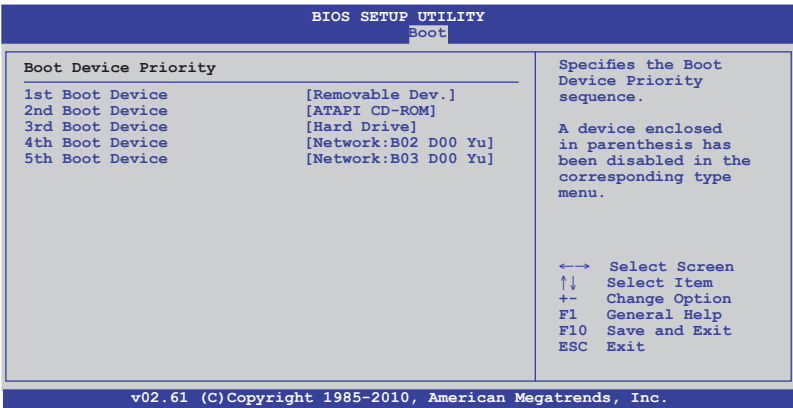
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select [Ignored] if you do not want to detect this item.

5.7 Boot menu

The Boot menu items allow you to change the system boot options. Select an item then press <Enter> to display the sub-menu.



5.7.1 Boot Device Priority



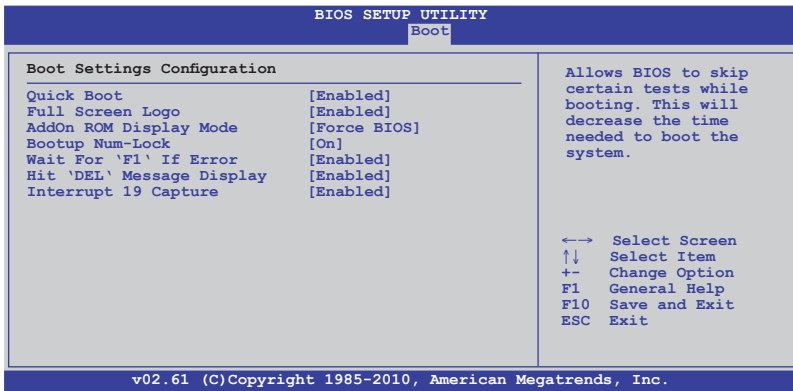
1st—xxth Boot Device [XXXXXXXX]

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. Configuration options: [xxxxx Drive] [Disabled]

5.7.2 Hard Disk Drives; CDROM Drives

These two items appear only when you install more than two hard disk drives or optical drives to your system. These items allow you to specify the boot priority sequence of the hard disk drives or the optical drives.

5.7.3 Boot Settings Configuration



Quick Boot [Enabled]

Enabling this item allows the BIOS to skip some power on self tests (POST) while booting to decrease the time needed to boot the system. When set to [Disabled], BIOS performs all the POST items. Configuration options: [Disabled] [Enabled]

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.

AddOn ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

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

Wait For 'F1' If Error [Enabled]

When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

Hit 'DEL' Message Display [Enabled]

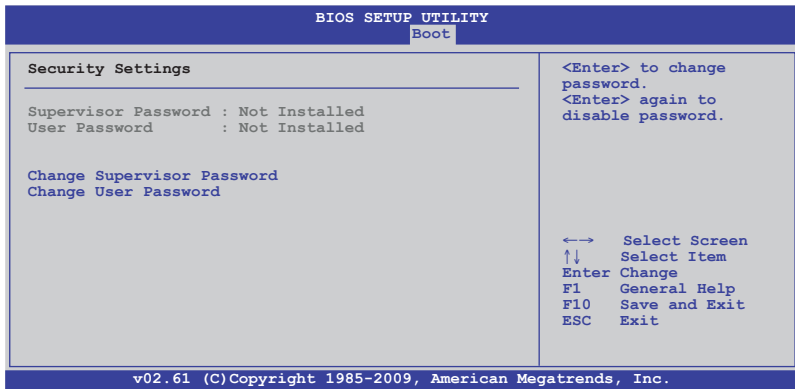
When set to [Enabled], the system displays the message "Press DEL to run Setup" during POST. Configuration options: [Disabled] [Enabled]

Interrupt 19 Capture [Enabled]

Allows the option ROMs to trap interrupt 19. Configuration options: [Disabled] [Enabled]

5.7.4 Security

The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.



Change Supervisor Password

Select this item to set or change the supervisor password. The **Supervisor Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows **Installed**.

To set a Supervisor Password:

1. Select the **Change Supervisor Password** item and press <Enter>.
2. From the password box, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message "Password Installed" appears after you successfully set your password.

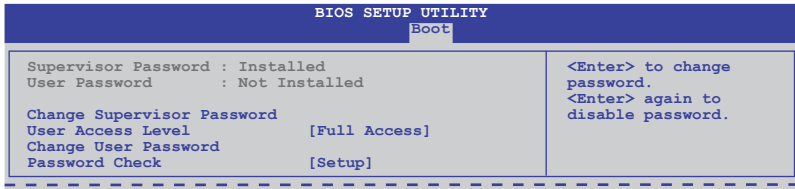
To change the supervisor password, follow the same steps as in setting a user password.

To clear the supervisor password, select the **Change Supervisor Password** then press <Enter>. The message "Password Uninstalled" appears.



If you forget your BIOS password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. See section **4.2 Jumpers** for information on how to erase the RTC RAM.

After you have set a supervisor password, the other items appear to allow you to change other security settings.



User Access Level [Full Access]

This item allows you to select the access restriction to the Setup items. Configuration options: [No Access] [View Only] [Limited] [Full Access]

No Access prevents user access to the Setup utility.

View Only allows access but does not allow change to any field.

Limited allows changes only to selected fields, such as Date and Time.

Full Access allows viewing and changing all the fields in the Setup utility.

Change User Password

Select this item to set or change the user password. The **User Password** item on top of the screen shows the default **Not Installed**. After you set a password, this item shows Installed.

To set a User Password:

1. Select the **Change User Password** item and press <Enter>.
2. On the password box that appears, type a password composed of at least six letters and/or numbers, then press <Enter>.
3. Confirm the password when prompted.

The message "Password Installed" appears after you set your password successfully.

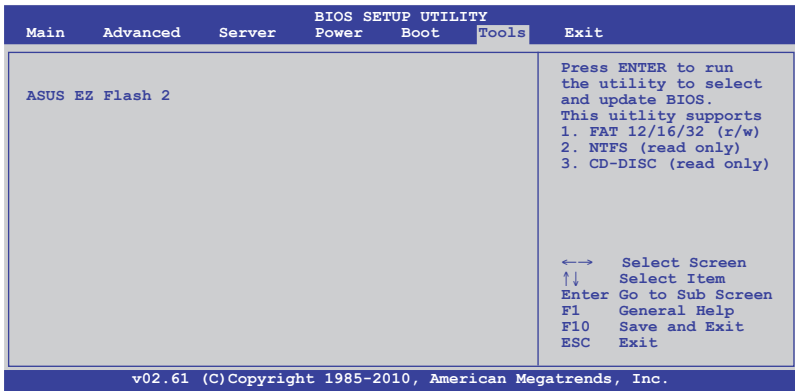
To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

When set to [Setup], BIOS checks for user password when accessing the Setup utility. When set to [Always], BIOS checks for user password both when accessing Setup and booting the system. Configuration options: [Setup] [Always]

5.8 Tools menu

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

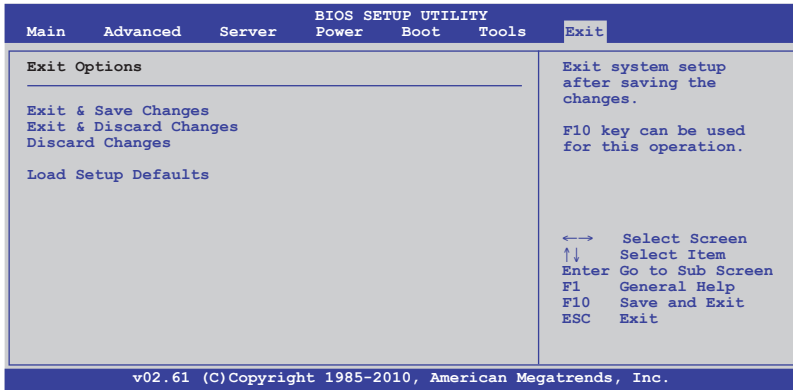


ASUS EZ Flash 2

Allows you to run ASUS EZ Flash 2. When you press <Enter>, a confirmation message appears. Use the left/right arrow key to select between [Yes] or [No], then press <Enter> to confirm your choice. Check section 5.1.1 **ASUS EZ Flash 2 utility** for details.

5.9 Exit menu

The Exit menu items allow you to load the optimal or failsafe default values for the BIOS items, and 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.

Exit & Save Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. An onboard backup battery sustains the CMOS RAM so it stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select **YES** to save changes and exit.



If you attempt to exit the Setup program without saving your changes, the program prompts you with a message asking if you want to save your changes before exiting. Press <Enter> to save the changes while exiting.

Exit & Discard Changes

Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than System Date, System Time, and Password, the BIOS asks for a confirmation before exiting.

Discard Changes

This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select **YES** to discard any changes and load the previously saved values.

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When you select this option or if you press <F5>, a confirmation window appears. Select **YES** to load default values. Select **Exit & Save Changes** or make other changes before saving the values to the non-volatile RAM.

Chapter 6

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



ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

RAID configuration

6.1 Setting up RAID

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.

JBOD (Spanning) stands for Just a Bunch of Disks and refers to hard disk drives that are not yet configured as a RAID set. This configuration stores the same data redundantly on multiple disks that appear as a single disk on the operating system. Spanning does not deliver any advantage over using separate disks independently and does not provide fault tolerance or other RAID performance benefits.

SPAN helps to combine the capacity of multiple physical disk drives into one single large drive volume, making the small-sized disk drives more useful. The disk drives in this mode need not to be identical in size or speed.

6.1.2 Installing hard disk drives

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

See section **2.3 Hard disk drives** for SATA hard disk drive installation.

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 AMD SP5100 chipset. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main Menu > Storage Configuration**, then press <Enter>.
3. Set **SATA Port1-4** to [RAID] and **SATA Port5-6** will be set to [RAID] too.
4. Press <F10> to save your changes and exit the BIOS Setup.



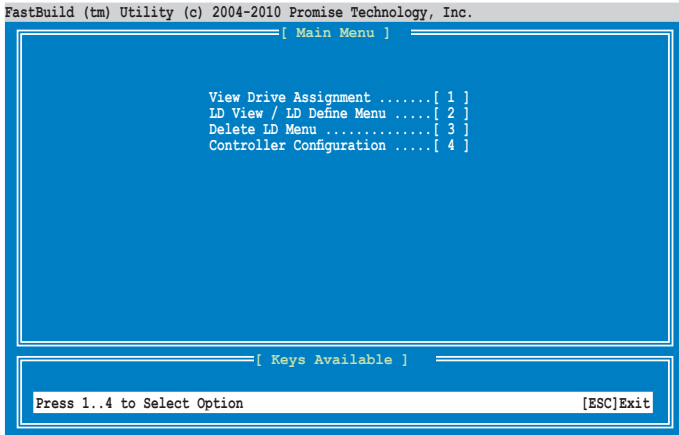
Refer to Chapter 5 for details on entering and navigating through the BIOS Setup.

6.2 FastBuild Utility

The FastBuild Utility allows you to create RAID 0, RAID 1, RAID 10 ,and RAID 5, SPAN and JBOD set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Promise RAID.

To enter the FastBuild Utility:

1. Install all the Serial ATA hard disk drives at Red SATA Connector.
2. Turn on the system.
3. During POST, press <Ctrl> + <F> to enter the utility main menu.



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

6.2.1 Creating a RAID set (RAID 0, RAID 1, RAID 10, RAID 5, SPAN or JBOD)

To create a RAID set:

1. From the main control panel, press <2> to enter the **LD View Menu**.

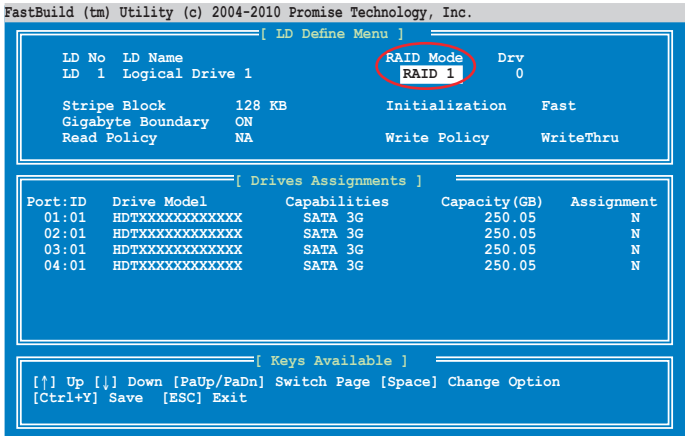
```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ Main Menu ]
View Drive Assignment .....[ 1 ]
LD View / LD Define Menu .....[ 2 ]
Delete LD Menu .....[ 3 ]
Controller Configuration .....[ 4 ]

[ Keys Available ]
Press 1..4 to Select Option [ESC]Exit
```

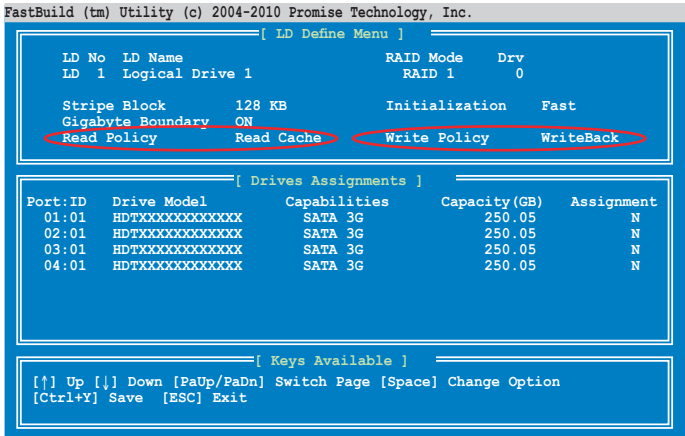
```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD View Menu ]
< There is no any LD >

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Ctrl+C] Define LD
[Enter] View LD [Ctrl+V] View JBOD Disk [ESC] Exit
```

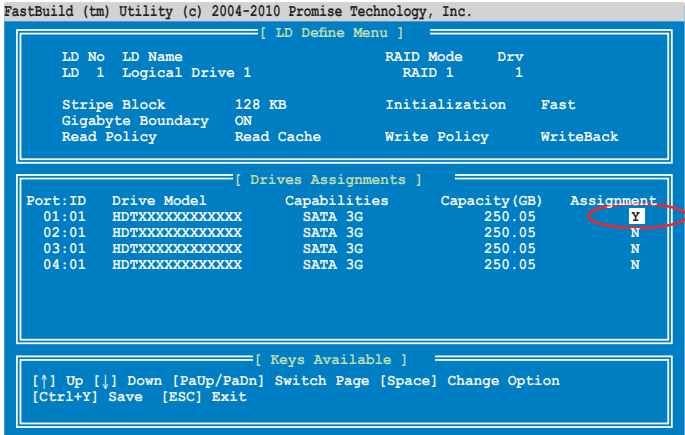
- Press <Ctrl> + <C> to define an LD and use <Spacebar> to select a desired RAID mode.



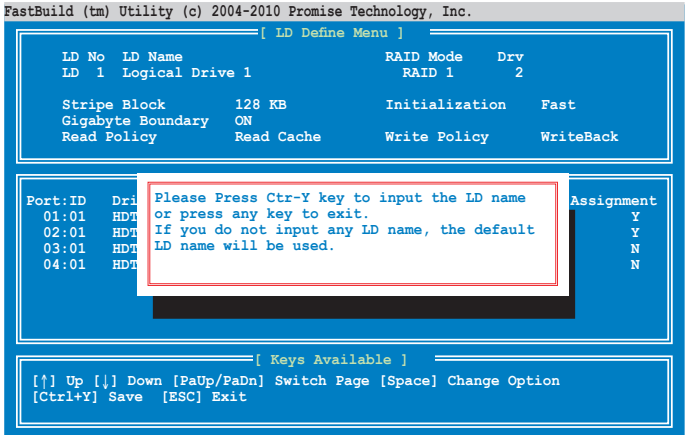
- Use <Spacebar> to set Read Policy to Read Cache and Write Policy to WriteBack.



- After you have selected the desired RAID mode, use the down arrow key to select desired disks for the RAID set.



- After you have selected desired disks for the RAID set, press <Ctrl> + <Y> to start building the RAID set.



- Press <Ctrl> + <Y> again and enter the LD name. Press <Enter> to continue.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD Define Menu ]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 1 2
Stripe Block 128 KB Initialization Fast
Gigabyte Boundary ON Read Cache Write Policy WriteBack

[ Drives Assignments ]
Port:ID Drive Model Capabilities Capacity(GB) Assignment
01:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 Y
02:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 Y
03:01 N N
04:01 Enter the LD name here: XXXX N

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
[Ctrl+Y] Save [ESC] Exit
```

- All the data on the selected disk drives will be deleted. Press <Ctrl> + <Y> to continue.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD Define Menu ]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 1 2
Stripe Block 128 KB Initialization Fast
Gigabyte Boundary ON Read Cache Write Policy WriteBack

Port:ID Drive Model Capabilities Capacity(GB) Assignment
01:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 Y
02:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 Y
03:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 N
04:01 HDTXXXXXXXXXXXXX SATA 3G 250.05 N

Fast Initialization Option has been selected.
It will erase the MBR data of the disks.
<Press Ctrl-Y Key if you are sure to erase it>
<Press any other key to ignore this option>

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
[Ctrl+Y] Save [ESC] Exit
```


- Press <Ctrl> + <Y> to modify the disk array size or press any other key to use all the available capacity of the disk drive.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD Define Menu ]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 1 2
Stripe Block 128 KB Initialization Fast
Gigabyte Boundary ON
Read Policy Read Cache Write Policy WriteBack

[ Drives Assignments ]
Port:ID Drive Model Capabilities Capacity (GB) Assignment
01:01 HDXXXXXXXXXXXXX SATA 3G 250.05 Y
02:01 HDXXXXXXXXXXXXX SATA 3G 250.05 Y
03:01 HDXXXXXXXXXXXXX SATA 3G 250.05 N
04:01 HDXXXXXXXXXXXXX SATA 3G 250.05 N

Press Ctrl-Y to Modify Array Capacity or press
any other key to use maximum capacity...

[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
Fast Initializing...
```

- Use the number keys to enter your desired array capacity.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD Define Menu ]
LD No LD Name RAID Mode Drv
LD 1 Logical Drive 1 RAID 1 2
Stripe Block 128 KB Initialization Fast
Gigabyte Boundary ON
Read Policy Read Cache Write Policy WriteBack

[ Drives Assignments ]
Port:ID Drive Model Capabilities Capacity (GB) Assignment
01:01 HDXXXXXXXXXXXXX SATA 3G 250.05 Y
02:01 HDXXXXXXXXXXXXX SATA 3G 250.05 Y
03:01
04:01 Enter array capacity (in GB) here: 200 N
N

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
[0-9] Input Capacity [Enter] Save [BackSpace] Delete [Esc] Exit
```

- The RAID set has been built successfully and press <Enter> to view the content.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ LD View Menu ]
LD No      RAID Mode   Drv      Capacity (GB)   Status
LD 1      RAID 1      2        199.99         Functional

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Ctrl+C] Define LD
[Enter] View LD [Ctrl+V] View JBOD Disk [ESC] Exit
```

- Press any key to return to the main control panel.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ View LD Definition Menu ]
LD No  LD Name      RAID Mode   Drv      Capacity (GB)
LD 1   RAID1      RAID 1      2        199.99

Stripe Block      NA
Read Policy       Read Cache      Write Policy     WriteBack

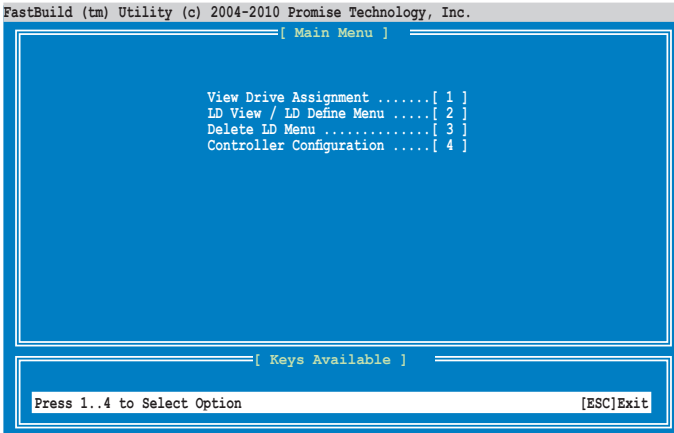
[ Drives Assignments ]
Port:ID  Drive Model  Capabilities  Capacity (GB)
01:01   HDTXXXXXXXXXX  SATA 3G      250.05
02:01   HDTXXXXXXXXXX  SATA 3G      250.05

Any Key To Continue.....
```

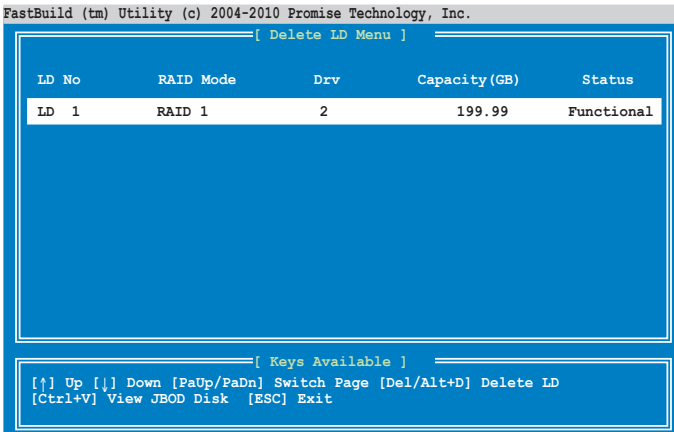
6.2.2 Deleting a RAID set

To delete a RAID set:

1. From the main control panel, press <3> to enter the **Delete LD Menu**.



2. Select the RAID set you would like to delete and press /<Alt>+<D> to delete the selected RAID set.



3. Press <Ctrl>+<Y> to confirm and delete the selected RAID set.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ View LD Definition Menu ]
LD No  LD Name      RAID Mode  Drv   Capacity(GB)
LD 1   RAID1        RAID 1     2     199.99
Stripe Block      NA
Read Policy       NA          Write Policy  WriteThru

[ Drives Assignments ]
Port:ID  Drive Model      Capabilities  Capacity(GB)
01:01   HDTXXXXXXXXXXXX  SATA 3G      250.05
02:01   HDTXXXXXXXXXXXX  SATA 3G      250.05

Press Ctrl-Y to delete the data in the disk!
or press any other key to abort...
```

4. The selected RAID set has been deleted.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
[ Delete LD Menu ]

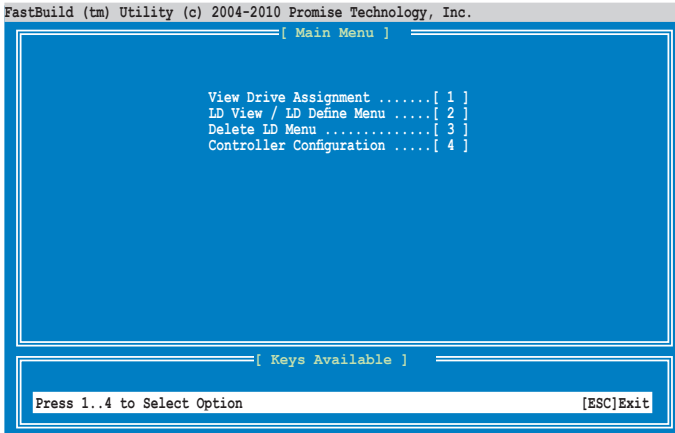
< There is no any LD >

[ Keys Available ]
[↑] Up [↓] Down [PaUp/PaDn] Switch Page [Del/Alt+D] Delete LD
[Ctrl+V] View JBOD Disk [ESC] Exit
```

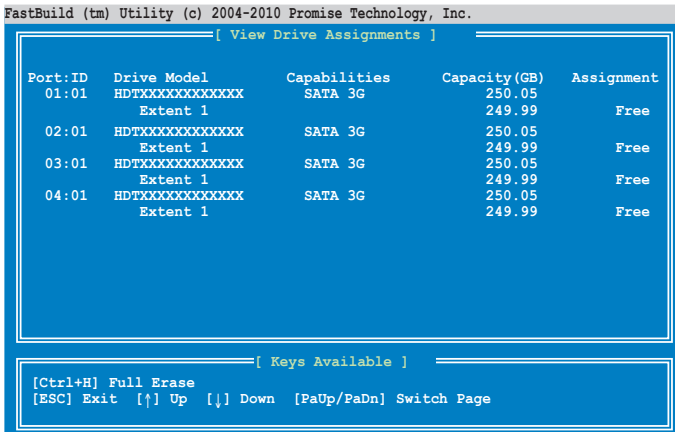
6.2.3 Viewing the Drive Assignment

To view the drive assignment:

1. From the main control panel, press <1> to enter the **Drive Assignment Menu**.



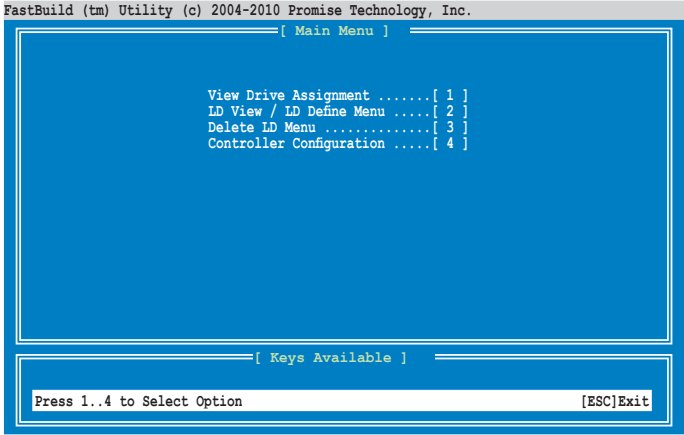
2. The drive assignment is displayed as shown.



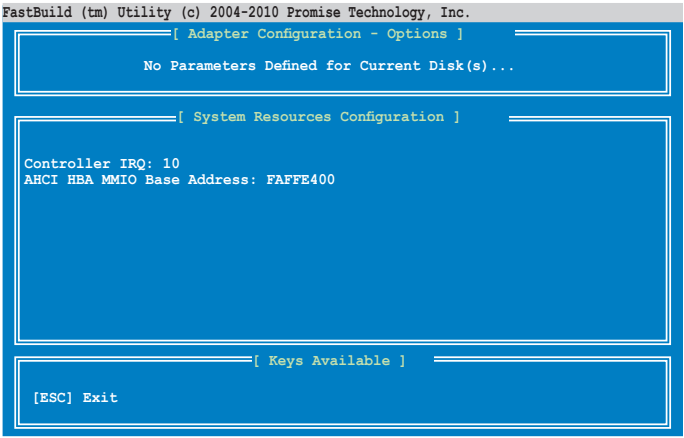
6.2.4 Viewing the Controller Configuration

To view the controller configuration:

1. From the main control panel, press <4> to enter the **Controller Configuration Menu**.



2. The system resources configuration is displayed as shown.



Chapter 7

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



ASUS RS700DA-E6/PS4, RS704DA-E6/PS4

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 instructions on how to install the RAID controller drivers during OS installation.



The RAID card driver might be included in the Linux OS installation CD, and could be loaded automatically during the OS installation. However, we recommend you use the RAID driver packaged in the RAID card support CD for a better reliability.

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.

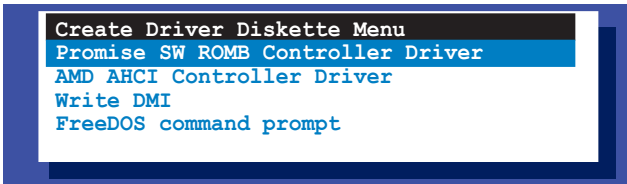


When you use a SATA optical drive and PROMISE RAID, you cannot boot into FreeDOS using this support CD. Either reset **SATA Port1-4** in BIOS to [IDE] and boot again or create the RAID driver in another computer.

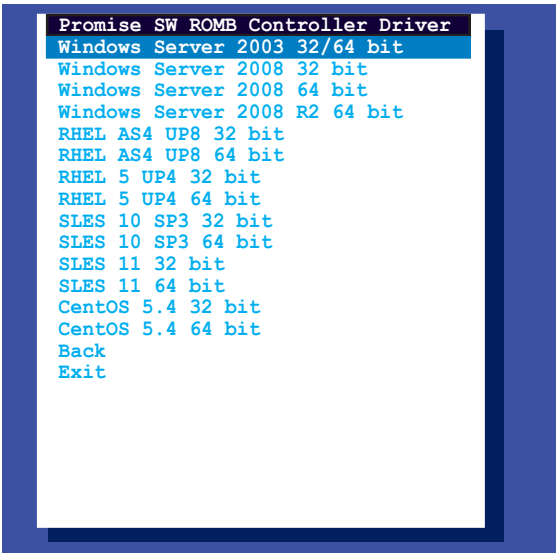
A floppy disk with the RAID driver is required when installing Windows® or Red Hat® Enterprise operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support DVD).

To create a RAID driver disk in DOS environment

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



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.

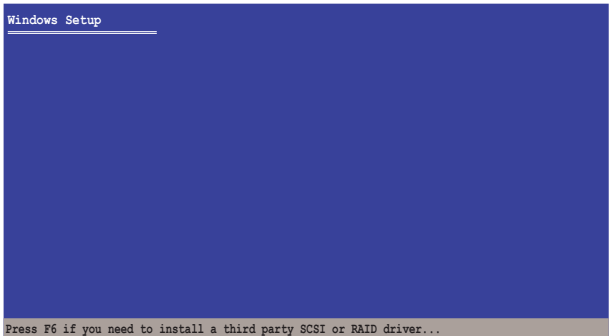
7.1.2 Installing the RAID controller driver

Windows® Server OS

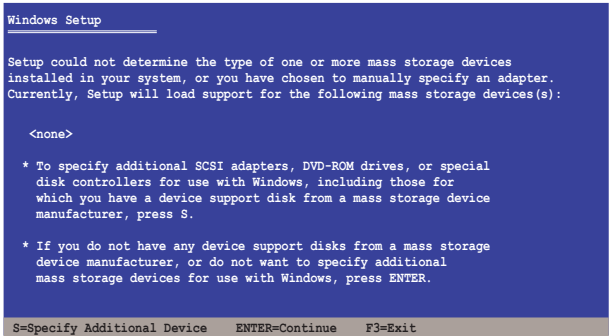
During Windows® Server OS installation

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

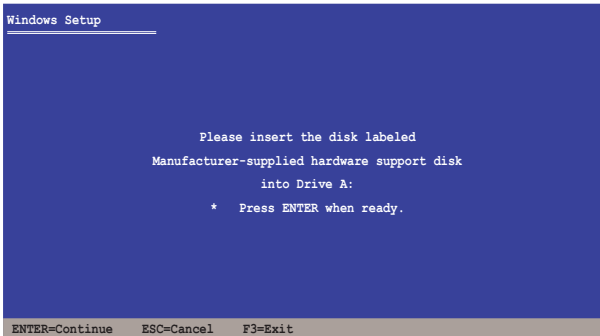
1. Boot the computer using the Windows® Server installation DVD. The Windows® Server OS Setup starts.



2. Press <F6> when the message “Press F6 if you need to install a third party SCSI or RAID driver...” appears at the bottom of the screen.
3. When prompted, press <S> to specify an additional device.



4. Insert the RAID driver disk you created earlier to the floppy disk drive, then press <Enter>.



5. Select the RAID controller driver you need from the list, then press <Enter>.
6. The Windows® Setup loads the RAID controller drivers from the RAID driver disk. When prompted, press <Enter> to continue installation.
7. Setup then proceeds with the OS installation. Follow screen instructions to continue.

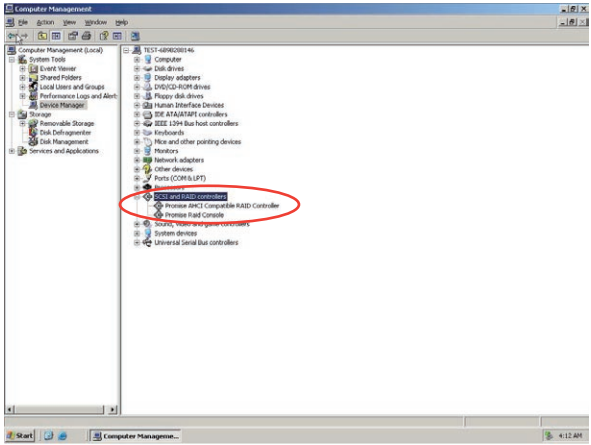
To an existing Windows® Server OS

To install the RAID controller driver on an existing Windows® Server OS

1. Restart the computer, and then log in with **Administrator** privileges.
2. Windows® automatically detects the RAID controller and displays a **New Hardware Found** window. Click **Cancel**.
3. Right-click the **My Computer** icon on the Windows® desktop, and then select **Properties** from the menu.
4. Click the **Hardware** tab, and then click the **Device Manager** button to display the list of devices installed in the system.
5. Right-click the **RAID controller** item, then select **Properties**.
6. Click the **Driver** tab, and then click the **Update Driver** button.
7. The **Upgrade Device Driver Wizard** window appears. Click **Next**.
8. Insert the RAID driver disk you created earlier to the floppy disk drive.
9. Select the option **Install the software automatically (Recommended)**, and then click **Next**.
10. The wizard searches the RAID controller drivers. When found, click **Next** to install the drivers.
11. Click **Finish** after the driver installation is done.

To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop, and then select **Properties** from the menu.
2. Click the **Hardware** tab, and then click the **Device Manager** button.
3. Click the “+” sign before the item **SCSI and RAID controllers**, and then the **Promise AHCI Compatible RAID Controller** item should appear.



The screen differs based on the controller.

4. Right-click the **RAID controller** driver item, and then select **Properties** from the menu.
5. Click the **Driver** tab, and then click the **Driver Details** button to display the RAID controller drivers.
6. Click **OK** when finished.

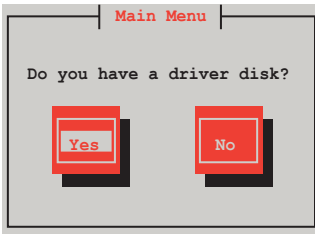
Red Hat® Enterprise Linux OS 4.7/4.8

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

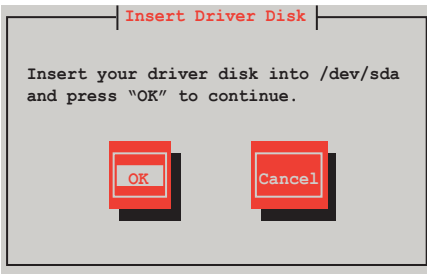
1. Boot the system from the Red Hat® OS installation CD.
2. At the `boot:`, type `linux dd`.
3. Press <Enter>.

```
- 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
```

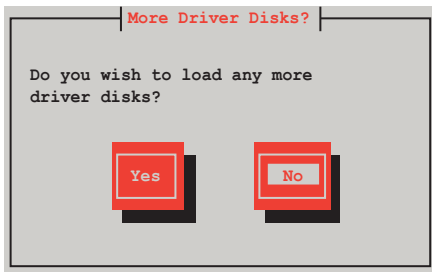
4. Select **Yes** using the <Tab> key when asked if you have the driver disk, then press <Enter>.



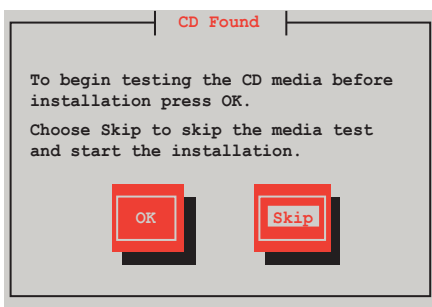
5. Press <Enter> to continue.



6. Select **No** and press <Enter> to continue.



7. Select **Skip** and press <Enter> to continue.



8. Follow the onscreen instructions to finish installing the RedHat operating system.

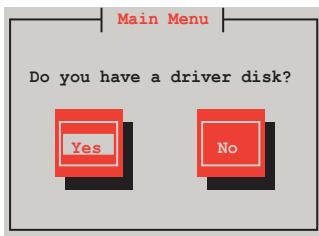
Red Hat® Enterprise Linux OS 5.0

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

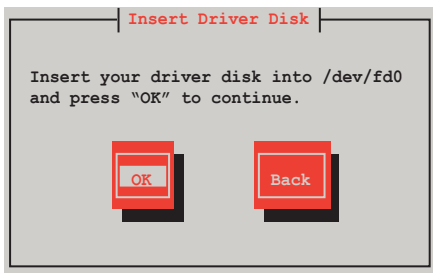
1. Boot the system from the Red Hat® OS installation CD.
2. At the `boot:`, type `linux dd`
3. Press <Enter>.

```
- 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
```

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

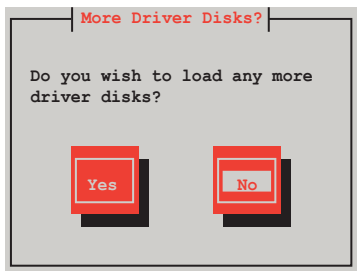


5. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

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

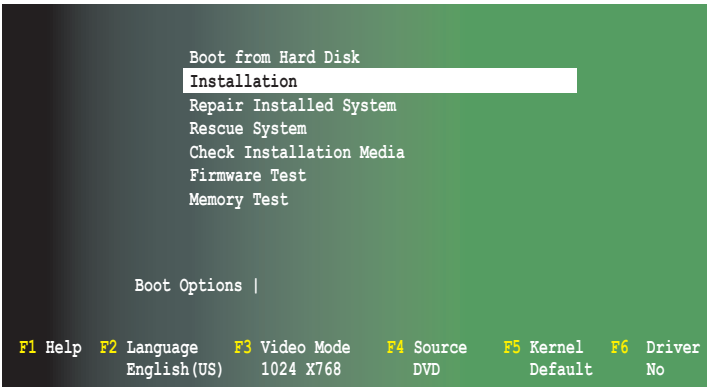


- Follow the onscreen instructions to finish the OS installation.

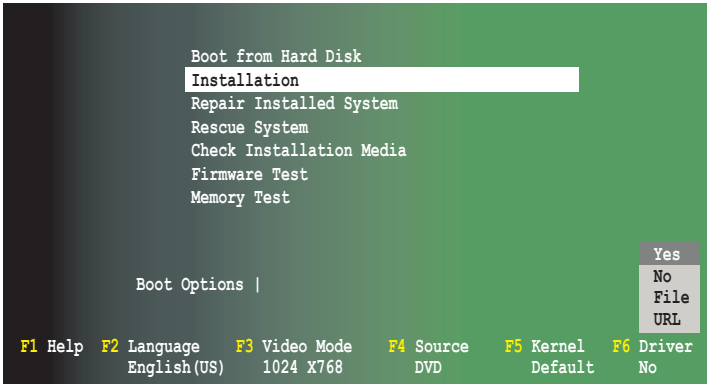
SUSE Linux 11 OS

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

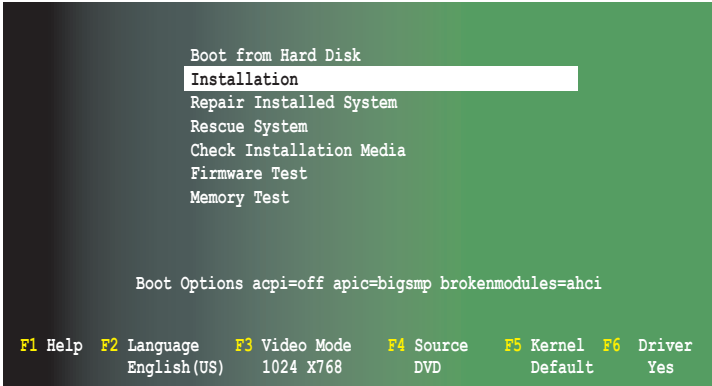
1. Boot the system from the SUSE OS installation CD.
2. Use the arrow keys to select **Installation** from the **Boot Options** menu.



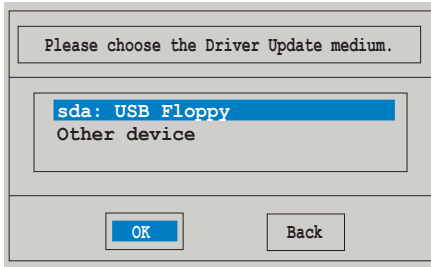
3. Press <F6>, then select **Yes** from the menu. Press <Enter>.



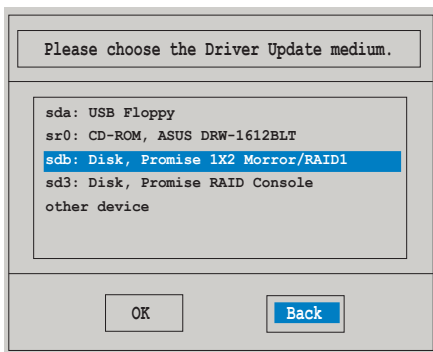
- 4. Insert the RAID driver disk to the floppy disk drive. Type the command **acpi=off apic=bigsm brokenmodules=ahci** in **Boot Options** field, and press <Enter>.



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



6. The drivers for the RAID controller are installed to the system as shown below.



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

7.2 ATI SM Bus controller driver installation

This section provides instructions on how to install the ATI SM Bus driver on the system.

You need to manually install the ATI SMBus driver on a Windows® operating system. To install the driver:

1. Restart the computer, 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.
3. Click the item **ATI SM Bus Controller Driver** from the menu, and then follow the onscreen instructions to complete the installation.



7.3 LAN driver installation

This section provides the instructions on how to install Intel® Gigabit LAN controller drivers.

To install the Intel® Gigabit LAN controller driver on a Windows® OS:

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

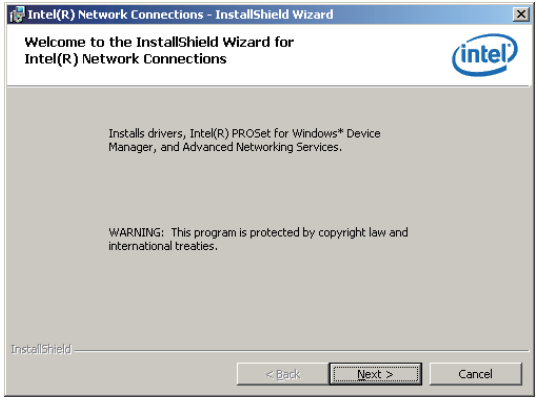


If **Autorun** is NOT enabled in your computer, browse the contents of the support DVD to locate the file **AUTORUN.EXE** and double-click the **AUTORUN.EXE** and follow step 4 to run the installation.

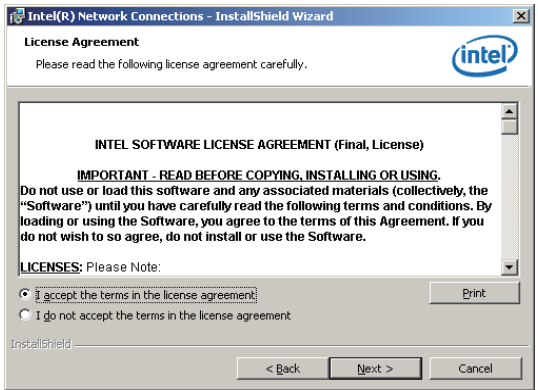
3. Click **Intel® PRO/1000 Gigabit Adapters Driver**.



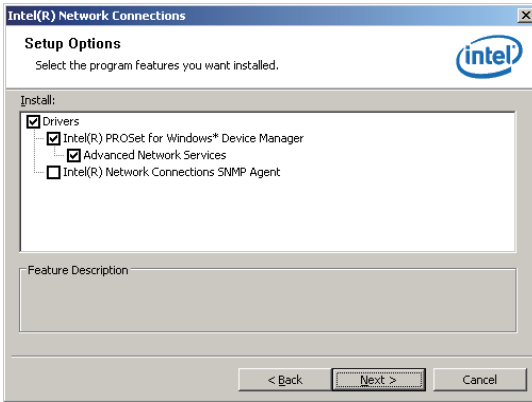
4. When the **Intel® PRO Network Connections – InstallShield Wizard** window appears, click **Next** to start the installation.



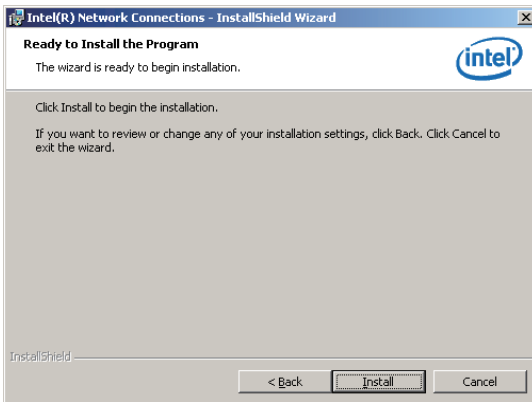
5. Click **I accept the terms in the license agreement** and then click **Next** to continue.



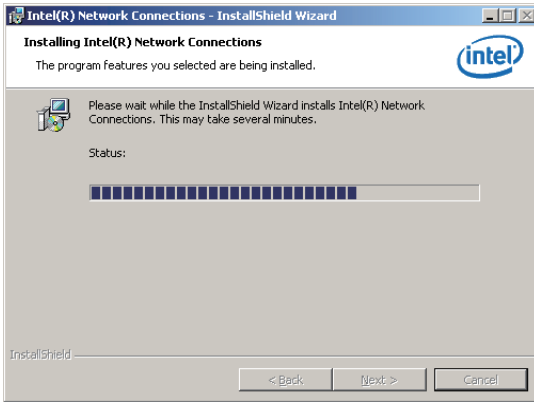
6. Select the programs you want to install and click **Next** to continue.



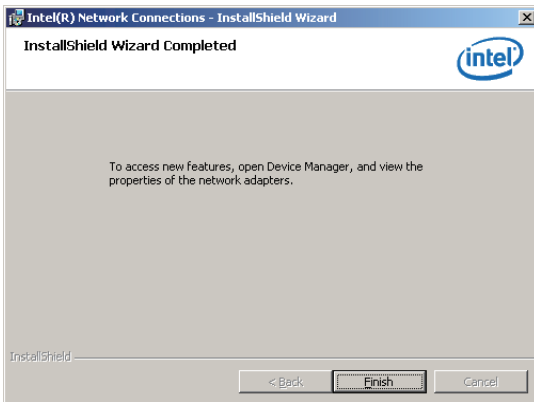
7. Click **Install** to start the installation.



- 8. The programs you select are being installed.



- 9. Click **Finish** to finish the installation.



7.4 Display driver installation

This section provides instructions on how to install the ASPEED display driver.

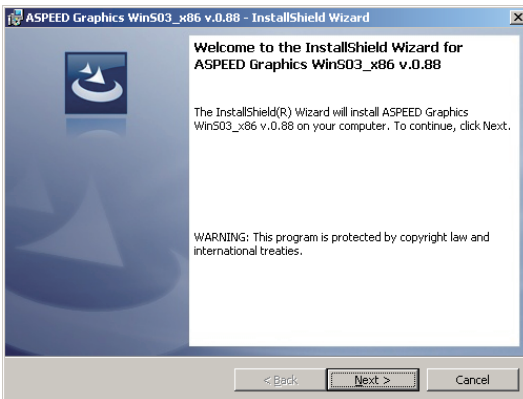
You need to manually install the ASPEED display driver on a Windows® operating system.

To install the ASPEED display driver

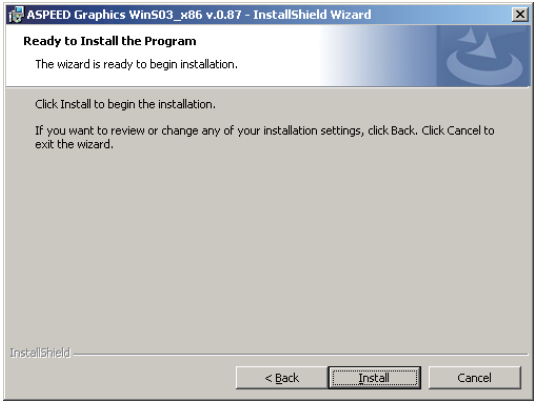
1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
3. Click **ASPEED AST2050 Display Driver**.



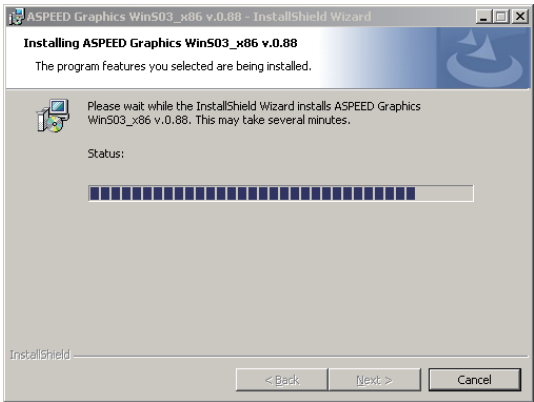
4. When the **ASPEED InstallShield Wizard** window appears, click **Next** to continue.



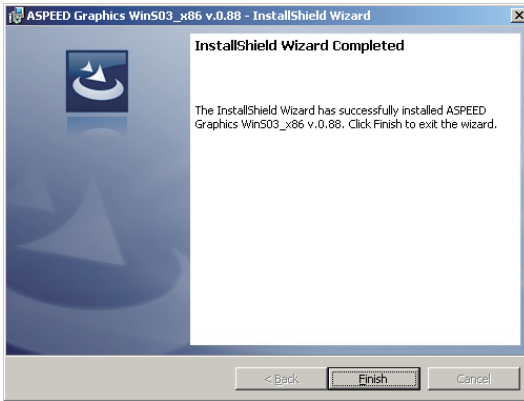
5. Click **Install** to start the installation.



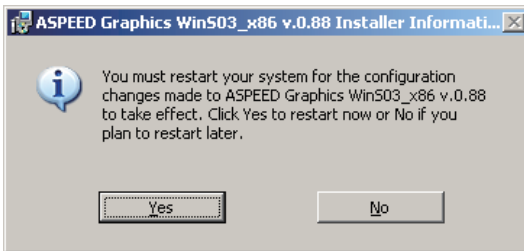
6. The system installs the driver automatically.



7. When the installation completes, click **Finish** to exit the wizard.



8. Click **Yes** to restart the computer.



7.5 Mellanox ConnectX QDR PCI Gen2 Channel Adapter driver installation (For RS704DA-E6/PS4 only)

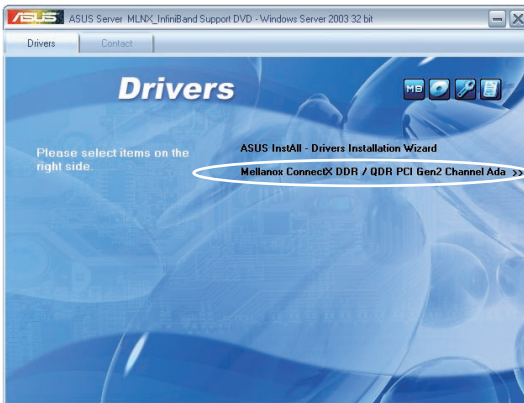
This section provides instructions on how to install the Mellanox driver.

7.5.1 Windows operating system

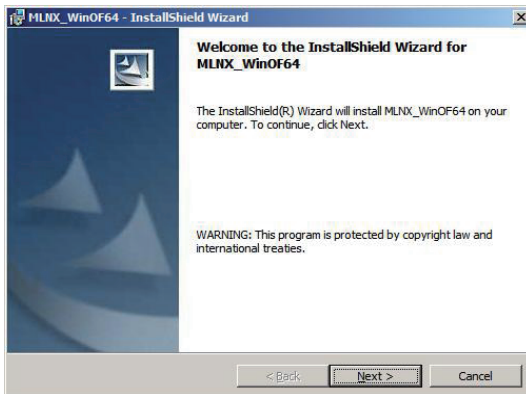
You need to manually install the Mellanox driver on a Windows® operating system.

To install the Mellanox driver

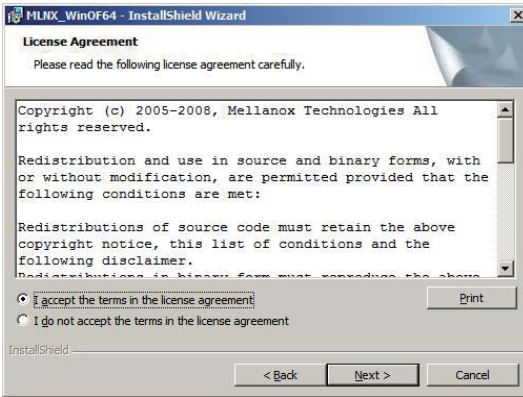
1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
3. Click **Mellanox ConnectX QDR PCI Gen2 Channel Adapter Driver**.



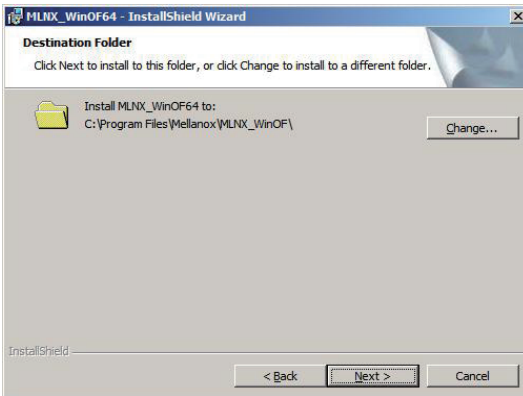
4. Click **Next** to start installing the driver.



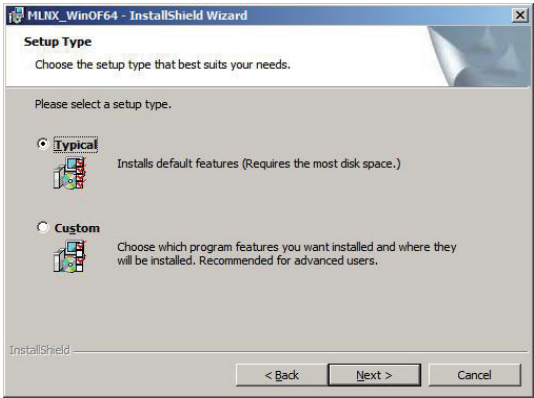
5. Click **I accept the terms in the license agreement** and click **Next** to continue.



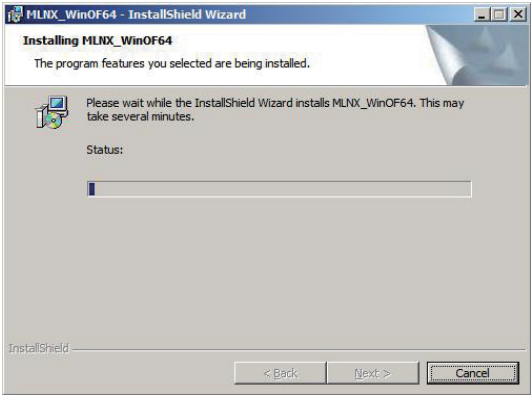
6. Click **Change** to select your desired destination folder and click **Next** to continue.



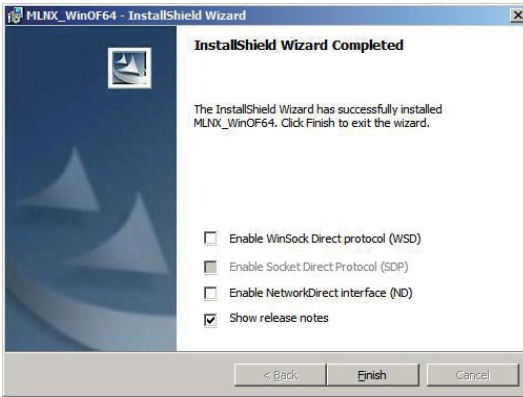
7. Select a setup type and click **Next** to continue.



8. The driver features you selected are being installed.



9. Click your preferred options and click **Finish** to exit the wizard.



7.5.2 Red Hat® Enterprise Linux OS

You need to manually mount the Mellanox driver on a Red Hat® Enterprise Linux OS.



For users using SUSE Linux Enterprise Server OS, follow the general instructions in this section to mount the Mellanox driver on your system.

To mount the Mellanox driver

1. Login to the system as root.
2. Create a folder on the desktop and copy the latest Mellanox driver to the folder.



You can name the folder as you like.

```
root@localhost: /
File Edit View Terminal Tabs Help
[root@localhost ~]# cd /
[root@localhost /]# mkdir xxx
[root@localhost /]#
```

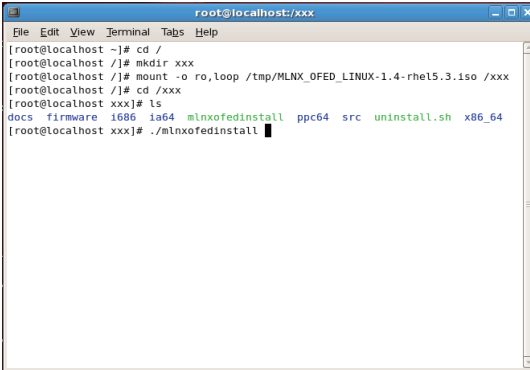
3. Type the command line and mount the driver to the system.



The driver version and the OS label may vary. Ensure that the command line matches your driver version and operating system.

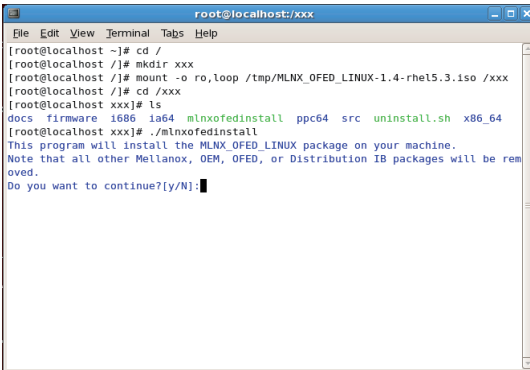
```
root@localhost: /
File Edit View Terminal Tabs Help
[root@localhost ~]# cd /
[root@localhost /]# mkdir xxx
[root@localhost /]# mount -o ro,loop /tmp/MLNX_OFED_LINUX-1.4-rhel5.3.iso /xxx
```


4. Type the command line and install the driver.



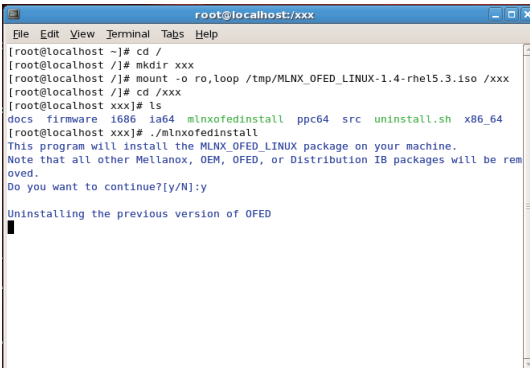
```
root@localhost:xxx
File Edit View Terminal Tabs Help
[root@localhost ~]# cd /
[root@localhost /]# mkdir xxx
[root@localhost /]# mount -o ro,loop /tmp/MLNX_OFED_LINUX-1.4-rhel5.3.iso /xxx
[root@localhost /]# cd /xxx
[root@localhost xxx]# ls
docs firmware 1686 ia64 mlnxofedinstall ppc64 src uninstall.sh x86_64
[root@localhost xxx]# ./mlnxofedinstall
```

5. All other Mellanox, OEM, OFED, or distribution IB packages will be removed. Press <Y> to continue.



```
root@localhost:xxx
File Edit View Terminal Tabs Help
[root@localhost ~]# cd /
[root@localhost /]# mkdir xxx
[root@localhost /]# mount -o ro,loop /tmp/MLNX_OFED_LINUX-1.4-rhel5.3.iso /xxx
[root@localhost /]# cd /xxx
[root@localhost xxx]# ls
docs firmware 1686 ia64 mlnxofedinstall ppc64 src uninstall.sh x86_64
[root@localhost xxx]# ./mlnxofedinstall
This program will install the MLNX_OFED_LINUX package on your machine.
Note that all other Mellanox, OEM, OFED, or Distribution IB packages will be removed.
Do you want to continue?[y/N]:
```

6. The system starts uninstalling the previous version of OFED.



```
root@localhost:xxx
File Edit View Terminal Tabs Help
[root@localhost ~]# cd /
[root@localhost /]# mkdir xxx
[root@localhost /]# mount -o ro,loop /tmp/MLNX_OFED_LINUX-1.4-rhel5.3.iso /xxx
[root@localhost /]# cd /xxx
[root@localhost xxx]# ls
docs firmware 1686 ia64 mlnxofedinstall ppc64 src uninstall.sh x86_64
[root@localhost xxx]# ./mlnxofedinstall
This program will install the MLNX_OFED_LINUX package on your machine.
Note that all other Mellanox, OEM, OFED, or Distribution IB packages will be removed.
Do you want to continue?[y/N]:y
Uninstalling the previous version of OFED
```

7. When the installation finishes, reboot your system to complete the installation.

```
root@localhost:xxx
File Edit View Terminal Tabs Help
65:libibmad-static ##### [ 88%]
66:libibmad-static ##### [ 89%]
67:librdmac-devel ##### [ 91%]
68:librdmac-devel ##### [ 92%]
69:libsdp-devel ##### [ 93%]
70:libsdp-devel ##### [ 95%]
71:opensm-devel ##### [ 96%]
72:opensm-devel ##### [ 97%]
73:opensm-static ##### [ 99%]
74:opensm-static ##### [100%]
Device (15b3:6732):
  0a:00:0 InfiniBand: Mellanox Technologies MT26418 [ConnectX IB DDR, PCIe
  2.0 5GT/s] (rev a0)
    Link Width: 8x
    Link Speed: 5Gb/s

Installation finished successfully.

The firmware version 2.6.0 is up to date.
Note: To force firmware update use '--force-fw-update' flag.
warning: /etc/infiniband/openib.conf saved as /etc/infiniband/openib.conf.rpmsav
e
[root@localhost xxx]#
```



If your system has the latest firmware, no firmware update will occur. To force firmware update, type **--force-fw-update**.

7.6 Management applications and utilities installation

The support DVD that came with the motherboard package contains the drivers, management applications, and utilities that you can install to avail all motherboard features.



The contents of the support DVD are subject to change at any time without notice. Visit the ASUS website at www.asus.com for updates.

7.6.1 Running the support DVD

Place the support DVD to the optical drive. The 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 DVD.

7.6.2 Drivers menu

The Drivers menu shows the available device drivers if the system detects installed devices. Install the necessary drivers to activate the devices.

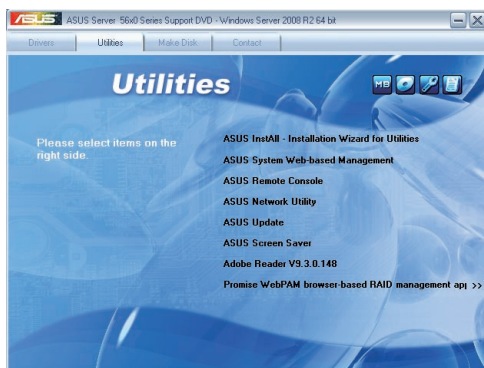


The screen display and driver options vary under different operating system versions.



7.6.3 Utilities menu

The Utilities menu displays the software applications and utilities that the motherboard supports. Click an item to install.



7.6.4 Make disk menu

The Make disk menu contains items to create the AMD AHCI Controller driver disk.



7.6.5 Contact information

Click the Contact tab to display the ASUS contact information. You can also find this information on the inside front cover of this user guide.

