KCMR-D12

ASUS®

Motherboard

Contents

Contents

Contents

Contents

Notices

Federal Communications Commission Statement

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

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

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

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

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

Canadian Department of Communications Statement

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

This class B digital apparatus complies with Canadian ICES-003.

REACH

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

Safety information

Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.

- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.

- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.

- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.

- Make sure that your power supply is set to the correct voltage in your area. If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.

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

Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.

- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.

- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.

- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.

- Place the product on a stable surface.

- If you encounter technical problems with the product, contact a qualified service technician or your retailer.

This symbol of the crossed out wheeled bin indicates that the product (electrical, electronic equipment, and mercury-containing button cell battery) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

About this guide

This user guide contains the information you need when installing and configuring the motherboard.

How this guide is organized

This user guide contains the following parts:

- **Chapter 1: Product introduction**

    This chapter describes the features of the motherboard and the new technologies it supports.

- **Chapter 2: Hardware information**

    This chapter lists the hardware setup procedures that you have to perform when installing system components. It includes description of the switches, jumpers, and connectors on the motherboard.

- **Chapter 3: Powering up**

    This chapter describes the power up sequence and ways of shutting down the system.

- **Chapter 4: BIOS setup**

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

- **Chapter 5: RAID configuration**

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

- **Chapter 6: Driver installation**

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

- **Appendix: Reference information**

    This appendix includes additional information that you may refer to when configuring the motherboard.

Where to find more information

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

1. **ASUS websites**

    The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.

2. **Optional documentation**

    Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

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+D>
`Command`	Means that you must type the command exactly as shown, then supply the required item or value enclosed in brackets.
	Example: At the DOS prompt, type the command line: `format A:/S`

KCMR-D12 specifications summary

Model Name		KCMR-D12
Processor Support / System Bus		2 * socket C32 (LGA 1207)
		4/6 Core AMD Opteron™ 4100 series
		HyperTransport™ Technology 3.0 6.4 GT/s per link (dual link)
Core Logic		AMD SR5670 / AMD SP5100
Form Factor		12" x 13"
ASUS Features	Fan Speed Control	V
	Rack Ready (Rack and Pedestal dual use)	V
	ASWM 2.0	V
Memory	Total Slots	12 (2-channel per CPU)
	Capacity	Maximum up to 128GB (RDIMM) Maximum up to 32GB (UDIMM)
	Memory Type	DDR3 1066/1333 UDIMM with ECC/ non ECC DDR3 667/800/1066/1333 RDIMM
	Memory Size	1GB, 2GB, 4GB, 8GB* (RDIMM) 1GB, 2GB, 4GB (UDIMM)
Expansion Slots (follow SSI Loacation #)	Total PCI/PCI-X/ PCI-E Slots	5
	Slot Loacation 1	1 * PCI-E x8 (Gen2 X4/X0 Link, share with additional slot 1)
	Slot Loacation 3	1 * PCI-E x8 (Gen2 X8 Link)
	Slot Loacation 4	1 * PCI-E x8 (Gen2 X8/X0 Link, share with slot 6)
	Slot Loacation 6	1 * PCI-E x16 (Gen2 X16/8 Link.auto switch with slot4)
	Slot Loacation 7	1 * PCI 32bit/33 MHz
	Additional Slot 1	1* PIKE Slot for Stroage expansion
Storage	SATA Controller	AMD SP5100: 6 SATA2 300MB/s ports
	SAS Controller	Optional: ASUS PIKE 1064E 4-port SAS RAID card ASUS PIKE 1068E 8-port SAS RAID card ASUS PIKE 1078 8-port SAS HW RAID card ASUS PIKE 6480 8-port SAS RAID card ASUS PIKE 2008 8-port SAS2 6G RAID card ASUS PIKE 2008/IMR 8-port SAS2 6G RAID card
Networking	LAN	2 * Intel 82574L
Graphic	VGA	Aspeed AST2050 8MB

KCMR-D12 specifications summary

Onboard I/O Connectors	**PSU Connector**	24-pin SSI power connector + 8-pin SSI 12V + 8-pin SSI 12V power connector
	Management Connector	Onboard socket for optional management card
	USB Connectors	5 Connectors: 1 x USB connector (Type A USB socket) 2 x USB pin headers (up to 4 devices)
	Fan Header	8 * 4pin
	SMBus	2
	Chassis intruder	1
	Front LAN LED	2
	Serial Port Header	1
	GPTPM header	1
Rear I/O Connectors	**External Serial Port**	1
	External USB Port	2
	VGA Port	1
	RJ-45	3 (One for BMC, 2 for LAN)
	PS/2 KB/Mouse	1
Management Solution	**Software**	ASWM
	Out of Band Remote Management	Optional ASMB4-iKVM for KVM-over-IP support
Monitoring	**CPU Temperature**	V
	FAN RPM	V
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.

⚠ DO NOT touch the Northbridge chipset! The Northbridge chipset may become overheated. Remember to provide sufficient air flow to keep the system stable.

This chapter describes the motherboard
features and the new technologies it supports.

Product introduction 1

Chapter summary

1

1.1   Welcome!

Thank you for buying an ASUS® KCMR-D12 motherboard!

The motherboard delivers a host of new features and latest technologies, making it another standout in the long line of ASUS quality motherboards!

Before you start installing the motherboard, and hardware devices on it, check the items in your package with the list below.

1.2   Package contents

Check your motherboard package for the following items.

		Standard Gift Box Pack	Standard Bulk Pack
Cable	SATA data	6	--
	Thermal sensor	1	--
Accessory	I/O Shield	1	1
Application CD	Support CD	1	1
Documentation	User Guide	1	1
Packing Qty.		1pc per carton	10pcs per carton

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

1.3   Serial number label

Before requesting support from the ASUS Technical Support team, you must take note of the motherboard's serial number containing 13 characters **xxS2xxxxxxxxx** 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.

KCMR-D12

xxS2xxxxxxxxx

Made in China

合格

1.4   Special features

1.4.1   Product highlights

Latest processor technology

The motherboard comes with dual 1207-pin surface mount Land Grid Array (LGA) sockets coded C32, designed for AMD Opteron™ 4100 series processors. The motherboard with the new socket supports registered DDR3 memory, delivering advanced performance and ensuring reliable data protection.

DDR3 memory support

The KCMR-D12 supports UDIMM and RDIMM DDR3 memory that features data transfer rates of 1333/1066 MHz to meet the higher bandwidth requirements of server and workstation applications. The 2-channel DDR3 architecture boosts system performance, eliminating bottlenecks with peak bandwidth of up to 20.8GB/s. Furthermore, the supply voltage for the memory is reduced form 1.8 V for DDR2 to just 1.5V for DDR3. This voltage reduction limits the power consumption and heat generation of DDR3 which makes it an ideal memory solution. The motherboard also supports 1.35V DDR3 LVDIMMs.

AMD 4/6 Core Architecture

The motherboard supports AMD 4/6 core processors with discrete L2 cache structure for each core and shared L3 cache to meet demands for more powerful computing.

HyperTransport™ technology 3.0 (HT3)

HyperTransport™ technology 3.0 (HT3) is a high-speed, low latency, point-topoint link designed to improve the overall system balance and scalability with the maximum interconnect rate of 6.4GT/s.

PCIe 2.0

This motherboard supports the latest PCIe 2.0 device for twice the current speed and bandwidth. This enhances system performance while still providing backward compatibility to PCIe 1.0 devices.

82574L LAN Solution

The motherboard comes with dual Gigabit LAN controllers and ports which provide a total solution for your networking needs. The onboard Intel 82574L Gigabit LAN controllers use the PCI Express interface and could achieve network throughput close to Gigabit bandwidth.

Serial ATA II technology

The motherboard supports the Serial ATA II 3 Gb/s technology through the Serial ATA interface and Intel ICH10R chipset. The Serial ATA II specification provides twice the bandwidth of the current Serial ATA products with a host of new features, including Native Command Queuing (NCQ), Power Management (PM) Implementation Algorithm, and Hot Swap. Serial ATA allows thinner, more flexible cables with lower pin count and reduced voltage requirements.

USB 2.0 technology

The motherboard implements the Universal Serial Bus (USB) 2.0 specification, dramatically increasing the connection speed from the 12 Mbps bandwidth on USB 1.1 to a fast 480 Mbps on USB 2.0. USB 2.0 is backward compatible with USB 1.1.

Temperature, fan, and voltage monitoring

The CPU temperature is monitored to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The chip monitors the voltage levels to ensure stable supply of current for critical components.

100% Conductive Polymer Capacitors

This motherboard uses all high-quality conductive polymer capacitors for durability, improved lifespan, and enhanced thermal capacity.

1.4.2   Innovative ASUS features

ASUS Fan Speed technology

The ASUS Fan speed technology smartly adjusts the fan speeds according to the system loading to ensure quiet, cool, and efficient operation.

PIKE (Proprietary I/O Kit Expansion)

PIKE is an on-demand upgrade kit for users. This ASUS unique feature enables users to choose their preferred I/O solutions. ASUS provides multiple SAS solutions for different segments and purposes and PIKE saves lots of validation efforts and hardware cost for end users. Moreover, the special patent design offers multiple I/O solutions without occupying the Slot 6 in 1U system.

This chapter lists the hardware setup
procedures that you have to perform
when installing system components. It
includes description of the jumpers and
connectors on the motherboard.

Hardware information 2

Chapter summary

2

2.1   Before you proceed

Take note of the following precautions before you install motherboard components or change any motherboard settings.

⚠

- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid touching the ICs on them.
- Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that came with the component.
- Before you install or remove any component, ensure that the power supply is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

Onboard LED

1. **Standby Power LED**

    The motherboard comes with a standby power LED. The green LED lights up to indicate that the system is ON, in sleep mode, or in soft-off mode. This is a reminder that you should shut down the system and unplug the power cable before removing or plugging in any motherboard component. The illustration below shows the location of the onboard LED.
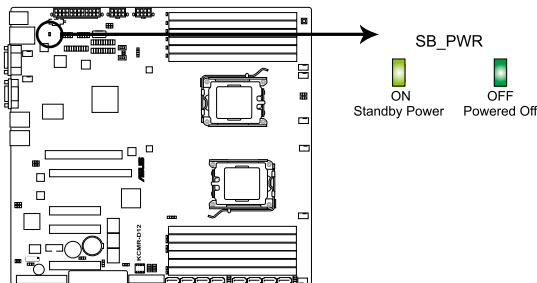
KCMR-D12 Onboard LED

2. **CPU warning LED (ERR_CPU1, ERR_CPU2)**

    The CPU warning LEDs light up to indicate that an impending failure of the corresponding CPU.
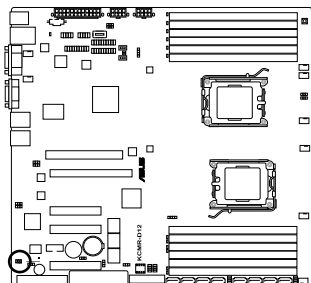
KCMR-D12 ERR CPU LED

3. **DIMM warning LED (ERR_DIMMA1/2/3; ERR_DIMMB1/2/3; ERR_DIMMC1/2/3; ERR_DIMMD1/2/3)**

    The DIMM warning LEDs light up to indicate that an impending failure of the corresponding DIMMs.
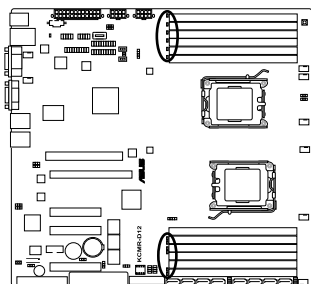
KCMR-D12 ERR DIMM LED

4. BMC LED (BMC_LED1)

The green heartbeat LED blinks per second to indicate that the ASMB4 is working normally.
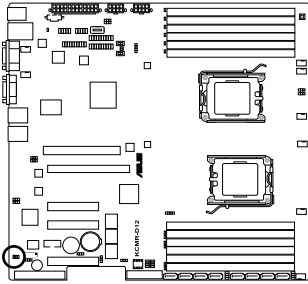
KCMR-D12 BMC LED

• The heartbeat LED functions only when you install the ASUS ASMB4.

• Everytime after the AC power is replugged, you have to wait for about 30 seconds for the system power up

2.2 Motherboard overview

Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

To optimize the motherboard features, we highly recommend that you install it in an SSI EEB 1.1 compliant chassis.

> Ensure to unplug the chassis power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components!

2.2.1 Placement direction

When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

Place nine (9) screws into the holes indicated by circles to secure the motherboard to the chassis.

> DO NOT overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis
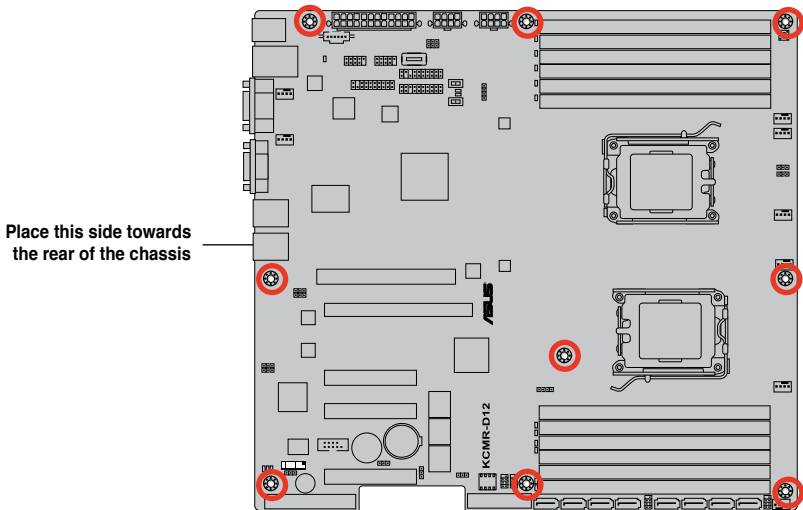
2.2.4 Motherboard layouts

KCMR-D12

ATXPWR1
PS2_KBMS1
USB12_LAN3 SB_PWR1
COM1
REAR_FAN1
VGA1
REAR_FAN2
LAN1
LAN2
ATX12V1 ATX12V2
PSUSMB1 USB34 USB56 USB8 TR2 TR1
RTL8211N
GPTPM1
AUX_PANEL1
PANEL1
Winbond W83795G
TurboV
CORE_UNLOCKER
TURBO_KEY_II
ERR_DIMMA3
ERR_DIMMA2
ERR_DIMMA1
ERR_DIMMB3
ERR_DIMMB2
ERR_DIMMB1
LVDDR3_SEL1
EPU

DDR3 DIMM_A3 (64bit, 240-pin module)
DDR3 DIMM_A2 (64bit, 240-pin module)
DDR3 DIMM_A1 (64bit, 240-pin module)
DDR3 DIMM_B3 (64bit, 240-pin module)
DDR3 DIMM_B2 (64bit, 240-pin module)
DDR3 DIMM_B1 (64bit, 240-pin module)
MEMOK

AMD SR5670
Super I/O
PCI1
LAN_SW1
LAN_SW2
PCIEX16_2
AMD SP5100
VGA_SW1
IPMI_SEL1
ASPEED AST2050
PCIEX8_4
PCIEX8_5
COM2
BMC_LED1
EPU_CPU1
ERR_CPU2
BMC_FW1
LOCLED1
BUZZ1
PCIEX8_7
PIKE1
I_BTN1
Lithium Cell CMOS Power
CLRTC1
RECOVERY1
PIKE_SW1
BIOS
ICS
EPU

CPU1
CPU2

FRNT_FAN1
CPU_FAN1
CHAFAN_SEL1
CPUFAN_SEL1
FRNT_FAN2
FRNT_FAN3
CPU_FAN2
LVDDR3_SEL2

SATA1 SATA2
SATA3 SATA4
SATA5 SATA6

ERR_DIMMD1
ERR_DIMMD2
ERR_DIMMD3
ERR_DIMMC1
ERR_DIMMC2
ERR_DIMMC3

DDR3 DIMM_D1 (64bit, 240-pin module)
DDR3 DIMM_D2 (64bit, 240-pin module)
DDR3 DIMM_D3 (64bit, 240-pin module)
DDR3 DIMM_C1 (64bit, 240-pin module)
DDR3 DIMM_C2 (64bit, 240-pin module)
DDR3 DIMM_C3 (64bit, 240-pin module)

SGPIO4 SGPIO3
FRNT_FAN4
PIKE2
SAS1 SAS2 SAS3 SAS4 SGPIO2 SAS5 SAS6 SAS7 SAS8 SGPIO1

2.2.5　Layout contents

Slots/Soocket		Page
1.	CPU sockets	2-10
2.	DDR3 sockets	2-17
3.	PCI slot	2-22
4.	PCI Express x 8 slots (x8/x4 link)	2-22
5.	PCI Express x 16 slot (x16/x8 link)	2-22
6.	PIKE slot	2-22

Jumpers		Page
1.	Clear RTC RAM (CLRTC1)	2-25
2.	VGA controller setting (3-pin VGA_SW1))	2-26
3.	DDR3 voltage control setting (4-pin LVDDR3_SEL1; LVDDR3_SEL2)	2-26
4.	LAN controller setting (3-pin LAN_SW1, LAN_SW2)	2-27
5.	CPU Fan and Chassis Fan control setting (3-pin CPUFAN_SEL1, CHAFAN_SEL1)	2-27
6.	Force BIOS recovery setting (3-pin RECOVERY1)	2-28

Rear panel connectors		Page
1.	PS/2 mouse port (green)	2-29
2.	RJ-45 port for iKVM	2-29
3.	PS/2 keyboard port (purple)	2-29
4.	USB 2.0 ports 1 and 2	2-29
5.	Serial (COM1) port	2-29
6.	Video Graphics Adapter port	2-29
7.	LAN 1 (RJ-45) port	2-29
8.	LAN 2 (RJ-45) port	2-29

Internal connectors	Page
1. Serial ATA connectors (7-pin SATA1, SATA2, SATA3, SATA4; RED) (7-pin SATA5, SATA6; Black)	2-30
2. SAS connectors (7-pin SAS1, SAS2, SAS3, SAS4; Red) (7-pin SAS5, SAS6, SAS7, SAS8; Blue)	2-31
3. USB connector (10-1 pin USB34, USB56; A-Type USB8)	2-31
4. Front fan connectors (4-pin CPU_FAN1/2; REAR_FAN1—2; FRNT_FAN1—4)	2-32
5. Serial General Purpose Input/Output connector (6-1 pin SGPIO1/2/3/4)	2-32
6. BMC header (BMC_FW1)	2-33
7. Thermal sensor cable connectors (3-pin TR1, TR2)	2-33
8. SSI power connectors (24-pin ATXPWR1, 8-pin ATX12V1, 8-pin ATX12V2)	2-34
9. Location LED cable connector (3-pin LOCLED1)	2-34
10. System panel connector (20-pin PANEL1)	2-35
11. Auxiliary panel connector (20-2 pin AUX_PANEL1)	2-36

2.3 Central Processing Unit (CPU)

The motherboard comes with dual surface mount LGA 1207 Socket designed for the AMD Opteron™ 4100 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 1207.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/ incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU

1. Locate the CPU socket on the motherboard.
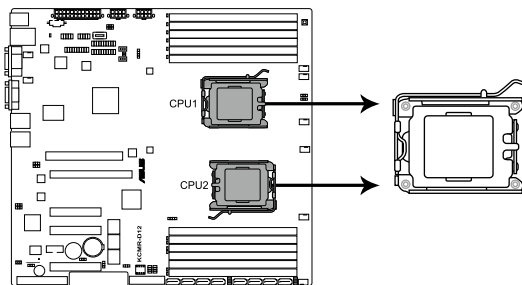
KCMR-D12 CPU LGA1207 Socket

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.

Retention tab

A

B
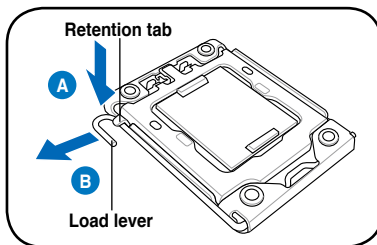
Load lever

3. Lift the load lever in the direction of the arrow to a 135º angle.

4. Lift the load plate with your thumb and forefinger to a 100º angle.

Load plate

4

3
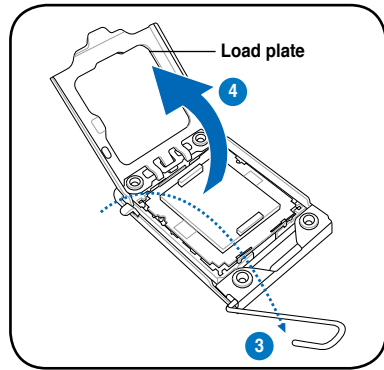
5. Remove the PnP cap from the CPU socket.

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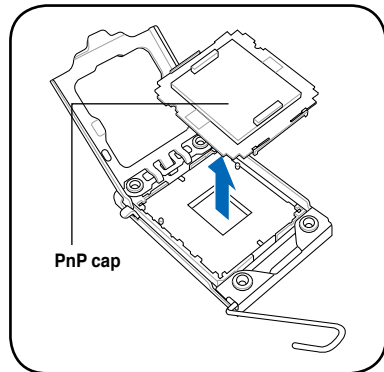
6. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment key into the CPU notch.

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!

Gold triangle mark

CPU notch

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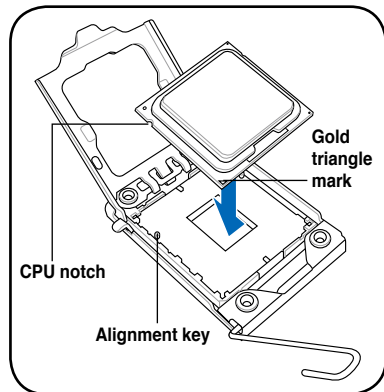
7. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.

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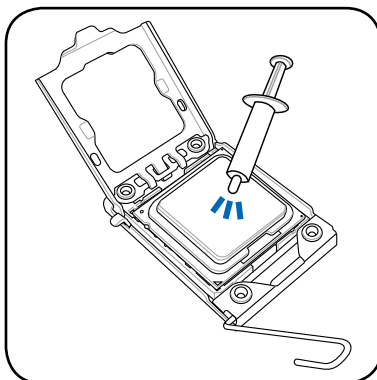
The Thermal Interface Material is toxic. DO NOT eat the Thermal Interface Material. If it gets into your eyes or touches your skin, ensure that you wash it off immediately and seek professional medical help.

To prevent contaminating the Thermal Interface Material, DO NOT spread the Thermal Interface Material with your finger directly.

2.3.2 Installing the CPU heatsink and fan

The AMD Opteron™ 4100 series processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

> •   The retention module base is already installed on the motherboard upon purchase.
>
> •   You do not have to remove the retention module base when installing the CPU or installing other motherboard components.
>
> •   Ensure that you use only AMD-certified heatsink and fan assembly.

> If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.

> Ensure that you have installed the motherboard to the chassis before you install the CPU fan and heatsink assembly.

To install the CPU heatsink and fan

1.   Place the heatsink on top of the installed CPU, ensuring that the heatsink fits properly on the retention module base.
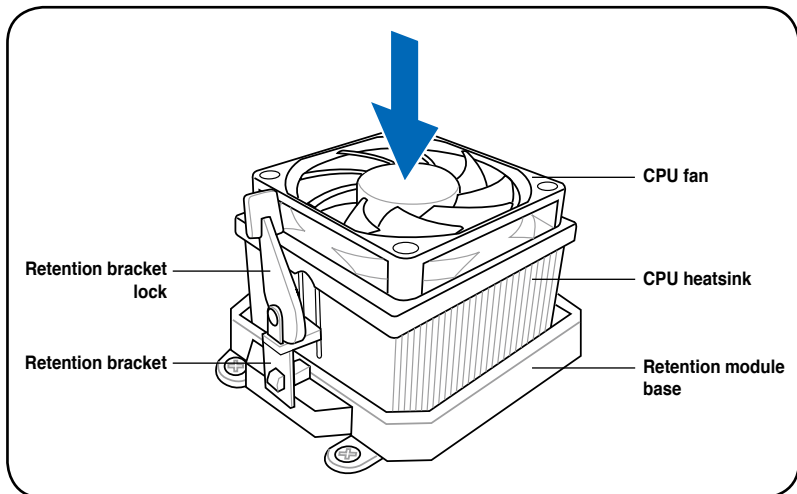
> Your boxed CPU heatsink and fan assembly should come with installation instructions for the CPU, heatsink, and the retention mechanism. If the instructions in this section do not match the CPU documentation, follow the latter.

2.   Attach one end of the retention bracket to the retention module base.
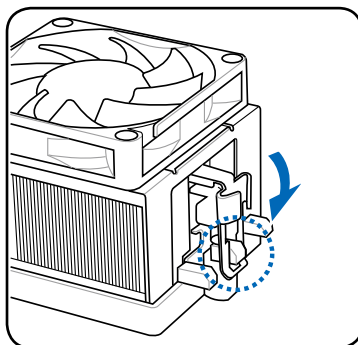
3.   Align the other end of the retention bracket (near the retention bracket lock) to the retention module base. A clicking sound denotes that the retention bracket is in place.

> Ensure that the fan and heatsink assembly perfectly fits the retention mechanism module base, otherwise you cannot snap the retention bracket in place.
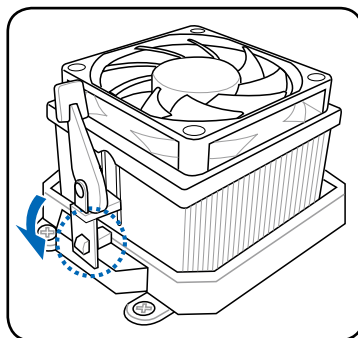
4.   Push down the retention bracket lock on the retention mechanism to secure the heatsink and fan to the module base.
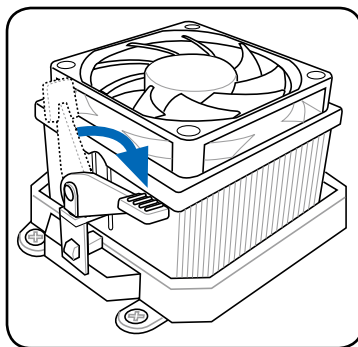
5. Connect the CPU fan cable to the corresponding connector on the motherboard.

KCMR-D12 CPU FAN connectors

CPU_FAN1

PWM Control
FAN Speed
FAN Power
GND

CPU_FAN2

PWM Control
FAN Speed
FAN Power
GND
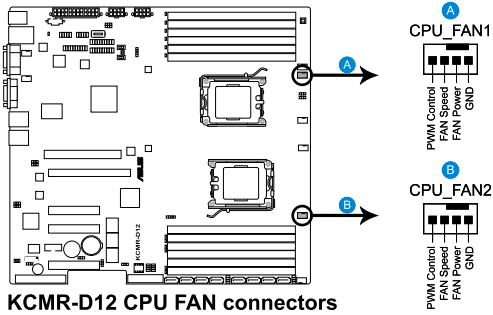
• Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

• This connector is backward compatible with old 3-pin CPU fan.

2.3.3   Installing the CPU heatsink

The AMD Opteron™ 4100 series processors require a specially designed heatsink to ensure optimum thermal condition and performance.

> • Ensure to use qualified heatsink assembly only.
> • Ensure that you have applied the thermal grease to the top of the CPU before installing the heatsink.

Follow these steps to install the CPU heatsink.

1.   Orient and place the heatsink on top of the installed CPU, ensuring that the screw holes are matched with the heatsink standoffs.
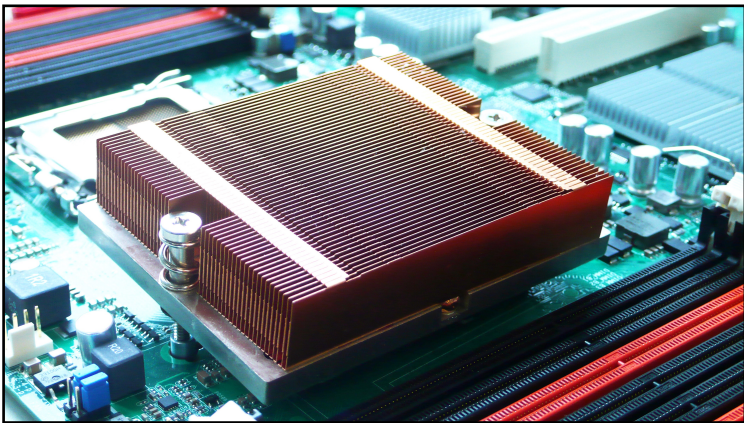
2.   Use a Phillips screwdriver to tighten the two heatsink screws.
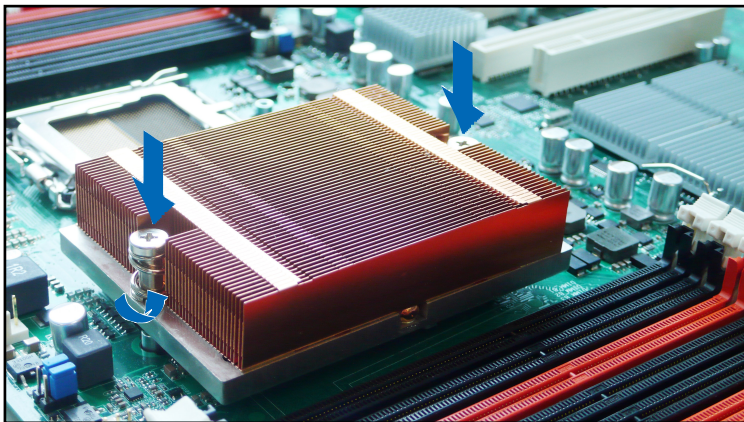
> Ensure that the heatsink is not skewed or tilted, otherwise the CPU will overheat.

2.4 System memory

2.4.1 Overview

The motherboard comes with twelve (12) Double Data Rate 3 (DDR3) Dual Inline Memory Modules (DIMM) sockets.

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

The figure illustrates the location of the DDR3 DIMM sockets:
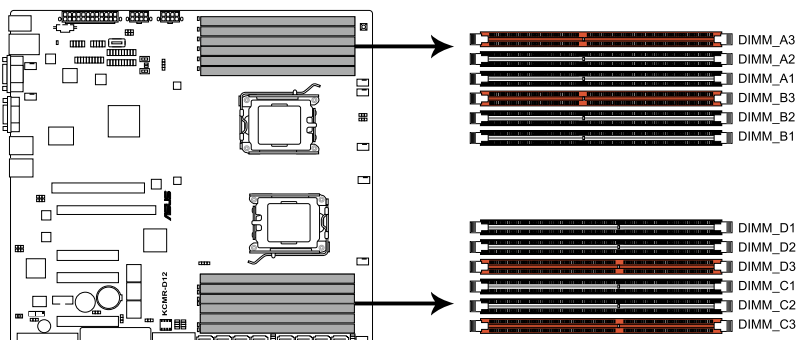
KCMR-D12 240-pin DDR3 DIMM sockets

2.4.2   Memory Configurations

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

Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.

Memory population table

SR: Single Rank; DR: Double Rank; QR: Quad Rank

	DIMM0	DIMM1	DIMM2	Max MHz (1.5V)	Max MHz (1.35V)	Timing Mode
UDIMM	--	--	SR/DR	800	800	1T
	SR/DR	--	SR/DR	800	800	1T
	--	--	SR/DR	1066	1066	1T
	SR/DR	--	SR/DR	1066	1066	1T
	--	--	SR/DR	1333	1333	1T
	SR	--	SR	1333	1333	2T
	DR	--	DR	1333	--	2T
	SR	--	DR	1333	--	2T
	DR	--	SR	1333	--	2T
RDIMM	--	--	SR/DR	667	667	
	SR/DR	--	SR/DR	667	667	
	--	QR	SR/DR	667	667	
	SR/DR	SR/DR	SR/DR	667	667	
	SR/DR	QR	SR/DR	667	667	
	--	--	SR/DR	800	800	
	SR/DR	--	SR/DR	800	800	
	--	QR	SR/DR	800	--	
	SR/DR	SR/DR	SR/DR	800	800	
	--	QR	--	800	800	
	--	--	SR/DR	1066	1066	
	SR/DR	--	SR/DR	1066	1066	
	SR	SR	SR	1066	--	
	--	--	SR/DR	1333	1333	
	SR	--	SR	1333	1333	

DO NOT install DIMMs of different voltages on the motherboard at the same time, such as a combination of 1.5V DIMMs and 1.35V LVDIMMs.

DIMM 0: DIMM_A1, B1, C1, D1; DIMM 1: DIMM_A2, B2, C2, D2; DIMM 2: DIMM_A3, B3, C3, D3.

2.4.3   Installing a DIMM

⚠️ Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

To install a DIMM:

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

2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.

DDR3 DIMM notch

Unlocked retaining clip
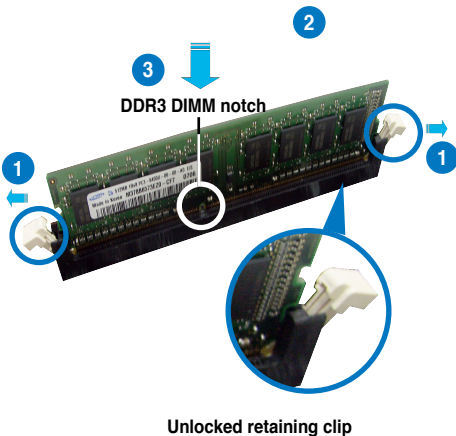
✏️
*   A DDR3 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.

*   The DDR3 DIMM sockets do not support DDR and DDR2 DIMMs. DO NOT install DDR or DDR2 DIMMs to the DDR3 DIMM sockets.

2.4.4   Removing a DIMM

To remove a DIMM:

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

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

DDR3 DIMM notch
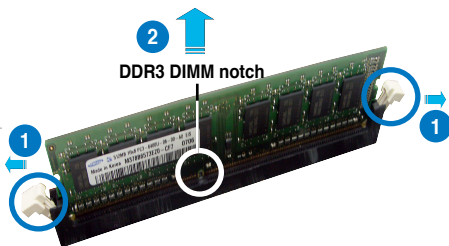
2. Remove the DIMM from the socket.

2.5 Expansion slots

In the future, you may need to install expansion cards. The following sub-sections describe the slots and the expansion cards that they support.

Ensure to unplug the power cord before adding or removing expansion cards. Failure to do so may cause you physical injury and damage motherboard components.

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.

2. Remove the system unit cover (if your motherboard is already installed in a chassis).

3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.

4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

5. Secure the card to the chassis with the screw you removed earlier.

6. Replace the system cover.

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 4 for information on BIOS setup.

2. Assign an IRQ to the card. Refer to the tables on the next page.

3. Install the software drivers for the expansion card.

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

2.5.3   Interrupt assignments

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.

2.5.4   PCI slots

The PCI slot supports cards such as a LAN card, USB card, and other cards that comply with PCI 2.3 specifications.

2.5.5   PCI Express x8 slots (x8/x4 link)

The onboard PCI Express x8 slots provide x8/x4 link to CPU. These slots support VGA cards and various server class high performance add-on cards.

2.5.6   PCI Express x16 slot (x16/x8 link)

The onboard PCI Express x16 slot provides x16 link to CPU. It automatically switches to x8 link when the slot 4 is occupied. This slot supports VGA cards and various server class high performance add-on cards.

2.5.7   PIKE slot

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

PCI slot

PIKE slots

PCIEx8 slots (x8/x4 link)

PCIEx16 slot (x16/x8 link)
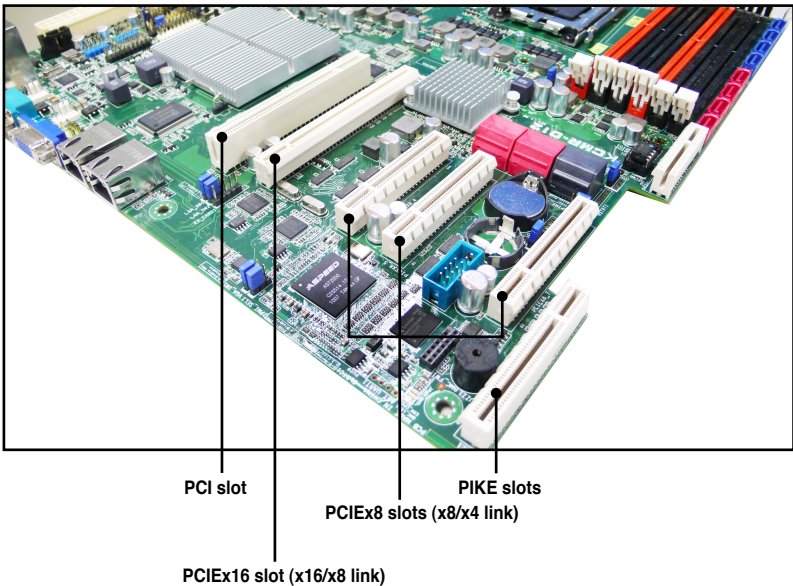
2.5.8 Installing ASMB4 management board

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

1. Locate the BMC_FW1 header on the motherboard.
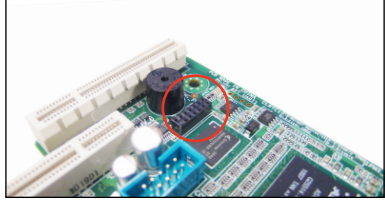
2. Orient and press the ASMB4 management board in place.
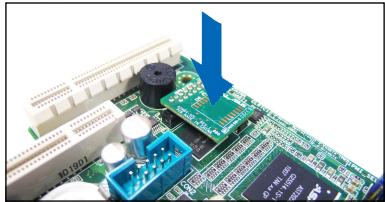
2.5.9 Installing i Button

Follow the steps below to install an optional i Button on your motherboard.

1. Locate the i Button slot on the motherboard.
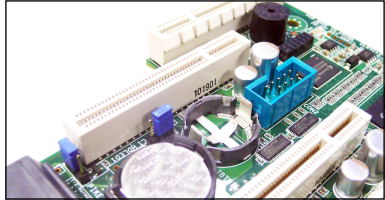
2. Snap the i Button in place.
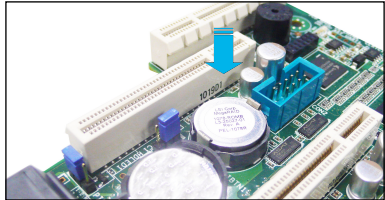
2.5.10   Installing ASUS PIKE RAID card

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

1.   Locate the PIKE RAID card slot on the motherboard.
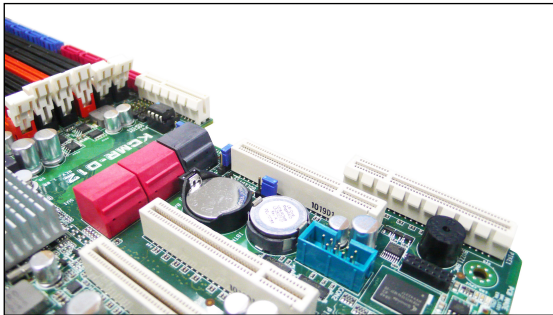
2.   Align the golden fingers of the RAID card with the PIKE RAID card slot.
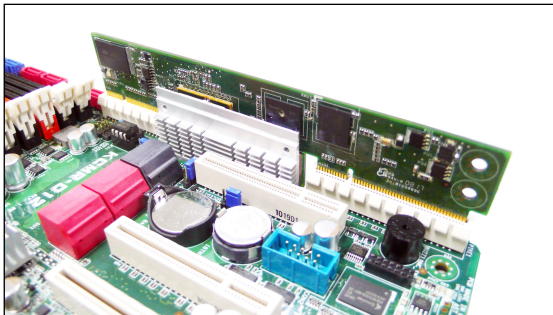
3.   Insert the RAID card into the PIKE RAID card slot. Make sure it is completely seated on the PIKE RAID card slot.
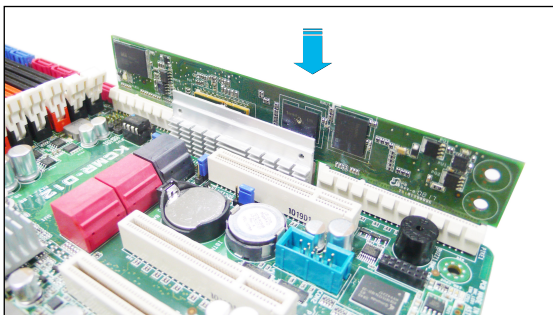
2.6 Jumpers

1. **Clear RTC RAM (CLRTC1)**

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

    To erase the RTC RAM:

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

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

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

KCMR-D12 Clear RTC RAM

CLRTC1

1 2   2 3

Normal   Clear CMOS
(Default)
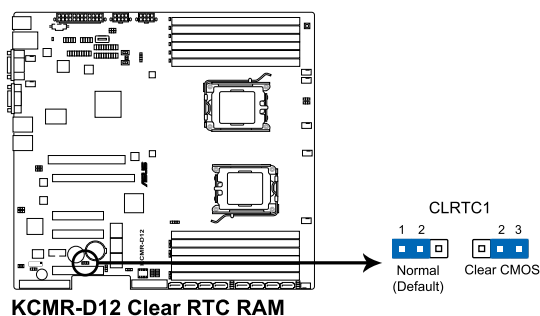
2.   **VGA controller setting (3-pin VGA_SW1)**

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

VGA_SW1

1 2   2 3

Enable   Disable
(Default)

KCMR-D12 VGA setting
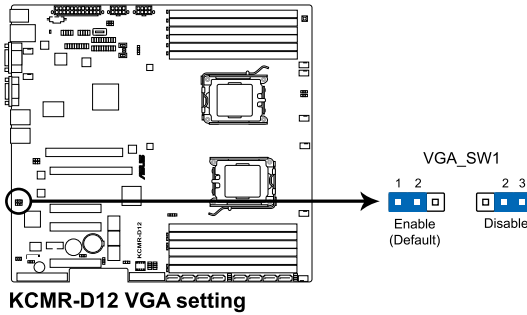
3.   **DDR3 voltage control setting (4-pin LVDDR3_SEL1; LVDDR3_SEL2)**

These jumpers allow you to adjust the DIMM voltage. Set to pins 1–2 to select 1.5V BIOS control, pins 2–3 to select 1.2V Force or 3–4 to select 1.35V Force.

LVDDR3_SEL1

2   3   4
1   2   3

+1.5V   Force +1.2V   Force +1.35V
(BIOS control)
(Default)

LVDDR3_SEL2

1 2   2 3   3 4

+1.5V   Force +1.2V   Force +1.35V
(BIOS control)
(Default)

KCMR-D12 LVDDR3 setting
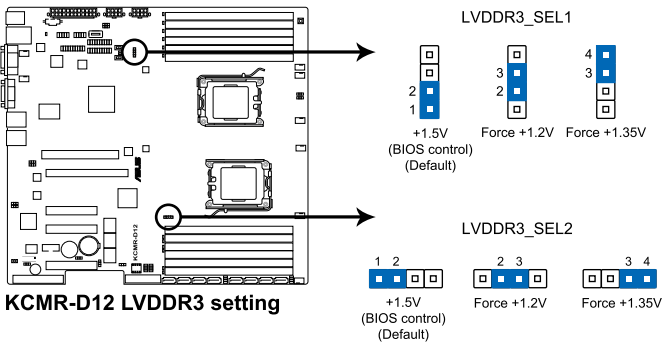
4. **LAN controller setting (3-pin LAN_SW1, LAN_SW2)**

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

   LAN_SW1

   1 2   2 3
   Enable   Disable
   (Default)

   LAN_SW2

   1 2   2 3
   Enable   Disable
   (Default)
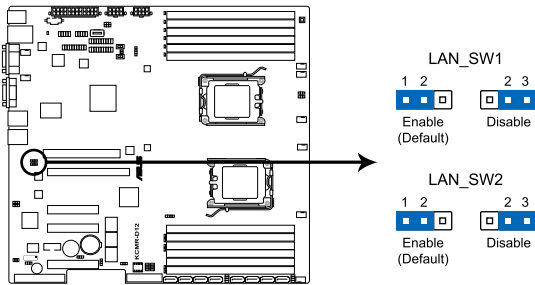
   KCMR-D12 LAN setting

5. **CPU Fan and Chassis Fan control setting (3-pin CPUFAN_SEL1, CHAFAN_SEL1)**

   These jumpers allow you to switch for fan pin selection. The CPUFAN_SEL1 jumper is for the CPU fan control and the CHAFAN_SEL1 jumper is for the front fans and rear fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.

   CHAFAN_SEL1

   1 2   2 3
   4-pin FAN   3-pin FAN
   (Default)

   CPUFAN_SEL1

   1 2   2 3
   4-pin FAN   3-pin FAN
   (Default)
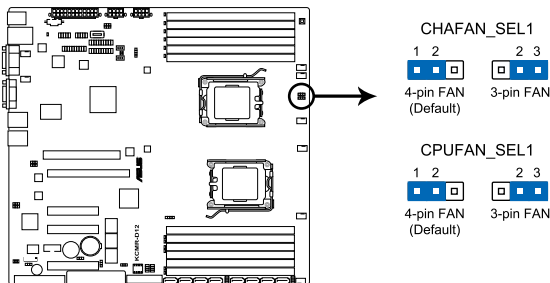
   KCMR-D12 FAN setting

   • If you use a 4-pin fan but set the jumper to pin 2-3, the fan you installed may not work.

   • If you use a 3-pin fan but set the jumper for a 4-pin fan, the fan control will not work and the fan you installed will always run at full speed.

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 (XXXXXX.ROM) and the AFUDOS.EXE utility.

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.

KCMR-D12 BIOS recovery setting
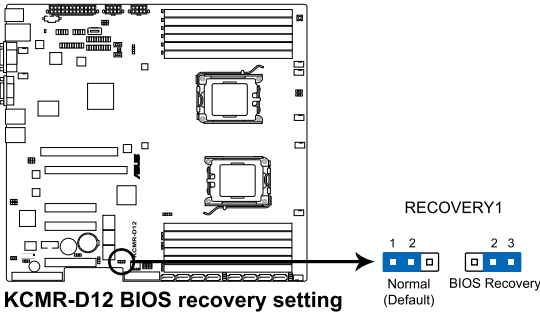
2.7 Connectors

2.7.1 Rear panel connectors
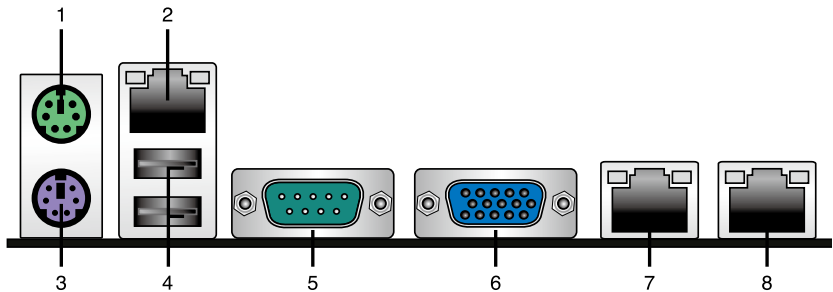
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **RJ-45 port for iKVM.** This RJ-45 port functions only when you install ASMB4 management card.
3. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
4. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
5. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
6. **Video Graphics Adapter port.** This port is for a VGA monitor or other VGA-compatible devices.
7. **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.
8. **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.

LAN port LED indications

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

ACT/LINK SPEED
LED   LED

LAN port
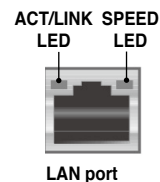
2.7.2   Internal connectors

1.   Serial ATA connectors
(7-pin SATA1, SATA2, SATA3, SATA4; RED)

(7-pin SATA5, SATA6; Black)

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 3Gb/s of data transfer rate.

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

KCMR-D12 SATA connectors
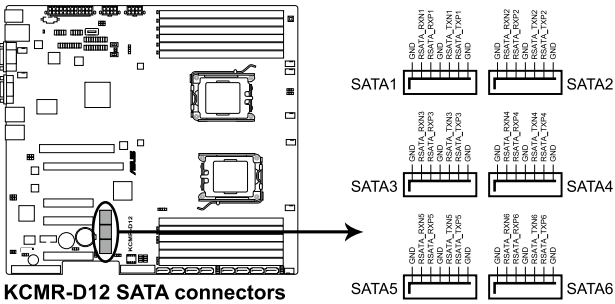
• The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

• The SATA connectors do not support SATA cables with latch.

2. **SAS connectors**
   (7-pin SAS1, SAS2, SAS3, SAS4; Red)
   (7-pin SAS5, SAS6, SAS7, SAS8; Blue)

   This motherboard comes with eight (8) Serial Attached SCSI (SAS) connectors, the next-generation storage technology that supports both Serial Attached SCSI (SAS) and Serial ATA (SATA). Each connector supports one device.

KCMR-D12 SAS connectors
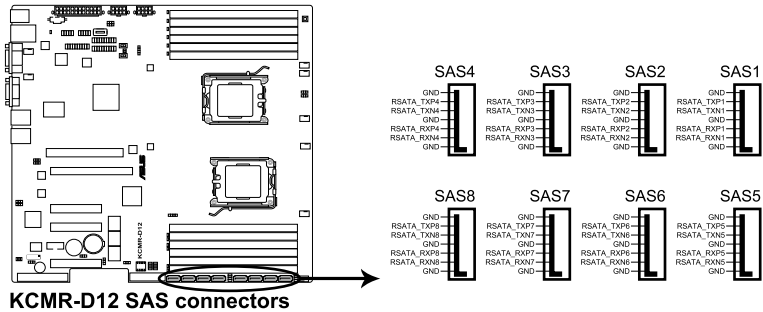
These SAS connectors function only when you install a PIKE RAID card to the motherboard.

3. **USB connector (10-1 pin USB34, USB56; A-Type USB8)**

   These connectors are for USB 2.0 ports. Connect the USB module cables to connectors USB34 and USB56, 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.

KCMR-D12 USB 2.0 connectors
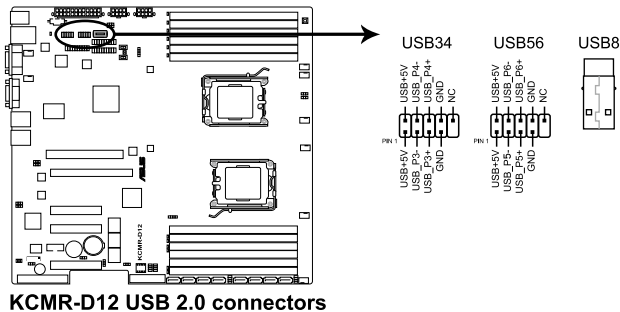
4. Front fan connectors
(4-pin CPU_FAN1/2; REAR_FAN1—2; FRNT_FAN1—4)

The fan connectors support cooling fans of 350 mA–740 mA (8.88 W max.) or a total of 3.15 A–6.66 A (53.28 W 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.

KCMR-D12 FAN connectors
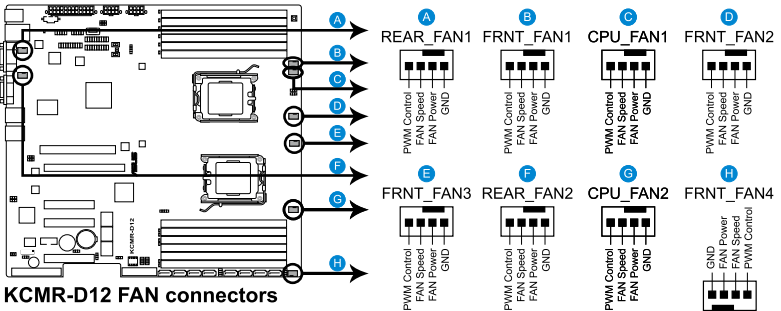
5. Serial General Purpose Input/Output connector (6-1 pin SGPIO1/2/3/4)

This connector is used for the SGPIO peripherals for the LSI MegaRAID and Intel Matrix RAID SATA LED.

KCMR-D12 SGPIO connectors
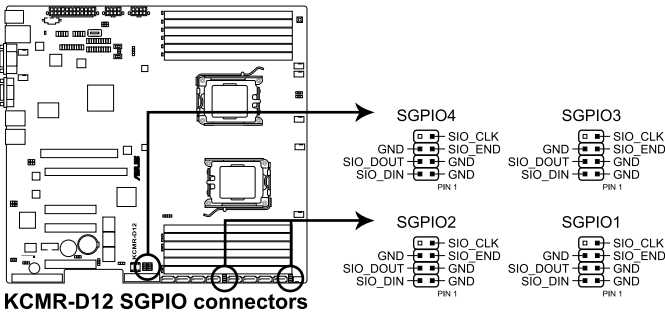
6. BMC header (BMC_FW1)

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

BMC_FW1

Pin1

KCMR-D12 BMC connector
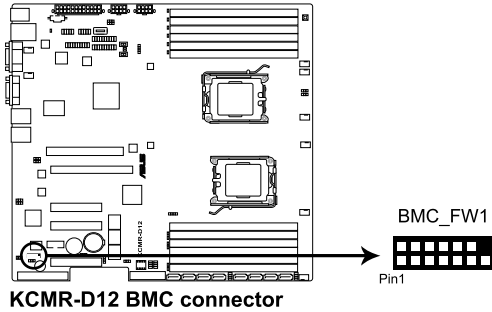
7. Thermal sensor cable connectors (3-pin TR1, TR2)

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.

KCMR-D12 Thermal sensor cable connectors
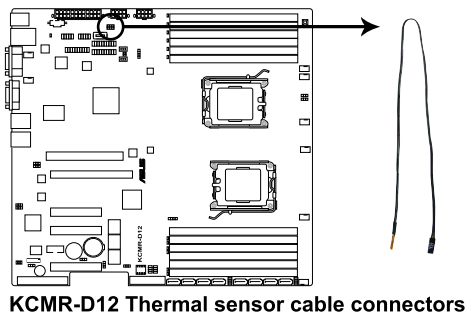
8. **SSI power connectors (24-pin ATXPWR1, 8-pin ATX12V1, 8-pin ATX12V2)**

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

    - Do not forget to connect the 24+8+8-pin power plugs; otherwise, the system will not boot up.

    - 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.

    - You must install a PSU with a higher power rating if you intend to install additional devices.
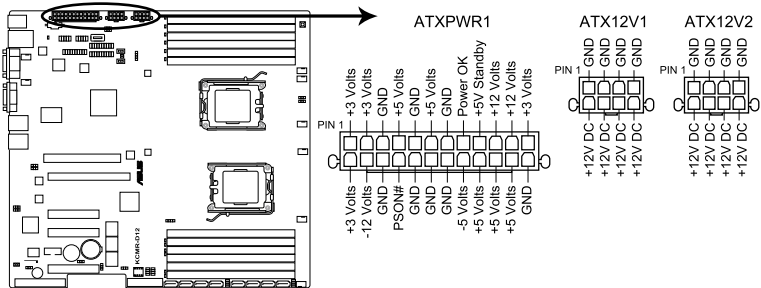
KCMR-D12 SSI power connectors

9. **Location LED cable connector (3-pin LOCLED1)**

    This connector is for a LED cable that allows you to know the server location.
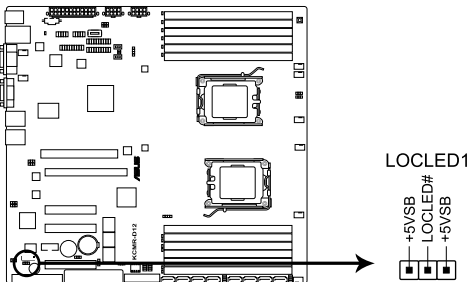
KCMR-D12 Location LED cable connector

10. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.
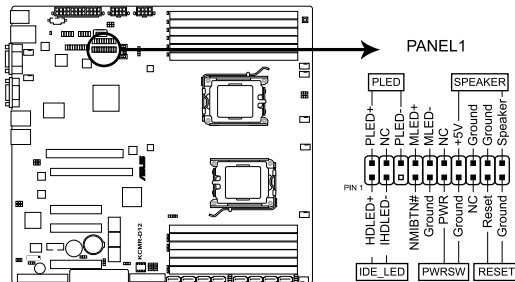
KCMR-D12 System panel connector

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

2. **Message LED (2-pin MLED)**
   This 2-pin connector is for the message LED cable that connects to the front message LED. The message LED is controlled by Hardware monitor to indicate an abnormal event occurance.

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

4. **Hard disk drive activity LED (2-pin 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.

5. **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.

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

11. **Auxiliary panel connector (20-pin AUX_PANEL1)**

This connector is for additional front panel features including front panel SMB, locator LED and switch, chassis intrusion, and LAN LEDs.
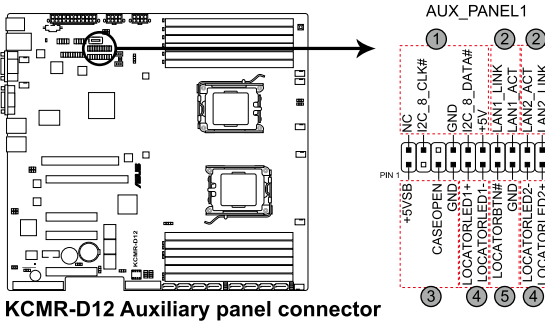
KCMR-D12 Auxiliary panel connector

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/Swich (2-pin LOCATORBTN)**
   These leads are for the locator button on the front panel. This button queries the state of the system locator.

This chapter describes the power up
sequence, and ways of shutting down the
system.

Powering up 3

Chapter summary

3

3.1   Starting up for the first time

1.   After making all the connections, replace the system case cover.

2.   Ensure that all switches are off.

3.   Connect the power cord to the power connector at the back of the system chassis.

4.   Connect the power cord to a power outlet that is equipped with a surge protector.

5.   Turn on the devices in the following order:

   a.   Monitor

   b.   External SCSI devices (starting with the last device on the chain)

   c.   System power

6.   After applying power, the system power LED on the system front panel case lights up. For systems with Proprietary power supplies, the system LED lights up when you press the Proprietary power button. If your monitor complies with "green" standards or if it has a "power standby" feature, the monitor LED may light up or switch between orange and green after the system LED turns on.

   The system then runs the power-on self-test or POST. While the tests are running, the BIOS beeps or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turned on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

7.   At power on, hold down the <Del> key to enter the BIOS Setup. Follow the instructions in Chapter 4.

3.2 Powering off the computer

3.2.1 Using the OS shut down function

If you are using Windows® 2000/2003 Server:

1. Click **Start** then click **Shut Down**.

2. Select **Shut Down** from the **What do you want the computer to do?** list box.

3. Select **Shutdown Event Tracker**.

4. Ensure that the **Planned** check box is checked.

5. Select **shutdown** from the list box.

6. If necessary, key in comments.

7. Click **OK**.

3.2.2 Using the dual function power switch

While the system is ON, pressing the power switch for less than four seconds puts the system to sleep mode or to soft-off mode, depending on the BIOS setting. Pressing the power switch for more than four seconds lets the system enter the soft-off mode regardless of the BIOS setting. Refer to section **4.5 Power Menu** in Chapter 4 for details.

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

BIOS setup 4

Chapter summary

4

4.1   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.

4.1.1   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.

```
              ASUSTek EZ Flash 2 BIOS ROM Utility V4.16
    FLASH TYPE: MXIC 25L1605A
    ┌──── Current ROM ────────────┐  ┌──── Update ROM ────────────┐
    │ BOARD: KCMR-D12             │  │ BOARD:                     │
    │ VER: 0301                   │  │ VER:                       │
    │ DATE: 10/08/2010            │  │ DATE:                      │
    └─────────────────────────────┘  └─────────────────────────────┘
    PATH: A:\
    ┌────────┐ ┌──────────────────────────────────────────────────┐
    │ A:     │ │                                                  │
    │        │ │                                                  │
    │        │ │                                                  │
    │        │ │                                                  │
    │        │ │                                                  │
    │        │ │                                                  │
    │        │ │                                                  │
    └────────┘ └──────────────────────────────────────────────────┘
    ┌─ Note ──────────────────────────────────────────────────────┐
    │ [Enter] Select or Load    [Tab] Switch    [V] Drive Info     │
    │ [Up/Down/Home/End] Move    [B] Backup      [Esc] Exit        │
    └──────────────────────────────────────────────────────────────┘
```
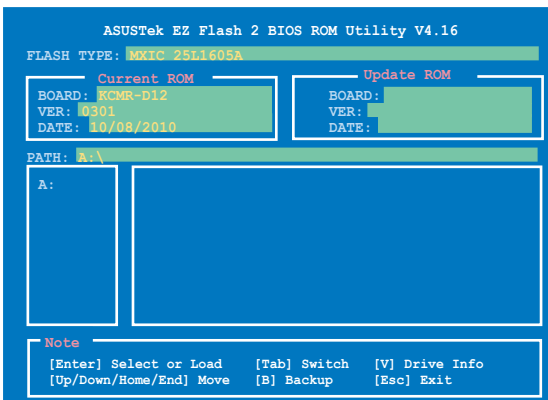
3. Press <Tab> to switch between drives until the correct BIOS file is found. When found, EZ Flash 2 performs the BIOS update process and automatically reboots the system when done.

⚠️ • 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 **4.9 Exit Menu** for details.

4.1.2 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.
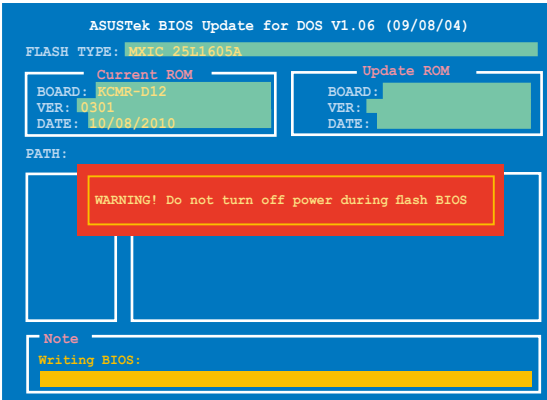
```
        ASUSTek BIOS Update for DOS V1.06 (09/08/04)
FLASH TYPE: MXIC 25L1605A
             Current ROM                    Update ROM
  BOARD: KCMR-D12                  BOARD:
  VER: 0301                        VER:
  DATE: 10/08/2010                 DATE:
PATH:

        WARNING! Do not turn off power during flash BIOS

  Note
  Writing BIOS:
```

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

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

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

C:\>
```
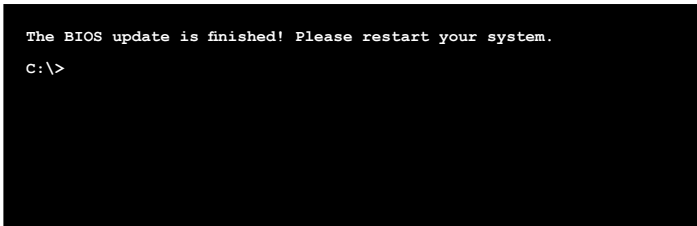
4.1.2 ASUS CrashFree BIOS 3 utility

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.

4.2   BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section **4.1 Managing and updating your BIOS**.

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

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

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

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

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

> •   The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **4.8 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.

4.2.1   BIOS menu screen

Menu items   Menu bar   Configuration fields   General help

```
                          BIOS SETUP UTILITY
  Main    Advanced    Server    Power    Boot    Tools    Exit

                                                     Use [ENTER], [TAB]
                                                     or [SHIFT-TAB] to
  System Time            [13:44:30]                  select a field.
  System Date            [Fri, 10/15/2010]
                                                     Use [+] or [-] to
                                                     configure system Date.
  ▶ SATA 1            :  [ST3160812AS]
  ▶ SATA 2            :  [Not Detected]
  ▶ SATA 3            :  [Not Detected]
  ▶ SATA 4            :  [Not Detected]
  ▶ SATA 5            :  [Not Detected]
  ▶ SATA 6            :  [Not Detected]              ←→    Select Screen
                                                     ↑↓    Select Item
                                                     +-    Change Field
  ▶ Storage Configuration                            Tab   Select Field
  ▶ System Information                               F1    General Help
                                                     F10   Save and Exit
                                                     ESC   Exit

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```

Sub-menu items   Navigation keys

4.2.2   Menu bar

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

Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
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.

4.2.3   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.

4.2.4   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.
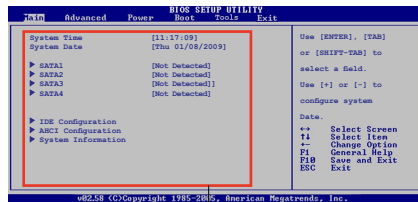
Main menu items

4.2.5   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>.

4.2.6   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 **4.2.7 Pop-up window**.

4.2.7   Pop-up window

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

4.2.8   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.
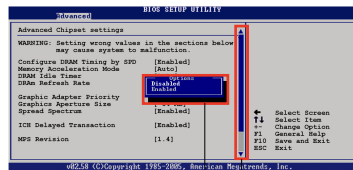
Pop-up window

Scroll bar

4.2.9   General help

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

4.3 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 **4.2.1 BIOS menu screen** for information on the menu screen items and how to navigate through them.

```
                          BIOS SETUP UTILITY
   Main    Advanced    Server    Power    Boot    Tools    Exit

                                                     Use [ENTER], [TAB]
                                                     or [SHIFT-TAB] to
 System Time                 [13:44:30]              select a field.
 System Date                 [Fri, 10/15/2010]
                                                     Use [+] or [-] to
 ▶ SATA 1               :    [ST3160812AS]           configure system Date.
 ▶ SATA 2               :    [Not Detected]
 ▶ SATA 3               :    [Not Detected]
 ▶ SATA 4               :    [Not Detected]
 ▶ SATA 5               :    [Not Detected]
 ▶ SATA 6               :    [Not Detected]
                                                     ←→   Select Screen
                                                     ↑↓   Select Item
 ▶ Storage Configuration                             +-   Change Field
 ▶ System Information                                Tab  Select Field
                                                     F1   General Help
                                                     F10  Save and Exit
                                                     ESC  Exit

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```

4.3.1 System Time [xx:xx:xx]

Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.3 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.

```
                          BIOS SETUP UTILITY
   Main

 Primary SATA Master                                 Disabled: Disabled LBA
                                                     Mode.
 Device    :Hard Disk                                Auto: Enables LBA
 Vendor    :xxxxxxxxx                                Mode if the device
 Size      :xx.xGB                                   supports it and the
 LBA Mode  :Supported                                device is not already
 Block Mode:16Sectors                                formatted with LBA
 PIO Mode  :4                                        Mode disabled.
 Async DMA :MultiWord DMA-2
 Ultra DMA :Ultra DMA-6
 S.M.A.R.T.:Supported

 Type                       [Auto]                   ←→   Select Screen
 LBA/Large Mode             [Auto]                   ↑↓   Select Item
 Block(Multi-Sector Transfer)M[Auto]                 +-   Change Option
 PIO Mode                   [Auto]                   F1   General Help
 DMA Mode                   [Auto]                   F10  Save and Exit
 SMART Monitoring           [Auto]                   ESC  Exit
 32Bit Data Transfer        [Enabled]

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```

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]

4.3.4   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.

```
                          BIOS SETUP UTILITY
  Main

 Storage Configuration                                    Options

 OnChip SATA Channel        [Enabled]
 SATA Port1- Port4          [IDE]              Disabled
  SATA Port5- Port6         [IDE]              Enabled




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

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```
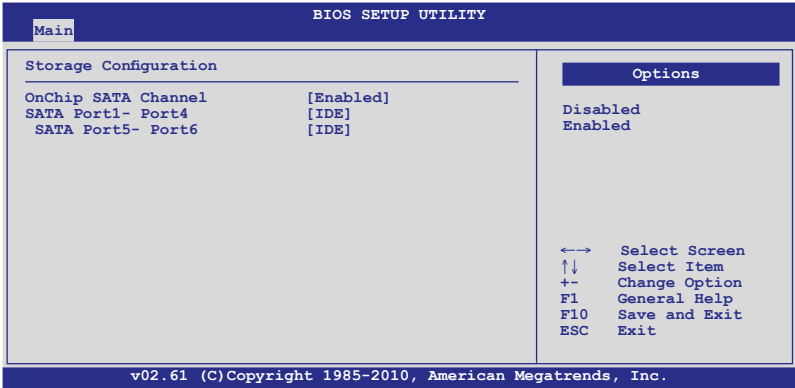
OnChip SATA Channel [Enabled]

Configuration options: [Disabled] [Enabled]

SATA Port1-Port4 [IDE]

Sets the configuration for the Serial ATA connectors.
Configuration options: [IDE] [RAID] [AHCI]

> *SATA Port5-Port6*
> Setting this item to [IDE] allows the system to recognize the optical drives connected to the SATA connectors 5/6 when installing OS.
> Configuration options: [IDE] [RAID] [AHCI]

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

4.3.5   System Information

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

```
                          BIOS SETUP UTILITY
    Main

    EC BIOS Version   : MBECB-0012
    Bios Information
    Version     :0301
    Build Date  :10/08/10


    Processor
    Type        :AMD Opteron(tm) Processor 4122
    Speed       :2200MHz


    System Memory
    Usable Size  : 1024MB
                                                  ←→   Select Screen
                                                  ↑↓   Select Item
    ▶  System Memory Information                  Enter Go to Sub Screen
                                                  F1   General Help
                                                  F10  Save and Exit
                                                  ESC  Exit

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```
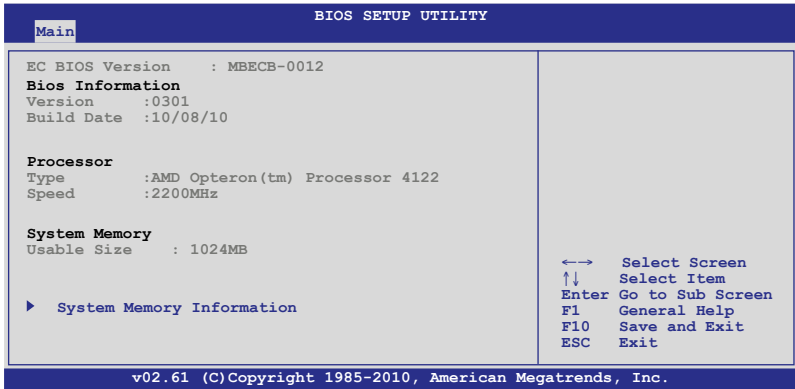
BIOS Information

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.

```
                          BIOS SETUP UTILITY
    Main

    System Memory Information

    ▶   CPU1 Memory Information
    ▶   CPU2 Memory Information
```
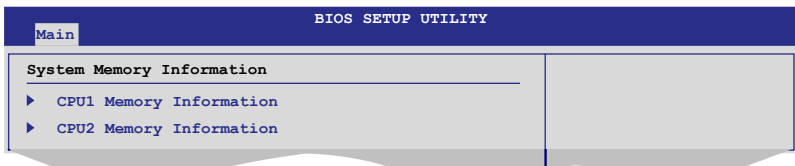
CPU1/2 Memory Configuration
Allows you to check information of installed memory (6 DIMMs per CPU).

CPU1/2 Memory Configuration
Displays the auto-detected memory specification.

```
                        BIOS SETUP UTILITY
  Main

 CPU1 Memory Configuration

 Node0 Speed    N/A

 DIMM_A1   N/A
 DIMM_A2   N/A
 DIMM_A3   N/A
 DIMM_B1   N/A
 DIMM_B2   N/A
 DIMM_B3   N/A
```

4.4   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 Configuration
  ▶  Onboard Device Configuration
  ▶  USB Configuration
  ▶  PCIPnP
  ▶  Event Log Configuration



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

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```
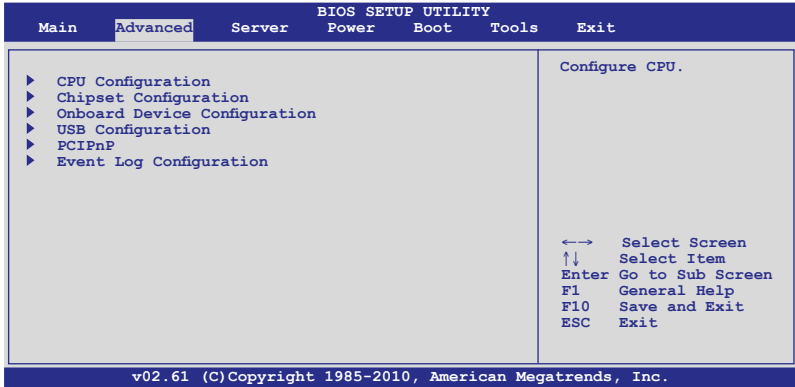
4.4.1   CPU Configuration

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                                 Sets the ratio between
   Module Version:5.1104.1                           CPU Core Clock and the
   Socket Count  :1                                  FSB Frequency.
   Node Count    :1                                  Note:If an invalid
   Core Count    :6                                  ratio is set in CMOS
                                                     then actual and
   AMD Opteron(tm) Processor 4122                    setpoint values may
   Revision: D0                                      differ.
   Cache L1: 512KB
   Cache L2: 2048KB
   Cache L3: 6MB
   Speed   : 2200MHz,    NB Clk: 2200MHz
   Able to Change Freq.  : Yes
   uCode Patch Level     : 0x10000C5
   GART Error Reporting        [Disabled]           ←→    Select Screen
   Microcode Updation          [Enabled]            ↑↓    Select Item
   Secure Virtual Machine Mode  [Enabled]           +-    Change Option
   PowerNow                    [Enabled]            F1    General Help
   PowerCap                    [P-state 0]          F10   Save and Exit
   ACPI SRAT Table             [Enabled]            ESC   Exit

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```

Scroll down for more items.

```
                         BIOS SETUP UTILITY
        Advanced
 ┌───────────────────────────────────────────┬─────────────────────────┐
 │ CPU DownCore Mode          [Auto Mode]     │  Cold Reset is needed   │
 │ C1E Support                [Enabled]       │  after changing option. │
 │ CPU2                       [Enabled]       │                         │
 │                                            │                         │
 │                                            │                         │
 │                                            │                         │
 │                                            │                         │
 │                                            │                         │
 │                                            │  ←→   Select Screen     │
 │                                            │  ↑↓   Select Item       │
 │                                            │  +-   Change Option     │
 │                                            │  F1   General Help      │
 │                                            │  F10  Save and Exit     │
 │                                            │  ESC  Exit              │
 └───────────────────────────────────────────┴─────────────────────────┘
        v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

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 diable the Secure Virtual Machine Mode (SVM).
Configuration options: [Disabled] [Enabled]

PowerNow [Enabled]
Allows you to enable or diable 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 diables the building of ACPI SRAT Table.
Configuration options: [Disabled] [Enabled]

CPU DownCore Mode [Auto Mode]
Allows you to select the CPU core. Reset the system after changing the settings.
Configuration optitons: [Auto] [Maximum Core Level] [No Leveling] [2 Cores]
[4 Cores]

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]

4.4.2   Chipset Configuration

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

```
                         BIOS SETUP UTILITY
         Advanced

 Advanced Chipset Settings                         Options for NB

 ▶  NorthBridge Configuration
 ▶  SouthBridge Configuration
 ▶  SR5670 Configuration



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

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```

NorthBridge Configuration
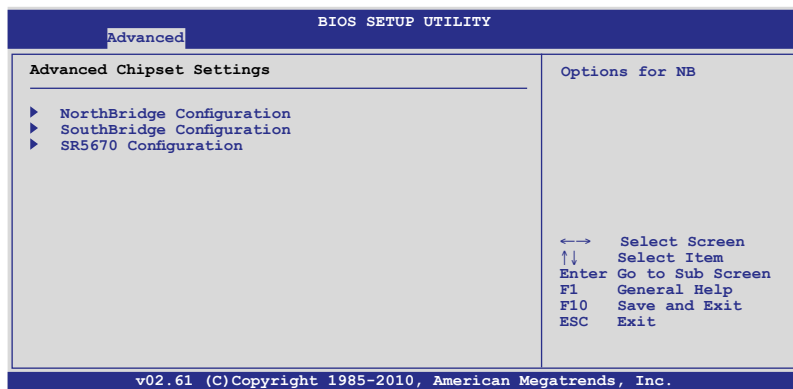
```
                         BIOS SETUP UTILITY
         Advanced

 NorthBridge Chipset Configuration

 ▶  Memory Configuration
 ▶  ECC Configuration
 ▶  DRAM Timing Configuration


 ─────────────────────────────

 Memory CLK               :667 MHz, N/A
 CAS Latency(Tcl)         :8 CLK , N/A
 RAS/CAS Delay(Trcd)      :8 CLK , N/A
 Row Precharge Time(Trp)  :8 CLK , N/A
 Min Active RAS(Tras)     :24 CLK , N/A          ←→    Select Screen
 RAS/RAS Delay(Trrd)      :4 CLK , N/A           ↑↓    Select Item
 Row Cycle(Trc)           :32 CLK , N/A          +-    Change Option
 Read to Precharge(Trtp)  :5 CLK , N/A           F1    General Help
 Write Recover Time(Twr)  :10 CLK , N/A          F10   Save and Exit
                                                 ESC   Exit

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```

Memory Configuration

```
                          BIOS SETUP UTILITY
            Advanced

  Memory Configuration                              Enable Bank Memory
  ─────────────────────────────────────            Interleaving
  Bank Interleaving            [Auto]
  Node Interleaving            [Disabled]
  Channel Interleaving         [Auto]
  CS Sparing Enabled           [Disabled]
  Bank Swizzle Mode            [Enabled]
  Channel B                    [Enabled]
  Channel C                    [Enabled]
  Channel D                    [Enabled]


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

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```

Rank Interleaving [Auto]
Allows you to set the rank memory interleaving setting.
Configuation options: [Disabled] [Auto]

Node Interleaving [Disabled]
Allows you to set the node memory interleaving setting.
Configuation options: [Disabled] [Auto]

Channel Interleaving [Auto]
Allows you to set the channel memory interleaving setting.
Configuation 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.
Configuation options: [Disabled] [Enabled]

Channel B/C/D [Enabled]
Allows you to enable or disable channel B, C and D.
Configuation options: [Disabled] [Enabled]

ECC Configuration

```
                          BIOS SETUP UTILITY
        Advanced

  ECC Configuration
                                                    Set the level of ECC
  ECC Mode                      [Basic]             protection. Note:
    DRAM ECC Enable             [Enabled]           The 'Super' ECC mode
    DRAM SCRUB REDIRECT         [Disabled]          dynamically sets
    4-Bit ECC Mode             [Enabled]            the DRAM scrub rate
    DRAM BG Scrub              [Disabled]           so all of memory is
    Data Cache BG Scrub        [Disabled]           scrubbed in 8 hours.
    L2 Cache BG Scrub          [Disabled]
    L3 Cache BG Scrub          [Disabled]


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

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```

ECC Mode [Basic]
Allows you to set the level of ECC protection.
Configuration options: [Disabled] [Basic] [Good] [Super] [Max] [User]

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

DRAM ECC Enable [Enabled]
DRAM ECC allows hardware to report and correct memory errors automatically and maintains the system integrity. This item becomes configurable when you set **ECC Mode** to [User]. Configuration options: [Disabled] [Enabled]

DRAM SCRUB REDIRECT [Disabled]
DRAM SCRUB REDIRECT allows the system to correct DRAM ECC errors immediately when errors occur, even when the background scrubbing is on.
Configuration options: [Disabled] [Enabled]

4-Bit ECC Mode [Enabled]
Allows you to enable or disable the 4-Bit ECC Mode.
Configuration options: [Disabled] [Enabled]

DRAM BG Scrub [Disabled]
DRAM scrubbing corrects the memory errors when the memory is being used and improves performance when the memory is not being used.
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]
Allows the L1 Data Cache ram to be corrected while 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]
Allows the L2 Data Cache ram to be corrected while 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]
Allows the L3 Data Cache ram to be corrected while 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

```
                            BIOS SETUP UTILITY
           Advanced
      DRAM Timing Configuration
                                                      Options
      DRAM Timing Config          [Auto]
                                                 Auto
                                                 Manual




                                                 ←→    Select Screen
                                                 ↑↓    Select Item
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit
           v02.61 (C)Copyright 1985-2010, American Megatrends, Inc.
```
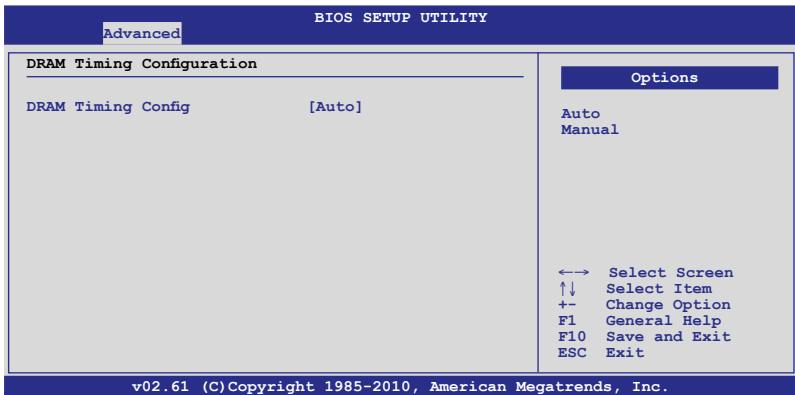
DRAM Timing Config [Auto]
Configuration options: [Auto] [Manual]

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: [333 MHz] [400 MHz] [533 MHz] [667 MHz]

SouthBridge Configuration

```
                            BIOS SETUP UTILITY
        Advanced

  SouthBridge Chipset Configuration
                                                  Options for SB HD
  SP5100 CIMx Version : 5.6.0                      Azalia

  ▶  SB Azalia Audio Configuration
  ▶  SB Debug Configuration


  OHCI HC  (Bus 0 Dev 18 Fn 0)     [Enabled]
  OHCI HC  (Bus 0 Dev 18 Fn 1)     [Enabled]
  EHCI HC  (Bus 0 Dev 18 Fn 2)     [Enabled]
  OHCI HC  (Bus 0 Dev 19 Fn 0)     [Enabled]
  OHCI HC  (Bus 0 Dev 19 Fn 1)     [Enabled]     ←→   Select Screen
  EHCI HC  (Bus 0 Dev 19 Fn 2)     [Enabled]     ↑↓   Select Item
  OHCI HC  (Bus 0 Dev 20 Fn 5)     [Enabled]     +-   Change Option
                                                  F1   General Help
                                                  F10  Save and Exit
                                                  ESC  Exit

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```

SB Azalia Audio Configuration

```
                      Onchip HD Azalia Configuration
        Advanced

  HD Audio Azalia Device       [Auto]            Auto : When MIO is
  HD Onboard PIN Config         [Enabled]         installed then MIO
  Azalia Front Panel            [Auto]            will be enabled.
  SDIN0 Pin Config              [Azalia]
  SDIN1 Pin Config              [Azalia]
  SDIN2 Pin Config              [Azalia]
  SDIN3 Pin Config              [Azalia]
  Azalia Snoop                  [Disabled]
  Azalia Clock Gating           [Disabled]




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

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```

HD Audio Azalia Device [Auto]
Allows you to enable or disable the HD Audio Azalia device.
Configuration options: [Auto] [Disabled] [Enabled]

HD Onboard PIN Config [Enabled]
Allows you to enable or disable the HD onboard PIN configuration.
Configuration options: [Disabled] [Enabled]

Azalia Front Panel [Auto]
Allows you to enable or disable the Azalia Front Panel.
Configuration options: [Auto] [Disabled]

SDIN0/1/2/3 [Azalia]
Configuration options: [GPIO] [Azalia]

Azalia Snoop [Disabled]
Configuration options: [Disabled] [Enabled]

Azalia Clock Gating [Disabled]
Configuration options: [Disabled] [Enabled]

SB Debug Configuration

```
                    SouthBridge Debug Configuration
         Advanced

  A15 ECOs                    [Disabled]              Options
  Port 0 ESP                  [ISP]
  Port 1 ESP                  [ISP]              Disabled
  Port 2 ESP                  [ISP]              Enabled
  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]         ←→   Select Screen
  SATA PORT2 MODE             [Auto]         ↑↓   Select Item
  SATA PORT3 MODE             [Auto]         +-   Change Option
  SATA PORT4 MODE             [Auto]         F1   General Help
  SATA PORT5 MODE             [Auto]         F10  Save and Exit
                                             ESC  Exit

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```

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 20 Fn 5) [Enabled]
Configuraiton options: [Disabled] [Enabled]

SR5670 Configuration

```
                         BIOS SETUP UTILITY
        Advanced

    SR5650 Configuration
                                             PCI Express
    ▶  PCI Express Configuration             Configuration
    ▶  Hyper Transport Configuration

    IOMMU                        [Disabled]

    VGA ROM Boot Priority        [PCIE VGA Card]

    ▶  Debug Options

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

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```
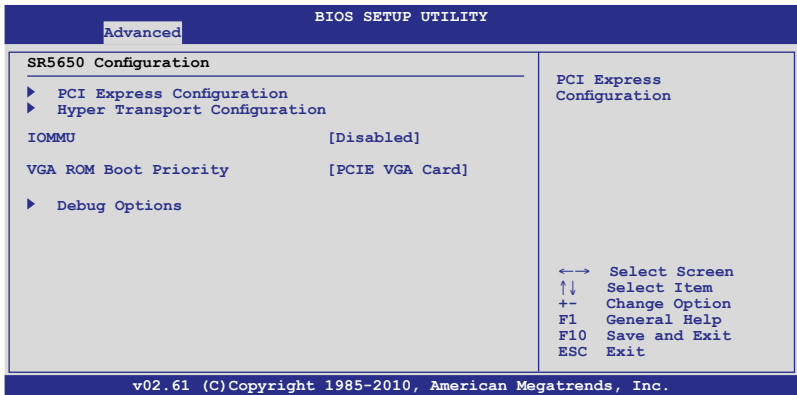
PCI Express Configuration

PCIE Slot 2/4/5 Features; PIKE Slot/PCIE Slot 7 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 2/4 Core Setting; PCIE Slot 5 Core Setting;
PIKE Slot/PCIE Slot 7 Core Setting

Powerdown Unused lanes [Enabled]
Configuration options: [Disabled] [Enabled]

Turn Off PLL During L1/L23 [Enabled]
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 [Enabled]
Configuration options: [Disabled] [Enabled]

LCLK Clock Gating in L1 [Enabled]
Configuration options: [Disabled] [Enabled]

Hyper Transport Configuration

HT Extended Address [Disabled]
Configuration options: [Auto] [Disabled] [Enabled]

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 set the VGA ROM boot priority.
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]

4.5 Server menu

```
                         BIOS SETUP UTILITY
  Main    Advanced   Server    Power    Boot    Tools    Exit

                                                  Configure Remote
 ▶  Remote Access Configuration                   Access.








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

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```
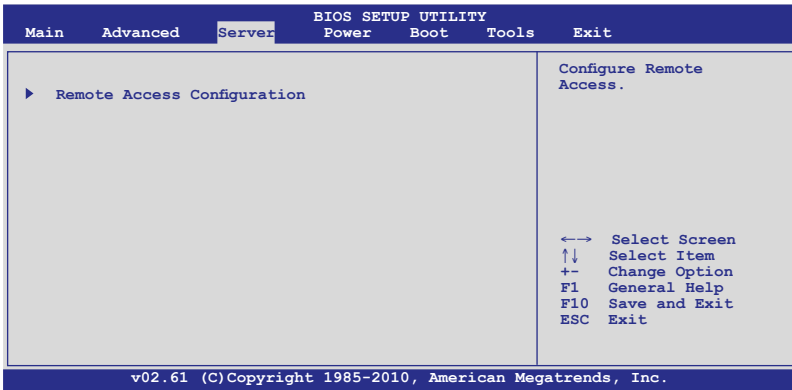
4.5.1 Remote Access Configuration

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

```
                         BIOS SETUP UTILITY
            Server

  Configure Remote Access type and parameters      Select Remote Access
                                                    type.
  Remote Access              [Enabled]

  Serial port number         [COM2]
     Base Address, IRQ       [2F8h, 3]
  Serial Port Mode           [57600 8,n,1]
  Flow Control               [Hardware]
  Redirection After BIOS POST [Disabled]
  Terminal Type              [VT-UTF8]
                                                    ←→   Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit

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```
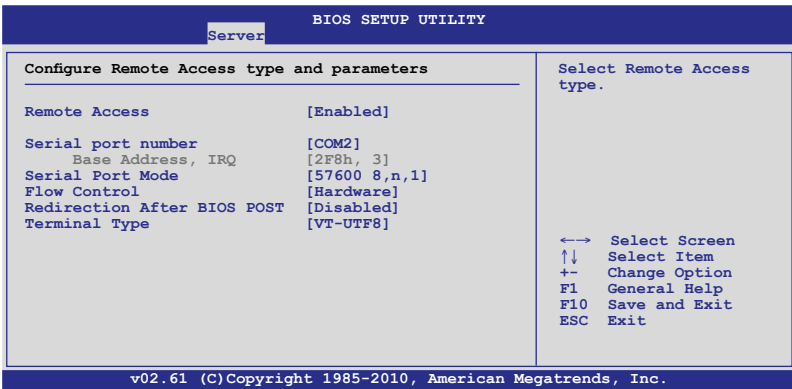
Remote Access [Enabled]

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]

4.6   Power menu

```
                              BIOS SETUP UTILITY
   Main     Advanced    Server    Power    Boot    Tools    Exit

   Suspend Mode                  [Auto]                    Select the ACPI state
   Repost Video on S3 Resume     [No]                      used for System
   ACPI 2.0 Support              [ACPI v2.0]               Suspend.
   ACPI APIC support             [Enabled]

   ▶  APM Configuration
   ▶  Hardware Monitor

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

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```

4.6.1   Suspend Mode [Auto]

Allows you to select the ACPI state used for system suspend.
Configuration options: [S1 (POS) only] [S3 only] [Auto]

4.6.2   Repost Video on S3 Resume [No]

Allows you to determine whether to incoke VGA BIOS post on S3/STR resume.
Configuration options: [No] [Yes]

4.6.3   ACPI 2.0 Support [ACPI v2.0]

Specifies the Advanced Configuration and Power Interface (ACPI) version
supported. Configuration options: [ACPI v1.0] [ACPI v2.0] [ACPI v3.0]

4.6.4   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]

4.6.5   APM Configuration

```
                          BIOS SETUP UTILITY
                         Power

     Power On Configuration                                    Options

     Restore on AC Power Loss     [Last State]
                                                       Power On
     Resume On PCIE Wake#         [Disabled]           Power Off
     Resume On Ring               [Disabled]           Last State
     Resume On RTC Alarm          [Disabled]


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


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```
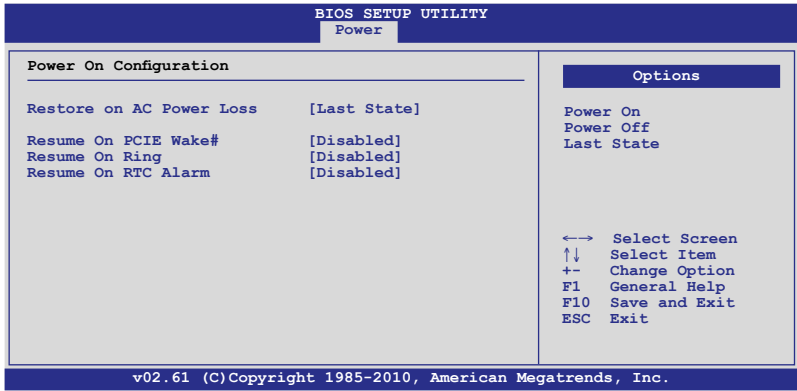
Restore on AC Power Loss [Last State]

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]

Resume 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.

Resume 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.

Resume On RTC Alarm [Disabled]

Allows you to enable or disable RTC to generate a wake-up event.
Configuration options: [Disabled] [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.

4.6.6   Hardware Monitor

```
                        BIOS SETUP UTILITY
                          Power

 Hardware Monitor                                  CPU1 Temperature

 CPU1 Temperature          [ 35°C/ 94°F]
 CPU2 Temperature          [ N/A    Re]
 TR1 Temperature           [  N/A   ]
 TR2 Temperature           [  N/A   ]
 CPU Fan1 Speed            [  N/A   ]
 CPU Fan2 Speed            [  N/A   ]
 Front Fan1 Speed          [  N/A   ]
 Front Fan2 Speed          [  N/A   ]
 Front Fan3 Speed          [  N/A   ]
 Front Fan4 Speed          [  N/A   ]
 Rear Fan1 Speed           [  N/A   ]
 Rear Fan2 Speed           [  N/A   ]          ←→   Select Screen
 Fan Speed Control         [Whisper Mode]      ↑↓   Select Item
 VCORE1                    [ 1.052 V]          +-   Change Option
 VCORE2                    [ 1.052 V]          F1   General Help
 P1DDR3 Voltage            [ 1.180 V]          F10  Save and Exit
 P2DDR3 Voltage            [ 1.180 V]          ESC  Exit
 P1_+1.2V Voltage          [ 1.204 V]

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```

Scroll down for more items.

```
 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]
 +1.1V Voltage             [ 1.084 V]
 +12V Voltage              [11.952 V]          ←→   Select Screen
 +5V Voltage               [ 5.043 V]          ↑↓   Select Item
 +3.3V Voltage             [ 3.228 V]          +-   Change Option
 +5VSB Voltage             [ 5.075 V]          F1   General Help
 +3.3VSB Voltage           [ 3.240 V]          F10  Save and Exit
 VBAT Voltage              [ 3.000 V]          ESC  Exit

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```

CPU1/CPU2/TR1/TR2 Temperature [xxxºC/xxxºF]

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.

CPU Fan1/2; Front Fan1–4;
Rear Fan1/2 Speed [xxxxRPM] or [Ignored] / [N/A]

The onboard hardware monitor automatically detects and displays the speed of CPU fans, front fans, and rear 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] [Whisper Mode] [Generic Mode] [High Density Mode]

VCORE1/2 Voltage, P1/2DDR3 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.

4.7   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.

```
                        BIOS SETUP UTILITY
   Main    Advanced    Server    Power    Boot    Tools    Exit

   Boot Settings                                    Specifies the Boot
   ─────────────────────────────────────────       Device Priority
   ▶   Boot Device Priority                         sequence.

   ▶   Boot Settings Configuration                  A virtual floppy disk
   ▶   Security                                     drive (Floppy Drive B:
                                                    ) may appear when you
                                                    set the CD-ROM drive
                                                    as the first boot
                                                    device.


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

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```

4.7.1   Boot Device Priority

```
                        BIOS SETUP UTILITY
                             Boot

   Boot Device Priority                             Specifies the Boot
   ─────────────────────────────────────────       Device Priority
   1st Boot Device          [Removable Dev.]        sequence.
   2nd Boot Device          [ATAPI CD-ROM]
   3rd Boot Device          [Hard Drive]            A device enclosed
   4th Boot Device          [Network:B02 D00 Yu]    in parenthesis has
   5th Boot Device          [Network:B03 D00 Yu]    been disabled in the
                                                    corresponding type
                                                    menu.


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

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```

1st—xxth Boot Device [XXXXXXX]

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]

4.7.2   Hard Disk Drives; CDROM Drives

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

4.7.3   Boot Settings Configuration

```
                            BIOS SETUP UTILITY
                                    Boot

    Boot Settings Configuration                          Allows BIOS to skip
                                                         certain tests while
    Quick Boot                   [Enabled]               booting. This will
    Full Screen Logo             [Enabled]               decrease the time
    AddOn ROM Display Mode       [Force BIOS]            needed to boot the
    Bootup Num-Lock              [On]                     system.
    Wait For 'F1' If Error       [Enabled]
    Hit 'DEL' Message Display    [Enabled]
    Interrupt 19 Capture         [Enabled]
    Boot Device Seeking          [Enabled]
                                                         ←→    Select Screen
                                                         ↑↓    Select Item
                                                         +-    Change Option
                                                         F1    General Help
                                                         F10   Save and Exit
                                                         ESC   Exit

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```

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]

Boot Device Seeking [Enabled]

Configuration options: [Enabled] [Disabled]

4.7.4 Security

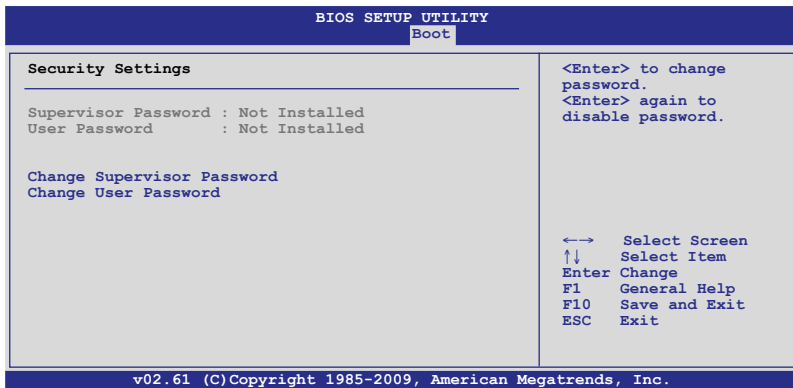The Security menu items allow you to change the system security settings. Select an item then press <Enter> to display the configuration options.

```
                        BIOS SETUP UTILITY
                               Boot

   Security Settings                            <Enter> to change
                                                password.
                                                <Enter> again to
   Supervisor Password : Not Installed          disable password.
   User Password       : Not Installed

   Change Supervisor Password
   Change User Password


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

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```

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.

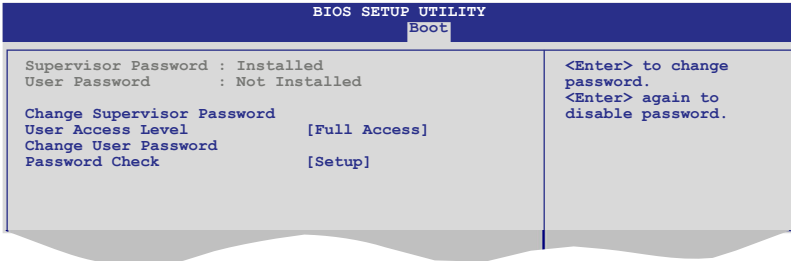To change the supervisor password, follow the same steps as in setting a user password.

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 **2.6 Jumper** 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.

```
                        BIOS SETUP UTILITY
                          Boot

 Supervisor Password : Installed                   <Enter> to change
 User Password       : Not Installed               password.
                                                   <Enter> again to
 Change Supervisor Password                         disable password.
 User Access Level            [Full Access]
 Change User Password
 Password Check               [Setup]
```

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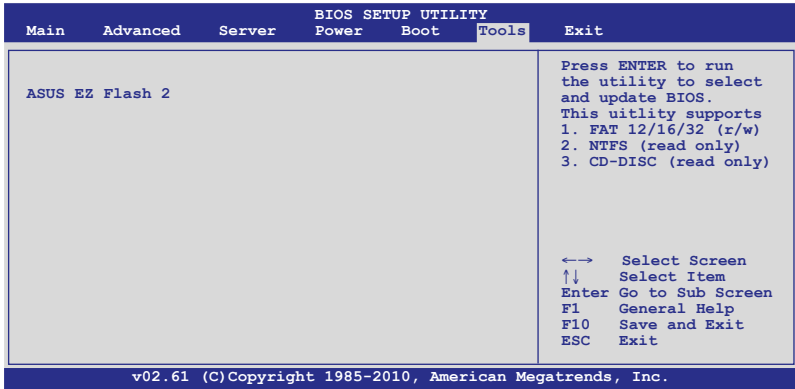
To change the user password, follow the same steps as in setting a user password.

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]

4.8   Tools menu

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

```
                          BIOS SETUP UTILITY
   Main    Advanced    Server    Power    Boot    Tools    Exit

                                              Press ENTER to run
                                              the utility to select
   ASUS EZ Flash 2                            and update BIOS.
                                              This uitlity supports
                                              1. FAT 12/16/32 (r/w)
                                              2. NTFS (read only)
                                              3. CD-DISC (read only)




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

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```
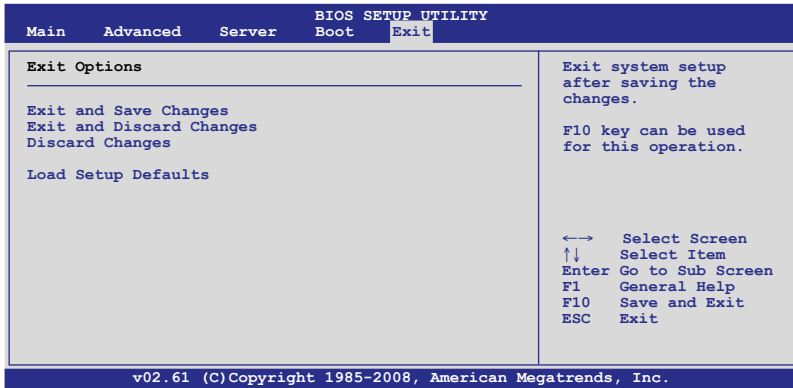
4.8.1   ASUS EZ Flash 2

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 [OK] or [Cancel], then press <Enter> to confirm your choice. Check section **4.1.1 ASUS EZ Flash 2 utility** for details.

4.9   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.

```
                              BIOS SETUP UTILITY
  Main     Advanced     Server     Boot     Exit

  Exit Options                                       Exit system setup
  ─────────────────────────────────────             after saving the
                                                     changes.
  Exit and Save Changes
  Exit and Discard Changes                           F10 key can be used
  Discard Changes                                    for this operation.

  Load Setup Defaults


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

       v02.61 (C)Copyright 1985-2008, American Megatrends, Inc.
```

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 and 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 and 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.

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

RAID
configuration

Chapter summary

5

5.1   Setting up RAID

5.1.1   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.

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

5.1.2   Installing hard disk drives

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

To install the SATA hard disks for RAID configuration:

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

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

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

5.1.3   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 4 for details on entering and navigating through the BIOS Setup.

5.2   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.

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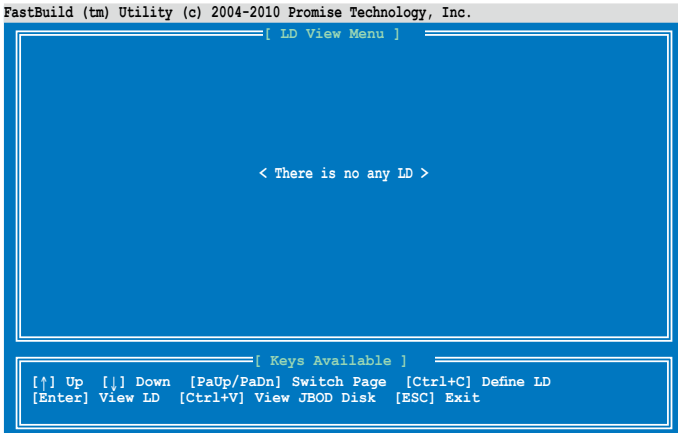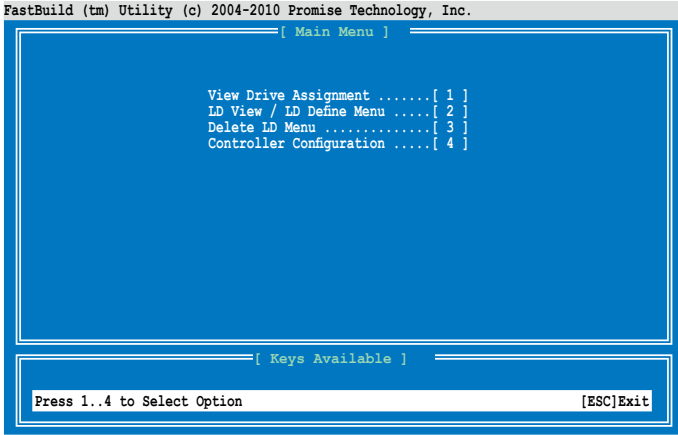
The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

5.2.1 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 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
```

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

```
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         0

    Stripe Block          128 KB         Initialization    Fast
    Gigabyte Boundary     ON
    Read Policy           NA             Write Policy      WriteThru

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



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

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

```
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         0

    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    HDTXXXXXXXXXXXX     SATA 3G             250.05           N
  02:01    HDTXXXXXXXXXXXX     SATA 3G             250.05           N
  03:01    HDTXXXXXXXXXXXX     SATA 3G             250.05           N
  04:01    HDTXXXXXXXXXXXX     SATA 3G             250.05           N



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

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

```
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         1

    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    HDTXXXXXXXXXXXX    SATA 3G           250.05           Y
   02:01    HDTXXXXXXXXXXXX    SATA 3G           250.05           N
   03:01    HDTXXXXXXXXXXXX    SATA 3G           250.05           N
   04:01    HDTXXXXXXXXXXXX    SATA 3G           250.05           N

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

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

```
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


  Port:ID   Dri┌─────────────────────────────────────────┐Assignment
   01:01    HDT│ Please Press Ctr-Y key to input the LD name│    Y
   02:01    HDT│ or press any key to exit.                 │    Y
   03:01    HDT│ If you do not input any LD name, the default│   N
   04:01    HDT│ LD name will be used.                     │    N
                └─────────────────────────────────────────┘

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

6. 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 Policy         Read Cache     Write Policy      WriteBack

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

7. 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 Policy         Read Cache     Write Policy      WriteBack


  Port:ID   Dri   Fast Initialization Option has been selected.  Assignment
   01:01    HDT   It wil erase the MBR data of the disks.             Y
   02:01    HDT   <Press Ctrl-Y Key if you are sure to erase it>      Y
   03:01    HDT   <Press any other key to ignore this option>         N
   04:01    HDT                                                       N



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

8.   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   HDTXXXXXXXXXXXX     SATA 3G             250.05         Y
  02:01   HDTXXXXXXXXXXXX     SATA 3G             250.05         Y
  03:01   HDTXXXXXXXXXXXX     SATA 3G             250.05         N
  04:01   HDTXXXXXXXXXXXX     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...
```

9.   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   HDTXXXXXXXXXXXX     SATA 3G             250.05         Y
  02:01   HDTXXXXXXXXXXXX     SATA 3G             250.05         Y
  03:01                                                         N
  04:01    Enter array capacity (in GB) here: 200              N




═══════════════════[ Keys Available ]════════════════════
 [↑] Up [↓] Down [PaUp/PaDn] Switch Page [Space] Change Option
 [0-9] Input Capacity [Enter] Save [BackSpace] Delete [Esc] Exit
```
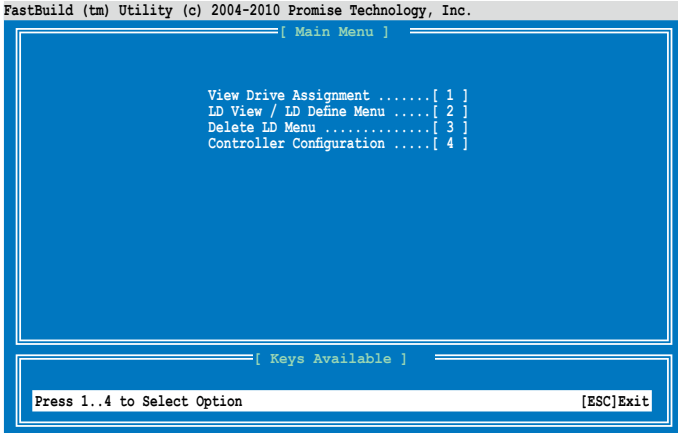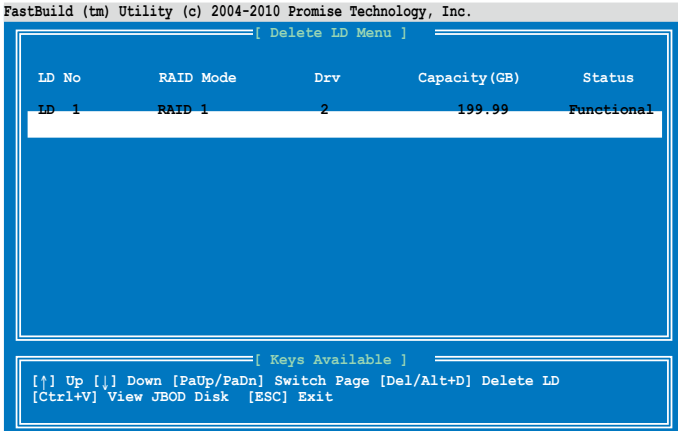
10. The RAID set has been built successfully and press <Enter> to view the content.

```
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
```

11. 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    HDTXXXXXXXXXXXX     SATA 3G             250.05
 02:01    HDTXXXXXXXXXXXX     SATA 3G             250.05




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

5.2.2   Deleting a RAID set

To delete a RAID set:

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

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

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
==========================[ Delete LD 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 [Del/Alt+D] Delete LD
 [Ctrl+V] View JBOD Disk  [ESC] Exit
```

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
```

5.2.3   Viewing the Drive Assignment

To view the drive assignment:

1.   From the main control panel, press <1> to to enter the **Drive Assignment 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
```
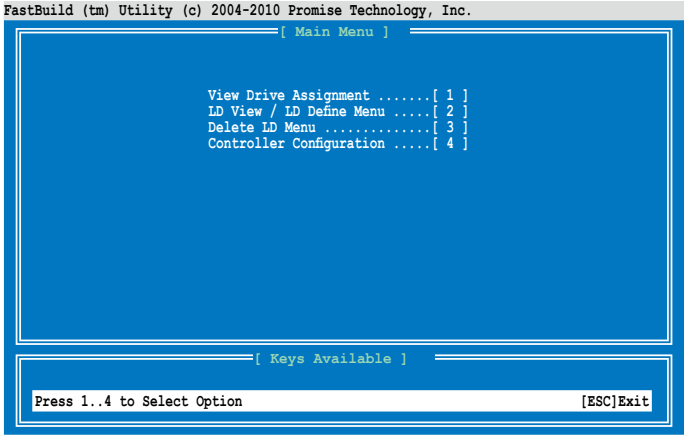
2.   The drive assignment is displayed as shown.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
                             [ View Drive Assignments ]

   Port:ID    Drive Model        Capabilities      Capacity(GB)    Assignment
     01:01    HDTXXXXXXXXXXXX      SATA 3G            250.05
              Extent 1                                249.99            Free
     02:01    HDTXXXXXXXXXXXX      SATA 3G            250.05
              Extent 1                                249.99            Free
     03:01    HDTXXXXXXXXXXXX      SATA 3G            250.05
              Extent 1                                249.99            Free
     04:01    HDTXXXXXXXXXXXX      SATA 3G            250.05
              Extent 1                                249.99            Free





                              [ Keys Available ]

  [Ctrl+H] Full Erase
  [ESC] Exit   [↑] Up   [↓] Down   [PaUp/PaDn] Switch Page
```

5.2.4   Viewing the Controller Configuration

To view the controller configuration:

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

2.   The system resources configuration is displayed as shown.

```
FastBuild (tm) Utility (c) 2004-2010 Promise Technology, Inc.
                    =[ Adapter Configuration - Options ]=

               No Parameters Defined for Current Disk(s)...


                    =[ System Resources Configuration ]=

  Controller IRQ: 10
  AHCI HBA MMIO Base Address: FAFFE400




                            =[ Keys Available ]=

  [ESC] Exit
```

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

6
Driver installation

Chapter summary

6

6.1 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.

6.1.1 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.

```
Create Driver Diskette Menu
Promise SW ROMB Controller Driver
AMD AHCI Controller Driver
Write DMI
FreeDOS command prompt
```
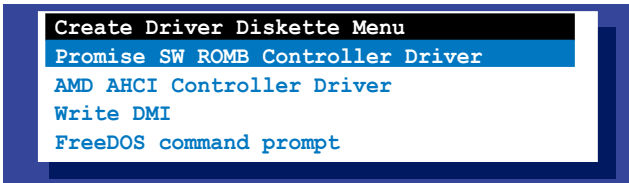
5.	Use the arrow keys to select the type of RAID driver disk you want to create and press <Enter> to enter the sub-menu.

```
 Promise SW ROMB Controller Driver
 Windows Server 2003 32/64 bit
 Windows Server 2008 32 bit
 Windows Server 2008 64 bit
 Windows Server 2008 R2 64 bit
 RHEL AS4 UP8 32 bit
 RHEL AS4 UP8 64 bit
 RHEL 5 UP4 32 bit
 RHEL 5 UP4 64 bit
 SLES 10 SP3 32 bit
 SLES 10 SP3 64 bit
 SLES 11 32 bit
 SLES 11 64 bit
 CentOS 5.4 32 bit
 CentOS 5.4 64 bit
 Back
 Exit
```
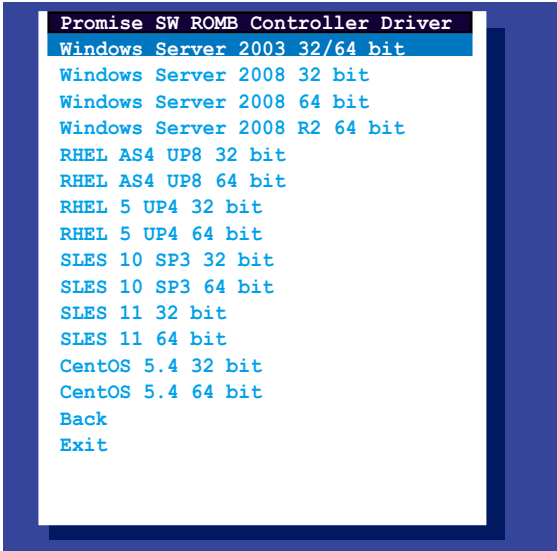
6.	Locate the RAID driver and place a blank, high-density floppy disk to the floppy disk drive.

7.	Press <Enter>.

8.	Follow screen instructions to create the driver disk.

6.1.2   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.

```
Windows Setup




















Press F6 if you need to install a third party SCSI or RAID driver...
```
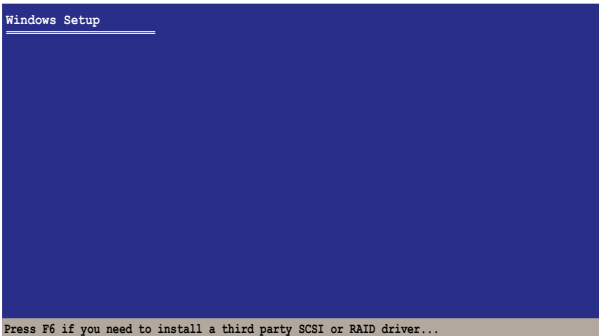
2.   Press <F6> when the message "Press F6 if you need to install a third party SCSI or RAID driver..." appears at the bottom of the screen.

3.   When prompted, press <S> to specify an additional device.

```
Windows Setup


Setup could not determine the type of one or more mass storage devices
installed in your system, or you have chosen to manually specify an adapter.
Currently, Setup will load support for the following mass storage devices(s):

   <none>

 * To specify additional SCSI adapters, DVD-ROM drives, or special
   disk controllers for use with Windows, including those for
   which you have a device support disk from a mass storage device
   manufacturer, press S.

 * If you do not have any device support disks from a mass storage
   device manufacturer, or do not want to specify additional
   mass storage devices for use with Windows, press ENTER.


 S=Specify Additional Device    ENTER=Continue    F3=Exit
```

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

```
Windows Setup




                      Please insert the disk labeled
            Manufacturer-supplied hardware support disk
                            into Drive A:
                   *    Press ENTER when ready.




   ENTER=Continue      ESC=Cancel     F3=Exit
```

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.
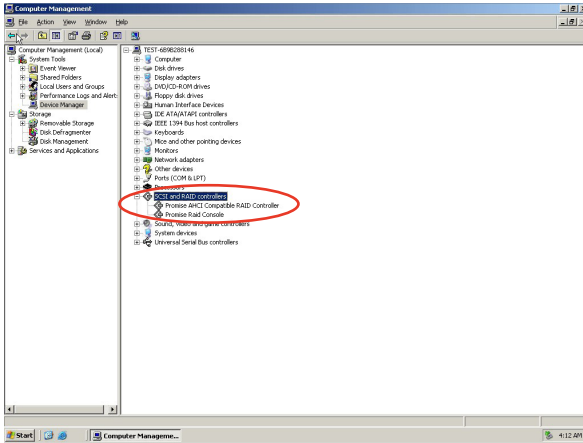
The screen differs based on the controller.

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>.

```
┤ Main Menu ├

Do you have a driver disk?

   Yes          No
```

5. Press <Enter> to continue.

```
┤ Insert Driver Disk ├

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

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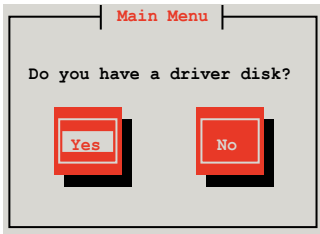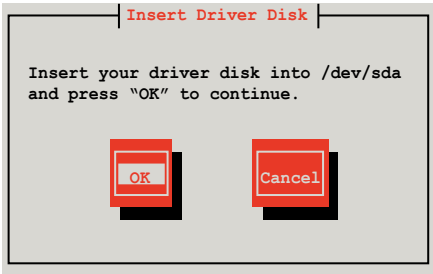
6. Select **No** and press <Enter> to continue.

```
┤ More Driver Disks? ├

Do you wish to load any more
driver disks?

   Yes          No
```
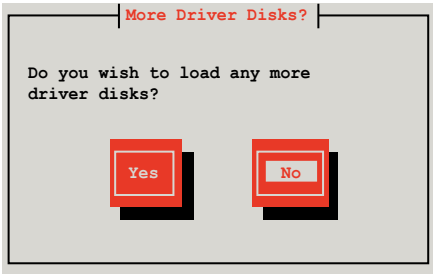
7. Select **Skip** and press <Enter> to continue.

```
┌─────────────┤ CD Found ├─────────────┐
│                                        │
│  To begin testing the CD media before  │
│  installation press OK.                 │
│                                         │
│  Choose Skip to skip the media test     │
│  and start the installation.            │
│                                         │
│      ┌────────┐      ┌────────┐         │
│      │   OK   │      │  Skip  │         │
│      └────────┘      └────────┘         │
│                                         │
└─────────────────────────────────────────┘
```
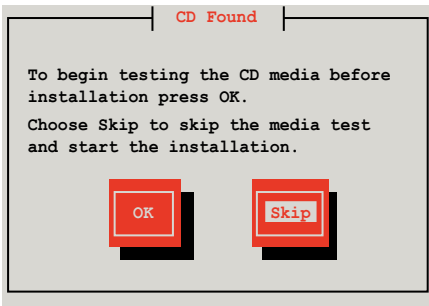
8. Follow the onscreen instructions to finish installing the RedHat operating system.

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>.

```
┤ Main Menu ├

Do you have a driver disk?

   Yes              No
```
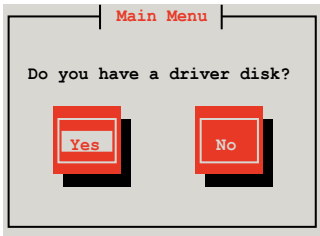
5. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.

```
┤ Insert Driver Disk ├

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

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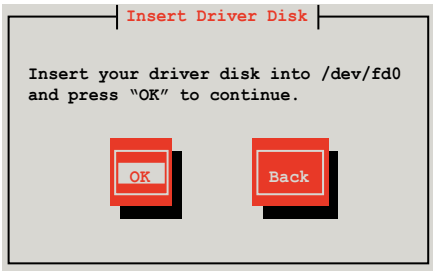
The drivers for the RAID card are installed to the system.

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

```
┌─────┤ More Driver Disks? ├─────┐
│                                │
│  Do you wish to load any more  │
│  driver disks?                 │
│                                │
│                                │
│    ┌─────┐        ┌────┐       │
│    │ Yes │        │ No │       │
│    └─────┘        └────┘       │
│                                │
└────────────────────────────────┘
```
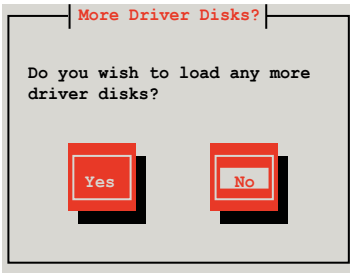
7. Follow the onscreen instructions to finish the OS installation.

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.

```
                Boot from Hard Disk
                Installation
                Repair Installed System
                Rescue System
                Check Installation Media
                Firmware Test
                Memory Test



           Boot Options |

 F1 Help  F2 Language   F3 Video Mode   F4 Source    F5 Kernel  F6 Driver
          English(US)    1024 X768         DVD         Default     No
```
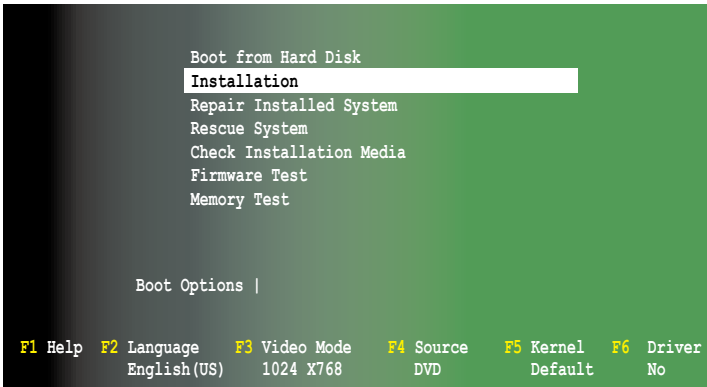
3. Press <F6>, then select **Yes** from the menu. Press <Enter>.

```
                Boot from Hard Disk
                Installation
                Repair Installed System
                Rescue System
                Check Installation Media
                Firmware Test
                Memory Test


                                                          Yes
                                                          No
           Boot Options |                                 File
                                                          URL
 F1 Help  F2 Language   F3 Video Mode   F4 Source    F5 Kernel  F6 Driver
          English(US)    1024 X768         DVD         Default     No
```
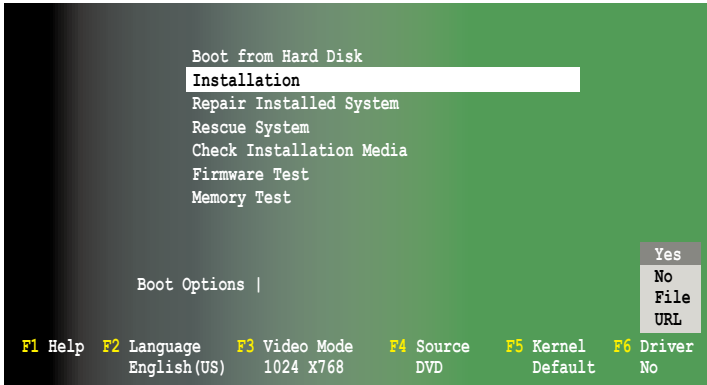
4.   Insert the RAID driver disk to the floppy disk drive. Type the command
      acpi=off apic=bigsmp brokenmodules=ahci in **Boot Options** field, and
      press <Enter>.

```
                    Boot from Hard Disk
                    Installation
                    Repair Installed System
                    Rescue System
                    Check Installation Media
                    Firmware Test
                    Memory Test


              Boot Options acpi=off apic=bigsmp brokenmodules=ahci


  F1 Help  F2 Language    F3 Video Mode   F4 Source    F5 Kernel  F6 Driver
              English(US)    1024 X768        DVD        Default       Yes
```
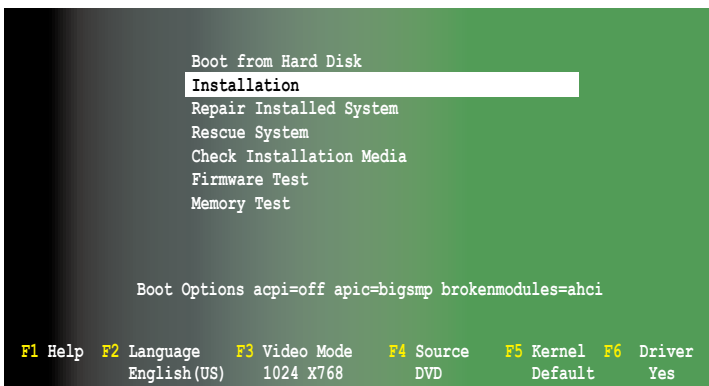
5.   When below screen appears, select the USB floppy disk drive (sda) as the
      driver update medium. Select **OK**, then press <Enter>.

```
      Please choose the Driver Update medium.

      sda: USB Floppy
      Other device


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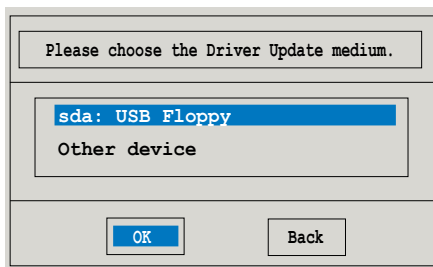
6. The drivers for the RAID controller are installed to the system as shown below.

```
Please choose the Driver Update medium.

sda: USB Floppy
sr0: CD-ROM, ASUS DRW-1612BLT
sdb: Disk, Promise 1X2 Morror/RAID1
sd3: Disk, Promise RAID Console
other device

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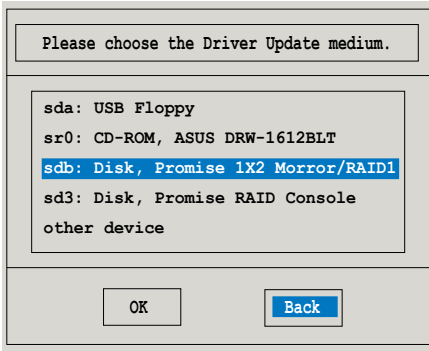
7. Select **Back** and follow the onscreen instructions to finish the installation.

6.2 AMD Processor Driver installation

This section provides instructions on how to install the Plug and Play components for the AMD® processor driver on the system.

You need to manually install the AMD® processor driver on a Windows XP/ 7, Server 2003/2008 R2 operating system. To install the AMD® processor 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.

> 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 the item **AMD Processor Driver** from the menu.
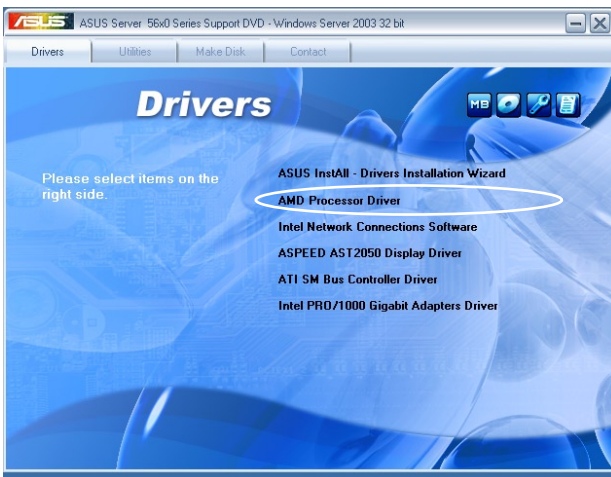
4.   The **AMD Processor Driver** window appears. Click **Next** to start the
     installation.
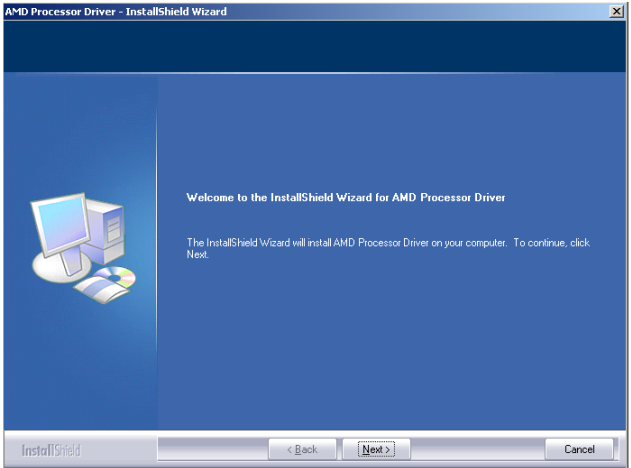
5.   Read the **License Agreement** and click **Yes** to continue.
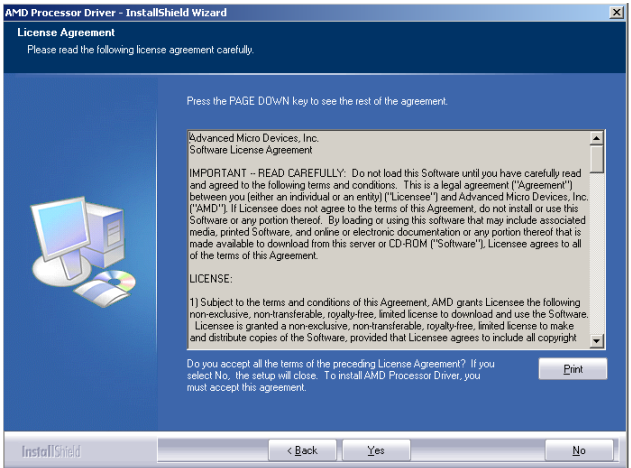
6. Read the **Information** and click **Next** to continue.
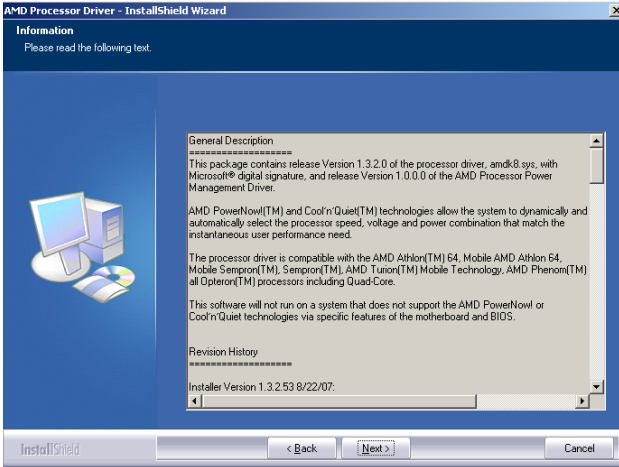
7. Choose the destination location and click **Next** to start the installation.
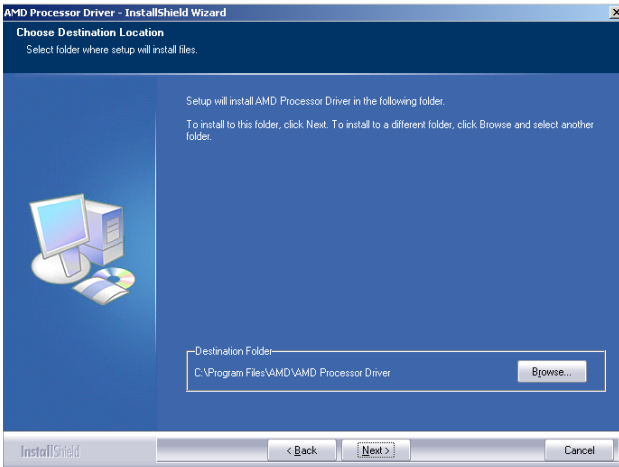
8.   AMD Processor Driver is configuring your new software installation.
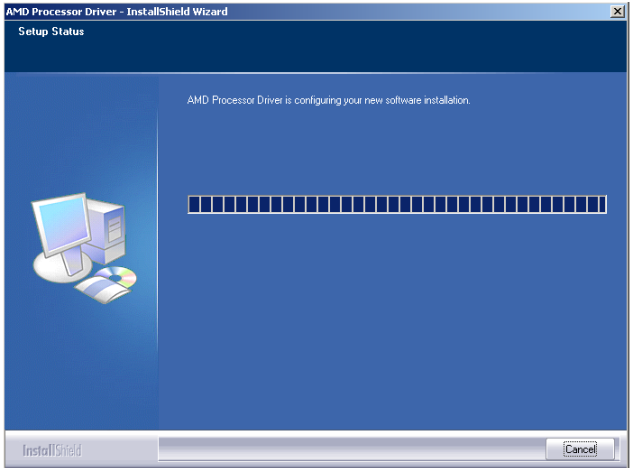
9.   Click **Yes, I want to restart my computer now** and click **Finish** to complete
      the installation.
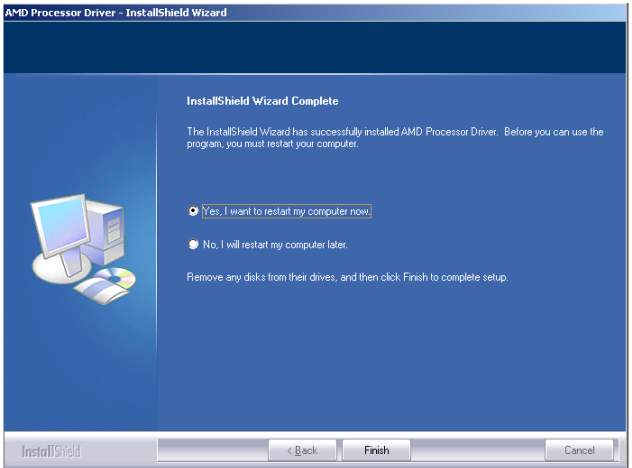
6.3 LAN driver installation

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**.
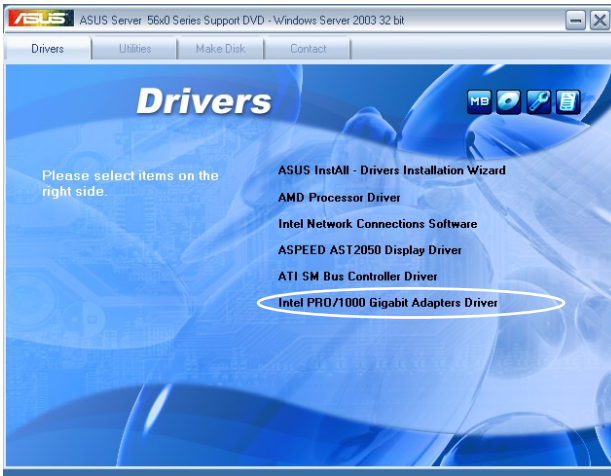
4.	When the **Intel® PRO Network Connections – InstallShield Wizard** window appears, click **Next** to start the installation.
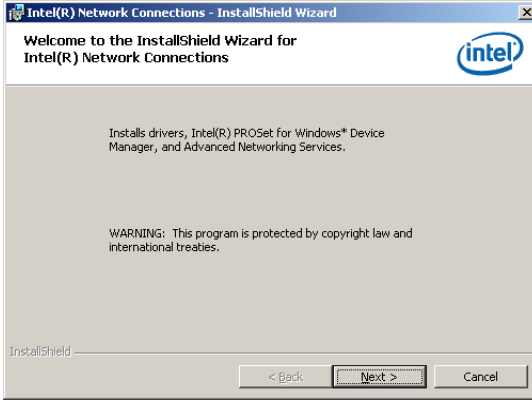
5.	Click **I accept the terms in the license agreement** and then click **Next** to continue.
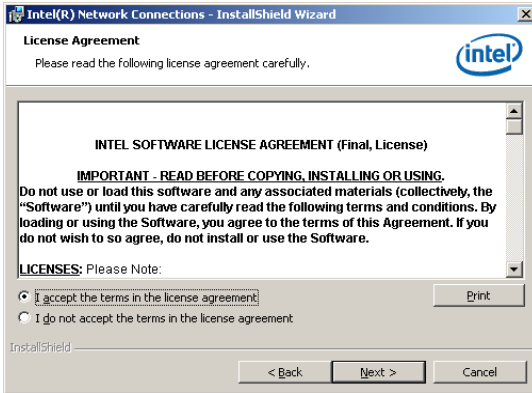
6. Select the programs you want to install and click **Next** to continue.
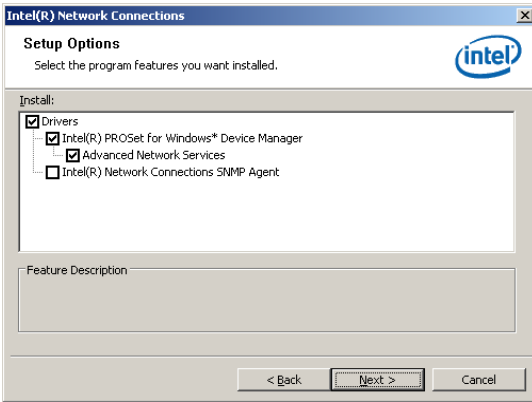
7. Click **Install** to start the installation.
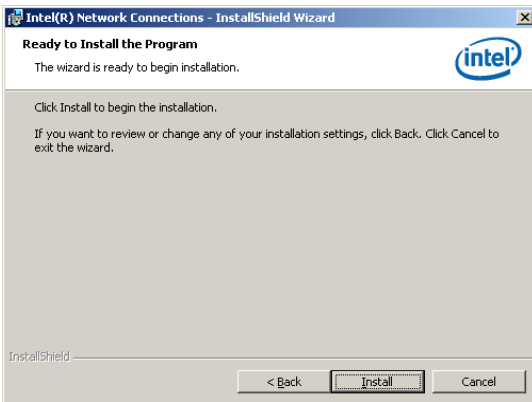
8.   The programs you select are being installed.
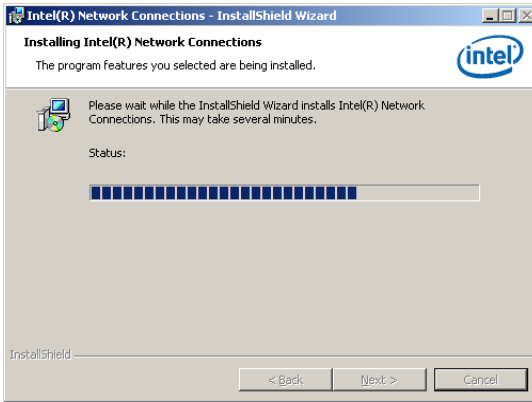
9.   Click **Finish** to finish the installation.
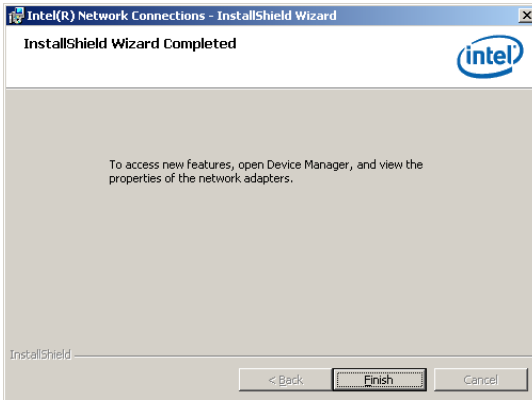
6.4   ATI SM Bus controller driver installation

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® XP / Server 2003 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.

> 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** to run the support DVD.

3.   Click the item **ATI SM Bus Controller Driver** from the menu, and then follow the onscreen instructions to complete the installation.
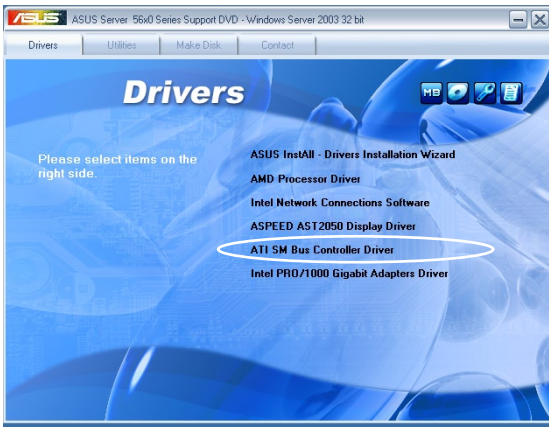
6.5 Display driver installation

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.
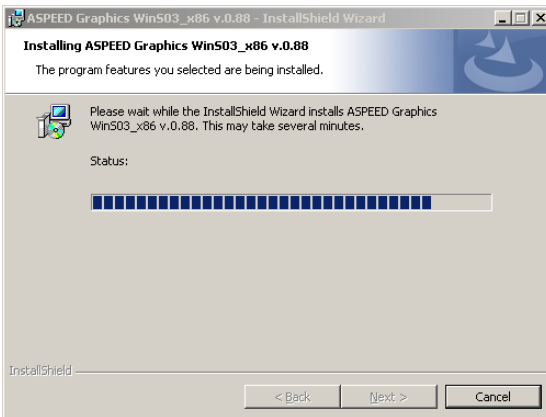
4. Click **ASPEED AST2050 Display Driver**.
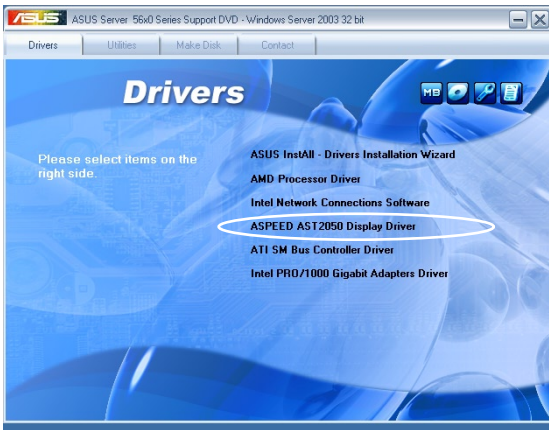
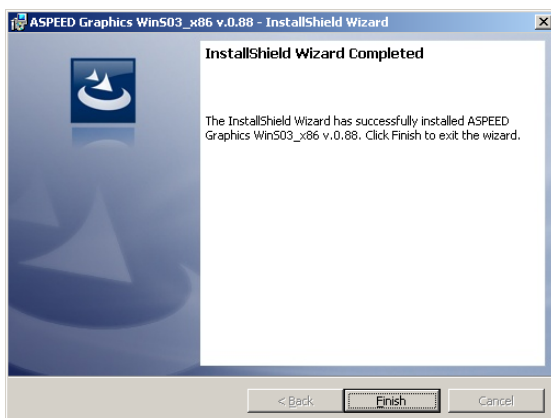4. When the **ASPEED InstallShield Wizard** window appears, click **Next** to continue.
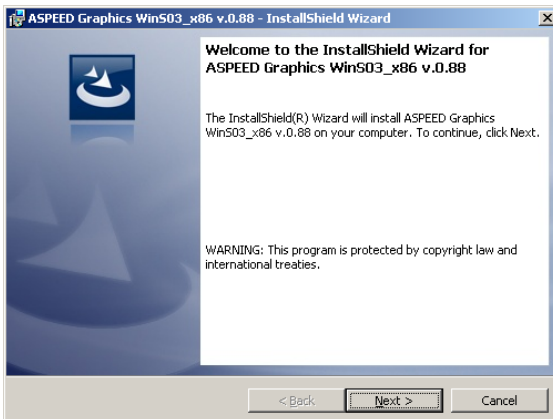
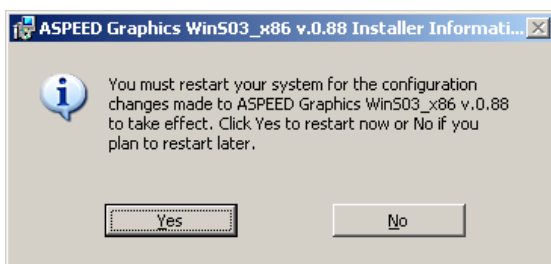5. Click **Install** to start the installation.
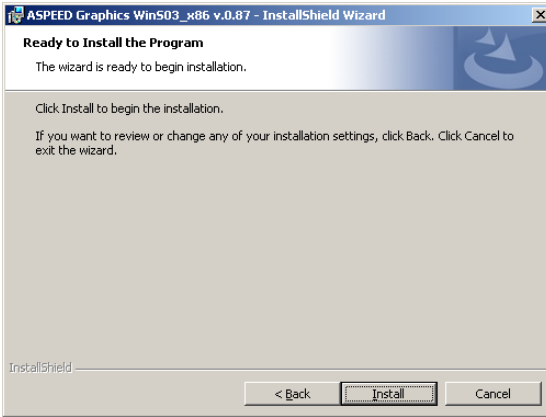
6. The system installs the driver automatically.

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

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

6.6 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.

6.6.1 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.

6.6.2 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.
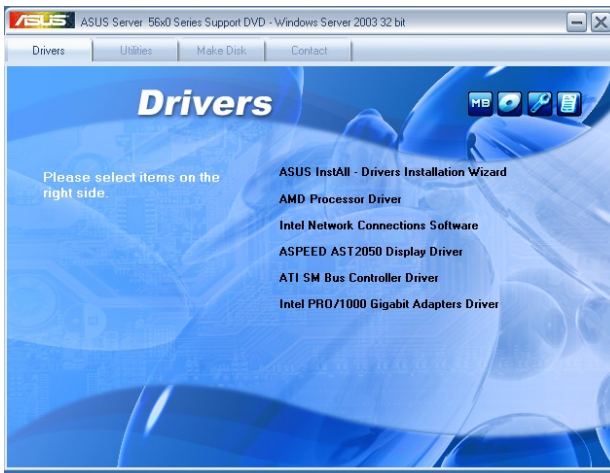
6.6.3   Utilities menu
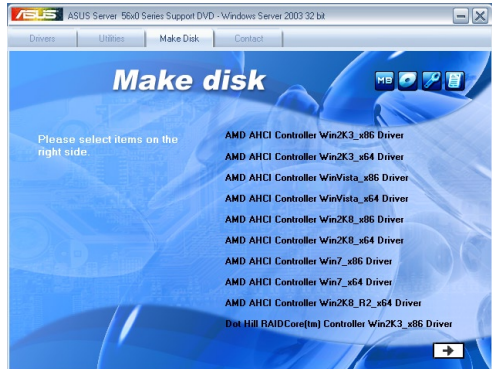
The Utilities menu displays
the software applications and
utilities that the motherboard
supports. Click an item to
install.

6.6.4   Make disk menu
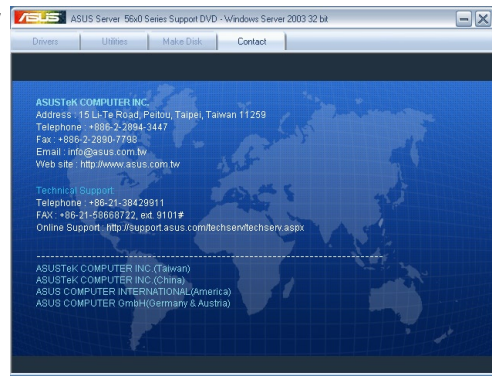
The Make disk menu contains
items to create RAID driver
disks.

6.6.5   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.

This appendix includes additional information that you may refer to when configuring the motherboard.

Reference information

Appendix summary

A

A.1 KCMR-D12 block diagram

800/1066/1333 MHz

800/1066/1333 MHz

AMD Lisbon Processor CPU1

6.4Gt/s HT3

6.4Gt/s HT3

AMD Lisbon Processor CPU2

800/1066/1333 MHz

800/1066/1333 MHz

5.2Gt/s HT3

Slot 1 / PCIEx8 Slot

PCI-e x16 Gen2 Link

PCI-e x4 Gen2 Link

ASM 1440 Switch

PCI-e x8 Gen2 Link

Slot 6 / PCIEx16 Slot

ASM 1440 Switch

AMD SR5670

PIKE1

PCI-e x8 Gen2 Link

8 x SAS Ports

Slot 4 / PCIEx8 Slot

PCI-e x8 Gen2 Link

PCI-e x1

GbE LAN Intel WG82574L

Slot 3 / PCIEx8 Slot

PCI-e x1

GbE LAN Intel WG82574L

2.5Gt/s A-Link

BIOS Flash ROM (SPI 16M)

SPI BUS

7 x USB1.1 / USB2.0 Ports

6 x SATA II Ports

PCI 33/32

AMD SP5100

Slot 7 / PCI Slot

SM BUS

SM BUS

HW MONITOR W83795G

Smart Fan

CPU Fan*2 Front Fan*4 Rear Fan*2 CPU Temp. MB Temp. Voltage

VGA port

BMC ASPEED AST2050

Realtek RTL8201N-GR

LPC BUS

ENE KB3720QF

Series Interface

Super I/O NUVOTON W83667HG-A-FAC

COM Port

KB

MS

Appendix A: Reference information