

Hummingbird

ASUS[®]

Motherboard

E5371

First Edition V1

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Notices

Federal Communications Commission Statement

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

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

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

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



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://green.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+Del>

Command

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

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

Hummingbird specifications summary

Model Name		Hummingbird	Hummingbird Lite
Processor		Intel® Atom™ Processor D510 (Pineview-D) on board Dual Core	
Core Logic		Intel® NM10	
Form Factor		mini ITX, 6.7 in. x 6.7 in. (17 cm x 17 cm)	
ASUS Features	FAN speed control	V	
	Rack Ready (Rack and Pedestal dual use)	V	
	ASWM2.0	V	
Memory	Total Slots	2 x SO-DIMM, Single Channel	
	Capacity	Maximum up to 4GB	
	Memory Type	non-ECC, unbuffered DDR2 667	
	Memory Size	512MB, 1GB, 2GB * Only support - Single sided x16 - Single sided x8 - Double sided x8	
Expansion Slots (follow SSI Location #)		1 x PCI-E x1 (x1 link)	
Storage		Intel® NM10: - 2 x SATA2 300MB/s ports Marvell® 6121: - 2 x SATA2 300MB/s ports - Supports software RAID 0, 1 (Windows)	
Networking	LAN	2 x Intel® 82574L GbE LAN 1 x Management LAN	2 x Intel® 82574L GbE LAN
Graphic	VGA	Aspeed® AST2050 8MB	Intel® Atom™ D510 (GMA 3150)
Onboard I/O Connectors	Management Connector	Onboard socket for optional management card	
	PSU Connector	24-pin ATX power connector	
	USB Connectors	3 (support 5 USB ports) (One for internal Type A USB connector)	
	Fan Header	5 x 4pin	
	SMBus	1	

(continued on the next page)

Hummingbird specifications summary

Rear I/O Connectors	External Serial Port	1
	External USB Port	2
	VGA Port	1
	RJ-45	3 2
	PS/2 KB/Mouse	1
Management Solution	Software	ASWM2.0
	Out of Band Remote Management	Optional ASMB4-iKVM for KVM-over-IP -
Monitoring	CPU/MB 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.

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

1 Product introduction

Chapter summary

1

1.1	Welcome!	1-3
1.2	Package contents.....	1-3
1.3	Serial number label	1-4
1.4	Special features.....	1-4

1.1 Welcome!

Thank you for buying an ASUS® Hummingbird 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
Cables	SATA data cable	2	--
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 **xxS2xxxxxxxx** shown as the figure below. With the correct serial number of the product, ASUS Technical Support team members can then offer a quicker and satisfying solution to your problems.



1.4 Special features

Intel® Atom™ Processor

This motherboard supports the latest Intel® Atom™ processor D510 in Micro-FCBGA8 packaging technologies, which has memory and VGA controller integrated to support 1-channel (2 x SO-DIMM) non-ECC DDR2 667 memory and providing great graphics performance.

Serial ATA II technology



The motherboard supports the Serial ATA II 3 Gb/s technology through the Serial ATA interface. 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/MB 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.

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



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2.3	Central Processing Unit (CPU)	2-9
2.4	System memory	2-9
2.5	Expansion slot.....	2-12
2.6	Jumpers	2-15
2.7	Connectors	2-18

2.1 Before you proceed

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

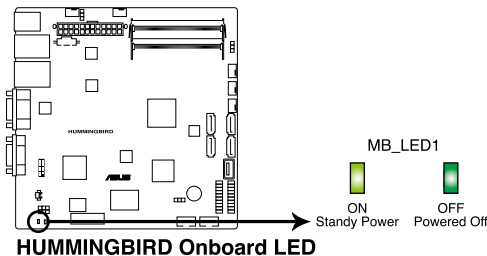


- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid 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

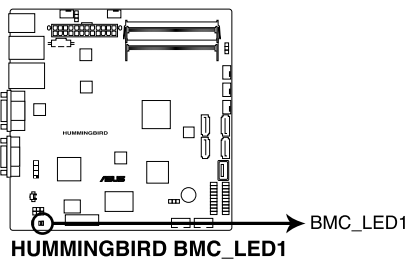
1. Standby Power LED

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.



2. BMC LED (BMC_LED1) (*Hummingbird model only*)

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



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

2.2 Motherboard overview



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

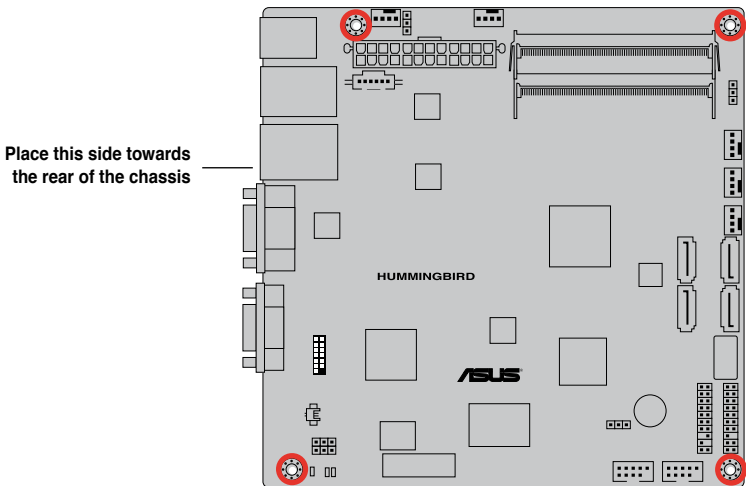
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

Place four (4) screws into the holes indicated by circles to secure the motherboard to the chassis.

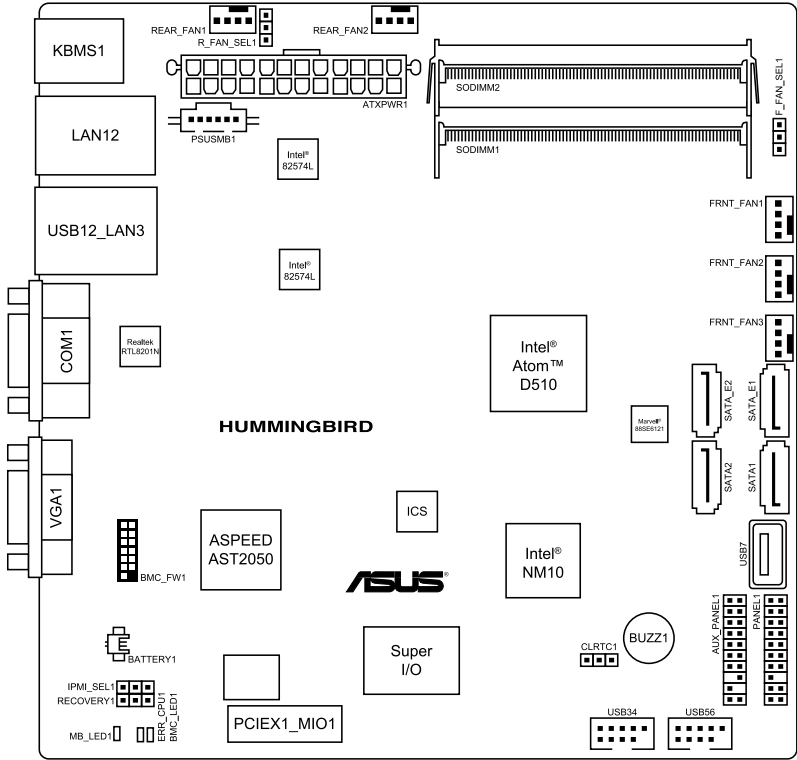


DO NOT overtighten the screws! Doing so can damage the motherboard.

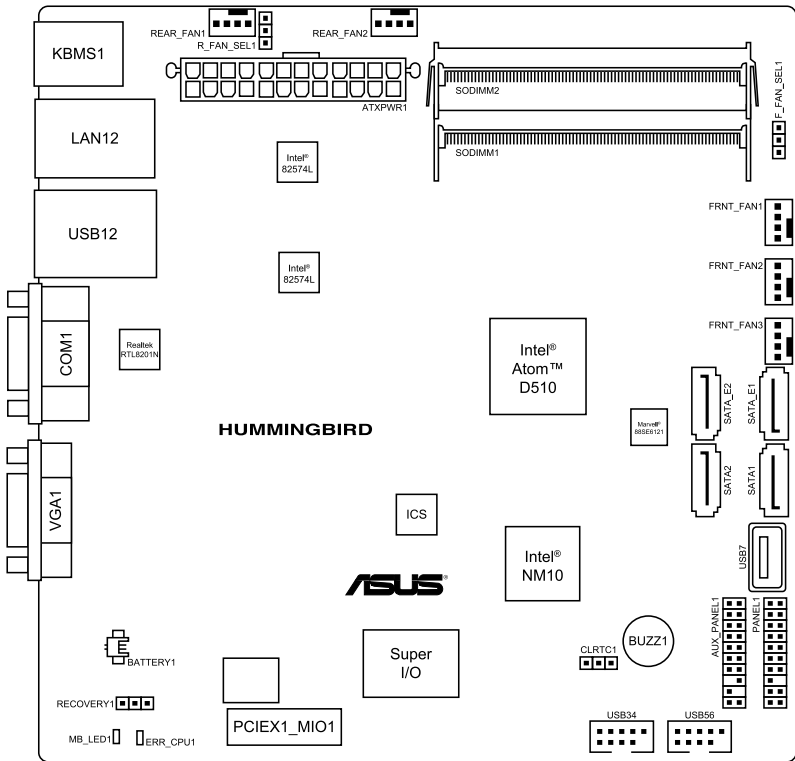


2.2.3 Motherboard layout

Hummingbird



Hummingbird Lite



2.2.4 Layout contents

Slots/Socket	Page
1. Central Processing Unit (CPU)	2-9
2. SO-DIMM DDR2 sockets	2-9
3. MIO / PCIE x1 slot	2-13

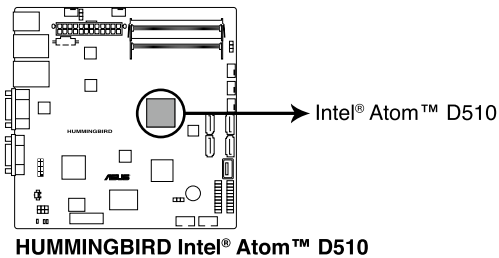
Jumpers	Page
1. Clear RTC RAM (CLRTC1)	2-15
2. Front Fan and Rear Fan control setting (3-pin F_FAN_SEL1, R_FAN_SEL1)	2-16
3. IPMI setting (3-in IPMI_SEL1) (<i>Hummingbird model only</i>)	2-16
4. Force BIOS recovery setting (3-pin RECOVERY1)	2-17

Rear panel connectors	Page
1. PS/2 mouse port (green)	2-18
2. PS/2 keyboard port (purple)	2-18
3. USB 2.0 ports 1 and 2	2-18
4. Serial (COM1) port	2-18
5. Video Graphics Adapter port	2-18
6. LAN 1 (RJ-45) port	2-18
7. LAN 2 (RJ-45) port	2-18
8. RJ-45 port for iKVM (<i>Hummingbird model only</i>)	2-18

Internal connectors	Page
1. Intel® NM10 Serial ATA connectors (7-pin SATA1, SATA2 [Red])	2-19
2. Marvell® 6121 Serial ATA connectors (7-pin SATA_E1, SATA_E2 [Blue])	2-19
3. Front and rear fan connectors (4-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, REAR_FAN1, REAR_FAN2)	2-20
4. ATX power connector (24-pin ATXPWR1)	2-21
5. BMC header (BMC_FW1) (<i>Hummingbird model only</i>)	2-21
6. USB connector (10-1 pin USB34, USB56; A-Type USB7)	2-22
7. Power Supply SMBus connector (5-pin PSUSMB1) (<i>Hummingbird model only</i>)	2-22
8. System panel connector (20-1 pin PANEL1)	2-23
9. Auxiliary panel connector (20-2 pin AUX_PANEL1)	2-24

2.3 Central Processing Unit (CPU)

The motherboard comes with an onboard Dual-Core Intel® Atom™ D510 processor and a specially designed CPU heatsink.

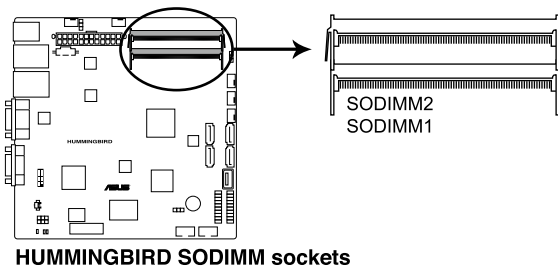


2.4 System memory

2.4.1 Overview

The motherboard comes with two Double Data Rate 2 (DDR2) SO Dual Inline Memory Modules (DIMM) sockets.

The figure illustrates the location of the SO-DIMM sockets:



2.4.2 Memory Configurations

You may install 512MB, 1GB, or 2GB unbuffered non-ECC DDR2 SO-DIMMs into the DIMM sockets.



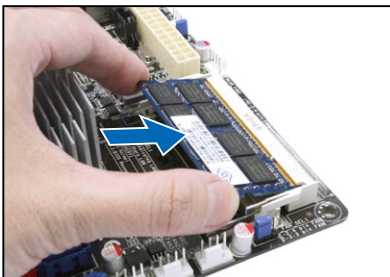
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- The motherboard supports single-sided x16, double-sided x8, and single-sided x8 DIMM modules only.

2.4.3 Installing a DIMM

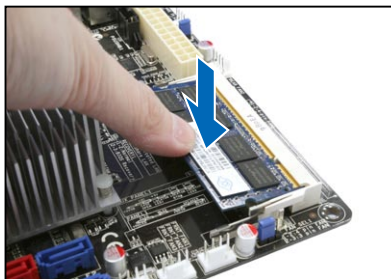


Unplug the power supply before adding or removing DIMMs or other system components. Failure to do so can cause severe damage to both the motherboard and the components.

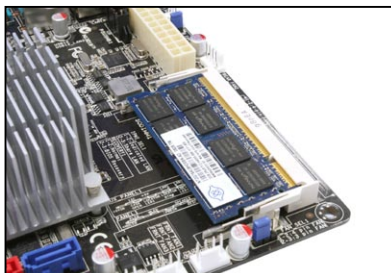
1. Position the DIMM at a 30°-45° angle, then match the notch on the DIMM with the break on the socket.
2. Carefully push the DIMM to the socket until its connectors (golden fingers) are fully-inserted to the socket.



3. Press the DIMM firmly until the DIMM socket retaining clips snap back and secure the DIMM in place.



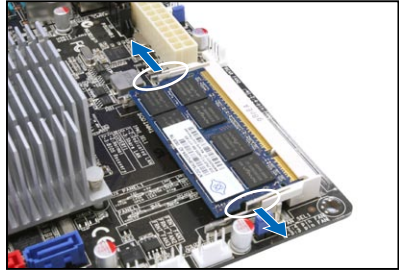
When installed, the DIMM appears as shown.



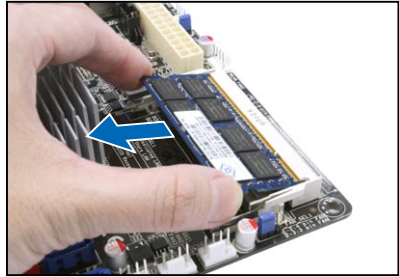
2.4.4 Removing a DIMM

To remove a DIMM:

1. Simultaneously push the DIMM socket retaining clips outward until the DIMM tilts up.



2. Carefully pull the DIMM out from the DIMM socket, then set aside.



2.5 Expansion slot

In the future, you may need to install expansion cards. The following subsections describe the slot and the expansion cards that it supports.



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 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
3*	11	Communications Port (COM2)
4*	12	Communications Port (COM1)
5*	13	--
6	14	Floppy Disk Controller
7*	15	--
8	3	System CMOS/Real Time Clock
9*	4	ACPI Mode when used
10*	5	IRQ Holder for PCI Steering
11*	6	IRQ Holder for PCI Steering
12*	7	PS/2 Compatible Mouse Port
13	8	Numeric Data Processor
14*	9	Primary IDE Channel
15*	10	Secondary IDE Channel

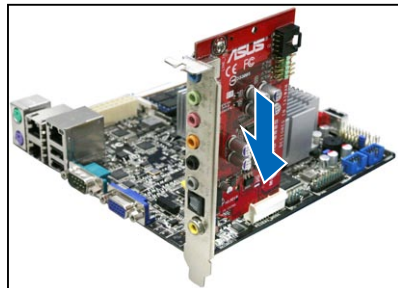
* These IRQs are usually available for ISA or PCI devices.

2.5.4 MIO/PCIE slot

The MIO/PCIE slot supports a MIO audio card or a PCI Express x1 card. The MIO audio card offers great sound quality to complement the robust video power.

To install an audio card:

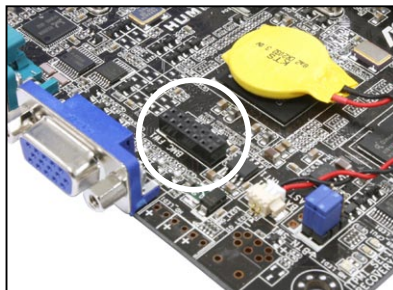
1. Locate the MIO/PCIE slot on the motherboard.
2. Align the card connector with the slot and press firmly until the card sits on the slot completely.



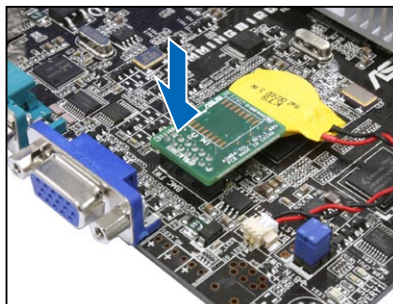
2.5.5 Installing ASMB4 management board (Hummingbird model only)

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

1. Locate the BMC_FW header on the motherboard.



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



2.6 Jumpers

1. Clear RTC RAM (CLRRTC1)

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

To erase the RTC RAM:

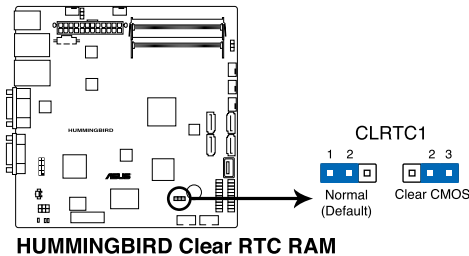
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and the computer turns on automatically.
4. Hold down the key during the boot process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



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

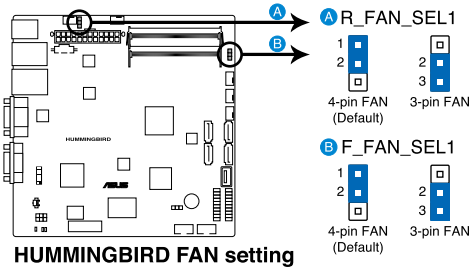


If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



2. CPU Fan and Chassis Fan control setting (3-pin F_FAN_SEL1, R_FAN_SEL1)

These jumpers allow you to switch for fan pin selection. The F_FAN_SEL1 jumper is for the front fans control and the R_FAN_SEL1 jumper is for the rear fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.



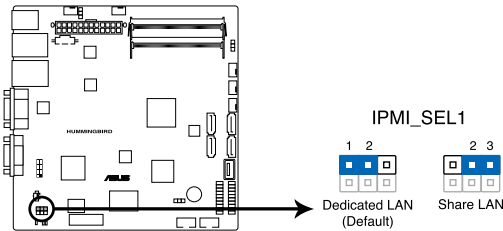
HUMMINGBIRD FAN setting



- 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.

3. IPMI setting (3-pin IPMI_SEL1) (Hummingbird model only)

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



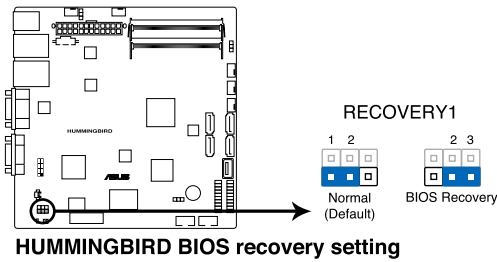
HUMMINGBIRD IPMI setting

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

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

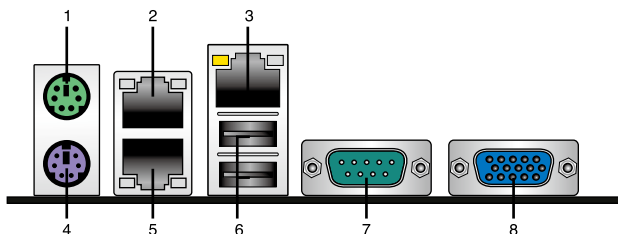
To update the BIOS:

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



2.7 Connectors

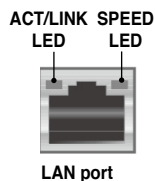
2.7.1 Rear panel connectors



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

LAN port LED indications

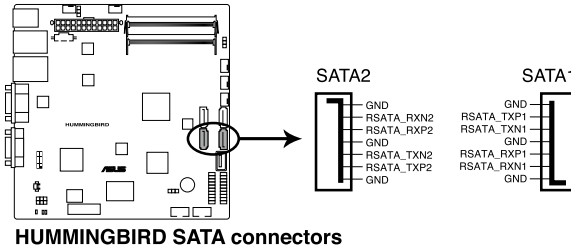
Activity/Link LED		Speed LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



2.7.2 Internal connectors

1. Intel® NM10 Serial ATA connectors (7-pin SATA1, SATA2 [Red])

Supported by the Intel® NM10 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allow up to 3Gb/s of data transfer rate.

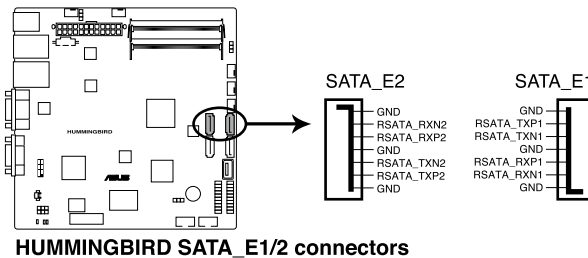


The actual data transfer rate depends on the speed of Serial ATA hard disks installed.

2. Marvell® 6121 Serial ATA connectors (7-pin SATA_E1, SATA_E2 [Blue])

Supported by the Marvell® 6121 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allow up to 3Gb/s of data transfer rate.

If you installed Serial ATA hard disk drives to these connectors, you can create a RAID 0 or RAID 1 configuration.

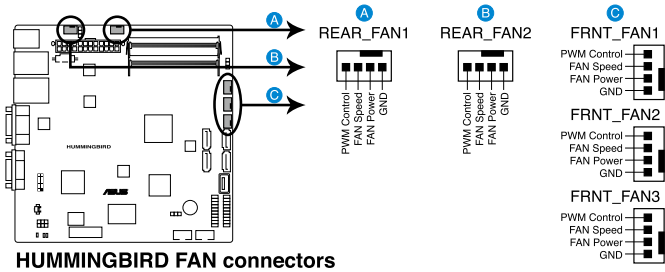


3. Front and rear fan connectors (4-pin FRNT_FAN1, FRNT_FAN2, FRNT_FAN3, REAR_FAN1, REAR_FAN2)

The fan connectors support cooling fans of 350 mA–740 mA (8.88 W max.) or a total of 1.75 A–3.7 A (44.4 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 Fan Speed Control technology.

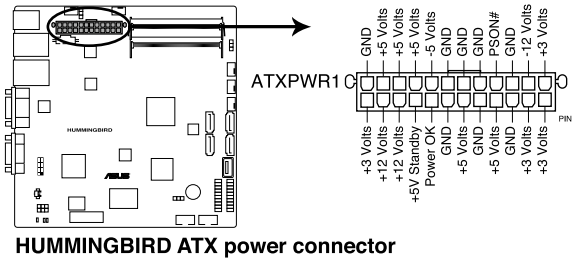


4. ATX power connector (24-pin ATXPWR1)

This connector is for an ATX power supply plug. The power supply plug is designed to fit the connector in only one orientation. Find the proper orientation and push down firmly until the connector completely fit.



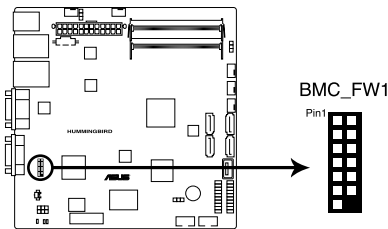
- This motherboard supports ATX2.0 PSU or later version.
- Ensure that your power supply unit (PSU) can provide at least the minimum power required by your system.



HUMMINGBIRD ATX power connector

5. BMC header (BMC_FW1) (Hummingbird model only)

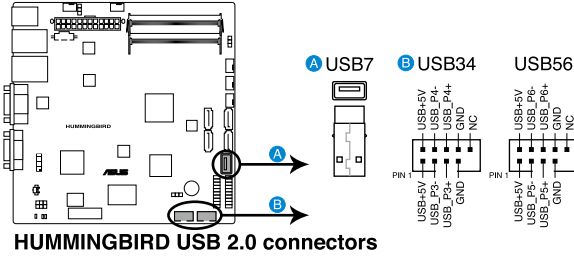
The BMC connector on the motherboard supports an ASUS® Server Management Board 4 Series (ASMB4).



HUMMINGBIRD BMC connector

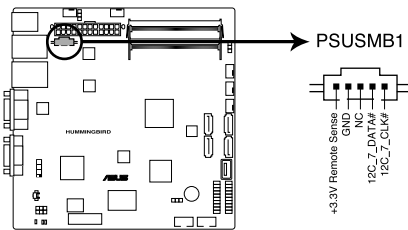
6. USB connector (10-1 pin USB34, USB56; A-Type USB7)

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.



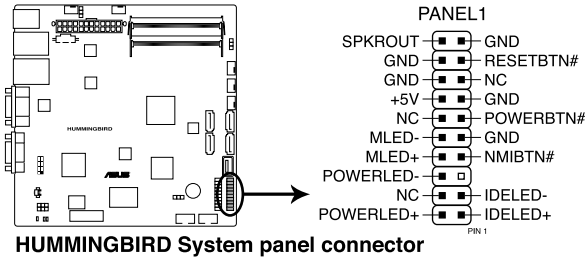
7. Power Supply SMBus connector (5-pin PSUSMB1) (Hummingbird model only)

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



8. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



HUMMINGBIRD System panel connector

1. System power LED (3-pin PLED)

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

2. Message LED (2-pin MLED)

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

3. System warning speaker (4-pin SPEAKER)

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

4. Hard disk drive activity LED (2-pin 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. ATX power button/soft-off button (2-pin PWRSW)

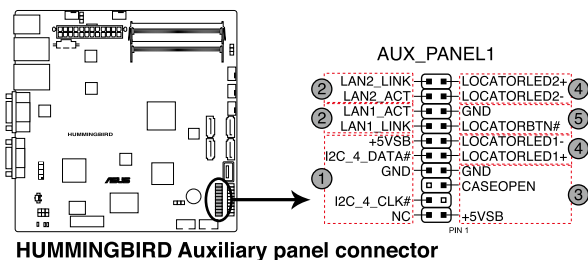
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

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.

9. 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.



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

These leads connect the front panel SMBus cable.

2. LAN activity LED (2-pin LAN1_LED, LAN2_LED)

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

3. Chassis intrusion (4-1 pin CHASSIS)

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

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

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

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

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

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.....	3-3
3.2	Powering off the computer.....	3-4

3.1 Starting up for the first time

1. After making all the connections, replace the system case cover.
2. Be sure 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 SSI power supplies, the system LED lights up when you press the SSI 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 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® 2008 Server:

1. Click the **Start** button 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 option 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 **4.6 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

4.1	Managing and updating your BIOS	4-3
4.2	BIOS setup program	4-7
4.3	Main menu	4-10
4.4	Advanced menu	4-15
4.5	Server menu	4-21
4.6	Power menu.....	4-23
4.7	Boot menu	4-26
4.8	Tools menu	4-30
4.9	Exit menu	4-31

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

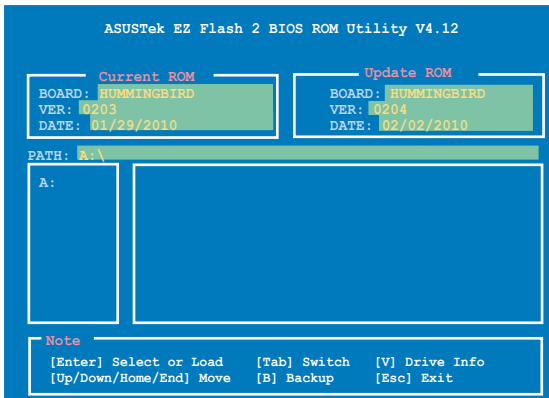
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a DOS-based utility.



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.



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:

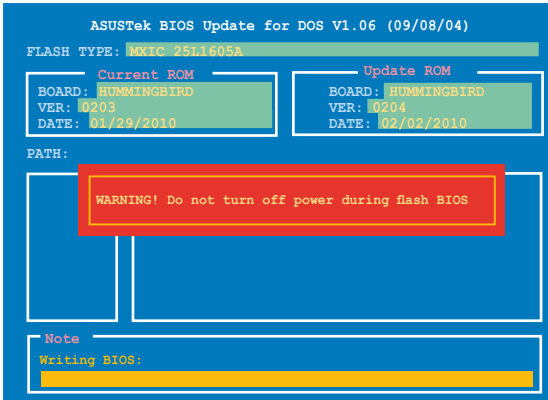
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable USB flash disk drive.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to the bootable USB flash disk drive you created earlier.
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>.

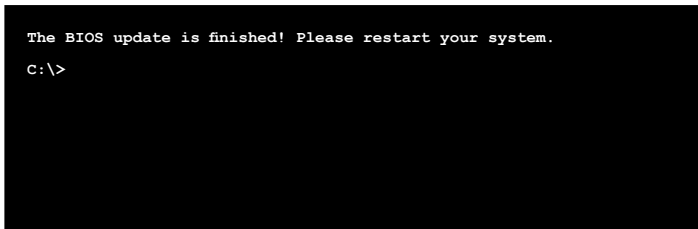
```
A:\>BUPDATER /i[file name].ROM
```


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



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

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



4.1.3 ASUS CrashFree BIOS 3 utility

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



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

Recovering the BIOS from a USB flash drive

To recover the BIOS from a USB flash drive:

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



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



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

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

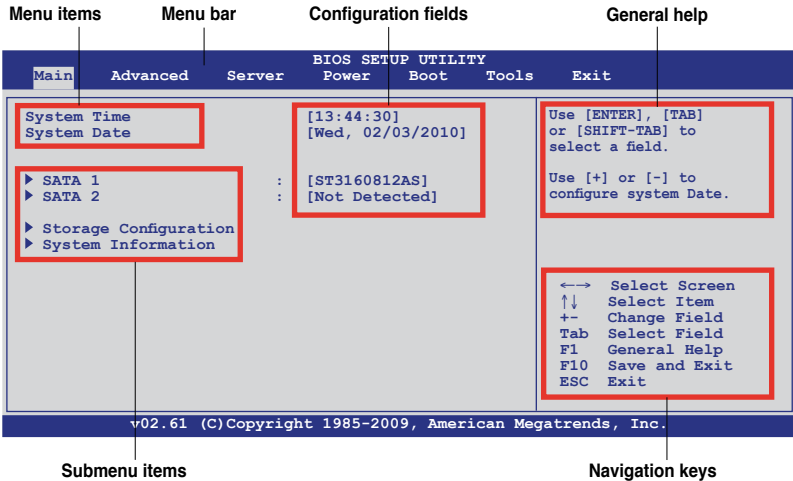
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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 submenus 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 **4.9 Exit Menu**.
 - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website (www.asus.com) to download the latest BIOS file for this motherboard.
-

4.2.1 BIOS menu screen



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.



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 Submenu items

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

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.

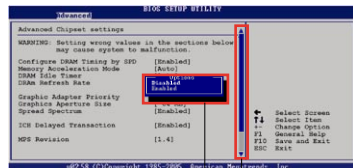
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to 4.2.7 Pop-up window.

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

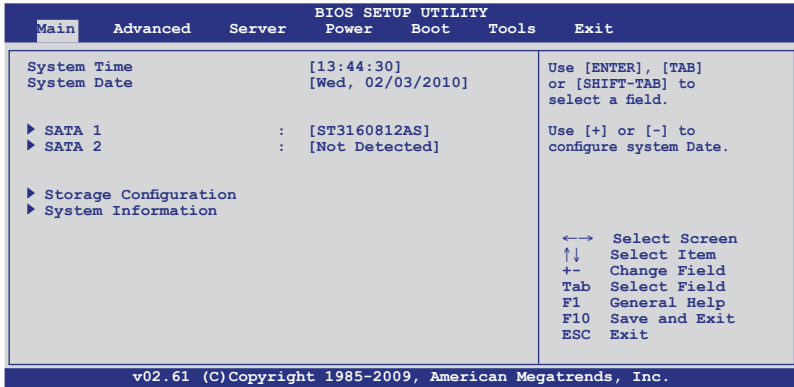
At the top right corner of the menu screen is a brief description of the selected item.

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.



4.3.1 System Time [xx:xx:xx]

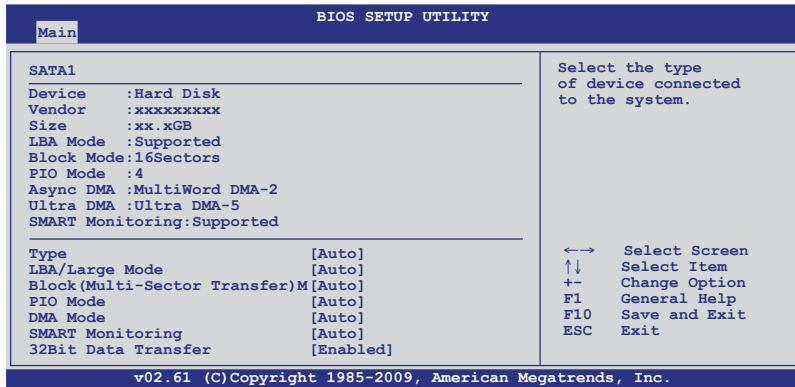
Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.3 SATA1-2

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



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

Type [Auto]

Allows you to select the type of device connected to the system.

Configuration options: [Not Installed] [Auto] [CDROM] [ARMD]

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]

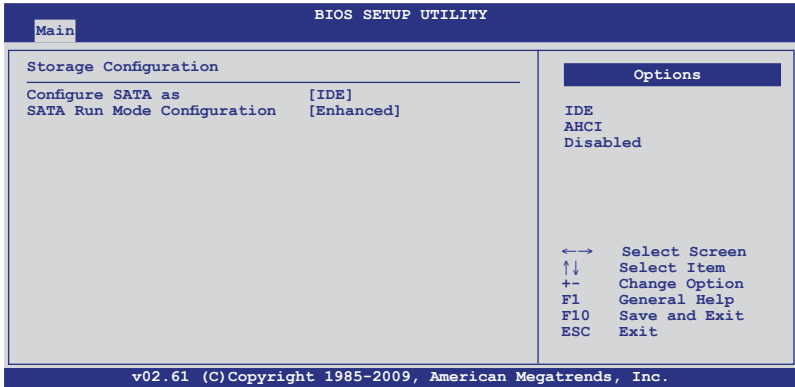
32Bit Data Transfer [Enabled]

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 SATA devices installed in the system. Select an item then press <Enter> if you wish to configure the item.



Configure SATA as [IDE]

Sets the configuration for the Serial ATA connectors supported by the Intel® NM10 chipset. Configuration options: [IDE] [AHCI] [Disabled]



- If you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices, keep the default setting [IDE].
- If you want the Serial ATA hard disk drives to use the Advanced Host Controller Interface (AHCI), set this item to [AHCI]. The AHCI allows the onboard storage driver to enable advanced Serial ATA features that increases storage performance on random workloads by allowing the drive to internally optimize the order of commands.

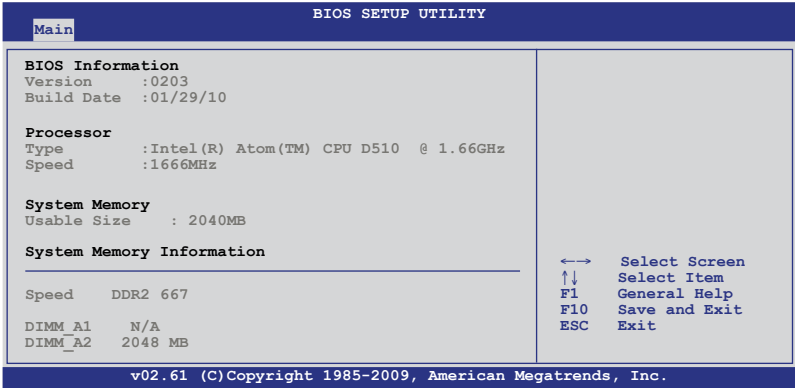
SATA Run Mode Configuration [Enhanced]

This item appears only when you set the previous item to [IDE].

Configuration options: [Compatible] [Enhanced]

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 Information

Displays the auto-detected BIOS information.

Processor

Displays the auto-detected CPU specification.

System Memory

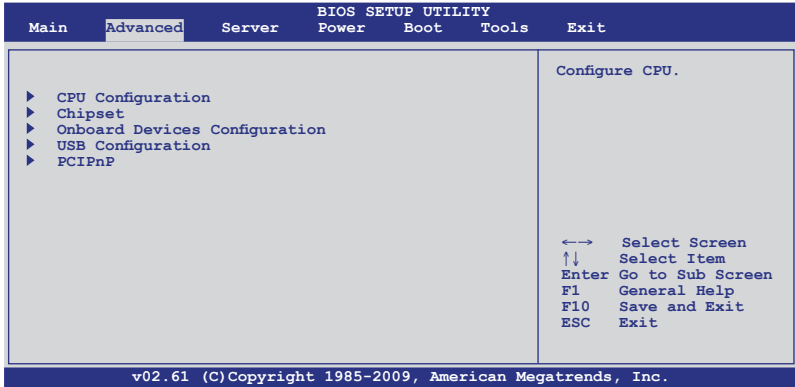
Displays the auto-detected system memory.

4.4 Advanced menu

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

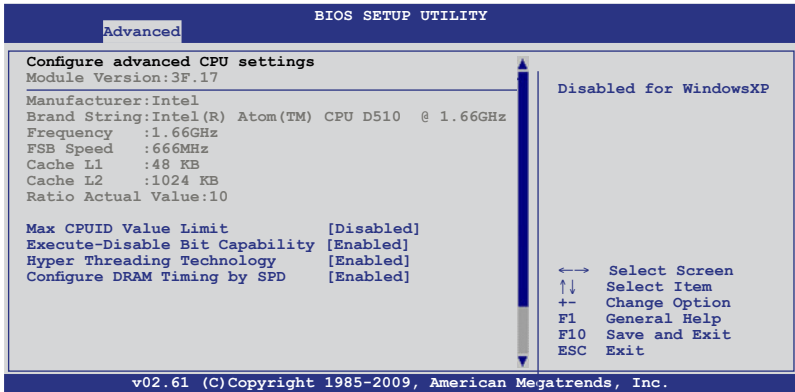


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.



4.4.1 CPU Configuration

The items in this menu show the CPU-related information that the BIOS automatically detects.



Max CPUID Value Limit [Disabled]

Setting this item to [Enabled] allows legacy operating systems to boot even without support for CPUs with extended CPUID functions.

Configuration options: [Disabled] [Enabled]

Execute-Disable Bit Capability [Enabled]

Allows you to enable or disable the No-Execution Page Protection Technology. Setting this item to [Disabled] forces the XD feature flag to always return to zero (0). Configuration options: [Disabled] [Enabled]

Hyper Threading Technology [Enabled]

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

Configure DRAM Timing by SPD [Enabled]

Allows you to enable or disable configuring the DRAM Timing by SPD. Configuration options: [Enabled] [Disabled]



The following 4 items appear when you set **Configure DRAM Timing by SPD** to [Disabled].

DRAM CAS# Latency [5]

Configuration options: [3] – [6]

DRAM RAS# to CAS# Delay [6 DRAM Clocks]

Configuration options: [3 DRAM Clocks] – [6 DRAM Clocks]

DRAM RAS# Precharge [6 DRAM Clocks]

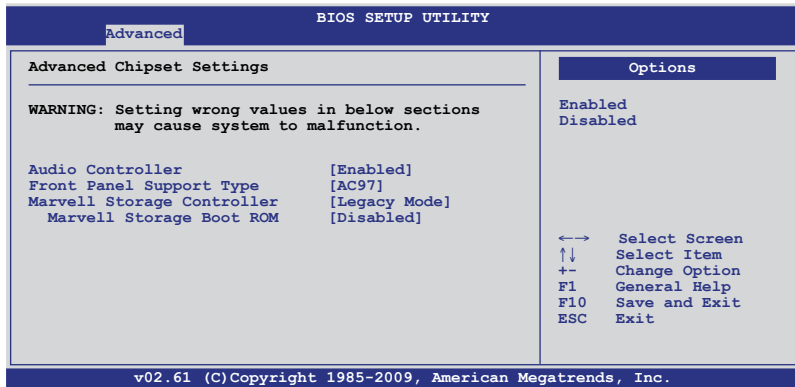
Configuration options: [3 DRAM Clocks] – [6 DRAM Clocks]

DRAM RAS# Activate to Precha [15 DRAM Clocks]

Configuration options: [9 DRAM Clocks] – [15 DRAM Clocks]

4.4.2 Chipset

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



Audio Controller [Enabled]

Allows you to enable or disable the audio controller.

Configuration options: [Disabled] [Enabled]

Front Panel Support Type [AC97]

Allows you to set the front panel audio connector (AAFP) mode to AC97 or Azalia.

Configuration options: [AC97] [Azalia]

Marvell Storage Controller [Legacy Mode]

Allows you to disable the controller or select the controller operating mode. Set to [Legacy Mode] when you want to use the Serial ATA hard disk drives as Parallel ATA physical storage devices. Set to [RAID Mode] when you want to create a RAID configuration from the SATA hard disk drives.

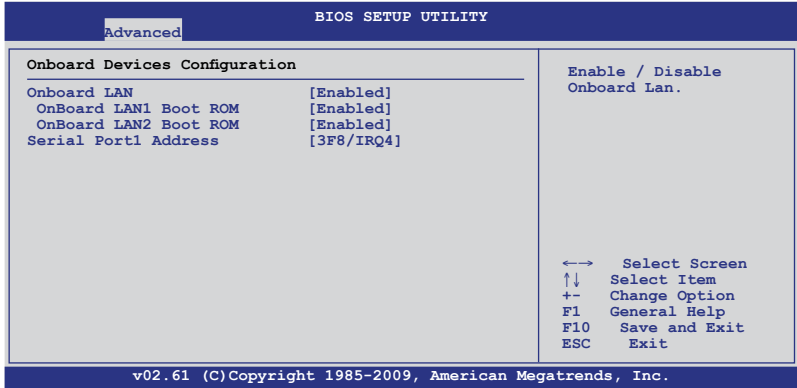
Configuration options: [Legacy Mode] [RAID Mode] [Disabled]

Marvell Storage Boot ROM [Disabled]

This item appears only when you set the previous item to [Legacy Mode] or [RAID Mode], and allows you to enable or disable the storage controller Boot ROM. Configuration options: [Disabled] [Enabled]

4.4.3 Onboard Devices Configuration

The Onboard Devices Configuration menu items allow you to change the advanced settings for onboard devices.



Onboard LAN [Enabled]

Allows you to enabled or disable the onboard LAN controller.

Configuration options: [Disabled] [Enabled]

Onboard LAN1 / LAN2 Boot ROM [Enabled]

This item appears only when you set the previous item to [Enabled] and allows you to enable or disable the onboard LAN1/2 Boot ROM.

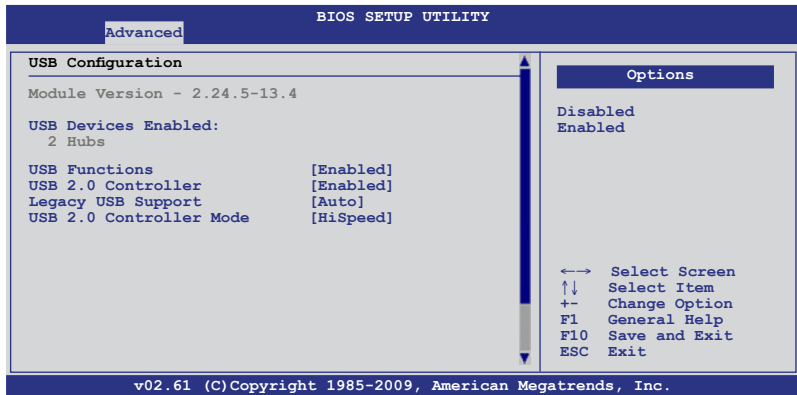
Configuration: [Disabled] [Enabled]

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

Configuration options: [Disabled] [3F8/IRQ4] [3E8/IRQ4] [2E8/IRQ3]

4.4.4 USB Configuration



USB Functions [Enabled]

Allows you to enable or disable the USB function.

Configuration options: [Disabled] [Enabled]



The following 2 items appear when you set **USB Functions** to [Enabled].

USB 2.0 Controller [Enabled]

Allows you to enable or disable the USB 2.0 controller.

Configuration options: [Disabled] [Enabled]

Legacy USB Support [Auto]

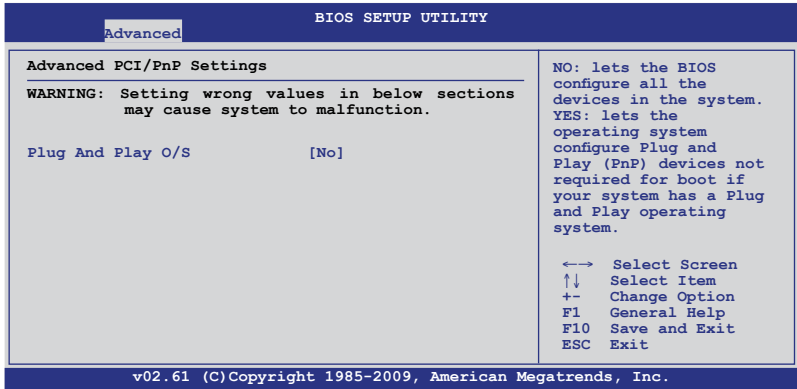
Allows you to enable or disable support for legacy USB devices. Setting to [Auto] allows the system to detect the presence of USB devices at startup. If detected, the USB controller legacy mode is enabled. If no USB device is detected, the legacy USB support is disabled. Configuration options: [Disabled]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

USB 2.0 Controller Mode [HiSpeed]

This item appears only when you set the USB 2.0 Controller to [Enabled] and allows you to select the controller mode. Configuration options: [FullSpeed] [HiSpeed]

4.4.5 PCIPnP

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

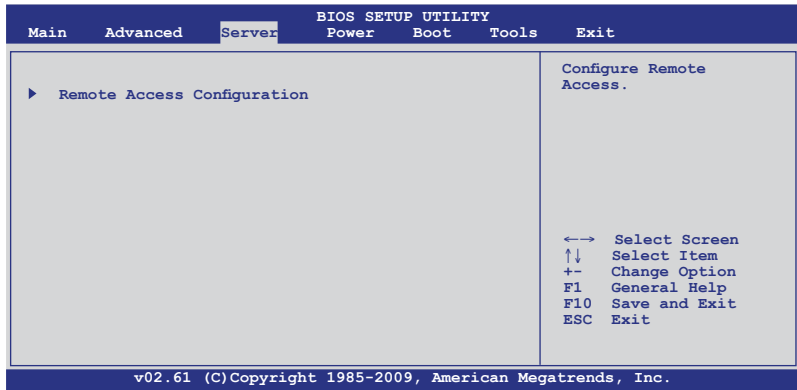


Plug And Play O/S [No]

When set to [No], BIOS configures all the devices in the system. When set to [Yes] and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot.

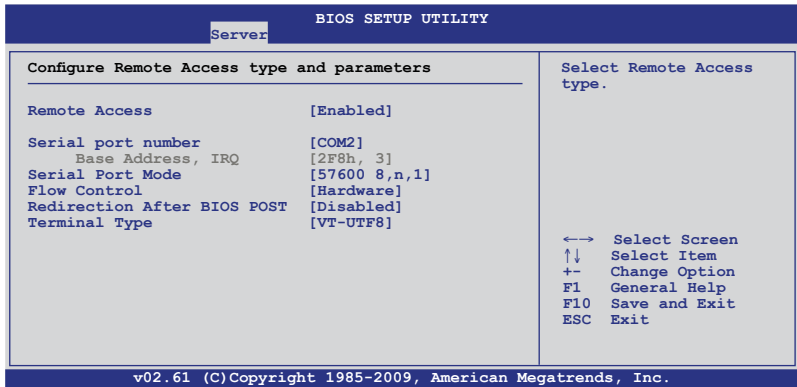
Configuration options: [No] [Yes]

4.5 Server menu



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.



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].

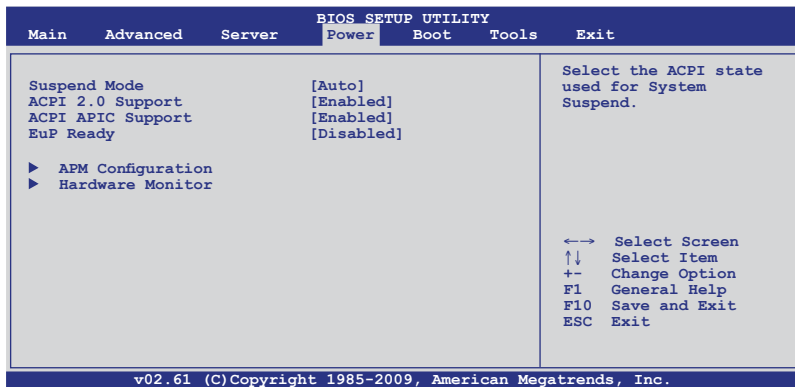
Configuration options: [Disabled] [Boot Loader] [Always]

Terminal Type [VT-UTF8]

Allows you to select the target terminal type.

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

4.6 Power menu



4.6.1 Suspend Mode [Auto]

Allows you to select the Advanced Configuration and Power Interface (ACPI) state to be used for system suspend.

Configuration options: [S1 (POS) only] [S3 only] [Auto]

4.6.2 ACPI 2.0 Support [Enabled]

Add additional tables as per ACPI 2.0 specifications.

Configuration options: [Disabled] [Enabled]

4.6.3 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.

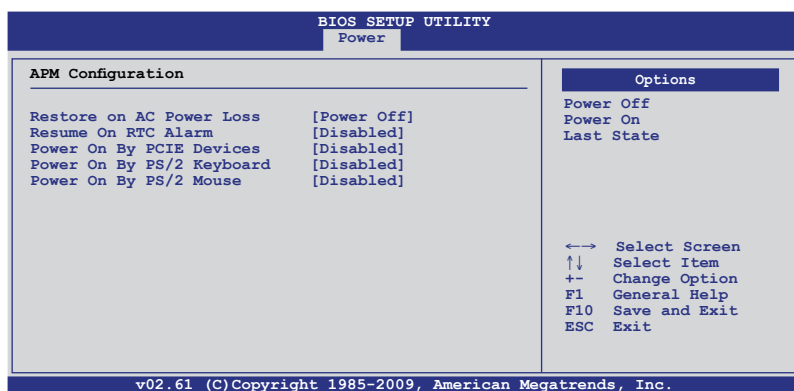
Configuration options: [Disabled] [Enabled]

4.6.4 EuP Ready [Disabled]

Allows you to disable or enable the Energy Using Products (EuP) Ready function.

Setting to [Enabled] allows BIOS to switch off some power at S5 state to get system ready for the EuP requirement. When set to [Enabled], power for WOL, WO_USB, audio and onboard LEDs will be switched off at S5 state.

4.6.5 APM Configuration



Restore on AC Power Loss [Power off]

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 RTC Alarm [Disabled]

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

Configuration options: [Disabled] [Enabled]



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

RTC Alarm Date (Days) [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.

Power On By PCIE Devices [Disabled]

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

Configuration options: [Disabled] [Enabled]

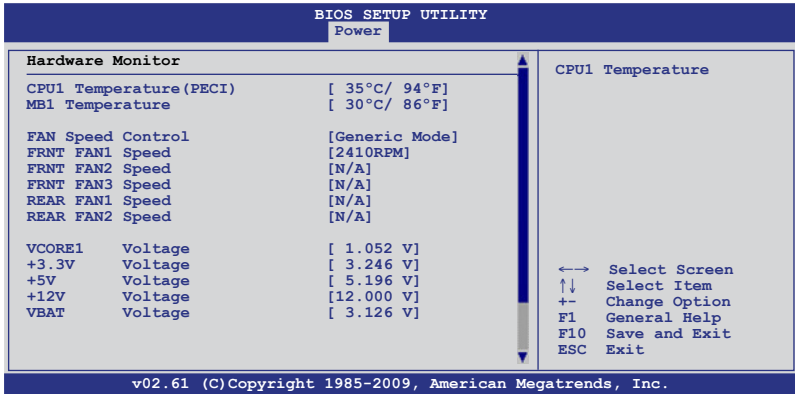
Power On By PS/2 Keyboard [Disabled]

Allows you to enable or disable the Power On by a PS/2 keyboard. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PS/2 Mouse [Disabled]

Allows you to enable or disable the Power On by a PS/2 mouse. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

4.6.6 Hardware Monitor



CPU1/MB1 Temperature [xxx°C/xxx°F]

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

Fan Speed Control [Generic Mode]

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

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

FRNT Fan1–3 Speed [xxxxRPM] or [Ignored] / [N/A]

REAR Fan1/2 Speed [xxxxRPM] or [Ignored] / [N/A]

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

VCORE1, +3.3V Voltage, +5V Voltage, +12V 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 submenu.

BIOS SETUP UTILITY						
Main	Advanced	Server	Power	Boot	Tools	Exit
Boot Settings			Specifies the Boot Device Priority sequence.			
▶ Boot Device Priority			A virtual floppy disk drive (Floppy Drive B:) may appear when you set the CD-ROM drive as the first boot device.			
▶ Hard Disk Drives						
▶ CDROM Drives						
▶ Boot Settings Configuration						
▶ Security						
			←→ Select Screen			
			↑↓ Select Item			
			Enter Go to Sub Screen			
			F1 General Help			
			F10 Save and Exit			
			ESC Exit			
v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.						

4.7.1 Boot Device Priority

BIOS SETUP UTILITY			
Boot			
Boot Device Priority		Specifies the boot sequence from the available devices.	
1st Boot Device	[Removable Dev.]	A device enclosed in parenthesis has been disabled in the corresponding type menu.	
2nd Boot Device	[ATAPI CD-ROM]		
3rd Boot Device	[Hard Drive]		
4th Boot Device	[Network:IBA GE Slo]		
5th Boot Device	[Network:IBA GE Slo]		
		←→ Select Screen	
		↑↓ Select Item	
		+- Change Option	
		F1 General Help	
		F10 Save and Exit	
		ESC Exit	
v02.61 (C)Copyright 1985-2009, American Megatrends, Inc.			

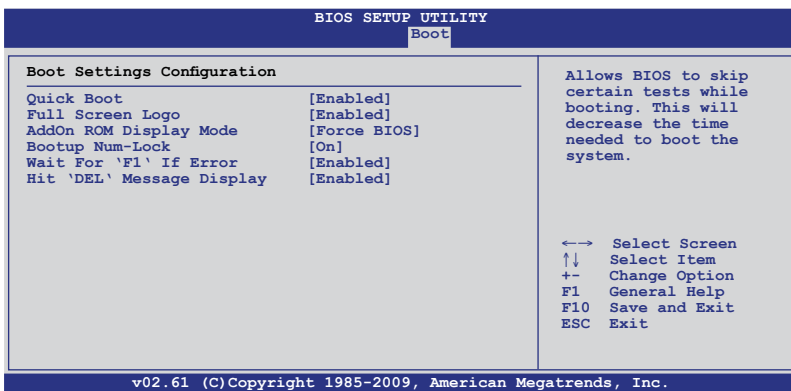
1st—xxth Boot Device [XXXXXXXX]

These items specify the boot device priority sequence from the available devices. The number of device items that appears on the screen depends on the number of devices installed in the system. Configuration options: [xxxxx Drive] [Disabled]

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 allow you to specify the boot priority sequence of the hard disk drives or the optical drives.

4.7.3 Boot Settings Configuration



Quick Boot [Enabled]

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

Full Screen Logo [Enabled]

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



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

AddOn ROM Display Mode [Force BIOS]

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

Bootup Num-Lock [On]

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

Wait For 'F1' If Error [Enabled]

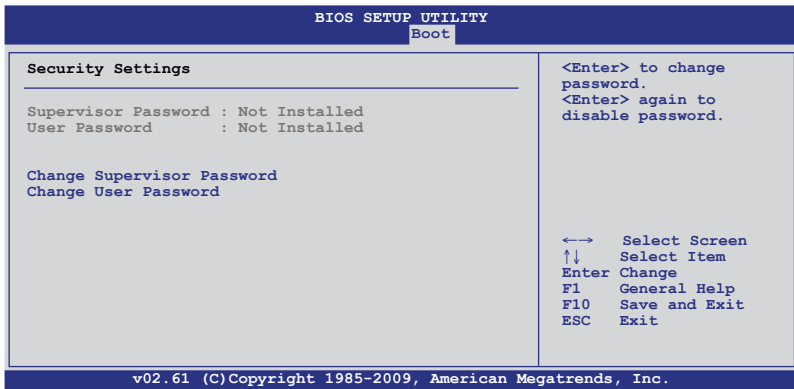
When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

Hit 'DEL' Message Display [Enabled]

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

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.



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.

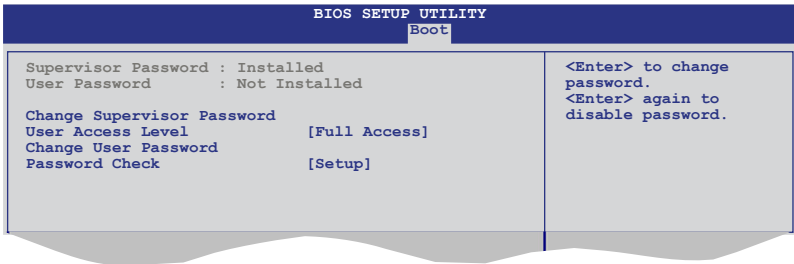
To change the supervisor password, follow the same steps as in setting a user password.

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 Jumpers** for information on how to erase the RTC RAM.

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



User Access Level [Full Access]

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

No Access prevents user access to the Setup utility.

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

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

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

Change User Password

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

To set a User Password:

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

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

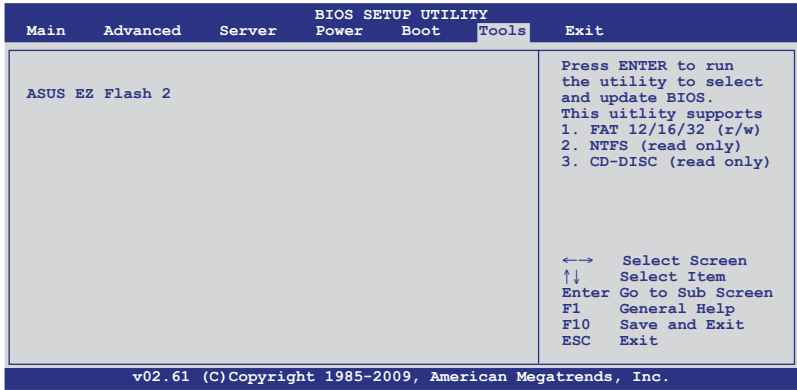
To change the user password, follow the same steps as in setting a user password.

Password Check [Setup]

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

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.

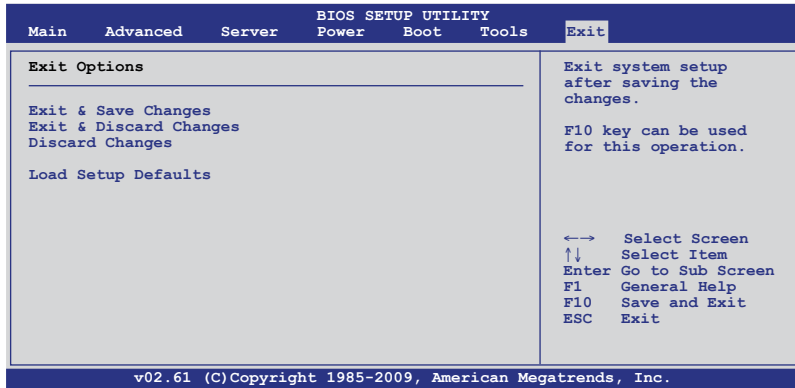


4.8.1 ASUS EZ Flash 2

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 [Yes] or [No], 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.



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

Exit & Save Changes

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



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

Exit & Discard Changes

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

Discard Changes

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

Load Setup Defaults

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

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

5 RAID configuration

5.1	Setting up RAID.....	5-3
5.2	Marvell® 6121 RAID BIOS configuration utility.....	5-5

5.1 Setting up RAID

The motherboard comes with the Marvell® 6121 controller that supports the following SATA RAID solutions: RAID 0 and RAID 1 (for Windows OS only).

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.



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 Marvell® 6121 chipset. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Advanced Menu > Chipset**, then press <Enter>.
3. Set **Marvell Storage Controller** to [RAID Mode], and **Marvell Storage Boot ROM** to [Enabled].
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 Marvell® 6121 RAID BIOS configuration utility

The Marvell® 6121 RAID BIOS Configuration utility allows you to create RAID 0 and RAID 1 set(s) from Serial ATA hard disk drives that are connected to the Serial ATA connectors supported by the Southbridge.

To enter the Marvell® RAID BIOS Configuration utility:

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

```
ENTER/SPACE>Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Adapter 1
Arrays Information:
  No array is defined!

Disks Information:
ID Port  Disk Name                Size  Speed  Status
0  0     SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE
4  1     SATA: Hitachi HDS721010KLA330  1TB   SATA II  FREE

Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```

4. Press <Enter> and select a desired adapter for RAID configuration.

```
ENTER/SPACE>Select, ESC:Back/Exit
[Adapter] [Create] [Delete]
Select Adapter
[Adapter 1]

Marvell BIOS Setup (c) 2006 Marvell Technology, Ltd.
```

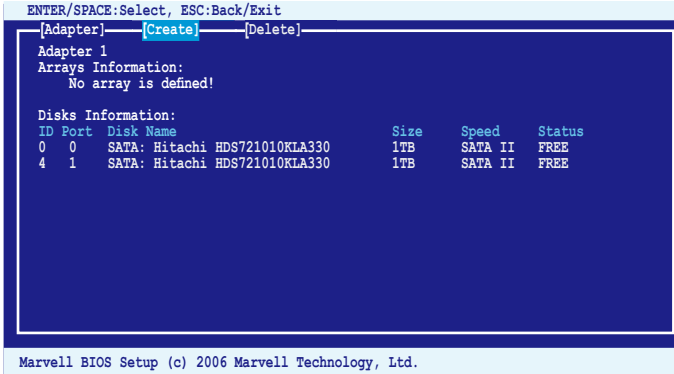


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

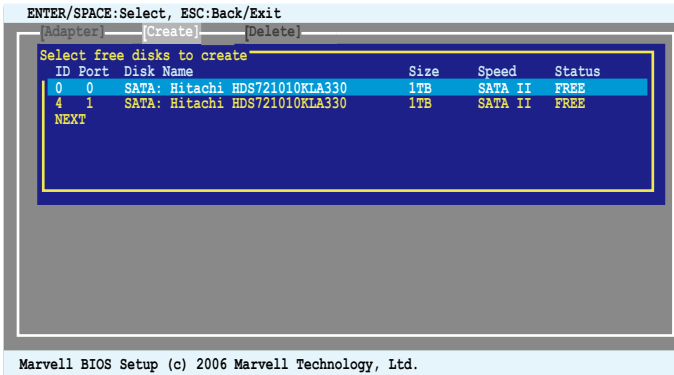
5.2.1 Creating a RAID set (RAID 0 or RAID 1)

To create a RAID set:

1. From the utility menu bar, select **Create** on the top.

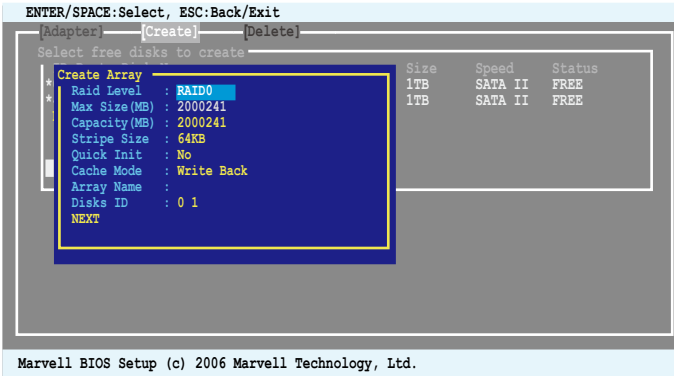


2. Press <Enter>. The screen shows the disks you can add to make up the RAID set. Use the arrow key to select a disk and press <Enter> or <Space> to include this disk in the array.

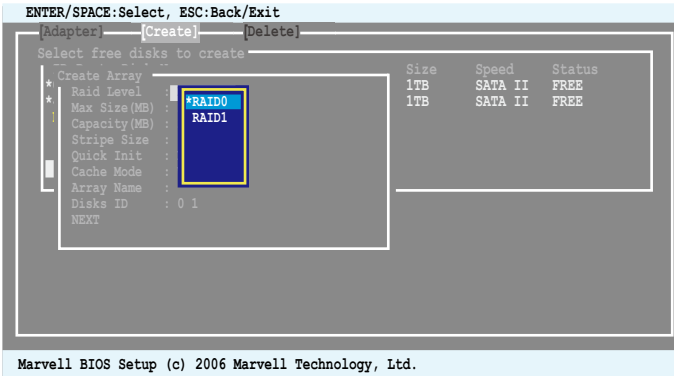


3. After you have selected the desired disks, select **NEXT** to create array.

4. The **Create Array** screen appears.

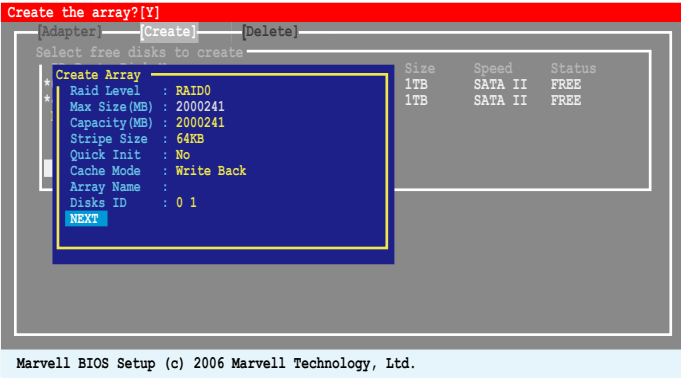


5. Use the arrow key to select the **RAID Level** item and press <Enter> to display the available RAID set. Select a RAID set and press <Enter> to create.

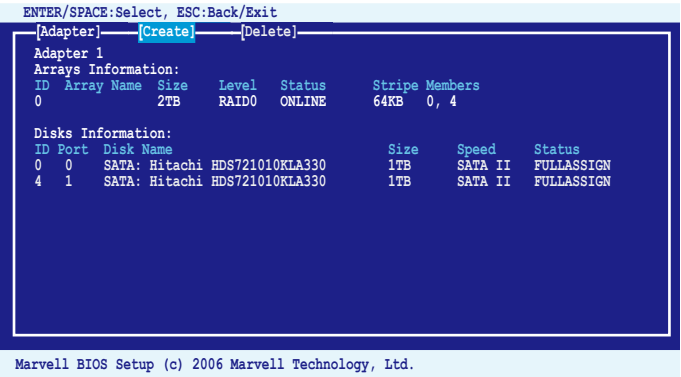


- The available RAID sets vary with the number of disks you select. The RAID sets that you are not allowed to create are grayed out.
- Except for the **RAID Level** item, we recommend you keep the default values for the other items in **Create Array** screen.

- A confirmation screen appears. Press <Y> to confirm the array creation.



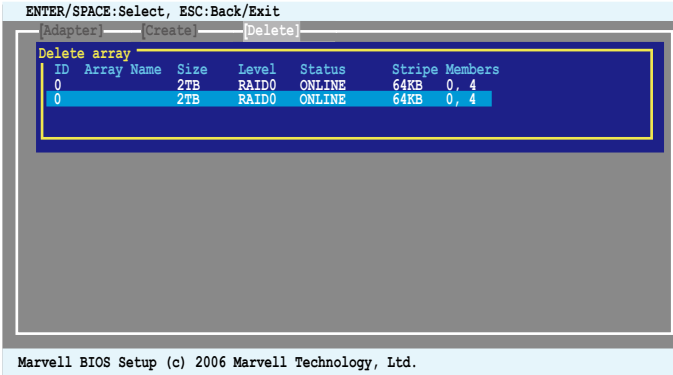
- The newly created array appears in **Arrays Information**.



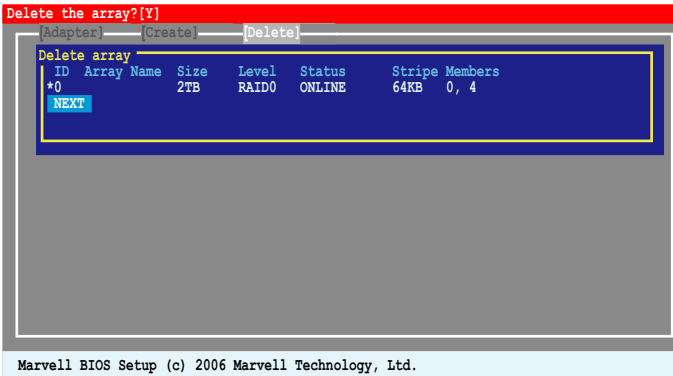
5.2.2 Deleting an array

To delete a RAID set:

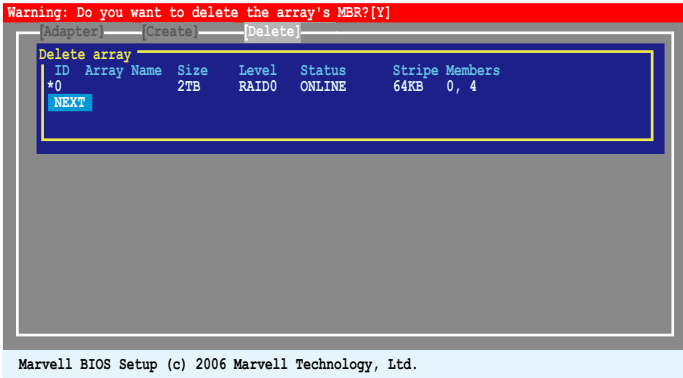
1. From the utility menu bar, select **Delete** on the top and press <Enter> and the **Delete array** screen appears.



2. Select a desired array to delete and select **NEXT**. Press <Y> after the confirmation screen appears.



3. Press <Y> again to confirm and delete the selected array.



You cannot recover lost data if you delete an array. Make sure you back up important data before deleting an array.

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

6 Driver installation

Chapter summary

6

6.1	RAID driver installation	6-3
6.2	Intel® chipset device installation	6-12
6.3	LAN driver installation.....	6-14
6.4	Display driver installation (<i>Hummingbird model only</i>).....	6-18
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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.

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.



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

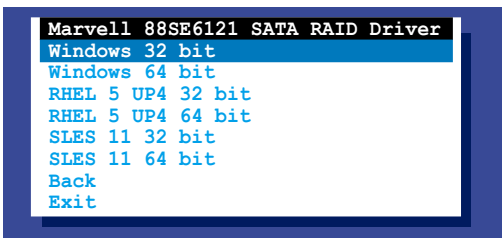
A floppy disk with the RAID driver is required when installing Windows® or Red Hat® Enterprise operating system on a hard disk drive that is included in a RAID set. You can create a RAID driver disk in DOS (using the Makedisk application in the support DVD).

To create a RAID driver disk in DOS environment

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



5. Use the arrow keys to select the Marvell RAID driver disk and press <Enter> to enter the sub-menu.



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

To create a RAID driver disk in Windows® environment

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



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

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

1. Insert a blank formatted high-density floppy disk to the floppy disk drive.
2. Type `dd if=xxx.img of=/dev/sda` to decompress the file into the floppy disk from the following path in the support DVD:
\\Drivers\\MARVELL 88SE6121 SATA RAID\\Driver\\makedisk\\Linux\\RAID
3. Eject the floppy disk.

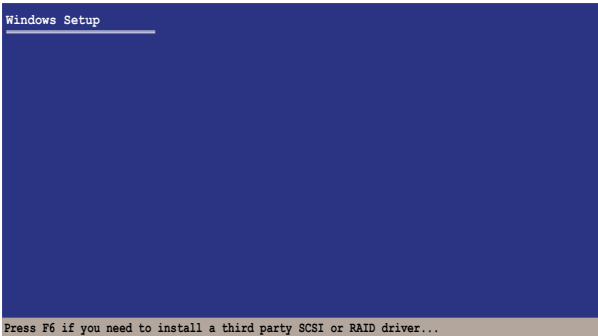
6.1.2 Installing the RAID controller driver

Windows® Server OS

During Windows® Server OS installation

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

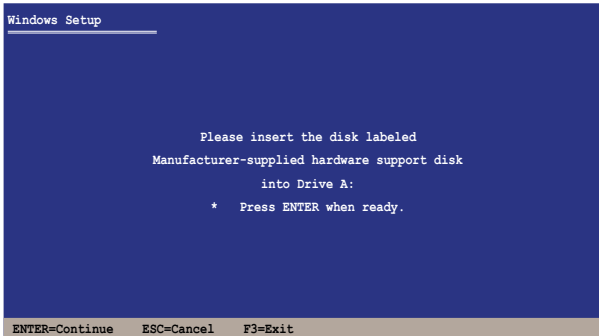
1. Boot the computer using the Windows® Server installation DVD. The Windows® Server OS Setup starts.



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



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



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

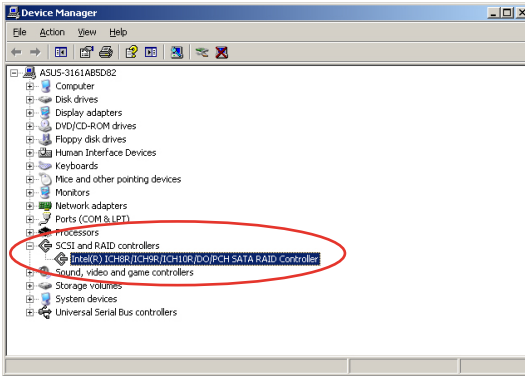
To an existing Windows® Server OS

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

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

To verify the RAID controller driver installation:

1. Right-click the **My Computer** icon on the Windows® desktop, and then select **Properties** from the menu.
2. Click the **Hardware** tab, and then click the **Device Manager** button.
3. Click the “+” sign before the item **SCSI and RAID controllers**, and then the **Marvell(R) 88SE6121 SATA 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.

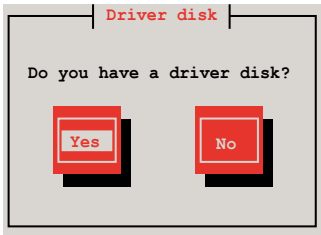
Red Hat® Enterprise Linux OS 5

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

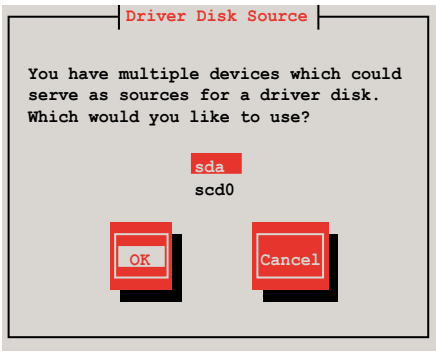
1. Boot the system from the Red Hat® OS installation CD.
2. At the `boot:`, type `linux dd`.
3. Press `<Enter>`.

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

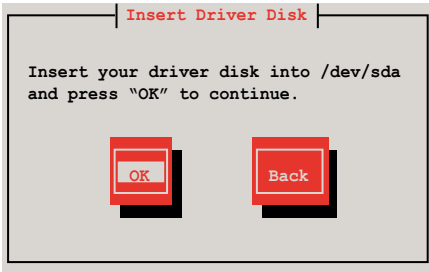
4. Select **Yes** using the `<Tab>` key when asked if you have the driver disk, then press `<Enter>`.



5. Select **sda** using the `<Tab>` key when asked to select the driver disk source. Press `<Tab>` to move the cursor to **OK**, then press `<Enter>`.

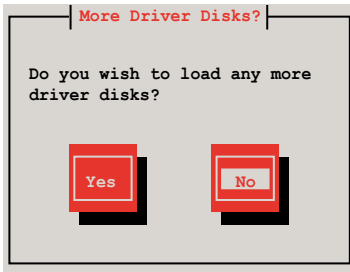


6. Insert the Red Hat® Enterprise RAID driver disk to the floppy disk drive, select **OK**, then press <Enter>.



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

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



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

```
cat /proc/partitions
```



Write down the **Major** and **Minor** number before **sd<x>** for later use.

```
mknod /dev/sd<x> b [major number] [minor number]
chroot /mnt/sysimage
mount /dev/sda /media
sh /media/post.install
umount /media
exit
```



The sd<x> device name varies depending on the numbers of installed USB devices.

SUSE Linux OS 11

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

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



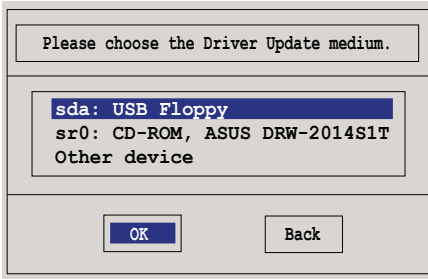
3. Press <F6>, then select **Yes** from the menu. Press <Enter>.



If you install marvell 61xx driver, type `oem-modules=1 broeknmodules=pata_marve11` after **Boot Options** and press **Enter** to continue.

4. Insert the RAID driver disk to the floppy disk drive. Ensure that **Installation** from the **Boot Options** menu is selected, then press <Enter>.

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



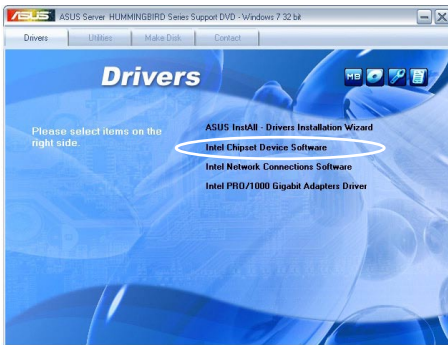
The drivers for the RAID controller are installed to the system.

6.2 Intel® chipset device installation

This section provides instructions on how to install the Plug and Play components for the Intel® chipset on the system.

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

1. Restart the computer, then log on with **Administrator** privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the **Drivers** menu if Autorun is enabled in your computer.
3. Click the item **Intel Chipset Device Software** from the menu.



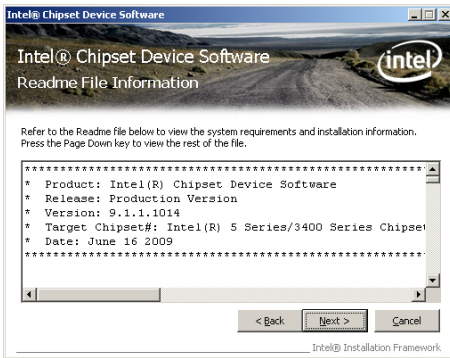
4. The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.



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



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



7. After completing the installation, click **Finish** to complete the setup process.



6.3 LAN driver installation

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

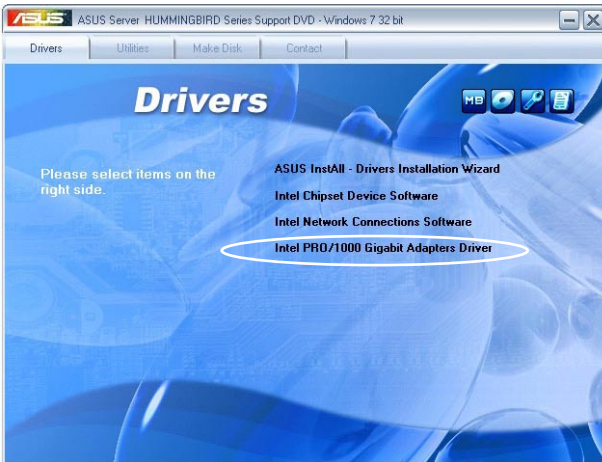
To install the Intel® Gigabit LAN controller driver on a Windows® OS:

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.

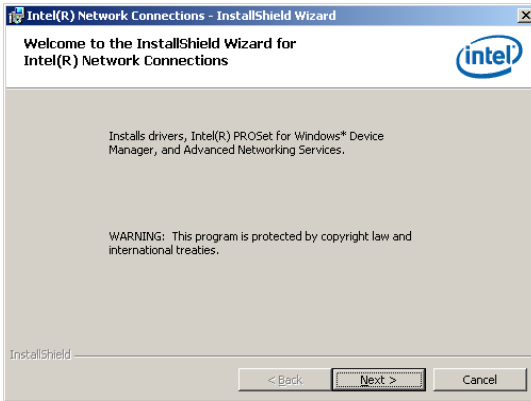


If **Autorun** is NOT enabled in your computer, browse the contents of the support DVD to locate the file **AUTORUN.EXE** and double-click the **AUTORUN.EXE** and follow step 4 to run the installation.

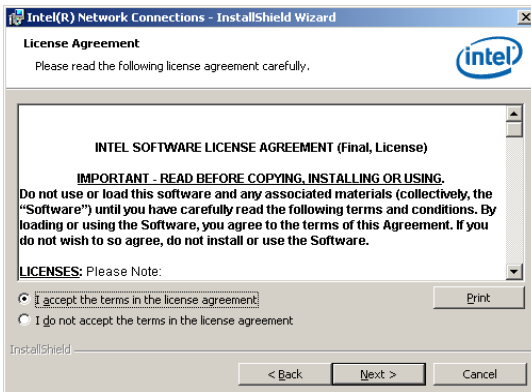
3. Click **Intel® PRO/1000 Gigabit Adapters Driver**.



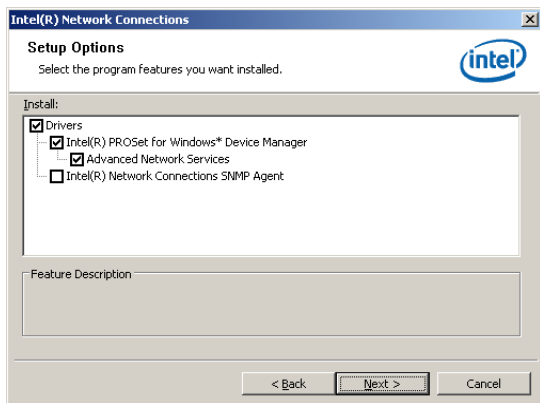
4. When the **Intel® PRO Network Connections – InstallShield Wizard** window appears, click **Next** to start the installation.



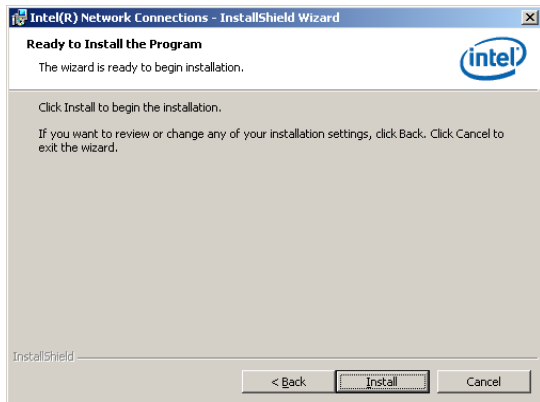
5. Click **I accept the terms in the license agreement** and then click **Next** to continue.



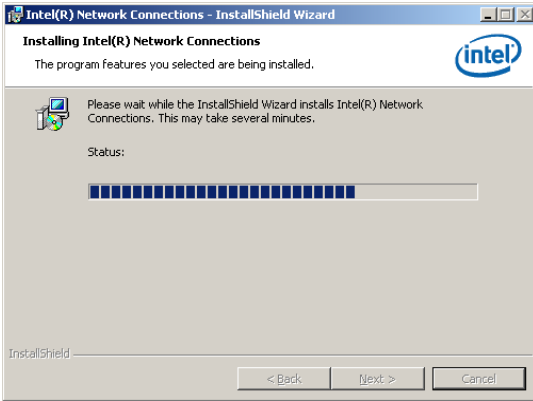
6. Select the programs you want to install and click **Next** to continue.



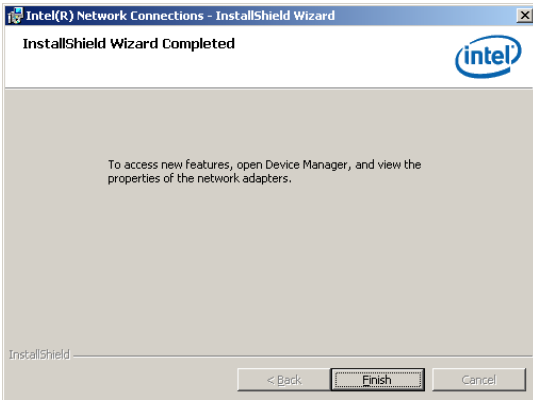
7. Click **Install** to start the installation.



8. The programs you select are being installed.



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



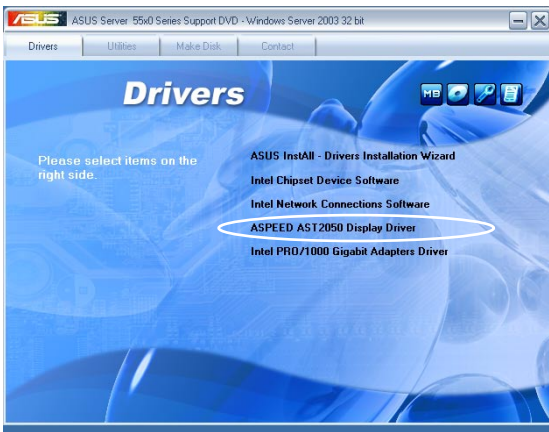
6.4 Display driver installation (Hummingbird model only)

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

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

To install the ASPEED display driver:

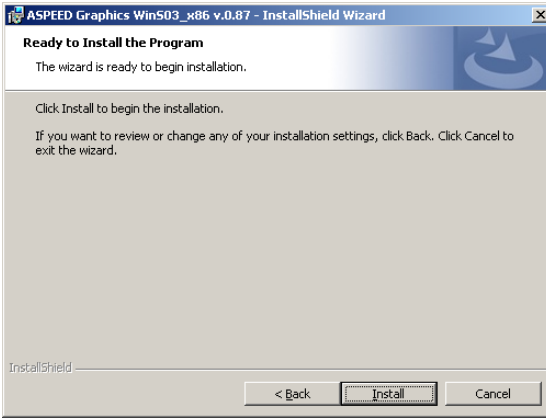
1. Restart the computer, then log on with Administrator privileges.
2. Insert the motherboard/system support DVD to the optical drive. The support DVD automatically displays the Drivers menu if Autorun is enabled in your computer.
3. Click **ASPEED AST2050 Display Driver**.



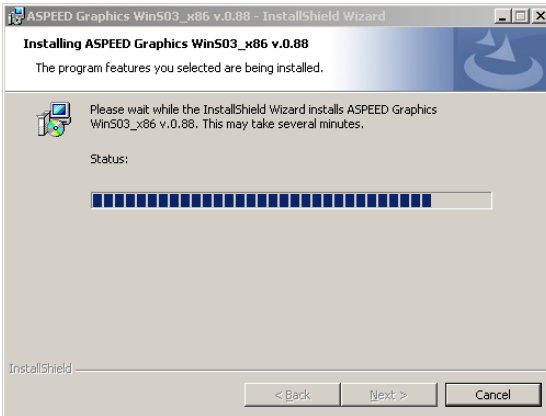
4. When the **ASPEED InstallShield Wizard** window appears, click **Next** to continue.



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



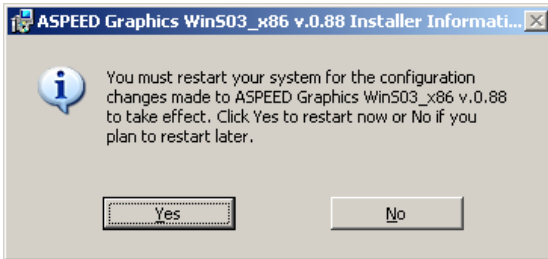
6. The system installs the driver automatically.



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



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



6.5 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 (www.asus.com) for updates.

6.5.1 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.



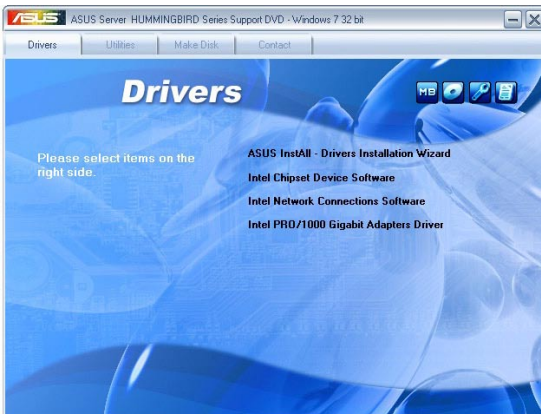
If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

6.5.2 Drivers menu

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

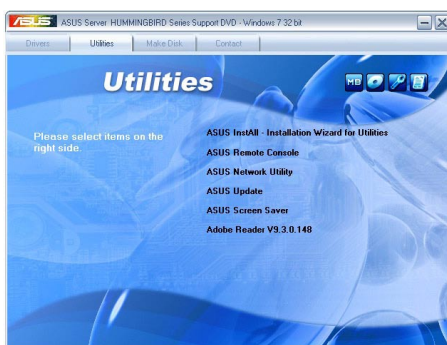


The screen display and driver options vary under different operating system versions.



6.5.3 Utilities menu

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



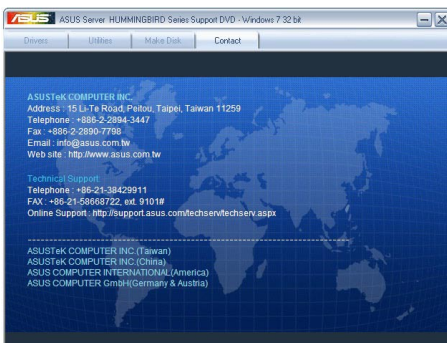
6.5.4 Make disk menu

The Make disk menu contains items to create the Marvell 88SE6121 RAID driver disks.



6.5.5 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

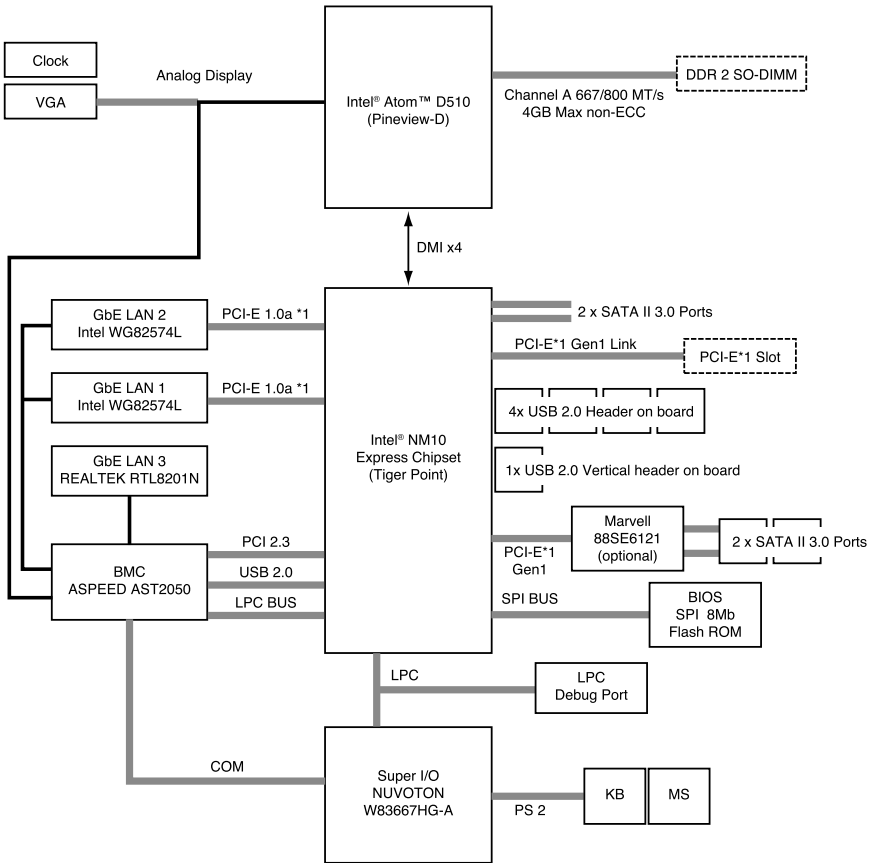


Appendix summary



A.1	Hummingbird block diagram	A-3
A.2	Hummingbird Lite block diagram.....	A-4

A.1 Hummingbird block diagram



A.2 Hummingbird Lite block diagram

