

P7F-M WS



Motherboard

E5027

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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 menu. Detailed descriptions of the BIOS parameters are also provided.
- **Chapter 5: RAID configuration**
This chapter provides instructions for setting up, creating, and configuring RAID sets using the available utilities.
- **Chapter 6: Driver installation**
This chapter provides instructions for installing the necessary drivers for different system components.
- **Appendix: Reference information**
This appendix includes additional information that you may refer to when configuring the motherboard.

Where to find more information

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

1. **ASUS websites**
The ASUS website provides updated information on ASUS hardware and software products. Refer to the ASUS contact information.
2. **Optional documentation**
Your product package may include optional documentation, such as warranty flyers, that may have been added by your dealer. These documents are not part of the standard package.

Conventions used in this guide

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



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



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



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



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

Typography

Bold text

Indicates a menu or an item to select.

Italics

Used to emphasize a word or a phrase.

<Key>

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

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

<Key1+Key2+Key3>

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

Example: <Ctrl+Alt+D>

Command

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

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

P7F-M WS specifications summary

Model Name		P7F-M WS
Processor Support / System Bus		1 * Socket LGA1156 Quad Core Intel Xeon 3400 series Server Processor Quad Core Intel Core i7-800 series Desktop Processor Quad Core Intel Core i5-700 series Desktop Processor Dual Core 32nm CPU design Ready
Core Logic		Intel® 3420 PCH
Form Factor		mATX, 9.6" * 9.6"
ASUS Features	Fan Speed Control	V
	Rack Ready (Rack and Pedestal dual use)	V
Memory	Total Slots	4 (RDIMM/UDIMM)
	Capacity	Maximum up to 32GB (RDIMM) Maximum up to 16GB (UDIMM) Desktop Processor do not support RDIMM & ECC UDIMM
	Memory Type	DDR3 800/1066/1333 Reg DIMM / Unbuffered DIMM with ECC/ non ECC
	Memory Size	1 GB, 2GB, 4GB, 8GB (RDIMM) 1 GB, 2GB, 4GB (UDIMM)
Expansion Slots (follow SSI Location #)	Total PCI/PCI-X/PCI-E Slots	4
	Slot Location 4	1 * PCI 32bit/33 MHz
	Slot Location 5	1 * PCI 32bit/33 MHz
	Slot Location 6	1 * PCI-E x16 (Gen2 x16 Link)
	Slot Location 7	1 * PCI-E x8 (x4 Link) or MIO support
Storage	SATA Controller	Intel® 3420: 6* SATA2 300MB/s ports- Intel Matrix Storage utility supports software RAID 0, 1, 10 & 5 (Windows)
Networking	LAN	2 * Intel 82574L
Onboard I/O Connectors	PSU Connector	24-pin ATX power connector + 8-pin ATX 12V power connector (24-pin + 4-pin power supply supported)
	USB Connectors	2 (support 4 USB port)
	Fan Header	5* 4pin
	TPM header	20-1 pin TPM header



Refer to **2.3 Central Processing Unit** for more information on CPU.

P7F-M WS specifications summary

Rear I/O Connectors	External Serial Port	1
	External USB Port	2
	RJ-45	2
	PS/2 KB/Mouse	1
Monitoring	CPU Temperature	V
	FAN RPM	V
Environment		Operation temperature: 10°C—35°C Non operation temperature: -40°C—70°C Non operation humidity: 20%—90% (Non condensing)

*Specifications are subject to change without notice.

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

1 Product introduction

Chapter summary

1

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1.1 Welcome!

Thank you for buying an ASUS® P7F-M WS 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
		P7F-M WS	P7F-M WS
Cables	SATA data cable	6	--
Accessories	IO shield	1	1
Card	ASUS MIO audio card	1	--
Application CD	Support CD	1	1
Documentation	User Guide	1	1
Packing Qty.		1 pcs per carton	10 pcs per carton

Items	Description
ASUS MIO audio card	Discrete 8 channel audio card provides the clearest high quality sounds



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 **xxS1xxxxxxxx** 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

1.4.1 Product highlights

Intel® LGA1156 Xeon 3400 Processor Ready

This motherboard supports the latest Intel® Xeon 3400 processors in LGA1156 package, which has memory and PCI Express controller integrated to support 2-channel (4 DIMMs) DDR3 memory and 16 PCI Express 2.0 lanes, providing great graphics performance. Intel® Xeon 3400 processor is one of the most powerful and energy efficient CPU in the world.

Intel Turbo Boost

Intel® Turbo Boost opportunistically and automatically allows the processor to run faster than the marked frequency if the processor is operating below power, temperature and current limits. This technology increases performance of both multi-threaded and single-threaded workloads.

Intel Hyper Threading

The thread-level parallelism on each processor makes more efficient use of the processor resources, higher processing throughput and improved performance on today's multi-threaded software.

Intel® EM64T

The motherboard supports Intel® processors with the Intel® EM64T (Extended Memory 64 Technology). The Intel® EM64T feature allows your computer to run on 64-bit operating systems and access larger amounts of system memory for faster and more efficient computing.

DDR3 memory support

The P7F-M WS supports UDIMM and RDIMM DDR3 memory that features data transfer rates of 1333/1066 MHz to meet the higher bandwidth requirements of server and workstation applications. The 2-channel DDR3 architecture boosts system performance, eliminating bottlenecks. Furthermore, the supply voltage for the memory is reduced from 1.8 V for DDR2 to just 1.5V for DDR3. This voltage reduction limits the power consumption and heat generation of DDR3 which makes it an ideal memory solution.

PCIe 2.0

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

82574L LAN Solution

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

Enhanced Intel SpeedStep Technology (EIST)

The Enhanced Intel SpeedStep Technology (EIST) intelligently manages the CPU resources by automatically adjusting the CPU voltage and core frequency depending on the CPU loading and system speed or power requirement.

Serial ATA II technology

The motherboard supports the Serial ATA II 3 Gb/s technology through the Serial ATA interface and Intel 3420 chipset. The Serial ATA II specification provides twice the bandwidth of the current Serial ATA products with a host of new features, including Native Command Queuing (NCQ), Power Management (PM) Implementation Algorithm, and Hot Swap. Serial ATA allows thinner, more flexible cables with lower pin count and reduced voltage requirements.

USB 2.0 technology

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

Temperature, fan, and voltage monitoring

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

100% Japan-made Conductive Polymer Capacitors



This motherboard uses all high-quality conductive polymer capacitors (2000hrs) onboard for durability, improved lifespan, and enhanced thermal capacity.

1.4.2 Innovative ASUS features

ASUS MIO Audio card

Enjoy high-end sound quality! The ASUS MIO audio card is a discrete 8-channel high definition audio (High Definition Audio previously codenamed Azalia) CODEC enable clearest high quality audio output, jack-sensing feature, retasking functions, and multi-streaming technology that simultaneously send different audio streams to different destinations.

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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2.1 Before you proceed

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

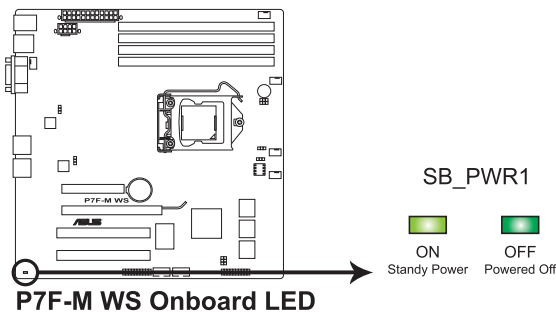


- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or a metal object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
- Hold components by the edges to avoid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

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



2.2 Motherboard overview

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

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



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

2.2.1 Placement direction

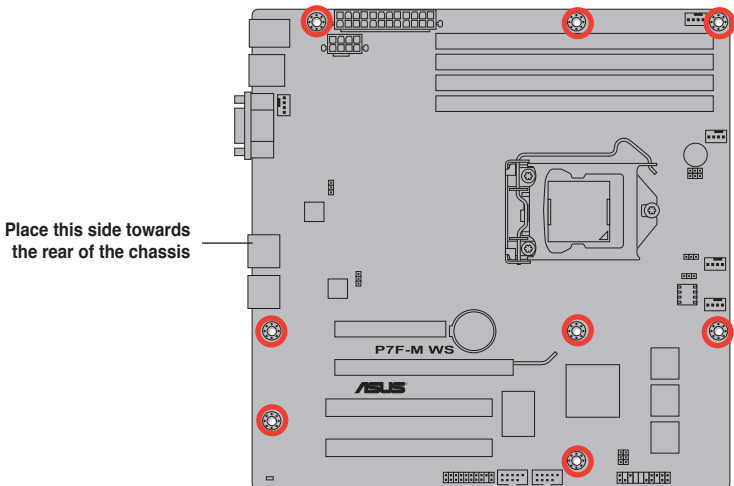
When installing the motherboard, ensure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

2.2.2 Screw holes

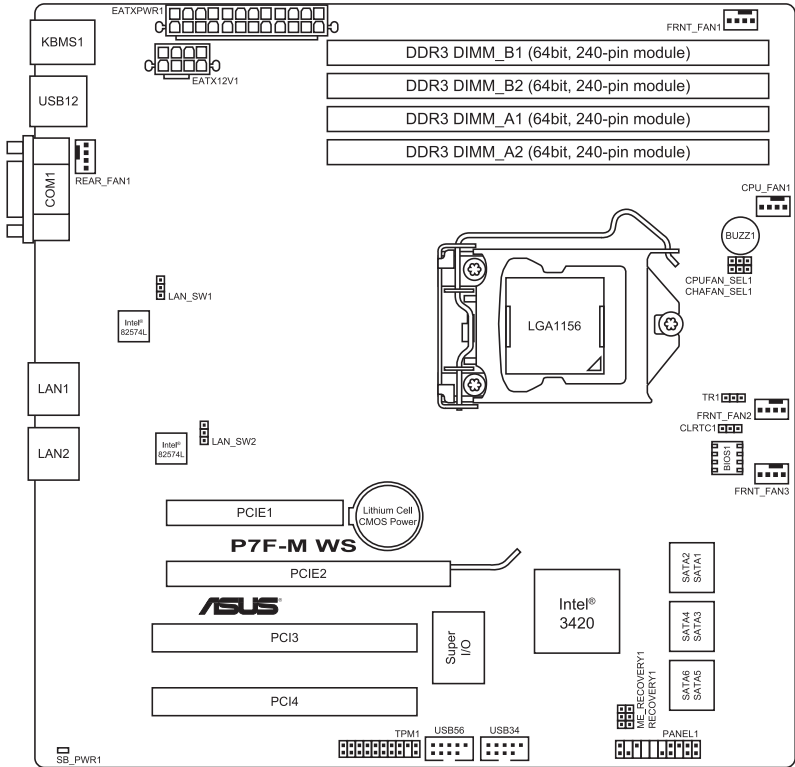
Place eight (8) screws into the holes indicated by circles to secure the motherboard to the chassis.



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



2.2.3 Motherboard layout



2.2.4 Layout contents

Slots/Socket		Page
1.	CPU sockets	2-8
2.	DDR3 sockets	2-13
3.	PCI Express x16 slot (x16 link)	2-17
4.	PCI Express x8 slot (x4 link) or MIO support	2-17
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Jumpers		Page
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2.	CPU Fan and Chassis Fan control setting (3-pin CPUFAN_SEL1, CHAFAN_SEL1)	2-20
3.	LAN controller setting (3-pin LAN_SW1, LAN_SW2)	2-20
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Rear panel connectors		Page
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2.	PS/2 keyboard port (purple)	2-22
3.	USB 2.0 ports 1 and 2	2-22
4.	Serial (COM1) port	2-22
5.	LAN 1 (RJ-45) port	2-22
6.	LAN 2 (RJ-45) port	2-22
7.	Line In port (light blue)	2-23
8.	Line Out port (lime)	2-23
9.	Microphone port (pink)	2-23
10.	Center/Subwoofer port (orange)	2-23
11.	Rear Speaker Out port (black)	2-23
12.	Side Speaker Out port (gray)	2-23
13.	Optical S/PDIF Out port	2-23
14.	Coaxial S/PDIF Out port	2-23

Internal connectors		Page
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2.	USB connector (10-1 pin USB34, USB56)	2-24
3.	Thermal sensor cable connectors (3-pin TR1)	2-25
4.	CPU, front and rear fan connectors (4-pin CPU_FAN1, FRNT_FAN1–3, REAR_FAN1)	2-25
5.	TPM connector (20-1 pin TPM) [Optional]	2-26
6.	ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)	2-26
7.	System panel connector (20-1 pin PANEL1)	2-27
8.	Front panel audio connector (10-1 pin AAFP)	2-28
9.	Optical drive audio connector (4-pin CD)	2-28

2.3 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA1156 socket designed for the Intel® Xeon 3400 series Processors.

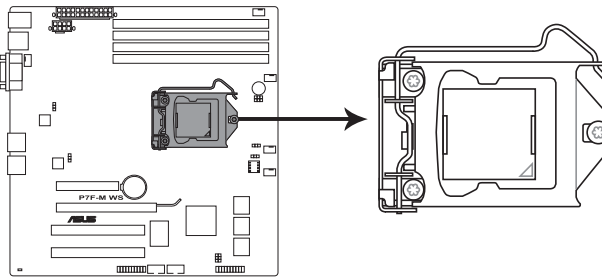


- Upon purchase of the motherboard, ensure that the PnP cap is on the socket and the socket contacts are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket contacts/motherboard components. ASUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ASUS will process Return Merchandise Authorization (RMA) requests only if the motherboard comes with the cap on the LGA1156 socket.
- The product warranty does not cover damage to the socket contacts resulting from incorrect CPU installation/removal, or misplacement/loss/incorrect removal of the PnP cap.

2.3.1 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.



P7F-M WS CPU LGA1156

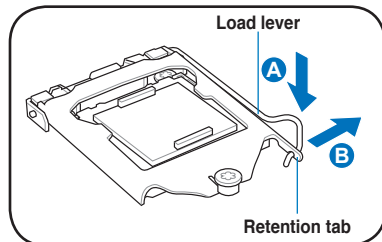


Before installing the CPU, ensure that the socket box is facing toward you and the load lever is on your left.

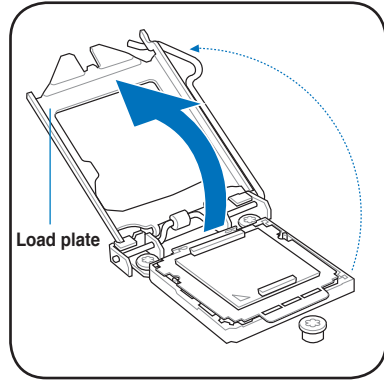
2. Press the load lever with your thumb (A), and then move it to the right (B) until it is released from the retention tab.



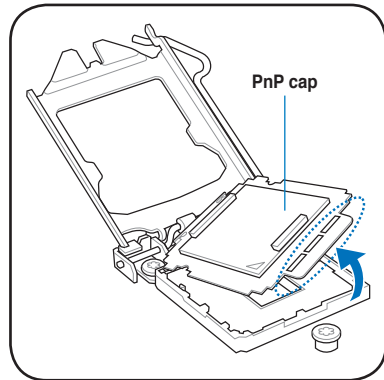
To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.



3. Lift the load lever in the direction of the arrow until the load plate is completely lifted.



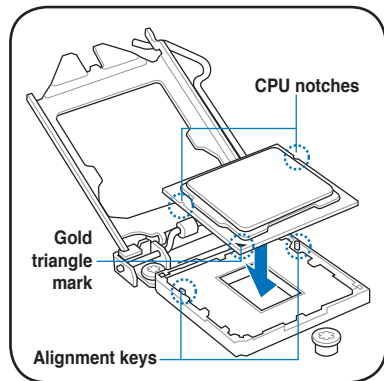
4. Remove the PnP cap from the CPU socket.



5. Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment keys into the CPU notches.



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



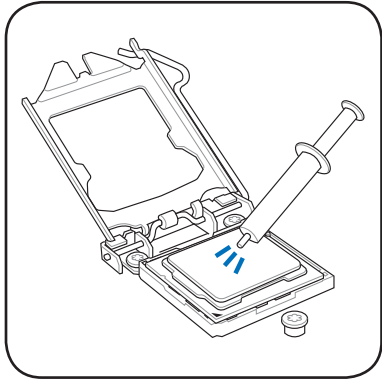
- 6. Apply some Thermal Interface Material to the exposed area of the CPU that the heatsink will be in contact with, ensuring that it is spread in an even thin layer.



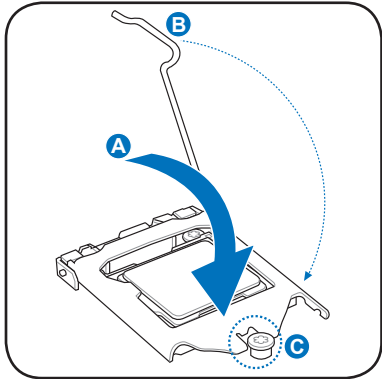
Some heatsinks come with pre-applied thermal paste. If so, skip this step.



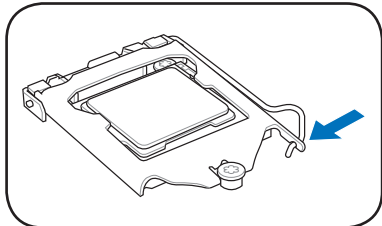
The Thermal Interface Material is toxic and inedible. DO NOT eat it. If it gets into your eyes or touches your skin, wash it off immediately, and seek professional medical help.



- 7. Close the load plate (A), and then push down the load lever (B), ensuring that the front edge of the load plate slides under the retention knob (C).



- 8. Insert the load lever under the retention tab.



2.3.2 Installing the CPU heatsink and fan

The Intel® LGA1156 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.



- When you buy a boxed Intel® processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, ensure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® LGA1156 heatsink and fan assembly comes in a push-pin design and requires no tool to install.
- Use an LGA1156-compatible CPU heatsink and fan assembly only. The LGA1156 socket is incompatible with the LGA775 and LGA1366 sockets in size and dimension.



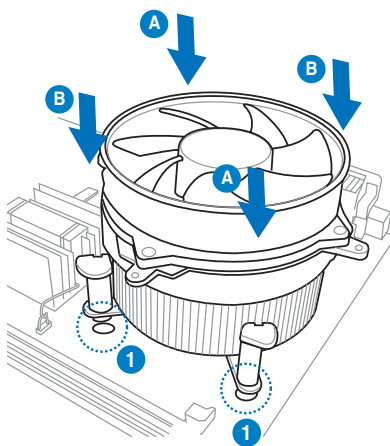
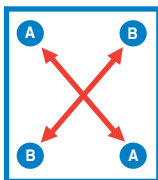
If you purchased a separate CPU heatsink and fan assembly, ensure that the Thermal Interface Material is properly applied to the CPU heatsink or CPU before you install the heatsink and fan assembly.



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

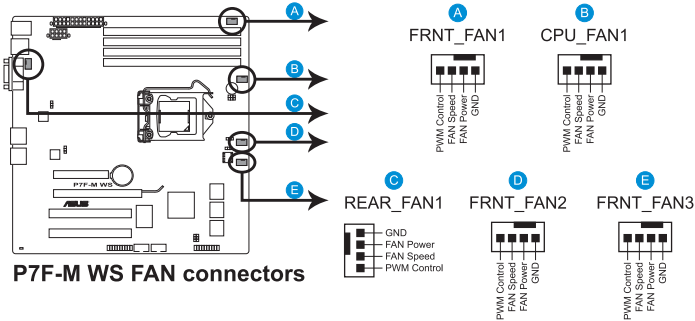
To install the CPU heatsink and fan:

1. Place the heatsink on top of the installed CPU, making sure that the four fasteners match the holes on the motherboard.
2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.



Orient the heatsink and fan assembly such that the CPU fan cable is closest to the CPU fan connector.

3. Connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.

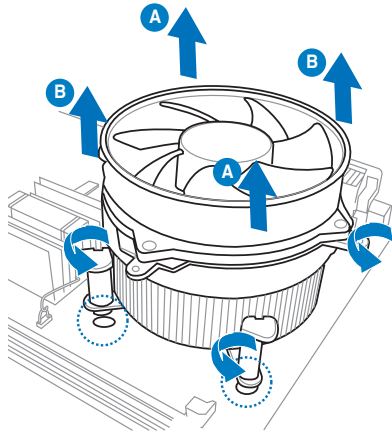
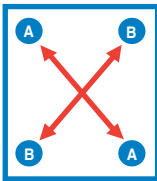


DO NOT forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

2.3.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.



4. Carefully remove the heatsink and fan assembly from the motherboard.

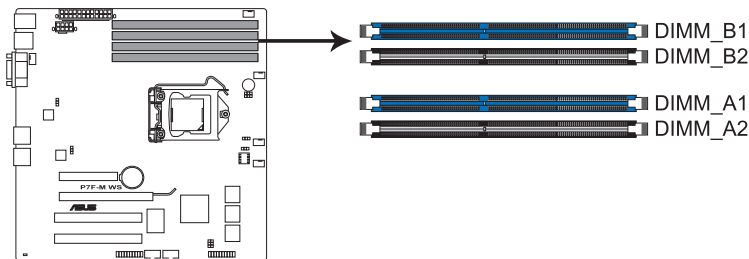
2.4 System memory

2.4.1 Overview

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

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

The figure illustrates the location of the DDR3 DIMM sockets:



P7F-M WS 240-pin DDR3 DIMM sockets

2.4.2 Memory Configurations

You may install 1 GB, 2 GB, 4 GB, 8 GB Registerd, or 1 GB, 2 GB, 4 GB Unbuffered with ECC/Non-ECC DDR3 DIMMs into the DIMM sockets using the memory configurations in this section.

RDIMM*				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Registered DDR3 ECC	1333	Single Rank, Dual Rank
2	1	Registered DDR3 ECC	1066	Quad Rank
2	2	Registered DDR3 ECC	1333	Single Rank, Dual Rank
2	2	Registered DDR3 ECC	800**	Quad Rank
UDIMM				
DIMM Slot Per Channel	DIMM Populated per Channel	DIMM Type	Speed	Rank per DIMM
2	1	Unbuffered DDR3	1333	Single Rank, Dual Rank
2	2	Unbuffered DDR3	1333	Single Rank, Dual Rank

*Support Low Voltage DIMMs; **Down from 1066 or 1333 MHz DIMM



- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. DO NOT combine RDIMM and UDIMM.
- The motherboard supports x8 DRAM Only and x4 & x16 DRAM are not supported

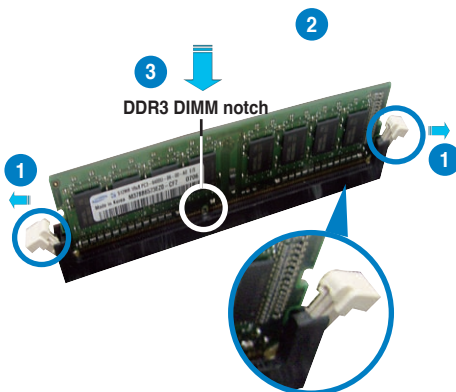
2.4.3 Installing a DIMM



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

To install a DIMM:

1. Press the retaining clips outward to unlock a DIMM socket.
2. Align a DIMM on the socket such that the notch on the DIMM matches the break on the socket.
3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.



Unlocked retaining clip



- A DDR3 DIMM is keyed with a notch so that it fits in only one direction. DO NOT force a DIMM into a socket to avoid damaging the DIMM.
- The DDR3 DIMM sockets do not support DDR and DDR2 DIMMs. DO NOT install DDR or DDR2 DIMMs to the DDR3 DIMM sockets.

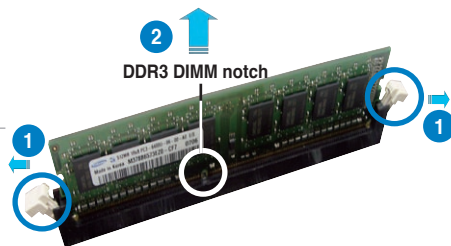
2.4.4 Removing a DIMM

To remove a DIMM:

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



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



2. Remove the DIMM from the socket.

2.5 Expansion slots

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



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

2.5.1 Installing an expansion card

To install an expansion card:

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

2.5.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.



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

2.5.3 Interrupt assignments

Standard Interrupt assignments

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

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

2.5.4 PCI Express x16 slot (x16 link)

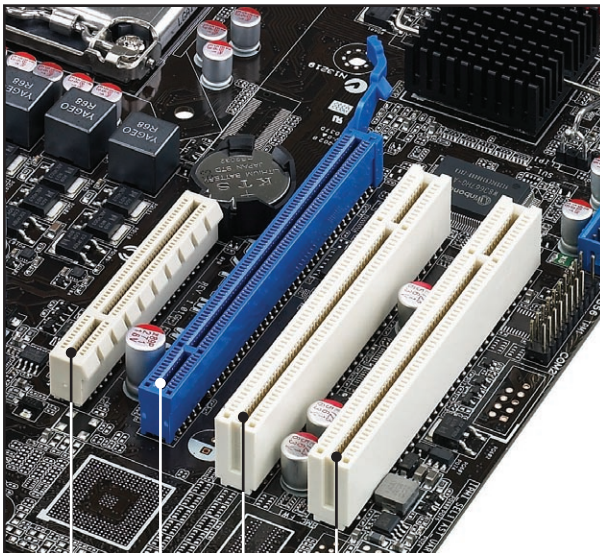
The onboard PCI Express x16 slot provides one x16 link to CPU. This slot supports VGA cards and various server class high performance add-on cards.

2.5.5 PCI Express x8 slot (x4 link) or MIO support

This slot supports PCI Express cards that comply with the PCI Express specifications. This slot also supports a MIO (Media Input Output) audio card, which offers great sound quality to complement the robust video power. Install the bundled audio card on this slot only, otherwise the audio card may not work properly. Refer to the figure below for the location of the slot.

2.5.6 PCI slots

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

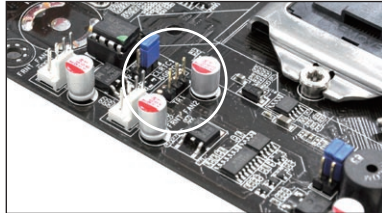


PCI_2 slot
PCI_1 slot
PCI Express x16 slot (x16 link)
PCI Express x8 slot with MIO support (x4 link)

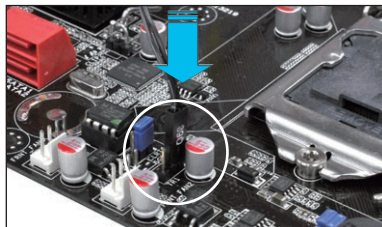
2.5.7 Connect Thermal sensor cable

Follow the steps below to connect the thermal sensor cable to the connector on your motherboard.

1. Locate the TR1 connector on the motherboard.



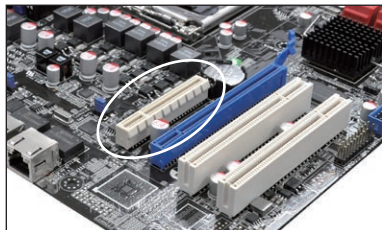
2. Connect the thermal sensor cable to the connector.



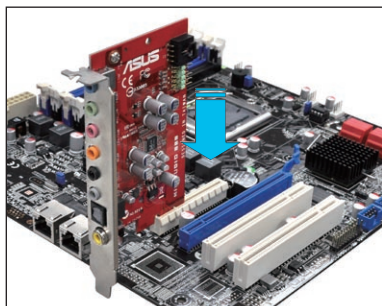
3. Place the other end of the thermal sensor cable to the device you would like to monitor temperature.

2.5.8 Installing the audio card

1. Locate the PCI Express x8 slot on the motherboard.



2. Align the card connector with the slot and press firmly until the card sits on the slot completely.



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:

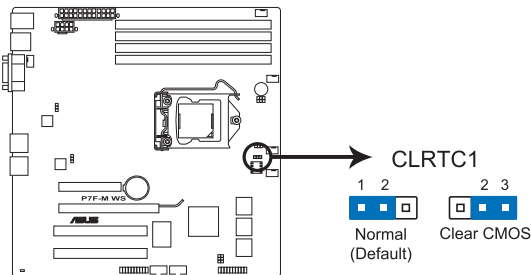
1. Turn OFF the computer and unplug the power cord.
2. Move the jumper cap from pins 1–2 (default) to pins 2–3. Keep the cap on pins 2–3 for about 5–10 seconds, then move the cap back to pins 1–2.
3. Plug the power cord and the computer turns on automatically.
4. Hold down the key during the boot process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



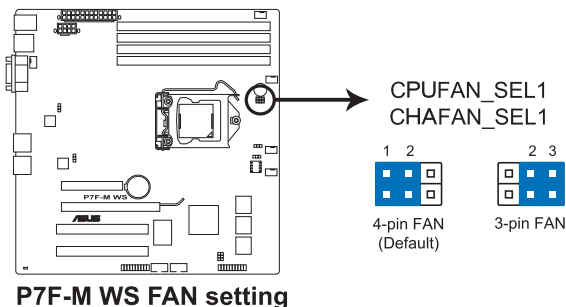
If the steps above do not help, remove the onboard battery and move the jumper again to clear the CMOS RTC RAM data. After the CMOS clearance, reinstall the battery.



P7F-M WS Clear RTC RAM

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

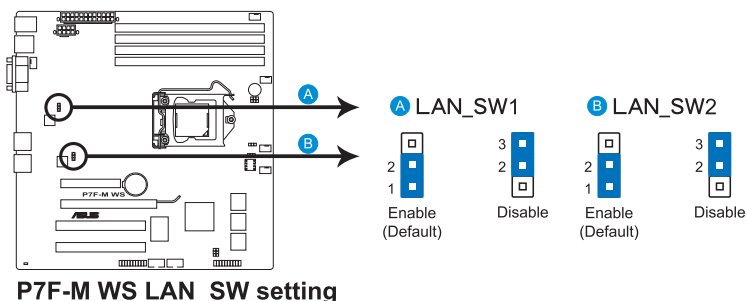
These jumpers allow you to switch for fan pin selection. The CPUFAN_SEL1 jumper is for the CPU fan control and the CHAFAN_SEL1 jumper is for the front fans and rear fans control. Set to pins 1–2 when using 4-pin fans or pins 2–3 when using 3-pin fans.



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

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

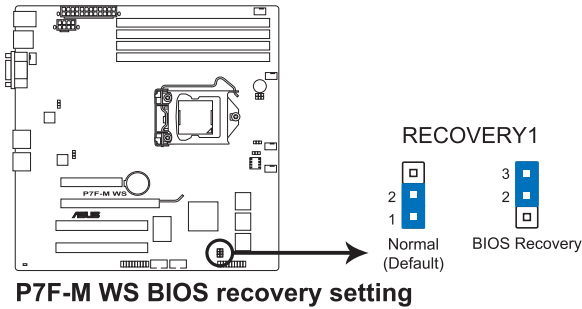


4. Force BIOS recovery setting (3-pin RECOVERY1)

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

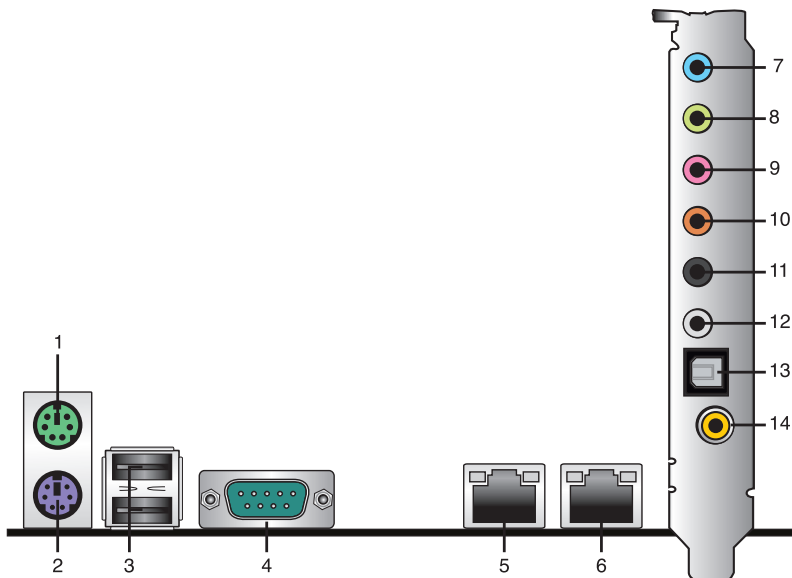
To update the BIOS:

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

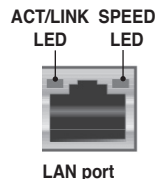
2.7.1 Rear panel connectors



1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.
3. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
4. **Serial (COM1) port.** This 9-pin communication port is for pointing devices or other serial devices.
5. **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.
6. **LAN 2 (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

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



7. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
8. **Line Out port (lime).** This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.
9. **Microphone port (pink).** This port connects a microphone.
10. **Center/Subwoofer port (orange).** This port connects the center/subwoofer speakers.
11. **Rear Speaker Out port (black).** This port connects the rear speakers in a 4-channel, 6-channel, or 8-channel audio configuration.
12. **Side Speaker Out port (gray).** This port connects the side speakers in an 8-channel audio configuration.



Refer to the audio configuration table below for the function of the audio ports in 2, 4, 6, or 8-channel configuration.

Audio 2, 4, 6, or 8-channel configuration

Port	Headset 2-channel	4-channel	6-channel	8-channel
Light Blue	Line In	Line In	Line In	Line In
Lime	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Mic In	Mic In
Orange	–	–	Center/Subwoofer	Center/Subwoofer
Black	–	Rear Speaker Out	Rear Speaker Ou	Rear Speaker Out
Gray	–	–	–	Side Speaker Out

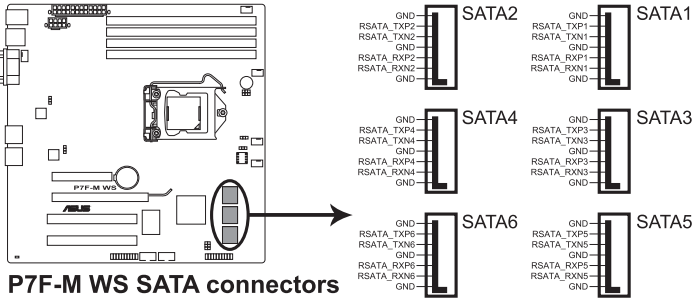
13. **Optical S/PDIF Out port.** This port connects an external audio output device via an optical S/PDIF cable.
14. **Coaxial S/PDIF Out port.** This port connects an external audio output device via a coaxial S/PDIF cable.

2.7.2 Internal connectors

1. Serial ATA connectors (7-pin SATA1–4 [Red], 7-pin SATA5–6 [Black])

Supported by the Intel® 3420 chipset, these connectors are for the Serial ATA signal cables for Serial ATA hard disk drives that allows up to 3Gb/s of data transfer rate.

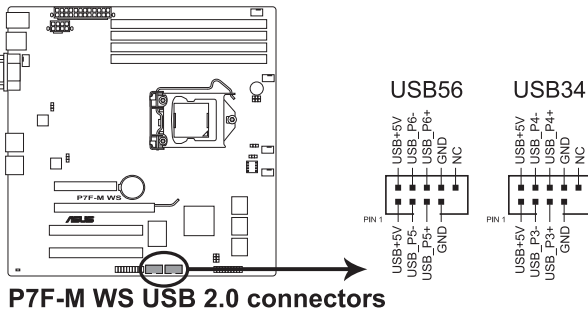
If you installed Serial ATA hard disk drives, you can create a RAID 0, RAID 1, RAID 10, or RAID 5 configuration.



- The actual data transfer rate depends on the speed of Serial ATA hard disks installed.
- The SATA connectors do not support SATA cables with latch.

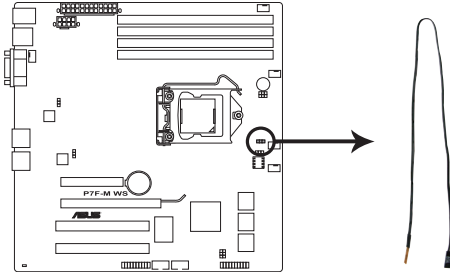
2. USB connector (10-1 pin USB34, USB56)

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.



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

This connector is for temperature monitoring. Connect the thermal sensor cable to this connector and place the other end to the device, which you want to monitor temperature.



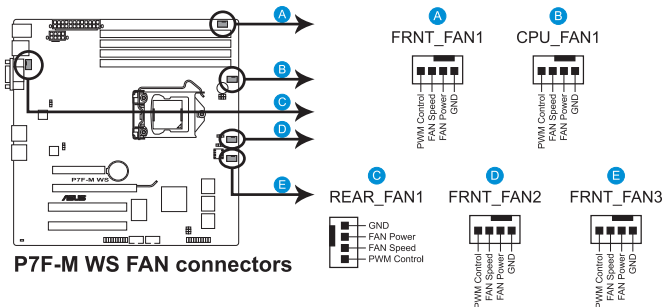
P7F-M WS Thermal sensor cable connector

4. CPU, front and rear fan connectors (4-pin CPU_FAN1, FRNT_FAN1-3, REAR_FAN1)

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.



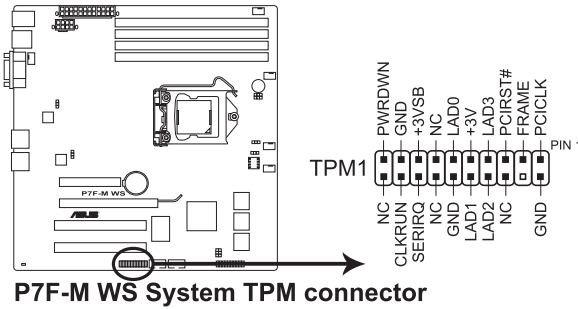
- DO NOT forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components.
- These are not jumpers! DO NOT place jumper caps on the fan connectors!
- All fans feature the ASUS Fan Speed Control technology.



P7F-M WS FAN connectors

5. TPM connector (20-1 pin TPM) [Optional]

This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

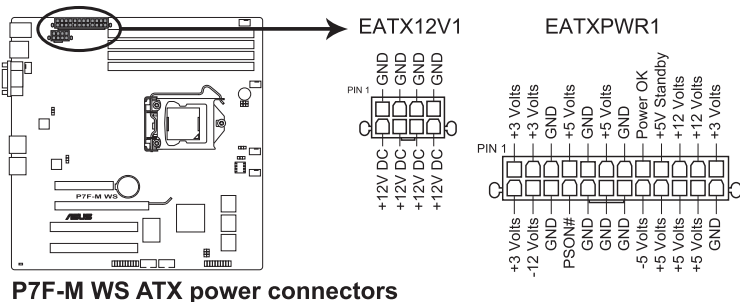


6. ATX power connectors (24-pin EATXPWR1, 8-pin EATX12V1)

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

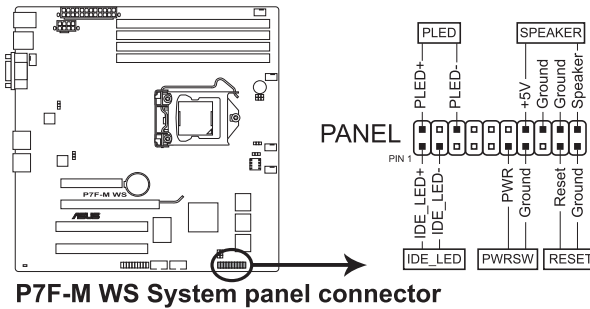


- DO NOT forget to connect the 24+8-pin power plugs; otherwise, the system will not boot up.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- This motherboard 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.



7. System panel connector (20-pin PANEL1)

This connector supports several chassis-mounted functions.



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)

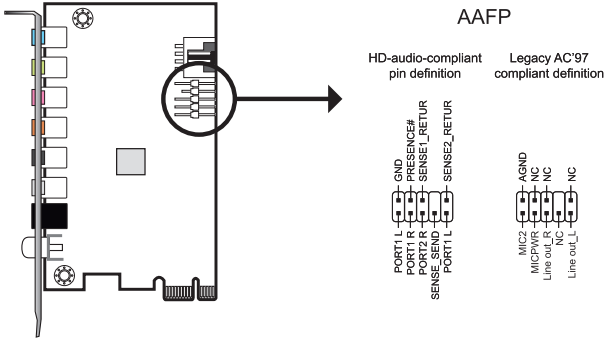
This connector is for the system power button. Pressing the power button turns the system on or puts the system in sleep or soft-off mode depending on the BIOS settings. Pressing the power switch for more than four seconds while the system is ON turns the system OFF.

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.

8. Front panel audio connector (10-1 pin AAFP)

This connector is for a chassis-mounted front panel audio I/O module that supports either HD Audio or legacy AC'97 audio standard. Connect one end of the front panel audio I/O module cable to this connector.



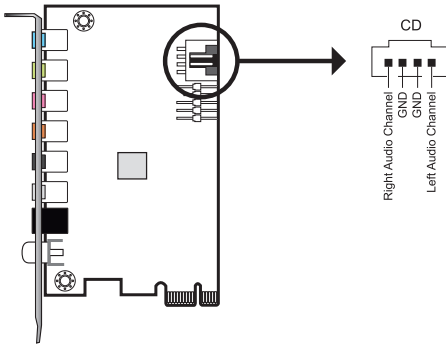
P7F-M WS Analog front panel connector



We recommend that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

9. Optical drive audio connector (4-pin CD)

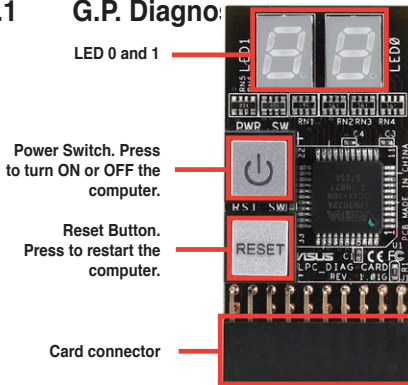
These connectors allow you to receive stereo audio input from sound sources such as a CD-ROM, TV tuner, or MPEG card.



P7F-M WS Internal audio connector

2.8 G.P. Diagnosis card installation (optional)

2.8.1 G.P. Diagnosis card

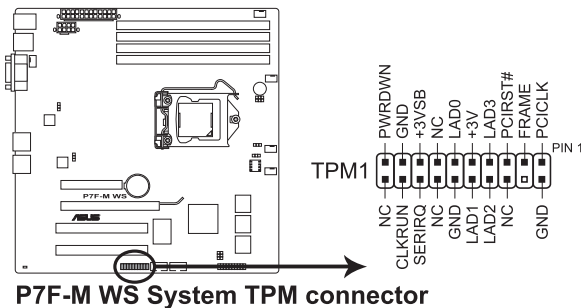


2.8.2 Installing G.P. Diagnosis card

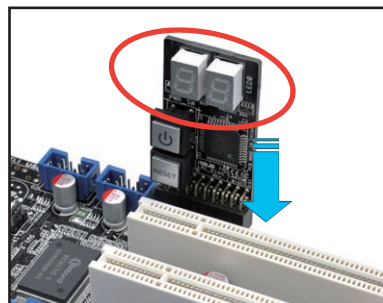


Ensure to turn off the power supply unit before installing the diagnosis card to avoid electrical shock hazard.

1. Locate the **TPM connector (20-1 pin TPM)** on the motherboard.



2. With the LEDs of the diagnosis card facing to the PCI slots, align the card connector with the TPM connector and press firmly until the card sits on the connector completely.



2.8.3 G.P. Diagnosis card check codes

D0	Initiate chip	75	Detect IDE
D1	Enable IO device for bootlock	78	Initiate option ROM
D2	Check and wake up system	85	Show post error
D3	Prepare system for memory detection and sizing	87	Enter BIOS setup
		A4	BIOS boot menu
D4	Memory test	AC	OS in PIC mode
D5	Copy BIOS from ROM to RAM	AA	OS in APIC mode
C0	Early CPU initiation	01	S1
C5	Wake up AP	03	S3
0A	Initiate KBC8042	04	S4
0B	Detect PS2 mouse	05	S5
0C	Detect PS2 keyboard	10	Resume from S1
2A	Initiate VGA BIOS	30	Resume from S3
38	USB initiation	40	Resume from S4
52	Detect system RAM	00	Leave BIOS and pass control to OS

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	Turning 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® 2003 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 **4.5 Power Menu** in Chapter 4 for details.

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

BIOS setup **4**

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	4-16
4.5	Power menu	4-29
4.6	Boot menu	4-32
4.7	Tools menu	4-36
4.8	Exit menu	4-37

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

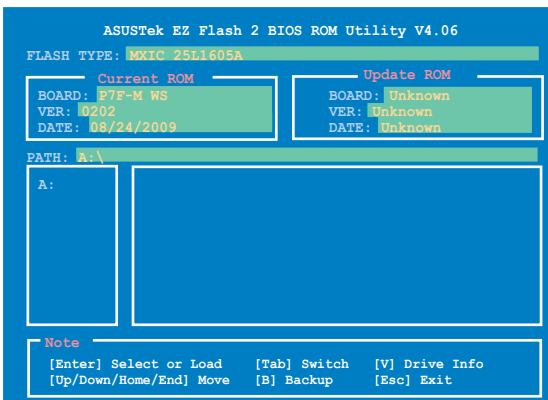
The ASUS EZ Flash 2 feature allows you to update the BIOS without having to use a DOS-based utility.



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 **4.8 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:

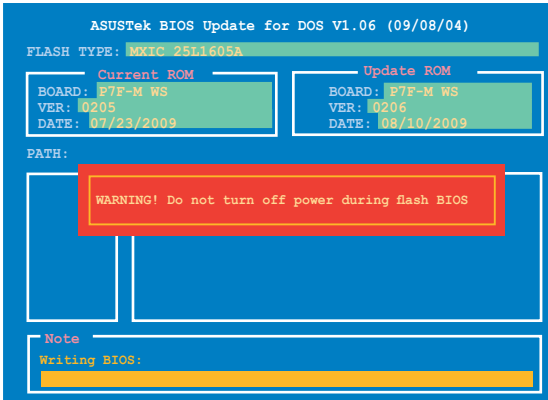
1. Visit the ASUS website at www.asus.com and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable **USB flash disk drive**.
2. Copy the BUPDATER utility (BUPDATER.exe) from the ASUS support website at support.asus.com to a bootable **USB flash disk drive**.
3. Boot the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

```
The BIOS update is finished! Please restart your system.  
C:\>
```

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 Low-Pin Count (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.

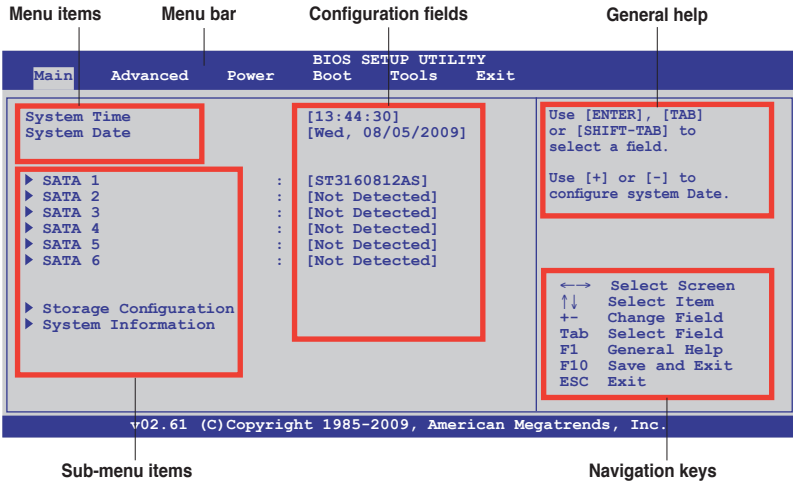
If you wish to enter Setup after POST, restart the system by pressing <Ctrl+Alt+Delete>, or by pressing the reset button on the system chassis. You can also restart by turning the system off and then back on. Do this last option only if the first two failed.

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 sub-menus and make your selections from the available options using the navigation keys.



-
- The default BIOS settings for this motherboard apply for most conditions to ensure optimum performance. If the system becomes unstable after changing any BIOS settings, load the default settings to ensure system compatibility and stability. Select the **Load Setup Defaults** item under the Exit Menu. See section **4.8 Exit Menu**.
 - The BIOS setup screens shown in this section are for reference purposes only, and may not exactly match what you see on your screen.
 - Visit the ASUS website (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
- 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.

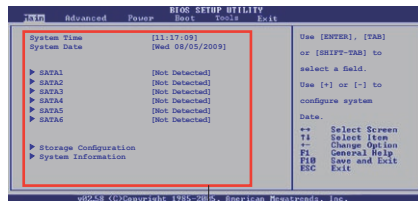


The navigation keys differ from one screen to another.

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 Sub-menu items

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

4.2.6 Configuration fields

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

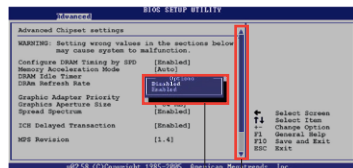
A configurable field is enclosed in brackets, and is highlighted when selected. To change the value of a field, select it then press <Enter> to display a list of options. Refer to 4.2.7 Pop-up window.

4.2.7 Pop-up window

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

4.2.8 Scroll bar

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



Pop-up window

Scroll bar

4.2.9 General help

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

4.3 Main menu

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



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

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Tools	Exit
System Time			[13:44:30]		
System Date			[Wed, 08/05/2009]		
▶ SATA 1	:		[ST3160812AS]		
▶ SATA 2	:		[Not Detected]		
▶ SATA 3	:		[Not Detected]		
▶ SATA 4	:		[Not Detected]		
▶ SATA 5	:		[Not Detected]		
▶ SATA 6	:		[Not Detected]		
▶ Storage Configuration					
▶ System Information					
					Use [ENTER], [TAB] or [SHIFT-TAB] to select a field.
					Use [+] or [-] to configure system Date.
					←→ Select Screen
					↑↓ Select Item
					+ - Change Field
					Tab Select Field
					F1 General Help
					F10 Save and Exit
					ESC Exit

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4.3.1 System Time [xx:xx:xx]

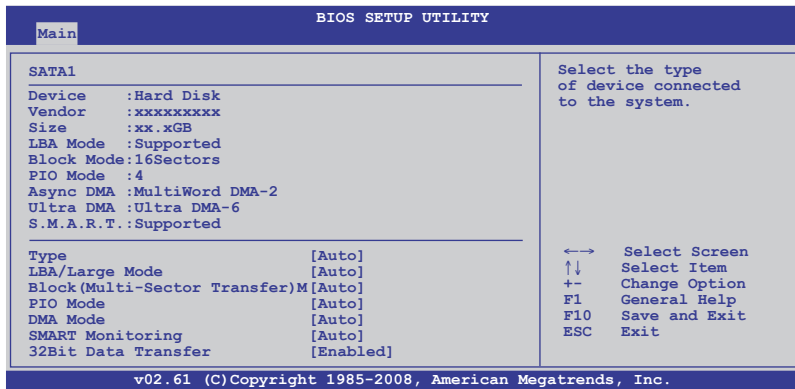
Allows you to set the system time.

4.3.2 System Date [Day xx/xx/xxxx]

Allows you to set the system date.

4.3.3 SATA1—6

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



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

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]

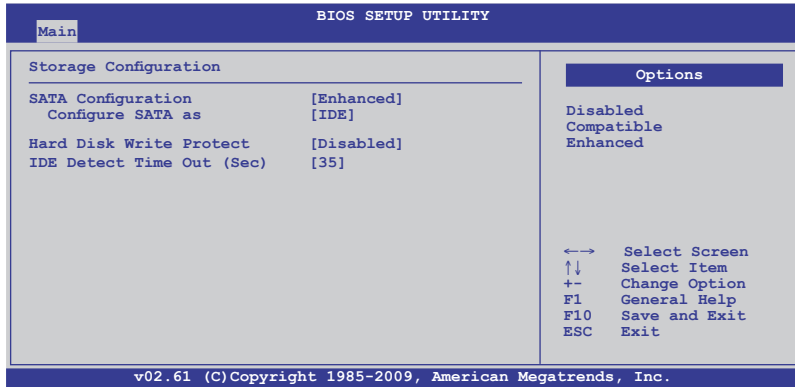
32Bit Data Transfer [Enabled]

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



SATA Configuration [Enhanced]

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

Configure SATA as [IDE]

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



- 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.
- If you want to create RAID sets with LSI MegaRAID utility, or Intel® Matrix Storage Technology from the Serial ATA hard disk drives, set this item to [RAID].

Hard Disk Write Protect [Disabled]

Disables or enables device write protection. This will be effective only if the device is accessed through BIOS.

Configuration option: [Disabled] [Enabled]

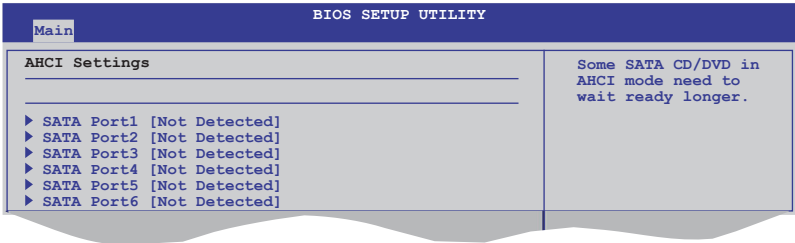
IDE Detect Time Out (Sec) [35]

Selects the time out value for detecting ATA/ATAPI devices.

Configuration options: [0] [5] [10] [15] [20] [25] [30] [35]

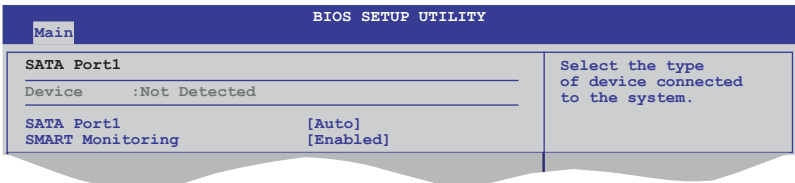
4.3.5 AHCI Configuration

This menu is the section for AHCI configuration. It appears only when you set the item **Configure SATA as** from the sub-menu of **SATA Configuration** to **[AHCI]**.



SATA Port1-6 [XXXX]

Displays the status of auto-detection of SATA devices.



SATA Port1 [Auto]

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

Configuration options: [Auto] [Not Installed]

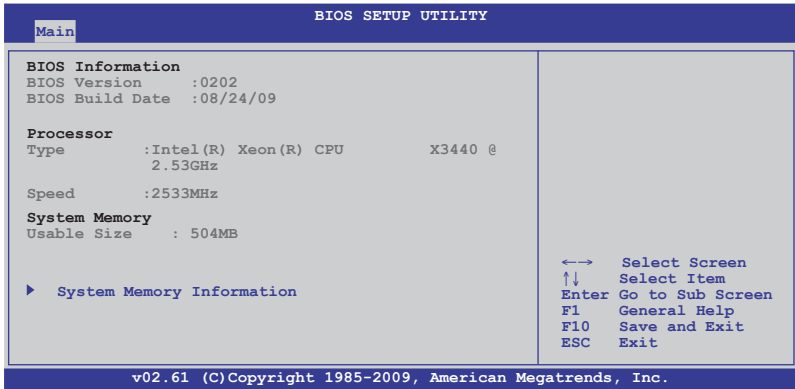
SMART Monitoring [Enabled]

Allows you to set the Self-Monitoring, Analysis and Reporting Technology.

Configuration options: [Disabled] [Enabled]

4.3.6 System Information

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



BIOS Information

Displays the auto-detected BIOS information.

Processor

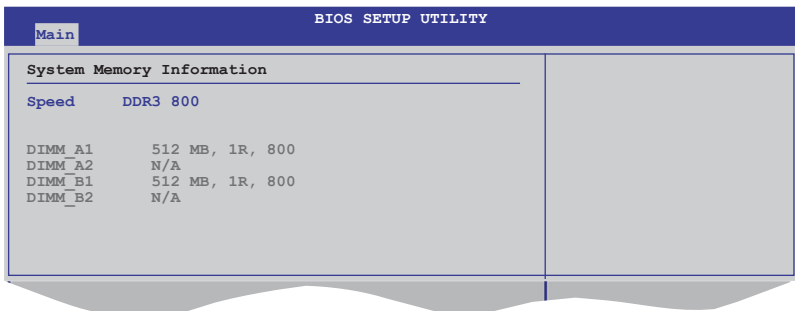
Displays the auto-detected CPU specification.

System Memory

Displays the auto-detected system memory.

System Memory Information

Displays system memory information.

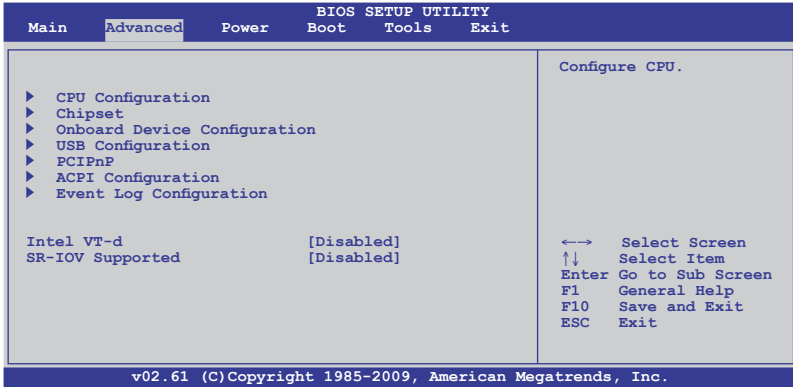


4.4 Advanced menu

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

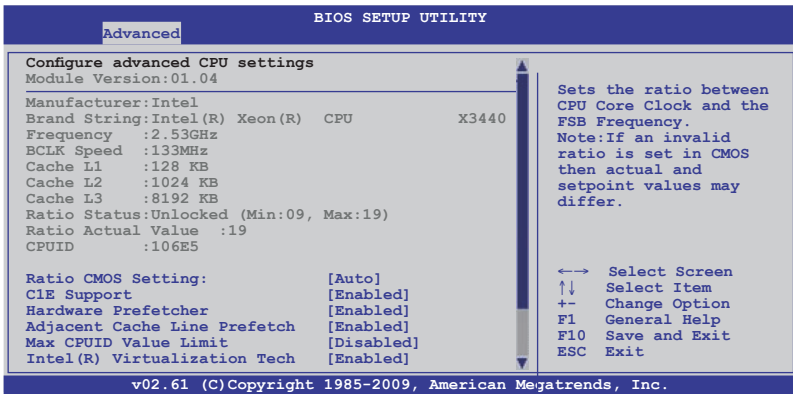


Take caution when changing the settings of the Advanced menu items. Incorrect field values can cause the system to malfunction.

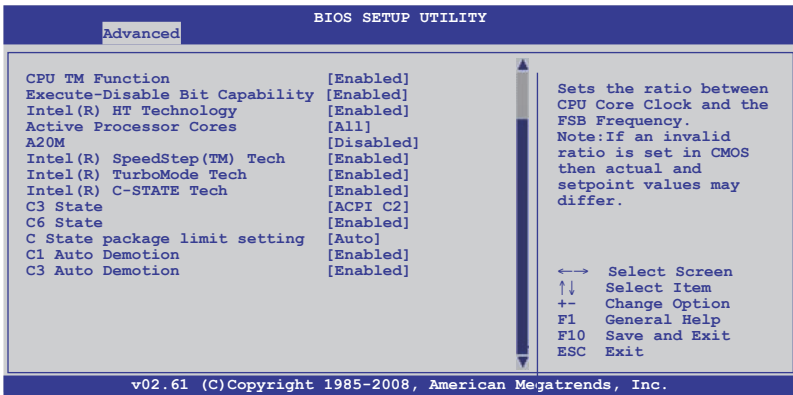


4.4.1 CPU Configuration

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



Scroll down for more items.



Ratio CMOS Setting [Auto]

Allows you to adjust the ratio between CPU Core Clock and BCLK Frequency. Use the <+> and <-> keys to adjust the value.

Configuration options: [Auto] [0.90] [10.0] [11.0] [12.0] [13.0] [14.0] [15.0] [16.0] [17.0] [18.0] [19.0] [20.0]

C1E Support [Enabled]

Allows you to enable or disable Enhanced Halt State support.

Configuration options: [Disabled] [Enabled]

Hardware Prefetcher [Enabled]

Allows you to enable or disable the Hardware Prefetcher function.

Configuration options: [Disabled] [Enabled]

Adjacent Cache Line Prefetch [Enabled]

Allows you to enable or disable the Adjacent Cache Line Prefetch function.

Configuration options: [Disabled] [Enabled]

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]

Intel(R) Virtualization Tech [Enabled]

The Intel® Virtualization Technology allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems. Configuration options: [Disabled] [Enabled]

CPU TM Function [Enabled]

This function enables the overheated CPU to throttle the clock speed to cool down.
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]

Intel(R) HT Technology [Enabled]

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

Active Processor Cores [All]

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

A20M [Disabled]

Legacy Oses and APs may need A20M enabled.
Configuration options: [Disabled] [Enabled]

Intel(R) SpeedStep (TM) Tech [Enabled]

When set to [Disabled], the CPU runs at its default speed. When set to [Enabled], the CPU speed is controlled by the operating system.
Configuration options: [Disabled] [Enabled]

Intel(R) TurboMode Tech [Enabled]

Turbo mode allows processor cores to run faster than marked frequency in specific condition.
Configuration options: [Disabled] [Enabled]

Intel(R) C-STATE Tech [Enabled]

The Intel® C-State Technology allows the CPU to save more power under idle mode. Enable this item only when you install a C-State Technology-supported CPU. Configuration options: [Disabled] [Enabled]



The following items appear only when you set the **Intel(R) C-STATE Tech** item to [Enabled].

C3 State [ACPI C2]

Allows you to select Nehalem C state action.
Configuration options: [Disabled] [ACPI C2] [ACPI C3]

C6 State [Enabled]

Allows you to select Nehalem C state action.

Configuratiton options: [Disabled] [Enabled]

C State package limit setting [Auto]

We recommend that you set this item to [Auto] for BIOS to automatically detect the C-State mode supported by your CPU.

Configuration options: [Auto] [C1] [C3] [C6]

C1 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C3/C6 requests to C1 based on the uncore auto-demote information.

Configuration options: [Disabled] [Enabled]

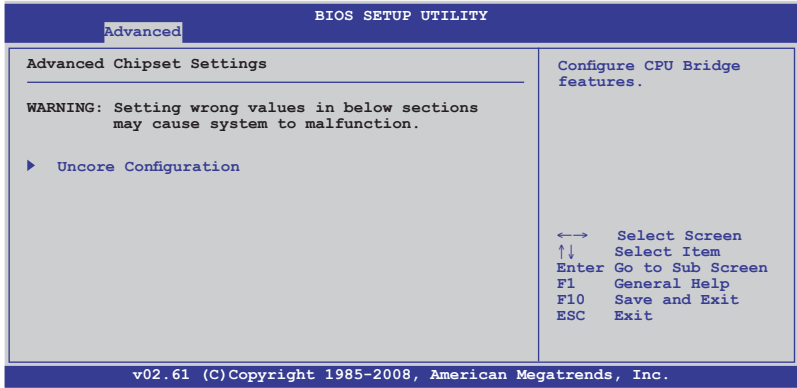
C3 Auto Demotion [Enabled]

When this item is enabled, the CPU will conditionally demote C6 requests to C3 based on the uncore auto-demote information.

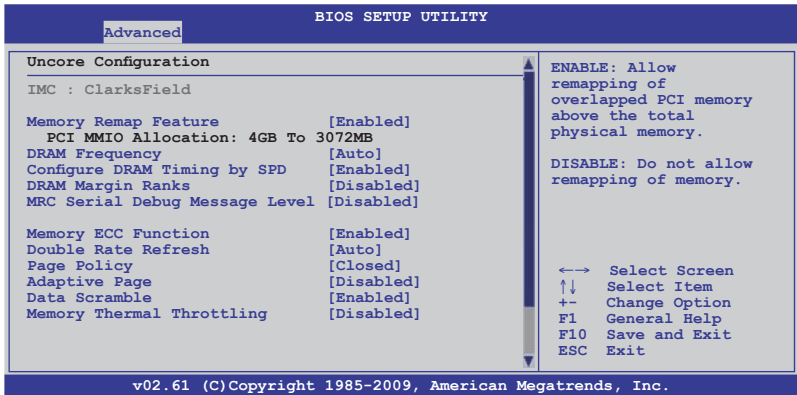
Configuration options: [Disabled] [Enabled]

4.4.2 Chipset

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



Uncore Configuration



Memory Remap Feature [Enabled]

Setting this item to [Enabled] allows you to remap the overlapped PCI memory above the total physical memory. Configuration options: [Disabled] [Enabled]

DRAM Frequency [Auto]

You may allow the system to detect DDR3 memory frequency via SPD or designate a specific frequency.

Configuration options: [Auto] [800 MHz] [1066 MHz] [1333 MHz]



Refer to the memory AVL on ASUS website at www.asus.com.

Configure DRAM Timing by SPD [Enabled]

Configuration options: [Enabled] [Disabled]



The following 10 items appear when you set Configure DRAM Timing by SPD to [Disabled].

DRAM tCL [7]

Configuration options: [3]—[15]

DRAM tRAS [20]

Configuration options: [9]—[63]

DRAM tRP [7]

Configuration options: [3]—[15]

DRAM tRCD [7]

Configuration options: [3]—[15]

DRAM tWR [8]

Configuration options: [3]—[31]

DRAM tRFC [59]

Configuration options: [15]—[255]

DRAM tWTR [4]

Configuration options: [4]—[31]

DRAM tRRD [4]

Configuration options: [4]—[15]

DRAM tRTP [4]

Configuration options: [4]—[15]

DRAM tFAW [20]

Configuration options: [15]—[63]

DRAM Margin Ranks [Disabled]

Configuration options: [Enabled] [Disabled]

MRC Serial Debug Message Level [Disabled]

Configuration options: [Disabled] [Minimum] [Maximum] [Test]

Memory ECC Function [Enabled]

Allows you to enable or disable Memory ECC function.

Configuration options: [Disabled] [Enabled]

Double Rate Refresh [Auto]

Allows you to enable or disable Double Rate Refresh.
Configuration options: [Auto] [Disabled]

Page Poilcy [Closed]

Configuration options: [Closed] [Open]

Adaptive Page [Disabled]

Configuration options: [Disabled] [Enabled]

Data Scramble [Enabled]

Configuration options: [Disabled] [Enabled]

Memory Thermal Throttling [Disabled]

Setting this item to [CLTT] to Closed Loop Thermal Throttling and [OLTT] to Open Loop Thermal Throttling. Configuration options: [CLTT] [OLTT] [Disabled] [Auto]

4.4.3 Onboard Devices Configuration

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



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

Advanced		BIOS SETUP UTILITY	
Onboard Devices Configuration		Options	
HDA Controller	[Enabled]	Enabled	
OnBoard LAN1 Boot ROM	[PXE]	Disabled	
OnBoard LAN2 Boot ROM	[PXE]		
Serial Port1 Address	[3F8/IRQ4]		
Interrupt 19 Capture	[Enabled]		
		←→	Select Screen
		↑↓	Select Item
		+ -	Change Option
		F1	General Help
		F10	Save and Exit
		ESC	Exit
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HDA Controller [Enabled]

Allows you to enable or disable the High Definition Audio controller.
Configuration options: [Enabled] [Disabled]

Onboard LAN1/2 Boot ROM [PXE]

Allows you to configure the onboard LAN1/2 boot mode.

Configuration: [Disabled] [PXE] [iSCSI]

Serial Port1 Address [3F8/IRQ4]

Allows you to select the Serial Port1 base address.

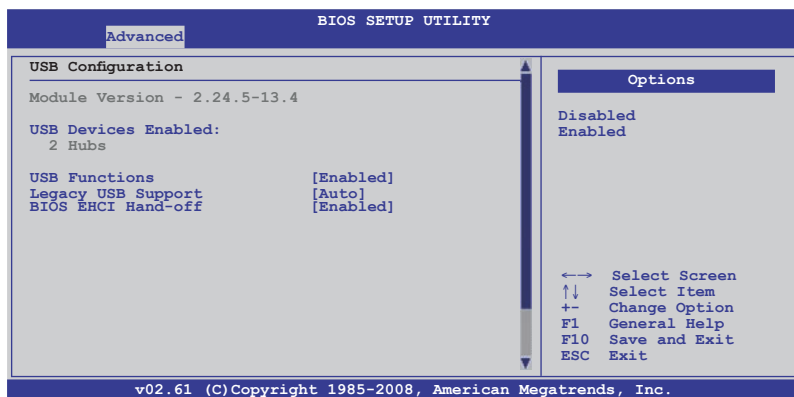
Configuration options: [Disabled] [3F8/IRQ4] [2F8/IRQ3] [3E8/IRQ4] [2E8/IRQ3]

Interrupt 19 Capture [Enabled]

When set to [Enabled], this function allows the option ROMs to trap Interrupt 19.

Configuration options: [Disabled] [Enabled]

4.4.4 USB Configuration



USB Functions [Enabled]

Allows you to enable or disable the USB function.

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]

BIOS EHCI Hand-Off [Enabled]

Enables or disables the BIOS EHCI hand-off support.

Configuration options: [Disabled] [Enabled]

4.4.5 PCIPnP

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



Take caution when changing the settings of the PCI/PnP Configuration menu items. Incorrect field values can cause the system to malfunction.

Advanced		BIOS SETUP UTILITY
Advanced PCI/PnP Settings		NO: lets the BIOS configure all the devices in the system. YES: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
WARNING: Setting wrong values in below sections may cause system to malfunction.		
Plug And Play O/S	[No]	←→ Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit
PCI Option ROM Scan Order	[Bus 0 First]	
Onboard Option ROM Priority	[Normal]	
v02.61 (C) Copyright 1985-2009, American Megatrends, Inc.		

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]

PCI Option ROM Scan Order [Bus 0 First]

Allows you to select the PCI option ROM scanning order. The scanning of the option ROM will start from the lowest bus, device, function number if you set this item to [Bus 0 First]; the scanning starts from the highest bus, device, function number if you set this item to [Bus N First].

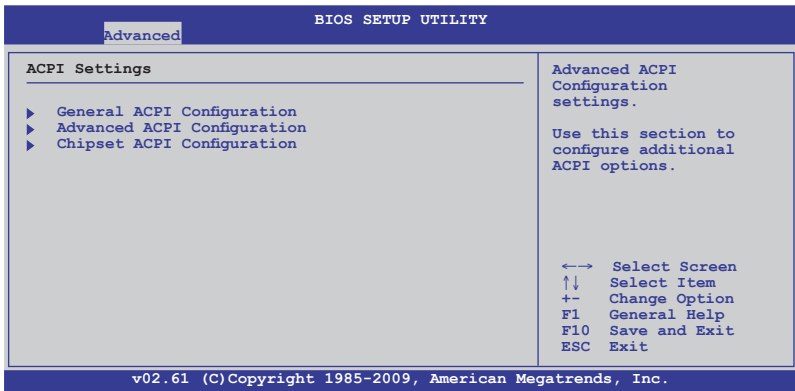
Configuration options: [Bus 0 First] [Bus N First]

Onboard Option ROM Priority [Normal]

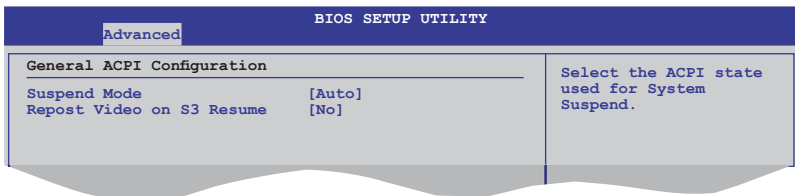
Allows you to select the onboard option ROM priority.

Configuration options: [Normal] [High]

4.4.6 ACPI Configuration



General ACPI Configuration



Suspend Mode [Auto]

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

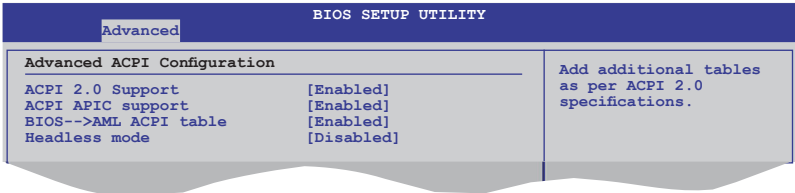
Configuration options: [S1 (POS) Only] [S3 Only] [Auto]

Repost Video on S3 Resume [No]

Determines whether to invoke VGA BIOS POST on S3/STR resume.

Configuration options: [No] [Yes]

Advanced ACPI Configuration



ACPI 2.0 Support [Enabled]

Specifies the Advanced Configuration and Power Interface (ACPI) version supported. Configuration options: [Disabled] [Enabled]

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]

BIOS-->AML ACPI table [Enabled]

Allows you to include the BIOS-->AML exchange table pointer to (X)RSMT pointer list. Configuration options: [Disabled] [Enabled]

Headless mode [Disabled]

Allows you to enable or disable the Headless operation mode through ACPI. Configuration options: [Disabled] [Enabled]

Chipset ACPI Configuration

Advanced		BIOS SETUP UTILITY	
South Bridge ACPI Configuration		Options	
Energy Lake Feature	[Disabled]	Enabled	Disabled
APIC ACPI SCI IRQ	[Disabled]		
High Performance Event Timer	[Enabled]		
HPET Memory Address	[FED00000h]		

Energy Lake Feature [Disabled]

Allows you to enable or disable the Energy Lake feature.

Configuration options: [Enabled] [Disabled]



We do not recommend you enable this feature.

APIC ACPI SCI IRQ [Disabled]

Allows you to enable or disable the APIC ACPI SCI IRQ feature.

Configuration options: [Disabled] [Enabled]

High Performance Event Timer [Enabled]

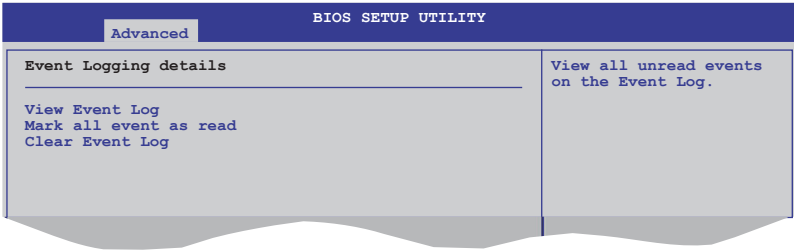
Allows you to enable or disable the High Performance Event Timer feature.

Configuration options: [Disabled] [Enabled]

HPET Memory Address [FED00000h]

Configuration options: [FED00000h] [FED01000h] [FED02000h] [FED03000h]

4.4.7 Event Log Configuration



View Event Log

Press <Enter> to read all the unread event log.

Mark all events as read

Press <Enter> to mark all the events as read.

Clear Event Log

Press <Enter> to clear all events on the event log.

4.4.8 Intel VT-d Configuration [Disabled]

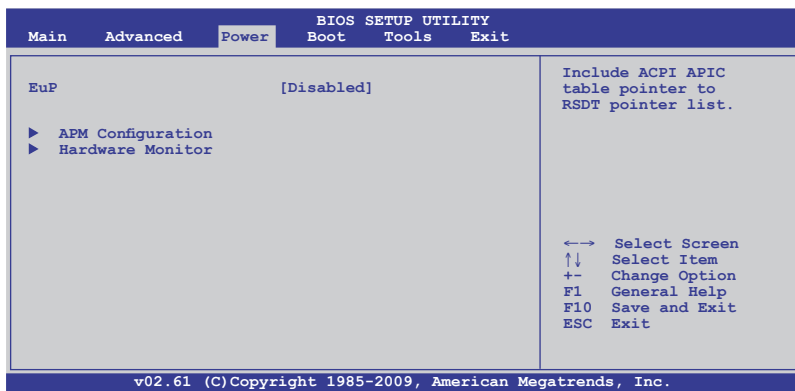
Allows you to enable or disable the Intel Virtualization Technology for Directed I/O.

Configuration options: [Disabled] [Enabled]

4.4.9 SR-IOV Supported [Disabled]

Configuration options: [Disabled] [Enabled]

4.5 Power menu

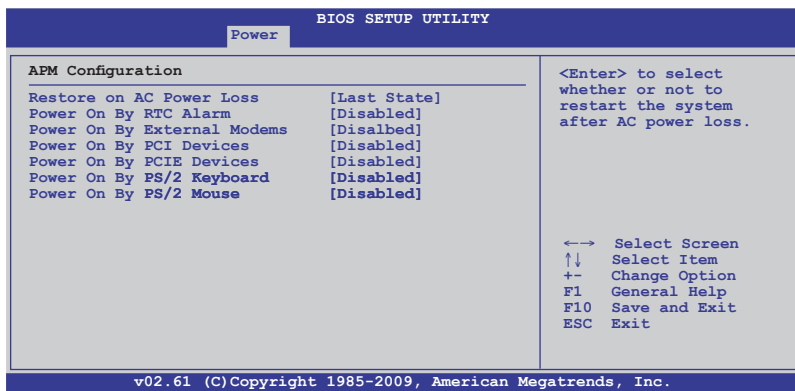


4.5.1 EuP Ready [Disabled]

[Disabled] Disables the Energy Using Products (EuP) Ready function.

[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.

4.5.2 APM Configuration



Restore On AC Power Loss [Last State]

[Power Off] The system goes into off state after an AC power loss.

[Power On] The system goes into on state after an AC power loss.

[Last State] The system goes into either off or on state, whatever the system state was before the AC power loss.

Power On By RTC Alarm [Disabled]

[Disabled] Disables RTC to generate a wake event.

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

Power On By External Modems [Disabled]

[Disabled] Disables to power up the computer when the external modem receives a call while the computer is in Soft-off mode.

[Enabled] The computer could be powered up when the external modem receives a call while the computer is in Soft-off mode.



The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Power On By PCI Devices [Disabled]

[Disabled] Disables the PME to wake up from S5 by PCI devices.

[Enabled] Allows you to turn on the system through a PCI LAN or modem card. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

Power On By PCIE Devices [Disabled]

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

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

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

Power On By PS/2 Keyboard [Disabled]

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

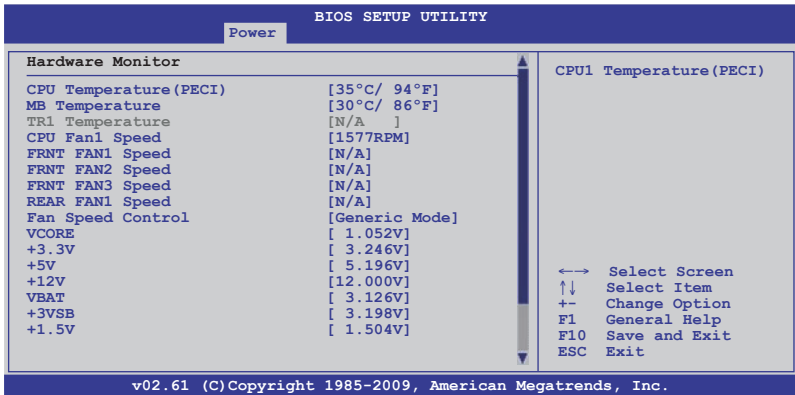
Configuration options: [Disabled] [Space Bar] [Ctrl-Esc] [Power Key]

Power On By PS/2 Mouse [Disabled]

[Disabled] Disables the Power On by a PS/2 mouse.

[Enabled] Enables the Power On by a PS/2 mouse. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead.

4.5.3 Hardware Monitor



CPU/MB/TR1 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.

CPU Fan1; FRNT FAN1–3 Speed [xxxxRPM] or [Ignored] / [N/A] REAR FAN1 Speed [xxxxRPM] or [Ignored] / [N/A]

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

Fan Speed Control [Generic Mode]

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

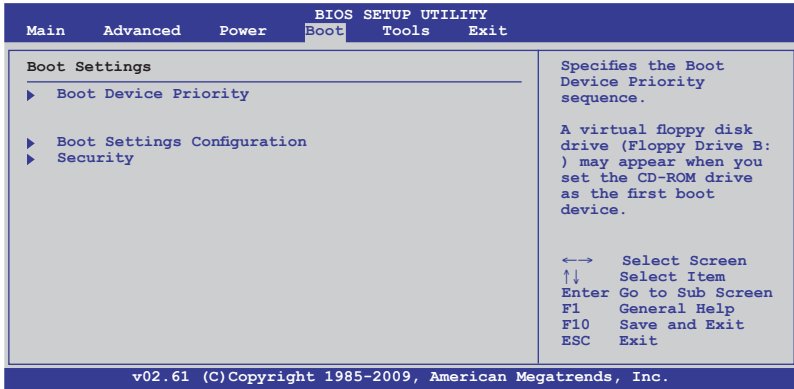
Configuration options: [Full Speed Mode] [High Density Mode] [Generic Mode] [Whisper Mode]

VCORE1, +3.3V, +5V, +12V, VBAT, +3VSB, +1.5V

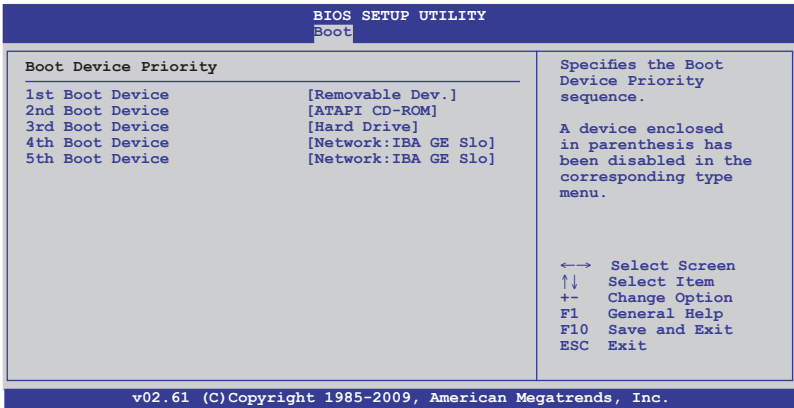
The onboard hardware monitor automatically detects the voltage output through the onboard voltage regulators. Select [Ignored] if you do not want to detect this item.

4.6 Boot menu

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



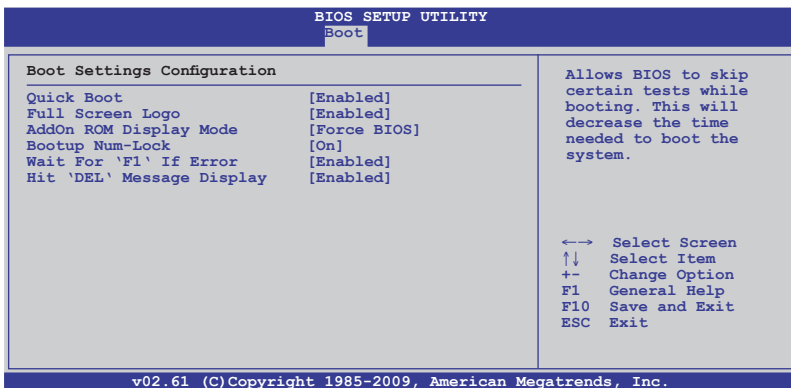
4.6.1 Boot Device Priority



1st—xxth Boot Device [XXXXXXX]

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

4.6.2 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]

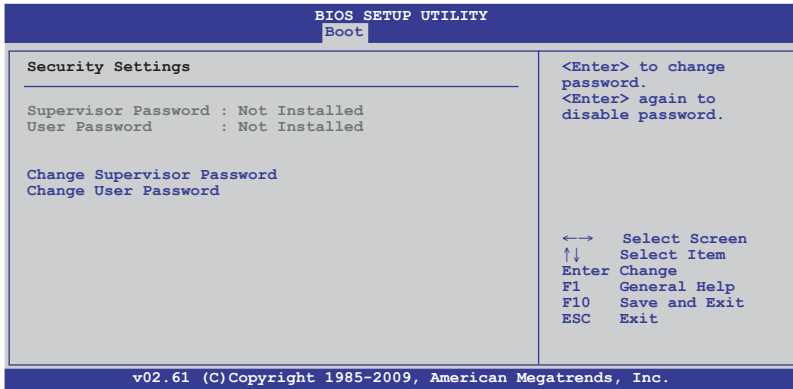
When set to [Enabled], the system waits for the <F1> key to be pressed when error occurs. Configuration options: [Disabled] [Enabled]

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]

4.6.3 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.

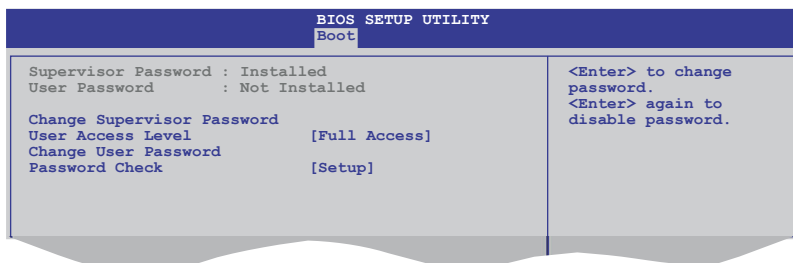
To change the supervisor password, follow the same steps as in setting a user password.

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.

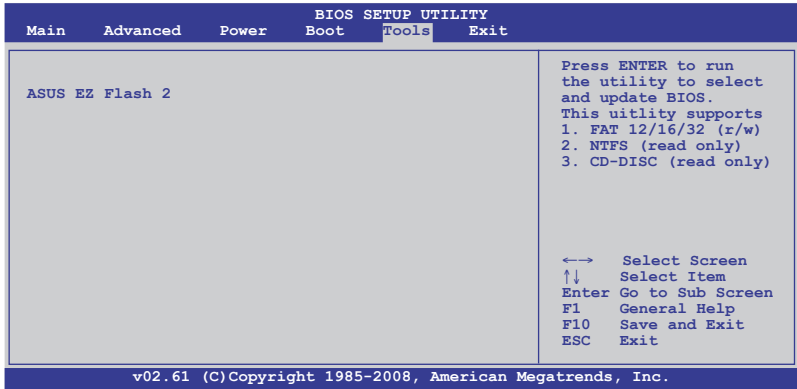
To change the user password, follow the same steps as in setting a user password.

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]

4.7 Tools menu

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

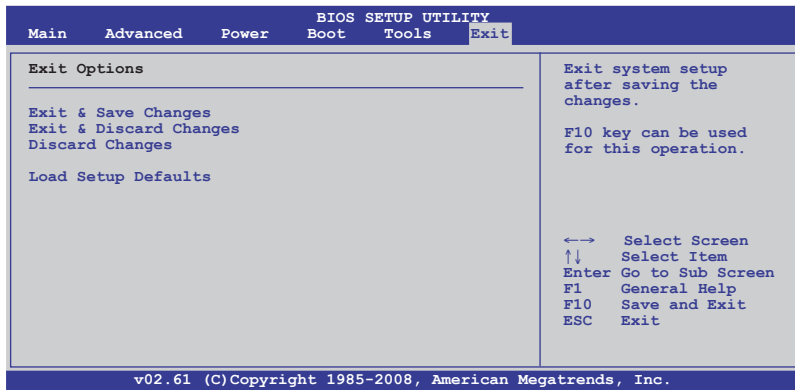


4.7.1 ASUS EZ Flash 2

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.

4.8 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 **OK** 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 **OK** 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	Intel® Matrix Storage Manager Option ROM Utility	5-5

5.1 Setting up RAID

The motherboard comes with the Intel® 3420 chipset that allows you to configure Serial ATA hard disk drives as RAID sets. The motherboard supports the following RAID configurations: RAID 0, RAID 1, RAID 10 and RAID 5.



- You must install Windows® XP Service Pack 2 or later versions before using Serial ATA hard disk drives. The Serial ATA RAID feature is available only if you are using Windows® XP SP2 or later versions.
- A RAID array with the total capacity over 2TB cannot be set as a boot disk. A RAID array over 2TB can only be set as a data disk only.
- If you want to install a Windows® operating system to a hard disk drive included in a RAID set, you have to create a RAID driver disk and load the RAID driver during OS installation. Refer to section **6.1 Creating a RAID driver disk** for details.

5.1.1 RAID definitions

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

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

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

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

5.1.2 Installing hard disk drives

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

To install the SATA hard disks for a RAID configuration:

1. Install the SATA hard disks into the drive bays.
2. Connect the SATA signal cables.
3. Connect a SATA power cable to the power connector on each drive.

5.1.3 Setting the RAID item in BIOS

You must enable the RAID function in the BIOS Setup before creating RAID set(s) using SATA HDDs. To do this:

1. Enter the BIOS Setup during POST.
2. Go to the **Main** menu > **Storage Configuration**, and then press <Enter>.
3. Set the **Configure SATA as** item to [RAID].
4. Save your changes, and then exit the BIOS Setup.



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



Due to chipset limitation, when set any of SATA ports to RAID mode, all SATA ports run at RAID mode together.

5.2 Intel® Matrix Storage Manager Option ROM Utility

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

To enter the Intel® Matrix Storage Manager option ROM utility:

1. Install all the Serial ATA hard disk drives.
2. Turn on the system.
3. During POST, press <Ctrl+I> to display the utility main menu.

```
Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 FCH-D wRAID5
Copyright(C) 2003-09 Intel Corporation. All Rights Reserved.

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

[ DISK/VOLUME INFORMATION ]

RAID Volumes:                * = Data is Encrypted
None defined.

Physical Disks:
Port Drive Model      Serial #      Size      Type/Status (Vol ID)
0  ST3160812AS        9LS0H7A4    149.0GB  Non-RAID Disk
1  ST3160812AS        9LS0F4HL    149.0GB  Non-RAID Disk
2  ST3160812AS        3LS0JYL8    149.0GB  Non-RAID Disk
3  ST3160812AS        9LS0BJ5H    149.0GB  Non-RAID Disk

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

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

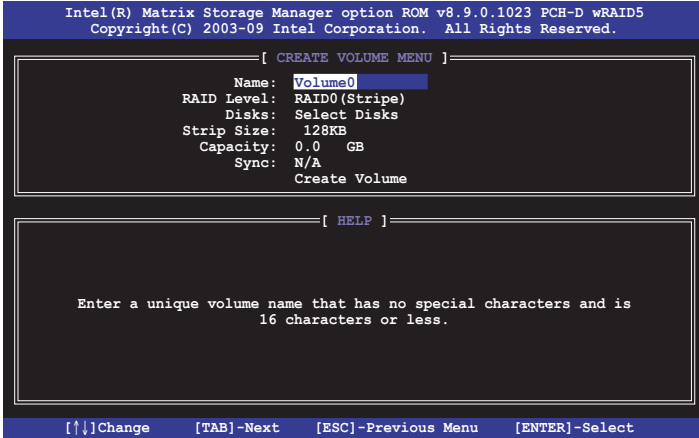


The RAID BIOS setup screens shown in this section are for reference only and may not exactly match the items on your screen.

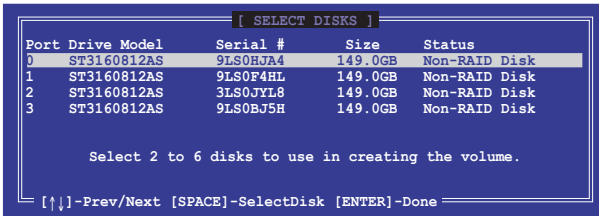
5.2.1 Creating a RAID set

To create a RAID set

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



2. Enter a name for the RAID set and press <Enter>.
3. When the **RAID Level** item is selected, press the up/down arrow key to select a RAID level to create, and then press <Enter>.
4. When the **Disks** item is selected, press <Enter> to select the hard disk drives you want to include in the RAID set. The **SELECT DISKS** screen appears.



5. Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection.

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



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

- When the **Capacity** item is selected, enter the RAID volume capacity that you want and press <Enter>. The default value indicates the maximum allowed capacity.
- When the **Create Volume** item is selected, press <Enter>. The following warning message appears.

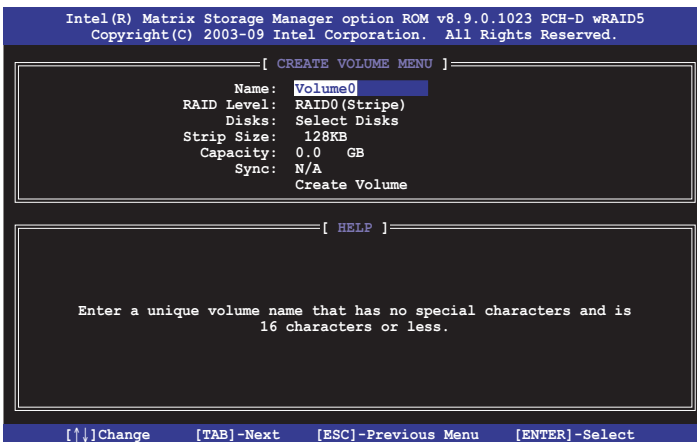


- Press <Y> to create the RAID volume and return to the main menu, or <N> to go back to the **CREATE VOLUME** menu.

5.2.2 Creating a Recovery set

To create a recovery set

- From the utility main menu, select **1. Create RAID Volume** and press <Enter>. The following screen appears.



2. Enter a name for the recovery set and press <Enter>.
3. When the **RAID Level** item is selected, press the up/down arrow key to select **Recovery**, and then press <Enter>.
4. When the **Disks** item is selected, press <Enter> to select the hard disk drives you want to include in the recovery set. The **SELECT DISKS** screen appears.

```

[ SELECT DISKS ]
Port Drive Model      Serial #      Size      Status
0  ST3160812AS      9LS0HJA4     149.0GB   Non-RAID Disk
1  ST3160812AS      9LS0F4HL     149.0GB   Non-RAID Disk
2  ST3160812AS      3LS0JYL8     149.0GB   Non-RAID Disk
3  ST3160812AS      9LS0BJ5H     149.0GB   Non-RAID Disk

Select 1 Master and 1 Recovery disk to create volume.

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

```

5. Use the up/down arrow key to select a drive, press <TAB> to select a Master disk, and then press <SPACE> to select a Recovery disk. A small triangle marks the selected drive. Press <Enter> after completing your selection.
6. When the **Sync** item is selected, use the up/down arrow key to select a sync option that you want and press <Enter>.
7. When the **Create Volume** item is selected, press <Enter>. The following warning message appears.

```

WARNING: ALL DATA ON SELECTED DISKS WILL BE LOST.
Are you sure you want to create this volume? (Y/N):

```

8. Press <Y> to create the recovery set and return to the main menu, or <N> to go back to the **CREATE VOLUME** menu.



If a recovery set is created, you cannot add more RAID sets even when you have more non-RAID disks installed in your system.

5.2.3 Deleting a RAID set



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

To delete a RAID set

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

```
Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
Copyright(C) 2003-09 Intel Corporation. All Rights Reserved.

[ DELETE VOLUME MENU ]

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

[ HELP ]

Deleting a volume will reset the disks to non-RAID.
WARNING: ALL DISK DATA WILL BE DELETED.
(This does not apply to Recovery volumes)

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

2. Use the up/down arrow key to select the RAID set you want to delete, and then press . The following warning message appears.

```
[ DELETE VOLUME VERIFICATION ]

ALL DATA IN THE VOLUME WILL BE LOST!
(This does not apply to Recovery volumes)

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

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

5.2.4 Resetting disks to Non-RAID



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

To reset a RAID set hard disk drive

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

```
[ RESET RAID DATA ]

Resetting RAID disk will remove its RAID structures
and revert it to a non-RAID disk.

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

Port Drive Model      Serial #      Size      Status
0  ST3160812AS        9LS0HJA4    149.0GB  Member Disk
1  ST3160812AS        9LS0F4HL    149.0GB  Member Disk

Select the disks that should be reset.

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

2. Use the up/down arrow key to select the RAID set drive(s) you want to reset, and then press <Space> to select.
3. Press <Enter> to reset the RAID set drive(s). A confirmation message appears.
4. Press <Y> to reset the drive(s) or press <N> to return to the utility main menu.

5.2.5 Recovery Volume Options

If you have created a recovery set, you can configure more recovery set options following the descriptions in the section.



See section **5.2.2 Creating a Recovery set** to create a recovery set before continue.

To configure a recovery set

1. From the utility main menu, select **4. Recovery Volume Options** and press <Enter>. The following screen appears.

```
Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
Copyright(C) 2003-09 Intel Corporation. All Rights Reserved.

[ RECOVERY VOLUME OPTIONS ]

1. Enable Only Recovery Disk
2. Enable Only Master Disk

[ HELP ]

Enable Only Recovery Disk - enables recovery disk if available and
disables master disk.
Enable Only Master Disk - enables master disk if available and
disables recovery disk.
Actions will result in change from Continuous Update mode to On-Request.

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

2. Use the up/down arrow key to select the option you want, and then press <ENTER>. The **SELECT RECOVERY VOLUME** screen appears.

```
[ SELECT RECOVERY VOLUME ]

Name      Level      Capacity  Status   Bootable
Volume0   Recovery(Cont.)  149.0GB  Normal   Yes

Select a Recovery volume to do the operation.

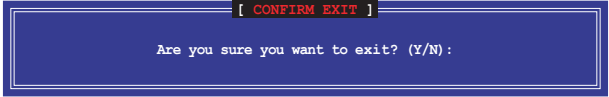
[↑↓]-Up/Down [SPACE]-Selects [ENTER]-Done
```

3. Use the up/down arrow key to select a drive, and then press <Space> to select. A small triangle marks the selected drive. Press <Enter> after completing your selection and return to the utility main menu.

5.2.6 Exiting the Intel® Matrix Storage Manager

To exit the utility

1. From the utility main menu, select **5. Exit**, and then press <Enter>. The following warning message appears.



2. Press <Y> to exit or press <N> to return to the utility main menu.

5.2.7 Rebuilding the RAID



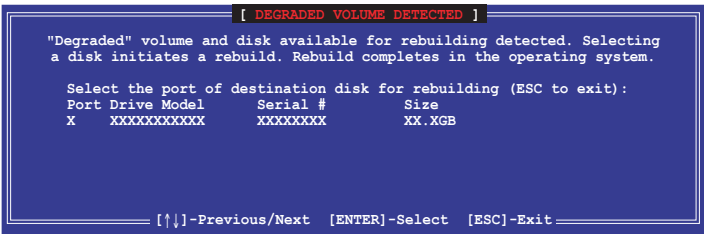
This option is only for the RAID 1 set.

Rebuilding the RAID with other non-RAID disk

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

To rebuild the RAID with other non-RAID disk:

1. At the prompt, press <Ctrl> + <I> to enter the Intel Matrix Storage Manager option ROM utility.
2. If there is a non-RAID SATA Hard Disk available, the utility will prompt to rebuild the RAID. Press <Enter>, and then use up/down arrow keys to select the destination disk or press <ESC> to exit.



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

- The utility immediately starts rebuilding after the disk is selected. The status of the degraded RAID volume is changed to **“Rebuild”**.

```

Intel(R) Matrix Storage Manager option ROM v8.9.0.1023 PCH-D wRAID5
Copyright(C) 2003-09 Intel Corporation. All Rights Reserved.

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

-----[ DISK/VOLUME INFORMATION ]-----

RAID Volumes:
ID   Name      Level      Strip  Size      Status      Bootable
0   Volume0   RAID1(Mirror)  N/A    149.0GB   Rebuild     Yes
                                     * = Data is Encrypted

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

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

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

```

- Exit Intel Matrix Storage Manager and reboot the system.
- Select **Start > Programs > Intel Matrix Storage > Intel Matrix Storage Console** or click the **Intel Matrix Storage Manager** tray icon to load the Intel Matrix Storage Manager utility.
- From the **View** menu, select **Advanced Mode** to display the details of the Intel Matrix Storage Console.
- From the **Volumes view** option, select **RAID volume** to view the rebuilding status. When finished, the status is changed to **“Normal”**.

Rebuilding the RAID with a new hard disk

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

To rebuild the RAID with a new hard disk:

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



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

- Reboot the system and then follow the steps in section **Rebuilding the RAID with other non-RAID disk** on page 5-12.

5.2.8 Setting the Boot array in the BIOS Setup Utility

You can set the boot priority sequence in the BIOS for your RAID arrays when creating multi-RAID using the Intel® Matrix Storage Manager.

To set the boot array in the BIOS:



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

1. Reboot the system and press to enter the BIOS setup utility during POST.
2. Go to the **Boot** menu and select the option **Boot Device Priority**.
3. Use up/down arrow keys to select the boot priority and press <Enter>. See section **4.6.1 Boot Device Priority** for details.
4. From the **Exit** menu, select **Exit & Save Changes**, then press <Enter>.
5. When the confirmation window appears, select **OK**, then press <Enter>.

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.....	6-8
6.3	LAN driver installation.....	6-10
6.4	Management application and utilities installation	6-13

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

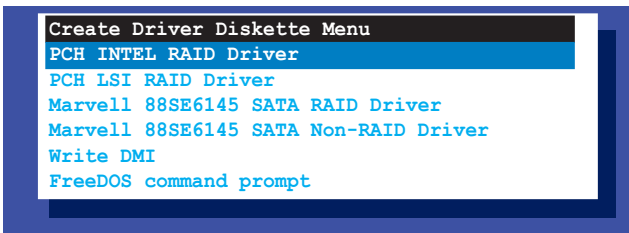


The system does not include a floppy drive. You have to use a USB floppy drive when creating a SATA RAID driver disk.

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

To create a RAID driver disk in DOS environment

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



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

PCH INTEL RAID Driver



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

To create a RAID driver disk in Windows® environment

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



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

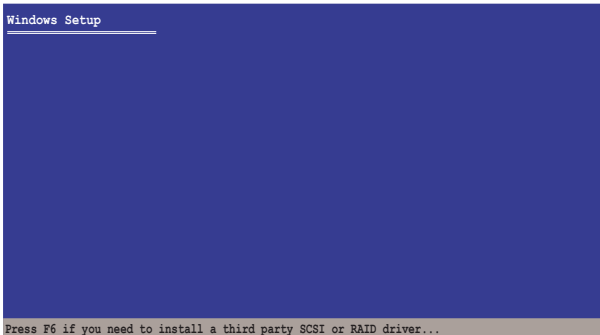
6.1.2 Installing the RAID controller driver

Windows® Server OS

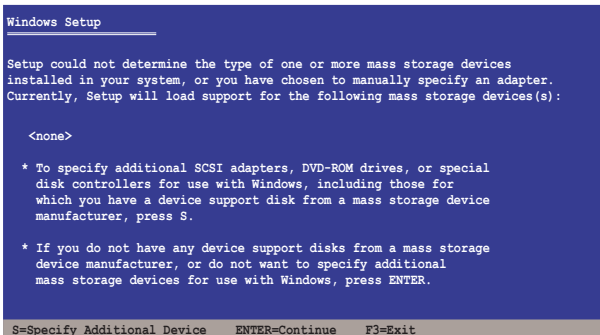
During Windows® Server OS installation

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

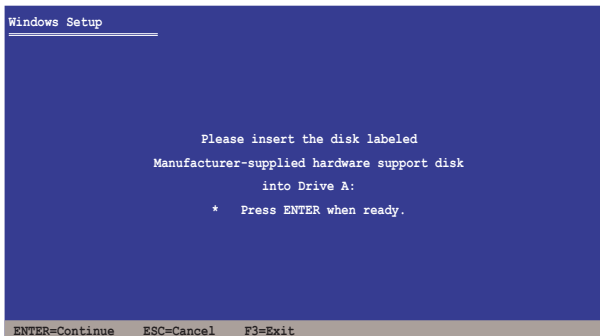
1. Boot the computer using the Windows® Server installation DVD. The Windows® Server OS Setup starts.



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.

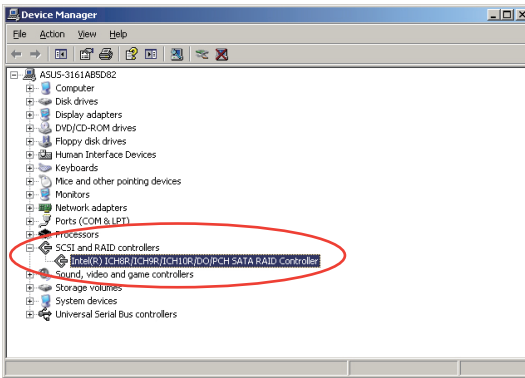
To an existing Windows® Server OS

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 **Intel(R) ICH8R/ICH9R/ICH10R/DO/PCH 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.

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.



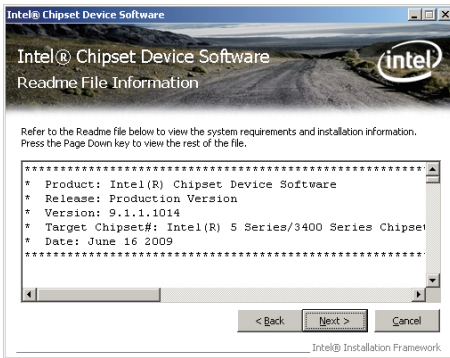
4. The **Intel(R) Chipset Device Software** window appears. Click **Next** to start installation.



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 instructions on how to install the Intel® Gigabit LAN controller drivers on a Windows® Server OS.

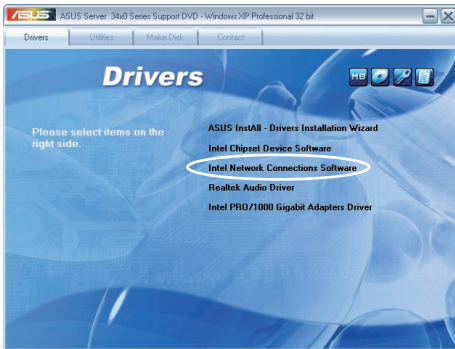
To install the LAN controller drivers

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.

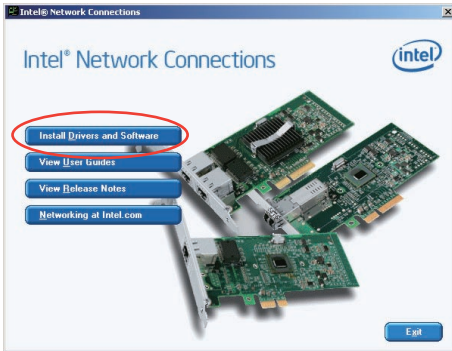


- Windows® automatically detects the LAN controllers and displays a New Hardware Found window. Click **Cancel** to close this window.
- If Autorun is NOT enabled in your computer, browse the contents of the support DVD to locate the file ASSETUP.EXE from the BIN folder. Double-click the ASSETUP.EXE to run the DVD.

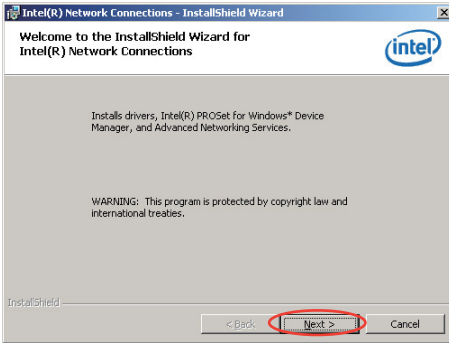
3. Click the **Intel Network Connections Software** to begin installation.



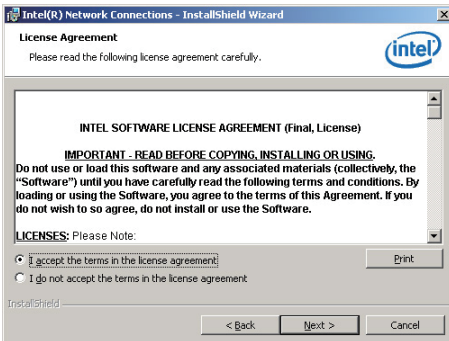
4. Click **Install Drivers and Software** option to begin installation.



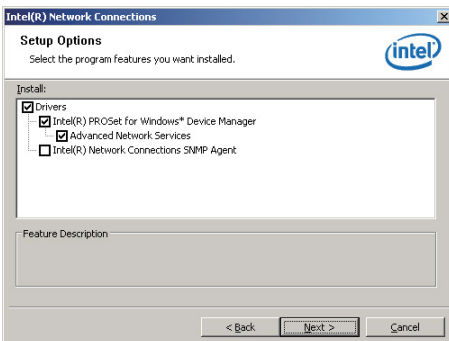
5. Click **Next** when the **Intel(R) Network Connections–InstallShield Wizard** window appears.



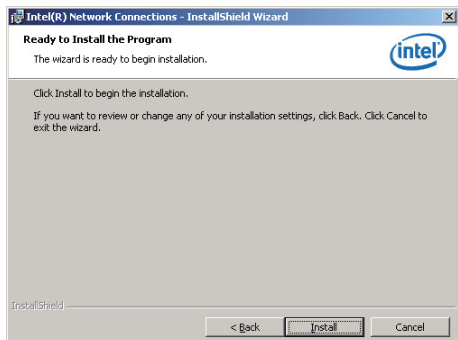
6. Toggle **I accept the terms in the license agreement** and click **Next** to continue.



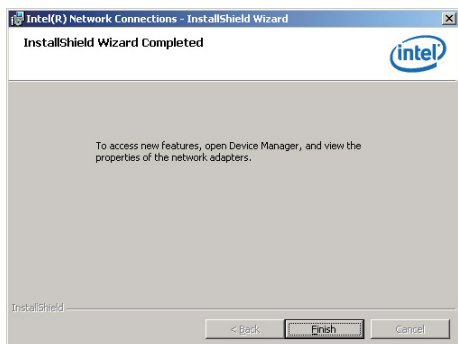
7. Click the **Intel(R) PROSet for Windows Device Manager** box, and then click **Next** to start the installation.



8. Follow the screen instructions to complete installation.



9. When finished, press **Finish** to continue.



6.4 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.

6.4.1 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.

6.4.2 Drivers menu

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

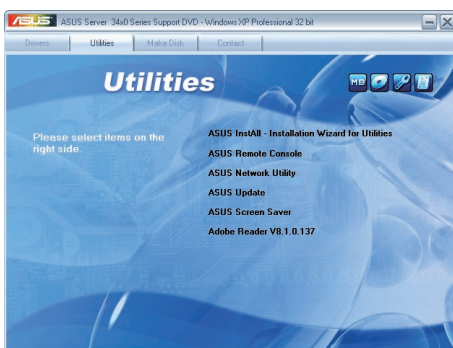


The screen display and driver options vary under different operating system versions.



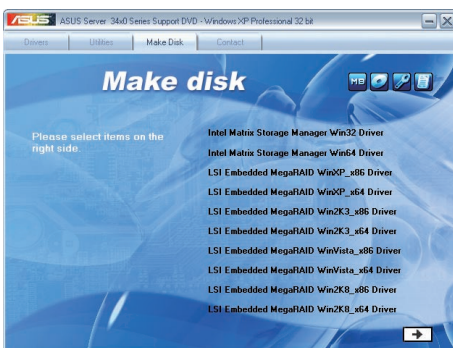
6.4.3 Utilities menu

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



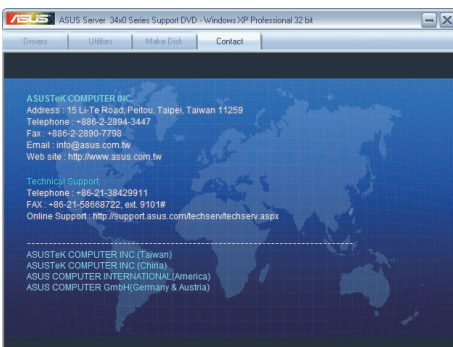
6.4.4 Make disk menu

The Make disk menu contains items to create the Intel 3420 driver disks.



6.4.5 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 P7F-M WS block diagramA-3

A.1 P7F-M WS block diagram

