P5L-MX/ IPAT

Motherboard

E2999

First Edition
March 2007

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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.

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.

The symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.

About this guide

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

How this guide is organized

This manual contains the following parts:

*   **Chapter 1: Product introduction**

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

*   **Chapter 2: BIOS setup**

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

*   **Chapter 3: Software support**

    This chapter describes the contents of the support CD that comes with the motherboard package.

*   **Appendix: CPU features**

    The Appendix describes the CPU features and technologies that the motherboard supports.

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: **afudos /i[filename]** **afudos /iP5L-MXIP.ROM**

P5L-MX/IPAT specifications summary

CPU	LGA775 socket for Intel® Core™2 Extreme / Core™2 Duo / Pentium® D / Pentium® 4 / Celeron® D Processors Compatible with Intel® 06/05B/05A processors Supports Intel® next generation 65nm processors Supports Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Intel® Hyper-Threading Technology
Chipset	Northbridge: Intel® 945G Southbridge: Intel® ICH7
Front Side Bus	1066/800/533 MHz
Memory	Dual-channel memory architecture 2 x 240-pin DIMM sockets support up to 4GB of unbufferred non-ECC 667/533/400 MHz DDR2 DIMMs
VGA	Integrated Intel® Graphics Media Accelerator 950
Expansion slots	1 x PCI Express x16 slot for discrete graphics cards 1 x PCI Express x1 2 x PCI slots
Storage	Intel® ICH7 SouthBridge supports: - 1 x IDE connector for up to two Ultra DMA 100/66/33 devices - 4 x Serial ATA 3Gb/s ports
Audio	ADI® ADI1986A 6-channel High-Definition audio CODEC Supports Jack-Sensing, Enumeration Technology S/PDIF out interface support
LAN	Attansic L1 Gigabit LAN controller
USB	Supports up to 8 USB 2.0 ports
Rear panel	1 x Parallel port 1 x LAN (RJ-45) port 4 x USB 2.0 ports 1 x VGA port 1 x Serial port 1 x PS/2 keyboard port 1 x PS/2 mouse port 6-channel high-definition audio I/O ports
BIOS features	8 Mb Flash ROM, AMI BIOS, PnP, WfM2.0, DMI2.0, SMBIOS 2.4

(continued on the next page)

P5L-MX/IPAT specifications summary

Industry standard	PCI 2.2, USB 2.0
Manageability	WfM 2.0, DMI 2.0, WOL by PME, WOR by PME
Internal connectors	2 x USB 2.0 connectors for 4 additional USB 2.0 ports 1 x CPU fan connector 1 x Chassis fan connector 1 x 24-pin EATX power connector 1 x 4-pin ATX 12 V power connector 1 x CD in connector 1 x Front panel high-definition audio connector 1 x S/PDIF out connector 1 x System Panel connector
Power Requirement	ATX power supply (with 24-pin and 4-pin 12 V plugs)
Form Factor	Micro-ATX form factor: 9.6 in x 8 in (24.5cm x 20.3cm)
Support CD contents	Device drivers ASUS PC Probe II ASUS update ASUS Screensaver

*Specifications are subject to change without notice.

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

Product
introduction

1

1.1 Welcome!

Thank you for buying an ASUS® P5L-MX/IPAT 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.

Motherboard	ASUS P5L-MX/IPAT motherboard
Cables	1 x Serial ATA Cable Kit (SATA/Power) 1 x Ultra DMA 100/66 cable 1 x Floppy disk drive cable
Accessories	I/O shield
Application CDs	ASUS motherboard support CD IPAT software CD
Documentation	User guide

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

1.3 Special features

LGA775 Intel® Core™2 Processor Ready

This motherboard supports the latest Intel® Core™2 processor in the LGA775 package. With the new Intel® Core™ microarchitecture technology and 1066/800/533 MHz FSB, Intel® Core™2 processor is one of the most powerful and energy efficient CPU in the world.

64-bit CPU support

The motherboard supports 64-bit processors that provides high-performance computing and faster memory access required for memory and data intensive applications.

Intel® 945G chipset

The Intel® 945G graphics memory controller hub (GMCH) and the ICH7 I/O controller hub provide the vital interfaces for the motherboard. The GMCH features the Intel® Graphics Media Accelerator 950, an integrated graphics engine for enhanced 3D, 2D, and video capabilities. The GMCH provides the interface for a processor in the 775-land package with 533/800/1066 MHz front side bus (FSB), dual channel DDR2 at speeds of up to 667 MHz, and PCI Express x16 graphics card.

The Intel® ICH7 Southbridge represents the seventh generation I/O controller hub that provides the interface for PCI Express and 6-channel high definition audio.

DDR2 memory support

The motherboard supports DDR2 memory which features data transfer rates of 667/533/400 MHz to meet the higher bandwidth requirements of the latest 3D graphics, multimedia, and Internet applications. The dual-channel DDR2 architecture doubles the bandwidth of your system memory to boost system performance, eliminating bottlenecks with peak bandwidths of up to 10.7 GB/s. See pages 1-14 to 1-17 for details.

PCI Express™ interface

The motherboard fully supports PCI Express, the latest I/O interconnect technology that speeds up the PCI bus. PCI Express features point-to-point serial interconnections between devices and allows higher clockspeeds by carrying data in packets. This high speed interface is software compatible with existing PCI specifications. See page 1-21 for details.

Serial ATA technology

The motherboard supports the Serial ATA technology through the Serial ATA interfaces and the Intel® ICH7 chipset. The SATA specification allows for thinner, more flexible cables with lower pin count, reduced voltage requirement, and up to 300 MB/s data transfer rate.

1.4   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 to 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 ATX 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

The motherboard comes with a standby power LED that 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.

SB_PWR

ON
Standby
Power

OFF
Powered
Off

P5L-MX/IPAT Onboard LED
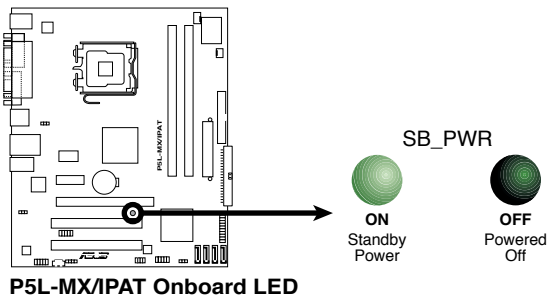
1.5   Motherboard overview

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

> ⚡ Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so can cause you physical injury and damage motherboard components.

1.5.1   Placement direction

When installing the motherboard, make sure 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.

1.5.2   Screw holes

Place six (6) screws into the holes indicated by circles to secure the motherboard to the chassis.

> ⚠ Do not overtighten the screws! Doing so can damage the motherboard.

Place this side towards the rear of the chassis

P5L-MX/IPAT

1.5.3 Motherboard layout

20.3cm (8in)

24.5cm (9.6in)

P5L-MX/IPAT

PS/2KBMS
T: Mouse
B: Keyboard

ATX12V

COM1

PARALLEL PORT

VGA

USB12

USBPW1234

LAN_USB34

ICS PRS552

AUDIO

PCIEX1_1

Attansic
L1

USBPW5678

AD1986A

AAFP

CD

SPDIF_OUT

CPU_FAN

Super I/O

LGA775

CHA_FAN1

DDR2 DIMM_A1 (64 bit,240-pin module)

DDR2 DIMM_B1 (64 bit,240-pin module)

FLOPPY

EATXPWR

Intel GMCH945G

CR2032 3V
Lithium Cell
CMOS Power

PRI_IDE

PCIEX16

SB_PWR

PCI1

Intel ICH7

USB56

PCI2

8Mb
BIOS

SPI_J1

USB78

CLRTC

SATA1

SATA2

SATA3

SATA4

PANEL

1.6   Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Core™2 Extreme/Core™2 Duo/Pentium® D/Pentium® 4 and Celeron® D processors.

> ⚠️
> - Your boxed Intel® Core™2 Extreme/Core™2 Duo/Pentium® D/ Pentium® 4 or Celeron® D LGA775 processor package should come with installation instructions for the CPU, fan and heatsink assembly. If the instructions in this section do not match the CPU documentation, follow the latter.
>
> - Upon purchase of the motherboard, make sure that the PnP cap is on the socket and the socket pins are not bent. Contact your retailer immediately if the PnP cap is missing, or if you see any damage to the PnP cap/socket pins/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 LGA775 socket.
>
> - The product warranty does not cover damage to the socket pins resulting from incorrect CPU installation/removal, or misplacement/ loss/incorrect removal of the PnP cap.

1.6.1   Installling the CPU

To install a CPU:

1.   Locate the CPU socket on the motherboard.
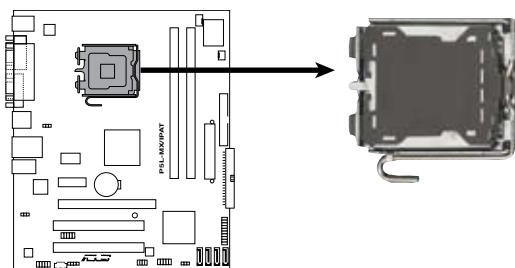
P5L-MX/IPAT CPU Socket 775

> 🖎 Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

Retention tab

Load lever

PnP Cap

Ⓐ

Ⓑ

This side of the cam box should face you.
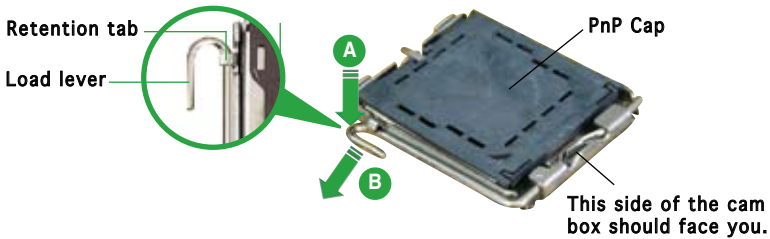
⚠️ To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

3. Lift the load lever in the direction of the arrow to a 135° angle.
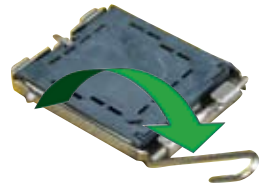
4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B).

Ⓑ

Ⓐ
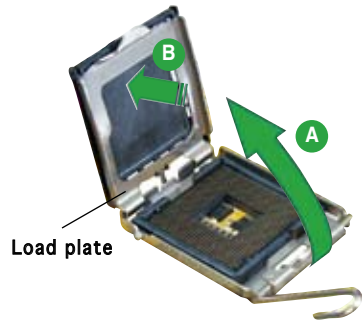
Load plate

5. Position the CPU over the socket, making sure that the gold triangle is on the bottom-left corner of the socket. The socket alignment key should fit into the CPU notch.

Alignment key

Gold triangle mark
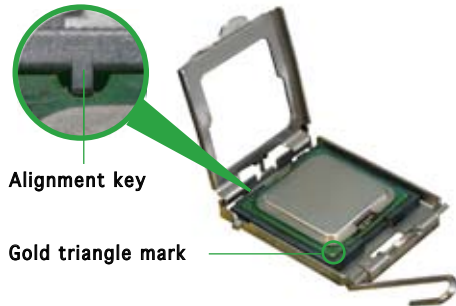
6. Close the load plate (A), then push the load lever (B) until it snaps into the retention tab.
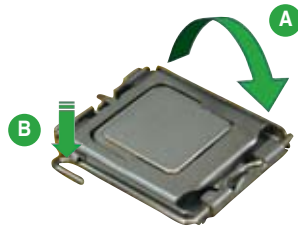
The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

The motherboard supports Intel® LGA775 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Hyper-Threading Technology.

If you install a dual-core CPU, make sure to connect the chassis fan cable to CHA_FAN connector for system stability.

1.6.2 Installling the CPU heatsink and fan

The Intel® Core™2 Extreme/Core™2 Duo/Pentium® D/Pentium® 4 and Celeron® D processors require a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.

• Install the motherboard to the chassis before you install the CPU fan and heatsink assembly

• When you buy a boxed Intel® Core™2 Extreme/Core™2 Duo/ Pentium® D/Pentium® 4 or Celeron® D LGA775 processor, the packageincludes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.

• Your I Intel® Core™2 Extreme/Core™2 Duo/Pentium® D/Pentium® 4 or Celeron® D LGA775 heatsink and fan assembly comes in a push-pin design and requires no tool to install.

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

Fastener

Motherboard hole
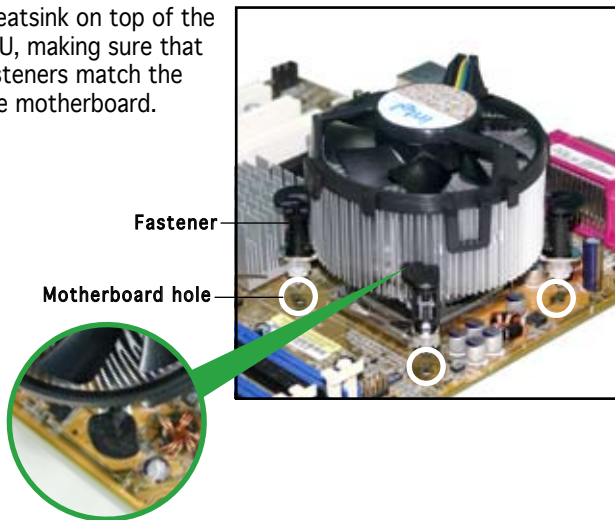
Make sure each fastener is oriented as shown, with the narrow groove directed outward.

2. Push down two fasteners at a time in a diagonal sequence to secure the heatsink and fan assembly in place.
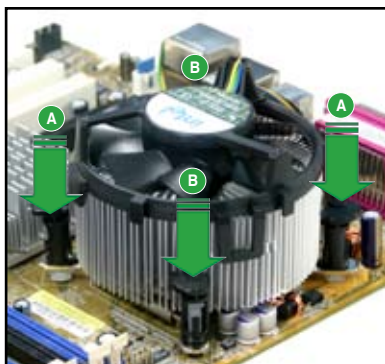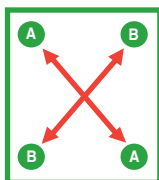
3. When the fan and heatsink assembly is in place, connect the CPU fan cable to the connector on the motherboard labeled CPU_FAN.

CPU_FAN

CPU FAN PWM
CPU FAN IN
CPU FAN PWR
GND
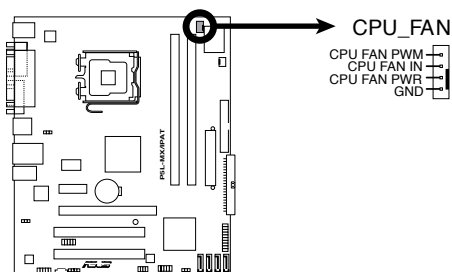
P5L-MX/IPAT CPU Fan Connector

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

1.6.3 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.
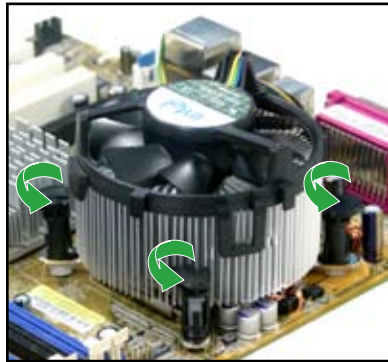
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.
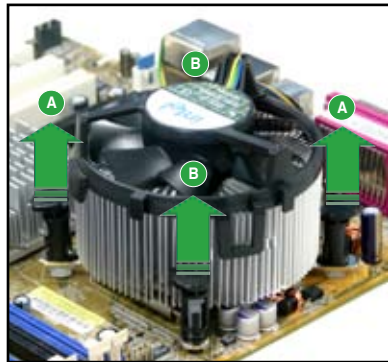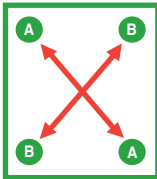
4. Remove the heatsink and fan assembly from the motherboard.

5. Rotate each fastener clockwise to reset the orientation.
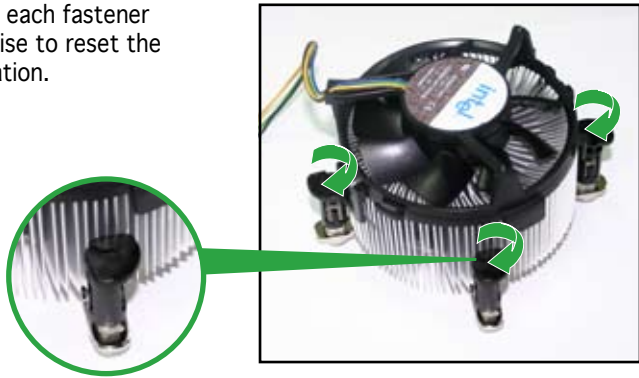
Narrow end of the groove

The narrow end of the groove should point outward after resetting. (The photo shows the groove shaded for emphasis.)
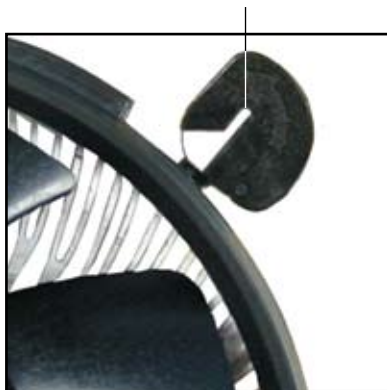
1.7 System memory

1.7.1 Overview

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

A DDR2 module has the same physical dimensions as a DDR DIMM but has a 240-pin footprint compared to the 184-pin DDR DIMM. DDR2 DIMMs are notched differently to prevent installation on a DDR DIMM socket.

The figure illustrates the location of the DDR2 DIMM sockets:
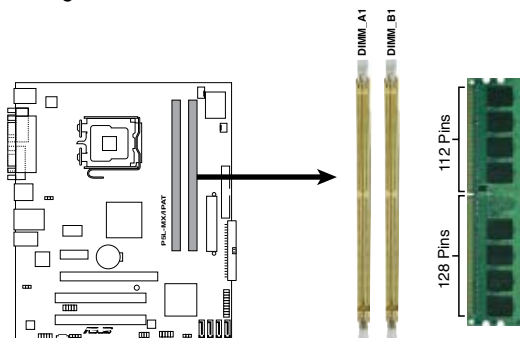
P5L-MX/IPAT 240-pin DDR2 DIMM Sockets

Channel	Sockets
Channel A	DIMM_A1
Channel B	DIMM_B1

1.7.2 Memory configurations

You may install 128MB, 256 MB, 512 MB and 1 GB unbuffered non-ECC DDR2 DIMMs into the DIMM sockets.

- For dual-channel configuration, the size of memory module installed per channel must be the same (DIMM_A1= DIMM_B1)

- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor. Refer to the DDR2 Qualified Vendors List on page 1-17 for details.

- If you are installing only one DIMM module for a Single-channel configuration, install the module on DIMM_B1.

Important notice on installing Windows® XP 32-bit version

If you install Windows® XP 32-bit version Operating System (OS), the limitation of this OS version is that it may reserve a certain amount of memory space for system devices. We recommend that you install less than 3 GB system memory if you would like to work under Windows® XP 32-bit version OS. The excess memory installation will not cause any usage problem, but it will not give users the benefit of manipulating this excess memory space.

Visit the ASUS FAQ site for further explanation:
http://support.asus.com/faq/faq.aspx?SLanguage=en-us
Under **General Search**, make the selections as shown, then click **Search**. Click the article titled "**4GB memory installed but less memory size detected.**"

You also may check the URLs below for third party comments on this issue:
http://dlsvr01.asus.com/pub/ASUS/mb/4GB_Rev1.pdf
http://www.intel.com/support/motherboards/server/sb/cs-016594.htm

1.7.3 DDR2 Qualified Vendors List

The following table lists the memory modules that have been tested and qualified for use with this motherboard. Visit the ASUS website (www.asus. com) for the latest DDR2 DIMM modules for this motherboard.

DDR2 667 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support A	B
56MB	Kingston	KVR667D2N5/256	Elpida	SS	E2508AB-6E-E	•	•
512MB	Kingston	KVR667D2N5/512	Kingston	SS	D6408TE8WL-27	•	•
512MB	Kingston	KVR667D2E5/512	Elpida	SS	E5108AE-6E-E	•	•
1G	Kingston	KVR667D2N5/1G	Kingston	DS	D6408TE8WL-3	•	•
512MB	Samsung	KR M378T6553CZ0-CE6	Samsung	SS	K4T51083QC	•	•
512MB	Samsung	KR M378T6453FZ0-CE6	Samsung	DS	K4T56083QF-ZCE6	•	•
1G	Samsung	KR M378T2953CZ0-CE6	Samsung	SS	K4T51083QC-ZCE6	•	•
256MB	Infineon	HYS64T32000HU-3S-A	Infineon	SS	HYB18T512160AF-3SSSS17310	•	•
512MB	Infineon	HYS64T32000HU-3S-A	Infineon	SS	HYB18T5128000AF-3SSSS27416	•	•
512MB	Infineon	HYS64T64000HU-3S-A	Infineon	SS	HYB18T512800AF3SFSS05346	•	•
1G	Infineon	HYS64T128020HU-3S-A	Infineon	DS	HYB18T512800AF3SSSS28104	•	•
512MB	Corsair	VS512MB667D2	Corsair	DS	MIII0052532M8CEC	•	•
512MB	HY	HYMP564U64AP8-Y4 AA	Hynix	SS	HY5PS12821AFP-Y4	•	•
512MB	HY	HYMP564U64AP8-Y5 AA	Hynix	SS	HY5PS12821AFP-Y5	•	•
1G	HY	HYMP512U64AP8-Y5 AB	Hynix	DS	HY5PS12821AFP-Y5	•	•
512MB	Kingmax	KLCC28F-A8EB5	Elpida	SS	E5108AE-6E-E	•	•
512MB	Kingmax	KLCC28F-A8KB5	Kingmax	SS	KKEA88B4LAUG-29DX	•	•
1G	Kingmax	KLCD48F-A8KB5	Kingmax	DS	KKEA88B4LAUG-29DX	•	•
512MB	Apacer	78.91092.420	Elpida	SS	E5108AE-6E-E	•	•
512MB	Apacer	AU512E667C5KBGC	Apacer	SS	AM4B5708MIJS7E0627B	•	•
1G	Apacer	78.01092.420	Elpida	DS	E5108AE-6E-E	•	•
1G	Apacer	AU01GE667C5KBGC	Apacer	DS	AM4B5708MIJS7E0627B	•	•
512MB	ADATA	M20EL5G3H3160B1C0Z	Elpida	SS	E5108AE-6E-E	•	•
512MB	VDATA	M2GVD5G3H31A4I1C52	VDATA	SS	VD29608A8A-3EC20615	•	•
512MB	VDATA	M2YVD5G3H31P4I1C52	VDATA	SS	VD29608A8A-3EG20627	•	•
1G	VDATA	M2GVD5G3I41P6I1C52	VDATA	DS	VD29608A8A-3EG20627	•	•
1G	VDATA	M2GVD5G3I41C4I1C52	VDATA	DS	VD29608A8A-3EC20620	•	•
256MB	Nanya	NT256T64UH4A1FY-3C	Nanya	SS	NT5TU32M16AG-3C	•	•
512MB	Nanya	NT512T64U88A1BY-3C	Nanya	SS	NT5TU64M8AE-3C	•	•
512MB	AENEON	AET660UD00-30DA98Z	AENEON	SS	AET93F30DA 0552	•	•
1G	AENEON	AET760UD00-30DA98Z	AENEON	DS	AET93F30DA8EE47414G 0540	•	•
512MB	AENEON	AET660UD00-30DA98Z	AENEON	SS	AET93F300A 0606	•	•
1G	AENEON	AET760UD00-30DA98Z	AENEON	DS	AET93F30DA 0604	•	•
512MB	VERITECH	GTP512HLTM45EG	VERITECH	SS	VTD264M8PC6G01A164129621	•	•
1G	VERITECH	GTP01GHLTM55EG	VERITECH	DS	VTD264M8PC6G01A164129621	•	•
512MB	GEIL	GX21GB5300DC	GEIT	SS	Heat-Sink Package	•	•
512MB	Century	CENTURY 512MB	Nanya	SS	NT5TU64M8AE-3C	•	•
512MB	Century	CENTURY 512MB	Hynix	SS	HY5PS12821AFP-Y5	•	•
1G	Century	CENTURY 1G	Hynix	DS	HY5PS12821AFP-Y5	•	•
1G	Century	CENTURY 1G	Nanya	DS	NT5TU64M8AE-3C	•	•
512MB	KINGBOX	512MB 667MHz	KINGBOX	SS	EPD264082200-4	•	•

DDR2 533 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support A	B
256MB	Kingston	KVR533D2N4/256	Elpida	SS	E5116AB-5C-E	•	•
256MB	Kingston	KVR533D2N4/256	Elpida	SS	E5116AF-5C-E	•	•
512MB	Kingston	KVR533D2N4/512	Hynix	DS	HY5PS56821	•	•
512MB	Kingston	KVR533D2N4/512	Infineon	SS	HYB18T512800AF3733336550	•	•
1G	Kingston	KVR533D2N4/1G	Kingston	DS	D6408TE7BL-37	•	•
1G	Kingston	KVR533D2N4/1G	Micron	DS	5YD11D9GCT	•	•
256MB	Samsung	M378T3253FG0-CD5	Samsung	SS	K4T56083QF-GCD5	•	•
512MB	Samsung	M378T6553BG0-CD5	Samsung	SS	K4T51083QB-GCD5	•	•
256MB	Infineon	HYS64T32000HU-3.7-A	Infineon	SS	HYB18T512160AF-3.7AFSS31270	•	•
512MB	Infineon	HYS64T64000GU-3.7-A	Infineon	SS	HYB18T512800AC37SSS11511	•	•
512MB	Infineon	HYS64T64000HU-3.7-A	Infineon	SS	HYB18T512800AF37SSS12079	•	•
512MB	Infineon	HYS64T64000HU-3.7-A	Infineon	SS	HYB18T512800AF37FSS29334	•	•
512MB	Micron	MT 16HTF6464AG-53EB2	Micron	DS	D9BOM	•	•
512MB	Micron	MT 16HTF6464AG-53EB2	Micron	DS	Z9BQT	•	•
1G	Micron	MT 16HTF12864AY-53EA1	Micron	DS	D9CRZ	•	•
512MB	Corsair	VS512MB533D2	Corsair	DS	MIII0052532M8CEC	•	•
512MB	Elpida	EBE51UD8ABFA-5C-E	Elpida	SS	E5108AB-5C-E	•	•
512MB	Kingmax	KLBC28F-A8KB4	Kingmax	SS	KKEA88B4IAK-37	•	•
256MB	Kingmax	KLBB68F-36EP4	Elpida	SS	E5116AB-5C-E	•	•
512MB	Kingmax	KLBC28F-A8EB4	Elpida	SS	E5108AE-5C-E	•	•
512MB	PQI	MEAB-323LA	PQI	SS	D2-E04180W025	•	•
1G	PQI	MEAB-423LA	PQI	DS	D2-E04230W107	•	•
512MB	AENEON	AET660UD00-370A98Z	AENEON	SS	AET93F370A G 0513	•	•
256MB	AENEON	AET560UD00-370A98Z	AENEON	SS	AET94F370AWVV34635G0520	•	•
512MB	AENEON	AET660UD00-370A98Z	AENEON	SS	AET93F370A 3VV36328G 0522	•	•
512MB	AENEON	AET660UD00-370A98X	AENEON	SS	AET93F370A 0518	•	•
512MB	AENEON	AET660UD00-370A88S	AENEON	DS	AET82F370A 0550	•	•
1G	AENEON	AET760UD00-370A98Z	AENEON	DS	AET93F370A 0551	•	•
1G	AENEON	AET760UD00-370A98S	AENEON	DS	AET92F370A 0606	•	•
2G	AENEON	AET860UD00-370A08X	AENEON	DS	AET03F370AFVV26176G 0542	•	•
512MB	VERITECH	GTP512HLTM46DG	VERITECH	SS	VTD264M8PC6G01A164129621	•	•
1G	VERITECH	GTP01GHLTM56DG	VERITECH	DS	VTD264M8PC6G01A164129621	•	•

Side(s): SS - Single Sided   **DS** - Double Sided

DIMM Support:

A - supports one module inserted into either slot, in a Single-channel memory configuration.

B - supports on pair of modules inserted into either the yellow slots as one pair of Dual-channel memory configuration.

1.7.4 Installing a DIMM

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

To install a DIMM:

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

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

3. Firmly insert the DIMM into the socket until the retaining clips snap back in place and the DIMM is properly seated.
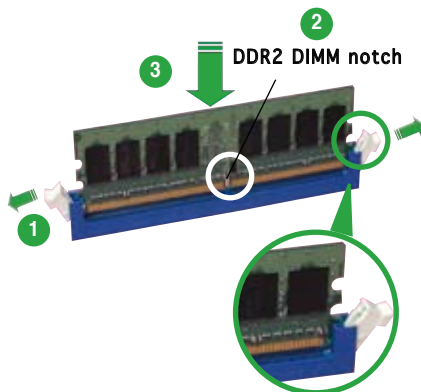
DDR2 DIMM notch

Unlocked retaining clip

✏️ • A DDR2 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 DDR2 DIMM sockets do not support DDR DIMMs. DO not install DDR DIMMs to the DDR2 DIMM sockets.

1.7.5 Removing a DIMM

Follow these steps 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.

DDR2 DIMM notch
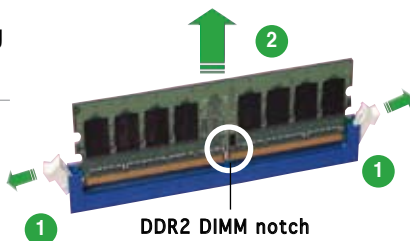
2. Remove the DIMM from the socket.

1.8 Expansion slots

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

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

1.8.1 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.

1.8.2 Configuring an expansion card

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

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 2 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.

1.8.3 Interrupt assignments

Standard interrupt assignments

IRQ	Standard Function
0	System Timer
1	Keyboard Controller
2	Re-direct to IRQ#9
4	Communications Port (COM1)*
5	IRQ holder for PCI steering*
6	Floppy Disk Controller
7	Printer Port (LPT1)*
8	System CMOS/Real Time Clock
9	IRQ holder for PCI steering*
10	IRQ holder for PCI steering*
11	IRQ holder for PCI steering*
12	PS/2 Compatible Mouse Port*
13	Numeric Data Processor
14	Primary IDE Channel

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

IRQ assignments for this motherboard

	A	B	C	D	E	F	G	H
PCI slot 1	—	shared	—	—	—	—	—	—
PCI slot 2	—	—	—	—	—	non-shared	—	—
PCI Express x16 slot	shared	—	—	—	—	—	—	—
PCI Express x1 slot	shared	—	—	—	—	—	—	—
Onboard USB controller 1	—	—	—	—	shared	—	—	—
Onboard USB controller 2	—	shared	—	—	—	—	—	—
Onboard USB controller 3	—	—	shared	—	—	—	—	—
Onboard USB controller 4	—	—	—	shared	—	—	—	—
Onboard USB 2.0 controller	—	—	—	—	shared	—	—	—
Onboard IDE port	—	—	—	—	—	—	shared	—
Onboard HD audio	—	—	—	shared	—	—	—	—
Onboard LAN	—	shared	—	—	—	—	—	—

> 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.

1.8.4 PCI slots

The PCI slots support cards such as a LAN card, SCSI card, USB card, and other cards that comply with PCI specifications. The figure shows a LAN card installed on a PCI slot.
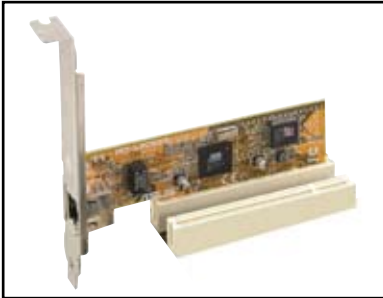
1.8.5 PCI Express x16

This motherboard supports one PCI Express x16 graphics card. The figure shows a graphics card installed on the PCI Express x16 slot.
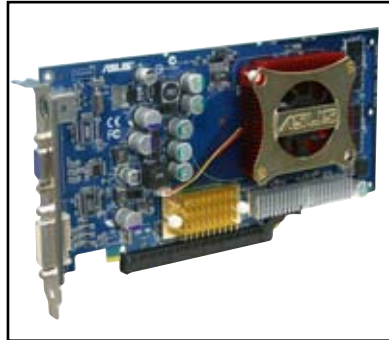
1.8.6 PCI Express x1

This motherboard supports PCI Express x1 network cards, SCSI cards and other cards that comply with the PCI Express specifications. The figure shows a network card installed on the PCI Express x1 slot.
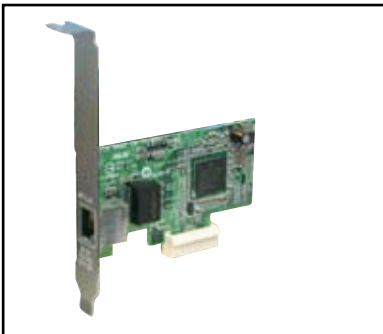
1.9   Jumpers

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

This jumper allows you to clear the Real Time Clock (RTC) RAM in
CMOS. You can clear the CMOS memory of date, time by erasing the
CMOS RTC RAM data. The onboard button cell battery powers the RAM
data in CMOS.

To erase the RTC RAM:

1.   Turn OFF the computer and unplug the power cord.

2.   Remove the onboard battery.

3.   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.

4.   Re-install the battery.

5.   Plug the power cord and turn ON the computer.

6.   Hold down the <Del> key during the boot process and enter BIOS
setup to re-enter data.

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

CLRTC

Normal
(Default)   Clear CMOS

P5L-MX/IPAT Clear RTC RAM
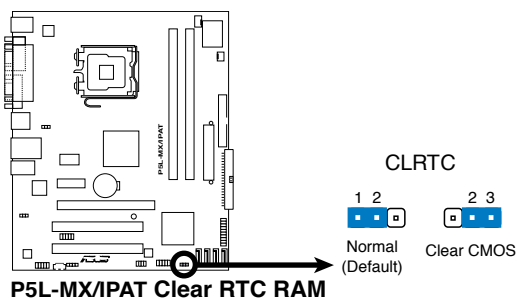
> You do not need to clear the RTC when the system hangs due to
> overclocking. For system failure due to overclocking, use the C.P.R. (CPU
> Parameter Recall) feature. Shut down and reboot the system so the BIOS
> can automatically reset parameter settings to default values.

2. USB device wake-up (3-pin USBPW1234, USBPW5678)

Set these jumpers to +5V to wake up the computer from S1 sleep mode (CPU stopped, DRAM refreshed, system running in low power mode) using the connected USB devices. Set to +5VSB to wake up from S3 and S4 sleep modes (no power to CPU, DRAM in slow refresh, power supply in reduced power mode).

The USBPW1234 jumper is for the rear USB ports. The USBPW5678 jumper is for the internal USB connectors that you can connect to additional USB ports.

USBPW1234

1 2   2 3

+5V   +5VSB
(Default)

USBPW5678

1 2   2 3

+5V   +5VSB
(Default)
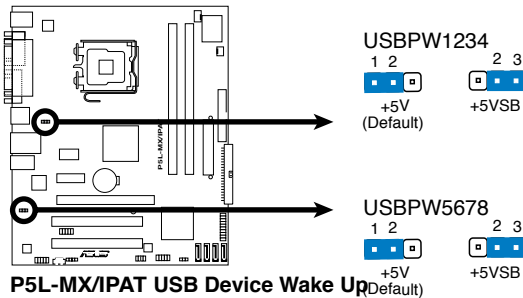
P5L-MX/IPAT USB Device Wake Up

- • The USB device wake-up feature requires a power supply that can provide 500 mA on the +5VSB lead for each USB port; otherwise, the system would not power up.

- • The total current consumed must NOT exceed the power supply capability (+5VSB) whether under normal condition or in sleep mode.

1.10   Connectors

1.10.1 Rear panel connectors
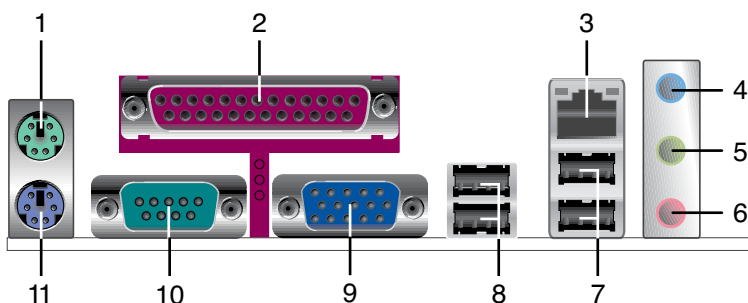
1. **PS/2 mouse port (green).** This port is for a PS/2 mouse.
2. **Parallel port.** This 25-pin port connects a parallel printer, a scanner, or other devices.
3. **LAN (RJ-45) port.** This port allows Gigabit connection to a Local Area Network (LAN) through a network hub. Refer to the table below for the LAN port LED indications.

LAN port LED indications

ACT/LINK LED		SPEED LED	
Status	Description	Status	Description
OFF	No link	OFF	10 Mbps connection
YELLOW (blinking)	Data activity	ORANGE	100 Mbps connection
YELLOW (no blinking)	Linked	GREEN	1 Gbps connection

ACT/LINK SPEED
   LED   LED

LAN port
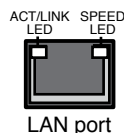
4. **Line In port (light blue).** This port connects the tape, CD, DVD player, or other audio sources.
5. **Line Out port (lime).** This port connects a headphone or a speaker. In 4-channel, 6-channel, and 8-channel configuration, the function of this port becomes Front Speaker Out.
6. **Microphone port (pink).** This port connects a microphone.

Refer to the audio configuration table on the next page for the function of the audio ports in 2, 4, or 6-channel configuration.

Audio 2, 4, or 6-channel configuration

Port	Headset 2-channel	4-channel	6-channel
Light Blue	Line In	Rear Speaker Out	Rear Speaker Out
Lime	Line Out	Front Speaker Out	Front Speaker Out
Pink	Mic In	Mic In	Bass/Center

7. **USB 2.0 ports 1 and 2.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

8. **USB 2.0 ports 3 and 4.** These two 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.

9. **VGA port.** This port is for a VGA monitor or other VGA-compatible devices.

10. **Serial port.** This port connects a mouse, modem, or other devices that conform with serial specification.

11. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

1.10.2 Internal connectors

1. Floppy disk drive connector (34-1 pin FLOPPY)

This connector is for the provided floppy disk drive (FDD) signal cable. Insert one end of the cable to this connector, then connect the other end to the signal connector at the back of the floppy disk drive.

Pin 5 on the connector is removed to prevent incorrect cable connection when using an FDD cable with a covered Pin 5.

FLOPPY

PIN 1

NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.
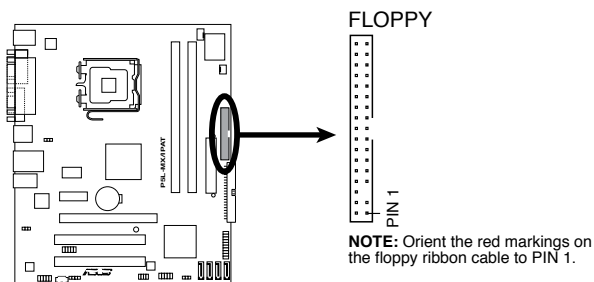
P5L-MX/IPAT Floppy Disk Drive Connector

2. IDE connectors (40-1 pin PRI_IDE)

The onboard IDE connectors are for Ultra DMA 133/100/66 signal cables. There are three connectors on each Ultra DMA 133/100/66 signal cable: blue, black, and gray. Connect the blue connector to the motherboard's IDE connector, then select one of the following modes to configure your device(s).
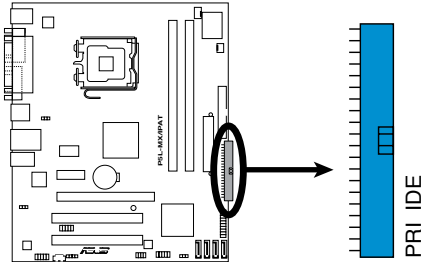
P5L-MX/IPAT IDE Connector

	Drive jumper setting	Mode of device(s)	Cable connector
Single device	Cable-Select or Master	-	Black
Two devices	Cable-Select	Master	Black
		Slave	Gray
	Master	Master	Black or gray
	Slave	Slave	

- Pin 20 on the IDE connector is removed to match the covered hole on the Ultra DMA cable connector. This prevents incorrect insertion when you connect the IDE cable.

- Use the 80-conductor IDE cable for Ultra DMA 133/100/66 IDE devices.

If any device jumper is set as "Cable-Select," make sure all other device jumpers have the same setting.

3. Serial ATA connectors
(7-pin SATA1, SATA2, SATA3, SATA4)

These connectors are for the Serial ATA signal cables for Serial ATA hard disk drives.

SATA1 SATA2 SATA3 SATA4

GND   GND   GND   GND
RSATA_RXN1   RSATA_RXN2   RSATA_RXN3   RSATA_RXN4
RSATA_RXP1   RSATA_RXP2   RSATA_RXP3   RSATA_RXP4
GND   GND   GND   GND
RSATA_TXN1   RSATA_TXN2   RSATA_TXN3   RSATA_TXN4
RSATA_TXP1   RSATA_TXP2   RSATA_TXP3   RSATA_TXP4
GND   GND   GND   GND

P5L-MX/IPAT SATA Connectors
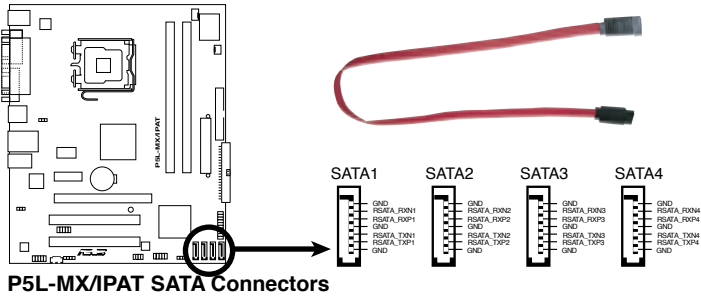
When using the connectors in Standard IDE mode, connect the primary (boot) hard disk drive to the SATA1/2 connector. Refer to the table below for the recommended SATA hard disk drive connections.

Serial ATA hard disk drive connection

Connector	Color	Setting	Use
SATA1/2	Red	Master	Boot disk
SATA3/4	Black	Slave	Data Disk

right angle side

Connect the right-angle side of SATA signal cable to SATA device. Or you may connect the right-angle side of SATA cable to the onboard SATA port to avoid mechanical conflict with huge graphics cards.
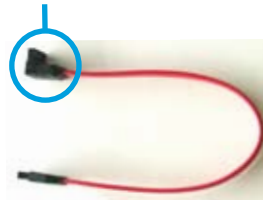
4. **CPU, Power and Chassis fan connectors (4-pin CPU_FAN, 3-pin PWR_FAN (optional), 3-pin CHA_FAN)**

The fan connectors support cooling fans of 350mA~2000mA (24W max.) or a total of 1A~7A (84W max.) at +12V. Connect the fan cables to the fan connectors on the motherboard, making sure 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.

CPU_FAN

CPU FAN PWM
CPU FAN IN
CPU FAN PWR
GND

CHA_FAN

GND
+12V
Rotation

P5L-MX/IPAT

P5L-MX/IPAT Fan Connectors
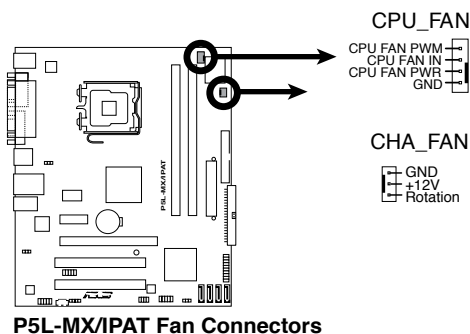
5. **Digital Audio connector (4-1 pin SPDIF_OUT)**

This connector is for the S/PDIF audio module to allow digital sound output. Connect one end of the S/PDIF audio cable to this connector and the other end to the S/PDIF module.

P5L-MX/IPAT

+5V
SPDIFOUT
GND

SPDIF_OUT

P5L-MX/IPAT CPU Digital Audio Connector
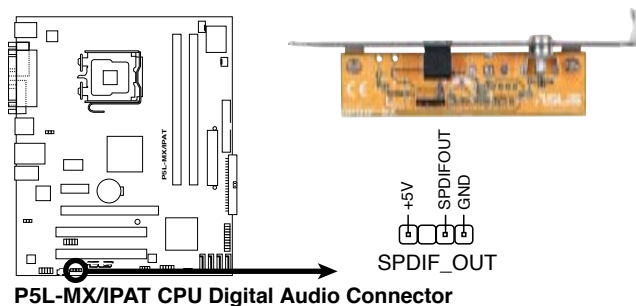
> The S/PDIF out module is purchased separately.

6. ATX power connectors (24-pin EATXPWR and 4-pin ATX12V)

These connectors are for 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 4-pin ATX +12 V power plug; otherwise, the system will not boot.

- 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.

- Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. See the table below for details.

EATX12V   EATXPWR

+12V DC —— +12V DC   +3 Volts —— Ground
GND —— GND   +12 Volts —— +5 Volts
                            +12 Volts —— +5 Volts
                            +5V Standby —— +5 Volts
                            Power OK —— -5 Volts
                            Ground —— Ground
                            +5 Volts —— Ground
                            Ground —— Ground
                            +5 Volts —— PSON#
                            Ground —— Ground
                            +3 Volts —— -12 Volts
P5L-MX/IPAT ATX Power Connector   +3 Volts —— +3 Volts
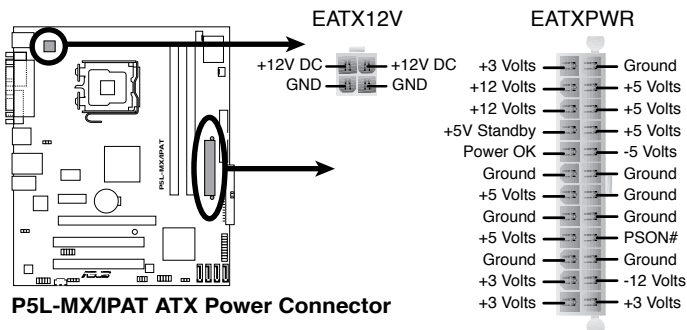
7. Optical drive audio connector (4-pin CD)

This connector is for the 4-pin audio cable that connects to the audio connector at the back of the optical drive.

P5L-MX/IPAT Internal Audio Connector
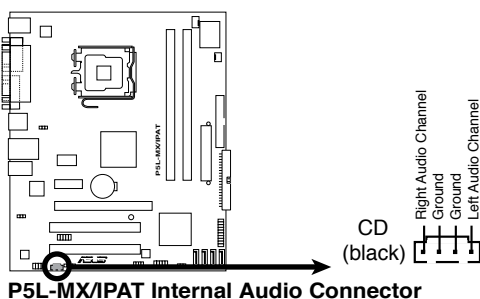
> Enable the CD-IN function in the audio utility when using this connector.

8. USB connectors (10-1 pin USB56, USB78)

These connectors are for USB 2.0 ports. Connect the optional USB module cable to any of these connectors, then install the module 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.

P5L-MX/IPAT USB 2.0 Connectors
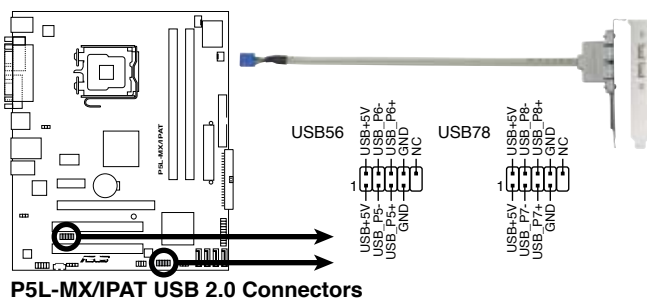
> Never connect a 1394 cable to the USB connectors. Doing so will damage the motherboard!

9. 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.

P5L-MX/IPAT Front Panel Audio Connector
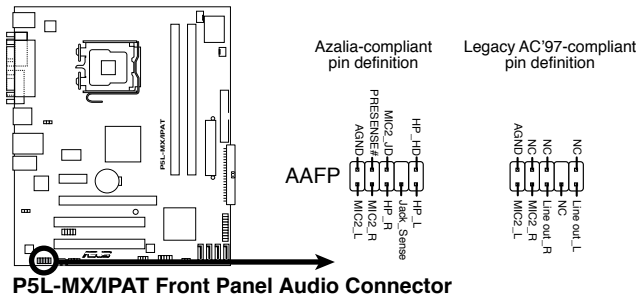
It is recommended that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

10. System panel connector (10-1 pin F_PANEL)

This connector supports several chassis-mounted functions.

PANEL

* Requires an ATX power supply
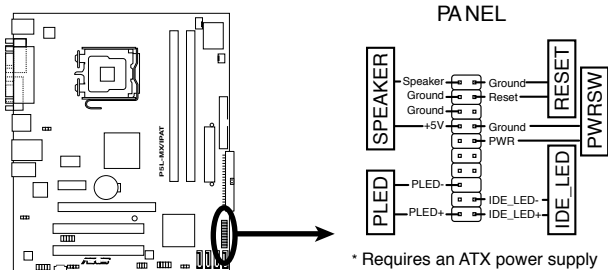
P5L-MX/IPAT System Panel Connector

- **System power LED (2-pin PLED)**

  This 2-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.

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

  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.

- **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.

- **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.

- **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.

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

2

2.1 Managing and updating your BIOS

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

1. **ASUS AFUDOS** (Updates the BIOS in DOS mode using a bootable floppy disk.)
2. **ASUS AFUWIN** (Updates the BIOS in Windows® environment.)

Refer to the corresponding sections for details on these utilities.

> Save a copy of the original motherboard BIOS file to a bootable floppy disk in case you need to restore the BIOS in the future. Copy the original motherboard BIOS using the AFUDOS utility.

2.1.1 Creating a bootable floppy disk

1. Do either one of the following to create a bootable floppy disk.
    DOS environment

    a. Insert a 1.44MB floppy disk into the drive.

    b. At the DOS prompt, type `format` **A:/S** then press <Enter>.
    Windows® XP environment

    a. Insert a 1.44 MB floppy disk to the floppy disk drive.

    b. Click **Start** from the Windows® desktop, then select **My Computer**.

    c. Select the 3 1/2 Floppy Drive icon.

    d. Click **File** from the menu, then select **Format**. A **Format 3 1/2 Floppy Disk** window appears.

    e. Select **Create an MS-DOS startup disk** from the format options field, then click **Start.**
    Windows® 2000 environment

    To create a set of boot disks for Windows® 2000:

    a. Insert a formatted, high density 1.44 MB floppy disk into the drive.

    b. Insert the Windows® 2000 CD to the optical drive.

    c. Click **Start,** then select **Run.**

    d. From the Open field, type

    D:\bootdisk\makeboot a:

    assuming that D: is your optical drive.

    e. Press <Enter>, then follow screen instructions to continue.

2. Copy the original or the latest motherboard BIOS file to the bootable floppy disk.

2.1.2 AFUDOS utility

The AFUDOS utility allows you to update the BIOS file in DOS environment using a bootable floppy disk with the updated BIOS file. This utility also allows you to copy the current BIOS file that you can use as backup when the BIOS fails or gets corrupted during the updating process.

Copying the current BIOS

To copy the current BIOS file using the AFUDOS utility:

- • Make sure that the floppy disk is not write-protected and has at least 1024KB free space to save the file.

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

---

1. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.

2. Boot the system in DOS mode, then at the prompt type:

    afudos /o[filename]

    where the [filename] is any user-assigned filename not more than eight alphanumeric characters for the main filename and three alphanumeric characters for the extension name.

    ```
    A:\>afudos /oOLDBIOS1.rom
    ```

    Main filename   Extension name

3. Press <Enter>. The utility copies the current BIOS file to the floppy disk.

    ```
    A:\>afudos /oOLDBIOS1.rom
    AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
    Copyright (C) 2002 American Megatrends, Inc. All rights reserved.
        Reading flash ..... done
        Write to file...... ok
    A:\>
    ```

    The utility returns to the DOS prompt after copying the current BIOS file.

Updating the BIOS file

To update the BIOS file using the AFUDOS utility:

1. Visit the ASUS website (www.asus.com) and download the latest BIOS file for the motherboard. Save the BIOS file to a bootable floppy disk.

    Write the BIOS filename on a piece of paper. You need to type the exact BIOS filename at the DOS prompt.

2. Copy the AFUDOS utility (afudos.exe) from the motherboard support CD to the bootable floppy disk you created earlier.

3. Boot the system in DOS mode, then at the prompt type:

    afudos /i[filename]

    where [filename] is the latest or the original BIOS file on the bootable floppy disk.

    ```
    A:\>afudos /iP5L-MXIP.ROM
    ```

4. The utility verifies the file and starts updating the BIOS.

    ```
    A:\>afudos /iP5L-MXIP.ROM
    AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
    Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

        WARNING!! Do not turn off power during flash BIOS
        Reading file ....... done
        Reading flash ...... done

        Advance Check ......
        Erasing flash ...... done
        Writing flash ...... 0x0008CC00 (9%)
    ```

    Do not shut down or reset the system while updating the BIOS to prevent system boot failure!

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

    ```
    A:\>afudos /iP5L-MXIP.ROM
    AMI Firmware Update Utility - Version 1.19(ASUS V2.07(03.11.24BB))
    Copyright (C) 2002 American Megatrends, Inc. All rights reserved.

        WARNING!! Do not turn off power during flash BIOS
        Reading file ....... done
        Reading flash ...... done

        Advance Check ......
        Erasing flash ...... done
        Writing flash ...... done
        Verifying flash .... done

        Please restart your computer

    A:\>
    ```

2.1.3 AFUWIN utility

The AFUWIN utility allows you to update the BIOS file in a Windows®
environment.

To update the BIOS using AFUWIN:

1. Download the latest BIOS file for your motherboard from the ASUS
    website (www.asus.com) and save the BIOS file to a new folder.

    Write the BIOS filename on a piece of paper. You need to type the exact
    BIOS filename at the DOS prompt later.

2. Copy the AFUWIN utilities (Afwin.exe and AMIFLDrv.sys) from the
    motherboard support CD to the folder with the downloaded BIOS file.
3. Click **Start > Programs > Accessories > Command Prompt** to run the
    DOS command promt. You can also click **Start > RUN,** then type `cmd`
    at the prompt.
4. From the command prompt, change the directory to the folder with
    the BIOS file and AFUWIN utilities, then type:

    afuwin /i[BIOS filename]

    ```
    C:\BIOS>afuwin /iP5L-MXIP.ROM
    ```

    The utility verifies the file and starts updating the BIOS.

    Do not shut down or reset the system while updating the BIOS to
    prevent system boot failure!

5. The utility returns to the command prompt after the BIOS update
    process is completed. Type `Exit` to return to Windows.

    ```
    C:\BIOS>afuwin /iP5L-MXIP.ROM
    AMI Firmware Update Utility for APTIO - Version 2.09 ASUS 0.03
    Copyright (C) 2004 American Megatrends, Inc. All rights reserved.

        BIOS Version 0272<11.24>      Image Version 0273<11.25>

        Reading file ....... done
        Erasing flash ...... done
        Writing flash ...... done
        Verifying flash .... done
        Erasing BootBlock...done
        Writing BootBlock...done
        Verifying BootBlock...done

    C:\BIOS>
    ```

6. Restart your computer.

2.2 BIOS setup program

This motherboard supports a programmable firmware chip that you can update using the provided utility described in section "2.1 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 SPI chip.

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

If you wish to enter Setup after POST, reboot the system by doing any of the following procedures:

- **Restart using the OS standard shut-down procedure.**
- **Press <Ctrl>+<Alt>+<Del> simultaneously.**
- **Press the reset button on the system chassis.**
- **Press the power button to turn the system off then back on.**

> Using the **power button**, **reset button**, or the **<Ctrl>+<Alt>+<Del>** keys to force reset from a running operating system can cause damage to your data or system. We recommend to always shut-down the system properly from the operating system.

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 "2.8 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.

2.2.1 BIOS menu screen

Menu items   Menu bar   Configuration fields   General help


```
        Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
     Main  Advanced  Chipset  Boot  Security  Save & Exit

    On Board LAN Configuration                          Enable or Disable Onboard
    On Board LAN Chip              [Enabled]             LAN Chip.
     S5 WOL                        [Enabled]
     On Board LAN Boot ROM         [Disabled]

    Power On By PS/2 Keyboard      [Disabled]
    Power On By PS/2 Mouse         [Disabled]
    Power On By External Modems    [Disabled]

  ▶ ACPI Settings
  ▶ CPU Configuration
  ▶ IDE Configuration                               ><: Select Screen
  ▶ Super IO Configuration                          ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F3: Optimized Defaults
                                                    F10: Save  ESC: Exit

              Version 1.18 1083 Copyright (C) 2006 American Megatrends, Inc.
```

Sub-menu items   Navigation keys

2.2.2 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

Chipset   For changing the chipset configuration

Boot   For changing the system boot configuration

Security   For changing the system security settings.

Save & 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.

2.2.3 Navigation keys

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

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

2.2.4　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, Chipset, Boot, Security, and Save & Exit) on the menu bar have their respective menu items.
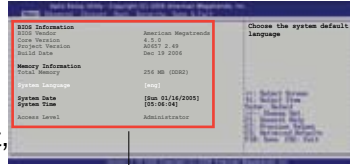
Main menu items

2.2.5　Sub-menu items

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

2.2.6　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 "2.2.7 Pop-up window."

2.2.7　Pop-up window

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

2.2.8　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.
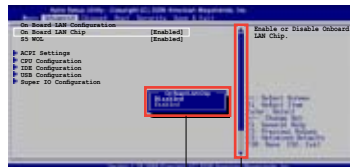
Pop-up window

2.2.9　General help

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

Scroll bar

2.3   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 "2.2.1   BIOS menu screen" for information on the menu
> screen items and how to navigate through them.

```
          Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
   Main  Advanced  Chipset  Boot  Security  Save & Exit

   BIOS Information                                    Choose the system default
   BIOS Vendor               American Megatrends       language
   Core Version              4.5.0
   Project Version           A0657 2.49
   Build Date                Dec 19 2006

   Memory Information
   Total Memory              256 MB (DDR2)

   System Language           [eng]
                                                       ><: Select Screen
   System Date               [Sun 01/16/2005]          ↑↓: Select Item
   System Time               [05:06:04]                Enter: Select
                                                       +/-: Change Opt.
   Access Level              Administrator             F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F10: Save  ESC: Exit

          Version 1.18.1083 Copyright (C) 2006 American Megatrends, Inc.
```

2.3.1   BIOS Information

Displays the auto-detected BIOS information

2.3.2   Memory Information

Displays the auto-detected system memory

2.3.3   System Language [eng]

Allows you to choose the system default langauge. Configuration options:
[eng] [chi]

2.3.4   System Date [Day xx/xx/xxxx]

Allows you to set the system date.

2.3.5   System Time [xx:xx:xx]

Allows you to set the system time.

2.4   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.

```
              Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
        Main  Advanced  Chipset  Boot  Security  Save & Exit

        On Board LAN Configuration                       Enable or Disable Onboard
        On Board LAN Chip              [Enabled]         LAN Chip.
         S5 WOL                        [Enabled]
         On Board LAN Boot ROM         [Disabled]

        Power On By PS/2 Keyboard      [Disabled]
        Power On By PS/2 Mouse         [Disabled]
        Power On By External Modems    [Disabled]

      ▶ ACPI Settings                                    ><: Select Screen
      ▶ CPU Configuration                                ↑↓: Select Item
      ▶ IDE Configuration                                Enter: Select
      ▶ Super IO Configuration                           +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F3: Optimized Defaults
                                                         F10: Save  ESC: Exit

              Version 1.18.1063 Copyright (C) 2006 American Megatrends, Inc.
```

2.4.1   On Board LAN Chip [Enabled]

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

2.4.2   S5 WOL [Enabled]

Allows you to enable or disable the LAN S5 wake up.
Configuration options: [Enabled] [Disabled]

2.4.3   On Board LAN Boot ROM [Disabled]

Allows you to enable or disable the onboard LAN Boot ROM.
Configuration options: [Enabled] [Disabled]

2.4.4   Power On By PS/2 Keyboard [Disabled]

Allows you to use specific keys on the 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]

2.4.5 Power On By PS/2 Mouse [Disabled]

When set to [Enabled], this parameter allows you to use the PS/2 mouse to turn on the system. This feature requires an ATX power supply that provides at least 1A on the +5VSB lead. Configuration options: [Disabled] [Enabled]

2.4.6 Power On By External Modems [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call while the computer is in Soft-off mode. Configuration options: [Disabled] [Enabled]

2.4.7 ACPI Settings

The items in this menu allows you to change the settings for the Advanced Configuration and Power Interface (ACPI). Select an item then press <Enter> to display the configuration options.

```
              Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
              Advanced

  Enable ACPI Auto Configuration        [Disabled]          Enable or Disable BIOS
                                                            ACPI Auto Configuration.
  ACPI Sleep State                      [S3(suspend to RAM)]
```
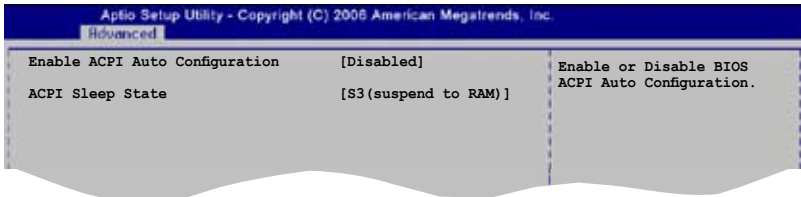
Enable ACPI Auto Configuration [Disabled]

Allows you to enable or disable the ACPI auto configuration.
Configuration options: [Enabled] [Disabled]

The following items appear only when the Enable ACPI Auto Configuration item is set to disabled.

ACPI Sleep State [S3(Suspend to RAM)]

Allows you to select the highest ACPI sleep state the system would enter when the SUSPEND button is pressed.
Configuration options: [Suspend Disabled] [S1(CPU Stop Clock]
[S3(Suspend to RAM)]

2.4.8 CPU Configuration

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

```
Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
Advanced

CPU Configuration                                      Enabled for Windows
                                                       XP and Linux(OS
Processor Type        Intel(R) Celeron(R)CPU 2         optimized for Hyper-
Processor Speed       2665 MHz                         Threading Technology)and
System Bus Speed      533 MHz                          Disabled for other
Processor Stepping    f49                              OS(OS not optimized
Microcode Revision    3                                for Hyper-Threading
Processor Core        Single                           Technology).
Hyper-Threading       Not Supported

Hyper-Threading       [Enabled]                        ><: Select Screen
Enhanced Debug        [Disabled]                       ↑↓: Select Item
Limit CPUID Maximum   [Disabled]                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F10: Save  ESC: Exit

Version 1.18.1083 Copyright (C) 2006 American Megatrends, Inc.
```

Hyper-Threading [Enabled]

Allows you to enable or disable the Hyper-Threading feature. Sets it to enabled when you use a OS optimized for Hyper-Threading technology, such as Windows XP, Linux, or later version.
Configuration options: [Enabled] [Disabled]

Enhanced Debug [Disabled]

Allows you to enable or disable the enhanced debug function. Sets it to disabled for normal system operation, and sets it to enabled for test environments. Configuration options: [Disabled] [Enabled]

Limit CPUID Maximum [Disabled]

Enable this item to boot legacy operating systems that cannot support CPUs with extended CPUID functions.
Configuration options: [Disabled] [Enabled]

2.4.9   IDE 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.

```
               Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
     Advanced

     IDE Configuration                                    Enable/Disable IDE
                                                          Controller
     PATA Master                  Not Present
     PATA Slave                   Not Present

     SATA Port1                   Not Present
     SATA Port2                   Not Present
     SATA Port3                   Not Present
     SATA Port4                   Not Present

                                                          ><: Select Screen
                                                          ↑↓: Select Item
     IDE Controller               [Enabled]               Enter: Select
     IDE mode                     [PATA-Primary,SATA-...] +/-: Change Opt.
                                                          F1: General Help
     Serial-ATA Port1             [Enabled]               F2: Previous Values
     Serial-ATA Port2             [Enabled]               F3: Optimized Defaults
     Serial-ATA Port3             [Enabled]               F10: Save  ESC: Exit
     Serial-ATA Port4             [Enabled]

               Version 1.16.1083 Copyright (C) 2006 American Megatrends, Inc.
```

IDE Controller [Enabled]

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

IDE Mode [PATA-Primary, SATA-...]

Allows you to select the IDE mode.Configuration options: [SATA only-Primary/Secondary (Non-combined, Legacy)] [SATA-Primary, PATA-Secondary (combined, Legacy)] [PATA-Primary, SATA-Secondary (Combined, Legacy)] [PATA only-Primary (Non-combined, Legacy)] [PATA-Primary, SATA-Ports 1,2,3,4 (Non-combined, PATA-Legacy)]

Serial-ATA Port1/2/3/4 [Enabled]

Allows you to disable or enable the Serial-ATA devices. Configuration options: [Disabled] [Enabled]

2.4.10 Super IO Configuration

The items in this menu allow you to set or change the configurations for super IO devices. Select an item then press <Enter> to display the configuration options.

```
Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
Advanced

Super IO Configuration                          Set Parameters of
                                                Floppy Disk Controller
Super IO Chip              Winbond W83627        (FDC)

▶ Floopy Disk Controller Configuration
▶ Serial Port Configuration
▶ Parallel Port Controller Configuration


                                                ><: Select Screen
```

Floppy Disk Controller Configuration

```
Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
Advanced

Floopy Disk Controller Configuration            Enable or Disable
                                                Floppy Disk Controller
Floopy Disk Controller       [Enabled]
Device Settings              Reset Required

Change Settings              [Auto]
Device Mode                  [Read Write]
```

Floppy Disk Controller [Enabled]
Allows you to enable or disable the floppy disk controller.
Configuration options: [Disabled] [Enabled]

Change Settings [Auto]
Allows you to select an optimal settings for the super IO device.
Configuration options: [Auto] [IO=3F0h; IRQ=6; DMA=2]
[IO=3F0h; IRQ=3, 4, 5, 6, 7, 10, 12; DMA=1, 2, 3;]

Device Mode [Read Write]
Allows you to set the mode of floppy disk controller. Selects Read Write mode for normal operation. Selects Write Protect mode for read only operation. Configuration options: [Read Write] [Write Protect]

Serial Port Configuration

```
           Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
            Advanced

    Serial Port Configuration                              Enable or Disable
                                                           Serial Port(COM)
    Serial Port                    [Enabled]
    Device Settings                IO=3F8h; IRQ=4;

    Change Settings                [Auto]
    Device Mode                    [Normal]
```

Serial Port [Enabled]
Allows you to enable or disable the Serial Port (COM).
Configuration options: [Disabled] [Enabled]

Change Settings [Auto]
Allows you to select an optimal settings for the super IO device.
Configuration options: [Auto] [IO=3F8h; IRQ=4;] [IO=3F8h; IRQ=3,
4, 5, 6, 7, 10, 11,12;] [IO=2F8h; IRQ=3, 4, 5, 6, 7, 10, 11,12;]
[IO=3E8h; IRQ=3, 4, 5, 6, 7, 10, 11,12;] [IO=2E8h; IRQ=3, 4, 5, 6, 7,
10, 11,12;]

Device Mode [Normal]

Allows you to set the mode of Serial Port.
Configuration options: [Normal] [High Speed]

Parallel Port Configuration

```
           Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
            Advanced

    Parallel Port Configuration                            Enable or Disable
                                                           Parallel Port(LPT/
    Parallel Port                  [Enabled]               LPTE)
    Device Settings                IO=378h; IRQ=5;

    Change Settings                [Auto]
    Device Mode                    [STD Printer Mode]
```

Parallel Port [Enabled]
Allows you to enable or disable the Parallel Port (LPT/LPTE).
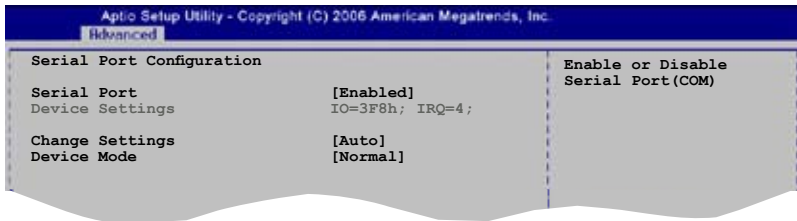Configuration options: [Disabled] [Enabled]

Change Settings [Auto]
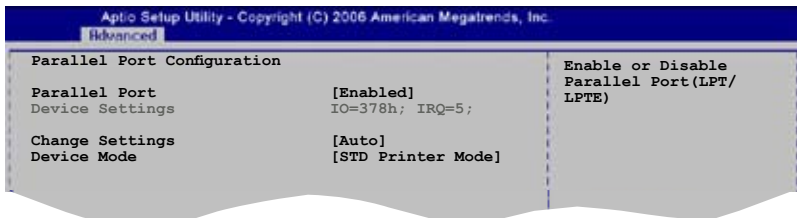Allows you to select an optimal settings for the super IO device.
Configuration options: [Auto] [IO=378h; IRQ=5;] [IO=378h; IRQ=5, 6,
7, 10, 11,12;] [IO=278h; IRQ=5, 6, 7, 10, 11,12;] [IO=3BCh; IRQ=5,
6, 7, 10, 11,12;]

Device Mode [STD Printer Mode]

Allows you to set the mode of Printer Port.
Configuration options: [STD Printer Mode] [SPP Mode] [EPP-1.9 and
SPP Mode] [EPP-1.7 and SPP Mode] [ECP Mode] [ECP and EPP 1.9
Mode] [ECP and EPP 1.7 Mode]

2.5   Chipset menu

The Advanced menu items allow you to change the advanced chipset
settings.

```
        Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
        Main  Advanced  Chipset  Boot  Security  Save & Exit it

   ▶ North Bridge                               North Bridge
   ▶ South Bridge                               Parameters
   ▶ Legacy USB Configuration
```

2.5.1   North Bridge

```
        Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
                      Chipset

   Memory Information                           Select DVMT Size; This
                                                option is no function
   Total Memory                256 MB (DDR2)    when a VGA Card is
                                                Installed
   Memory Slot0                256 MB
   Memory Slot2                Not Present
   DVMT Size                   [Auto]
   Boot Graphic Adapter Priority   [PCIE->PCI->IGD]
```

DVMT Size [128M]

Allows you to select the DVMT size. This option is not functional when a
VGA card is installed. Configuration options: [Auto] [32M] [64M] [128M]

Boot Graphic Adapter Priority [PCIE->PCI->IGD]

Allows you to select the graphics controller as the primary boot device.
Configuration options: [PCIE->PCI->IGD] [IGD->PCIE->PCI] [PCI->PCIE->IGD]

2.5.2 South Bridge

Azalia HD Audio [Enabled]

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

All USB Ports [Enabled]

Allows you to enable or disable all USB
Configuration options: [Enabled] [Disabled]

USB 2.0(EHCI) Support [Enabled]

Allows you to enable USB 2.0 (EHCI) support.
Configuration options: [Enabled]

2.5.3 Legacy USB Configuration

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

```
        Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
        Advanced

   USB Configuration

   Module Version              08.06.05

   USB Devices:
      None

   Legacy USB Support          [Auto]
   Device Reset timeout        [20 sec]

                                                  ><: Select Screen
```
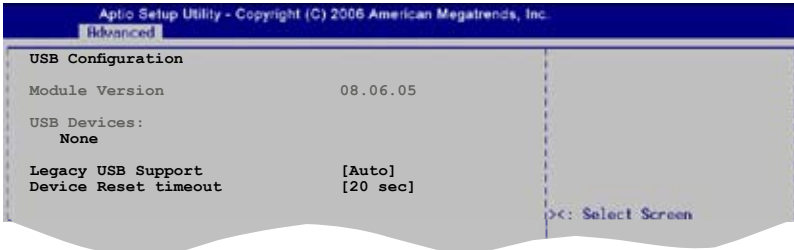
The Module Version and USB Devices Enabled items show the auto-detected values. If no USB device is detected, the item shows None.

Legacy USB Support [Auto]

Allows you to enable or disable support for USB devices on legacy operating systems (OS). 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]

Device Reset timeout [20 sec]

Allows you to set the USB mass storage device start unit command timeout. Configuration options: [10 sec] [20 sec] [30 sec] [40 sec]

2.6   Boot menu

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

```
         Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
           Main  Advanced  Chipset  Boot  Security  Save & Exit

      Boot Configuration                                  Enable/Disable Quiet
      Quiet Boot                      [Disabled]          Boot option
      Fast Boot                       [Disabled]
      Boot to Linux                   [Disabled]
      Setup Prompt Timeout            3

      Boot Option Priorities

                                                          ><: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F10: Save  ESC: Exit

              Version 1.16.1083 Copyright (C) 2006 American Megatrends, Inc.
```

2.6.1   Quiet Boot [Disabled]

Allows you to enable or disable the quiet boot function.
Configuration options: [Enabled] [Disabled]

2.6.2   Fast Boot [Disabled]

Allows you to enable or disable the fast boot function.
Configuration options: [Enabled] [Disabled]

2.6.3   Boot to Linux [Disabled]

Enable this item to patch some Kernel of Linux.
Configuration options: [Enabled] [Disabled]

2.6.4   Setup Prompt Timeout [3]

Allows you to set the time to wait for setup activation key. Type the desired number of seconds using the numeric keypad. The values range from 0 to 65535. 0 Means no waiting, while 65535 means indefinite waiting.

✎   We do not recommend you to set the setup prompt timeout to 0.

2.7   Security

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

2.7.1   Setup Administrator Password

Select this item to set or change the Administrator password. No password is installed by default.

To set a Administrator Password:

1.   Select the Setup Administrator Password item and press <Enter>.
2.   From the password box, type a password composed of letters and/or numbers, then press <Enter>.
3.   Confirm the password when prompted.

To change the administrator password, select the Setup Administrator Password then press <Enter>. Type the current password then press <Enter>. Follow the steps of setting a administrator password from 2 to 3.

To clear the administrator password, select the Setup Administrator Password then press <Enter>. Type the current password then press <Enter>. Type <Enter> when prompted.

2.7.2 User Password

Select this item to set or change the user password. No password is installed by default.

To set a User Password:

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

To change the user password, select the User Password then press <Enter>. Type the current password then press <Enter>. Follow the steps of setting a user password from 2 to 3.

To clear the user password, select the User Password then press <Enter>. Type the current password then press <Enter>. Type <Enter> when prompted.

2.8   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.

```
          Aptio Setup Utility - Copyright (C) 2006 American Megatrends, Inc.
          Main   Advanced   Chipset   Boot   Security   Save & Exit

   Save Changes and Reset                              Exit system setup
   Discard Changes and Reset                           after saving the
                                                       changes.
   Save Options
   Save Changes
   Discard Changes

   Restore Defaults

   Boot Override
                                                       ><: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F10: Save  ESC: Exit

                Version 1.18.1083 Copyright (C) 2005 American Megatrends, Inc.
```

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

Save Changes and Reset

This option allows you to save the changes that you made to the Setup
program and reset the system. After selecting this option, a confirmation
appears. When you select this option, a confirmation window appears.
Select Ok to save changes and reset.

Discard Changes and Reset

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

Save Changes

This option allows you to save all the changes you made so far. After
selecting this option, a confirmation appears. Select Ok to save the
changes.

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 Ok to discard any changes and load the previously saved values.

Restore 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 <F3>, a confirmation window appears. Select Ok to load default values. Select Save Changes and Exit or make other changes before saving the values to the non-volatile RAM.

This chapter describes the contents
of the support CD that comes with
the motherboard package.

Software

support 3

3.1 Installing an operating system

This motherboard supports Windows® 2000/XP/2003 Server operating systems (OS). Always install the latest OS version and corresponding updates to maximize the features of your hardware.

> • Motherboard settings and hardware options vary. Use the setup procedures presented in this chapter for reference only. Refer to your OS documentation for detailed information.
>
> • Make sure that you install Windows® 2000 Service Pack 4 or the Windows® XP Service Pack 1 or later versions before installing the drivers for better compatibility and system stability.
>
> • Intel® Platform Administration Technology (IPAT) application programs are included in an IPAT SCD that came with the motherboard package. Check the IPAT SCD for details.

3.2 Support CD information

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

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

3.2.1 Running the support CD

Place the support CD to the optical drive. The CD automatically displays the Drivers menu if Autorun is enabled in your computer.

Click an icon to display support CD/motherboard information

Click an item to install

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

3.2.2 Drivers menu

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

Intel(R) Chipset Inf Update Program

This item installs the Intel® Chipset INF Update Program. This driver enables Plug-n-Play INF support for the Intel® chipset components on the motherboard. When installed to the target system, this driver provides the method for configuring the chipset components.

You can install this utility using three different modes: interactive, silent, or unattended preload. Installing the driver in interactive mode requires user input during installation. User input is not required when installing the driver in silent or unattended preload modes. Refer to the online help or readme file that came with the utility for details.

Intel(R) Graphics Accelerator Driver

Installs the Intel® Graphics Accelerator driver.

SoundMAX ADI1986A Audio Driver

Installs the SoundMAX ADI1986A high-definition audio driver and application.

Attansic L1 Gigabit Ethernet Driver

Installs the Attansic L1 Gigabit Ethernet driver.

USB 2.0 Driver

Installs the USB 2.0 driver.

3.2.3 Utilities menu

The Utilities menu shows the applications and other software that the motherboard supports.

ASUS Screen Saver

Bring life to your computer screen by installing the ASUS screen saver.

ADOBE Acrobat Reader V7.0

Installs the Adobe® Acrobat® Reader that allows you to open, view, and print documents in Portable Document Format (PDF).

Microsoft DirectX 9.0c

Installs the Microsoft® DirectX 9.0c driver. The Microsoft DirectX® 9.0c is a multimedia technology that enhances computer graphics and sound. DirectX® improves the multimedia features of you computer so you can enjoy watching TV and movies, capturing videos, or playing games in your computer. Visit the Microsoft website (www.microsoft.com) for updates.

Anti-virus Utility

The anti-virus utility scans, identifies, and removes computer viruses. View the online help for detailed information.

3.2.4 Manuals menu

The Manuals menu contains a list of supplementary user manuals. Click an item to open the folder of the user manual.

Most user manual files are in Portable Document Format (PDF). Install the Adobe® Acrobat® Reader from the Utilities menu before opening a user manual file.

3.2.5 ASUS 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.

The Appendix describes the CPU
features that the motherboard
supports.

CPU features

A.1   Intel® EM64T

- The motherboard is fully compatible with Intel® Pentium® 4 LGA775 processors running on 32-bit operating systems.

- The motherboard comes with a BIOS file that supports EM64T. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS file. See Chapter 2 for details.

- Visit www.intel.com for more information on the EM64T feature.

- Visit www.microsoft.com for more information on Windows® 64-bit OS.

Using the Intel® EM64T feature

To use the Intel® EM64T feature:

1.   Install an Intel® Pentium® 4 CPU that supports the Intel® EM64T.

2.   Install a 64-bit operating system (Windows® XP Professional x64 Edition or Windows® Server 2003 x64 Edition).

3.   Install the 64-bit drivers for the motherboard components and devices from the support CD.

4.   Install the 64-bit drivers for expansion cards or add-on devices, if any.

> Refer to the expansion card or add-on device(s) documentation, or visit the related website, to verify if the card/device supports a 64-bit system.

A.2   Enhanced Intel SpeedStep® Technology (EIST)

- The motherboard comes with a BIOS file that supports EIST. You can download the latest BIOS file from the ASUS website (www.asus.com/support/download/) if you need to update the BIOS. See Chapter 2 for details.

- Visit www.intel.com for more information on the EIST feature.

A.2.1   System requirements

Before using EIST, check your system if it meets the following requirements:

- Intel® Pentium® 4 processor with EIST support

- BIOS file with EIST support

- Operating system with EIST support (Windows® XP SP2/Windows® Server 2003 SP1/Linux 2.6 kernel or later versions)

A.2.2 Using the EIST

To use the EIST feature:

1. Turn on the computer, then enter the BIOS Setup.
2. Go to the Advanced Menu, highlight CPU Configuration, then press <Enter>.
3. Set the Intel(R) SpeedStep Technology item to [Automatic], then press <Enter>. See page 2-24 for details.
4. Press <F10> to save your changes and exit the BIOS setup.
5. After the computer restarts, right click on a blank space on the desktop, then select Properties from the pop-up menu.

6. When the Display Properties window appears, click the Screen Saver tab.
7. Click the Power button on the Monitor power section to open the Power Options Properties window.
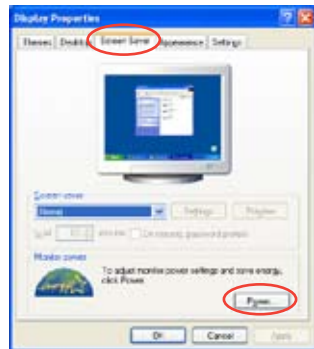
8. On the Power schemes section, click , then select any option except Home/Office Desktop or Always On.
9. Click Apply, then click OK.
10. Close the Display Properties window.

    After you adjust the power scheme, the CPU internal frequency slightly decreases when the CPU loading is low.
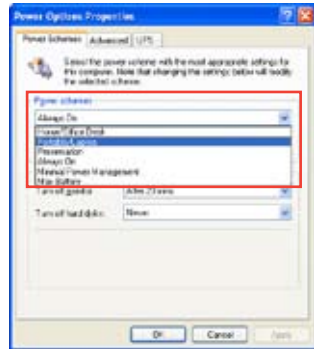
The screen displays and procedures may vary depending on the operating system.

A.3 Intel® Hyper-Threading Technology

- The motherboard supports Intel® Pentium® 4 LGA775 processors with Hyper-Threading Technology.

- Hyper-Threading Technology is supported under Windows® XP/2003 Server and Linux 2.4.x (kernel) and later versions only. Under Linux, use the Hyper-Threading compiler to compile the code. If you are using any other operating systems, disable the Hyper-Threading Techonology item in the BIOS to ensure system stability and performance.

- Installing Windows® XP Service Pack 1 or later version is recommended.

- Make sure to enable the Hyper-Threading Technology item in BIOS before installing a supported operating system.

- For more information on Hyper-Threading Technology, visit www.intel.com/info/hyperthreading.

Using the Hyper-Threading Technology

To use the Hyper-Threading Technology:

1. Install an Intel® Pentium® 4 CPU that supports Hyper-Threading Technology.
2. Power up the system and enter the BIOS Setup. Under the Advanced Menu, make sure that the item Hyper-Threading Technology is set to Enabled.

   The BIOS item appears only if you installed a CPU that supports Hyper-Threading Technology.
3. Restart the computer.