

Intel® Pentium® D / Pentium®  
4 / Celeron® / Core™2  
Duo ATX Main Board

**BV945GL**

**User's Manual**

<http://www.bcmcom.com>

Ver. 1.00

# Contents

Notices .....	iv
Safety information .....	v
Tech Support.....	vi
BV945GL specifications summary.....	vii

## Product introduction

1.1	Welcome! .....	1-2
1.2	Package contents .....	1-2
1.3	Special features .....	1-2
1.3.1	Product highlights .....	1-2
1.4	Before you proceed .....	1-5
1.5	Motherboard overview .....	1-6
1.5.1	Placement direction .....	1-6
1.5.2	Screw holes .....	1-6
1.5.3	Motherboard layout.....	1-7
1.6	Central Processing Unit (CPU) .....	1-8
1.6.1	Installing the CPU .....	1-8
1.6.2	Installing the CPU heatsink and fan .....	1-11
1.6.3	Uninstalling the CPU heatsink and fan .....	1-13

# Contents

1.7	System memory.....	1-15
1.7.1	Overview.....	1-15
1.7.2	Memory Configurations.....	1-15
1.7.3	DDR2 Qualified Vendors List.....	1-16
1.7.4	Installing a DIMM.....	1-18
1.7.5	Removing a DIMM.....	1-18
1.8	Expansion slots.....	1-19
1.8.1	Installing an expansion card.....	1-19
1.8.2	Configuring an expansion card.....	1-19
1.8.3	PCI slots.....	1-20
1.8.4	PCI Express x1.....	1-20
1.8.5	PCI Express x16.....	1-20
1.9	Jumpers.....	1-21
1.10	Connectors.....	1-22
1.10.1	Rear panel connectors.....	1-22
1.10.2	Internal connectors.....	1-24

## BIOS Setup

2.1	Introduction.....	2-1
2.2	Entering Setup.....	2-2
2.3	Standard CMOS Setup.....	2-3
2.4	Advanced BIOS Features.....	2-3
2.5	Advanced Chipset Features.....	2-4
2.6	Integrated Peripherals.....	2-4
2.7	Power Management Setup.....	2-5
2.8	PnP/PCI Configurations.....	2-5
2.9	PC Health Status.....	2-6
2.10	Frequency / Voltage Control.....	2-6
2.11	Load Default / Optimized Settings.....	2-7
2.12	Password Setting.....	2-8
2.13	Save & Exit Setup.....	2-9
2.14	Exit Without Saving.....	2-9

# 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.



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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.

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## 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.



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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.

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## Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone. So please consult the user's manual first.

To receive the latest version of the user's manual; please visit our Web site at:  
<http://www.bcmcom.com/>

If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your BCM products. In fact, most problems reported are minor and are able to be easily solved over the phone.

In addition, free technical support is available from BCM engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

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## BV945GL specifications summary

CPU	LGA775 socket for Intel® Pentium® D/ Pentium® 4/ Celeron® / Core™2 Duo processor Compatible with the Intel® 05B/05A and 04B/ 04A processors Supports Intel® Enhanced Memory 64 Technology (EM64T) Supports Enhanced Intel® SpeedStep® Technology (EIST) Supports Intel® Hyper-Threading Technology
Chipset	Northbridge: Intel® 945G Southbridge: Intel® ICH7
Front Side Bus	1066/800/533 MHz
Memory	4 x 240-pin DIMM sockets support up to 4GB Dual Channel DDR2 400/533/667 MHz SDRAM
Integrated Graphics	Integrated Intel® Graphics Media Accelerator 950
Expansion slots	1 x PCI Express x16 slot for discrete graphics cards 1 x PCI Express x1 5 x PCI slots
Storage	Intel(R) ICH7 South Bridge supports: - 1 x Ultra DMA 100/66/33 - 4 x Serial ATA 3Gb/s ports
Audio	Realtek® ALC888 8-channel High-Definition audio CODEC S/PDIF out interface support Universal Audio Jack (UAJ (R)) Sensing Technology support
LAN	Intel® 82573L 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 Serial port (COM) 1 x VGA port 1 x PS/2 keyboard port 1 x PS/2 mouse port 1 x Audio I/O

(continued on the next page)

## BV945GL specifications summary

BIOS features	4 Mb Flash ROM, Award BIOS, PnP, WfM2.0, DMI2.0, SM BIOS 2.3
Industry standard	PCI 2.2, USB 2.0
Manageability	WfM 2.0, DMI 2.0, WOL by PME, WOR by PME, Chassis Intrusion
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 Power fan connector 1 x 24-pin ATX 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 COM port (COM2) 1 x 3-pin Power LED connector (PLED)
Power Requirement	ATX power supply (with 20-pin and 4-pin 12 V plugs)
Form Factor	ATX form factor: 12 in x 9.6 in (304.8 mm x 243.84 mm)
Support CD contents	Device drivers

\*Specifications are subject to change without notice.

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

# Product introduction



## 1.1 Welcome!

### Thank you for buying an BV945GL motherboard!

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

---

<b>Motherboard</b>	BV945GL
<b>Cables</b>	2 x Serial ATA signal cable 1 x IDE Drive cable 1 x Floppy disk drive cable
<b>Accessories</b>	I/O shield
<b>Application CDs</b>	motherboard support CD
<b>Documentation</b>	User guide



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

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## 1.3 Special features

### 1.3.1 Product highlights

#### Latest processor technology

The motherboard comes with a 775-pin surface mount Land Grid Array (LGA) socket designed for the Intel® Pentium® D, Pentium® 4, Celeron® or Core™2 Duo processor in the 775-land package. The motherboard supports the Intel® Pentium® 4, Intel® Pentium® D or Core™2 Duo processor with 1066/800/533 MHz Front Side Bus (FSB). The motherboard also supports the Intel® Hyper-Threading Technology and is fully compatible with Intel® PCG 04B/04A and 05B/05A processors.

#### Intel® 65nm Dual-Core Technology CPU support

This motherboard supports Intel® Pentium® D/Pentium® 4/Celeron® / Core™2 Duo processors built on the 65-nanometer (nm) process technology with copper interconnect.

Dual-core processors contain two physical CPU cores with dedicated L2 caches to meet demands for more powerful processing. Intel®'s 65nm process is the most advanced chip manufacturing technology, delivering breakthrough performance, enhanced media experience, and low power consumption. Intel® 65nm dual-core processors utilize the latest package technologies for a thinner, lighter design without compromising performance.

### **Intel® 945G chipset**

The Intel® 945G graphics memory controller hub (GMCH) and the ICH7 DH 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 DH Southbridge represents the seventh generation I/O controller hub that provides the interface for PCI Express and 8-channel high definition audio.

### **Intel® Viiv™ Technology support**

Intel® Viiv™ Technology transforms your PC into an entertainment center, allowing you to enjoy and share digital multi-media content like never before. With Intel® Viiv™ Technology-based computers, you can record, playback, organize, and edit digital media content easily. Enjoy the entertainment experience even more with sharp graphics, flawless video playback, and support for up to 7.1 channel surround sound. To enable Intel® Viiv™ Technology, make sure you enable the Quick Resume function called **Energy Lake** in the BIOS. You also need to install the Intel® Viiv™ Technology driver and software.

Enabling Intel Viiv platform also requires:

- Intel® Pentium® D processor, Intel® Pentium® processor Extreme Edition or Intel® Core™2 Duo
- Native Command Queuing (NCQ) SATA hard drive
- Microsoft Windows XP Media Center Edition Update Rollup 2 Refer to [www.Intel.com](http://www.Intel.com) for more information.

### **DDR2 memory support**

The motherboard supports DDR2 memory which features data transfer rates of 600 MHz (FSB 800) or 533 MHz (FSB 1066/800) 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 8.5 GB/s.

### **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.

### **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.

### **Serial ATA technology**

The motherboard supports the Serial ATA technology through the Serial ATA interfaces and the Intel® ICH7 DH 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.

### **8-channel high definition audio**

The onboard Realtek® ALC888 8-channel high-definition audio CODEC provides 192 KHz/ 24-bit audio output, jack-sensing and restasking functions. With the 8-channel audio ports and S/PDIF interfaces, you can connect your computer to home theater decoders to produce crystal-clear digital audio.

### **S/PDIF digital sound ready**

The motherboard supports the S/PDIF Out function through the S/PDIF interfaces at midboard. The S/PDIF technology turns your computer into a high-end entertainment system with digital connectivity to powerful audio and speaker systems.

### **Temperature, fan, and voltage monitoring**

The CPU temperature is monitored by the ASIC (integrated in the Winbond Super I/O) to prevent overheating and damage. The system fan rotations per minute (RPM) is monitored for timely failure detection. The ASIC monitors the voltage levels to ensure stable supply of current for critical components.

## 1.4 Before you proceed

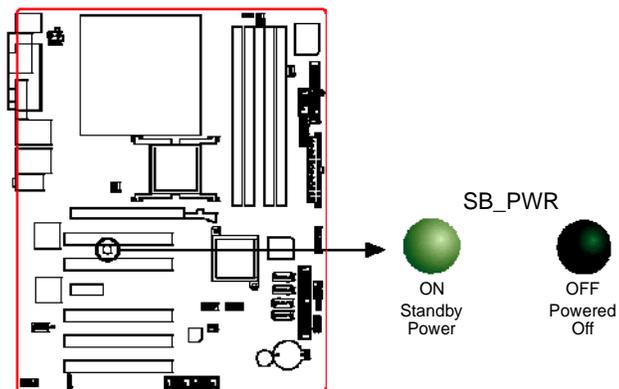
Take note of the following precautions before you install motherboard components or change any motherboard settings.



- Unplug the power cord from the wall socket before touching any component.
- Use a grounded wrist strap or touch a safely grounded object or 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.



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

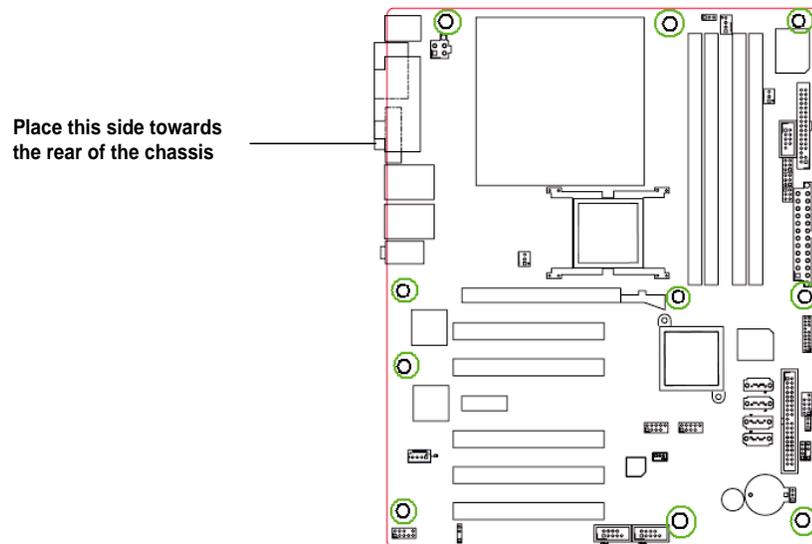
When installing the motherboard, make sure that you place it into the chassis in the correct orientation. The edge with external ports goes to the rear part of the chassis as indicated in the image below.

### 1.5.2 Screw holes

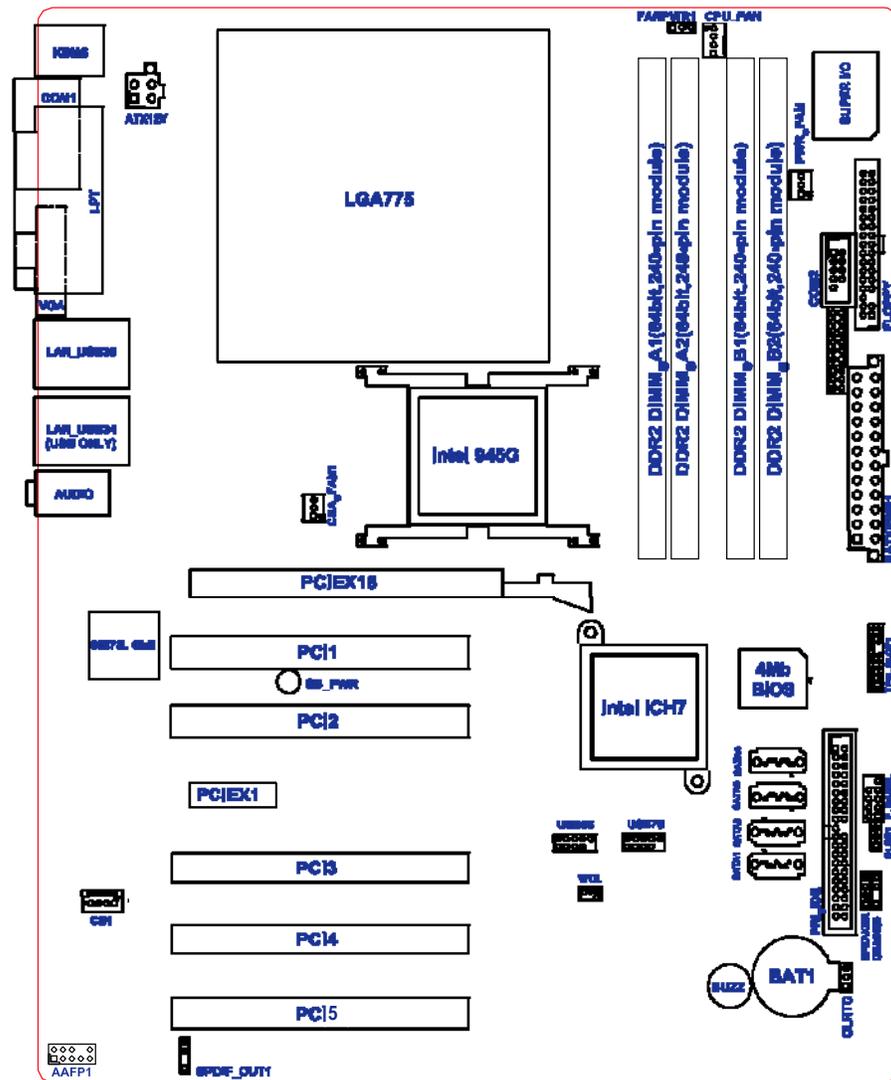
Place ten (10) screws into the holes indicated by circles to secure the motherboard to the chassis.



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



### 1.5.3 BV945GL Motherboard layout



## 1.6 Central Processing Unit (CPU)

The motherboard comes with a surface mount LGA775 socket designed for the Intel® Pentium® D / Pentium® 4 / Celeron® / Core™2 Duo processor in the 775-land package.

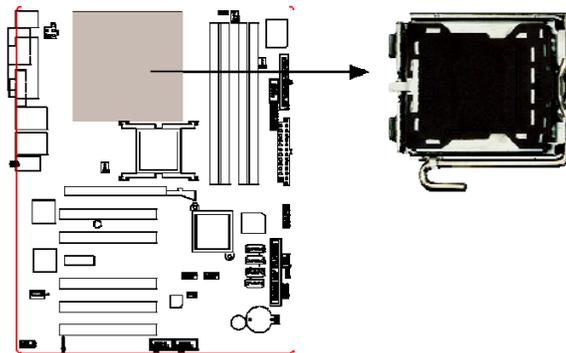


- Your boxed Intel® Pentium® D / Pentium® 4 / Celeron® / Core™2 Duo LGA775 processor package should come with installation instructions for the CPU, fan and heatsink assembly. If the instructions in this section do not match the CPU documentation, follow the latter.
- Upon purchase of the motherboard, 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. ADVANSUS will shoulder the cost of repair only if the damage is shipment/transit-related.
- Keep the cap after installing the motherboard. ADVANSUS 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 Installing the CPU

To install a CPU:

1. Locate the CPU socket on the motherboard.

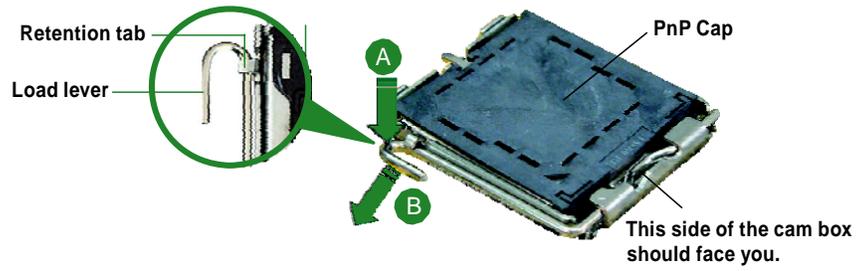


CPU Socket 775



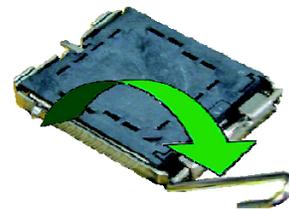
Before installing the CPU, make sure that the socket box is facing towards you and the load lever is on your left.

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

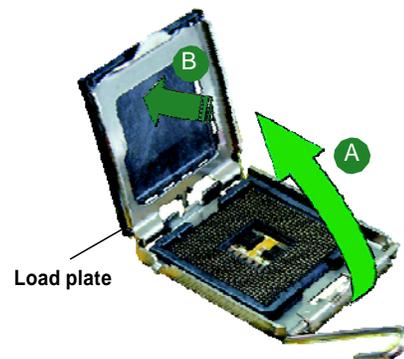


To prevent damage to the socket pins, do not remove the PnP cap unless you are installing a CPU.

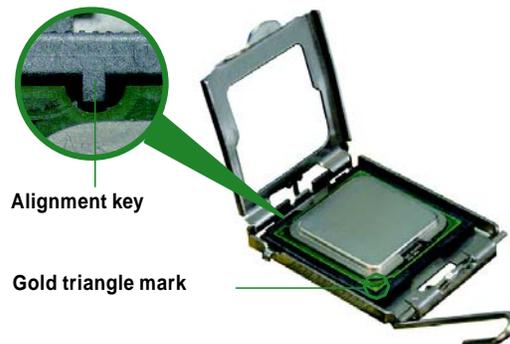
3. Lift the load lever in the direction of the arrow to a 135° angle.



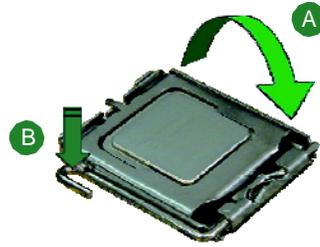
4. Lift the load plate with your thumb and forefinger to a 100° angle (A), then push the PnP cap from the load plate window to remove (B).



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.



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



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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!

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The motherboard supports Intel® Pentium® D or Intel® Pentium® 4 LGA775 processors with the Intel® Enhanced Memory 64 Technology (EM64T), Enhanced Intel SpeedStep® Technology (EIST), and Hyper-Threading Technology. Refer to the Appendix for more information on these CPU features.

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## 1.6.2 Installing the CPU heatsink and fan

The Intel® Pentium® D / Pentium® 4 / Celeron® / Core™2 Duo LGA775 processor requires a specially designed heatsink and fan assembly to ensure optimum thermal condition and performance.



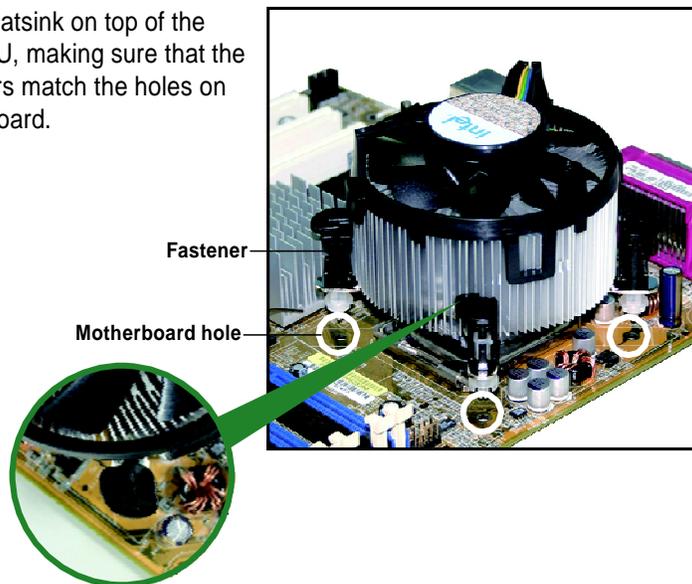
- Install the motherboard to the chassis before you install the CPU fan and heatsink assembly
- When you buy a boxed Intel® Pentium® D / Pentium® 4 / Celeron® / Core™2 Duo processor, the package includes the CPU fan and heatsink assembly. If you buy a CPU separately, make sure that you use only Intel®-certified multi-directional heatsink and fan.
- Your Intel® Pentium® D / Pentium® 4 / Celeron® / Core™2 Duo 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.

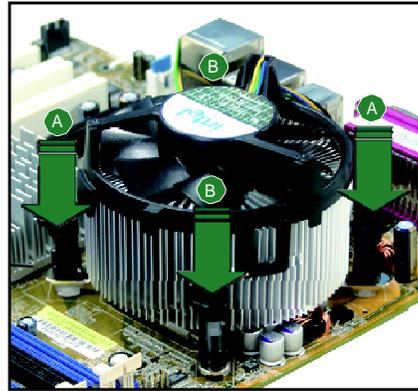
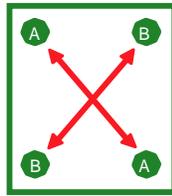
To install the CPU heatsink and fan:

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

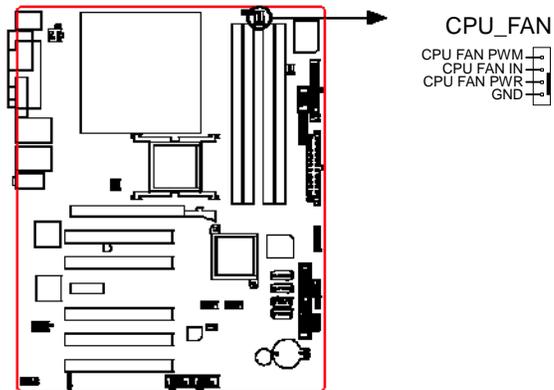


Make sure each fastener is oriented as shown, with the narrow groove directed outward.

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 connector

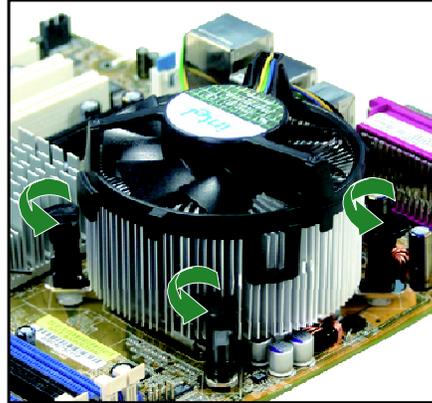


Do not forget to connect the CPU fan connector! Hardware monitoring errors can occur if you fail to plug this connector.

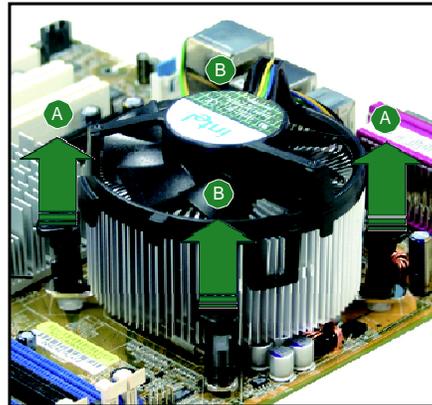
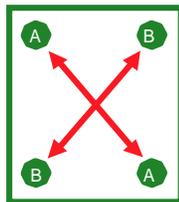
### 1.6.3 Uninstalling the CPU heatsink and fan

To uninstall the CPU heatsink and fan:

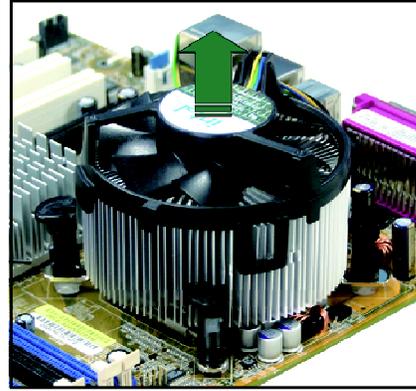
1. Disconnect the CPU fan cable from the connector on the motherboard.
2. Rotate each fastener counterclockwise.



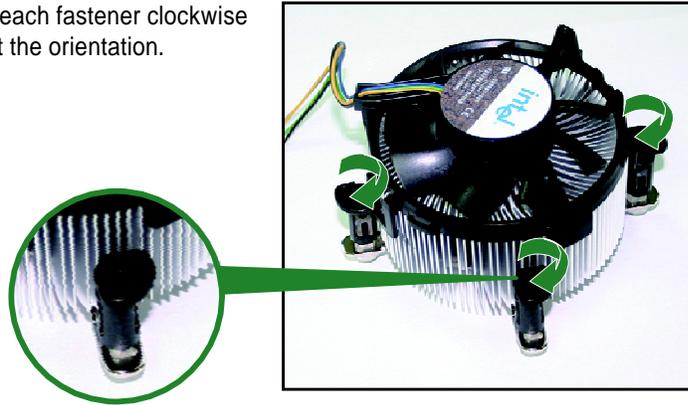
3. Pull up two fasteners at a time in a diagonal sequence to disengage the heatsink and fan assembly from the motherboard.



4. Remove the heatsink and fan assembly from the motherboard.



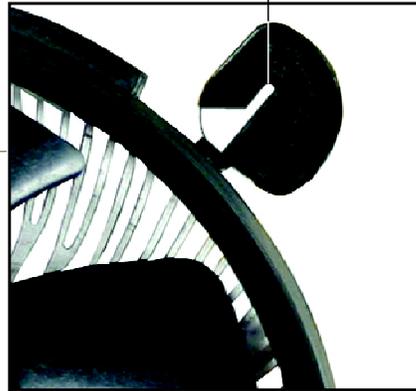
5. Rotate each fastener clockwise to reset the orientation.



Narrow end of the groove



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



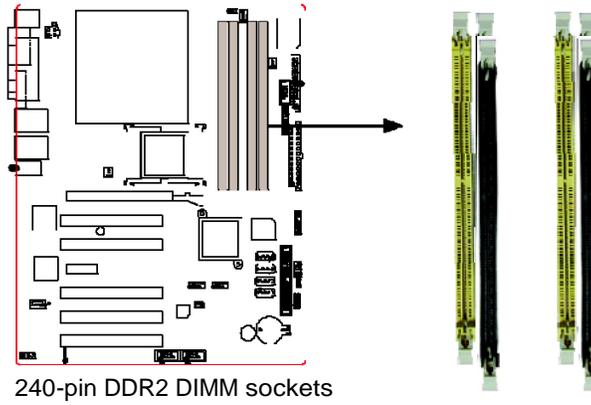
# 1.7 System memory

## 1.7.1 Overview

The motherboard comes with four 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:



Channel	Sockets
Channel A	DIMM_A1 and DIMM_A2
Channel B	DIMM_B1 and DIMM_B2

## 1.7.2 Memory Configurations

You may install 64 MB, 128 MB, 256 MB, 512 MB and 1 GB unbuffered ECC or non-ECC DDR DIMMs into the DIMM sockets using the memory configurations in this section.



- IF you installed four 1GB memory modules, the system may detect less than 3GB of total memory because of address space allocation for other critical functions. This limitation applies to Windows XP 32-bit version operating system since it does not support PAE (Physical Address Extension) mode.
- IF you install Windows XP 32-bit version operating system, we recommend that you install less than 3GB of total memory.
- For dual-channel configuration, the total size of memory module(s) installed per channel must be the same for better performance (DIMM\_A1 + DIMM\_A2 = DIMM\_B1 + DIMM\_B2).
- When using one DDR DIMM module, install into DIMM\_B1 slot only.
- When using two DDR DIMM modules, install into DIMM\_A1 and DIMM\_B1 slots only.

- 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 memory Qualified Vendors List on the next page for details.
- Due to CPU limitation, DIMM modules with 128 Mb memory chips or double-sided x16 memory chips are not supported in this motherboard.

### 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 website for the latest DDR2 DIMM modules for this motherboard.

#### DDR2 533 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support	
						A	B
512MB	SAMSUNG	M378T6553BG0-CD5	N/A	SS	K4T51083QB-GCD5		
256MB	SAMSUNG	M378T3253FG0-CD5	N/A	SS	K4T56083QF-GCD5		
512MB	SAMSUNG	M378T6453FG0-CD5	N/A	DS	K4T56083QF-GCD5		
512MB	Infineon	HYS64T64000GU-3.7-A	Infineon	SS	HYB18T512800AC37		
256MB	Infineon	HYS64T32000HU-3.7-A	Infineon	SS	HYB18T512160AF-3.7		
1024MB	Infineon	HYS64T128020HU-3.7-A	Infineon	DS	HYB18T512800AF37		
512MB	Infineon	HYS64T64000HU-3.7-A	Infineon	SS	HYB18T512800AF37		
512MB	CORSAIR	CM2X512-4200	N/A	DS	N/A		
512MB	MICRON	MT16HTF6464AG-53EB2	MICRON	DS	4FBII9BQM	•	•
1024MB	MICRON	MT16HTF12864AY-53EA1	MICRON	DS	4JAIID9CRZ		
256MB	MICRON	MT8HTF3264AY-53EB3	MICRON	SS	4FBII9CHM	•	•
512MB	MICRON	MT16HTF6464AY-53EB2	MICRON	DS	4FBII9CHM		
1024MB	Kingston	D6408TE7BL-37	N/A	DS	E5108AB-5C-E		
256MB	Kingston	E5116AB-5C-E	N/A	SS	HYB18T512160AC-3.7		
512MB	Kingston	HY5PS56821F-C4	ELPIDA	SS	E5108AB-5C-E		
512MB	Hynix	HYMP564U648-C4	N/A	SS	HY5PS12821F-C4		
512MB	Hynix	HY5PS1282AFP-C3	N/A	SS	HYMP564U64AP8-C3		
1024MB	Hynix	HYMP512U648-C4	N/A	DS	HY5PS12821FP-C4		
512MB	ELPIDA	EBE51UD8ABFA-5C	ELPIDA	DS	E5108AB-5C-E		
1024MB	ELPIDA	EBE11UD8ABFA-5C-E	ELPIDA	DS	E5108AB-5C-E		

## DDR2 667 Qualified Vendors List

Size	Vendor	Model	Brand	Side(s)	Component	DIMM support	
						A	B
512MB	Hynix	HYMP564U64AP8-Y5	Hynix	SS	HY5PS12821AFP-Y5		
1024MB	Hynix	HYMP512U64AP8-Y4	Hynix	DS	HY5PS12821AFP-Y4		
512MB	Hynix	HYMP564U64AP8-Y4	Hynix	SS	HY5PS12821AFP-Y4		
256MB	MICRON	MT8HTF3264AY-667B5	MICRON	SS	4SB42D9CZM		
256MB	MICRON	MT8HTF3264AY-667B6	MICRON	SS	5FB42D9DPN		
512MB	Infineon	HYS64T64000HU-3S-A	Infineon	SS	HYB18T512800AF3S		
256MB	Infineon	HYS64T32000HU-3S-A	Infineon	SS	HYB18T512160AF-3S		
1024MB	Infineon	HYS64T128020HU-3S-A	Infineon	DS	HYB18T512800AF3S		
256MB	ELPIDA	EBE25UC8ABFA-6E-E	ELPIDA	SS	E2508AB-GE-E		
512MB	ELPIDA	EBE51UD8AEFA-6E-E	ELPIDA	SS	E5108AE-GE-E		
1024MB	ELPIDA	EBE11UD8AEFA-6E-E	N/A	DS	N/A		

**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 or the black slots as one pair of Dual-channel memory configuration.
- C** - support for 4 modules inserted into the yellow and black slots as two pairs of Dual-channel memory configuration.

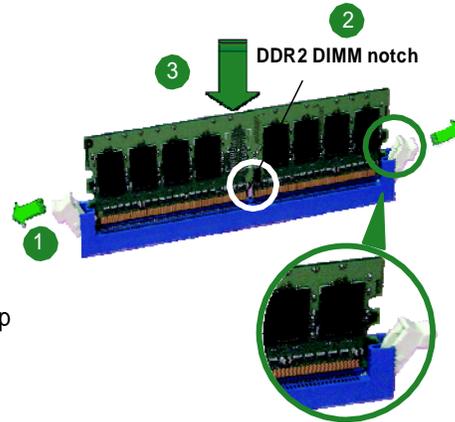
## 1.7.4 Installing a DIMM



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.



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.

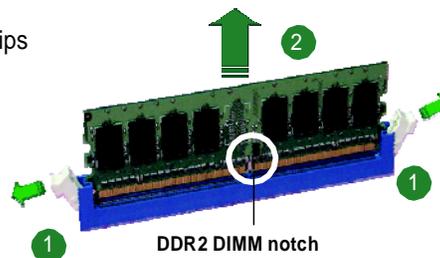
## 1.7.5 Removing a DIMM

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.



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.

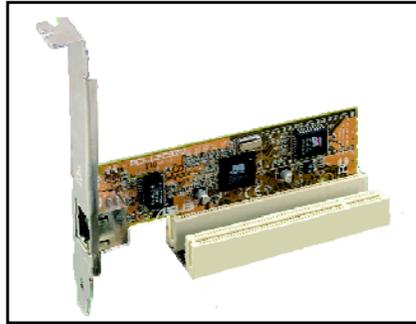
### 1.8.2 Configuring an expansion card

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.

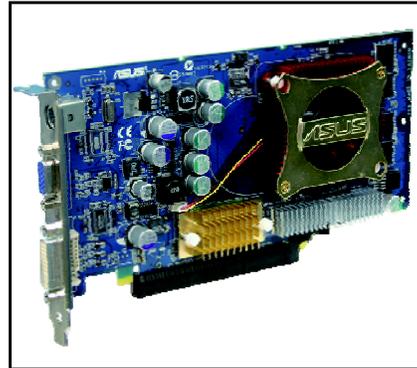
### 1.8.3 PCI slots

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 the type of LAN card that can be installed on a PCI slot.



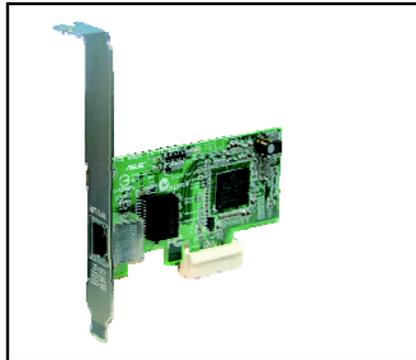
### 1.8.5 PCI Express x16

This motherboard supports one PCI Express x16 graphics card. The figure shows a typical graphics card that can be installed on the PCI Express x16 slot.



### 1.8.4 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 the type of network card that can be installed on the PCI Express x1 slot.



## 1.9 Jumpers

### 1. Clear RTC RAM (CLRRTC)

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

To erase the RTC RAM:

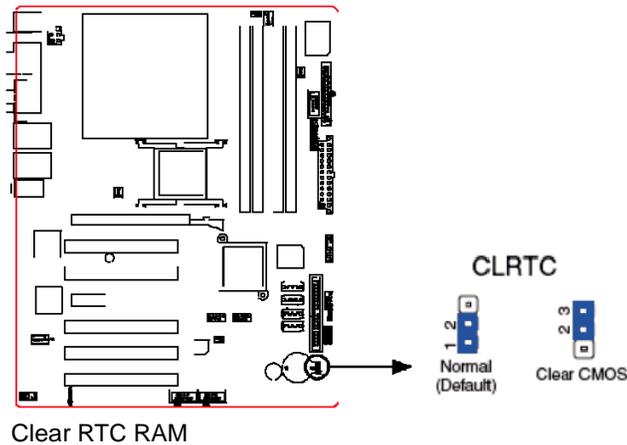
1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper cap from pins 1-2 (default) to pins 2-3. Keep the cap on pins 2-3 for about 5~10 seconds, then move the cap back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.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



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

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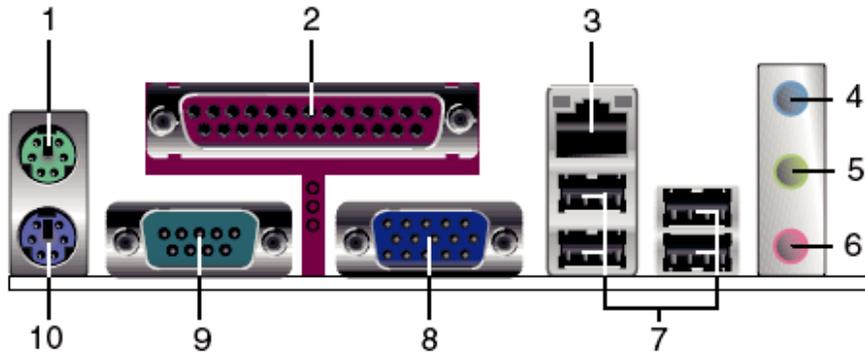
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You do not need to clear the RTC when the system hangs due to overclocking. For system failure due to overclocking, use the C.P.R. (CPU Parameter Recall) feature. Shut down and reboot the system so the BIOS can automatically reset parameter settings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

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## 1.10 Connectors

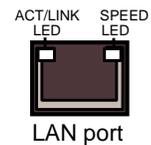
### 1.10.1 Rear panel connectors



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
GREEN	Linked	ORANGE	100 Mbps connection
BLINKING	Data activity	GREEN	1 Gbps connection



4. **Line In port (light blue).** This port connects a 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.
7. **USB 2.0 ports.** These 4-pin Universal Serial Bus (USB) ports are available for connecting USB 2.0 devices.
8. **VGA port.** This 15-pin VGA port connects to a VGA monitor.
9. **Serial connector.** This 9-pin COM1 port is for serial devices.
10. **PS/2 keyboard port (purple).** This port is for a PS/2 keyboard.

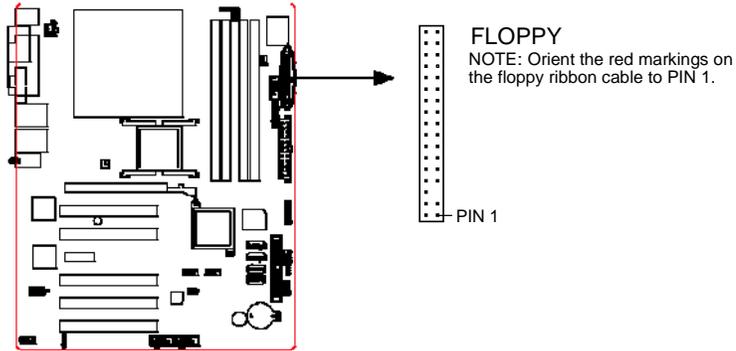
## 1.10.2 Internal connectors

### 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 disk drive connector

### 2. Primary IDE connector (40-1 pin PRI\_IDE)

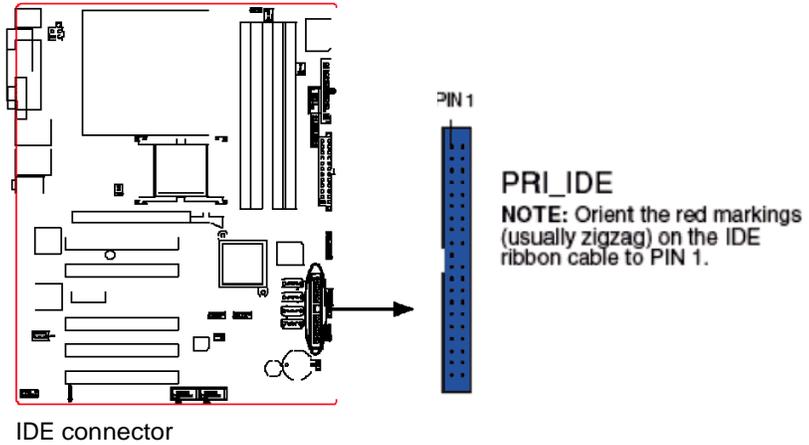
These connectors are for Ultra DMA 133/100/66 signal cables. There are three interfaces on each Ultra DMA 133/100/66 signal cable: blue, black, and gray. Connect the blue interface into the motherboard's IDE connector, then select one of the following modes to configure your hard disk drive(s).

**Cable Select Mode** - use this mode to select the operating mode by cable connectors.

No. of drives	Drive type	Drive jumper	Cable connector
1	With OS	Cable select	black
2	With OS		black
	Without OS		gray

**Jumper Select Mode** - use this mode to select the operating mode by hard disk drive jumper.

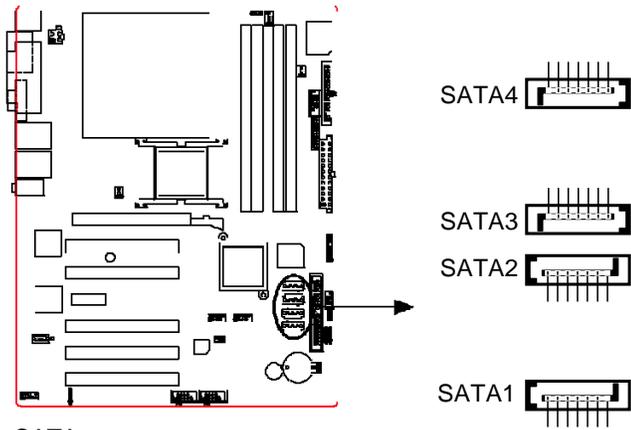
No. of drives	Drive type	Drive jumper	Cable connector
1	With OS	Master	black or gray
2	With OS	Master	
	Without OS	Slave	



IDE connector

**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.



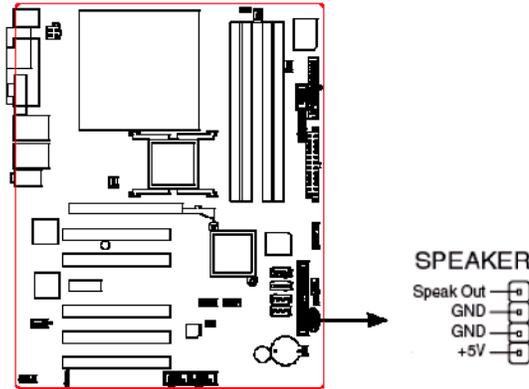
SATA connectors



Install the Windows® 2000 Service Pack 4 or the Windows® XP Service Pack1 or later before using Serial ATA.

#### 4. Speaker connector (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.



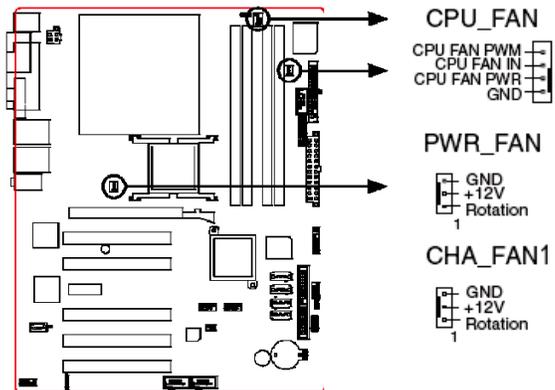
Speaker out connector

#### 5. CPU, Power and Chassis fan connectors (4-pin CPU\_FAN, 3-pin PWR\_FAN, 3-pin CHA\_FAN)

The fan connectors support cooling fans of 350mA~740mA (8.88W max.) or a total of 1A~2.22A (26.64W 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.



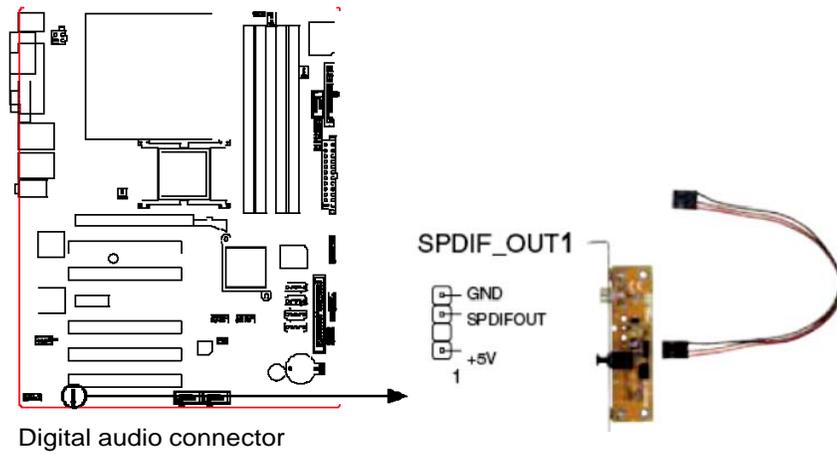
Do not forget to connect the fan cables to the fan connectors. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! DO NOT place jumper caps on the fan connectors.



Fan connectors

## 6. 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.



Digital audio connector



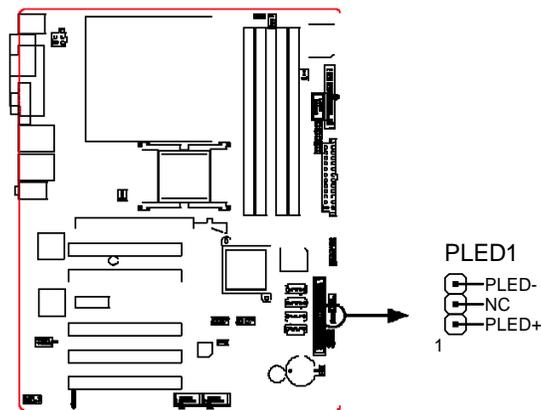
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The S/PDIF out module is purchased separately.

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## 7. Power LED connector (3-pin PLED)

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



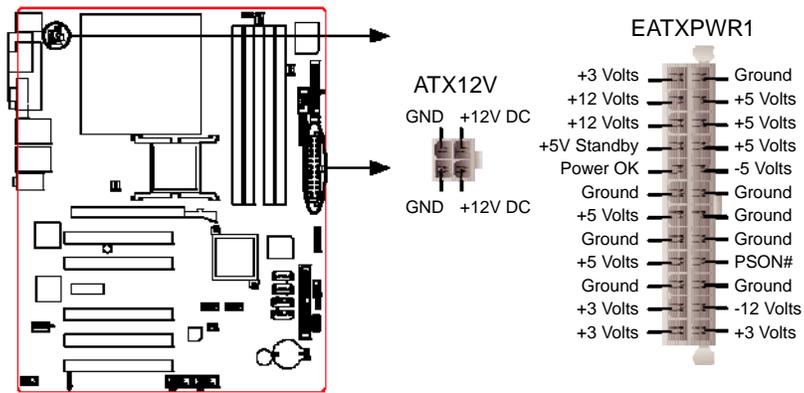
Power LED connector

## 8. 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.



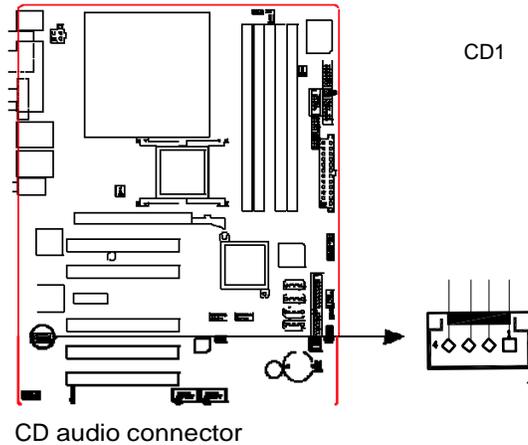
- Do not forget to connect the 4-pin ATX +12 V power plug; otherwise, the system will not boot.
- Use of a PSU with a higher power output is recommended when configuring a system with more power-consuming devices. The system may become unstable or may not boot up if the power is inadequate.
- Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. See the table below for details.



ATX power connectors

### 9. 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.



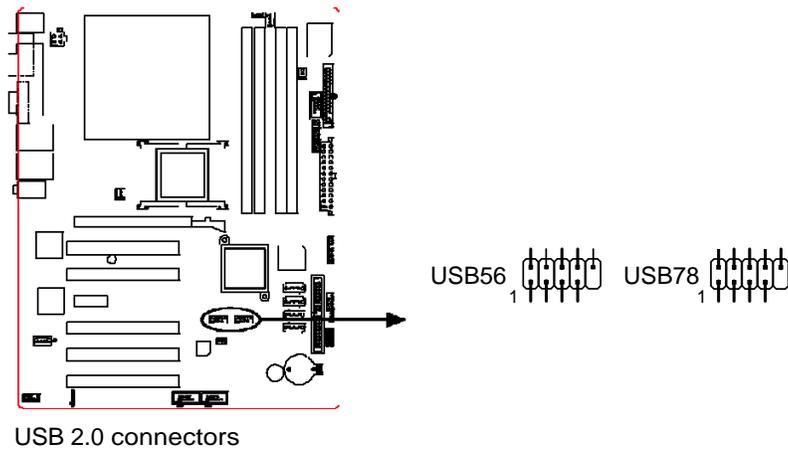
CD audio connector



Enable the CD-IN function in the audio utility when using this connector.

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

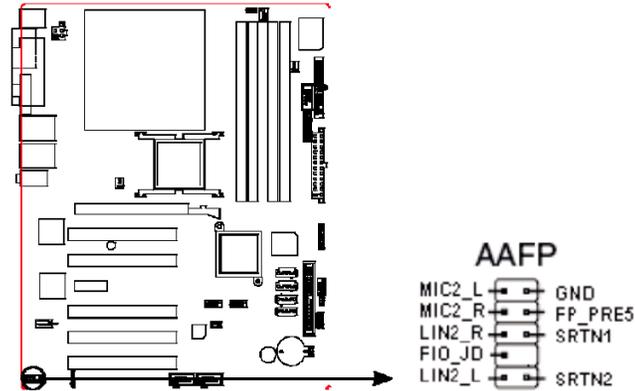
These connectors are for USB 2.0 ports. Connect the optional USB module cable to any of these connectors, then install the module to a slot opening at the back of the system chassis. These USB connectors comply with USB 2.0 specification that supports up to 480 Mbps connection speed.



USB 2.0 connectors

### 11. 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.



Analog front panel connector

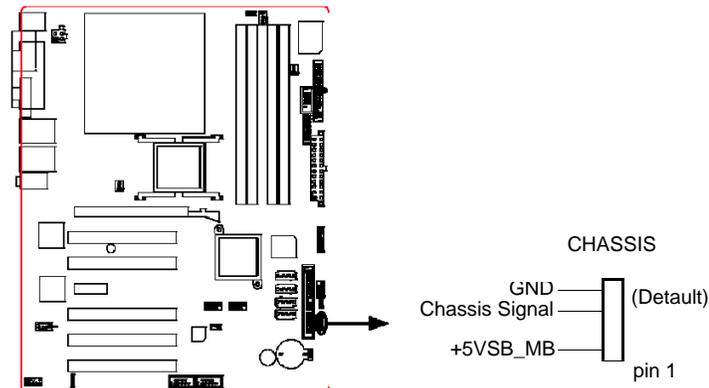


It is recommended that you connect a high-definition front panel audio module to this connector to avail of the motherboard's high-definition audio capability.

### 12. Chassis intrusion connector (4-1 pin CHASSIS)

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

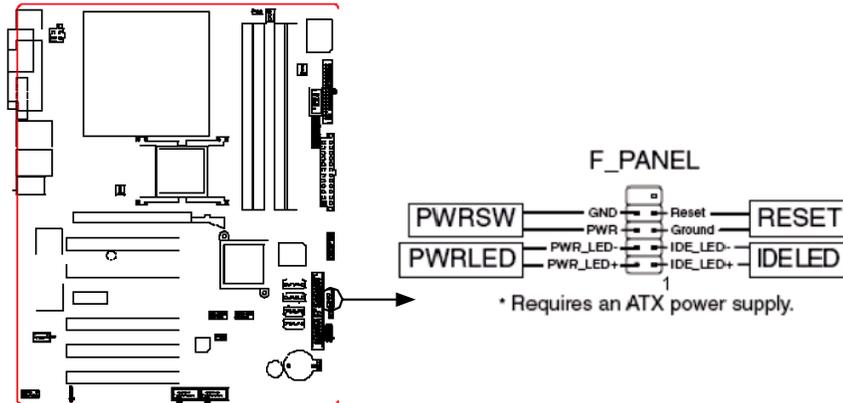
By default, the pins labeled "Chassis Signal" and "Ground" are shorted with a jumper cap. Remove the jumper caps only when you intend to use the chassis intrusion detection feature.



Chassis intrusion connector

### 13. System panel connector (10-1 pin F\_PANEL)

This connector supports several chassis-mounted functions.



System panel connector

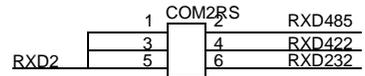
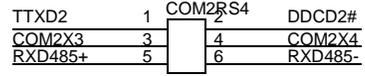
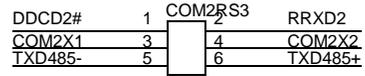
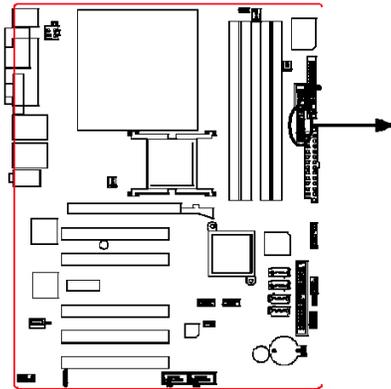


The system panel connector is color-coded for easy connection. Refer to the connector description below for details.

- **Power/Soft-off button (Black 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.
- **System Power LED connector (2-pin PWRLED)**  
This 2-pin connector is for the system power LED. The system power LED lights up when you turn on the system power, and blinks when the system is in sleep mode.
- **Reset button (Blue 2-pin RESET)**  
This 2-pin connector is for the chassis-mounted reset button for system reboot without turning off the system power.
- **Hard disk drive activity (Red 2-pin IDELED)**  
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.

**14. COM2 ports (6-pin COM2RS, 6-pin COM2RS3 and 6-pin COM2RS4)**

These three 6-pin connectors allow you to configure COM2 to either RS232 (default value), RS422 or RS485.



	RS232	RS422	RS485
COM2RS3	1-3 2-4	3-5 4-6	3-5 4-6
COM2RS4	1-3 2-4	3-5 4-6	3-5 4-6
COM2RS	5-6	3-4	1-2



COM3 and COM4 only support RS232.

## **2. BIOS Setup**

After you have installed the motherboard and assembled the system hardware, you can power up the system. The motherboard uses the most recent Award BIOS CMOS chip. The ROM setup instructions for configuring the motherboard's BIOS (Basic Input Output System) are contained on this chip. The CMOS Setup program lets you set system parameters, which are stored in nonvolatile CMOS RAM. This information is retained by battery backup when the system is powered off. The value stored in the CMOS configures the system each time the system is powered on.

### **Running the CMOS Setup Utility**

The CMOS Setup Utility does not depend on an operating system to run. You run the utility by typing the Del or Delete key before the operating system boots up. The CMOS Main screen will appear. You navigate the CMOS Setup Utility using keyboard commands that are listed at the bottom of each screen. Help is available at any time by pressing the F1 key.

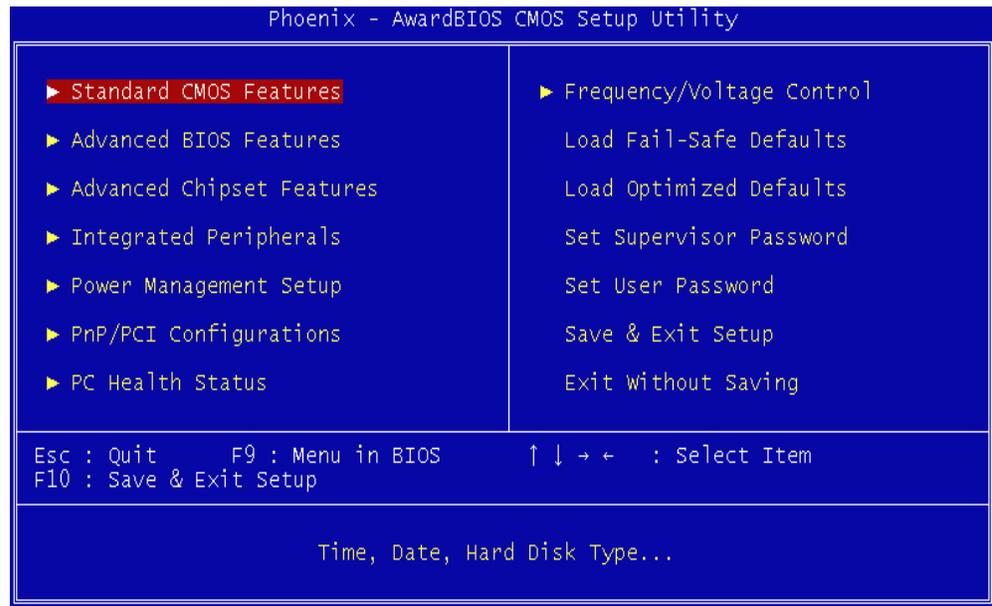
Once you have fully configured the CMOS Setup Utility you will rarely if ever need to configure it again.

## Entering Setup

Each time the system is turned on, the BIOS performs Power-On Self Test (POST) routines. These routines run through a series of diagnostic checks. If an error occurs, it is reported in one of two ways:

1. A series of beeps, if the error is encountered before the display is initialized.
2. An error message is shown on the screen, if the display is initialized. After the POST routines are performed, the following message appears: "Press DEL to enter SETUP"

Press the <DEL> key to enter the Award BIOS Setup program, and the main screen appears:



Use the arrow keys to select items. A description of each selection follows.

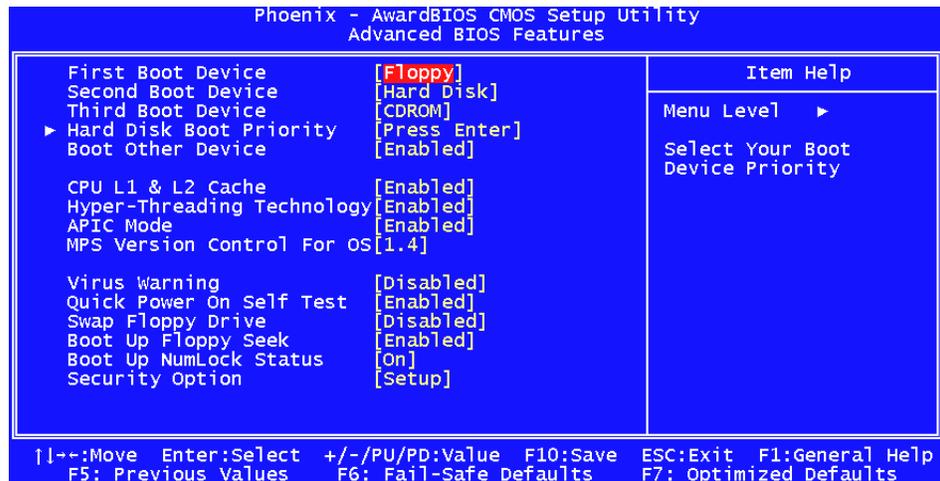
## Standard CMOS Features

The Standard CMOS Features screen lets you reset time and date settings to suit your location. The IDE devices are Auto Detected, but you can change these settings manually if necessary. The floppy drive settings and other settings are standard defaults that you can also change if necessary.



## Advanced BIOS Features

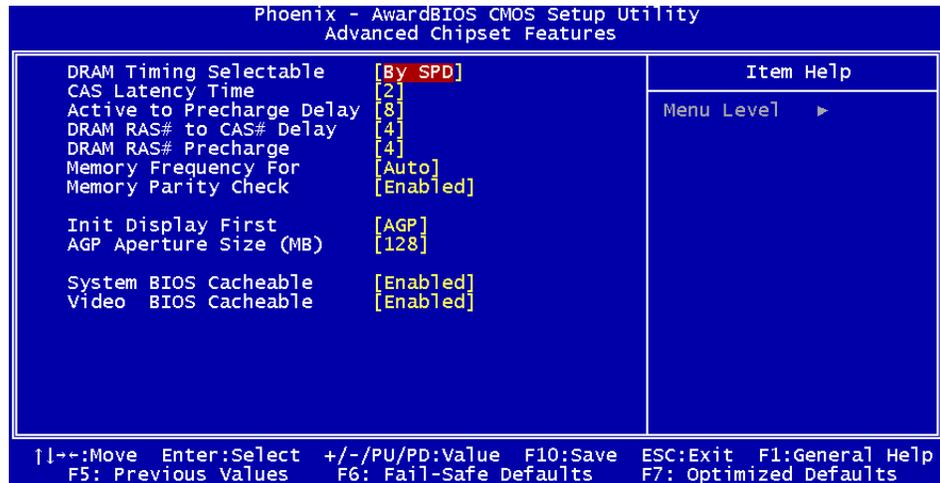
The Advanced BIOS Features screen configures boot options such as boot devices, boot order, various boot configurations and other power functions. Unless you fully understand the function of these settings, it is better to leave the default settings.



**Note1:** Please enable both the “Hyper-threading” and “APIC Mode” if you install a CPU with a speed higher than 3.06GB.

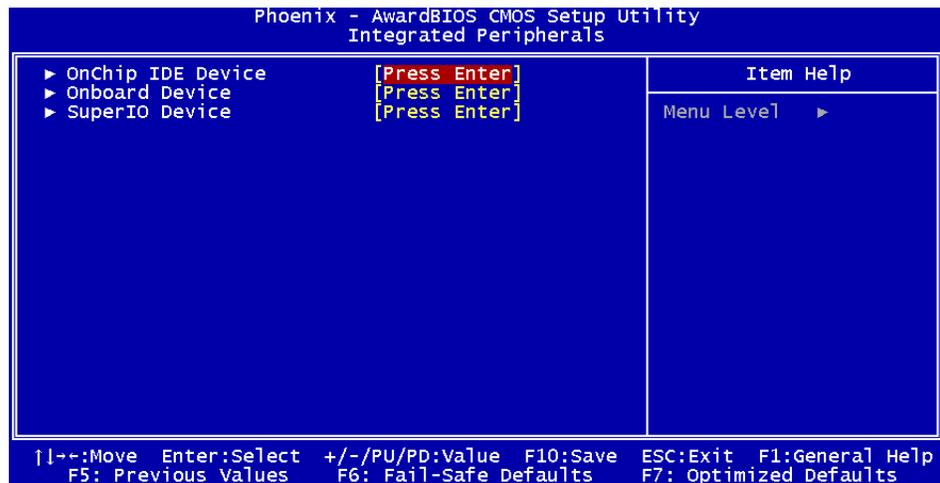
### Advanced Chipset Features

The Advanced Chipset Features screen configures the chipset, BIOS caching and the AGP. Unless you fully understand the function of these settings, it is recommended that you do not change the default settings



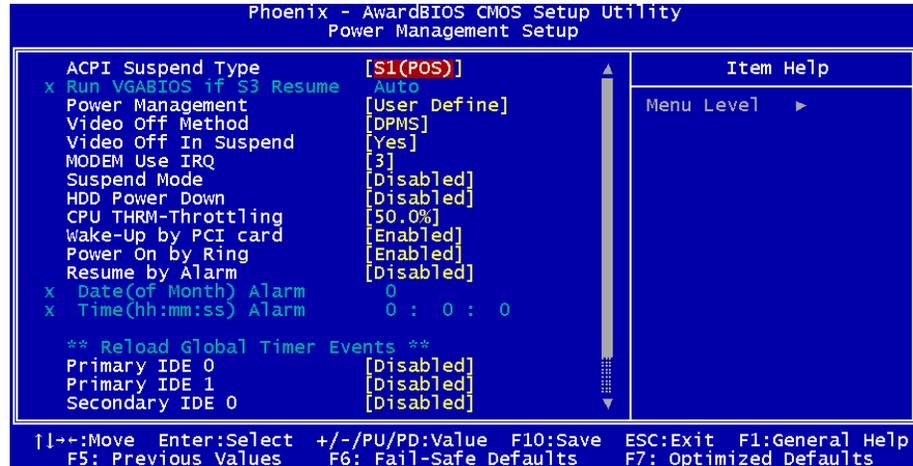
### Integrated Peripherals Screen

The Integrated Peripherals screen configures the peripheral features integrated onto the motherboard. The settings on this screen are all optimized defaults. The IDE settings are Auto Detected and the port settings are standard settings.



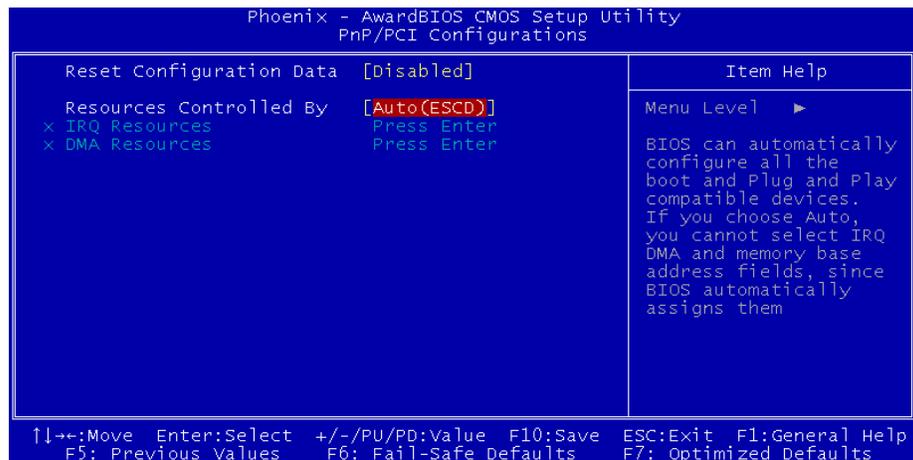
## Power Management Setup Screen

The Power Management Setup screen configures power management settings. The settings on this screen are all optimized defaults. Windows ACPI power management overrides most of these settings. There are Minimum and Maximum configurations available in addition to the User Defined defaults. In User Defined mode you can customize all settings.



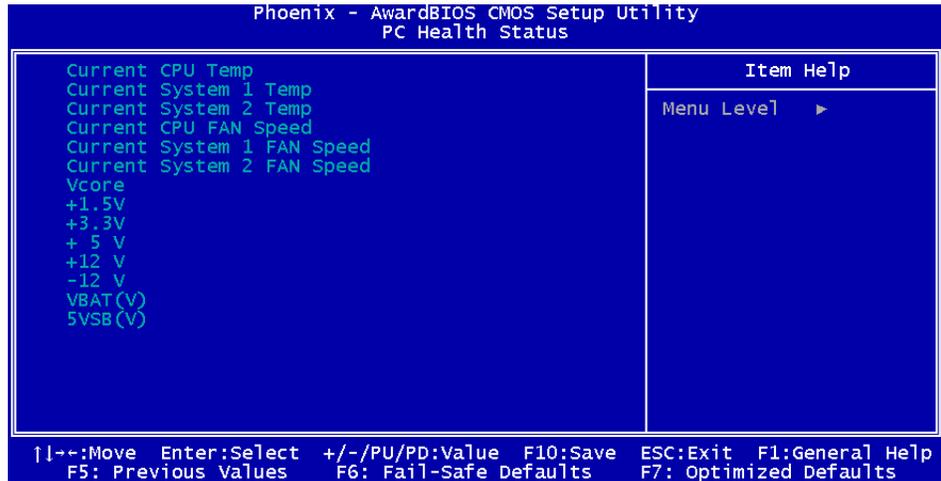
## PnP/PCI Configurations

The PnP/PCI Configurations screen configures Plug and Play and other PCI bus settings. The default is for BIOS control of these functions. Set Reset Configuration Data to Enabled if a problem occurs after installing an expansion card. This rewrites the ESCD.



### PC Health Status

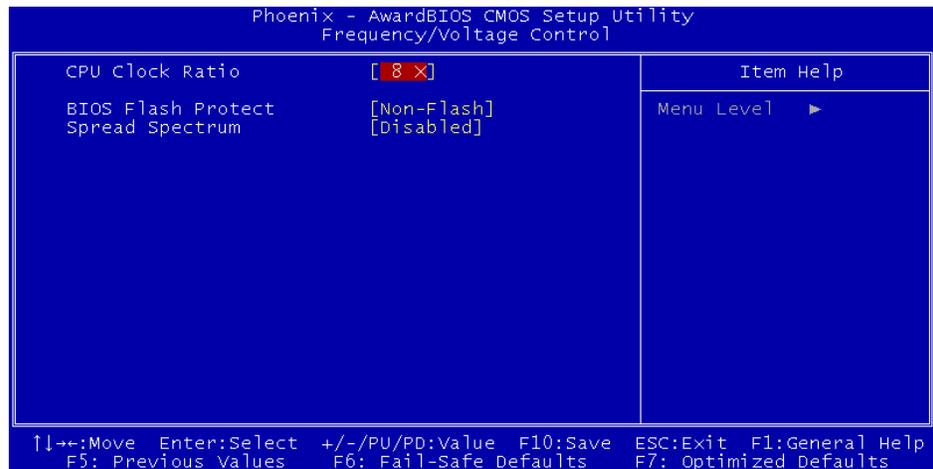
The PC Health Status screen displays system information such as CPU cooling fan speed and various voltage levels. This information is Auto Detected.



### Frequency/ Voltage Control

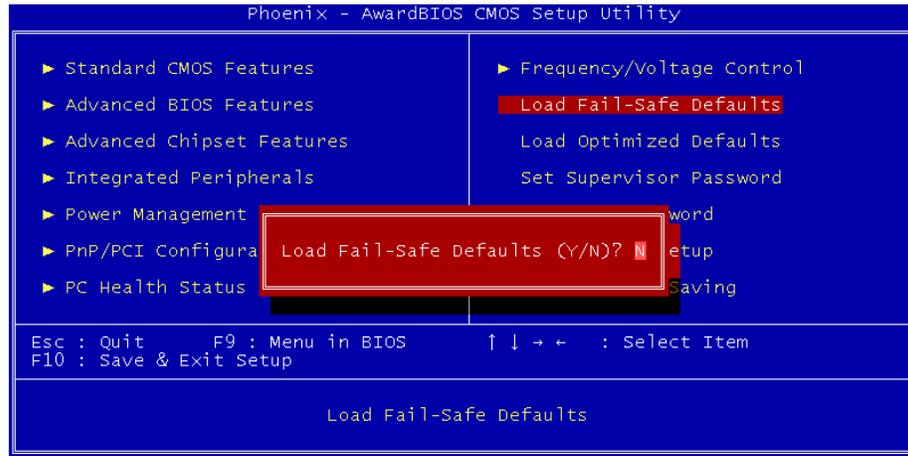
The Frequency/ Voltage Control screen configures CPU settings. Configuring CPU clock ratio settings that are different than Intel specifications can damage the Intel CPU and void the CPU warranty.

Enable the Spread Spectrum setting to reduce interference generated by the board circuitry.



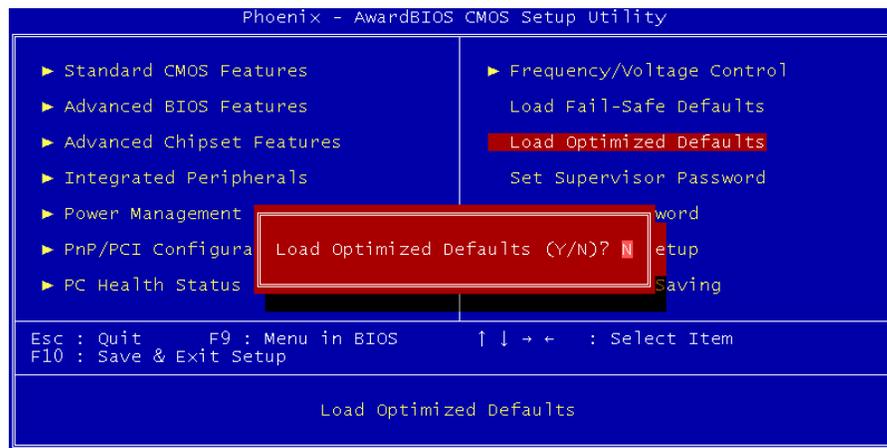
## Load Fail-Safe Defaults

Selecting “Y” for this item loads the minimum set of configuration settings. The Fail-Safe Defaults let the system start for troubleshooting of hardware problems.



## Load Optimized Defaults

Selecting “Y” after choosing this item loads the optimized set of default settings. Use these default settings if the configuration is corrupted or if a mistake is made in the configuration. You should also load these settings after performing the Clear CMOS procedure.



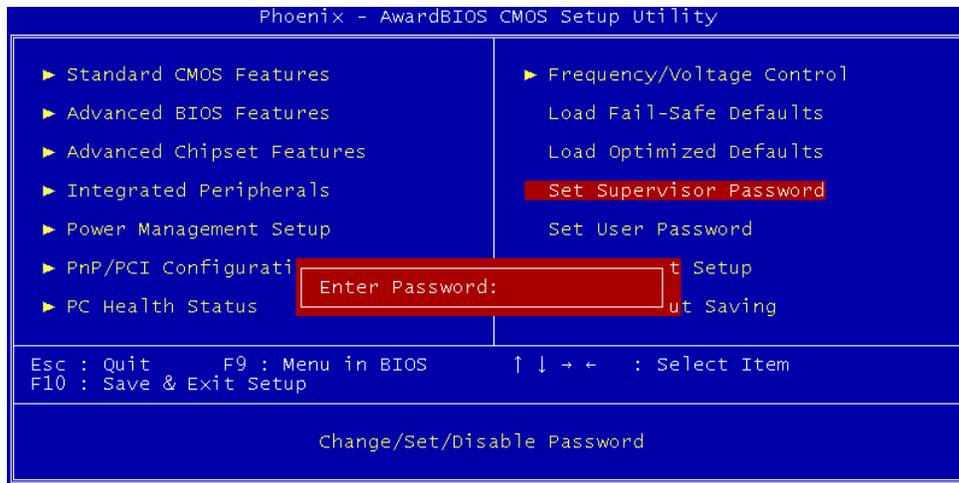
## Setting Supervisor/User Password

The Set Supervisor Password items let you set passwords for system access. The Supervisor password prevents access to the CMOS Setup utility.

Set a password as follows:

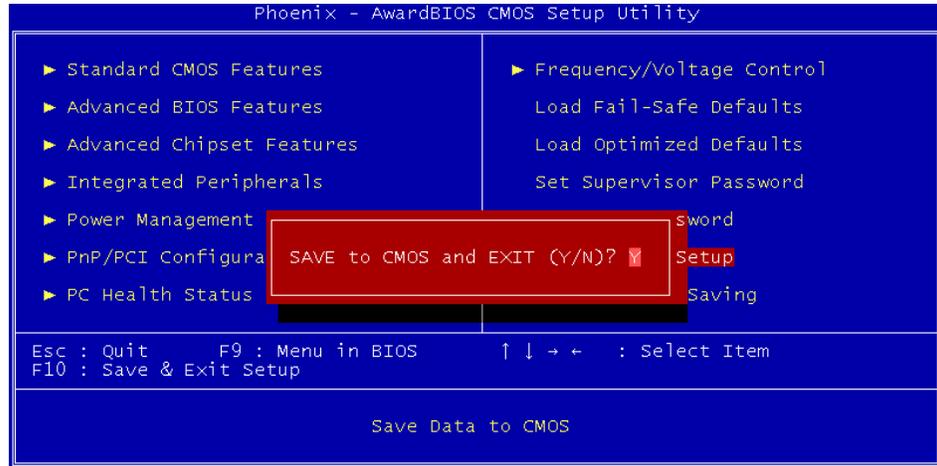
1. Choose either Set Supervisor Password item or the Set User Password item in the main screen and press Enter. A password dialog box appears.
2. To enter a new password type in the password using no more than eight characters or numbers and press Enter.
3. A dialog box asks you to confirm the new password by typing it in a second time. Type the password again and press Enter, or just press Enter if you are deleting a password. The password is then recorded. After bringing up the password dialog box you decide not to set a password, press the Enter key, not the Esc key, to exit the password dialog box.

Note: the password is case sensitive. To delete a password, press enter when the password dialog box appears and just press "Enter" from keyboard.



## Save & Exit Setup

Entering “Y” and pressing Enter saves the current utility configuration as a new record, exits the utility and restarts the system using the saved configuration record.



## Quit Without Saving

This item lets you exit the utility and restart the system without changing the saved configuration record.

