

**945PDG / 945GDG**

***USER'S MANUAL***

***M/B For LGA 775 Pentium 4 Processor***

***NO. G03945GDG0665***

***Rev:2.0***

**Release date: October 2005**

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## Manual Revision Information

Reversion	Revision History	Date
2.0	Second Edition	November 2005

## Item Checklist

- 945PDG / 945GDG Motherboard
- Cable for IDE/Floppy
- CD for motherboard utilities
- Cable for USB Port 3/4 (Option)
- SPDIF-IN/SPDIF-OUT Adaptor (Option)
- Cable for Serial ATA IDE Port
- 945PDG / 945GDG User's Manual

## Intel Pentium 4 Processor Family Cooling Solutions

As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly crucial when building computer systems. Maintaining the proper thermal environment is key to reliable, long-term system operation. The overall goal in providing the proper thermal environment is keeping the processor below its specified maximum case temperature. Heat sinks induce improved processor heat dissipation through increased surface area and concentrated airflow from attached fans. In addition, interface materials allow effective transfers of heat from the processor to the heatsink. For optimum heat transfer, Intel recommends the use of thermal grease and mounting clips to attach the heatsink to the processor.

When selecting a thermal solution for your system, please refer to the website below for collection of heat sinks evaluated and recommended by Intel for use with Intel processors. Note, those heat sinks are recommended for maintaining the specified Maximum T case requirement. In addition, this collection is not intended to be a comprehensive listing of all heat sinks that support Intel processors.

For vendor list of heatsink and fan, please visit :

<http://developer.intel.com/design/Pentium4/components/index>

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# Chapter 1

## Introduction of 945 Motherboard Series

### 1-1 Feature of motherboard

The 945 motherboard series are based on Intel 945P / 945G Express chipset and Intel FW82801GR ICH chipset technology which supports the innovative 90nm Dual-Core Intel® Pentium® D Processor 840, 830, and 820 with Intel® Hyper-Threading Technology. The 945 motherboard series provide discreet (945P Express Chipset Based motherboard series, such as 945PDG.) and integrated GMA 950 (Graphics Media Accelerator 950 is only for the 945G Express Chipset Based Motherboard Series, such as 945GDG.) solutions to deliver the outstanding system performance with of the benefits from reliable multi-tasking dual core Intel® Pentium® D Processor through the high bandwidth of dual channel DDR2 667MHz memory which is expandable to 4.0GB DIMM support, the 945 motherboard series meet the demanding usage of computing today and the future..

These motherboards implement Intel 945P / 945G Express Chipset which supports Front Side Bus 533MHz / 800MHz / 1066MHz of data transferring and offer with 133MHz / 166MHz / 200 MHz / 266 MHz memory clock frequency for Dual channel DDR2 400/533/667MHz DIMMs to increase memory performance. The whole motherboard series are embedded with ICH7R chipset to provide with one parallel Ultra ATA 100 interface for optical drives and four serial ATA2 interface of 3.0Gb / s data transfer rate with RAID0, 1, 0+1, and RAID10 functions.

945G / P motherboard series are designed with innovative Bi-GPU-Link technology which implements one PCI Express x16 slot and one PCI Express x4 slot for the graphic interfaces nowadays, and it offers full bandwidth of 16-lane and quarter bandwidth of 16-lane for the latest released PCI Express x16 compatible VGA cards of both NVIDIA and ATI. By running dual PCI Express graphic cards simultaneously, this motherboard provides the ability to connect to as many as four separate displays. Moreover the 945G motherboard series are also embedded with the integrated Intel GMA 950 graphics core that offers responsive graphics performance and stunning video playback.

945G / P motherboard series provide optional Gigabit LAN function by using the Marvell 88E8001 10 /100/1000 LAN NIC which supports 10M / 100M / 1Gbps data transfer rate. Embedded 8-channel High Definition Audio CODEC is fully compatible with Sound Blaster Pro® standards that offers you with the home cinema quality and absolutely software compatibility.

Embedded USB controller as well as capability of expanding to 8 of USB2.0 functional ports delivering 480Mb/s of rich connectivity, these motherboards meet the future USB demands which are also equipped with hardware monitor function on system to monitor and protect your system and maintain your non-stop business computing.

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Some special features---**CPU Thermal Throttling/ CPU Vcore 7-shift/ CPU Smart Fan/ Debug Port(Option)** in this motherboard are designed for power user to use the over-clocking function in more flexible ways. But please be caution that the over-clocking maybe cause the fails in system reliabilities. This motherboard provides the guaranteed performance and meets the demands of the next generation computing. But if you insist to gain more system performance with variety possibilities of the components you choose, please be careful and make sure to read the detailed descriptions of these value added product features, please get them in the coming section.

## 1-1.1 Special Features of motherboard

### **Bi-turbo Technology**---( Hardware-based Dynamic Over-clocking )

The Bi-turbo Technology offers you dual over-clocking modes. On top of the software based BIOS setting “Current CPU Clock” for over-clocking, the onboard hardware circuitry will monitor the change of CPU current to activate 2<sup>nd</sup> level over-clocking at preset workload level automatically. The Bi-turbo technology offers the versatility of both hardware-based intelligent automatic mode and power-manual mode for extra computing performance. Without complex settings from system BIOS, Bi-turbo provides the seeing promoted system performance by simple and intuitional BIOS setting. Bi-turbo technology offers more flexible ways to choose the over-clocking range of over-clocking activation by actually CPU hardware loading you define. *(for detail operating please read Section 3-11 Bi-turbo Configuration)*

### **Debug Port (Option for 945PDeluxe and 945GDeluxe)**--- ( The Professional Hardware Diagnosis System )

Being bugged of abnormal system failure through the tossed and turned nights no more, the embedded Hardware Debug Port offers you the real-time visual system healthy for the demanding usage of computing. No more bugging by unknown system failure and no more time wasted in the first moment of 24-hour nonstop ping business computing, the embedded Debug Port will turn you into a well training hardware professional with the seeing system situation. (The Post Code please refer Appendix)

### **CPU Thermal Throttling Technology**---(The CPU Overheat Protection Technology)

To prevent the increasing heat from damage of CPU or accidental shutdown while at high workload, the CPU Thermal Throttling Technology will force CPU to enter partially idle mode from 87.5% to 12.5% according to preset CPU operating temperature in BIOS (from 40°C to 90°C). When the system senses the CPU operating temperature reaching the preset value, the CPU operating bandwidth will be decreased to the preset idle percentage to cool down the processor. When at throttling mode the beeper sound can be optionally selected to indicate it is in working. *( for detail operating please read Section 3-11 Bi-turbo Configuration)*

### **CPU Smart Fan**---( The Noise Management System )

It's never been a good idea to gain the performance of your system by sacrificing its acoustics. CPU Smart Fan Noise Management System is the answer to control the noise level needed for now-a-day's high performance computing system. The system will automatically increase the fan speed when CPU operating loading is high, after the CPU is in normal operating condition, the system will low down the fan speed for the silent operating environment. The system can provide the much longer life cycle for both CPU and the system fans for game use and business requirements.

### **CPU Vcore 7 Shift**--- ( Shift to Higher Performance )

The CPU voltage can be adjusted up by 7 steps for the precisely over-clocking of extra demanding computing performance.

## 1-2 Specification

Spec	Description
<b>Design</b>	* ATX form factor 4 layers PCB size: 30.5x24.5cm
<b>Chipset</b>	* Intel 945P Memory Controller Hub (MCH) Chipset for 945PDG * Intel 945G Graphics Memory Controller Hub (GMCH) Chipset for 945GDG * Intel 82801GR I/O Controller Hub (ICH7R) Chipset
<b>CPU Socket (LGA775 Socket)</b>	* Support Intel Pentium 4 775-Land LGA Package utilizes Flip-Chip Land Grid Array (FCLGA4) package processor * Support FSB Frequency 533MHz/800/1066MHz * Support 5xx,6xx,8xx LGA 775 Pentium 4 processor Series * Reserves support for Dual-Core Intel Pentium 4 processors
<b>Memory Socket</b>	* 240-pin DDR2 RAM module socket x4 * Support Dual channel DDR2 667 / DDR2 533 / DDR2 400 RAM Module and which is expandable to 4.0GB.
<b>Integrate Intel Graphics Media Accelerator 950 (Only for 945GDG )</b>	* Integrated 256-bit graphics core running at 400MHz * Up to 224MB maximum video memory, 2048x1536@75 Hz maximum resolution, and DirectX 9 3D hardware acceleration * Up to 4 pixels per clock rendering * High Definition Hardware Motion Compensation to support high definition hi-bitrate MPEG2 media playback * Pixel Shader 2.0 supported * Media Expansion Cards available to add TV tuner and display output options
<b>Expansion Slots</b>	* PCI-Express x16 slot 1pcs delivers up to 8GB/s concurrent bandwidth for Bi-GPU-Link. * PCI-Express x4 slot 1pcs delivers up to 2GB/s concurrent bandwidth for Bi-GPU-Link. * PCI-Express x1 slot 2pcs delivers up to 512MB/s concurrent bandwidth * 32-bit PCI slot x 2pcs
<b>Integrate IDE and Serial ATA2 RAID</b>	* Two PCI IDE controllers support PCI Bus Mastering, ATA PIO/DMA and the ULTRA DMA 33/66/100 functions that deliver the data transfer rate up to 100 MB/s; four Serial ATA ports provide 300 MB/sec data transfer rate with RAID 0, 1, 0+1, and 10 functions
<b>Gigabit LAN</b>	* Integrated Marvell 88E8001CL PCI Gigabit LAN. * Supports Fast Ethernet LAN function provide 10Mb/100Mb/ 1Gb /s data transfer rate
<b>Audio</b>	* Realtek ALC880 8-channel High Definition Audio Codec integrated * Support 8-channel 3D surround & Positioning Audio * SPDIF-In/ SPDIF-Out Optical support (Cable optional) * Audio driver and utility included
<b>BIOS</b>	* Award 4MB Flash ROM
<b>Multi I/O</b>	* PS/2 keyboard and PS/2 mouse connectors * Floppy disk drive connector x1 * Parallel port x1, Serial port x2 for 945PDG motherboards * Parallel port x 1, Serial port x 1, D-Sub connector x 1 for 945GDG motherboards * USB 2.0 connector x 2, headers x4 (connecting cable option) * 8-channel High Definition Audio connector (Line-in, MIC, 4x Line-Out)

## 1-3 Performance List

The following performance data list is the testing result of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users (the different Hardware & Software configuration will result in different benchmark testing results.)

### Performance Test Report

**CPU:** Intel Pentium 4 Prescott 3.4G(CIE)  
**DRAM:** PMI SAMSUNG 512M DDR2-533 X 2 1Gbyte Memory  
 TwinMOS Hynix Hy5du56822CT 512M DDR400 X 2 (1Gbyte) Memory  
**On Board VGA:** Nvidia Geforce 6600GT 128M (1024X768X32BIT Color)  
**Hard Disk Driver:** Seagate Barracude 7200.7 SATA150  
**BIOS:** Award Optimal default  
**OS:** Win XP Professional (Service Pack 2)

	<b>945P / 945G Dual Channel</b>
3D Mark 2001SE	17692
3D Mark 2003	8694
3D Mark 2005	3655
AQUAMRK3 (GFX / CPU)	54790 (7767 / 9298)
PCMark2004	
System / CPU / Memory	5072 / 5194 / 5035
Graph / HDD	4178 / N/A
Content Creation Winstone 2004	28.5
Business Winstone 2004	17.6
Winbench 99 V2.0:	
Business/Hi-end Disk Winmark99	14200 / 39500
Business/Hi-end Graphic Winmark	729 / 1490
SISMark 2004: SISMark Rating(Internet Content Creation / Office Productivity )	
SISMark 2004	212 / 271
3D Creation / 2D Creation	192
/ Web publication	180 / 205
Communication / Document Creation	200
/ Data Analysis	212 / 271
SISOFT Sandra 2004 : 1.CPU Arithmetic Benchmark 2.Memory bandwidth Benchmark 3.CPU Multi-Media Benchmark	
1.Dhrystone ALU MIPS	10024
Whetstone FPU iSSE2 FLOPS	4125 / 6995
2.Int/Float Buffered iSSE2 MB/S	4815 / 4819
3.Integer/Floating-Point SSE2 IT/S	24495 / 32393
UT2003 Benchmark (flyby/botmatch)	238.27 / 83.40
DOOM3 FPS	90.4
Super Pi (1M) Second	38s
CPUZ System / Memory/CPU MHZ	200/266/3400





## Jumpers

Jumper	Name	Description	Page
JBAT	CMOS RAM Clear	3-pin Block	P.7
JP1	Keyboard Power On Enable/Disabled	3-pin Block	P.8
JP2/JP3	USB Power On Enable/Disabled	3-pin Block	P.8

## Connectors

Connector	Name	Description	Page
ATXPWR	ATX Power Connector	24-pin Block	P.22
ATX12V	ATX 12V Power Connector	4-pin Block	P.23
UL1	RJ45 LAN Port Over USB Conn.	RJ-45 Connector	P.23
UL2	USB Conn.	USB Connector	P.23
PS2 KB/MOUSE	PS/2 Mouse & PS/2 Keyboard Connector	6-pin Female	P.23
PARALLEL	Parallel Port Connector	25-pin Female	P.23
J1	Audio Line In/Out MIC Connector	6 phone jack Connector	P.23
VGA (for 945GDG)	VGA Display Connector	15-pin Female Connector	P.23
COM2 (for 945PDG)	Serial Port COM2 Connector	9-pin Connector	P.24
COM1	Serial Port COM1 Connector	9-pin Connector	P.24
FLOPPY	Floppy Driver Connector	34-pin Block	P.24
IDE1	Ultra DMA 100 IDE Connector	40-pin Block	P.24
SATA1~4	Serial-ATA2 Port Connector	7-pin Block	P.25

## Headers

Header	Name	Description	Page
AUDIO	Line-Out, MIC Headers	9-pin Block	P.25
USB2 / USB3	USB Port Headers	9-pin Block	P.25
SPEAK	Speaker connector	4-pin Block	P.26
FP (Power LED/Reset/ IDE LED/ Power Button)	Front Panel Header (including Power LED/ IDE activity LED/ Reset switch / Power On Button lead)	9-pin Block	P.26
CPUFAN	CPUFAN Power Header	4-pin Block	P.26
SYSFAN1, SYSFAN2	FAN Power Headers	3-pin Block	P.26
IR	IR infrared module Headers	5-pin Block	P.27
CDIN	CD Audio-In Headers	4-pin Block	P.27
SPDIF	SPDIF In/Out Header	10-pin Block	P.27

## Expansion Sockets

Socket/Slot	Name	Description	Page
LGA 775 Socket	CPU Socket	LGA 775 CPU Socket	P.9
DIMM1, DIMM2 DIMM3, DIMM4	DDR2 Module Socket	240-pin DDR2 RAM Module Expansion Socket	P.19
PCI 1 ~ PCI 2	PCI Slot	32-bit PCI Local Bus Expansion slots	P.21
PE1	x16 PCI Express Slot	x16 PCI Express Expansion Slot	P.21
PE3	X4 PCI Express Slot	X4 PCI Express Expansion Slot	P.21
PE2 / PE4	x1 PCI Express Slot	x1 PCI Express Expansion Slot	P.21

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# Chapter 2

## Hardware Installation

### 2-1 Hardware Installation Steps

Before using your computer, you had better complete the following steps:

1. Check motherboard jumper setting
2. Install CPU and Fan
3. Install System Memory (DIMM)
4. Install Expansion cards
5. Connect IDE and Floppy cables, Front Panel /Back Panel cable
6. Connect ATX Power cable
7. Power-On and Load Standard Default
8. Reboot
9. Install Operating System
10. Install Driver and Utility

### 2-2 Checking Motherboard's Jumper Setting

#### (1) CMOS RAM Clear (3-pin) : JBAT

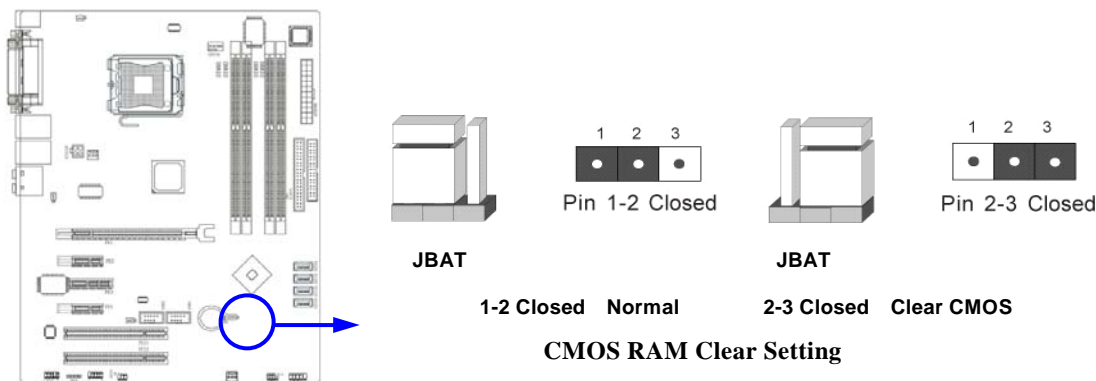
A battery must be used to retain the motherboard configuration in CMOS RAM short 1-2 pins of JP4 to store the CMOS data.

To clear the CMOS, follow the procedure below:

1. Turn off the system and unplug the AC power
2. Remove ATX power cable from ATX power connector
3. Locate JP4 and short pins 2-3 for a few seconds
4. Return JP4 to its normal setting by shorting pins 1-2
5. Connect ATX power cable back to ATX power connector

**Note: When should clear CMOS**

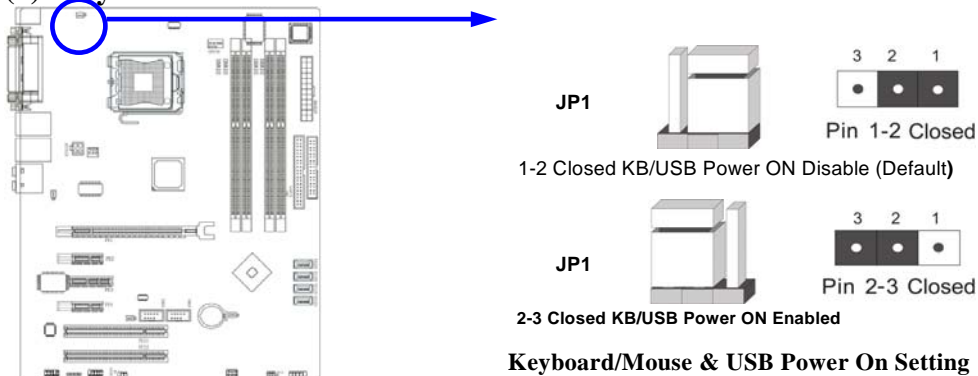
1. **Troubleshooting**
2. **Forget password**
3. **After over clocking system boot fail**



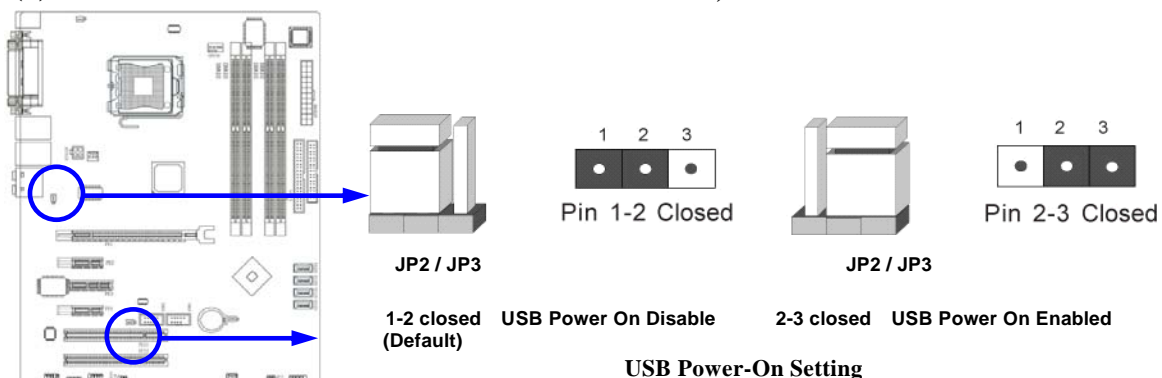
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## (2) Keyboard function Enabled/Disabled: JP1



## (3) USB Power On function Enabled/Disabled: JP2, JP3



## 2-3 Install CPU

### 2-3-1 Glossary

**Chipset (or core logic)** - two or more integrated circuits which control the interfaces between the system processor, RAM, I/O devices, and adapter cards.

**Processor slot/socket/LGA** - the slot or socket used to mount the system processor on the motherboard.

**Slot (PCI-E, PCI, RAM)** - the slots used to mount adapter cards and system RAM.

**PCI - Peripheral Component Interconnect** - a high speed interface for video cards, sound cards, network interface cards, and modems; runs at 33MHz.

**PCI Express- Peripheral Component Interconnect Express-** a high speed interface for video cards, sound cards, network interface cards, and modems

**Serial Port** - a low speed interface typically used for mouse and external modems.

**Parallel Port** - a low speed interface typically used for printers.

**PS/2** - a low speed interface used for mouse and keyboards.

**USB - Universal Serial Bus** - a medium speed interface typically used for mouse, keyboards, scanners, and some digital cameras.

**Sound (interface)** - the interface between the sound card or integrated sound connectors and speakers, MIC, game controllers, and MIDI sound devices.

**LAN (interface) - Local Area Network** - the interface to your local area network.

**BIOS (Basic Input/Output System)** - the program logic used to boot up a computer and establish the relationship between the various components.

**Driver** - software, which defines the characteristics of a device for use by another device or other software.

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**Processor** - the "central processing unit" (CPU); the principal integrated circuit used for doing the "computing" in "personal computer"

**Front Side Bus Frequency** - the working frequency of the motherboard, which is generated by the clock generator for CPU, DRAM and PCI BUS.

**CPU L2 Cache** - the flash memory inside the CPU, normally Athlon CPU has 256K or above, while Duron will have 64K.

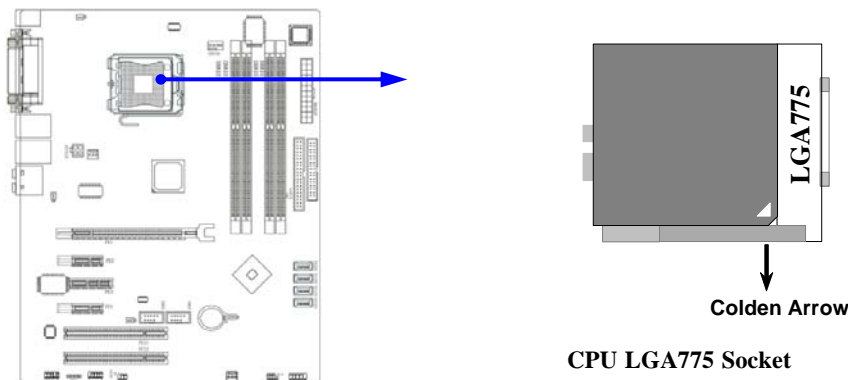
## 2-3-2 About Intel Pentium 4 LGA775 CPU

This motherboard provides a 775-pin surface mount, LGA775 Land Grid Array socket, referred to as the LGA775 socket supports Intel Pentium 4 processor in the 775 Pin package utilizes Flip-Chip Land Grid Array (FC-LGA4) package technology.

The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

**WARNING!** Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the LGA775 socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.



When you put the CPU into the LGA775 socket. No force require to insert of the CPU, then press the level to Locate position slightly without any extra force.

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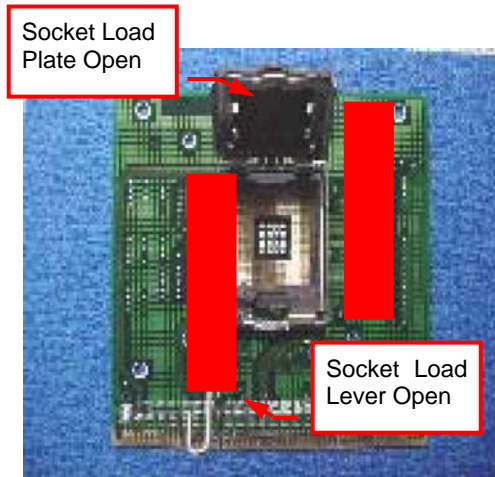
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## 2-3-3 LGA 775 CPU Installation Guide

### Socket Preparation

#### 1. Opening the socket:

**Note:** Apply pressure to the corner with right hand thumb while opening/closing the load lever, otherwise lever can bounce back like a “mouse trap” and WILL cause bent contacts (when loaded)



- i. Disengage Load Lever by **depressing down** and **out** on the hook to clear retention tab
- ii. Rotate Load Lever to fully open position at approximately 135degrees
- iii. Rotate Load Plate to fully open position at approximately 100degrees

#### 2. Remove PnP Cap (Pick & Place Cap)

- i. With left hand index finger and thumb to support the load plate edge, engage PnP cap with right hand thumb and peel the cap from LGA775 Socket while pressing on center of PnP cap to assist in removal.
- ii. Set PnP cap aside. Always put PnP cap back on if the processor is removed from the socket.
- iii. Visually inspect PnP cap for damage. If damage observed, replace the PnP cap.



**Note:** After PnP cap removal, make sure socket load plate and contacts are free of foreign material; Refer to Overview Module for FM cleaning.

**Note:** Optionally, remove PnP cap after CPU insertion. This will compromise the ability to visually inspect socket.

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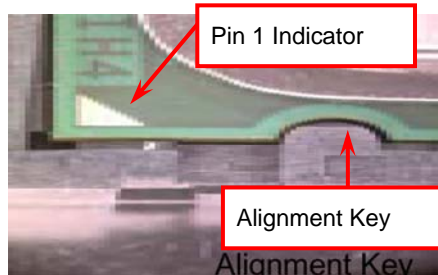
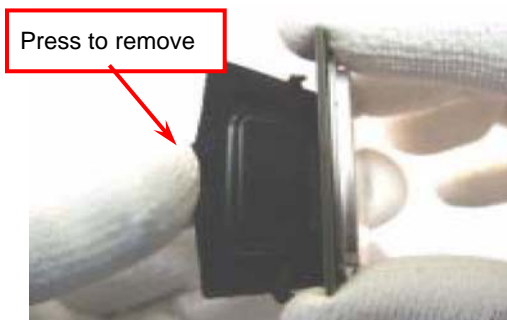
### 3. Visually inspect for bent contacts (Recommend at least 1stpass visual inspection)

**NOTE:** Refer to the Handling and Inspection Module for 1st and 2nd pass inspection details.

**NOTE:** Glove images are for illustrative purposes only. Please consult local safety guidelines for specific requirements

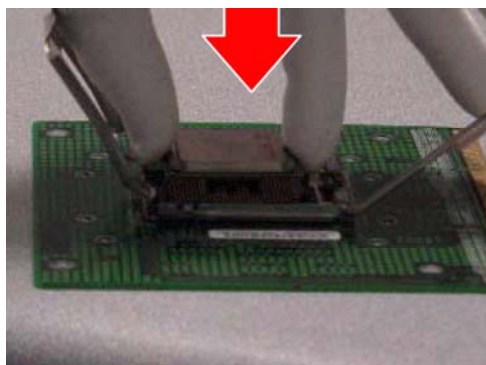
**NOTE:** Recommend not to hold the load plate as a lever, instead hold at tab with left hand, removing the PnP cap with right hand

## 775- Land LGA Package Insertion



1. Lift processor package from shipping media by grasping the substrate edges ONLY.  
**Note:** Orient processor package such that the Pin 1 triangle mark is on bottom left and both key notches are on left side
2. Land Side Cover Handling: Remove land side cover with the opposite hand by depressing larger retention tab and peeling the cover away
3. Set and reserve the land side cover aside.  
**Note:** Always keep the land side cover on the processor when not in the socket.
4. Visually inspect the package gold pads: Scan the processor package gold pad array for presence of foreign material. Refer to Overview Module for FM cleaning recommendations
5. Orient the package with IHS up. Locate Pin 1 and the two orientation key notches
6. Carefully place the package into the socket body using a purely vertical motion

**CAUTION:** Using Vacuum Pen for installation is *not* recommended

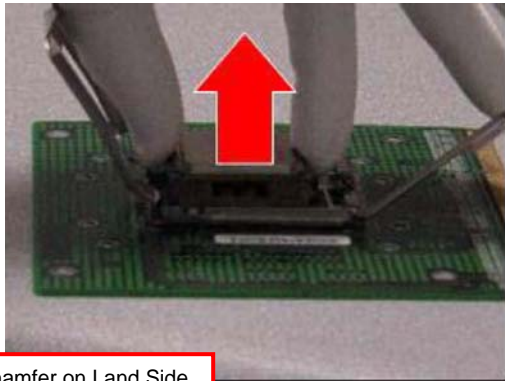


7. Verify that package is within the socket body and properly mated to the orient keys
8. Close the socket by
  - i. Rotating the Load Plate onto the package HIS
  - ii. While pressing down lightly on Load Plate, engage the Load Lever.
  - iii. Securing Load Lever with Load Plate tab under retention tab of Load Lever

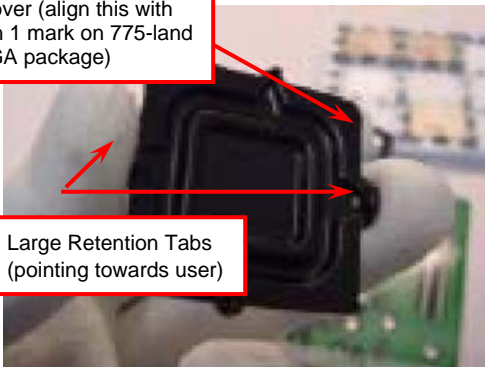




## 775- Land Package Removal



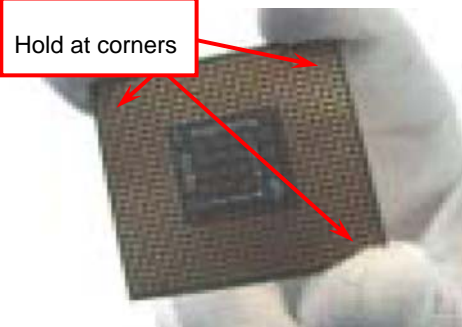
Chamfer on Land Side Cover (align this with pin 1 mark on 775-land LGA package)



Large Retention Tabs (pointing towards user)

onto

Hold at corners



1. Open the Load Plate/Lever with both hands:
  - With left hand index finger and thumb to support the load plate edge, engage PnP cap with right hand thumb and peel the cap from LGA775 Socket while pressing on center of PnP cap to assist in removal.
2. Pick up 775-land LGA package:
  - By Vacuum Pen: Place a minimum 9-mm cup at approximately the center of IHS.
  - Recommend not to place Vacuum Pen on IHS edge. Risk of dropping and causing bent contact.
  - Recommend not to use Vacuum Pen for inserting CPU By Hand: Index finger to hold load plate hinge side and thumb to hold load lever side
3. Lift the package straight up and away.
4. Assemble processors land side cover immediately to prevent contamination.
  - i. While holding the processor by the 3 corners, the other hand lift land side cover from work surface by grasping at the large retention tabs. Ensure retention tabs and package are pointing each other.
  - ii. Orientate so that land side cover chamfer is matching with package Pin 1 location.
  - iii. Hook the first large retention tab on the package substrate. Then press the opposite tab onto the substrate.
  - iv. Place processor with land side cover installed onto proper shipping media or other ESD approved work surface

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## 5. Visually inspect socket contact array

### 1. First Pass Inspection

- i. Scan socket contact array at varying angles noting the presence of any foreign material
- ii. If foreign material can't be blown off by compressed air, or mechanical damage (Mode1 or 4) observed, reject the motherboard for further evaluation or socket replacement.

### 2. Second Pass Inspection

- i. Repeat 2 more times to sight down the rows and columns from each of the 4 sides of the socket to ensure all contacts within the array are inspected
- ii. Inspect for Mode2, Mode3, and Mode5 failures

**Note:** Refer to the Test Module for detail visual inspections

## 6. Assemble LGA775 socket PnP cap

- i. Secure/Hook the back side of PnP cap.
- ii. Snap down the front side to fully secure

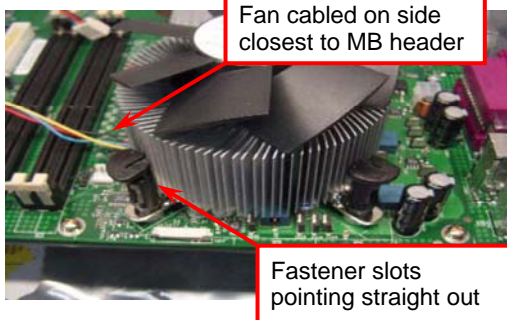
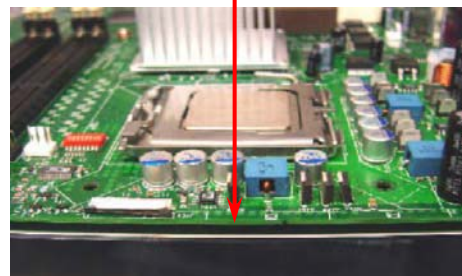
## 7. Close the Socket

## Intel Reference Thermal Solution Assembly

**NOTE:** Depending on the configuration, Thermal Solution Integration procedure could perform with M/B alone or with M/B in the Chassis.



0.150-inch backside clearance for fastener installation

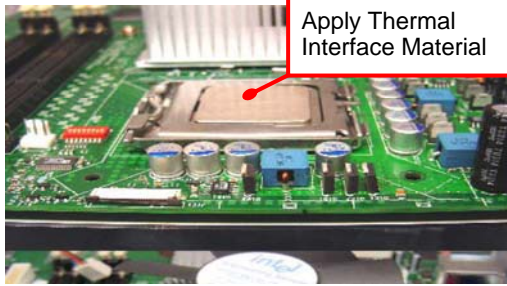


Fan cabled on side closest to MB header

Fastener slots pointing straight out

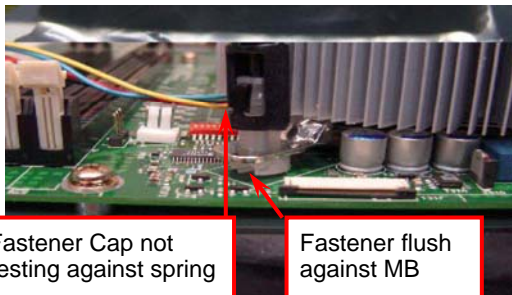
1. Place motherboard on support structure providing minimum 0.150-inch backside clearance
2. Apply 300 mg of Thermal Interface Material (Shin-Etsu G751) onto center of IHS





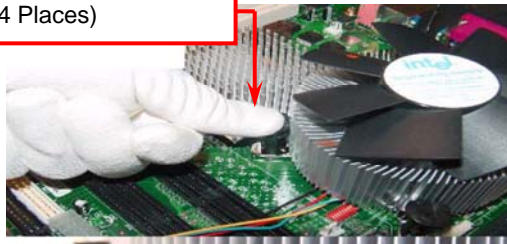
**NOTE:** Thermal Solutions that come with Intel® boxed processor use pre-applied thermal interface material and not grease.

3. Remove Heat Sink (HS) from packaging media
4. Place HS onto the LGA775 Socket
  - Ensure fan cables are oriented on side closest to fan header
  - Align Fasteners with MB through-holes



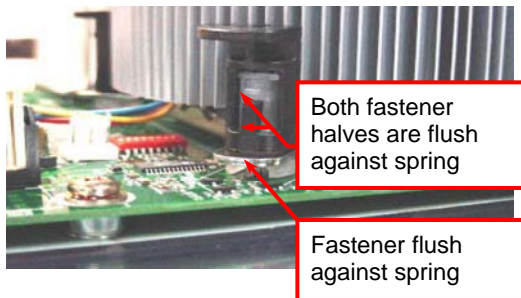
5. Inspection
  - Ensure cables are not trapped or interfere fastener operation
  - Ensure fastener slots are pointing straight out from heatsink

Press Down  
(4 Places)



6. Actuate fasteners
    - While holding HS to prevent tilting, press down on fastener caps with thumb to install and lock
- Repeat with remaining fasteners

7. Inspection
  - Verify the fasteners are properly seated
  - Ensure both fastener cap and base are flush with spring and motherboard
8. Connect fan header with Board header



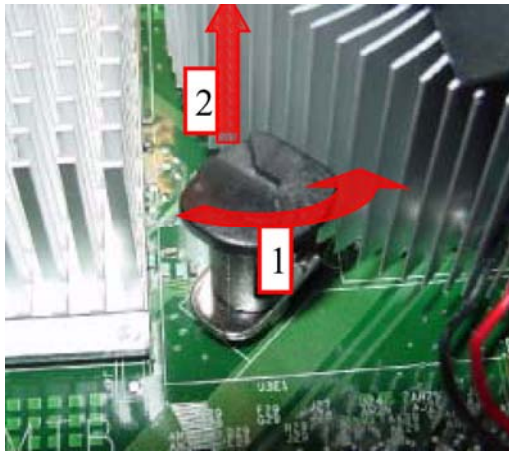
9. Secure excess cable with tie-wrap to ensure cable does not interfere with fan operation or contact other components.



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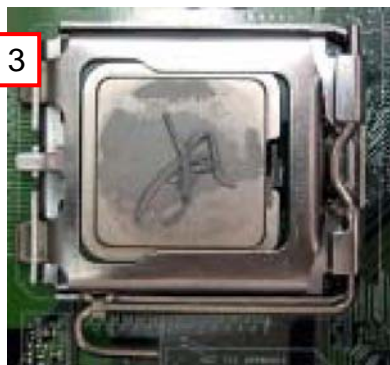
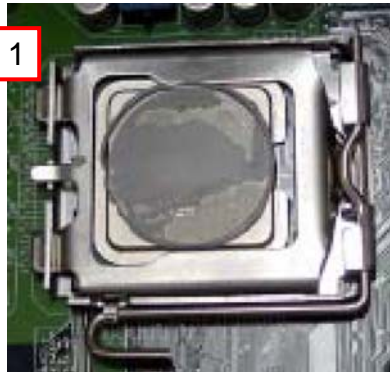
## Intel Reference Thermal Solution Disassembly

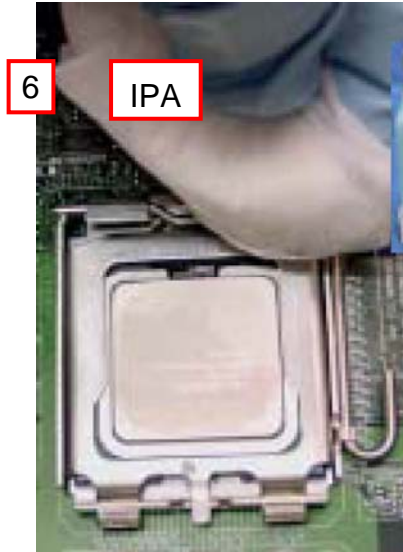


1. Rotate fastener cap. turn to un-lock
  2. Pull up fastener cap to un-seat
1. Disconnect fan cable from motherboard header
  2. Turn fastener caps (4) counter-clock wise 90degrees to the un-locked position
    - A flat-bladed screwdriver may be used if required
  3. Pull up on fastener caps to unseat
  4. Manually remove HS with gentle twist motion.
  5. To re-assemble the HS, reset the fastener caps to their original position with the slot perpendicular to the HS. Then, follow the assembly instructions.

**Note:** Thermal grease should be reapplied

## TIM and Grease Removal from CPU



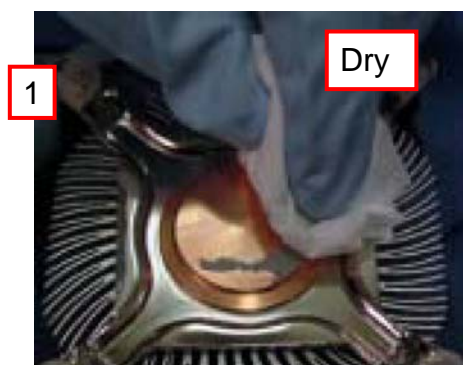


1. Remove the heatsink from the socket
2. Gently push loose thermal interface material (TIM) to center of processor (pictures 2 and 3)
3. Remove pieces with dry cloth (picture 4)
4. Wipe with dry, lint-free cloth to remove most of the material (picture 5)
5. Wet another lint-free cloth with isopropyl alcohol (IPA) and wipe to clean remaining material (picture 6)
6. Be careful to remove material from gaps between processor and load plate
7. For thermal grease removal use Step 4-6

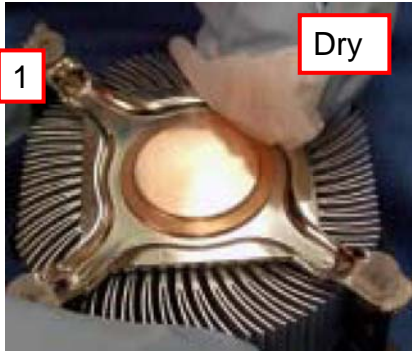
## TIM and Grease Removal from Heat-sink

**Note:** Remove and replace the TIM from the heatsink if you are re-using the heatsink on a new processor

1. Use dry, lint-free cloth and wipe package to remove most of the material
2. Wet another lint-free cloth with isopropyl alcohol (IPA) and wipe heatsink to clean remaining material







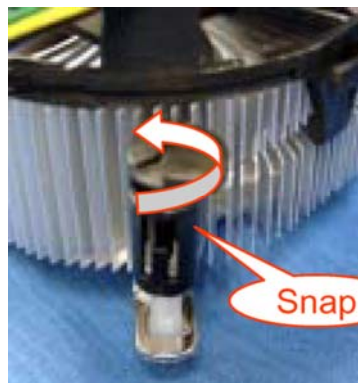
## Replacing Damaged Fasteners

- To prevent damage, avoid setting the thermal solution with the prongs down
  - Set on heatsink side or with fan down
- The plastic fasteners on the heatsink can be replaced.
  - Use Shop Intel to order spare fasteners
  - <http://www.shop-intel.com>
- To remove a damaged fastener

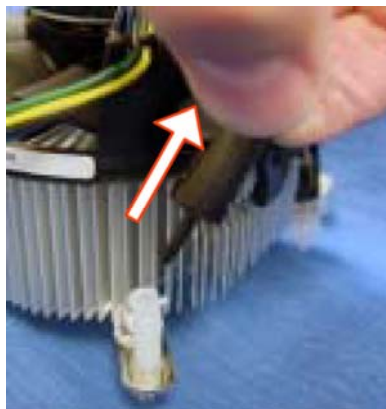
**Note:** Protective gloves are not required for this procedure

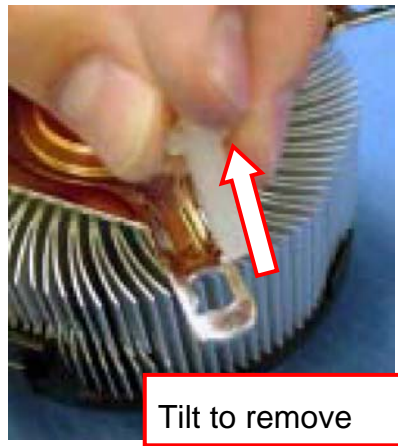
- Rotate the black pin counterclockwise until it “snaps”. There will be some resistance
- Remove the black pin from the white prong
- Tilt the white prong to remove it from the heatsink leg

Avoid damage, avoid placing prongs on hard surface



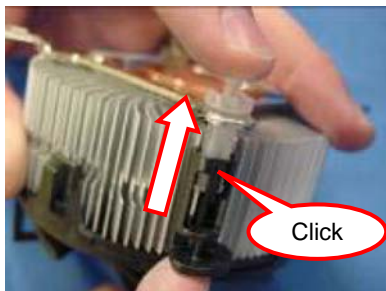
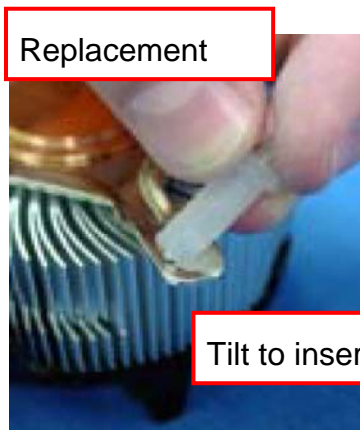
Damaged. Attempts to straighten not recommended





## Replacing Fasteners

- To **replace** the fastener
  - Start with the white prong
  - Note the “keying” notch feature
  - Tilt the prong to insert into the heatsink leg.
  - Holding the white prong without bending it, push the black pin on from the bottom until you hear a single “click”



**Note:** The black pin and white prong will only “snap” on in one orientation

- Check to ensure the black pin is rotated properly for installation with the slot perpendicular to the heat sink

## 2-4 Install Memory

This motherboard provides **four** 240-pin DDR2 DUAL INLINE MEMORY MODULES (DIMM) sockets for DDR2 memory expansion available from minimum memory volume of 128MB to maximum memory volume of 4.0GB DDR SDRAM.

### Valid Memory Configurations

Bank	184-Pin DIMM	PCS	Total Memory
Bank 0, 1 (DIMM1)	DDR2 400/DDR2 533/DDR2 667	X1	128MB~1.0GB
Bank 2, 3 (DIMM2)	DDR2 400/DDR2 533/DDR2 667	X1	128MB~1.0GB
Bank 4, 5 (DIMM3)	DDR2 400/DDR2 533/DDR2 667	X1	128MB~1.0GB
Bank 6,7 (DIMM4)	DDR2 400/DDR2 533/DDR2 667	X1	128MB~1.0GB
Total	System Memory (Max. 4.0GB)	4	128MB~4.0GB

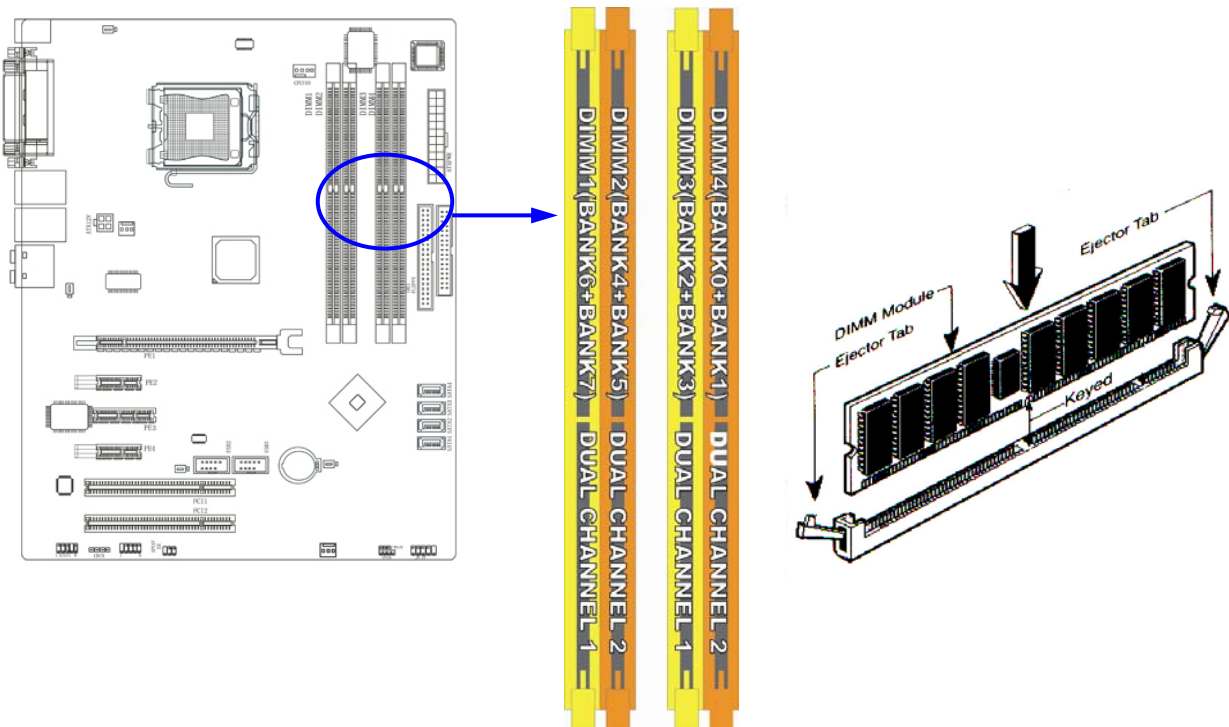
### Recommend DIMM Module Combination

1. **One DIMM Module** ---Plug in DIMM1
2. **Two DIMM Modules**---Plug in DIMM1 and DIMM2 for Dual channel function
3. **Four DIMM Modules**---Plug in DIMM1/DIMM2/DIMM3/DIMM4.

### For Dual channel Limited!

4. Dual channel function only supports when 2 DIMM Modules plug in either both DIMM1 & DIMM3 or DIMM2 & DIMM4, or four DIMM Modules plug in DIMM1~DIMM4.
5. DIMM1 & DIMM3, or DIMM2 & DIMM4 must be the same type, same size, same frequency for dual channel function.

Install DDR SDRAM modules to your motherboard is not difficult, you can refer to figure below to see how to install a 240-Pin DDR2 400/DDR2 533/DDR2 667 SDRAM module.



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**NOTE!** When you install DIMM module fully into the DIMM socket the eject tab should be locked into the DIMM module very firmly and fit into its indentation on both sides.

**WARNING!** For the DDR SDRAM CLOCK is set at 266MHz, use only DDR2 533- compliant DDR2 Modules. When this motherboard operate at 266Mhz, most system will not even boot if non-compliant modules are used because of the strict timing issues, if your DDR Modules are not DDR2 533-compliant, set the SDRAM clock to 133MHz to ensure system stability.

## 2-5 Expansion Cards

**WARNING!** Turn off your PC while adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

### 2-5-1 Procedure For Expansion Card Installation

1. Read the documentation for your expansion card and make any necessary hardware or software setting for your expansion card such as jumpers.
2. Remove your computer's cover and the bracket plate on the slot you intend to use.
3. Align the card's connectors and press firmly.
4. Secure the card on the slot with the screen you remove above.
5. Replace the computer system's cover.
6. Set up the BIOS if necessary.
7. Install the necessary software driver for your expansion card.

### 2-5-2 Assigning IRQs For Expansion Card

Some expansion cards need an IRQ to operate. Generally, an IRQ must exclusively assign to one use. In a standard design, there are 16 IRQs available but most of them are already in use.

#### Standard Interrupt Assignments

IRQ	Priority	Standard function
0	N/A	System Timer
1	N/A	Keyboard Controller
2	N/A	Programmable Interrupt
3 *	8	Communications Port (COM2)
4 *	9	Communications Port (COM1)
5 *	6	Sound Card (sometimes LPT2)
6 *	11	Floppy Disk Controller
7 *	7	Printer Port (LPT1)
8	N/A	System CMOS/Real Time Clock
9 *	10	ACPI Mode when enabled
10 *	3	IRQ Holder for PCI Steering
11 *	2	IRQ Holder for PCI Steering
12 *	4	PS/2 Compatible Mouse Port
13	N/A	Numeric Data Processor
14 *	5	Primary IDE Channel
15 *	1	Secondary IDE Channel

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

## 2-5-3 Interrupt Request Table For This Motherboard

Interrupt request are shared as shown the table below:

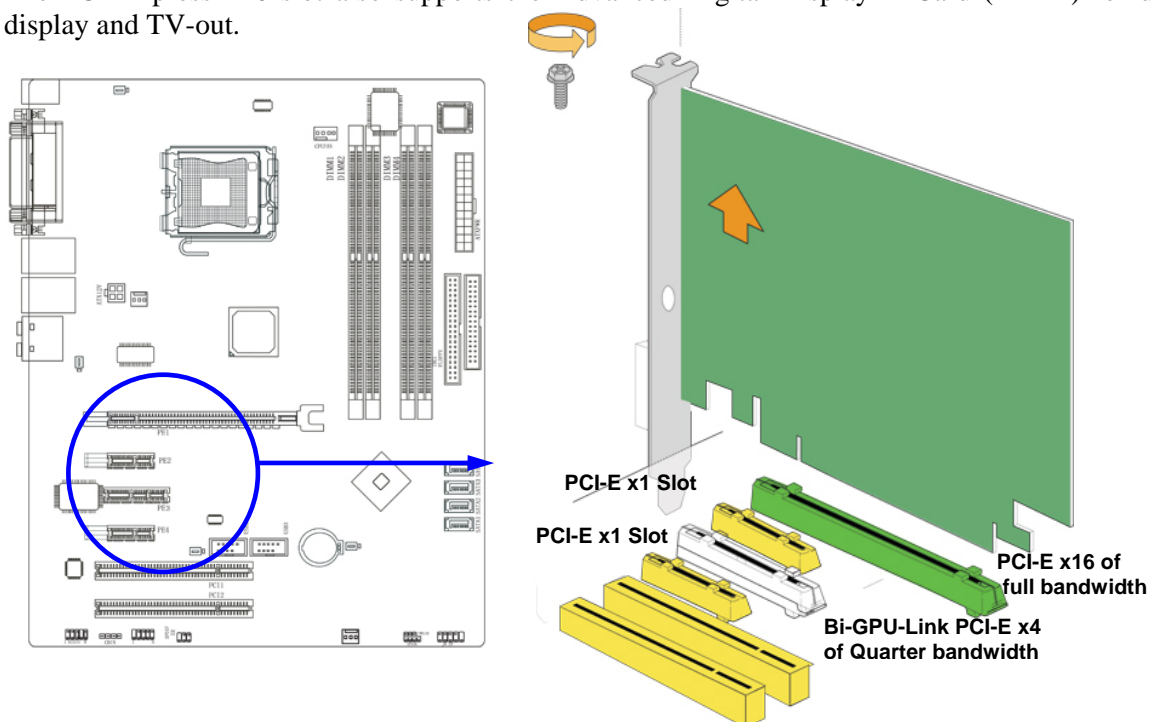
	INT A	INT B	INT C	INT D	INT E	INT F	INT G	INT H
Slot 1	√							
Slot 2		√						
Onboard VGA	√							
Onboard LAN					√			
Onboard USB 1								√
Onboard USB 2				√				
Onboard USB 3			√					
Sound		√						

### IMPORTANT!

If using PCI cards on shared slots, make sure that the drivers support “Shared IRQ” or that the cards don’t need IRQ assignments. Conflicts will arise between the two PCI groups that will make the system unstable or cards inoperable.

## 2-5-4 PCI Express Slot

This motherboard is embedded advanced “Bi-GPU-Link” technology which implements one PCI Express x16 slot and one PCI Express x4 slot for the graphic interfaces nowadays, and it offers full bandwidth of 16-lane and quarter bandwidth of 16-lane for the latest released PCI Express x16 compatible VGA cards of both NVIDIA and ATI. By running dual PCI Express graphic cards simultaneously, this motherboard provides the ability to connect to as many as four separate displays; it also provides one PCI Express x1 slot and 2 32-bit PCI slots for peripherals connectivity. The PCI Express x16 slot also supports the Advanced Digital Display II Card (ADD2) for digital display and TV-out.





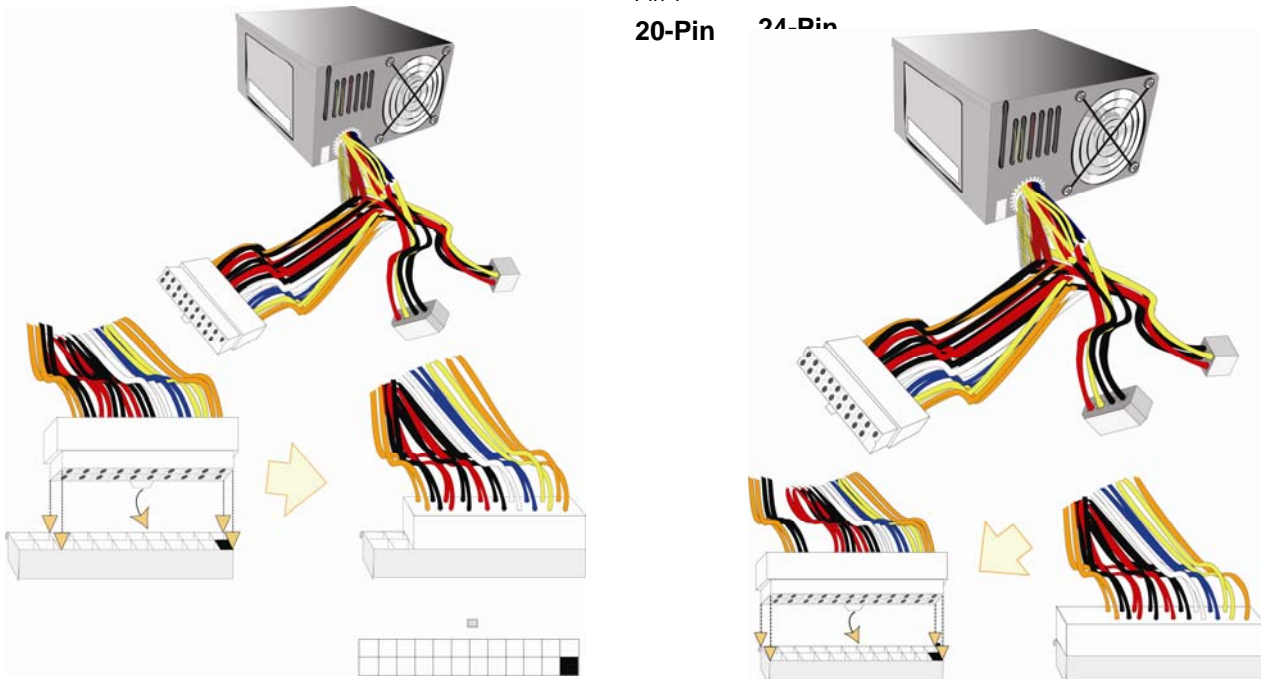
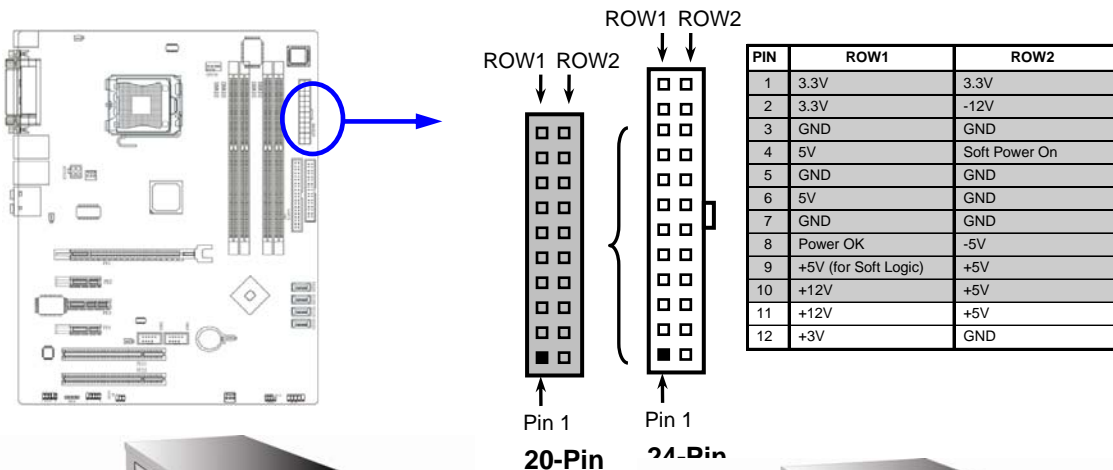
## 2-6 Connectors, Headers

### 2-6-1 Connectors

#### (1) Power Connector (24-pin block) : ATXPWR24P

ATX Power Supply connector. This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows to use soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

- \*\* We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.
- \*\* If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.

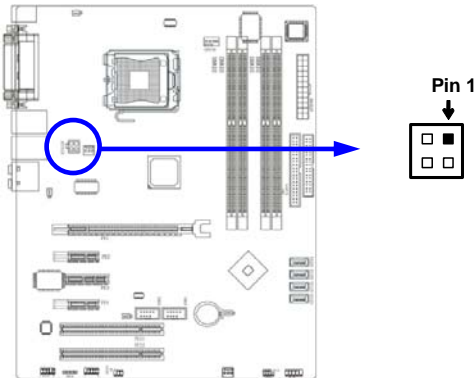


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(2) **ATX 12V Power Connector (4-pin block) : ATX12V**

This is a new defined 4-pins connector that usually comes with ATX Power Supply. The ATX Power Supply which fully support Pentium 4 processor must including this connector for support extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.



(3) **USB Port connector: UL2 (USB)**

The connectors are 4-pin connector that connect USB devices to the system board.

(4) **LAN Port connector: UL1**

This connector is standard RJ45 over USB connector.

(5) **PS/2 Mouse & PS/2 Keyboard Connector: KB (PS2 KB/MOUSE)**

The connectors for PS/2 keyboard and PS/2 Mouse.

(6) **Parallel Port Connector (25-pin female): PARALLEL**

Parallel Port connector is a 25-pin D-Subminiature Receptacle connector. The On-board Parallel Port can be disabled through the BIOS SETUP. Please refer to Chapter 3 "INTEGRATED PERIPHERALS SETUP" section for more detail information.

(7) **VGA Connector (15-pin D-Sub) Connector: VGA (for 945GDeluxe and 945GDG)**

VGA is the 15-pin D-Subminiature female connector for the connecting of displays.

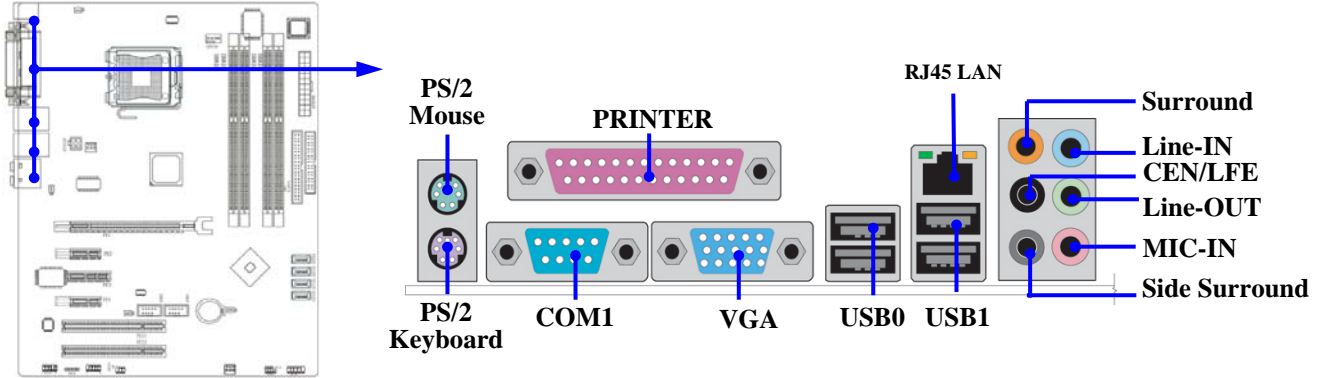
(8) **Audio Line-In, Lin-Out, MIC, Surrback, Surround, GEN/LEF Connector : J1**

This Connector are 6 phone Jack for LINE-OUT, LINE-IN, MIC, Surrback, Surround, GEN/LEF

<b>Line-out : (GREEN)</b>	Audio output to speaker
<b>Line-in : (BLUE)</b>	Audio input to sound chip
<b>MIC : (PINK)</b>	Microphone Connector
<b>Surround : (ORANGE)</b>	Audio output to speaker-Rear speaker out
<b>CEN / LFE : (BLACKNESS)</b>	Audio output to speaker-Center/Subwoofer speaker out
<b>Side Surround: (GRAY)</b>	Audio output to speaker-Side speaker out

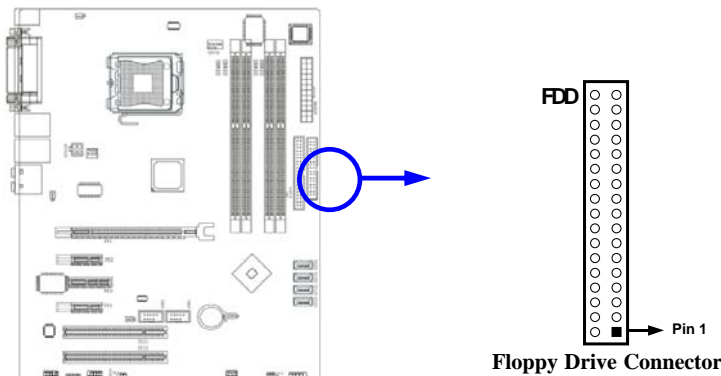
**(9) Serial Port COM1/COM2(COM2 only for 945PDG):**

COM1 / COM2 is the 9-pin D-Subminiature male connector. The On-board serial port can be disabled through BIOS SETUP. Please refer to Chapter 3 “INTEGRATED PERIPHERALS SETUP” section for more detail information.



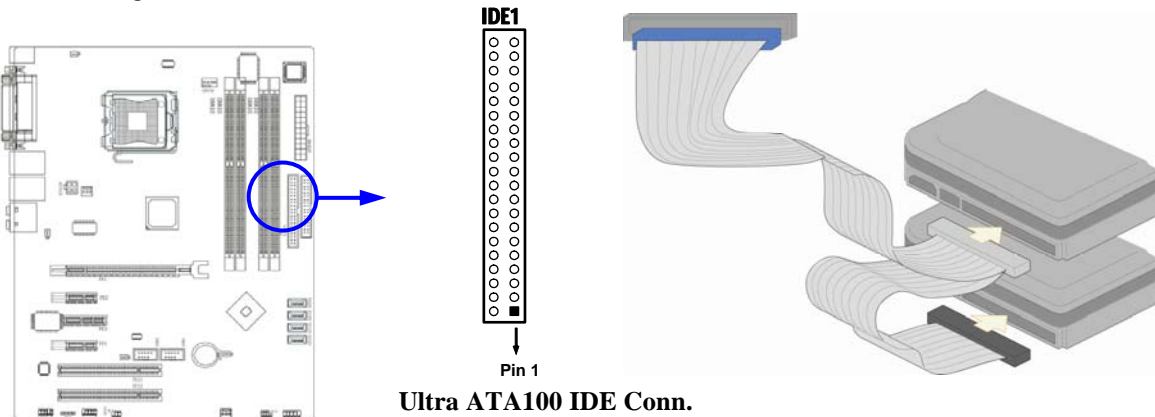
**(10) Floppy drive Connector (34-pin block): FDD**

This connector supports the provided floppy drive ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to the floppy drives.



**(11) Ultra ATA100 IDE Connector (40-pin block): IDE1 (Support ATA 100)**

This connector supports the provided IDE hard disk ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to your hard disk(s). If you install two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumper settings.

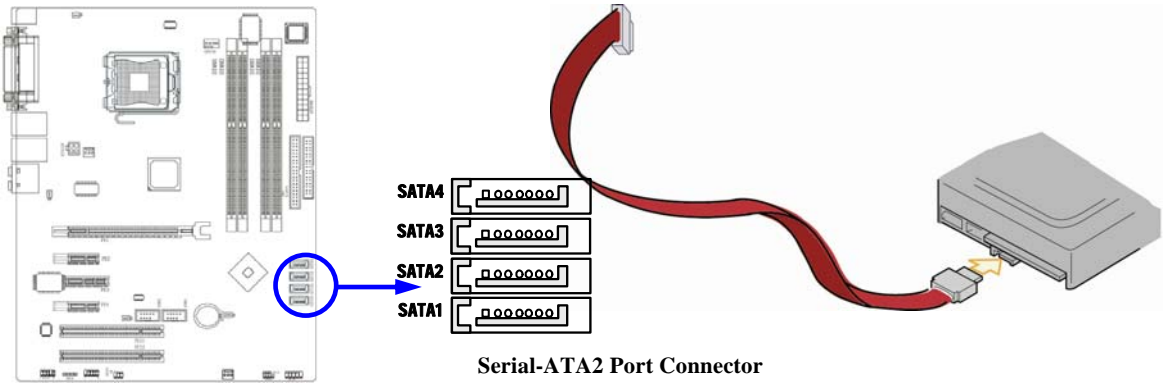


- Two hard disks can be connected to each connector. The first HDD is referred to as the “Master” and the second HDD is referred to as the “Slave”.

- For performance issues, we strongly suggest you don't install a CD-ROM or DVD-ROM drive on the same IDE channel as a hard disk. Otherwise, the system performance on this channel may drop.

**(12) Serial-ATA2 Port connector: SATA1/SATA2/SATA3/SATA4**

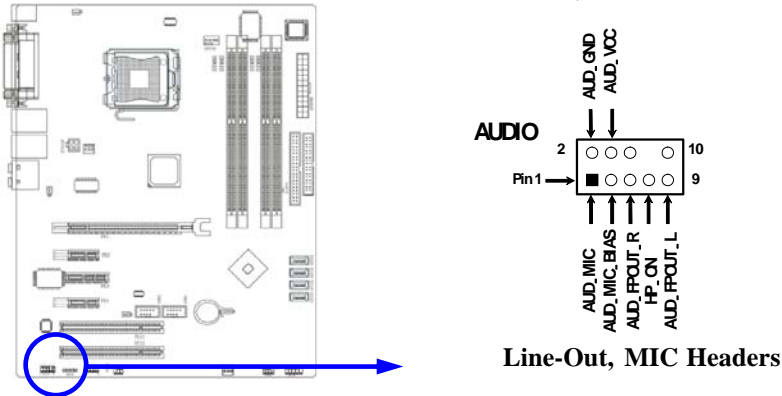
This connector supports the provided Serial ATA2 IDE hard disk cable connect to the motherboard and serial ATA hard disk.



## 2-6-2 Headers

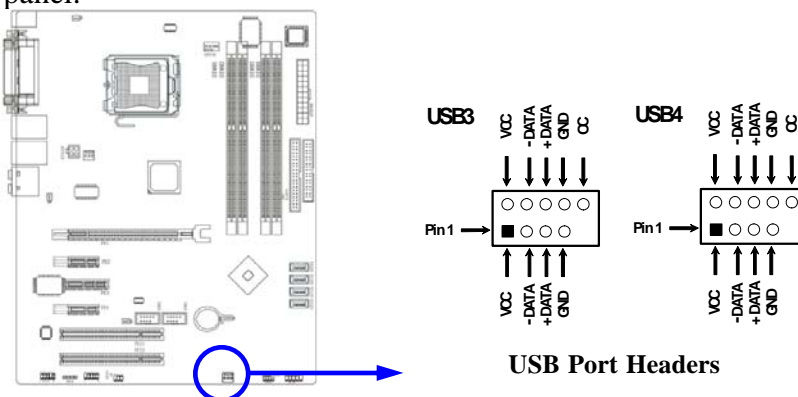
**(1) Line-Out, MIC Header (9-pin): AUDIO**

This header connect to Front Panel Line-out, MIC connector with cable.



**(2) USB Port Headers (9-pin) : USB2, USB3**

The header is used for connecting the additional USB port plug. By attaching an option USB cable, your can be provided with two additional USB plugs affixed to the back panel.



**(3) IDE Activity LED: IDE LED**

This connector connects to the hard disk activity indicator light on the case.

**(4) Reset switch led: RESET**

This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the life of the system's power supply. See the figure below.

**(5) Power LED: PWR-LED**

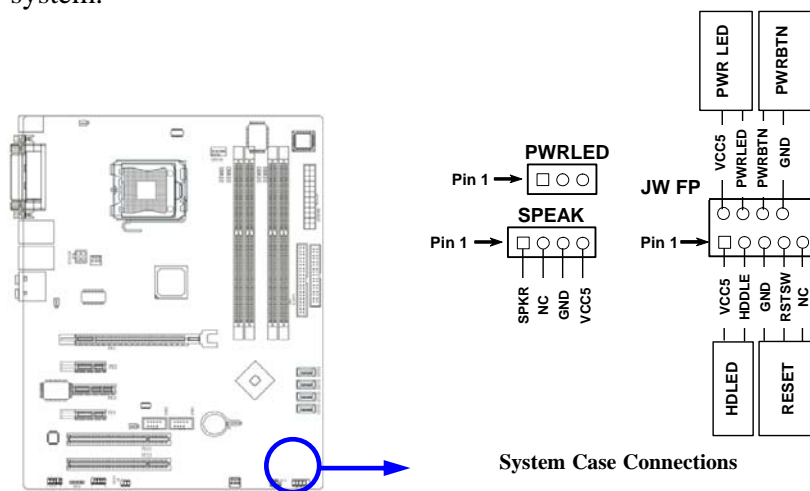
The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin.

**(6) Speaker connector: SPEAK**

This 4-pin connector connects to the case-mounted speaker. See the figure below.

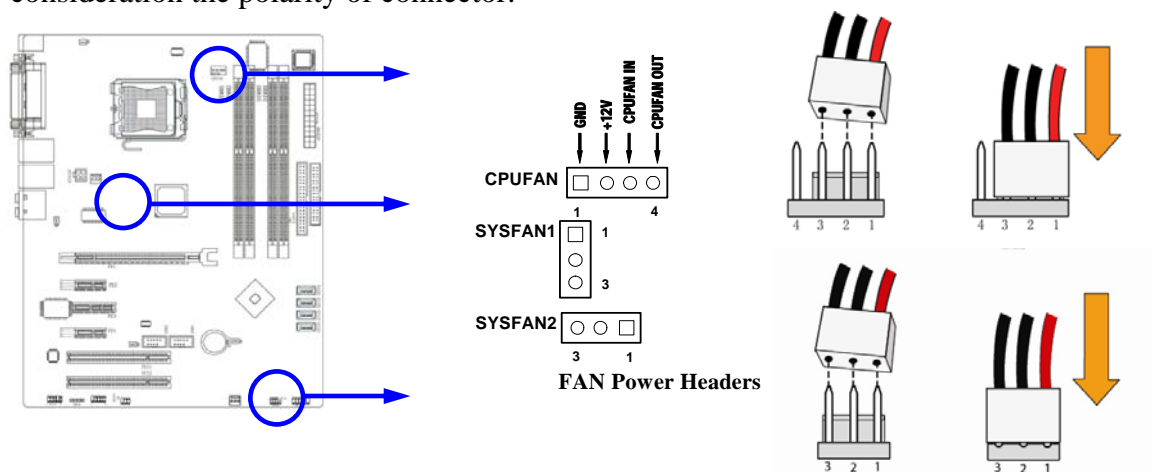
**(7) Power switch: PWR BTN**

This 2-pin connector connects to the case-mounted power switch to power ON/OFF the system.



**(8) FAN Power Headers: SYSFAN1, SYSFAN2 (3-pin), CPUFAN (4-pin)**

These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.

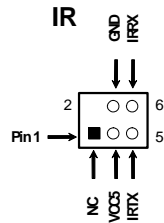
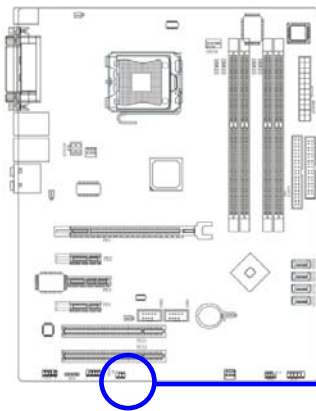


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**(9) IR infrared module Headers (5-pin) : IR**

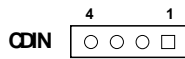
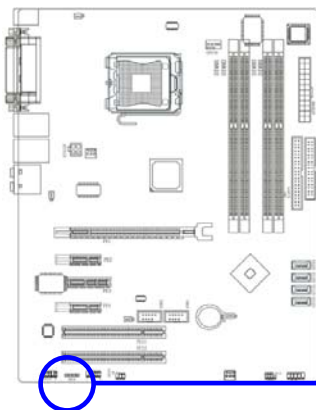
This connector supports the optional wireless transmitting and receiving infrared module. You must configure the setting through the BIOS setup to use the IR function.



**IR infrared module Headers**

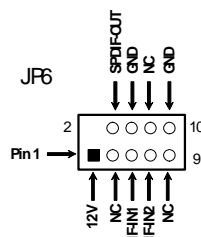
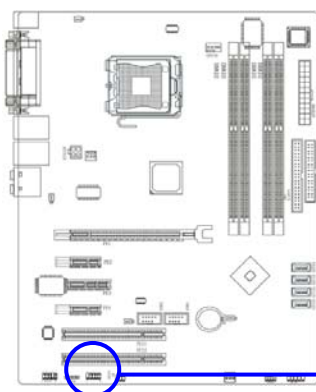
**(10) CD Audio-In Headers (4-pin) : CDIN**

CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.

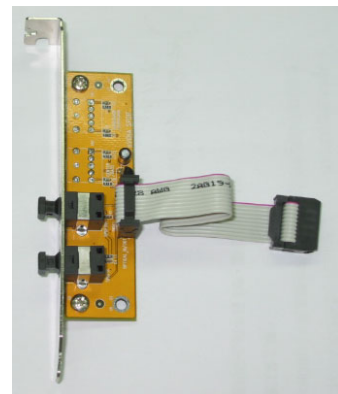


**CD Audio-In Headers**

**(11) SPDIF In/Out Header: SPDIF**



**SPDIF-Bracket Connector**



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## 2-7 Starting Up Your Computer

1. After all connection are made, close your computer case cover.
2. Be sure all the switch are off, and check that the power supply input voltage is set to proper position, usually in-put voltage is 220V~240V or 110V~120V depending on your country's voltage used.
3. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.
4. Turn on your peripheral as following order:
  - a. Your monitor.
  - b. Other external peripheral (Printer, Scanner, External Modem etc...)
  - c. Your system power. For ATX power supplies, you need to turn on the power supply and press the ATX power switch on the front side of the case.
5. The power LED on the front panel of the system case will light. The LED on the monitor may light up or switch between orange and green after the system is on. If it complies with green standards or if it is has a power standby feature. The system will then run power-on test. While the test are running, the BIOS will alarm beeps or additional message will appear on the screen. If you do not see any thing within 30 seconds from the time you turn on the power. The system may have failed on power-on test. Recheck your jumper settings and connections or call your retailer for assistance.

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM install or detected
One long beep followed by three short beeps	Video card not found or video card memory bad
High frequency beeps when system is working	CPU overheated System running at a lower frequency

6. During power-on, press <Delete> key to enter BIOS setup. Follow the instructions in BIOS SETUP.
7. **Power off your computer:** You must first exit or shut down your operating system before switch off the power switch. For ATX power supply, you can press ATX power switching after exiting or shutting down your operating system. If you use Windows 9X, click "**Start**" button, click "**Shut down**" and then click "**Shut down the computer?**" The power supply should turn off after windows shut down.



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## Chapter 3

### Introducing BIOS

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

In the BIOS Setup main menu of Figure 3-1, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press <Esc> to quit the BIOS Setup.
- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press Page Up/Page Down or +/- keys when you want to modify the BIOS parameters for the active option.

#### 3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup.

If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

**Press <F1> to continue, <Ctrl-Alt-Esc> or <Del> to enter Setup**

#### 3-2 Getting Help

##### Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

##### Status Page Setup Menu/Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.



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### 3-3 The Main Menu

Once you enter Award® BIOS CMOS Setup Utility, the Main Menu (Figure 3-1) will appear on the screen. The Main Menu allows you to select from fourteen setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

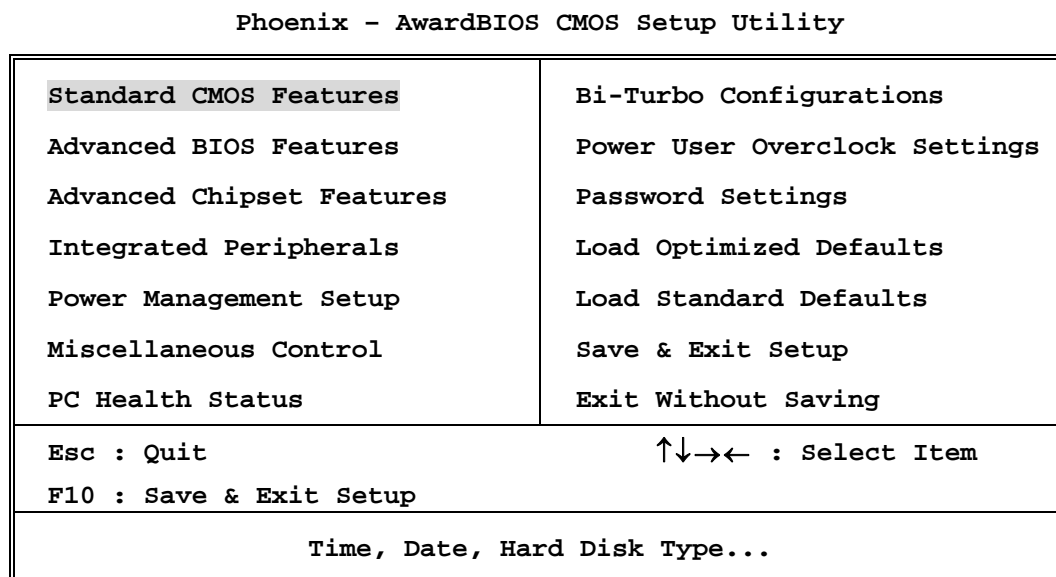


Figure 3-1

#### Standard CMOS Features

Use this Menu for basic system configurations.

#### Advanced BIOS Features

Use this menu to set the Advanced Features available on your system.

#### Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system's performance.

#### Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

#### Power Management Setup

Use this menu to specify your settings for power management.

#### Miscellaneous Control

Use this menu to specify your settings for Miscellaneous control.

#### PC Health Status

This entry shows your PC health status.

#### Bi-Turbo Configurations

This entry appears if your system supports BiTurbo Configurations.

#### Power User Overclock Settings

Use this menu to specify your settings (frequency, Voltage) for overclocking demand

#### Password Settings

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This entry for setting Supervisor password and User password

### Load Optimized Defaults

Use this menu to load the BIOS default values these are setting for optimal performances system operations for performance use.

### Load Standard Defaults

Use this menu to load the BIOS default values for the stable performance system operation that are factory settings for normal use.

### Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

### Exit Without Saving

Abandon all CMOS value changes and exit setup.

## 3-4 Standard CMOS Features

The items in Standard CMOS Setup Menu are divided into several categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Phoenix - AwardBIOS CMOS Setup Utility

### Standard CMOS Features

Date (mm:dd:yy)	The, OCT, 10 2005	Item Help
Time (hh:mm:ss)	11 : 02 : 35	
> IDE Channel 0 Master	None	Menu Level >
> IDE Channel 0 Slave	None	
> IDE Channel 1 Master	None	
> IDE Channel 1 Slave	None	Change the day, month, year and century
Drive A	1.44M, 3.5 in.	
Video	EGA/VGA	
Halt On	All Errors	
Base Memory	640K	
Extended Memory	56320K	
Total Memory	57344K	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Date

The date format is <day><month><date><year>.

**Day** Day of the week, from Sun to Sat, determined by BIOS. Read-only.

**Month** The month from Jan. through Dec.

**Date** The date from 1 to 31 can be keyed by numeric function keys.

**Year** The year depends on the year of the BIOS.

### Time

The time format is <hour><minute><second>.

**IDE Channel 0 Master / Channel 0 Slave / Channel 1 Master / Channel 1 Slave**  
**SATA Channel 1, 2, 3, 4**

Press PgUp/<+> or PgDn/<-> to select Manual, None, Auto type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If the type of hard disk drives is not matched or listed, you can use Manual to define your own drive type manually.

If you select Manual, related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is SCSI, the selection shall be "None".

If the controller of HDD interface is CD-ROM, the selection shall be "None"

**Access Mode** The settings are Auto Normal, Large, and LBA.

**Cylinder** number of cylinders

**Head** number of heads

**Precomp** write precomp

**Landing Zone** landing zone

**Sector** number of sectors

### 3-5 Advanced BIOS Features

Phoenix - AwardBIOS CMOS Setup Utility

Advanced BIOS Features

Virus Warning	Disabled	Item Help
CPU L1 & L2 Cache	Enabled	
Limit CPUID MaxVal	Disabled	Menu Level >
Hard Disk Boot Priority	Press Enter	
Hyper Threading Technology	Enabled	
Quick Power On Self Test	Enabled	
First Boot Device	Floppy	
Second Boot Device	Hard Disk	
Third Boot Device	CDROM	
Boot other Device	Enabled	
Boot Up Floppy Seek	Enabled	
Boot Up NumLock Status	On	
Gate A20 Option	Fast	
Typematic Rate Setting	Disabled	
Typematic Rate (Chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	Setup	
APIC Mode	Enabled	
MPS Version Control For OS	1.4	
OS Select For DRAM > 64MB	Non-OS2	
HDD S.M.A.R.T Capablity	Disabled	
Report No FDD For Windows	Yes	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

#### Virus Warning

Allows you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

**Disabled** (default) No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

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**Enabled** Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector of hard disk partition table.

### **CPU L1&L2 Cache**

The default value is Enabled.

**Enabled** (default) Enable cache

**Disabled** Disable cache

*Note: The L1&L2 cache is built in the processor.*

### **Hard Disk Boot Priority**

The selection is for you to choose the hard disk drives priorities to boot from.

### **Quick Power On Self Test**

This category speeds up Power On Self Test (POST) after you power on the computer. If this is set to Enabled. BIOS will shorten or skip some check items during POST.

**Enabled** (default) Enable quick POST

**Disabled** Normal POST

### **First/Second/Third Boot Device**

The BIOS attempts to load the operating system from the devices in the sequence selected in these items. The settings are Removable, Hard Disk, CDROM, Legacy LAN, CDROM and Disabled.

### **Boot Up Floppy Seek**

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

### **Boot Up NumLock Status**

The default value is On.

**On** (default) Keypad is numeric keys.

**Off** Keypad is arrow keys.

### **Gate A20 Option**

**Normal** The A20 signal is controlled by keyboard controller or chipset hardware.

**Fast** (default) The A20 signal is controlled by port 92 or chipset specific method.

### **Typematic Rate Setting**

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected. The settings are: Enabled/Disabled.

### **Typematic Rate (Chars/Sec)**

Sets the number of times a second to repeat a keystroke when you hold the key down. The settings are: 6, 8, 10, 12, 15, 20, 24, and 30.

### **Typematic Delay (Msec)**

Sets the delay time after the key is held down before it begins to repeat the keystroke. The settings are 250, 500, 750, and 1000.

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## Security Option

This category allows you to limit access to the system and Setup, or just to Setup.

- System** The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
- Setup (default)** The system will boot, but access to Setup will be denied if the correct password is not entered prompt.

## APIC MODE

This field is used to enable or disable the APIC(Advanced Programmable Interrupt Controller). Due to compliance with PC2004 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQ resources for the system. Settings:[Enabled] and [disabled].

## MPS Version Control For OS

This field allows you to select which MPS(Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, Consult the vendor of your operating system. Settings:[1.4],[1.1].

## OS Select For DRAM > 64MB

Allows OS2<sup>®</sup> to be used with >64MB or DRAM. Settings are Non-OS/2 (default) and OS2. Set to OS/2 if using more than 64MB and running OS/2.

## 3-6 Advanced Chipset Features

The Advanced Chipset Features Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.

Phoenix - AwardBIOS CMOS Setup Utility  
Advanced Chipset Features

DRAM Timing Selectable	By SPD	Item Help
SDRAM CAS Latency Time	Auto	
SDRAM Cycle Time	Auto	
SDRAM RAS-to CAS Delay	Auto	Menu Level >
SDRAM RAS Precharge Time	Auto	
System BIOS Cacheable	Disabled	
Video BIOS Cacheable	Disabled	
Memory Hole at 15M-16M	Disabled	
> PCIEExpress Root Port Function Press Enter		
** VGA Setting **		
PEG/Onchip VGA Control	Auto	
Force PEG to X1	Disabled	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

## SDRAM RAS-to-CAS Delay

This field let's you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. *Fast* gives faster performance; and *Slow* gives more stable performance. This field applies only when synchronous DRAM is installed in the system. The settings are: 4T and 3T.

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### SDRAM RAS Precharge Time

If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. *Fast* gives faster performance; and *Slow* gives more stable performance. This field applies only when synchronous DRAM is installed in the system. The settings are: 2T and 3T.

### PCIExpress Root Port Function

Please refer to section 3-6-1

### System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The settings are: Enabled and Disabled.

### Video BIOS Cacheable

Select Enabled allows caching of the video BIOS, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The settings are: Enabled and Disabled.

### Memory Hole At 15M-16M

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements. The settings are: Enabled and Disabled.

## 3-6-1 PCIExpress Root Port Function

Phoenix - AwardBIOS CMOS Setup Utility

PCIExpress Root Port Function

PCIExpress Port 1	Auto	Item Help
PCIExpress Compliancy Mode	v1.0a	Menu Level >>
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

## 3-7 Integrated Peripherals

CMOS Setup Utility - Copyright(C) 1984-2004 Award Software

### Integrated Peripherals

> Onchip IDE Function	Press Enter	Item Help
> Onchip Device Function	Press Enter	
> Onchip Super IO Function	Press Enter	Menu Level >
Init Display First	PCI Slot	
PWR Status After PWR Failure	Always Off	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Onchip IDE Function

Please refer to section 3-7-1

### Onchip Device Function

Please refer to section 3-7-2

### Onchip Super IO Function

Please refer to section 3-7-3

### Init Display First

This item allows you to decide to activate whether PCI Slot or AGP VGA first. The settings are: PCI Slot, AGP Slot.

## 3-7-1 Onchip IDE Function

Phoenix - AwardBIOS CMOS Setup Utility

### Onboard IDE Function

On-Chip Primary PCI IDE	Enabled	Item Help
On-Chip Secondary PCI IDE	Enabled	
IDE Primary Master PIO	Auto	Menu Level >>
IDE Primary Slave PIO	Auto	
IDE Secondary Master PIO	Auto	
IDE Secondary Slave PIO	Auto	
IDE Primary Master UDMA	Auto	
IDE Primary Slave UDMA	Auto	
IDE Secondary Master UDMA	Auto	
IDE Secondary Slave UDMA	Auto	
SATA Port Speed Settings	Disabled	
IDE DMA Transfer Access	Enabled	
IDE HDD Block Mode	Enabled	
*** On-Chip Serial ATA Setting ****		
On-Chip Serial ATA	Auto	
PATA IDE Mode	Primary	
SATA Port	P2, P4 is Secondary	
SATA Mode	IDE	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

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### OnChip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately. The settings are: Enabled and Disabled.

### IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device. The settings are: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

### IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33 and Ultra DMA/66, select Auto to enable BIOS support. The settings are: Auto, Disabled.

### IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support. The settings are: Enabled, Disabled.

## 3-7-2 Onchip Device Function

Phoenix - AwardBIOS CMOS Setup Utility

### Onboard Device Function

LAN1 Function	Enabled	Item Help
LAN2 Function	Enabled	
VIA1394 Function	Enabled	Menu Level >>
USB Host Controller	Enabled	
USB2.0 Function	Enabled	
USB Keyboard Legacy Support	Disabled	
USB Mouse Legacy Support	Disabled	
High Definition Audio	Enabled	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### LAN1/LAN2 Function

Setting to [Enabled] allows the BIOS to auto-detect the LAN controller and enable it. Setting options:[ Enabled] and [Disabled] .

### USB Host Controller

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB peripherals. The settings are: Enabled, Disabled.

### USB 2.0 Function

This setting allows you to enable/disable the onboard USB controller. Selecting [Enabled] enables the system to support USB 2.0 spec. setting options:[Disabled],[Enabled].

### USB Keyboard Legacy Support

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard. The settings are: Enabled, Disabled.



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## High Definition Audio

This will determine which on Board Sound Chip Function will use. The settings are: Enabled, Disabled.

## 3-7-3 Onboard Super IO Function

Phoenix - AwardBIOS CMOS Setup Utility

### Onboard Super IO Function

Onboard FDD Controller	Enabled	Item Help
Onboard Serial Port 1	3F8/IRQ4	
Onboard Serial Port 2	2F8/IRQ3	Menu Level >>
UART2 Mode Select	Normal	
IR Duplex Mode	Half	
IR Pins	IRRX/IRTX	
Onboard Parallel Port	378/IRQ7	
Parallel Port Mode	SPP	
ECP Mode Use DMA	3	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Onboard FDD Controller

Select Enabled if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it. If you install add-on FDC or the system has no floppy drive, select Disabled in this field. The settings are: Enabled and Disabled.

### Onboard Serial Port 1/Port 2

Select an address and corresponding interrupt for the first and the second serial ports. The settings are: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

### UART2 Mode Select

This item allows you to determine which InfraRed(IR) function of the onboard I/O chip, this functions uses.

### Onboard Parallel Port

There is a built-in parallel port on the on-board Super I/O chipset that Provides Standard, ECP, and EPP features. It has the following option:

#### Disabled

(3BCH/IRQ7)/ Line Printer port 0

(278H/IRQ5)/ Line Printer port 2

(378H/IRQ7) Line Printer port 1

### Parallel Port Mode

SPP : Standard Parallel Port

EPP : Enhanced Parallel Port

ECP : Extended Capability Port

#### SPP/EPP/ECP/ECP+EPP

To operate the onboard parallel port as Standard Parallel Port only, choose "SPP." To operate the onboard parallel port in the EPP modes simultaneously, choose "EPP." By choosing "ECP", the onboard parallel port will operate in ECP mode only. Choosing "ECP+EPP" will allow the onboard parallel port to support both the ECP and EPP modes simultaneously. The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA" at this time, the user can choose between DMA channels 3 to 1. The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: "EPP Mode Select." At this time either EPP 1.7 spec. or EPP 1.9 spec. can be chosen.

## 3-8 Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy saving while operating in a manner consistent with your own style of computer use.

Phoenix - AwardBIOS CMOS Setup Utility

### Power Management Setup

ACPI Function	<b>Enabled</b>	Item Help
ACPI Suspend Type	S1(POS)	
Power Management	User Define	Menu Level >
Video off Method	V/H SYNC+Blank	
Video Off In Suspend	Yes	
Suspend Type	Stop Grant	
MODEM Use IRQ	3	
Suspend Mode	Disabled	
HDD Power Down	Disabled	
Soft-off by PWR-BTTN	Instant-off	
Wake-Up by PCI card	Disabled	
Power On by Ring	Disabled	
Wake-up by USB/KB From S3(S4)	Disabled	
PS2 KB/MS Wake-up From S1-S5	Disabled	
Resume by Alarm	Disabled	
X Date (of Month)Alarm	0	
X Time (hh:mm:ss)Alarm	0 : 0 :0	
> PM Timer Reload Events	Press Enter	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### ACPI Function

This item allows you to Enabled/Disabled the Advanced Configuration and Power Management (ACPI). The settings are Enabled and Disabled.

### ACPI Suspend Type

This item allows you to select ACPI Suspend Type.

The setting are: S1(POS), S3(STR)

### Video Off in Suspend

This determines the manner in which the monitor is blanked. The choice are Yes → Video will off , and No→ Video always On.

### Video Off Method

This determines the manner in which the monitor is blanked.

- DPMS (default)** Initial display power management signaling.
- Blank Screen** This option only writes blanks to the video buffer.
- V/H SYNC+Blank** This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

### Modem Use IRQ

This determines the IRQ in which the MODEM can use.

The settings are: 3, 4, 5, 7, 9, 10, 11, NA.

### Soft-off by PWR-BTTN

Pressing the power button for more than 4 seconds forces the system to enter the Soft-Off state.

The settings are: Delay 4 Sec, Instant-Off.

### Power On by Ring

During Disabled, the system will ignore any incoming call from the modem. During Enabled, the system will boot up if there's an incoming call from modem.

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### Date(of month) Alarm

You can choose which month the system will boot up. Set to 0, to boot every day.

### Time(hh:mm:ss) Alarm

You can choose what hour, minute and second the system will boot up.

**Note:**If you have change the setting, you must let the system boot up until it goes to the operating system, before this function will work

### PM Timer Reload Events

Please refer to section 3-8-1

## 3-8-1 PM Timer Reload Events

Phoenix - AwardBIOS CMOS Setup Utility

PM Timer Reload Events

Primary IDE 0	Disabled	Item Help
Primary IDE 1	Disabled	
Secondary IDE 0	Disabled	Menu Level >>
Secondary IDE 1	Disabled	
FDD, COM, LPT Port	Disabled	
PCI PIRQ [A-D] #	Disabled	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

## 3-9 Miscellaneous Control

This section is for setting CPU Frequency/Voltage Control.

Phoenix - AwardBIOS CMOS Setup Utility

Miscellaneous Control

Auto Detect PCI Clock	Enabled	Item Help
Spread Spectrum	Disabled	
Flash Port Write Protect	Enabled	Menu Level >
Resources Controlled by	Manual	
> IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	
*** PCIExpress Relative Items ***		
Maximum Payload Size	4096	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Auto Detect PCI Clock

This item allows you to enable/disable auto detect PCI Clock.

### Spread Spectrum

This item allows you to set the CPU Host/PCI clock and Spread Spectrum.

The settings are: Enabled, Disabled.

### IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

Please refer to section 3-9-1

### Maximum Payload Size

This setting specifies the maximum TLP payload size for the PCI Express devices. The unit is byte. Setting options:[128], [256], [512], [1024], [2048], [4096] .

## 3-9-1 IRQ Resources

Phoenix - AwardBIOS CMOS Setup Utility

### IRQ Resources

IRQ-5	assigned to	PCI Device	Item Help
IRQ-7	assigned to	PCI Device	
IRQ-9	assigned to	PCI Device	Menu Level >>
IRQ-10	assigned to	PCI Device	
IRQ-11	assigned to	PCI Device	
IRQ-12	assigned to	PCI Device	
IRQ-14	assigned to	PCI Device	
IRQ-15	assigned to	PCI Device	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults			

## 3-10 PC Health Status

This section shows the Status of you CPU, Fan, Warning for overall system status. This is only available if there is Hardware Monitor onboard.

Phoenix - AwardBIOS CMOS Setup Utility

### PC Health Status

Shutdown Temperature	Disabled	Item Help
Show PC Health in Post	Enabled	
> Smart FAN Configurations	Press Enter	Menu Level >
Vcore	1.52V	
Vcc	1.5V	
+5	4.96V	
+12	12.36V	
5VSB	5.04V	
VDIMM	1.77V	
3VSB	3.40V	
Vbat	3.31V	
CPU Temperature	39°C/102°F	
System Temperature	23°C/73°F	
CPUFAN	3667 RPM	
SFAN 1	0 RPM	
SFAN 2	0 RPM	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

### Shutdown Temperature

This item can let users setting the Shutdown temperature, when CPU temperature over this setting the system will auto shutdown to protect CPU.

### Show PCHealth in Post

During Enabled, it displays information list below. The choice is either Enabled or Disabled.

### Smart FAN Configurations

Please refer to section 3-10-1

**Current CPU Temperature/Current System Temp/CurrentSFAN1,SFAN2 Speed/Vcore/VCC/ 3.3V/+5V/+12V/VBAT(V)/3VSB(V)**

This will show the CPU/FAN/System voltage chart and FAN Speed.

### 3-10-1 Smart FAN Configurations

Phoenix - AwardBIOS CMOS Setup Utility  
Smart FAN Configurations

CPUFAN Smart Mode	Disabled	Item Help
XCPUFAN Full-Speed Temp	50	Menu Level >
XCPUFAN Idle Temp	30	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

#### CPUFAN Full-Speed Temp

This item allows you setting the FAN works in full speed when the temperature over the value which out set. If the temperature below the value but over the Idle Temperature, the FAN will works over 60% of full speed, and the higher temperature will gain higher FAN speed, after over the temperature which this item setting, the FAN works in full speed.

#### CPUFAN Idle Temp

This item allows you setting the FAN works in 60% of full speed, when the temperature lower than the temperature which you setting.

### 3-11 Bi-Turbo Configurations

Phoenix - AwardBIOS CMOS Setup Utility  
Bi-Turbo Configurations

CPU Thermal-Throttling	Disabled	Item Help
CPU Thermal-Throttling Temp	70	Menu Level >
CPU Thermal-Throttling Duty	50.0%	
CPU Thermal-Throttling Beep	Enabled	
<div style="border: 1px solid black; background-color: blue; color: white; padding: 5px;">           CPU Thermal-Throttling            Disabled . . . . . [ ]            Enabled . . . . . [ ]            ↑↓:Move ENTER:Accept ESC:Abort         </div>		
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

#### CPU Thermal Throttling Temp

This item allows you to activate the CPU Thermal Throttling function when the CPU temperature is over the value which you set to low down the CPU temperature when at high workload to protect processor from damage or accidental shutdown.

Phoenix - AwardBIOS CMOS Setup Utility  
Bi-Turbo Configurations

CPU Thermal-Throttling <b>Disabled</b> CPU Thermal-Throttling Temp      70 CPU Thermal-Throttling Duty       50.0% CPU Thermal-Throttling Beep       Enabled	Item Help  Menu Level >
<b>CPU Thermal-Throttling Temp</b>  Min = 40 Max = 90  Key in a DEC number: ↑↓:Move ENTER:Accept ESC:Abort	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

Phoenix - AwardBIOS CMOS Setup Utility  
Bi-Turbo Configurations

CPU Thermal-Throttling <b>Disabled</b> CPU Thermal-Throttling Temp      70 CPU Thermal-Throttling Duty       50.0% CPU Thermal-Throttling Beep       Enabled	Item Help  Menu Level >
<b>CPU Thermal-Throttling Duty</b>  87.50% . . . . . [   ] 75.00% . . . . . [   ] 62.50% . . . . . [   ] 50.00% . . . . . [ █ ] 37.50% . . . . . [   ] 25.00% . . . . . [   ]  ↑↓:Move ENTER:Accept ESC:Abort	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

Phoenix - AwardBIOS CMOS Setup Utility  
Bi-Turbo Configurations

CPU Thermal-Throttling <b>Disabled</b> CPU Thermal-Throttling Temp      70 CPU Thermal-Throttling Duty       50.0% CPU Thermal-Throttling Beep       Enabled	Item Help  Menu Level >
<b>CPU Thermal-Throttling Beep</b>  Disabled . . . . . [   ] Enabled . . . . . [ █ ]  ↑↓:Move ENTER:Accept ESC:Abort	
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults	

## 3-12 Power User Overclock Settings

Phoenix - AwardBIOS CMOS Setup Utility

Power User Overclock Settings

<pre> *** Current Host/PCI Clock is 200/33 MHz *** Host/PCI Clock at Next Boot  200/33 MHz *** Current DRAM Clock is 267MHz *** DRAM Clock at Next Boot      By SPD(DDR533) CPU Vcore 7-Shift           Normal CPU Vcore Select            Default VDD1.5V Settings            1.55V VRAM Settings                1.80V VRAM Under Voltage Protect   Disabled VDD1.5V Under Voltage Protect Disabled           </pre>	<p>Item Help</p> <hr/> <p>Menu Level &gt;</p>
<pre> Host/PCI Clock at Next Clock Min= 200 Max= 355 ↑↓:Move ENTER:Accept ESC:Abort           </pre>	
<p>↑↓←→ Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help  F5:Previous Values F6:Optimized Defaults F7:Standard Defaults</p>	

Phoenix - AwardBIOS CMOS Setup Utility

Power User Overclock Settings

<pre> *** Current Host/PCI Clock is 200/33 MHz *** Host/PCI Clock at Next Boot  200/33 MHz *** Current DRAM Clock is 267MHz *** DRAM Clock at Next Boot      By SPD(DDR533) CPU Vcore 7-Shift           Normal CPU Vcore Select            Default VDD1.5V Settings            1.55V VRAM Settings                1.80V VRAM Under Voltage Protect   Disabled VDD1.5V Under Voltage Protect Disabled           </pre>	<p>Item Help</p> <hr/> <p>Menu Level &gt;</p>
<pre> CPU Vcore 7-Shift Normal . . . . . [ ] + 50mv . . . . . [ ] + 100mv . . . . . [ ] + 150mv . . . . . [ ] + 200mv . . . . . [ ] + 250mv . . . . . [ ] + 300mv . . . . . [ ] + 350mv . . . . . [ ] ↑↓:Move ENTER:Accept ESC:Abort           </pre>	
<p>↑↓←→ Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help  F5:Previous Values F6:Optimized Defaults F7:Standard Defaults</p>	

Phoenix - AwardBIOS CMOS Setup Utility  
Power User Overclock Settings

<pre> *** Current Host/PCI Clock is 200/33 MHz *** Host/PCI Clock at Next Boot  200/33 MHz *** Current DRAM Clock is 267MHz *** DRAM Clock at Next Boot      By SPD(DDR533) CPU Vcore 7-Shift            Normal CPU Vcore Select              Default VDD1.5V Settings              1.55V VRAM Settings                  1.80V VRAM Under Voltage Protect    Disabled VDD1.5V Under Voltage Protect Disabled           </pre>	Item Help							
<div style="border: 1px solid black; background-color: #0000FF; color: white; padding: 5px;"> <p style="margin: 0;">VRAM Settings</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">1.80V(Default) . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">1.85V . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">1.90V . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">2.00V . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">2.05V . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">2.10V . . . . . [ ]</td></tr> <tr><td style="padding: 2px;">2.15V . . . . . [ ]</td></tr> </table> <p style="margin: 0; font-size: small;">↑↓:Move ENTER:Accept ESC:Abort</p> </div>	1.80V(Default) . . . . . [ ]	1.85V . . . . . [ ]	1.90V . . . . . [ ]	2.00V . . . . . [ ]	2.05V . . . . . [ ]	2.10V . . . . . [ ]	2.15V . . . . . [ ]	Menu Level >
1.80V(Default) . . . . . [ ]								
1.85V . . . . . [ ]								
1.90V . . . . . [ ]								
2.00V . . . . . [ ]								
2.05V . . . . . [ ]								
2.10V . . . . . [ ]								
2.15V . . . . . [ ]								
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults								

**Host Clock at Next Boot**

This item allows you to select CPU frequency step by step increasing.  
The choice are: 533MHz CPU---133MHz~350MHz, 800MHz CPU---200MHz~350MHz

**DRAM Clock at Next Boot**

This item allows you select the DRAM Clock for DDR2 533/DDR2 400. The setting are:  
By SPD, DDR2 667, DDR2 533, DDR2 400

**CPU Vcore 7-Shift**

This item allows you select the CPU Vcore Voltage xx% more than the standard value, by this function for the precise over-clocking for extra demanding of performance.

**CPU Vcore Select**

This item allows you select CPU Vcore Voltage by increase 0.0125V step by step from 0.8375V to 1.6V or the Default setting is Default (CPU manufacturer Default setting).

**VDD1.5V Settings**

This item allows you to select 1.5V of the AGP VGA card. The choice are: Default, 1.5V, 1.6V, 1.7V, 1.8V.

**VRAM Settings**

This item allows you to select DRAM Voltage. The choice are: 1.80V,1.85V,1.90V, 2.00V,2.05V,2.10V,2.15V.



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## 3-13 Password Settings

Phoenix - AwardBIOS CMOS Setup Utility

### Password Settings

Set Supervisor Password	Press Enter	Item Help
Set User Password	Press Enter	
		Menu Level >
↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5:Previous Values F6:Optimized Defaults F7:Standard Defaults		

You can set either supervisor or user password, or both of them. The differences are:

**Supervisor password:** Can enter and change the options of the setup menus.

**User password:** Can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

#### ENTER PASSWORD:

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

#### PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

## 3-14 Load Standard/Optimized Defaults

### Load Standard Defaults

When you press <Enter> on this item, you get confirmation dialog box with a message similar to:

Load Standard Defaults (Y/N)? N

Pressing <Y> loads the BIOS default values for the most stable, minimal-performance system operations.

### Load Optimized Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N)? N

Pressing <Y> loads the default values that are factory settings for optimal performance system operations.

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## Chapter 4

### DRIVER & FREE PROGRAM INSTALLATION

Check your package and there is A MAGIC INSTALL CD included. This CD consists of all DRIVERS you need and some free application programs and utility programs. In addition, this CD also include an auto detect software which can tell you which hardware is installed, and which DRIVERS needed so that your system can function properly. We call this auto detect software MAGIC INSTALL.

#### MAGIC INSTALL Supports WINDOWS 2000/XP

Insert CD into your CD-ROM drive and the MAGIC INSTALL Menu should appear as below. If the menu does not appear, double-click MY COMPUTER / double-click CD-ROM drive or click START / click RUN / type X:\SETUP.EXE (assuming X is your CD-ROM drive).

#### The Intel 945 serial chipset driver only support Windows 2000 and Windows XP OS



#### From MAGIC INSTALL MENU you may make 10 selections:

1. INF                   install Intel 945 chipset system driver
2. VGA                   install Intel 945G VGA driver (**Only for 945GDeluxe / 945GDG**)
3. SOUND                install ALC880 AC97 Codec Audio Driver
4. LAN                   install Intel LAN Controller driver
5. USB2.0               install USB 2.0 driver
6. RAID                  install RAID driver
7. DIRECTX9             install Microsoft DirectX 9 driver
8. PC-CILLIN            install PC-CILLIN2005 anti-virus program
9. PC-HEALTH           install MyGuard Hardware Doctor Utility
10. BROWSE CD          to browse the contents of the CD
11. EXIT                 to exit from MAGIC INSTALL menu

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## 4-1 INF Install Intel 945 chipset system driver



1. Click INF in the MAGIC INSTALL MENU



2. Click NEXT when Chipset Software Install Utility appears



3. This license agreement appear, click Yes, the readme information appear, click Next

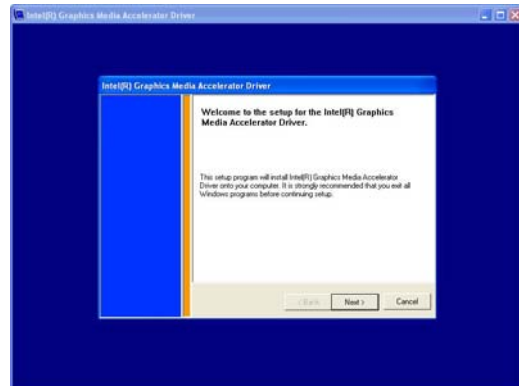


4. Select if you want computer re-started click Finish

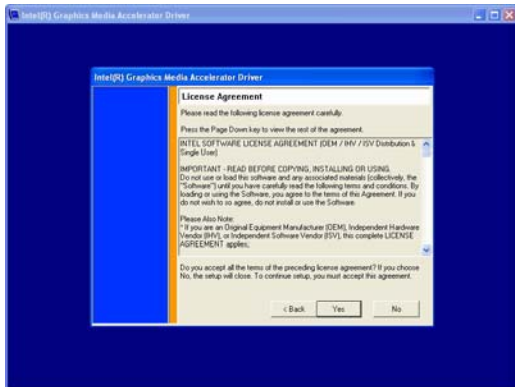
## 4-2 VGA Install Intel 945G VGA Driver (For 945GDG)



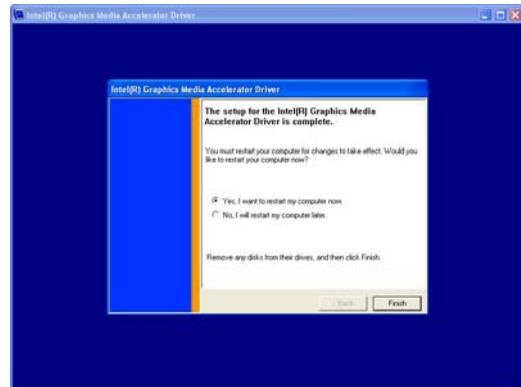
1. Click VGA when MAGIC INSTALL MENU appears



2. Click NEXT When Intel (R) Graphics Media Accelerator Driver Software Setup appear

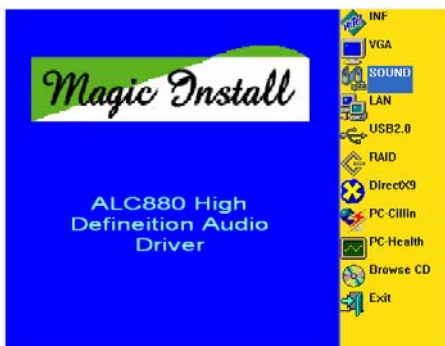


3. Click “YES” for Copy Right Announcement



4. Click “FINISH” to reboot your PC

### 4-3 SOUND Install ALC880 HD Codec Audio Driver



1. Click SOUND when MAGIC INSTALL MENU appears



2. Click NEXT When Realtek High Definition Audio driver windows appear



3. Click FINISH and restart your computer



4. Manual Sound Effect Setting



5. Speaker configuration setting



6. SPDIF out setting

**NOTE: Please upgrade your Windows XP to Service Pack 1 / Windows 2000 to Service Pack 4 or later before you the HD Audio CODEC driver.**

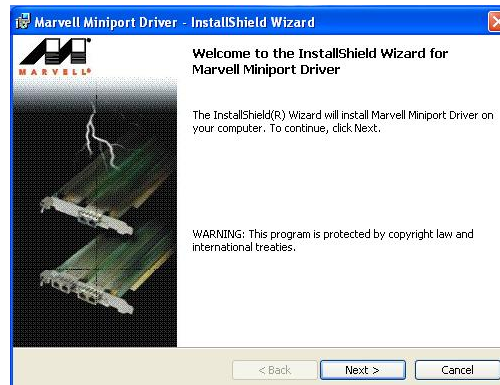
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## 4-4 LAN Marvell Yukon Gigabit Ethernet NIC Driver



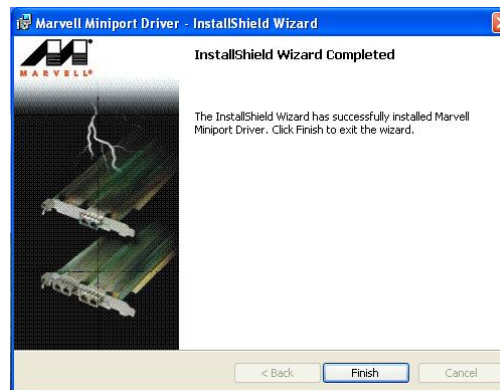
1. Click LAN when Magic Install Menu appear



2. Click Next to install Marvell LAN driver



3. Please Accept the license agreement and read the “Readme” file for detailed information , then click Next to proceed.

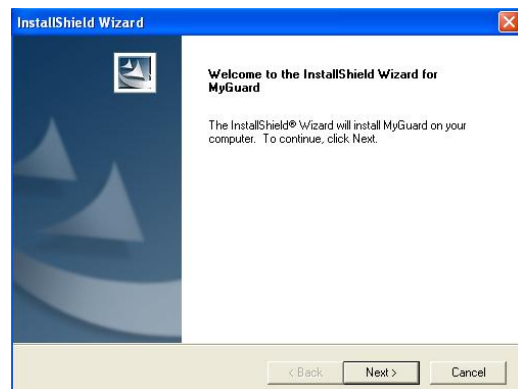


4. Click Install to install driver and Click Finish end the installation

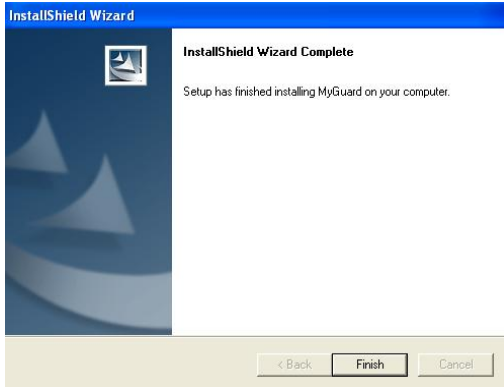
## 4-5 PC-HEALTH Install MyGuard Hardware monitor Utility



1. Click PC-HEALTH when MAGIC INSTALL MENU appears



2. Click Next when Install shield wizard Window appears, Choose destination location and click Next, when the start copy file windows appear, click next



3. Select Finish after setup complete

4. Execute MY GUARD utility, On-time Monitoring your system health

**NOTE:**

**MAGIC INSTALL will auto detect file path X:\NFORCE4\MYGUARD\SETUP.EXE**

## 4-6 USB2.0 Install Intel USB2.0 DRIVER

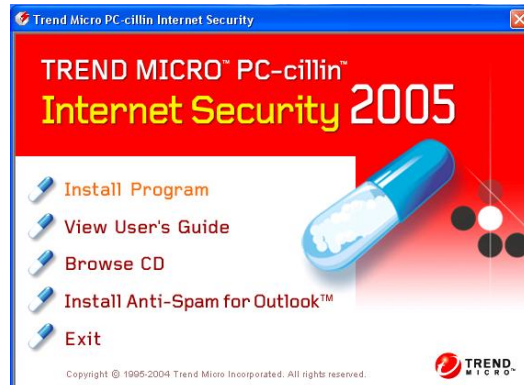
**Windows 2000 OS**

Please install Windows 2000 service pack 4 or later .

**Windows XP OS**

Please install Windows XP service pack 1 or later .

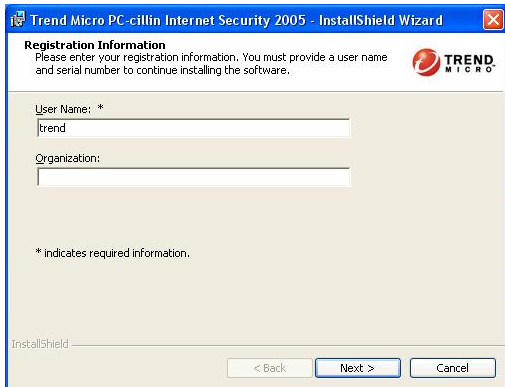
## 4-7 PC-CILLIN Install PC-CILLIN 2005 Anti-virus program



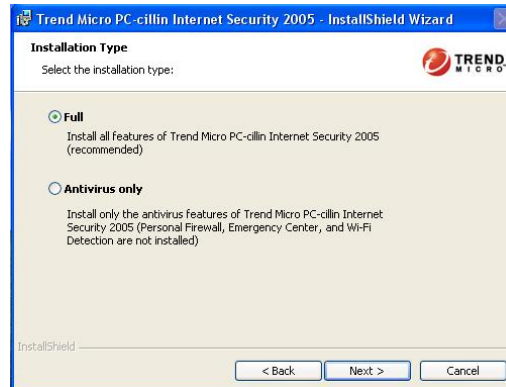
1. Click PC-CILLIN when MAGIC INSTALL MENU appears

2. Please select "Install program" when the "Trend Micro internet security" installshield wizard windows appears





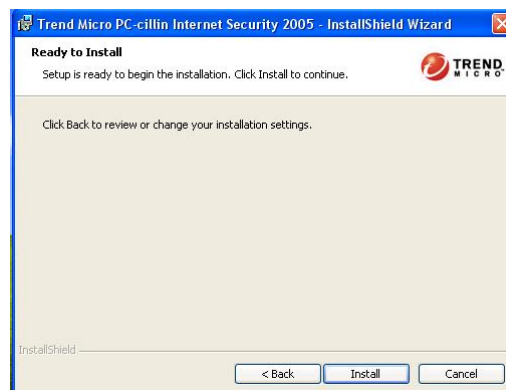
3. Click NEXT and Enter your Customer Information, Click NEXT or choose Change to change the path for the file to be stored



4. Please select install “FULL” function or install “Antivirus software” only



5. We suggest to use “Recommend configuration”.



Click Install to install PCCILLIN 2005 internet security software , then select to restart your computer

**Note :** Please install ACROBAT READER for reading PC-CILLIN 2005 User Manual which locates at the path “X:\acrobat\adberdr6\_enu\_full.exe”.

## 4-8 HOW TO UPDATE BIOS

Before update BIOS users have to “Disable”, “Flash Part Write Protect” item which in “Miscellaneous Control” of BIOS SETUP. Otherwise the system the will not allow you to upgrade BIOS by Award Flash Utility.

**STEP 1.** Prepare a boot disc. (you may make one by click START click RUN type SYS A: click OK)

**STEP 2.** Copy utility program to your boot disc. You may copy from DRIVER CD X:\FLASH\AWDFLASH.EXE or download from our web site.

**STEP 3.** Copy latest BIOS for 945GDG/945PDG from our web site to your boot disc.

**STEP 4.** Insert your boot disc into A:,

start the computer, type “Awdflash A:\945GDGAxxx.BIN /SN/PY/CC/R”

945GDG Axxx.BIN is the file name of latest BIOS it can be 945GDG A03.BIN or 945GDG CPB02.BIN

SN means don't save existing BIOS data

PY means renew existing BIOS data

CC means clear existing CMOS data

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R means restart computer  
**STEP 5.** Push ENTER and the BIOS will be updated, computer will be restarted automatically.

## 4-9 Pro Magic Plus Function Introduction

### What's Pro Magic Plus?

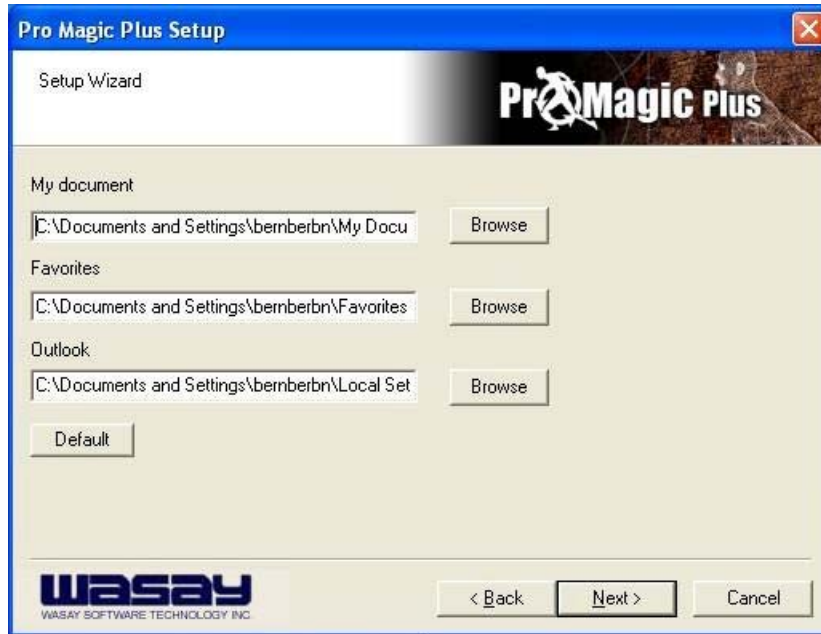
Tired with reinstall OS each time when it doesn't work? Does your computer often crash down or unable to work after installed new software? Have you had great loses and troubles because of computer problems? Still using time-consuming backup software that occupies lots of HD space?

Pro Magic Plus- an instant system recovery software tailored to solve these problems for you. It combines various application tools (e.g. anti-virus, backup software, uninstall software, multi-boot software) to satisfy your needs of all sorts of system protections.

### What functions does Pro Magic Plus have?

1. **Instant System Restoration** – Regardless of mis-operation or system crash, install Pro Magic Plus beforehand would allow you to instantly restore your system back by simply reboot your computer.
2. **Easy-to-use** – Auto installation from CD ROM; Supports Mouse
3. **System Uninstall** – Pro Magic provides a protection mode, which allows user to freely test any software. If user does not want to keep the software, just reboot the computer to restore back to the previous state, and Pro Magic will remove it completely from you computer.
4. **Password Security** – Pro Magic provides double password protection, including user password for entering each OS and manager password for managing 'Pro Magic', which can effectively prevent others from using your computer without permission or data from being stolen. (disable item for OEM version)
5. **Complete Protection** – Pro Magic not only protects the system disk, but also can protect your data disk, and does not require to reboot when backup or restore data disk.
6. **Multipoint Save/Restore** – You can backup your system whenever you need and restore them back to anytime you wish, 1 hour, 1 day or 1 month ago. Restore points are unlimited. (disable item for OEM version)
7. **Data Disk Protection** – Pro Magic Plus now comes with data disk protection, provides complete protection for your computer! (disable item for OEM version)
8. **You can choose to change the default path of 'My Document', 'My Favorite' and 'Outlook Express'**, so that when you are restoring the system, data in these folders will not be restored as well. (This is optional, you can leave it as it is).





graph 4

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**NOTE:** Functions of each version will differ from each other, and will be based on the function descriptions of each version.

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### System Requirements

- ◇ First OS must be Windows 98 SE/ME/2000/XP
- ◇ Support Only Windows OS (No Linux)
- ◇ Windows server OS and Windows NT not supported
- ◇ Minimum of Intel 486 or above, 16MB of memory or above
- ◇ Minimum of 500MB free/usable space or above
- ◇ Support for SCSI & SATA Hard disk

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*Pro Magic Plus only supports SCSI hard disk with Windows 2000 or OS above*

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### Notice Before Installation

1. Before install Pro Magic Plus, turn off all anti-virus software. (Include BIOS anti-virus function)
2. Pro Magic Plus does not support multiple PRI partitions. If you have multiple PRI partitions, please repartition your HD before installation.
3. If your HDD is not fully partitioned (with un-partitioned/unused space at end of HDD), please repartition the HDD before install Pro Magic Plus.

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# APPENDIX

## Debug Port Post Code

### *Normal POST Codes*

**NOTE:** EISA POST codes are typically output to port address 300h.

ISA POST codes are output to port address 80h.

Code(hex)	Name	Description
C0	Turn Off Chipset And CPU test	OEM Specific-Cache control cache Processor Status (1FLAGS) Verification. Tests the following processor status flags: Carry, zero, sign, overflow, The BIOS sets each flag, verifies They are set, then turns each flag off and verifies it is off. Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00. RAM must be periodically refreshed to keep the memory from decaying. This function ensures that the memory refresh function is working properly.
C1	Memory Presence	First block memory detect OEM Specific-Test to size on-board memory. Early chip set initialization Memory presence test OEM chip set routines Clear low 64K of memory Test first 64K memory.
C2	Early Memory Initialization	OEM Specific- Board Initialization
C3	Extend Memory DRAM select	OEM Specific- Turn on extended memory Initialization Cyrix CPU initialization Cache initialization
C4	Special Display Handling	OEM Specific- Display/Video Switch Handling so that Switch Handling display switch errors never occurs
C5	Early Shadow	OEM specific- Early shadow enable for fast boot
C6	Cache presence test	External cache size detection
CF	CMOS Check	CMOS checkup
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
BF	Program Chip Set	To program chipset from defaults values
E1-EF	Setup Pages	E1- Page 1, E2 - Page 2, etc.
1	Force load Default to chipset	Chipset defaults program
2	Reserved	
3	Early Superio Init	Early Initialized the super IO

Code(hex)	Name	Description
4	Reserved	
5	Blank video	Reset Video controller
6	Reserved	
7	Init KBC	Keyboard controller init
8	KB test	Test the Keyboard
9	Reserved	
A	Mouse Init	Initialized the mouse
B	Onboard Audio init	Onboard audio controller initialize if exist
C	Reserved	
D	Reserved	
E	Checksum Check	Check the intergraty of the ROM, BIOS and message
F	Reserved	
10	Auto detec EEPROM	Check Flash type and copy flash write/erase routines to 0F000h segments
11	Reserved	
12	Cmos Check	Check Cmos Circuitry and reset CMOS
13	Reserved	
14	Chipset Default load	Program the chipset registers with CMOS values
15	Reserved	
16	Clock Init	Init onboard clock generator
17	Reserved	
18	Identify the CPU	Check the CPU ID and init L1/L2 cache
19	Reserved	
1A	Reserved	
1B	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT TBL
1C	Reserved	
1D	Early PM Init	First step initialize if single CPU onboard
1E	Reserved	
1F	Re-initial KB	Re-init KB
20	Reserved	
21	HPM init	If support HPM, HPM get initialized here
22	Reserved	
23	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset
24	Reserved	
25	Reserved	
26	Reserved	
27	KBC final Init	Final Initial KBC and setup BIOS data area
28	Reserved	
29	Initialize Video Interface	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
2A	Reserved	
2B	Reserved	
2C	Reserved	
2D	Video memory test	Test video memory, write sign-on message to screen.
2E	Reserved	Setup shadow RAM - Enable shadow according to Setup.

Code(hex)	Name	Description
2F	Reserved	
30	Reserved	
31	Reserved	
32	Reserved	
33	PS2 Mouse setup	Setup PS2 Mouse and reset KB
34	Reserved	
35	Test DMA Controller 0	Test DMA channel 0
36	Reserved	
37	Test DMA Controller 1	Test DMA channel 1
38	Reserved	
39	Test DMA Page Registers	Test DMA Page Registers.
3A	Reserved	
3B	Reserved	
3C	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
3D	Reserved	
3E	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
3F	Reserved	
40	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
41	Reserved	
42	Reserved	
43	Test Stuck8259's Interrupt Bits Test 8259 Interrupt Functionality	Turn off interrupts then verify no interrupt mask register is on. Force an interrupt and verify the interrupt occurred.
44	Reserved	
45	Reserved	
46	Reserved	
47	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests and clear EISA mode flag.
48	Reserved	
49	Size Base and Extended Memory	Size base memory from 256K to 640K and extended memory above 1MB.
4A	Reserved	
4B	Reserved	
4C	Reserved	
4D	Reserved	
4E	Test Base and Extended Memory	Test base memory from 256K to 640K and extended memory above 1MB using various patterns.  NOTE: This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.
4F	Reserved	
50	USB init	Initialize USB controller
51	Reserved	

<b>Code(hex)</b>	<b>Name</b>	<b>Description</b>
52	Memory Test	Test all memory of memory above 1MB using Virtual 8086 mode, page mode and clear the memory
53	Reserved	
54	Reserved	
55	CPU display	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features
56	Reserved	
57	PnP Init	Display PnP logo and PnP early init
58	Reserved	
59	Setup Virus Protect	Setup virus protect according to Setup
5A	Reserved	
5B	Awdflash Load	If required, will auto load Awdflash.exe in POST
5C	Reserved	
5D	Onboard I/O Init	Initializing onboard superIO
5E	Reserved	
5F	Reserved	
60	Setup enable	Display setup message and enable setup functions
61	Reserved	
62	Reserved	
63	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
64	Reserved	
65	PS2 Mouse special	Special treatment to PS2 Mouse port
66	Reserved	
67	ACPI init	ACPI sub-system initializing
68	Reserved	
69	Setup Cache Controller	Initialize cache controller.
6A	Reserved	
6B	Setup Entering	Enter setup check and auto-configuration check up
6C	Reserved	
6D	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
6E	Reserved	
6F	FDD install	Install FDD and setup BIOS data area parameters
70	Reserved	
71	Reserved	
72	Reserved	
73	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
74	Reserved	
75	Install HDD	IDE device detection and install
76	Reserved	
77	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
78	Reserved	
79	Reserved	
7A	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
7B	Reserved	

Code(hex)	Name	Description
7C	HDD Check for Write protection	HDD check out
7D	Reserved	
7E	Reserved	
7F	POST error check	Check POST error and display them and ask for user intervention
80	Reserved	
81	Reserved	
82	Security Check	Ask password security (optional).
83	Write CMOS	Write all CMOS values back to RAM and clear screen.
84	Pre-boot Enable	Enable parity checker Enable NMI, Enable cache before boot.
85	Initialize	Initialize any option ROMs present Option ROMs from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
86	Reserved	
87	Reserved	
88	Reserved	
89	Reserved	
8A	Reserved	
8B	Reserved	
8C	Reserved	
8D	Reserved	
8E	Reserved	
8F	Reserved	
90	Reserved	
91	Reserved	
92	Reserved	
93	Boot Medium detection	Read and store boot partition head and cylinders values in RAM
94	Final Init	Final init for last micro details before boot
95	Special KBC patch	Set system speed for boot Setup NumLock status according to Setup
96	Boot Attempt	Set low stack Boot via INT 19h.
FF	Boot	

## *Quick POST Codes*

Code(hex)	Name	Description
65	Init onboard device	Early Initialized the super IO Reset Video controller Keyboard controller init Test the Keyboard Initialized the mouse Onboard audio controller initialize if exist. Check the intergraty of the ROM, BIOS and message Check Flash type and copy flash write/erase routines to 0F000h segments Check Cmos Circuitry and reset CMOS Program the chipset registers with CMOS values Init onboard clock generator

Code(hex)	Name	Description
66	Early System setup	Check the CPU ID and init L1/L2 cache Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL First step initialize if single CPU onboard. Re-init KB If support HPM, HPM get initialized here
67	KBC and CMOS Init	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset Final Initial KBC and setup BIOS data area.
68	Video Init	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter. Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
69	8259 Init	Init 8259 channel 1 and mask IRQ 9
6A	Memory test	Quick Memory Test
6B	CPU Detect and IO init	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features Display PnP logo and PnP early init Setup virus protect according to Setup. If required, will auto load Awdflash.exe in POST Initializing onboard superIO
6C	Reserved	
6D	Reserved	
6E	Reserved	
6F	Reserved	
70	Setup Init	Display setup message and enable setup functions Detect if mouse is present, initialize mouse, install interrupt vectors. Special treatment to PS2 Mouse port ACPI sub-system initializing
71	Setup Cache Controller	Initialize cache controller.
72	Install FDD	Enter setup check and auto-configuration check up Initialize floppy disk drive controller and any drives. Install FDD and setup BIOS data area parameters
73	Install HDD	Initialize hard drive controller and any drives. IDE device detection and install Initialize any serial and parallel ports (also game port).
74	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
75	HDD Check for Write protection	HDD check out
76	Reserved	



<b>Code(hex)</b>	<b>Name</b>	<b>Description</b>
77	Display POST error	Check POST error and display them and ask for user intervention Ask password security (optional).
78	CMOS and Option ROM Init	Write all CMOS values back to RAM and clear screen. Enable parity checker Enable NMI, Enable cache before boot. Initialize any option ROMs present from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
79	Reserved	
7A	Reserved	
7B	Reserved	
7C	Reserved	
7D	Boot Medium detection	Read and store boot partition head and cylinders values in RAM
7E	Final Init	Final init for last micro details before boot
7F	Special KBC patch	Set system speed for boot Setup NumLock status according to Setup
80	Boot Attempt	Set low stack Boot via INT 19h.
FF	Boot	

## *S4 POST Codes*

<b>Code(hex)</b>	<b>Name</b>	<b>Description</b>
5A	Early Chipset Init	Early Initialized the super IO Reset Video controller Keyboard controller init Test the Keyboard Initilized the mouse
5B	Cmos Check	Check Cmos Circuitry and reset CMOS
5C	Chipset default Prog	Program the chipset registers with CMOS values. Init onboard clock generator
5D	Identify the CPU	Check the CPU ID and init L1/L2 cache
5E	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and INT_00h-1Fh according to INT_TBL First step initialize if single CPU Onboard. Re-init KB If support HPM, HPM get initialized Here.
5F	Test CMOS Interface and Battery status	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset
60	KBC final Init	Final Initial KBC and setup BIOS data area

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<b>Code(hex)</b>	<b>Name</b>	<b>Description</b>
61	Initialize Video Interface	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
62	Video memory test	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
63	Setup PS2 mouse and test DMA	Setup PS2 Mouse and reset KB Test DMA channel 0
64	Test 8259	Test 8259 channel 1 and mask IRQ 9
65	Init Boot Device	Detect if mouse is present, initialize mouse, install interrupt vectors. Special treatment to PS2 Mouse port ACPI sub-system initializing Initialize cache controller.
66	Install Boot Devices	Enter setup check and auto-configuration check up Initialize floppy disk drive controller and any drives. Install FDD and setup BIOS data area Parameters Initialize hard drive controller and any drives. IDE device detection and install
67	Cache Init	Cache init and USB init
68	PM init	PM initialization
69	PM final Init and issue SMI	Final init Before resume
FF	Full on	

### ***BootBlock POST Codes***

<b>Code(hex)</b>	<b>Name</b>	<b>Description</b>
1	Base memory test	Clear base memory area (0000:0000--9000:ffffh)
5	KB init	Initialized KBC
12	Install interrupt vectors	Install int. vector (0-77), and initialized 00-1fh to their proper place
0D	Init Video	Video initializing
41	Init FDD	Scan floppy and media capacity for onboard superIO
FF	Boot	Load boot sector