# P45X3 Deluxe

## User Manual

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(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

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The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

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# Chapter 1: Introduction

Thank you for purchasing ASRock ***P45X3 Deluxe*** motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

In this manual, chapter 1 and 2 contain introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contain the configuration guide to BIOS setup and information of the Support CD.

Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock website without further notice. You may find the latest VGA cards and CPU support lists on ASRock website as well. ASRock website http://www.asrock.com
If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.
www.asrock.com/support/index.asp

## 1.1 Package Contents

ASRock ***P45X3 Deluxe*** Motherboard
(ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
ASRock ***P45X3 Deluxe*** Quick Installation Guide
ASRock ***P45X3 Deluxe*** Support CD
One ASRock SLI/XFire Switch Card
One 80-conductor Ultra ATA 66/100/133 IDE Ribbon Cable
One Ribbon Cable for a 3.5-in Floppy Drive
Four Serial ATA (SATA) Data Cables (Optional)
One Serial ATA (SATA) HDD Power Cable (Optional)
One I/O Panel Shield

## 1.2 Specifications

| | |
|---|---|
| **Platform** | - ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm<br>- All Solid Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors) |
| **CPU** | - LGA 775 for Intel® Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo / Pentium® Dual Core / Celeron® Dual Core / Celeron®, supporting Penryn Quad Core Yorkfield and Dual Core Wolfdale processors<br>- Compatible with FSB2000/1600/1333/1066/800 MHz (see **CAUTION 1**)<br>- Advanced V8 Power Phase Design<br>- Supports Hyper-Threading Technology (see **CAUTION 2**)<br>- Supports Untied Overclocking Technology (see **CAUTION 3**)<br>- Supports EM64T CPU |
| **Chipset** | - Northbridge: Intel® P45<br>- Southbridge: Intel® ICH10 |
| **Memory** | - Dual Channel DDR3 Memory Technology (see **CAUTION 4**)<br>- 4 x DDR3 DIMM slots<br>- Support DDR3 1600/1333/1066/800 non-ECC, un-buffered memory (see **CAUTION 5**)<br>- Max. capacity of system memory: 16GB (see **CAUTION 6**) |
| **Expansion Slot** | - 2 x PCI Express 2.0 x16 slots (blue @ x16 mode, orange @ x8 mode)<br>- 3 x PCI Express x1 slots<br>- 2 x PCI slots<br>- Supports ATI™ CrossFireX™ (see **CAUTION 7**) |
| **Audio** | - 7.1 CH Windows® Vista™ Premium Level HD Audio (ALC888 Audio Codec) |
| **LAN** | - PCIE x1 Gigabit LAN 10/100/1000 Mb/s<br>- Realtek RTL8111DL<br>- Supports Wake-On-LAN |
| **Rear Panel I/O** | I/O Panel<br>- 1 x PS/2 Mouse Port<br>- 1 x PS/2 Keyboard Port<br>- 1 x Coaxial SPDIF Out Port<br>- 1 x Optical SPDIF Out Port<br>- 1 x IEEE 1394 Port<br>- 7 x Ready-to-Use USB 2.0 Ports<br>- 1 x Powered eSATAII/USB Connector<br>- 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED) |

| | |
|---|---|
| | - 1 x Clear CMOS Switch with LED<br>- HD Audio Jack: Side Speaker/Rear Speaker/Central/Bass/ Line in/Front Speaker/Microphone (see **CAUTION 8**) |
| **Connector** | - 6 x SATAII 3.0Gb/s connectors, support NCQ, AHCI and "Hot Plug" functions (see **CAUTION 9**)<br>- 1 x ATA133 IDE connector (supports 2 x IDE devices)<br>- 1 x Floppy connector<br>- 1 x IR header<br>- 1 x COM port header<br>- 1 x HDMI_SPDIF header<br>- 1 x IEEE 1394 header<br>- 1 x TPM header<br>- CPU/Chassis/NB/Power FAN connector<br>- 24 pin ATX power connector<br>- 8 pin 12V power connector<br>- CD in header<br>- Front panel audio connector<br>- 2 x USB 2.0 headers (support 4 USB 2.0 ports) (see **CAUTION 10**) |
| **Quick Switch** | - 1 x Clear CMOS Switch with LED<br>- 1 x Power Switch with LED<br>- 1 x Reset Switch with LED |
| **BIOS Feature** | - 8Mb AMI BIOS<br>- AMI Legal BIOS<br>- Supports "Plug and Play"<br>- ACPI 1.1 Compliance Wake Up Events<br>- Supports jumperfree<br>- AMBIOS 2.3.1 Support<br>- CPU, VCCM, VTT Voltage Multi-adjustment<br>- Supports I. O. T. (Intelligent Overclocking Technology)<br>- Supports Smart BIOS |
| **Support CD** | - Drivers, Utilities, AntiVirus Software (Trial Version) |
| **Unique Feature** | - ASRock OC Tuner (see **CAUTION 11**)<br>- Intelligent Energy Saver (see **CAUTION 12**)<br>- Instant Boot<br>- ASRock Instant Flash (see **CAUTION 13**)<br>- Hybrid Booster:<br>- CPU Frequency Stepless Control (see **CAUTION 14**)<br>- ASRock U-COP (see **CAUTION 15**)<br>- Boot Failure Guard (B.F.G.) |
| **Hardware Monitor** | - CPU Temperature Sensing<br>- Chassis Temperature Sensing |

| | |
|---|---|
| | - CPU/Chassis/NB/Power Fan Tachometer<br>- CPU Quiet Fan<br>- Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore |
| **OS** | - Microsoft® Windows® 2000 / XP / XP 64-bit / Vista™ / Vista™ 64-bit compliant (see **CAUTION 16**) |
| **Certifications** | - FCC, CE, WHQL |

* For detailed product information, please visit our website: http://www.asrock.com

**WARNING**

Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using the third-party overclocking tools. Overclocking may affect your system stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.

## *CAUTION!*

1. Some CPU you adopt may be overclocked to FSB2000 MHz, in this situation, please adopt DDR3 1333 or DDR3 1600 memory modules on this motherboard.
2. About the setting of "Hyper Threading Technology", please check page 49.
3. This motherboard supports Untied Overclocking Technology. Please read "Untied Overclocking Technology" on page 43 for details.
4. This motherboard supports Dual Channel Memory Technology. Before you implement Dual Channel Memory Technology, make sure to read the installation guide of memory modules on page 16 for proper installation.
5. Please check the table below for the CPU FSB frequency and its corresponding memory support frequency.

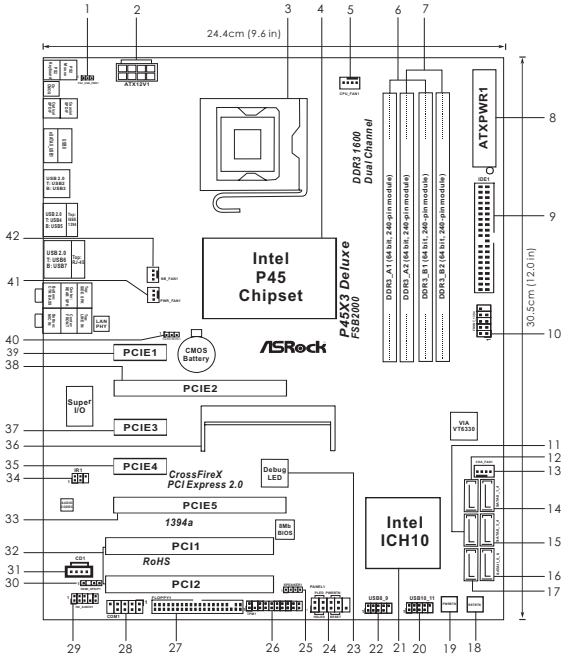
| CPU FSB Frequency | Memory Support Frequency |
|---|---|
| 1600 | DDR3 800, DDR3 1066, DDR3 1333, DDR3 1600 |
| 1333 | DDR3 800, DDR3 1066, DDR3 1333 |
| 1066 | DDR3 800, DDR3 1066 |
| 800 | DDR3 800 |

* DDR3 1600 memory module is operating in overclocking mode.

6. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® XP and Windows® Vista™. For Windows® XP 64-bit and Windows® Vista™ 64-bit with 64-bit CPU, there is no such limitation.
7. This motherboard supports ATI™ CrossFireX™ technology. If you want to use CrossFireX™ function, please follow the instructions on page 21 to reverse the direction of ASRock SLI/XFire Switch Card in advance.

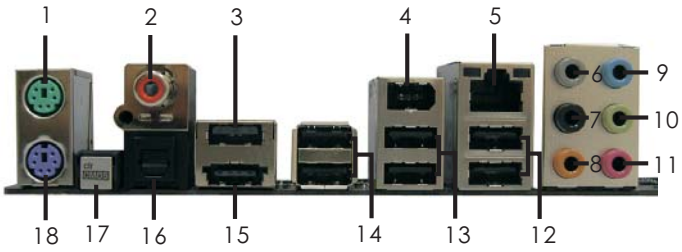
8. For microphone input, this motherboard supports both stereo and mono modes. For audio output, this motherboard supports 2-channel, 4-channel, 6-channel, and 8-channel modes. Please check the table on page 11 for proper connection.
9. Before installing SATAII hard disk to SATAII connector, please read the "SATAII Hard Disk Setup Guide" on page 37 to adjust your SATAII hard disk drive to SATAII mode. You can also connect SATA hard disk to SATAII connector directly.
10. Power Management for USB 2.0 works fine under Microsoft® Windows® Vista™ 64-bit / Vista™ / XP 64-bit / XP SP1 or SP2 / 2000 SP4.
11. It is a user-friendly ASRock overclocking tool which allows you to surveil your system by hardware monitor function and overclock your hardware devices to get the best system performance under Windows® environment. Please visit our website for the operation procedures of ASRock OC Tuner. ASRock website: http://www.asrock.com
12. Featuring an advanced proprietary hardware and software design, Intelligent Energy Saver is a revolutionary technology that delivers unparalleled power savings. In other words, it is able to provide exceptional power saving and improve power efficiency without sacrificing computing performance. Please visit our website for the operation procedures of Intelligent Energy Saver.
ASRock website: http://www.asrock.com
13. ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. With this utility, you can press <F6> key during the POST or press <F2> key to BIOS setup menu to access ASRock Instant Flash. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system.
14. Although this motherboard offers stepless control, it is not recommended to perform over-clocking. Frequencies other than the recommended CPU bus frequencies may cause the instability of the system or damage the CPU.
15. While CPU overheat is detected, the system will automatically shutdown. Before you resume the system, please check if the CPU fan on the motherboard functions properly and unplug the power cord, then plug it back again. To improve heat dissipation, remember to spray thermal grease between the CPU and the heatsink when you install the PC system.
16. AHCI function is not supported under Windows® 2000 OS. It is recommended to use IDE mode under Windows® 2000. Please refer to page 59 for detailed setup.

## 1.3 Motherboard Layout




| | |
|---|---|
| 1 | PS2_USB_PWR1 Jumper |
| 2 | ATX 12V Connector (ATX12V1) |
| 3 | 775-Pin CPU Socket |
| 4 | North Bridge Controller |
| 5 | CPU Fan Connector (CPU_FAN1) |
| 6 | 2 x 240-pin DDR3 DIMM Slots (Dual Channel A: DDR3_A1, DDR3_B1; Blue) |
| 7 | 2 x 240-pin DDR3 DIMM Slots (Dual Channel B: DDR3_A2, DDR3_B2; White) |
| 8 | ATX Power Connector (ATXPWR1) |
| 9 | IDE1 Connector (IDE1, Blue) |
| 10 | Front Panel IEEE 1394 Header (FRONT_1394; Red) |
| 11 | Fourth SATAII Connector (SATAII_4; Red) |
| 12 | Secondary SATAII Connector (SATAII_2; Red) |
| 13 | Chassis Fan Connector (CHA_FAN1) |
| 14 | Primary SATAII Connector (SATAII_1; Red) |
| 15 | Third SATAII Connector (SATAII_3; Red) |
| 16 | Fifth SATAII Connector (SATAII_5; Red) |
| 17 | Sixth SATAII Connector (SATAII_6; Red) |
| 18 | Reset Switch (RSTBTN) |
| 19 | Power Switch (PWRBTN) |
| 20 | USB 2.0 Header (USB10_11, Blue) |
| 21 | South Bridge Controller |
| 22 | USB 2.0 Header (USB8_9, Blue) |
| 23 | Debug LED |
| 24 | System Panel Header (PANEL1, Orange) |
| 25 | Chassis Speaker Header (SPEAKER 1, Purple) |
| 26 | TPM Header (TPM1) |
| 27 | Floppy Connector (FLOPPY1) |
| 28 | COM Port Header (COM1) |
| 29 | Front Panel Audio Header (HD_AUDIO1, Lime) |
| 30 | HDMI_SPDIF Header (HDMI_SPDIF1, Yellow) |
| 31 | Internal Audio Connector: CD1 (Black) |
| 32 | PCI Slots (PCI1- 2) |
| 33 | PCI Express x16 Slot (PCIE5; Orange) |
| 34 | Infrared Module Header (IR1) |
| 35 | PCI Express x1 Slot (PCIE4) |
| 36 | SLI/XFire Switch Card Retention Slot |
| 37 | PCI Express x1 Slot (PCIE3) |
| 38 | PCI Express x16 Slot (PCIE2; Blue) |
| 39 | PCI Express x1 Slot (PCIE1) |
| 40 | Clear CMOS Jumper (CLRCMOS1) |
| 41 | Power Fan Connector (PWR_FAN1) |
| 42 | NB Fan Connector (NB_FAN1) |

## 1.4 I/O Panel




| | | | |
|---|---|---|---|
| 1 | PS/2 Mouse Port (Green) | ** 10 | Front Speaker (Lime) |
| 2 | Coaxial SPDIF Out Port | 11 | Microphone (Pink) |
| 3 | USB 2.0 Port (USB0) | 12 | USB 2.0 Ports (USB67) |
| 4 | IEEE 1394 Port (IEEE 1394) | 13 | USB 2.0 Ports (USB45) |
| * 5 | LAN RJ-45 Port | 14 | USB 2.0 Ports (USB23) |
| 6 | Side Speaker (Gray) | 15 | Powered eSATAII/USB Connector |
| 7 | Rear Speaker (Black) | 16 | Optical SPDIF Out Port |
| 8 | Central / Bass (Orange) | 17 | Clear CMOS Switch (CLRCBTN) |
| 9 | Line In (Light Blue) | 18 | PS/2 Keyboard Port (Purple) |

* There are two LED next to the LAN port. Please refer to the table below for the LAN port LED indications.

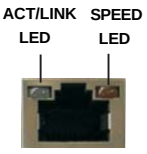
**LAN Port LED Indications**

**Activity/Link LED**

| Status | Description |
|---|---|
| Off | No Activity |
| Blinking | Data Activity |

**SPEED LED**

| Status | Description |
|---|---|
| Off | 10Mbps connection |
| Orange | 100Mbps connection |
| Green | 1Gbps connection |




**LAN Port**

**** If you use 2-channel speaker, please connect the speaker's plug into "Front Speaker Jack". See the table below for connection details in accordance with the type of speaker you use.

**TABLE for Audio Output Connection**

| Audio Output Channels | Front Speaker (No. 10) | Rear Speaker (No. 7) | Central / Bass (No. 8) | Side Speaker (No. 6) |
|---|---|---|---|---|
| 2 | V | -- | -- | -- |
| 4 | V | V | -- | -- |
| 6 | V | V | V | -- |
| 8 | V | V | V | V |

To enable Multi-Streaming function, you need to connect a front panel audio cable to the front panel audio header. After restarting your computer, you will find "Mixer" tool on your system. Please select "Mixer ToolBox" , click "Enable playback multi-streaming", and click "ok". Choose "2CH", "4CH", "6CH", or "8CH" and then you are allowed to select "Realtek HDA Primary output" to use Rear Speaker, Central/Bass, and Front Speaker, or select "Realtek HDA Audio 2nd output" to use front panel audio.

# Chapter 2: Installation

This is an ATX form factor (12.0" x 9.6", 30.5 x 24.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

## 2.1 Screw Holes

Place screws into the holes indicated by circles to secure the motherboard to the chassis.

Do not over-tighten the screws! Doing so may damage the motherboard.

## 2.2 Pre-installation Precautions

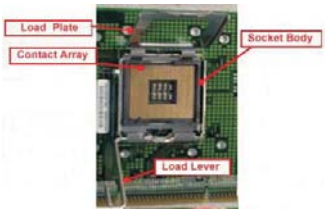
Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component.

Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply.
Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

## 2.3 CPU Installation

For the installation of Intel 775-LAND CPU, please follow the steps below.




775-Pin Socket Overview

Before you insert the 775-LAND CPU into the socket, please check if the CPU surface is unclean or if there is any bent pin on the socket. Do not force to insert the CPU into the socket if above situation is found. Otherwise, the CPU will be seriously damaged.

Step 1. Open the socket:

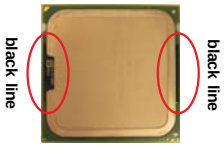
Step 1-1. Disengaging the lever by depressing down and out on the hook to clear retention tab.

Step 1-2. Rotate the load lever to fully open position at approximately 135 degrees.

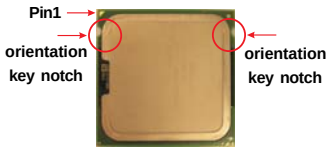
Step 1-3. Rotate the load plate to fully open position at approximately 100 degrees.

Step 2. Insert the 775-LAND CPU:

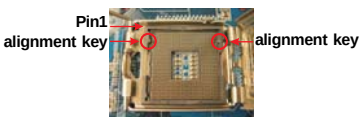
Step 2-1. Hold the CPU by the edges where are marked with black lines.




Step 2-2. Orient the CPU with IHS (Integrated Heat Sink) up. Locate Pin1 and the two orientation key notches.




775-LAND CPU




775-Pin Socket

For proper inserting, please ensure to match the two orientation key notches of the CPU with the two alignment keys of the socket.

Step 2-3. Carefully place the CPU into the socket by using a purely vertical motion.
Step 2-4. Verify that the CPU is within the socket and properly mated to the orient keys.

Step 3. Remove PnP Cap (Pick and Place Cap):
Use your left hand index finger and thumb to support the load plate edge, engage PnP cap with right hand thumb and peel the cap from the socket while pressing on center of PnP cap to assist in removal.

1. It is recommended to use the cap tab to handle and avoid kicking off the PnP cap.
2. This cap must be placed if returning the motherboard for after service.

Step 4. Close the socket:
Step 4-1. Rotate the load plate onto the IHS.
Step 4-2. While pressing down lightly on load plate, engage the load lever.
Step 4-3. Secure load lever with load plate tab under retention tab of load lever.

## 2.4 Installation of CPU Fan and Heatsink

This motherboard is equipped with 775-Pin socket that supports Intel 775-LAND CPU. Please adopt the type of heatsink and cooling fan compliant with Intel 775-LAND CPU to dissipate heat. Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to improve heat dissipation. Ensure that the CPU and the heatsink are securely fastened and in good contact with each other. Then connect the CPU fan to the CPU_FAN connector (CPU_FAN1, see page 10, No.5).

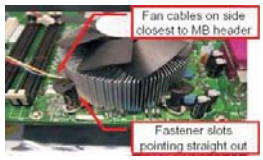
**For proper installation, please kindly refer to the instruction manuals of your CPU fan and heatsink.**

Below is an example to illustrate the installation of the heatsink for 775-LAND CPU.

Step 1. Apply thermal interface material onto center of IHS on the socket surface.

Step 2. Place the heatsink onto the socket. Ensure fan cables are oriented on side closest to the CPU fan connector on the motherboard (CPU_FAN1, see page 10, No. 5).

Step 3. Align fasteners with the motherboard throughholes.




Step 4. Rotate the fastener clockwise, then press down on fastener caps with thumb to install and lock. Repeat with remaining fasteners.

If you press down the fasteners without rotating them clockwise, the heatsink cannot be secured on the motherboard.

Step 5. Connect fan header with the CPU fan connector on the motherboard.

Step 6. Secure excess cable with tie-wrap to ensure cable does not interfere with fan operation or contact other components.

## 2.5 Installation of Memory Modules (DIMM)

This motherboard provides four 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology. For dual channel configuration, you always need to install **identical** (the same brand, speed, size and chip-type) DDR3 DIMM pair in the slots of the same color. In other words, you have to install **identical** DDR3 DIMM pair in **Dual Channel A** (DDR3_A1 and DDR3_B1; Blue slots; see p.10 No.6) or **identical** DDR3 DIMM pair in **Dual Channel B** (DDR3_A2 and DDR3_B2; white slots; see p.10 No.7), so that Dual Channel Memory Technology can be activated. This motherboard also allows you to install four DDR3 DIMMs for dual channel configuration, and please install **identical** DDR3 DIMMs in all four slots. You may refer to the Dual Channel Memory Configuration Table below.

**Dual Channel Memory Configurations**

| | DDR3_A1 (Blue Slot) | DDR3_A2 (White Slot) | DDR3_B1 (Blue Slot) | DDR3_B2 (White Slot) |
|---|---|---|---|---|
| (1) | Populated | - | Populated | - |
| (2) | - | Populated | - | Populated |
| (3)* | Populated | Populated | Populated | Populated |

* For the configuration (3), please install **identical** DDR3 DIMMs in all four slots.

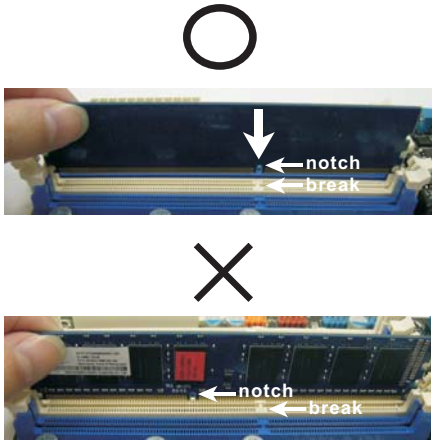
1. If you want to install two memory modules, for optimal compatibility and reliability, it is recommended to install them in the slots of the same color. In other words, install them either in the set of blue slots (DDR3_A1 and DDR3_B1), or in the set of white slots (DDR3_A2 and DDR3_B2).
2. If only one memory module or three memory modules are installed in the DDR3 DIMM slots on this motherboard, it is unable to activate the Dual Channel Memory Technology.
3. If a pair of memory modules is NOT installed in the same Dual Channel, for example, installing a pair of memory modules in DDR3_A1 and DDR3_A2, it is unable to activate the Dual Channel Memory Technology .
4. It is not allowed to install a DDR or DDR2 memory module into DDR3 slot;otherwise, this motherboard and DIMM may be damaged.
5. If you adopt a DDR3 1600 memory module, you can only install it on DDR3_A1 slot.

## Installing a DIMM

Please make sure to disconnect power supply before adding or removing DIMMs or the system components.

Step 1. Unlock a DIMM slot by pressing the retaining clips outward.

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




The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

Step 3. Firmly insert the DIMM into the slot until the retaining clips at both ends fully snap back in place and the DIMM is properly seated.

## 2.6 Expansion Slots (PCI and PCI Express Slots)

There are 2 PCI slots and 5 PCI Express slots on this motherboard.

**PCI Slots:** PCI slots are used to install expansion cards that have the 32-bit PCI interface.

**PCIE Slots:**

PCIE1 / PCIE3 / PCIE4 (PCIE x1 slot; White) is used for PCI Express cards with x1 lane width cards, such as Gigabit LAN card, SATA2 card, etc.

PCIE2 (PCIE x16 slot; Blue) is used for PCI Express x16 lane width graphics cards, or used to install PCI Express graphics cards to support CrossFireX™ function.

PCIE5 (PCIE x16 slot; Orange) is used for PCI Express x1 lane width cards, such as Gigabit LAN card, SATA2 card, etc., or used to install PCI Express graphics cards to support CrossFireX™ function.

**PCIE2 / PCIE5 / SLI/XFire Switch Card Retention Slot Configurations**

| | PCIE2 Slot (Blue) | PCIE5 Slot (Orange) | SLI/XFire Switch Card Retention Slot |
|---|---|---|---|
| **Single Graphics Card** | PCIE x16 | N/A | (Default) |
| **Dual Graphics Cards in CrossFireX™ Mode** | PCIE x8 | PCIE x8 | |

1. If you plan to install only one PCI Express VGA card on this motherboard, please install it on PCIE2 slot (Blue). In this mode, you do not need to adjust the default setting of ASRock SLI/XFire Switch Card, and please do not remove or lose ASRock SLI/XFire Switch Card when it is still in working condition.
2. For the information of the compatible CrossFireX™ Mode PCI Express VGA cards and CrossFireX™ setup procedures, please refer to "CrossFireX™ Operation Guide" on page 20.

## Installing an expansion card

Step 1. Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).

Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.

Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.

Step 5. Fasten the card to the chassis with screws.

Step 6. Replace the system cover.

## 2.7 CrossFireX™ Operation Guide

This motherboard supports CrossFireX™ feature. CrossFireX™ technology offers the most advantageous means available of combining multiple high performance Graphics Processing Units (GPU) in a single PC. Combining a range of different operating modes with intelligent software design and an innovative interconnect mechanism, CrossFireX™ enables the highest possible level of performance and image quality in any 3D application. Currently CrossFireX™ feature is supported with Windows® XP with Service Pack 2 and Vista™ OS. Please check AMD website for ATI™ CrossFireX™ driver updates.

**What graphics cards work with CrossFireX™?**

A complete CrossFireX™ system requires a CrossFireX™ Ready motherboard, a CrossFireX™ Edition graphics card and a compatible standard Radeon (CrossFireX™ Ready) graphics card from the same series, or two CrossFireX™ Ready cards. This applies to cards from ATI™ or any of its partners. Please refer to below table for CrossFireX™ VGA card support list according to the OS you install.

**For Windows® XP**

| Vendor | Chipset | Model | Driver |
|---|---|---|---|
| ATI | Radeon HD 2600PRO | MSI RX2600PRO-T2D256EZ | Catalyst 9.1 |
| | Radeon HD 2600XT | Gigabyte GV-RX26T256HP-B | Catalyst 9.1 |
| | RADEON 3650 | Powercolor AX3650 512MMD3-XP | Catalyst 9.1 |
| | RADEON 3850 | Gigabyte GV-RX385256H-B | Catalyst 9.1 |
| | RADEON 3870 | Powercolor AX3870 512MD4-H | Catalyst 9.1 |
| | Radeon HD 4350 | ASUS EAH4350 SILENT/DI/512MD2/A | Catalyst 9.1 |
| | RADEON 4670 | Powercolor AX4670 512MD3-P | Catalyst 9.1 |
| | RADEON 4850 | Gecube GC-HD485PG3-E3 | Catalyst 9.1 |

**For Windows® Vista**

| Vendor | Chipset | Model | Driver |
|---|---|---|---|
| ATI | Radeon HD 2600PRO | MSI RX2600PRO-T2D256EZ | Catalyst 9.1 |
| | Radeon HD 2600XT | Gigabyte GV-RX26T256HP-B | Catalyst 9.1 |
| | RADEON 3650 | Powercolor AX3650 512MMD3-XP | Catalyst 9.1 |
| | RADEON 3850 | Gigabyte GV-RX385256H-B | Catalyst 9.1 |
| | RADEON 3870 | Powercolor AX3870 512MD4-H | Catalyst 9.1 |
| | RADEON 3870 | Powercolor AX3870X2 1GBD3-H | Catalyst 9.1 |
| | Radeon HD 4350 | ASUS EAH4350 SILENT/DI/512MD2/A | Catalyst 9.1 |
| | RADEON 4670 | Powercolor AX4670 512MD3-P | Catalyst 9.1 |
| | RADEON 4850 | Gecube GC-HD485PG3-E3 | Catalyst 9.1 |
| | Radeon HD 4870X2 | ASUS EAH4870X2/HDTI/2G | Catalyst 9.1 |

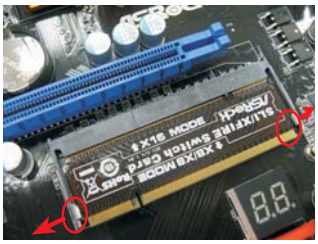
1. If a customer incorrectly configures their system they will not see the performance benefits of CrossFireX™. All three CrossFireX™ components, a CrossFireX™ Ready graphics card, a CrossFireX™ Ready motherboard and a CrossFireX™ Edition co-processor graphics card, must be installed correctly to benefit from the CrossFireX™ multi-GPU platform.
2. If you pair a 12-pipe CrossFireX™ Edition card with a 16-pipe card, both cards will operate as 12-pipe cards while in CrossFireX™ mode.

## Enjoy the benefit of CrossFireX™

Different CrossFireX™ cards may require different methods to enable CrossFireX™ feature. In below procedures, we use Radeon 4850 as the example graphics card. For other CrossFireX™ cards that ATI™ has released or will release in the future, please refer to ATI™ graphics card manuals for detailed installation guide.

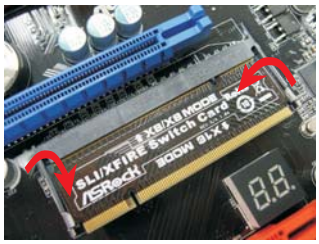
Step 1. There is one ASRock SLI/XFire Switch Card factory-mounted on this motherboard. This card served as a switch between the default mode (x16) and CrossFireX™ mode (x8 / x8). ASRock SLI/XFire Switch Card is factory-mounted with its default mode (x16) side toward the retention slot base.

Step 2. To change it to CrossFireX™ Mode, you need to reverse the direction of ASRock SLI/XFire Switch Card. Please simultaneously pull open both the retention arms that hold the card in position. The card itself will spring away from the retention slot. Take it out gently by holding its edges, and keep away from touching the connectors (Golden Fingers).



Step 3. Reverse the card direction so as to have the “X8 / X8 MODE” wording side toward the retention slot base. Insert the card into the bottom of the base.

Step 4. Push the card down into the retention slot till both the retention arms firmly hold the card into position. Also, keep away from touching the connectors (Golden Fingers).

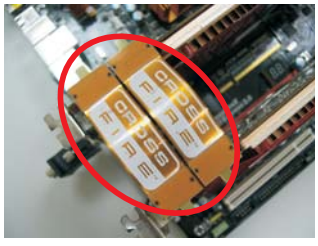



Step 5. Install one Radeon graphics card to PCIE2 slot. For the proper installation procedures, please refer to section “Expansion Slots”.

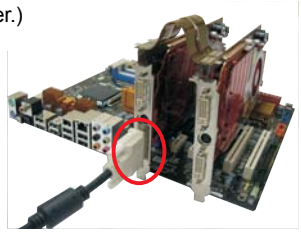
Step 6. Install one Radeon graphics card to PCIE5 slot. For the proper installation procedures, please refer to section “Expansion Slots”.

Step 7. Connect two Radeon graphics cards by installing two CrossFire™ Bridge on CrossFire™ Bridge Interconnects on the top of Radeon graphics cards. (CrossFire™ Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.)

**CrossFire™ Bridge**



Step 8. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card on PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.)



Step 9. Power on your computer and boot into OS.

Step 10. Remove the ATI™ driver if you have any VGA driver installed in your system.

The Catalyst Uninstaller is an optional download. We recommend using this utility to uninstall any previously installed Catalyst drivers prior to installation. Please check AMD website for ATI™ driver updates.

Step 11. Install the required drivers to your system.

**For Windows® XP OS:**

A. ATI™ recommends Windows® XP Service Pack 2 or higher to be installed (If you have Windows® XP Service Pack 2 or higher installed in your system, there is no need to download it again): http://www.microsoft.com/windowsxp/sp2/default.mspx

B. You must have Microsoft .NET Framework installed prior to downloading and installing the CATALYST Control Center. Please check Microsoft website for details.

**For Windows® Vista™ OS:**

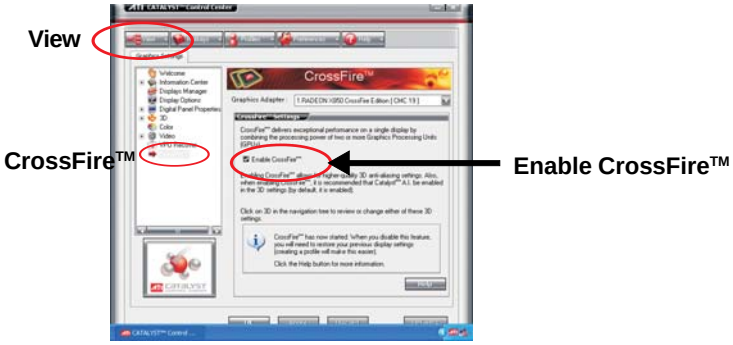
Install the CATALYST Control Center. Please check AMD website for details.

Step 12. Restart your computer.

Step 13. Install the VGA card drivers to your system, and restart your computer. Then you will find “ATI Catalyst Control Center” on your Windows® taskbar.

**ATI Catalyst Control Center**

Step 14. Double-click “ATI Catalyst Control Center”. Click “View”, and select “Advanced View”. Click “CrossFire™”, and then set the option “Enable CrossFire™” to “Yes”.




Although you have selected the option “Enable CrossFire™”, the CrossFireX™ function may not work actually. Your computer will automatically reboot. After restarting your computer, please confirm whether the option “Enable CrossFire™” in “ATI Catalyst Control Center” is selected or not; if not, please select it again, and then you are able to enjoy the benefit of CrossFireX™ feature.

Step 15. You can freely enjoy the benefit of CrossFireX™ feature.

* CrossFireX™ appearing here is a registered trademark of ATI™ Technologies Inc., and is used only for identification or explanation and to the owners’ benefit, without intent to infringe.
* For further information of ATI™ CrossFireX™ technology, please check AMD website for updates and details.

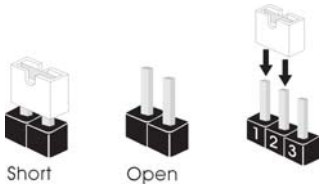
## 2.8 Surround Display Feature

This motherboard supports Surround Display upgrade. With the external add-on PCI Express VGA cards, you can easily enjoy the benefits of Surround Display feature. For the detailed instruction, please refer to the document at the following path in the Support CD:

**..\ Surround Display Information**

## 2.9 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is "Short". If no jumper cap is placed on pins, the jumper is "Open". The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when jumper cap is placed on these 2 pins.




| Jumper | Setting | Description |
|---|---|---|
| PS2_USB_PWR1 (see p.10 No. 1) | 1_2 +5V; 2_3 +5VSB | Short pin2, pin3 to enable +5VSB (standby) for PS/2 or USB wake up events. |

Note: To select +5VSB, it requires 2 Amp and higher standby current provided by power supply.

Clear CMOS Jumper (CLRCMOS1) (see p.10 No. 40)

1_2 Default  2_3 Clear CMOS

Note: CLRCMOS1 allows you to clear the data in CMOS. The data in CMOS includes system setup information such as system password, date, time, and system setup parameters. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action.

## 2.10 Onboard Headers and Connectors

Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard!

FDD connector
(33-pin FLOPPY1)
(see p.10 No. 27)

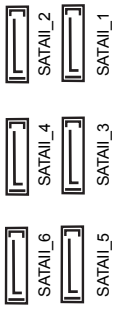
Note: Make sure the red-striped side of the cable is plugged into Pin1 side of the connector.

Primary IDE connector (Blue)
(39-pin IDE1, see p.10 No. 9)

80-conductor ATA 66/100/133 cable

Note: Please refer to the instruction of your IDE device vendor for the details.

Serial ATAII Connectors
(SATAII_1: see p.10, No. 14)
(SATAII_2: see p.10, No. 12)
(SATAII_3: see p.10, No. 15)
(SATAII_4: see p.10, No. 11)
(SATAII_5: see p.10, No. 16)
(SATAII_6: see p.10, No. 17)

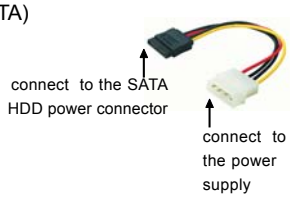



These six Serial ATAII (SATAII) connectors support SATA data cables for internal storage devices. The current SATAII interface allows up to 3.0 Gb/s data transfer rate.

Serial ATA (SATA) Data Cable
(Optional)

Either end of the SATA data cable can be connected to the SATA / SATAII hard disk or the SATAII connector on this motherboard.

Serial ATA (SATA) Power Cable (Optional)




Please connect the black end of SATA power cable to the power connector on each drive. Then connect the white end of SATA power cable to the power connector of the power supply.

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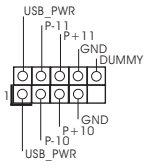
USB 2.0 Headers

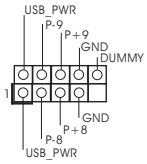
(9-pin USB10_11)

(see p.10 No. 20)




(9-pin USB8_9)

(see p.10 No. 22)



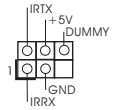

Besides seven default USB 2.0 ports on the I/O panel, there are two USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

---

Infrared Module Header

(5-pin IR1)

(see p.10 No. 34)



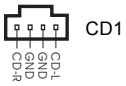

This header supports an optional wireless transmitting and receiving infrared module.

---

Internal Audio Connectors

(4-pin CD1)

(CD1: see p.10 No. 31)



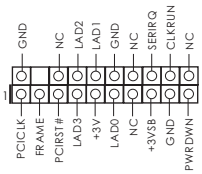

This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, DVD-ROM, TV tuner card, or MPEG card.

---

TPM Header

(19-pin TPM1)

(see p.10 No. 26)

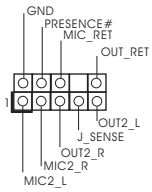



This connector supports a Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.10 No. 29)



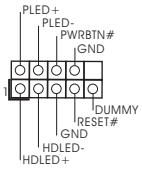

This is an interface for front panel audio cable that allows convenient connection and control of audio devices.

1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instruction in our manual and chassis manual to install your system.
2. If you use AC'97 audio panel, please install it to the front panel audio header as below:
   A. Connect Mic_IN (MIC) to MIC2_L.
   B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L.
   C. Connect Ground (GND) to Ground (GND).
   D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.
   E. Enter BIOS Setup Utility. Enter Advanced Settings, and then select Chipset Configuration. Set the Front Panel Control option from [Auto] to [Enabled].
   F. Enter Windows system. Click the icon on the lower right hand taskbar to enter Realtek HD Audio Manager.
   For Windows® 2000 / XP / XP 64-bit OS:
   Click "Audio I/O", select "Connector Settings" , choose "Disable front panel jack detection", and save the change by clicking "OK".
   For Windows® Vista™ / Vista™ 64-bit OS:
   Click the right-top "Folder" icon , choose "Disable front panel jack detection", and save the change by clicking "OK".
   G. To activate the front mic.
   For Windows® 2000 / XP / XP 64-bit OS:
   Please select "Front Mic" as default record device.
   If you want to hear your voice through front mic, please deselect "Mute" icon in "Front Mic" of "Playback" portion.
   For Windows® Vista™ / Vista™ 64-bit OS:
   Go to the "Front Mic" Tab in the Realtek Control panel.
   Click "Set Default Device" to make the Front Mic as the default record device.

### System Panel Header

(9-pin PANEL1)

(see p.10 No. 24)

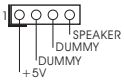



This header accommodates several system front panel functions.

### Chassis Speaker Header

(4-pin SPEAKER 1)

(see p.10 No. 25)

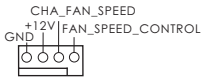



Please connect the chassis speaker to this header.

### Chassis, NB and Power Fan Connectors

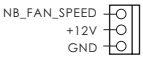
(4-pin CHA_FAN1)

(see p.10 No. 13)



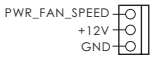

(3-pin NB_FAN1)

(see p.10 No. 42)




(3-pin PWR_FAN1)

(see p.10 No. 41)

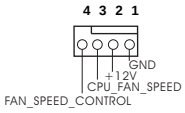



Please connect the fan cables to the fan connectors and match the black wire to the ground pin.

### CPU Fan Connector

(4-pin CPU_FAN1)

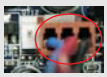
(see p.10 No. 5)




Please connect a CPU fan cable to this connector and match the black wire to the ground pin.

Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

**Pin 1-3 Connected**

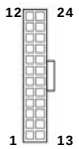


3-Pin Fan Installation

### ATX Power Connector

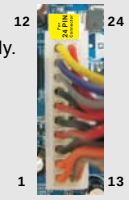
(24-pin ATXPWR1)

(see p.10 No. 8)




Please connect an ATX power supply to this connector.

Though this motherboard provides 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use the 20-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 13.




20-Pin ATX Power Supply Installation

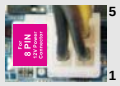
## ATX 12V Power Connector

(8-pin ATX12V1)

(see p.10 No. 2)

Please connect an ATX 12V power supply to this connector.

Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply. To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5.

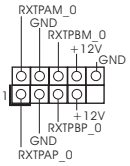



4-Pin ATX 12V Power Supply Installation

## IEEE 1394 Header

(9-pin FRONT_1394)

(see p.10 No. 10)

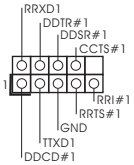



Besides one default IEEE 1394 port on the I/O panel, there is one IEEE 1394 header (FRONT_1394) on this motherboard. This IEEE 1394 header can support one IEEE 1394 port.

## Serial port Header

(9-pin COM1)

(see p.10 No.28)




This COM1 header supports a serial port module.

## HDMI_SPDIF Header

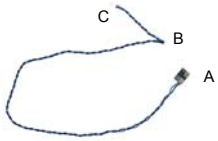
(3-pin HDMI_SPDIF1)

(see p.10 No. 30)

HDMI_SPDIF header, providing SPDIF audio output to HDMI VGA card, allows the system to connect HDMI Digital TV/ projector/LCD devices. Please connect the HDMI_SPDIF connector of HDMI VGA card to this header.

HDMI_SPDIF Cable

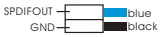
(Optional)



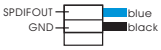

Please connect the black end (A) of HDMI_SPDIF cable to the HDMI_SPDIF header on the motherboard. Then connect the white end (B or C) of HDMI_SPDIF cable to the HDMI_SPDIF connector of HDMI VGA card.

A. black end

B. white end (2-pin)




C. white end (3-pin)



## 2.11 Quick Switches

This motherboard has three quick switches: power switch, reset switch and clear CMOS switch, allowing users to quickly turn on/off or reset the system or clear the CMOS values.

| | | |
|---|---|---|
| Power Switch<br>(PWRBTN)<br>(see p.10 No. 19) | | Power Switch is a quick switch, allowing users to quickly turn on/off the system. |
| Reset Switch<br>(RSTBTN)<br>(see p.10 No. 18) | | Reset Switch is a quick switch, allowing users to quickly reset the system. |
| Clear CMOS Switch<br>(CLRCBTN)<br>(see p.11 No. 17) | | Clear CMOS Switch is a quick switch, allowing users to quickly clear the CMOS values |

You are not allowed to use Clear CMOS switch function if you set up the system password. If you want to clear the CMOS values, please clean your system password in advance or refer to page 25 “Clear CMOS jumper” description instead.

## 2.12 Debug LED

The onboard Debug LED is used to provide code information, which makes troubleshooting even easier. Please see the diagrams below for reading the Debug LED codes.

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS:

| Checkpoint | Description |
|---|---|
| Before D1 | Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled. |
| D1 | Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS. |
| D0 | Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum. |
| D2 | Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled. |
| D3 | If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled. |
| D4 | Test base 512KB memory. Adjust policies and cache first 8MB. Set stack. |
| D5 | Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM. |
| D6 | Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. |
| D7 | Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash. |
| D8 | The Runtime module is uncompressed into memory. CPUID information is stored in memory. |
| D9 | Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM. |
| DA | Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). |

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

| Checkpoint | Description |
|---|---|
| 03 | Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags." |
| 04 | Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system |
| 05 | Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table. |
| 06 | Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock." |
| 08 | Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5. |
| C0 | Early CPU Init Start — Disable Cache - Init Local APIC |
| C1 | Set up boot strap proccessor Information |
| C2 | Set up boot strap proccessor for POST |
| C5 | Enumerate and set up application proccessors |
| C6 | Re-enable cache for boot strap proccessor |
| C7 | Early CPU Init Exit |
| 0A | Initializes the 8042 compatible Key Board Controller. |
| 0B | Detects the presence of PS/2 mouse. |
| 0C | Detects the presence of Keyboard in KBC port. |
| 0E | Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules. |
| 13 | Early POST initialization of chipset registers. |
| 24 | Uncompress and initialize any platform specific BIOS modules. |
| 30 | Initialize System Management Interrupt. |
| 2A | Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information. |
| 2C | Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs. |
| 2E | Initializes all the output devices. |
| 31 | Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module. |

| | |
|---|---|
| 33 | Initializes the silent boot module. Set the window for displaying text information. |
| 37 | Displaying sign-on message, CPU information, setup key message, and any OEM specific information. |
| 38 | Initializes different devices through DIM. |
| 39 | Initializes DMAC-1 & DMAC-2. |
| 3A | Initialize RTC date/time. |
| 3B | Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system. |
| 3C | Mid POST initialization of chipset registers. |
| 40 | Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc. |
| 50 | Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed. |
| 52 | Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. |
| 60 | Initializes NUM-LOCK status and programs the KBD typematic rate. |
| 75 | Initialize Int-13 and prepare for IPL detection. |
| 78 | Initializes IPL devices controlled by BIOS and option ROMs. |
| 7A | Initializes remaining option ROMs. |
| 7C | Generate and write contents of ESCD in NVRam. |
| 84 | Log errors encountered during POST. |
| 85 | Display errors to the user and gets the user response for error. |
| 87 | Execute BIOS setup if needed / requested. |
| 8C | Late POST initialization of chipset registers. |
| 8D | Build ACPI tables (if ACPI is supported) |
| 8E | Program the peripheral parameters. Enable/Disable NMI as selected |
| 90 | Late POST initialization of system management interrupt. |
| A0 | Check boot password if installed. |
| A1 | Clean-up work needed before booting to OS. |
| A2 | Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed. |
| A4 | Initialize runtime language module. |
| A7 | Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's. |
| A8 | Prepare CPU for OS boot including final MTRR values. |
| A9 | Wait for user input at config display if needed. |
| AA | Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module. |
| AB | Prepare BBS for Int 19 boot. |
| AC | End of POST initialization of chipset registers. |
| B1 | Save system context for ACPI. |
| 00 | Passes control to OS Loader (typically INT19h). |

## 2.13 HDMI_SPDIF Header Connection Guide

HDMI (High-Definition Multi-media Interface) is an all-digital audio/video specification, which provides an interface between any compatible digital audio/ video source, such as a set-top box, DVD player, A/V receiver and a compatible digital audio or video monitor, such as a digital television (DTV). A complete HDMI system requires a HDMI VGA card and a HDMI ready motherboard with a HDMI_SPDIF header. This motherboard is equipped with a HDMI_SPDIF header, which provides SPDIF audio output to HDMI VGA card, allows the system to connect HDMI Digital TV/projector/LCD devices. To use HDMI function on this motherboard, please carefully follow the below steps.

Step 1. Install the HDMI VGA card to the PCI Express Graphics slot on this motherboard. For the proper installation of HDMI VGA card, please refer to the installation guide on page 18.

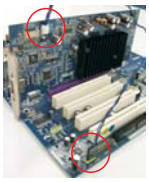
Step 2. Connect the black end (A) of HDMI_SPDIF cable to the HDMI_SPDIF header (HDMI_SPDIF1, yellow, see page 10, No. 30) on the motherboard.

Make sure to correctly connect the HDMI_SPDIF cable to the motherboard and the HDMI VGA card according to the same pin definition. For the pin definition of HDMI_SPDIF header and HDMI_SPDIF cable connectors, please refer to page 30. For the pin definition of HDMI_SPDIF connectors on HDMI VGA card, please refer to the user manual of HDMI VGA card vendor. Incorrect connection may cause permanent damage to this motherboard and the HDMI VGA card.

Step 3. Connect the white end (B or C) of HDMI_SPDIF cable to the HDMI_SPDIF connector of HDMI VGA card. (There are two white ends (2-pin and 3-pin) on HDMI_SPDIF cable. Please choose the appropriate white end according to the HDMI_SPDIF connector of the HDMI VGA card you install.

white end (2-pin) (B)

white end (3-pin) (C)



Please do not connect the white end of HDMI_SPDIF cable to the wrong connector of HDMI VGA card or other VGA card. Otherwise, the motherboard and the VGA card may be damaged. For example, this picture shows the wrong example of connecting HDMI_SPDIF cable to the fan connector of PCI Express VGA card. Please refer to the VGA card user manual for connector usage in advance.

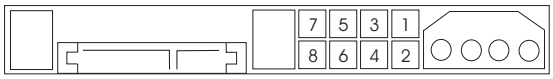
Step 4. Connect the HDMI output connector on HDMI VGA card to HDMI device, such as HDTV. Please refer to the user manual of HDTV and HDMI VGA card vendor for detailed connection procedures.

Step 5. Install HDMI VGA card driver to your system.

## 2.14 SATAII Hard Disk Setup Guide

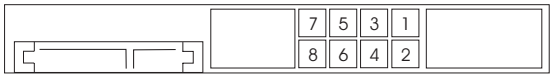
Before installing SATAII hard disk to your computer, please carefully read below SATAII hard disk setup guide. Some default setting of SATAII hard disks may not be at SATAII mode, which operate with the best performance. In order to enable SATAII function, please follow the below instruction with different vendors to correctly adjust your SATAII hard disk to SATAII mode in advance; otherwise, your SATAII hard disk may fail to run at SATAII mode.

**Western Digital**




If pin 5 and pin 6 are shorted, SATA 1.5Gb/s will be enabled.
On the other hand, if you want to enable SATAII 3.0Gb/s, please remove the jumpers from pin 5 and pin 6.

**SAMSUNG**




If pin 3 and pin 4 are shorted, SATA 1.5Gb/s will be enabled.
On the other hand, if you want to enable SATAII 3.0Gb/s, please remove the jumpers from pin 3 and pin 4.

**HITACHI**

Please use the Feature Tool, a DOS-bootable tool, for changing various ATA features. Please visit HITACHI's website for details:
http://www.hitachigst.com/hdd/support/download.htm

The above examples are just for your reference. For different SATAII hard disk products of different vendors, the jumper pin setting methods may not be the same. Please visit the vendors' website for the updates.

## 2.15 Serial ATA (SATA) / Serial ATAII (SATAII) Hard Disks Installation

***P45X3 Deluxe*** adopts Intel® ICH10 south bridge chipset that supports Serial ATA (SATA) / Serial ATAII (SATAII) hard disks. You may install SATA / SATAII hard disks on this motherboard for internal storage devices. This section will guide you to install the SATA / SATAII hard disks.

STEP 1: Install the SATA / SATAII hard disks into the drive bays of your chassis.
STEP 2: Connect the SATA power cable to the SATA / SATAII hard disk.
STEP 3: Connect one end of the SATA data cable to the motherboard's SATAII connector.
STEP 4: Connect the other end of the SATA data cable to the SATA / SATAII hard disk.

It is not recommended to switch the "Configure SATAII as" setting after OS installation.

## 2.16 Hot Plug and Hot Swap Functions for SATA / SATAII HDDs

***P45X3 Deluxe*** supports Hot Plug and Hot Swap functions for SATA / SATAII Devices in AHCI mode. Intel® ICH10 south bridge chipset provides hardware support for Advanced Host controller Interface (AHCI), a new programming interface for SATA host controllers developed thru a joint industry effort.

**NOTE**

**What is Hot Plug Function?**

If the SATA / SATAII HDDs are NOT set for RAID configuration, it is called "Hot Plug" for the action to insert and remove the SATA / SATAII HDDs while the system is still power-on and in working condition.
However, please note that it cannot perform Hot Plug if the OS has been installed into the SATA / SATAII HDD.

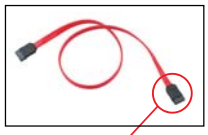
## 2.17 SATA / SATAII HDD Hot Plug Feature and Operation Guide

This motherboard supports Hot Plug feature for SATA / SATAII HDD in AHCI mode. Please read below operation guide of SATA / SATAII HDD Hot Plug feature carefully. Before you process the SATA / SATAII HDD Hot Plug, please check below cable accessories from the motherboard gift box pack.

A. 7-pin SATA data cable

B. SATA power cable with SATA 15-pin power connector interface

A. SATA data cable (Red)



SATA 7-pin connector

B. SATA power cable

The SATA 15-pin power connector (Black) connect to SATA / SATAII HDD

1x4-pin conventional power connector (White) connect to power supply

### Caution

1. Without SATA 15-pin power connector interface, the SATA / SATAII Hot Plug cannot be processed.
2. Even some SATA / SATAII HDDs provide both SATA 15-pin power connector and IDE 1x4-pin conventional power connector interfaces, the IDE 1x4-pin conventional power connector interface is definitely not able to support Hot Plug and will cause the HDD damage and data loss.

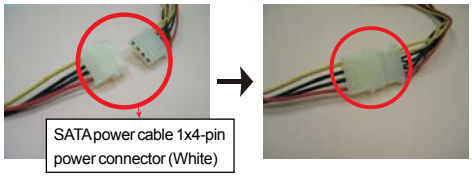
### Points of attention, before you process the Hot Plug:

1. Below operation procedure is designed only for our motherboard, which supports SATA / SATAII HDD Hot Plug.
   * The SATA / SATAII Hot Plug feature might not be supported by the chipset because of its limitation, the SATA / SATAII Hot Plug support information of our motherboard is indicated in the product spec on our website: www.asrock.com
2. Make sure your SATA / SATAII HDD can support Hot Plug function from your dealer or HDD user manual. The SATA / SATAII HDD, which cannot support Hot Plug function, will be damaged under the Hot Plug operation.
3. Please make sure the SATA / SATAII driver is installed into system properly. The latest SATA / SATAII driver is available on our support website: www.asrock.com
4. Make sure to use the SATA power cable & data cable, which are from our motherboard package.
5. Please follow below instructions step by step to reduce the risk of HDD crash or data loss.

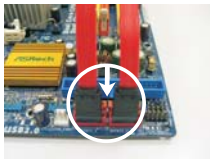
## How to Hot Plug a SATA / SATAII HDD:

Points of attention, before you process the Hot Plug:
Please do follow below instruction sequence to process the Hot Plug, improper procedure will cause the SATA / SATAII HDD damage and data loss.

Step *1* Please connect SATA power cable 1x4-pin end (White) to the power supply 1x4-pin cable.




Step *2* Connect SATA data cable to the motherboard's SATAII connector.



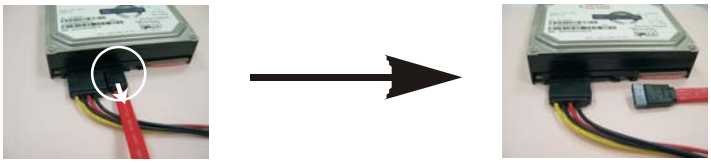
Step *3* Connect SATA 15-pin power cable connector (Black) end to SATA / SATAII HDD.

Step *4*

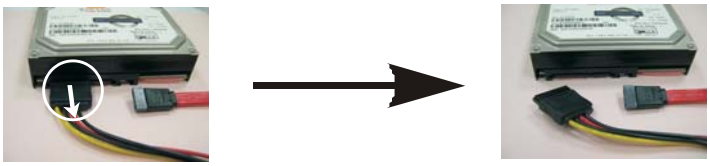
## How to Hot Unplug a SATA / SATAII HDD:

Points of attention, before you process the Hot Unplug:
Please do follow below instruction sequence to process the Hot Unplug, improper procedure will cause the SATA / SATAII HDD damage and data loss.

Step *1* Unplug SATA data cable from SATA / SATAII HDD side.



Step *2* Unplug SATA 15-pin power cable connector (Black) from SATA / SATAII HDD side.



## 2.18 Driver Installation Guide

To install the drivers to your system, please insert the support CD to your optical drive first. Then, the drivers compatible to your system can be auto-detected and listed on the support CD driver page. Please follow the order from up to bottom side to install those required drivers. Therefore, the drivers you install can work properly.

## 2.19 Installing Windows® 2000 / XP / XP 64-bit / Vista™ / Vista™ 64-bit Without RAID Functions

If you want to install Windows® 2000 / XP / XP 64-bit / Vista™ / Vista™ 64-bit OS on your SATA / SATAII HDDs without RAID functions, please follow below procedures according to the OS you install.

Since Windows® 2000 AHCI driver is not provided by the chipset vendor, AHCI function is not supported under Windows® 2000.

### 2.19.1 Installing Windows® 2000 / XP / XP 64-bit Without RAID Functions

If you want to install Windows® 2000 / XP / XP 64-bit OS on your SATA / SATAII HDDs without RAID functions, please follow below steps.

**Using SATA / SATAII HDDs with NCQ function**

**STEP 1: Set Up BIOS.**

A. Enter BIOS SETUP UTILITY→ Advanced screen → IDE Configuration.

B. Set "SATAII Configuration" to [Enhanced], and then in the option "Configure SATAII as", please set the option to [AHCI].

**STEP 2: Make a SATA / SATAII driver diskette.**

A. Insert the Support CD into your optical drive to boot your system.

B. During POST at the beginning of system boot-up, press <F11> key, and then a window for boot devices selection appears. Please select CD-ROM as the boot device.

C. When you see the message on the screen, "Do you want to generate Serial ATA driver diskette [YN]?", press <Y>.

D. Then you will see these messages,

**Please insert a diskette into the floppy drive.**
**WARNING! Formatting the floppy diskette will lose ALL data in it!**
**Start to format and copy files [YN]?**
Please insert a floppy diskette into the floppy drive, and press <Y>.

E. The system will start to format the floppy diskette and copy SATA / SATAII drivers into the floppy diskette.

**STEP 3: Install Windows® XP / XP 64-bit OS on your system. (Windows® 2000 is not supported.)**

After making a SATA / SATAII driver diskette, you can start to install Windows® XP / XP 64-bit on your system. At the beginning of Windows® setup, press F6 to install a third-party AHCI driver. When prompted, insert the SATA / SATAII driver diskette containing the Intel® AHCI driver. After reading the floppy disk, the driver will be presented. Select the driver to install according to the mode you choose and the OS you install. You may select: "Intel(R) ICH10 SATA AHCI Controller (Desktop - Windows XP)" for Windows® XP or "Intel(R) ICH10 SATA AHCI Controller (Desktop - Windows XP64)" for Windows® XP 64-bit.

**Using SATA / SATAII HDDs without NCQ function**

**STEP 1: Set up BIOS.**

A. Enter BIOS SETUP UTILITY → Advanced screen → IDE Configuration.

B. Set “SATAII Configuration” to [Enhanced], and then in the option “Configure SATAII as”, please set the option to [IDE].

**STEP 2: Install Windows® 2000 / XP / XP 64-bit OS on your system.**

## 2.19.2 Installing Windows® Vista™ / Vista™ 64-bit Without RAID Functions

If you want to install Windows® Vista™ / Vista™ 64-bit OS on your SATA / SATAII HDDs without RAID functions, please follow below steps.

**Using SATA / SATAII HDDs with NCQ function**

**STEP 1: Set Up BIOS.**

A. Enter BIOS SETUP UTILITY → Advanced screen → IDE Configuration.

B. Set “SATAII Configuration” to [Enhanced], and then in the option “Configure SATAII as”, please set the option to [AHCI].

**STEP 2: Install Windows® Vista™ / Vista™ 64-bit OS on your system.**

Insert the Windows® Vista™ / Vista™ 64-bit optical disk into the optical drive to boot your system, and follow the instruction to install Windows® Vista™ / Vista™ 64-bit OS on your system. When you see “Where do you want to install Windows?” page, please insert the ASRock Support CD into your optical drive, and click the “Load Driver” button on the left on the bottom to load the Intel® AHCI drivers. Intel® AHCI drivers are in the following path in our Support CD:

**.. \ I386** (For Windows® Vista™ OS)

**.. \ AMD64** (For Windows® Vista™ 64-bit OS)

After that, please insert Windows® Vista™ / Vista™ 64-bit optical disk into the optical drive again to continue the installation.

**Using SATA / SATAII HDDs without NCQ function**

**STEP 1: Set up BIOS.**

A. Enter BIOS SETUP UTILITY → Advanced screen → IDE Configuration.

B. Set "SATAII Configuration" to [Enhanced], and then in the option "Configure SATAII as", please set the option to [IDE].

**STEP 2: Install Windows® Vista™ / Vista™ 64-bit OS on your system.**

## 2.20 Untied Overclocking Technology

This motherboard supports Untied Overclocking Technology, which means during overclocking, FSB enjoys better margin due to fixed PCI / PCIE buses. Before you enable Untied Overclocking function, please enter "Overclock Mode" option of BIOS setup to set the selection from [Auto] to [Manual]. Therefore, CPU FSB is untied during overclocking, but PCI / PCIE buses are in the fixed mode so that FSB can operate under a more stable overclocking environment.

Please refer to the warning on page 8 for the possible overclocking risk before you apply Untied Overclocking Technology.

# Chapter 3: BIOS SETUP UTILITY

## 3.1 Introduction

This section explains how to use the BIOS SETUP UTILITY to configure your system. The BIOS FWH chip on the motherboard stores the BIOS SETUP UTILITY. You may run the BIOS SETUP UTILITY when you start up the computer. Please press <F2> during the Power-On-Self-Test (POST) to enter the BIOS SETUP UTILITY, otherwise, POST will continue with its test routines.

If you wish to enter the BIOS SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

Because the BIOS software is constantly being updated, the following BIOS setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

### 3.1.1 BIOS Menu Bar

The top of the screen has a menu bar with the following selections:

| | |
|---|---|
| **Main** | To set up the system time/date information |
| **Smart** | To load the BIOS according to your requirements |
| **Advanced** | To set up the advanced BIOS features |
| **H/W Monitor** | To display current hardware status |
| **Boot** | To set up the default system device to locate and load the Operating System |
| **Security** | To set up the security features |
| **Exit** | To exit the current screen or the BIOS SETUP UTILITY |

Use < ← > key or < → > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen.

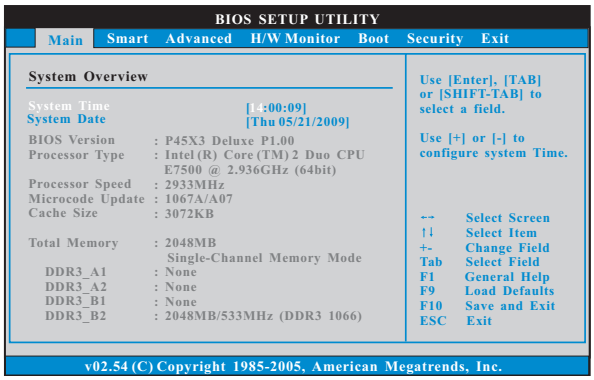
### 3.1.2 Navigation Keys

Please check the following table for the function description of each navigation key.

| Navigation Key(s) | Function Description |
|---|---|
| / | Moves cursor left or right to select Screens |
| ← / → | Moves cursor up or down to select items |
| + / - | To change option for the selected items |
| <Enter> | To bring up the selected screen |
| <F1> | To display the General Help Screen |
| <F9> | To load optimal default values for all the settings |
| <F10> | To save changes and exit the BIOS SETUP UTILITY |
| <ESC> | To jump to the Exit Screen or exit the current screen |

## 3.2 Main Screen

When you enter the BIOS SETUP UTILITY, the Main screen will appear and display the system overview.




**System Time [Hour:Minute:Second]**

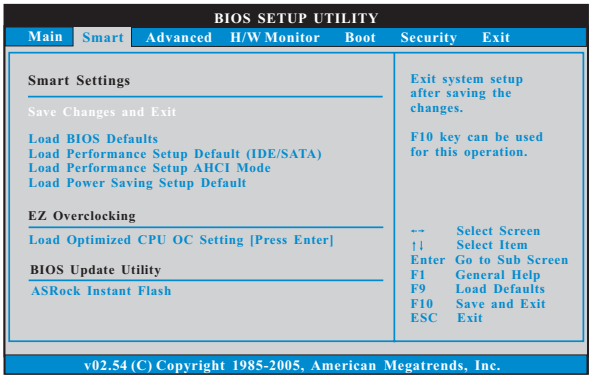
Use this item to specify the system time.

**System Date [Day Month/Date/Year]**

Use this item to specify the system date.

## 3.3 Smart Screen

In the Smart screen, you can load the BIOS setup according to your requirements.




**Save Changes and Exit**

When you select this option, it will pop-out the following message, “Save configuration changes and exit setup?” Select [OK] to save the changes and exit the BIOS SETUP UTILITY.

**Load BIOS Defaults**

Load BIOS default values for all the setup questions. F9 key can be used for this operation.

**Load Performance Setup Default (IDE/SATA)**

This performance setup default may not be compatible with all system configurations. If system boot failure occurs after loading, please resume optimal default settings. F5 key can be used for this operation.

**Load Performance Setup AHCI Mode**

This performance setup AHCI mode may not be compatible with all system configurations. If system boot failure occurs after loading, please resume optimal default settings. F3 key can be used for this operation.

**Load Power Saving Setup Default**

Load power saving setup default. F6 key can be used for this operation.

**Load Optimized CPU OC Setting**

You can use this option to load the optiomized CPU overclocking setting. Configuration options: [CPU 3.00GHz], [CPU 3.20GHz], [CPU 3.40GHz], [CPU 3.60GHz], [CPU 3.80GHz], [CPU 4.00GHz], [CPU 4.20GHz] and [CPU 4.40GHz]. Please note that overclocing may cause damage to your CPU and motherboard. It should be done at your own risk and expense.

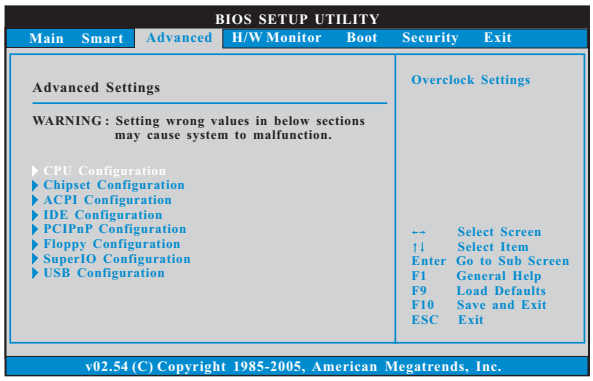
**ASRock Instant Flash**

ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. Just launch

this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute ASRock Instant Flash utility, the utility will show the BIOS files and their respective information. Select the proper BIOS file to update your BIOS, and reboot your system after BIOS update process completes.

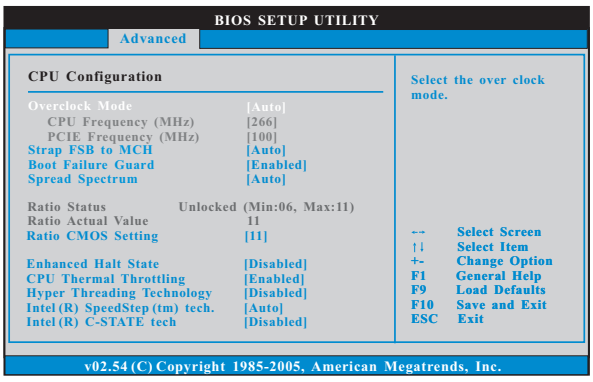
## 3.4 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Chipset Configuration, ACPI Configuration, IDE Configuration, PCIPnP Configuration, Floppy Configuration, SuperIO Configuration, and USB Configuration.




Setting wrong values in this section may cause the system to malfunction.

### 3.4.1 CPU Configuration



**Overclock Mode**

Use this to select Overclock Mode. Configuration options: [Auto], [Manual] and [I.O.T.]. The default value is [Auto]. If you select [Manual], Untied Overclocking function is enabled. Please refer to page 43 for the details of Untied Overclocking Technology. If you select [I.O.T.] (Intelligent Overclocking Technology), you are allowed to adjust the CPU frequency and PCIE frequency in the following two items. Therefore, the system will automatically enable the overclocking function when your CPU is heavy loaded.

**CPU Frequency (MHz)**

Use this option to adjust CPU frequency.

**PCIE Frequency (MHz)**

Use this option to adjust PCIE frequency.

**Strap FSB to MCH**

Use this item to strap FSB to MCH. Configuration options: [Auto], [800], [1066], [1333] and [1600]. The configuration options depend on the CPU you adopt. The default value is [Auto].

**Boot Failure Guard**

Enable or disable the feature of Boot Failure Guard.

**Spread Spectrum**

This item should always be [Auto] for better system stability.

**Ratio Status**

This is a read-only item, which displays whether the ratio status of this motherboard is “Locked” or “Unlocked”. If it shows “Unlocked”, you will find an item **Ratio CMOS Setting** appears to allow you changing the ratio value of this motherboard.

**Ratio Actual Value**

This is a read-only item, which displays the ratio actual value of this motherboard.

**Ratio CMOS Setting**

If the ratio status is unlocked, you will find this item appear to allow you changing the ratio value of this motherboard. If the CPU you adopt supports EIST (Intel (R) SpeedStep(tm) tech.), and you plan to adjust the ratio value, please disable the option “ Intel (R) SpeedStep(tm) tech.” in advance.

**Enhance Halt State**

All processors support the Halt State (C1). The C1 state is supported through the native processor instructions HLT and MWAIT and requires no hardware support from the chipset. In the C1 power state, the processor maintains the context of the system caches.

**CPU Thermal Throttling**

You may select [Enabled] to enable P4 CPU internal thermal control mechanism to keep the CPU from overheated.

**Hyper Threading Technology**

To enable this feature, it requires a computer system with an Intel Pentium® 4 processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology, such as Microsoft® Windows® XP. Set to [Enabled] if using Microsoft® Windows® XP, or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

**Intel (R) Virtualization tech.**

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel (R) Virtualization Technology.

**No-Excute Memory Protection**

No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with "No Execute (NX) Memory Protection" can prevent data pages from being used by malicious software to execute code. This option will be hidden if the current CPU does not support No-Excute Memory Protection.

**Intel (R) SpeedStep(tm) tech.**

Intel (R) SpeedStep(tm) tech. is Intel's new power saving technology. Processor can switch between multiple frequency and voltage points to enable power

savings. The default value is [Auto]. Configuration options: [Auto], [Enabled] and [Disabled]. If you install Windows® XP and select [Auto], you need to set the "Power Schemes" as "Portable/Laptop" to enable this function. If you install Windows® Vista™ and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel (R) SpeedStep(tm) tech..

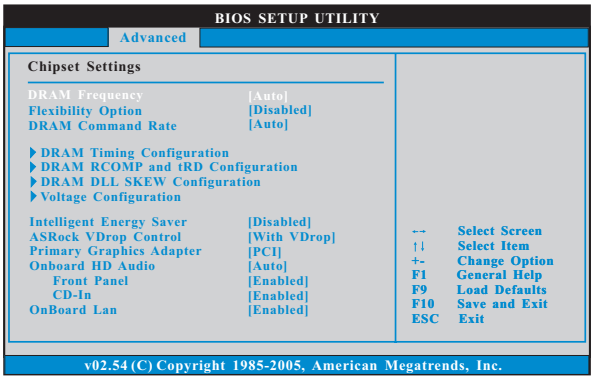
Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issue with some power supplies. Please set this item to [Disable] if above issue occurs.

**Intel (R) C-STATE tech.**

Intel (R) C-STATE tech. is achieved by making the power and thermal control unit part of the core logic and not part of the chipset as before. Migration of the power and thermal management flow into the processor allows us to use a hardware coordination mechanism in which each core can request any C-state it wishes, thus allowing for individual core savings to be maximized. The CPU C-state is determined and entered based on the lowest common denominator of both cores' requests, portraying a single CPU entity to the chipset power management hardware and flows. Thus, software can manage each core

independently, while the actual power management adheres to the platform and CPU shared resource restrictions. Configuration options are: [C2], [C3], [C4] and [Disabled]. The default value is [Disabled].

## 3.4.2 Chipset Configuration




**DRAM Frequency**

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assigns appropriate frequency automatically. You may select [400MHz (DDR3 800)], [533MHz (DDR3 1066)] , [667MHz (DDR3 1333)] or [800MHz (DDR3 1600)]. The configuration options depend on the CPU and memory module you adopt on this motherboard. Please refer to page 8 for the CPU FSB frequency and its corresponding memory support frequency.

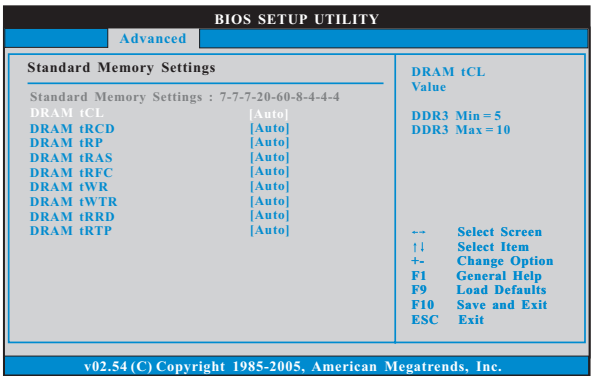
**Flexibility Option**

The default value of this option is [Disabled]. It will allow better tolerance for memory compatibility when it is set to [Enabled].

**DRAM Command Rate**

This controls the Command Rate timing for DDR3 memory. Configuration options: [Auto], [1N] and [2N].

### DRAM Timing Configuation




**XMP Technology**

This option only appears when you adopt XMP memory module and FSB1333 / 1600 CPU. Configuration options: [Auto], [Profile 1] and [Profile 2]. The default value is [Auto].

**DRAM tCL**

This controls the number of DRAM clocks for TCL. Min: 5. Max: 10. The default value is [Auto].

**DRAM tRCD**

This controls the number of DRAM clocks for TRCD. Min: 3. Max: 10. The default value is [Auto].

**DRAM tRP**

This controls the number of DRAM clocks for TRP. Min: 3. Max: 10. The default value is [Auto].

**DRAM tRAS**

This controls the number of DRAM clocks for TRAS. Min: 9. Max: 24. The default value is [Auto].

**DRAM tRFC**

This controls the number of DRAM clocks for TRFC. Min: 15. Max: 78. The default value is [Auto].

**DRAM tWR**

This controls the number of DRAM clocks for TWR. Min: 3. Max: 15. The default value is [Auto].

**DRAM tWTR**

This controls the number of DRAM clocks for TWTR. Min: 2. Max: 15. The default value is [Auto].

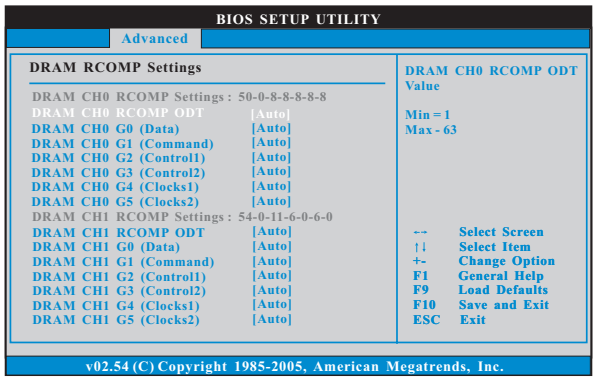
**DRAM tRRD**

This controls the number of DRAM clocks for TRRD. Min: 2. Max: 15. The default value is [Auto].

**DRAM tRTP**

This controls the number of DRAM clocks for TRTP. Min: 2. Max: 13. The default value is [Auto].

**DRAM RCOMP and tRD Configuration**




**DRAM CH0 RCOMP ODT**

This controls the number of DRAM CH0 RCOMP ODT. Min: 1. Max: 63. The default value is [Auto].

**DRAM CH0 G0 (Data)**

This controls the number of DRAM CH0 G0 (Data). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH0 G1 (Command)**

This controls the number of DRAM CH0 G1 (Command). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH0 G2 (Control1)**

This controls the number of DRAM CH0 G2 (Control1). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH0 G3 (Control2)**

This controls the number of DRAM CH0 G3 (Control2). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH0 G4 (Clocks1)**

This controls the number of DRAM CH0 G4 (Clocks1). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH0 G5 (Clocks2)**

This controls the number of DRAM CH0 G5 (Clocks2). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 RCOMP ODT**

This controls the number of DRAM CH1 RCOMP ODT. Min: 1. Max: 63. The default value is [Auto].

**DRAM CH1 G0 (Data)**

This controls the number of DRAM CH1 G0 (Data). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 G1 (Command)**

This controls the number of DRAM CH1 G1 (Command). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 G2 (Control1)**

This controls the number of DRAM CH1 G2 (Control1). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 G3 (Control2)**

This controls the number of DRAM CH1 G3 (Control2). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 G4 (Clocks1)**

This controls the number of DRAM CH1 G4 (Clocks1). Min: 1. Max: 15. The default value is [Auto].

**DRAM CH1 G5 (Clocks2)**

This controls the number of DRAM CH1 G5 (Clocks2). Min: 1. Max: 15. The default value is [Auto].

**DRAM tRD Settings**

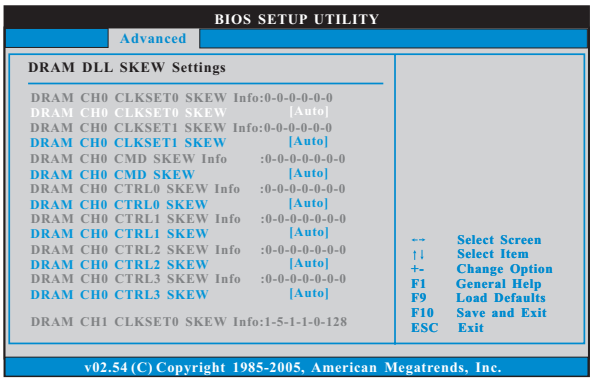
**DRAM CH0 tRD**

This controls the number of DRAM CH0 tRD. Min: 0. Max: 30. The default value is [Auto].

**DRAM CH1 tRD**

This controls the number of DRAM CH1 tRD. Min: 0. Max: 30. The default value is [Auto].

### DRAM DLL SKEW Settings




**DRAM CH0 CLKSET0 SKEW**

This controls the number of DRAM CH0 CLKSET0 SKEW. The default value is [Auto].

**DRAM CH0 CLKSET1 SKEW**

This controls the number of DRAM CH0 CLKSET1 SKEW. The default value is [Auto].

**DRAM CH0 CMD SKEW**

This controls the number of DRAM CH0 CMD SKEW. The default value is [Auto].

**DRAM CH0 CTRL0 SKEW**

This controls the number of DRAM CH0 CTRL0 SKEW. The default value is [Auto].

**DRAM CH0 CTRL1 SKEW**

This controls the number of DRAM CH0 CTRL1 SKEW. The default value is [Auto].

**DRAM CH0 CTRL2 SKEW**

This controls the number of DRAM CH0 CTRL2 SKEW. The default value is [Auto].

**DRAM CH0 CTRL3 SKEW**

This controls the number of DRAM CH0 CTRL3 SKEW. The default value is [Auto].

**DRAM CH1 CLKSET0 SKEW**

This controls the number of DRAM CH1 CLKSET0 SKEW. The default value is [Auto].

**DRAM CH1 CLKSET1 SKEW**

This controls the number of DRAM CH1 CLKSET1 SKEW. The default value is [Auto].

**DRAM CH1 CMD SKEW**

This controls the number of DRAM CH1 CMD SKEW. The default value is [Auto].

**DRAM CH1 CTRL0 SKEW**

This controls the number of DRAM CH1 CTRL0 SKEW. The default value is [Auto].

**DRAM CH1 CTRL1 SKEW**

This controls the number of DRAM CH1 CTRL1 SKEW. The default value is [Auto].

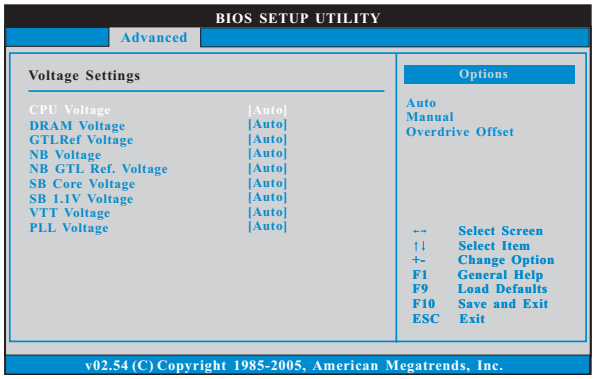
**DRAM CH1 CTRL2 SKEW**

This controls the number of DRAM CH1 CTRL2 SKEW. The default value is [Auto].

**DRAM CH1 CTRL3 SKEW**

This controls the number of DRAM CH1 CTRL3 SKEW. The default value is [Auto].

## Voltage Settings




**CPU Voltage**

Use this to select CPU Voltage. Configuration options: [Auto], [Manual] and [Offset]. The default value is [Auto].

**DRAM Voltage**

Use this to select DRAM Voltage. Configuration options: [Auto], [1.561V] to [2.429V]. The default value is [Auto].

**GLTRef Voltage**

Use this to select GLTRef Voltage. Configuration options: [Auto], [0.67 x Vtt], [0.65 x Vtt], [0.63 x Vtt] and [0.615 x Vtt]. The default value of this feature is [Auto].

**NB Voltage**

Use this to select NB Voltage. Configuration options: [Auto], [1.11V] to [2.21V]. The default value is [Auto].

**NB CTL Ref. Voltage**

Use this to select NB Voltage. Configuration options: [Auto], [Normal] and [Low]. The default value is [Auto].

**SB Core Voltage**

Use this to select SB core Voltage. Configuration options: [Auto], [1.536V] to [1.800V]. The default value is [Auto].

**SB 1.1V Voltage**

Use this to select SB 1.1V Voltage. Configuration options: [Auto], [1.11V] to [1.51V]. The default value is [Auto].

**VTT Voltage**

Use this to select VTT Voltage. Configuration options: [Auto], [1.21V] to [1.91V]. The default value is [Auto].

**PLL Voltage**

Use this to select PLL Voltage. Configuration options: [Auto], [1.50V] to [2.78V]. The default value is [Auto].

**Intelligent Energy Saver**

Intelligent Energy Saver is a revolutionary technology that delivers unparalleled power savings. The default value is [Disabled]. Configuration options: [Auto], [Enabled] and [Disabled]. If you want to enable this function, please set this item to [Enabled]. Besides the BIOS option, you can also choose our Intelligent Energy Saver utility to enable this function.

**ASRock VDrop Control**

Use this to enable or disable ASRock VDrop control. Configuration options: [With VDrop] and [Without VDrop]. The default value is [With VDrop].

**Primary Graphics Adapter**

This allows you to select [PCI] or [PCI Express] as the boot graphic adapter priority. The default value is [PCI].

**Onboard HD Audio**

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged.

**Front Panel**

Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio Front Panel.

**CD-In**

Use this item to enable or disable CD-In of Onboard HD Audio. If you plan to use this motherboard to submit Windows® Vista™ logo test, please disable this option.

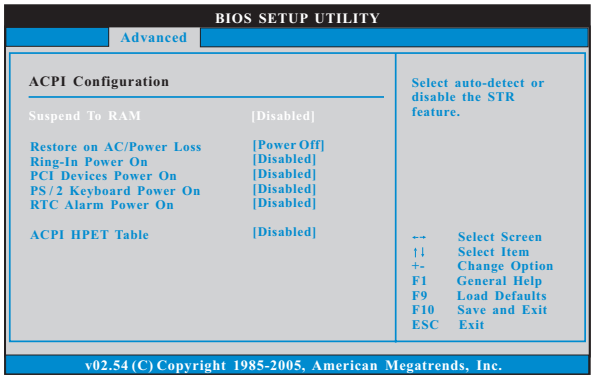
**OnBoard Lan**

This allows you to enable or disable the “OnBoard Lan” feature.

**CIR10 Field 1**

Use this to enable or disable CIR10 Field 1. The default value of this feature is [Enabled].

## 3.4.3 ACPI Configuration




**Suspend to RAM**

Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it. If you set this item to [Disabled], the function "Repost Video on STR Resume" will be hidden.

**Repost Video on STR Resume**

This feature allows you to repost video on STR resume. (STR refers to suspend to RAM.)

**Restore on AC/Power Loss**

This allows you to set the power state after an unexpected AC/power loss. If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers.

**Ring-In Power On**

Use this item to enable or disable Ring-In signals to turn on the system from the power-soft-off mode.

**PCI Devices Power On**

Use this item to enable or disable PCI devices to turn on the system from the power-soft-off mode.

**PS/2 Keyboard Power On**

Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode.

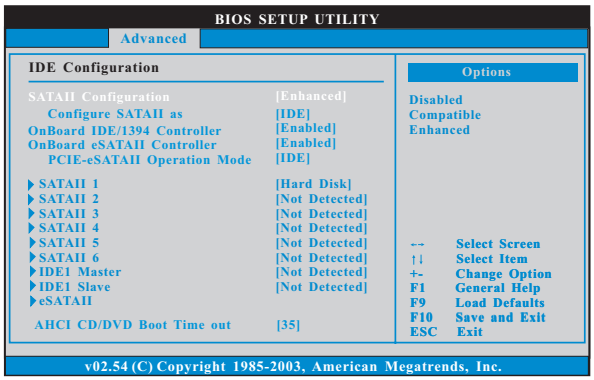
**RTC Alarm Power On**

Use this item to enable or disable RTC (Real Time Clock) to power on the system.

**ACPI HPET Table**

Use this item to enable or disable ACPI HPET Table. The default value is [Disabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® Vista™ certification.

## 3.4.4 IDE Configuration




**SATAII Configuration**

Please select [**Compatible**] when you install legacy OS. If native OS (Windows® 2000 / XP / Vista™) is installed, please select [**Enhanced**]. Then in the option "Configure SATAII as", you are allowed to set the selection to [IDE] or [AHCI].The default value is [IDE].

If you select [AHCI] mode, the options "Hot Plug" and "SATA Link Power Management" will appear. Configuration options: [Enabled] and [Disabled].

AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.

**OnBoard IDE/1394 Controller**

Use this item to enable or disable onboard IDE/1394 controller. The default value is [Enabled].

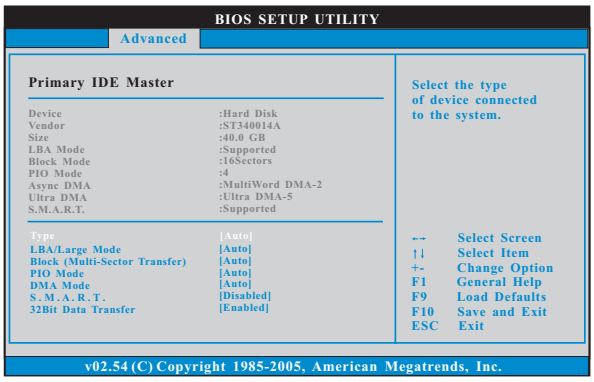
**OnBoard eSATAII Controller**

Use this item to enable or disable onboard eSATAII controller. The default value is [Enabled].

If you enable the option "OnBoard eSATAII Controller", the option "PCIE-eSATAII Operation Mode" will appear. Configuration options: [IDE] and [AHCI].

### IDE Device Configuration

You may set the IDE configuration for the device that you specify. We will use the “Primary IDE Master” as the example in the following instruction.




**TYPE**

Use this item to configure the type of the IDE device that you specify. Configuration options: [Not Installed], [Auto], [CD/DVD], and [ARMD].

**[Not Installed]:** Select [Not Installed] to disable the use of IDE device.

**[Auto]:** Select [Auto] to automatically detect the hard disk drive.

After selecting the hard disk information into BIOS, use a disk utility, such as FDISK, to partition and format the new IDE hard disk drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drives to active.

**[CD/DVD]:** This is used for IDE CD/DVD drives.

**[ARMD]:** This is used for IDE ARMD (ATAPI Removable Media Device), such as MO.

**LBA/Large Mode**

Use this item to select the LBA/Large mode for a hard disk > 512 MB under DOS and Windows; for Netware and UNIX user, select [Disabled] to disable the LBA/Large mode.

**Block (Multi-Sector Transfer)**

The default value of this item is [Auto]. If this feature is enabled, it will enhance hard disk performance by reading or writing more data during each transfer.

**PIO Mode**

Use this item to set the PIO mode to enhance hard disk performance by optimizing the hard disk timing.

**DMA Mode**

DMA capability allows the improved transfer-speed and data-integrity for compatible IDE devices.

**S.M.A.R.T.**

Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options: [Disabled], [Auto], [Enabled].

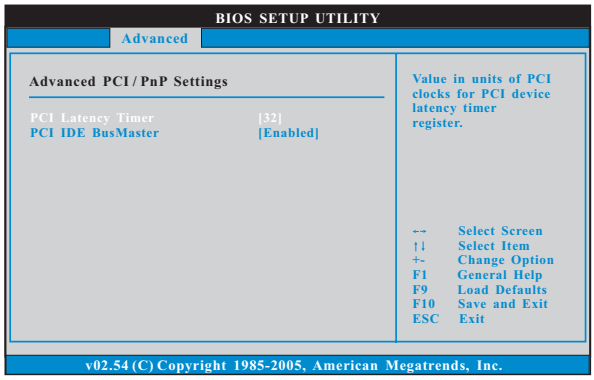
**32-Bit Data Transfer**

Use this item to enable 32-bit access to maximize the IDE hard disk data transfer rate.

**AHCI CD/DVD Boot Time Out**

Some SATA CD / DVD in AHCI mode need to wait ready longer. Configuration options: [0], [5], [10], [15], [20], [25], [30] and [35]. The default value is [35].

## 3.4.5 PCIPnP Configuration




**PCI Latency Timer**

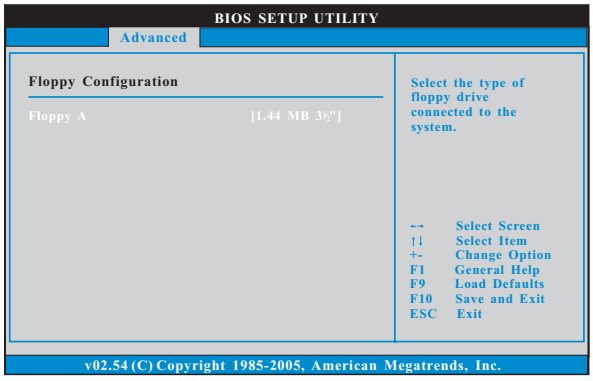
The default value is 32. It is recommended to keep the default value unless the installed PCI expansion cards' specifications require other settings.

**PCI IDE BusMaster**

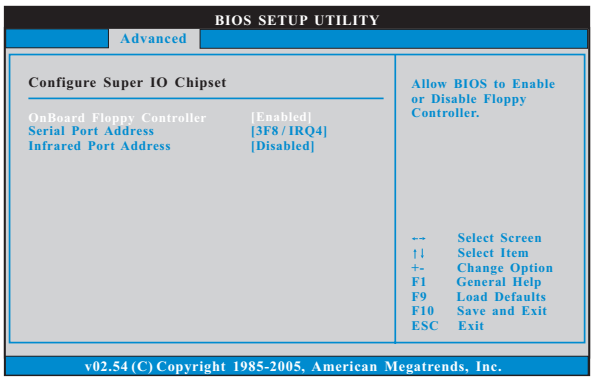
Use this item to enable or disable the PCI IDE BusMaster feature.

## 3.4.6 Floppy Configuration

In this section, you may configure the type of your floppy drive.



## 3.4.7 Super IO Configuration




**OnBoard Floppy Controller**

Use this item to enable or disable floppy drive controller.

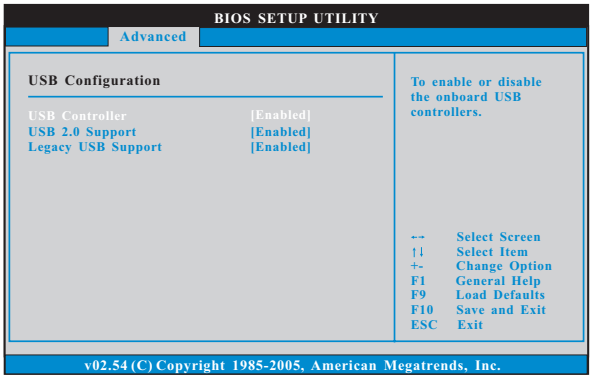
**Serial Port Address**

Use this item to set the address for the onboard serial port or disable it. Configuration options: [Disabled], [3F8 / IRQ4], [2F8 / IRQ3], [3E8 / IRQ4], [2E8 / IRQ3].

**Infrared Port Address**

Use this item to set the address for the onboard infrared port or disable it. Configuration options: [Disabled], [2F8 / IRQ3], and [2E8 / IRQ3]. If you plan to use ASRock DeskExpress on this motherboard, please keep this item on [Disabled] option.

## 3.4.8 USB Configuration




**USB Controller**

Use this item to enable or disable the use of USB controller.

**USB 2.0 Support**

Use this item to enable or disable the USB 2.0 support.

**Legacy USB Support**

Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Auto], [Disabled] and [BIOS Setup Only]. The default value is [Enabled]. Please refer to below descriptions for the details of these four options:

[Enabled] - Enables support for legacy USB.

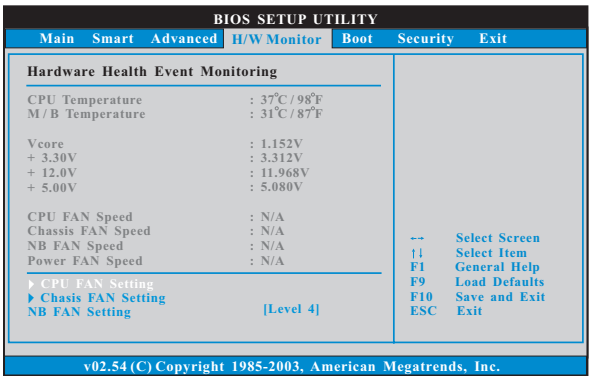
[Auto] - Enables legacy support if USB devices are connected.

[Disabled] - USB devices are not allowed to use under legacy OS and BIOS setup when [Disabled] is selected. If you have USB compatibility issue, it is recommended to select [Disabled] to enter OS.

[BIOS Setup Only] - USB devices are allowed to use only under BIOS setup and Windows / Linux OS.

## 3.5 Hardware Health Event Monitoring Screen

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.




**CPU FAN Setting**

This allows you to set the CPU fan speed. Configuration options: [Full On] and [Automatic mode]. The default is value [Full On].

**Chassis FAN Setting**

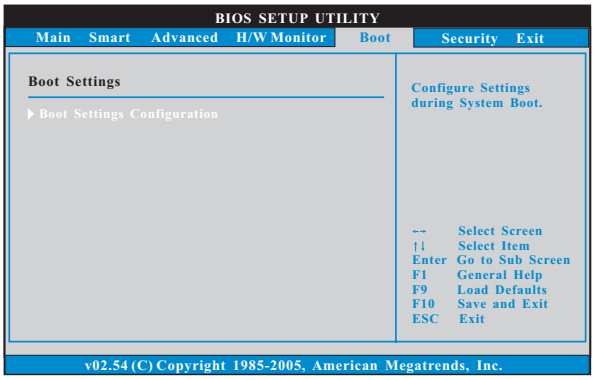
This allows you to set the chassis fan speed. Configuration options: [Full On] and [Automatic mode]. The default is value [Full On].

**NB FAN Setting**

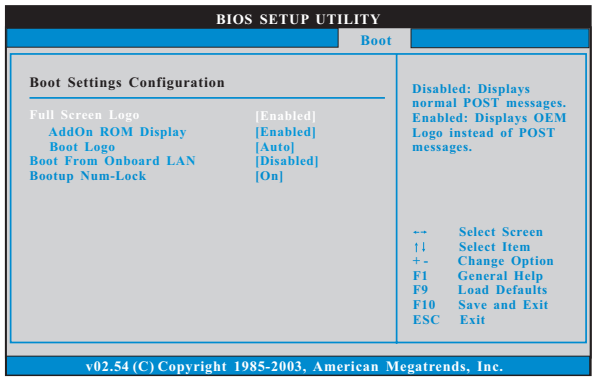
This allows you to set the NB fan speed. Configuration options: [Level 1], [Level 2], [Level 3] and [Level 4]. The default is value [Level 4].

## 3.6 Boot Screen

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.




### 3.6.1 Boot Settings Configuration




**Full Screen Logo**

Use this item to enable or disable OEM Logo. The default value is [Enabled].

**AddOn ROM Display**

Use this option to adjust AddOn ROM Display. If you enable the option "Full Screen Logo" but you want to see the AddOn ROM information when the system boots, please select [Enabled]. Configuration options: [Enabled] and [Disabled]. The default value is [Enabled].

**Boot Logo**

Use this option to select logo in POST screen. This option only appears when you enable the option “Full Screen Logo”. Configuration options: [Auto], [PCIE2.0 Revolution], [Scenery] and [ASRock]. The default value is [Auto]. Currently, the option [Auto] is set to Aircraft.

**Boot From Onboard LAN**

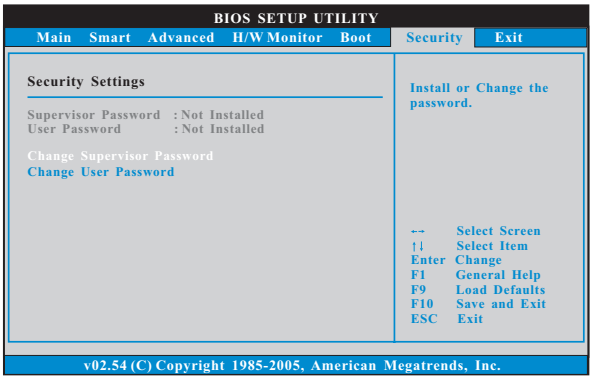
Use this item to enable or disable the Boot From Onboard LAN feature.

**Boot Up Num-Lock**

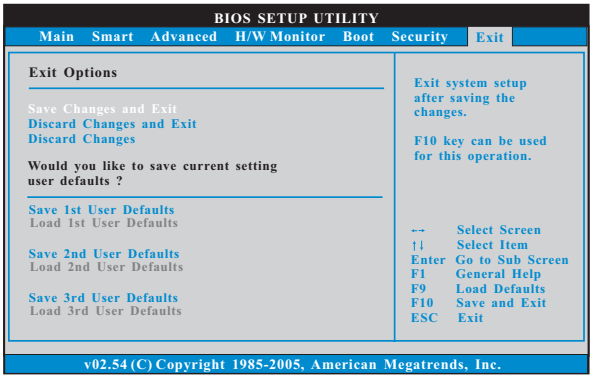
If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

## 3.7 Security Screen

In this section, you may set or change the supervisor/user password for the system. For the user password, you may also clear it.



## 3.8 Exit Screen




**Save Changes and Exit**

When you select this option, it will pop-out the following message, "Save configuration changes and exit setup?" Select [OK] to save the changes and exit the BIOS SETUP UTILITY.

**Discard Changes and Exit**

When you select this option, it will pop-out the following message, "Discard changes and exit setup?" Select [OK] to exit the BIOS SETUP UTILITY without saving any changes.

**Discard Changes**

When you select this option, it will pop-out the following message, "Discard changes?" Select [OK] to discard all changes.

**Load Optimal Defaults**

When you select this option, it will pop-out the following message, "Load optimal defaults?" Select [OK] to load the default values for all the setup configurations.

# Chapter 4: Software Support

## 4.1 Install Operating System

This motherboard supports various Microsoft® Windows® operating systems: 2000 / XP / XP 64-bit / Vista™ / Vista™ 64-bit. Because motherboard settings and hardware options vary, use the setup procedures in this chapter for general reference only. Refer to your OS documentation for more information.

## 4.2 Support CD Information

The Support CD that came with the motherboard contains necessary drivers and useful utilities that enhance the motherboard features.

### 4.2.1 Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu did not appear automatically, locate and double click on the file "ASSETUP.EXE" from the BIN folder in the Support CD to display the menus.

### 4.2.2 Drivers Menu

The Drivers Menu shows the available devices drivers if the system detects installed devices. Please install the necessary drivers to activate the devices.

### 4.2.3 Utilities Menu

The Utilities Menu shows the applications software that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

### 4.2.4 Contact Information

If you need to contact ASRock or want to know more about ASRock, welcome to visit ASRock's website at http://www.asrock.com; or you may contact your dealer for further information.