X58 Extreme

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.

CALIFORNIA, USA ONLY
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 ***X58 Extreme*** 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 ***X58 Extreme*** Motherboard
(ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm)
ASRock ***X58 Extreme*** Quick Installation Guide
ASRock ***X58 Extreme*** Support CD
1 x 80-conductor Ultra ATA 66/100/133 IDE Ribbon Cable
1 x Ribbon Cable for a 3.5-in Floppy Drive
4 x Serial ATA (SATA) Data Cables (Optional)
2 x Serial ATA (SATA) HDD Power Cables (Optional)
1 x I/O Panel Shield
1 x ASRock SLI_Bridge_2S Card

1.2 Specifications

Platform	- ATX Form Factor: 12.0-in x 9.6-in, 30.5 cm x 24.4 cm - All Solid Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors)
CPU	- Intel® Socket 1366 Core™ i7 Processor Extreme Edition / Core™ i7 Processor Supports Intel® Dynamic Speed Technology - System Bus up to 6400 MT/s; Intel® QuickPath Interconnect - Advanced V8 Power Phase Design - Supports Hyper-Threading Technology (see **CAUTION 1**) - Supports Untied Overclocking Technology (see **CAUTION 2**) - Supports EM64T CPU
Chipset	- Northbridge: Intel® X58 - Southbridge: Intel® ICH10R
Memory	- Triple Channel DDR3 Memory Technology (see **CAUTION 3**) - 6 x DDR3 DIMM slots - Supports DDR3 2000(OC)/1866(OC)/1600(OC)/1333(OC)/1066 non-ECC, un-buffered memory - Supports DDR3 ECC, un-buffered memory with Intel® Workstation 1S Xeon® processors 3500 series - Max. capacity of system memory: 24GB (see **CAUTION 4**) - Supports Intel® Extreme Memory Profile (XMP)
Expansion Slot	- 3 x PCI Express 2.0 x16 slots (blue @ x16 mode, orange @ x4 mode) (Double-wide slot spacing between each PCI-E slot) - 2 x PCI Express x1 slots - 2 x PCI slots - Supports ATI™ CrossFireX™, 3-Way CrossFireX™ and Quad CrossFireX™ - Supports NVIDIA® SLI™ and Quad SLI™
Audio	- 7.1 CH Windows® Vista™ Premium Level HD Audio with Content Protection - DAC with 110dB dynamic range (ALC890 Audio Codec)
LAN	- PCIE x1 Gigabit LAN 10/100/1000 Mb/s - Realtek RTL8111DL - Supports Wake-On-LAN
Rear Panel I/O	I/O Panel - 1 x PS/2 Mouse Port - 1 x PS/2 Keyboard Port - 1 x Coaxial SPDIF Out Port - 1 x Optical SPDIF Out Port

	- 7 x Ready-to-Use USB 2.0 Ports - 1 x Powered eSATAII/USB Connector - 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED) - 1 x IEEE 1394 Port - 1 x Clear CMOS Switch - HD Audio Jack: Side Speaker/Rear Speaker/Central/Bass/ Line in/Front Speaker/Microphone (see **CAUTION 5**)
Connector	- 6 x SATAII 3.0Gb/s connectors, support RAID (RAID 0, RAID 1, RAID 10, RAID 5 and Intel Matrix Storage), NCQ, AHCI and "Hot Plug" functions (see **CAUTION 6**) - 1 x ATA133 IDE connector (supports 2 x IDE devices) - 1 x Floppy connector - 1 x IR header - 1 x COM port header - 1 x HDMI_SPDIF header - 1 x IEEE 1394 header - 1 x TPM header - CPU/Chassis/NB/Power FAN connector - 24 pin ATX power connector - 8 pin 12V power connector - CD in header - Front panel audio connector - 2 x USB 2.0 headers (support 4 USB 2.0 ports) (see **CAUTION 7**)
Quick Switch	- 1 x Clear CMOS Switch - 1 x Power Switch - 1 x Reset Switch
BIOS Feature	- 8Mb AMI BIOS - AMI Legal BIOS - Supports "Plug and Play" - ACPI 1.1 Compliance Wake Up Events - Supports jumperfree - SMBIOS 2.3.1 Support - CPU, DRAM, NB, SB, VTT Voltage Multi-adjustment - Supports I. O. T. (Intelligent Overclocking Technology) - Supports Smart BIOS
Support CD	- Drivers, Utilities, AntiVirus Software (Trial Version)
Unique Feature	- ASRock OC Tuner (see **CAUTION 8**) - Intelligent Energy Saver (see **CAUTION 9**) - Instant Boot - ASRock Instant Flash (see **CAUTION 10**)

	- Hybrid Booster: - CPU Frequency Stepless Control (see **CAUTION 11**) - ASRock U-COP (see **CAUTION 12**) - Boot Failure Guard (B.F.G.)
Hardware Monitor	- CPU Temperature Sensing - Chassis Temperature Sensing - CPU/Chassis/NB/Power Fan Tachometer - CPU Quiet Fan - Voltage Monitoring: +12V, +5V, +3.3V, CPU Vcore
OS	- Microsoft® Windows® XP / XP 64-bit / Vista™ / Vista™ 64-bit compliant
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. About the setting of "Hyper Threading Technology", please check page 61.
2. This motherboard supports Untied Overclocking Technology. Please read "Untied Overclocking Technology" on page 52 for details.
3. This motherboard supports Triple Channel Memory Technology. Before you implement Triple Channel Memory Technology, make sure to read the installation guide of memory modules on page 18 for proper installation.
4. 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.
5. 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 13 for proper connection.
6. Before installing SATAII hard disk to SATAII connector, please read the "SATAII Hard Disk Setup Guide" on page 42 to adjust your SATAII hard disk drive to SATAII mode. You can also connect SATA hard disk to SATAII connector directly.
7. Power Management for USB 2.0 works fine under Microsoft® Windows® Vista™ 64-bit / Vista™ / XP 64-bit / XP SP1 or SP2.

8. 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
9. 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
10. 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.
11. 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.
12. 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.

1.3 Two SLI™ Graphics Card Support List

(for Windows® XP / XP 64-bit / Vista™ / Vista™ 64-bit)

Chipset Vendor	Model Name	Chipset Name	Driver
NVIDIA	Gigabyte GV-NX88T256H	GeForce 8800 GT	182.50
	Gigabyte GV-NX88S512H-B	GeForce 8800 GTS	182.50
	LEADTEK PX8800 GTX TDH	GeForce 8800 GTX	182.50
	Chaintech GES96GT-A1512P	GeForce 9600 GT	182.50
	ASUS EN9800GT TDP/HTDP/512M	GeForce 9800GT	182.50
	LEADTEK PX9800GTX	GeForce 9800GTX	182.50
	LEADTEK PX9800 GTX+	GeForce 9800GTX+	182.50
	GIGABYTE GV-N26-896H-B	GeForce GTX260	182.50

* For the latest updates of the supported PCI Express VGA card list for SLI™ Mode, please visit our website for details.
ASRock website: http://www.asrock.com/support/index.htm

1.4 Two CrossFireX™ Graphics Card Support List

(for Windows® Vista™ / Vista™ 64-bit)

Chipset Vendor	Model Name	Chipset Name	Driver
ATI	MSI RX2600PRO-T2D256EZ	Radeon HD 2600PRO	Catalyst 9.1
	Gigabyte GV-RX26T256HP-B	Radeon HD 2600XT	Catalyst 9.1
	Powercolor AX3650 512MMD3-XP	RADEON 3650	Catalyst 9.1
	Gigabyte GV-RX385256H-B	RADEON 3850	Catalyst 9.1
	Powercolor AX3870 512MD4-H	RADEON 3870	Catalyst 9.1
	Powercolor AX3870X2 1GBD3-H	RADEON 3870	Catalyst 9.1
	Gecube GC-HD485PG3-E3	RADEON 4850	Catalyst 9.1

* For the latest updates of the supported PCI Express VGA card list for CrossFireX™ Mode, please visit our website for details.
ASRock website: http://www.asrock.com/support/index.htm

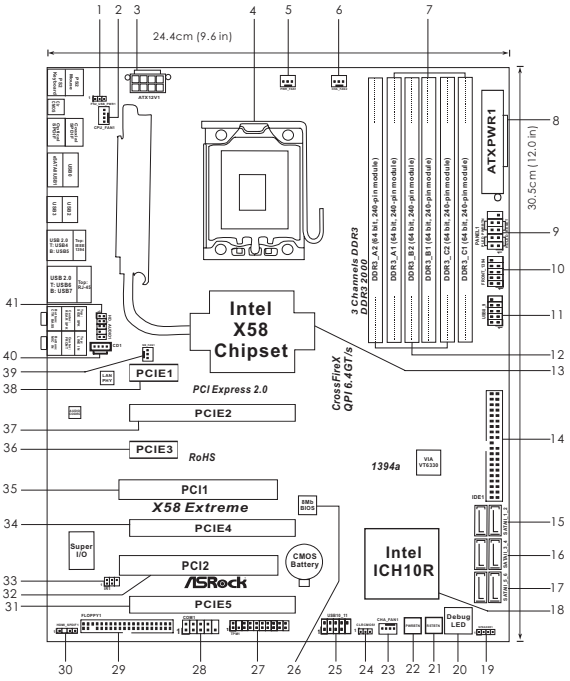
1.5 Three CrossFireX™ Graphics Card Support List

(for Windows® Vista™ / Vista™ 64-bit)

Chipset Vendor	Model Name	Chipset Name	Driver
ATI	Gecube GC-HD485PG3-E3	RADEON 4850	Catalyst 9.1

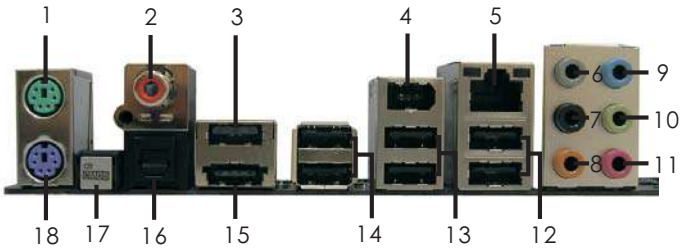
* For the latest updates of the supported PCI Express VGA card list for CrossFireX™ Mode, please visit our website for details.
ASRock website: http://www.asrock.com/support/index.htm

1.6 Motherboard Layout



1	PS2_USB_PWR1 Jumper	20	Debug LED
2	CPU Fan Connector (CPU_FAN1)	21	Reset Switch (RSTBTN)
3	ATX 12V Power Connector (ATX12V1)	22	Power Switch (PWRBTN)
4	1366-Pin CPU Socket	23	Chassis Fan Connector (CHA_FAN1)
5	Power Fan Connector (PWR_FAN1)	24	Clear CMOS Jumper (CLRCMOS1)
6	Chassis Fan Connector (CHA_FAN2)	25	USB 2.0 Header (USB10_11, Blue)
7	3 x 240-pin DDR3 DIMM Slots (Triple Channel: DDR3_A1, DDR3_B1, DDR3_C1 ; White)	26	8Mb SPI Flash
		27	TPM Header (TPM1)
		28	COM Port Header (COM1)
8	ATX Power Connector (ATXPWR1)	29	Floppy Connector (FLOPPY1)
9	System Panel Header (PANEL1, Orange)	30	HDMI_SPDIF Header (HDMI_SPDIF1, Yellow)
10	Front Panel IEEE 1394 Header (FRONT_1394, Red)	31	PCI Express x16 Slot (PCIE5, Orange)
11	USB 2.0 Header (USB8_9, Blue)	32	PCI Slots (PCI2)
12	3 x 240-pin DDR3 DIMM Slots (Triple Channel: DDR3_A2, DDR3_B2, DDR3_C2 ; Blue)	33	Infrared Module Header (IR1)
		34	PCI Express x16 Slot (PCIE4, Blue)
		35	PCI Slots (PCI1)
13	North Bridge Controller	36	PCI Express x1 Slot (PCIE3, White)
14	Primary IDE Connector (IDE1, Blue)	37	PCI Express x16 Slot (PCIE2, Blue)
15	SATAII Connector (SATAII_1_2, Red)	38	PCI Express x1 Slot (PCIE1, White)
16	SATAII Connector (SATAII_3_4, Red)	39	North Bridge Fan Connector (NB_FAN1)
17	SATAII Connector (SATAII_5_6, Red)	40	Internal Audio Connector: CD1 (Black)
18	South Bridge Controller	41	Front Panel Audio Header (HD_AUDIO1, Lime)
19	Chassis Speaker Header (SPEAKER 1, Purple)		

1.7 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.

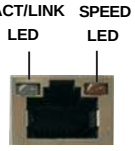
LAN Port LED Indications

Activity/Link LED

Status	Description
Off	No Link
Blinking	Data Activity
On	Link

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

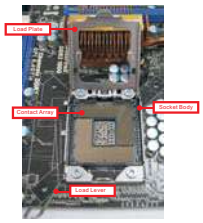
Take note of the following precautions before you install motherboard components or change any motherboard settings.

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 1366-Pin CPU, please follow the steps below.



1366-Pin Socket Overview

Before you insert the 1366-Pin 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.

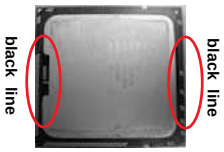
Step 1-3. Rotate the load plate to fully open position at approximately 100 degrees.

Step 2. Remove PnP Cap (Pick and Place Cap).

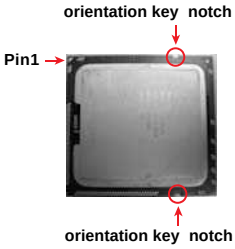
1. It is recommended to use the cap tab to handle and avoid kicking off the PnP cap.
2. This cap must be placed if returning the motherboard for after service.

Step 3. Insert the 1366-Pin CPU:

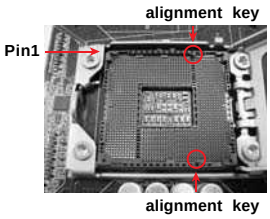
Step 3-1. Hold the CPU by the edges where are marked with black lines.



Step 3-2. Orient the CPU with IHS (Integrated Heat Sink) up. Locate Pin1 and the two orientation key notches.



1366-Pin CPU



1366-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 3-3. Carefully place the CPU into the socket by using a purely vertical motion.

Step 3-4. Verify that the CPU is within the socket and properly mated to the orient keys.

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

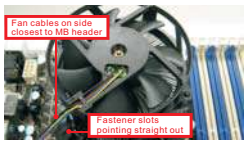
This motherboard is equipped with 1366-Pin socket that supports Intel 1366-Pin CPU. Please adopt the type of heatsink and cooling fan compliant with Intel 1366-Pin CPU to dissipate heat. Before you installed the heatsink, you need to spray thermal interface material between the CPU and the heatsink to 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 12, No. 2).
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 1366-Pin 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 12, No. 2).

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 six 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Triple Channel Memory Technology. For triple 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 Triple Channel (DDR3_A1, DDR3_B1 and DDR3_C1; White slots; see p.12 No.7), or **identical** DDR3 DIMM pair in Triple Channel (DDR3_A2, DDR3_B2 and DDR3_C2; Blue slots; see p.12 No.12), so that Triple Channel Memory Technology can be activated. This motherboard also allows you to install six DDR3 DIMMs for triple channel configuration, and please install **identical** DDR3 DIMMs in all six slots.

Recommended Memory Configurations

	DDR3_A2 (Blue)	DDR3_A1 (White)	DDR3_B2 (Blue)	DDR3_B1 (White)	DDR3_C2 (Blue)	DDR3_C1 (White)
1 DIMM	-	Populated	-	-	-	-
2 DIMMs	-	Populated	-	Populated	-	-
3 DIMMs	-	Populated	-	Populated	-	Populated
4 DIMMs	Populated	Populated	-	Populated	-	Populated
5 DIMMs	Populated	Populated	Populated	Populated	-	Populated
6 DIMMs	Populated	Populated	Populated	Populated	Populated	Populated

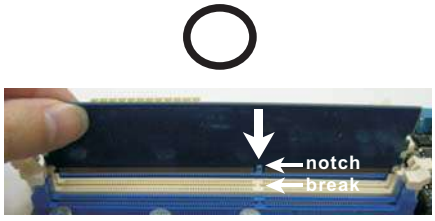
1. Please install the memory module into the white slot (DDR3_A1, DDR3_B1 or DDR3_C1) for the first priority.
2. Due to Intel® CPU spec definition, the system will not boot if only one DIMM is installed into DDR3_A2, DDR3_B2 or DDR3_C2 slot.
3. Due to Intel® CPU spec definition, XMP DIMMs and DDR3 2000/ 1866/1600 are supported for one DIMM per channel only.
4. You may install varying memory sizes in Channel A, Channel B and Channel C. The system maps the total size of the lower-sized channel for the dual-channel or triple-channel configuration. Any excess memory from the higher-sized channel is then mapped for single-channel operation.
5. It is not allowed to install a DDR or DDR2 memory module into DDR3 slot; otherwise, this motherboard and DIMM may be damaged.

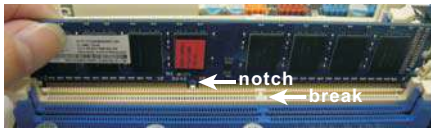
Installing a DIMM

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 (PCIE x1 slot; White) is used for PCI Express cards with x1 lane width cards, such as Gigabit LAN card, SATA2 card, etc.
PCIE2 / PCIE4 (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™ or SLI™ 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 3-Way CrossFireX™ function.

1. In single VGA card mode, it is recommended to install a PCI Express x16 graphics card on PCIE2 slot.
2. In CrossFireX™ mode or SLI™ mode, please install PCI Express x16 graphics cards on PCIE2 and PCIE4 slots. Therefore, both these two slots will work at x16 bandwidth.
3. In 3-Way CrossFireX™ mode, please install PCI Express x16 graphics cards on PCIE2, PCIE4 and PCIE5 slots. Therefore, PCIE2 and PCIE4 slots will work at x16 bandwidth while PCIE5 slot will work at x4 bandwidth.
4. Please connect a chassis fan to motherboard chassis fan connector (CHA_FAN1 or CHA_FAN2) when using multiple graphics cards for better thermal environment.

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 SLI™ and Quad SLI™ Operation Guide

This motherboard supports NVIDIA® SLI™ and Quad SLI™ (Scalable Link Interface) technology that allows you to install up to two identical PCI Express x16 graphics cards. Currently, NVIDIA® SLI™ technology supports Windows® XP, XP 64-bit, Vista™ and Vista™ 64-bit OS. NVIDIA® Quad SLI™ technology support Windows® Vista™ and Vista™ 64-bit OS only. Please follow the installation procedures in this section.

Requirements

1. For SLI™ or Quad SLI™ technology, you should have two identical SLI™-ready graphics cards that are NVIDIA® certified.
2. Make sure that your graphics card driver supports NVIDIA® SLI™ technology. Download the driver version 181.20 or later from NVIDIA® website (www.nvidia.com).
3. Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. It is recommended to use NVIDIA® certified PSU. Please refer to NVIDIA® website for details.

2.7.1 Graphics Card Setup

2.7.1.1 Installing Two SLI™-Ready Graphics Cards

Step 1. Install the identical SLI™-ready graphics cards that are NVIDIA® certified because different types of graphics cards will not work together properly. (Even the GPU chips version shall be the same.) Insert one graphics card into PCIE2 slot and the other graphics card to PCIE4 slot. Make sure that the cards are properly seated on the slots.

Step2. If required, connect the auxiliary power source to the PCI Express graphics cards.

Step3. Align and insert ASRock SLI_Bridge_2S Card to the goldfingers on each graphics card. Make sure ASRock SLI_Bridge_2S Card is firmly in place.

ASRock SLI_Bridge_2S Card

Step4. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE2 slot.

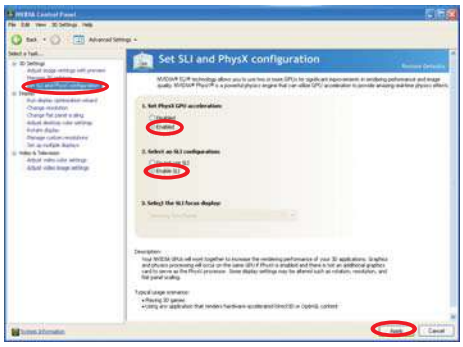
2.7.2 Driver Installation and Setup

Install the graphics card drivers to your system. After that, you can enable the Multi-Graphics Processing Unit (GPU) feature in the NVIDIA® nView system tray utility. Please follow the below procedures to enable the multi-GPU feature.

For Windows® XP / XP 64-bit OS:
(For SLI™ mode only)

A. Double-click **NVIDIA Settings icon** on your Windows® taskbar.

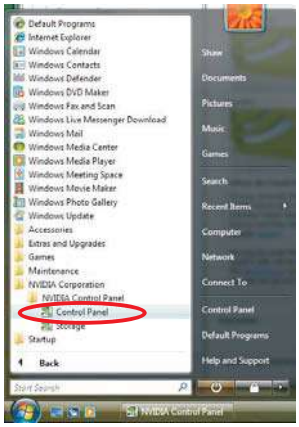
B. From the pop-up menu, select **Set SLI and PhysX configuration**. In **Set PhysX GPU acceleration** item, please select **Enabled**. In **Select an SLI configuration** item, please select **Enable SLI**. And click **Apply**.



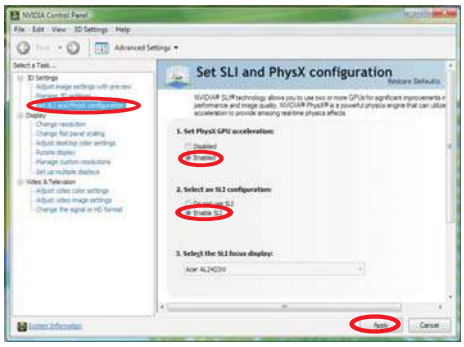
C. Reboot your system.
D. You can freely enjoy the benefit of SLI™ feature.

For Windows® Vista™ / Vista™ 64-bit OS:
(For SLI™ and Quad SLI™ mode)

A. Click the **Start** icon on your Windows taskbar.
B. From the pop-up menu, select **All Programs**, and then click **NVIDIA Corporation**.
C. Select **NVIDIA Control Panel** tab.
D. Select **Control Panel** tab.



E. From the pop-up menu, select **Set SLI and PhysX configuration**. In **Set PhysX GPU acceleration** item, please select **Enabled**. In **Select an SLI configuration** item, please select **Enable SLI**. And click **Apply**.



F. Reboot your system.
G. You can freely enjoy the benefit of SLI™ or Quad SLI™ feature.

* SLI™ appearing here is a registered trademark of NVIDIA® Technologies Inc., and is used only for identification or explanation and to the owners' benefit, without intent to infringe.

2.8 CrossFireX™, 3-Way CrossFireX™ and Quad CrossFireX™ Operation Guide

This motherboard supports CrossFireX™, 3-Way CrossFireX™ and Quad 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. 3-Way CrossFireX™ and Quad CrossFireX™ feature are supported with Windows® Vista™ OS only. Please check AMD website for ATI™ CrossFireX™ driver updates.

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.

2.8.1 Graphics Card Setup

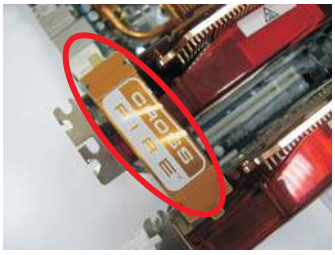
2.8.1.1 Installing Two CrossFireX™-Ready Graphics Cards

Different CrossFireX™ cards may require different methods to enable CrossFireX™ feature. In below procedures, we use Radeon HD 3870 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.

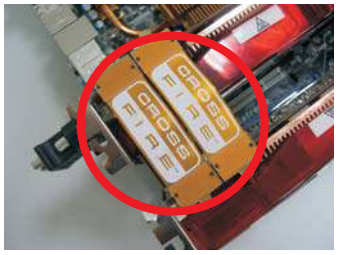
Step 1. Insert one Radeon graphics card into PCIE2 slot and the other Radeon graphics card to PCIE4 slot. Make sure that the cards are properly seated on the slots.

Step 2. Connect two Radeon graphics cards by installing 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



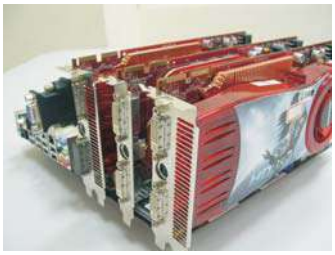
or



Step 3. 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.)

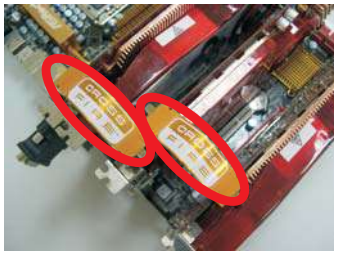
2.8.1.2 Installing Three CrossFireX™-Ready Graphics Cards

Step 1. Insert Radeon graphics cards into PCIE2, PCIE4 and PCIE5 slots. Make sure that the cards are properly seated on the slots.



Step 2. Use one CrossFire Bridge to connect Radeon graphics cards on PCIE2 and PCIE4 slots, and use the other CrossFire Bridge to connect Radeon graphics cards on PCIE4 and PCIE5 slots. (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 3. 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.)

2.8.2 Driver Installation and Setup

Step 1. Power on your computer and boot into OS.

Step 2. 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 3. 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 4. Restart your computer.

Step 5. Install the VGA card drivers to your system, and restart your computer. Then you will find "ATI Catalyst Control Center" on your Windows® taskbar. (Driver Version: 8-12_vista32_dd_ccc_wdm_enu_72275.exe)

ATI Catalyst Control Center

Step 6. Double-click "ATI Catalyst Control Center". Click "View", select "CrossFireX™", and then check the item "Enable CrossFireX™". Select the option according to the total GPU number on the Radeon graphics cards. Click "Apply".

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 7. You can freely enjoy the benefit of CrossFireX™, 3-Way CrossFireX™ or Quad 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.

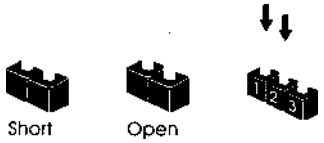
2.9 Surround Display Feature

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

2.10 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.12, No. 1)		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.12, No. 24)		

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.

2.11 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.12 No. 29)

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.12 No. 14)

80-conductor ATA 66/100/133 cable

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

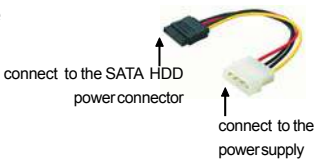
Serial ATAII Connectors
(SATAII_1_2:
see p.12, No. 15)
(SATAII_3_4:
see p.12, No. 16)
(SATAII_5_6:
see p.12, No. 17)

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)

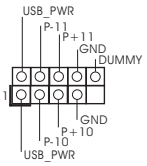
Either end of the SATA data cable can be connected to the SATA / SATAII hard disk or the SATAII connector on this motherboard.

Serial ATA (SATA)
Power Cable
(Optional)



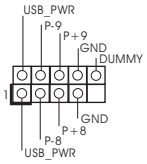
Please connect the black end of SATA power cable to the power connector on each drive. Then connect the white end of SATA power cable to the power connector of the power supply.

USB 2.0 Headers
(9-pin USB10_11)
(see p.12 No. 25)

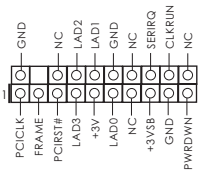


Besides seven default USB 2.0 ports on the I/O panel, there are two USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

(9-pin USB8_9)
(see p.12 No. 11)

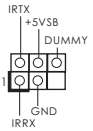


TPM Header
(19-pin TPM1)
(see p.12 No. 27)



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.

Infrared Module Header
(5-pin IR1)
(see p.12 No. 33)



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

Internal Audio Connectors
(4-pin CD1)
(CD1: see p.12 No. 40)

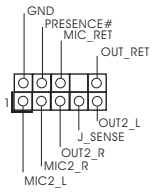
CD1

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.

Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.12 No. 41)



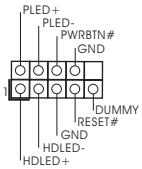
This is an interface for front panel audio cable that allows convenient connection and control of audio devices.

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® 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® 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.12 No. 9)

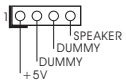


This header accommodates several system front panel functions.

Chassis Speaker Header

(4-pin SPEAKER 1)

(see p.12 No. 19)



Please connect the chassis speaker to this header.

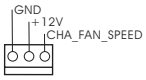
Chassis, NB and Power Fan Connectors

(4-pin CHA_FAN1)

(see p.12 No. 23)

(3-pin CHA_FAN2)

(see p.12 No. 6)

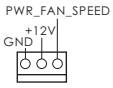


(3-pin NB_FAN1)

(see p.12 No. 39)

(3-pin PWR_FAN1)

(see p.12 No. 5)

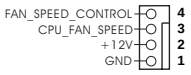


Please connect the fan cables to the fan connectors and match the black wire to the ground pin.

CPU Fan Connector

(4-pin CPU_FAN1)

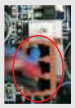
(see p.12 No. 2)



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

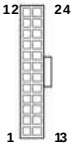


3-Pin Fan Installation

ATX Power Connector

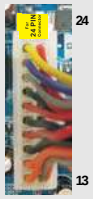
(24-pin ATXPWR1)

(see p.12, 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.12 No. 3)

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

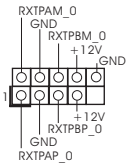
Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply. To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5.

4-Pin ATX 12V Power Supply Installation

IEEE 1394 Header

(9-pin FRONT_1394)

(see p.12 No. 10)

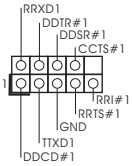


Besides one default IEEE 1394 port on the I/O panel, there is one IEEE 1394 header (FRONT_1394) on this motherboard. This IEEE 1394 header can support one IEEE 1394 port.

Serial port Header

(9-pin COM1)

(see p.12 No.28)



This COM1 header supports a serial port module.

HDMI_SPDIF Header

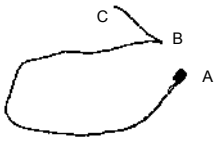
(3-pin HDMI_SPDIF1)

(see p.12 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

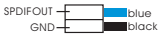
(Optional)



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)

2.12 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 (PWRBTN) (see p.12 No. 22)		Power Switch is a quick switch, allowing users to quickly turn on/off the system.
Reset Switch (RSTBTN) (see p.12 No. 21)		Reset Switch is a quick switch, allowing users to quickly reset the system.
Clear CMOS Switch (CLRCBTN) (see p.13 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 30 “Clear CMOS jumper” description instead.

2.13 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).

2.14 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 20.

Step 2. Connect the black end (A) of HDMI_SPDIF cable to the HDMI_SPDIF header (HDMI_SPDIF1, yellow, see page 12, 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 35. 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.

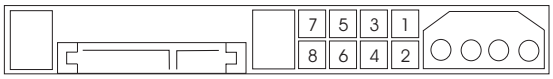
Step 4. Connect the HDMI output connector on HDMI VGA card to HDMI device, such as HDTV. Please refer to the user manual of HDTV and HDMI VGA card vendor for detailed connection procedures.

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

2.15 SATAII Hard Disk Setup Guide

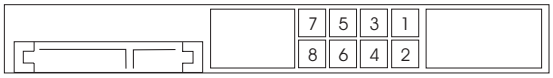
Before installing SATAII hard disk to your computer, please carefully read below SATAII hard disk setup guide. Some default setting of SATAII hard disks may not be at SATAII mode, which operate with the best performance. In order to enable SATAII function, please follow the below instruction with different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

2.16 Serial ATA (SATA) / Serial ATAII (SATAII) Hard Disks Installation

This motherboard adopts Intel® ICH10R south bridge chipset that supports Serial ATA (SATA) / Serial ATAII (SATAII) hard disks and RAID (RAID 0, RAID 1, RAID 10, RAID 5, and Intel Matrix Storage) functions. 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.

1. If you plan to use RAID 0, RAID 1, RAID 10 or Intel Matrix Storage function, you need to install at least 2 SATA / SATAII hard disks. If you plan to use RAID 5 function, you need to install at least 3 SATA / SATAII hard disks.
2. It is not recommended to switch the "Configure SATAII as" setting between AHCI, RAID and IDE mode after OS installation.

2.17 Hot Plug and Hot Swap Functions for SATA / SATAII HDDs

This motherboard supports Hot Plug and Hot Swap functions for SATA / SATAII in RAID / AHCI mode. Intel® ICH10R 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.

What is Hot Swap Function?

If SATA / SATAII HDDs are built as RAID1 or RAID 5 then it is called "Hot Swap" for the action to insert and remove the SATA / SATAII HDDs while the system is still power-on and in working condition.

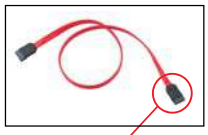
2.18 SATA / SATAII HDD Hot Plug Feature and Operation Guide

This motherboard supports Hot Plug feature for SATA / SATAII HDD in RAID / 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

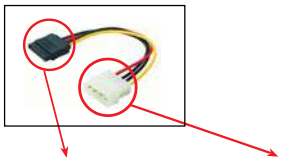
B. SATA power cable with SATA 15-pin power connector interface

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.

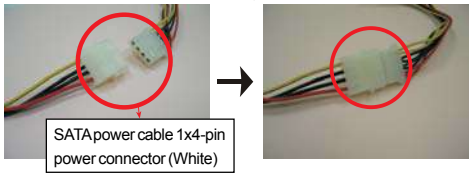
Points of attention, before you process the Hot Plug:

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.

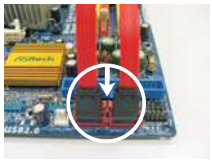
How to Hot Plug a SATA / SATAII HDD:

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.



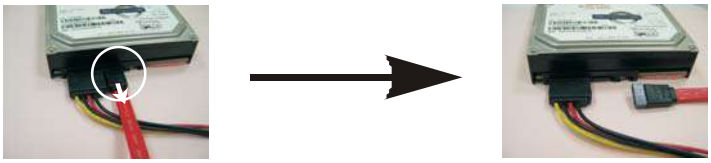
Step *3* Connect SATA 15-pin power cable connector (Black) end to SATA / SATAII HDD.

Step *4* Connect SATA data cable to the SATA / SATAII HDD.

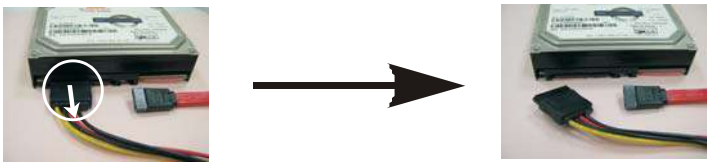
How to Hot Unplug a SATA / SATAII HDD:

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.



2.19 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.

2.20 Installing Windows® XP / XP 64-bit / Vista™ / Vista™ 64-bit With RAID Functions

If you want to install Windows® XP / XP 64-bit / Vista™ / Vista™ 64-bit OS on your SATA / SATAII HDDs with RAID functions, please follow below procedures according to the OS you install.

2.20.1 Installing Windows® XP / XP 64-bit With RAID Functions

If you want to install Windows® XP / XP 64-bit on your SATA / SATAII HDDs with RAID functions, please follow below steps.

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 [RAID].

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: Use "RAID Installation Guide" to set RAID configuration.
Before you start to configure the RAID function, you need to check the installation guide in the Support CD for proper configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path: **.. \ RAID Installation Guide**
STEP 4: Install Windows® XP / XP 64-bit OS on your system.
After making a SATA / SATAII driver diskette and using "RAID Installation Guide" to set RAID configuration, 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 RAID driver. When prompted, insert the SATA / SATAII driver diskette containing the Intel® RAID 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) ICH10R SATA RAID Controller (Desktop - Windows XP)" for Windows® XP or "Intel(R) ICH10R SATA RAID Controller (Desktop - Windows XP64) " for Windows® XP 64-bit.

After the installation of Windows® XP / Windows® XP-64bit OS, if you want to manage RAID functions, you are allowed to use both "RAID Installation Guide" and "Intel Matrix Storage Manager Information" for RAID configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path: **.. \ RAID Installation Guide** and the document in the support CD, "Guide to Intel Matrix Storage Manager", which is located in the folder at the following path: **.. \ Intel Matrix Storage Manager Information**

If you want to use "Intel Matrix Storage Manager" in Windows® environment, please install SATA / SATAII drivers from the Support CD again so that "Intel Matrix Storage Manager" will be installed to your system as well.

2.20.2 Setting Up a "RAID Ready" System

You can also set up a "RAID Ready" system with a single SATA / SATAII hard disk. A "RAID Ready" system can be seamlessly upgraded to RAID 0, RAID 1 or RAID 5 at a later date by using RAID migration feature of Intel Matrix Storage. The following steps outline how to build an Intel "RAID Ready" system.

1. Assemble the system and attach a single SATA / SATAII hard drive.
2. Set up system BIOS as step 1 of page 47. When done, exit Setup.
3. Make a SATA / SATAII driver diskette as step 2 of page 47. Begin Windows® setup by booting from the installation CD.
4. At the beginning of Windows® setup, press F6 to install a third-party RAID driver. When prompted, insert the SATA / SATAII driver diskette containing the Intel® RAID 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) ICH10R SATA RAID Controller (Desktop - Windows XP)" for Windows® XP or "Intel(R) ICH10R SATA RAID Controller (Desktop - Windows XP64)" for Windows® XP 64-bit.

5. Finish the Windows® installation and install all necessary drivers.
6. Install the Intel(R) Matrix Storage Manager software via the CD-ROM included with your motherboard or after downloading it from the Internet. This will add the Intel(R) Matrix Storage Console which can be used to manage the RAID configuration.
7. After setting up a “RAID Ready” system as the above steps, you can follow the procedures of the next section to migrate the system to RAID 0, RAID 1 or RAID 5.

2.20.3 Migrating a “RAID Ready” System to RAID 0, RAID 1 or RAID 5

If you have an existing “RAID Ready” system, then you can use the following steps to perform a migration from a single non-RAID configuration to a two drive RAID 0, RAID 1 configuration or three drive RAID 5 configuration. To prepare for this, you will need another SATA / SATAII hard drive with a capacity equal to or greater than that currently being used as the source hard drive.

1. Physically attach one additional SATA / SATAII hard drive to the SATAII port not being used. Note the serial number of the hard drive already in the system; you will use this to select it as the source hard drive when initiating the migration.
2. Boot Windows®, install the Intel(R) Matrix Storage Manager software, if not already installed, using the setup package obtained from a CD-ROM or from the Internet. This will install the necessary Intel Storage Utility and start menu links.
3. Open the Intel Storage Utility from the Start Menu and select “Create RAID volume from Existing Hard Drive” from the Actions menu. This will activate the Create RAID volume from Existing Hard Drive Wizard. Click through the dialogs as prompted. It’s important to understand what will occur during the migration process because any data on the destination hard drive will be lost.
4. Once the migration is complete, reboot the system. If you migrated to a RAID 0 volume, use Disk Management from within Windows® in order to partition and format the empty space created when the two hard drive capacities are combined. You may also use third-party software to extend any existing partitions within the RAID volume.

2.20.4 Installing Windows® Vista™ / Vista™ 64-bit With RAID Functions

If you want to install Windows® Vista™ / Vista™ 64-bit on your SATA / SATAII HDDs with RAID functions, please follow below steps.

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 [RAID].

STEP 2: Use "RAID Installation Guide" to set RAID configuration.

Before you start to configure the RAID function, you need to check the installation guide in the Support CD for proper configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path: **.. \ RAID Installation Guide**

STEP 3: 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® RAID drivers. Intel® RAID 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.

After the installation of Windows® Vista™ / Vista™ 64-bit OS, if you want to manage RAID functions, you are allowed to use both "RAID Installation Guide" and "Intel Matrix Storage Manager Information" for RAID configuration. Please refer to the document in the Support CD, "Guide to SATA Hard Disks Installation and RAID Configuration", which is located in the folder at the following path: **.. \ RAID Installation Guide** and the document in the support CD, "Guide to Intel Matrix Storage Manager", which is located in the folder at the following path: **.. \ Intel Matrix Storage Manager Information**

If you want to use "Intel Matrix Storage Manager" in Windows® environment, please install SATA / SATAII drivers from the Support CD again so that "Intel Matrix Storage Manager" will be installed to your system as well.

2.21 Installing Windows® XP / XP 64-bit / Vista™ / Vista™ 64-bit Without RAID Functions

If you want to install Windows® 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.

2.21.1 Installing Windows® XP / XP 64-bit Without RAID Functions

If you want to install Windows® 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.

Please make a SATA / SATAII driver diskette by following section 2.20.1 step 2 on page 47.

STEP 3: Install Windows® XP / XP 64-bit OS on your system.

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) ICH10R SATA AHCI Controller (Desktop - Windows XP)" for Windows® XP or "Intel(R) ICH10R 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® XP / XP 64-bit OS on your system.

2.21.2 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.

2.22 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
OC Tweaker	To set up overclocking features
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.

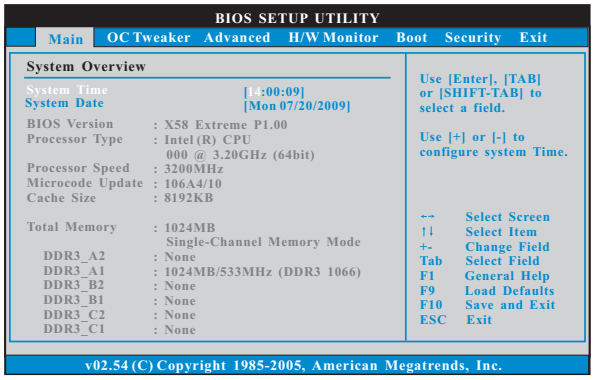
3.1.2 Navigation Keys

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]

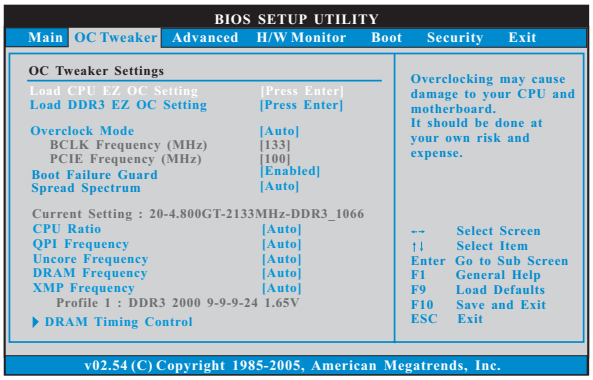
Use this item to specify the system time.

System Date [Day Month/Date/Year]

Use this item to specify the system date.

3.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.



Load CPU EZ OC Setting

You can use this option to load CPU EZ overclocking setting. Configuration options: [3.60GHz], [3.70GHz], [3.80GHz], [3.90GHz], [4.00GHz] and [4.20GHz]. Please note that overclocing may cause damage to your CPU and motherboard. It should be done at your own risk and expense.

Load DDR3 EZ OC Setting

You can use this option to load DDR3 EZ overclocking setting. Please note that overclocing may cause damage to your memory and motherboard. It should be done at your own risk and expense.

Overclock Mode

Use this to select Overclock Mode. Configuration options: [Auto], [Manual], [I.O.T.] and [Optimized]. The default value is [Auto]. If you select [Manual], Untied Overclocking function is enabled. Please refer to page 52 for the details of Untied Overclocking Technology. Therefore, you are allowed to adjust the Host frequency and PCIE frequency in the following two items. If you select [I.O.T.] (Intelligent Overclocking Technology), the system will automatically enable the overclocking function when your CPU is heavy loaded.

BCLK Frequency (MHz)

Use this option to adjust BCLK (Internal Base Clock) frequency.

PCIE Frequency (MHz)

Use this option to adjust PCIE frequency.

Boot Failure Guard

Enable or disable the feature of Boot Failure Guard.

Spread Spectrum

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

CPU Ratio

If the ratio status is unlocked, you will find this item appear to allow you changing the ratio value of this motherboard.

QPI Frequency

Use this option to adjust QPI (QuickPath Interconnect) frequency. Configuration options: [Auto], [4.800GT], [5.866GT] and [6.400GT]. The default value is [Auto].

Uncore Frequency

Use this option to adjust uncore frequency. The value of uncore frequency should be at least double of DRAM frequency. For exanple, if the DRAM frequency is [800MHz (DDR3 1600)], uncore frequency should be above [3200MHz]. Configuration options: [Auto], [1600MHz], [1866MHz], [2133MHz], [2400MHz], [2666MHz], [2933MHz], [3200MHz], [3466MHz], [3733MHz], [4000MHz] and [4266MHz]. The default value is [Auto].

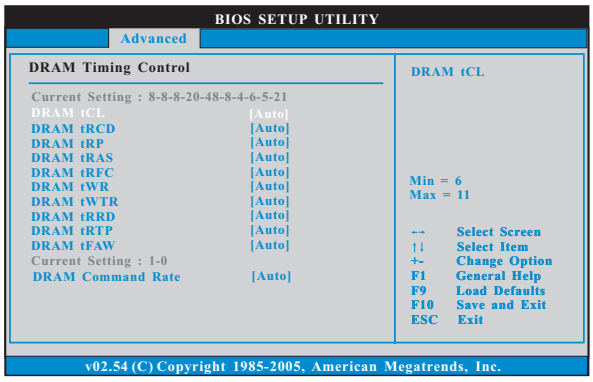
DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assigns appropriate frequency automatically. You may select [Auto], [400MHz (DDR3 800)], [533MHz (DDR3 1066)], [666MHz (DDR3 1333)], [800MHz (DDR3 1600)], [933MHz (DDR3 1866)] or [1066MHz (DDR3 2133)].

XMP Frequency

Use this option to adjust XMP frequency. The default value is [Auto].

DRAM Timing Control



DRAM tCL

Use this item to adjust the means of memory accessing. Configuration options : [6] to [11] and [Auto].

DRAM tRCD

This controls the number of DRAM clocks for TRCD. Configuration options: Configuration options: [Auto], [3] to [15].

DRAM tRP

This controls the number of DRAM clocks for TRP. Configuration options: Configuration options: [Auto], [3] to [15].

DRAM tRAS

This controls the number of DRAM clocks for TRAS. Configuration options: Configuration options: [Auto], [9] to [31].

DRAM tRFC

This controls the number of DRAM clocks for TRFC. Configuration options: Configuration options: [Auto], [15] to [255].

DRAM tWR

This controls the number of DRAM clocks for TWR. Configuration options: Configuration options: [Auto], [3] to [15].

DRAM tWTR

This controls the number of DRAM clocks for TWTR. Configuration options: Configuration options: [Auto], [2] to [10].

DRAM tRRD

This controls the number of DRAM clocks for TRRD. Configuration options: Configuration options: [Auto], [4] to [7].

DRAM tRTP

This controls the number of DRAM clocks for TRTP. Configuration options: Configuration options: [Auto], [2] to [13].

DRAM tFAW

This controls the number of DRAM clocks for TFAW. Configuration options: Configuration options: [Auto], [2] to [63].

DRAM Command Rate

Use this item to adjust DRAM Command Rate. Configuration options : [1], [2] and [Auto].

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].

CPU Voltage

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

DRAM Voltage

Use this to select DRAM Voltage. The default value is [Auto].

IOH Voltage

Use this to select IOH Voltage. The default value is [Auto].

VTT Voltage

Use this to select VTT Voltage. The default value is [Auto].

ICH Voltage

Use this to select ICH Voltage. Standard: 1.12V. Max: 1.56V. Increment: 0.02V.

IOH CSI Voltage

Use this to select IOH CSI Voltage. Standard: 1.12V. Max: 1.56V. Increment: 0.02V.

IOH/ICH PCIE Voltage

Use this to select IOH/ICH PCIE Voltage. Standard: 1.52V. Max: 1.90V. Increment: 0.02V.

CPU PLL Voltage

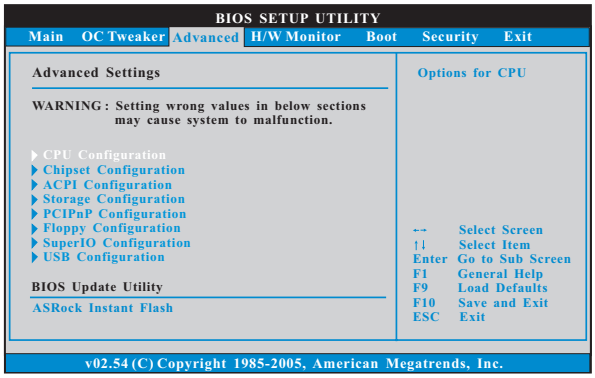
Use this to select CPU PLL Voltage. Standard: 1.82V. Max: 2.50V. Increment: 0.02V.

Would you like to save current setting user defaults?

In this option, you are allowed to load and save three user defaults according to your own requirements.

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.

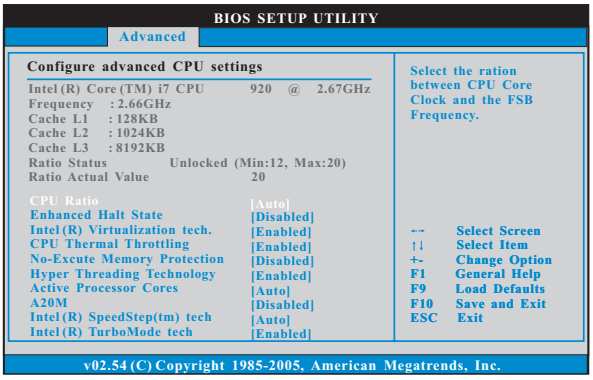


Setting wrong values in this section may cause the system to malfunction.

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.

3.4.1 CPU Configuration



CPU Ratio

If the ratio status is unlocked, you will find this item appear to allow you changing the ratio value of this motherboard.

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.

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.

CPU Thermal Throttling

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

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.

Hyper Threading Technology

To enable this feature, it requires a computer system with an Intel Core™ i7 processor that supports Hyper-Threading technology and an operating system that includes optimization for this technology, such as Microsoft® Windows® XP or Vista™. Set to [Enabled] if using Microsoft® Windows® XP, Vista™, or Linux kernel version 2.4.18 or higher. This option will be hidden if the installed CPU does not support Hyper-Threading technology.

Active Processor Cores

Use this item to select the number of cores to enable in each processor package. Configuration options: [All], [1] and [2]. The default value is [All].

A20M

Use this item to enable or disable A20M. Legacy OS and AP may need A20M enabled. The default value is [Disabled].

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) TurboMode tech

Use this item to enable or disable Intel (R) Turbo Boost Technology. Turbo mode allows processor cores to run faster than marked frequency in specific condition. The default value is [Enabled].

1-Core Ratio Limit

Program highest CPU Ratio used by Turbo Mode for 1-Core Ratio Limit.

2-Core Ratio Limit

Program highest CPU Ratio used by Turbo Mode for 2-Core Ratio Limit.

3-Core Ratio Limit

Program highest CPU Ratio used by Turbo Mode for 3-Core Ratio Limit.

4-Core Ratio Limit

Program highest CPU Ratio used by Turbo Mode for 4-Core Ratio Limit.

TDC Limit value

Program the TDC (current) limit for Turbo Mode so that the processor does not throttle at peak performance conditions.

TDP Limit value

Program the TDP (power) limit for Turbo Mode so that the processor does not throttle at peak performance conditions.

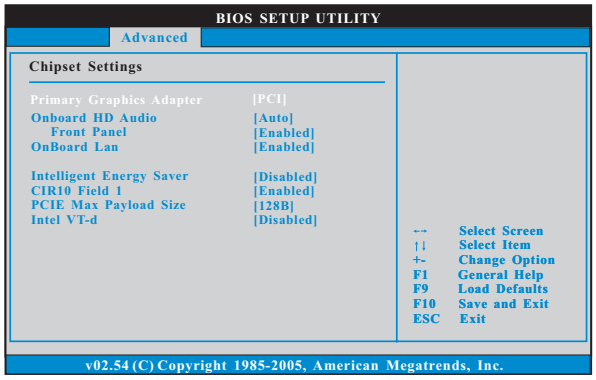
Intel (R) C-STATE tech.

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.

C State package limit setting

Selected option will program into C State package limit register. This item appears only when you set the item Intel (R) C-STATE tech. to [Enabled]. Configuration options: [Auto], [C3] and [C6]. The default value is [Auto].

3.4.2Chipset Configuration



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.

OnBoard Lan

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

Intelligent Energy Saver

Intelligent Energy Saver is a revolutionary technology that delivers unparalleled power savings. The default value is [Disabled]. Configuration options: [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.

CIR10 Field 1

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

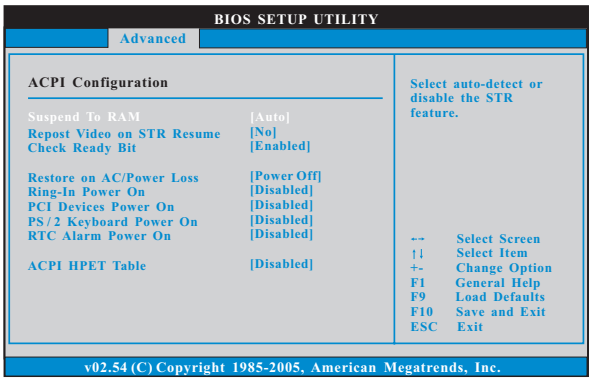
PCIE Max Payload Size

This determines the maximum TLP (Transaction Layer Packet) payload size that can be supported by PCI Express controller. Configuration options: [128B] and [256B]. The default value is [128B].

Intel VT-d

Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is [Disabled].

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.)

Check Ready Bit

Use this item to enable or disable the feature Check Ready Bit.

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.

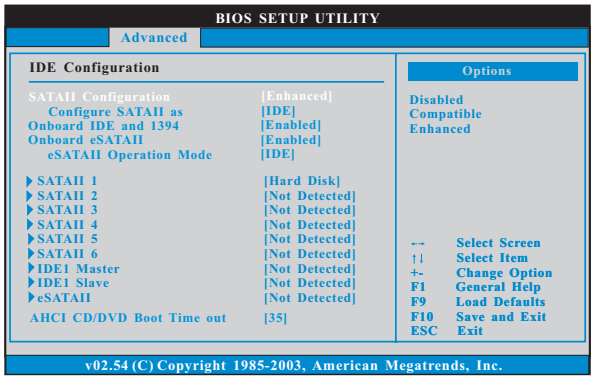
RTC Alarm Power On

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.

3.4.4IDE Configuration



SATAII Configuration

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

If you select [RAID] or [AHCI] mode, the options "Hot Plug" and "SATA Link Power Management" will appear.

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 and 1394

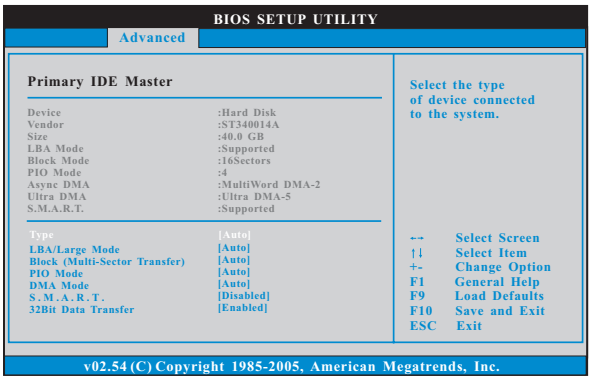
Use this item to enable or disable onboard IDE and 1394. The default value is [Enabled].

Onboard eSATAII

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

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].

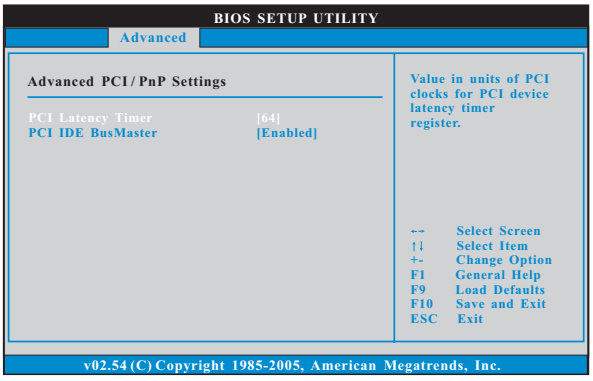
32-Bit Data Transfer

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].

3.4.5PCIPnP Configuration



PCI Latency Timer

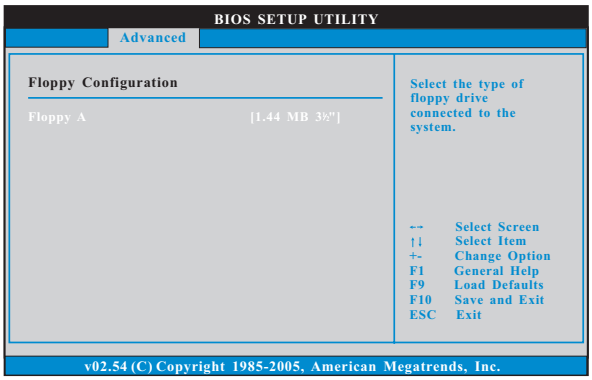
The default value is 32. It is recommended to keep the default value unless the installed PCI expansion cards' specifications require other settings.

PCI IDE BusMaster

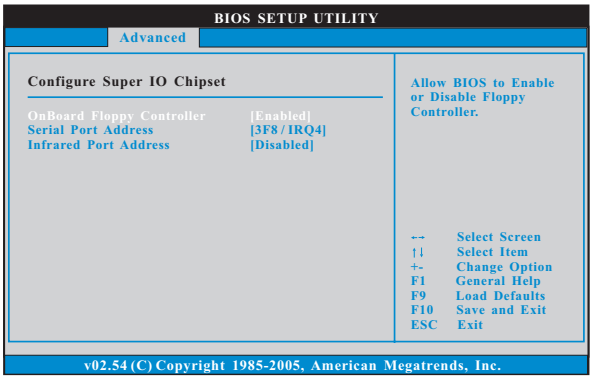
Use this item to enable or disable the PCI IDE BusMaster feature.

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.

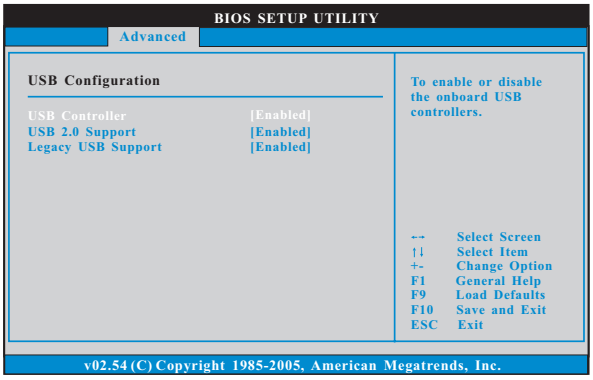
Configuration options: [Disabled], [3F8 / IRQ4], [2F8 / IRQ3], [3E8 / IRQ4], [2E8 / IRQ3].

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].

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.

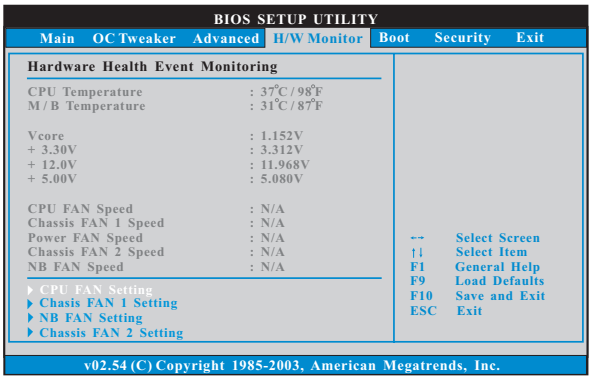
[Auto] - Enables legacy support if USB devices are connected.

[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 1 Setting

This allows you to set the chassis fan 1 speed. Configuration options: [Full On] and [Manual mode]. The default is value [Full On].

NB FAN Setting

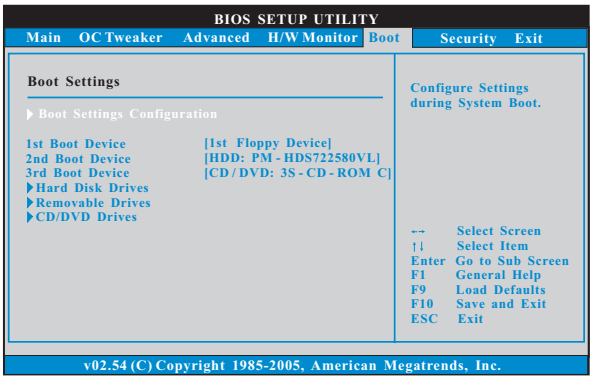
This allows you to set the NB fan speed. Configuration options: [Full On] and [Manual mode]. The default is value [Full On].

Chassis FAN 2 Setting

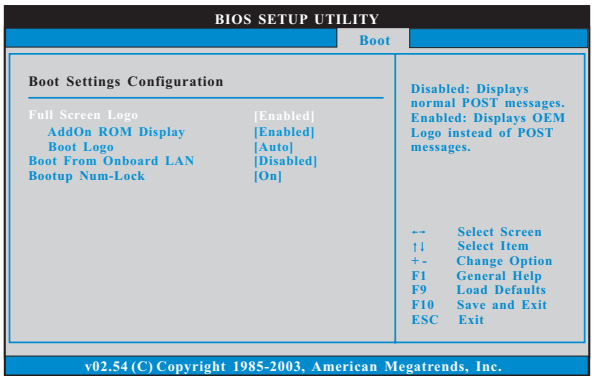
This allows you to set the chassis fan 2 speed. Configuration options: [Full On] and [Manual mode]. The default is value [Full On].

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

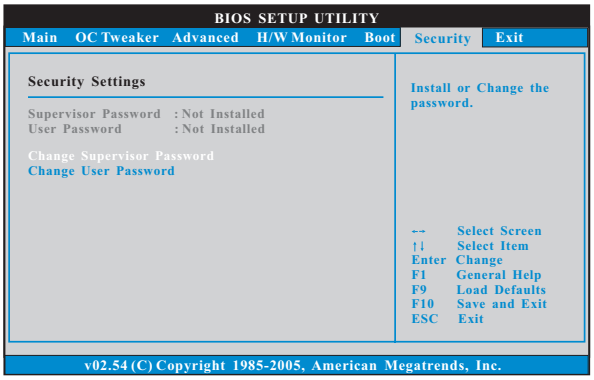
Use this item to enable or disable the Boot From Onboard LAN feature.

Boot Up Num-Lock

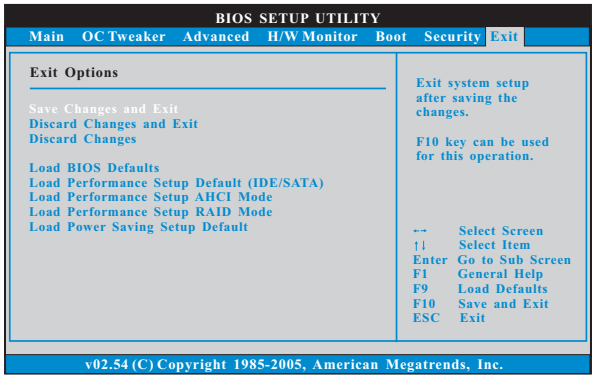
If this item is set to [On], it will automatically activate the Numeric Lock function after boot-up.

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 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 Performance Setup RAID Mode

This performance setup RAID mode may not be compatible with all system configurations. If system boot failure occurs after loading, please resume optimal default settings. F4 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.

Chapter 4: Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® operating systems: 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.