M3A790GXH/USB3

User Manual

Version 1.0

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FC

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(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"

ASRock Website: http://www.asrock.com

Contents

1. Introduction

Thank you for purchasing ASRock **M3A790GXH/USB3** 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 **M3A790GXH/USB3** Motherboard
    (ATX Form Factor: 12.0-in x 8.8-in, 30.5 cm x 22.4 cm)
ASRock **M3A790GXH/USB3** Quick Installation Guide
ASRock **M3A790GXH/USB3** Support CD
1 x Ultra ATA 66/100/133 IDE Ribbon Cable (80-conductor)
1 x Ribbon Cable for a 3.5-in Floppy Drive
4 x Serial ATA (SATA) Data Cables (Optional)
1 x Serial ATA (SATA) HDD Power Cable (Optional)
1 x I/O Panel Shield
1 x ASRock SLI/XFire Switch Card
1 x ASRock USB 3.0 Card (Optional)

1.2 Specifications

Platform	- ATX Form Factor: 12.0-in x 8.8-in, 30.5 cm x 22.4 cm - All Solid Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors)
CPU	- Support for Socket AM3 processors: AMD Phenom™ II X4 / X3 / X2 (except 920 / 940) / Athlon II X4 / X3 / X2 / Sempron processors - Supports CPU up to 140W - Supports AMD OverDrive™ with ACC feature (Advanced Clock Calibration) - AMD LIVE!™ Ready - Supports AMD's Cool 'n' Quiet™ Technology - FSB 2600 MHz (5.2 GT/s) - Supports Untied Overclocking Technology (see **CAUTION 1**) - Supports Hyper-Transport 3.0 (HT 3.0) Technology
Chipset	- Northbridge: AMD 790GX - Southbridge: AMD SB750
Memory	- Dual Channel DDR3 Memory Technology (see **CAUTION 2**) - 4 x DDR3 DIMM slots - Support DDR3 1600(OC)/1333/1066/800 non-ECC, un-buffered memory (see **CAUTION 3**) - Max. capacity of system memory: 16GB (see **CAUTION 4**)
Expansion Slot	- 3 x PCI Express 2.0 x16 slots (blue: single at x16 or dual at x8/x8 mode; white: x4 mode) - 1 x PCI Express 2.0 x1 slot - 2 x PCI slots - Supports ATI™ Quad CrossFireX™, 3-Way CrossFireX™, CrossFireX™ and Hybrid CrossFireX™ (see **CAUTION 5**)
Graphics	- Integrated AMD Radeon HD 3300 graphics - DX10 class iGPU, Pixel Shader 4.0 - Max. shared memory 512MB (see **CAUTION 6**) - Built-in 128MB DDR3 1333(OC)/1200MHz SidePort Memory - Three VGA Output options: D-Sub, DVI-D and HDMI - Supports HDMI Technology with max. resolution up to 1920x1200 (1080P) - Supports Dual-link DVI with max. resolution up to 2560x1600 @ 75Hz - Supports D-Sub with max. resolution up to 2048x1536 @ 60Hz - Supports HDCP function

	- Supports Full HD 1080p Blu-ray (BD) / HD-DVD playback
Audio	- 7.1 CH HD Audio with Content Protection
	- DAC with 110dB dynamic range (ALC890 Audio Codec)
	- DTS (Digital Theater Systems) support (see **CAUTION 7**)
	- Premium Blu-ray audio support
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 Keyboard Port
	- 1 x VGA/D-Sub Port
	- 1 x VGA/DVI-D Port
	- 1 x HDMI Port
	- 1 x Optical SPDIF Out Port
	- 1 x IEEE 1394 Port
	- 1 x eSATAII Port
	- 6 x Ready-to-Use USB 2.0 Ports
	- 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED)
	- HD Audio Jack: Side Speaker/Rear Speaker/Central/Bass/
	Line in/Front Speaker/Microphone (see **CAUTION 8**)
Connector	- 6 x Serial ATAII 3.0Gb/s connectors, support RAID (RAID 0,
	RAID 1, RAID 5, RAID 10 and JBOD), NCQ, AHCI and "Hot Plug"
	functions (see **CAUTION 9**)
	- 1 x eSATAII 3.0Gb/s connector (shared with 1 SATAII
	connector) (see **CAUTION 10**)
	- 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 IEEE 1394 header
	- 1 x HDMI_SPDIF header
	- CPU/Chassis/NB/Power FAN connector
	- 24 pin ATX power connector
	- 8 pin 12V power connector
	- SLI/XFIRE power connector
	- CD in header
	- Front panel audio connector
	- 3 x USB 2.0 headers (support 6 USB 2.0 ports)
	(see **CAUTION 11**)
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 Voltage Multi-adjustment
	- Supports Smart BIOS
Support CD	- Drivers, Utilities, AntiVirus Software (Trial Version), AMD OverDrive™ Utility, AMD Live! Explorer, AMD Fusion, ASRock Software Suite (CyberLink DVD Suite - OEM and Trial; Creative Sound Blaster X-Fi MB - Trial)

Unique Feature	- ASRock OC Tuner (see **CAUTION 12**)
	- Intelligent Energy Saver (see **CAUTION 13**)
	- Instant Boot
	- ASRock Instant Flash (see **CAUTION 14**)
	- ASRock OC DNA (see **CAUTION 15**)
	- Hybrid Booster:
	   - CPU Frequency Stepless Control (see **CAUTION 16**)
	   - ASRock U-COP (see **CAUTION 17**)
	   - 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, Vcore
OS	- Microsoft® Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP Media Center / XP 64-bit compliant
Certifications	- FCC, CE, Microsoft® WHQL Certificated - EuP Ready (EuP ready power supply is required) (see **CAUTION 18**)

* 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. This motherboard supports Untied Overclocking Technology. Please read "Un-tied Overclocking Technology" on page 55 for details.

2. This motherboard supports Dual Channel Memory Technology. Before you implement Dual Channel Memory Technology, make sure to read the installation guide of memory modules on page 18 for proper installation.

3. Whether 1600MHz memory speed is supported depends on the AM3 CPU you adopt. If you want to adopt DDR3 1600 memory module on this motherboard, please refer to the memory support list on our website for the compatible memory modules.
    ASRock website   http://www.asrock.com

4. Due to the operating system limitation, the actual memory size may be less than 4GB for the reservation for system usage under Windows® 7 / Vista™ / XP. For Windows® OS with 64-bit CPU, there is no such limitation.

5. If you want to use CrossFireX™ function, please follow the instructions on page 25 and 26 to reverse the direction of ASRock SLI/XFire Switch Card in advance.

6. The maximum shared memory size is defined by the chipset vendor and is subject to change. Please check AMD website for the latest information.

7. DTS (Digital Theater Systems) is a multi-channel digital surround sound format. To enable DTS function, you need to adjust the settings after audio driver installation. Please refer to "DTS Operation Guide" on page 53 for details.

8. For microphone input, this motherboard supports both stereo and mono modes. For audio output, this motherboard supports 2-channel, 4-channel, 6-channel, and 8-channel modes. Please check the table on page 15 for proper connection.

9. 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.

10. This motherboard supports eSATAII interface, the external SATAII specification. Please read "eSATAII Interface Introduction" on page 43 for details about eSATAII and eSATAII installation procedures.

11. Power Management for USB 2.0 works fine under Microsoft® Windows® 7 64-bit / 7 / Vista™ 64-bit / Vista™ / XP 64-bit / XP SP1 or SP2.

12. 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

13. Featuring an advanced proprietary hardware and software design, Intelligent Energy Saver is a revolutionary technology that delivers unparalleled power savings. The voltage regulator can reduce the number of output phases to improve efficiency when the CPU cores are idle. In other words, it is able to provide exceptional power saving and improve power efficiency without sacrificing computing performance.

To use Intelligent Energy Saver function, please enable Cool 'n' Quiet option in the BIOS setup in advance. Please visit our website for the operation procedures of Intelligent Energy Saver.
ASRock website: http://www.asrock.com

14. 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.

15. The software name itself – OC DNA literally tells you what it is capable of. OC DNA, an exclusive utility developed by ASRock, provides a convenient way for the user to record the OC settings and share with others. It helps you to save your overclocking record under the operating system and simplifies the complicated recording process of overclocking settings. With OC DNA, you can save your OC settings as a profile and share with your friends! Your friends then can load the OC profile to their own system to get the same OC settings as yours! Please be noticed that the OC profile can only be shared and worked on the same motherboard.

16. 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.

17. 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.

18. EuP, stands for Energy Using Product, was a provision regulated by European Union to define the power consumption for the completed system. According to EuP, the total AC power of the completed system shall be under 1.00W in off mode condition. To meet EuP standard, an EuP ready motherboard and an EuP ready power supply are required. According to Intel's suggestion, the EuP ready power supply must meet the standard of 5v standby power efficiency is higher than 50% under 100 mA current consumption. For EuP ready power supply selection, we recommend you checking with the power supply manufacturer for more details.

1.3　Two CrossFireX™ Graphics Card Support List

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

Chipset Vendor	Model Name	Chipset Name	Driver
ATI	MSI RX2600PRO-T2D256EZ	Radeon HD 2600PRO	Catalyst 8.9
	Gigabyte GV-RX26T256HP-B	Radeon HD 2600XT	Catalyst 8.9
	Powercolor AX3650 512MMD3-XP	RADEON 3650	Catalyst 8.9
	Gigabyte GV-RX385256H-B	RADEON 3850	Catalyst 8.9
	Powercolor AX3870 512MD4-H	RADEON 3870	Catalyst 8.9
	Powercolor AX3870X2 1GBD3-H *	RADEON 3870	Catalyst 8.9
	Gecube GC-HD485PG3-E3	RADEON 4850	Catalyst 8.9
	Powercolor AX4870 512MD5-H	RADEON 4870	Catalyst 8.9

* The PCI Express VGA card with * mark is supported under Windows® Vista™ /
   Vista™ 64-bit only.
* 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

1.4　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 8.12 + Hotfix
	Powercolor AX4870 512MD5-H	RADEON 4870	Catalyst 8.12 + Hotfix

* For the latest updates of the supported PCI Express VGA card list for 3-Way
   CrossFireX™ Mode, please visit our website for details.
   ASRock website: http://www.asrock.com/support/index.htm

1.5 Motherboard Layout
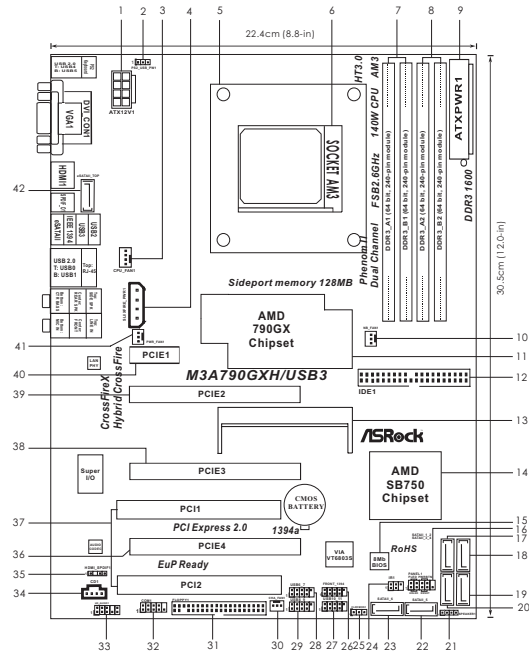
1	ATX 12V Power Connector (ATX12V1)	23	Sixth SATAII Connector
2	PS2_USB_PW1 Jumper		(SATAII_6, Blue)
3	CPU Fan Connector (CPU_FAN1)	24	Infrared Module Header (IR1)
4	SLI / XFIRE Power Connector	25	Clear CMOS Jumper (CLRCMOS1)
5	CPU Heatsink Retention Module	26	Front Panel IEEE 1394 Header
6	AM3 941-Pin CPU Socket		(FRONT_1394)
7	2 x 240-pin DDR3 DIMM Slots	27	USB 2.0 Header (USB10_11, Blue)
	(Dual Channel A: DDR3_A1, DDR3_B1; Blue)	28	USB 2.0 Header (USB6_7, Blue)
8	2 x 240-pin DDR3 DIMM Slots	29	USB 2.0 Header (USB8_9, Blue)
	(Dual Channel B: DDR3_A2, DDR3_B2; White)	30	Chassis Fan Connector (CHA_FAN1)
9	ATX Power Connector (ATXPWR1)	31	Floppy Connector (FLOPPY1)
10	North Bridge Fan Connector (NB_FAN1)	32	Serial Port Connector (COM1)
11	Northbridge Controller	33	Front Panel Audio Header
12	Primary IDE Connector (IDE1, Blue)		(HD_AUDIO1, White)
13	SLI/XFire Switch Card Retention Slot	34	Internal Audio Connector: CD1 (Black)
14	Southbridge Controller	35	HDMI_SPDIF Header
15	SPI Flash Memory (8Mb)		(HDMI_SPDIF1, White)
16	System Panel Header (PANEL1, White)	36	PCI Express 2.0 x16 Slot
17	Primary SATAII Connector (SATAII_1, Blue)		(PCIE4; White)
18	Secondary SATAII Connector (SATAII_2, Blue)	37	PCI Slots (PCI1- 2)
19	Fourth SATAII Connector (SATAII_4, Blue)	38	PCI Express 2.0 x16 Slot (PCIE3; Blue)
20	Third SATAII Connector (SATAII_3, Blue)	39	PCI Express 2.0 x16 Slot (PCIE2; Blue)
21	Chassis Speaker Header	40	PCI Express 2.0 x1 Slot (PCIE1; White)
	(SPEAKER 1, White)	41	Power Fan Connector (PWR_FAN1)
22	Fifth SATAII Connector (SATAII_5, Blue)	42	eSATAII Connector (eSATAII_TOP)

1.6   I/O Panel
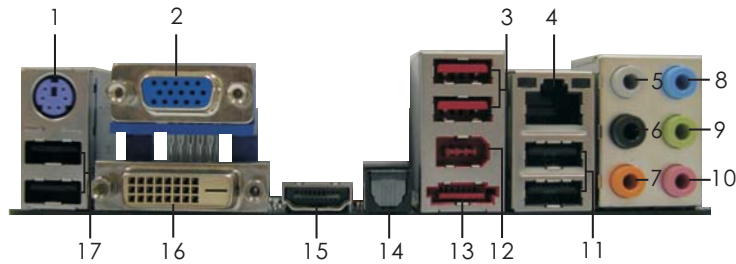
1	**PS/2 Keyboard Port (Purple)**
2	**VGA/D-Sub Port**
3	**USB 2.0 Ports (USB23)**
* 4	**LAN RJ-45 Port**
5	**Side Speaker (Gray)**
6	**Rear Speaker (Black)**
7	**Central / Bass (Orange)**
8	**Line In (Light Blue)**
** 9	**Front Speaker (Lime)**

10	**Microphone (Pink)**
11	**USB 2.0 Ports (USB01)**
12	**IEEE 1394 Port**
13	**eSATAII Port**
14	**Optical SPDIF Out Port**
*** 15	**HDMI Port**
16	**VGA/DVI-D Port**
17	**USB 2.0 Ports (USB45)**

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

LAN Port LED Indications

Activity/Link LED

Status	Description
Off	No Activity
Blinking	Data Activity

SPEED LED

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

ACT/LINK   SPEED
LED   LED

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. 9)	Rear Speaker (No. 6)	Central / Bass (No. 7)	Side Speaker (No. 5)
2	V	--	--	--
4	V	--	--	V
6	V	--	V	V
8	V	V	V	V

*** To support AC3 or DTS audio format with HDMI Audio under Vista™, please install the
HDMI audio driver in XP support CD AAX790H-10.
The driver is located under the path: **..\Drivers\NB Audio\REALTEK\XP64_XP(R1.68)**
And note for LPCM support up to stereo 2 channels only.

2. Installation

This is an ATX form factor (12.0-in x 8.8-in, 30.5 cm x 22.4 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Pre-installation Precautions

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

> 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.

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 anti-static pad or in the bag that comes with the component.
5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

2.1 CPU Installation

Step 1. Unlock the socket by lifting the lever up to a 90° angle.

Step 2. Position the CPU directly above the socket such that the CPU corner with the golden triangle matches the socket corner with a small triangle.

Step 3. Carefully insert the CPU into the socket until it fits in place.

> The CPU fits only in one correct orientation. DO NOT force the CPU into the socket to avoid bending of the pins.

Step 4. When the CPU is in place, press it firmly on the socket while you push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.

STEP 1:
Lift Up The Socket Lever
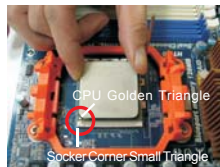
STEP 2 / STEP 3:
Match The CPU Golden Triangle To The Socket Corner Small Triangle

STEP 4:
Push Down And Lock The Socket Lever

2.2 Installation of CPU Fan and Heatsink

After you install the CPU into this motherboard, it is necessary to install a larger heatsink and cooling fan to dissipate heat. You also need to spray thermal grease between the CPU and the heatsink to improve heat dissipation. Make sure 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. 3). For proper installation, please kindly refer to the instruction manuals of the CPU fan and the heatsink.

2.3 Installation of Memory Modules (DIMM)

This motherboard provides four 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology. For dual channel configuration, you always need to install **identical** (the same brand, speed, size and chip-type) DDR3 DIMM pair in the slots of the same color. In other words, you have to install **identical** DDR3 DIMM pair in **Dual Channel A** (DDR3_A1 and DDR3_B1; Blue slots; see p.12 No.7) or **identical** DDR3 DIMM pair in **Dual Channel B** (DDR3_A2 and DDR3_B2; White slots; see p.12 No.8), so that Dual Channel Memory Technology can be activated. This motherboard also allows you to install four DDR3 DIMMs for dual channel configuration, and please install **identical** DDR3 DIMMs in all four slots. You may refer to the Dual Channel Memory Configuration Table below.

Dual Channel Memory Configurations

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

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

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

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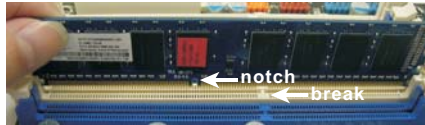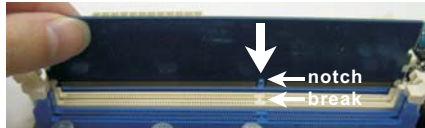
The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

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.

2.4 Expansion Slots (PCI and PCI Express Slots)

There are 2 PCI slots and 4 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 (PCIE x1 slot; White) is used for PCI Express cards with x1 lane width cards, such as Gigabit LAN card and SATA2 card.

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

PCIE3 (PCIE x16 slot; Blue) is used to install PCI Express graphics cards to support CrossFireX™ function.

PCIE4 (PCIE x16 slot; White) 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. If you plan to install only one PCI Express VGA card on this motherboard, please install it on PCIE2 slot. In this mode, you do not need to adjust the default setting of ASRock SLI/XFire Switch Card, and please do not remove or lose ASRock SLI/XFire Switch Card when it is still in working condition.

2. In CrossFireX™ mode, please reverse the direction of ASRock SLI/XFire Switch Card, and install PCI Express x16 graphics cards on PCIE2 and PCIE3 slots. Therefore, both these two slots will work at x8 bandwidth.

3. In 3-Way CrossFireX™ mode, please reverse the direction of ASRock SLI/XFire Switch Card, and install PCI Express x16 graphics cards on PCIE2, PCIE3 and PCIE4 slots. Therefore, PCIE2 and PCIE3 slots will work at x8 bandwidth while PCIE4 slot will work at x4 bandwidth.

PCIE2 / PCIE3 / SLI/XFire Switch Card Retention Slot Configurations

	PCIE2 Slot (Blue)	PCIE3 Slot (Blue)	SLI/XFire Switch Card Retention Slot
Single Graphics Card	PCIE x16	N/A	(Default)
Dual Graphics Cards in CrossFireX™ Mode	PCIE x8	PCIE x8	

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.

2.5 Dual Monitor and Surround Display Features

Dual Monitor Feature

This motherboard supports dual monitor feature. With the internal VGA output support (DVI-D, D-Sub and HDMI), you can easily enjoy the benefits of dual monitor feature without installing any add-on VGA card to this motherboard. This motherboard also provides independent display controllers for DVI-D, D-Sub and HDMI to support dual VGA output so that DVI-D, D-sub and HDMI can drive same or different display contents.

To enable dual monitor feature, please follow the below steps:

1. Connect DVI-D monitor cable to VGA/DVI-D port on the I/O panel, connect D-Sub monitor cable to VGA/D-Sub port on the I/O panel, and connect HDMI monitor cable to HDMI port on the I/O panel.

VGA/D-Sub port

VGA/DVI-D port   **HDMI port**
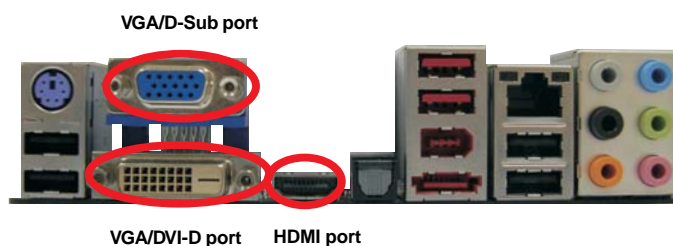
2. If you have installed onboard VGA driver from our support CD to your system already, you can freely enjoy the benefits of dual monitor function after your system boots. If you haven't installed onboard VGA driver yet, please install onboard VGA driver from our support CD to your system and restart your computer. Then you can start to use dual monitor function on this motherboard.

> 1. DVI-D and HDMI ports cannot function at the same time. When one of them is enabled, the other one will be disabled.
> 2. When you playback HDCP-protected video from Blu-ray (BD) or HD-DVD disc, the content will be displayed only in one of the two monitors instead of both monitors.

Surround Display Feature

This motherboard supports surround display upgrade. With the internal VGA output support (DVI-D, D-Sub and HDMI) and external add-on PCI Express VGA cards, you can easily enjoy the benefits of surround display feature.

Please refer to the following steps to set up a surround display environment:

1. Refer to page 23 and 24 to reverse the direction of ASRock SLI/XFire Switch Card.

2. Install the ATI™ PCI Express VGA cards on PCIE2, PCIE3 and PCIE4 slots. Please refer to page 19 for proper expansion card installation procedures for details.

3. Connect DVI-D monitor cable to VGA/DVI-D port on the I/O panel, connect D-Sub monitor cable to VGA/D-Sub port on the I/O panel, and connect HDMI monitor cable to HDMI port on the I/O panel. Then connect other monitor cables to the corresponding connectors of the add-on PCI Express VGA cards on PCIE2, PCIE3 and PCIE4 slots.

4. Boot your system. Press <F2> to enter BIOS setup. Enter "Share Memory" option to adjust the memory capability to [32MB], [64MB], [128MB] [256MB] or [512MB] to enable the function of VGA/D-sub. Please make sure that the value you select is less than the total capability of the system memory. If you do not adjust the BIOS setup, the default value of "Share Memory", [Auto], will disable VGA/D-Sub function when the add-on VGA card is inserted to this motherboard.

5. Install the onboard VGA driver and the add-on PCI Express VGA card driver to your system. If you have installed the drivers already, there is no need to install them again.

6. Set up a multi-monitor display.

For Windows® XP / XP 64-bit OS:

Right click the desktop, choose "Properties", and select the "Settings" tab so that you can adjust the parameters of the multi-monitor according to the steps below.

A. Click the "Identify" button to display a large number on each monitor.

B. Right-click the display icon in the Display Properties dialog that you wish to be your primary monitor, and then select "Primary". When you use multiple monitors with your card, one monitor will always be Primary, and all additional monitors will be designated as Secondary.

C. Select the display icon identified by the number 2.

D. Click "Extend my Windows desktop onto this monitor".

E. Right-click the display icon and select "Attached", if necessary.

F. Set the "Screen Resolution" and "Color Quality" as appropriate for the second monitor. Click "Apply" or "OK" to apply these new values.

G. Repeat steps C through E for the diaplay icon identified by the number one, two, three, four, five, six, seven and eight.

For Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS:

Right click the desktop, choose "Personalize", and select the "Display Settings" tab so that you can adjust the parameters of the multi-monitor according to the steps below.

A. Click the number "2" icon.

B. Click the items "This is my main monitor" and "Extend the desktop onto this monitor".

C. Click "OK" to save your change.

D. Repeat steps A through C for the display icon identified by the number three, four, five, six, seven and eight.

6. Use Surround Display. Click and drag the display icons to positions representing the physical setup of your monitors that you would like to use. The placement of display icons determines how you move items from one monitor to another.

HDCP Function

HDCP function is supported on this motherboard. To use HDCP function with this motherboard, you need to adopt the monitor that supports HDCP function as well. Therefore, you can enjoy the superior display quality with high-definition HDCP encryption contents. Please refer to below instruction for more details about HDCP function.

What is HDCP?

HDCP stands for High-Bandwidth Digital Content Protection, a specification developed by Intel® for protecting digital entertainment content that uses the DVI interface. HDCP is a copy protection scheme to eliminate the possibility of intercepting digital data midstream between the video source, or transmitter - such as a computer, DVD player or set-top box - and the digital display, or receiver - such as a monitor, television or projector. In other words, HDCP specification is designed to protect the integrity of content as it is being transmitted.

Products compatible with the HDCP scheme such as DVD players, satellite and cable HDTV set-top-boxes, as well as few entertainment PCs requires a secure connection to a compliant display. Due to the increase in manufacturers employing HDCP in their equipment, it is highly recommended that the HDTV or LCD monitor you purchase is compatible.

2.6 CrossFireX™ and 3-Way CrossFireX™ Operation Guide

This motherboard supports CrossFireX™ and 3-Way CrossFireX™ feature. CrossFireX™ and 3-Way CrossFireX™ technology offer 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™ and 3-Way CrossFireX™ enable 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 / Vista™ / 7 OS, and 3-Way CrossFireX™ feature is supported with Windows® Vista™ / 7 OS. Please check AMD website for ATI™ CrossFireX™ and 3-Way 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 CrossFire™ Edition card with a 16-pipe card, both cards will operate as 12-pipe cards while in CrossFireX™ mode.

2.6.1 Graphics Card Setup

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

Step 2. To change it to CrossFireX™ mode, you need to reverse the direction of ASRock SLI/XFire Switch Card. Please simultaneously pull open both the retention arms that hold the card in position. The card itself will spring away from the retention slot. Take it out gently by holding its edges, and keep away from touching the connectors (Golden Fingers).
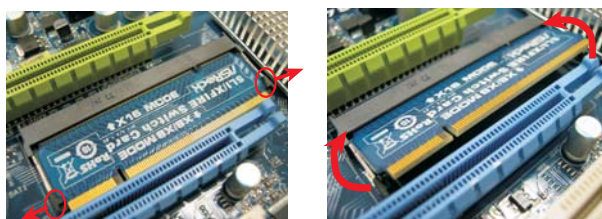
Step 3. Reverse the card direction so as to have the "X8 / X8 MODE" wording side toward the retention slot base. Insert the card into the bottom of the base.

Step 4. Push the card down into the retention slot till both the retention arms firmly hold the card into position. Also, keep away from touching the connectors (Golden Fingers).
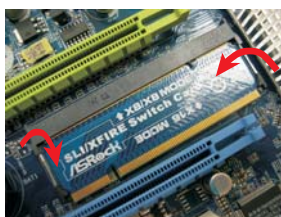
Step 5. Install one Radeon graphics card to PCIE2 slot. For the proper installation procedures, please refer to section "Expansion Slots".

Step 6.   Install one Radeon graphics card to PCIE3 slot. For the proper installation procedures, please refer to section "Expansion Slots".

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

CrossFire™ Bridge

Step 8.   Connect the DVI monitor cable to the DVI connector on the Radeon graphics card on PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.)
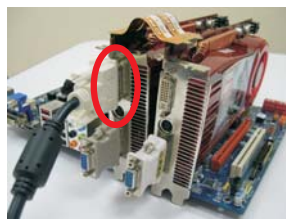
Step 9.   Connect a 4-pin ATX power cable to SLI/XFIRE power connector.

2.6.1.2 Installing Three CrossFireX™-Ready Graphics Cards

Step 1. Follow step 1 to 4 on page 23 and 24 to reverse the direction of ASRock SLI/XFire Switch Card.

Step 2. Install one Radeon graphics card to PCIE2 slot. For the proper installation procedures, please refer to section "Expansion Slots".

Step 3. Install one Radeon graphics card to PCIE3 slot. For the proper installation procedures, please refer to section "Expansion Slots".

Step 4. Install one Radeon graphics card to PCIE4 slot. For the proper installation procedures, please refer to section "Expansion Slots".

Step 5. Use one CrossFire™ Bridge to connect Radeon graphics cards on PCIE2 and PCIE3 slots, and use the other CrossFire™ Bridge to connect Radeon graphics cards on PCIE3 and PCIE4 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
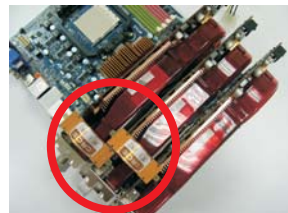
Step 6. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card on PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.)
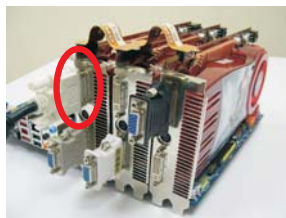
Step 7. Connect a 4-pin ATX power cable to SLI/XFIRE power connector.

2.6.2 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® 7 / 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.

ATI Catalyst Control Center

Step 6.   Double-click "ATI Catalyst Control Center". Click "View", select "CrossFireX™", and then check the item "Enable CrossFireX™". Select "2 GPUs" and click "Apply" (if you install two Radeon graphics cards). Select "3 GPUs" and click "OK" (if you install three Radeon graphics cards).

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™ or 3-Way 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.

2.7 Hybrid CrossFireX™ Operation Guide

This motherboard supports ATI™ Hybrid CrossFireX™ feature. ATI™ Hybrid CrossFireX™ brings multi-GPU performance capabilities by enabling an AMD 790GX integrated graphics processor and a discrete graphics processor to operate simultaneously with combined output to a single display for blisteringly-fast frame rates. Currently, ATI™ Hybrid CrossFireX™ Technology is only supported with Windows® Vista™ / 7 OS, and is not available with Windows® XP OS. In the future, ATI™ Hybrid CrossFireX™ may be supported with Windows® XP OS. Please visit our website for updated information.

What does an ATI™ Hybrid CrossFireX™ system include?

An ATI™ Hybrid CrossFireX™ system includes an ATI™ Radeon™ 2400 or ATI™ Radeon™ 3450 series graphics processor and a motherboard based on an AMD 790GX integrated chipset, all operating in a Windows® Vista™ environment. Please refer to below PCI Express graphics card support list for ATI™ Hybrid CrossFireX™. For the future update of more compatible PCI Express graphics cards, please visit our website for further information.

Vendor	Chipset	Model	Driver
ATI	RADEON X2400PRO	MSI RX2400 PRO-TD256EH	Catalyst 8.9
	RADEON HD2400XT *	POWERCOLOR HD2400 XT 256MB DDR3	Catalyst 8.9
	RADEON HD3450	POWERCOLOR AX3450 256MD2-S	Catalyst 8.9

* Please visit our website for the future driver update and the latest information.

Enjoy the benefit of Hybrid CrossFireX™

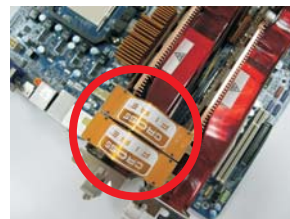Step 1.   Keep ASRock SLI/XFire Switch Card at the default mode (x16).

Step 2.   Install one compatible PCI Express graphics card to PCIE2 slot. For the proper installation procedures, please refer to section "Expansion Slots".

Step 3.   Connect the monitor cable to the correspondent connector on the PCI Express graphics card on PCIE2 slot.

Step 4.   Boot your system. Press <F2> to enter BIOS setup. Enter "Advanced" screen, and enter "Chipset Settings". Then set the option "Surround View" to [Enabled].

Step 5.   Boot into OS. Please remove the ATI™ driver if you have any VGA driver installed in your system.

Step 6.   Install the onboard VGA driver from our support CD to your system for both the onboard VGA and the discrete graphics card.

Step 7.   Restart your computer. Then you will find "ATI Catalyst Control Center" on your Windows® taskbar.

ATI Catalyst Control Center

Step 8. Double-click "ATI Catalyst Control Center". Click "View", click "CrossFire™",
and then select the option "Enable CrossFire™".
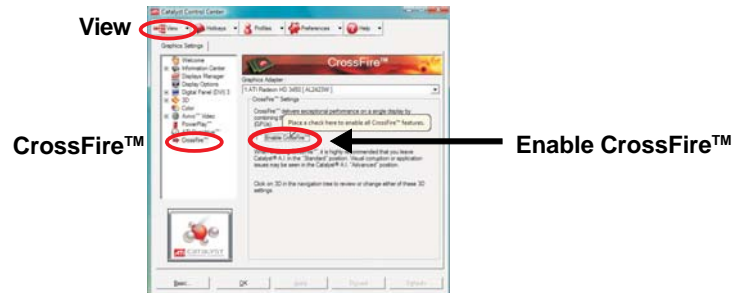
Step 9. Click "Yes" to continue.
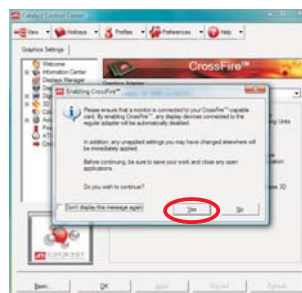
Step 10. Click "OK" to save your change.
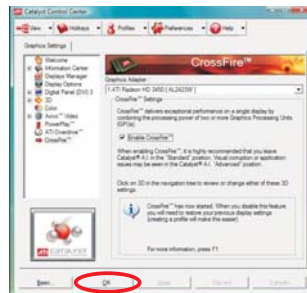
Step 11. Reboot your system. Then you can freely enjoy the benefit of Hybrid™
CrossFireX™ feature.

 * Hybrid 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™ Hybrid CrossFireX™ technology, please check AMD website
    for up dates and details.

2.8 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		
PS2_USB_PW1 (see p.12, No. 2)	1_2 +5V	2_3 +5VSB	Short pin2, pin3 to enable +5VSB (standby) for PS/2 or USB wake up events.

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

Clear CMOS Jumper (CLRCMOS1) (see p.12, No. 25)	1_2 Default	2_3 Clear CMOS	

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

2.9 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!

Floppy Connector
(33-pin FLOPPY1)
(see p.12 No. 31)

Pin1   FLOPPY1

the red-striped side to Pin1

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. 12)

PIN1   IDE1
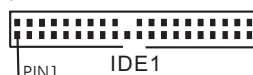
connect the blue end to the motherboard

connect the black end to the IDE devices

80-conductor ATA 66/100/133 cable

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

Serial ATAII Connectors
(SATAII_1: see p.12, No. 17)
(SATAII_2: see p.12, No. 18)
(SATAII_3: see p.12, No. 20)
(SATAII_4: see p.12, No. 19)
(SATAII_5: see p.12, No. 22)
(SATAII_6: see p.12, No. 23)

SATAII_1   SATAII_2

SATAII_3   SATAII_4
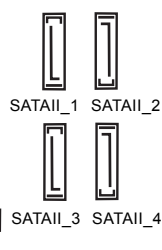
SATAII_6   SATAII_5

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

SATAII_6 connector can be used for internal storage device or be connected to eSATAII connector to support eSATAII device. Please read "eSATAII Interface Introduction" on page 43 for details about eSATAII and eSATAII installation procedures.

eSATAII Connector
(eSATAII_TOP: see p.12, No. 41)

eSATAII_TOP

This eSATAII connector supports SATA data cable for external SATAII function. The current eSATAII 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. You can also use the SATA data cable to connect SATAII_6 connector and eSATAII connector.
Serial ATA (SATA) Power Cable (Optional) connect to the SATA HDD power connector connect to the power supply		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.
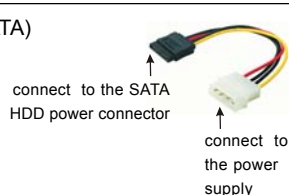
USB 2.0 Headers (9-pin USB10_11) (see p.12 No. 27)	USB_PWR P-11 P+11 GND DUMMY GND P+10 P-10 USB_PWR	Besides six default USB 2.0 ports on the I/O panel, there are three USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.
(9-pin USB8_9) (see p.12 No. 29)	USB_PWR P-9 P+9 GND DUMMY GND P+8 P-8 USB_PWR	
(9-pin USB6_7) (see p.12 No. 28)	USB_PWR P-7 P+7 GND DUMMY GND P+6 P-6 USB_PWR	
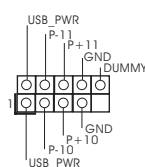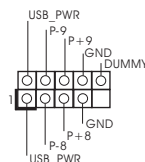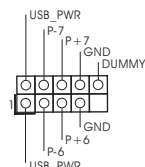
Infrared Module Header (5-pin IR1) (see p.12 No. 24)	IRTX +5V DUMMY GND IRRX	This header supports an optional wireless transmitting and receiving infrared module.
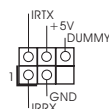
Internal Audio Connectors (4-pin CD1) (CD1: see p.12 No. 34)	CD1 CD-R GND GND CD-L	This connector allows you to receive stereo audio input from sound sources such as a CD-ROM, DVD-ROM, TV tuner card, or MPEG card.
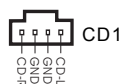
Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.12, No. 33)

GND
PRESENCE#
MIC_RET
OUT_RET

1

OUT2_L
J_SENSE
OUT2_R
MIC2_R
MIC2_L
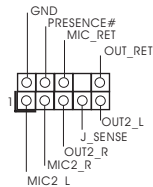
This is an interface for the front panel audio cable that allows convenient connection and control of audio devices.

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® 7 / 7 64-bit / 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® 7 / 7 64-bi / 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. 16)

PLED+
PLED-
PWRBTN#
GND

1

DUMMY
RESET#
GND
HDLED-
HDLED+
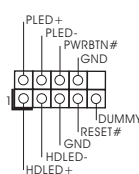
This header accommodates several system front panel functions.

Chassis Speaker Header

(4-pin SPEAKER 1)

(see p.12 No. 21)

SPEAKER
DUMMY
DUMMY
+5V
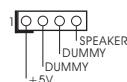
Please connect the chassis speaker to this header.

Chassis, NB and Power Fan Connectors

(3-pin CHA_FAN1)

(see p.12 No. 30)

GND
+12V
CHA_FAN_SPEED
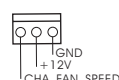
Please connect the fan cables to the fan connectors and match the black wire to the ground pin.

(3-pin NB_FAN1)

(see p.12 No. 10)

NB_FAN_SPEED
+12V
GND
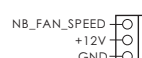
(3-pin PWR_FAN1)

(see p.12 No. 41)

PWR_FAN_SPEED
+12V
GND

CPU Fan Connector

(4-pin CPU_FAN1)

(see p.12 No. 3)

FAN_SPEED_CONTROL 4
CPU_FAN_SPEED 3
+12V 2
GND 1
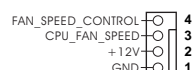
Please connect the CPU fan cable to this connector and match the black wire to the ground pin.

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. 9)

12   24

1   13
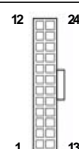
Please connect an ATX power supply to this connector.

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

12   24

1   13
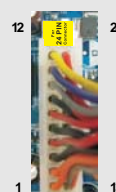
ATX 12V Power Connector

(8-pin ATX12V1)

(see p.12 No. 1)

4   8

1   5

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   8

For
8 PIN
12V Power
Connector

4-Pin ATX 12V Power Supply Installation   1   5

SLI/XFIRE Power Connector

(4-pin SLI/XFIRE_PWR1)

(see p.12 No. 4)

SLI/XFIRE_POWER1

It is not necessary to use this connector, but please connect it with a hard disk power connecor when two graphics cards are plugged to this motherboard at the same time.

IEEE 1394 Header

(9-pin FRONT_1394)

(see p.12 No. 26)

RXTPAM_0
GND
RXTPBM_0
+12V
GND

1

+12V
RXTPBP_0
GND
RXTPAP_0
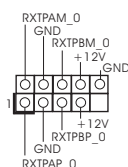
Besides one default IEEE 1394 port on the I/O panel, there is one IEEE 1394 header (FRONT_1394) on this motherboard. This IEEE 1394 header can support one IEEE 1394 port.

Serial port Header

(9-pin COM1)

(see p.12 No.32)

RRXD1
DDTR#1
DDSR#1
CCTS#1

1

RRI#1
RRTS#1
GND
TTXD1
DDCD#1
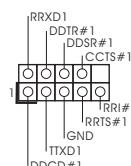
This COM1 header supports a serial port module.

HDMI_SPDIF Header

(3-pin HDMI_SPDIF1)

(see p.12 No. 35)

1

GND
SPDIFOUT
+5V

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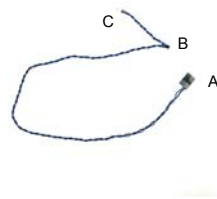
Please connect the black end (A) of HDMI_SPDIF cable to the HDMI_SPDIF header on the motherboard. Then connect the white end (B or C) of HDMI_SPDIF cable to the HDMI_SPDIF connector of HDMI VGA card.

A. black end

+5V
SPDIFOUT — blue
GND — black

B. white end (2-pin)

SPDIFOUT — blue
GND — black

C. white end (3-pin)

SPDIFOUT — blue
GND — black
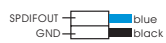
2.10 HDMI_SPDIF Header Connection Guide

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

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

Step 2.   Connect the black end (A) of HDMI_SPDIF cable to the HDMI_SPDIF header (HDMI_SPDIF1, white, see page 12, No. 35) 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 37. 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)
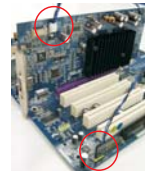
> Please do not connect the white end of HDMI_SPDIF cable to the wrong connector of HDMI VGA card or other VGA card. Otherwise, the motherboard and the VGA card may be damaged. For example, this picture shows the wrong example of connecting HDMI_SPDIF cable to the fan connector of PCI Express VGA card. 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.

2.11 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.

2.12 eSATAII Interface Introduction

What is eSATAII?

This motherboard supports eSATAII interface, the external SATAII specification. eSATAII allows you to enjoy the SATAII function provided by the I/O of your computer, offering the high speed data transfer rate up to 3.0Gb/s, and the convenient mobility like USB. eSATAII is equipped with Hot Plug capability that enables you to exchange drives easily. For example, with eSATAII interface, you may simply plug your eSATAII hard disk to the eSATAII ports instead of opening your chassis to exchange your SATAII hard disk. Currently, on the market, the data transfer rate of USB 2.0 is up to 480Mb/s, and for IEEE 1394 is up to 400Mb/s. However, eSATAII provides the data transfer rate up to 3000Mb/s, which is much higher than USB 2.0 and IEEE 1394, and still keeps the convenience of Hot Plug feature. Therefore, on the basis of the advantageous transfer speed and the facilitating mobile capability, in the near future, eSATAII will replace USB 2.0 and IEEE 1394 to be a trend for external interface.

NOTE:

1. If you set "SATA Operation Mode" option in BIOS setup to AHCI or RAID mode, Hot Plug function is supported with eSATAII devices. Therefore, you can insert or remove your eSATAII devices to the eSATAII ports while the system is power-on and in working condition.

2. If you set "SATA Operation Mode" option in BIOS setup to IDE mode, Hot Plug function is not supported with eSATAII devices. If you still want to use eSATAII function in IDE mode, please insert or remove your eSATAII devices to the eSATAII ports only when the system is power-off.

3. If you want to use the eSATAII HDD as an OS disk, please set "SATA Operation Mode" option in BIOS setup to IDE mode. If you want to use the eSATAII HDD as a removable data disk, please set "SATA Operation Mode" option in BIOS setup to RAID mode. If you want to add the eSATAII HDD as a RAID disk, please set "SATA Operation Mode" option in BIOS setup to RAID mode.

4. Please do not configure your eSATAII HDD as a RAID disk; otherwise, it may affect the Hot Plug function that eSATAII HDD should have.

5.

How to install eSATAII?
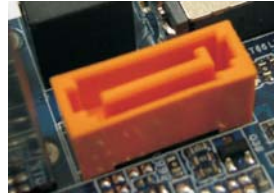
SATAII_6   eSATAII_TOP

1. In order to enable the eSATAII port of the I/O shield, you need to connect the SATAII connector (SATAII_6; see p.12 No.23) and the eSATAII connector (eSATAII_TOP; see p.12 No.42) with a SATA data cable first.

Connect the SATA data Cable to the SATAII connector (SATAII_6)

Connect the SATA data cable to the eSATAII connector (eSATAII_TOP)

2. Use the eSATAII device cable to connect eSATAII device and the eSATAII port of the I/O shield.

Connect one end of the eSATAII device cable to eSATAII device

Connect the other end of the eSATAII device cable to eSATAII port of the I/O shield

Comparison between eSATAII and other devices

IEEE 1394	400Mb/s
USB 2.0	480Mb/s
SATA	1.5Gb/s (1500Mb/s)
eSATAII/SATAII	3.0Gb/s (3000Mb/s)
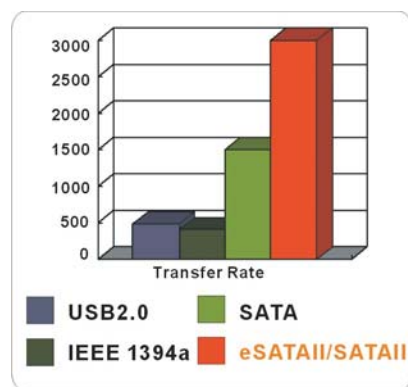
2.13 Serial ATA (SATA) / Serial ATAII (SATAII) Hard Disks Installation

This motherboard adopts AMD SB750 south bridge chipset that supports Serial ATA (SATA) / Serial ATAII (SATAII) hard disks and RAID (RAID 0, RAID 1, RAID 5, RAID 10 and JBOD) 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.

> If you plan to use RAID 0 or RAID 1 function, you need to install at least 2 SATA / SATAII hard disks. If you plan to use RAID 5 function, you need to install 3 SATA / SATAII hard disks. If you plan to use RAID 10 function, you need to install 4 SATA / SATAII hard disks.

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

This motherboard supports Hot Plug and Hot Swap functions for SATA / SATAII Devices in RAID / AHCI mode. AMD SB750 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. AHCI also provides usability enhancements such as Hot Plug.

> **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 RAID 1 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.

2.15 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)   B. SATA power cable
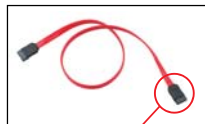
SATA 7-pin connector

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.

SATA power cable 1x4-pin power connector (White)
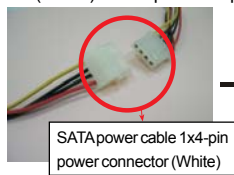
Step **3** Connect SATA 15-pin power cable connector (Black) end to SATA / SATAII HDD.

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.

2.16 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.

2.17 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit With RAID Functions

If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit on a RAID disk composed of 2 or more SATA / SATAII HDDs with RAID functions, please follow below procedures according to the OS you install.

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

If you want to install Windows® XP / XP 64-bit on a RAID disk composed of 2 or more SATA / SATAII HDDs with RAID functions, please follow below steps.

STEP 1: Set up BIOS.

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

B.   Set the "SATA Operation Mode" option to [RAID].

STEP 2: Make a SATA / SATAII Driver Diskette.

A.   Insert the ASRock 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, "Generate Serial ATA driver diskette [YN]?", press <Y>.

D.   Then you will see these messages,

> **Please insert a blank**
> **formatted diskette into floppy**
> **drive A:**
> **press any key to start**

Please insert a floppy diskette into the floppy drive, and press any key.

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 RAID function, you need to check the RAID installation guide in the Support CD for proper configuration. Please refer to the BIOS RAID installation guide part of the document in the following path in the Support CD:

.. \ RAID Installation Guide

STEP 4: Install Windows® XP / XP 64-bit OS on your system.

After step 1, 2, 3, you can start to install Windows® XP / XP 64-bit OS 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 AMD RAID driver. After reading the floppy disk, the driver will be presented. Select the driver to install according to the OS you install. (Select "AMD AHCI Compatible RAID Controller-x86 platform" for Windows® XP, or "AMD AHCI Compatible RAID Controller-x64 plat-form" for Windows® XP 64-bit.)

> NOTE. If you install Windows® XP / XP 64-bit on IDE HDDs and want to manage (create, convert, delete, or rebuild) RAID functions on SATA / SATAII HDDs, you still need to set up "SATA Operation Mode" to [RAID] first. Then, please set the RAID configuration by using the Windows RAID installation guide in the following path in the Support CD:
> **.. \ RAID Installation Guide**

2.17.2 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit With RAID Functions

If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on a RAID disk composed of 2 or more SATA / SATAII HDDs with RAID functions, please follow below steps.

STEP 1: Set up BIOS.

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

B.   Set the "SATA Operation Mode" option to [RAID].

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

Before you start to configure RAID function, you need to check the RAID installation guide in the Support CD for proper configuration. Please refer to the BIOS RAID installation guide part of the document in the following path in the Support CD:

.. \ RAID Installation Guide

STEP 3: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.

Insert the Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit optical disk into the optical drive to boot your system, and follow the instruction to install Windows® 7 / 7 64-bit / 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 AMD RAID drivers. AMD 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.

NOTE1. If you install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on IDE HDDs and want to manage (create, convert, delete, or rebuild) RAID functions on SATA / SATAII HDDs, you still need to set up "SATA Operation Mode" to [RAID] in BIOS first. Then, please set the RAID configuration by using the Windows RAID installation guide in the following path in the Support CD:

.. \ RAID Installation Guide

NOTE2. Currently, if you install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on IDE HDDs and there are no SATA / SATAII device used, please set up "SATA Operation Mode" to [IDE] in BIOS.

2.18 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit Without RAID Functions

If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit OS on your SATA / SATAII HDDs without RAID functions, please follow below procedures according to the OS you install.

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

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

Using SATA / SATAII HDDs and eSATAII devices with NCQ and Hot Plug functions

STEP 1: Set Up BIOS.
A.   Enter BIOS SETUP UTILITY → Advanced screen → Storage Configuration.
B.   Set the "SATA Operation Mode" option to [IDE].

STEP 2: Make a SATA / SATAII driver diskette.
Make a SATA / SATAII driver diskette by following section 2.17.1 step 2 on page 47.

STEP 3: Set Up BIOS.
A.   Enter BIOS SETUP UTILITY → Advanced screen → Storage Configuration.
B.   Set the "SATA Operation Mode" option to [AHCI].

STEP 4: Install Windows® XP / XP 64-bit OS on your system.
You can start to install Windows® XP / XP 64-bit OS 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 AMD AHCI driver. After reading the floppy disk, the driver will be presented. Select the driver to install according to the OS you install. (Select "AMD AHCI Compatible RAID Controller-x86 platform" for Windows® XP, or "AMD AHCI Compatible RAID Controller-x64 platform" for Windows® XP 64-bit.)

Using SATA / SATAII HDDs and eSATAII devices without NCQ and Hot Plug functions

STEP 1: Set up BIOS.
A.   Enter BIOS SETUP UTILITY → Advanced screen → Storage Configuration.
B.   Set the "SATA Operation Mode" option to [IDE].
STEP 2: Install Windows® XP / XP 64-bit OS on your system.

2.18.2 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit Without RAID Functions

If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on your SATA / SATAII HDDs without RAID functions, please follow below steps.

Using SATA / SATAII HDDs and eSATAII devices with NCQ and Hot Plug functions

STEP 1: Set Up BIOS.
A.   Enter BIOS SETUP UTILITY → Advanced screen → Storage Configuration.
B.   Set the "SATA Operation Mode" option to [AHCI].
STEP 2: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.
Insert the Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit optical disk into the optical drive to boot your system, and follow the instruction to install Windows® 7 / 7 64-bit / 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 AMD AHCI drivers. AMD 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 and eSATAII devices without NCQ and Hot Plug functions

STEP 1: Set up BIOS.
A.   Enter BIOS SETUP UTILITY → Advanced screen → Storage Configuration.
B.   Set the "SATA Operation Mode" option to [IDE].
STEP 2: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system.

2.19 DTS Operation Guide

DTS (Digital Theater Systems) is a multi-channel digital surround sound format to bring you a new class of entertainment experience by using home PCs. DTS makes audio tracks more closely match the original master recording than other digitally encoded soundtracks. Coupled with the multi-dimensional benefit of surround sound technology, the audio quality of DTS-format soundtracks and music mixes dramatically improves content.

Please follow below steps to enable DTS function:

1. Install the drivers to your system from ASRock support CD.

2. Reboot your system.

3. You will find the icon (Realtek HD Audio Manager) on the Windows® task bar.

4. Double-click this icon to open Realtek HD Audio Manager.

5. On the bottom of Realtek HD Audio Manager. You can find that the DTS Connect contains 2 elements: **DTS Neo: PC** and **DTS Interactive**. Click the button to enable or disable it.

DTS Neo: PC   **DTS Interactive**

DTS Neo: PC
DTS Neo: PC turns your stereo audio (WMA, MP3, CD and more) into a convincing 7.1-channel audio experience.

DTS Interactive
DTS Interactive provides a single cable connection to your DTS enabled surround sound system. Your stereo or multi-channel (up to 5.1) audio sources are re-encoded into a DTS audio signal and sent out from your PC to any DTS enabled system such as, powered PC speakers, an A/V receiver or any other DTS compatible surround sound system.

6. If you select **DTS Neo: PC**. You can click the icon (Detail Settings) to access advanced controls.
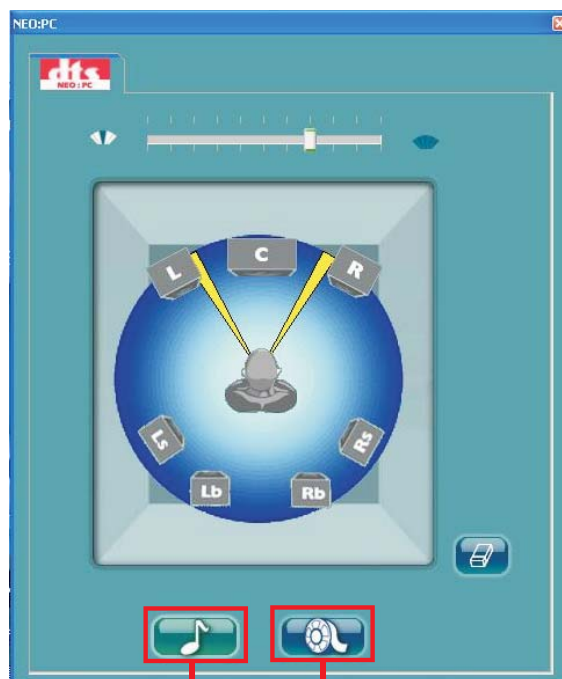
Music Mode Cinema Mode

Music Mode
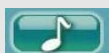
The music mode is for use with any stereo music recordings, which preserves the integrity of the stereo mix while augmenting it with a center channel to anchor the image, and deriving enough surround content to yield a spacious, three-dimensional listening experience. The Music mode includes the control that allows the sound to be tailored to room layout and personal preferences.

Cinema Mode

The Cinema mode is for use with stereo television shows and all programs encoded in DTS Surround. The result is enhanced soundfield directionality that approaches the quality of discrete 7.1-channel sound.

2.20 Untied Overclocking Technology

This motherboard supports Untied Overclocking Technology, which means during overclocking, FSB enjoys better margin due to fixed PCI / PCIE buses. Before you enable Untied Overclocking function, please enter "Overclock Mode" option of BIOS setup to set the selection from [Auto] to [CPU, PCIE, Async.]. 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.

3. BIOS SETUP UTILITY

3.1 Introduction

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

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

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

3.1.1 BIOS Menu Bar

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

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

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

3.1.2 Navigation Keys

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

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

3.2   Main Screen

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

```
                      BIOS SETUP UTILITY
   Main    Smart   Advanced   H/W Monitor   Boot   Security   Exit

   System Overview
                                                Use [Enter], [TAB]
   System Time              [ :00:09]           or [SHIFT-TAB] to
   System Date              [Fri 01/29/2010]    select a field.

   BIOS Version    : M3A790GXH/USB3 P1.0
   Processor Type  : AMD Engineering Sample (64bit)   Use [+] or [-] to
   Processor Speed : 2500MHz                          configure system Time.
   Microcode Update: 100F41/1000086
   L1 Cache Size   : 512KB
   L2 Cache Size   : 2048KB
   L3 Cache Size   : 6144KB
                                                ←→       Select Screen
   Total Memory    : 1024MB with 128MB shared memory   ↑↓   Select Item
                     Single-Channel Memory Mode   +-       Change Field
      DDR3_1        : 1024MB/667MHz (DDR3 1333)   Tab      Select Field
      DDR3_2        : None                        F1       General Help
      DDR3_3        : None                        F9       Load Defaults
      DDR3_4        : None                        F10      Save and Exit
                                                  ESC      Exit

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```

System Time [Hour:Minute:Second]

Use this item to specify the system time.

System Date [Day Month/Date/Year]

Use this item to specify the system date.

3.3 Smart Screen

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

```
                        BIOS SETUP UTILITY
 Main   Smart   Advanced   H/W Monitor   Boot   Security   Exit

 Smart Settings                               Exit system setup
                                              after saving the
 Save Changes and Exit                        changes.

 Load BIOS Defaults                           F10 key can be used
 Load Performance Setup Default (IDE/SATA)    for this operation.
 Load Performance Setup AHCI Mode
 Load Performance Setup RAID Mode
 Load Power Saving Setup Default

 BIOS Update Utility                          ←→     Select Screen
 ASRock Instant Flash                         ↑↓     Select Item
                                              Enter  Go to Sub Screen
                                              F1     General Help
                                              F9     Load Defaults
                                              F10    Save and Exit
                                              ESC    Exit

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```

Save Changes and Exit

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

Load BIOS Defaults

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

Load Performance Setup Default (IDE/SATA)

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

Load Performance Setup AHCI Mode

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

Load 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.

ASRock Instant Flash

ASRock Instant Flash is a BIOS flash utility embedded in Flash ROM. This convenient BIOS update tool allows you to update system BIOS without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new BIOS file to your USB flash drive, floppy disk or hard drive, then you can update your BIOS only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/ 12 file system. If you execute ASRock Instant Flash utility, the utility will show the BIOS files and their respective information. Select the proper BIOS file to update your BIOS, and reboot your system after BIOS update process completes.

3.4 Advanced Screen

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

```
                           BIOS  SETUP  UTILITY
    Main    Smart    Advanced   H/W Monitor   Boot   Security   Exit

    Advanced Settings                           Options  for  CPU

    WARNING : Setting wrong values in below sections
              may cause system to malfunction.

  ▶ CPU  Configuration
  ▶ Memory  Configuration
  ▶ Chipset  Configuration
  ▶ ACPI  Configuration
  ▶ Storage  Configuration             ←→      Select  Screen
  ▶ PCIPnP  Configuration              ↑↓      Select  Item
  ▶ Floppy  Configuration              Enter  Go  to  Sub  Screen
  ▶ SuperIO  Configuration             F1      General  Help
  ▶ USB  Configuration                 F9      Load  Defaults
                                       F10     Save  and  Exit
                                       ESC     Exit

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```

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

3.4.1 CPU Configuration

```
                           BIOS  SETUP  UTILITY
            Advanced

    CPU  Configuration

    Overclock  Mode            [Auto]        If  AUTO,  multiplier  and
       CPU  Frequency  (MHz)    [200]        voltage  will  be  left  at  the
       PCIE  Frequency  (MHz)   [100]        rated  frequency/voltage.  If
                                             Manual,  multiplier  and
    Spread  Spectrum           [Auto]        voltage  will  be  set  based
    Boot  Failure  Guard       [Enabled]     on  User  Selection  in  Setup.
    Cool' n' Quiet             [Auto]
    Secure  Virtual  Machine   [Enabled]
    Enhanced  Halt  State      [Disabled]
    L3  Cache  Allocation      [BSP Only]

    Processor  Maximum  Frequency      x31.5 6300 MHZ
    North Bridge Maximum Frequency x31.0 6200 MHz   ←→      Select  Screen
    Processor  Maximum  Voltage        1.5500 V     ↑↓      Select  Item
    Multiplier/Voltage  Change         [Auto]       +-      Change  Option
                                                    F1      General  Help
    Memory  Clock              [Auto]               F9      Load  Defaults
    Flexibility  Option        [Disabled]           F10     Save  and  Exit
                                                    ESC     Exit

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```

Overclock Mode

Use this to select Overclock Mode. The default value is [Auto]. Configuration options: [Auto], [CPU, PCIE, Sync.], [CPU, PCIE, Async.] and [Optimized].

CPU Frequency (MHz)

Use this option to adjust CPU frequency.

PCIE Frequency (MHz)

Use this option to adjust PCIE frequency.

Spread Spectrum

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

Boot Failure Guard

Enable or disable the feature of Boot Failure Guard.

Cool 'n' Quiet

Use this item to enable or disable AMD's Cool 'n' Quiet™ technology. The default value is [Auto]. Configuration options: [Auto], [Enabled] and [Disabled]. If you install Windows® Vista™ and want to enable this function, please set this item to [Enabled]. Please note that enabling this function may reduce CPU voltage and memory frequency, and lead to system stability or compatibility issue with some memory modules or power supplies. Please set this item to [Disable] if above issue occurs.

Secure Virtual Machine

When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by AMD-V. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled].

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.

L3 Cache Allocation

The default value is [BSP Only]. Configuration options: [BSP Only] and [All Cores].

Processor Maximum Frequency

It will display Processor Maximum Frequency for reference.

North Bridge Maximum Frequency

It will display North Bridge Maximum Frequency for reference.

Processor Maximum Voltage

It will display Processor Maximum Voltage for reference.

Multiplier/Voltage Change

This item is set to [Auto] by default. If it is set to [Manual], you may adjust the value of Processor Frequency and Processor Voltage. However, it is recommended to keep the default value for system stability.

```
                    BIOS SETUP UTILITY
           Advanced

   CPU Configuration                                    If AUTO, multiplier and
                                                        voltage will be left at the
   Overclock Mode              [Auto]                   rated frequency/voltage. If
       CPU Frequency (MHz)     [200]                    Manual, multiplier and
       PCIE Frequency (MHz)    [100]                    voltage will be set based
   Spread Spectrum             [Auto]                   on User Selection in Setup.
   Boot Failure Guard          [Enabled]
   Cool' n' Quiet              [Auto]
   Secure Virtual Machine      [Enabled]
   Enhanced Halt State         [Disabled]
   L3 Cache Allocation         [BSP Only]
                                                        ←→    Select Screen
   Processor Maximum Frequency      x31.5 6300 MHZ      ↑↓    Select Item
   North Bridge Maximum Frequency x31.0 6200 MHz        +-    Change Option
   Processor Maximum Voltage        1.5500 V            F1    General Help
   Multiplier/Voltage Change        [Manual]            F9    Load Defaults
   CPU Frequency Multiplier         [x0.5 100 MHz]      F10   Save and Exit
   CPU Voltage                      [0.6000 V]          ESC   Exit
   NB Frequency Multiplier          [x5.0 1000 MHz]

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```

CPU Frequency Multiplier

> For safety and system stability, it is not recommended to adjust the value of this item.

CPU Voltage

> It allows you to adjust the value of CPU voltage. However, for safety and system stability, it is not recommended to adjust the value of this item.

NB Frequency Multiplier

> For safety and system stability, it is not recommended to adjust the value of this item.

NB Voltage

> It allows you to adjust the value of NB voltage. However, for safety and system stability, it is not recommended to adjust the value of this item.

HT Bus Speed

> This feature allows you selecting Hyper-Transport bus speed. Configuration options: [Auto],[x1 200 MHz] to [x13 2600 MHz].

HT Bus Width

> This feature allows you selecting Hyper-Transport bus width. Configuration options: [Auto], [8 Bit] and [16 Bit].

3.4.2 Memory Configuration

```
                        BIOS SETUP UTILITY
        Advanced

   Memory Configuration

   Memory Clock                   [Auto]
   Memory Controller Mode         [Unganged]
   Power Down Enable              [Disabled]
   Bank Interleaving              [Auto]
   Channel Interleaving           [XOR of Address bit]

   Timing : 4-4-4-12
   CAS Latency (CL)               [Auto]
   TRCD                           [Auto]
   TRP                            [Auto]                ←→   Select Screen
   TRAS                           [Auto]               ↑↓   Select Item
   Timing : 2-2-2-4-16                                  +-   Change Option
   TRTP                           [Auto]               F1   General Help
   TRRD                           [Auto]               F9   Load Defaults
   TWTR                           [Auto]               F10  Save and Exit
   TWR                            [Auto]               ESC  Exit


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```

Memory Clock

This item can be set by the code using [Auto]. You can set one of the standard values as listed: [400 MHz (DDR3 800)], [533 MHz (DDR3 1066)], [667 MHz (DDR3 1333)] and [800MHz (DDR3 1600)].

Memory Controller Mode

It allows you to adjust the memory controller mode. Configuration options: [Unganged] and [Ganged]. The default value is [Unganged].

Power Down Enable

Use this item to enable or disable DDR power down mode.

Bank Interleaving

Interleaving allows memory accesses to be spread out over banks on the same node, or accross nodes, decreasing access contention.

Channel Interleaving

This option appears only when you adopt Phenom CPU. It allows you to enable Channel Memory Interleaving. Configuration options: [Disabled], [XOR of Address bit [20:16, 6]], [XOR of Address bit [20:16, 9]], [Address bits 6] and [Address bits 12]. The default value is
[XOR of Address bit [20:16, 9]].

CAS Latency (CL)

Use this item to adjust the means of memory accessing. Configuration options: [Auto], [4CLK] to [12CLK]. The default value is [Auto].

TRCD

Use this to adjust TRCD values. Configuration options: [Auto], [5CLK] to [12CLK]. The default value is [Auto].

TRP

Use this to adjust TRP values. Configuration options: [Auto], [5CLK] to [12CLK]. The default value is [Auto].

TRAS

Use this to adjust TRAS values. Configuration options: [Auto], [15CLK] to [30CLK]. The default value is [Auto].

TRTP

Use this to adjust TRTP values. Configuration options: [Auto], [4CLK] to [7CLK]. The default value is [Auto].

TRRD

Use this to adjust TRRD values. Configuration options: [Auto], [4CLK] to [7CLK]. The default value is [Auto].

TWTR

Use this to adjust TWTR values. Configuration options: [Auto], [4CLK] to [7CLK]. The default value is [Auto].

TWR

Use this to adjust TWR values. Configuration options: [Auto], [5CLK] to [12CLK]. The default value is [Auto].

TRC

Use this to adjust TRC values. Configuration options: [Auto], [11CLK] to [42CLK]. The default value is [Auto].

TRWTWB

Use this to adjust TRWTWB values. Configuration options: [Auto], [3CLK] to [18CLK]. The default value is [Auto].

TRWTTO

Use this to adjust TRWTTD values. Configuration options: [Auto], [3CLK] to [17CLK]. The default value is [Auto].

TWRRD

Use this to adjust TWRRD values. Configuration options: [Auto], [2CLK] to [10CLK]. The default value is [Auto].

TWRWR

Use this to adjust TWRWR values. Configuration options: [Auto], [2CLK] to [10CLK]. The default value is [Auto].

TRDRD

Use this to adjust TRWTTD values. Configuration options: [Auto], [3CLK] to [10CLK]. The default value is [Auto].

TRFC0

Use this to adjust TRFC0 values. Configuration options: [Auto], [90ns], [110ns], [160ns], [300ns] and [350ns]. The default value is [Auto].

TRFC1

Use this to adjust TRFC1 values. Configuration options: [Auto], [90ns], [110ns], [160ns], [300ns] and [350ns]. The default value is [Auto].

MA Timing

Use this to adjust values for MA timing. Configuration options: [Auto], [2T], [1T]. The default value is [Auto].

CHA Addr/Cmd Fine Delay

Use this to adjust values for CHA Addr/Cmd Fine Delay feature. Configuration options: [Auto], [No Delay], [1/64CLK] to [31/64CLK]. The default value is [Auto].

CHA Addr/Cmd Setup Time

Use this to adjust values for CHA Addr/Cmd Setup Time feature. Configuration options: [Auto], [1/2CLK] and [1CLK]. The default value is [Auto].

CHA CS/ODT Fine Delay

Use this to adjust values for CHA CS/ODT Fine Delay feature. Configuration options: [Auto], [No Delay], [1/64CLK] to [31/64CLK]. The default value is [Auto].

CHA CS/ODT Setup Time

Use this to adjust values for CHA CS/ODT Setup Time feature. Configuration options: [Auto], [1/2CLK] and [1CLK]. The default value is [Auto].

CHB Addr/Cmd Fine Delay

Use this to adjust values for CHB Addr/Cmd Fine Delay feature. Configuration options: [Auto], [No Delay], [1/64CLK] to [31/64CLK]. The default value is [Auto].

CHB Addr/Cmd Setup Time

Use this to adjust values for CHB Addr/Cmd Setup Time feature. Configuration options: [Auto], [1/2CLK] and [1CLK]. The default value is [Auto].

CHB CS/ODT Fine Delay

Use this to adjust values for CHB CS/ODT Fine Delay feature. Configuration options: [Auto], [No Delay], [1/64CLK] to [31/64CLK]. The default value is [Auto].

CHB CS/ODT Setup Time

Use this to adjust values for CHB CS/ODT Setup Time feature. Configuration options: [Auto], [1/2CLK] and [1CLK]. The default value is [Auto].

CHA CKE Drive Strength

Use this to adjust values for CHA CKE Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHA CS/ODT Drive Strength

Use this to adjust values for CHA CS/ODT Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHA ODDR/CMD Drive Strength

Use this to adjust values for CHA ODDR/CMD Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHA CLK Drive Strength

Use this to adjust values for CHA CLK Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHA DATA Drive Strength

Use this to adjust values for CHA DATA Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHA DQS Drive Strength

Use this to adjust values for CHA DQS Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHA Processor ODT

Use this to adjust values for CHA Processor ODT. Configuration options: [Auto], [240 ohms], [120 ohms] and [60 ohms]. The default value is [Auto].

CHB CKE Drive Strength

Use this to adjust values for CHB CKE Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHB CS/ODT Drive Strength

Use this to adjust values for CHB CS/ODT Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHB ODDR/CMD Drive Strength

Use this to adjust values for CHB ODDR/CMD Drive Strength. Configuration options: [Auto], [1.00x], [1.25x], [1.50x] and [2.00x]. The default value is [Auto].

CHB CLK Drive Strength

Use this to adjust values for CHB CLK Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHB DATA Drive Strength

Use this to adjust values for CHB DATA Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHB DQS Drive Strength

Use this to adjust values for CHB DQS Drive Strength. Configuration options: [Auto], [0.75x], [1.00x], [1.25x] and [1.50x]. The default value is [Auto].

CHB Processor ODT

Use this to adjust values for CHB Processor ODT. Configuration options: [Auto], [240 ohms], [120 ohms] and [60 ohms]. The default value is [Auto].

3.4.3 Chipset Configuration

```
                    BIOS SETUP UTILITY
       Advanced

  Chipset Settings                                      Options

  Onboard HD Audio            [Auto]          UMA
     Front Panel              [Auto]          SIDEPORT
  OnBoard Lan                 [Enabled]       UMA+SIDEPORT
  Onboard IEEE 1394           [Enabled]
  Primary Graphics Adapter    [PCI]

  Internal Graphics Mode      [UMA+SIDEPORT]
  Share Memory                [Auto]
  SidePort Clock Speed        [Auto]          ←→    Select Screen
  Onboard HDMI HD Audio       [Disabled]      ↑↓    Select Item
  Onboard GPU Clock Override  [Disabled]      +-    Change Option
  Surround View               [Disabled]      F1    General Help
  Advanced Clock Calibration  [Disabled]      F9    Load Defaults
                                              F10   Save and Exit
  DRAM Voltage                [Auto]          ESC   Exit
  mGPU Voltage                [Auto]
  SidePort Voltage            [Auto]

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```

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.

Onboard IEEE 1394

This allows you to enable or disable the onboard IEEE 1394 feature.

Primary Graphics Adapter

This item will switch the PCI Bus scanning order while searching for video card. It allows you to select the type of Primary VGA in case of multiple video controllers. The default value of this feature is [PCI]. Configuration options: [PCI], [Onboard] and [PCI Express].

Internal Graphics Mode

This allows you to adjust internal graphics mode. The default value is [UMA+SIDEPORT]. Configuration options: [UMA], [SIDEPORT] and [UMA+SIDEPORT].

Share Memory

This allows you to set share memory feature. The default value is [Auto]. Configuration options: [Auto], [32MB], [64MB], [128MB], [256MB] and [512MB]. This option only appears when you set "Internal Graphics Mode" to [UMA] or [UMA+SIDEPORT].

SidePort Clock Speed

This allows you to select sideport clock speed. The default value is [Auto]. Configuration options: [Auto], [400 MHz], [533 MHz], [667 MHz], [800 MHz], [1066 MHz], [1333 MHz], [1400 MHz], [1430 MHz], [1460 MHz], [1490 MHz], [1520 MHz], [1550 MHz], [1580 MHz], [1610 MHz], [1640 MHz], [1670 MHz] and [1700 MHz]. This option only appears when you set "Internal Graphics Mode" to [SIDEPORT] or [UMA+SIDEPORT].

Onboard HDMI HD Audio

This allows you to enable or disable the onboard HDMI HD Audio in AMD 790GX.

Onboard GPU Clock Override

This allows you to enable or disable the Onboard GPU Clock Override feature.

Onboard GPU Clock

This option only appears when you enable "Onboard GPU Clock Override". The default value is [700].

Surround View

This allows you to enable or disable the Surround View feature or Hybrid CrossFireX™ feature.

Advanced Clock Calibration

This allows you to adjust Advanced Clock Calibration feature. The default value is [Disabled]. Configuration options: [Disabled], [Auto], [All Cores] and [Per Core]. If you select [All Cores], you will see the option "Value (All Cores)". Configuration options: [+12%] to [-12%]. If you select [Per Core], you will see the options "Value (Core 0)", "Value (Core 1)", "Value (Core 2)" and "Value (Core 3)". Configuration options: [+12%] to [-12%].

DRAM Voltage

Use this to select DRAM voltage. Configuration options: [Auto], [1.48V], [1.58V], [1.59V], [1.65V], [1.71V], [1.77V], [1.83V], [1.88V], [2.00V], [2.05V], [2.11V], [2.17V], [2.23V], [2.29V], [2.34V] and [2.40V]. The default value is [Auto].

mGPU Voltage

Use this to select mGPU voltage. Configuration options: [Auto], [1.09V], [1.19V], [1.30V], [1.40V], [1.48V], [1.58V], [1.69V] and [1.79V]. The default value is [Auto].

HT Voltage

Use this to select HT voltage. Configuration options: [Auto], [1.30V] and [1.35V]. The default value is [Auto].

SidePort Voltage

Use this to select SidePort voltage. Configuration options: [Auto], [1.5V], [1.6V], [1.7V] and [1.8V]. The default value is [Auto].

CPU Thermal Throttle

Use this item to enable CPU internal thermal control mechanism to keep the CPU from overheated. Configuration options: [Disabled], [Auto], [12.5%], [25%], [37.5%], [50%], [62.5%], [75%] and [87.5%]. The default value is [Auto].

3.4.4 ACPI Configuration

```
                    BIOS SETUP UTILITY
   Advanced

   ACPI Settings                              Select auto-detect or
                                              disable the STR
   Suspend To RAM              [Disabled]     feature.
   Check Ready Bit             [Enabled]
   Away Mode Support           [Disabled]

   Restore on AC/Power Loss    [Power Off]
   Ring-In Power On            [Disabled]
   PCI Devices Power On        [Disabled]
   PS/2 Keyboard Power On      [Disabled]
   RTC Alarm Power On          [Disabled]
                                              ←→     Select Screen
   ACPI HPET Table             [Disabled]     ↑↓     Select Item
                                              +-     Change Option
                                              F1     General Help
                                              F9     Load Defaults
                                              F10    Save and Exit
                                              ESC    Exit

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```

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.

Away Mode Support

Use this item to enable or disable Away Mode support under Windows® XP Media Center OS. The default value is [Disabled].

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.

3.4.5 Storage Configuration

```
                        BIOS SETUP UTILITY
        Advanced

  Storage Configuration                    Configure onboard
                                           serial ATA
                                           controller.
  Onboard SATA Controller      [Enabled]
    SATA Operation Mode        [IDE]

▶ IDE1 Master                  [Hard Disk]
▶ IDE1 Slave                   [Not Detected]
▶ SATAII_1                     [Not Detected]
▶ SATAII_2                     [Not Detected]
▶ SATAII_3                     [Not Detected]
▶ SATAII_4                     [Not Detected]    ←→    Select Screen
▶ SATAII_5                     [Not Detected]    ↑↓    Select Item
▶ SATAII_6                     [Not Detected]    +-    Change Option
                                                 F1    General Help
                                                 F9    Load Defaults
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

Onboard SATA Controller

Use this item to enable or disable the "Onboard SATA Controller" feature.

SATA Operation Mode

Use this item to adjust SATA Operation Mode. The default value of this option is [IDE]. If you want to operate RAID function on SATA / SATAII HDDs, please select [RAID]. Configuration options: [AHCI], [RAID] and [IDE].

IDE Device Configuration

You may set the IDE configuration for the device that you specify. We will use the "IDE1 Master" as the example in the following instruction, which can be applied to the configurations of "IDE1 Slave" as well.

```
                        BIOS SETUP UTILITY
        Advanced

  IDE Master                               Select the type
                                           of device connected
  Device      :Hard Disk                   to the system.
  Vendor      :MAXTOR 6L080J4
  Size        :80.0 GB
  LBA Mode    :Supported
  Block Mode  :16Sectors
  PIO Mode    :4
  Async DMA   :MultiWord DMA-2
  Ultra DMA   :Ultra DMA-6
  S.M.A.R.T.  :Supported

  Type                         [Auto]      ←→    Select Screen
  LBA/Large Mode               [Auto]      ↑↓    Select Item
  Block (Multi-Sector Transfer) [Auto]     +-    Change Option
  PIO Mode                     [Auto]      F1    General Help
  DMA Mode                     [Auto]      F9    Load Defaults
  S.M.A.R.T.                   [Disabled]  F10   Save and Exit
  32Bit Data Transfer          [Disabled]  ESC   Exit

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```

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].

32Bit Data Transfer

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

3.4.6 PCIPnP Configuration

```
                        BIOS SETUP UTILITY
        Advanced

Advanced PCI / PnP Settings                    Value in units of PCI
                                               clocks for PCI device
PCI Latency Timer              [32]            latency timer
PCI IDE BusMaster             [Enabled]        register.



                                               ←→     Select Screen
                                               ↑↓     Select Item
                                               +-     Change Option
                                               F1     General Help
                                               F9     Load Defaults
                                               F10    Save and Exit
                                               ESC    Exit

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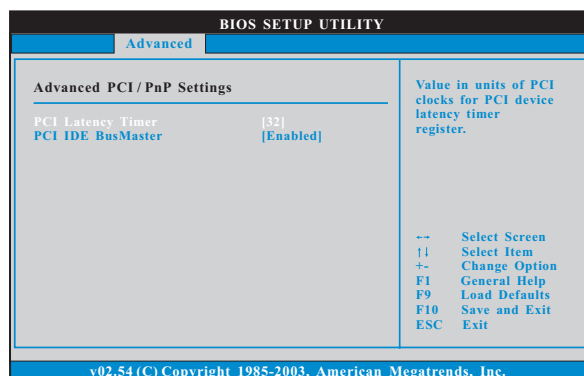
> Setting wrong values in this section may cause the system to malfunction.

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.

3.4.7 Floppy Configuration

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

```
                    BIOS SETUP UTILITY
   Advanced

 Floppy Configuration                       Select the type of
                                            floppy drive
 Floppy A              [1.44 MB 3½"]        connected to the
                                            system.




                                        ←→     Select Screen
                                        ↑↓     Select Item
                                        +-     Change Option
                                        F1     General Help
                                        F9     Load Defaults
                                        F10    Save and Exit
                                        ESC    Exit

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```

3.4.8 Super IO Configuration

```
                    BIOS SETUP UTILITY
   Advanced

 Configure Super IO Chipset                 Allow BIOS to Enable
                                            or Disable Floppy
 OnBoard Floppy Controller   [Enabled]      Controller.
 Serial Port Address         [3F8 / IRQ4]
 Infrared Port Address       [Disabled]



                                        ←→     Select Screen
                                        ↑↓     Select Item
                                        +-     Change Option
                                        F1     General Help
                                        F9     Load Defaults
                                        F10    Save and Exit
                                        ESC    Exit

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```

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].

3.4.9 USB Configuration

```
                    BIOS SETUP UTILITY
  ┌──────────────────────────────────────────────────────────┐
  │  Advanced                                                │
  ├──────────────────────────────────────────────────────────┤
  │  USB Configuration                   To enable or disable │
  │                                      the onboard USB      │
  │  USB Controller          [Enabled]   controllers.        │
  │  USB 2.0 Support         [Enabled]                        │
  │  Legacy USB Support      [Enabled]                        │
  │                                                           │
  │                                                           │
  │                                      ←→    Select Screen  │
  │                                      ↑↓    Select Item    │
  │                                      +-    Change Option  │
  │                                      F1    General Help   │
  │                                      F9    Load Defaults  │
  │                                      F10   Save and Exit  │
  │                                      ESC   Exit           │
  ├──────────────────────────────────────────────────────────┤
  │  v02.54 (C) Copyright 1985-2003, American Megatrends, Inc.│
  └──────────────────────────────────────────────────────────┘
```
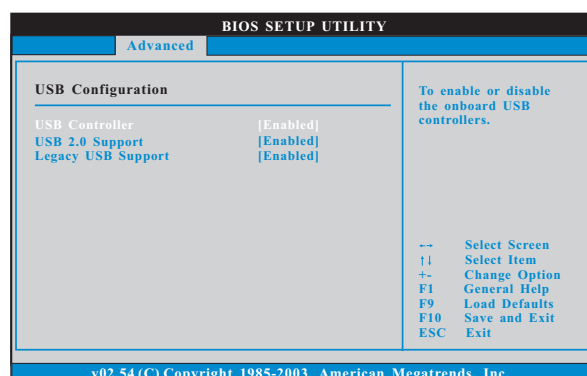
USB Controller

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.

```
                    BIOS SETUP UTILITY
  Main   Smart   Advanced   H/W Monitor   Boot   Security   Exit

                                              Enable/Disable
  Hardware Health Event Monitoring            CPU Quiet Fan
                                              Function.
  CPU Temperature           : 37°C / 98°F
  M / B Temperature         : 27°C / 80°F

  CPU Fan Speed             : 4722 RPM
  Chassis Fan Speed         : N / A
  NB Fan Speed              : N / A
  Power Fan Speed           : N / A

  Vcore                     : 1.216V            ←→    Select Screen
  + 3.30V                   : 3.248V            ↑↓    Select Item
  + 5.00V                   : 5.136V            F1    General Help
  + 12.00V                  : 12.091V           F9    Load Defaults
                                                F10   Save and Exit
  CPU Quiet Fan                [Disabled]       ESC   Exit


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```

CPU Quiet Fan

This item allows you to identify the temperature of CPU fan. If you set this option as [Disabled], the CPU fan will operate in full speed. If you set this option as [Enabled], you will find the items "Target CPU Temperature" and "Target Fan Speed" appear to allow you adjusting them. The default value is [Disabled]. You are allowed to enable this function only when you install 4-pin CPU fan.

Target CPU Temperature

The target temperature will be between 45° C/113° F and 65° C/149° F. The default value is [50°C/122° F].

Target Fan Speed

Use this option to set the target fan speed. You can freely adjust the target fan speed according to the target CPU temperature that you choose. Configuration options: [Level 1], [Level 2], [Level 3], [Level 4], [Level 5], [Level 6] [Level 7], [Level 8] and [Level 9].

3.6 Boot Screen

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

```
                    BIOS SETUP UTILITY
  Main   Smart   Advanced   H/W Monitor   Boot      Security   Exit

  Boot Settings                             Configure Settings
                                            during System Boot.
▶ Boot Settings Configuration

  1st Boot Device        [1st  Floppy Device]
  2nd Boot Device        [HDD: PM - HDS722580VL]
  3rd Boot Device        [CD / DVD: 3S - CD - ROM C]
  4th Boot Device        [USB]
  5th Boot Device        [USB]
▶ Hard Disk Drives
▶ Removable Drives                          ←→      Select Screen
▶ CD/DVD Drives                             ↑↓      Select Item
                                            Enter   Go to Sub Screen
                                            F1      General Help
                                            F9      Load Defaults
                                            F10     Save and Exit
                                            ESC     Exit

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```

3.6.1 Boot Settings Configuration

```
                    BIOS SETUP UTILITY
                                     Boot

  Boot Settings Configuration               Disabled: Displays
                                            normal POST messages.
  Full Screen Logo          |Enabled|       Enabled: Displays OEM
    AddOn ROM Display        [Enabled]       Logo instead of POST
    Boot Logo               [Auto]          messages.
  Boot From Onboard LAN      [Disabled]
  Bootup Num-Lock            [On]



                                            ←→      Select Screen
                                            ↑↓      Select Item
                                            + -     Change Option
                                            F1      General Help
                                            F9      Load Defaults
                                            F10     Save and Exit
                                            ESC     Exit

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```

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.

```
                    BIOS  SETUP  UTILITY
  Main    Smart    Advanced    H/W Monitor   Boot    Security    Exit

  Security Settings                            Install or Change the
                                               password.
  Supervisor Password   : Not Installed
  User Password         : Not Installed

  Change Supervisor Password
  Change User Password



                                               ←→     Select Screen
                                               ↑↓     Select Item
                                               Enter  Change
                                               F1     General Help
                                               F9     Load Defaults
                                               F10    Save and Exit
                                               ESC    Exit

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```

3.8 Exit Screen

```
                        BIOS SETUP UTILITY
    Main    Smart    Advanced    H/W Monitor    Boot    Security    Exit

    Exit Options                                Exit system setup
    ─────────────────────────────              after saving the
    Save Changes and Exit                      changes.
    Discard Changes and Exit
    Discard Changes                            F10 key can be used
                                               for this operation.
    Would you like to save current setting
    user defaults ?
    ─────────────────────────────

    Save 1st User Defaults
    Load 1st User Defaults                     ←→      Select Screen
                                               ↑↓      Select Item
    Save 2nd User Defaults                     Enter  Go to Sub Screen
    Load 2nd User Defaults                     F1      General Help
                                               F9      Load Defaults
    Save 3rd User Defaults                     F10    Save and Exit
    Load 3rd User Defaults                     ESC    Exit

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```

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.

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.

4. Software Support

4.1 Install Operating System

This motherboard supports various Microsoft® Windows® operating systems: 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP Media Center / XP 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 the 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.