Dreadnought Motherboard

User's Manual

FOXCONN®

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Version:

User's Manual V1.0 for Dreadnought motherboard.
P/N: 3A220WW00-000-G

Symbol description:

Caution: refers to important information that can help you to use motherboard better, and tells you how to avoid problems.

Warning: indicating a potential risk of hardware damage or physical injury may exist.

WEEE:

The use of this symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased this product.

More information:

If you want more information about our products, please visit Foxconn's website: http://www.foxconnchannel.com

Declaration of conformity

$C\epsilon$

HON HAI PRECISION INDUSTRY COMPANY LTD
66 , CHUNG SHAN RD., TU-CHENG INDUSTRIAL DISTRICT,
TAIPEI HSIEN, TAIWAN, R.O.C.

declares that the product
Motherboard Dreadnought

is in conformity with
(reference to the specification under which conformity is declared in
accordance with 89/336 EEC-EMC Directive)

■ EN 55022: 1998/A2:   2003 Limits and methods of measurements of radio
                        disturbance characteristics of information technology
                        equipment
■ EN 61000-3-2/:2000   Electromagnetic compatibility (EMC)
                        Part 3: Limits
                        Section 2: Limits for harmonic current emissions
                        (equipment input current <= 16A per phase)
■ EN 61000-3-3/A1:2001 Electromagnetic compatibility (EMC)
                        Part 3: Limits
                        Section 2: Limits of voltage fluctuations and flicker in low
                        voltage supply systems for equipment with rated current <=
                        16A
■ EN 55024/A2:2003   Information technology equipment-Immunity characteristics
                        limits and methods of measurement

Signature :   *James Liang*   Place / Date : TAIPEI/2008

Printed Name : James Liang

Declaration of conformity

FC

Trade Name:	FOXCONN
Model Name:	Dreadnought
Responsible Party:	PCE Industry Inc.
Address:	458 E. Lambert Rd.
	Fullerton, CA 92835
Telephone:	714-738-8868
Facsimile:	714-738-8838
Equipment Classification:	FCC Class B Subassembly
Type of Product:	Motherboard
Manufacturer:	HON HAI PRECISION INDUSTRY
	COMPANY LTD
Address:	66 , CHUNG SHAN RD., TU-CHENG
	INDUSTRIAL DISTRICT, TAIPEI HSIEN,
	TAIWAN, R.O.C.

Supplementary Information:

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.

Tested to comply with FCC standards.

Signature : *James Liang*   Date :   2008

Installation Precautions

WARNING!

- Electrostatic discharge (ESD) is the sudden and momentary electric current that flows between two objects at different electrical potentials. Normally it comes out as a spark which will quickly damage your electronic equipment. Please wear an electrostatic discharge (ESD) wrist strap when handling components such as a motherboard, CPU or memory.
- Ensure that the DC power supply is turned off before installing or removing CPU, memory, expansion cards or other peripherals. It is recommended to unplug the AC power cord from the power supply outlet. Failure to unplug the power supply cord may result in serious damage to your system.

CAUTION

Please carefully read the following procedures to install your computer :

- It is suggested to select high-quality, certified fans in order to avoid damage to the motherboard and CPU due to high temperature. Never turn on the computer if the CPU fan is not properly installed.
- We cannot guarantee that your system can operate normally when your CPU is overclocked. Normal operation depends on the overclocking capacity of your device.
- If there is any, when connecting USB, audio, 1394a, RS232 COM, IrDA or S/PDIF cables to the internal connectors on the motherboard, make sure their pinouts are matching with the connectors on the motherboard. Incorrect connections might damage the motherboard.
- When handling the motherboard, avoid touching any metal leads or connectors.
- If there is a PCI Express x16 graphics card installed in your system, we recommend using a 24-pin ATX power supply to get the best performance.
- Before turning on the power, please make sure the power supply AC input voltage setting has been configured to the local standard.
- To prevent damage to the motherboard, do not allow screws to come in contact with the motherboard circuit or its components. Also, make sure there are no leftover screws or metal components placed on the motherboard or within the computer casing.
- If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

Technical Support :

Support

Website :
http://www.foxconnchannel.com

Support Website :
http://www.foxconnsupport.com

Worldwide online contact Support :
http://www.foxconnchannel.com/support/online.aspx

CPU, Memory, VGA Compatibility Supporting Website :
http://www.foxconnchannel.com/product/Motherboards/compatibility.aspx

1

Thank you for buying Foxconn Quantum Force series motherboard-Dreadnought. Foxconn Quantum Force products are engineered to maximize computing power, providing only what you need for break-through performance.

With advanced overclocking capability and a range of connectivity features for today multi-media computing requirements, Dreadnought enables you to unleash more power from your computer.

This chapter includes the following information:
- Package List
- Product Specifications
- Layout
- Back Panel Connectors

Package List

Check your product package for the following items:

Motherboard	Foxconn Dreadnought motherboard
I/O modules	1 X USB 2.0 x 2 ports and 1 x 1394a module
Cables	1 X Ultra DMA 100/66 cable
	1 X Floppy disk drive cable
	2 X SATA power and signal cables right angle
	4 X SATA power and signal cables
Accessory	1 X I/O shield
	1 X PCB tray
	1 X Chipset fan
	1 X Quantum Booster
	1 X Quantum Flow-GPU blower
	1 X Extreme-Cooling tower
	1 X 2-way SLI bridge
	1 X 3-way SLI bridge
	1 X 20K variable resistor
	1 X 50K variable resistor
	9 X Copper column bolts
	15 X Cable ties
Application CD	Foxconn motherboard support CD
Documentation	User's manual
	Quick installation guide
	Registration card
	Quantum Force sticker
	Quantum Force dog tag
	6 X Quantum Force tattoos

! Before your purchase, if any of the above items is damaged or missing, please contact your retailer. Accessories are not in the warranty, only motherboard is.

1-1 Product Specifications

CPU	Support LGA775 socket Intel® CPU:
	Core™ 2 Extreme / Core™ 2 Quad / Core™ 2 Duo processors
	Support 45nm processors
Front Side Bus	1600/1333/1066/800 MHz FSB
Chipset	North Bridge: NVIDIA nForce 790i Ultra SLI
	South Bridge: NVIDIA nForce 570 SLI
Memory	4 x 240-pin DDR3 DIMM sockets
	Support up to 8GB of system memory
	Dual channel DDR3 2000(oc)/1800(oc)/1600(oc)/1333/1066/800MHz
	architecture (oc*: Overclocking)
Audio	Realtek ALC885 chip
	High Definition Audio
	2/4/5.1/7.1-channel
	Support for S/PDIF Out
	Support Jack-Sensing function
LAN	2 x Broadcom BCM5786 Gigabit LAN chips
Expansion Slots	3 x PCI Express x16 slots
	2 x PCI Express x1 slots
	2 x PCI slots
Onboard Serial ATA	6 x SATA connectors (Controlled by nForce 570 SLI)
	300MB/s data transfer rate
	Support hot plug and NCQ (Native Command Queuing)
	Support RAID 0, RAID 1, RAID 5, RAID 0+1
USB	Support hot plug
	Support up to 10 USB 2.0 ports (6 rear panel ports, 2 onboard USB
	connectors providing 4 extra ports)
	Supports USB 2.0 protocol up to 480Mb/s
Internal Connectors	1 x 24-pin ATX main power connector
	1 x 8-pin ATX 12V power connector
	1 x Floppy disk drive connector
	1 x IDE connector
	6 x SATA connectors
	2 x USB 2.0 connectors (supporting 4 x USB devices)
	1 x CPU fan header (4-pin)
	1 x System fan header (3-pin)
	1 x NB fan header (3-pin)
	2 x Power fan headers (3-pin)(FAN1, FAN2)
	1 x Front panel connector
	1 x CD_IN connector
	1 x Front Audio connector
	1 x 1394a connector
	1 x Speaker connector
	1 x COM1 connector

	1 x IrDA connector
Back Panel Connectors	1 x PS/2 Keyboard port
	1 x PS/2 Mouse port
	1 x Optical S/PDIF Out connector
	1 x Coaxial S/PDIF Out connector
	6 x USB 2.0 ports
	2 x RJ-45 LAN ports
	1 x 1394a port
	2 x External SATA ports (Controlled by JMicron JMB362)
	7.1-channel Audio ports
Hardware Monitor	System voltage detection
	CPU/System/NB temperature detection
	CPU/System/NB fan speed detection
	CPU/System/NB overheating shutdown
	CPU/System/NB fan speed control
Onboard 1394a	Support hot plug
	400Mb/s transmission rate
	Support 2 independent 1394a units synchronously at most
PCI Express x16	PCI-E1_16X(**red**) and PCI-E3_16X(**red**) support 8GB/s (16GB/s concurrent) bandwidth
	PCI-E2_16X(**blue**) supports 4GB/s (8GB/s concurrent) bandwidth
	Low power consumption and power management features
Green Function	Support ACPI (Advanced Configuration and Power Interface)
	Support S0 (normal), S1 (power on suspend), S3 (suspend to RAM), S4 (suspend to disk), and S5 (soft - off)
Bundled Software	AEGIS PANEL
	FOX LiveUpdate
	FOX DMI
	FOX LOGO
Operating System	Support for Microsoft® Windows® Vista/XP/2000
Form Factor	ATX Form Factor, 12 inches x 9.6 inches (30.5cm x 24.4cm)

1-2 Layout
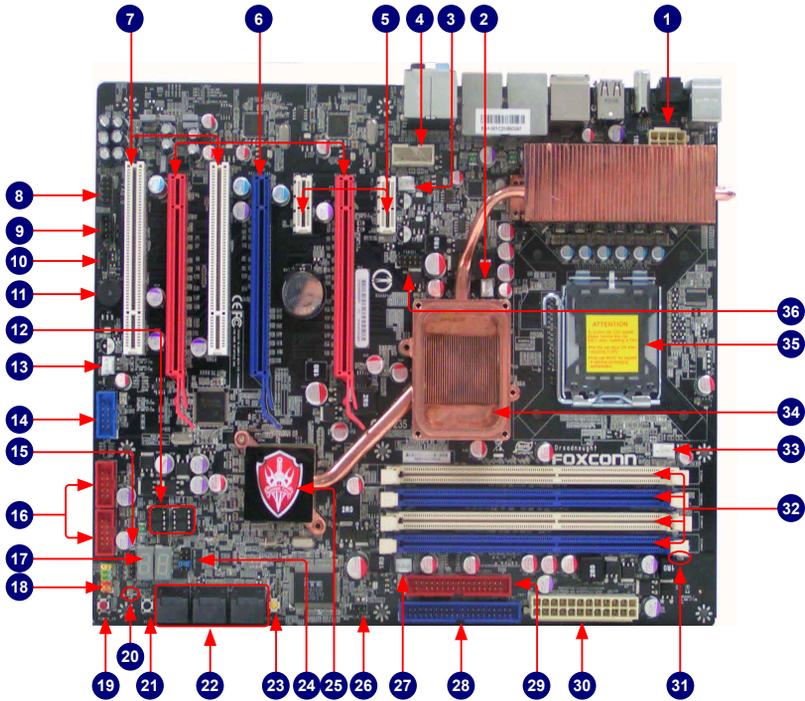
1. 8-pin ATX 12V Power Connector
2. NB(North Bridge) FAN
3. FAN1 Header
4. COM1 Connector
5. PCI Express x1 Slots
6. PCI Express x16 Slots
7. PCI Slots
8. Front Audio Conncetor
9. CD_IN Connector
10. Speaker Connector
11. Buzzer
12. BIOS ROM 1, BIOS ROM 2
13. SYS_FAN Header
14. 1394a Connector
15. IrDA Connector
16. Front USB Connectors
17. Debug LED
18. Front Panel Connector

19. Power on Button
20. +5V Standby LED
21. Reset Button
22. SATA Connectors
23. Clear CMOS Button
24. BIOS_SELECT Jumper
25. South Bridge: NVIDIA nForce 570 SLI
26. Clear CMOS Jumper
27. FAN2 Header
28. IDE Connector
29. Floppy Connector
30. 24-pin ATX Power Connector
31. DRAM Power LED
32. DDR3 DIMM Slots
33. CPU_FAN Header
34. North Bridge: NVIDIA nForce 790i Ultra SLI
35. LGA 775 CPU Socket
36. FSB Select Jumper

Note : The above motherboard layout is for reference only, please refer to the physical mother-
board for detail.

5

1-3 Back Panel Connectors

PS/2 Mouse Port • Coaxial S/PDIF Out • 1394a Port • LAN Ports • Line Out • Line In • Rear Speaker • Subwoofer • Side Speaker • Microphone • PS/2 Keyboard Port • Optical S/PDIF Out • USB Ports • External SATA Ports • USB Ports • Audio Ports
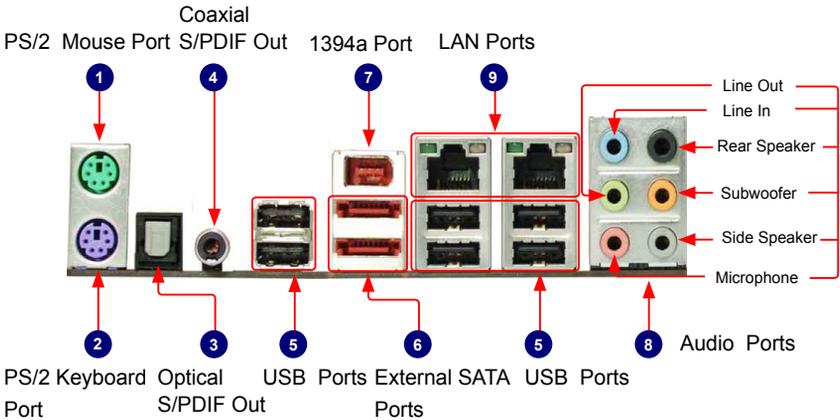
1. PS/2 Mouse Port
Use the upper port (green) to connect a PS/2 mouse.

2. PS/2 Keyboard Port
Use the lower port (purple) to connect a PS/2 keyboard.

3. Optical S/PDIF Out Connector
This connector provides digital audio out to an external audio system that supports digital optical audio.

4. Coaxial S/PDIF Out Connector
This connector provides digital audio out to an external audio system that supports digital coaxial audio. Before using this feature, ensure that your audio system provides a coaxial digital audio in connector.

5. USB Ports
The USB port supports the USB 2.0/1.1 specification. Use this port to connect a USB device such as a USB keyboard/mouse, USB printer, USB flash drive and etc.

6. External SATA Ports
To connect external SATA device(s) to your system by expanding the internal SATA port(s) to the chassis back panel. External SATA device shall provide power by its own.

7. 1394a Port
This port is used to connect a 1394a device.

8. Audio Ports
For the definition of each audio port, please refer to the table below :

Port	2-channel	4-channel	5.1-channel	7.1-channel
Blue	Line In	Line In	Line In	Line In
Green	Line Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
Pink	Microphone In	Microphone In	Microphone In	Microphone In
Orange	-	-	Center/Subwoofer Out	Center/Subwoofer Out
Black	-	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
Grey	-	-	-	Side Speaker Out

9. LAN Ports

The Gigabit Ethernet LAN port provides Internet connection at up to 1Gb/s data rate.

LAN Type	Left: Active		Right: Link		Active LED Link LED
	Status	Description	Status	Description	
1000M	Off	No Link	Off	No Link	
	Green Blinking	Data Activity	Off	10 Mb/s Connection	
			Green	100 Mb/s Connection	
			Orange	1000 Mb/s Connection	

7
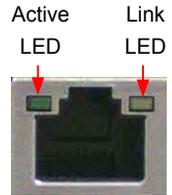
2

This chapter introduces the hardware installation process, including the installation of the CPU, memory, power supply, slots, pin headers and the mounting of jumpers. Caution should be exercised during the installation of these modules. Please refer to the motherboard layout prior to any installation and read the contents in this chapter carefully.

This chapter includes the following information :

- ■   Install the CPU and CPU Cooler
- ■   Install the Memory
- ■   Install an Expansion Card
- ■   Install other Internal Connectors
- ■   Install the Optional Accessory
- ■   Jumpers
- ■   OnBoard Button
- ■   OnBoard LED
- ■   OnBoard Debug LED

Please visit this website for more supporting information about CPU, Memory and VGA for your motherboard :

http://www.foxconnchannel.com/product/Motherboards/compatibility.aspx

2-1 Install the CPU and CPU Cooler

CAUTION

!

Read the following guidelines before you begin to install the CPU :

■ Make sure that the motherboard supports the CPU.

■ Always turn off the computer and unplug the power cord from the power supply before installing the CPU to prevent hardware damage.

■ Locate the Pin_1 of the CPU. The CPU cannot be inserted if oriented incorrectly. (Or you may locate the notches on both sides of the CPU and alignment keys on the CPU socket.)

■ Apply an even and thin layer of thermal grease on the surface of the CPU.

■ Do not turn on the computer if the CPU cooler is not installed, otherwise overheating and damage of the CPU may occur.

■ Set the CPU host frequency in accordance with the CPU specifications. It is not recommended that the system bus frequency be set beyond hardware specifications since it does not meet the standard requirements for the peripherals. If you wish to set the frequency beyond the standard specifications, please do so according to your hardware specifications including the CPU, graphics card, memory, hard drive, etc.

Install the CPU

Locate the alignment keys on the motherboard CPU socket and the notches on the CPU.

Pin_1 Corner of the CPU Socket

LGA775 CPU

Notch

Pin_1 triangle marking of CPU
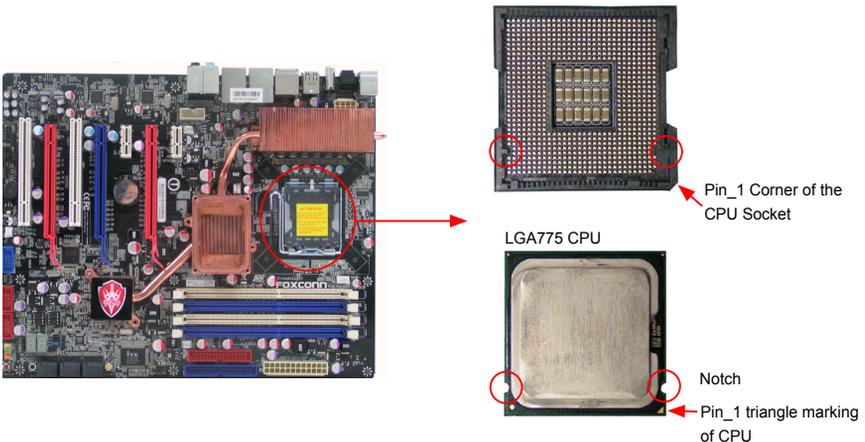
Follow the steps to install the CPU onto the CPU socket :

⚠ Before installing the CPU, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the CPU.

1. Remove protective socket cover.

2. Release the CPU socket lever.
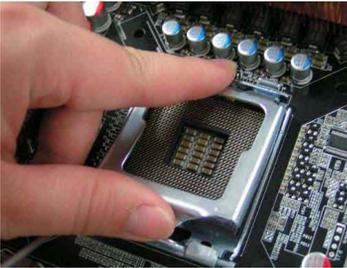
3. Lift the metal cover on the CPU socket.
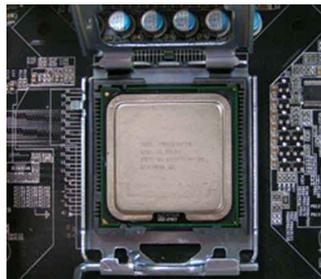
4. Check pin one marking (triangle) with the pin one corner of the CPU socket, align the CPU notches with the socket alignment keys and gently put the CPU onto the socket.

5. When CPU is properly seated, replace the metal cover and push the CPU socket lever back to its locked position.

Install the CPU Cooler

Follow the steps below to correctly install the CPU cooler on the motherboard. (The following procedures use Foxconn cooler as the example.)

1. Apply and spread an even thermal grease on the surface of CPU.
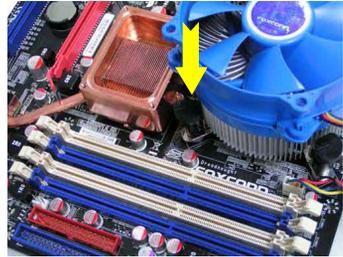
2. Place the four bolts of the CPU cooler to the holes of the motherboard, push them straight down from the top, and the bolts will be fastened on the motherboard. That's it.
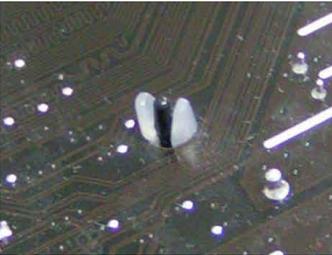
3. Check the solder side of the motherboard, the push pin should be fixed as depicted in the picture.
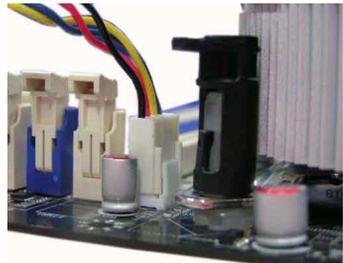
4. Attach the 4-wire CPU cooler connector to the CPU FAN socket on the motherboard .
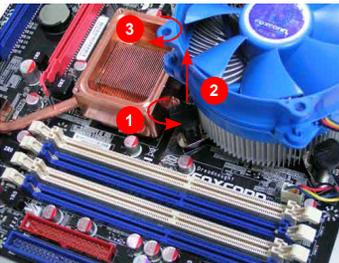
Release bolts of CPU cooler from motherboard :
1. Turning the push pin (bolt) along with the direction of arrow (counterclockwise).
2. Pull the push pin straight up.
3. Turning push pin clockwise to its default position.

Use extreme care when removing the CPU cooler because the thermal grease may adhere to the CPU. Inadequately removing the CPU cooler may damage the CPU.

2-2 Install the Memory

! Read the following guidelines before you begin to install the memory :
- Make sure that the motherboard supports the memory. It is recommended that memory of the same capacity, brand, speed, and chips be used.
- Always turn off the computer and unplug the power cord from the power outlet before installing the memory to prevent hardware damage.
- Memory modules have a foolproof design. A memory module can be installed in only one direction. If you are unable to insert the memory, switch the direction.

Dual Channel Memory Configuration

This motherboard provides four DDR3 memory sockets and supports Dual Channel Technology. When memory is installed, the BIOS will automatically check the memory in your system.

Four DDR3 memory sockets are divided into two channels and each channel has two memory sockets as following:
Channel 0 : DIMM1, DIMM2
Channel 1 : DIMM3, DIMM4

The combinations of DIMM modules are :

	DIMM1	DIMM2	DIMM3	DIMM4
Single Channel	DS/SS	-	-	-
Single Channel	DS/SS	DS/SS		-
Single Channel	-	-	DS/SS	-
Single Channel	-	-	DS/SS	DS/SS
Dual Channel	DS/SS	-	DS/SS	-
Dual Channel	-	DS/SS	-	DS/SS
Dual Channel	DS/SS	DS/SS	DS/SS	DS/SS

(DS : Double Side, SS : Single Side, - : No Memory)

! It is recommended that memory of the same capacity, brand, speed, and chips be used and please select dual channel first to achieve optimum performance.

Installing a Memory

Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module. Be sure to install DDR3 DIMMs on this motherboard.

2

144-Pin

96-Pin
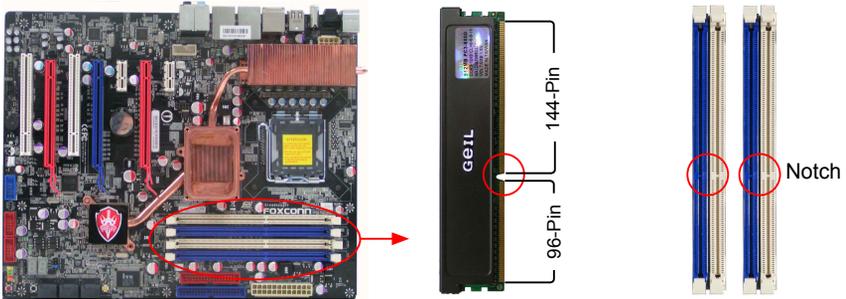
Notch

If you take a look at front side of memory module, it has asymmetric pin counts on both sides separated by a notch in the middle, so it can only fit in one direction. Follow the steps below to correctly install your memory modules into the sockets.
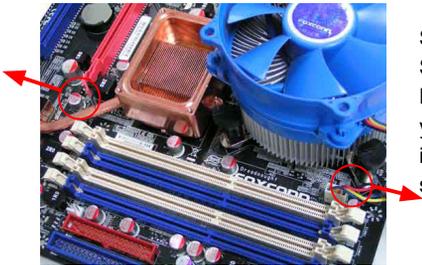
Step 1:
Spread the clips at both ends of the memory socket. Place the memory module onto the socket, then put your fingers on top edge of the module, and push it down firmly and seat it vertically into the memory socket.
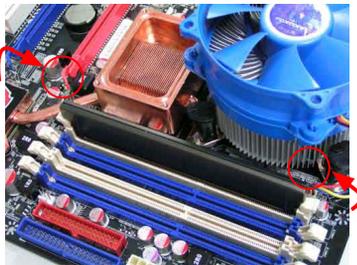
Step 2:
The clips at both ends of the socket will snap into place when the memory module is securely inserted.

13

2-3 Install an Expansion Card
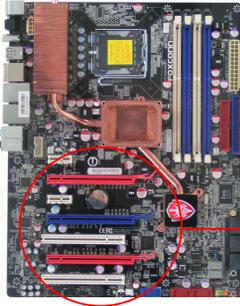
PCI Express x1

PCI Express x16

PCI Express x16

PCI

Follow the steps below to correctly install your expansion card in the expansion slot.

1. Locate an expansion slot that supports your card. Remove the metal slot cover from the chassis back panel.
2. Align the card with the slot, and press down on the card until it is fully seated in the slot.
3. Make sure the metal contacts on the card are completely inserted into the slot.
4. Secure the card's metal bracket to the chassis back panel with a screw.
5. After installing all expansion cards, replace the chassis cover.
6. Turn on your computer. If necessary, go to BIOS Setup to make any required BIOS changes for your expansion card(s).
7. Install the driver provided with the expansion card in your operating system.

Installing and Removing a PCI Express x16 Graphics Card :
• Installing a Graphics Card:
Gently insert the graphics card into the PCI Express x16 slot. Make sure the graphics card is locked by the latch at the end of the PCI Express x16 slot.

• Removing the Card:
Push the latch at the end of the PCI Express x16 slot to release the card and then pull the card straight up from the slot.

2-4 Install other Internal Connectors

Power Connectors
This motherboard uses an ATX power supply. In order not to damage any device, make sure all the devices have been installed properly before applying the power supply.

24-pin ATX power connector : PWR1
PWR1 is the ATX power supply connector. Make sure that the power supply cable and pins are properly aligned with the connector on the motherboard. Firmly plug the power supply cable into the connector and make sure it is secure.

Pin #	Definition	Pin #	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON(Soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	NC
9	+5V SB(Stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

24   13

12   PWR1   1

⚠ CAUTION

We recommend you using a 24-pin power supply. If you are using a 20-pin power supply, you need to align the ATX power connector according to the picture.

Pin No. 24
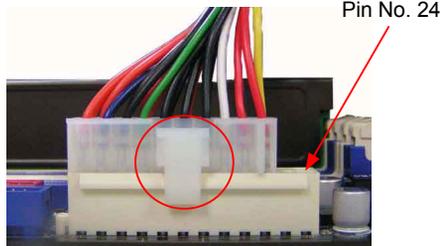
20-Pin Power

8-pin ATX 12V Power Connector : PWR2

The 8-pin ATX 12V power supply connects to PWR2 and provides power to the CPU.

5 1

8 4

PWR2
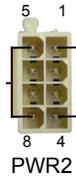
Pin #	Definition	Pin #	Definition
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

Connect a 4-pin power plug

CAUTION

!
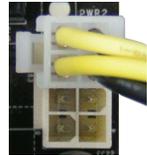
We recommend you using an 8-pin ATX 12V power supply. If you are using a 4-pin power supply, you need to align the ATX power connector according to the picture on the right.

Floppy Disk Drive Connector : FLOPPY

This motherboard includes a standard floppy disk drive(FDD) connector, supporting 360KB, 720KB,1.2MB, 1.44MB, and 2.88MB FDDs.

IDE Connector : PIDE

With the provided Ultra DMA IDE ribbon cable, you can connect to any IDE type of hard disk and CD/ DVD ROM/RW drive.
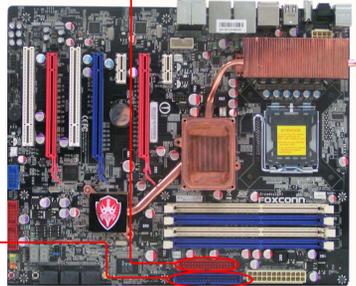
Front Panel Connector : FP1

This motherboard includes one connector for connecting the front panel switch and LED Indicators.

Hard Disk LED Connector (HDD-LED)

Connect to the chassis front panel IDE indicator LED. It indicates the active status of the hard disks. This 2-pin connector is directional with +/- sign.

Reset Switch (RESET-SW)

Attach the connector to the Reset switch on the front panel of the case; the system will restart when the switch is pressed.

Power LED Connector (PWR-LED)

Connect to the power LED indicator on the front panel of the chassis. The Power LED indicates the system's status. When the system is in operation (S0 status), the LED is on. When the system gets into sleep mode (S1) , the LED is blinking; When the system is in S3/S4 sleep state or power off mode (S5), the LED is off. This 2-pin connector is directional with +/- sign.

Power Switch Connector (PWR-SW)

Connect to the power button on the front panel of the chassis. Push this switch allows the system to be turned on and off rather than using the power supply button.

1 2

HDD-LED — PWR-LED
RESET-SW — PWR-SW
NC — EMPTY

9 10

FP1
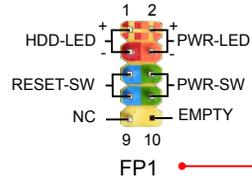
1394a Connector : F_1394

The 1394a expansion cable can be connected to either the front (provided that the front panel of your chassis is equipped with the appropriate interface) or real panel of the chassis.

1 2

TPA+ — TPA-
GND — GND
TPB+ — TPB-
+12V — +12V
EMPTY — GND

9 10

F_1394
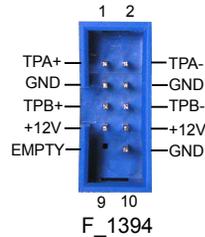
USB Connectors : F_USB1/2

In addition to the six USB ports on the rear panel, this product also provides two 10-pin USB connectors on its motherboard. By connecting through USB cables with them, user can quickly expand another four USB ports on the front panel .

1 2

5V_DUAL — 5V_DUAL
D- — D-
D+ — D+
GND — GND
EMPTY — NC

9 10

F_USB 1/2
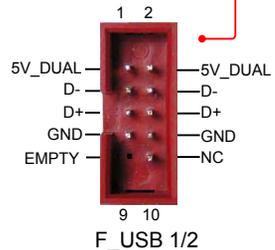
COM Connector : COM1

This motherboard supports one serial RS232 COM port for legacy compatibility. User must purchase another RS232 cable with a 9-pin D-sub connector at one end to connect with the external RS232 device and another end with 10-pin female connector to connect with COM1 connector in the motherboard.

```
        1   2
RLSD ——        —— SIN
SOUT ——        —— DTR
GND  ——        —— DSR
RTS  ——        —— CTS
RI   ——        —— EMPTY
        9  10
```
COM1
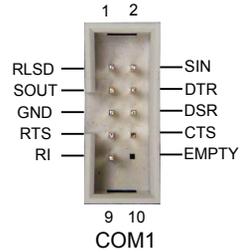
Speaker Connector : SPEAKER

The speaker connector is used to connect speaker of the chassis.

```
SPKJ —  1
EMPTY—  2
NC   —  3
SPKJ —  4
```
SPEAKER

Serial ATA Connectors : SATA_1/2/3

The Serial ATA connector is used to connect with SATA Hard Disk or CD devices which supporting this feature. The current Serial ATA II interface allows up to 300MB/s data transfer rate.

```
        TX-  RX-
GND TX+ GND RX+ GND
1
```

SATA_1/2/3
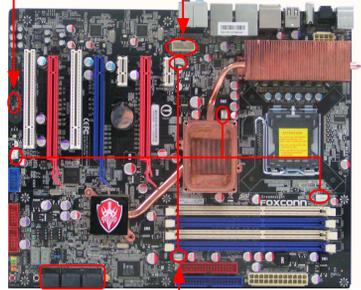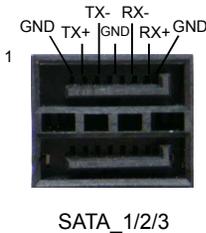
Fan Connectors : CPU_FAN, SYS_FAN, NB_FAN, FAN1/2

There are five fan headers on this motherboard. The fan speed can be controlled and monitored in "PC Health Status" section of the BIOS Setup. These fans can be automatically turned off after the system enters S3, S4 and S5 sleeping states.

```
1 — GND
  — POWER
  — SENSE
  — CONTROL
```
CPU_FAN

```
1 — GND
  — +12V
  — SENSE
```
FAN_1/2

```
1 — GND
  — +12V
  — SENSE
```
SYS_FAN/NB_FAN

18
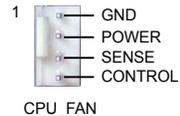
Audio Connector : F_AUDIO

The audio connector supports HD Audio standard.
It provides the Front Audio output choice.

```
        1   2
PORT1_L ──■ ■── AUD_GND
PORT1_R ──  ── PRESENCE_J
PORT2_R ──  ── SENSE1_RETURN
SENSE_SEND ──  ── EMPTY
PORT2_L ──  ── SENSE2_RETURN
        9  10
       F_AUDIO
```
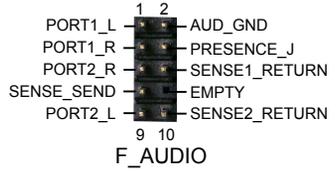
Audio Connector : CD_IN

CD_IN is a Sony standard audio connector, it can be
connected to a CD/DVD-ROM drive through a CD/DVD
audio cable.

```
CD_L  GND  CD_R

1

   CD_IN
```

IrDA Connector : IR

This connector supports infrared wireless transmitting
and receiving device.

```
1  ──■── +5V
2  ──■── EMPTY
3  ──■── IRRX
4  ──■── GND
5  ──■── IRTX
       IR
```
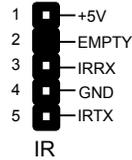
2-5 Install the Optional Accessory

! Before you install the Water-Cooling Cap or Extreme-Cooling Tower, you have to Adjust and place the O Ring into the heatsink cooler first.

O Ring
(black rubber band)

1. Install the Water-Cooling Cap

Place the Water-Cooling Cap above the heatsink (with O Ring installed) and fix it by four screws. This is for user who wants to cool his system by using water cooling technology.

2. Install the Extreme-Cooling Tower

Place the Extreme-Cooling Tower above the heatsink (with O Ring installed) and fix it by four screws. Cooling Tower allows extreme overclockers to use Dry Ice or Liquid Nitrogen as a cooling media. But it is at your own risk!!

3. Install the Chipset Fan

Place the chipset fan above the heatsink (with O Ring installed) and fix it by screws, then connect its 3-wire cable to NB fan header on the motherboard.
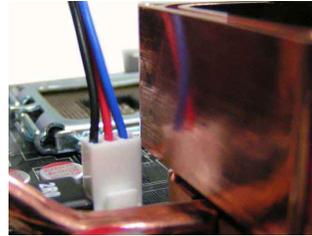
4. Quantum Flow-GPU Blower

The 120mm fan provides good cooling for the graphics card, especially in multi-GPU setups. You can easily use the accompanied screw to fix it on the graphics card, then attach the 3-wire fan cable to the fan header on the motherboard.
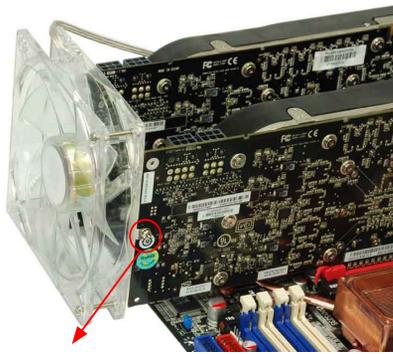
Screw

5. Install the Quantum Booster

Enhance cooling your motherboard by mounting Quantum Booster onto the chipset heatsink. Quantum Booster improves contact area of air/metal surface, benefits 5-7 degrees temperature drop in celsius. Simply fix the Quantum Booster onto the chipset heatsink with the accompanied screws, and that's it !

6. PCB Tray

If you choose not to use the chassis, you can use the plastic tray and copper bars to assemble the motherboard in an open environment as depicted.

Note: The PCB or plastic tray(in the package) is assembled under the motherboard.

2-6 Jumpers

For some features needed, users can change the jumper settings on this motherboard to modify them. This section explains how to use the various functions of this motherboard by changing the jumper settings. Users should read the following content carefully prior to modifying any jumper setting.

Description of Jumpers

1. For any jumper on this motherboard, pin 1 can be identified by the bold silkscreen next to it. However, in this manual, pin 1 is simply labeled as "1".
2. The following table explains different types of the jumper settings. "Closed" means placing a jumper cap on the two pins to temporarily short them. The shorting can also be done by touching two pins by a screwdriver for a few seconds, but using jumper cap is recommended. It can prevent hazardous ESD (Electrical Static Discharge) problem.

Jumper	Diagram	Definition	Description
1 ▢▢▢	1 ■■ ▢	1-2	Set Pin 1 and Pin 2 closed
	1 ▢ ■■	2-3	Set Pin 2 and Pin 3 closed

Clear CMOS Jumper: CLR_CMOS

The motherboard uses CMOS RAM to store the basic hardware information (such as BIOS data, date, time information, hardware password...etc.). Clear CMOS data is the fast way to go back to factory default when the BIOS settings were mistakenly modified.

The steps to clear CMOS data are :
1. Turn off the computer, unplug the power cord from the power outlet.
2. Remove jumper cap from pins 2-3, put it onto pins 1-2 to short them. This will clear CMOS data.
3. Return the setting to its original with pins 2-3 closed.
4. Plug in the power cord to your computer and turn it on.
5. Go to BIOS Setup to configure new system as described in next chapter.

Clear

Normal
(Default)

CLR_CMOS

WARNING!
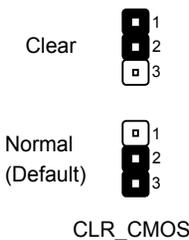
■ Disconnect the power cable before adjusting the jumper settings.
■ Do not clear the CMOS while the system is turned on.

BIOS Select Jumper: BIOS_SELECT

The jumper is used to select the booting from BIOS ROM 1 or BIOS ROM 2. You can refer to the following table for the setting.

BIOS ROM 1

BIOS_SELECT
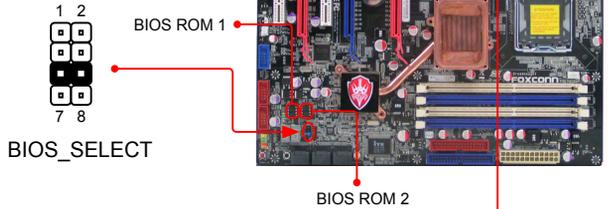
BIOS ROM 2

Definition	Description	Function
1-2	Set Pin 1 and Pin 2 closed	Force BIOS ROM 1
3-4	Set Pin 3 and Pin 4 closed	Force BIOS ROM 2
5-6 (default)	Set Pin 5 and Pin 6 closed	BIOS select, default is BIOS ROM 1
7-8	Set Pin 7 and Pin 8 closed	BIOS select, default is BIOS ROM 2

FSB Select Jumper: FSBSEL

The jumper is used to select the FSB clock, the setting values are: Auto, 266MHz, 333MHz, 400MHz, 450MHz. See the table as below.

Definition	Description	Function
1-2(default)	Set Pin 1 and Pin 2 closed	Auto
3-4	Set Pin 3 and Pin 4 closed	266MHz
5-6	Set Pin 5 and Pin 6 closed	333MHz
7-8	Set Pin 7 and Pin 8 closed	400MHz
9-10	Set Pin 9 and Pin 10 closed	450MHz

FSBSEL
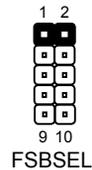
Note : When you set the jumper to pins 1-2, FSB clock can be set by BIOS setup. But if you select other settings, FSB clock will work at corresponding value.

2-7 OnBoard Button

Power on Button: POWER_ON
Push the power on button to power on the system.

Reset Button: RESET
Push the reset button to reboot the system.

Clear CMOS Button: CLR_CMOS1
Turn off the AC power supply, push the CLR_CMOS1 button and hold there for a couple of seconds to clear CMOS.

POWER_ON   RESET   CLR_CMOS1

CAUTION

■   Make sure the power supply is turned off before pressing the CLR_CMOS1 button to clear CMOS.

■   Push down the CLR_CMOS1 button and hold it there for a couple of seconds to clear the CMOS completely, then release.

2-8 OnBoard LED

+5V Standby LED:
It will light whenever the power supply that connected to the motherboard is switched on.

DRAM Power LED:
The LED lights up indicating the system is on or the system is staying at S1 or S3 sleeping state.

WARNING!
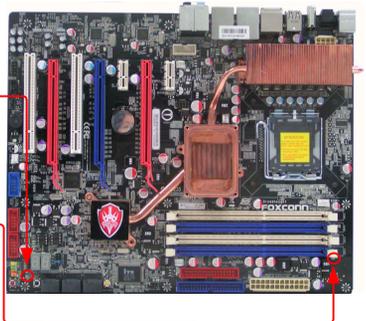
Do not remove or plug in any device when the onboard LED is lighting on.

2-9 OnBoard Debug LED

2-digital LED readout displays hardware status
and enables quick error diagnosis.

3

This chapter tells how to change system settings through the BIOS Setup menus. Detailed descriptions of the BIOS parameters are also provided.

You have to run the Setup Program when the following cases occur :

1. An error message appears on the screen during the system Power-On Self-Test (POST) process.
2. You want to change the default CMOS settings.

This chapter includes the following information :

- ■ Enter BIOS Setup
- ■ Main Menu
- ■ Standard CMOS Features
- ■ Advanced BIOS Features
- ■ Advanced Chipset Features
- ■ Integrated Peripherals
- ■ Power Management Setup
- ■ PnP/PCI Configurations
- ■ PC Health Status
- ■ Quantum BIOS
- ■ Board Information
- ■ Load Optimized Defaults
- ■ Set Supervisor Password
- ■ Set User Password
- ■ Save & Exit Setup
- ■ Exit Without Saving

Since BIOS could be updated some other times, the BIOS information described in this manual is for reference only. We do not guarantee the content of this manual will remain consistent with the newly released BIOS at any given time in the future. Please visit our support website for updated manual if it is available.

Enter BIOS Setup

The BIOS is the communication bridge between hardware and software, correctly setting up the BIOS parameters is critical to maintain optimal system performance. Power on the computer, when the message "**Press TAB to show POST screen, DEL to enter SETUP**" appears at the bottom of the screen, you can press <Del> key to enter SETUP.

CAUTION

! We do not suggest that you change the default values in the BIOS Setup, and we shall not be responsible for any damage which resulted from the change you made.

Main Menu

The main menu allows you to select from a list of setup functions together with two exit choices. Use the arrow keys to select a specific item and press <Enter> to go to the submenu.

```
            Phoenix - AwardBIOS CMOS Setup Utility

   ► Standard CMOS Features          ► Quantum BIOS

   ► Advanced BIOS Features          ► Board Information

   ► Advanced Chipset Features          Load Optimized Defaults

   ► Integrated Peripherals             Set Supervisor Password

   ► Power Management Setup             Set User Password

   ► PnP/PCI Configurations             Save & Exit Setup

   ► PC Health Status                  Exit Without Saving

   Esc : Quit                    ↑↓→←      : Select Item
   F10 : Save & Exit Setup

                  Time, Date, Hard Disk Type...
```

Each item in the main menu is explained below:

► **Standard CMOS Features**

It displays the basic system configuration, such as system date, time and floppy drive. They all can be set up through this menu.

► **Advanced BIOS Features**

The advanced system features can be set up through this menu.

► **Advanced Chipset Features**

The values for the chipset can be changed through this menu, and the system performance can be optimized.

► **Integrated Peripherals**

All onboard peripherals can be set up through this menu.There are IDE devices, Super I/O devices such as Serial I/O, Parallel port and other USB, PCI Enhanced ports...etc.

► **Power Management Setup**

All the items related with Green function features can be set up through this menu.

► **PnP/PCI Configurations**

PCI/PnP features, such as O/S supporting, IRQ/DMA settings and bus master enabling/ disabling...etc. can be modified through this menu.

► **PC Health Status**

This setup enables you to read/change fan speeds, and displays temperatures and voltages of your CPU/System.

► **Quantum BIOS**

Some special proprietary features (such as overclocking) can be set up through this menu.

► **Board Information**

It displays the basic board information, such as BIOS version, onboard LAN MAC address... etc.

► **Load Optimized Defaults**

The optimal performance settings can be loaded through this menu. However, it may offer better performance in some ways (such as less I/O cards, less memory ...etc.), still, it may cause problem if you have more memory or I/O cards installed. It means, if your system loading is heavy, set to optimal default may sometimes come out an unstable system. What you need now is to adjust BIOS setting one by one, trial and error, to find out the best setting for your current system.

► **Set Supervisor Password**

The supervisor password can be set up through this menu.

► **Set User Password**

The user password can be set up through this menu.

► **Save & Exit Setup**

Save setting values to CMOS and exit.

► **Exit Without Saving**

Do not change anything and exit the setup.

3

CAUTION

! When we talk about <+> and <-> keys in this manual, they are the single-keypad keys of the numeric keypad which is located at the right hand side of your desktop keyboard. They are not the combination keys made by pressing and holding down <Shift> key first, then press <+ => or <-_> key the next.

Standard CMOS Features

This submenu is used to set up the standard BIOS features, such as the date, time, floppy drive and so on. Use the arrow up/down keys to select an item, then use the <+> or <-> keys to change the setting.

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                           Standard CMOS Features
  ┌──────────────────────────────────────────────┬──────────────────────┐
  │ Date (mm:dd:yy)          Fri, May 30 2008     │      Item Help       │
  │ Time (hh:mm:ss)          17 : 44 : 13         │                      │
  │                                               │  Menu Level  ►       │
  │ ► IDE Channel Master     WDC WD2500JS-60NCB1  │                      │
  │ ► IDE Channel Slave      None                 │  Press [Enter] to enter │
  │ ► SATA Channel 1 Primary     None             │  next page for       │
  │ ► SATA Channel 1 Secondary   None             │  detailed hard drive │
  │ ► SATA Channel 2 Primary     None             │  settings            │
  │ ► SATA Channel 2 Secondary   None             │                      │
  │ ► SATA Channel 3 Primary     None             │                      │
  │ ► SATA Channel 3 Secondary   None             │                      │
  │                                               │                      │
  │ Drive A                  1.44M, 3.5 in.       │                      │
  │ Halt On                  All Errors           │                      │
  │ Installed Memory         512M                 │                      │
  │                                               │                      │
  │                                               │                      │
  ├──────────────────────────────────────────────┴──────────────────────┤
  │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
  │       F5:Previous Values                  F7:Optimized Defaults       │
  └──────────────────────────────────────────────────────────────────────┘
```

► **Date -** <weekday><month><date> <year> format

Day—weekday from Sun. to Sat., automatically displayed by BIOS (Read Only).

Month—month from 1 to 12.

Date—date from 1st to 31st.

Year—year, set up by users.

Use <Enter>, <Tab> keys to select a field. Use <+>, <->, <PageUp> or <PageDown> to select a value.

► **Time -** <hour> : <minute> : <second> format

This item allows you to configure the desired time. Use <Enter>, <Tab> to move forward and select a field. Directly input a value or use <PageUp>, <PageDown>, <+> or <-> to select a value.

► **IDE Channel Master/Slave**

These categories identify the hard disks connected to the PATA port in the system.

In each channel's display, you can press [Enter] to go to its submenu. You can further configure specific drive settings. [None] and [Auto] settings allow you to enable or disable this drive. [None] means no HDD is installed or set, and [Auto] means the system can auto-detect the hard disk when booting up. In Access Mode setting, selections of [CHS], [LBA], [Large] and [Auto] can help you to select hard drive for legacy compatibility.

Award (Phoenix) BIOS can support 3 HDD modes: CHS, LBA and Large.

CHS	For HDD <528MB
LBA	For HDD >528MB & Supporting LBA (Logical Block Addressing)
Large	For HDD>528MB but not supporting LBA

Note: Set to [Auto] , the system can detect the hard disk and select the HDD mode automatically.
Suggest you select this option.

► **SATA Channel 1 Primary / Secondary & SATA Channel 2 Primary / Secondary & SATA Channel 3 Primary / Secondary**

When RAID Configuration -> RAID Enable is set to [Disabled], These items will appear. The relationships between SATA channels and SATA ports on the motherboard are :

SATA Channel 1 Primary is the lower SATA_1 port on the motherboard.

SATA Channel 1 Secondary is the upper SATA_1 port.

SATA Channel 2 Primary is the lower SATA_2 port.

SATA Channel 2 Secondary is the upper SATA_2 port.

SATA Channel 3 Primary is the lower SATA_3 port.

SATA Channel 3 Secondary is the upper SATA_3 port.

► **Drive A**

This option allows you to select which kind of the Floppy Disk Drive is installed in your system. It can be [360KB, 5.25in], [1.2MB, 5.25in], [720KB, 3.5in], [1.44MB, 3.5in] and [2.88 MB, 3.5in].

► **Halt On**

This category determines whether or not the computer will stop if an error is detected during powering on.

All Errors	Whenever the BIOS detects a nonfatal error, the system will stop and you will be prompted.
No Errors	The system boot will not stop for any errors that may be detected.
All, But Keyboard	The system boot will not stop for a keyboard error; but it will stop for all other errors.
All, But Diskette	The system boot will not stop for a diskette error; but it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error, but it will stop for all other errors.

► **Installed Memory**

This category determines whether or not the computer will stop if an error is detected during powering on.

Advanced BIOS Features

```
         Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced BIOS Features
┌─────────────────────────────────────────┬──────────────────────┐
│ ► Removable Boot Priority   Press Enter ▲│       Item Help      │
│ ► Hard Disk Boot Priority   Press Enter  │                      │
│   First Boot Device         Hard Disk    │  Menu Level  ►       │
│   Second Boot Device        CDROM        │                      │
│   Third Boot Device         Removable    │  Select removable boot│
│   Boot Other Device         Enabled      │  device priority     │
│   Boot Up Floppy Seek       Disabled     │                      │
│   Boot Up NumLock Status    On           │                      │
│   Gate A20 Option           Fast         │                      │
│   Typematic Rate Setting    Disabled     │                      │
│ x Typematic Rate (Chars/Sec) 6           │                      │
│ x Typematic Delay (Msec)    250          │                      │
│   Security Option           Setup        │                      │
│   APIC Mode                 Enabled      │                      │
│   MPS Version Control for OS 1.4         │                      │
│   Delay for HDD (Seconds)   0            │                      │
│   Full Screen Logo Show     Enabled      │                      │
│   Small Logo(EPA) Show      Disabled     │                      │
│   Summary Screen Show       Disabled    ▼│                      │
├─────────────────────────────────────────┴──────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│           F5:Previous Values              F7:Optimized Defaults  │
└─────────────────────────────────────────────────────────────────┘
```

► **Removable Device Priority**

This option is used to select the priority for removable device.

► **Hard Disk Boot Priority**

This option is used to select the Priority for HDD startup. After pressing <Enter>, you can select the HDD using the Up/Down arrow keys, and change the HDD priority using <PageUp>/<PageDown>; you can exit this menu by pressing <Esc>.

► **First/Second/Third Boot Device**

These three options allow you to select the priority of boot sequence from different devices.

► **Boot Other Device**

With this function set to enable, the system will boot from some other devices provided that the first/second/third boot devices failed.

► **Boot Up Floppy Seek**

This item controls whether the BIOS will be checking for a floppy drive while booting up. If it cannot detect one (either due to improper configuration or physical unavailability), it will appear an error message. Disabling this function, then POST will not detect the floppy.

► **Boot Up NumLock Status**

This item defines if the keyboard Num Lock key is active when your system is started. The available settings are: On (default) and Off.

► **Gate A20 Option**

This feature determines how Gate A20 is used to address memory above 1MB. When this option is set to Fast, the motherboard chipset controls the operation of Gate A20. But when set to Normal, a pin in the keyboard controller controls Gate A20. Setting Gate A20 to Fast improves memory access speed and thus, overall system speed, especially with OS/2 and Windows. It is recommended that you set it to Fast for faster memory accesses, unless in some Linux systems which setting to Normal is necessary.

► **Typematic Rate Setting**

If this item is enabled, you can use the following two items to see the typematic rate and the typematic delay settings for your keyboard.

► **Typematic Rate (Chars/Sec)**

This item is used to define how many characters per second a hold-down key generated.

► **Typematic Delay (Msec)**

This item is used to define how many delayed milliseconds before a hold-down key begins generating repeat characters.

► **Security Option**

When it is set to "Setup", a password is required to enter the CMOS Setup screen; When it is set to "System", a password is required not only to enter CMOS Setup, but also to start up your PC.

► **APIC Mode**

This item is used to enable or disable APIC **(**Advanced Programmable Interrupt Controller) function.

APIC interrupt subsystems can have as many IRQs as are required in a specific machine. APICs are beneficial for the following reasons :

■ APICs can contribute to resolving resource conflicts in the PC platform.

■ Windows operating systems have been designed with APICs in mind.

■ APICs are necessary for enabling new features in the PCI specification.

► **MPS Version Control for OS** (Multi-Processor Specification)

This feature is only applicable to multiprocessor motherboards as it specifies the version of the MPS that the motherboard will use. The MPS is a specification by which PC manufacturers design and build Intel architecture systems with two or more processors. MPS 1.1 was the original specification. MPS version 1.4 adds extended configuration tables for improved support of multiple PCI bus configurations and greater expandability in the future. In addition, MPS 1.4 introduces support for a secondary PCI bus without requiring a PCI bridge.

If your operating system comes with support for MPS 1.4, you should keep the setting as the default 1.4. You also need to enable MPS 1.4 support if you need to make use of the secondary PCI bus on a motherboard that doesn't come with a PCI bridge.

You should only leave it as 1.1 only if you are running an older operating system that only supports MPS 1.1.

► **Delay For HDD (Seconds)**

This item allows you to select the delay for detecting ATA/ATAPI devices while booting. Time out value: 0~15s.

► **Full Screen Logo Show**

This item allows you to enable or disable full screen logo show.

► **Small Logo(EPA) Show**

This item allows you to enable or disable the EPA logo.

► **Summary Screen Show**

This item allows you to enable or disable the summary screen show.

► **Debug Code Control**

This item allows you to select debug code control mode. Select "LPC", you can use onboard seven segment LED; Select "PCI", you must insert debug card into PCI slot.

Advanced Chipset Features

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                      Advanced Chipset Features

   TOM Limit Under 4GB          2GB                Item Help
   System BIOS Cacheable        Disabled
                                                Menu Level  ►

                                                Set 2GB, if using 4
                                                DIMM












↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values              F7:Optimized Defaults
```
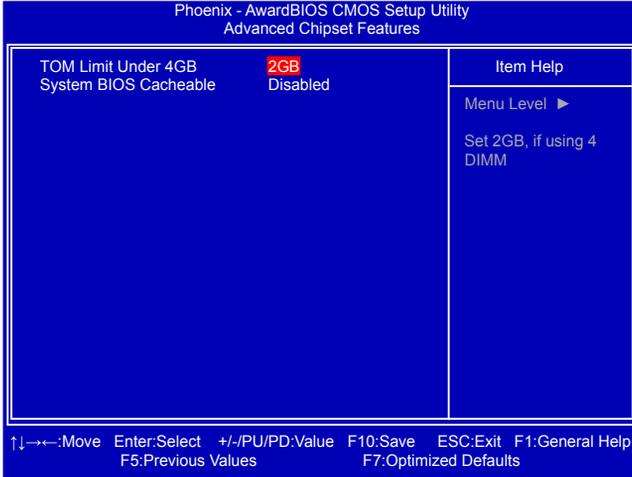
► **TOM Limit Under 4GB**

This item is used to set top of PCI base memory decode limit to 1GB or 2GB or 2.5GB or 3GB.

► **System BIOS Cacheable**

Select "Enabled" to allow caching of the system BIOS which may improve performance. If any other program writes to this memory area, a system error may result.

Integrated Peripherals

```
           Phoenix - AwardBIOS CMOS Setup Utility
                   Integrated Peripherals

 ► IDE Function Setup          Press Enter        Item Help
 ► RAID Configuration          Press Enter
 ► USB Device Setting          Press Enter      Menu Level  ►
 ► OnBoard Device Setting      Press Enter
   OnBoard FDC Controller      Enabled
   OnBoard Serial Port         3F8/IRQ4
   OnBoard IrDA Function        2F8/IRQ3
   IrDA Duplex Mode            Half




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values           F7:Optimized Defaults
```

► **IDE Function Setup / RAID Configuration / USB Device Setting / OnBoard Device Setting**

Press <Enter> to go to relative submenu.

► **OnBoard FDC Controller**

This item is used to enable or disable the onboard floppy disk controller.

► **OnBoard Serial Port**

This item is used to assign the I/O address and interrupt request (IRQ) for the onboard serial port.

► **OnBoard IrDA Function**

This item is used to assign the I/O address and interrupt request (IRQ) for the onboard infrared device.

► **IrDA Duplex Mode**

This item allows you to select the infrared mode of the onboard infrared device.

IDE Function Setup

```
             Phoenix - AwardBIOS CMOS Setup Utility
                     IDE Function Setup

   OnChip IDE Channel              Enabled          Item Help
   IDE DMA Transfer Access         Enabled
   MCP55 SATA Controller           All Enabled      Menu Level  ►
   IDE Prefetch Mode               Enabled
   IDE HDD Block Mode              Enabled




↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
         F5:Previous Values              F7:Optimized Defaults
```
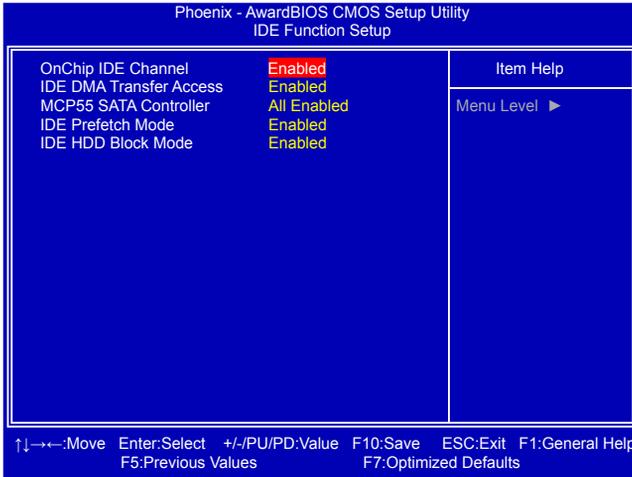
► **OnChip IDE Channel**

This option is used to enable/disable function of IDE drives connected to the PATA interface.

► **IDE DMA Transfer Access**

[Disabled] : to disable DMA transfers for all IDE drives. They will revert to PIO mode transfers.

[Enabled] : to enable DMA transfers for all IDE drives. The proper DMA mode will be detected at boot-up. If the drive does not support DMA transfers, then it will use PIO mode instead.

Recommend leaving this BIOS feature at the default [Enabled] setting.

► **MCP55 SATA Controller**

This option is used to enable the number of SATA. The options are: [All Enabled], [SATA-1+2], [SATA-1], [Disabled].

► **IDE Prefetch Mode**

Enabling IDE prefetching can achieve faster IDE device access.

► **IDE HDD Block Mode**

If your IDE hard drive supports block mode, select [Enabled] for automatic detection of the optimal number of block read/write per sector.

RAID Configuration

```
         Phoenix - AwardBIOS CMOS Setup Utility
                   RAID Configuration

   RAID Enable              Disabled    │      Item Help
 x SATA 1 Primary     RAID  Disabled    │
 x SATA 1 Secondary   RAID  Disabled    │  Menu Level  ►
 x SATA 2 Primary     RAID  Disabled    │
 x SATA 2 Secondary   RAID  Disabled    │
 x SATA 3 Primary     RAID  Disabled    │
 x SATA 3 Secondary   RAID  Disabled    │



↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
           F5:Previous Values              F7:Optimized Defaults
```

► **RAID Enable**

This option is used to enable or disable RAID function.

► **SATA 1 Primary/Secondary RAID & SATA 2 Primary/Secondary RAID & SATA 3 Primary/ Secondary RAID**

These items are valid only when "RAID Enable" is set to Enabled, They are used to enable or disable the RAID function of each SATA port on the motherboard.

The relationships between RAID settings and SATA ports on the motherboard are :

SATA Channel 1 Primary   RAID is the lower SATA_1 port on the motherboard.

SATA Channel 1 Secondary RAID is the upper SATA_1 port.

SATA Channel 2 Primary   RAID is the lower SATA_2 port.

SATA Channel 2 Secondary RAID is the upper SATA_2 port.

SATA Channel 3 Primary   RAID is the lower SATA_3 port.

SATA Channel 3 Secondary RAID is the upper SATA_3 port.

USB Device Setting

```
            Phoenix - AwardBIOS CMOS Setup Utility
                       USB Device Setting

   OnChip USB                  V1.1+V2.0           Item Help
   USB Keyboard Support        Enabled
   USB Mouse Support           Enabled          Menu Level  ►
   USB Storage Function        Enabled




 ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help
            F5:Previous Values                F7:Optimized Defaults
```
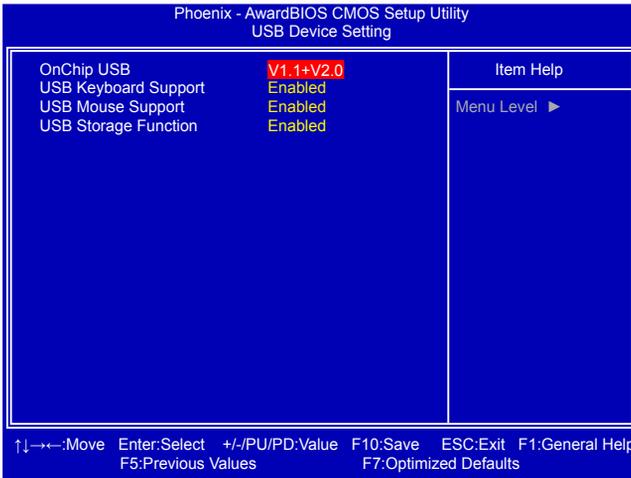
► **OnChip USB**

This item is used to set the USB operation mode. If you select the [V1.1+V2.0], then the USB operation mode is determined by the USB device automatically; Select [V1.1], then the USB device operates at USB 1.1 mode. Select [Disabled], no function at all.

► **USB Keyboard Support**

This item is used to enable the support for USB keyboard in DOS mode. Even if this option is disabled, the USB keyboard is still working under BIOS or Windows environments.

► **USB Mouse Support**

This item is used to enable the support for USB mouse in DOS mode. Even if this option is disabled, the USB mouse is still working under BIOS or Windows environments.

► **USB Storage Function**

This option is used to set whether the USB Mass Storage controller is enabled in a legacy operating system (such as DOS).

OnBoard Device Setting

```
            Phoenix - AwardBIOS CMOS Setup Utility
                      OnBoard Device Setting

   HD Audio Controller         Auto                Item Help
   BCM5786 LAN 1 Controller    Auto
   BCM5786 LAN 2 Controller    Auto             Menu Level  ►
   LAN Boot ROM Controller     Disabled All
   OnBoard SATA Controller     IDE Mode
   OnBoard 1394 Controller     Enabled




 ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help
            F5:Previous Values                F7:Optimized Defaults
```

► HD Audio Controller

This item is used to set whether the HD Audio controller is enabled.

► BCM5786 LAN 1 Controller

This item is used to set whether the onboard LAN 1 controller is enabled.

► BCM5786 LAN 2 Controller

This item is used to set whether the onboard LAN 2 controller is enabled.

► LAN Boot ROM Controller

This item is used to enable or disable the onboard LAN boot optional ROM. A LAN boot ROM lets you set up a diskless workstation on the network. By installing a boot ROM in the network board, you can enable a client PC system on the network to be booted remotely.

► OnBoard SATA Controller

This item is used to set the operating mode of your SATA ports. The available options are:

[IDE] - This configures the SATA ports to support legacy PATA mode or SATA mode.

[AHCI] - The Advanced Host Controller Interface (AHCI) specification describes the register level interface for a Host Controller for Serial ATA. The specification includes a description of the hardware/software interface between system software and the host controller hardware. AHCI provides more advanced features including SATA features, but some SATA drives may not support AHCI, unless they are labeled with AHCI support in its specification.

If your motherboard supporting AHCI, and you have a SATA device, which also supports AHCI, then you can select IDE option to have fair performance (only PATA, SATA level), or you can select AHCI to get its best performance.

WARNING!

With your motherboard and SATA hard disk both supporting AHCI, you had better set this BIOS setting to AHCI, then install your Operating System (such as Windows XP). Later, if you ever change this BIOS setting to IDE, OS still can run.
But if you at the first time set this setting to IDE, then install the Operating System. Later, if you change this BIOS setting to AHCI, this operating system can not run.

[RAID] - When you enable RAID, it means all your SATA drives must also support AHCI.

CAUTION

The Installation procedures for AHCI and RAID drivers are the same, they are :
- Creating a bootable drive (or RAID array).
- Creating a non-bootable drive (or RAID array).

In Chapter 5, only RAID is introduced. AHCI installation is almost the same, the only difference is BIOS "OnBoard SATA Controller" is set to [AHCI] instead of [RAID].

► OnBoard 1394 Controller

This item is used to set whether the onboard 1394 controller is enabled.

Power Management Setup

```
          Phoenix - AwardBIOS CMOS Setup Utility
                Power Management Setup
┌──────────────────────────────────────────┬─────────────────┐
│  ACPI Function              Enabled        │    Item Help    │
│  ACPI Suspend Type          S3(STR)        ├─────────────────┤
│  Soft-Off by Power Button   Instant-Off    │  Menu Level  ►  │
│  PCI PME# from Soft-Off     Disabled       │                 │
│  WOR(RI#) from Soft-Off     Disabled       │                 │
│  USB Resume from S3         Disabled       │                 │
│  Power On by Alarm          Disabled       │                 │
│ x Date of Month Alarm       0              │                 │
│ x Time (hh:mm:ss) Alarm     0 : 0 : 0      │                 │
│  HPET Support               Enabled        │                 │
│  Power On Function          Button Only    │                 │
│ x KB Power On Password      Enter          │                 │
│ x Hot Key Power On          Ctrl-F1        │                 │
│  PWRON after PWR-Fail       Off            │                 │
│                                            │                 │
│                                            │                 │
│                                            │                 │
└──────────────────────────────────────────┴─────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
        F5:Previous Values           F7:Optimized Defaults
```

ACPI (Advanced Configuration and Power Interface) is an open industry standard that defines power and configuration management interfaces between an operating system and the BIOS. In other words, it is a standard that describes how computer components work together to manage system hardware. In order to use this function the ACPI specification must be supported by the OS (for example, Windows 2000 or Windows XP).

ACPI defines five sleeping states, they are :

S1 - The S1 sleeping state is a low wake latency sleeping state. In this state, no system context is lost (CPU or chip set) and hardware maintains all system context. (also called **Power On Suspend**)

S2 - The S2 sleeping state is a low wake latency sleeping state. This state is similar to the S1 sleeping state except that the CPU and system cache context is lost (the OS is responsible for maintaining the caches and CPU context). Control starts from the processor's reset vector after the wake event.

S3 - The S3 sleeping state is a low wake latency sleeping state where all system context is lost except system memory. CPU, cache, and chip set context are lost in this state. Hardware maintains memory context and restores some CPU and L2 configuration context. Control starts from the processor's reset vector after the wake event. (also called **Suspend to RAM**)

S4 - The S4 sleeping state is the lowest power, longest wake latency sleeping state supported by ACPI. In order to reduce power to a minimum, it is assumed that the hardware platform has powered off all devices. Platform context is maintained. (also called **Suspend to Disk**)

S5 - The S5 state is similar to the S4 state except that the OS does not save any context. The system is in the "soft" off state and requires a complete boot when it wakes. Software uses a different state value to distinguish between the S5 state and the S4 state to allow for initial boot operations within the BIOS to distinguish whether or not the boot is going to wake from a saved memory image.

► **ACPI Function**

This item is used to enable or disable the ACPI function.

► **ACPI Suspend Type**

This item is used to set the energy saving mode of the ACPI function. When you select "S1 (POS)" mode, the power is always on and computer can be resumed at any time. When you select "S3 (STR)" mode, the power will be down after a period of time. The status of the computer before it entering STR will be saved in memory, and the computer can quickly return to previous state when the STR function wakes.

When you select "S1&S3", it means OS will automatically take care and assign which mode is the most suitable now.

► **Soft-Off by Power Button**

This item is used to set the power down method. This function is only valid for system using an ATX power supply. When set to [Delay 4 Sec.], the power button will put the system in suspend mode if you push the power button in less than 4 seconds then release. If set to [Instant-Off], the PC power off immediately when the power button is pressed.

► **PCI PME# from Soft-Off**

This item is used to set PCI card such as LAN card or modem card whehter to use the PME (Power Management Event) signal to remotely wake up the system.

► **WOR(RI#) from Soft-Off**

A Ring Indicator (RI) signal from COM port will wake up the system from a soft-off state.

► **USB Resume form S3**

This item is used to wake up the system by a USB keyboard or mouse when it is staying at S3 (Suspend to RAM) state.

► **Power On by Alarm**

This item is used to set the timing of the start-up function. In order to use this function, the start-up password function must be disabled. Also, the PC power source must not be turned off.

► **Date of Month Alarm**

When Power On by Alarm is set to "Enabled", this item can be modified. It is used to set the timing for the start-up date.

► **Time (hh:mm:ss) Alarm**

When Power On by Alarm is set to "Enabled", this item can be modified. It is used to set the timing for the start-up time.

► **HPET Support**

HPET stands for High Precision Even Timer. If you have the HPET disabled, then windows does not have access to it and therefore falls back to less accurate timing methods. This item is used to enable or disable the HPET Support.

► **Power On Function**

This item allows you to use the keyboard or mouse to wake up the system from S3 mode. This feature requires an ATX power supply. The setting values: [Password]; [Hot Key]; [Mouse Move]; [Mouse Click]; [Any Key]; [Button Only] and [Keyboard 98].

► **KB Power On Password**

When "Power On Function" is set to [Password], this item allows you to input a password to wake up the system from S3 mode.

► **Hot Key Power On**

When "Power On Function" is set to [Hot Key], this item allows you to press a [Ctrl] + Function

key to wake up the system from S3 mode.

► PWRON after PWR-Fail

This item is used to set which state the PC will take with when it resumes after an AC power loss.

PnP/PCI Configuration

```
              Phoenix - AwardBIOS CMOS Setup Utility
                      PnP/PCI Configuration

   Init Display First              PCI Slot           Item Help

   Resources Controlled By         Auto            Menu Level ►
 x IRQ Resources                   Press Enter

   ** PCI Express Relative Items **
   Maximum Payload Size            4096




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values              F7:Optimized Defaults
```
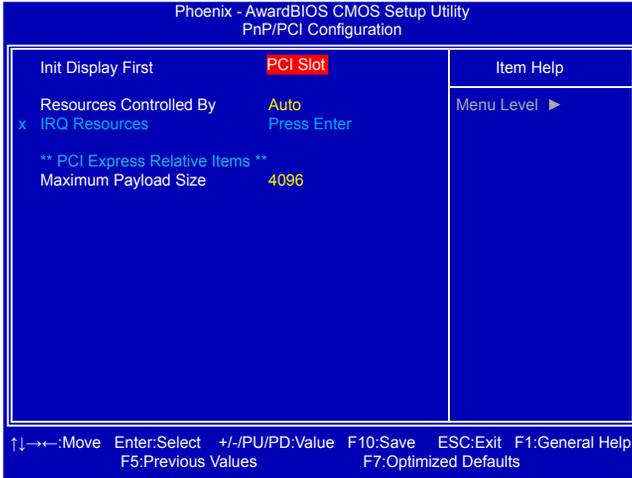
► **Init Display First**

This item is used to choose the initial display device which will be used first when your PC starts up. Options are : [PCI Slot] and [PCIEx].

► **Resources Controlled By**

This item is used to define the system resource control scheme. If all cards are supporting PnP (Plug & Play), then select [Auto] and the BIOS will automatically arrange the interrupt resources. If a PCI card you installed needs a special IRQ, then you need to select [Manual] and assign a specific interrupt for this card.

► **IRQ Resources**

When "Resources Controlled by" is set to "Manual", you can press the <Enter> key, then manually assign the IRQ resources.

** PCI Express relative items **

► **Maximum Payload Size**

This item is used to set maximum Transaction Layer Packets (TLP) payload size for PCI Express devices. The unit is byte.

PC Health Status

```
          Phoenix - AwardBIOS CMOS Setup Utility
                    PC Health Status
┌─────────────────────────────────────┬──────────────────┐
│  Shutdown Temperature      Disabled ▲│    Item Help     │
│  Current CPU Temperature    88°C     │                  │
│  Current NB Temperature     40°C     │  Menu Level  ►   │
│  Current SB Temperature     59°C     │                  │
│  Smart CPU Fan Function     Smart Fan │                 │
│ x Smart CPU Fan Duty Cycle  90%      │                  │
│  Current CPU Fan Speed      2566 RPM │                  │
│  Smart NB Fan Function      Smart Fan│                  │
│ x Smart NB Fan Duty Cycle   90%      │                  │
│  Current NB Fan Speed       10384 RPM│                  │
│  Smart System Fan Function  Smart Fan│                  │
│ x Smart System Fan Duty Cycle 90%    │                  │
│  Current System Fan Speed   0 RPM    │                  │
│  Smart Fan1 Controlled by   CPU Fan Control │           │
│  Current Fan1 Speed         0 RPM    │                  │
│  Smart Fan2 Controlled by   CPU Fan Control │           │
│  Current Fan2 Speed         10074 RPM│                  │
│  Current CPU Voltage        1.20V    │                  │
│  Current CPU VTT Voltage    1.10V  ▼ │                  │
├─────────────────────────────────────┴──────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│          F5:Previous Values           F7:Optimized Defaults │
└─────────────────────────────────────────────────────────┘
```

► **Shutdown Temperature**

This item is used to set the system temperature upper limit. When the temperature exceeds the set value, the system will shut down automatically.

► **Current CPU/NB/SB Temperature**

These items show the current CPU/NB(North Bridge)/SB(South Bridge) temperature detected by the system.

► **Smart CPU Fan Function**

This item is used to set the Smart CPU Fan function. Configuration options are:
[Full Speed], [By Duty-Cycle] and [Smart Fan].

► **Smart CPU Fan Duty Cycle**

It allows you to control the CPU fan by using Duty-Cycle. You can input a value ranging from 0 to 99.

► **Current CPU Fan Speed**

This item shows the Current CPU Fan speed detected by the system.

►**Smart NB Fan Function**

This item is used to set the Smart NB Fan Function. Configuration options are:
[Full Speed, [By Duty-Cycle] and [Smart FAN].

► **Smart NB Fan Duty Cycle**

It allows you to control the NB fan by its Duty-Cycle. You can input a value from 0 to 99.

► **Current NB Fan Speed**

This item shows the Current NB Fan Speed detected by the system.

► **Smart System Fan Function**

It allows you to set the smart System Fan function. Configuration options are:
[Full Speed], [By Duty-Cycle] and [Smart Fan].

► **Smart System Fan Duty Cycle**

It allows you to control the System fan by its Duty-Cycle. You can input a value ranging from 0 to 99.

► **Current System Fan Speed**

This item shows the Current System Fan speed detected by the system.

► **Smart Fan1 Controlled by**

It allows you to set the smart Fan 1 function. The options are: [CPU Fan Control] , [NB Fan Control] and [Sys Fan Control].

► **Current Fan1 Speed**

This item shows the Current Fan 1 speed detected by the system.

► **Smart Fan2 Controlled by**

It allows you to set the smart Fan 2 function. The options are: [CPU Fan Control] , [NB Fan Control] and [Sys Fan Control].

► **Current Fan2 Speed**

This item shows the Current Fan 2 speed detected by the system.

► **Current CPU / CPU VTT / + 3.3V / + 5V / + 12V / SPP/HT / DRAM Voltage**

These items show the current system voltages detected by the system.

► **Voltage Battery**

These items show the + 5.0V / + 12V / + 3.3V / BAT Voltage detected by the system.

3

Quantum BIOS

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                                Quantum BIOS

    ► CPU Feature                 Press Enter      ▲         Item Help
    x  Memory Configuration       Press Enter
    x  All Voltage Control        Press Enter            Menu Level  ►
    ► OC Gear                     Press Enter
       Over Clock Phase Select    O.C. Disabled
       ******* Ratio and Clock Setting *******
       CPU Clock Ratio Unlock     Disabled
    x  CPU Clock Ratio            8 X
    x  CPU Clock Ratio + 0.5x     Disabled
       Target CPU Core Speed      2833MHz
    x  CPU Clock(FSB)             333MHz
    x  CPU Clock vs Memory Speed  Auto
    x  Memory Speed               Auto
       Target Memory Speed        800MHz
       PCI E1x16+E3x16 Slot Clock Auto
       PCI E2x16 Slot Clock       Auto
       LDT Frequency              5x
       SPP and MCP Path Clock     200.0MHz
       ************ Miscellaneous ************  ▼

    ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
                   F5:Previous Values          F7:Optimized Defaults
```

► **CPU Feature / OC Gear**

Press <Enter> to go to each submenu.

► **Memory Configuration / All Voltage Control**

When "Over Clock Phase Select" is set to "Linked Mode" or "Unlinked Mode", these items are valid and then press <Enter> to go to relative submenu.

► **Over Clock Phase Select**

It allows you to select the over clock phase. Setting values: [O.C. Disabled], [Linked Mode], [Unlinked Mode].

*******Ratio and Clock Setting*******

► **CPU Clock Ratio Unlock**

This item is used to enable or disable the CPU clock ratio unlock. If CPU ratio is locked, this item will be hidden.

► **CPU Clock Ratio**

This option is used to set the ratio of an unlocked CPU. When "CPU Clock Ratio Unlock" is set to "Enabled", you can regulate CPU clock ratio.

► **CPU Clock Ratio +0.5x**

When "CPU Clock Ratio Unlock" is set to "Enabled", this item allows you to set the N/2 ratio of an unlocked CPU. If CPU do not support N/2 ratio, this item will be hidden.

► **Target CPU Core Speed**

This item shows target CPU core speed.

► **CPU Clock(FSB)**

When "Over Clock Phase Select" is set to "Linked Mode" or "Unlinked Mode". This item allows you to regulate CPU clock.

► **CPU Clock vs Memory Speed**

When "Over Clock Phase Select" is set to "Linked Mode", this item allows you to set the ratio between CPU clock and memory speed.

► **Memory Speed**

When "Over Clock Phase Select" is set to "Unlinked Mode", this item allows you to adjust memory speed.

► **Target Memory Speed**

This item shows the system memory speed.

► **PCI E1x16 +E3x16 Slot Clock**

This item allows you to adjust the PCI E1 x16 and PCI E3 x16 slot bus clock.

► **PCI E2x16 Slot Clock**

This item allows you to adjust the PCI E2 x16 slot bus clock.

► **LDT Frequency**

LDT means Lightning Data Transfer or HyperTransport.

On an nForce motherboard, LDT is the bus used to connect the NB & SB. This item allows you to adjust the LDT frequency ratio. Default values are: 1x, 2x, 3x, 4x, 5x. The actual LDT bus speed is Path Clock multiplied by LDT frequency ratio.

► **SPP and MCP Path Clock**

This item allows you to adjust the path clock between system platform processor (SPP - NVIDIA 790i NB) and media and communications processor (MCP - NVIDIA 570 SB).

 Miscellaneous

► **Spread Spectrum Control**

Press <Enter> to go to submenu.

► **SLI-Ready Memory**

Memory modules all have a programmable ROM chip that stores the SPD (Serial Presence Detect) information. The function of SPD is to hold the performance capabilities of the memory. This information is typically the optimal memory frequency and timings. Only one set of memory information can be stored on the SPD ROM because of JEDEC specifications. Developed as an extension to the traditional Serial Presence Detect (SPD) found on today's high-perform-ance DIMMS, Enhanced Performance Profiles (EPP) allow memory manufacturers to integrate additional module performance data in the unused portion of the JEDEC standard SPD, allow-ing compatible motherboards to read and take advantage of added performance capabilities. Enhanced Performance Profiles are useful for JEDEC specified modules as manufacturers can have two predefined profiles for the memory modules—conservative and aggressive timings. SLI-Ready Memory settings become available when SLI-Ready/EPP memory modules are detected by the BIOS. The settings include CPUOC 0% to CPUOC 13% and CPUOC MAX. The various settings tells the BIOS the user wants to run the memory modules at the higher speed, and it is alright to overclock the processor by the selected percentage. With the selected option the BIOS will automatically drop the multiplier and increase the Hyper Transport reference clock accordingly. The only thing the BIOS can't do is adjust the CPU voltage so if it goes too high you may run into stability problems if the CPU voltage isn't increased. While memory modules with Enhanced Performance Profiles will work on any motherboard, only motherboards equipped with properly-designed BIOSes, such as those designed for NVIDIA nForce® SLI media and com-munications processors (MCPs), will detect the presence of these new capabilities and prompt the user to set PC boot parameters for guaranteed optimized settings.

CPU Feature

```
┌─────────────────────────────────────────────────────────────────────────────┐
│            Phoenix - AwardBIOS CMOS Setup Utility                             │
│                          CPU Feature                                          │
├──────────────────────────────────────────────────┬──────────────────────────┤
│  EIST Function              Native Mode           │       Item Help          │
│  Limit CPUID MaxVal         Disabled              │                          │
│  C1E Function               Auto                  │   Menu Level  ►          │
│  PECI Function              Disabled              │                          │
│  Execute Disable Bit        Enabled               │                          │
│  Virtualization Technology  Enabled               │                          │
│  Frequency Unlimit          Disabled              │                          │
│  Core Multi-Processing      Enabled               │                          │
│  Cold Bug Boot Fix          Disabled              │                          │
│                                                   │                          │
│                                                   │                          │
│                                                   │                          │
│                                                   │                          │
├──────────────────────────────────────────────────┴──────────────────────────┤
│  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help│
│             F5:Previous Values             F7:Optimized Defaults              │
└─────────────────────────────────────────────────────────────────────────────┘
```

► EIST Function

You can select the EIST (Processor Power Management, PPM) through this item. Setting values: [Native Mode] (For fully support ACPI OS, e.g. Windows XP, Vista); [SMM Mode] (For legacy OS, e.g. Windows 2000) and [Disabled].

⚠ CAUTION

Enhanced Intel SpeedStep® technology (EIST) allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production. There are some system requirements must be met, including CPU, chipset, motherboard, BIOS and operation system. Please refer to Intel website for more information.

► Limit CPUID MaxVal

This item is used to enable or disable CPUID maximum value limit configuration. Set Limit CPUID MaxVal to 3. Should be [Disabled] for WinXP.

► C1E Function

C1E represents Enhanced HALT State. It is a feature which Intel CPU uses to reduce power consumption when in halt state. C1E drops the CPU's multiplier and voltage to lower levels when a HLT (halt) command is issued. This item is used to enable/disable the C1E support.

► PECI Function

PECI stands for Platform Environment Control Interface. The PECI bus, allowing access to this data from chipset components, is a proprietary single-wire interface with a variable data transfer speed (from 2 kbit/s to 2 Mbit/s). From a control standpoint, the main difference between PECI and the previously used thermal monitoring methods is that PECI reports a negative value expressing the difference between the current temperature and the thermal throttle point (at which the CPU reduces speed or shuts down to prevent damage due to overheating) instead of the absolute temperature. For example, for a CPU with maximal temperature of 85 °C and a current temperature reading of 35 °C, the value reported by PECI would be -50 °C.

► **Execute Disable Bit**

This item is used to enable/disable the Execute Disable Bit feature.

Intel's Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system.

Execute Disable Bit allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage and worm propagation. Replacing older computers with Execute Disable Bit-enabled systems can halt worm attacks, reducing the need for virus-related repairs. By combining Execute Disable Bit with anti-virus, firewall, spyware removal, e-mail filtering software, and other network security measures, IT managers can free IT resources for other initiatives.

► **Virtualization Technology**

Virtualization allows a platform to run multiple operating systems and applications in independent partitions or "containers." One physical compute system can function as multiple "virtual" systems. Vanderpool Technology can help improve future virtualization solutions. This item will be displayed only when the CPU is supporting this feature and the setting is used to enable/disable it.

► **Frequency Unlimit**

It means the processor is not ratio locked and has no factory configured maximum ratio limit on the Smithfield XE multi-processing CPU core.

► **Core Multi-Processing**

When disabled, it will disable one execution core of each CPU die. It is going to provide backward compatibility, any way, keeps it enabled.

► **Cold Bug Boot Fix**

When you select liquid Nitrogen to cool down your 45nm CPU, low temperature may force the system fail to power on. This item is used to fix this problem.

Memory Configuration

```
              Phoenix - AwardBIOS CMOS Setup Utility
                        Memory Configuration

   CAS# Latency (tCL)            Auto      6         Item Help
   RAS# to CAS# Delay (tRCD)     Auto      6
   Row Precharge Time (tRP)      Auto      6      Menu Level  ►
   RAS# Active Time (tRAS)       Auto     15
   RAS# to RAS# Delay (tRRD)     Auto      4       CAS# latency (CAS# to
   Row Cycle Time (tRC)          Auto     21       read data valid)
   Write Recovery (tWR)          Auto      7
   Write to Read Delay (tWTR)    Auto     13
   4 Act. Window Delay (tFAW)    Auto     17
   Command Per Clock (CR)        Auto     1T
   Refresh Period (tREF)         Auto    7.8uS




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
            F5:Previous Values              F7:Optimized Defaults
```

► **CAS# Latency (tCL)**

This item controls the CAS latency, which determines the timing delay (in clock cycles) before SDRAM starts a read command after receiving it.

► **RAS# to CAS# Delay (tRCD)**

This item allows you to select a delay time (in clock cycles) between the CAS and RAS strobe signals.

► **Row Precharge Time (tRP)**

This item allows you to select the DRAM RAS precharge time (in clock cycles).

► **RAS# Active Time (tRAS)**

This item allows you to set the precharge delay time (in clock cycles).

► **RAS# to RAS# Delay (tRRD)**

This item allows you to set RAS to RAS Delay (in clock cycles).

► **Row Cycle Time (tRC)**

This item allows you to set Row Cycle Time (in clock cycles).

► **Write Recovery (tWR)**

This item allows you to set Write to Precharge delay (in clock cycles).

► **Write to Read Delay (tWTR)**

This item allows you to set minimum Write-to-read delay (in clock cycles).

► **4 Act. Window Delay (tFAW)**

Try setting this to whatever you use for tRC. Those that are overclocking 8GB of DDR3 may need to loosen this significantly above DDR3 1600 or so.

► **Command Per Clock (CR)**

This item is used to set the Command per clock for your memory (in clock cycles).

► **Refresh Period (tREF)**

This item is used to set refresh period(in clock cycles).

All Voltage Control

```
                 Phoenix - AwardBIOS CMOS Setup Utility
                          All Voltage Control

 ********** Affect CPU MHz **********    ▲   │        Item Help
 CPU Voltage Multiplier      x 1.000         │
 CPU Voltage Setting         1.23750V        │ Menu Level  ►
 CPU Target Voltage          1.23750V        │
 CPU Current Voltage         1.20000V        │ Target CPU Voltage
 CPU Default Voltage         1.23750V        │ equal to "CPU Voltage
 CPU Vdroop Compensation     Disabled        │ Multiplier" x "CPU
                                             │ Voltage Setting". The
 ********** Affect FSB MHz **********        │ maximum Target CPU
 CPU PLL Voltage Setting     1.507V          │ Voltage is 2.440V
 CPU VTT Voltage Setting     1.100V          │ Recommand below 1.6V
 CPU GTL Ref. 0 Voltage      Default         │ for aircooling, below
 CPU GTL Ref. 1 Voltage      Default         │ 1.8V for watercooling.
 CPU GTL Ref. 2 Voltage      Default         │  !!! Warning
 CPU GTL Ref. 3 Voltage      Default         │ adjusting the "Target
 nForce SPP/HT Voltage       1.321V          │ CPU Voltage" beyond
 nForce SPP Clockgen Voltage 2.5186V         │ the default CPU
 nForce MCP Voltage Setting  1.500V          │ voltage could result
                                        ▼    │ in damage to the CPU

 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
         F5:Previous Values             F7:Optimized Defaults
```

**********Affect CPU MHz**********

► CPU Voltage Multiplier

This item is used to set CPU Voltage Multiplier.

► CPU Voltage Setting

This item is used to set CPU Voltage.

► CPU Target/Current/Default Voltage

These items show the Target/Current/Default CPU Voltage.

Note: The Target CPU Voltage equals to "CPU Voltage Multiplier" multiplied by "CPU Voltage Setting" .The maximum Target CPU Voltage is 2.440V. Recommend below 1.6V for aircooling, below 1.8V for watercooling.

► CPU Vdroop Compensation

This item is used to enable or disable CPU Vdroop compensation.

**********Affect FSB MHz**********

► CPU PLL Setting

This item is used to set core voltage level for CPU PLL.

► CPU VTT Voltage Setting

This item is used to set CPU VTT Voltage.

► CPU GTL Ref. 0/1/2/3 Voltage

These items are used to adjust CPU GTL reference voltage.

► nForce SPP/HT Setting

This item is used to set core voltage level for nForce SPP 1.2V and Hyper Transport voltage.

► nForce SPP Clockgen Setting

This item is used to set core voltage level for nForce SPP 2.5V.

► nForce MCP Voltage Setting

This item is used to adjust core voltage level for nForce MCP.

*********Affect Memory MHz*********

► DRAM Voltage Setting

This item is used to set voltage level for DRAM.

► DRAM Ref. 0 Voltage

This item is used to set north bridge Gunning Transceiver Logic(GTL) reference voltage.

► **DRAM Ref. 1 Voltage**

This item is used to set system memory pull-up reference voltage.

► **DRAM Ref. 2 Voltage**

This item is used to set system memory pull-down reference voltage.

► **DRAM Ref. 3 Voltage**

This item is used to set system memory controller reference voltage.

OC Gear

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                                  OC Gear

      ************** OC Gear **************          │    Item Help
      Current Storage Gear          Not Use It       │
    x Store My Setting              Store             │ Menu Level  ►
    x Restore My Setting            Restore           │
    x Clear My Setting              Clear             │ Choose storage section
                                                      │ 1 - 8 to store your
      ********** Foxconn Function **********          │ over clock setting.
      Smart Boot Menu               Disabled          │ If you store your
      Smart Power LED               Enabled           │ setting to current
      Software Item Selecting       BIOS ROM 1        │ Storage Gear
                                                      │ successfully, then the
                                                      │ Storage Gear will
                                                      │ turn to Green color
                                                      │ If you clear the
                                                      │ Current Storage Gear
                                                      │ successfully, then the
                                                      │ color will turn back
                                                      │ to normal.

    ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
                 F5:Previous Values              F7:Optimized Defaults
```

**************OC Gear***************

► **Current Storage Gear**

We have more spaces in CMOS to allow you to store up to 8 sets of BIOS configuration data. You can change any setting of BIOS, including the overclocking information, and save the whole BIOS settings to one of eight storage area. Later, you can retrieve BIOS settings by restore it. This item is used to choose storage section to store your BIOS settings. Setting values: [Not Use It], [Storage Gear 1 - 8] .

► **Store/Restore/Clear My Setting**

When "Current Storage Gear" is set to [Storage Gear 1 - 8]. This item allows you to Store/Restore/Clear the BIOS settings.

**********Foxconn Function*********

► **Smart Boot Menu**

When PC starts, if [Enabled] is selected, a Boot Menu will be automatically displayed to inform you to select a boot device. If no device is selected, the first device will be used. If [Disabled] is selected, then PC will ask you to press [Esc] key to get into Boot Menu. This setting simplifies multiple boot devices user from pressing [Esc] key to enter boot menu.

► **Smart Power LED**

Smart Power LED is a feature built on your motherboard to indicate different states during Power On Self Test (POST). The LED is located at the front panel, and it displays POST state by different long-short blinking intervals. You can always leave this state enabled.

System Status	Power LED Status	Stop Blinking Condition
Normal	Always On	Always On
No Memory	Continue blinking On (1sec.), Off (1sec.)	Reboot & Memory OK
No Display	Continue blinking On (2sec.), Off (2sec.)	Reboot & Display OK
Post Error Message	Quick blinking twice (1/3sec. On, 1/3sec. Off), one long On (1sec.), continuously.	Enter Setup or Skip
No CPU Fan	Continue blinking On (1/2sec.), Off (1/2sec.)	Reboot & Fan OK

► **Software Item Selecting**

When BIOS_SELECT jumper, which is on the motherboard, is set to 5-6 or 7-8, you can select the power-on boot BIOS by this item. Its default is BIOS ROM 1.

Spread Spectrum Control
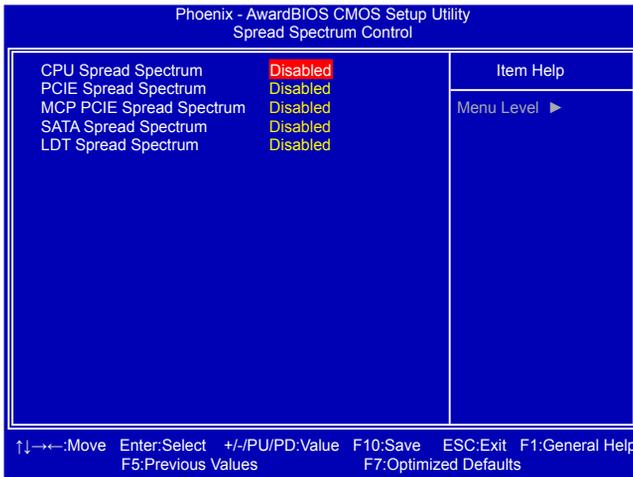
► **CPU Spread Spectrum**

This option is used to enable or disable clock generator spread spectrum. If you enabled this function, it can significantly reduce the EMI (Electromagnetic Interference) generated by the system, so to comply with FCC regulation. But if overclocking is activated, you had better disable it.

► **PCIE Spread Spectrum & MCP PCIE Spread Spectrum**

This option is used to enable or disable the PCIe spread spectrum function. If you enabled this function, it can significantly reduce the EMI (Electromagnetic Interference) generated by the system, so to comply with FCC regulation.

► **SATA Spread Spectrum**

This option is used to enable or disable the SATA spread spectrum function. If you enabled this function, it can significantly reduce the EMI (Electromagnetic Interference) generated by the system, so to comply with FCC regulation.

► **LDT Spread Spectrum**

This option is used to enable or disable the LDT spread spectrum function. If you enabled this function, it can significantly reduce the EMI (Electromagnetic Interference) generated by the System, so to comply with FCC regulation.
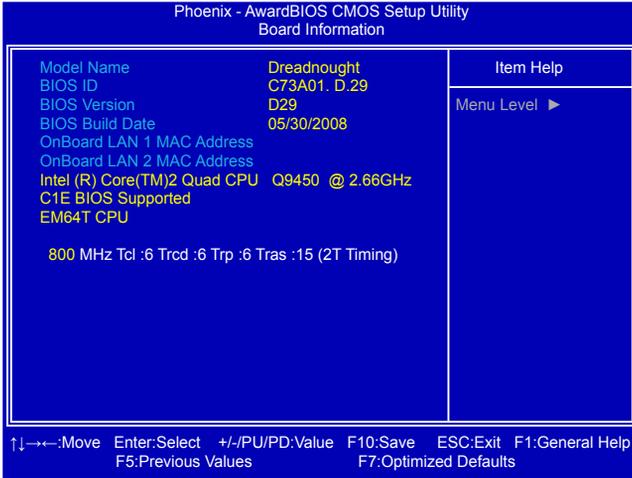
Board Information

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                              Board Information

    Model Name                 Dreadnought          │    Item Help
    BIOS ID                    C73A01. D.29          │
    BIOS Version               D29                   │   Menu Level  ►
    BIOS Build Date            05/30/2008            │
    OnBoard LAN 1 MAC Address                        │
    OnBoard LAN 2 MAC Address                        │
    Intel (R) Core(TM)2 Quad CPU   Q9450  @ 2.66GHz  │
    C1E BIOS Supported                               │
    EM64T CPU                                        │
                                                     │
     800 MHz Tcl :6 Trcd :6 Trp :6 Tras :15 (2T Timing)

    ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save    ESC:Exit  F1:General Help
                F5:Previous Values            F7:Optimized Defaults
```

► Model Name

This item shows the model name.

► BIOS ID

This item shows the BIOS ID.

► BIOS Version

This item shows the BIOS version.

► BIOS Build Date

This item shows the BIOS building date.

► OnBoard LAN 1/2 MAC Address

This item shows the onboard LAN 1/2 MAC address.

Load Optimized Defaults

Select this option and press <Enter>. A dialogue pops out, select
<Y> then press <Enter> to load the defaults; press <N> to skip.
By this default, BIOS have set the optimized performance
parameters of system to improve the performances of system

Load Optimized Defaults (Y/N)? N

components. But if the optimized performance parameters to be set cannot be supported by your
hardware devices, the system may fail to work. It may happen on when you installed too many
add-on cards on your system, or overloaded the hardware until it can not afford.
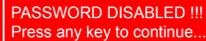
Set Supervisor Password

The access rights and permissions associated with the Supervisor password are higher than those
of a regular User password. The Supervisor password can be used to start the system or modify
the CMOS settings, while User password can only be used to start the system, view the CMOS
settings, but modify CMOS settings is not allowable.

When you select the Set Supervisor/User Password option, the
Enter Password message will appear :

Enter Password:

The supervisor password can be set up through this menu.
Key in a password, not exceeding 8 characters, save the change
and exit. The next time, when you enter the BIOS, it will ask you

PASSWORD DISABLED !!!
Press any key to continue...

to input this password to confirm your access right. After you get the right to access the BIOS,
you then can select this setting again, and press <Enter> to disable this function or input a new
password to replace the original one.

If you select "System" for the Security Option in "Advanced BIOS Features" menu, then you will
be asked to enter a password when the system is started or when you try to enter the CMOS set-
ting program. If an incorrect password is entered, you will be hold there.
If you select "Setup" for the Security Option in "Advanced BIOS Features" menu, you will be
asked to enter a password only when you enter the CMOS setting program.

Set User Password

The user password can be set up through this menu. Only when there exists a Supervisor pass-
word, then this setting can be activated.

Save & Exit Setup

When you select this option and press <Enter>,
Select <Y> to save your changes to CMOS and exit the program;
Select <N> or <ESC> to return to the main menu.

SAVE to CMOS and EXIT (Y/N)? Y

Exit Without Saving

If you select this option and press <Enter>,
Select <Y> to exit CMOS without saving your modifications;
Select <N> or <ESC> to return to the main menu.

Quit Without Saving (Y/N)? N

4

The utility CD that came with the motherboard contains useful software and several utility drivers that enhance the motherboard features.

This chapter includes the following information :

■   Utility CD Introduction
■   AEGIS PANEL
■   FOX LiveUpdate
■   FOX DMI
■   FOX LOGO

Note : Because each module is independent, so the section number will be reorganized and unique to each module, please understand.

Utility CD Introduction

This motherboard comes with one Utility CD. To begin with, simply insert the CD into your CD drive. The CD will automatically run and display the main menu on the screen.

1. Install Driver
Click on "**Install Driver**", then use these options to install all the necessary drivers for your motherboard. You need to restart your computer after finishing all the installations of drivers.

Chipset driver
Use it to install NVIDIA chipset driver.

Realtek Audio drivers
Use it to install Realtek Audio driver.

Broadcom LAN driver
Use it to install Broadcom LAN driver.

Jmicron Raid drivers
Use it to install JMicron RAID drivers. JMircon provides two external SATA ports. Due to limitation

57

of RAID interface on JMircon, we recommend you building RAID system by using onboard SATA ports instead of JMicron.

Microsoft DirectX 9.0C
Use it to install Microsoft DirectX 9.0C driver.

2. Software
Use these options to install additional software programs.

AEGIS PANEL
Foxconn new utility software for monitoring system information. See "AEGIS PANEL" for details.

Fox LiveUpdate
The Fox LiveUpdate allows you to backup or update the system BIOS, drivers and utilities in Windows® environment. See "Fox LiveUpdate" for details.

FOX DMI
The FOX DMI is a full Desktop Management Interface viewer, and it provides three DMI data formats. See "FOX DMI" for details.

Adobe Reader
Installs Adobe® Acrobat® Reader that is used for viewing and printing the PDF document.

FOX LOGO
The FOX LOGO is a simple and useful utility to backup, change and delete the boot time Logo. See "FOX LOGO" for details.

Norton Internet Security
Installs Norton® Internet Security to protect your PC from being affected by viruses.

3. Create RAID Driver Floppy

This section is helping you to create a floppy diskette with JMicron RAID driver. You need to create this diskette from another PC. Due to limitation of RAID interface on JMircon, we recommend you building RAID system by using onboard SATA ports instead of JMicron.

Create (32bit) JMicron SATA RAID Floppy

Allows you to create (32bit) JMicron SATA RAID Floppy.

Create (64bit) JMicron SATA RAID Floppy

Allows you to create (64bit) JMicron SATA RAID Floppy.

4. Browse CD

Click it to browse the CD content.

AEGIS PANEL

This is Foxconn's new utility software. Aegis Panel is a Windows innovation tool to provide fan control, alarm function and system monitoring information such as fan speed, temperature, voltage and CPU clock etc..

The powerful features are:

        Overclocking (OC)
        HWM INFO. (Hardware Monitor Information)
        ALARM
        CONFIG

Supported Operating Systems :
        -Windows 2000
        -Windows XP (32-bit and 64-bit)
        -Windows 2003 (32-bit and 64-bit)
        -Windows Vista (32-bit and 64-bit)

Using AEGIS PANEL:

1. Main Panel

Hazard Light

Open/Close main panel to view CPU clock

Open/Close the right panel

Open/Close the left panel

Open/Close control panel for detail operation

Minimize Aegis Panel to taskbar

Hide Aegis Panel and put it to the System Tray

Visit Foxconn's website

Get help
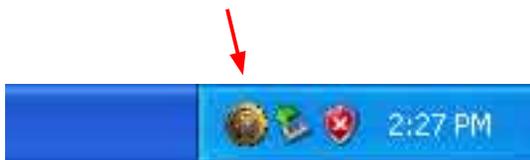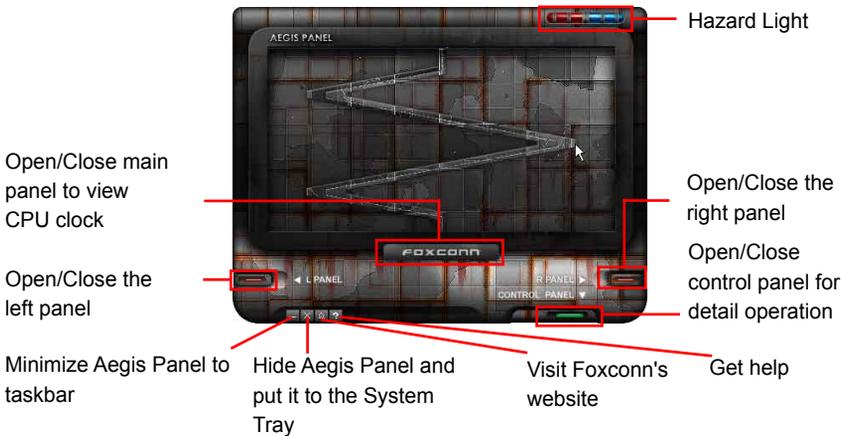
Aegis is a very important system monitoring program, so when you click cross icon on it, Aegis only goes to notification area of the system tray, but does not stop running. If you really want to close it, you must right click on it on the notification area, and select exit to make it.

Open :   Open Aegis Panel main panel on the screen.
Configure : Open Aegis Panel and directly enter configure mode.
Exit :   Close Aegis program.

2. Overclocking

Click on "Foxconn" button to open/close the display screen. The information of CPU, memory, and PCIE clocks are displayed.

Open/Close screen

Click on Control Panel button, and its panel appears. Then click on OC button to visit Overclocking menu which allows you to overclock your CPU and PCIE bus manually.

Control Panel button

OC button

3. HWM INFO. (Hardware Monitor Information)

Click on "HWM INFO." button to display the fan's information. In this fan control panel, you can configure five different fan's speeds.

Fan icon →

HWM INFO button
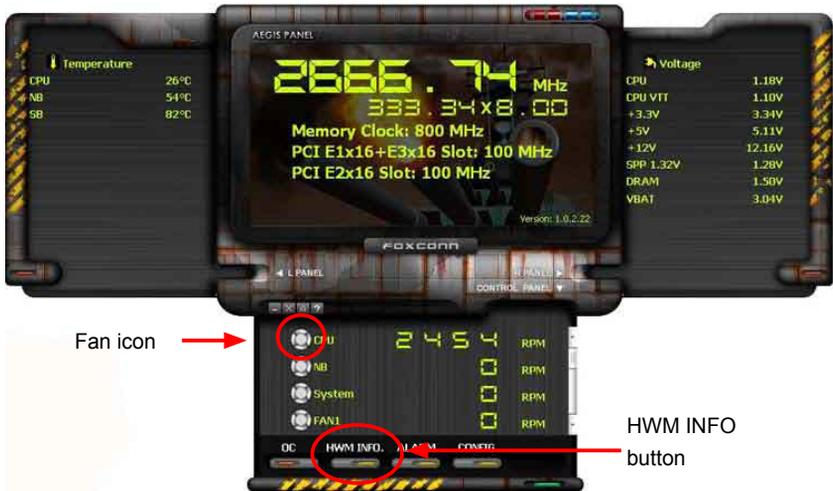
Fan Operations

Click on fan icon to configure each fan's function.

ON/OFF Mode:

Only ON/OFF is available for fan speed choice.

Close this page →

SmartGuardian Mode :

Software: You can set the fan's speed by adjusting a PWM Value. This value can be selected from 0 to 127.

Automatic: The fan operates by following the below defined values.

Start Temperature:

It allows you set a value from which the smart fan starts its operation.

Start PWM Value:

It allows you to set an initial PWM value to drive the fan when the Start Temperature value is reached and smart fan begins its operation. The higher the PWM value can achieve the faster fan speed.

Full-Speed Temperature:

When the temperature gets over this value, the fan will run at its full speed.

Slope PWM Value:

To define the slope of PWM when the temperature changes. The higher the slope is, the faster the fan speed changes.

FAN1 and FAN2 only copy their working models from one of CPU Fan, System Fan and NB Fan, and they do not own their detailed settings.

4. ALARM

Click "ALARM" button to trigger the warning events. It allows you to set the low/high limits of the monitoring sensors. You can select a particular sensor to be watched carefully, or choose them all.

If the monitoring value is lower than the low limit or higher than the high limit, and the Action item in the CONFIG menu is set to "Ask Me", then you can hear a buzzer sounds and the hazard light is blinking. Click OK/Cancel button in the popped up HMW Alarm screen to acknowledge/cancel the warning. If OK is pressed, the relative item will be displayed by red on the "HWM INFO" screen.

Hazard light

63

5. CONFIG

Click "CONFIG" button to configure Aegis function. (Recommend using default values if possible).

Go to System Tray

CONFIG button

Fahrenheit / Celsius scales :
You can select temperature scales between them.

External / OnBoard Speaker :
It allows you to choose the warning tone devices.

Refresh Interval :
It is used to select the interval of refreshing the current monitoring information such as the CPU clock, temperature, voltage etc.. (Unit: second per times)

Action when exceed the limitations :
It provides you four action items to handle events.
> **Ask Me** : Default. Pop out HWM Alarm screen, and red mark item on HWM INFO. display.
> **Ignore** : Just red mark current item, no HMW Alarm screen is displayed.
> **Disable** : No HMW Alarm screen and no red mark.
> **Shutdown** : The computer will be shut down after 10 seconds if selected.

Launch "Aegis Panel" on startup :
The Aegis Panel will be automatically started after the Windows operating system is activated.

Hidden tray icon :
Hide Aegis from the system tray display.

FOX LiveUpdate

FOX LiveUpdate is a useful utility to backup and update your system BIOS, drivers and utilities by local or online.

Supporting Operating Systems :
- ■ Windows 2000
- ■ Windows XP (32-bit and 64-bit)
- ■ Windows 2003 (32-bit and 64-bit)
- ■ Windows Vista (32-bit and 64-bit)

Using FOX LiveUpdate :

1. Local Update

1-1 Local Update - BIOS Information
This page lets you know your system BIOS information.

Link to website   Minimum

Exit

Toolbar

Show current BIOS information
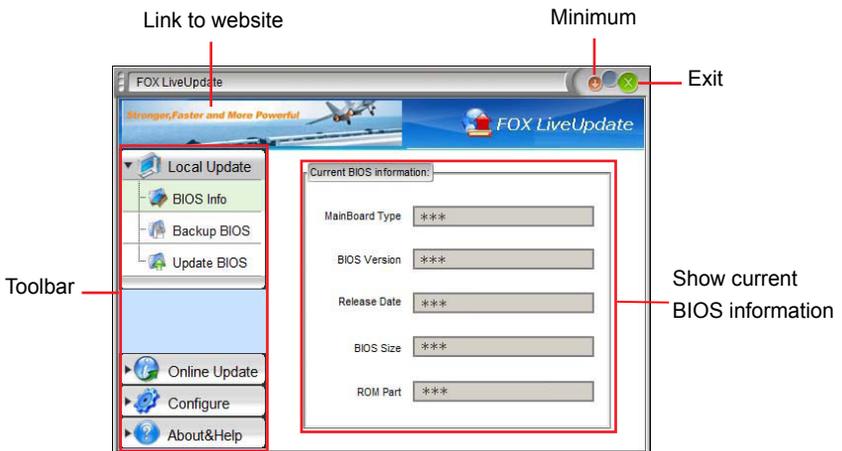
*** : please refer to the physical motherboard for detail.

1-2 Local Update - Backup

This page can backup your system BIOS. You can click "Backup", and key in a file name, then click "Save" to finish the backup operation. The extension of this backup file is ".BIN" for Award BIOS and ".ROM" for AMI BIOS. Default directory is "C:\Desktop\My Documents" in Windows XP and "Documents" in Vista. Make sure you can remember the file name together with the directory which it is stored, prevented that you may need them to recover your BIOS later.
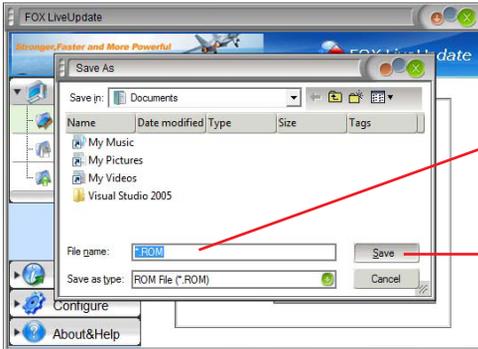
Key in a BIOS name

Click here

1-3 Local Update - Update

This page helps you to update your BIOS from a local file. After click "Update", An alert message will be displayed to ensure if you really want to continue, click "Yes" to confirm. A setup wizard will guide you to load a local BIOS file to finish the operation. You must remember from which directory to load your new BIOS file (with an extension of ".BIN" for Award BIOS, ".ROM" for AMI BIOS) before the setup wizard starts.
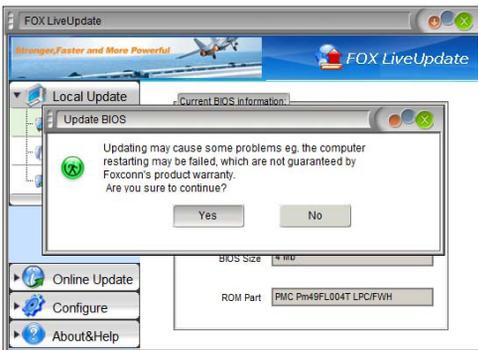
FOX LiveUpdate can automatically backup old BIOS before update. This feature can be enabled in the "Configure-System" setup. Please refer to "Configure-System" section for more detail. The default backup directory is C:\LiveUpdate_Temp, but the backup file name will be automatically generated. It is hard to find it out from a backup directory, and we recommend you using Explorer to check date/time message of this backup file to find it out and write its name down to remember it.

2. Online Update

2-1 Online Update - Update BIOS

This page lets you update your system BIOS from Internet. Click "start", it will search the new BIOS from Internet. Then follow the wizard to finish the update operation.

Click here

Current information

Search new BIOS from Internet

Select BIOS to update

Browse detailed information

Update BIOS

Close the window
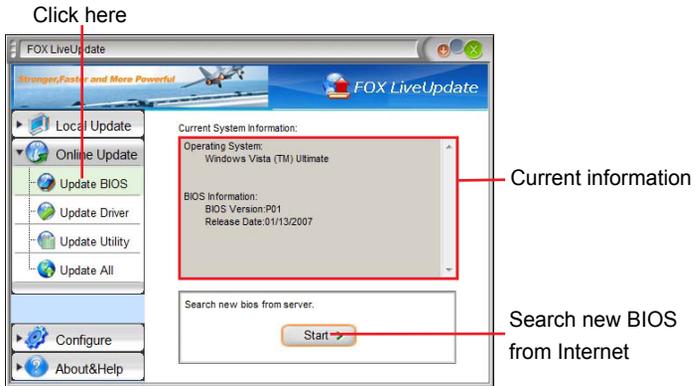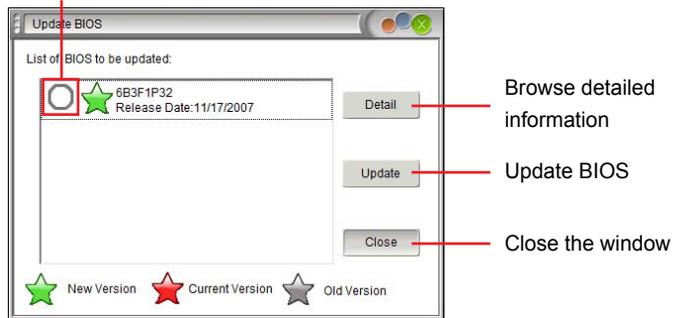
2-2 Online Update - Update Driver

This page lets you update your system drivers from Internet. Click "start", it will search the new drivers from Internet. Then follow the wizard to finish the update operation.

Click here

Current information

Search new drivers from Internet
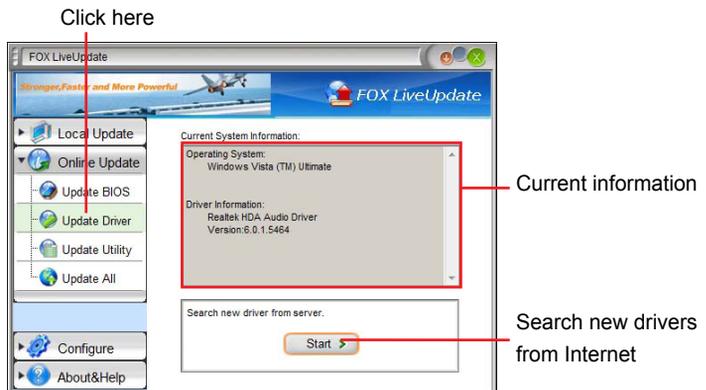
Select the driver to update
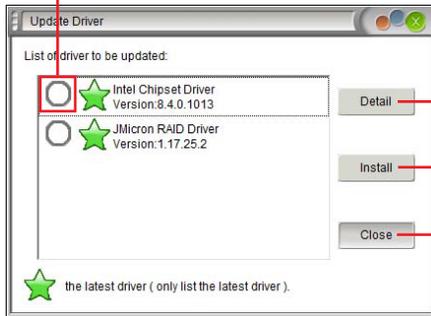
Browse detailed information

Install the selected driver

Close the window

2-3 Online Update - Update Utility

This page lets you update utilities from Internet. Click "start", it will search the new utilities from Internet. Then follow the wizard to finish the update operation.

Click here
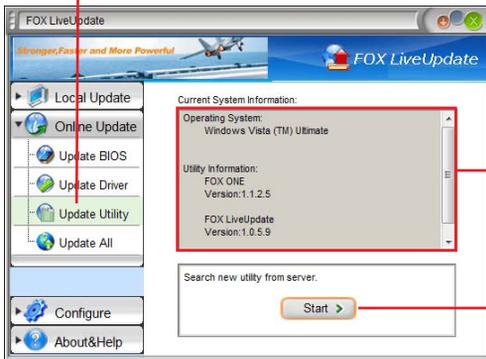
Current information

Search new utilities from Internet

Select the utility to update
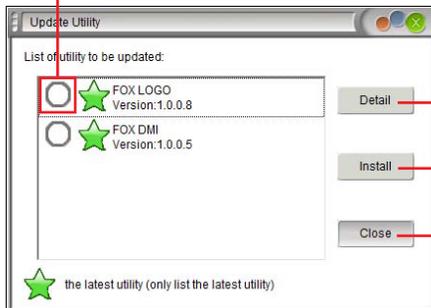
Browse detailed information

Install the selected utility

Close the window

2-4 Online Update - Update All

This page lets you update your system drivers from Internet. Click "start", it will search all new BIOS/drivers/utilities from Internet. Then follow the wizard to finish the update operation.

Click here

Current information

Search all new BIOS/ drivers/utilities from Internet

Browse detailed BIOS information

Browse detailed driver information

Browse detailed utility information
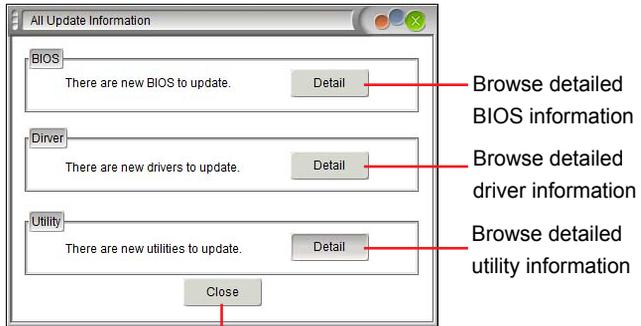
Close the window

3. Configure

3-1 Configure - option

This page lets you set auto search options. After you enable the auto search function, FOX LiveUpdate will start its searching from Internet and if any qualified item found, it will pop out a message on the task bar to inform you to do the next step.

Click here
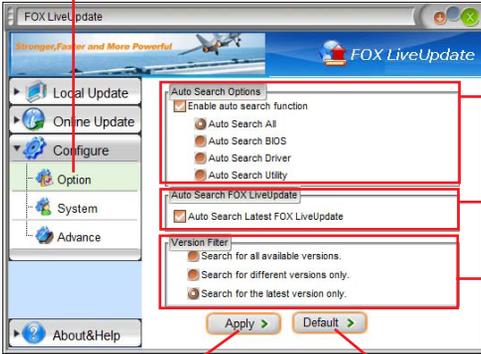
Set auto search options

Set auto search the latest FOX LiveUpdate

Select search which kind of versions

Apply the changes   Reset to default value

Double click on the icon as show below, you can see the detailed information.

Double click here

When you enable "Auto Search FOX LiveUpdate", if your FOX LiveUpdate version is older, it will auto search from internet and prompt you to install the new version.

Prompt you to install the new FOX LiveUpdate

4
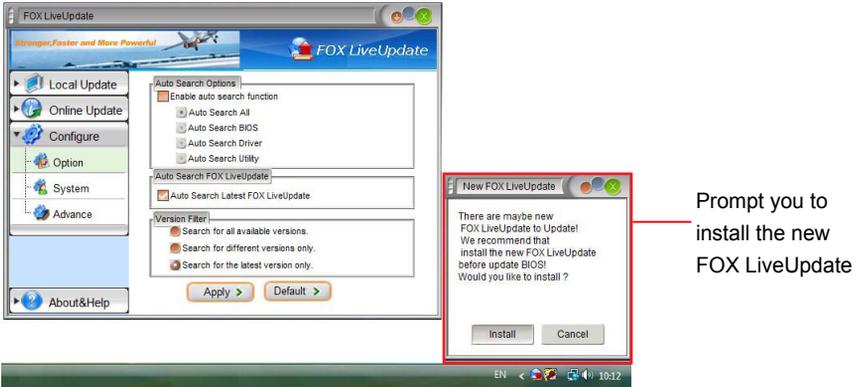
3-2 Configure - System

This page lets you set the backup BIOS location and change different skin of the FOX LiveUpdate utility.

Click here

Set the location of download files or auto backup BIOS

Select different skin of the software

Reset to default value

Determine if the FOX LiveUpdate can auto run when the system starts up

Apply the changes
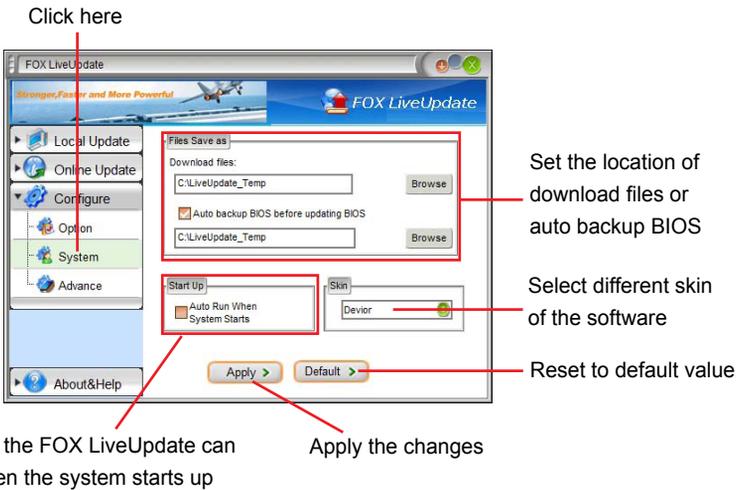
3-3 Configure - Advance

This page lets you select to flash BIOS / Boot Block and clear CMOS. If you choose Flash Boot Block, it means BIOS is not protective, and you must make sure the flash process is continuous and without any interruption.

Click here

Select which BIOS ROM to flash(Only available to motherboard with backup BIOS ROM)

Select to flash Boot Block

Select to clear CMOS

Apply the changes   Reset to default value

CAUTION

We recommend that you should better keep the default setting unchanged to avoid any damage.

4. About & Help

This page shows some information about FOX LiveUpdate.

Click here

Show information about FOX LiveUpdate

FOX DMI

FOX DMI is a full Desktop Management Interface viewer, and it provides three DMI data formats : Report, Data Fields and Memory Dump.
With DMI information, system maker can easily analyze and troubleshoot your mother-board if there is any problem occurred.

Supporting Operating Systems :

- ■ Windows 2000
- ■ Windows XP (32-bit and 64-bit)
- ■ Windows 2003 (32-bit and 64-bit)
- ■ Windows Vista (32-bit and 64-bit)

Using FOX DMI:

Please operate this utility as the comments shows.

Click here to select the type you want to view.

Click here to select the DMI Data format you need
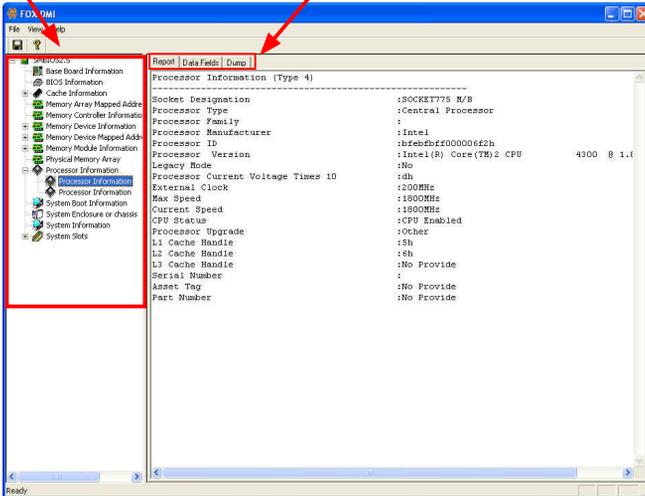
FOX LOGO

FOX LOGO is a simple and useful utility to backup, change and delete the boot time Logo. The boot Logo is the image that appears on screen during POST (Power-On Self-Test).

You can prepare a JPG image (1024x768) file, then use FOX LOGO to open it and change the boot time Logo. Boot time Logo will be displayed if you enable the BIOS "Full Screen Logo Show" setting in "Advanced BIOS Features" menu.

Supporting Operating Systems :
■   Windows 2000
■   Windows XP (32-bit and 64-bit)
■   Windows 2003 (32-bit and 64-bit)
■   Windows Vista (32-bit and 64-bit)

Using FOX LOGO:

Main Page

> **WARNING!**
>
> When you change Logo or delete current Logo, the system will flash BIOS file automatically. During this time, please DO NOT shut down the application and the system, or the motherboard will be damaged seriously.

5

This chapter will cover two topics :

- Creating a Bootable Array - Installing a new Windows XP (Vista) in a brand new RAID system.
- Creating a Non-Bootable Array - Existing Windows XP (Vista) system with new RAID built as data storage.

It includes the following information :

- RAID Configuration Introduction
- NVIDIA MediaShield Driver
- Create a RAID Driver Diskette
- RAID Enable in BIOS
- Select a RAID Array for Use
- Install a New Windows XP
- Setting Up a Non-Bootable RAID Array

The RAID BIOS Setup pictures shown in this chapter are for reference only, please refer to the practical screen.

Creating a Bootable Array - Installing a new Windows XP (or Vista) in a brand new RAID system.

1. Follow 5-1 to create a RAID driver diskette.
2. Follow 5-2 to set RAID enabled in BIOS.
3. Follow 5-3 to select a RAID array for use.
4. Follow 5-4 to Install a new Windows Operating System.

What kinds of hardware and software you need here :
1. A floppy drive.
2. A CD-ROM drive.
3. Several SATA hard disks.
4. A RAID driver diskette.
5. A motherboard driver CD.
6. Windows XP or Vista Install CD.

Creating a Non-Bootable Array - Existing Windows XP (or Vista) system with new RAID built as data storage.

Follow 5-5 to go through the processes to build a new RAID array in your existing Windows XP system, it includes :
1. Set RAID enabled in BIOS.
2. Follow 5-3 to select a RAID array for use.
3. Run setup program to install NVIDIA RAID driver into your current Windows XP system.
4. Use Administrative Tools in Control Panel to format new RAID array.

What kinds of hardware and software you need here :
1. A CD-ROM drive.
2. Several SATA hard disks.
3. A motherboard driver CD.

RAID Configuration Introduction

RAID (Redundant Array of Independent Disks) is a method for computer data storage schemes that divide and/or replicate data among multiple hard drives. RAID can be designed to provide increased data reliability (fault tolerance) or increased I/O (input/output) performance, or both. The following RAID configurations are provided for users.

There are three major key concepts in RAID:
1. Mirroring : The copying of data to more than one disk;
2. Striping : The splitting of data across more than one disk;
3. Error correction : Where redundant data is stored to allow problems to be detected and possibly fixed (known as fault tolerance).

Different RAID levels use one or more of these techniques, depending on the system requirements. The main aims of using RAID are to improve reliability, important for protecting information that is critical to a business, for example a database of customer orders; or where speed is important, for example a system that delivers video on demand TV programs to many viewers.

The configuration affects reliability and performance in different ways. The problem with using more disks is that it is more likely that one will go wrong, but by using error checking the total system can be made more reliable by being able to survive and repair the failure. Basic mirroring can speed up reading data as a system can read different data from both the disks, but it may be slow for writing if it insists that both disks must confirm that the data is correctly written. Striping is often used for performance, where it allows sequences of data to be read off multiple disks at the same time. Error checking typically will slow the system down as data needs to be read from several places and compared. The design of RAID systems is therefore a compromise and understanding the requirements of a system is important. Modern disk arrays typically provide the facility to select the appropriate RAID configuration.

RAID is often used in high availability systems, where it is important that the system keeps running as much of the time as possible.

RAID 0 (Striped)

RAID 0 reads and writes sectors of data interleaved among multiple drives. If any disk member fails, it affects the entire array. The disk array data capacity is equal to the number of drive members times the capacity of the smallest member. RAID 0 does not support fault tolerance.

RAID 1 (Mirror)

RAID 1 writes duplicate data onto a pair of drives and reads both sets of data in parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to redundancy, the drive capacity of the array is the capacity of the smallest drive.

RAID 5 (Parity)

RAID 5 provides data striping at the byte level and also stripes error correction information. This results in excellent performance and good fault tolerance. Level 5 is one of the most popular implementations of RAID.

RAID 0+1 (Striped Mirror)

RAID 10 is a combination of striping and mirroring. This configuration provides optimal speed and reliability, but you need four SATA hard disks.

Spanning (JBOD)

JBOD stands for "Just a Bunch of Disks". Each drive is accessed as if it were on a standard SCSI host bus adapter. This is useful when a single drive configuration is needed, but it offers no speed improvement or fault tolerance. A spanned volume is a formatted partition which data is stored on more than one hard disk, yet appears as one volume. Unlike RAID, spanned volumes have no fault-tolerance, so if any disk fails, the data on the whole volume could be lost. Additionally, the system or boot partitions cannot be included in a spanned volume. FAT16/32 and NTFS file systems may be used, and the volume can span up to 32 hard disks.

Comparison Table :

Solution	Hard Disks No.	Capacity	Performance	Reliability	Application
RAID0	>=2	All	Highest	Dangerous	Look for speed
RAID1	2	50%	Read faster	Excellent	100% Data backup
RAID5	>=3	N-1	Read faster Write slower	Good	Limited budget
RAID0+1	>=4 (Even number)	Smallest *2	High	Excellent	Unlimited budget
Span	>=1	All	none	Dangerous	Big disk space

NVIDIA® MediaShield Driver

The NVIDIA® MediaShield driver supports RAID 0,RAID 1, RAID 5, and RAID 0+1 functions. It allows you to get high performance with fault tolerance, big capacity, or data safety provided by different RAID functions.

Here, we will use four SATA hard disks as an example to guide you how to select your RAID system. Assume four hard disks are connected to the motherboard :
The lower SATA_1 port - WDC WD1200JD-98HBBO, 111.79GB
The upper SATA_1 port- Hitachi HDT725025VLA, 232.88GB
The lower SATA_2 port - HDS728080PLA380, 76.69GB
The upper SATA_2 port - ST3320620AS, 298.09GB

WARNING!

To achieve the best performance and reliability, we highly recommend you using the hard disks with the same brand, size and model number. Though we are using four different hard disks as an example to describe RAID function in this chapter, it is only helpful in explaining what the final disk volume of the RAID array will be. In the real world, using the same model to build a disk array is strongly recommended.

The relationships between RAID settings and SATA ports on the motherboard are :
SATA 1 Primary   RAID is the lower SATA_1 port of the motherboard.
SATA 1 Secondary   RAID is the upper SATA_1 port.
SATA 2 Primary   RAID is the lower SATA_2 port.
SATA 2 Secondary   RAID is the upper SATA_2 port.

```
           Phoenix - AwardBIOS CMOS Setup Utility
                    RAID Configuration

 RAID Enable                    Enabled          Item Help
 SATA 1 Primary      RAID       Enabled
 SATA 1 Secondary    RAID       Enabled       Menu Level  ►
 SATA 2 Primary      RAID       Enabled
 SATA 2 Secondary    RAID       Enabled
 SATA 3 Primary      RAID       Disabled
 SATA 3 Secondary    RAID       Disabled




 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
              F5:Previous Values            F7:Optimized Defaults
```
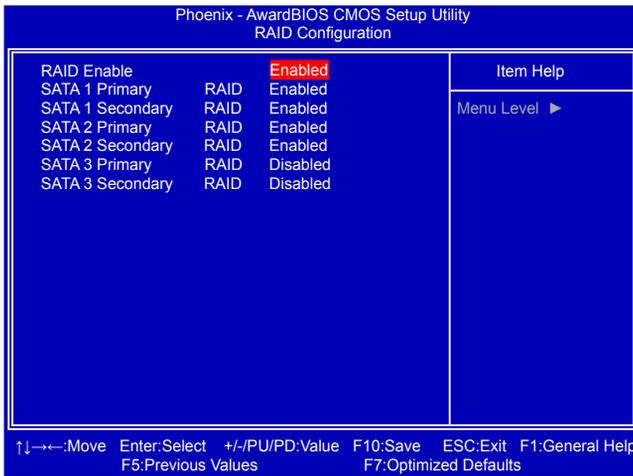
In section 5-3 later, you will know the relationships between port numbers in the MediaShield BIOS and SATA ports on the motherboard. We put their descriptions here for better arrangement. They are :

Port 0.0 is the lower SATA_1 port of the motherboard.

Port 0.1 is the upper SATA_1 port.

Port 1.0 is the lower SATA_2 port.

Port 1.1 is the upper SATA_2 port.
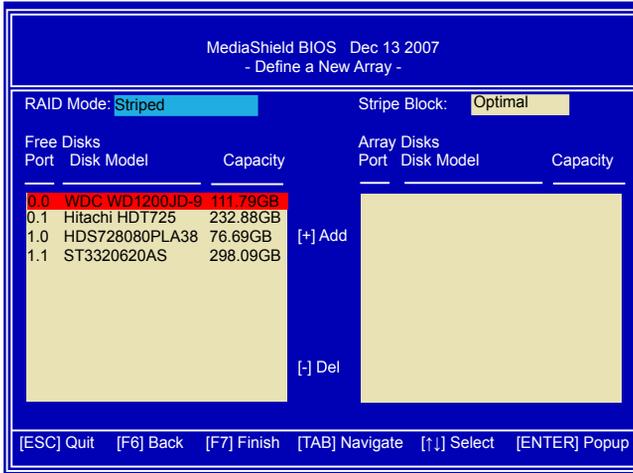
Two topics will be covered in the following sections :

1). Creating a Bootable Array - Installing a new Windows XP in a brand new RAID system.

2). Creating a Non-Bootable Array - Existing Windows XP system with new RAID built as data storage.

Install SATA Hard Disks before we continue :

■   Shut down your computer.

■   Install SATA hard disks into the drive bays, connect all power and SATA cables.

> ■   Before installing the SATA hard disks, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the hardware.
>
> ■   Depending on how many SATA ports are built on your motherboard. If your system is accompanied with a SATA DVD drive, then you may not select Striped Mirror (RAID 0+1) function if only four SATA ports are provided.

5-1 Create a RAID Driver Diskette

If you want to install a brand new Windows XP on a RAID system, you need to create a RAID driver floppy diskette which will be used during Windows XP installation later.

1. Find a PC, put a diskette into its floppy drive A:. Put the driver CD into CD-ROM drive. Suggest you format the diskette first. Right click Floppy (A:) to select Format.
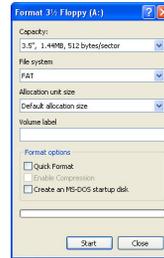
2. Click on "OK" to go through this warning message.
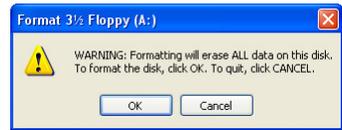
3. Click "OK" to finish the format.
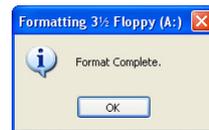
4. Depending on which platform your XP system is, normally, it is a 32-bit system. In Windows, browse CD content, and go to CD:\Driver\Chipset\xp\IDE\WinXP\sataraid, copy its content to diskette.
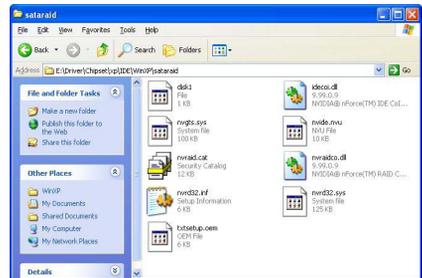
5. Check if the diskette contains the driver files.

   Later, when in the process of installing Windows XP in your RAID system, it will ask you to use this floppy diskette to provide driver for additional specific devices, for example, a RAID device.

81
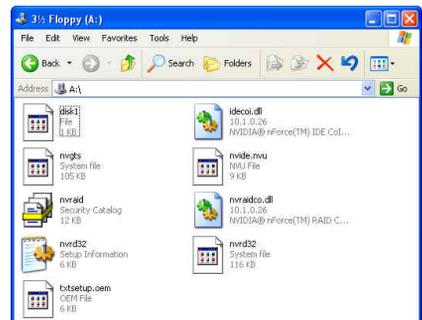
5-2 RAID Enable in BIOS

1. Enter the BIOS setup by pressing <Del> key when boot up.
2. Select the "Integrated Peripherals" from the "Main menu", then select the "RAID Configuration" menu and press <Enter> to go to the configuration items.
3. Enable RAID function and individual SATA port for hard drive or DVD connection.
4. Press <F10> to save the setting then PC will reboot itself.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                        RAID Configuration

   RAID Enable                   Enabled          Item Help
   SATA 1 Primary        RAID    Enabled
   SATA 1 Secondary      RAID    Enabled      Menu Level  ►
   SATA 2 Primary        RAID    Enabled
   SATA 2 Secondary      RAID    Enabled
   SATA 3 Primary        RAID    Disabled
   SATA 3 Secondary      RAID    Disabled




  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
            F5:Previous Values               F7:Optimized Defaults
```

5-3 Select a RAID Array for Use

When BIOS is restarted, it will display a message asking you to press [F10] key to enter the main menu of MediaShield BIOS. Press [F10], the screen appears.
At the bottom of each screen displayed, there is one line listing each key's function, such as <Tab>, <Enter>, <ESC>...etc. It is helpful to make your choice easier.

```
              MediaShield BIOS   Dec 13 2007
                    - Define a New Array -

   RAID Mode: Mirrored              Stripe Block:  Optimal

   Free Disks                       Array Disks
   Port   Disk Model      Capacity  Port   Disk Model     Capacity

   0.0   WDC WD1200JD-9  111.79GB
   0.1   Hitachi HDT725   232.88GB
   1.0   HDS728080PLA38  76.69GB   [+] Add
   1.1   ST3320620AS      298.09GB



                                   [-] Del



   [ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [Enter] Popup
```
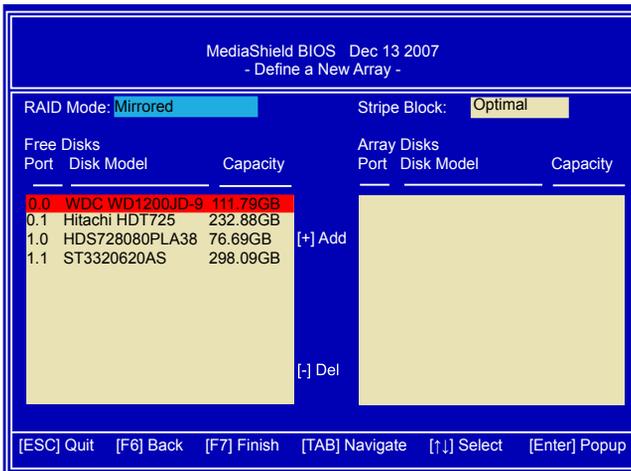
Create RAID 0 (Striped)

1. Select "**Striped"** from the RAID Mode. The menu appears :
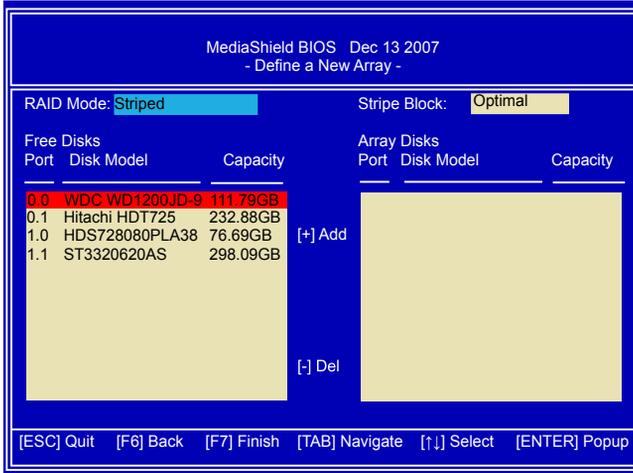
2. Select two hard disks to build our RAID0 system.
3. Press [TAB] to navigate to left drive panel, then use [→] and [↓] keys to add the hard
   disks to the right drive panel.

4. The stripe value should be selected based on different applications. It ranges from
   4KB to 128KB. Some suggested choices are :

   16K - Best for sequential transfer.

   64K - Good general purpose strip size.

   128K - Best performance for most desktops and workstations.

   Keep it at Optimal default value. Press <F7> to finish the setting.
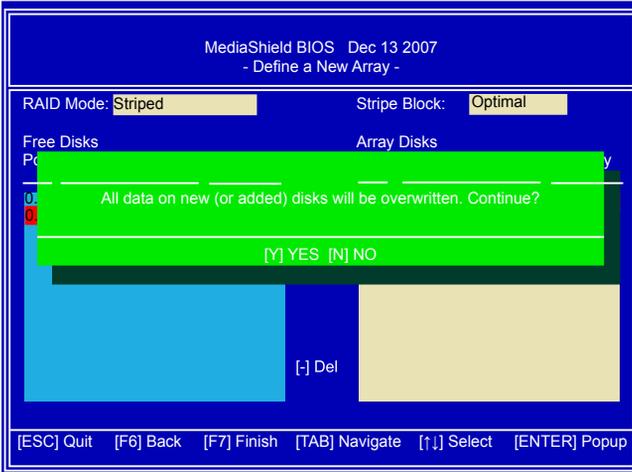
5. Press [Y] to continue, and press [Y] again to select "Clear MBR".
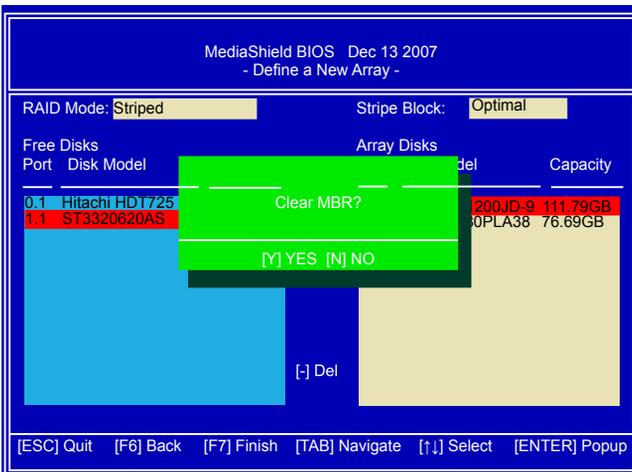
6. The screen displays a STRIPE array of 153.38GB, which is twice the size of the smallest hard disk. That is, 2*76.69GB = 153.38GB.

   If you want to build a new Operating System (such as Windows XP) in this RAID system, please press [B] to select it as bootable.

   You can then press [Ctrl]+[X] keys to exit the setup program, and restart your PC.

```
┌─────────────────────────────────────────────────────┐
│              MediaShield BIOS   Dec 13 2007           │
│                     - Array List -                    │
├─────────────────────────────────────────────────────┤
│                                                       │
│      Boot   Status   Vendor   Array     Size          │
│             Healthy  NVIDIA   STRIPE   153.38G         │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│                                                       │
│ [Ctrl-X] Exit   [↑↓] Select   [B] Set Bootable   [N] New Array   [ENTER] Detail │
└─────────────────────────────────────────────────────┘
```

7. In above screen, you also can press <Enter> to know the detailed drive information of this RAID system. Press [D] here allow you to delete previous settings, and go back to the first time when MediaShield was started.

```
┌─────────────────────────────────────────────────────┐
│            Array 4 : NVIDIA   STRIPE   153.38G        │
│                     - Array Detail-                   │
├─────────────────────────────────────────────────────┤
│ RAID Mode: Striped                                    │
│ Stripe Width :    2              Stripe Block:   64K  │
│                                                       │
│      Port   Index  Disk Model            Capacity     │
│      0.0    0      WDC WD1200JD-98HBB0    111.79G      │
│      1.0    1      HDS728080PLA380         76.69GB     │
│                                                       │
│                                                       │
│                                                       │
│   [R] Rebuild    [D] Delete    [C] Clear MBR    [ENTER] Return │
└─────────────────────────────────────────────────────┘
```

Create RAID 1 (Mirrored)

1. Select "**Mirrored**" from the RAID Mode.

```
                  MediaShield BIOS   Dec 13 2007
                      - Define a New Array -

RAID Mode: Mirrored                   Stripe Block:    Optimal

Free Disks                            Array Disks
Port   Disk Model        Capacity     Port  Disk Model         Capacity

0.0    WDC WD1200JD-9    111.79GB
0.1    Hitachi HDT725    232.88GB
1.0    HDS728080PLA38    76.69GB    [+] Add
1.1    ST3320620AS       298.09GB




                                     [-] Del

[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup
```

2. Select two hard disks to build our RAID1 system.
3. Press [TAB] to navigate to left drive panel, then use [→] and [↓] keys to add the hard
   disks to the right drive panel.

```
                  MediaShield BIOS   Dec 13 2007
                      - Define a New Array -

RAID Mode: Mirrored                   Stripe Block:    Optimal

Free Disks                            Array Disks
Port   Disk Model        Capacity     Port  Disk Model         Capacity

0.0    WDC WD1200JD-9    111.79GB      0.1   Hitachi HDT725     232.88GB
1.0    HDS728080PLA38    76.69GB       1.1   ST3320620AS        298.09GB
                                     [+] Add




                                     [-] Del

[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup
```

4. The stripe block value is fixed and not changeable.
   Press <F7> to finish the setting.
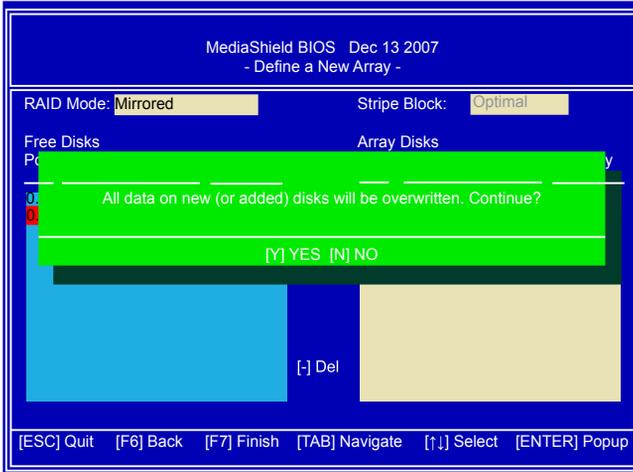
5. Press [Y] to continue, and press [Y] again to select "Clear MBR".
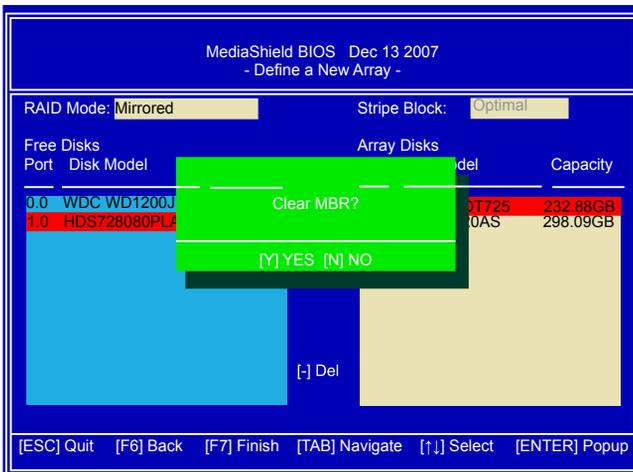
6. The screen displays a MIRRORED array of 232.88GB, which is the size of the smallest hard disk. That is, 232.88GB.

   If you want to build a new Operating System (such as Windows XP) in this RAID system, please press [B] to select it as bootable.

   You can then press [Ctrl]+[X] keys to exit the setup program, and restart your PC.

```
┌────────────────────────────────────────────────────────┐
│            MediaShield BIOS   Dec 13 2007                │
│                  - Array List -                          │
├────────────────────────────────────────────────────────┤
│     Boot   Status   Vendor   Array    Size               │
│            Healthy  NVIDIA   MIRROR  232.88G             │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
├────────────────────────────────────────────────────────┤
│ [Ctrl-X] Exit   [↑↓] Select   [B] Set Bootable   [N] New Array   [ENTER] Detail │
└────────────────────────────────────────────────────────┘
```

7. In above screen, you also can press <Enter> to know the detailed drive information of this RAID system. Press [D] here allow you to delete previous settings, and go back to the first time when MediaShield was started.

```
┌────────────────────────────────────────────────────────┐
│         Array 4 : NVIDIA  MIRROR  232.88G                │
│                  - Array Detail -                        │
├────────────────────────────────────────────────────────┤
│ RAID Mode: Mirrored                                      │
│ Stripe Width :  1                    Stripe Block:   64K │
│                                                          │
│     Port   Index   Disk Model              Capacity      │
│     0.1    0       Hitachi HDT725025VLA380  232.88G      │
│     1.1    1       ST3320620AS              298.09G      │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
├────────────────────────────────────────────────────────┤
│   [R] Rebuild    [D] Delete    [C] Clear MBR   [ENTER] Return │
└────────────────────────────────────────────────────────┘
```
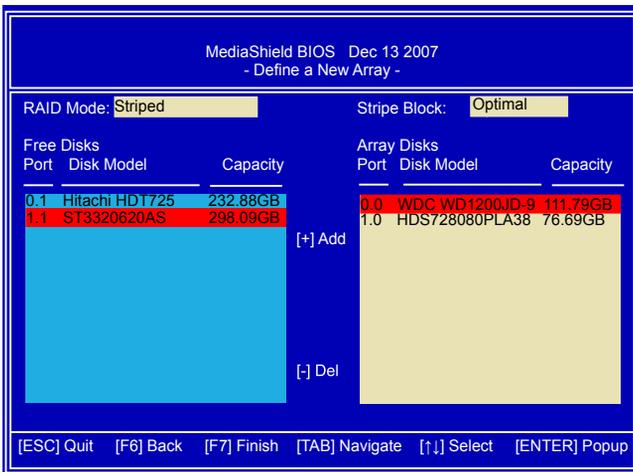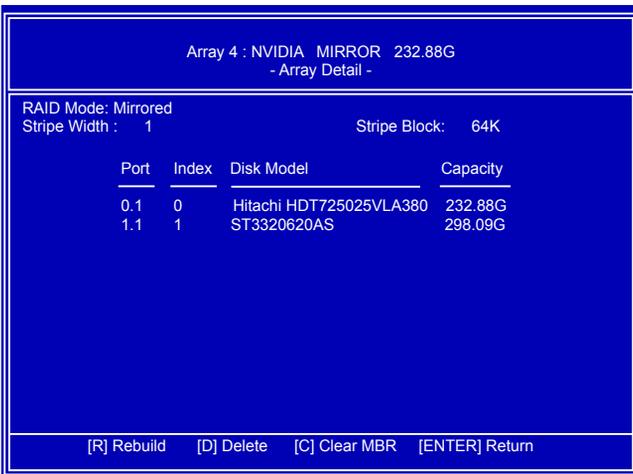
Create RAID 0+1 (Striped Mirror)

1. Select "**Striped Mirror**" from the RAID Mode. The menu appears :
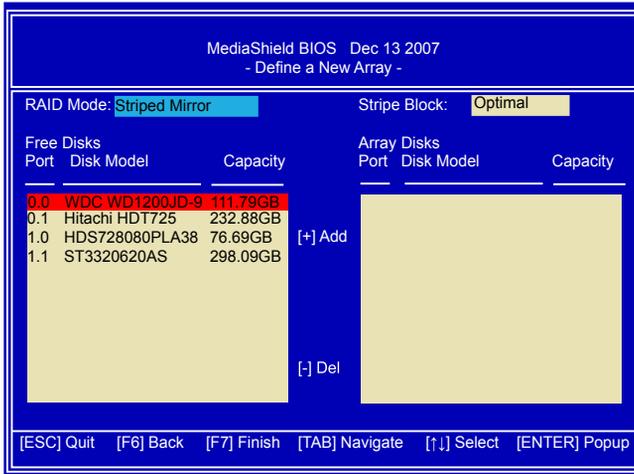

2. Select four hard disks to build our RAID0+1 system.
3. Press [TAB] to navigate to left drive panel, then use [→] and [↓] keys to add the hard disks to the right drive panel.

4. The stripe value should be selected based on different applications. It ranges from 4KB to 128KB. Some suggested choices are :

16K - Best for sequential transfer.

64K - Good general purpose strip size.

128K - Best performance for most desktops and workstations .

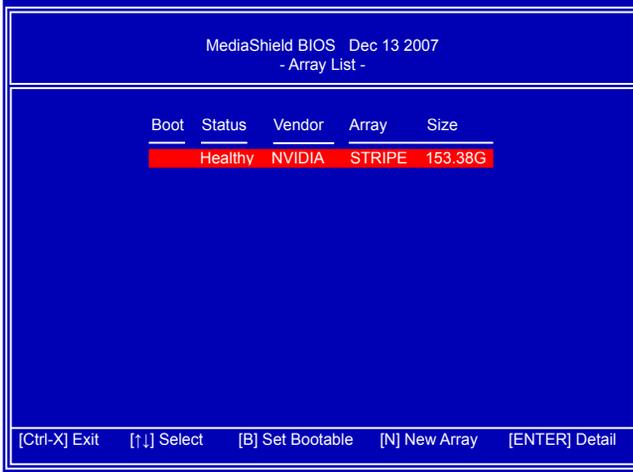Keep it at Optimal default value. Press <F7> to finish the setting.
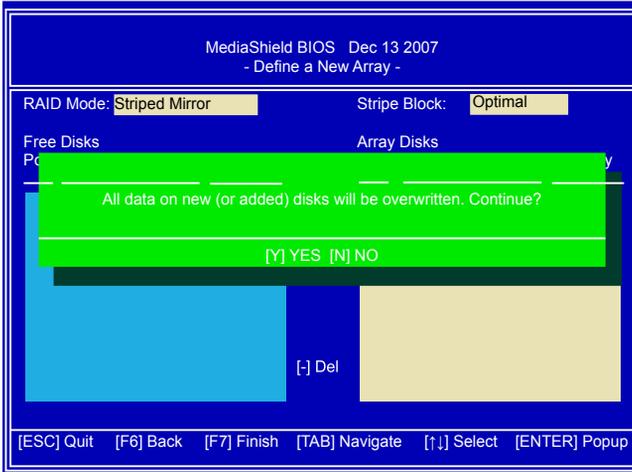
5. Press [Y] to continue, and press [Y] again to select "Clear MBR".
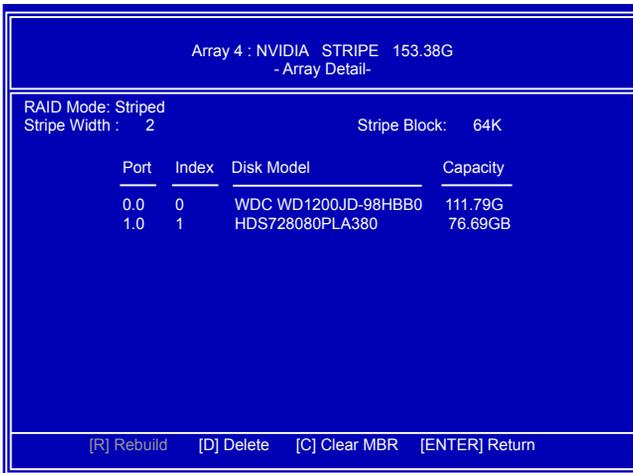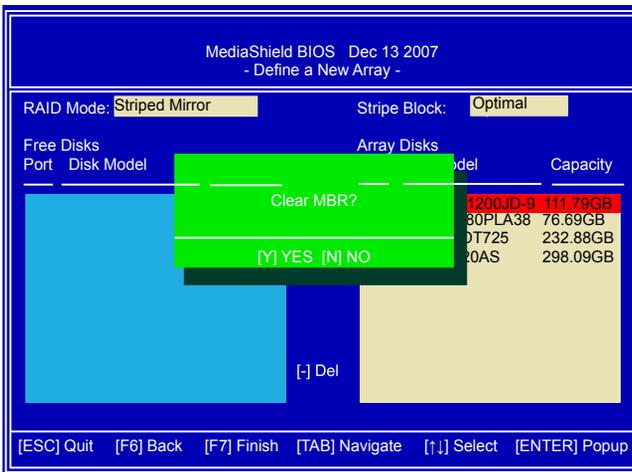
6. The screen displays a RAID 0+1 array of 153.38GB, which is twice the size of the smallest hard disk. That is, 2*76.69= 153.38GB.

   If you want to build a new Operating System (such as Windows XP) in this RAID system, please press [B] to select it as bootable.

   You can then press [Ctrl]+[X] keys to exit the setup program, and restart your PC.

```
┌──────────────────────────────────────────────────────────┐
│                                                          │
│              MediaShield BIOS  Dec 13 2007               │
│                      - Array List -                      │
│                                                          │
├──────────────────────────────────────────────────────────┤
│                                                          │
│        Boot  Status   Vendor   Array     Size           │
│                                                          │
│              Healthy  NVIDIA   RAID 0+1 153.38G         │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
├──────────────────────────────────────────────────────────┤
│ [Ctrl-X] Exit   [↑↓] Select   [B] Set Bootable   [N] New Array   [ENTER] Detail │
└──────────────────────────────────────────────────────────┘
```
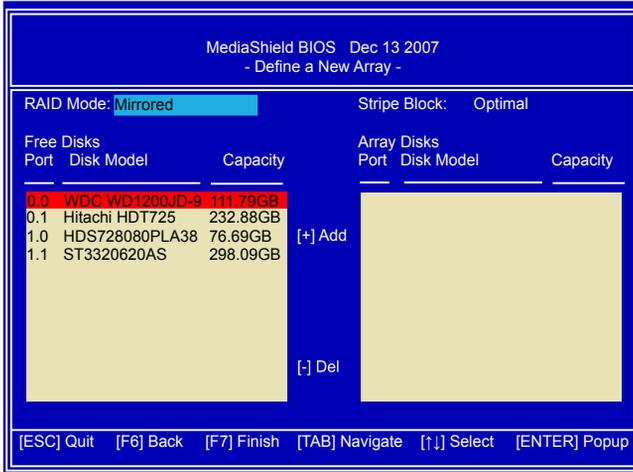
7. In above screen, you also can press <Enter> to know the detailed drive information of this RAID system. Press [D] here allow you to delete previous settings, and go back to the first time when MediaShield was started.
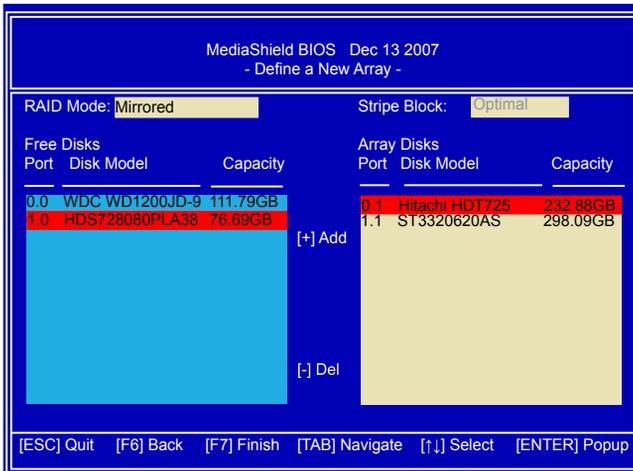
```
┌──────────────────────────────────────────────────────────┐
│                                                          │
│            Array 4 : NVIDIA  RAID 0+1  153.38G          │
│                     - Array Detail -                     │
│                                                          │
├──────────────────────────────────────────────────────────┤
│ RAID Mode: Striped Mirror                                │
│ Stripe Width :   2                Stripe Block:   64K    │
│                                                          │
│        Port   Index  Disk Model              Capacity   │
│                                                          │
│        0.0    0      WDC WD1200JD-98HBB0     111.79G     │
│        0.1    1      HDS728080PLA380          76.69GB    │
│        1.0    2      Hitachi HDT725025VLA380 232.88G     │
│        1.1    3      ST3320620AS             298.09G     │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
│                                                          │
├──────────────────────────────────────────────────────────┤
│    [R] Rebuild    [D] Delete    [C] Clear MBR   [ENTER] Return │
└──────────────────────────────────────────────────────────┘
```
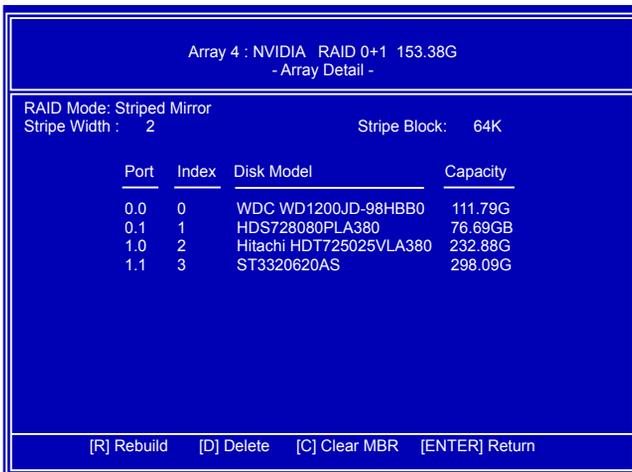
Create RAID 5

1. Select "**RAID5**" from the RAID Mode.
   The menu appears :
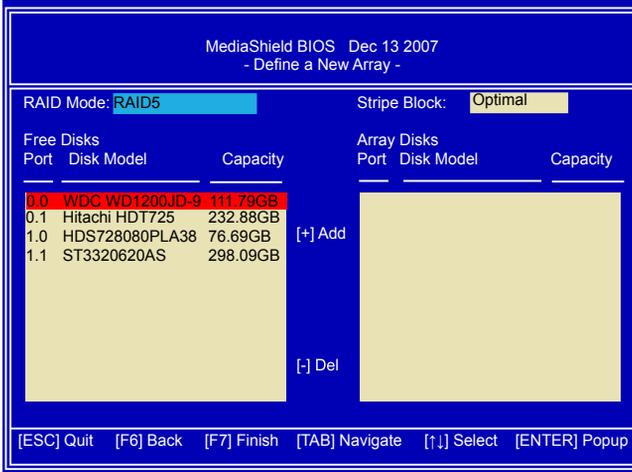
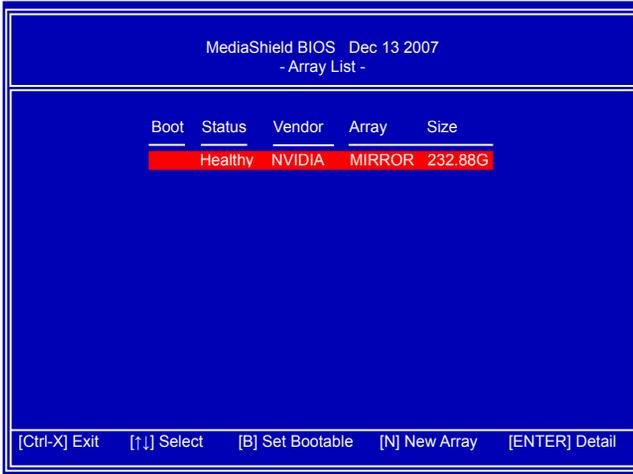2. Select three SATA hard disks to build our RAID5 system.
3. Press [TAB] to navigate to left drive panel, then use [→] and [↓] keys to add the hard disks to the right drive panel.

4. The stripe value should be selected based on different applications. It ranges from 4KB to 128KB. Some suggested choices are :

16K - Best for sequential transfer.

64K - Good general purpose strip size.

128K - Best performance for most desktops and workstations .

Keep it at Optimal default value. Press <F7> to finish the setting.

5. Press [Y] to continue, and press [Y] again to select "Clear MBR".

6. The screen displays a RAID5 array of 153.38GB, which is twice the size of the smallest hard disk. That is, 2*76.69= 153.38GB. Another hard disk is used for parity check. If you want to build a new Operating System (such as Windows XP) in this RAID system, please press [B] to select it as bootable.
You can then press [Ctrl]+[X] keys to exit the setup program, and restart your PC.

```
                     MediaShield BIOS   Dec 13 2007
                             - Array List -

          Boot    Status    Vendor    Array    Size

                  Healthy   NVIDIA    RAID5    153.38G




   [Ctrl-X] Exit    [↑↓] Select    [B] Set Bootable    [N] New Array    [ENTER] Detail
```

7. In above screen, you also can press <Enter> to know the detailed drive information of this RAID system. Press [D] here allow you to delete previous settings, and go back to the first time when MediaShield was started.
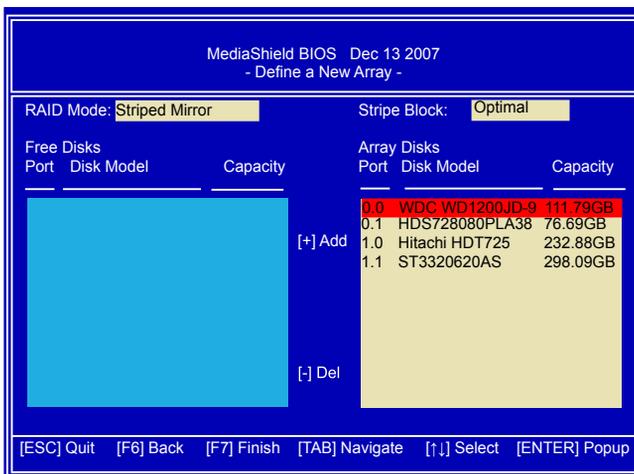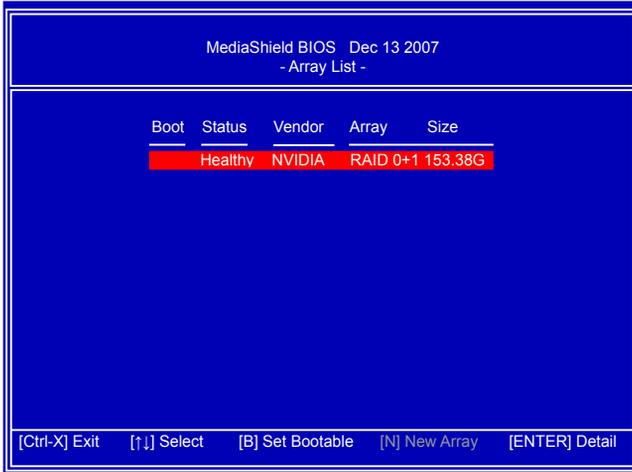
```
                  Array 4 : NVIDIA   RAID5  153.38G
                             - Array Detail -

   RAID Mode: RAID5
   Stripe Width :   2                        Stripe Block:    64K

          Port    Index    Disk Model                   Capacity

          0.0     0        WDC WD1200JD-98HBB0          111.79G
          1.0     1        HDS728080PLA380               76.69GB
          0.1     2        Hitachi HDT725025VLA380      232.88G




        [R] Rebuild     [D] Delete     [C] Clear MBR    [ENTER] Return
```

Create Spanned RAID

1. Select "**Spanned**" from the RAID Mode. The menu appears :

```
                    MediaShield BIOS   Dec 13 2007
                       - Define a New Array -

RAID Mode: Spanned                Stripe Block:   Optimal

Free Disks                        Array Disks
Port   Disk Model      Capacity   Port  Disk Model      Capacity

0.0   WDC WD1200JD-9  111.79GB
0.1   Hitachi HDT725   232.88GB
1.0   HDS728080PLA38   76.69GB    [+] Add
1.1   ST3320620AS      298.09GB




                                  [-] Del


[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup
```
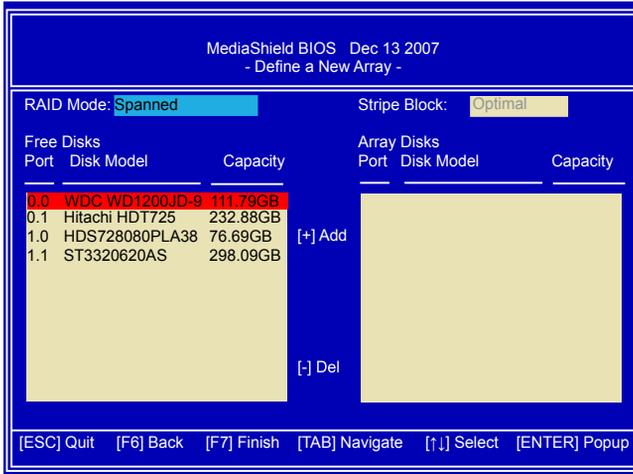
2. Select three SATA hard disks to build our Spanned RAID system.
3. Press [TAB] to navigate to left drive panel, then use [→] and [↓] keys to add the hard
   disks to the right drive panel.

```
                    MediaShield BIOS   Dec 13 2007
                       - Define a New Array -

RAID Mode: Spanned                Stripe Block:   Optimal

Free Disks                        Array Disks
Port   Disk Model      Capacity   Port  Disk Model      Capacity

1.1   ST3320620AS      298.09GB   0.0   WDC WD1200JD-9  111.79GB
                                  1.0   HDS728080PLA38   76.69GB
                       [+] Add    0.1   Hitachi HDT725   232.88GB




                                  [-] Del


[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup
```

4. The stripe block value is fixed and not changeable.
   Press <F7> to finish the setting.

MediaShield BIOS   Dec 13 2007
- Define a New Array -

RAID Mode: Spanned   Stripe Block: Optimal

Free Disks   Array Disks
Po

All data on new (or added) disks will be overwritten. Continue?

[Y] YES [N] NO

[-] Del

[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup

5. Press [Y] to continue, and press [Y] again to select "Clear MBR".

MediaShield BIOS   Dec 13 2007
- Define a New Array -

RAID Mode: Spanned   Stripe Block: Optimal

Free Disks   Array Disks
Port   Disk Model   del   Capacity

1.1   ST3320620AS   Clear MBR?   1200JD-9 111.79GB
                                                               30PLA38   76.69GB
                                                               DT725   232.88GB
                        [Y] YES [N] NO

[-] Del

[ESC] Quit   [F6] Back   [F7] Finish   [TAB] Navigate   [↑↓] Select   [ENTER] Popup

6. The screen displays a Spanned RAID array of 421.36GB, which is the total sizes of these three hard disks. That is, 111.79+76.69+232.88= 421.36GB. We recommend not setting it to bootable as it will be impossible to recover if crashed. You can then press [Ctrl]+[X] keys to exit the setup program, and restart your PC.
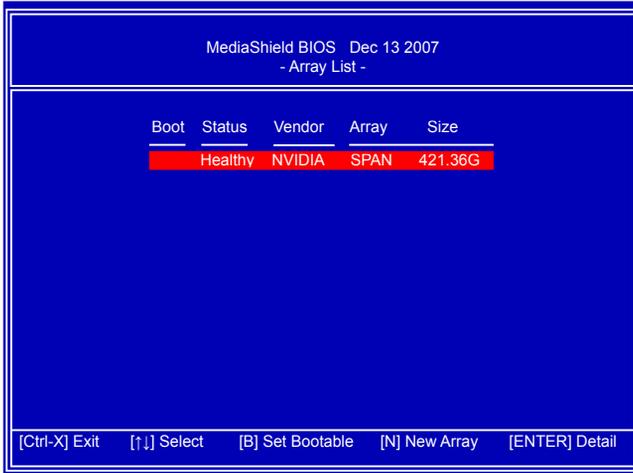
```
                    MediaShield BIOS   Dec 13 2007
                              - Array List -

            Boot    Status    Vendor    Array    Size
                    Healthy   NVIDIA    SPAN     421.36G




    [Ctrl-X] Exit    [↑↓] Select    [B] Set Bootable    [N] New Array    [ENTER] Detail
```

7. In above screen, you also can press <Enter> to know the detailed drive information of this RAID system. Press [D] here allow you to delete previous settings, and go back to the first time when MediaShield was started.

```
                    Array 4 : NVIDIA   SPAN   421.36G
                              - Array Detail -

    RAID Mode: Spanned
    Stripe Width :    3                    Stripe Block:    64K

            Port    Index    Disk Model                   Capacity

            0.0     0        WDC WD1200JD-98HBB0           111.79G
            1.0     1        HDS728080PLA380               76.69GB
            0.1     2        Hitachi HDT725025VLA380       232.88G




            [R] Rebuild    [D] Delete    [C] Clear MBR    [ENTER] Return
```
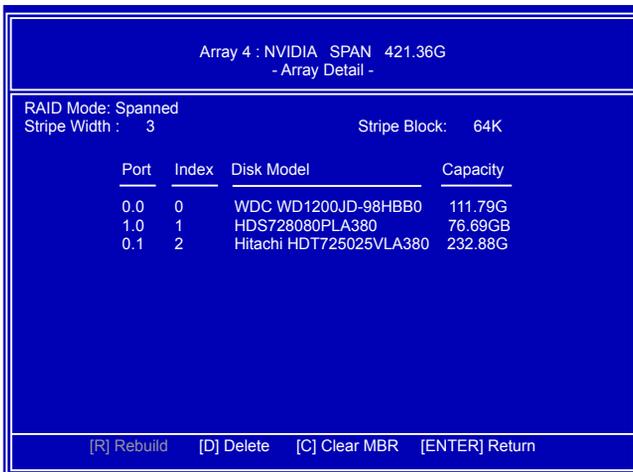
5-4 Install a New Windows XP

Assume a Mirrored array (232.88GB) was created as introduced in section 5-3, after the system restarts :

1. Press <Del> to enter BIOS Setup during POST.

2. Insert the Windows installation CD into the optical drive.

3. Set the "First Boot Device" to "CDROM", save changes and exit BIOS.

```
           Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced BIOS Features
┌──────────────────────────────────────────┬─────────────────────────┐
│ ► Removable Boot Priority    Press Enter  ▲│      Item Help          │
│ ► Hard Disk Boot Priority    Press Enter   │                         │
│   First Boot Device          CDROM         │ Menu Level ►            │
│   Second Boot Device         CDROM         │                         │
│   Third Boot Device          Removable     │ Select removable boot   │
│   Boot Other Device          Enabled       │ device priority         │
│   Boot Up Floppy Seek        Disabled      │                         │
│   Boot Up NumLock Status     On            │                         │
│   Gate A20 Option            Fast          │                         │
│   Typematic Rate Setting     Disabled      │                         │
│ x Typematic Rate (Chars/Sec) 6             │                         │
│ x Typematic Delay (Msec)     250           │                         │
│   Security Option            Setup         │                         │
│   APIC Mode                  Enabled       │                         │
│   MPS Version Control for OS 1.4           │                         │
│   Delay for HDD (Seconds)    0             │                         │
│   Full Screen Logo Show      Enabled       │                         │
│   Small Logo(EPA) Show       Disabled      │                         │
│   Summary Screen Show        Disabled     ▼│                         │
├──────────────────────────────────────────┴─────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│           F5:Previous Values           F7:Optimized Defaults        │
└─────────────────────────────────────────────────────────────────────┘
```
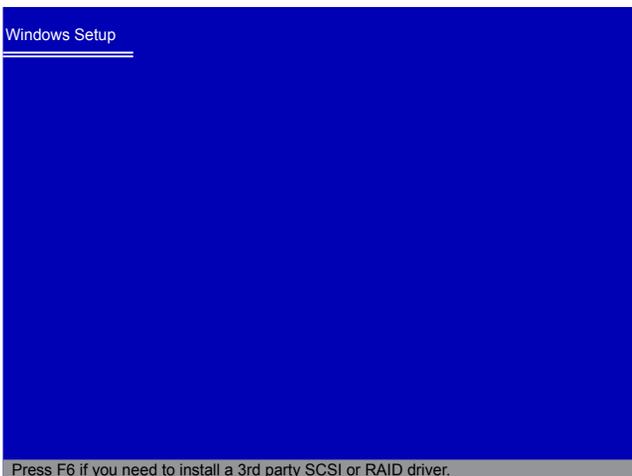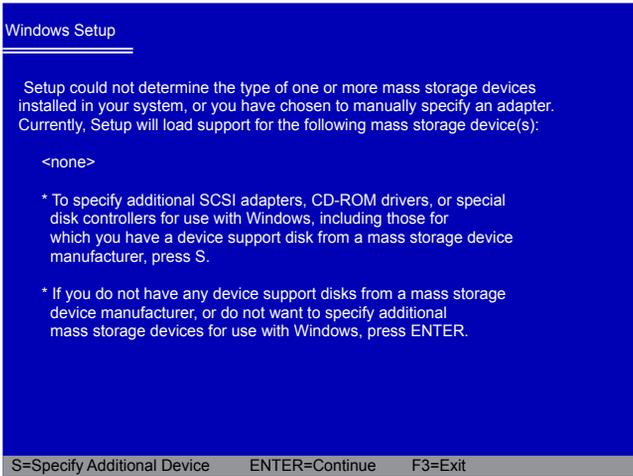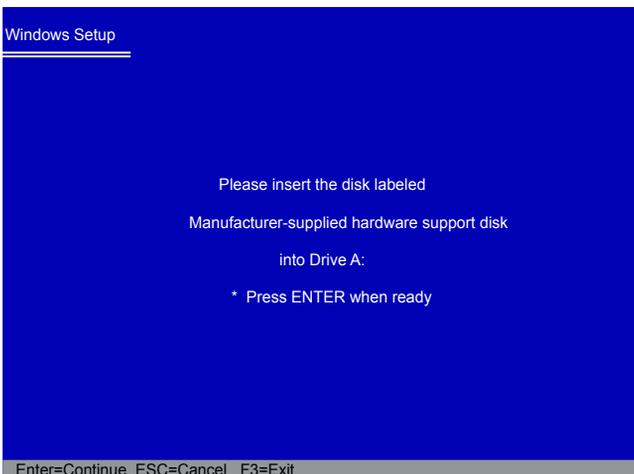
4. The computer will reboot, and it will start installing Windows Operating System. Watch the screen carefully, when the following picture appears, press <F6> key immediately. If you forgot to do this, PC will go to an fatal blue screen, and you may need to reboot the system again. PC may not respond to your <F6> input immediately, and it keeps loading files until the next screen displays.

```
Windows Setup
─────────────────────────────────────────────────────────────────────




                    (blank screen)




─────────────────────────────────────────────────────────────────────
 Press F6 if you need to install a 3rd party SCSI or RAID driver.
```
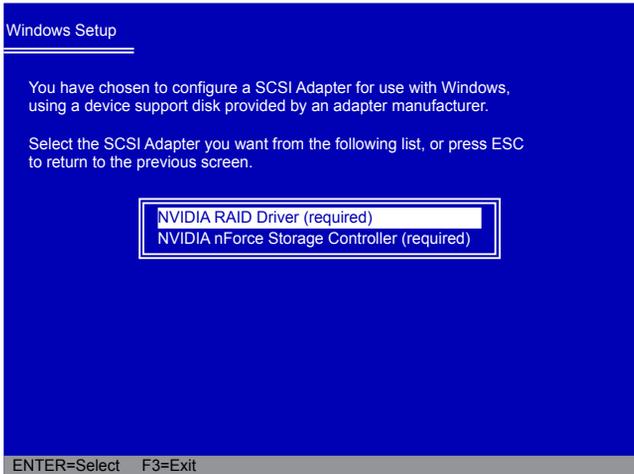
5. After some files are copied to your system, the following picture appears, press <S> to continue the specific driver installation.


```
Windows Setup

  Setup could not determine the type of one or more mass storage devices
  installed in your system, or you have chosen to manually specify an adapter.
  Currently, Setup will load support for the following mass storage device(s):

    <none>

   * To specify additional SCSI adapters, CD-ROM drivers, or special
     disk controllers for use with Windows, including those for
     which you have a device support disk from a mass storage device
     manufacturer, press S.

   * If you do not have any device support disks from a mass storage
     device manufacturer, or do not want to specify additional
     mass storage devices for use with Windows, press ENTER.




 S=Specify Additional Device       ENTER=Continue       F3=Exit
```
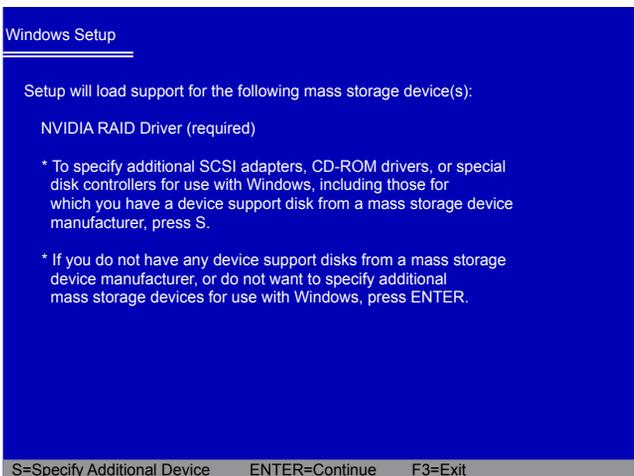
6. It will ask you to insert the RAID driver diskette into your floppy drive. Press <Enter> after it is done.


```
Windows Setup




                    Please insert the disk labeled

              Manufacturer-supplied hardware support disk

                            into Drive A:

                      *  Press ENTER when ready





 Enter=Continue  ESC=Cancel  F3=Exit
```

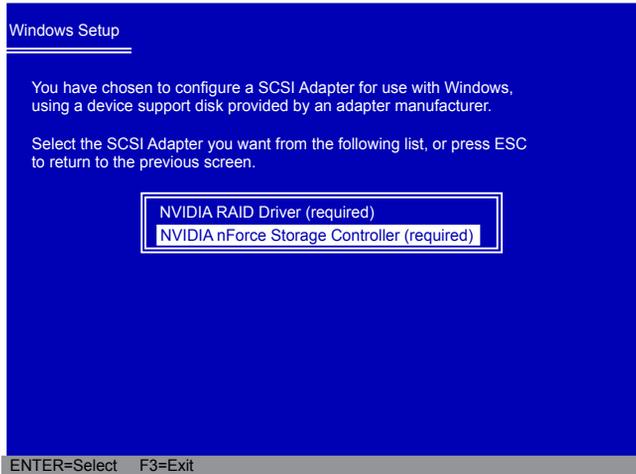7. There are two drivers, all these two drivers must be installed. Press [Enter] to select the first driver - "NVIDIA RAID Driver (required)".

```
Windows Setup

   You have chosen to configure a SCSI Adapter for use with Windows,
   using a device support disk provided by an adapter manufacturer.

   Select the SCSI Adapter you want from the following list, or press ESC
   to return to the previous screen.

            NVIDIA RAID Driver (required)
            NVIDIA nForce Storage Controller (required)




ENTER=Select    F3=Exit
```
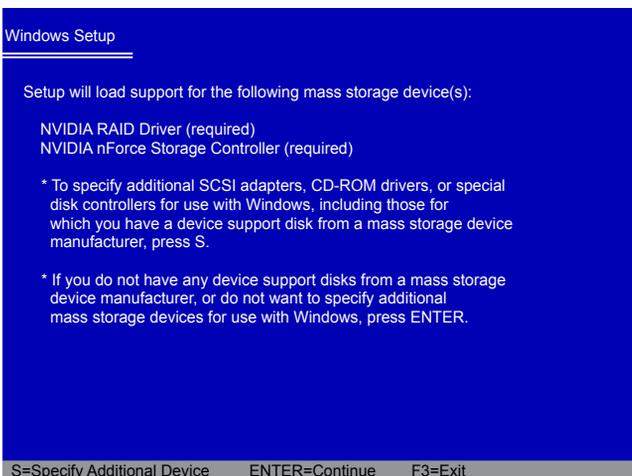
8. A confirmation message apperas to double check if the driver is really what we wanted. As we need to install both two drivers, so we will press <S> again to select the second driver. It will ask you to insert the RAID driver diskette into your floppy drive again, press <Enter> to continue.
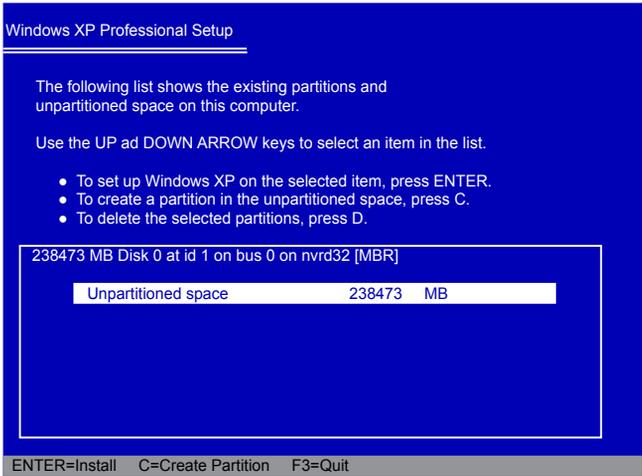
```
Windows Setup

  Setup will load support for the following mass storage device(s):

    NVIDIA RAID Driver (required)

   * To specify additional SCSI adapters, CD-ROM drivers, or special
     disk controllers for use with Windows, including those for
     which you have a device support disk from a mass storage device
     manufacturer, press S.

   * If you do not have any device support disks from a mass storage
     device manufacturer, or do not want to specify additional
     mass storage devices for use with Windows, press ENTER.




S=Specify Additional Device      ENTER=Continue      F3=Exit
```

9. Use [↓] key to select "NVIDIA nForce Storage Controller (required)", then press [Enter].

```
Windows Setup

    You have chosen to configure a SCSI Adapter for use with Windows,
    using a device support disk provided by an adapter manufacturer.

    Select the SCSI Adapter you want from the following list, or press ESC
    to return to the previous screen.

                    NVIDIA RAID Driver (required)
                    NVIDIA nForce Storage Controller (required)




ENTER=Select    F3=Exit
```

10. Two drivers are displayed. Press <Enter> to continue.

```
Windows Setup

   Setup will load support for the following mass storage device(s):

     NVIDIA RAID Driver (required)
     NVIDIA nForce Storage Controller (required)

     * To specify additional SCSI adapters, CD-ROM drivers, or special
       disk controllers for use with Windows, including those for
       which you have a device support disk from a mass storage device
       manufacturer, press S.

     * If you do not have any device support disks from a mass storage
       device manufacturer, or do not want to specify additional
       mass storage devices for use with Windows, press ENTER.




S=Specify Additional Device       ENTER=Continue      F3=Exit
```

11. Windows will display the partition of your system. As we are using a Mirrored RAID array as an example, its size 232.88GB is now displayed as 238473MB. You can press [C] to create partitions as many as you wish, assign them C:, D: or E: logical drive names.

(Note : 238473MB/1024 = 232.88GB)

```
Windows XP Professional Setup

    The following list shows the existing partitions and
    unpartitioned space on this computer.

    Use the UP ad DOWN ARROW keys to select an item in the list.

        ● To set up Windows XP on the selected item, press ENTER.
        ● To create a partition in the unpartitioned space, press C.
        ● To delete the selected partitions, press D.

    238473 MB Disk 0 at id 1 on bus 0 on nvrd32 [MBR]

        Unpartitioned space              238473    MB




    ENTER=Install    C=Create Partition    F3=Quit
```

12. In this example, we will create a 30GB partition C: and leave the remaining space as a partition E:. (D: is allocated by a DVD drive)

13. Press <Enter> to install Windows. The Windows XP install processes will ask you to format your hard disk, then copy files...etc. Follow the installation steps until the whole Windows is setup.

```
Windows XP Professional Setup

    The following list shows the existing partitions and
    unpartitioned space on this computer.

    Use the UP ad DOWN ARROW keys to select an item in the list.

        ● To set up Windows XP on the selected item, press ENTER.
        ● To create a partition in the unpartitioned space, press C.
        ● To delete the selected partitions, press D.

    238473 MB Disk 0 at id 1 on bus 0 on nvrd32 [MBR]

        C: Partition1 [New (Raw)]            29996 MB ( 29996 MB free)
        E: Partition2 [New (Raw)]           208468 MB ( 208468 MB free)
        Unpartitioned space                    8 MB



    ENTER=Install    D=Delete Partition    F3=Quit
```

5-5 Setting Up a Non-Bootable RAID Array

This section assumes the following setup :

■ Boot Disk with Windows XP installed :

One hard disk HDS728080PLAT20 (80GB) is connected to the IDE channel, and set to Master.

■ A Mirrored RAID Array Disk :

Two SATA hard disks are configured as a mirrored RAID1 array, they are :

Hitachi HDT725025VLA, (232.88GB) connected to the upper SATA_1 port of the moherboard.

Segate ST3320620AS, (298.09GB) connected to the upper SATA_2 port.

■ A SATA DVD Drive :

A DVD drive connected to the lower SATA_1 port.

> **WARNING!**
>
> To achieve the best performance and reliability, we highly recommend you using the hard disks with the same brand, size and model number. Though we are using different brand of hard disks as an example here, the purpose is only for easy understanding.

1. Reboot your system, and go to "RAID Configuration" menu.

Enable the RAID function together with the SATA ports which have the hard disks and DVD drive connected. Press [F10] to save the settings and reboot.

```
              Phoenix - AwardBIOS CMOS Setup Utility
                        RAID Configuration

   RAID Enable                      Enabled          Item Help
   SATA 1 Primary      RAID         Enabled
   SATA 1 Secondary    RAID         Enabled        Menu Level  ▶
   SATA 2 Primary      RAID         Enabled
   SATA 2 Secondary    RAID         Enabled
   SATA 3 Primary      RAID         Disabled
   SATA 3 Secondary    RAID         Disabled




   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save   ESC:Exit  F1:General Help
            F5:Previous Values               F7:Optimized Defaults
```

2. Select a RAID array for use (also can refer to section 5-3)

   After rebooting your computer, you will see the RAID software prompting you to press [F10].

   Press [F10] to enter the NVIDIA MediaShield BIOS setup and configure the mirrored RAID array as described in the 5-3 section. Finally, you can reach this step as depicted.
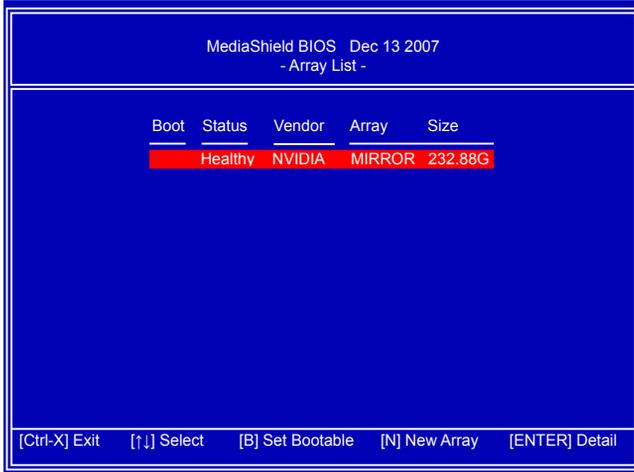
3. Press [Ctrl]+[X] keys to exit and go to Windows.
4. In Windows, click "Cancel" to skip any "Found New Hardware Wizard".

   Use driver CD and click on "Chipset Driver" to install the NVIDIA RAID driver. The RAID driver will be installed only when you select "Enabled" in "RAID Enable" setting. If you do not select RAID, then RAID driver will not be installed.

5. After the NVIDIA driver is installed, it will ask you to click "Finish" to restart your computer.
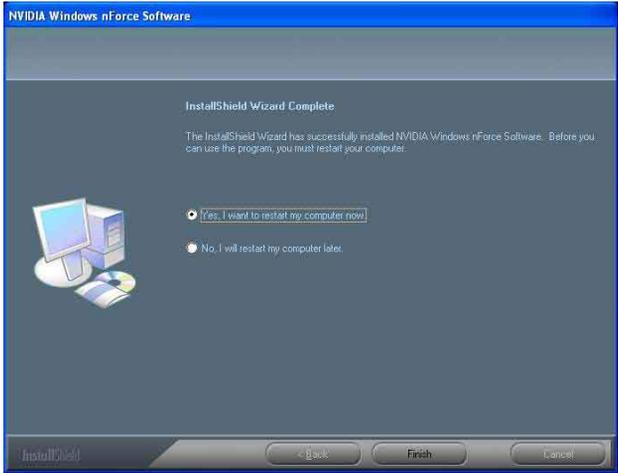
6. When Windows starts, a "Found New Hardware" message is prompting you to reboot again.
   Click "Yes" to restart your computer.

7. After PC starts, the RAID array is now ready to be initialized under Windows. Launch Computer Management by clicking Start -> Settings -> Control Panel then open the Administrative Tools folder and double click on Computer Management. Click Disk Management (under the Storage section). The Initialize and Convert Disk Wizards appears. Click "Next" to continue. The New Volume is named as Disk1 and its status is unknown and not Initialized.

8. A "Select Disks to Initialize" window will appear. The disks listed depend on how many arrays you have configured. Select "Disk1" and click "Next" to continue.

9. When "Select Disks to Convert" window appears, do not select anything and click "Next" to continue.

10. When the "Completing the Initialize and Convert Disk Wizard" window appears, click "Finish" to complete the wizard.
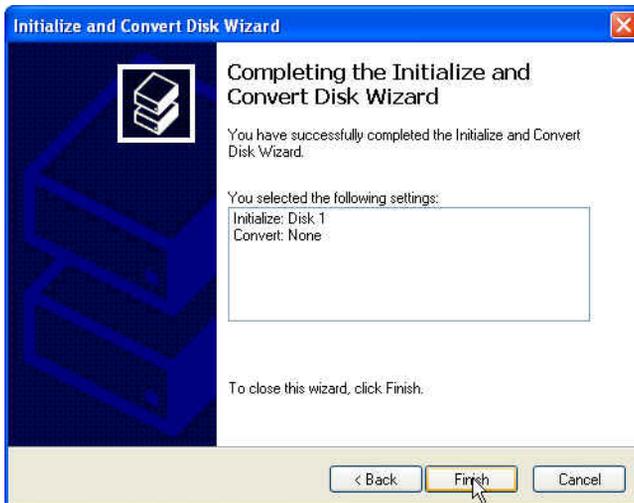
11. The Computer Management window appears. The actual disks listed will depend on your system. In below figure, you can see there is a 232.88 GB unallocated partition. You must format the unallocated disk space before using it.
Right click "Unallocated space", select "New Partition…" and follow the Wizard instrucrtions.
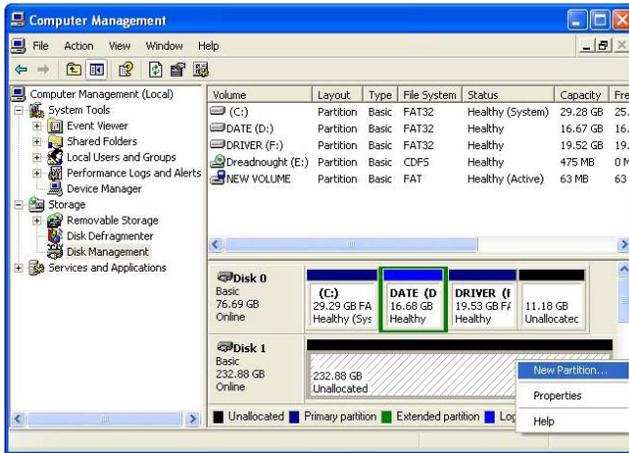
12. When "New Partition Wizard" appears, click "Next" to continue.
13. When "Primary partition" screen appears, click "Next" to continue.
14. When "Specify Partition Size" screen appears, click "Next" to continue.
15. When "Assign Drive Letter or Path" screen appears, click "Next" to continue.
16. Click "Finish" to end the "New Partition Wizard".

17. The format of disk array (Disk1) is in processing.
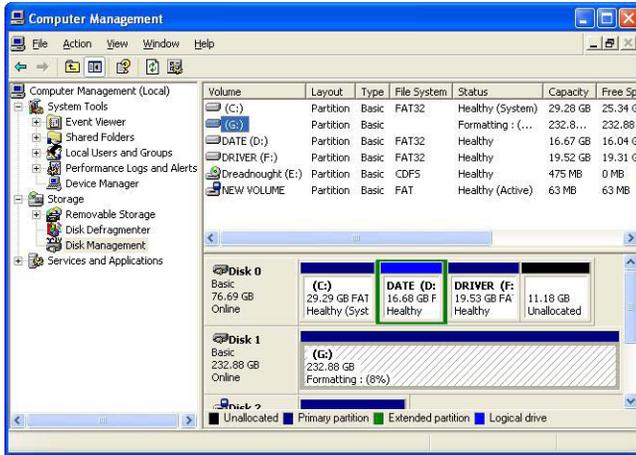
18. Format completed, now you can start using your RAID array.
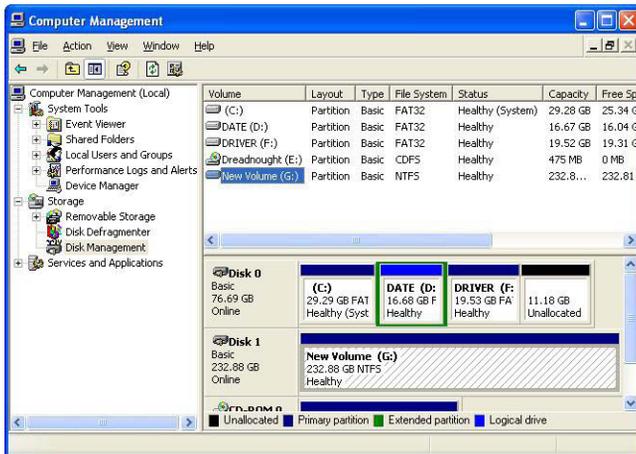
NVIDIA® SLI™ Technology

1. Introduction

NVIDIA® SLI™ (Scalable Link Interface) technology takes advantage of the increased bandwidth of the PCI Express™ bus architecture, and features intelligent hardware and software solutions to deliver earth-shattering PC performance in a multi NVIDIA® GPU solution. It allows up to three identical PCI Express™ x16 graphics cards.

> ⚠ CAUTION
>
> ■ In Dual SLI mode, it needs two identical SLI-ready graphics cards.
>
> ■ In 3-way SLI mode, it needs three identical SLI-ready graphics cards.
>
> ■ Make sure that all the graphics cards are certified by NVIDIA, different type of graphics cards will not work together properly.
>
> ■ Make sure that your power supply unit can provide at least the minimum power required by your system. If you want to use 3-way SLI™ configuration, please visit the NVIDIA website (www.nvidia.com) for the qualified Power Supply Unit vendor list.
>
> ■ The NVIDIA 3-way SLI technology supports Windows® Vista operating system only.
>
> ■ For the detailed Graphics Card support list on this motherboard, please visit the website: http://www.foxconnchannel.com
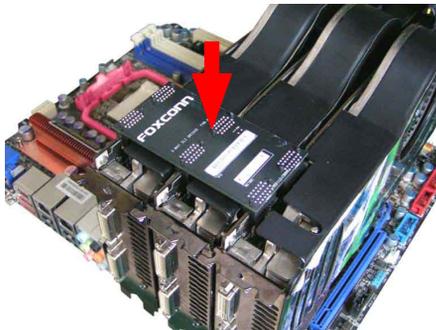
2. Graphics card configuration

2-1 Installing three SLI-ready graphics cards

1. Install the first graphics card into the PCI-E1_16X slot, the second into the PCI-E2_16X slot, and the third into the PCI-E3_16X slot.
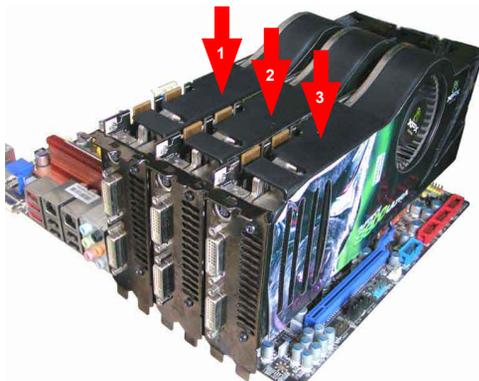
2. Align and firmly insert the 3-way SLI bridge onto the edge connector of each graphics card. Make sure that the bridge is firmly in place.

3. Connect power extension cable from the power supply to the graphics card power connector separately.

4. Follow Chapter 2, section 2-5 to install the Quantum Flow-GPU Blower for better thermal emanation.
5. Connect a monitor DVI-I cable to the graphics card.

2-2 Installing two SLI-ready graphics cards
1. Install the first graphics card into the PCI-E1_16X slot and the other into the PCI-E3_16X slot.
2. Align and firmly insert the 2-way SLI bridge onto the edge connector of each graphics card. Make sure that the bridge is firmly in place.
3. Connect power extension cable from the power supply to the graphics card power connector separately.
4. Follow Chapter 2, section 2-5 to install the Quantum Flow-GPU Blower for better thermal emanation.
5. Connect a monitor DVI-I cable to the graphics card.

2-3 Installing the graphics cards drivers
1. Power on your computer and boot into Operating System.
2. Install the NVIDIA graphics card drivers and restart your computer.

2-4 Enabling the NVIDIA® SLI™ technology
1. Right click on the empty space of Windows®
   and select "NVIDIA Control Panel" to open it.

   If you cannot see the NVIDIA Control Panel
   item, select "Personalize", then follow the
   procedure below:

   From the "Personalization" window, select
   "Display Settings".

   Click "Advanced Settings" from the dialog box.

   Select the NVIDIA GeForce tab, then click
   "Start the NVIDIA Control Panel".

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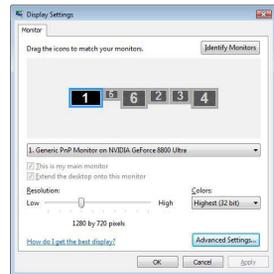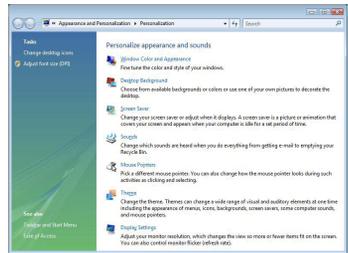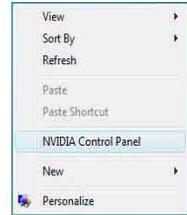
2. When using three graphics cards:
    Select "Set SLI Configuration", then
    click "Enable 3-way NVIDIA SLI",
    when done, click Apply to enable it.

Select the "3D Setting" tab and enable
the "Show SLI Visual Indicators" item.

When using two graphics cards:
The display is similar to the three graphics'
one.
Just select "Set SLI Configuration", then
click "Enable SLI" and set the display, when
done, click Apply.