P35A Series Motherboard

User's Manual

FOXCONN®

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Version:

User's Manual V1.2 for P35A Series motherboard.

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

CE

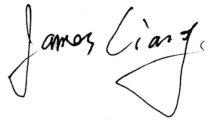
HON HAI PRECISION INDUSTRY COMPANY LTD
66 , CHUNG SHAN RD., TU-CHENG INDUSTRIAL DISTRICT,
TAIPEI HSIEN, TAIWAN, R.O.C.

declares that the product

Motherboard P35A/P35A-S

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 : 

Place / Date : TAIPEI/2007

Printed Name : James Liang

Declaration of conformity

Trade Name:	FOXCONN
Model Name:	P35A/P35A-S
Responsible Party:	PCE Industry Inc.
Address:	458 E. Lambert Rd. Fullerton, CA 92835
Telephone:	714-738-8868
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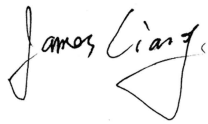
Equipment Classification:	FCC Class B Subassembly
Type of Product:	Motherboard
Manufacturer:	HON HAI PRECISION INDUSTRY COMPANY LTD
Address:	66 , CHUNG SHAN RD., TU-CHENG INDUSTRIAL DISTRICT, TAIPEI HSIEN, TAIWAN, R.O.C.

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 :  Date : 2007

Installation Precautions

- 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.

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.

TABLE OF CONTENTS

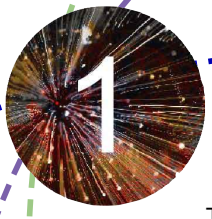
Technical Support :

Website :
http://www.foxconnchannel.com

Support Website :
http://www.foxconnchannel.com/support/online.aspx or
http://www.foxconnsupport.com

Worldwide E-mail Support :
pcebg-cisg-support@foxconn.com

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



Thank you for buying Foxconn P35A series motherboard. Foxconn 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, P35A enables you to unleash more power from your computer.

This chapter includes the following information:

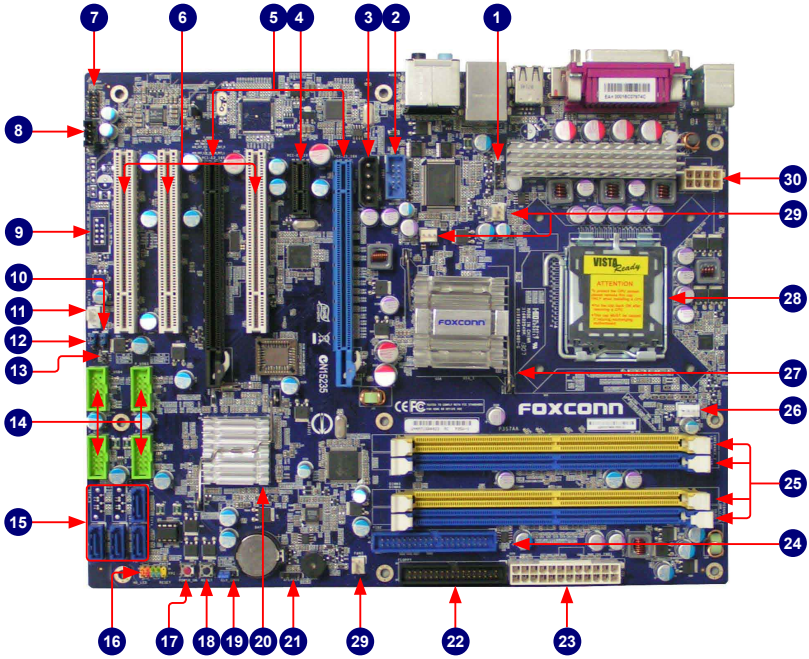
- Product Specifications
- Layout
- Back Panel Connectors

1-1 Product Specifications

CPU	Support Intel® Core™ 2 Extreme processor/ Intel® Core™ 2 Quad processor / Intel® Core™ 2 Duo processor / Intel® Pentium® 4 processor Extreme Edition/ Intel® Pentium® D processor / Intel® Pentium® 4 processor / Support for Intel® Hyper-Threading Technology
Front Side Bus	1333/1066/800MHz FSB
Chipset	North Bridge : Intel® P35 chipset South Bridge : Intel® ICH9 (P35A)/ICH9R (P35A-S)
Memory	4 x 240-pin DDR2 DIMM sockets Support up to 8GB of system memory Dual channel DDR2 800/667MHz architecture
Audio	Realtek ALC888 chip High Definition Audio 2/4/5.1/7.1-channel Support for S/PDIF out Support Jack-Sensing function
LAN	On board Realtek 8111B chip Support 10/100/1000Mb/s Ethernet
Expansion Slots	2 x PCI Express x16 slots 1 x PCI Express x1 slot 3 x PCI slots
Onboard Serial ATA	6 x SATA connectors and one external SATA connector (P35A-S) 4 x SATA connectors and one external SATA connector (P35A) 300MB/s data transfer rate Support hot plug and NCQ (Native Command Queuing) Support RAID 0, RAID 1, RAID 5, RAID 10 (for P35A-S) Support Intel® Matrix Storage Technology (for P35A-S)
USB	Support hot plug Support up to 12 x USB 2.0 ports (4 rear panel ports, 4 onboard USB connectors supporting 8 extra ports) Support 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 (P35A-S) or 4 x (P35A) SATA connectors 4 x USB 2.0 connectors (supporting 8 x USB devices) 1 x CPU fan header (4-pin) 1 x System fan header (4-pin) 3 x Power fan headers (3-pin) (FAN1/2/3) 1 x Front panel connectors 1 x 1394a connector (P35A-S only) 1 x CD_IN connector

	1 x COM1 connector
	1 x Chassis intrusion alarm header
Back Panel Connectors	1 x PS/2 Keyboard port
	1 x PS/2 Mouse port
	1 x Parallel port
	1 x Serial port
	1 x Coaxial S/PDIF out connector
	1 x External SATA connector
	4 x USB 2.0/1.1 ports
	1 x RJ-45 LAN port
	6 x Audio jacks
Hardware Monitor	System voltage detection
	CPU/System temperature detection
	CPU/System/Power fan speed detection
	CPU overheating warning
	CPU fan speed control
Onboard 1394a (P35A-S only)	Support hot plug
	400Mb/s transmission rate
	Support 2 independent 1394a units synchronously at most
PCI Express x1	Support 250MB/s (500MB/s concurrent) bandwidth
	Low power consumption and power management features
PCI Express x16	Support 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	FOX ONE
	FOX LiveUpdate
	FOX LOGO
	FOX DMI
Operating System	Support for Microsoft® Windows® Vista/XP/2000
Form Factor	ATX Form Factor, 12 inches x 9.6 inches (30.5cm x 24.3cm)

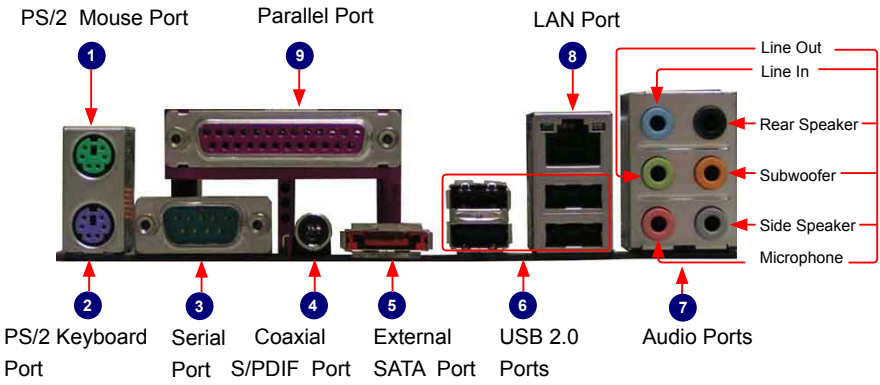
1-2 Layout



1. IrDA Connector
2. COM1 Connector
3. AUX Power Connector: PWR3
4. PCI Express x1 Slot
5. PCI Express x16 Slots
6. PCI Slots
7. Front Audio Connector
8. CD_IN Connector
9. 1394a Connector (P35A-S only)
10. TBL_EN Jumper
11. SYS_FAN Header
12. WP_EN Jumper
13. Chassis Intrusion Alarm Header
14. Front USB Connectors
15. SATA Connectors
16. Front Panel Connector
17. Power On Button
18. Reset Button
19. Clear CMOS Jumper
20. South Bridge: Intel® ICH9/ICH9R
21. Speaker Connector
22. Floppy Connector
23. 24-pin ATX Power Connector : PWR1
24. IDE Connector : PIDE
25. DDR2 DIMM Slots
26. CPU_FAN Header
27. North Bridge: Intel® P35 Chipset
28. LGA 775 CPU Socket
29. FAN1/2/3 Connector
30. 8-pin ATX 12V Power Connector: PWR2

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

1-3 Back Panel Connectors



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. Serial Port

Before using this port, make sure the “Serial Port2 mode” of “SuperIO Configuration” in CMOS Setup is set to be [Normal].(Default is [Normal]).

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. External SATA Port

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.

6. USB Ports

The USB port support the USB 2.0/1.1 specification. Use these ports for USB devices such as an USB keyboard/mouse, USB printer, USB flash drive and etc.

7. Audio Ports

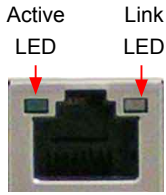
For the definition of each audio port, please refer to the below table :

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

8. RJ-45 LAN Port

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

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



9. Parallel Port

Use the parallel port to connect devices such as a printer, scanner and etc. The parallel port is also called a printer port.

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
- Jumpers

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.

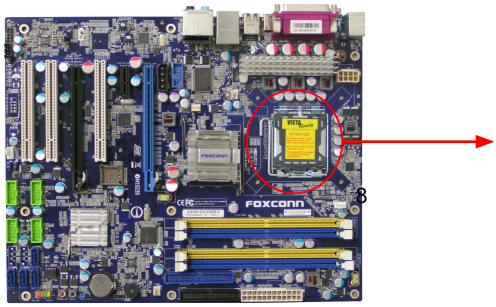
Hyper-Threading Technology System Requirements:

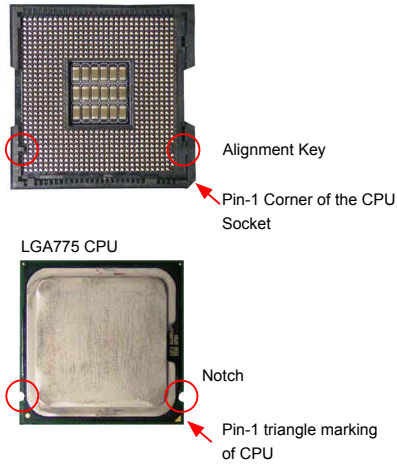
(Go to Intel's website for more information about the Hyper-Threading Technology)

- An Intel® CPU that supports HT Technology
- A chipset that supports HT Technology
- An operating system that is optimized for HT Technology
- A BIOS that supports HT Technology and has it enabled

Install the CPU

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



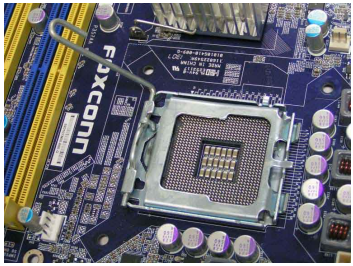


B. Follow the steps to install the CPU onto the CPU socket.

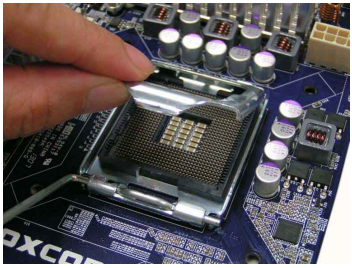
CAUTION

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.

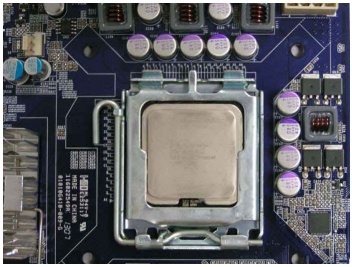


2. Release the CPU socket lever.



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.



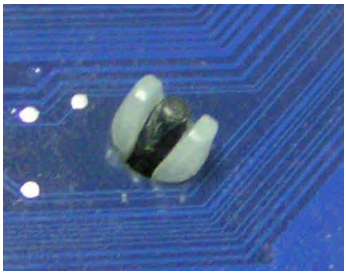
5. When CPU is properly seated, replace the metal cover and push the CPU socket lever back to its locked position.

Install the CPU Cooler

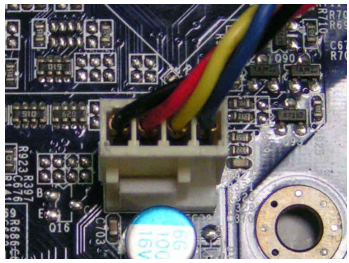
Follow the steps below to correctly install the CPU cooler on the motherboard. (The following procedures use Foxconn cooler as the example.)

1. Apply and spread an even thermal grease on the surface of CPU.

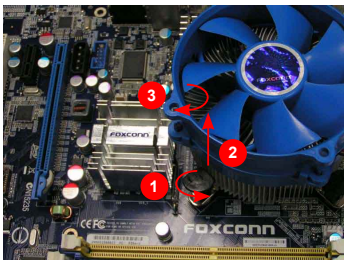
2. Place the four bolts of the CPU cooler to the holes of the motherboard, push them straight down from the top, and the bolts will be fastened on the motherboard. That's it.



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.

CAUTION

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 DDR2 memory sockets and supports Dual Channel Technology. When memory is installed, the BIOS will automatically check the memory in your system.

Four DDR2 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
Double Channel	DS/SS	-	DS/SS	-
Double Channel	-	DS/SS	-	DS/SS
Double Channel	DS/SS	DS/SS	DS/SS	DS/SS

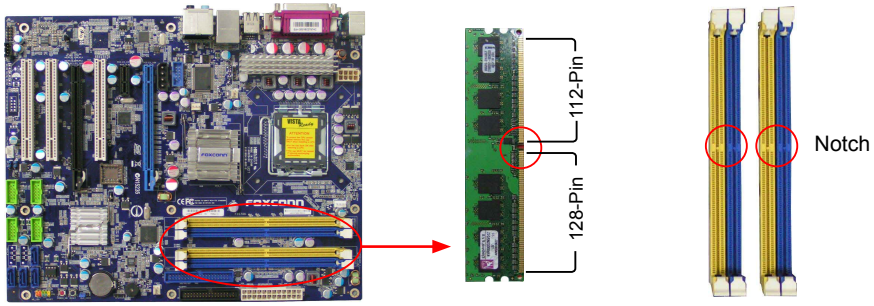
(DS : Double Side, SS : Single Side, -: No Memory)

It is recommended that memory of the same capacity, brand, speed, and chips be used and installed in the same colored DDR2 sockets for optimum performance.

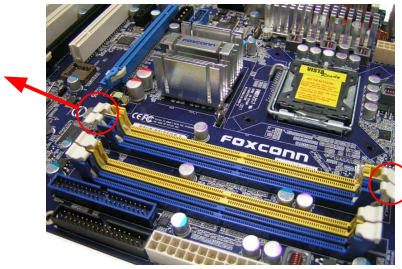
Installing a Memory

CAUTION

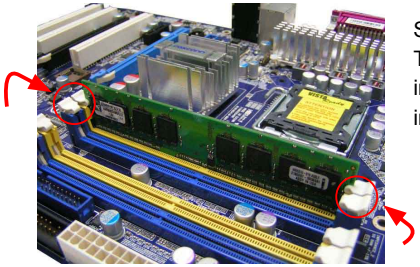
Before installing a memory module, make sure to turn off the computer and unplug the power cord from the power outlet to prevent damage to the memory module. Be sure to install DDR2 DIMMs on this motherboard.



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.

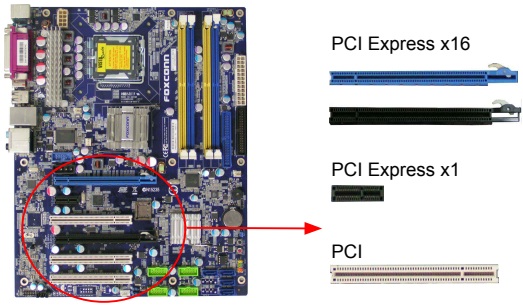


Step 2:
The clips at both ends of the socket will snap into place when the memory module is securely inserted.

2-3 Install an Expansion Card

CAUTION

- Make sure the motherboard supports the expansion card. Carefully read the manual that came with your expansion card.
- Always turn off the computer and unplug the power cord from the power outlet before installing an expansion card to prevent hardware damage.



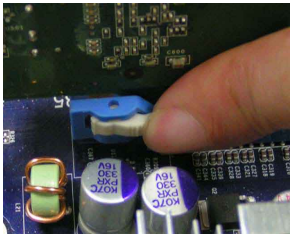
Follow the steps below to correctly install your expansion card in the expansion slot.

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(s).
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:

Press the white 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

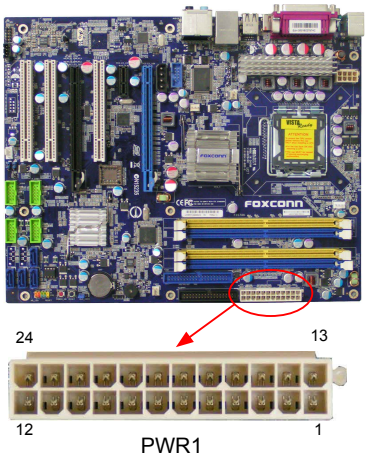
Power Connectors

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.

2

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.



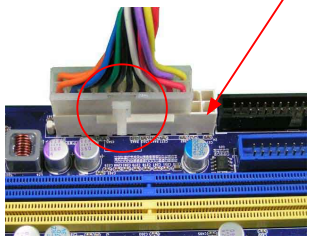
PWR1

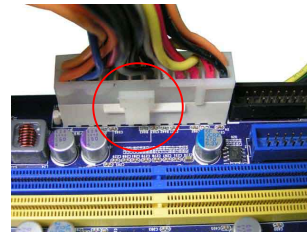
Pin #	Definition	Pin #	Definition
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON(Soft On/Off)
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	Power Good	20	-5V
9	+5V SB(Stand by +5V)	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND

CAUTION

We recommend you use 24-pin power supply. If you want to use 20-pin power supply, you need to align the ATX power connector according to the following picture.

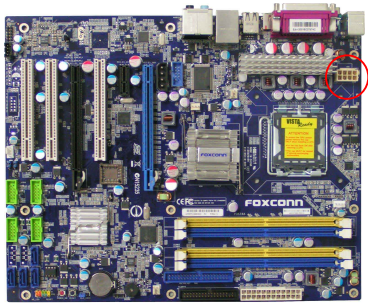
Pin No. 24

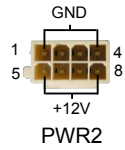

20-Pin Power


24-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.





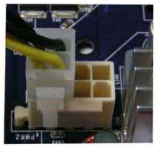
PWR2

Pin No.	Definition	Pin No.	Definition
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

CAUTION

We recommend you use 8-pin ATX 12V power supply. If you want to use 4-pin power supply, you need to align the ATX power connector according to the picture on the right.

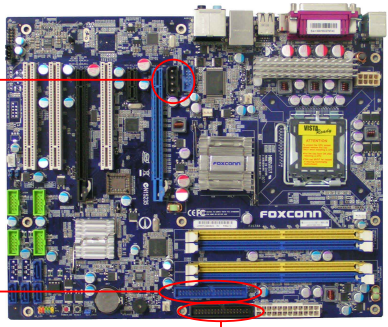
Connect a 4-pin power plug



Exclusive Graphics power Connector : PWR3

This connector is an auxiliary power for graphics card. Exclusive power for graphics card is for better graphics performance and future upgrade usage.

PWR3



IDE Connectors : PIDE

With the provided Ultra DMA133/100/66 IDE ribbon cable, you can connect to any type of hard disk and CD/DVD ROM/RW drive. You also can configure as a disk array through RAID controller.

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.

Front Panel Connector : FP1

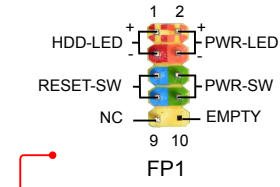
This motherboard includes one connector for connecting the front panel switch and LED Indicators.

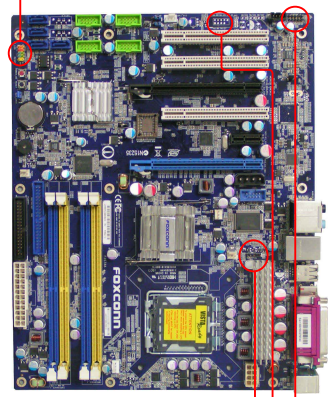
Hard Disk LED Connector (HDD-LED)
Connect to the chassis front panel IDE indicator LED. It indicates the active status of the hard disks. This 2-pin connector is directional with +/- sign.

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.

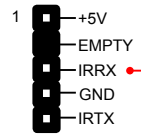
Power Switch Connector (PWR-SW)
Connect to the power button on the front panel of the chassis. Push this switch allows the system to be turned on and off rather than using the power supply button.





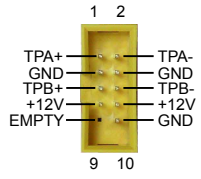
IrDA Connector : IR

This connector supports wireless transmitting and receiving device.



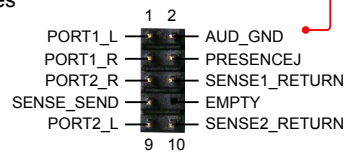
1394a Connector : F_1394 (P35A-S Only)

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.



Audio Connector : F_AUDIO

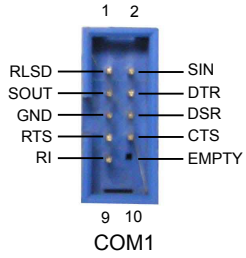
The audio connector supports HD Audio standard. It provides the Front Audio output choice.



COM Connector : COM1

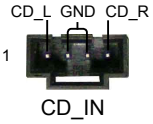
This motherboard supports another serial RS232 COM port for legacy compatibility. User must purchase a RS232 cable

with a 9-pin D-sub connector at one end to connect with external RS232 device and another end with 10-pin female connector to connect with COM1 connector on the motherboard.



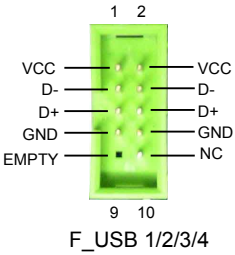
Audio Connector : CD_IN

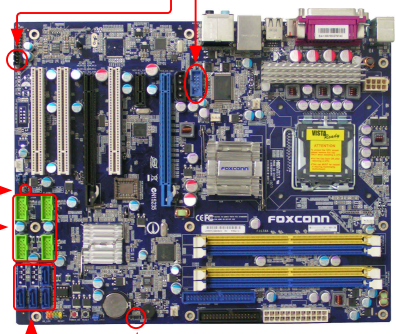
CD_IN is a Sony standard audio connector, it can be connected to a CD/DVD-ROM drive through a CD/DVD audio cable.



Chassis Intrusion Alarm Connector : INTR

The connector can be connected to a security switch on the chassis. The system can detect the chassis intrusion through the function of this connector. If eventually the chassis was closed, the system will send a message out.





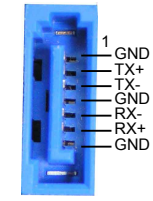
USB Connectors : F_USB1/2/3/4

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

Serial ATA Connectors :

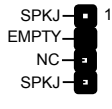
SATA_1/2/3/5, SATA_4/6 (Optional).

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



Speaker Connector : SPEAKER

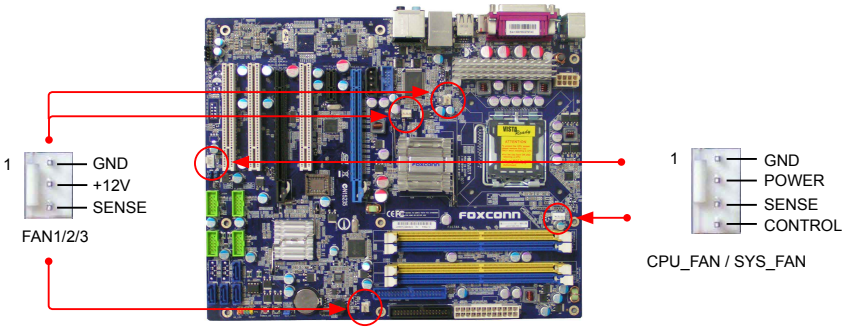
The speaker connector is used to connect speaker of the chassis.



Fan Connectors : CPU_FAN, SYS_FAN and FAN1/2/3

There are five fan connectors on this motherboard. The fan speed can be detected and viewed in “Hardware Health Configure”

section of the BIOS Setup. These fans will be automatically turned off after the system enters S3, S4 and S5 mode.



2-5 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

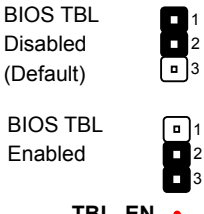
1. For any jumper on this motherboard, pin 1 can be identified by the bold silkscreen next to it. However, in this manual, pin 1 is simply labeled as “1”.
2. The following table explains different types of the jumper settings. "Closed" means placing a jumper cap on the two pins to temporarily short them. 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 any 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
1	1	Closed	Set two pins closed
	1	Opened	Set two pins opened

BIOS TBL Enable Jumper: TBL_EN

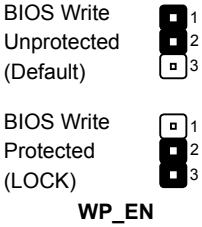
Occasionally, user may go to website to look for newly updated BIOS information, and when in upgrading the BIOS, if the power happened to be shut down, or any abnormal operation during

BIOS upgrading process, then the system will no longer be booted.
With our BIOS TBL feature, you can get away from this worry. BIOS TBL is used to lock “Top Boot Block” of BIOS code. By using this function, the system still can boot even the previous BIOS upgrade failed. In addition, more helpfully, the system will show some information to tell you how to recover the BIOS. To acquire this function, please set the jumper with pin 2 and 3 closed.



BIOS Write Protect Jumper: WP_EN

To protect the system BIOS from virus attack, there is a BIOS write-protection mechanism provided.
With pins 1 and 2 closed on a WP_EN jumper, the BIOS is unprotected and can be flashed (or upgraded). Most of this cases happen when user wants to upgrade the BIOS.
With pins 2 and 3 closed, your BIOS code is fully protected and can not be modified, Virus such as CIH can do nothing on your PC.

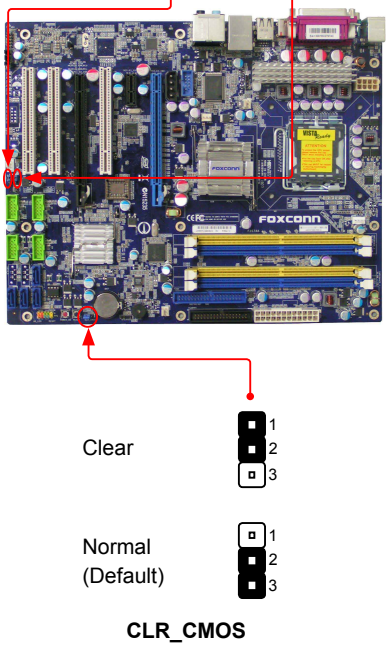


Clear CMOS Jumper: CLR_CMOS

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 and 3, put it onto pins 1 and 2 to short them. This will clear CMOS data.
3. Return the setting to its original with pins 2 and 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.



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 BIOS Features
- Fox Central Control Unit
- Boot Configuration Features
- Advanced BIOS Features
- PCI/PNP Resource Management
- Power Management Features
- Hardware Health Configure
- BIOS Security Features
- Load Optimal Defaults
- Load FailSafe Defaults
- Save Changes and Exit
- Discard Changes and Exit

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

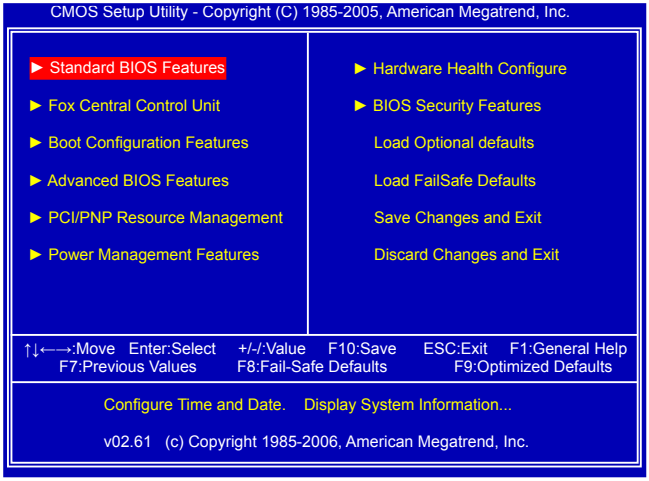
The BIOS is the communication bridge between hardware and software, correctly setting up the BIOS parameters is critical to maintain optimal system performance. Power on the computer, when the message "**Press <Del> key to enter the BIOS CMOS Setup Utility**". appears at the bottom of the screen, you 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 sub-menu.
Each item in the main menu is explained below:



► **Standard BIOS Features**

It displays the basic system configuration, such as BIOS date code, ID, CPU speed, memory size plus system date, time and Floppy drive. They all can be set up through this menu.

► **Fox Central Control Unit**

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

► **Boot Configuration Features**

This menu is used for configuring Boot up setting, such as quick boot, boot device priority...etc.

► **Advanced BIOS Features**

The advanced system features 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.

► **PCI/PNP Resource Management**

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

► **Power Management Features**

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

► **Hardware Health Configure**

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

► **BIOS Security Features**

The Supervisor/User password can be set up through this menu to prevent unauthorized use of your computer. If you set a password, the system will ask you to key in correct password before boot or access to Setup.

► **Load Optimal 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.

► **Load Failsafe Defaults**

The Failsafe default BIOS settings can be loaded through this menu. For normal operation, it is more reliable than optimal setting. But if your system loading becomes heavy (such as more I/O cards, memory...etc.), we will recommend you to adjust some BIOS settings instead of using this default.

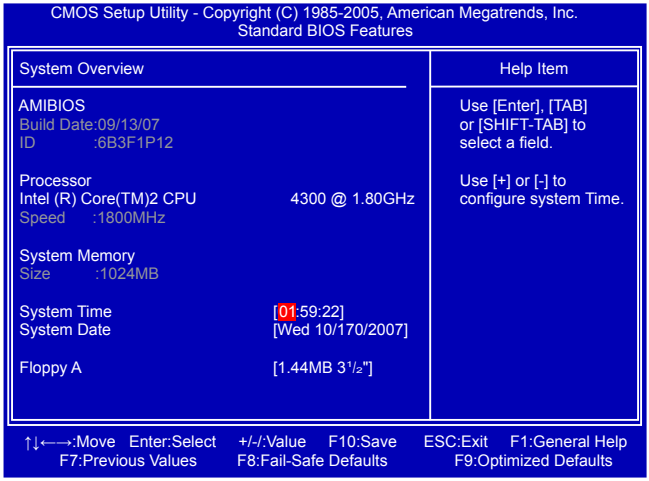
► **Save Changes and Exit**

Save setting values to CMOS and exit.

► **Discard Changes and Exit**

Do not change anything and exit the setup.

Standard BIOS Features



This sub-menu 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.

► **AMIBIOS**

It displays the current BIOS date code and its ID. User can check this information and discuss with the field service people if a BIOS upgrade is needed.

► **Processor**

It displays the current CPU speed.

► **System Memory**

This item displays the current memory size. The size is depending on how many memory modules were installed in your system before powering on.

► **System Time**

This item allows you to configure the desired time. Use [ENTER] to enter the setting, then use [TAB] to move forward a field. Use [+] or [-] to input the value.

The three fields of the setting are <hour> : <minute> : <second> respectively.

► **System Date**

<weekday><month><date> <year> format.

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

Month—month from 1 to 12.

Date—date from 1st to 31st.

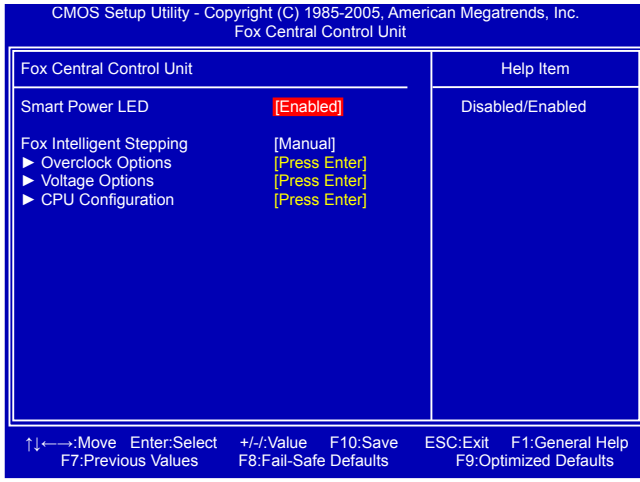
Year—year, set up by users.

Use [ENTER], [TAB] or [SHIFT-TAB] to select a field. Use [+] or [-] to input the value.

► **Floppy A**

This option allows you to select which kind of the Floppy Disk Drive is installed in your system. It can be [360KB, 5¼"], [1.2MB, 5¼"], [720KB, 3½"], [1.44MB, 3½"] and [2.88 MB, 3½"].

Fox Central Control Unit



► Smart Power LED (Optional)

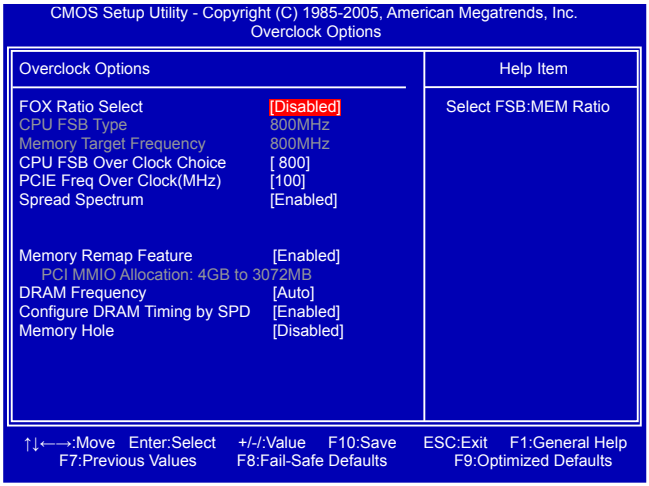
Smart Power LED is a feature built on your motherboard to indicate different states during Power On System Test (POST). The LED is located at the front panel, and it displays POST state by different long-short blinking intervals. You can always leave this state enabled.

► Fox Intelligent Stepping (FIS)

User can select different overcloking options by this item. Select [Auto], the system will automatically adjust its CPU clock based on the current loading in running O/S and application programs. Depending on series of motherboard design, one entry level model may provide very limited overclocking mechanism, while in value edition design, the complete overclocking functions are all provided. More detailed explanations of FIS feature can be found from FOX One utility of Chapter 4.

If you select "Manual", it means FIS is disabled. You have to use the following three options to configure overclocking manually.

Overclock Options



Inside Intel chipset, there is a ratio number (we called it FOX Ratio here) which is defined as the value of the memory clock divided by the CPU clock.
Normally, multiply CPU clock by 4, you can get the CPU Front Side BUS speed. While for DDR2 memory, multiply memory clock by 2, you can get DDR2 memory speed.

In this section, we will explain how to overclock your memory or CPU.

CPU FSB Speed	DDR2 Speed	CPU Clock	Memory Clock	FOX Ratio Select
1333MHz	800MHz	333MHz	400MHz	1:1.2
1333MHz	667MHz	333MHz	333MHz	1:1
1066MHz	800MHz	266MHz	400MHz	1:1.5
1066MHz	667MHz	266MHz	333MHz	1:1.25
800MHz	800MHz	200MHz	400MHz	1:2
800MHz	667MHz	200MHz	333MHz	1:1.66

The above table lists the Ratio numbers come with different combinations of CPUs and memories.

A Normal, Non-overclocking System :

We set FOX Ratio to disabled, and DRAM Frequency to Auto.
In a CPU FSB 1333MHz system, if a DDR2 800MHz memory is installed, then FOX Ratio number will be set to 1:1.2. Same CPU (FSB 1333MHz), if we install a DDR2 667MHz memory, then FOX Ratio number will be set to 1:1.

An Overclocking System :

A CPU FSB 800MHz system with a DDR2 667MHz memory installed, from the below table you can see, its Ratio number is set to 1:1.66 by the system. Now, we want to overclock it.

Physical DRAM	DDR2 667MHz			DDR2 800MHz		
FOX Ratio / CPU FSB	1:1	1:1.25	1:1.66	1:1.2	1:1.5	1:2
800MHz	400MHz	500MHz	667MHz	480MHz	600MHz	800MHz
1066MHz	533MHz	667MHz	888MHz	639MHz	800MHz	1066MHz
1333MHz	667MHz	833MHz	1110MHz	800MHz	999MHz	1333MHz

Overclocking Example 1 :

1. Select [667 MHz] at DRAM Frequency setting.
2. Select [1:1.66] at FOX Ratio Select setting.
   Now, CPU FSB Type is displaying 800MHz, and Memory Target Frequency is displaying 667MHz.
3. At the setting of CPU FSB Over Clock Choice, input a new CPU FSB number, e.g., [1066 MHz].
   You can read the display of Memory Target Frequency is [888MHz].
4. Press [ESC] to exit Overclock Options page, then go to Main Menu, select "Save Changes and Exit", system will power down to change the settings and reboot again.
5. After new boot, your system will be running at 1066MHz CPU speed (physically 800MHz) together with an 888MHz memory speed (physically 667MHz).

Overclocking Example 2 :

1. Select [667 MHz] at DRAM Frequency setting.
2. Select [1:1.25] at FOX Ratio Select setting.
   Now, CPU FSB Type is displaying 800MHz, and Memory Target Frequency is displaying 500MHz. We can say at this moment, the memory (physically 800MHz) is underclocked.
3. At CPU FSB Over Clock Choice setting, try increasing the CPU Speed by pressing [+], you can see each time when CPU Speed is increased, the Memory Target Frequency is also increased. Try increasing CPU Speed to [1066 MHz].
   You can read Memory Target Frequency is [800MHz] now. This is an example telling that only CPU is overclocked, while memory is operating in its normal state.
4. Press [ESC] to exit Overclock Options page, then go to Main Menu, select "Save Changes and Exit", system will power down to change the settings and reboot again.

All the changed settings of overclocking must be saved before exiting BIOS, then it will function. PC will hardware shut down with total power off, it does not like software shut down of which the power is still on.

► **FOX Ratio Select**

FOX Ratio is a number representing memory clock divided by CPU Clock. Select a memory speed, a FOX Ratio number, and try increasing CPU FSB speed, then your PC can be overclocked.

► **CPU FSB Type**

This item displays the current CPU Front Side Bus speed.

► **Memory Target Frequency**

This item displays the target Memory Bus speed which we want to overclock or underclock.

► **CPU FSB Over Clock Choice**

This item allows you to change the CPU Front Side Bus speed. The maximum value is current CPU FSB speed plus 2400MHz. You shall be careful not to set too high a value to damage your CPU.

► **PCIE Frequency Over Clock(MHz)**

This item is used to adjust the speed of PCI-Express slot. It may enhance the graphics card speed.

► **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 better disable it.

► **Memory Remap Feature**

This item is used to set the memory remap feature.

[Enabled] : Allow remapping of overlapped PCI memory to go above the total physical memory.

[Disabled] : Do not allow remapping of memory.

► **DRAM Frequency**

This item is used to manually select a DRAM speed as a reference for overclocking. Select a memory speed, a FOX Ratio number, and try increasing CPU FSB speed, then your PC can be overclocked. [Auto] means the memory speed is decided by the SPD device on DDR2 module.

► **Configure DRAM Timing by SPD**

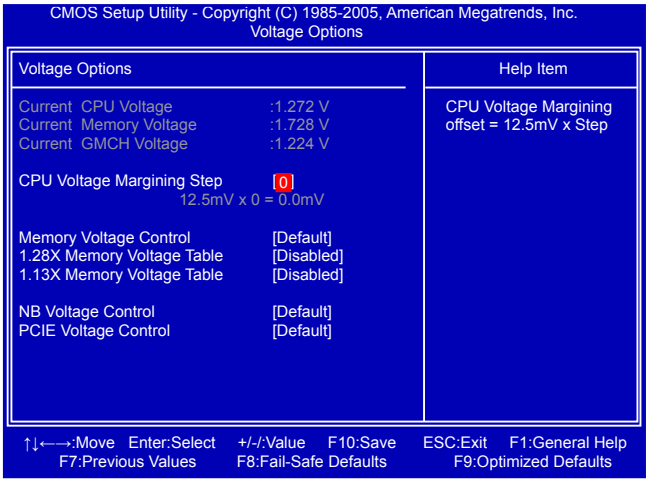
This item is used to enable/disable provision of DRAM timing by SPD device. The Serial Presence Detect (SPD) device is a small EEPROM chip, mounted on a DDR2 memory module. It contains important information about the module's speed, size, addressing mode and various other parameters, so that the motherboard memory controller (chipset) can better access the memory device.

► **Memory Hole**

This item is used to set the memory hole. The available values are [Disabled] and [15MB-16MB].

Some special ISA cards require this area of memory for them to work properly. Enabling this function reserves the memory area for the card's use. In some cases, it may also prevent the system from accessing memory above 15MB. If you enable this function, 1MB of RAM (the 15th MB) will be reserved and is therefore not available for the OS' use. Since ISA cards are a thing of the past, you should always disable this feature.

Voltage Options



► **CPU Voltage Margining Step**

This item is used to set the CPU voltage margining offset. You can adjust CPU voltage by a voltage step of 0.0125V * number each.

► **Memory Voltage Control**

This item is used to select a voltage for memory. Voltage ranges from 1.665V to 2.340V.

► **1.28X Memory Voltage Table**

This item is used to raise the voltage ranged in the Memory Voltage Control setting, Higher voltage options are provided. Voltage ranges from 2.131V to 2.995V.

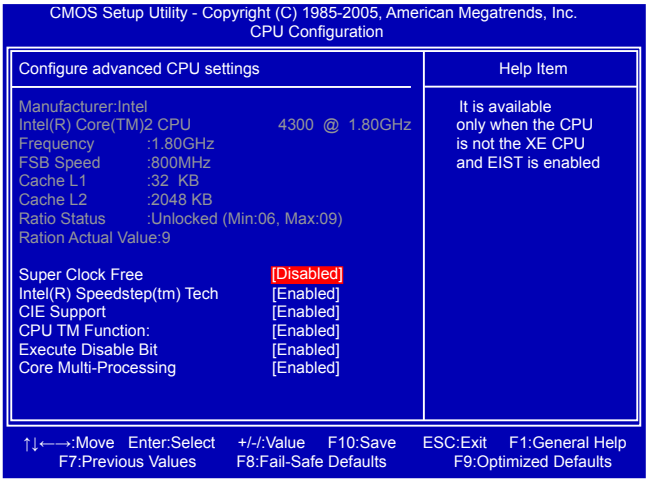
► **1.13X Memory Voltage Table**

This item is used to raise the voltage ranged in the Memory Voltage Control setting. Voltage ranges from 1.894V to 2.662V.

► **NB/PCIE Voltage Control**

This item is used to set the Northern Bridge/PCI-Express voltage control.

CPU Configuration



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.

► **Super Clock Free**

This item is used for the Super Clock Free technology. It supports adjustable CPU Multiplier, perform better FSB, more options for overclocking.

It is available only when the CPU is not the XE CPU and EIST is enabled.

► **Intel® SpeedStep(tm) tech.**

This item is used specifically for the Enhanced Intel SpeedStep technology (EIST), the options are :

[Enabled] : CPU speed is controlled by the operating system.

[Disabled] : Use default CPU speed.

► **C1E Support**

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.

► **CPU Thermal Meter Function**

For the processor with CPUID below 04F1H, when CPU is running up to a higher frequency, enable Thermal Meter will automatically keep Front Side Bus to run at a limited speed, so to protect your system.

When CPU frequency >=3.6GHz, maximum FSB is 800MHz

When CPU frequency >=2.8GHz, maximum FSB is 533MHz.

Disabling this feature may come out a high temperature system, and system would crash.

► **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.

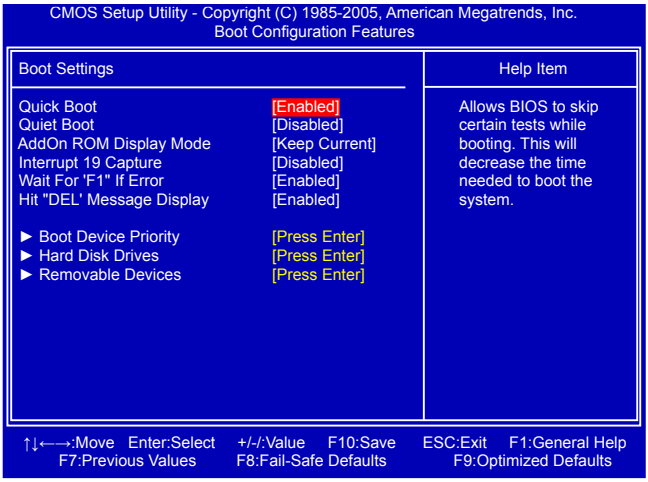
Execute Disable Bit allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage and worm propagation.

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.

► **Core Multi-Processing**

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

Boot Configuration Features



► Quick Boot

While Enabled, this option allows BIOS to skip certain tests while booting, this will shorten the time needed to boot the system.

► Quiet Boot

This item is used to enable/disable the quiet boot.

[Disabled] : Displays the normal POST messages.

[Enabled] : Displays OEM Logo instead of POST messages.

► AddOn ROM Display Mode

This item is used to set the display mode for option ROM. When Quiet Boot is enabled, this option controls whether output from the option ROM is displayed.

The available settings are : Force BIOS; Keep Current.

► Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. It is typically handled by the motherboard BIOS although it can also be handled by the optional boot ROM BIOS in some IDE/SCSI host adaptors.

When enabled, this BIOS feature allows the ROM BIOS of these host adaptors to "capture" Interrupt 19 during the boot process so that drives attached to these adaptors can function as bootable disks. In addition, it allows you to gain access to the host adaptor's ROM setup utility, if one is available.

When disabled, the ROM BIOS of these host adaptors will not be able to "capture" Interrupt 19. Therefore, you will not be able to boot operating systems from any bootable disks attached to these host adaptors. Nor will you be able to gain access to their ROM setup utilities.

If you use separate IDE/SCSI host adaptors, you should enable this BIOS feature if you wish to boot from any drive attached to your host adaptors. It will also allow you to gain access to any ROM based setup utilities.

However, if you are not using any separate IDE/SCSI host adaptors, it's recommended that you disable this BIOS feature.

[Enabled] : Allows option ROM to trap interrupt 19.

► **Wait For 'F1' If Error**

This item is used to enable the waiting for 'F1' key to be pressed if error occurs.

Enabling this option causes the system to suspend the POST operation when it encounters an error, and wait for user to press the 'F1' key for resuming.

► **Hit 'DEL' Message Display**

This item is used to set whether displaying the information about pressing 'DEL' key to run the BIOS setup.

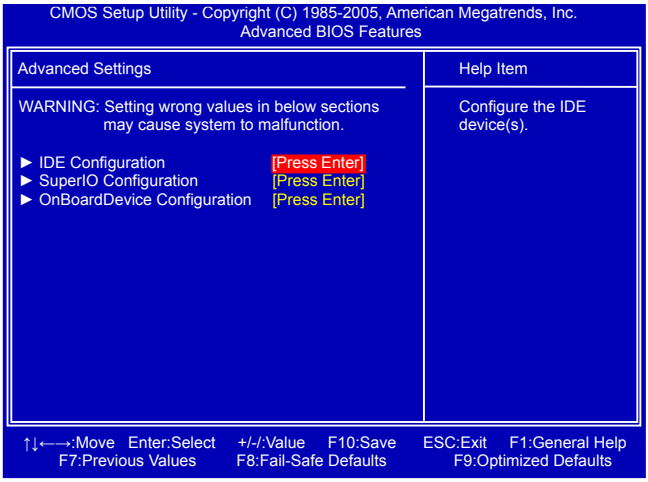
► **Boot Device Priority**

This option is used to select the priority for boot devices. After pressing <Enter>, you can select the device using the Up/Down arrow keys, and change the device priority using <+> or <->; you can exit this menu by pressing <Esc>.

► **Removable Drives**

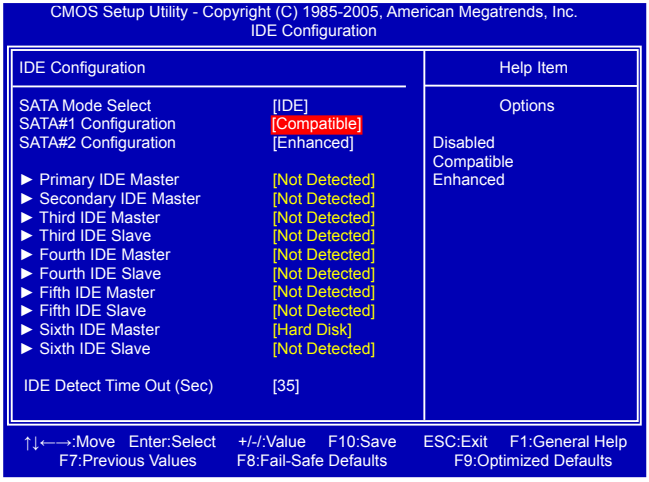
This option is used to specify the Boot Device priority sequence from available removable drives.

Advanced BIOS Features



Use the arrow keys to select the option; Press [Enter] to enter the submenu.
The options are discussed below:

IDE Configuration



► SATA Mode Select

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 :
[Compatible] - Support legacy PATA modes. Old Linux system only can use this mode.
[Enhanced] - Support SATA specification mode. Old Linux system can not use this 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 (some Intel chipsets do not support this feature), and you have a SATA device, which also supports AHCI, then you can select IDE setting to have fair performance (only PATA, SATA level), or you can select AHCI to get its best performance.

When you select AHCI or RAID, you need to install Intel Matrix Storage Manager driver to trigger the function. ICH9R (P35A-S) is supporting both AHCI and RAID functions, while ICH9 (P35A) only supports AHCI.

With your motherboard and SATA hard disk both supporting AHCI, you 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.

Configuring RAID on a New PC :

You can configure your new system for RAID and install the Intel® Matrix Storage Manager driver from a floppy drive during the Windows XP installation.

Configuring RAID on an Existing PC

Intel's RAID configuration utilities offer the flexibility to upgrade from a single Serial ATA (SATA) hard drive to a two drive RAID 0 or RAID 1 configuration when an additional SATA hard drive is added to an existing PC. Beginning with Intel Matrix Storage Manager, you can also migrate to a 3 or 4-drive RAID 5 or a 4-drive RAID 10 configuration.
Please refer to RAID chapter for detail.

► **SATA #1 Configuration**

Each Intel chipset contains two SATA controllers - SATA#1 and SATA#2 :
1). SATA#1 controls four SATA devices, they are in silkscreen SATA 3 (port 0), 4 (port 2), 5 (port 1), 6 (port 3) on the motherboard. SATA 4, 6 are not populated in P35A.
2). SATA#2.controls two SATA devices, they are in silkscreen SATA 1 (port 4), 2 (port 5) on the motherboard.
This item is used for SATA#1 configuration. The available options are :
[Disabled] - No function at all.
[Compatible] - Support legacy Parallel ATA PIO modes. Old Linux system only can use this mode.
[Enhanced] - Supports SATA specification mode. Old Linux system can not use this mode.

► **SATA #2 Configuration**

This item is used for SATA#2 configuration. The available values are : [Disabled]; [Enhanced]. SATA#2 controller does not support legacy Parallel ATA compatibility.

► **AHCI Configuration**

When your motherboard supports AHCI, and you also set SATA Mode setting to [AHCI] or [RAID], then [Press Enter], you can read the drive information of at most six SATA devices from here.

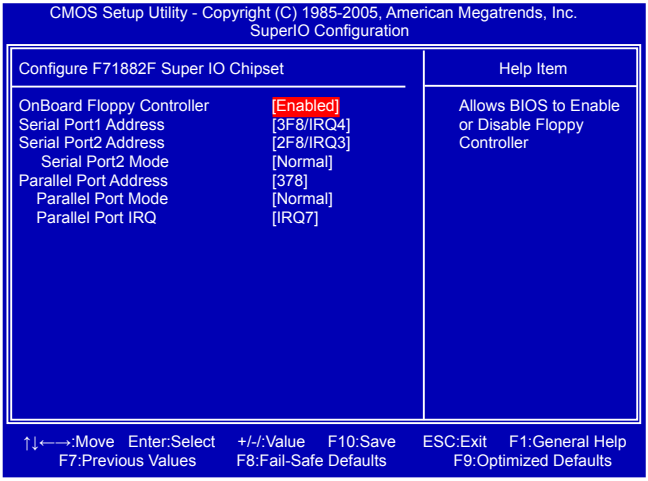
► **Primary/Secondary IDE Master, Third/Fourth/Fifth/Sixth IDE Master/Slave**

While entering setup, BIOS automatically detects the presence of IDE devices. This item displays the drive information of IDE devices. The display information only applies when SATA Mode Select is set to [IDE] mode.

► **IDE Detect Time Out (Sec)**

This item is used to select the time out value for detecting ATA/ATAPI devices. If the checking time is over the set value, the system will skip it.

SuperIO Configuration



► **OnBoard Floppy Controller**

This item is used to enable/disable Floppy Controller.

► **Serial Port 1/2 Address**

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

Note: Do not try to set the same values for serial ports 1 and 2.

► **Serial Port2 Mode**

This item is used to set the serial Port2 mode. The available settings are :

[Normal]; [IrDA 1.6us]; [IrDA 3/16 bit].

► **Parallel Port Address**

This item is used to assign the base address for the onboard parallel port.

► **Parallel Port Mode**

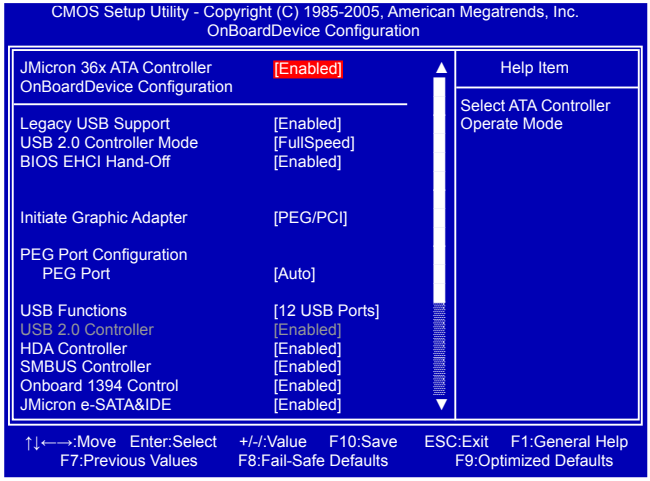
This item is used to set the transmission mode of the parallel port. They are :

Normal, Bi-Directional, ECP, EPP and ECP/EPP.

► **Parallel Port IRQ**

This item is used to determine onboard parallel port IRQ.

OnBoardDevice Configuration



► **Legacy USB Support**

This item is used to enable the support for USB devices on legacy OS. If you have a USB keyboard or mouse, set to auto or enabled.

► **USB 2.0 Controller Mode**

This item is used to set the transmission rate mode of USB 2.0. The available settings are : [HiSpeed] in 480Mbps; [Full Speed] in 12Mbps.

► **BIOS EHCI Hand-Off**

Windows XP supports a number of features in the Enhanced Host Controller Interface (EHCI) specification, but there are a few features that are not implemented. Microsoft said preliminary support for EHCI BIOS handoff will be available in Windows XP SP2.

This item allows you to enable support for OS without EHCI hand-off feature.

This is a workaround for OS without EHCI hand-Off support .

The EHCI ownership change should claim by EHCI driver.

► **Initiate Graphic Adapter**

In application of multiple graphics cards, this item is used to select which graphics controller is used as the primary display device during boot. The available values are [PEG/PCI]; [PCI/PEG]. PEG stands for PCI-Express(x16) graphics card.

► **PEG Port Configuration - PEG Port**

This item is used to enable/disable the PCI Express Graphics port.

► **USB Functions**

This item is used to set the USB functions. You can select the amount of enabled USB ports.

► **HDA Controller**

This item is used to enable/disable the High Definition Audio (HDA) controller on your motherboard.

► **SMBUS Controller**

This item is used to enable or disable the SMBUS controller.

The System Management Bus (abbreviated to SMBus) is a simple two-wire bus, derived from I²C and used for communication with low-bandwidth devices on a motherboard, especially

power related chips. Other devices might include temperature, fan, or voltage sensors; and lid switches. PCI add-in cards may connect to an SMBus segment.

► **Onboard 1394 Control**

This item is used to enable or disable the 1394 devices. In some motherboards, 1394 is optional and need a specific hardware chip to fulfill its functions.

► **JMicron e-SATA&IDE**

This item is used to enable/disable the Parallel ATA IDE (PIDE) drive controller on the motherboard.

► **Realtek Gigabit LAN**

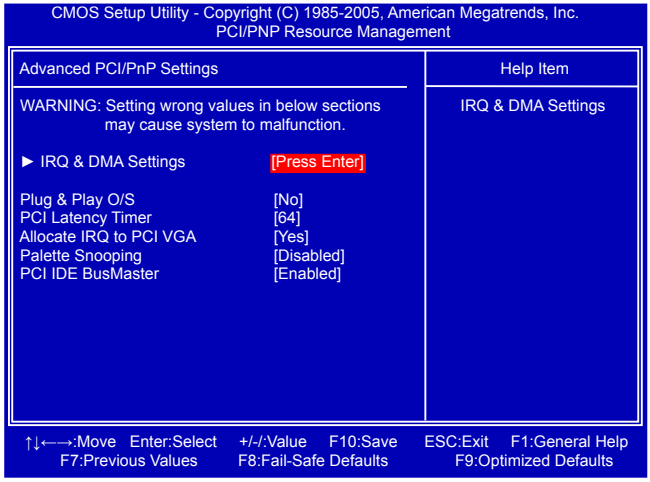
This item is used to enable/disable the gigabit Ethernet controller on the motherboard.

► **SLP_S4# Min. Assertion Width**

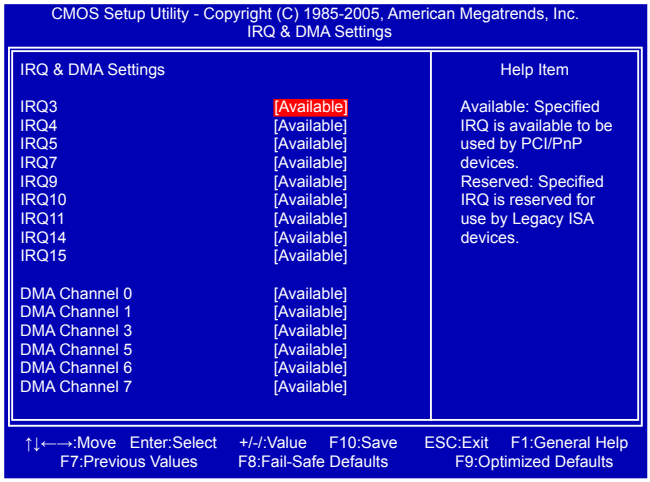
SLP_S4# is a signal of Southern Bridge (ICH) chip. It is for power plane control. This signal shuts power to all non-critical systems when in the S4 (Suspend to Disk) or S5 (Soft Off) state. It can also be used to control the DRAM power.

This item is used to set the SLP_S4# Min. Assertion Width. The available values are : [4 to 5 seconds]; [3 to 4 seconds]; [2 to 3 seconds]; [1 to 2 seconds](Default).

PCI/PNP Resource Management



IRQ and DMA Settings



The BIOS has the capability to automatically configure all of the boot and Plug & Play compatible devices. Normally, you should set them as [Available], so that the BIOS can automatically assign the IRQs and DMA channels. In the old days, you might assign each IRQ or DMA channel to a Legacy ISA card, and you had to change the setting to [Reserved] to reserve IRQ/DMA for this ISA card. This happened mostly on the ISA bus sound cards. Legacy ISA devices are compliant with the original PC AT bus specification and require a specific interrupt / DMA channel to function properly.

Now, ISA bus is disappeared on the motherboard, only PCI PnP devices are considered. PCI PnP devices, on the other hand, adhere to the Plug & Play standard and can use any interrupt / DMA channel. The IRQ/DMA assignments here are just to reserve some particular resources for them, and you can go to Device Manager for the assignments.

►IRQ 3/4/5/7/9/10/11/14/15, DMA Channel 0/1/3/5/6/7

These items are used to set if the PCI/PnP card assign IRQ/DMA automatically.

[Available] : Specified IRQ/DMA is available to be used by PCI/PnP devices.

[Reserved] : Specified IRQ/DMA is reserved for use by legacy ISA or PCI PnP devices.

► Plug & Play O/S

This item is used to set the plug and play function for your OS.

[No] : Let the BIOS configure all the devices in the system.

[Yes] : Let the operating system configure plug and play devices not required for boot if your system has a plug and play operating system.

► PCI Latency Timer

This item is used to set the PCI latency timer. The value is in unit of PCI cycle for PCI device latency timer register. Setting values are 32, 64, 96, 128, 160, 192, 224, 248.

This feature controls how long each PCI device can hold the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. Low values for the PCI Latency Timer will reduce the effective PCI bandwidth while higher values means every PCI device will have to wait longer before they can get access to the bus, but when they do get access, they can conduct their transactions for a longer time. Normally, a default value of 64 cycles is set. Some PCI devices may not agree with longer latency times so if you start facing problems like stuttering sound or a less responsive system, reduce the latency. Higher values will actually reduce performance as too much time may be allocated to each PCI device to the disadvantage of other devices on the bus.

►Allocate IRQ to PCI VGA

This item is used to allocate IRQ to PCI VGA.

Many high-end graphics cards may require an IRQ to function properly. Disabling this feature with such cards will cause improper operation and/or poor performance. Thus, it is best to make sure you enable this feature if you are having problems with your graphics card. Check your graphics card's manual. If it states that the card does not require an IRQ, then you can disable this feature to release an IRQ for other uses. It is best to leave this setting enabled (i.e. Yes) unless you really need the IRQ for other purposes.

[Yes] : Assigns IRQ to PCI VGA card if it requires an IRQ.

[No] : Does not assign an IRQ to PCI VGA card.

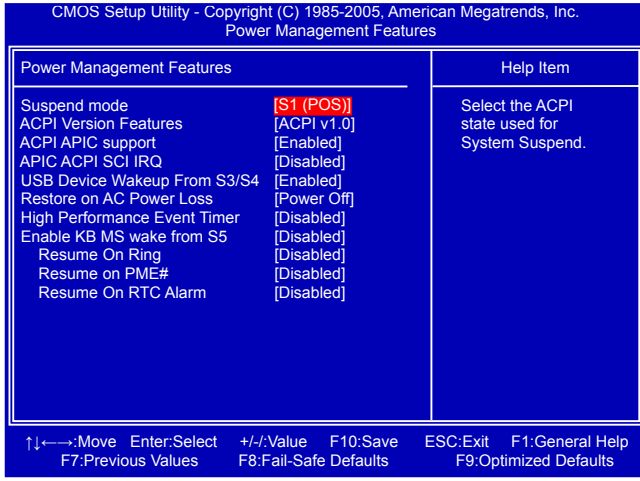
► Palette Snooping

This option is only useful if you use an MPEG card or an add-on card that makes use of the graphics card's Feature Connector. It corrects incorrect color reproduction by "snooping" into the graphics card's frame buffer memory and modifying (synchronizing) the information delivered from the graphics card's Feature Connector to the MPEG or add-on card. It will also solve the problem of display inversion to a black screen after using the MPEG card. Graphics card's Feature Connector normally stays at top edge of the graphics card.

► PCI IDE BusMaster

This item is used to control whether the PCI IDE bus master is enabled. If enabled, the PCI IDE bus mastering controller can access the PCI bus directly to achieve a faster throughput.

Power Management Features



ACPI (Advanced Configuration and Power Interface) is an open industry standard interfaces enabling OS-directed configuration, power management, and thermal management of mobile, desktop, and server platforms. It 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.

► **Suspend mode**

This item is used to select the ACPI state used for system suspend. Options are :

[S1 - Power On Standby]; [S3 - Suspend to RAM]; [Auto].

Auto is the mode in that system will check the driver of each device, if they all support S3, then system can go to S3 suspend, otherwise, only S1 state will be used.

► **ACPI Version Features**

This item is used to select the ACPI version. Keep it in default.

► **ACPI APIC Support**

The original IBM PC and its immediate successor, the PC XT defined a rather simple PIC scheme with a number of limitations. So an Advanced Programmable Interrupt Controller (APIC) was defined, that can cope with more devices and share them evenly among multiple processors. The APIC provides multiprocessor support, more IRQs and faster interrupt handling.

This item is used to set if add the ACPI APIC table pointer to RSDT pointer list. Keep it in default.

► **APIC ACPI SCI IRQ**

SCI - System Control Interrupt

This item is used to enable or disable the APIC ACPI SCI IRQ. Enabling APIC mode will expand available IRQs resources. Keep it in default.

► **USB Device Wakeup From S3/S4**

This item is used to enable/disable the USB device wakeup from S3/S4.

► **Restore on AC Power Loss**

The options are :

[Last State]; [Power On]; [Power Off]. Keep it in default.

► **High Performance Event Timer**

The options are :

[Enable]; [Disable]. Keep it in default.

► **Enable KB MS Wake from S5**

This item is used to enable/disable keyboard and mouse wake up from S5.

► **Resume On Ring / PME# / RTC Alarm**

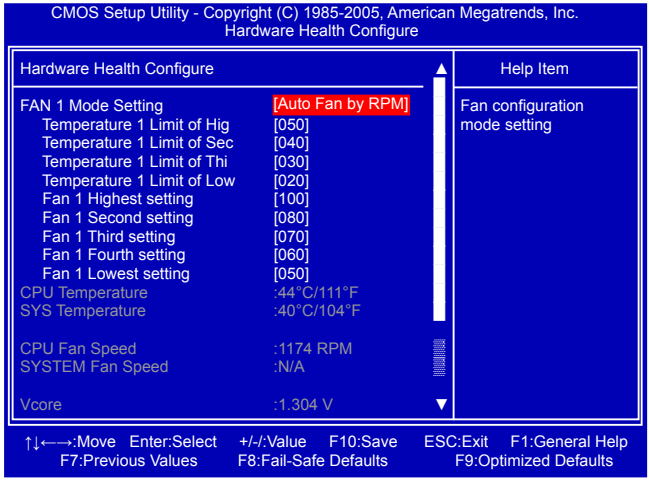
This item is used to enable/disable Ring /PME# / RTC alarm event to generate a wake up.

Ring is alarm event from external modem connected to RS232 port.

PME# is a signal which can be triggered from a PCI card. It represents Power Management Event.

RTC is system real time clock.

Hardware Health Configure



► **Fan 1 Mode Setting (CPU FAN)**

This item is used to support SMART CPU FAN feature which allows system to adjust its fan speed according to CPU temperature. The lower the CPU temperature, the slower the FAN speed. The options of this setting are :

Auto Fan by RPM :

Control CPU FAN by delivering a PWM signal, which supports SMART FAN feature. You must use 4-wire FAN for this setting. Also, if you are using 3-wire CPU FAN, we recommend you to choose this setting so it can run at its full speed.

Auto Fan by DutyCycle :

Control CPU FAN by using linear voltage, only supports 3-wire CPU FAN. DO NOT recommend to use this setting for 3-wire CPU FAN, as some old 3-wire FANs may fail to run by this setting.

Manual Fan by RPM :

Manually fix 4-wire CPU FAN running at one particular speed.

Manual Fan by DutyCycle :

Manually fix 3-wire CPU Fan running at one particular speed based on a percentage ratio to the maximum speed. DO NOT recommend.

► **Temperature 1 Limit of Highest / Second / Third / Lowest**

These items are used to set the CPU temperature limit. When CPU detects itself staying at the highest temperature, system will drive CPU FAN to run at its maximum speed.

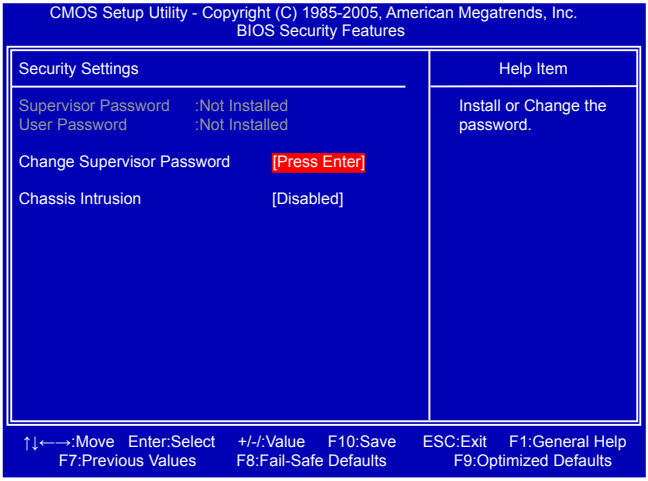
► **Fan 1 Highest / Second / Third / Fourth / Lowest Setting**

These items are used to set the different levels of the fan speed, 100 is its maximum speed.

► **CPU Temperature / System Temperature / CPU Fan Speed / System Fan Speed / Vcore / 1.8V SUS / 1.2V CORE / +5V / +12V / +3.3V / VCC / VSB / VBAT**

These items display the information of current CPU / chipset / system temperature, fan speeds and voltages, all these messages are automatically detected and displayed by the system.

BIOS Security Features



►Change Supervisor / User Password

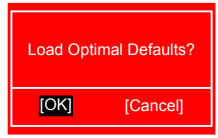
This item is used to install or change supervisor / user password.

After you input Supervisor password, it then will ask you to input user password optionally.

► Chassis Intrusion

This item is used to enable or disable function of intrusion detection.

Load Optimal Defaults

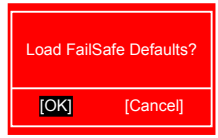


Optimal defaults are the best settings of this mainboard. Always load the Optimal defaults after updating the BIOS or after clearing the CMOS values.

Select this option and press Enter, it will pop out a dialogue box to let you load the defaults. Select <OK> and then press <Enter> to load the defaults. Select <Cancel> and press <Enter>, it will not load.

By this default, BIOS have set the optimal performance parameters of system to improve the performances of system components. But if the optimal performance parameters to be set cannot be supported by your hardware devices (for example, too many expansion cards were installed), the system might fail to work.

Load Failsafe Defaults

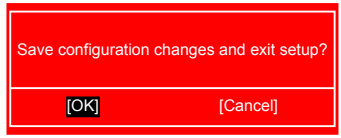


If you encounter any system unstable problem, you may try to load Fail-Safe defaults, which are the safest and most stable BIOS settings for the motherboard.

Select this option and press Enter, it will pop out a dialogue box to let you load the defaults. Select <OK> and then press <Enter> to load the defaults. Select <Cancel> and press <Enter>, it will not load.

The BIOS have set the basic and safest default functions to ensure the stability of your system. If your computer fails to run properly, then you may load this default to recover the system back to normal, and carry out failure analysis in next step.

Save Changes and Exit



When you select this option and press <Enter>, a message will be displayed in the center of the screen:

Select [OK] to save your changes to CMOS and exit the program, select [Cancel] or <ESC> to return to the main menu.

Discard Changes and Exit

If you select this option and press <Enter>, the following message will be displayed in the center of the screen:

Select [OK] to exit CMOS without saving your modifications, select [Cancel] or <ESC> to return to the main menu.

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 content
- Install driver and utility
- FOX ONE
- FOX LiveUpdate
- FOX LOGO
- FOX DMI

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

Utility CD content

This motherboard comes with one Utility CD. You can simply put it into your CD/DVD-ROM drive, and the main menu will be displayed on your PC screen to guide you how to install.

1. Install Driver

Use these options to install all the drivers for your system. You should install the drivers in order, and you need to restart your computer after all the drivers have been installed.
Drivers A, B, C must be installed to take the advantage of the basic motherboard features. While drivers D, E is related with your hard drives which can be configured as a RAID system to ensure that, occasionally, if one of your hard disks is crashed, then you can recover it back by replacing a new hard disk. Intel RAID driver controls the hard disks connected to SATA interfaces, while JMicron RAID driver controls the hard disks connected to PATA interface.

A. Intel Chipset Driver
B. Realtek HDA Audio Driver
C. Realtek 811X LAN Driver
D. Intel RAID Driver
E. JMicron RAID Driver

2. Software Utilities

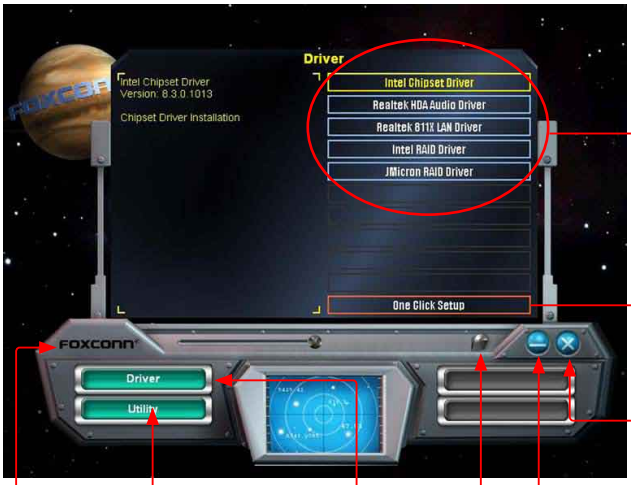
Use these options to install additional software programs. FOX ONE is a very powerful user interface program which allows you to change your system setting without going to BIOS. Some auto features help user to improve (or overclock) your system without being a computer literate.

A. FOX ONE
B. FOX LiveUpdate
C. FOX LOGO
D. FOX DMI
E. Microsoft DirectX 9.0
F. Adobe Acrobat Reader
G. Norton Internet Security
H. Create RAID Driver Floppy

Install driver and utility

1. Install Driver

You must click "Intel Chipset Driver" to install it first. After that, you can click "One Click Setup" to install all the other drivers left, or you can click on each individual driver to install it manually.



Manual Installation Step by Step

Automatic Installation by One Click.

Exit the program

Click to visit Foxconn's website

Select to Install Utilities

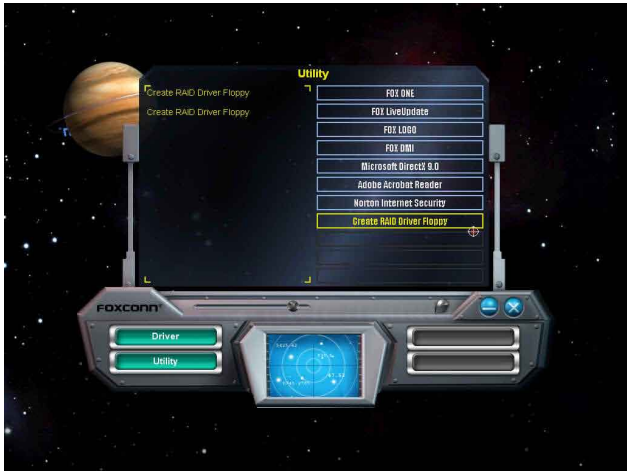
Select to Install Drivers

Browse CD

Drop to System Tray

2. Install Utility

You can select the specific utility to install.



FOX ONE

FOX ONE is a powerful utility for easily modifying system settings. It also allows users to monitor various temperature values, voltage values, frequencies and fan speeds at any time.

With FOX ONE, you can :

- Modify system performance settings, such as the CPU and memory bus speeds, CPU voltages, fan speeds, and other system performance options.
- Monitor hardware temperatures, voltages, frequencies and fan speeds.

CAUTION

Depending on hardware support, voltage monitoring and Fox Intelligent Stepping features are optional and only supported in some models. If the option is selectable, it also means the feature is supported.

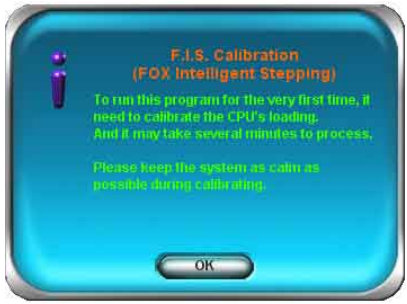
- Voltage Monitoring is supported only in FOX ONE Premium & Deluxe products.
- Fox Intelligent Stepping is supported only in FOX ONE Deluxe products.

Supporting Operating Systems :

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

Using FOX ONE :

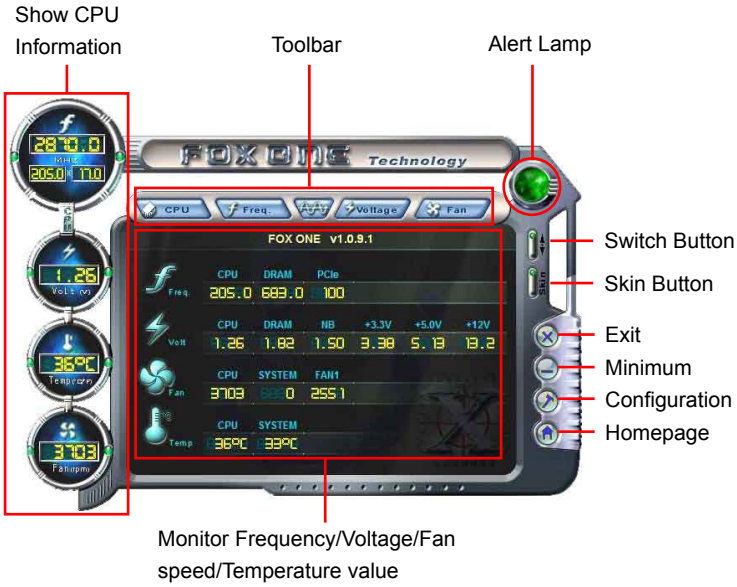
The very first time you run FOX ONE, F.I.S. Calibration function (FOX Intelligent Stepping) will require you to calibrate the CPU's loading. Click "OK" to proceed and start the Utility. F.I.S. is a feature of FOX ONE, which can automatically adjust your CPU clock based on your current system loading.



CAUTION

Before you running the FOX ONE program, the system parameters (such as CPU clock, voltage...etc.) are controlled by BIOS settings. After you run FOX ONE, it will take over, and the controlling right will be transferred to FOX ONE. Later, if you exit FOX ONE, then BIOS control will be back again.

1. Main Page



Toolbar

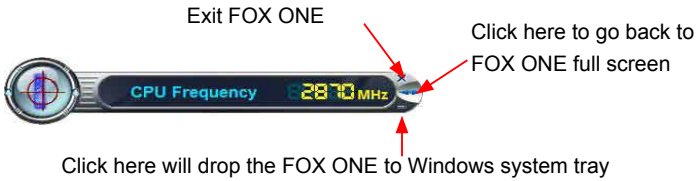
Use the toolbar to navigate to other pages.

Alert Lamp

When the system is in healthy state, the alert lamp color is green. When the system is in abnormal state, the alert lamp color is red.

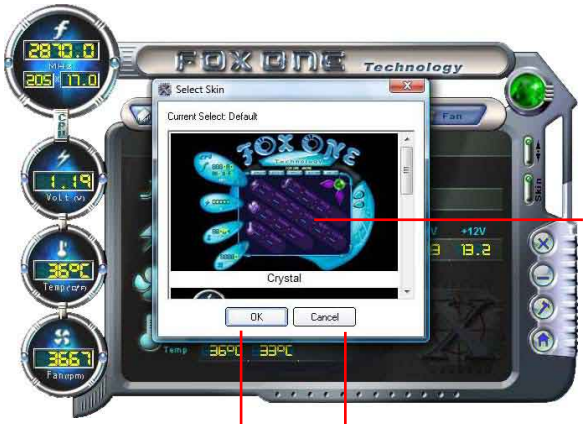
Switch Button

Click this button, it will simplify the whole FOX ONE control panel to a smaller information bar (i.e. Simple Mode) as depicted below, you can drag this bar to any place on your screen to help you monitoring system status.



Skin Button

There are more choices of FOX ONE screen panels provided. Click this button, you can select your favorite skin (FOX ONE Panel).



Exit

Click this button to exit the program.

Minimum

Click this button to drop the FOX ONE to Windows system tray located at the lower right corner of your screen.

Homepage

Click this button to visit Foxconn motherboard website :
http://www.foxconnchannel.com

Configuration

This menu allows you to configure :

1). Monitor interval (ms) :

This is to define the interval of which different messages of system settings are to be displayed on Simple Mode screen. Minimum value is 1 second.

2). Simple Mode :

To select which message of system settings are to be displayed in the Simple Mode. Messages such as CPU frequency, voltage...etc., they can be displayed one by one in Simple Mode.

3). F.I.S. Calibration (FOX Intelligent Stepping, Optional)

This function will re-calibrate the CPU's loading, and it may take several minutes to proceed. The FOX ONE calibration process will apply different loadings to your CPU, record PWM IC voltage together with the CPU clock running at these loadings, so it can define and estimate within a particular range of system loading, what the CPU clock should be.

Step 1 : Click Calibration icon, a message pops out to ask for continue. Select Yes.

Step 2 : After data is collected, it will ask you to restart your computer now.

Later on, when the FOX ONE program is activated, and F.I.S. feature (in CPU Page) is also enabled, FOX ONE will automatically adjust your CPU clock according to your system loadings. (Loadings are like Power Gaming, Data Mining...etc.)

2. CPU Page - CPU Control

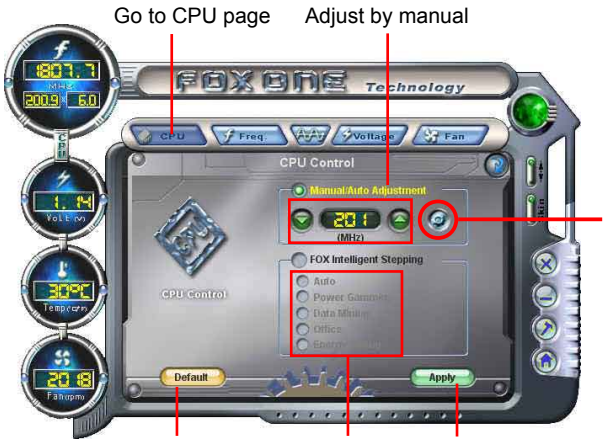
This page lets you select (or overclock) CPU clock to meet the current performance level of the system. The fastest and suitable CPU clock running for current system can be calculated by FOX ONE automatically or manually input by yourselves.

Manual :

You can press the up/down button to adjust your CPU clock.

Auto :

Click this button to let FOX ONE check the highest CPU clock you can use. System will raise the CPU clock step by step until it hangs, you can then push the RESET button on your PC panel to restart the system. When system restarts, run FOX ONE again, it will display a recommended highest CPU clock for you, click <Yes> to apply it.



Press Auto button to let FOX ONE check the highest CPU clock you can use.

A message informs you to push RESET button later if the system hangs finally. Click Yes to continue.

You can see the system is raising CPU clock until the system hangs.
Push RESET button on the front panel of your system to restart the computer.

Run FOX ONE program again, it will inform you the previous test found that 255MHz is the recommended CPU clock for your system.
Click Yes to apply it to your system.

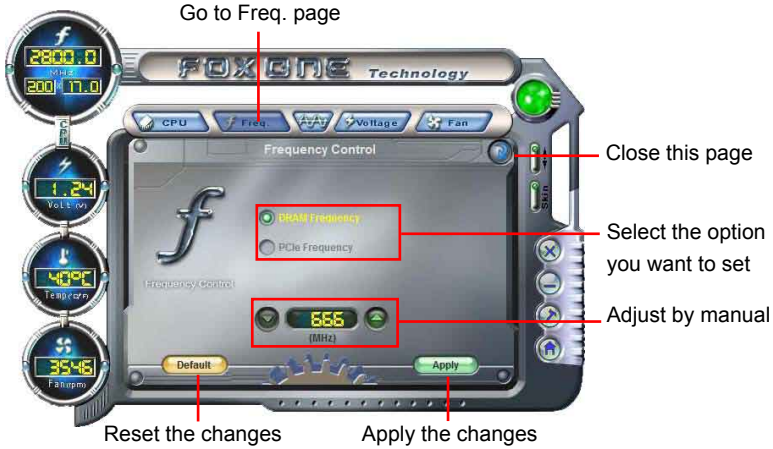
Now, your system is running at a CPU clock of 255MHz.

FOX Intelligent Stepping (F.I.S., Optional)

Select FOX Intelligent Stepping will allow your system to automatically adjust your CPU clock rate based on different system loadings. For example, if you select Power Gaming, CPU clock will be driven to run at its maximum speed. While in Energy Saving, CPU will lower down its speed to a minimum. The four benchmarks - Power Gaming, Data Mining, Office and Energy Saving, the references of their system loading were calculated and defined in the FIS Calibration option of Configuration menu. Select Auto, CPU will automatically adjust its clock according to current system loading.

3. Frequency Page - Frequency Control

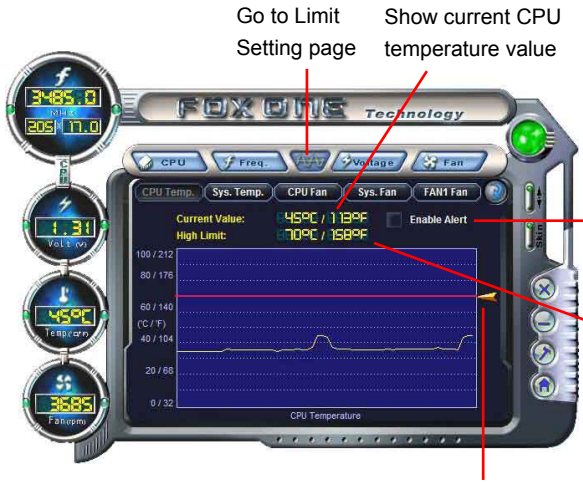
This page lets you set memory and PCI Express frequencies by manual.



4. Limit Setting

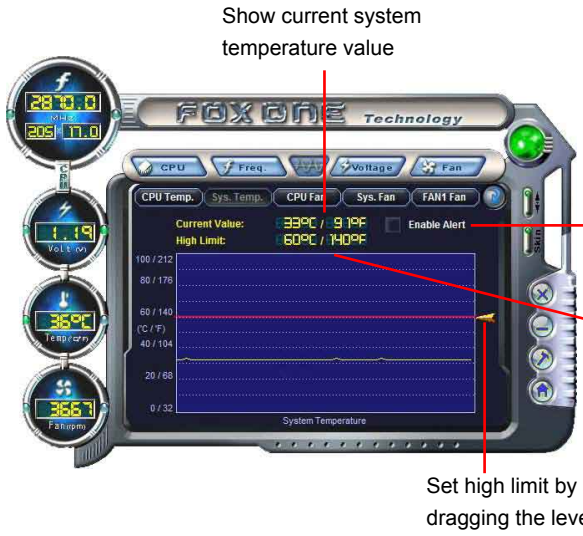
4.1 Limit Setting - CPU Temperature

This page lets you to set CPU high limit temperature and enable the alert function.



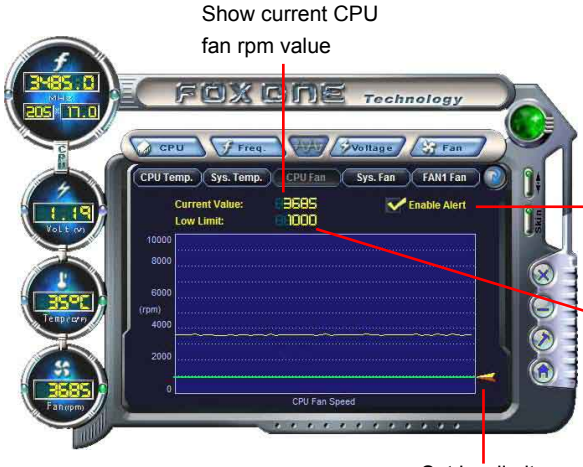
4.2 Limit Setting - System Temperature

This page lets you to set system high limit temperature and enable the alert function.



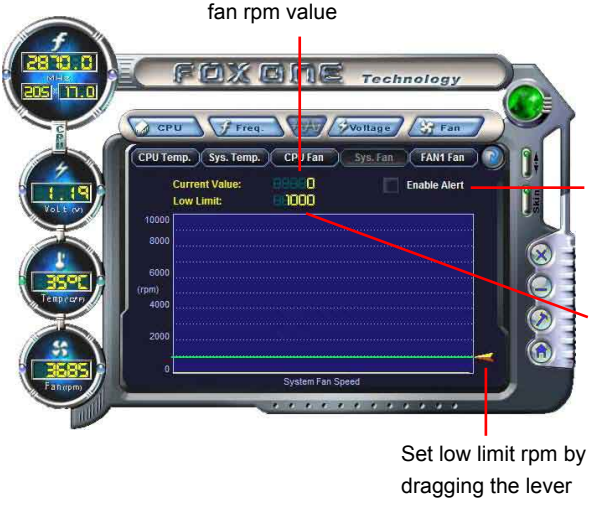
4.3 Limit Setting - CPU Fan

This page lets you to set CPU fan low limit rpm and enable the alert function.



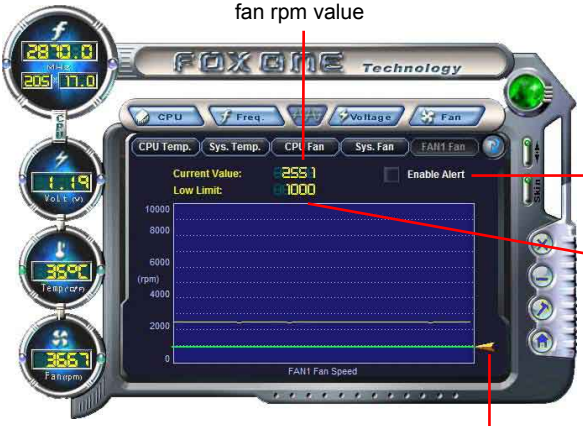
4.4 Limit Setting - System Fan

This page lets you to set system fan low limit rpm and enable the alert function.



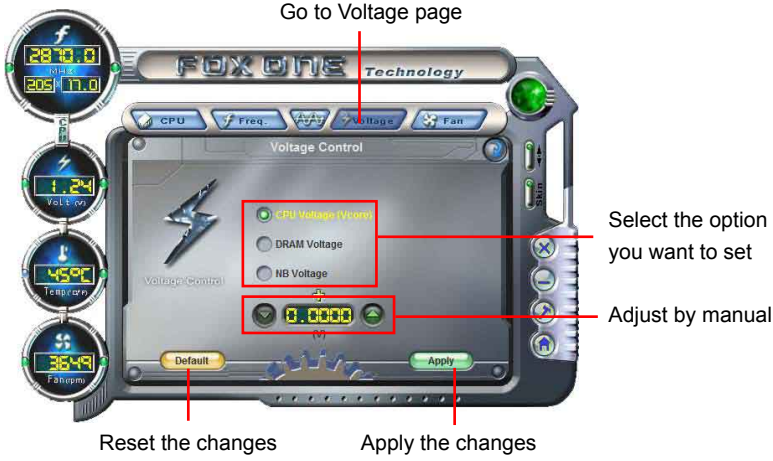
4.5 Limit Setting - FAN1 Fan

This page lets you to set FAN1 fan low limit rpm and enable the alert function.



5. Voltage Page - Voltage Control (Optional)

This page lets you set CPU voltage, memory voltage and North Bridge voltage manually. CPU voltage can be stepped up/down by a unit of 12.5mV, while memory is 0.05V/step, and North Bridge is 0.04V/step.



6. Fan Page - Fan Control

This page lets you enable Smart Fan function or set the fan speed by manual.
When Smart Fan is selected, you must use a 4-pin CPU cooler in your system.

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 :

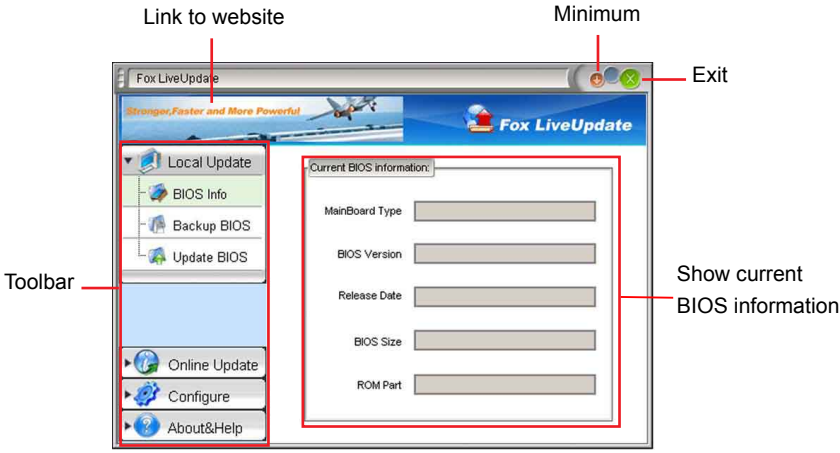
- Windows 2000
- Windows XP (32-bit and 64-bit)
- Windows 2003 (32-bit and 64-bit)
- Windows Vista (32-bit and 64-bit)

Using FOX LiveUpdate :

1. Local Update

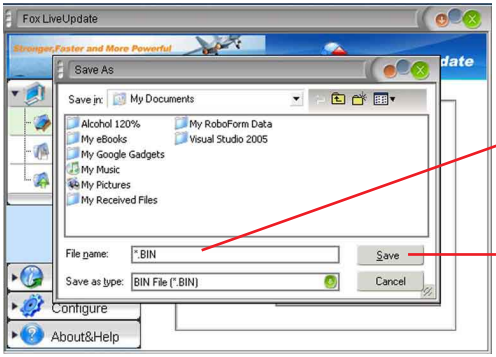
1-1 Local Update - BIOS Information

This page lets you know your system BIOS information.



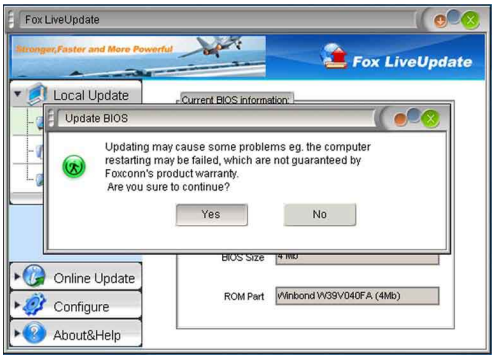
1-2 Local Update - Backup

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.



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.



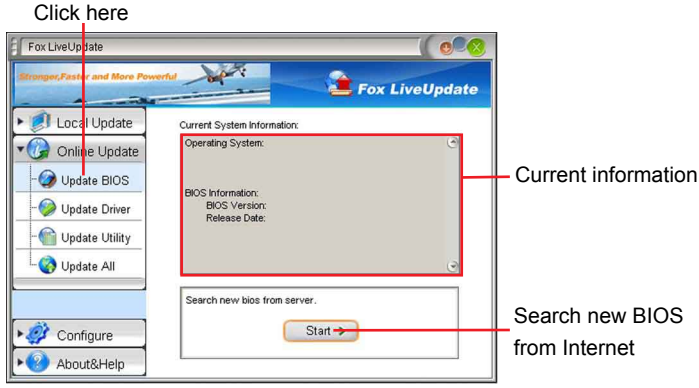
CAUTION

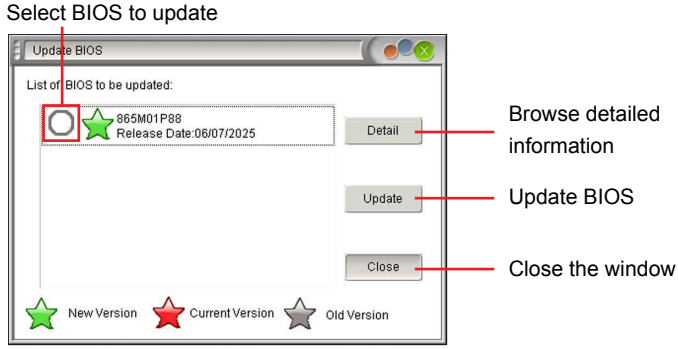
FOX LiveUpdate can automatically backup old BIOS before update. This feature can be enabled in the "Configure-System" setup. Please refer to "Configure-System" section for more detail. The default backup directory is C:\LiveUpdate_Temp, but the backup file name will be automatically generated. It is 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

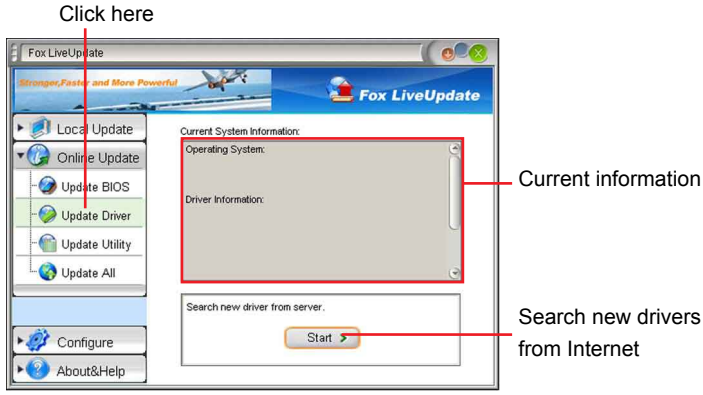
This page lets you update your system BIOS from Internet. Click “start”, it will search the new BIOS from Internet. Then follow the wizard to finish the update operation.

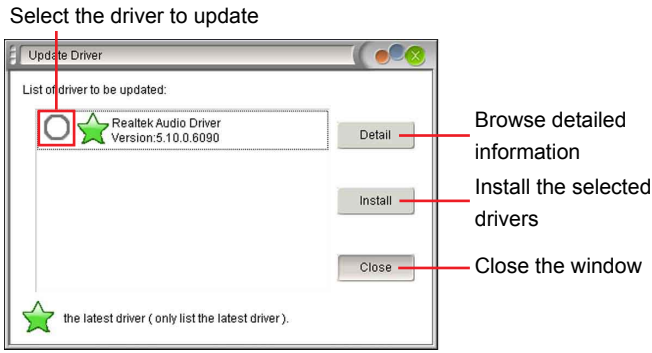




2-2 Online Update - Update Driver

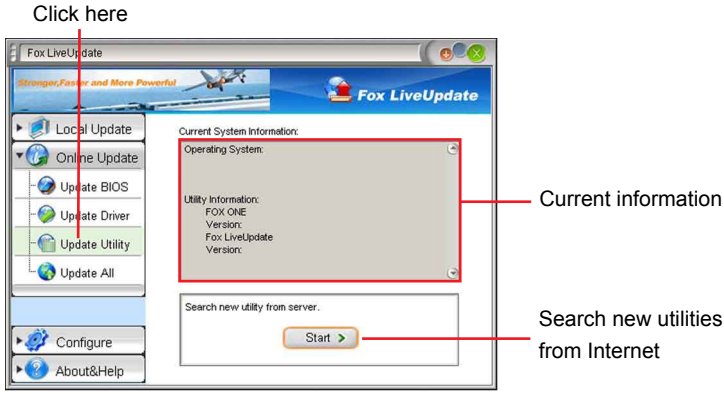
This page lets you update your system drivers from Internet. Click “start”, it will search the new drivers from Internet. Then follow the wizard to finish the update operation.





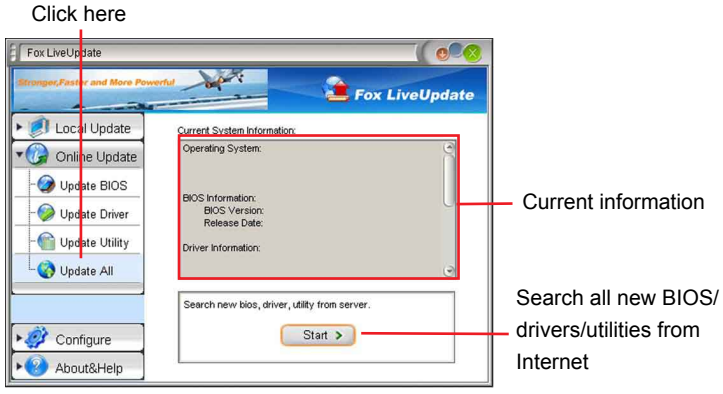
2-3 Online Update - Update Utility

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.



2-4 Online Update - Update All

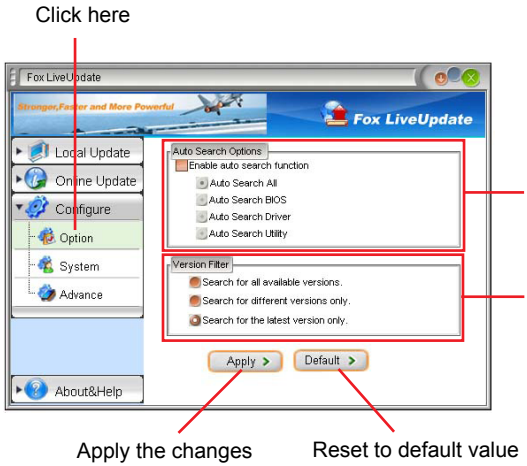
This page lets you update your system drivers from Internet. Click “start”, it will search all new BIOS/drivers/utilities from Internet. Then follow the wizard to finish the update operation.



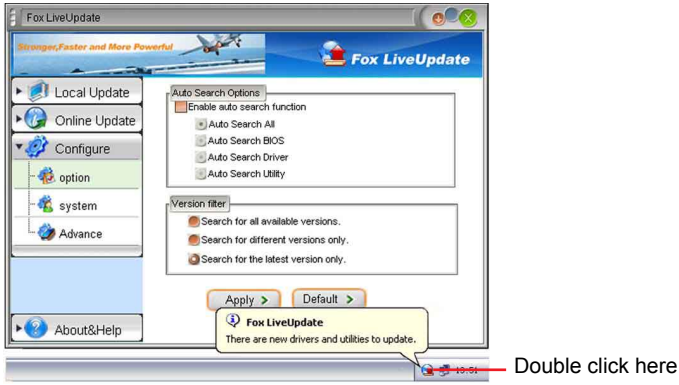
3. Configure

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.

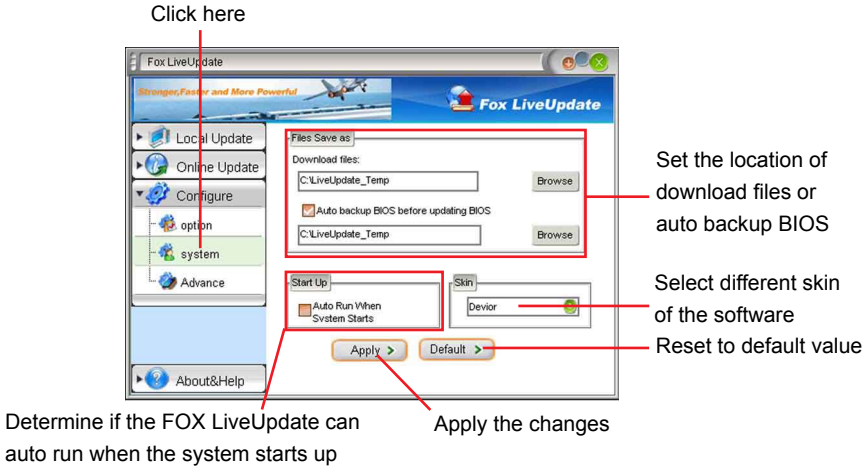


Double click the icon on the system bar, you can see the detailed information.



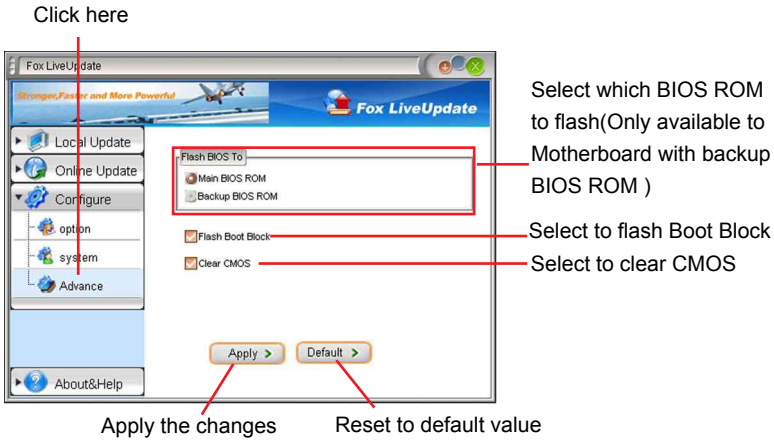
3-2 Configure - System

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



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.

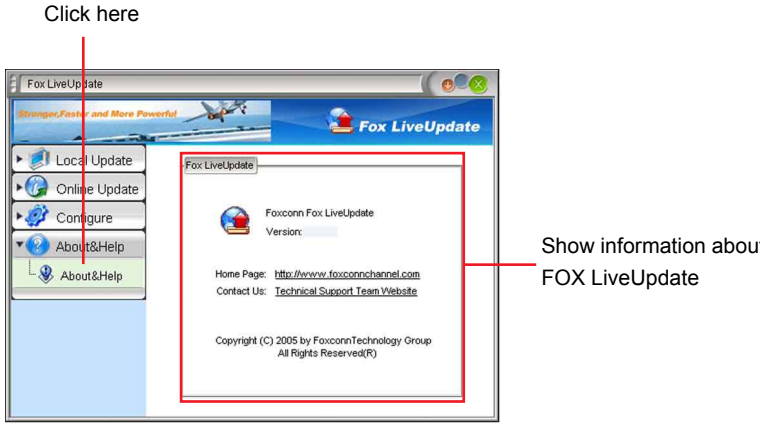


CAUTION

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.



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 bitmap image (640x480) 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 "Quiet Boot" setting in "Boot Configuration 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

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.

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 :

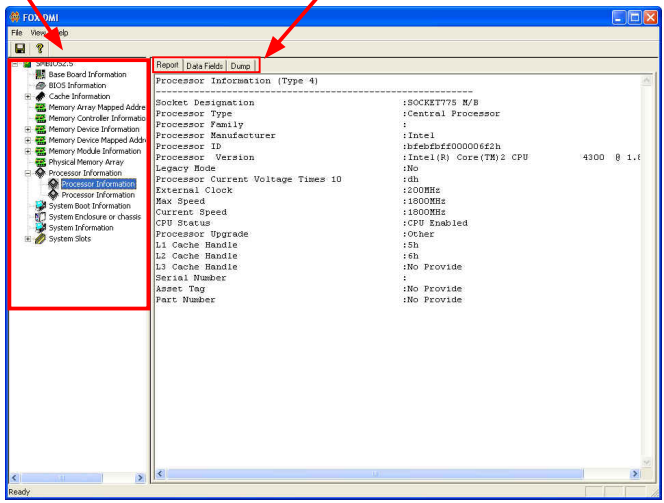
- Windows 2000
- Windows XP (32-bit and 64-bit)
- Windows 2003 (32-bit and 64-bit)
- Windows Vista (32-bit and 64-bit)

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



This chapter will cover two topics :

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

It includes the following information :

- RAID Configuration Introduction
- Intel® Matrix Storage Manager
- Create a RAID Driver Diskette
- BIOS Configuration
- Create RAID in BIOS
- Install a New Windows XP
- Existing Windows XP with RAID built as data storage.

You need to install Intel® Matrix Storage Manager driver for the following conditions :
1). P35A is selecting AHCI in its BIOS setting of SATA Mode Select.
2). P35A-S is selecting AHCI or RAID in its BIOS setting of SATA Mode Select .
Please refer to page 33, 102 for detail.

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

Installing a new Windows XP (Vista) in a brand new RAID system.

1. Follow 5-1 to create a RAID driver diskette.
   (Windows Vista has in-box driver by its own and can skip this step).
2. Follow 5-2 to set BIOS setting SATA mode to RAID or AHCI.
3. Follow 5-3 to create RAID in BIOS.
4. Follow 5-4 to Install 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. (Could be bundled in motherboard package.)
5. P35A Series CD. (To create RAID driver diskette if it is not bundled.)
6. Windows XP or Vista Install CD.

Existing Windows XP (Vista) system with new RAID built as data storage.

Follow 5-5 to go through the processes to build a new RAID data storage in your existing Windows XP system, it includes :
1. Copy RAID driver setup program to your hard disk. (Vista can skip)
2. Follow 5-2 to set BIOS setting SATA mode to RAID or AHCI.
3. Follow 5-3 to create RAID in BIOS.
4. Run setup program to install Intel® Matrix Storage Manager driver into your current Windows XP system. (Vista can skip this step)
5. Format new RAID partitions.

What kinds of hardware and software you need here :
1. A CD-ROM drive.
2. Several SATA hard disks.
3. A P35A Series 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 motherboard comes with the Intel ICH9R. 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 (Stripe)

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. The striping block size can be set from 4KB to 128KB. 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. Under a RAID 1 setup, an extra drive called the “spare drive” can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, if any RAID 1 drive fails, data access will not be affected as long as there are other working drives in the array.

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 10 (0+1)

RAID 10 is a combination of striping and mirroring. This configuration provides optimal speed and reliability, but you need four SATA 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
RAID10	>=4 (Even number)	Smallest *2	High	Excellent	Unlimited budget

Intel® Matrix Storage Manager

The Intel® Matrix Storage technology supports RAID 0 ,RAID 1, RAID 5, and RAID 10 (0+1) functions. It allows you to get high performance with fault tolerance, big capacity, or data safety provided by different RAID functions.

In this section, we will use four SATA hard disks as an example to guide you how to configure your RAID system. There are two 232.9GBs, one 298.1GB, and one 279.5GB. A creation of second volume will also be well described.

In each screen, there is also a message bar about each key's function, such as <Tab>, <Enter>, <Del>...etc. it is to help making your selection easier.

Two topics will be introduced :

1). Installing a new Windows XP in a brand new RAID system.

2). Existing Windows XP system with new RAID built as data storage.

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.

Steps to Install Serial ATA Hard Disks :

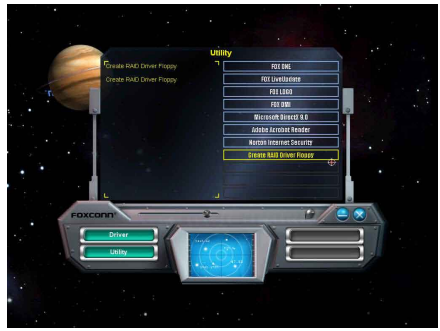
1. Install SATA hard disks into the drive bays.
2. Connect one end of the SATA cable to motherboard's SATA connector, and the other end to SATA hard disk.
3. Connect SATA power cable to the power connector of SATA hard disk.

- Both AHCI and RAID modes need to install **Intel® Matrix Storage driver.**
- Set SATA mode in BIOS to AHCI, you can skip RAID BIOS creation steps, but the software driver installation of **Intel® Matrix Storage Manager** shall follow the same rule as described for RAID.

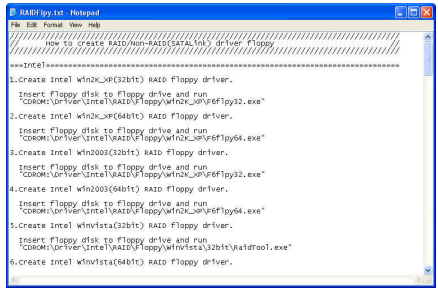
5-1 Create a RAID driver diskette

If you want to install a brand new Windows XP on a RAID system, you need to configure the SATA Mode in BIOS to either AHCI or RAID first. You also need to create a RAID driver floppy diskette which will be used during Windows XP installation later.
Windows Vista has native RAID driver in itself, you can skip these steps.

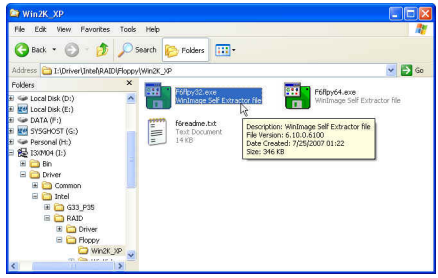
1. Find another PC, put a diskette into its floppy drive A:, this diskette will be formatted later. Put the P35A driver CD into CD-ROM drive, after the screen comes out, click on "Utility" icon, then click on "**Create RAID Driver Floppy**" icon.



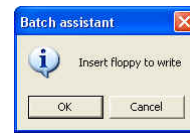
2. A message pops out telling you where to find the routine in driver CD to create the driver diskette.



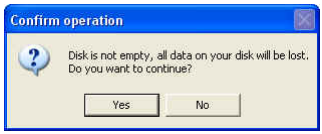
3. Depending on which platform your XP system is, normally, it is a 32-bit system. Use Windows explorer, and go to **CD:\ Driver\Intel\RAID\Floppy\Win2K_XP**, click on **F6flpy32.exe** to start the creation.



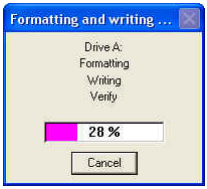
4. Asking you to insert a diskette into floppy drive A:.



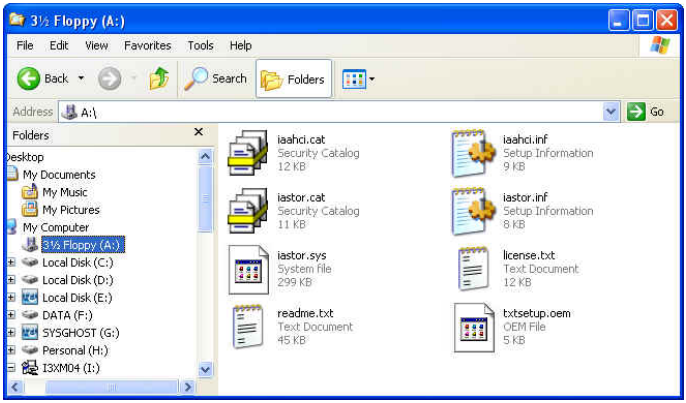
5. Double confirm if you really want to format this diskette. Click on "**Yes"** to continue.



6. Format and writing are in processing.



7. 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.

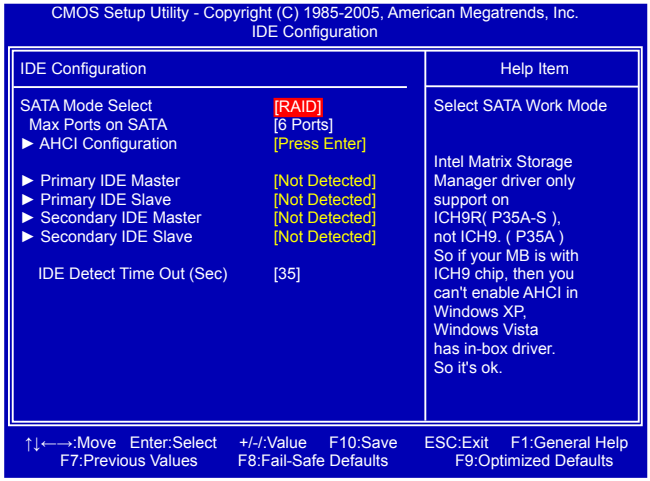


8. Install Serial ATA Hard Disks :
   8-1. Shut down your computer.
   8-2. Install SATA hard disks into the drive bays.
   8-3. Connect one end of the SATA cable to motherboard's SATA connector, and the other end to SATA hard disk.
   8-4. Connect SATA power cable to the power connector of SATA hard disk.

Go to section 5-2.

5-2 BIOS Configuration

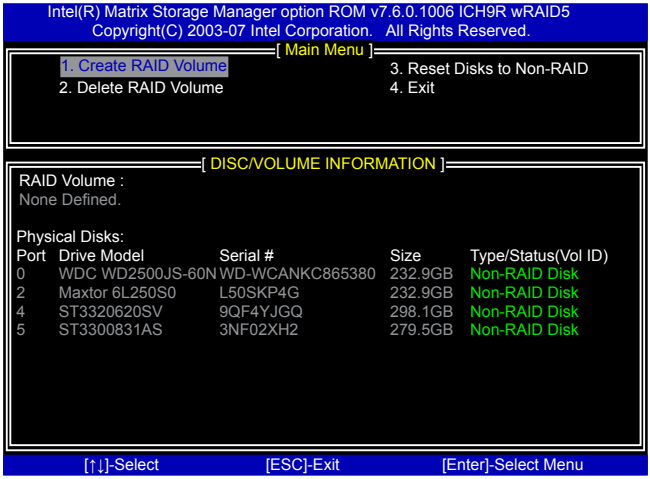
1. Enter the BIOS setup by pressing <DEL> key during the POST(Power On Self Test).
2. Select the “Advanced BIOS Features” from the “Main menu”, then select the “IDE Configuration” item and press <Enter> to go to the configuration items.
3. Set the “SATA Mode Select” option to [RAID].
4. Press <F10> to save the setting then PC will reboot itself.



5-3 Create RAID in BIOS

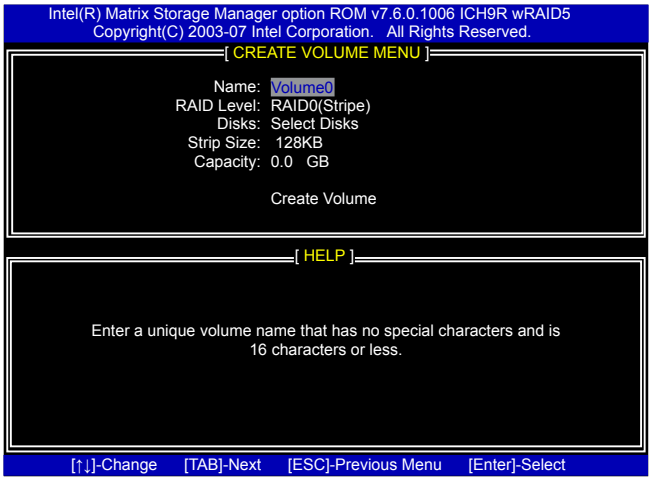
Enter RAID BIOS Setup

When BIOS is restarted, it will display a message asking you to press <Ctrl><I> keys simultaneously to enter the main menu of Intel® Matrix Storage Manager Option ROM Utility. Press the <Ctrl+I> to enter Configuration Utility.



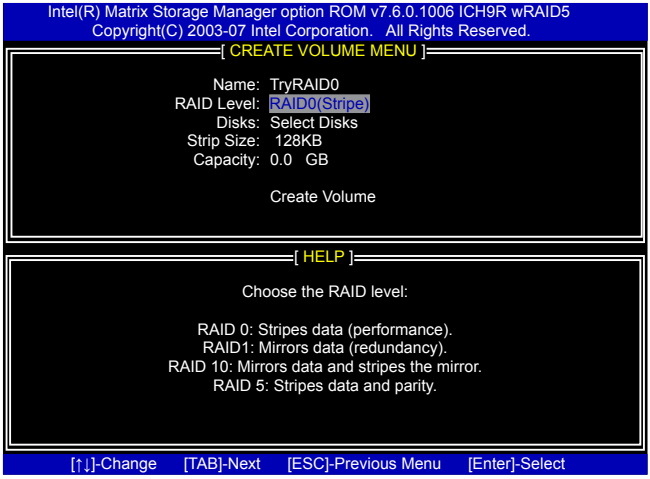
Create RAID Volume
Create RAID 0 (1st Volume)

1. Select "**1. Create RAID Volume**" from the menu and press <Enter>.
The menu appears :

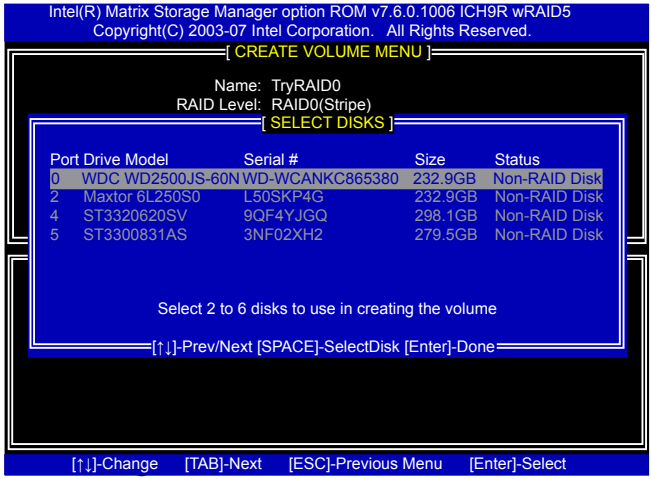


2. In "**Name**" item, you can input a device name for the RAID0 system and press <Enter> to apply it. Here, we name it as TryRAID0 to replace the default Volume0.

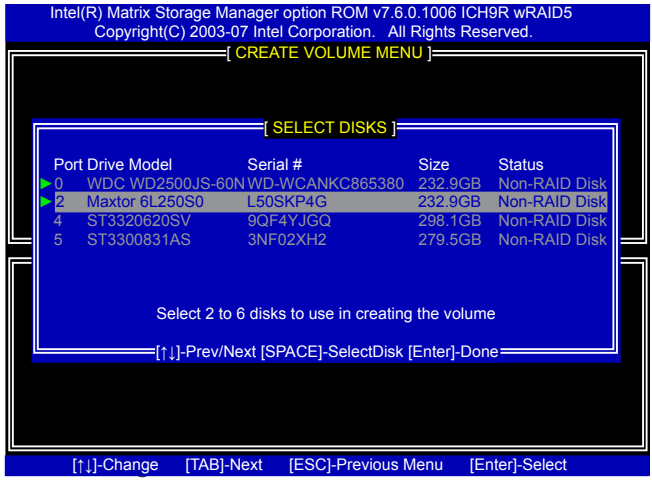
3. In "**RAID Level**" item, you can use Up or Down arrow key to make a selection from one of RAID0, 1, 5, 10 items. Select RAID0 (Stripe) and press <Enter>.



4. It then goes to "**Disks**" item. Press <Enter> to choose the hard disks for this RAID0 system.

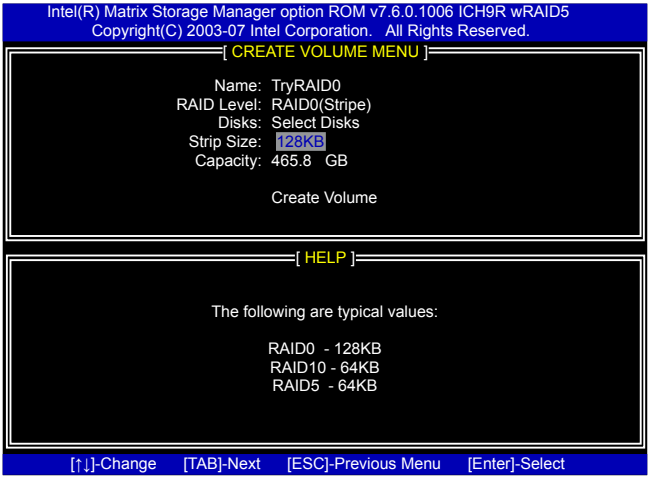


5. From the hard drive list, use Up or Down arrow key to reach the hard disks you want to combine them as RAID0, then press <Space> key to select them. A triangle sign will appear to indicate the drive selected. Here, we select two 232.9GB hard disks as an example. Press <Enter> key to finish the selection.

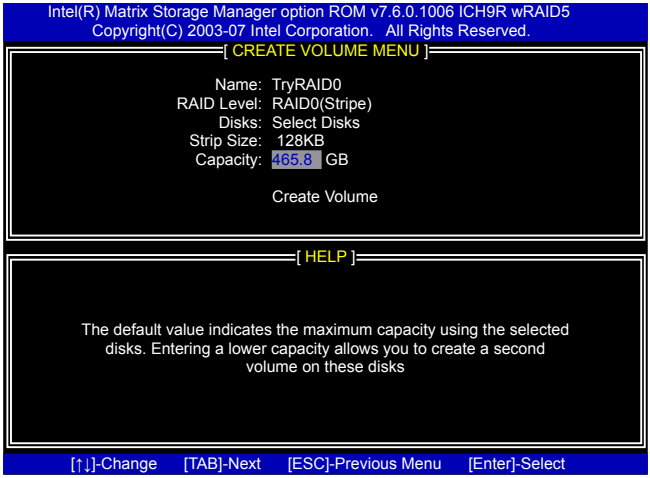


6. It is now entering “**Strip Size**” menu. Use Up or Down arrow key to select the desired strip size. The available values range from 4KB to 128KB. The strip value should be selected based on different applications. Some suggested choices are :
   16K - Best for sequential transfer.
   64K - Good general purpose strip size.
   128K - Best performance for most desktops and workstations .

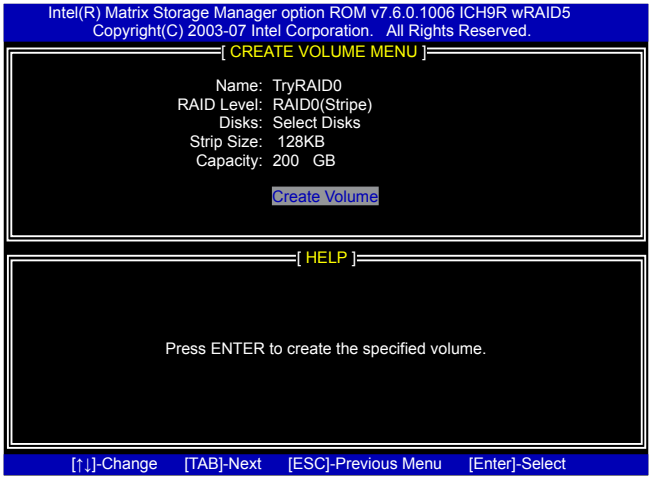
The default value is 128K for RAID0. Press <Enter>.



7. In “**Capacity**” line, it displays there are maximum 232.9GB * 2 = 465.8GB available. As we want to introduce how to create two disk volumes (like logical devices C: and D:) in a RAID0 system, so we only key in 200GB here to build the first volume. Later, we will also describe how the second volume is generated. Input 200GB, and press <Enter>.

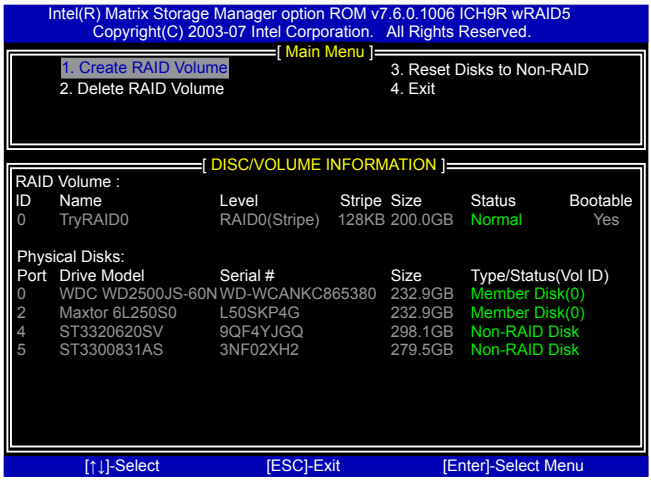


8. In “**Create Volume**” item, press <Enter>.



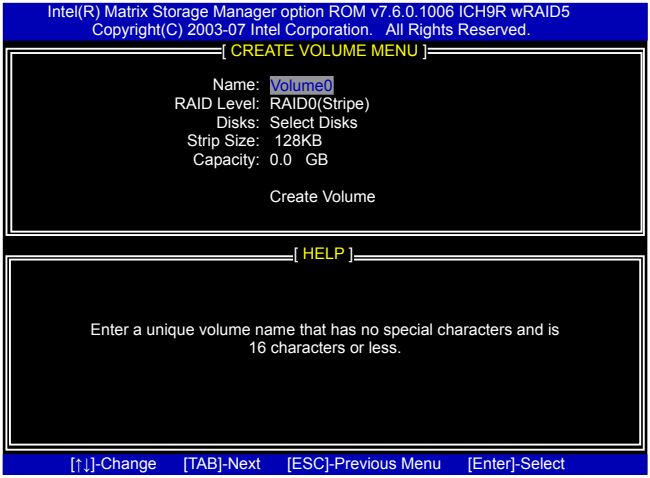
A warning message will appear :

9. Press <Y> to create the volume and return to the main menu, a 200GB RAID0 system is normally configured.



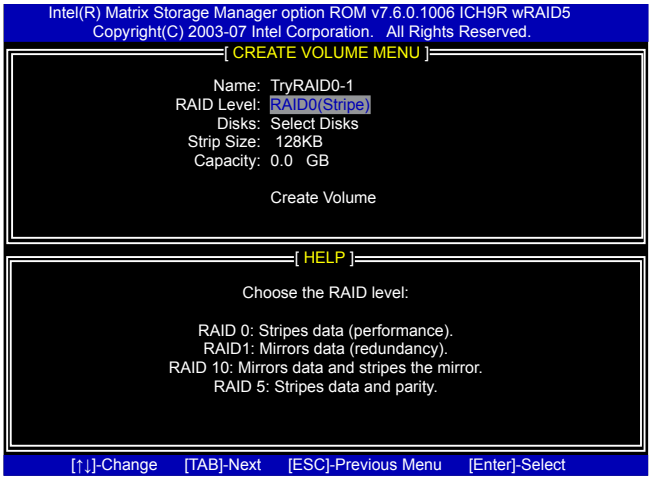
Create RAID0 (2nd Volume)

1. Select "**1. Create RAID Volume**" from the menu and press <Enter>.
   The menu appears :

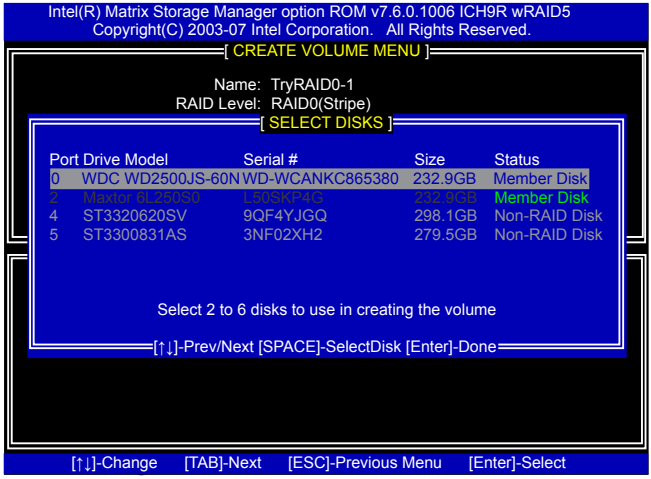


2. In "**Name**" item, we name it as TryRAID0-1 for second volume.
3. In "**RAID Level**" item, you can use Up or Down arrow key to make a selection, only RAID0, 1 can be selected. Select RAID0 (Stripe) and press <Enter>.

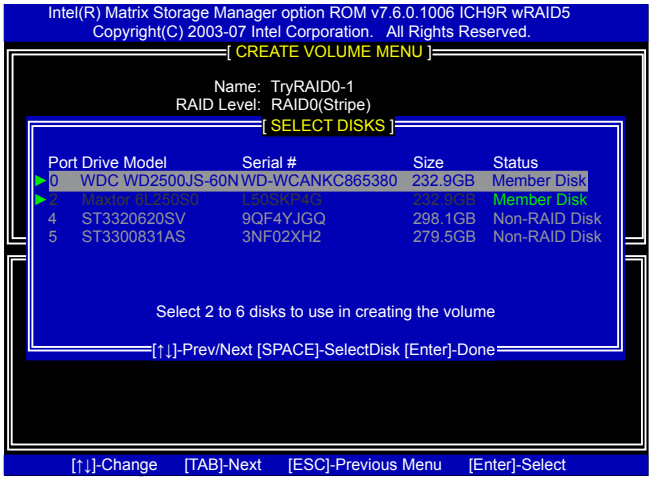
(Note : You also can try to select RAID1 for the second volume as an experiment here)



4. It then goes to “**Disks**” item. Press <Enter> to choose the hard disks for this RAID0 second volume system.



5. From the hard disk list, select the previously configured RAID0 hard disks, and press <Space> key to select them. Two triangle signs will appear to indicate the selections. Press <Enter> to continue.



6. It goes to “**Strip Size**” menu directly. Capacity automatically displays 265.8GB, and at this time, you can not input any value in capacity as there is no additional volume available.

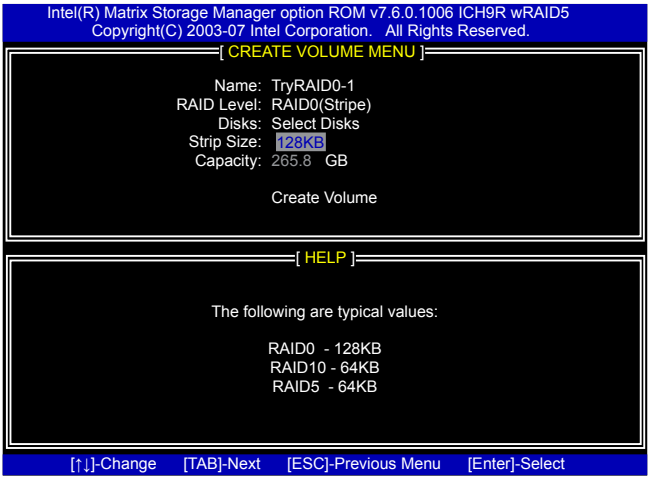
The available values of Strip Size range from 4KB to 128KB. The strip value should be selected based on different applications. Some suggested choices are :

16K - Best for sequential transfer.

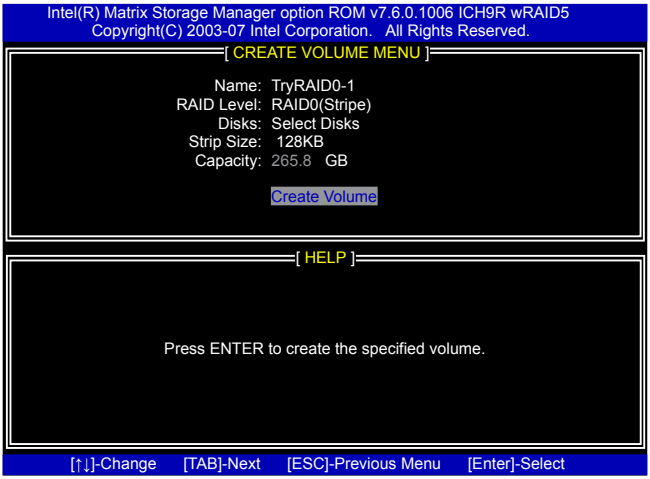
64K - Good general purpose strip size.

128K - Best performance for most desktops and workstations .

The default value is 128K. Press <Enter>.

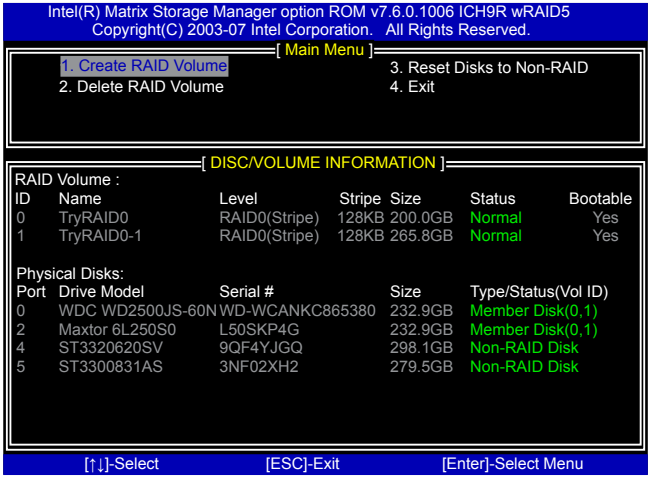


7. Select “**Create Volume**” and press <Enter>.



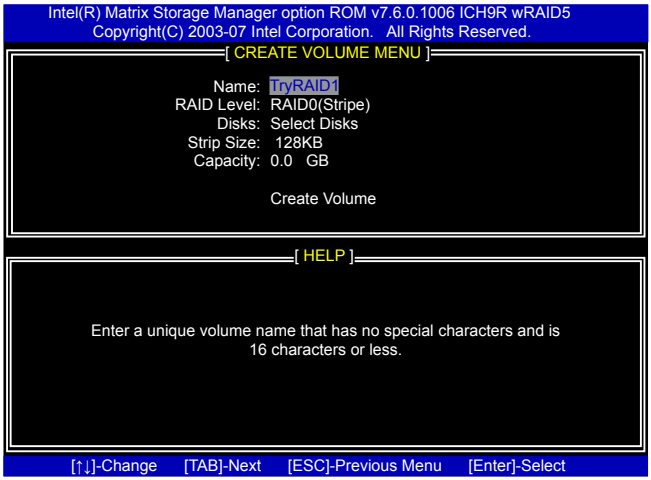
A message will appear :

Press <Y> to create the volume and return to the main menu. Two RAID0 volumes were configured.

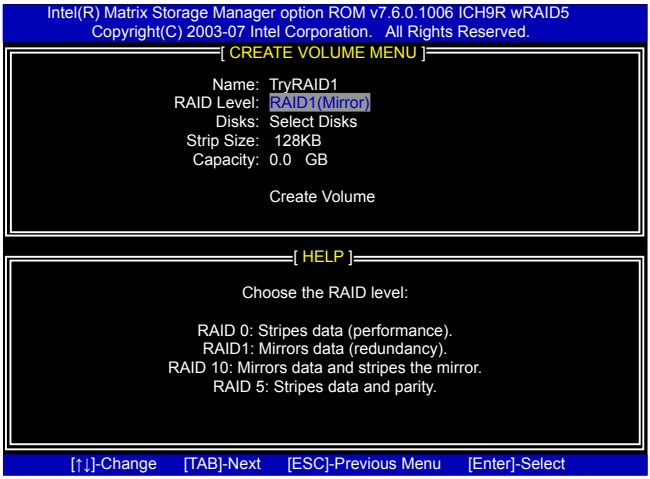


Create RAID 1

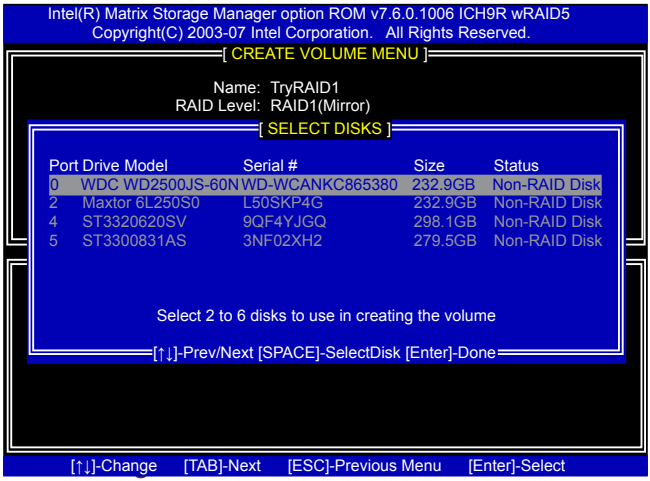
1. Select “**1.Create RAID Volume**” from the main menu and press <Enter>.
2. In "**Name**" item, you can input a device name for the RAID1 system and press <Enter> to apply it. Here, we name it as TryRAID1 to replace the default Volume0.



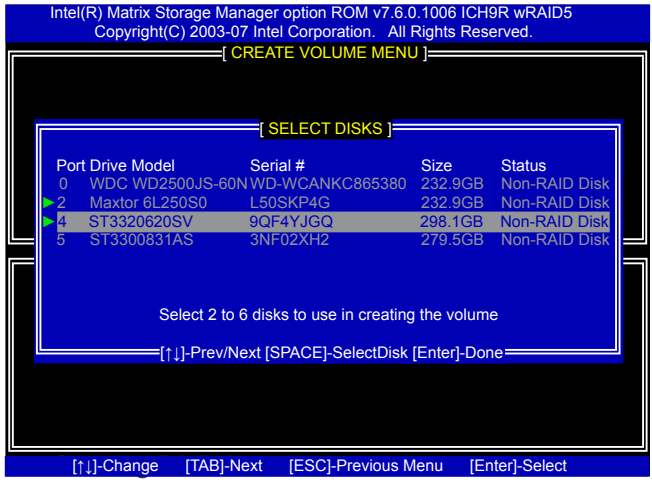
3. In “**RAID Level**” item, you can use Up or Down arrow key to make a selection from one of RAID0, 1, 5, 10 items. Select RAID1 (Mirror) and press <Enter>.



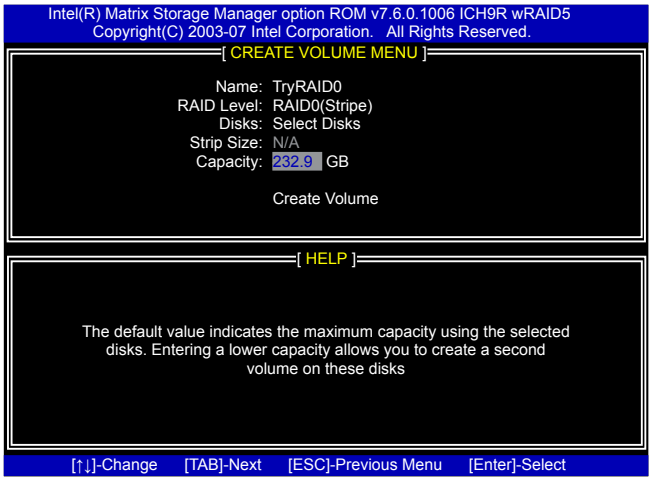
4. It then goes to "**Disks**" item. Press <Enter> to choose the hard disks for this RAID1 system.



5. From the hard drive list, use Up or Down arrow key to reach the hard disks you want to combine them as RAID1, then press <Space> key to select them. A triangle sign will appear to indicate the drive selection. Here, we select one 232.9GB and one 298.1GB hard disks. Press <Enter> key to finish the selection.

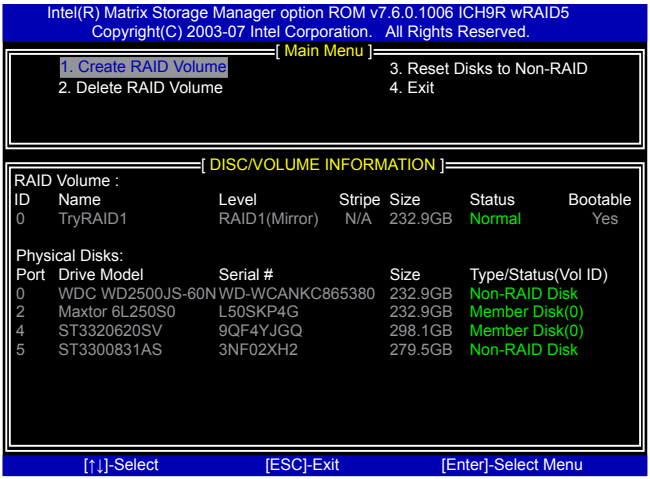


6. It will skip “**Strip Size**” menu for RAID1.



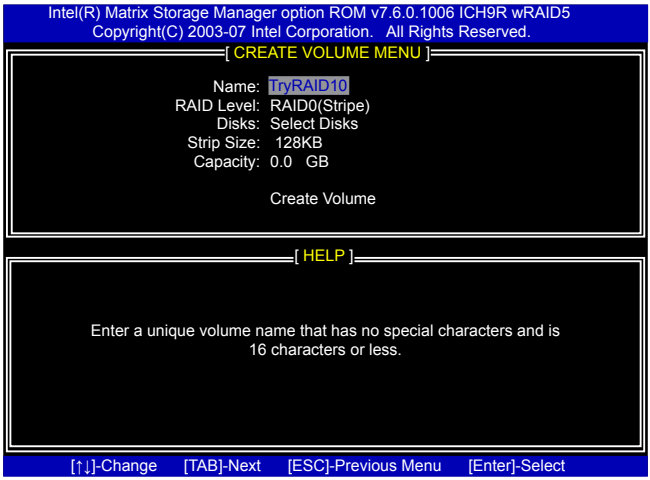
7. In “**Capacity**” item, use the default value, and press <Enter>. The size of the smaller hard disk 232.9GB is becoming the default value, and it indicates the maximum capacity.
8. Select “**Create Volume**” and press <Enter>. A warning message will appear :

Press <Y> to create the volume and return to the main menu.

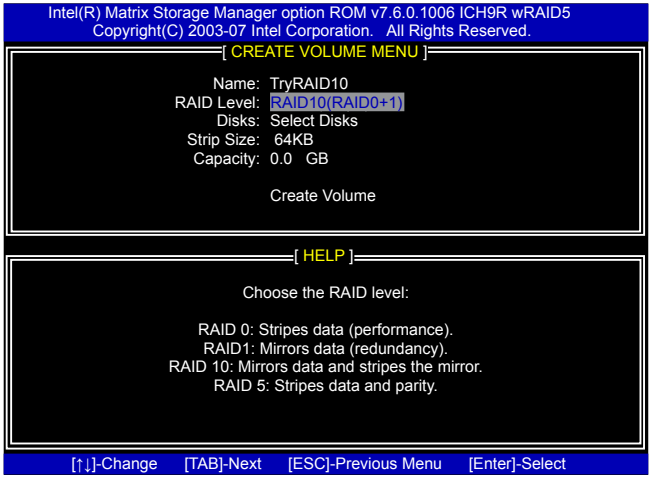


Create RAID 10 (0+1)

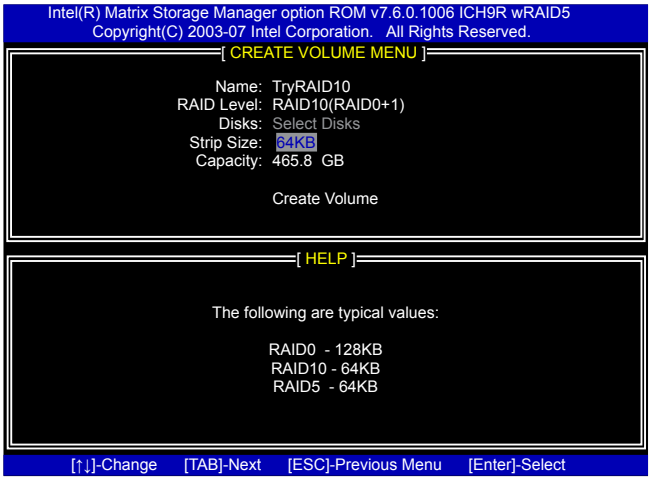
1. Select “**1.Create RAID Volume**” from the main menu and press <Enter>.
2. In "**Name**" item, you can input a device name for the RAID10 system and press <Enter> to apply it. Here, we name it as TryRAID10 to replace the default Volume0.



3. In “**RAID Level**” item, you can use Up or Down arrow key to make a selection from one of RAID0, 1, 5, 10 items. Select RAID10(RAID0+1) and press <Enter>.

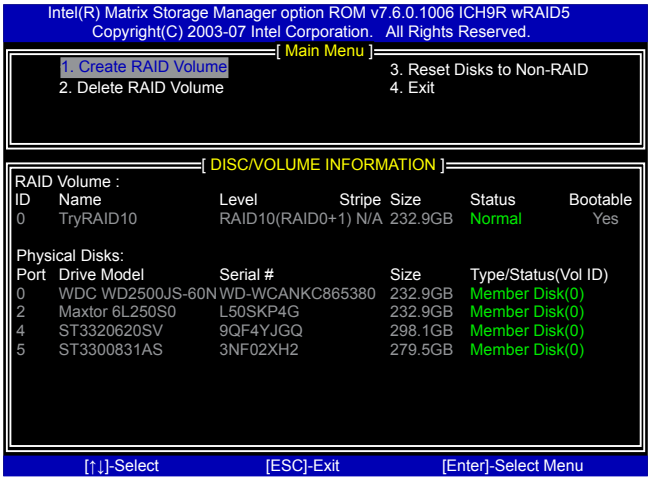


4. After exiting from "**RAID Level**", it goes directly to "**Stripe Size**" item. Because all four disks are selected for RAID10, so there is no need to go to **Disks** option.
5. Use Up or Down arrow key to select the desired strip size when entering "**Strip Size**" menu. The default value is 64K.



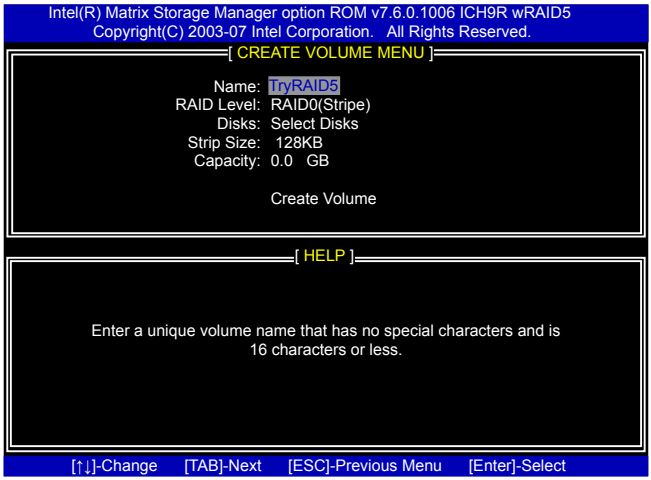
6. In "**Capacity**" item, use the default value, and press <Enter>. The default value is twice the smallest hard disk size, that is, 232.9GB * 2 = 465.8GB.
7. Select "**Create Volume**" and press <Enter>. A warning message will appear :

Press <Y> to create the volume and return to the main menu.

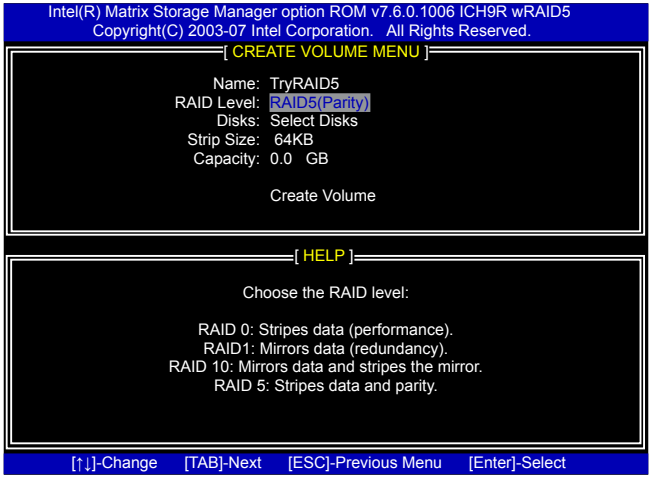


Create RAID5 (Parity)

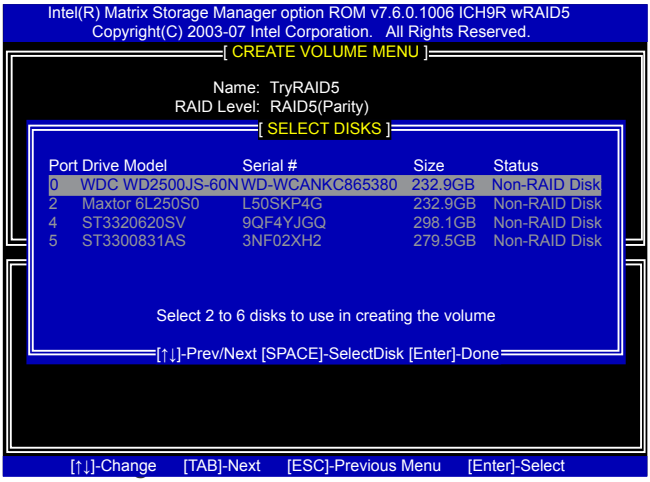
1. Select “**1.Create RAID Volume**” from the main menu and press <Enter>.
2. In "**Name**" item, you can input a device name for the RAID5 system and press <Enter> to apply it. Here, we name it as TryRAID5 to replace the default Volume0.



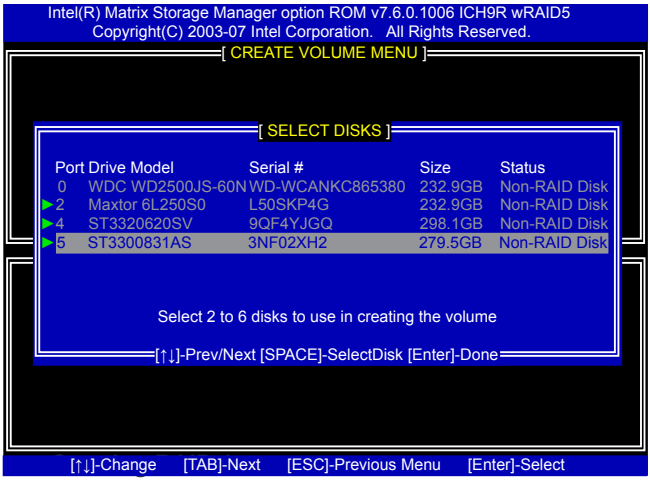
3. In “**RAID Level**” item, you can use Up or Down arrow key to make a selection from one of RAID0, 1, 5, 10 items. Select RAID5(Parity) and press <Enter>.



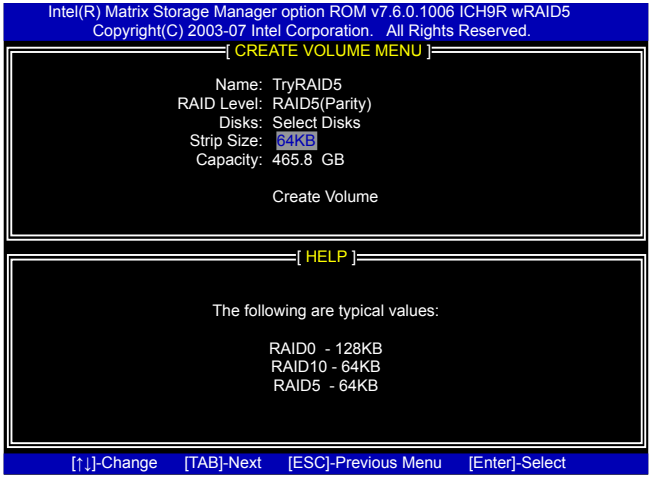
4. It then goes to “**Disks**” item. Press <Enter> to choose the hard disks for this RAID5 system.



5. From the hard drive list, use Up or Down arrow key to reach the hard disks you want to combine them as RAID5, then press <Space> key to select them. A triangle sign will appear to indicate the drive selection. Here, we select 232.9GB, 298.1GB and 279.5GB hard disks for an example. Press <Enter> key to finish the selection.

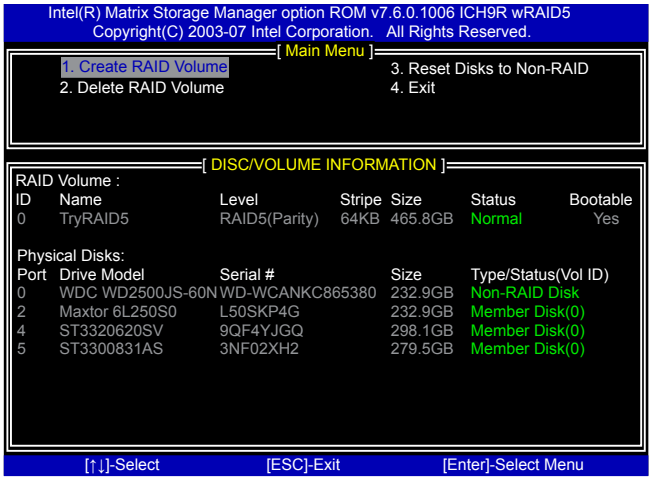


6. Use Up or Down arrow key to select the desired strip size when entering "**Strip Size**" menu. The default value is 64K. Press <Enter>.



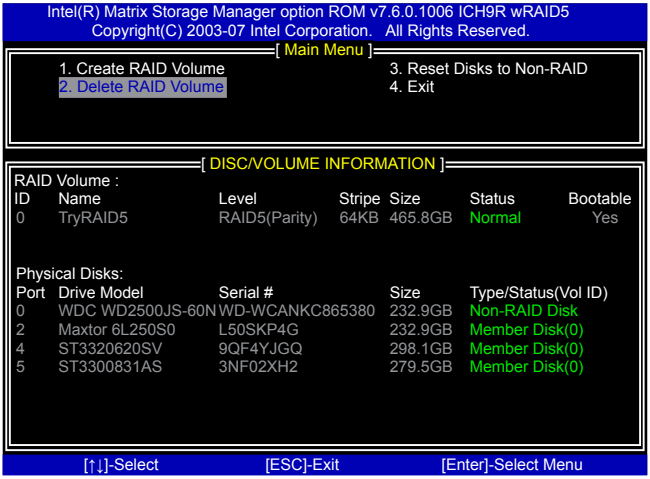
7. In "**Capacity**" item, use the default value, and press <Enter>. The default value is twice that of the smallest hard disk size, that is, 232.9GB * 2 = 465.8GB.
8. Select "**Create Volume**" and press <Enter>. A warning message will appear :

Press <Y> to create the volume and return to the main menu.

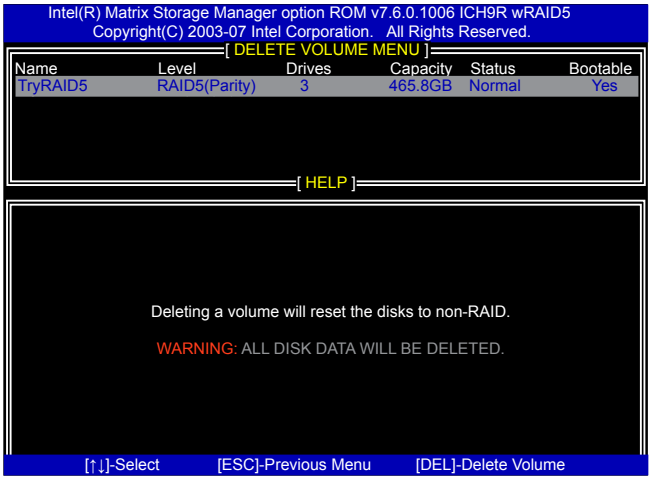


Delete RAID Volume

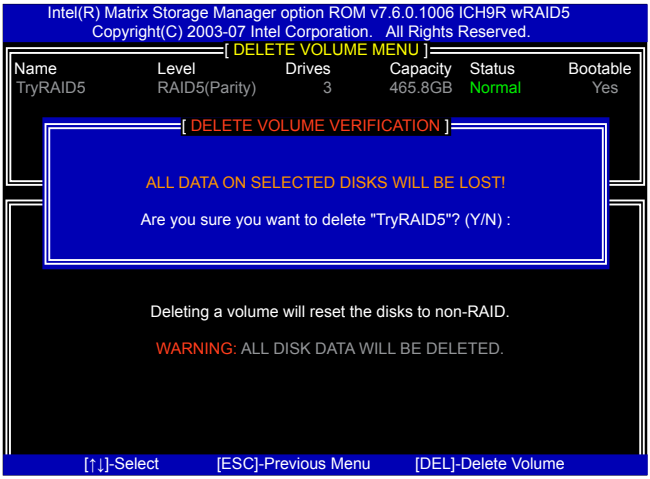
1. Take TryRAID5 for example. Select "**2. Delete RAID Volume**" in main menu and press <Enter>.



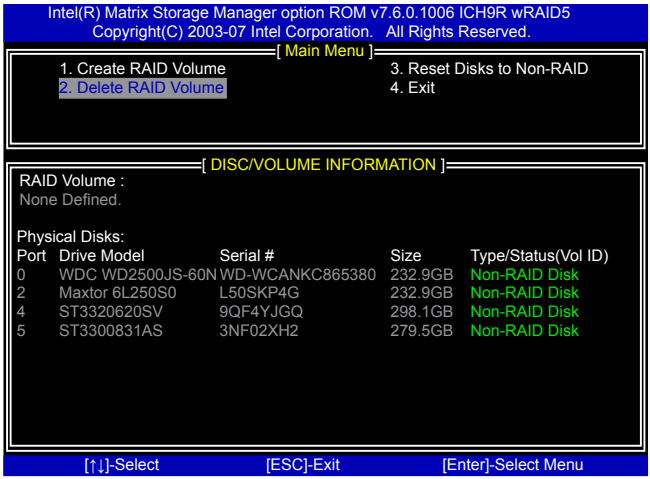
2. Use Up or Down arrow key to select the RAID set you want to delete. Here only one RAID5 is seen, so press <DEL> key to continue.



3. After <DEL> key is pressed, the screen appears as below:
Press <Y> key to confirm the volume deletion.



4. Return to Main Menu.

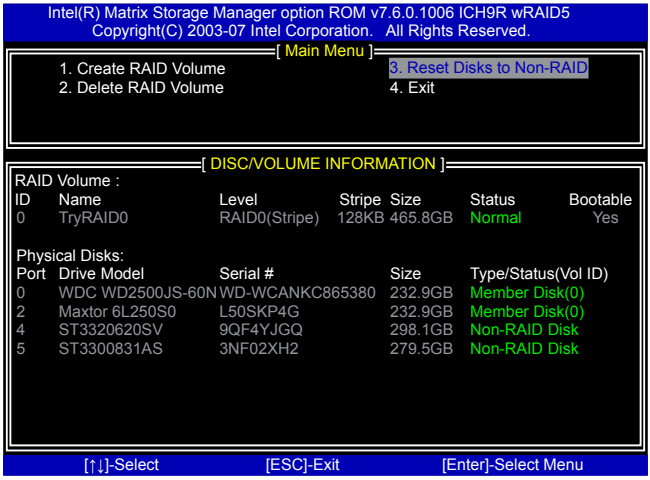


Reset Disks to Non-RAID

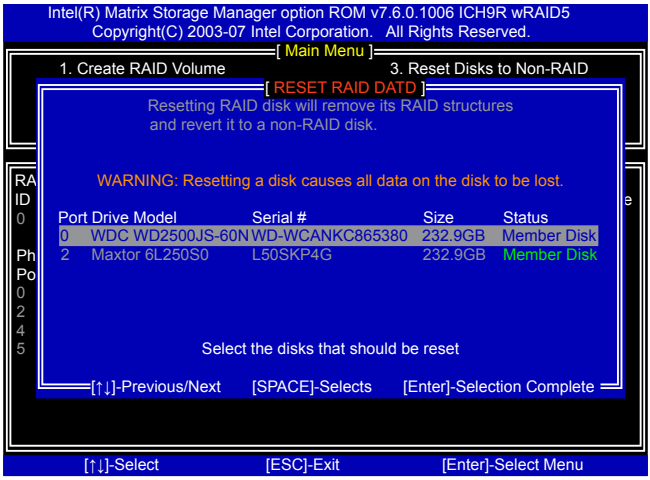
Reset RAID volume allows you to replace a failed disk with a new one, and the operating system will rebuild the data later. For RAID0, reset a hard disk would totally crash the system, but for RAID1, RAID10 and RAID5, they all can be rebuilt.
When rebuild is needed, you must first install a new hard disk in your system before getting into Intel® Matrix Storage Manager utility, because the utility will ask you which hard disk the new rebuild will be performed.

Example 1. Reset a RAID0 system.

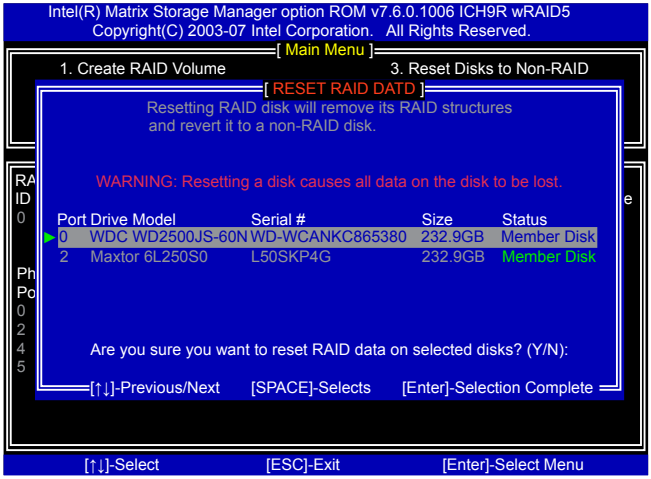
1. A TryRAID0 volume was built with two 232.9GB hard disks, we want to reset one of them. Select "**3. Reset Disks to Non-RAID**" in main menu and press <Enter>.



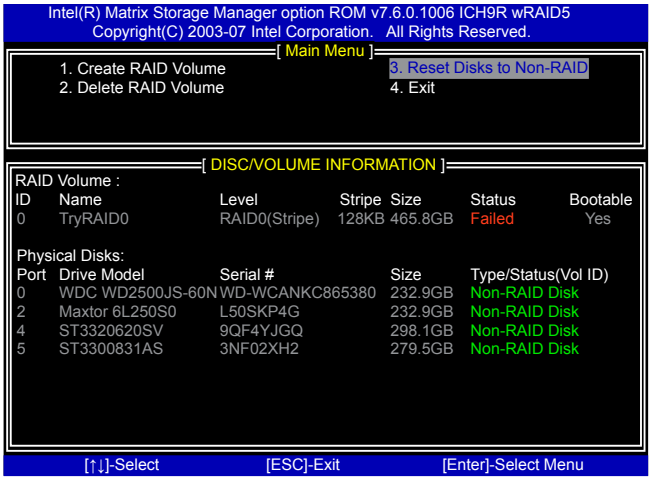
2. A warning message is displayed.



3. Select WDC hard disk as the one to be reset. Press <Enter>. A double confirmation message pops out, press <Y> to confirm.

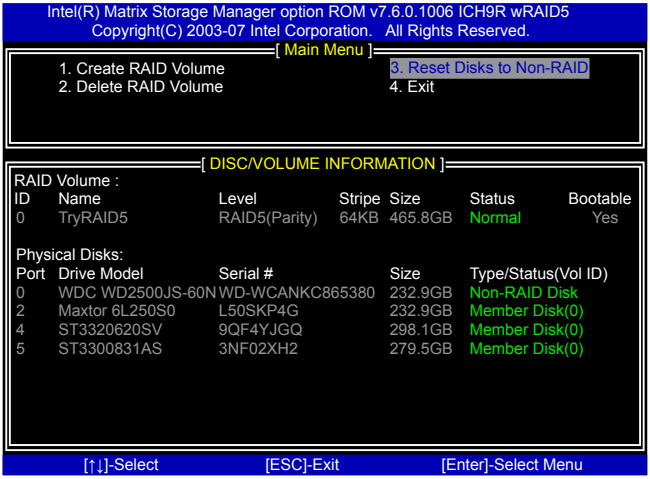


4. It goes back to Main menu with a "Failed" status of RAID0 volume.

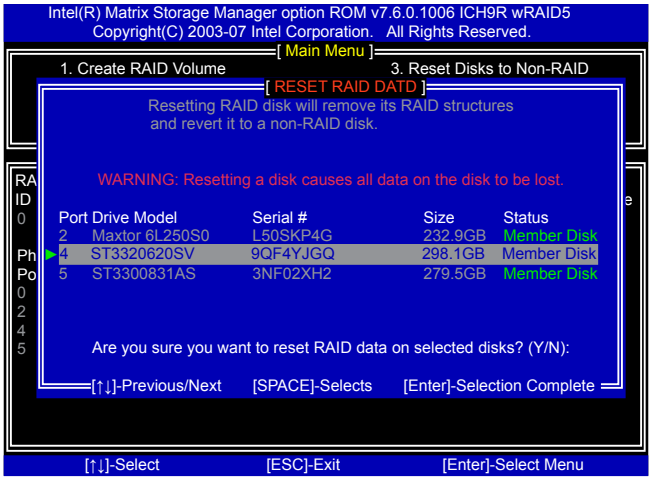


Example 2. Reset a RAID5 system

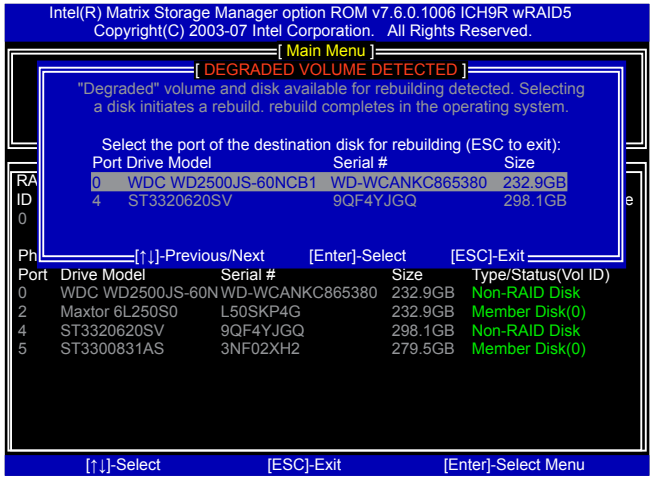
1. A TryRAID5 volume was built with three hard disks, we want to reset one of them. Select "**3. Reset Disks to Non-RAID**" in main menu and press <Enter>.



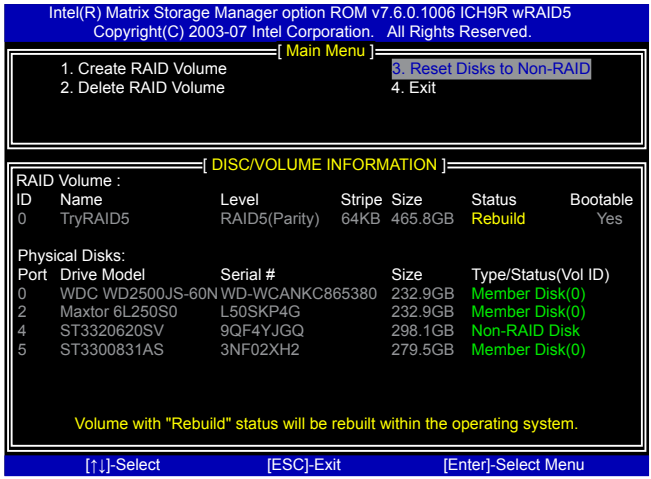
2. A warning message is displayed.
3. Select "**Port 4 - ST3320620SV**" hard disk as the one to be reset. Press <Enter>. A double confirmation message pops out, press <Y> to confirm.



4. A "**DEGRADED VOLUME DETECTED**" screen pops out asking you to select a new hard disk for rebuilding. Here, we select WDC 232.9GB. Press <Enter> to select it.

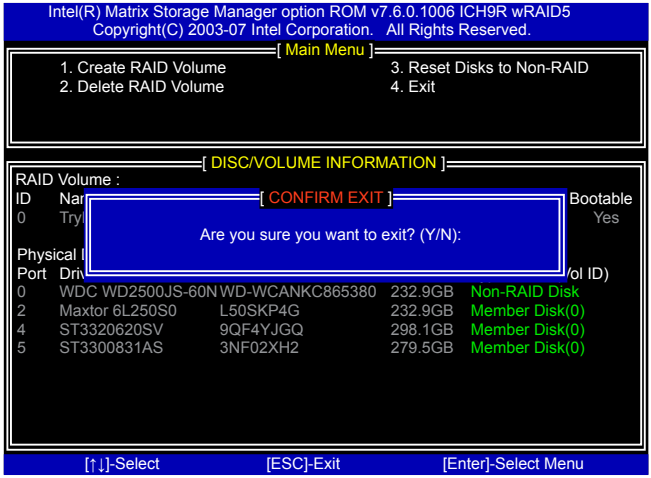


5. It goes back to Main menu with a "Rebuild" status of RAID5 volume. Eventually, a replacement hard disk has to join in and it always keeps three hard disks in the RAID5 system.
6. Operating System will perform the rebuilding later.



Exit RAID BIOS

1. Take TryRAID5 as an example, select "**4. Exit**" in main menu and press <Enter>. The screen displays :



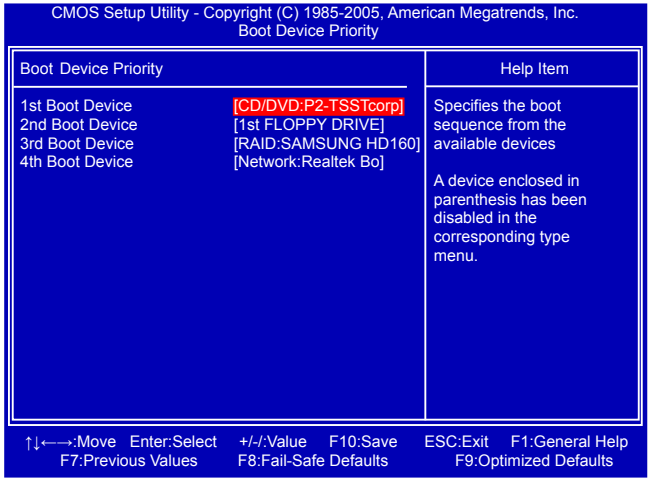
2. Press <Y> to exit Intel® Matrix Storage Manager program. The system will reboot.
3. Shut down the computer, remove WD hard disk, and we will continue for Windows OS installation. If you do not remove irrelevant WD hard disk, Windows may detect it during the installation, and you could be confused.
4. Remove any diskette from floppy drive.
5. Restart computer to start Windows installation.

5-4 Install a New Windows XP

CAUTION

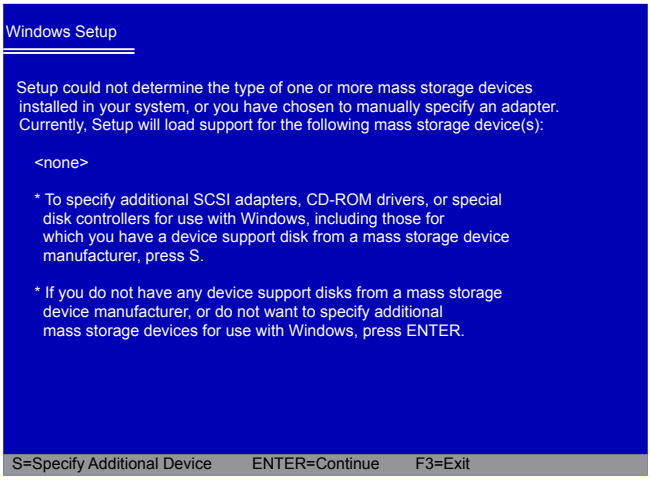
When you set the SATA Mode in BIOS to either AHCI or RAID, you need to follow these steps to install your Windows XP system.

1. Press <DEL> to enter BIOS Setup during POST.
2. Insert the Windows installation CD into the optical drive.
3. Set the “1st Boot Device” to “CDROM”, save changes and exit the BIOS setup.

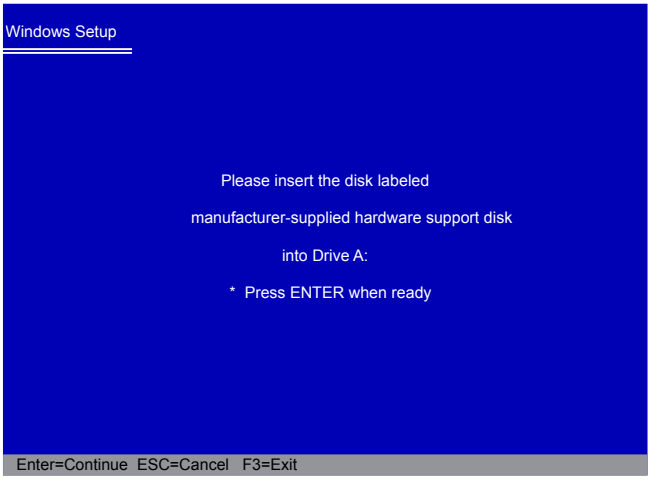


4. The computer will reboot, and it will start installing Windows Operating System. Watch the screen carefully, when the following picture appears, press <F6> key immediately. If you forgot to do this, PC will go to an fatal blue screen, and you may need to reboot the system again. PC may not respond to your <F6> input immediately, and it keeps loading files until the next screen displays.

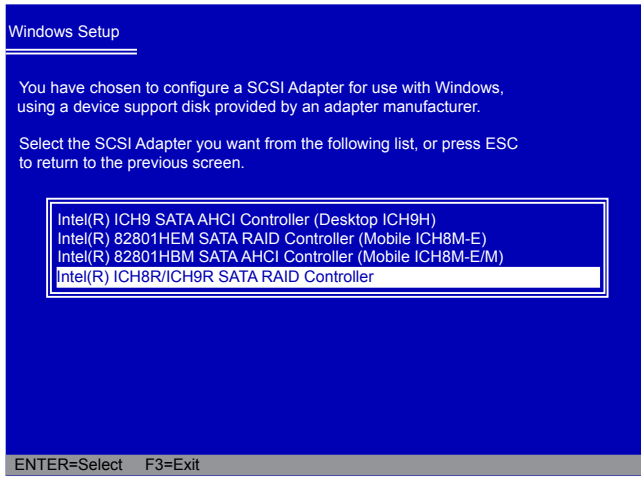
5. After some files are copied to your system, the following picture appears, press <S> to continue the specific driver installation.



6. It will ask you to insert the RAID driver diskette into you floppy drive. Press <Enter> after it is done.



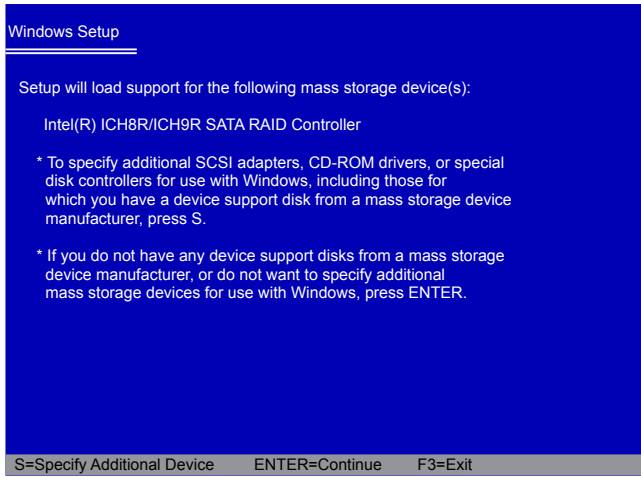
7. Depending on South Bridge chip of your system, select appropriate driver for it. Here, we choose Intel® ICH8R/ICH9R SATA RAID Controller. Press <Enter> to select it.



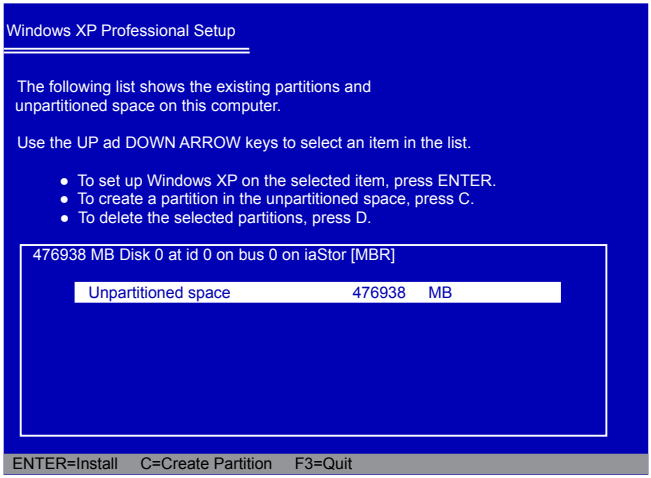
CAUTION

P35A AHCI - Select Intel(R) ICH9 SATA AHCI Controller (Desktop ICH9H).
P35A-S AHCI - Select Intel(R) ICH9 SATA AHCI Controller (Desktop ICH9H).
P35A-S RAID - Select Intel(R) ICH8R/ICH9R SATA RAID Controller.

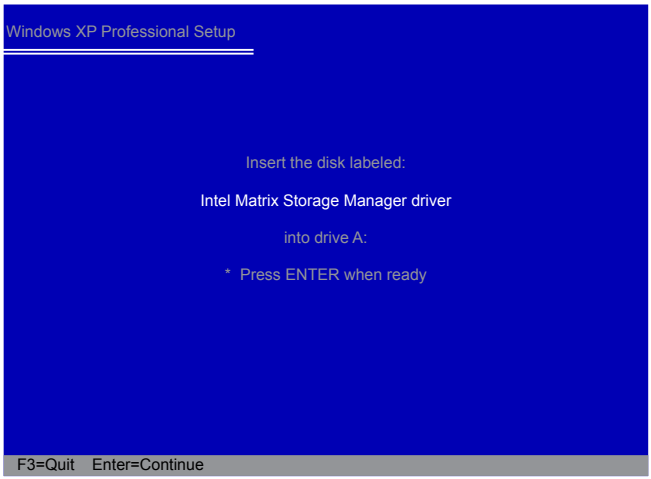
8. A confirmation message pops out to double check if the driver is really what we wanted. Press <Enter> to continue.



9. Windows will display the partition of your system, you have to create partitions as many as you wish, assign them C:, D: or E: drive names. After partitions were done, you can press <Enter> to continue. It will ask you to format your hard disk, then copy files...etc., until the whole Windows is setup.



10. You must always keep RAID diskette in the floppy drive during Windows XP installation, otherwise, Windows may ask you to put it inside again by below message. There are many times Windows XP may copy files from the floppy drive, please remember.
11. Follow the Windows XP install processes to finish the set up.



5-5 Existing Windows XP with RAID built as data storage.

When you already have a Windows XP system running at a traditional IDE hard disk, and you want to keep it unchanged, but you also want to expand the system with some SATA hard disks, to come out a new RAID system for data storage. In this case, you need to install the Intel® Matrix Storage Manager into your Windows XP system first.

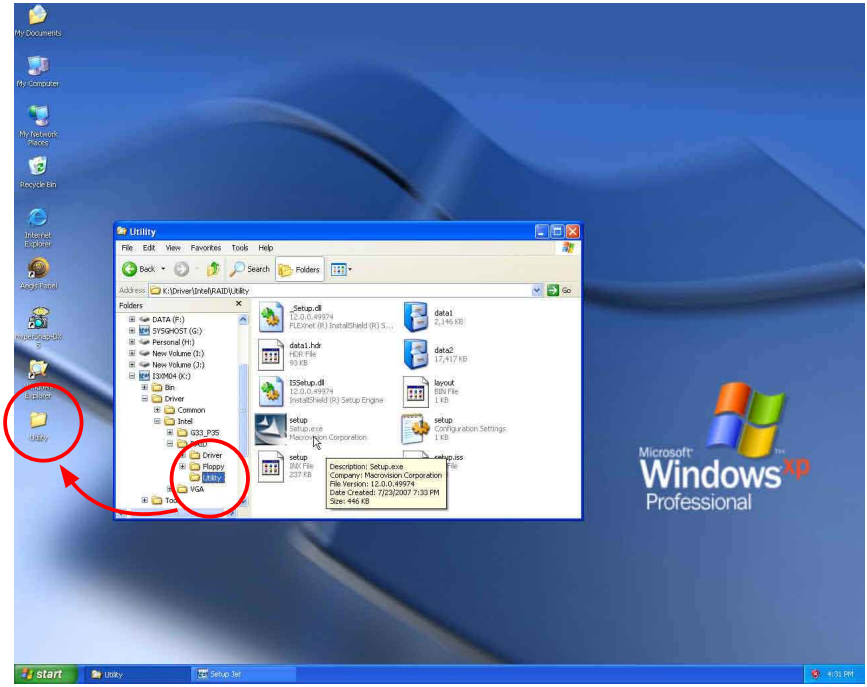
The conditions to install Intel® driver successfully, you need :
1. BIOS SATA mode must be set to [AHCI] or [RAID].
2. You'd better have an IDE CD drive.

If you have a SATA CD drive and the BIOS SATA mode was set to [AHCI] or [RAID], in Windows XP platform, this CD drive can not be recognized if Intel® Matrix Storage Manager has not been installed. If the system can not recognize it, how can the driver be installed ? This is the reason why we need to come out a standard procedure for SATA CD drive users.

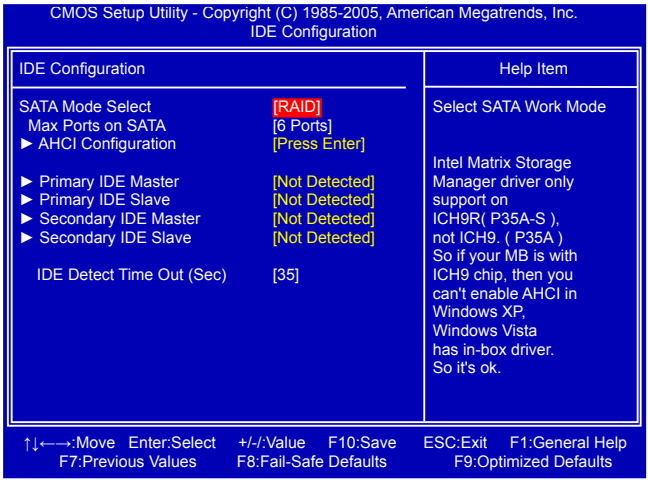
5

The correct steps are :

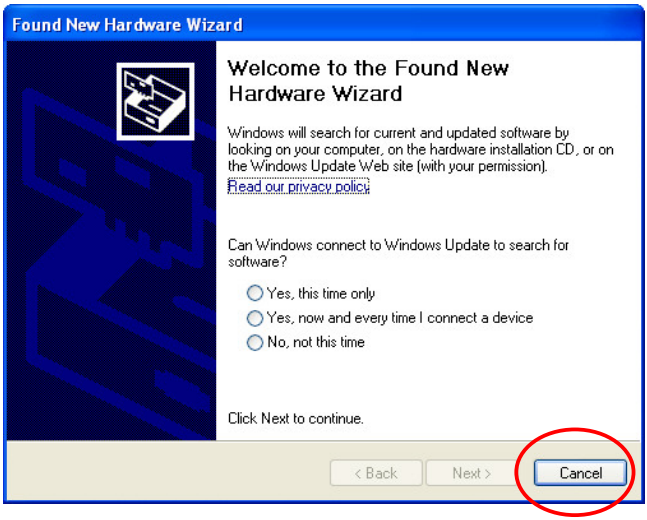
1. In current Windows XP system (no matter what SATA or IDE CD drive you have), browse the CD, copy the whole directory of Intel® Matrix Storage Manager setup program to your desktop. For example, drag and copy directory "**\Driver\Intel\RAID\Utility**" to your desktop.



2. Copy section 5-2, BIOS Configuration.
   Shut down the computer, connect SATA hard disks to SATA ports, power on computer again.
   Press <Del> key, get into BIOS, set SATA mode to [RAID], press <F10> to save and exit BIOS. PC will reboot.

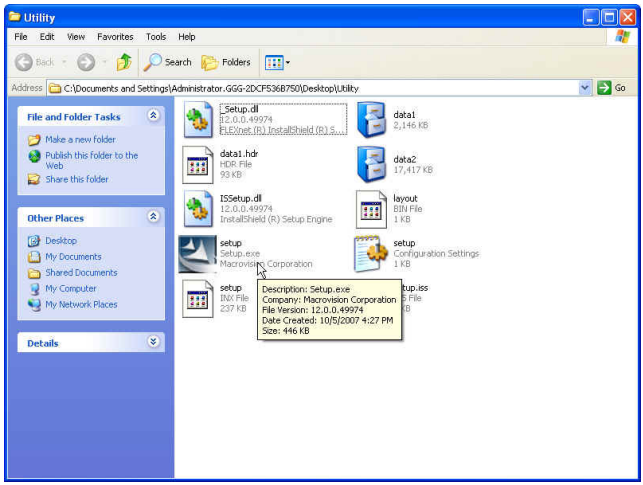


3. Copy section 5-3, Create RAID in BIOS.
   Press <CTRL><I> simultaneously to get into RAID BIOS set up (Intel® Matrix Storage Manager option ROM utility).
   Configure your new hard disks to RAID0, 1, 5 or 10. Exit RAID BIOS. PC will reboot.
4. The Windows XP is running again and a new hardware of RAID disk was found.
   Click [Cancel] to skip this Wizard.

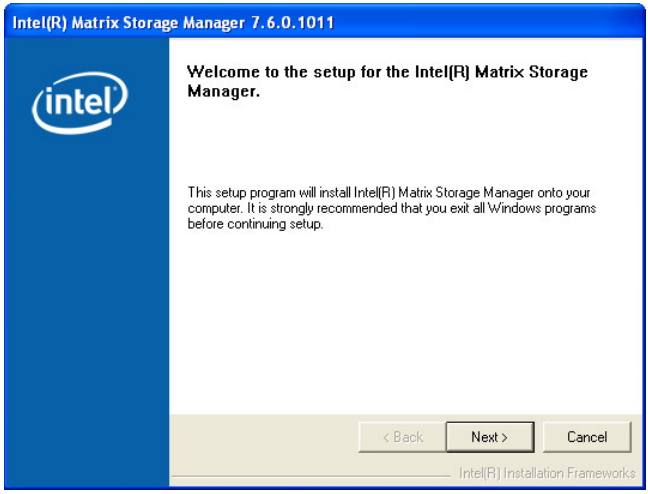


Click to exit.

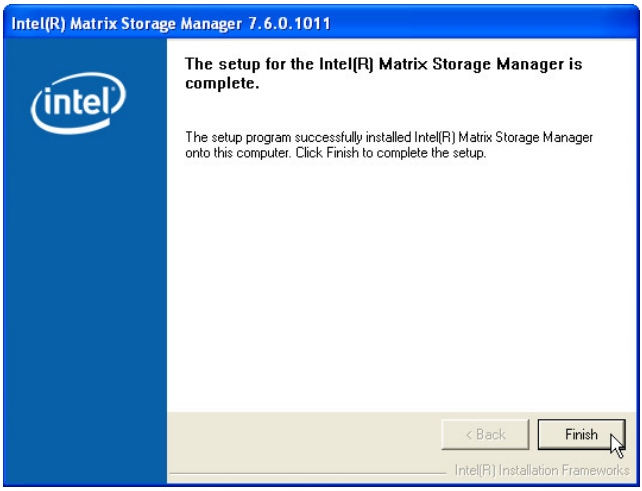
5. Use Explorer to get into the Intel® driver directory which was previously copied to the desktop.



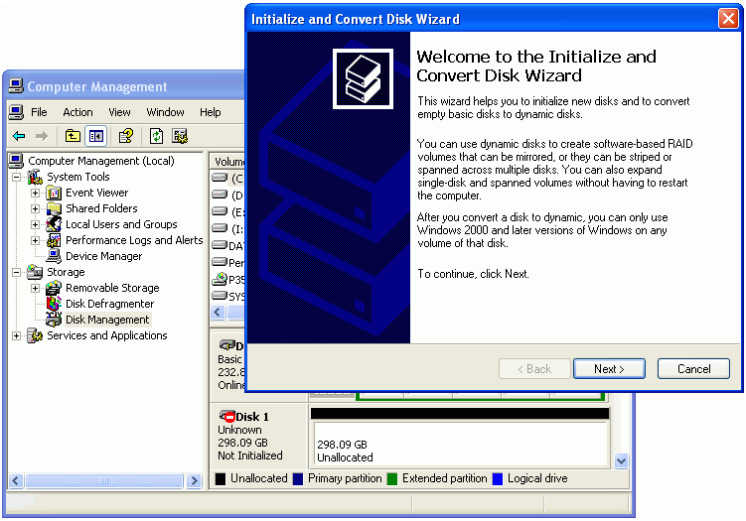
6. Click on Setup.exe to install Intel® Matrix Storage Manager driver.



7. Install complete.



8. In Windows Explorer, right click on My Computer, click on Manage, then click on Disk Management to format these new RAID disks. Follow the Wizard to finish the job.



Appendix - CrossFire™ Technology

Introduction

CrossFire™ technology is a newly introduced product from ATI Technologies. It is designed to dramatically improve the graphics performance for applications which is used by players and other high-end users.

The CrossFire™ aspect requires the following components to be available in order to appear as an option within Catalyst™ Control Center :

- CrossFire™ Ready motherboard, such as Foxconn's P35A Series.
- CrossFire™ Edition graphics card that works as the master graphics card.
- CrossFire™ Ready graphics card from the same brand-family that works as the slave graphics card.

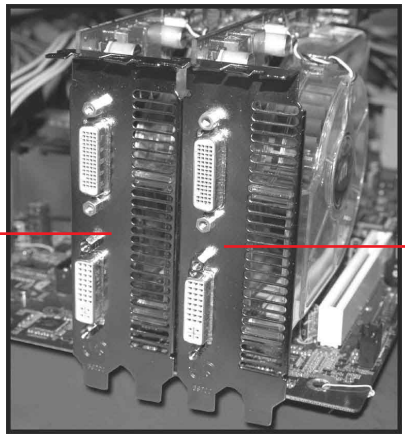
For the detailed CrossFire Graphic Card support list on this motherboard, please visit the website: http://www.foxconnchannel.com

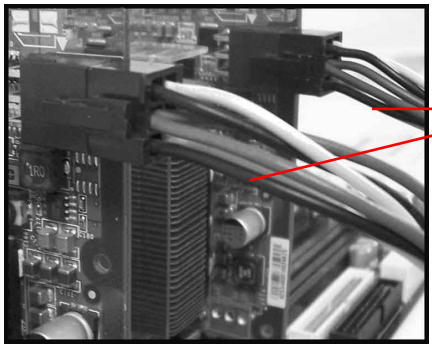
Using CrossFire™ Technology

1. Please uninstall any existing graphics card drivers which would possibly create a conflict before attempting to install this display card.

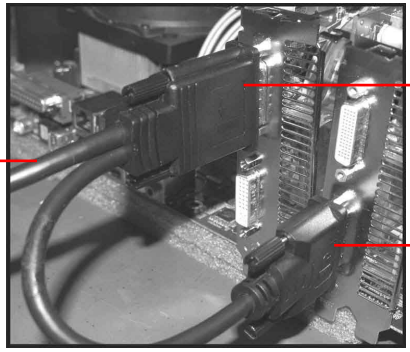
2. Install the Radeon CrossFire™ Edition graphics card (master) to PCI-E1_16X slot.

3. Install the Radeon CrossFire™ Ready graphics card (slave) to PCI-E2_16X slot.





4. Connect an auxiliary power source from the power supply to the graphics card.



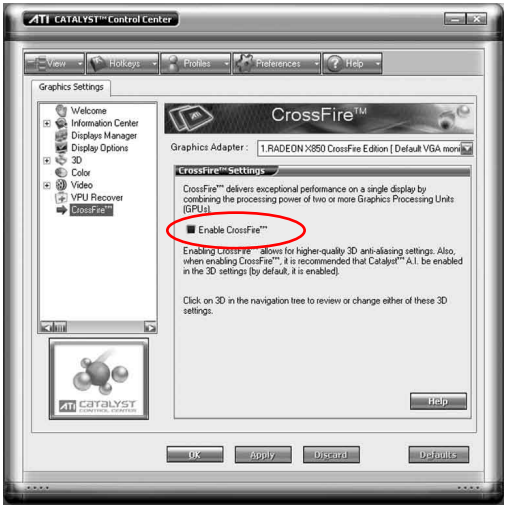
5. Connect the DMS-59 cable to the DVI monitor connector and two graphics cards that you install as shown.
6. Power on your computer and get into OS (Windows® XP 32-bit with SP2 or Windows® XP Professional 64-bit Edition).

7. Install Microsoft's .NET Framework Version 1.1. Without it, The ATI Catalyst™ Control Center can not launch properly.

8. Install the ATI graphics card drivers and restart your computer. Then you will find "ATI Catalyst Control Center" on your desktop.

9. Double-click on the ATI Catalyst Control Center icon 

to launch it. Click "View"-->Select "Advanced View" -->Click "CrossFire™"-->Set "Enable CrossFire™" to Yes.



Now you can enjoy the advanced CrossFire™ technology.

CAUTION

- It is recommended using 400-450 Watt power supply or above to enjoy the benefit of CrossFire™ technology.
- One PCI Express x16 slot will work at x16 mode and the other will work at x4 mode when you are using CrossFire™ technology.
- The all new Radeon X1300 and X1600 graphics cards do not need a Cross-Fire™ Edition co-processor or external cable.