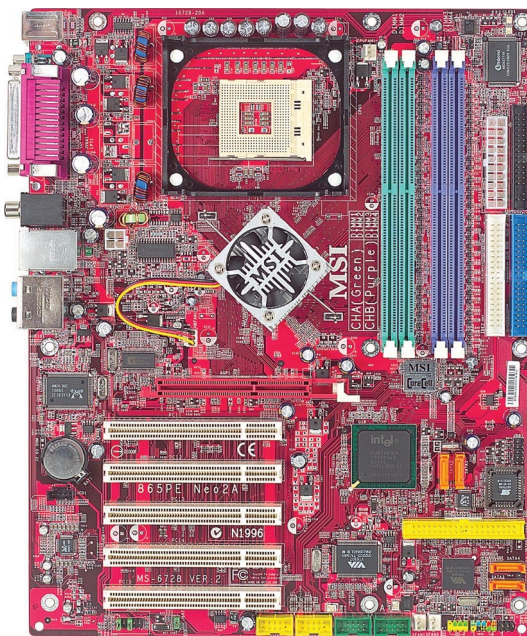




865PE/G Neo2-P
MS-6728 (v2.X) ATX Mainboard



Version 2.0
G52-M6728XG

Manual Rev: 2.0

Release Date: September 2003



FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

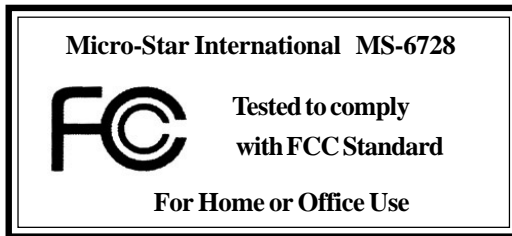
Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.



Copyright Notice

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Revision History

Revision	Revision History	Date
V2.0	First release with chipsets Intel® 865PE/G & Intel® ICH5/ICH5R	September 2003

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. **Do not cover the openings.**
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by a service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment has not work well or you can not get it work according to User's Manual.
 - The equipment has dropped and damaged.
 - The equipment has obvious sign of breakage.
12. **Do not leave this equipment in an environment unconditioned, storage temperature above 60^o C (140^oF), it may damage the equipment.**



CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

CONTENTS

FCC-B Radio Frequency Interference Statement	ii
Copyright Notice	iii
Revision History	iii
Safety Instructions	iv
Chapter 1. Getting Started	1-1
Mainboard Specifications	1-2
Mainboard Layout	1-4
MSI Special Features	1-5
Super Pack (Optional)	1-5
CoreCenter	1-6
CoreCell™	1-8
Color Management	1-9
D-Bracket™ 2 (Optional)	1-10
Live Monitor™	1-12
Live BIOS™/Live Driver™	1-13
Round Cable (Optional)	1-14
CPU Thermal Protection	1-14
Chapter 2. Hardware Setup	2-1
Quick Components Guide	2-2
Central Processing Unit: CPU	2-3
CPU Core Speed Derivation Procedure	2-3
Memory Speed/CPU FSB Support Matrix	2-3
CPU Installation Procedures for Socket 478	2-5
Installing the CPU Fan	2-5
Memory	2-7
Introduction to DDR SDRAM	2-7
DDR Population Rules	2-7
Installing DDR Modules	2-8
Power Supply	2-9
ATX 20-Pin Power Connector: ATX1	2-9

ATX 12V Power Connector: JPW1	2-9
Back Panel	2-10
Mouse Connector	2-11
Keyboard Connector	2-12
USB Connectors	2-12
Serial Port Connectors: COM A	2-13
VGA Connector (For 865G only)	2-13
RJ-45 LAN Jack: 10/100 LAN (8100C)/	
Giga-bit LAN (8110S) (Optional)	2-14
Audio Port Connectors (Optional)	2-15
Parallel Port Connector: LPT1	2-16
Connectors	2-17
Floppy Disk Drive Connector: FDD1	2-17
Fan Power Connectors: CPUFAN1/SFAN1, SFAN2/NBFAN1	2-17
Front Panel Connectors: JFP1 & JFP2	2-18
ATA100 Hard Disk Connectors: IDE1 & IDE2	2-19
Serial ATA/Serial ATA RAID Connectors controlled	
by ICH5/ICH5R: SATA1, SATA2 (Optional)	2-20
Serial ATA /Serial ATA RAID Connectors controlled	
by VIA VT6420: IDE3, SATA3 & SATA4 (Optional)	2-20
IEEE 1394 Connectors: J1394_1, J1394_2 (Optional)	2-22
D-Bracket™ 2 Connector: JDB1	2-23
IrDA Infrared Module Header: JIR1	2-24
Front Panel Audio Connector: JAUD1	2-24
CD-In Connector: JCD1	2-25
Chassis Intrusion Switch Connector: JCI1	2-25
Front USB Connectors: JUSB1 & JUSB2	2-25
Jumpers	2-26
Clear CMOS Jumper: JBAT1	2-26
Slots	2-27

PCI Interrupt Request Routing	2-27
AGP (Accelerated Graphics Port) Slot	2-27
PCI (Peripheral Component Interconnect) Slots	2-27
Chapter 3. BIOS Setup	3-1
Entering Setup	3-2
Selecting the First Boot Device	3-2
Control Keys	3-3
Getting Help	3-3
The Main Menu	3-4
Standard CMOS Features	3-6
Advanced BIOS Features	3-8
Advanced Chipset Features	3-12
Power Management Features	3-15
PNP/PCI Configuration	3-19
Integrated Peripherals	3-22
PC Health Status	3-27
Frequency/Voltage Control	3-28
Set Supervisor/User Password	3-32
Load High Performance/BIOS Setup Defaults	3-33
Appendix A: Using 2-, 4- & 6-Channel Audio Function	A-1
Installing the Audio Driver	A-2
Installation for Windows 98SE/ME/2000/XP	A-2
Software Configuration	A-4
Sound Effect	A-4
Equalizer	A-6
Speaker Configuration	A-7
Speaker Test	A-9
HRTFDemo	A-11
General	A-12
Using 2-, 4- & 6- Channel Audio Function	A-13

For 865G Neo2-P and 865PE Neo2-P Option 1:	A-13
For 865PE Neo2-P Option 2:	A-16
Appendix B. Intel ICH5R Serial ATA RAID Introduction	B-1
Introduction	B-2
BIOS Configuration	B-5
Installing Software	B-13
RAID Migration Instructions	B-19
Appendix C. VIA VT6420 Serial ATA RAID Introduction	C-1
Introduction	C-2
BIOS Configuration	C-4
Installing RAID Software & Drivers	C-15
Using VIA RAID Tool	C-18
Appendix D. Appendix D: The explanation for overspecification and overclocking on Intel® 865PE chipset	D-1



Getting Started

Thank you for choosing the 865PE/G Neo2-P (MS-6728) v2.X ATX mainboard. The 865PE/G Neo2-P is based on **Intel® 865PE / 865G & ICH5 / ICH5R** chipsets for optimal system efficiency. Designed to fit the advanced **Intel® Pentium® 4** processors in 478 pin package, the 865PE/G Neo2-P delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU

- ▶ Supports Intel® P4 Northwood/Prescott (Socket 478) processors.
- ▶ FSB 400 (for Northwood only), 533, 800MHz.
- ▶ Supports up to 3.2GHz or higher speed.

Chipset

- ▶ Intel® 865PE/G chipset
 - Supports FSB 800/533/400MHz.
 - Supports AGP 8X interface.
 - Supports DDR 400/333/266 memory interface.
 - Integrated graphics controller (for 865G only).
- ▶ Intel® ICH5/ICH5R chipset
 - Hi-Speed USB (USB2.0) controller, 480Mb/sec, 8 ports.
 - 2 Serial ATA/150 ports.
 - 2 channel Ultra ATA 100 bus Master IDE controller.
 - PCI Master v2.3, I/O APIC.
 - Supports both ACPI and legacy APM power management.
 - Serial ATA/150 RAID 0 and RAID 1 (Optional).

Main Memory

- ▶ Supports four unbuffered DIMM of 2.5 Volt DDR SDRAM.
- ▶ Supports up to 4GB memory size without ECC.
- ▶ Supports Dual channel DDR266/333/400/433/466/500/533 MHz and up. (DDR433/466/500/533 are overclocking spec)

Slots

- ▶ One AGP slot supports 8x/4x at 0.8V (AGP 3.0) or 4x at 1.5V (3.3V is not supported).
- ▶ Five 32-bit v2.3 Master PCI bus slots (support 3.3v/5v PCI bus interface).

On-Board IDE

- ▶ Dual Ultra DMA 66/100 IDE controllers integrated in ICH5/ICH5R.
 - Supports PIO, Bus Master operation modes.
 - Can connect up to four Ultra ATA drives.
- ▶ Serial ATA/150 controller integrated in ICH5/ICH5R.
 - Up to 150MB/sec transfer speeds.
 - Can connect up to two Serial ATA drives.
 - Supports SATA RAID 0/RAID 1 (Optional).

VIA6420 On-Board (Optional)

- ▶ Supports Ultra ATA, Serial ATA, Serial ATA RAID 0 or 1.
- ▶ Connect up to 2 Serial ATA devices and 2 Ultra ATA 133 devices.

On-Board Peripherals

- ▶ On-Board Peripherals include:
 - 1 floppy port supports 2 FDDs with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
 - 1 serial port COM1, 1 VGA port (for 865G only) (Optional)
 - 1 parallel port supports SPP/EPP/ECP mode
 - 8 USB 2.0 ports (Rear * 4/ Front * 4)
 - 1 Line-In/Line-Out/Mic-In/Real Speaker Out/Center-Subwoofer Speaker Out/SPDIF Out-Optical audio port (Optional)
 - 1 RJ45 LAN jack (Optional)
 - 2 IEEE 1394 pinheaders (Optional)

Audio

- ▶ AC97 link controller integrated in Intel® 865PE/G chipset.
- ▶ 6-channel audio codec Realtek ALC655.
 - Compliance with AC97 v2.3 Spec.
 - Meet PC2001 audio performance requirement.

LAN (Optional)

- ▶ Realtek® 8100C/8110S (Optional)
 - Integrated Fast Ethernet MAC and PHY in one chip.
 - Supports 10Mb/s, 100Mb/s and 1000Mb/s (1000Mb/s for 8100S only).
 - Compliance with PCI 2.2.
 - Supports ACPI Power Management.

BIOS

- ▶ The mainboard BIOS provides “Plug & Play” BIOS which detects the peripheral devices and expansion cards of the board automatically.
- ▶ The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications.

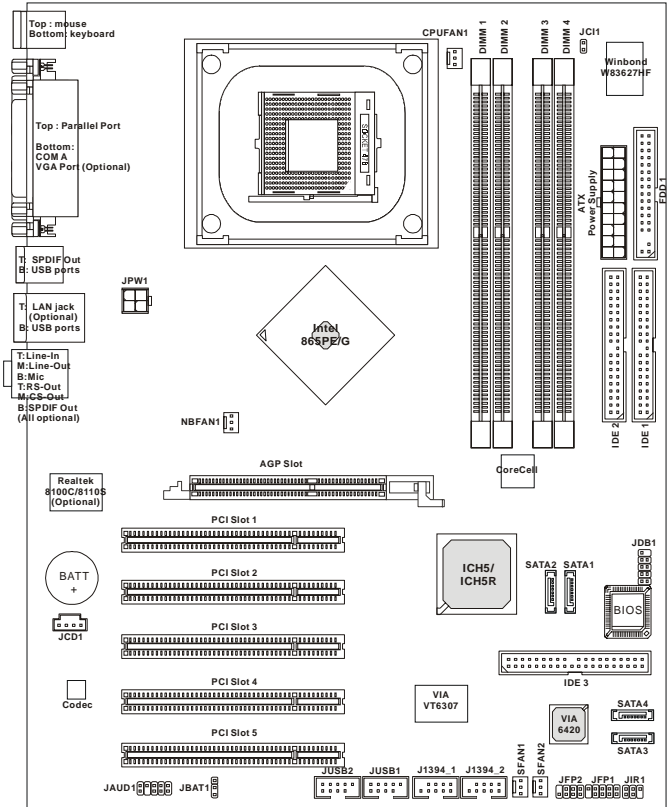
Dimension

- ▶ ATX Form Factor: 30.5 cm (L) x 24.5 cm (W).

Mounting

- ▶ 9 mounting holes.

Mainboard Layout



**865PE Neo2-P / 865G Neo2-P
(MS-6728) v2.X ATX Mainboard**

MSI Special Features

Super Pack (Optional)

MSI provides a useful CD which includes 6 powerful and popular utilities for your office professional working and for your home leisure entertainment.

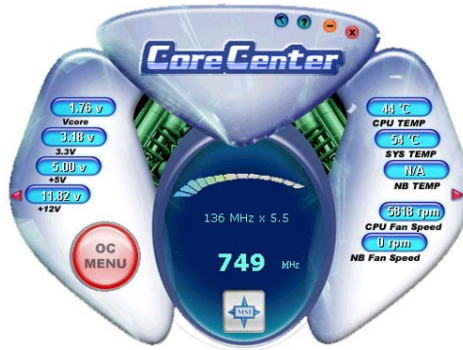


1. Adobe Photoshop Album: The fast and easy way to organize and share your lifetime photos.
2. Media Dialer: A high quality voice service for PC users to make international calls without the elevated cost of traditional IDD providers.
3. FarStone Virtual Drive: A revolutionary software that emulates a physical CD drive.
4. InterVideo WinDVD: The World's Most Popular Software DVD Player.
5. InterVideo WinRip: A state-of-the-art software application that provides you with a complete audio playback and environment.
6. FarStone RestoreIt!: Instantly recover from system crash, virus attack, and accidental data deletion.

CoreCenter

CoreCenter (TM)- contains OC Menu panel, users can determine their processor and memory type to optimize its memory capacity. This all-in-one hardware console is advanced combination of the popular PC Alert and Fuzzy Logic. Including powerful function with hardware monitor, system alert and instinctive UI of overclocking, CoreCenter is just like your PC doctor that can detect, view and adjust the PC hardware and system status during real time operation.

In the left side it shows the current system status including the Vcore, 3.3V, +5V and 12V. In the right side it shows the current PC hardware status such as the CPU & system temperatures and all fans speeds.



When you click the red triangles in the left and right sides, two sub-menus will open for users to overclock, overspec or to adjust the thresholds of system to send out the warning messages. If you click the *Core Center* button in the top, a screen pops up for you to choose the “Auto mode” or “User mode” of CPU fan.



Left-wing: Current system status

In the left sub-menu, you can configure the settings of FSB, Vcore, Memory Voltage and AGP Voltage by clicking the radio button in front of each item and make it available (the radio button will be lighted as yellow when selected), use the “+” and “-” buttons to adjust, then click “**OK**” to apply the changes. Then you can click **Save** to save the desired FSB you just configured.

Also you may click **Auto** to start testing the maximal CPU overclocking value, The CPU FSB will automatically increase the testing value until the PC reboots. Or you may click **Default** to restore the default values.

Right-wing: PC hardware status during real time operation

In the right sub-menu, you can configure the PC hardware status such as CPU & system temperatures and fan speeds. You may use the scroll bars to adjust each item, then click “**OK**” to apply the changes. The values you set for the temperatures are the maximum thresholds for the system for warnings, and the value for fan speeds are the minimum thresholds.

Top-side: User mode/Auto mode

Here you may adjust the CPU fan speed. If you choose **User mode**, you may adjust the CPU fan speed in 8 different modes, from **Stop** to **Full speed**.

OC Menu

The exclusive OC Menu is fully developed to support DDR400+ memory modules. By comprehensive validation of over 67 DDR400+ memory modules, MSI concluded best parameters for DRAM voltage, Vio and other BIOS settings. You can select DDR433, DDR450, DDR466 and DDR500 from DRAM frequency in **BIOS setting**. Or you can just click on **OC Menu** button to configure in the OC Menu at CoreCenter. OC Menu will adjust the necessary parameters of voltage and frequency simultaneously. The only limitation was the margin of processor from overclocking.



Core Cell™ Chip

By diagnosing the current system utilization, the CoreCell™ chip automatically tunes your motherboard to the optimal state, leading to less noise, longer duration, more power-saving and higher performance.



Features of CoreCell™

Speedster

- Advanced O.C. design.
- Superior O.C. capability.
- Greater O.C. method.



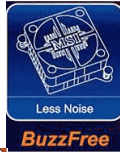
PowerPro

- Saves up to 65% power.
- Assures motherboard stability.
- Empowers O.C. Capability.



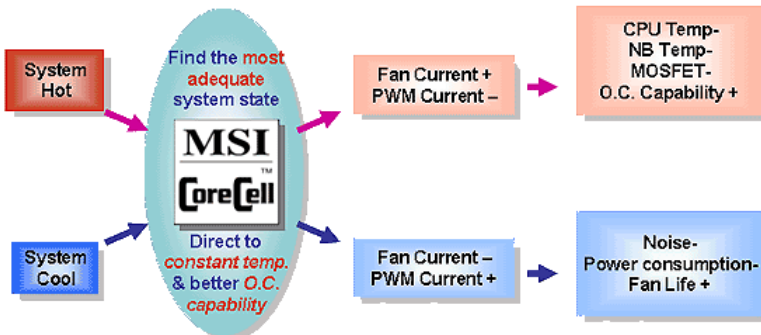
BuzzFree

- Diagnoses current system utilization & temperature.
- Controls both CPU and NorthBridge fans.
- Cuts up to 50% of system noise.



LifePro

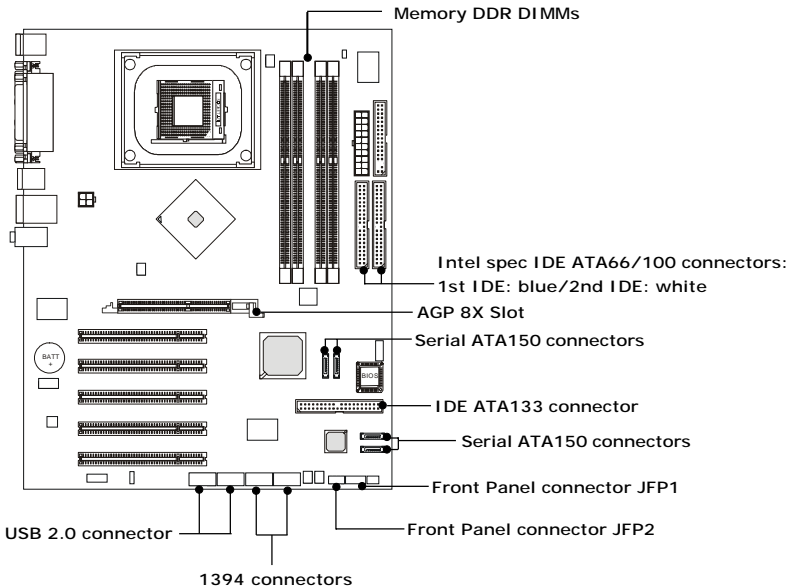
- Prolongs motherboard, CPU and fan life.
- Maintains motherboard & CPU in constant temperature.
- Prevents components from operating beyond specifications.



Color Management

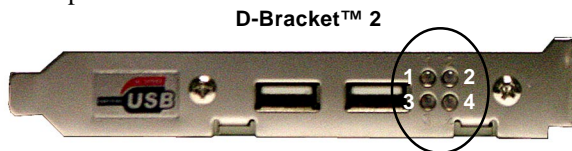
MSI has a unified color management rule for some connectors on the mainboards, which helps you to install the memory modules, expansion cards and other peripherals devices more easily and conveniently.

- Dual Memory DDR DIMMs: Channel A is light green, Channel B is purple
- Intel spec IDE ATA66/100 connector: 1st IDE is blue, 2nd IDE is white
- IDE ATA133 connector: yellow
- Serial ATA150 connector: orange
- AGP 8X slot: red
- 1394 connector: dark green
- USB 2.0 connector: yellow
- Front panel connector JFP1 : HDD LED is red, Reset Switch is blue, Power Switch is black, Power LED is light green.
- Front panel connector JFP2: Power LED is light green.













D-Bracket™ 2 (Optional)

D-Bracket™ 2 is a USB bracket integrating four Diagnostic LEDs, which use graphic signal display to help users understand their system. The LEDs provide up to 16 combinations of signals to debug the system. The 4 LEDs can detect all problems that fail the system, such as VGA, RAM or other failures. This special feature is very useful for overclocking users. These users can use the feature to detect if there are any problems or failures. D-Bracket™ 2 supports both USB 1.1 & 2.0 spec.



● Red ○ Green


D-Bracket™ 2	Description
	System Power ON - The D-LED will hang here if the processor is damaged or not installed properly.
	Early Chipset Initialization
	Memory Detection Test - Testing onboard memory size. The D-LED will hang if the memory module is damaged or not installed properly.
	Decompressing BIOS image to RAM for fast booting.
	Initializing Keyboard Controller.
	Testing VGA BIOS - This will start writing VGA sign-on message to the screen.

D-Bracket™ 2	Description
	<p>Processor Initialization</p> <p>- This will show information regarding the processor (like brand name, system bus, etc...)</p>
	<p>Testing RTC (Real Time Clock)</p>
	<p>Initializing Video Interface</p> <p>- This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter.</p>
	<p>BIOS Sign On</p> <p>- This will start showing information about logo, processor brand name, etc....</p>
	<p>Testing Base and Extended Memory</p> <p>- Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.</p>
	<p>Assign Resources to all ISA.</p>
	<p>Initializing Hard Drive Controller</p> <p>- This will initialize IDE drive and controller.</p>
	<p>Initializing Floppy Drive Controller</p> <p>- This will initializing Floppy Drive and controller.</p>
	<p>Boot Attempt</p> <p>- This will set low stack and boot via INT 19h.</p>
	<p>Operating System Booting</p>

Live Monitor™

The Live Monitor™ is a tool used to schedule the search for the latest BIOS/drivers version on the MSI Web site. To use the function, you need to install the “MSI Live Update 3” application. After installation, the “MSI Live Monitor” icon (as shown on the right) will appear on the screen. Double click this icon to run the application.



Double click the “MSI Live Monitor” icon  at the lower-right corner of the taskbar, and the following dialog box will appear. You can specify how often the system will automatically search for the BIOS/drivers version, or change the LAN settings right from the dialog box.



You can right-click the MSI Live Monitor icon  to perform the functions listed below:

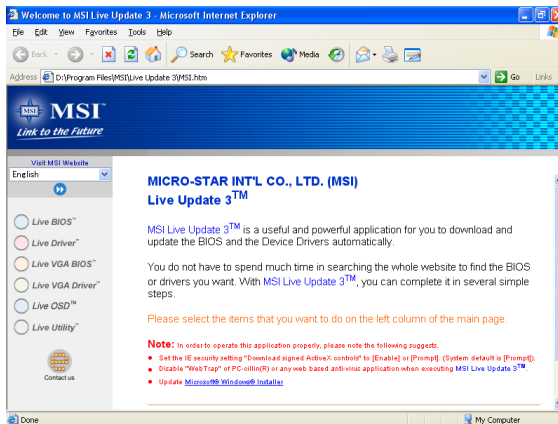
- **Auto Search** – Searches for the BIOS/drivers version you need immediately.
- **View Last Result** – Allows you to view the last search result if there is any.
- **Preference** – Configures the Search function, including the Search schedule.
- **Exit** – Exits the Live Monitor™ application.
- **FAQ** – Provides a link to a database which contains various possible questions about MSI's products for users to inquire.

Live BIOS™/Live Driver™

The Live BIOS™/Live Driver™ is a tool used to detect and update your BIOS/drivers online so that you don't need to search for the correct BIOS/driver version throughout the whole Web site. To use the function, you need to install the “MSI Live Update 3” application. After the installation, the “MSI Live Update 3” icon (as shown on the right) will appear on the screen.



Double click the “MSI Live Update 3” icon, and the following screen will appear:



Five buttons are placed on the left column of the screen. Click the desired button to start the update process.

- ✦ **Live BIOS** – Updates the BIOS online.
- ✦ **Live Driver** – Updates the drivers online.
- ✦ **Live VGA BIOS** – Updates the VGA BIOS online.
- ✦ **Live VGA Driver** – Updates the VGA driver online.
- ✦ **Live OSD** – Updates the firmware of the OSD products online.
- ✦ **Live Utility** – Updates the utilities online.

If the product you purchased does not support any of the functions listed above, a “sorry” message is displayed. For more information on the update instructions, insert the companion CD and refer to the “Live Update Guide” under the “Manual” Tab.

Round Cable (Optional)

Round cable is an enhanced cable for PCI IDE and Ultra DMA controller.

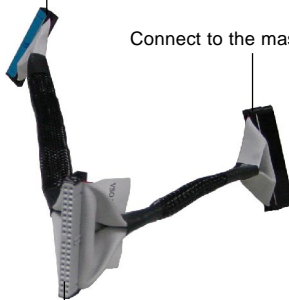
It has the following benefits:

- Data transfer rate started by 133MB/s
- Backward compatibility (ATA33/66/100/133)
- Higher performance than traditional Flat cable (data rate)
- Improved data robustness
- Better airflow due to thinner ATA/133 cable



Connect one end to the floppy disk drive connector (FDD1) and the other end to the standard floppy disk.

Connect to the system connectors on the mainboard.



Connect to the master drive.

Connect to the slave drive.

CPU Thermal Protection

Aimed to prevent the CPU from overheating, MSI has developed a CPU Thermal Protection mechanism for Intel® CPU platform. This CPU Thermal Protection mechanism works on a thermal signal sensor. If the mechanism senses an abnormal temperature rise, it will automatically shut down the system and the CPU temperature will then drop down and become normal. With this unique feature, users can better protect their CPU. Please note that this feature is for Intel® Pentium CPU only.

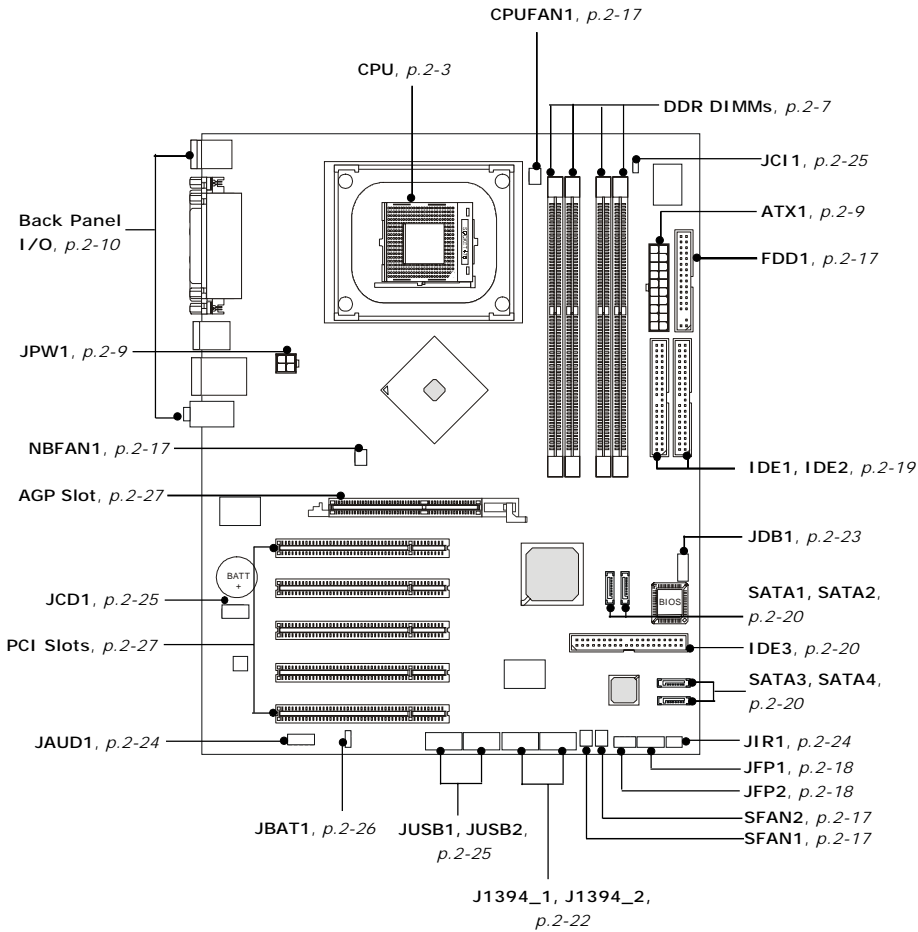
2

Hardware Setup

This chapter tells you how to install the CPU, memory modules, and expansion cards, as well as how to setup the jumpers on the mainboard. Also, it provides the instructions on connecting the peripheral devices, such as the mouse, keyboard, etc.

While doing the installation, be careful in holding the components and follow the installation procedures.

Quick Components Guide



Central Processing Unit: CPU

The mainboard supports Intel® Pentium® 4 Northwood/Prescott processor in the 478 pin package. The mainboard uses a CPU socket called PGA478 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heatsink and a cooling fan attached on the top to prevent overheating.** If you do not find the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

CPU Core Speed Derivation Procedure

If CPU Clock = 100MHz
 Core/Bus ratio = 16
then CPU core speed = Host Clock x Core/Bus ratio
 = 100MHz x 16
 = 1.6GHz

Memory Speed/CPU FSB Support Matrix

Memory \ FSB	DDR266	DDR333	DDR400	DDR433	DDR466	DDR500	DDR533
FSB400	OK	N/A	N/A	N/A	N/A	N/A	N/A
FSB533	OK	OK	N/A	N/A	N/A	N/A	N/A
FSB800	OK	OK	OK	OK *	OK *	OK *	OK*

*: Overclocking spec. Please refer to *Appendix D: The explanation for overspecification and overclocking on Intel® 865PE chipset* for the list of qualified test memory modules.



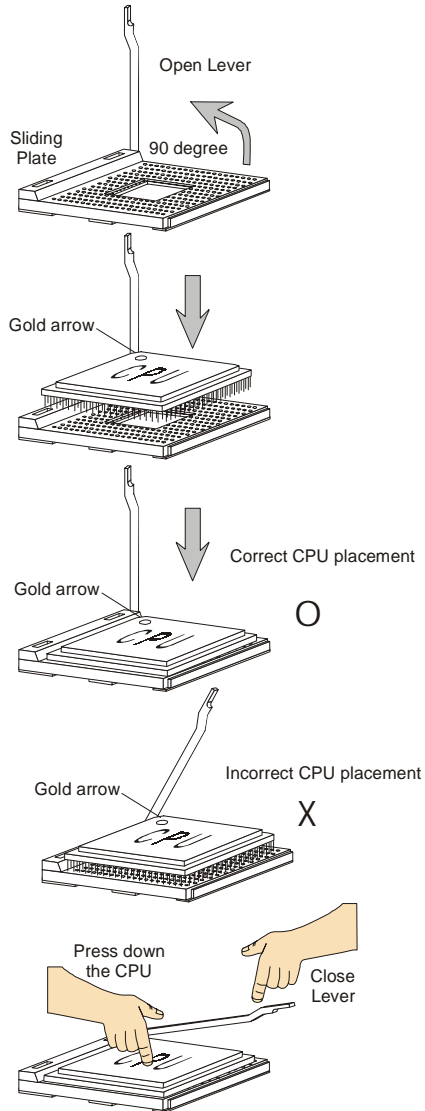
MSI Reminds You...

Overclocking

This motherboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while doing overclocking. Any attempt to operate beyond product specifications is not recommended. We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.

CPU Installation Procedures for Socket 478

1. Please turn off the power and unplug the power cord before installing the CPU.
2. Pull the lever sideways away from the socket. Make sure to raise the lever up to a 90-degree angle.
3. Look for the gold arrow. The gold arrow should point towards the lever pivot. The CPU can only fit in the correct orientation.
4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.
5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.

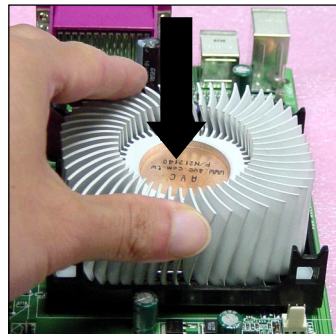
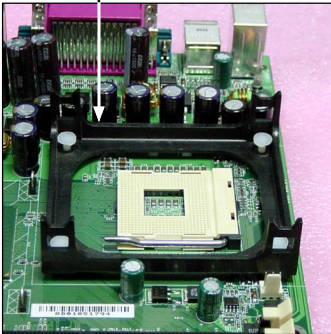


Installing the CPU Fan

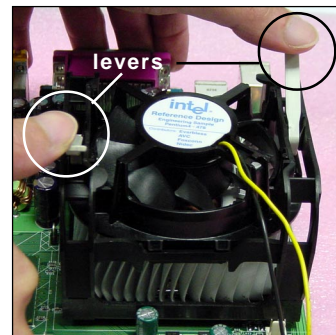
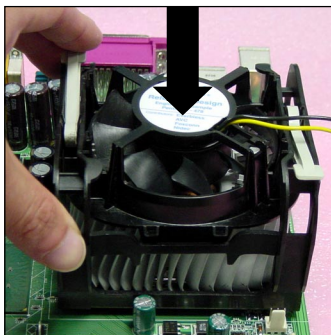
As processor technology pushes to faster speeds and higher performance, thermal management becomes increasingly important. To dissipate heat, you need to attach the CPU cooling fan and heatsink on top of the CPU. Follow the instructions below to install the Heatsink/Fan:

1. Locate the CPU and its retention mechanism on the motherboard.
2. Position the heatsink onto the retention mechanism.

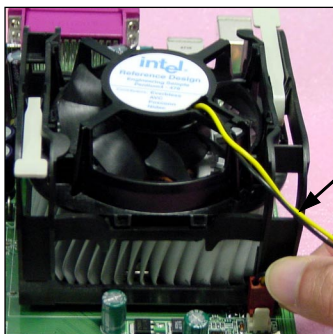
retention mechanism



3. Mount the fan on top of the heatsink. Press down the fan until its four clips get wedged in the holes of the retention mechanism.
4. Press the two levers down to fasten the fan. Each lever can be pressed down in only ONE direction.



5. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the board.



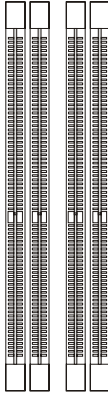
fan power cable



NOTES

Memory

The mainboard provides 4 slots for 184-pin, 2.5V DDR DIMM with 8 memory banks. You can install DDR266/DDR333/DDR400/DDR433/DDR466 / DDR500 / DDR533 SDRAM modules on the DDR DIMM slots (DIMM 1~4). To operate properly, at least one DIMM module must be installed. **Please note that DDR433 / DDR466 / DDR500 / DDR533 are for overclocking spec.**



DDR DIMM Slots
 (DDR 1~4, from left to right)
 Channel A: DIMM1 & DIMM2 (green)
 Channel B: DIMM3 & DIMM4 (purple)

Introduction to DDR SDRAM

DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM. Please note that the DDR SDRAM does not support ECC (error correcting code) and registered DIMM.

DDR Population Rules

Install at least one DIMM module on the slots. Each DIMM slot supports up to a maximum size of 1GB. Users can install either single- or double-sided modules to meet their own needs. Please note that ***each DIMM can work respectively for single-channel DDR, but there are some rules while using dual-channel DDR*** (Please refer to the suggested DDR population table on p. 2-8). Users may install memory modules of different type and density on different-

channel DDR DIMMs. However, the *same type and density memory modules* are necessary while using dual-channel DDR, or unstability may happen.

Please refer to the following table for detailed dual-channel DDR. Other combination not listed below will function as single-channel DDR.

DIMM1 (Ch A)	DIMM2 (Ch A)	DIMM3 (Ch B)	DIMM4 (Ch B)	System Density
128MB~1GB		128MB~1GB		256MB~2GB
	128MB~1GB		128MB~1GB	256MB~2GB
128MB~1GB	128MB~1GB	128MB~1GB	128MB~1GB	512MB~4GB

Installing DDR Modules

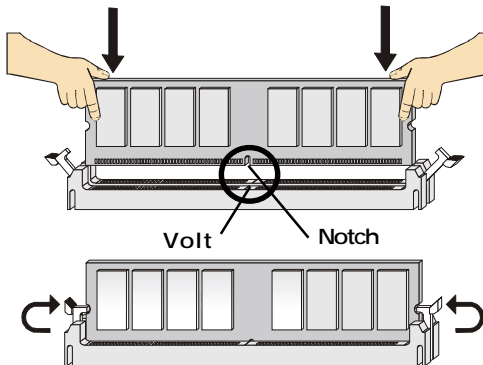
1. The DDR DIMM has only one notch on the center of module. The module will only fit in the right orientation.
2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the socket.



MSI Reminds You...

You can barely see the golden finger if the module is properly inserted in the socket.

3. The plastic clip at each side of the DIMM slot will automatically close.

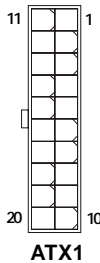


Power Supply

The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 20-Pin Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

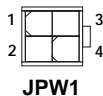


ATX1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.

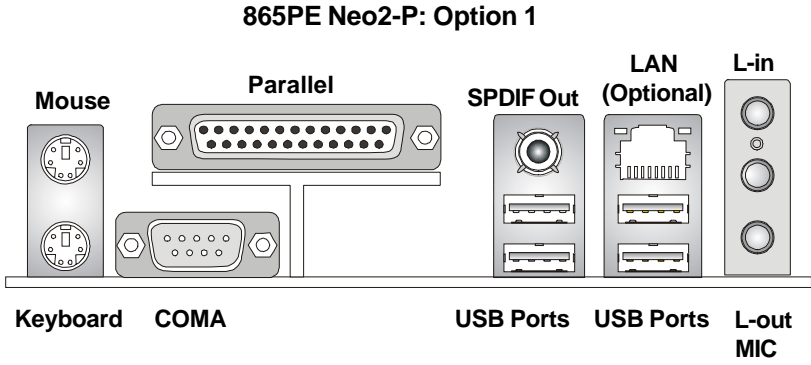
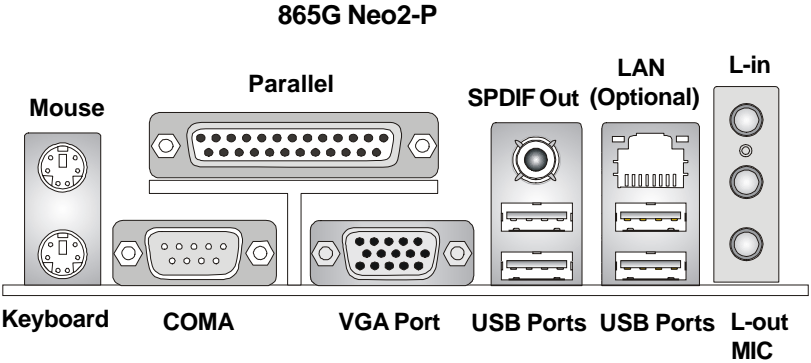


JPW1 Pin Definition

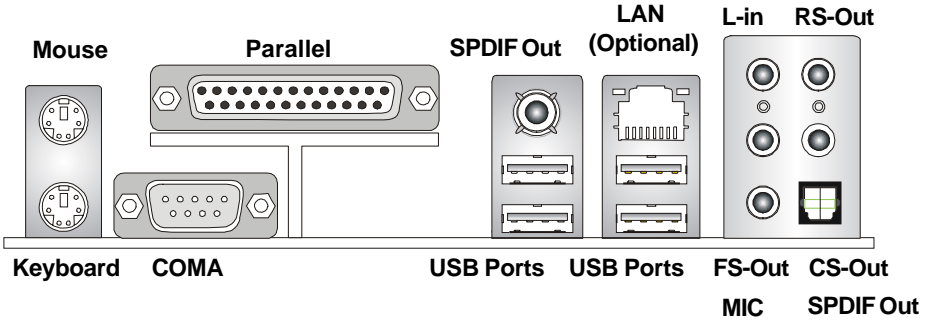
PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

Back Panel

The back panel provides the following connectors:

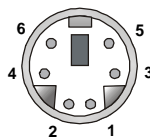


865PE Neo2-P: Option 2



Mouse Connector

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin assignments are as follows:



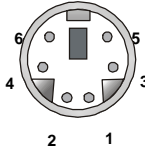
PS/2 Mouse (6-pin Female)

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Mouse DATA	Mouse DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Mouse Clock	Mouse clock
6	NC	No connection

Keyboard Connector

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a PS/2® keyboard. You can plug a PS/2® keyboard directly into this connector.



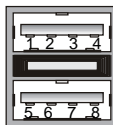
PS/2 Keyboard (6-pin Female)

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	Keyboard DATA	Keyboard DATA
2	NC	No connection
3	GND	Ground
4	VCC	+5V
5	Keyboard Clock	Keyboard clock
6	NC	No connection

USB Connectors

The mainboard provides a UHCI (Universal Host Controller Interface) Universal Serial Bus port for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.



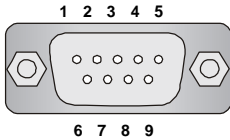
USB Ports

USB Port Description

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

Serial Port Connectors: COM A

The mainboard offers one 9-pin male DIN connectors as serial port COM A. The port is a 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connectors.



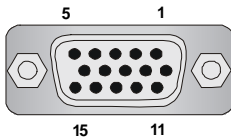
9-Pin Male DIN Connector

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready)
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

VGA Connector (For 865G only)

The mainboard provides a DB 15-pin female connector to connect a VGA monitor.

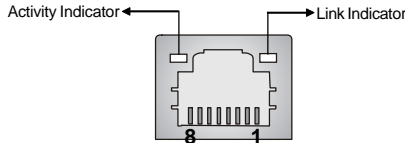


VGA Connector
(DB 15-pin)

Pin	Signal Description
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	+5V
10	GND
11	N/C
12	SDA
13	Horizontal Sync
14	Vertical Sync
15	SCL

RJ-45 LAN Jack: 10/100 LAN (8100C) /Giga-bit LAN (8110S) (Optional)

The mainboard provides two standard RJ-45 jacks for connection to Local Area Network (LAN). Giga-bit LAN enables data to be transferred at 1000, 100 or 10Mbps. You can connect a network cable to either LAN jack.



RJ-45 LAN Jack

The pin assignments vary depending on the transfer rates: 10/100Mbps or 1000Mbps. Note that Pin 1/2, 3/6, 4/5, 7/8 must work in pairs. Please refer to the following for details:

10/100 LAN Pin Definition

PIN	SIGNAL	DESCRIPTION
1	TDP	Transmit Differential Pair
2	TDN	Transmit Differential Pair
3	RDP	Receive Differential Pair
4	NC	Not Used
5	NC	Not Used
6	RDN	Receive Differential Pair
7	NC	Not Used
8	NC	Not Used

Giga-bit LAN Pin Definition

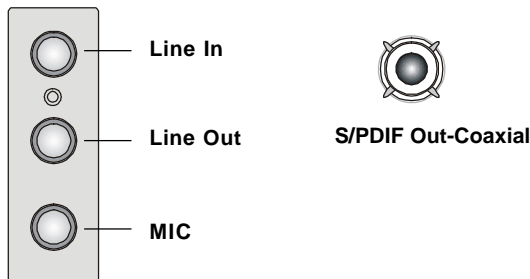
PIN	SIGNAL	DESCRIPTION
1	D0P	Differential Pair 0+
2	D0N	Differential Pair 0-
3	D1P	Differential Pair 1+
4	D2P	Differential Pair 2+
5	D2N	Differential Pair 2-
6	D1N	Differential Pair 1-
7	D3P	Differential Pair 3+
8	D3N	Differential Pair 3-

Audio Port Connectors (Optional)

Depending on the mainboards you purchase, there are two options for the audio ports: three-port audio connectors for **865G Neo2-P / 865PE Neo2-P Option 1** and six-port plus SPDIF-Out for **865PE Neo2-P Option 2**.

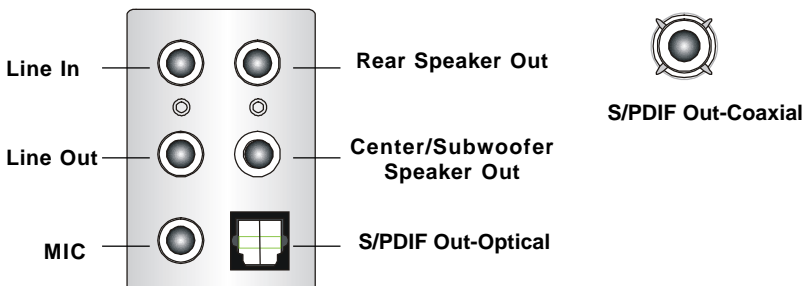
Line Out is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices. **Mic** is a connector for microphones. **SPDIF-out** is a jack for coaxial fiber connection for digital audio transmission.

For 865G Neo2-P / 865PE Neo2-P Option 1



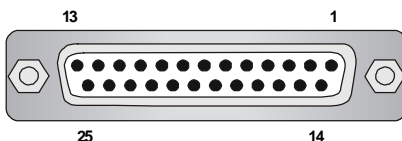
For **865PE Neo2-P Option 2**, there are six ports plus the SPDIF-Out for 6-channel and S/PDIF function. For more information on **6-channel audio operation**, please refer to *Appendix A: Using 2-, 4- & 6-Channel Audio Function*.

For 865PE Neo2-P Option 2



Parallel Port Connector: LPT1

The mainboard provides a 25-pin female centronic connector as LPT. A parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.



Pin Definition

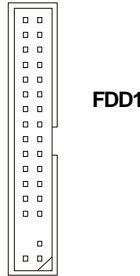
PIN	SIGNAL	DESCRIPTION
1	STROBE	Strobe
2	DATA0	Data0
3	DATA1	Data1
4	DATA2	Data2
5	DATA3	Data3
6	DATA4	Data4
7	DATA5	Data5
8	DATA6	Data6
9	DATA7	Data7
10	ACK#	Acknowledge
11	BUSY	Busy
12	PE	Paper End
13	SELECT	Select
14	AUTO FEED#	Automatic Feed
15	ERR#	Error
16	INIT#	Initialize Printer
17	SLIN#	Select In
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

Connectors

The mainboard provides connectors to connect to FDD, IDE HDD, case, LAN, USB Ports, IR module and CPU/System/Power Supply FAN.

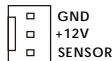
Floppy Disk Drive Connector: FDD1

The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.



Fan Power Connectors: CPUFAN1/SFAN1, SFAN2/NBFAN1

The CPUFAN1 (processor fan), SFAN1/SFAN2 (system fan) and NBFAN1 (NorthBridge Chipset fan) support system cooling fan with +12V. It supports three-pin head connector. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.



CPUFAN1



SFAN1, SFAN2



NBFAN1

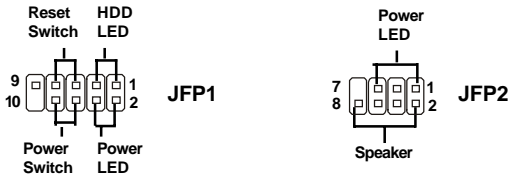


MSI Reminds You...

1. Always consult the vendors for proper CPU cooling fan.
2. CPUFAN1 supports the fan control. You can install **Core Center** utility that will automatically control the CPU fan speed according to the actual CPU temperature.

Front Panel Connectors: JFP1 & JFP2

The mainboard provides two front panel connectors for electrical connection to the front panel switches and LEDs. JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Power Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

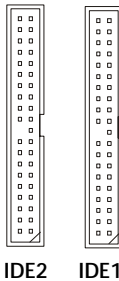
JFP2 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	SPK-
3	SLED	4	BUZ+
5	PLED	6	BUZ-
7	NC	8	SPK+

ATA100 Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 66/100 function. You can connect up to four hard disk drives, CD-ROM and other IDE devices.

The Ultra ATA100 interface boosts data transfer rates between the computer and the hard drive up to 100 megabytes (MB) per second. The new interface is one-third faster than earlier record-breaking Ultra ATA/100 technology and is backwards compatible with the existing Ultra ATA interface.



IDE1 (Primary IDE Connector)

The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)

IDE2 can also connect a Master and a Slave drive.



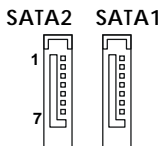
MSI Reminds You...

If you install two hard disks on cable, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.

Serial ATA/Serial ATA RAID Connectors controlled by ICH5/ ICH5R: SATA1, SATA2 (Optional)

The Southbridge of this mainboard is ICH5/ICH5R which supports two serial connectors SATA1& SATA2.

SATA1 & SATA2 are dual high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150 MB/s. Both connectors are fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device. Please refer to the *Appendix B: Intel ICH5R Serial ATA Raid Introduction* for detail software installation procedure.



Serial ATA /Serial ATA RAID Connectors controlled by VIA VT6420: IDE3, SATA3 & SATA4 (Optional)

The brand new VIA VT6420 chipset supports one IDE connector IDE3 and two serial connectors SATA3 & SATA4.

IDE3 is a 32-bit Enhanced PCI IDE and Ultra DMA 66/100/133 controller that provides PIO mode 0~6, Bus Master, and Ultra DMA 66/100/133 function. You can connect up to 2 hard disk drives---one IDE master and one IDE slave.

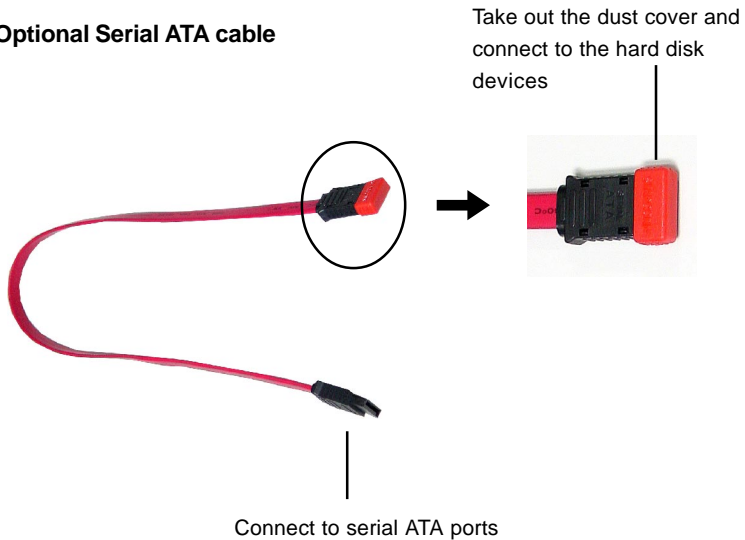
SATA3 & SATA4 are dual high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150 MB/s. Both connectors are fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device. Please refer to *Appendix C: VIA VT6420 Serial ATA Raid Introduction* for detail software installation procedure.



SATA1~ SATA4 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	TXP
3	TXN	4	GND
5	RXN	6	RXP
7	GND		

Optional Serial ATA cable

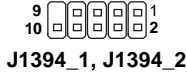


MSI Reminds You...

Please do not fold the serial ATA cable in a 90-degree angle, for this might cause the loss of data during the transmission.

IEEE 1394 Connectors: J1394_1, J1394_2 (Optional)

The mainboard provides two 1394 pin headers that allow you to connect optional IEEE 1394 ports.



J1394 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	TPA+	2	TPA-
3	Ground	4	Ground
5	TPB+	6	TPB-
7	Cable power	8	Cable power
9	Key (no pin)	10	Ground

How to attach the IEEE 1394 Port:

1394 Port



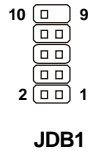
Foolproof Design



IEEE1394 Bracket (Optional)

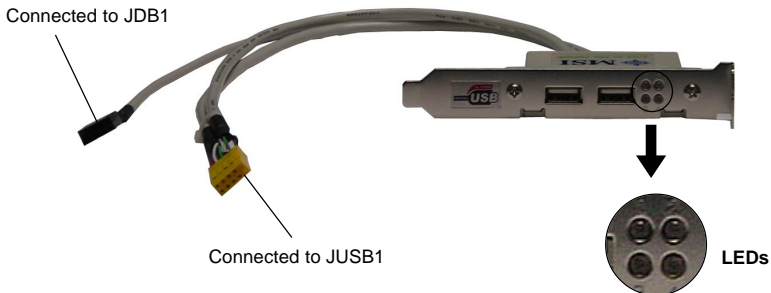
D-Bracket™ 2 Connector: JDB1

The mainboard comes with a JDB1 connector for you to connect to D-Bracket™ 2. D-Bracket™ 2 is a USB Bracket that supports both USB1.1 & 2.0 spec. It integrates four LEDs and allows users to identify system problem through 16 various combinations of LED signals. For definitions of 16 signal combinations, please refer to *D-Bracket™ 2* at P.1-10 in Chapter 1.



JDB1 Pin Definition

Pin	Signal
1	DBG1 (high for green color)
2	DBR1 (high for red color)
3	DBG2 (high for green color)
4	DBR2 (high for red color)
5	DBG3 (high for green color)
6	DBR3 (high for red color)
7	DBG4 (high for green color)
8	DBR4 (high for red color)
9	Key (no pin)
10	NC



IrDA Infrared Module Header: JIR1

The connector allows you to connect to IrDA Infrared module. You must configure the setting through the BIOS setup to use the IR function. JIR1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

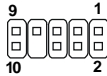


JIR1 Pin Definition

Pin	Signal
1	NC
2	NC
3	VCC5
4	GND
5	IRTX
6	IRRX

Front Panel Audio Connector: JAUD1

The JAUD1 front panel audio connector allows you to connect to the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.



JAUD1

JAUD1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	AUD_MIC	Front panel microphone input signal
2	AUD_GND	Ground used by analog audio circuits
3	AUD_MIC_BIAS	Microphone power
4	AUD_VCC	Filtered +5V used by analog audio circuits
5	AUD_FPOUT_R	Right channel audio signal to front panel
6	AUD_RET_R	Right channel audio signal return from front panel
7	HP_ON	Reserved for future use to control headphone amplifier
8	KEY	No pin
9	AUD_FPOUT_L	Left channel audio signal to front panel
10	AUD_RET_L	Left channel audio signal return from front panel



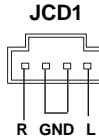
MSI Reminds You...

If you don't want to connect to the front audio header, pins 5 & 6, 9 & 10 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.



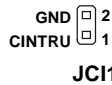
CD-In Connector: JCD1

The connector is for CD-ROM audio connector.



Chassis Intrusion Switch Connector: JCI1

This connector is connected to a 2-pin chassis switch. If the chassis is opened, the switch will be short. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



Front USB Connectors: JUSB1 & JUSB2

The mainboard provides two USB 2.0 pin headers *JUSB1* & *JUSB2* (Optional) that are compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD, digital cameras, MP3 players, printers, modems and the like.**



JUSB1 & JUSB2 Pin Definition

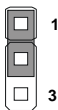
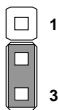
PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	USBOC

Jumpers

The motherboard provides the following jumpers for you to set the computer's function. This section will explain how to change your motherboard's function through the use of jumpers.

Clear CMOS Jumper: JBAT1

There is a CMOS RAM on board that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, use the JBAT1 (Clear CMOS Jumper) to clear data. Follow the instructions below to clear the data:

**JBAT1****Keep Data****Clear Data**

MSI Reminds You...

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Slots

The motherboard provides one AGP slot and five 32-bit PCI bus slots.

AGP (Accelerated Graphics Port) Slot

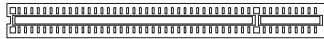
The AGP slot allows you to insert the AGP graphics card. AGP is an interface specification designed for the throughput demands of 3D graphics. It introduces a 66MHz, 32-bit channel for the graphics controller to directly access main memory. The slot supports 8x/4x AGP card.



AGP Slot

PCI (Peripheral Component Interconnect) Slots

The PCI slots allow you to insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to make any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.



PCI Slots

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus INT A# ~ INT D# pins as follows:

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT A#	INT B#	INT C#	INT D#
PCI Slot 2	INT B#	INT C#	INT D#	INT A#
PCI Slot 3	INT C#	INT D#	INT A#	INT B#
PCI Slot 4	INT D#	INT A#	INT B#	INT C#
PCI Slot 5	INT B#	INT C#	INT D#	INT A#

3

BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

You may need to run the Setup program when:

- ◆ An error message appears on the screen during the system booting up, and you are requested to run SETUP.
- ◆ You want to change the default settings for customized features.

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press key to enter Setup.

DEL:Setup F11:Boot Menu F12:Network boot TAB:Logo

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Selecting the First Boot Device

You are allowed to select the 1st boot device without entering the BIOS setup utility by pressing <F11>. When the same message as listed above appears on the screen, press <F11> to trigger the boot menu.

The POST messages might pass by too quickly for you to respond in time. If so, restart the system and press <F11> after around 2 or 3 seconds to activate the boot menu similar to the following.

Select First Boot Device		
Floppy	:	1st Floppy
IDE-0	:	IBM-DTLA-307038
CDROM	:	ATAPI CD-ROM DRIVE 40X M
[Up/Dn] Select	[RETURN] Boot	[ESC] cancel

The boot menu will list all the bootable devices. Select the one you want to boot from by using arrow keys, then press <Enter>. The system will boot from the selected device. The selection will not make changes to the settings in the BIOS setup utility, so next time when you power on the system, it will still use the original first boot device to boot up.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F7>	Load BIOS Setup Defaults
<F9>	Load High Performance Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup utility, the first screen you see is the Main Menu.

Main Menu

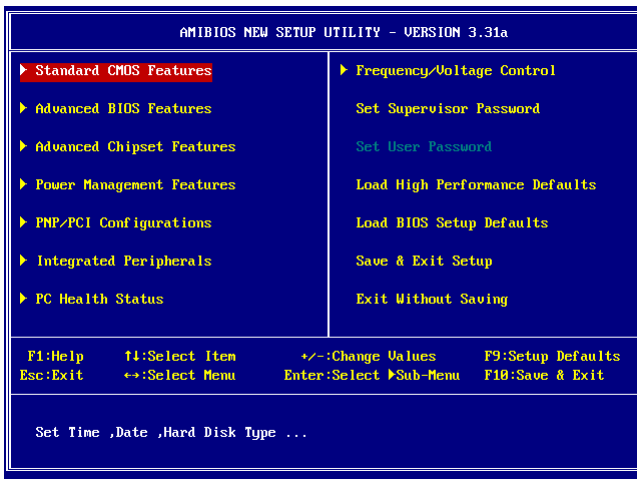
The main menu displays the setup categories the BIOS supplies. You can use the arrow keys (↑↓) to select the item. The on-line description for the selected setup category is displayed at the bottom of the screen.

Default Settings

The BIOS setup program contains two kinds of default settings: the BIOS Setup and High Performance defaults. BIOS Setup defaults provide stable performance settings for all devices and the system, while High Performance defaults provide the best system performance but may affect the system stability.

The Main Menu

Once you enter AMIBIOS NEW SETUP UTILITY, the Main Menu will appear on the screen. The Main Menu displays twelve configurable functions and two exit choices. Use arrow keys to move among the items and press <Enter> to enter the sub-menu.



Standard CMOS Features

Use this menu for basic system configurations, such as time, date etc.

Advanced BIOS Features

Use this menu to setup the items of AMI® special enhanced features.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system's performance.

Power Management Features

Use this menu to specify your settings for power management.

PNP/PCI Configurations

This entry appears if your system supports PnP/PCI.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

PC Health Status

This entry shows your PC health status.

Frequency/Voltage Control

Use this menu to specify your settings for frequency/voltage control.

Set Supervisor Password

Use this menu to set Supervisor Password.

Set User Password

Use this menu to set User Password.

Load High Performance Defaults

Use this menu to load the BIOS values for the best system performance, but the system stability may be affected.

Load BIOS Setup Defaults

Use this menu to load factory default settings into the BIOS for stable system performance operations.

Save & Exit Setup

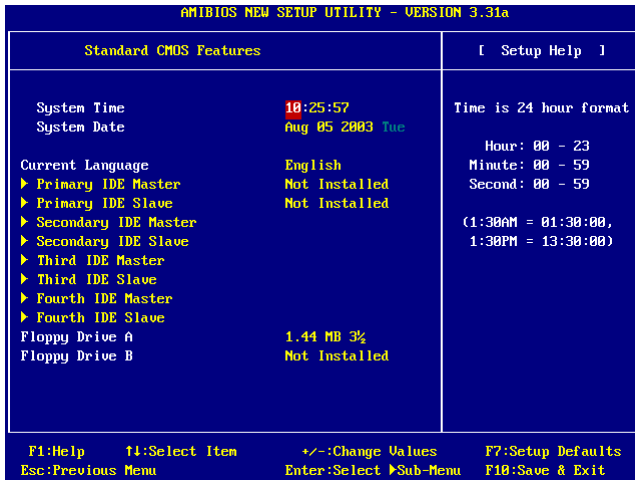
Save changes to CMOS and exit setup.

Exit Without Saving

Abandon all changes and exit setup.

Standard CMOS Features

The items inside STANDARD CMOS SETUP menu are divided into 9 categories. Each category includes none, one or more setup items. Use the arrow keys to highlight the item you want to modify and use the <PgUp> or <PgDn> keys to switch to the value you prefer.



System Time

This allows you to set the system time that you want (usually the current time). The time format is <hour> <minute> <second>.

System Date

This allows you to set the system to the date that you want (usually the current date). The format is <month> <date> <year> <day>.

- month** The month from Jan. through Dec.
- date** The date from 1 to 31 can be keyed by numeric function keys.
- year** The year can be adjusted by users.
- day** Day of the week, from Sun to Sat, determined by BIOS. Read-only.

Primary/Secondary/Third/Fourth IDE Master/Slave

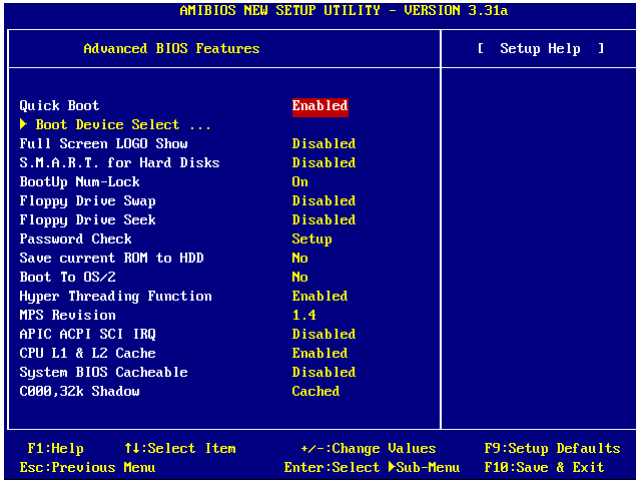
Press PgUp/<+> or PgDn/<-> to select the hard disk drive type. The specification of hard disk drive will show up on the right hand according to your selection.

Type	Select how to define the HDD parameters
Cylinders	Enter cylinder number
Heads	Enter head number
Write Precompensation	Enter write precomp cylinder
Sectors	Enter sector number
Maximum Capacity	Read the maximal HDD capacity
LBA Mode	Select <i>Auto</i> for a hard disk > 512 MB under Windows and DOS, or <i>Disabled</i> under Netware and UNIX
Block Mode	Select <i>Auto</i> to enhance the hard disk performance
Fast Programmed I/O Modes	Select <i>Auto</i> to enhance hard disk performance by optimizing the hard disk timing
32 Bit Transfer Mode	Enable 32 bit to maximize the IDE hard disk data transfer rate

Floppy Drive A:/B:

This item allows you to set the type of floppy drives installed. Available options: *Not Installed*, *1.2 MB 5¼*, *720 KB 3½*, *1.44 MB 3½* and *2.88 MB 3½*.

Advanced BIOS Features

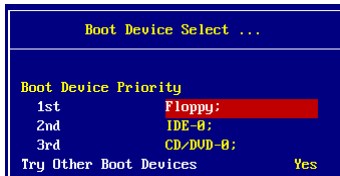


Quick Boot

Setting the item to *Enabled* allows the system to boot within 5 seconds since it will skip some check items. Available options: *Enabled, Disabled*.

Boot Device Select

Press <Enter> to enter the sub-menu screen.



Boot Device Priority: 1st/2nd/3rd

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.



MSI Reminds You...

Available settings for “1st/2nd/3rd Boot Device” vary depending on the bootable devices you have installed. For example, if you did not install a floppy drive, the setting “Floppy” does not show up.

Try Other Boot Device

Setting the option to *Yes* allows the system to try to boot from other devices if the system fails to boot from the 1st/2nd/3rd boot device.

Full Screen LOGO Show

This item enables you to show the company logo on the bootup screen. Settings are:

- Enabled* Shows a still image (logo) on the full screen at boot.
- Disabled* Shows the POST messages at boot.

S.M.A.R.T. for Hard Disks

This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T. is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline. Settings: *Enabled, Disabled*.

BootUpNum-Lock

This item is to set the Num Lock status when the system is powered on. Setting to *On* will turn on the Num Lock key when the system is powered on. Setting to *Off* will allow end users to use the arrow keys on the numeric keypad. Setting options: *On, Off*.

Floppy Drive Swap

Setting to *Enabled* will swap floppy drives A: and B:.

Floppy Drive Seek

This setting causes the BIOS to search for floppy disk drives at boot time. When enabled, the BIOS will activate the floppy disk drives during the boot process: the drive activity light will come on and the head will move back and forth once. First A: will be done and then B: if it exists. Setting options: *Disabled, Enabled*.

Password Check

This specifies the type of AMIBIOS password protection that is implemented. Setting options are described below.

Option	Description
Setup	The password prompt appears only when end users try to run Setup.
Always	A password prompt appears every time when the computer is powered on or when end users try to run Setup.

Save Current ROM to HDD

This allows you to save the BIOS to your hard disk drive. Setting options: *No*, *Yes*.

Boot To OS/2

This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose *No*, you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose *Yes*.

Hyper Threading Function

This field is used to enable or disable the Hyper Threading function. Setting to *Enabled* will increase the system performance. Settings: *Enabled*, *Disabled*.



MSI Reminds You...

Enabling the functionality of Hyper-Threading Technology for your computer system requires ALL of the following platform Components:

- * **CPU:** An Intel® Pentium® 4 Processor with HT Technology;
- * **Chipset:** An Intel® Chipset that supports HT Technology;
- * **BIOS:** A BIOS that supports HT Technology and has it enabled;
- * **OS:** An operating system that supports HT Technology.

*For more information on Hyper-threading Technology, go to:
www.intel.com/info/hyperthreading*

MPS Revision

This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. Settings: *1.4* and *1.1*.

APICACPISCIIRQ

This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance to PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQs resources for the system. Settings: *Enabled* and *Disabled*.

CPU L1 & L2 Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. The setting controls the internal cache (also known as L1 or level 1 cache). Setting to *WriteBack* will speed up the system performance.

System BIOS Cacheable

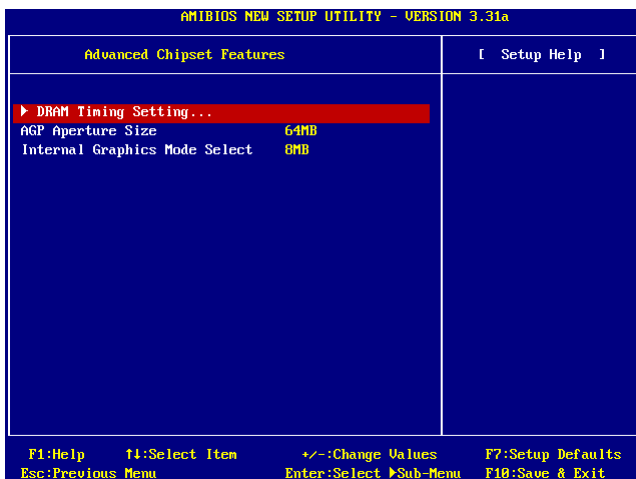
Selecting *Enabled* allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. Setting options: *Enabled*, *Disabled*.

C000, 32k Shadow

This item specifies how the contents of the adapter ROM named in the item are handled. Settings are described below:

Option	Description
Disabled	The specified ROM is not copied to RAM.
Enabled	The contents of specified ROM are copied to RAM for faster system performance.
Cached	The contents of specified ROM are not only copied to RAM, the contents of the ROM area can be written to and read from cache memory.

Advanced Chipset Features

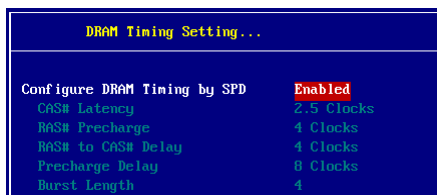


MSI Reminds You...

Change these settings only if you are familiar with the chipset.

DRAM Timing Setting...

Press <Enter> and to enter the sub-menu screen.



Configure SDRAM Timing by SPD

Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to *Enabled* enables the following fields automatically to be determined by BIOS based on the configurations on the SPD. Selecting *Disabled* allows users to configure these fields manually.

CAS# Latency

This controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Settings: 2, 2.5 (clocks). 2 (clocks) increases the system performance the most while 2.5 (clocks) provides the most stable performance.

RAS# Precharge

This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refreshing may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Available settings: *2 clocks, 3 clocks, 4 clocks.*

RAS# to CAS# Delay

When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance. Setting options: *2 clocks, 3 clocks, 4 clocks, .*

Precharge Delay

This setting controls the precharge delay, which determines the timing delay for DRAM precharge. Settings: *5 clocks, 6 clocks, 7 clocks, 8 clocks, .*

Burst Length

This setting allows you to set the size of Burst-Length for DRAM. Bursting feature is a technique that DRAM itself predicts the address of the next memory location to be accessed after the first address is accessed. To use the feature, you need to define the burst length, which is the actual length of burst plus the starting address and allows internal address counter to properly generate the next memory location. The bigger the size, the faster the DRAM performance. Available settings: *4, 8.*

AGP Aperture Size (MB)

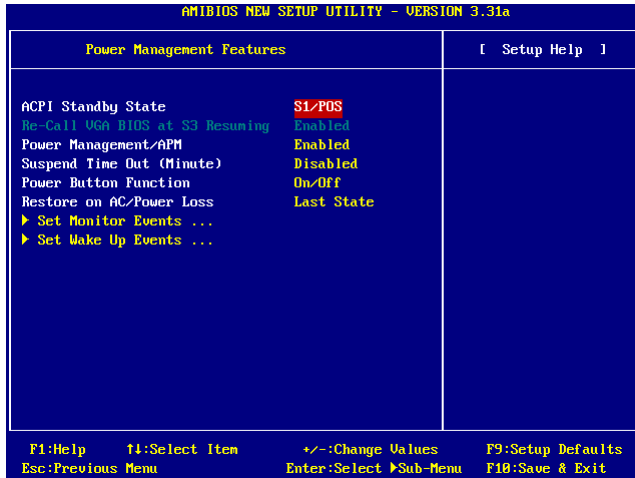
This setting controls just how much system RAM can be allocated to AGP for video purposes. The aperture is a portion of the PCI memory address range

dedicated to graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The option allows the selection of an aperture size of *4MB*, *8MB*, *16MB*, *32MB*, *64MB*, *128MB*, and *256 MB*.

Internal Graphics Mode Select (For 865G only)

The field specifies the size of system memory allocated for video memory. Settings: *Disabled*, *1MB*, *4MB*, *8MB*, *16MB*, *32MB*.

Power Management Features



ACPI Standby State

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1(POS) or S3(STR) fashion through the setting of this field. Options are:

- S1/POS** The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.
- S3/STR** The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a “wake up” event occurs.
- Auto** BIOS determines the best automatically.

Re-Call VGA BIOS at S3 Resuming

Selecting *Enabled* allows BIOS to call VGA BIOS to initialize the VGA card when system wakes up (resumes) from S3 sleep state. The system resume time is shortened when you disable the function, but system will need an AGP

driver to initialize the VGA card. Therefore, if the AGP driver of the card does not support the initialization feature, the display may work abnormally or not function after resuming from S3.

Power Management/APM

Setting to *Enabled* will activate an Advanced Power Management (APM) device to enhance Max Saving mode and stop CPU internal clock. Settings: *Disabled, Enabled*.

Suspend Time Out (Minute)

After the selected period of system inactivity, all devices except the CPU shut off. Settings: *Disabled, 1, 2, 4, 8, 10, 20, 30, 40, 50, 60*.

Power Button Function

This feature sets the function of the power button. Settings are:

- On/Off* The power button functions as normal power off button.
- Suspend* When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

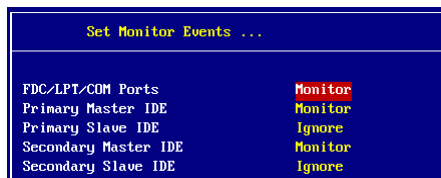
Restore on AC/Power Loss

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

- Power Off* Leaves the computer in the power off state.
- Power On* Leaves the computer in the power on state.
- Last State* Restores the system to the previous status before power failure or interrupt occurred.

Set Monitor Events

Press <Enter> and the following sub-menu appears.



FDC/LPT/COM Ports, Primary/Secondary Master/Slave IDE

These items specify if the BIOS will monitor the activity of the specified hardware peripherals or components. If set to *Monitor*, any activity detected on the specified hardware peripherals or components will wake up the system or prevent the system from entering the power saving modes. Settings: *Monitor, Ignore*.

Set WakeUp Events

Press <Enter> and the following sub-menu appears.

Set Wake Up Events ...	
USB Device Wakeup From S3	Disabled
Resume On PME#	Enabled
Resume On RTC Alarm	Disabled
RTC Alarm Date	15
RTC Alarm Hour	12
RTC Alarm Minute	30
RTC Alarm Second	30
Keyboard PowerOn Function	Disabled
Specific Key for PowerOn	N/A
Mouse PowerOn Function	Disabled

USB Device Wakeup From S3

This item allows the activity of the USB devices (keyboard and mouse) to wake up the system from S3 sleep state. Setting: *Enabled, Disabled*.

Resume On PME#

This field specifies whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected. Settings: *Enabled, Disabled*.

Resume By RTC Alarm

This is used to enable or disable the feature of booting up the system on a scheduled time/date from the soft off (S5) state. Settings: *Enabled, Disabled*.

RTC Alarm Date/Hour/Minute/Second

If *Resume By Alarm* is set to *Enabled*, the system will automatically resume (boot up) on a specific date/hour/minute/second specified in these fields.

Available settings for each item are:

Alarm Date	01 ~ 31, Every Day
Alarm Hour	00 ~ 23
Alarm Minute	00 ~ 59
Alarm Second	00 ~ 59



MSI Reminds You...

If you have changed this setting, you must let the system boot up until it enters the operating system, before this function will work.

Keyboard PowerOn Function

This controls how the PS/2 keyboard can power on the system. Settings: *Any Key, Specific Key, Disabled*.

Specific Key for PowerOn

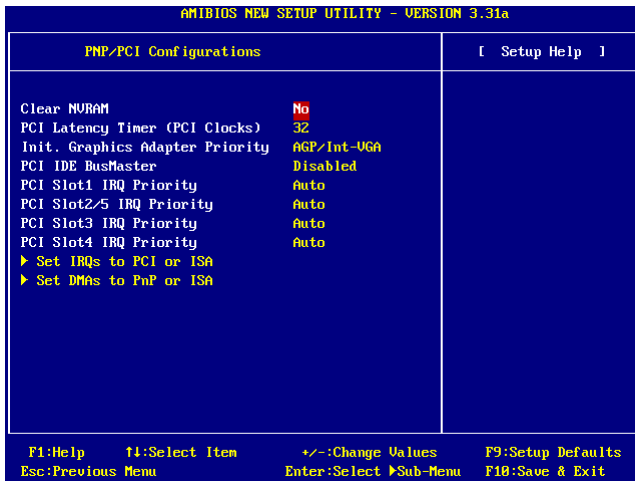
This setting allows users to set a password (max. 5 letters) for the *Keyboard Wakeup* function.

Mouse PowerOn Function

This item allows the activity of the mouse to wake up the system sleep state. Settings: *Disabled, Any Action, Left-button, Right-button*.

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or **P**eripheral **C**omponent **I**nterconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.



Clear NVRAM

The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to *Yes*, the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to *No* automatically.

PCI Latency Timer (PCI Clocks)

This item controls how long each PCI device can hold the bus before another takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. For better PCI performance, you should set the item to higher values. Settings range from 32 to 248 at a 32 increment.

Init. Graphics Adapter Priority

This setting specifies which VGA card is your primary graphics adapter. Setting options are:

<i>Internal VGA</i>	The system initializes the onboard VGA device. (For 865G)
<i>AGP/Int-VGA</i>	The system initializes the installed AGP card first. If an AGP card is not available, it will initialize the onboard VGA device. (For 865G)
<i>AGP/PCI</i>	The system initializes the installed AGP card first. If an AGP card is not available, it will initialize the PCI VGA card.
<i>PCI/AGP</i>	The system initializes the installed PCI VGA card first. If a PCI VGA card is not available, it will initialize the AGP card.
<i>PCI/Int-VGA</i>	The system initializes the installed PCI VGA card first. If a PCI VGA card is not available, it will initialize the onboard VGA device. (For 865G)

PCIIDE BusMaster

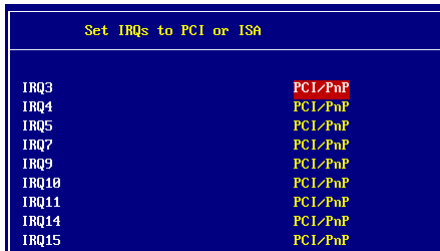
Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has bus mastering capability. Setting options: *Disabled, Enabled*.

PCI Slot1 IRQ Priority, PCI Slot2/5 IRQ Priority, PCI Slot3 IRQ Priority, PCI Slot4 IRQ Priority

These items specify the IRQ line for each PCI slot. Setting options: 3, 4, 5, 7, 9, 10, 11, *Auto*. Selecting *Auto* allows BIOS to automatically determine the IRQ line for each PCI slot.

Set IRQs to PCI or ISA

Press <Enter> to enter the sub-menu and the following screen appears:

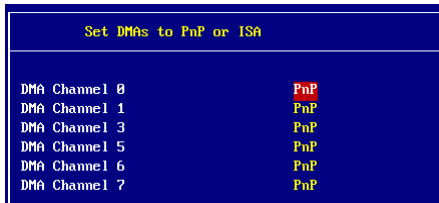


IRQ 3/4/5/7/9/10/11/14/15

These items specify the bus where the specified IRQ line is used. The settings determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the IRQ pool, the end user can use these settings to reserve the IRQ by assigning an *ISA/EISA* setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as *PCI/PnP*. If all IRQs are set to *ISA/EISA*, and IRQ 14/15 are allocated to the onboard PCI IDE, IRQ 9 will still be available for PCI and PnP devices. Available settings: *ISA/EISA* and *PCI/PnP*.

Set DMAs to PnP or ISA

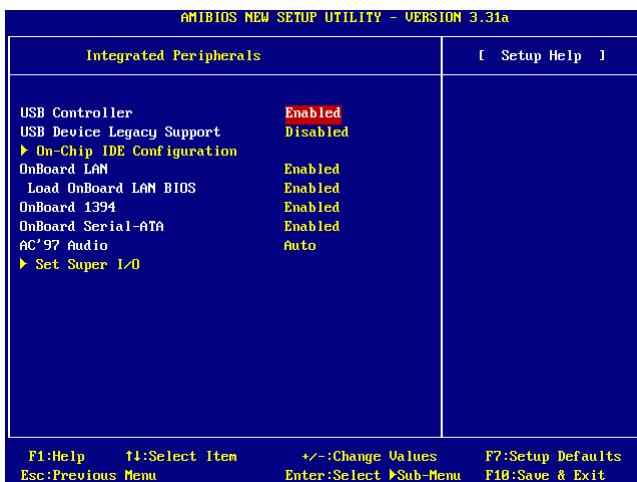
Press <Enter> to enter the sub-menu and the following screen appears:



DMA Channel 0/1/3/5/6/7

These items specify the bus that the system DMA (Direct Memory Access) channel is using. The settings determine if AMIBIOS should remove a DMA from the available DMAs passed to devices that are configurable by the system BIOS. The available DMA pool is determined by reading the ESCD NVRAM. If more DMAs must be removed from the pool, the end user can reserve the DMA by assigning an *ISA/EISA* setting to it.

Integrated Peripherals



Please note that the options showed on your BIOS might be different depending on the motherboard you buy.

USB Controller

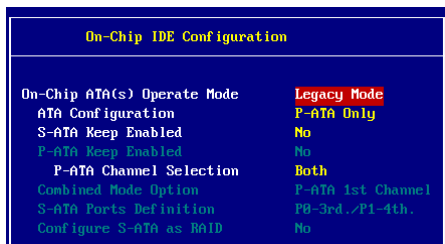
This setting is used to enable/disable the onboard USB controllers.

USB Device Legacy Support

Set to *All Device* if you need to use any the USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix. Set to *Disabled* only if you do not want to use any USB device. Set to *Keyboard+Mouse* if you only want to use keyboard and mouse. Setting options: *Disabled*, *Keyboard+Mouse*, *All Device*.

On-Chip IDE Configuration

Press <Enter> to enter the sub-menu and the following screen appears:



On-Chip ATA(s) Operate Mode

This setting allows you to determine how the RAID controller on the south bridge is going to switch to SATA controller. *Legacy Mode* means you may use the traditional 14 and 15 IRQs, while *Native Mode* means you may use all the available IRQs. Setting options: *Legacy Mode, Native Mode.*

ATA Configuration

The field lets you to configure the available ATA controller. Setting options: *Disabled, P-ATA Only, S-ATA Only, P-ATA+S-ATA.*

S-ATA Keep Enabled

This item is available for you to enable/disable the onboard S-ATA. Setting options: *Yes, No.*

P-ATA Keep Enabled

This item is available for you to enable/disable the onboard P-ATA. Setting options: *Yes, No.*

P-ATA Channel Selection

This item is available for you to select the parallel ATA channel. Setting options: *Primary, Secondary, Both.*

Combined Mode Option

This item is available for you to select the combined mode which boots first. Setting options: *P-ATA 1st Channel, S-ATA 1st Channel.*

S-ATA Ports Definition

This allows you to set the boot sequence of serial ATA ports.

Configure S-ATA as RAID

This item is available for you to configure S-ATA as onboard RAID. Setting: *Yes, No.*

Onboard LAN

This setting controls the onboard LAN controller. Setting options: *Disabled, Enabled.*

Load OnBoard LAN BIOS

This item is available for you to load the onboard LAN BIOS settings. Setting options: *Disabled, Enabled.*

Onboard 1394

This setting controls the onboard 1394 device. Setting options: *Disabled*, *Enabled*.

Onboard Serial-ATA

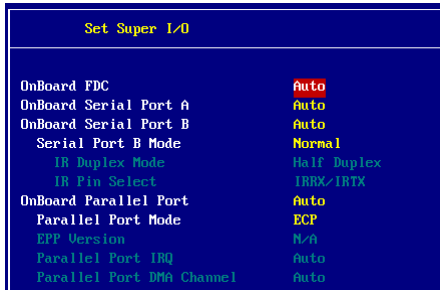
This setting controls the onboard VIA Serial-ATA controller. Setting options: *Disabled*, *Enabled*.

AC'97 Audio

This item is used to enable or disable the onboard AC'97 (Audio Codec'97) feature. Selecting *Auto* allows the mainboard to detect whether an audio device is used. If an audio device is detected, the onboard AC'97 controller will be enabled; if not, the controller is disabled. Disable the function if you want to use other controller cards to connect an audio device. Settings: *Disabled* and *Auto*.

Set Super I/O

Press <Enter> to enter the sub-menu and the following screen appears:



OnBoard FDC

Select *Enabled* if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it.

Option	Description
Auto	BIOS will automatically determine whether to enable the onboard Floppy controller or not.
Enabled	Enables the onboard Floppy controller.
Disabled	Disables the onboard Floppy controller.

Onboard Serial Port A/B

These items specify the base I/O port addresses of the onboard Serial Port 1 (COM A)/Serial Port 2 (COM B). Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 3F8/COM1, 2F8/COM2, 3E8/COM3, 2E8/COM4* and *Disabled*.

Serial Port B Mode

This item sets the operation mode for Serial Port B. Settings: *Normal, 1.6uS, 3/16 Baud* and *ASKIR* (the last three operation modes are setting options for IR function).

IR Duplex Mode

This setting controls the operating mode of IR transmission/reception. Setting options: *Full Duplex, Half Duplex*. Under *Full Duplex* mode, synchronous, bi-directional transmission/reception is allowed. Under *Half Duplex* mode, only asynchronous, bi-directional transmission/reception is allowed.

IR Pin Select

Set to *IRRX/IRTX* when using an internal IR module connected to the IR connector. Set to *SINB/SOUTB*. when connecting an IR adapter to COM B.

Onboard Parallel Port

This field specifies the base I/O port address of the onboard parallel port. Selecting *Auto* allows AMIBIOS to automatically determine the correct base I/O port address. Settings: *Auto, 378, 278, 3BC* and *Disabled*.

Parallel Port Mode

This item selects the operation mode for the onboard parallel port: *ECP, Normal, Bi-Dir* or *EPP*.

EPP Version

The item selects the EPP version used by the parallel port if the port is set to *EPP* mode. Settings: *1.7* and *1.9*.

Parallel Port IRQ

When *Onboard Parallel Port* is set to *Auto*, the item shows *Auto* indicating that BIOS determines the IRQ for the parallel port automatically.

Parallel Port DMA Channel

This feature needs to be configured only when *Parallel Port Mode* is set to the *ECP* mode. When Parallel Port is set to *Auto*, the field will show *Auto* indicating that BIOS automatically determines the DMA channel for the parallel port.

PC Health Status

This section shows the status of your CPU, fan, overall system status, etc. Monitor function is available only if there is hardware monitoring mechanism onboard.

PC Health Status		[Setup Help]
Chassis Intrusion	Disabled	
CPU Temperature	39°C/102°F	
System Temperature	88°C/176°F	
CPU Fan Speed		
NB Fan Speed		
Vcore		
3.3V		
+5.0V		
+12.0V		
-12.0V		
Battery		
+5V SB		

F1:Help F4:Select Item +/-:Change Values F7:Setup Defaults
Esc:Previous Menu Enter:Select Sub-Menu F10:Save & Exit

Chassis Intrusion

The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to *Reset*. The setting of the field will automatically return to *Enabled* later. Settings: *Enabled, Reset, Disabled*.

CPU/System Temperature, CPU/NB Fan Speed, Vcore, 3.3V, +5.0V, +12.0V, -12.0V, -5.0V, Battery, +5V SB

These items display the current status of all of the monitored hardware devices/components such as CPU voltages, temperatures and all fans' speeds.

Frequency/Voltage Control

Use this menu to specify your settings for frequency/voltage control.

Frequency/Voltage Control		[Setup Help]
Dynamic OverClocking	Private	Warning! Dynamic OverClocking is an advanced overclocking function. Any damage or risk resulted from impropriety or overclocking are not guaranteed. Please make sure your peripherals can afford different settings.
Performance Mode	Slow	
CPU Ratio Selection	8.0x	
DRAM Frequency (Mhz)	Auto	
Spread Spectrum	Enabled	
Adj. just CPU Bus Clock(Mhz)	100	
DDR Clock(Mhz)	0	
Adj. just AGP/PCI Clock(Mhz)	66.66/33.33	
CPU Voltage Adj. just	No	
CPU Voltage (V)		
DDR Power Voltage	U	
AGP Power Voltage	U	

F1:Help F4:Select Item +/-:Change Values F7:Setup Defaults
 Esc:Previous Menu Enter:Select >Sub-Menu F10:Save & Exit

Dynamic OverClocking

Dynamic Overclocking Technology is the automatic overlocking function, included in the MSI™'s newly developed CoreCell™ Technology. It is designed to detect the load balance of CPU while running programs, and to adjust the best CPU frequency automatically. When the motherboard detects CPU is running programs, it will speed up CPU automatically to make the program run smoothly and faster. When the CPU is temporarily suspending or staying in the low load balance, it will restore the default settings instead. Usually the Dynamic Overclocking Technology will be powered only when users' PC need to run huge amount of data like 3D games or the video process, and the CPU frequency need to be boosted up to enhance the overall performance. Setting options:

<i>Disabled</i>	Disable Dynamic Overclocking.
<i>Private</i>	1st level of overlocking.
<i>Sergeant</i>	2nd level of overlocking.
<i>Captain</i>	3rd level of overlocking, also the default value of "Load High Performance Defaults".
<i>Colonel</i>	4th level of overlocking.
<i>General</i>	5th level of overlocking.
<i>Commander</i>	6th level of overlocking.



MSI Reminds You...

Even though the Dynamic Overclocking Technology is more stable than manual overclocking, basically, it is still risky. We suggest user to make sure that your CPU can afford to overclocking regularly first. If you find the PC appears to be unstable or reboot incidentally, it's better to disable the Dynamic Overclocking or to lower the level of overclocking options. By the way, if you need to conduct overclocking manually, you also need to disable the Dynamic OverClocking first.

PerformanceMode

This item allows you to control the MAT (memory acceleration technology) function of CPU. MAT is MSI™'s exclusive technology, specializing in optimizing the data transfer rate among CPU, north bridge chip and memory, and also in procuring better memory performance and bandwidth up to 10%. Selecting *Fast* will enable MAT. Please be noted that not every memory is compatible with MAT. If the system fail to reboot for four times, the BIOS will be restored to the Default value (*Normal*). Setting options: *Normal*, *Fast*.



MSI Reminds You...

1. *Even though MAT is easy to use, it doesn't mean there's no risk at all. We recommend you to check if your memory is able to bear MAT setting or not before deciding to always use it. If your system will be unstable or reboot incidentally after switching to **Fast**, please switch back to **Normal**. Moreover, if you want to conduct FSB overclocking, you should set MAT as **Normal**.*
2. *Meanwhile, for security reason, there are two functions to protect BIOS and protect user's system from crashing:*
 - (a) *There is a safe hotkey "Ins" in BIOS. If the overclocking or/and MAT fails to run, you can press "Ins" key while rebooting system to restore to the BIOS Defaults.*
 - (b) *If your system reboot for four times continually, the BIOS will be restored to the Defaults (**Normal**), too*

CPU Ratio Selection

This setting controls the multiplier that is used to determine the internal clock speed of the processor relative to the external or motherboard clock speed.

DRAM Frequency

Use this field to configure the clock frequency of the installed DRAM. Settings

are: PSB 400: 266, Auto, 333, 400, 433, 466, 500.

PSB 533: 266, 333, Auto, 400, 433, 450, 466, 500, 354 (3:4).

PSB 800: 266, 333, 400, Auto, 433, 450, 466, 500, 532, 501 (4:5),
533 (3:4).



MSI Reminds You...

The value plus a ratio (CPU: DDR) with parentheses means the non-synchronous overclocking.

Spread Spectrum

When the motherboard's clock generator pulses, the extreme values (spikes) of the pulses creates EMI (Electromagnetic Interference). The Spread Spectrum function reduces the EMI generated by modulating the pulses so that the spikes of the pulses are reduced to flatter curves. If you do not have any EMI problem, leave the setting at *Disabled* for optimal system stability and performance. But if you are plagued by EMI, activate the Spread Spectrum for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clock speed which may just cause your overclocked processor to lock up. Options: *Disabled, Enabled.*

Adjust CPU Bus Clock

This item allows you to select the CPU Bus clock frequency (in MHz) and overclock the processor by adjusting the FSB clock to a higher frequency.

Settings are: PSB 400: 100-355MHz.

PSB 533: 133-500MHz

PSB 800: 200-500MHz

DDR Clock (Mhz)

This read-only item allows you to view the current DDR clock.

Adjust AGP/PCI Clock (Mhz)

This item allows you to select the AGP/PCI clock frequency (in MHz) by adjusting the AGP/PCI clock to a higher frequency.

CPU Vcore Adjust

The setting allows you to adjust the CPU Vcore voltage. Available options: *Yes, No.*

CPU Voltage (V)

The setting is adjustable if you set the “CPU Vcore Adjust” to “Yes”.



MSI Reminds You...

Changing CPU Ratio/Vcore could result in the instability of the system; therefore, it is NOT recommended to change the default setting for long-term usage.

DDR Power Voltage

Adjusting the DDR voltage can increase the DDR speed. Any changes made to this setting may cause a stability issue, so ***changing the DDR voltage for long-term purpose is NOT recommended.***

AGP Power Voltage

AGP voltage is adjustable in the field, allowing you to increase the performance of your AGP display card when overclocking, but the stability may be affected.



MSI Reminds You...

*The settings shown in different color in **CPU Voltage (V)**, **DDR Power Voltage** and **AGP Power Voltage** helps to verify if your setting is proper for your system.*

White: Safe setting.

Yellow: High performance setting.

Red: Not recommended setting and the system may be unstable.

Set Supervisor/User Password

When you select this function, a message as below will appear on the screen:



Type the password, up to six characters in length, and press <Enter>. The password typed now will replace any previously set password from CMOS memory. You will be prompted to confirm the password. Retype the password and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To clear a set password, just press <Enter> when you are prompted to enter the password. A message will show up confirming the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup without entering any password.

When a password has been set, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also have AMIBIOS to request a password each time the system is booted. This would prevent unauthorized use of your computer. The setting to determine when the password prompt is required is the PASSWORD CHECK option of the ADVANCED BIOS FEATURES menu. If the PASSWORD CHECK option is set to *Always*, the password is required both at boot and at entry to Setup. If set to *Setup*, password prompt only occurs when you try to enter Setup.



MSI Reminds You...

About Supervisor Password & User Password:

Supervisor password: Can enter and change the settings of the setup menu.

User password: Can only enter but do not have the right to change the settings of the setup menu.

Load High Performance/BIOS Setup Defaults

The two options on the main menu allow users to restore all of the BIOS settings to High Performance defaults or BIOS Setup defaults. The High Performance Defaults are the values set by the mainboard manufacturer for the best system performance but probably will cause a stability issue. The BIOS Setup Defaults are the default values also set by the mainboard manufacturer for stable performance of the mainboard.

When you select Load High Performance Defaults, a message as below appears:

```
[ Load High Performance Defaults ]
WARNING! This default might have potential reliability risk.
Press [Enter] to Continue
Or [ESC] to Abort
```

Pressing 'Enter' loads the default BIOS values that enable the best system performance but may lead to a stability issue.



MSI Reminds You...

The option is for power or overclocking users only. Use of high performance defaults will tighten most timings to increase the system performance. Therefore, a high-end system configuration is a must, which means you need high-quality VGA adapter, RAM and so on. We don't recommend that users should apply the high performance defaults in their regular systems. Otherwise, the system may become unstable or even crash. If the system crashes or hangs after enabling the feature, please CLEAR CMOS DATA to resolve the problem. For more information, refer to "Clear CMOS Jumper: JBAT1" in Chapter 2.

When you select Load BIOS Setup Defaults, a message as below appears:

```
[ Load BIOS Setup Defaults ]
Press [Enter] to Continue
Or [ESC] to Abort
```

Pressing 'Enter' loads the default values that are factory settings for stable system performance.

Appendix A: Using 2-, 4- & 6-Channel Audio Function

The mainboard is equipped with Realtek ALC655 chip, which provides support for 6-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. ALC655 allows the board to attach 4 or 6 speakers for better surround sound effect. The section will tell you how to install and use 4-/6-channel audio function on the board.

Installing the Audio Driver

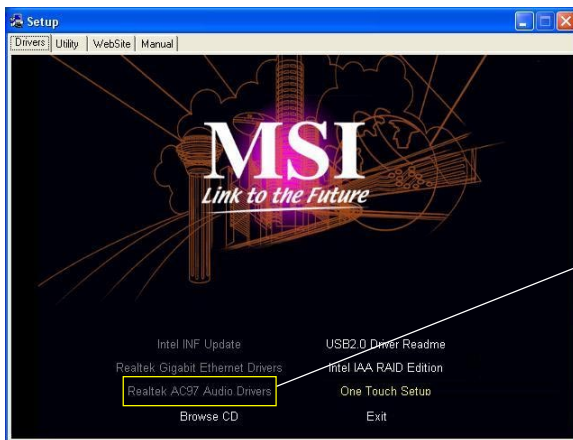
You need to install the driver for Realtek ALC655 chip to function properly before you can get access to 4-/6-channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 98SE/ME/2000/XP

For Windows® 2000, you must install Windows® 2000 Service Pack2 or later before installing the driver.

The following illustrations are based on Windows® XP environment and could look slightly different if you install the drivers in different operating systems.


1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear.
2. Click **Realtek AC97 Audio Drivers**.



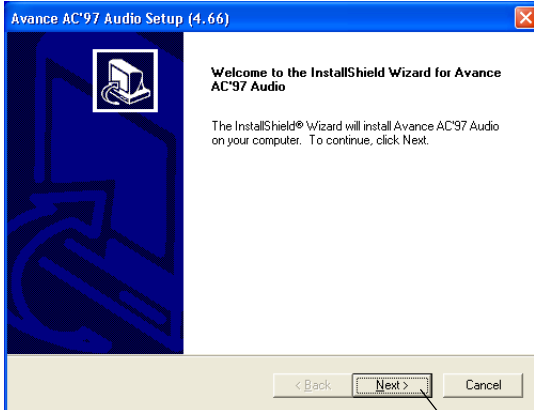
Click here



MSI Reminds You...

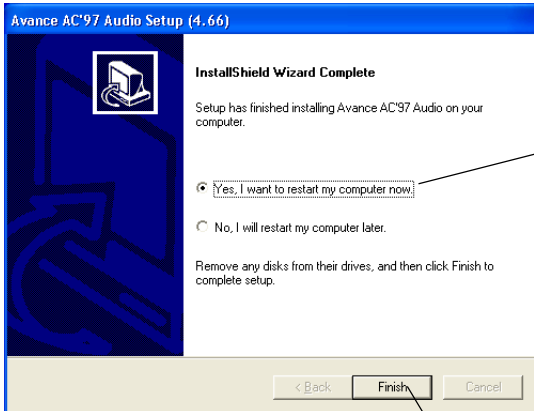
The **AC97 Audio Configuration**  software utility is under continuous update to enhance audio applications. Hence, the program screens shown here in this appendix may be slightly different from the latest software utility and shall be held for reference only.

3. Click **N**ext to install the AC'97 Audio software.



Click here


4. Click **F**inish to restart the system.



Select this option

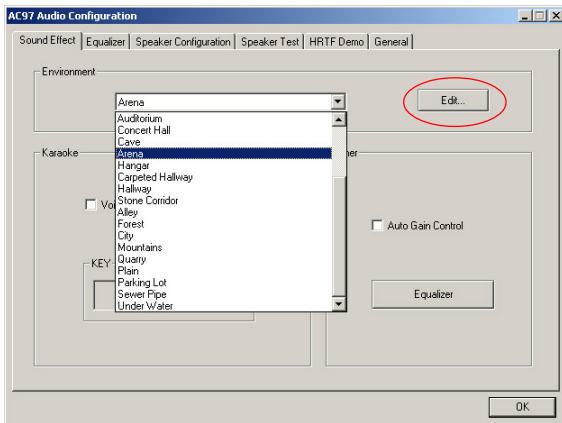
Click here

Software Configuration

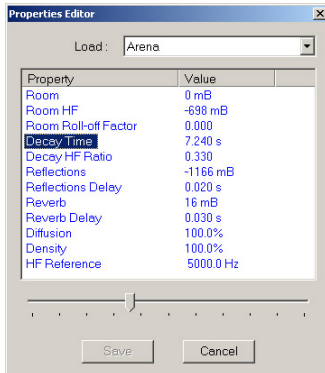
After installing the audio driver, you are able to use the 4-/6-channel audio feature now. Click the audio icon  from the window tray at the lower-right corner of the screen to activate the **AC97 Audio Configuration**.

Sound Effect

Here you can select a sound effect you like from the **Environment** list.

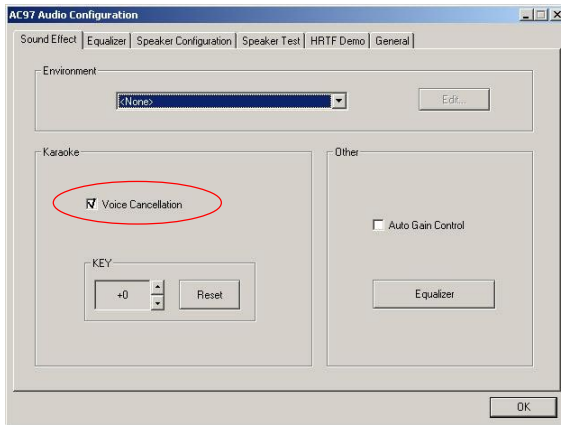


You may also edit the properties for an environment as you wish by clicking the **Edit** button, then just scroll the bar in the bottom for each property to adjust.



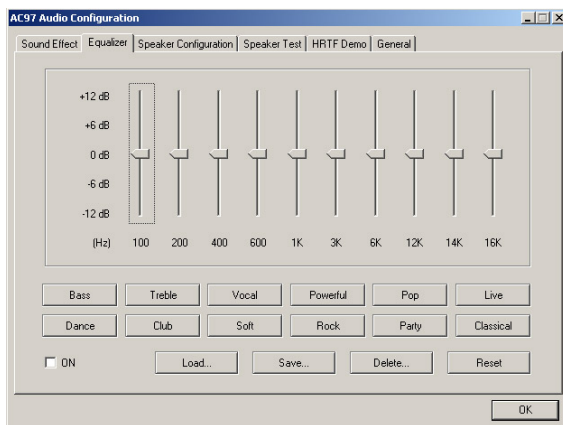
Here it provides the Karaoke function which will automatically remove human voice (lyrics) and leave melody for you to sing the song. Note that this function applies only for 2-channel audio operation.

Just check the **Voice Cancellation** box and then click **OK** to activate the Karaoke function.

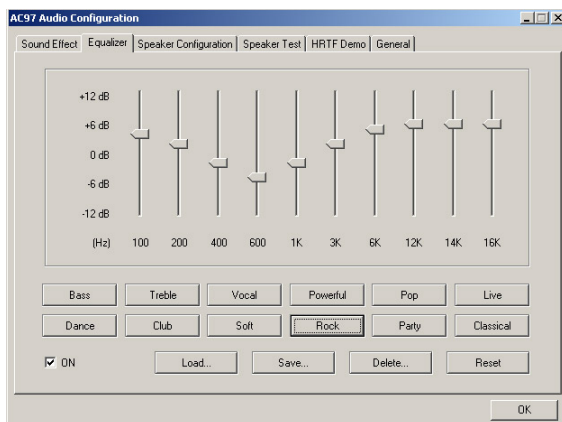


Equalizer

Here you regulate each equalizer for current playing digital sound sources.



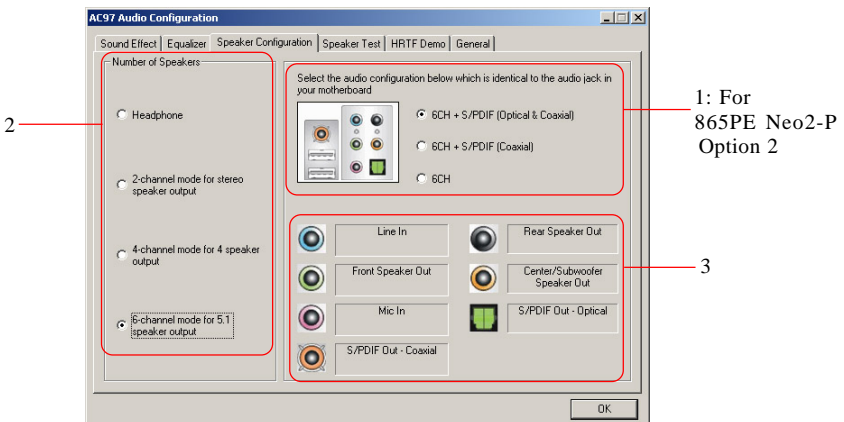
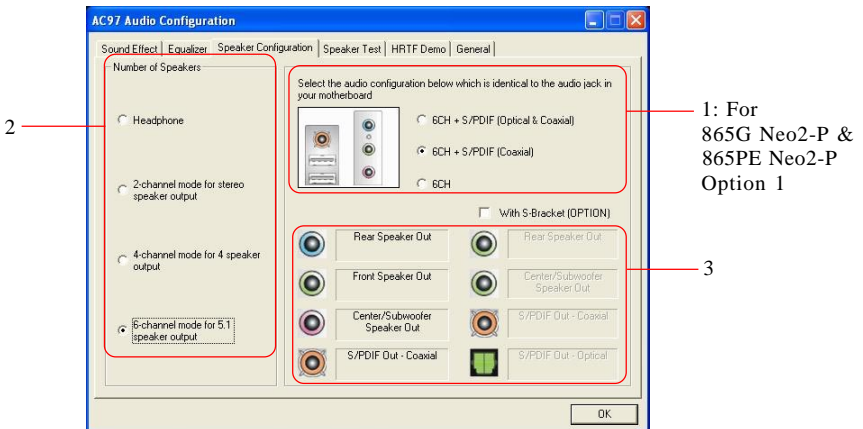
You may choose the provided sound effects, and the equalizer will adjust automatically. If you like, you may also load an equalizer setting or make a new equalizer setting to save as a new one by using the buttons **Load** and **Save**. Or you may click **Reset** to use the default value.



Speaker Configuration

In this tab, you can easily configure your multi-channel audio function and speakers.

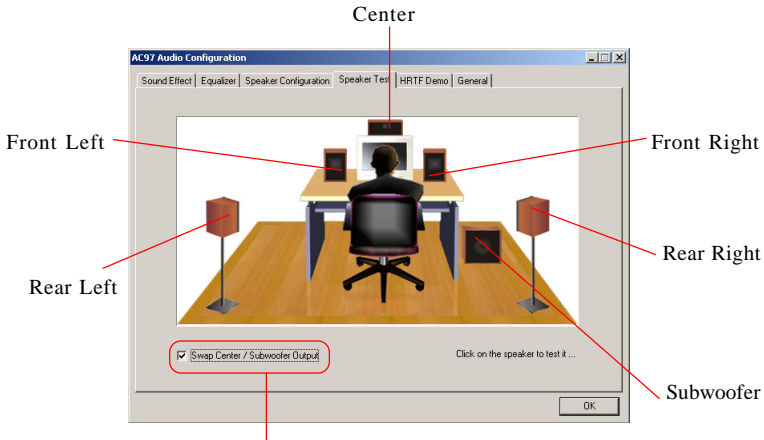
1. Select the audio configuration below which is identical to the audio jack in your motherboard. Since the audio port for this 865PE/G Neo2-P motherboard is optional, you will have to choose either **6CH+ S/PDIF (Coaxial)** (for 865G Neo2-P & 865PE Neo2-P Option 1) or **6CH+ S/PDIF (Optical & Coaxial)** (for 865PE Neo2-P Option 2).



2. Select a desired multi-channel operation from *Number of Speaker*.
 - a. Headphone for the common headphone
 - b. 2-Channel Mode for Stereo-Speaker Output
 - c. 4-Channel Mode for 4-Speaker Output
 - d. 6-Channel Mode for 5.1-Speaker Output
3. Here it shows the multi-channel setting for the audio jack. Please connect your speakers to the correct phone jack in accordance with the setting displayed here.
4. Then click **OK** to apply the configuration.

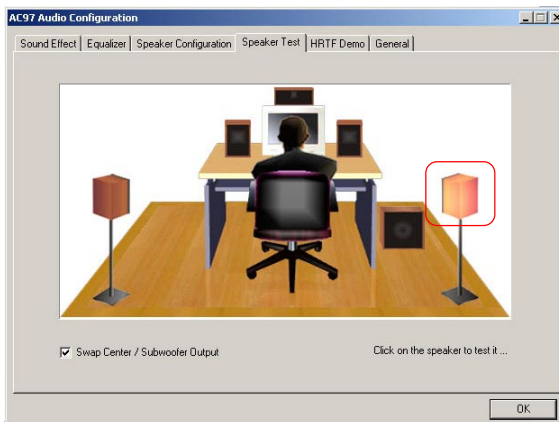
Speaker Test

You can use this tab to test each connected speaker to ensure if 4- or 6-channel audio operation works properly. If any speaker fails to make sound, then check whether the cable is inserted firmly to the connector or replace the bad speakers with good ones.



Select this function

Select the speaker by clicking it to test its functionality. The one you select will light up and make testing sound.



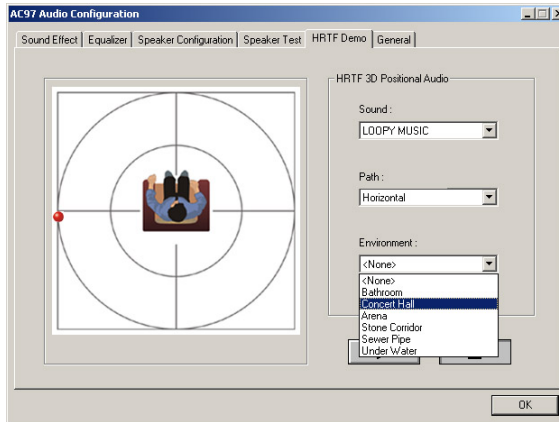


MSI Reminds You...

1. *6 speakers appear on the "Speaker Test" tab only when you select "6-Channel Mode" in the "Number of Speakers" column in "Speaker Configuration" tab. If you select "4-Channel Mode", only 4 speakers appear on the window.*
2. *While you are testing the speakers in 6-Channel Mode, if the sound coming from the center speaker and subwoofer is swapped, you should select **Swap Center/Subwoofer Output** to readjust these two channels.*

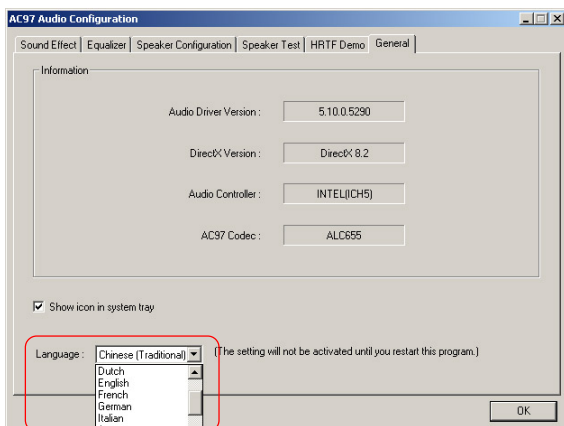
HRTF Demo

In this tab you may adjust your HRTF (Head Related Transfer Functions) 3D positional audio before playing 3D audio applications like gaming. You may also select different environment to choose the most suitable environment you like.



General

In this tab it provides some information about this AC97 Audio Configuration utility, including Audio Driver Version, DirectX Version, Audio Controller & AC97 Codec. You may also select the language of this utility by choosing from the **Language** list.



Using 2-, 4- & 6- Channel Audio Function

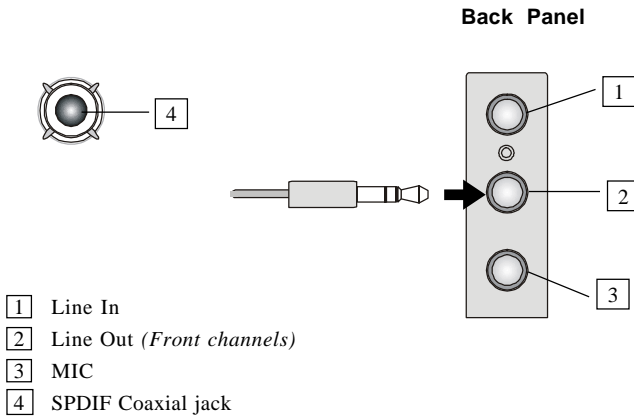
For 865G Neo2-P and 865PE Neo2-P Option 1:

Connecting the Speakers

When you have set the Multi-Channel Audio Function mode properly in the software utility, connect your speakers to the correct phone jacks in accordance with the setting in software utility.

■ 2-Channel Mode for Stereo-Speaker Output

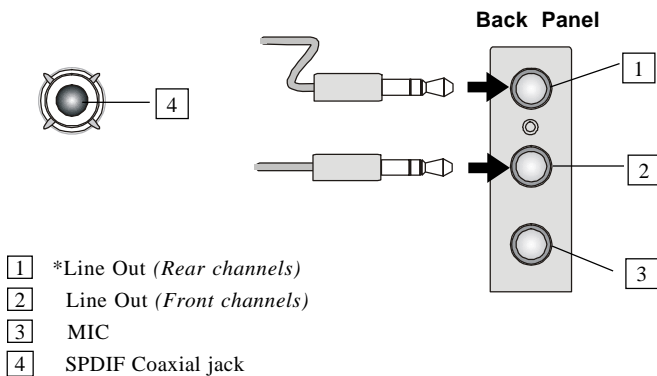
Refer to the following diagram and caption for the function of each phone jack on the back panel when 2-Channel Mode is selected.



■ 4-Channel Mode for 4-Speaker Output

The audio jacks on the back panel always provide 2-channel analog audio output function, however these audio jacks can be transformed to 4- or 6- channel analog audio jacks by selecting the corresponding multi-channel operation from **No. of Speakers**.

Refer to the following diagram and caption for the function of each jack on the back panel when 4-Channel Mode is selected.

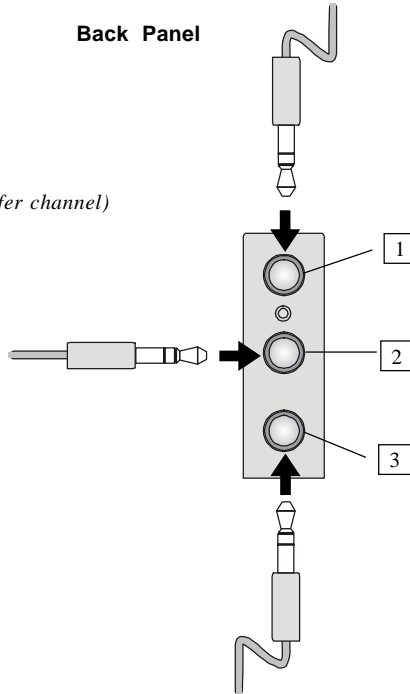
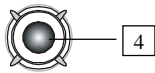


* Line In function is converted to Line Out function when 4-Channel Mode for 4-Speaker Output is selected.

■ 6-Channel Mode for 6-Speaker Output

Refer to the following diagram and caption for the function of each jack on the back panel when 6-Channel Mode is selected.

- 1 * Line Out (Rear channels)
- 2 Line Out (Front channels)
- 3 * Line Out (Center and Subwoofer channel)
- 4 SPDIF Coaxial jack



* Both Line In and MIC function are converted to Line Out function when 6-Channel Mode for 6-Speaker Output is selected.



MSI Reminds You...

If the audio signals coming from the Center and Subwoofer speaker are swapped when you play video or music on the computer, a converter may be required to exchange center and subwoofer audio signals. The converter can be purchased from a speaker store.

For 865PE Neo2-P Option 2:

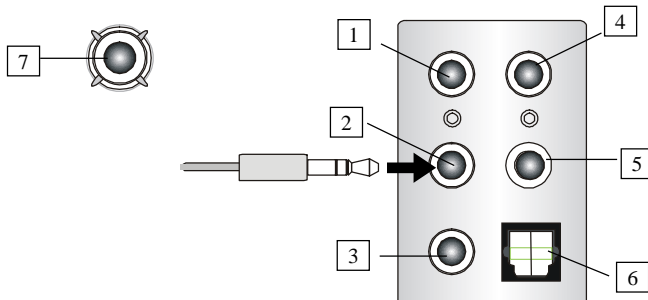
Connecting the Speakers

When you have set the Multi-Channel Audio Function mode properly in the software utility, connect your speakers to the correct phone jacks in accordance with the setting in software utility.

■ 2-Channel Mode for Stereo-Speaker Output

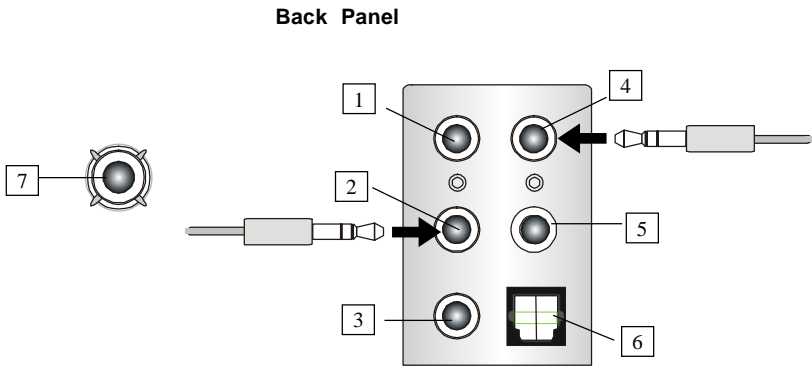
Refer to the following diagram and caption for the function of each phone jack on the back panel when 2-Channel Mode is selected.

Back Panel



- 1 Line In
- 2 Line Out (*Front channels*)
- 3 MIC
- 4 Line Out (*Rear channels, but no functioning in this mode*)
- 5 Line Out (*Center and Subwoofer channel, but no functioning in this mode*)
- 6 SPDIF Out Optical jack
- 7 SPDIF Out Coaxial jack

■ 4-Channel Mode for 4-Speaker Output

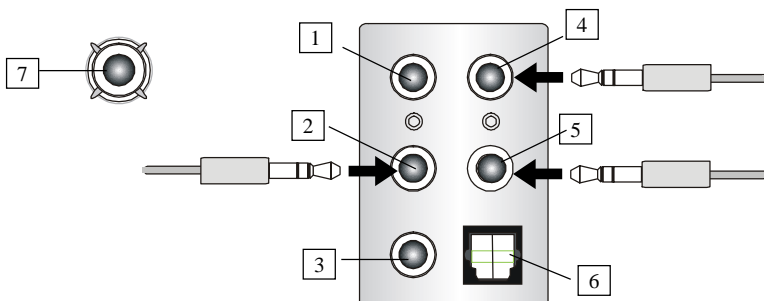


4-Channel Analog Audio Output

- 1 Line In
- 2 Line Out (*Front channels*)
- 3 MIC
- 4 Line Out (*Rear channels*)
- 5 Line Out (*Center and Subwoofer channel, but no functioning in this mode*)
- 6 SPDIF Out Optical jack
- 7 SPDIF Out Coaxial jack

■ 6-Channel Mode for 4-Speaker Output

Back Panel



6-Channel Analog Audio Output

- 1 Line In
- 2 Line Out (*Front channels*)
- 3 MIC
- 4 Line Out (*Rear channels*)
- 5 Line Out (*Center and Subwoofer channel*)
- 6 SPDIF-Out Optical jack
- 7 SPDIF-Out Coaxial jack

Appendix B: Intel ICH5R Serial ATA RAID Introduction

The southbridge ICH5R provides a hybrid solution that combines two independent SATA ports for support of up to two Serial ATA (Serial ATA RAID) drives.

Serial ATA (SATA) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds of up to 150MB/sec. Serial ATA uses long, thin cables, making it easier to connect your drive and improving the airflow inside your PC.

1. Supports 150 MB/s transfers with CRC error checking
2. Data handling optimizations including tagged command queuing, elevator seek and packet chain command



MSI Reminds You...

All the information/volumes listed in your system might differ from the illustrations in this appendix.

Introduction

Following are the Parallel ATA (P-ATA) and Serial ATA (S-ATA) device configurations supported by Intel ICH5R.

ATA Operate Mode

There are two modes to select: Legacy mode and Native mode.

Legacy Mode:

- In this mode, system BIOS just assign the traditional 14 and 15 IRQs to use for HDD.
- Older OSs that do not support switch to Native Mode (DOS, Win98/ME...) should set SATA and PATA to Legacy Mode.
- Maximum 4 ATA devices to connect.
- Combine mode and Non-Combine mode.
 - Non-Combined Mode: P-ATA devices only .
Maximum of 4 devices.
 - Non-Combined Mode: S-ATA devices only.
Maximum of 2 devices.
 - Combined Mode: S-ATA devices
P-ATA devices
Maximum of 2 devices each, thus total 4 devices at maximum.

Native Mode:

- In this mode, system BIOS will search all available IRQs to use for HDD.
- New OS that support switch to Native Mode (WinXP, Win2K) can set SATA and PATA to Native Mode.
- Comprehend both Legacy and/or Native Modes.
- Maximum 6 ATA devices to connect (4 for P-ATA & 2 for S-ATA).



MSI Reminds You...

*BIOS provides a BIOS setup option for Native Mode or Legacy Mode user selection. Please refer to P.3-23 **On-Chip IDE Configuration** for details.*

What is RAID 0 (striping)?

RAID 0 leverages the read/write capabilities of two or more hard drives working in unison to maximize the storage performance of a computer system. Data in a RAID 0 volume is arranged into blocks that are interleaved among the disks so that reads and writes can be performed in parallel (see below diagram). This technique, known as "striping", is the fastest of all of the RAID levels, especially for reading and writing large sequential files. Real world usage models where RAID 0 can be of particular benefit include loading large files into an image editing application such as Adobe* Photoshop*, saving large movie files in a video editing application such as Adobe* Premiere*, or creating CD or DVD images with a CD/DVD authoring package such as Roxio* Easy CD Creator*.

The hard drives in a RAID 0 volume are combined to form one volume which appears as a single virtual drive to the operating system. For example, two 40 GB hard drives in a RAID 0 array will appear as a single 80 GB hard drive to the operating system.

No redundancy information is stored in a RAID 0 volume. This means that if one hard drive fails, all data on both drives is lost. This lack of redundancy is also reflected by the RAID level 0, which indicates no redundancy. RAID 0 is not recommended for use in servers or other environments where data redundancy is a primary goal.



Minimum Disks:	2
Advantage:	Highest transfer rates
Redundancy:	None - if one disk fails all data will be lost
Application:	Typically used in desktops and workstations for maximum performance for temporary data and high I/O rate

What is RAID 1 (mirroring)?

A RAID 1 array contains two hard drives where the data between the two is mirrored in real time. Since all of the data is duplicated, the operating system treats the usable space of a RAID 1 array as the maximum size of one hard drive in the array. For example, two 40 GB hard drives in a RAID 1 array will appear as a single 40 GB hard drive to the operating system.

The primary benefit of RAID 1 mirroring is that it provides good data reliability in the case of a single disk failure. When one disk drive fails, all data is immediately available on the other without any impact to the data integrity. In the case of a disk failure, the computer system will remain fully operational to ensure maximum productivity.

The performance of a RAID 1 array is greater than that of a single drive since data can be read from multiple disks simultaneously, although disk writes do not realize the same benefit as is the case with RAID 0.



Minimum Disks: 2

Advantage: 100% redundancy of data. One disk may fail, but data will continue to be accessible. A rebuild to a new disk is recommended to maintain data redundancy.

Redundancy: Excellent - disk mirroring means that all data on one disk is duplicated on another disk.

Application: Typically used for smaller systems where capacity of one disk is sufficient and for any application(s) requiring very high availability.

BIOS Configuration

The Intel RAID Option ROM should be integrated with the system BIOS on all motherboards with a supported Intel chipset. The Intel RAID Option ROM is the Intel RAID implementation and provides BIOS and DOS disk services. Please use <Ctrl> + <I> keys to enter the “Intel(R) RAID for Serial ATA” status screen, which should appear early in system boot-up, during the POST (Power-On Self Test).

Using the Intel RAID Option ROM

1. Creating, Deleting and Resetting RAID Volumes:

The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the Intel RAID Option ROM. During the Power-On Self Test (POST), the following message will appear for a few seconds:



MSI Reminds You...

The “Driver Model”, “Serial #” and “Size” in the following example might be different from your system.

```
Intel(R) RAID for Serial ATA - RAID BIOS v3.0.0.2307
Copyright (C) 2003 Intel Corporation. All Rights Reserved.

RAID Volumes:
None defined.

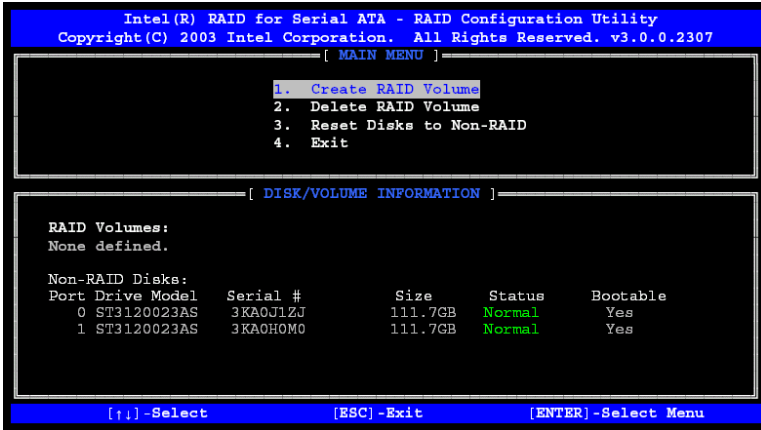
Non-RAID Disks:
Port Drive Model          Serial #          Size   Status   Bootable
0   ST3120023AS          3KA0J1ZJ         111.7GB Normal   Yes
1   ST3120023AS          3KA0H0M0         111.7GB Normal   Yes

Press <CTRL-I> to enter Configuration Utility...
```

After the above message shows, press <Ctrl> and <I> keys simultaneously to enter the RAID Configuration Utility.

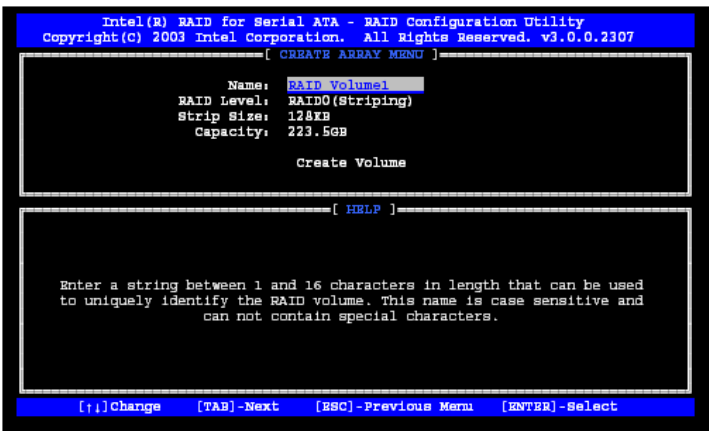
2. Creating, Deleting and Resetting RAID Volumes:

After pressing the <Ctrl> and <I> keys simultaneously, the following window will appear:



(1) Create RAID Volume

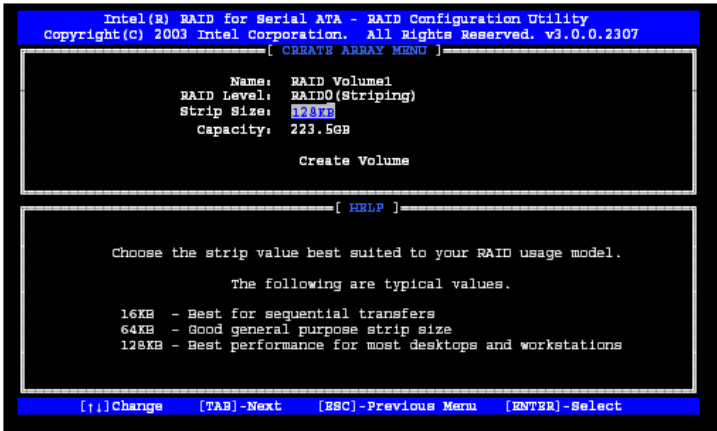
1. Select option 1 “Create RAID Volume” and press <Enter> key. The following screen appears:



MSI Reminds You...

The following procedure is only available with a newly-built system or if you are reinstalling your OS. It should not be used to migrate an existing system to RAID 0.

2. Specify a RAID Volume name and then press the <TAB> or <Enter> key to go to the next field.

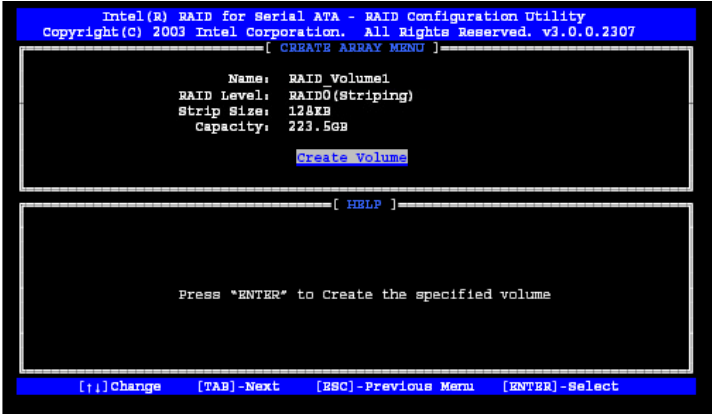


3. Select the strip value for the RAID 0 or RAID 1 array by using the “upper arrow” or “down arrow” keys to scroll through the available values, and pressing the <Enter> key to select and advance to the next field. The available values range from 4KB to 128 KB in power of 2 increments. The strip value should be chosen based on the planned drive usage. Here are some suggested selections:

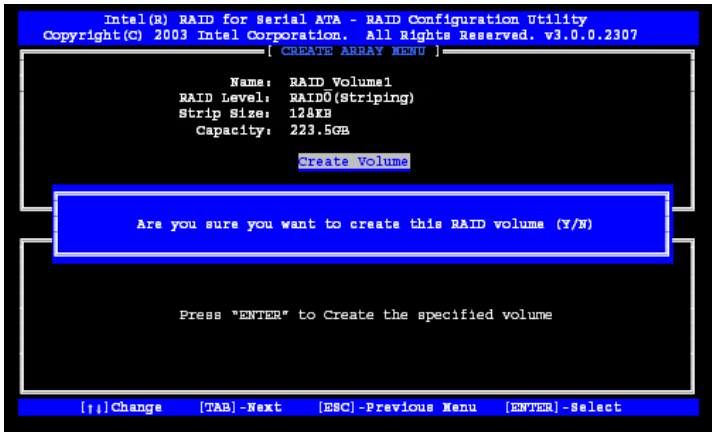
- 16 KB – Best for sequential transfers
 - 64 KB – Good general purpose strip size
 - 128 KB – Best performance for most desktops and workstations.
- The default value.

Select the RAID level (**Striping** for RAID0 and **Mirror** for RAID1) by scrolling through the available values by using the “upper arrow” or “down arrow”, and press the <Enter> key to select and advance to the next field.

4. From the Strip size, press the <Tab> or <ENTER> key to advance to the **Create Volume** prompt. The window will appear as follows:



5. Then press <Enter> to create the specified volume and the following prompt will show:



- Press <Y> to confirm the selection or press <N> to create the RAID volume again. Then you will return to the main menu with an updated status as follows:

```
Intel(R) RAID for Serial ATA - RAID Configuration Utility
Copyright(C) 2003 Intel Corporation. All Rights Reserved. v3.0.0.2307
[ MAIN MENU ]

1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ DISK/VOLUME INFORMATION ]

RAID Volumes:
ID Name          Level          Strip   Size   Status   Bootable
0 RAID_Volume1  RAID0(Stripe) 128KB   223.5GB Normal   Yes
├ ST3120023AS   3KAOJLZJ      Port0   111.7GB Normal
└ ST3120023AS   3KAOHOMO      Port1   111.7GB Normal

Non-RAID Disks:
None defined.

[↑]-Select [ESC]-Exit [ENTER]-Select Menu
```

- Scroll to option 4 **Exit** and press <Enter> to exit the RAID Configuration utility. The following prompt appears:

```
Intel(R) RAID for Serial ATA - RAID Configuration Utility
Copyright(C) 2003 Intel Corporation. All Rights Reserved. v3.0.0.2307
[ MAIN MENU ]

1. Create RAID Volume
2. Delete RAID Volume
3. Reset Disks to Non-RAID
4. Exit

[ CONFIRM EXIT ]
Are you sure you want to exit? (Y/N):

RAID Volumes:
ID Name          Level          Strip   Size   Status   Bootable
0 RAID_Volume1  RAID0(Stripe) 128KB   223.5GB Normal   Yes
├ ST3120023AS   3KAOJLZJ      Port0   111.7GB Normal
└ ST3120023AS   3KAOHOMO      Port1   111.7GB Normal

Non-RAID Disks:
None defined.

[↑]-Select [ESC]-Exit [ENTER]-Select Menu
```

- Click <Y> to confirm the exit.

(2) Delete RAID Volume

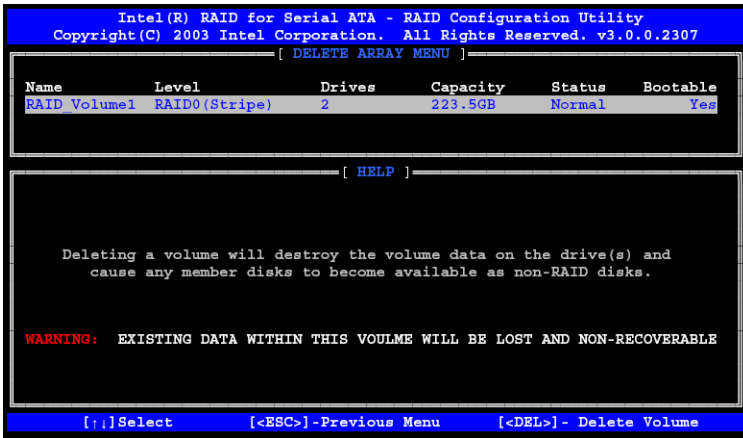
Here you can delete the RAID volume, but please be noted that all data on RAID drives will be lost.



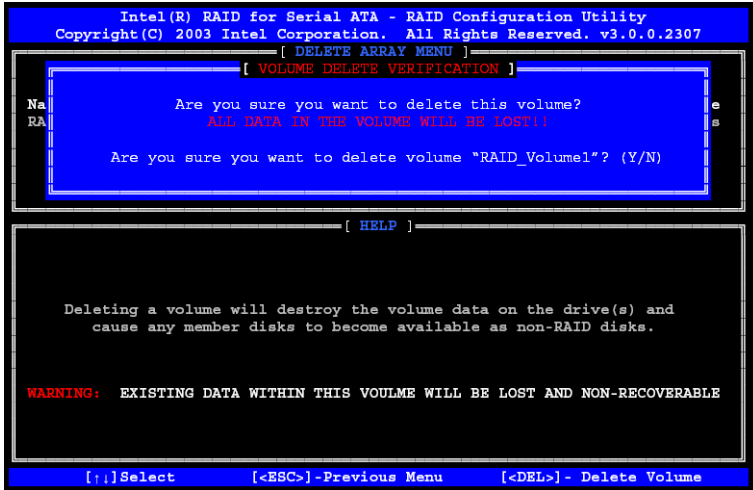
MSI Reminds You...

If your system currently boots to RAID and you delete the RAID volume in the Intel RAID Option ROM, your system will become unbootable.

Select option **2 Delete RAID Volume** from the main menu window and press <Enter> key to select a RAID volume for deletion. The following window will appear:



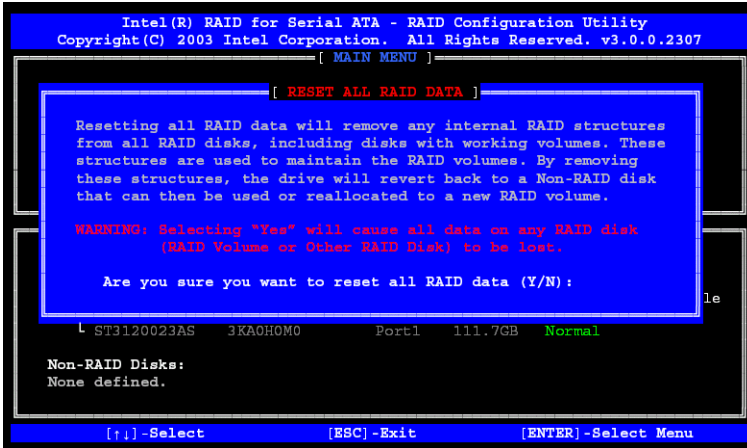
Select the volume and press <Delete> key to delete the RAID volume. The following prompt appears:



Press <Y> key to accept the volume deletion.

(3) Reset Disks to Non-RAID

Select option 3 **Reset Disks to Non-RAID** and press <Enter> to delete the RAID volume and remove any RAID structures from the drives. The following screen appears:



Press <Y> key to accept the selection.



MSI Reminds You...

- 1. You will lost all data on the RAID drives and any internal RAID structures when you perform this operation.*
- 2. Possible reasons to 'Reset Disks to Non-RAID' could include issues such as incompatible RAID configurations or a failed volume or failed disk.*

Installing Software

Install Driver in Windows XP / 2000

► New Windows XP / 2000 Installation

The following details the installation of the drivers while installing Windows XP / 2000.

1. Start the installation:
Boot from the CD-ROM. Press F6 when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows XP Setup window is generated, press S to specify an Additional Device(s).
3. Insert the driver diskette *Intel IAA RAID XP Driver For ICH5R (FW82801ER)* into drive A: and press <Enter>.
4. Choose *Intel(R) 82801ER SATA RAID Controller* from the list that appears on Windows XP Setup screen, press the <Enter> key.
5. Press <Enter> to continue with installation or if you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, press <Enter> to continue with installation.
6. From the Windows XP Setup screen, press the <Enter> key. Setup will now load all device files and then continue the Windows XP installation.

► Existing Windows XP / 2000 Driver Installation

1. Insert the MSI CD into the CD-ROM drive.
2. The CD will auto-run and the setup screen will appear.
3. Under the Driver tab, click on *Intel IAA RAID Edition*.
4. The drivers will be automatically installed.

► Confirming Windows XP / 2000 Driver Installation

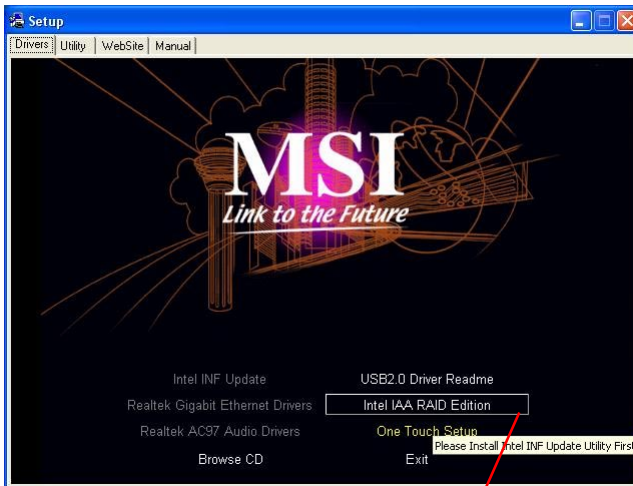
1. From Windows XP / 2000, open the **Control Panel** from **My Computer** followed by the System icon.
2. Choose the **Hardware** tab, then click the **Device Manager** tab.
3. Click the "+" in front of the **SCSI and RAID Controllers** hardware type. The driver *Intel(R) 82801ER SATA RAID Controller* should appear.

Installation of Intel Application Accelerator RAID Edition

The Intel Application Accelerator RAID Edition driver may be used to operate the hard drive from which the system is booting or a hard drive that contains important data. For this reason, you cannot remove or un-install this driver from the system after installation; however, you will have the ability to un-install all other non-driver components. The following non-driver components can be un-installed:

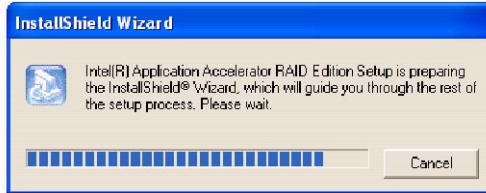
- Intel Application Accelerator RAID Edition utility
- Help documentation
- Start menu shortcuts and system tray icon service
- RAID Monitor service

Insert the MSI CD and click on the **Intel IAA RAID Edition** to install the software.

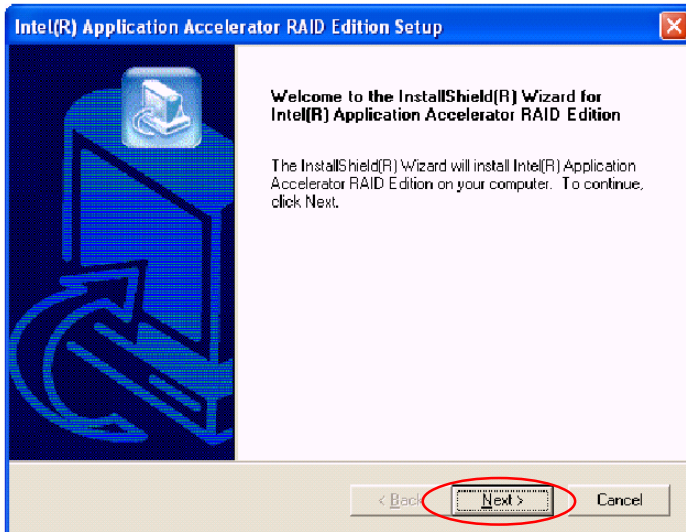


**Click the Intel IAA
RAID Edition**

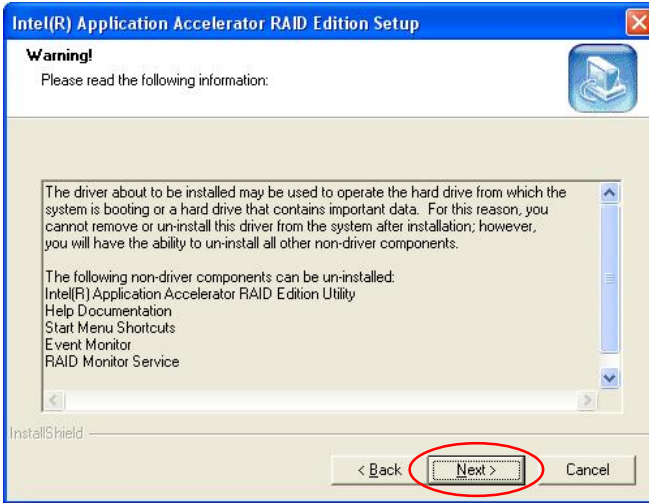
The **InstallShield Wizard** will begin automatically for installation showed as following:



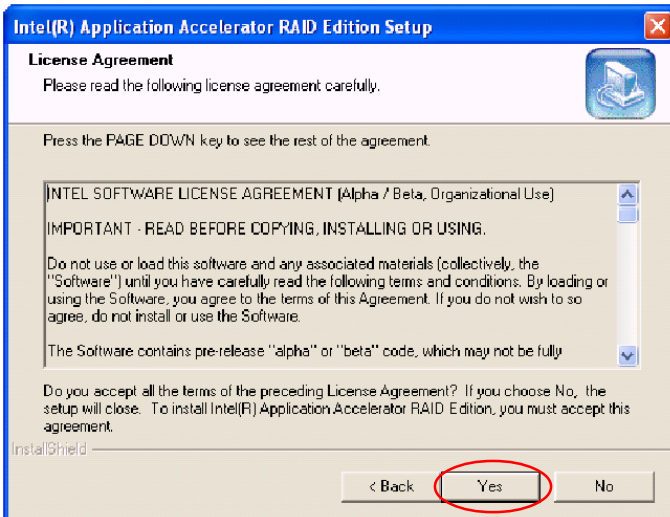
Click on the **Next** button to proceed the installation in the welcoming window.



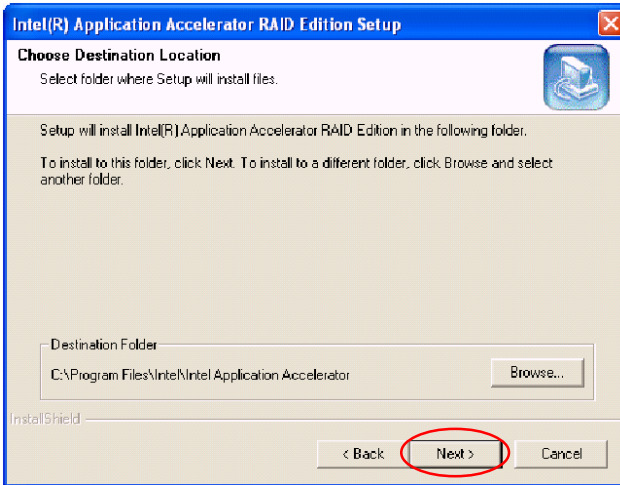
The window shows the components to be installed. Click **Next** button to continue.



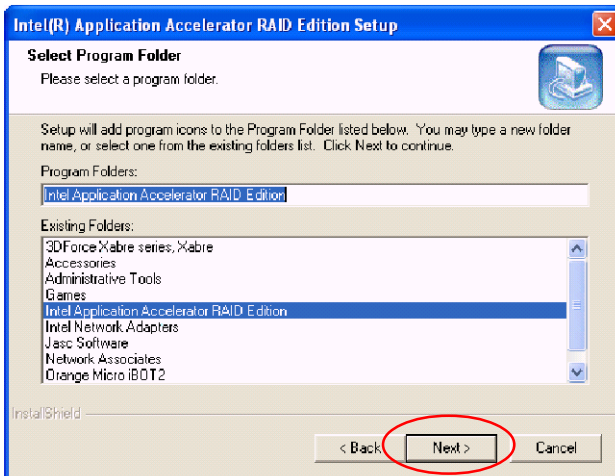
After reading the license agreement in the following window, click **Yes** button to continue.



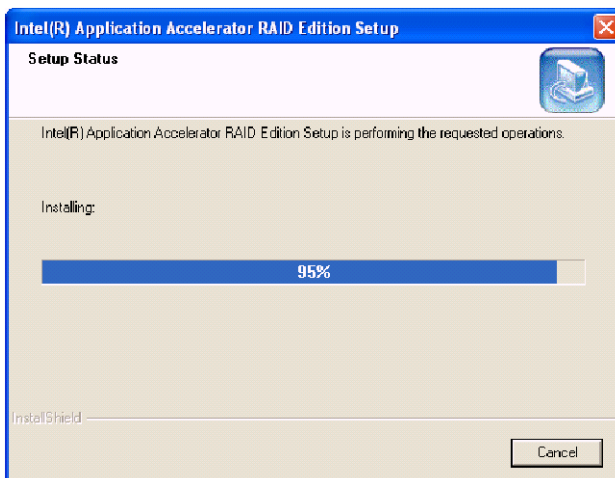
Select the folder in which you want the program to be installed in the following window, and click **Next** button to start installation.



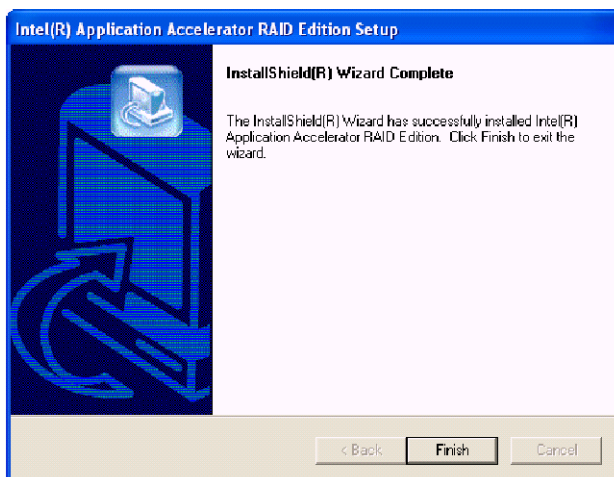
Select a program folder in the following window where you want Setup to add the program icon.



The following window appears to show the Intel Application Accelerator RAID Edition Setup installation status.



Once the installation is complete, the following window appears.



RAID Migration Instructions

The Intel Application Accelerator RAID Edition offers 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 the system. This process will create a new RAID volume from an existing disk. However, several important steps must be followed at the time the system is first configured in order to take advantage of RAID when upgrading to a second SATA hard drive:

1. BIOS must be configured for RAID before installing Windows* XP on the single SATA hard drive. Refer to Page B-5 **BIOS Configuration** for properly setting of the BIOS.
2. Install the Intel Application Accelerator RAID Driver during Windows Setup. Refer to Page B-13 **Installing Software** for instructions on installing the driver during Windows Setup.
3. Install the Intel Application Accelerator RAID Edition after the operating system is installed.

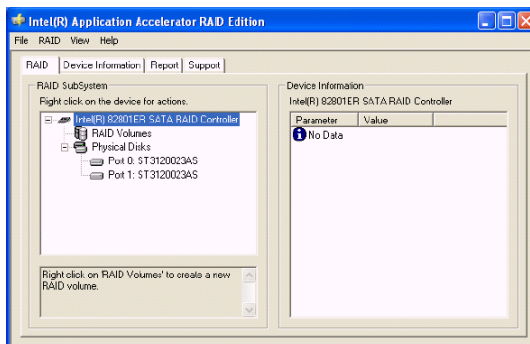
To create a volume from an existing disk, complete the following steps:



MSI Reminds You...

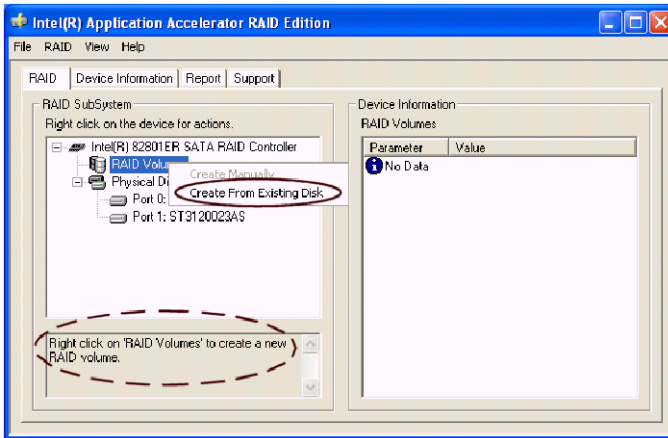
A Create from Existing Disk operation will delete all existing data from the added disk and the data cannot be recovered. It is critical to backup all important data on the added disk before proceeding. However, during the migration process, the data on the source disk is preserved.

After the Intel Application Accelerator RAID Edition has been successfully installed and the system has rebooted, click on the Intel Application Accelerator shortcut link and the following window will appear:



Create RAID Volume from Existing Disk

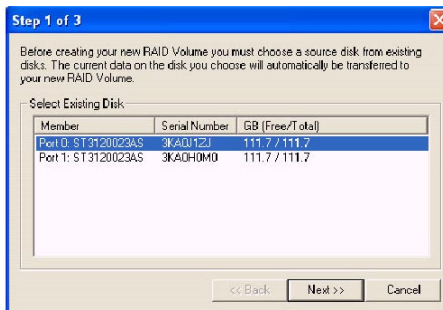
To create a RAID volume from an existing disk, right-mouse click on **RAID Volume** and select **Create From Existing Disk** to create a new RAID volume as the screen below. You may also use the **RAID** drop-down menu and click on **Create Volume from Existing Disk**.



(1) Step 1 of 3: Select the source disk

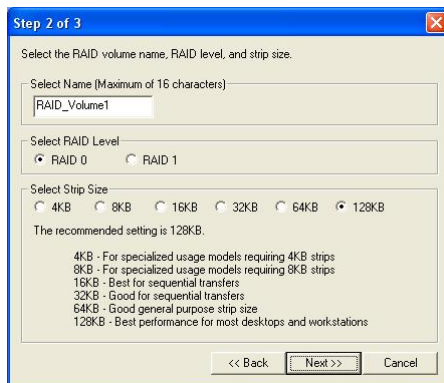
For Step 1, select the source disk that you wish to use and then click **Next**. It is very important to note which disk is the source disk (the one containing all of the information to be migrated) and which one is the target disk. On a RAID Ready system, this can be determined by making a note during POST of which port (e.g. Port 0 or Port 1) the single disk is attached to.

You can also use the Intel Application Accelerator RAID Edition utility before the second disk is installed to verify the Port and serial number of the drive that contains all the data.



(2) Step 2 of 3: Select the RAID Volume Name and Strip Size

In Step 2, select the RAID volume name and strip size, and click **Next**:



► **RAID Volume Name:**

A desired RAID volume name needs to be typed in where the 'RAID_Volume1' text currently appears above. The RAID volume name has a maximum limit of 16 characters. The RAID volume name must also be in English alphanumeric ASCII characters.

► **RAID Level:**

Select the desired RAID level:

RAID 0 (Performance) – A volume optimized for performance will allow you to access your data more quickly.

RAID 1 (Redundancy) – A volume optimized for data redundancy will provide you with a realtime duplicate copy of your data. Note: Only half of the available volume space will be available for data storage.

► **Strip Sizes:**

Select the desired strip size setting. As indicated, the optimal setting is 128KB. Selecting any other option may result in performance degradation. Even though 128KB is the recommended setting for most users, you should choose the strip size value which is best suited to your specific RAID usage model. The most typical strip size settings are:

4KB: For specialized usage models requiring 4KB strips

8KB: For specialized usage models requiring 8KB strips

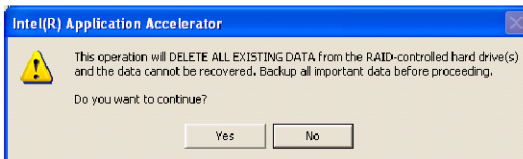
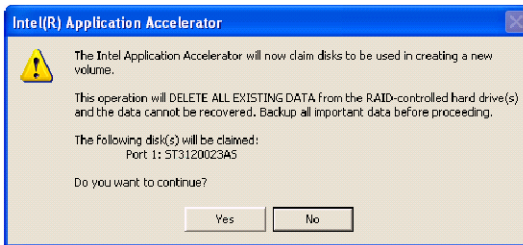
16KB: Best for sequential transfers

32KB: Good for sequential transfers

64KB: Good general purpose strip size

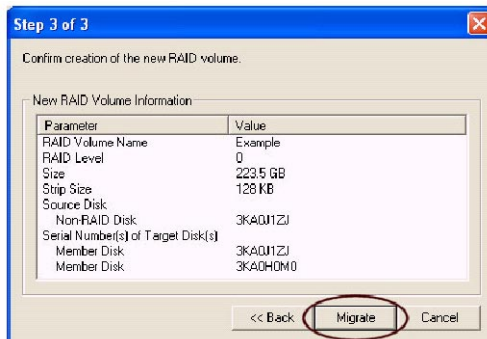
128KB: Best performance for most desktops and workstations

Before you continue to Step 3 of 3 by clicking **Next** in Step 2 of 3, read the next 2 dialogue boxes carefully. Please note that once you have selected **Migrate** on Step 3 of 3, the Intel Application Accelerator RAID Edition will have claimed the disks to be used in creating a new volume and this operation cannot be undone. It is critical that you backup all important data before selecting **Yes** to these dialogue boxes:



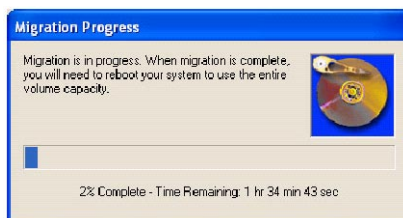
(2) Step 3 of 3: Confirm the creation of new RAID volume

In Step 3, confirm the creation of the new RAID volume and then click **Migrate**:

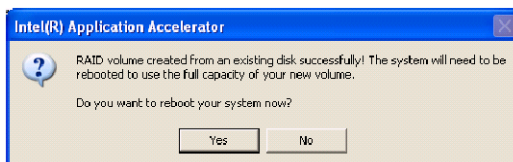


Migration Process

The migration process may take up to two hours to complete depending on the size of the disks being used and the strip size selected. A dialog window will appear stating that the migration process may take considerable time to complete and you must click **Yes** in order to start the migration. While you can still continue using your computer during the migration process, once the migration process starts, it cannot be stopped. If the migration process gets interrupted and your system is rebooted for any reason, it will pick up the migration process where it left off. You will be provided with an estimated completion time (the remaining time will depend on your system) once the migration process starts as illustrated in the following example:



The following screen appears if the migration process is completed successfully. Then you have to reboot your system to use the full capacity of the new volume.



Appendix C: VIA VT6420 Serial ATA RAID Introduction

VIA VT6420 provides a hybrid solution that combines two independent SATA ports for support of up to two Serial ATA (Serial ATA RAID) drives.

Serial ATA (SATA) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds of up to 150MB/sec. Serial ATA uses long, thin cables, making it easier to connect your drive and improving the airflow inside your PC.

The key features of VT6420 SATA RAID are:

1. Support two SATA + two PATA.
2. Only SATA supports RAID.
3. Supports ATA 133 high performance hard disk drive.
4. Supports hard disk drive larger than 137 GB (48-bits LBA).
5. Dual independent ATA channels and maximum connection of four hard disk drives allowed.
6. Supports Ultra DMA mode 6/5/4/3/2/1/0, DMA mode 2/1/0, and PIO mode 4/3/2/1/0.
7. Supports PCI Plug and Play. PCI interrupt sharing and coexists with mainboard IDE controller.
8. Supports IDE bus master operation.
9. Supports RAID 0, 1, and JBOD.
10. 4 KB to 64 KB striping block size support.
11. Bootable disk or disk array support.
12. Windows-based RAID configure and management software tool. (Compatible with BIOS)
13. Real-time monitoring of device status and error alarm with popup message box and beeping.
14. Supports hot-swap failed disk drive in RAID 1 array.
15. Mirroring automatic background rebuilds support.
16. ATA SMART function support.
17. Microsoft Windows 98, Me, NT4.0, 2000, XP operating systems support.
18. Event log for easy troubleshooting.
19. On-line help for easy operation for RAID software.

Introduction

This section gives a brief introduction on the RAID-related background knowledge and a brief introduction on VIA SATA RAID Host Controller. For users wishing to install their VIA SATA RAID driver and RAID software, proceed to **Driver and RAID Software Installation** section.

RAID Basics

RAID (Redundant Array of Independent Disks) is a method of combining two or more hard disk drives into one logical unit. The advantage of an Array is to provide better performance or data fault tolerance. Fault tolerance is achieved through data redundant operation, where if one drives fails, a mirrored copy of the data can be found on another drive. This can prevent data loss if the operating system fails or hangs. The individual disk drives in an array are called “members”. The configuration information of each member is recorded in the “reserved sector” that identifies the drive as a member. All disk members in a formed disk array are recognized as a single physical drive to the operating system.

Hard disk drives can be combined together through a few different methods. The different methods are referred to as different RAID levels. Different RAID levels represent different performance levels, security levels and implementation costs. The RAID levels which the VIA VT6420 SATA RAID Host Controller supports are RAID 0 and RAID 1. The table below briefly introduced these RAID levels.

RAID Level	No. of Drives	Capacity	Benefits
RAID 0 (Striping)	2	Number drives * Smallest size	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection
JBOD (Spanning)	2	Sum of all drives	No data protection and performance improving, but disk capacity is fully used.

RAID 0 (Striping)

RAID 0 reads and writes sectors of data interleaved between 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 64KB. RAID 0 does not support fault tolerance.

RAID 1 (Mirroring)

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.

JBOD (Spanning)

A spanning disk array is equal to the sum of the all drives when the drives used are having different capacities. Spanning stores data onto a drive until it is full, then proceeds to store files onto the next drive in the array. When any disk member fails, the failure affects the entire array. JBOD is not really a RAID and does not support fault tolerance.

BIOS Configuration

When the system powers on during the POST (Power-On Self Test) process, press <Tab> key to enter the BIOS configuration.

```
VIA Technologies, Inc. VIA V16420 RAID BIOS Setting Utility V1.10
Copyright (C) VIA Technologies, Inc. All Right reserved.

Press < Tab > key into User Window!
Scan Devices, Please wait...
Channel 0 Master: Maxtor 34098H4
Channel 1 Master: Maxtor 34098H4
```

The Serial ATA RAID volume may be configured using the VIA Tech. RAID BIOS. Always use the arrow keys to navigate the main menu, use up and down arrow key to select the each item and press <Enter> to call out the list of creation steps. The main interface of BIOS configuration utility is as below:

```
VIA Tech. RAID BIOS Ver V1.10
```

<pre>▶ Create Array ▶ Delete Array ▶ Create/Delete Spare ▶ Select Boot Array ▶ Serial Number View</pre>	<pre>Create a RAID array with the hard disks attached to VIA IDE controller F1 : View Array/disk Status ↑,↓ : Move to next item Enter: Confirm the selection ESC : Exit</pre>				
Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel0 Master	Maxtor 34098H4		ATA 133	37.27	Hdd
Channel1 Master	Maxtor 34098H4		ATA 133	37.27	Hdd

Create Disk Array

Use the up and down arrow keys to select the **Create Array** command and press <Enter>.



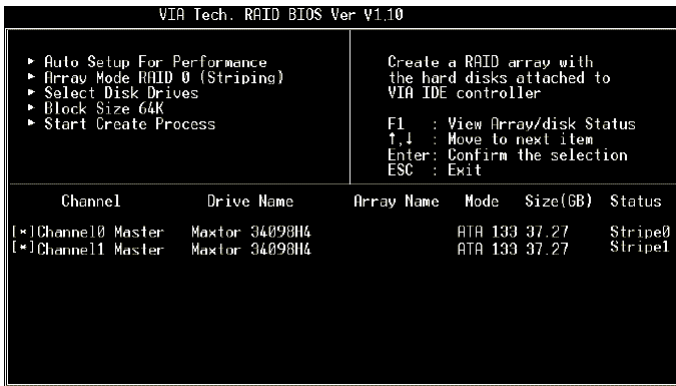
MSI Reminds You...

The “Channel”, “Drive Name”, “Mode” and “Size (GB)” in the following example might be different from your system.

Select **Array Mode** and press <Enter>, a list of array modes will appear. Highlight the target array mode that you want to create, and press <Enter> to confirm the selection. If RAID 1 or RAID 0/1 is selected, an option list will popup and enable the users to select **Create only** or **Create and duplicate**. **Create only** will allow BIOS to only create an array. The data on the mirroring drive may be different from the source drive. **Create and duplicate** lets BIOS copy the data from the source to the mirroring drive.



After array mode is selected, there are two methods to create a disk array. One method is “**Auto Setup**” and the other one is “**Select Disk Drives**”. **Auto Setup** allows BIOS to select the disk drives and create arrays automatically, but it does not duplicate the mirroring drives even if the user selected **Create and duplicate** for RAID 1. It is recommended all disk drives are new ones when wanting to create an array. **Select Disk Drives** lets the user select the array drives by their requirements. When using **Select Disk Drives**, the channel column will be activated. Highlight the target drives that you want to use and press <Enter> to select them. After all drives have been selected, press <Esc> to go back to the creation steps menu.



If user selects a RAID 0 array in step 2, the block size of the array can also be selected. Use the arrow key to highlight **Block Size** and press <Enter>, then select a block size from the popup menu. The block size can be 4KB to 64KB.





MSI Reminds You...

Even though 64KB is the recommended setting for most users, you should choose the block size value which is best suited to your specific RAID usage model.

4KB: *For specialized usage models requiring 4KB blocks*

8KB: *For specialized usage models requiring 8KB blocks*

16KB: *Best for sequential transfers*

32KB: *Good for sequential transfers*

64KB: *Optimal setting*

Use the arrow key to highlight **Start Create Process** and press <Enter>. A warning message will appear, Press **Y** to finish the creation, or press **N** to cancel the creation.

Important note: All existing content in the hard drive will be destroyed after array creation.

Delete Disk Array

A RAID can be deleted after it has been created. To delete a RAID, use the following steps:

1. Select **Delete Array** in the main menu and press <Enter>. The channel column will be activated.
2. Select the member of an array that is to be deleted and press <Enter>. A warning message will show up, press Y to delete or press N to cancel.

```
VIA Tech. RAID BIOS Ver V1.10
```

<pre>▶ Create Array ▶ Delete Array ▶ Create/Delete Spare ▶ Select Boot Array ▶ Serial Number View The selected array will be destroyed. Are you sure? Continue? Press Y/N</pre>	<pre>Delete a RAID array contain the hard disks attached to VIA IDE controller F1 : View Array/disk Status ↑,↓ : Move to next item Enter: Confirm the selection ESC : Exit</pre>				
Channel	Drive Name	Array Name	Mode	Size(GB)	Status
1* Channel0 Master	Maxtor 34098H4	ARRAY 0	ATA 133 37.27	Stripe0	
1* Channel1 Master	Maxtor 34098H4	ARRAY 0	ATA 133 37.27	Stripe1	

Deleting a disk array will destroy all the data on the disk array except RAID 1 arrays. When a RAID is deleted, the data on these two hard disk drives will be reserved and become two normal disk drives.

Create and Delete Spare Hard Drive

If a RAID 1 array is created and there are drives that do not belong to other arrays, the one that has a capacity which is equal to or greater than the array capacity can be selected as a spare drive for the RAID 1 array. Select **Create/Delete Spare** and press <Enter>, the channel column will then be activated. Select the drive that you want to use as a spare drive and press <Enter>, the selected drive will be marked as **Spare**. The spare drive cannot be accessed in an OS.

To delete a spare drive, highlight **Create/Delete Spare** and press <Enter>. The spare drive will be highlighted, press <Enter> to delete the spare drive.



Select Boot Array

User can select a disk array as boot device if user wants to boot operating system from an array. Boot disk array cannot be selected if the operating system does not boot from the disk array. Highlight the **Select Boot Array** item; press <Enter> and the channel column will be activated. Then highlight the target disk array and press <Enter>. If user selects a disk array that has a boot mark and press <Enter>, its boot setting will be canceled.

VIA Tech. RAID BIOS V1.10						
▶ Create Array ▶ Delete Array ▶ Create/Delete Spare ▶ Select Boot Array ▶ Serial Number View			Set/Clear bootable array			
			F1 : View Array/disk Status ↑,↓ : Move to next item Enter : Confirm the selection ESC : Exit			
Channel	Drive Name	Array Name	Mode	Size(GB)	Status	
[*] Channel0 Master	Maxtor 34098H4	ARRAY 0	ATA	133 37.27	Boot	
[] Channel0 Slave	Maxtor 34098H4	ARRAY 1	ATA	133 37.27	Source	
[*] Channel1 Master	Maxtor 34098H4	ARRAY 0	ATA	133 37.27	Boot	
[] Channel1 Slave	Maxtor 34098H4	ARRAY 1	ATA	133 37.27	Mirror	

View Serial Number of Hard Drive

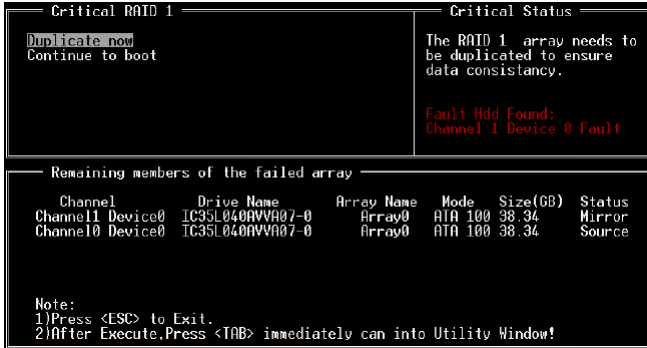
Highlight **Serial Number View** and press <Enter>. Use arrow key to select a drive, the selected drive's serial number can be viewed in the last column. The serial number is assigned by the disk drive manufacturer.

Press the **F1** key to show the array status on the lower screen. If there are no disk arrays then nothing will be displayed on the screen.



Duplicate Critical RAID 1 Array

When booting up the system, BIOS will detect if the RAID 1 array has any inconsistencies between user data and backup data. If BIOS detects any inconsistencies, the status of the disk array will be marked as critical, and BIOS will prompt the user to duplicate the RAID 1 in order to ensure the backup data consistency with the user data.



If user selects **Continue to boot**, it will enable duplicating the array after booting into OS.

Rebuild Broken RAID 1 Array

When booting up the system, BIOS will detect if any member disk drives of RAID has failed or is absent. If BIOS detects any disk drive failures or missing disk drives, the status of the array will be marked as broken.

If BIOS detects a broken RAID 1 array but there is a spare hard drive available for rebuilding the broken array, the spare hard drive will automatically become the mirroring drive. BIOS will show a main interface just like a duplicated RAID 1. Selecting **Continue to boot** enables the user to duplicate the array after booting into operating system.

If BIOS detects a broken RAID 1 array but there is no spare hard drive available for rebuilding the array, BIOS will provide several operations to solve such problem.



1. Power off and Check the Failed Drive:

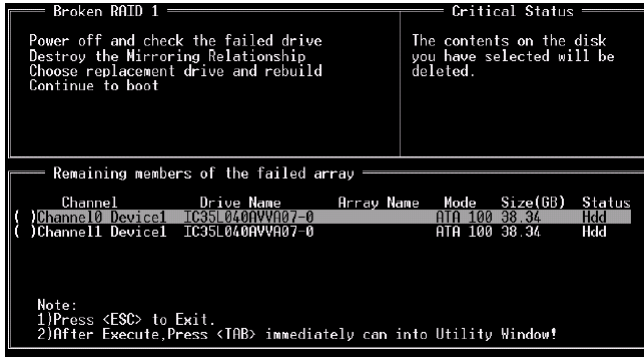
This item turns off the computer and replaces the failed hard drive with a good one. If your computer does not support APM, you must turn off your computer manually. After replacing the hard drive, boot into BIOS and select **Choose replacement drive and rebuild** to rebuild the broken array.

2. Destroy the Mirroring Relationship:

This item cancels the data mirroring relationship of the broken array. For broken RAID 1 arrays, the data on the surviving disk will remain after the destroy operation. However, **Destroy the Mirroring Relationship** is not recommend because the data on the remaining disk will be lost when the hard drive is used to create another RAID 1 array.

3. Choose Replacement Drive and Rebuild:

This item enables users to select an already-connected hard drive to rebuild the broken array. After choosing a hard drive, the channel column will be activated.



Highlight the target hard drive and press <Enter>, a warning message will appear. Press **Y** to use that hard drive to rebuild, or press **N** to cancel. Please note selecting option **Y** will destroy all the data on the selected hard drive.

4. Continue to boot:

This item enables BIOS to skip the problem and continue booting into OS.

Installing RAID Software & Drivers

Install Driver in Windows OS

► New Windows OS (2000/XP/NT4) Installation

The following details the installation of the drivers while installing Windows XP.

1. Start the installation:

Boot from the CD-ROM. Press **F6** when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.

2. When the Windows Setup window is generated, press **S** to specify an Additional Device(s).

3. Insert the driver diskette *VIA VT6420/VT8237 Disk Driver* into drive A: and press <Enter>.

4. Depending on your operation system, choose *VIA Serial ATA RAID Controller(Windows XP)*, *VIA Serial ATA RAID Controller(Windows 2000)* or *VIA Serial ATA RAID Controller(Windows NT4)* from the list that appears on Windows XP Setup screen, press the <Enter> key.

5. Press <Enter> to continue with installation or if you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, press <Enter> to continue with installation.

6. From the Windows XP Setup screen, press the <Enter> key. Setup will now load all device files and then continue the Windows XP installation

► Existing Windows XP Driver Installation

1. Insert the MSI CD into the CD-ROM drive.
2. The CD will auto-run and the setup screen will appear.
3. Under the Driver tab, click on *VIA SATA RAID Utility*.
4. The drivers will be automatically installed.

► Confirming Windows XP Driver Installation

1. From Windows XP, open the **Control Panel** from **My Computer** followed by the System icon.

2. Choose the **Hardware** tab, then click the **Device Manager** tab.

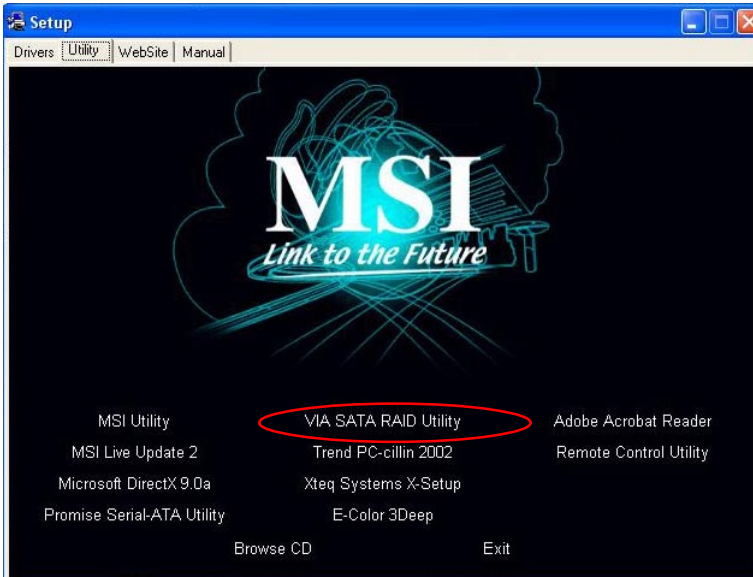
3. Click the "+" in front of the **SCSI and RAID Controllers** hardware type. The driver *VIA IDE RAID Host Controller* should appear.

Installation of VIA SATA RAID Utility

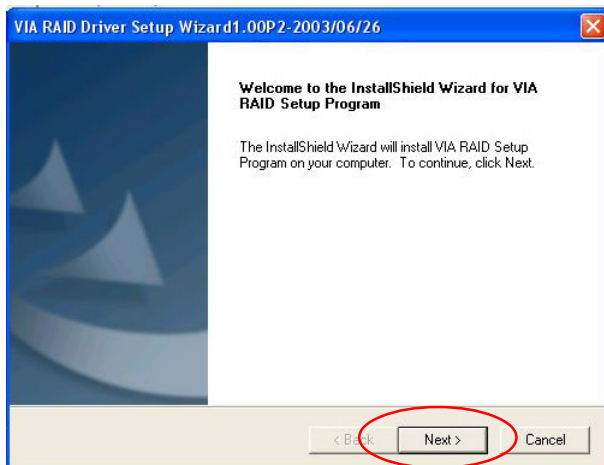
The VIA SATA RAID Utility is the software package that enables high-performance RAID 0 arrays in the Windows* XP operating system. This version of VIA SATA RAID Utility contains the following key features:

- Serial ATA RAID driver for Windows XP
- VIA SATA RAID utility
- RAID0 and RAID1 functions

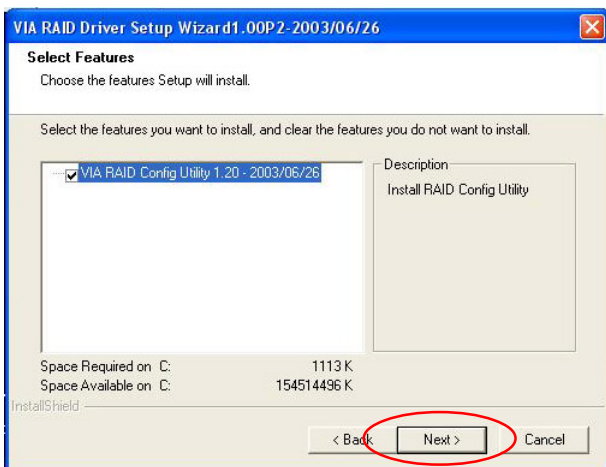
Insert the MSI CD and click on the **VIA SATA RAID Utility** to install the software.



The **InstallShield Wizard** will begin automatically for installation. Click on the **Next** button to proceed the installation in the welcoming window.

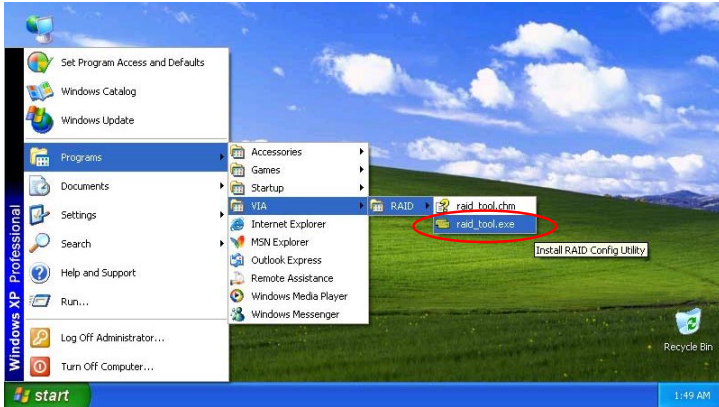



Put a check mark in the check box to install the feature you want. Then click **Next** button to proceed the installation.



Using VIA RAID Tool

Once the installation is complete, go to **Start** ----> **Programs** ----> **VIA** --> **raid_tool.exe** to enable **VIA RAID Tool**.





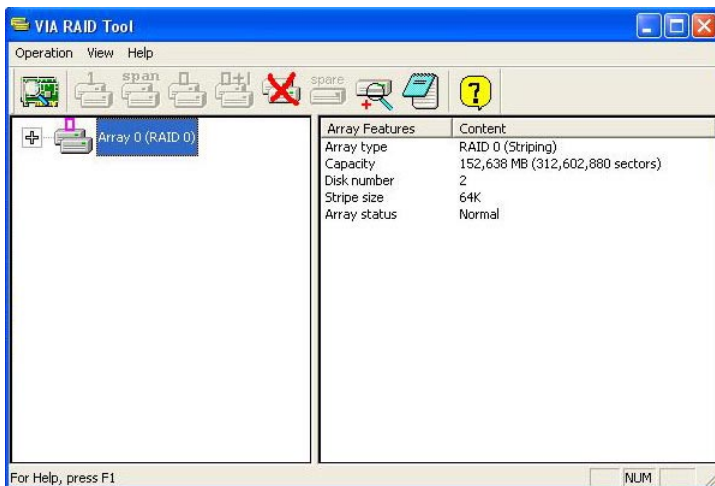
After the software is finished installation, it will automatically started every time Windows is initiated. You may double-click on the  icon shown in the system tray of the tool bar to launch the **VIA RAID Tool** utility.



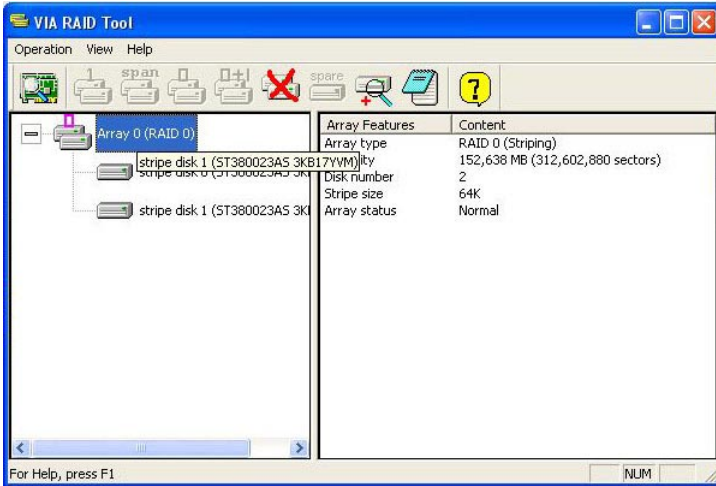
The main interface is divided into two windows and the toolbar above contain the main functions. Click on these toolbar buttons to execute their specific functions. The left windowpane displays the controller and disk drives and the right windowpane displays the details of the controller or disk drives. In this model, the available features are as following:



-  View by Controller
-  View by Devices
-  View Event log
-  Help Topics

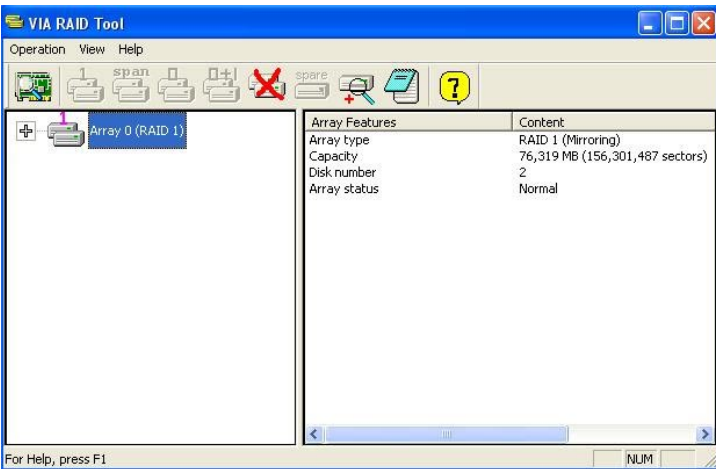
Click on  or  button to determine the viewing type of left window pane. There are two viewing types: By controllers and by device. Click on the object in the left window pane to display the status of the object in the right windowpane. The following screen shows the status of Array 0---RAID 0.



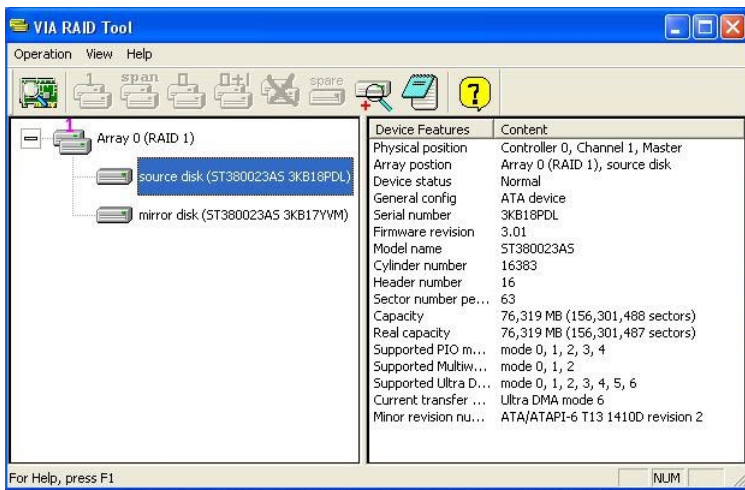
Click on the plus (+) symbol next to Array 0---RAID 0 to see the details of each disk.



You may also use the same  or  button to view the statuses of Array 0---RAID 1.



Click on the plus (+) symbol next to Array 0---RAID 1 to see the details of each disk.



Appendix D: The explanation for overspecification and overclocking on Intel® 865PE chipset

The default specification of Intel® 865PE chipset is only able to support FSB 400/533MHz CPU and DDR 266/333/400 DRAM technology. However, we have spent engineering efforts to allow the overspecification and overclocking of 865PE Neo2-P under certain conditions. Here is the information which could help you to achieve overclocking more easily.

Should you decide to overspec the mainboard, the following conditions shall be satisfied in order to make overspecification possible.

1. Memory Speed/CPU FSB Overclocking Support Matrix

Memory \ FSB	DDR266	DDR333	DDR400	DDR433	DDR466	DDR500	DDR533
FSB400	OK	N/A	N/A	N/A	N/A	N/A	N/A
FSB533	OK	OK	N/A	N/A	N/A	N/A	N/A
FSB800	OK	OK	OK	OK *	OK *	OK *	OK*

*: Overclocking spec.

2. Configure BIOS settings

You also need to configure BIOS settings for overclocking.

- A. In the “Frequency/Voltage Control”, configure “Dynamic OverClocking” and “Performance Mode” to the settings you wish to overclock.
- B. In the “Frequency/Voltage Control”, configure “DRAM Frequency” to the setting you wish to overclock.

AMIBIOS NEW SETUP UTILITY - VERSION 3.31a		[Setup Help]
Frequency/Voltage Control		
Dynamic OverClocking	Private	Warning! Dynamic OverClocking is an advanced overclocking function. Any damage or risk resulted from inappropriety or overclocking are not guaranteed. Please make sure your peripherals can afford different settings.
Performance Mode	Slow	
CPU Ratio Selection	8.0x	
DRAM Frequency (Mhz)	Auto	
Spread Spectrum	Enabled	
Adjust CPU Bus Clock(Mhz)	100	
DDR Clock(Mhz)	8	
Adjust AGP/PCI Clock(Mhz)	66.66/33.33	
CPU Vcore Adjust	No	
CPU Voltage (V)	U	
DDR Power Voltage	U	
AGP Power Voltage	U	

- C If the frequency after overclocking is not stable, you may fine-tune the settings of ‘CPU Voltage’ and ‘DDR Power Voltage’ by adjusting to a higher value.



MSI Reminds You...

*Please refer to p. 3-28 **Frequency/Voltage Control** for the details of BIOS settings.*

3. System configuration and DDR 400/PC 3200 Qualified Memory Test List

When using DDR400 memory modules, a maximum of 2 DIMMs are recommended. Please refer to the system configuration and DDR400/PC3200 DIMMs listed below for overclocking.

Table 1: System Configuration

System Configuration			
	Manufacturer	Model No.	Spec.
Device Configuration	Processor	Intel	P4 2.6GHz
	Memory	As Follows	
	VGA Card	MSI	MS-8894 v120
	Lan Card	Onboard	
	Sound Card	Onboard	
	Hard Drive	IBM	Deskstar 1C35L040AVVN07-0
	CD-ROM	MSI	MS-8235M
	Floppy Drive	Teac	FD-235HF
	Power Supply	Delta	DPS-300KB-1A
	Mouse	Logitech	PS2
	Keyboard	BTC	5198 PS2
	Monitor	ViewSonic	PS775 17"
SW Info	VGA BIOS	4.28.20.05.11	
	VGA Driver	4.5.2.3	

Table 2: DDR433/466/500 Memory Test List

Model	Mem. Size	DDR	Memory Slot		Memory Bandwidth Benchmark	R.S.T	
			1	3			
TwinMOS	M2GH108AKATTIF083S9TD	256MB	433	√	√	OK	OK
Kingston	KHX3500/256	256MB	433	√	√	OK	OK
OCZ	OCZ433256EL	256MB	433	√	√	OK	OK
GeIL	GD3500-512DC	256MB	433	√	√	OK	OK
Kingston	KHX3500/512	512MB	433	√	√	OK	OK
ADATA	MD0ADHF3G31JB1FC2	256MB	450	√	√	OK	OK
TwinMOS	M2GG108AFATTGF0811DDT	256MB	466	√	√	OK	OK
OCZ	OCE466256P	256MB	466	√	√	OK	OK
GeIL	GL2563700P	256MB	466	√	√	OK	OK
GeIL	GD3700-512DC	256MB	466	√	√	OK	OK
Transcend	TS32MLD64V2F	256MB	466	√	√	OK	OK
CORSAIR	CMX512-3700 XMS3700	512MB	466	√	√	OK	OK
Transcend	TS64MLD64V2F	512MB	466	√	√	OK	OK
Kingston	KHX4000/256	256MB	500	√	√	OK	OK
ADATA	MD0HY6F3G31WB1EZZ	256MB	500	√	√	OK	OK
ADATA	MD0ADBF3G31YB1GZH	256MB	500	√	√	OK	OK
GeIL	GL5124000DC	256MB	500	√	√	OK	OK
GeIL	GD4000-512DC	256MB	500	√	√	OK	OK
Transcend	TS32MLD64V5F	256MB	500	√	√	OK	OK
TwinMOS	M2GH108AKATTHF083S9DT	256MB	500	√	√	OK	OK
OCZ	High Performance Gold	256MB	500	√	√	OK	OK
Kingston	KHX4000/512	512MB	500	√	√	OK	OK
ADATA	MD0ADBF3H41YB1GZH	512MB	500	√	√	OK	OK
GeIL	GL1GB4000DC	512MB	500	√	√	OK	OK
Transcend	TS64MLD64V5F	512MB	500	√	√	OK	OK
OCZ	High Performance Premier Series	256MB	533	√		OK	OK
GeIL	MGL16UL6464D2TG35-KD	256MB	533	√	√	OK	OK