MSI

PT880 Neo (V2.0)

MS-7043 (v1.X) ATX Mainboard

English Version
G52-M7043X5

$C\epsilon$ **N1996**

FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A 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.

Micro-Star International
MS-7043

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Copyright Notice

The material in this document is the intellectual property of **MICRO-STAR INTERNATIONAL**. We take every care in the preparation of this document, but no guarantee is given as to the correctness of its contents. Our products are under continual improvement and we reserve the right to make changes without notice.

Trademarks

All trademarks are the properties of their respective owners.

Intel® and Pentium® are registered trademarks of Intel Corporation.
PS/2 and OS®/2 are registered trademarks of International Business Machines Corporation.
Windows® 95/98/2000/2003/NT/XP are registered trademarks of Microsoft Corporation.
Netware® is a registered trademark of Novell, Inc.
Award® is a registered trademark of Phoenix Technologies Ltd.
AMI® is a registered trademark of American Megatrends Inc.

Revision History

Revision	Revision History	Date
V1.2	First release for PT880 Neo (V2.0)	April 2004

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

 Visit the MSI website for FAQ, technical guide, BIOS updates, driver updates, and other information: ***http://www.msi.com.tw/program/service/faq/ faq/esc_faq_list.php***

 Contact our technical staff at: ***support@msi.com.tw***

iii

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 60^0C (140^0F), 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.

iv

CONTENTS

1

Getting Started

Thank you for choosing the PT880 Neo (V2.0) (MS-7043) v1.X ATX mainboard. The PT880 Neo (V2.0) is a superior computer mainboard based on **VIA® PT880 Northbridge** & **VT8237 Southbridge** for optimal system efficiency. Designed to fit the advanced **Intel® Pentium® 4** processors in 478-pin package, the PT880 Neo (V2.0) delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU
⑥ Supports Intel® P4 Northwood/Prescott (Socket 478) processors
⑥ FSB 400 (for Northwood only), 533, 800MHz
⑥ Supports up to 3.4GHz or higher speed (Please refer to the latest online news at *http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php*)

Chipset
⑥ VIA® PT880 chipset
   - Supports FSB 800/533/400MHz
   - Supports AGP 8X interface
   - Supports DDR 400/333/266 memory interface

⑥ VIA® VT8237 chipset
   - High Bandwidth V-link Client controller
   - Integrated Faster Ethernet LPC
   - Integrated Hardware Sound Blaster/Direct Sound AC97 audio
   - Ultra DMA 66/100/133 master mode PCI EIDE controller
   - ACPI
   - Supports Serial ATA
   - Supports USB2.0

Main Memory
⑥ Supports six memory banks using three 184-pin DDR DIMMs
⑥ Supports *dual-channel* memory
⑥ Supports a maximum memory size up to 3GB
⑥ Supports 2.5v DDR SDRAM DIMM

Slots
⑥ One AGP (Accelerated Graphics Port) slot supports 8x/4x at 0.8V (AGP 3.0) or 4x at 1.5V (3.3V not supported)
⑥ Five 32-bit Master PCI bus slots (support 3.3v/5v PCI bus interface)

Onboard IDE
⑥ An IDE controller integrated in the VIA® VT8237 chipset
   - Supports IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA 66/100/133 operation modes
   - Can connect up to four Ultra ATA drives

Onboard Serial ATA
⑥ Serial ATA/150 controller integrated in the VIA® VT8237 chipset
   - Up to 150MB/sec transfer rate
   - Can connect up to two Serial ATA drives

On-Board Peripherals
⑥ On-Board Peripherals include:
- 1 floppy port supports 2 FDDs with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
- 1 serial port (COM A)
- 1 parallel port supports SPP/EPP/ECP mode
- 8 USB 2.0 ports (Rear x 4 / Front x 4)
- 1 RJ45 LAN jack
- 1 D-Bracket2 pinheader (Optional)
- 1 S-Bracket pinheader (Optional)
- 1 Line-In / Line-Out /Mic
- 1 Coaxial SPDIF out (Optional)

Audio
⑥ AC97 link controller integrated in VT8237
⑥ VIA® VT1617 6-channel audio codec
- Compliance with AC97 v2.2 Spec
- Meets PC2001 audio performance requirement

LAN
⑥ VIA® VT6122 Gigabit LAN controller

BIOS
⑥ The mainboard BIOS provides "Plug & Play" BIOS which detects the peripheral devices and expansion cards of the board automatically
⑥ The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications

Dimension
⑥ ATX Form Factor: 30.5cm x 20.4cm

Mounting
⑥ 6 standard mounting holes

Mainboard Layout
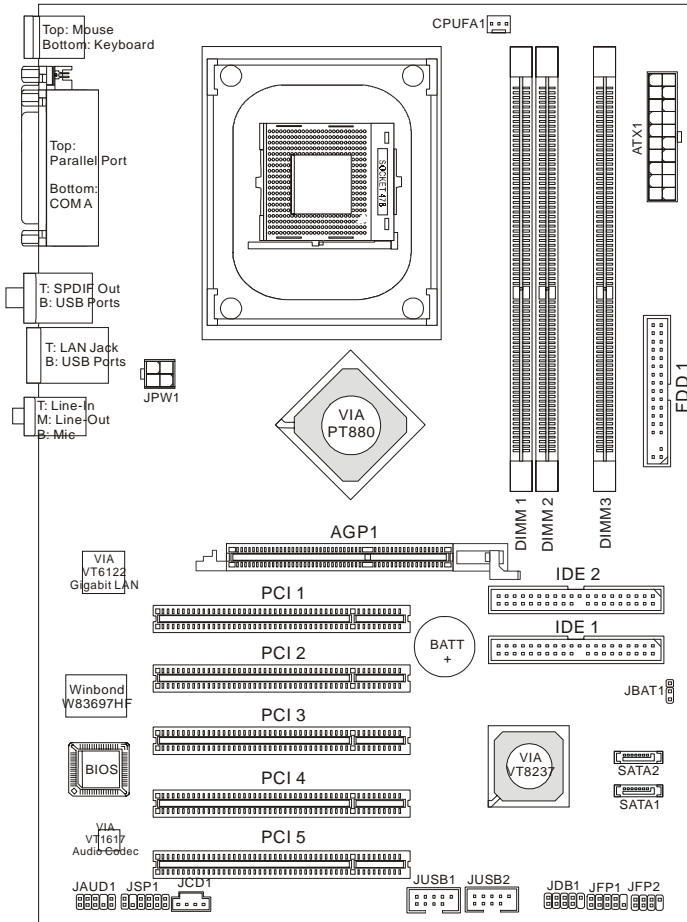
PT880 Neo (V2.0) (MS-7043 v1.X) ATX Mainboard

MSI Special Features

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 ATA133 connector: yellow
 ⊚ Serial ATA150 connector: orange
 ⊚ AGP 8X slot: red
 ⊚ 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.
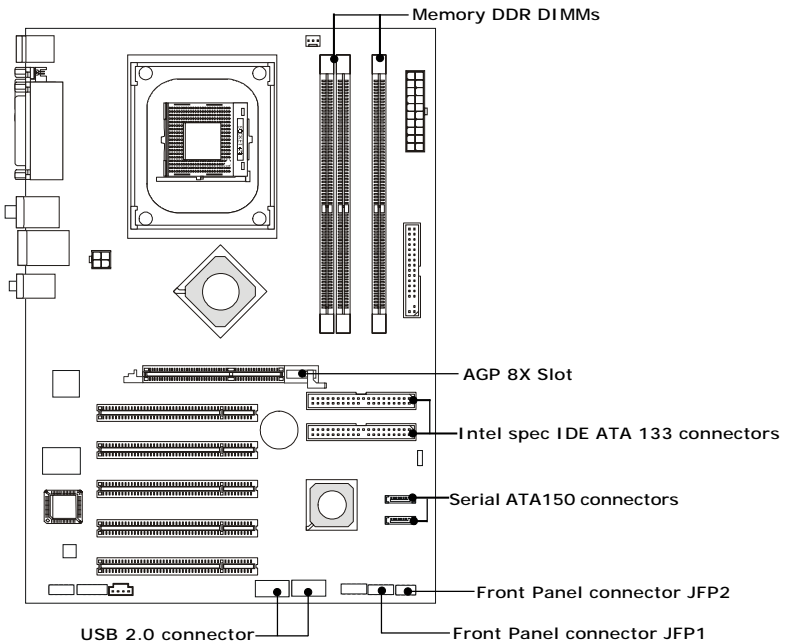
CoreCenter

CoreCenter™- 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 **Low speed** to **High 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.
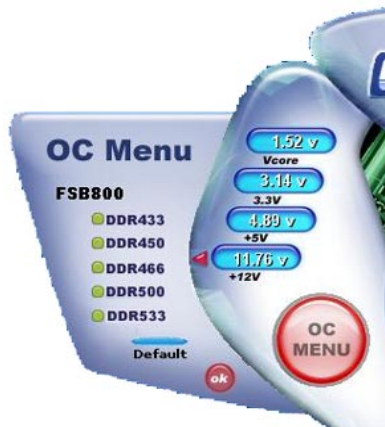
Core CellTM Chip

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.
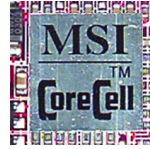
Features of CoreCell™

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.
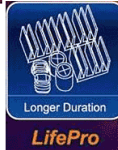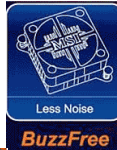
LifePro
-- Prolongs motherboard, CPU and fan life.
-- Maintains motherboard & CPU in constant temperature.
-- Prevents components from operating beyond
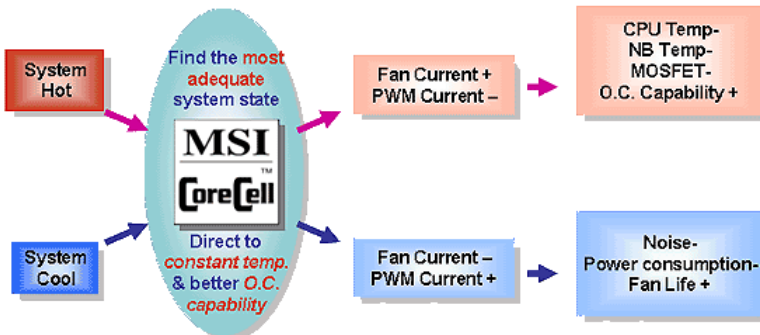
Round Cable (Optional)

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 to the system connectors on the mainboard.

Connect to the master drive.

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

Connect to the slave drive.
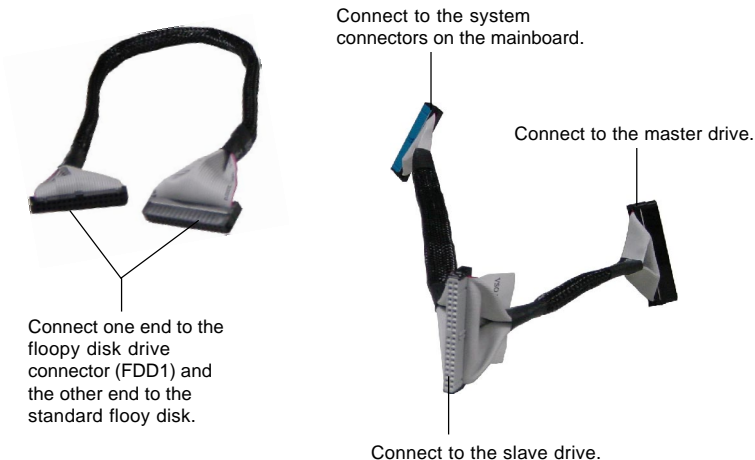
CPU Thermal Protection

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 resume normal. With this unique feature, users can better protect their CPU. Please note that this feature is for Intel® Pentium CPU only.

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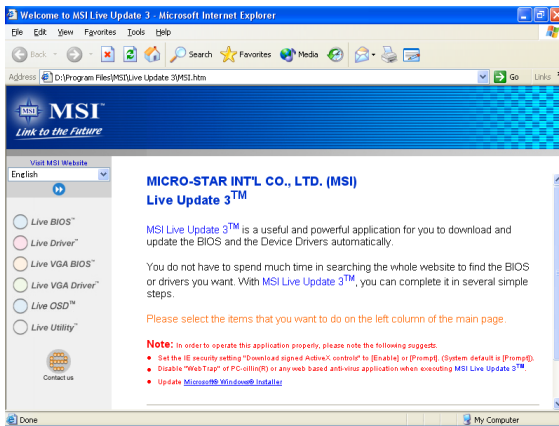
Five buttons are placed on the left column of the screen. Click the desired button to start the update process.

- ✂ **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.

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 [icon] PM 07:39 at the lower-right corner of the taskbar.
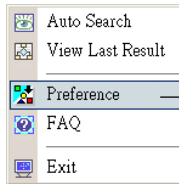
Select **Preference**

● **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.

If Preference is selected, you can specify how often the system will automatically search for the BIOS/drivers version, or change the LAN settings right from the MSI Live Monitor [Preference] dialog box .
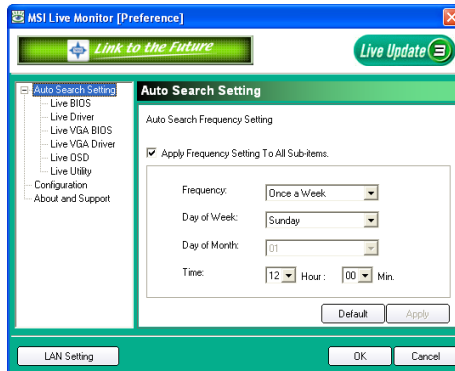
D-Bracket™ 2 (Optional)

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.

D-Bracket™ 2

● **Red**   ○ **Green**

D-Bracket™ 2	Description
1 ●● 2 3 ●● 4	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
1 ● ○ 2 3 ○ ● 4	**Processor Initialization** - This will show information regarding the processor (like brand name, system bus, etc...)
○ ○ ○ ●	Testing RTC (Real Time Clock)
● ● ● ○	**Initializing Video Interface** - This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter.
○ ● ● ○	**BIOS Sign On** - This will start showing information about logo, processor brand name, etc...
● ○ ● ○	**Testing Base and Extended Memory** - Teting base memory from 240K to 640K and extended memory above 1MB using various patterns.
○ ○ ● ○	Assign Resources to all ISA.
● ● ○ ○	**Initializing Hard Drive Controller** - This will initialize IDE drive and controller.
○ ● ○ ○	**Initializing Floppy Drive Controller** - This will initialize Floppy Drive and controller.
● ○ ○ ○	**Boot Attempt** - This will set low stack and boot via INT 19h.
○ ○ ○ ○	Operating System Booting

S-Bracket (Optional)

S-Bracket is a bracket which provides 2 SPDIF jacks for digital audio transmission and 2 analog Line-Out connectors for additional 4-channel analog audio output. With the S-Bracket, your system will be able to perform 6-channel audio operation for wonderful surround sound effect, or connect to Sony & Philips Digital Interface (SPDIF) speakers for audio transmission with better quality.

The S-Bracket offers two types of SPDIF connectors: one for optical fiber and the other for coaxial connection. Select the appropriate one to meet your own need. For more information on S-Bracket, refer to *Appendix A: Using 4- or 6-Channel Audio Function*.

S-Bracket

SPDIF jack (coaxial)

SPDIF jack (optical)

Analog Line-Out jacks
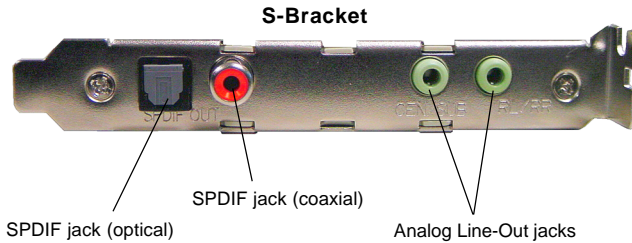
2

Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

Quick Components Guide

CPUFA1, *p.2-13*

CPU, *p.2-3*

DIMM1~3, *p.2-7*

JPW1, *p.2-9*

Back Panel I/O, *p.2-10*

ATX1, *p.2-9*

FDD1, *p.2-11*

AGP1, *p.2-19*

IDE2/1, *p.2-11*

PCI 1~5, *p.2-19*

JBAT1, *p.2-18*

SATA2/1, *p.2-12*

JFP1/2, *p.2-14*

JAUD1, *p.2-13*

JCD1, *p.2-15*

JDB1, *p.2-15*

JSP1, *p.2-16*

JUSB1/2, *p.2-17*
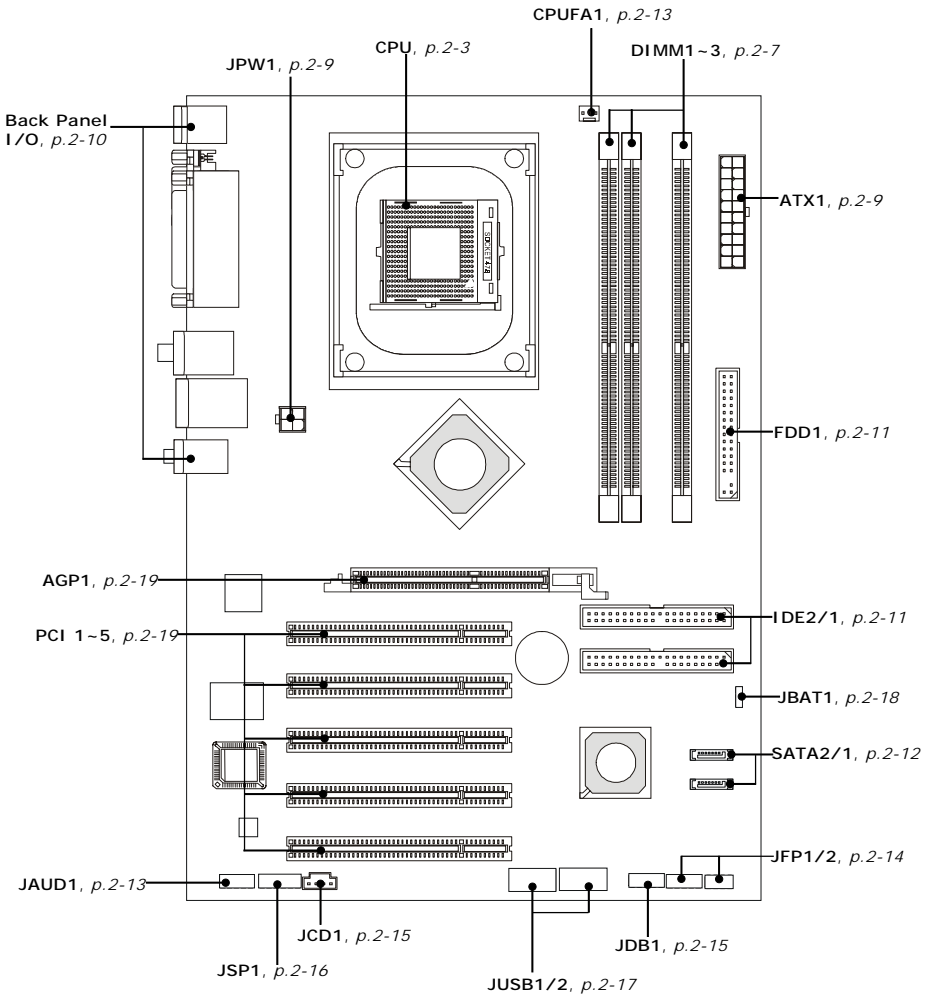
Central Processing Unit: CPU

The mainboard supports Intel® Pentium® 4 processors 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 heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have 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	=	200MHz
	Core/Bus ratio	=	12
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	200MHz x 12
		=	2.4 GHz

Memory Speed/CPU FSB Support Matrix

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

*: Overclocking spec.

MSI

MSI Reminds You...

Overheating
Overheating will seriously damage the CPU and system, always make sure the cooling fan can work properly to protect the CPU from overheating.

Overclocking
This motherboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal settings 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.

Open Lever

Sliding Plate   90 degree

Gold arrow

Correct CPU placement

Gold arrow   O

Incorrect CPU placement

Gold arrow   X

Press down the CPU   Close Lever
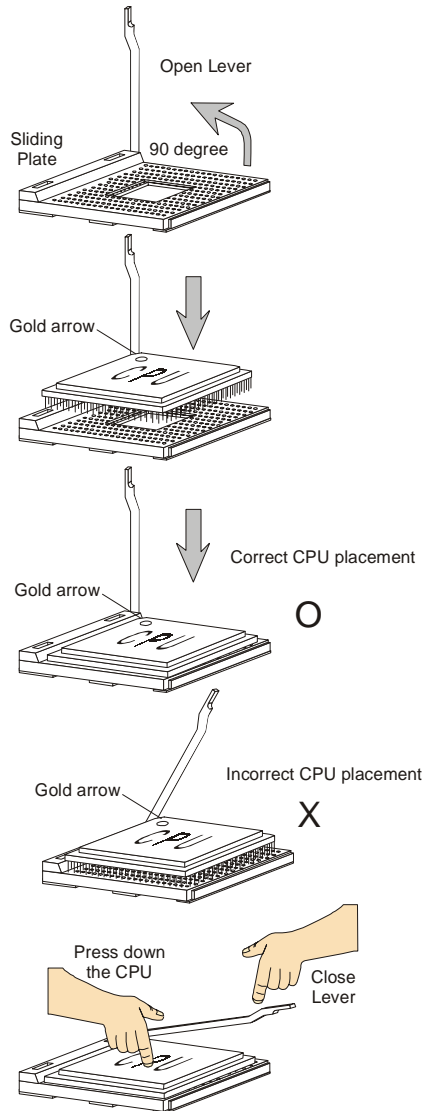
Installing the CPU Fan

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 mainboard.

2. Position the heatsink onto the retention mechanism.

retention mechanism
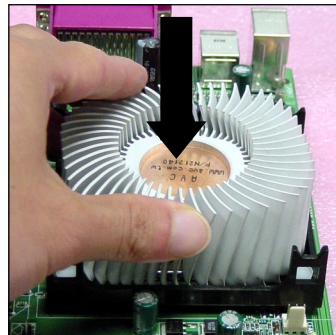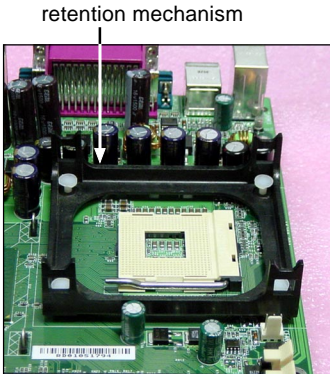
3. Mount the fan on top of the heatsink. Press down the fan until its four clips get wedged in the holes of the retention mechanism.

4. Press the two levers down to fasten the fan. Each lever can be pressed down in only ONE direction.
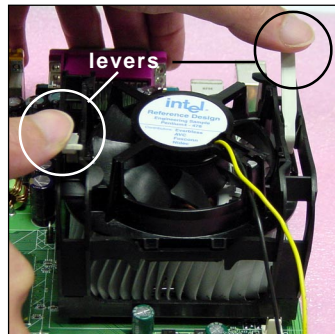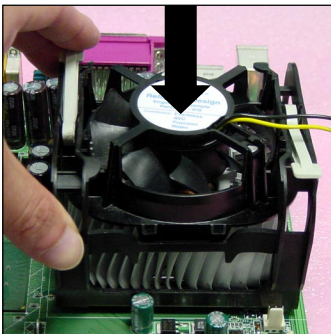
5. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the board.
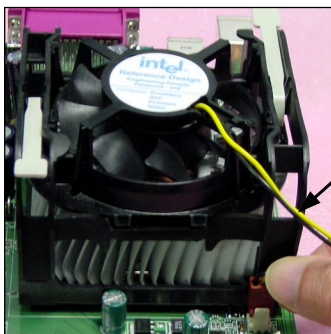
fan power cable

MSI Reminds You...
Please refer to the Intel/AMD websites for recommended CPU cooling fans.

Memory

The mainboard provides 3 slots for 184-pin, 2.5V DDR DIMM and supports up to 3GB memory size. You can install DDR266 / DDR333 / DDR400 / DDR433 / DDR466 SDRAM modules on the DDR DIMM slots (DIMM 1~3).

To operate properly, at least one DIMM module must be installed. ***Please note that DDR433/DDR466 are overclocking specs.***

DDR DIMM Slots

(DIMM 1~3, from left to right)
Channel A: DIMM1 & DIMM2 (green)
Channel B: DIMM3 (purple)

DIMM1 DIMM2 DIMM3
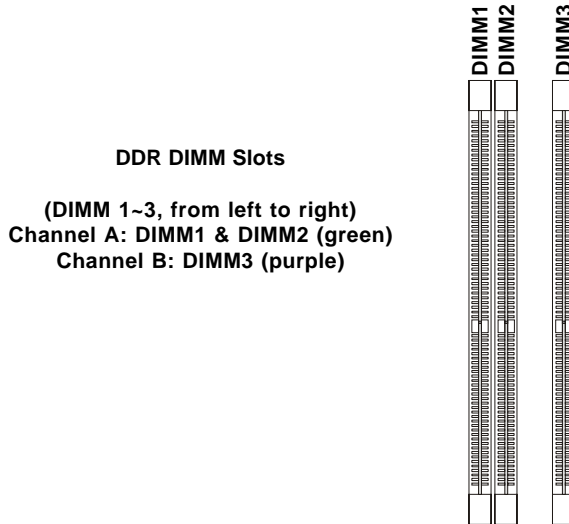
Memory Population Rules

Install at least one DIMM module on the slots. Each DIMM slot supports up to a maximum size of 1GB. You can install either single- or double-sided modules to meet your own needs.

The mainboard supports both dual-channel & single-channel modes. Users may install memory modules of different types and density under single-channel mode. *Under dual-channel mode, however, please make sure that you install memory modules of **the same type and density** on DDR DIMMs "in pairs" -- {DIMM1 & DIMM3} or {DIMM2 & DIMM3} to ensure system stability.*

Memory modules can be installed in any combination as follows:

DIMM1	DIMM2	DIMM3	System Density	Mode
128MB~1GB			128MB~1GB	S
	128MB~1GB		128MB~1GB	S
		128MB~1GB	128MB~1GB	S
128MB~1GB	128MB~1GB		256MB~2GB	S
128MB~1GB		128MB~1GB	256MB~2GB	D
	128MB~1GB	128MB~1GB	256MB~2GB	D
128MB~1GB	128MB~1GB	128MB~1GB	384MB~3GB	S

S: Single-Channel Mode   D: Dual-Channel Mode

Please refer to *http://www.msi.com.tw/program/products/mainboard/ mbd/pro_mbd_trp_list.php* for compatible DDR modules.

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 **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.

Volt   Notch
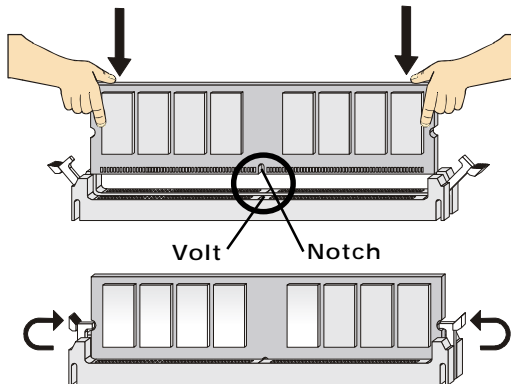
Power Supply

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.

ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.
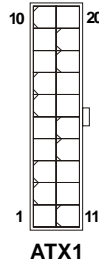
JPW1

ATX1

JPW1 Pin Definition

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

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

MSI

MSI Reminds You...
1. Power supplies of 300watt (and up) are highly recommended for system stability.
2. Please refer to the Intel/AMD websites for recommended power supplies.

Back Panel

L-In

Parallel

Mouse

SPDIF Out **LAN**

Keyboard **COMA**

USB Ports

L-Out
MIC
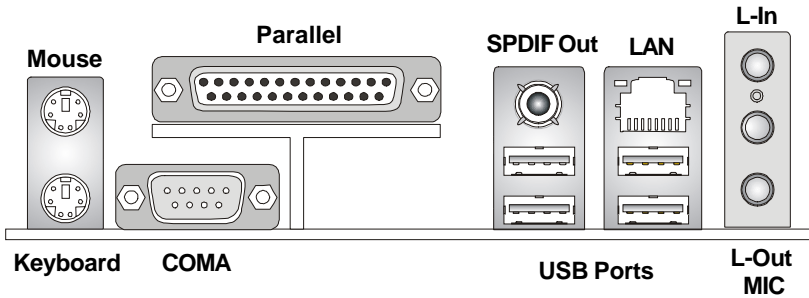
Mouse/Keyboard Connector

Pin6 NC

Pin5
Mouse/KBD Clock

Pin4 VCC

Pin3 GND

Pin2 NC

Pin1
Mouse/KBD
DATA

Serial Port

1 2 3 4 5

6 7 8 9
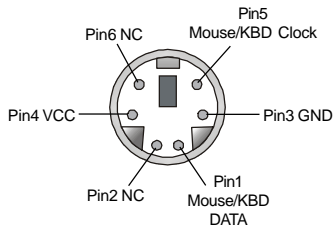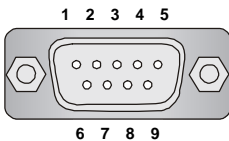
PIN	SIGNAL
1	DCD
2	SIN
3	SOUT
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

RJ-45 LAN Jack

Activity Indicator   Link Indicator

8   1
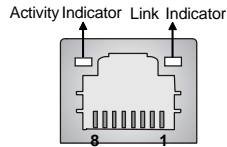
Gigabit LAN

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-

USB Ports

1 2 3 4
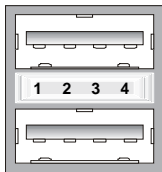
PIN	SIGNAL
1	VCC
2	-Data
3	+Data
4	GND

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.
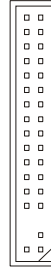
FDD1

ATA133 Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 66/100/133 function. You can connect up to four hard disk drives, CD-ROM and other IDE devices.

The Ultra ATA133 interface boosts data transfer rates between the computer and the hard drive up to 133 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.
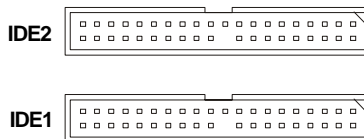
IDE2

IDE1

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 RAID 0, 1 Connectors: SATA1, SATA2

The southbridge VIA® VT8237 provides a hybrid solution that combines two independent SATA ports for support of up to two Serial ATA (Serial ATA RAID) drives and supports RAID levels 0 and 1 for easy management of the storage subsystems. Both connectors support 1st generation serial ATA data rate of 150 MB/s and are fully compliant with Serial ATA 1.0 specifications.
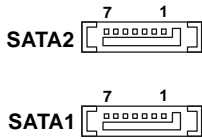
SATA1/2 Pin Definition

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

Optional Serial ATA cable

Take out the dust cover and connect to the hard disk devices

Connect to SATA1 or SATA2
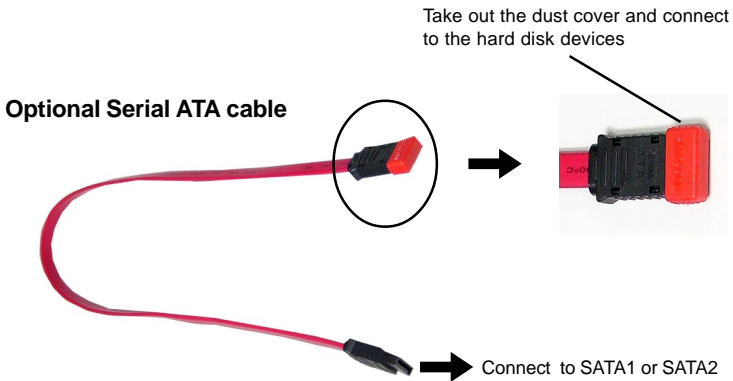
MSI Reminds You...
Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

Fan Power Connector: CPUFA1

The CPUFA1 (processor fan) supports 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 onboard, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.
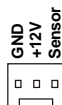
CPUFA1

MSI Reminds You...
Always consult the vendors for proper CPU cooling fans.

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.

Chassis Intrusion Switch Connector: JCI1 (Optional)

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.

```
GND  ☐ 2
CINTRU ☐ 1
```
JCI1
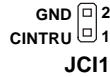
Front Panel Connectors: JFP1 & JFP2

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

JFP1 Pin Definition

JFP1

Power LED   Power Switch

```
2  [ ][ ][ ][ ][ ] 10
1  [ ][ ][ ][ ][ ]  9
```

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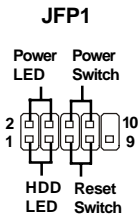
PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Power Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N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

JFP2 Pin Definition

JFP2

Speaker

```
2  [ ][ ][ ][ ] 8
1  [ ][ ][ ][ ] 7
```

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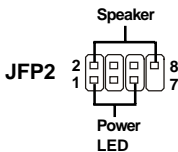
PIN	SIGNAL	PIN	SIGNAL
1	GND	2	SPK-
3	SLED	4	BUZ+
5	PLED	6	BUZ-
7	NC	8	SPK+

CD-In Connector: JCD1

The connector is for CD-ROM audio connector.

JCD1

R   GND   L
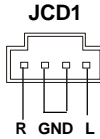
D-Bracket™ 2 Connector: JDB1 (Optional)

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 problems through 16 various combinations of LED signals. For definitions of 16 signal combinations, please refer to *D-Bracket™ 2* 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
10	NC

```
2 □□□□□ 10
1 □□□□□ 9
```
JDB1

Connect to JDB1

D-Bracket™ 2
(Optional)

Connect to JUSB1/JUSB2

LEDs

S-Bracket (SPDIF) Connector: JSP1 (Optional)

The connector allows you to connect a S-Bracket for Sony & Philips Digital Interface (SPDIF). The S-Bracket offers 2 SPDIF jacks for digital audio transmission (one for optical fiber connection and the other for coaxial), and 2 analog Line-Out jacks for 4-channel audio output.

To attach the fiber-optic cable to optical SPDIF jack, you need to remove the plug from the jack first. The two SPDIF jacks support *SPDIF output* only. For more information on the S-Bracket, refer to *Appendix: Using 2-, 4-, or 6-Channel Audio Function*.
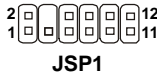
JSP1

JSP1 Pin Definition

PIN	SIGNAL	DESCRIPTION	PIN	SIGNAL	DESCRIPTION
1	VCC5	VCC 5V	2	VDD3	VDD 3.3V
3	SPDFO	S/PDIF output	4	(No Pin)	Key
5	GND	Ground	6	SPDFI	S/PDIF input
7	LFE-OUT	Audio bass output	8	SOUT-R	Audio right surrounding output
9	CET-OUT	Audio center output	10	SOUT-L	Audio left surrounding output
11	GND	Ground	12	GND	Ground

Optional S-Bracket

Analog Line-Out jack

Connect to JSP1

SPDIF jack (optical)   SPDIF jack (coaxial)
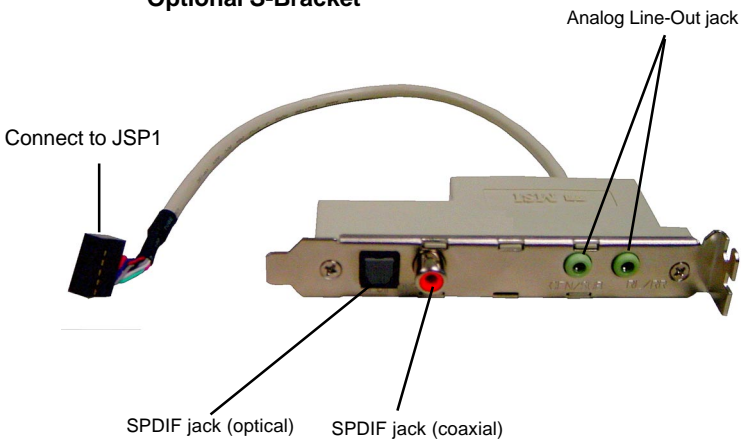
Front USB Connectors: JUSB1 & JUSB2 (Optional)

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**.
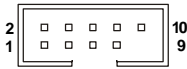
JUSB1/ JUSB2
(USB 2.0/Intel spec)

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

4-Port USB 2.0 Bracket (Optional)

Connect to JUSB1 & JUSB2 separately
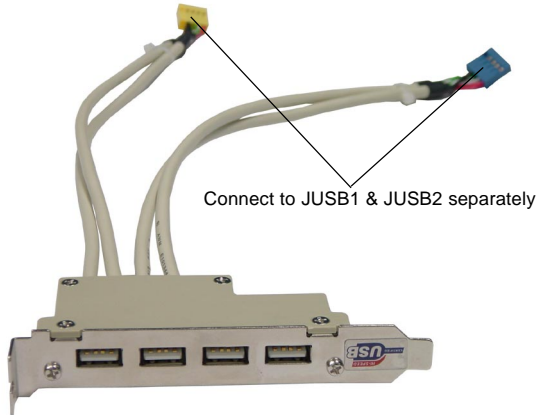
2-Port USB 2.0 Bracket (Optional)

Connect to JUSB1/JUSB2

Jumpers

The mainboard provides the following jumpers for you to set the computer's function. This section will explain how to change your mainboard'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
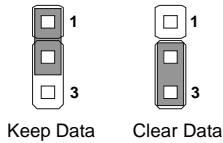
MSI Reminds You...
You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Slots

The mainboard 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
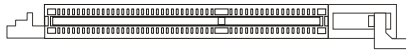
PCI (Peripheral Component Interconnect) Slots

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 Slot
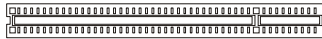
PCI Interrupt Request Routing

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 requests you to run SETUP.

◇ You want to change the default settings for customized features.

MSI

MSI Reminds You...
1. The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

2. Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:

A7043MS V1.0 150304 where:

1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
2nd - 5th digit refers to the model number.
6th - 7th digit refers to the customer as MS = all standard customers.
V1.0 refers to the BIOS version.
150304 refers to the date this BIOS was released.

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 <DEL> key to enter Setup.

DEL: Setup   F11: Boot Menu   F12: Network Boot   TAB: Logo   F10: Flash Recovery

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
<F6>	Load High Performance Defaults
<F7>	Load Optimal 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 Optimal and High Performance Defaults. The Optimal Defaults provide stable performance settings for all devices and the system, while the High Performance Defaults provide the best system performance but may affect the system stability.

The Main Menu

Once you enter the AMI BIOS 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.

```
              AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

  ▶ Standard CMOS Features          ▶ Frequency/Voltage Control

  ▶ Advanced BIOS Features            Set Supervisor Password

  ▶ Advanced Chipset Features         Set User Password

  ▶ Power Management Features          Load Optimal Defaults

  ▶ PNP/PCI Configurations            Load High Performance Defaults

  ▶ Integrated Peripherals            Save & Exit Setup

  ▶ PC Health Status                  Exit Without Saving


   F1:Help        ↑↓:Select Item   +/-:Change Values      F7:Setup Defaults
   Esc:Exit       ←→:Select Menu   Enter:Select ▶Sub-Menu F10:Save & Exit


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

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 Optimal Defaults
Use this menu to load the factory default settings for optimal & stable system performance.

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

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 Features menu are divided into 8 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.

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

Standard CMOS Features                      [ Setup Help ]

System Date              Feb 05 2004 Thu    Month: Jan - Dec
System Time              16:43:12            Day:  01 - 31
                                            Year: 1980 - 2099

▶ Primary IDE Master      Not Installed
▶ Primary IDE Slave       Not Installed
▶ Secondary IDE Master
▶ Secondary IDE Slave

Floppy Drive A           1.44 MB 3½
Floppy Drive B           Not Installed




F1:Help      ↑↓:Select Item     +/-:Change Values    F7:Setup Defaults
Esc:Previous Menu               Enter:Select ▶Sub-Menu F6:Hi-Performance
```

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.

System Time
This allows you to set the system time that you want (usually the current time). The time format is [hour] [minute] [second].

Primary/Secondary 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 [Auto] for a hard disk > 512 MB under Windows and DOS, or [Disabled] under Netware and UNIX
[Block Mode]	Select [Auto] to enhance the hard disk performance
[Fast Programmed I/O Modes]	Select [Auto] 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

```
            AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

    Advanced BIOS Features                    [  Setup Help  ]

  Quick Boot                       Enabled
  Full Screen LOGO Show            Disabled
  ▶ Boot Sequence
  Hard Disk S.M.A.R.T.             Disabled
  BootUp Num-Lock LED              On
  Halt On Keyboard Error           Disabled
  Swap Floppy                      Disabled
  Seek Floppy                      Disabled
  Security Option                  Setup
  Save current ROM to HDD          No
  Boot OS/2 For DRAM > 64MB        No
  Internal Cache                   Enabled
  Hyper Threading Function         Enabled
  MPS Revision                     1.4



  F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Setup Defaults
  Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Hi-Performance
```

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].

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.

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

```
            Boot Sequence


     1st  Disabled
     2nd  Disabled
     3rd  Disabled
     Boot Other Device         Yes
```
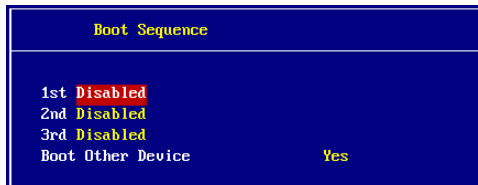
1st/2nd/3rd
These items allow you to set the sequence of boot devices where AMIBIOS attempts to load the operating system.

Boot Other Devices
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.

Hard Disk S.M.A.R.T.

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].

Boot Up Num-Lock LED

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].

Halt On Keyboard Error

This setting determines whether the system will stop if an error is detected at keyboard. Settings: [Enabled], [Disabled].

Swap Floppy

This field is effective only in systems with two floppy drives. Selecting [Enabled] assigns physical drive B to logical drive A, and physical drive A to logical drive B.

Seek Floppy

Setting to *Enabled* will make BIOS seek floppy drive A: before booting the system. Settings: [Enabled], [Disabled].

Security Option

This specifies the type of BIOS password protection that is implemented. Settings 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 OS/2 For DRAM > 64MB

This allows you to run the OS/2® operating system with DRAM greater than 64MB. Setting options: [No], [Yes].

Internal 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 options: [Enabled], [Disabled].

Hyper-Threading Function
The processor uses Hyper-Threading technology to increase transaction rates and reduces end-user response times. The technology treats the two cores inside the processor as two logical processors that can execute instructions simultaneously. In this way, the system performance is highly improved. If you disable the function, the processor will use only one core to execute the instructions. Settings: [Enabled], [Disabled]. Note that this function only available when the CPU installed supports Hyper-Threading function.

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:*** *A 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. To find out which version to use, consult the vendor of your operating system. Settings: [1.4], [1.1].

Advanced Chipset Features

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

     Advanced Chipset Features              [  Setup Help  ]

 ▶ DRAM Timing Control
 ▶ AGP Timing Control
   Top Performance              Disabled
   PCI Delay Transaction        Disabled
   VLink 8X Supported           Enabled
   VLink mode selection         Mode 1




 F1:Help       ↑↓:Select Item      +/-:Change Values    F7:Setup Defaults
 Esc:Previous Menu                 Enter:Select ▶Sub-Menu  F6:Hi-Performance
```
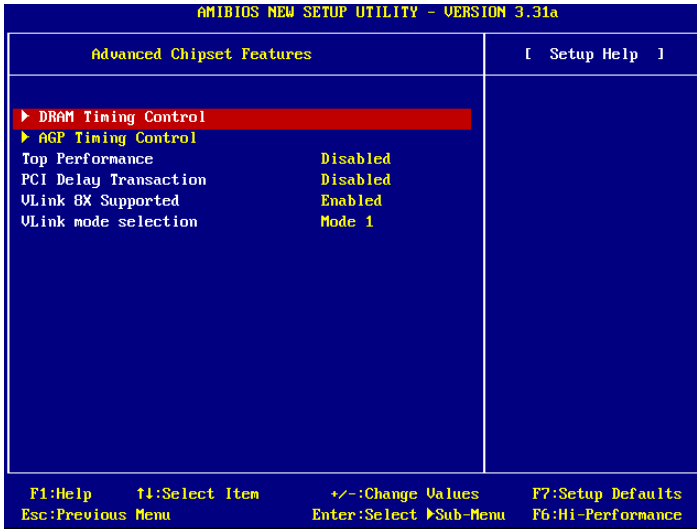
MSI | **MSI Reminds You...**
Change these settings only if you are familiar with the chipset.

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

```
        DRAM Timing Control

   DRAM Timing                  Auto By SPD
   SDRAM CAS# Latency           3.0
   SDRAM Bank Interleave        Disabled
   Precharge to Active(Trp)     4T
   Active to CMD(Trcd)          4T
   Active to Precharge(Tras)    9T
   REF to ACT/REF to REF(Trfc)  15T
   ACT(0) to ACT(1) (Trrd)      3T
   DRAM Command Rate            2T
   DRAM BUS Selection           Auto
```
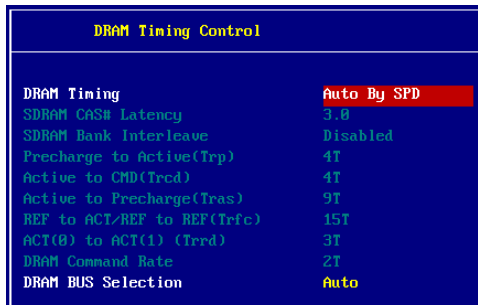
DRAM Timing
The value in this field depends on performance parameters of the installed memory chips (DRAM). Do not change the value from the factory setting unless you install new memory that has a different performance rating than the original DRAMs.

SDRAM CAS# Latency
The field controls the CAS latency, which determines the timing delay before SDRAM starts a read command after receiving it. Setting options: [1.5], [2.0], [2.5], [3.0]. [1.5] (clocks) increases system performance while [3.0] (clocks) provides more stable system performance.

SDRAM Bank Interleave
This field selects 2-bank or 4-bank interleave for the installed DRAM. Disable the function if 16MB DRAM is installed. Setting options: [Enabled], [Disabled].

Precharge to Active (Trp)
This setting 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, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system. Setting options: [2T] to [5T].

Active to CMD (Trcd)
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: [2T] to [5T].

Active to Precharge (Tras)
This setting determines the time RAS takes to read from and write to a memory cell. Setting options: [6T] to [9T].

REF to ACT/REF to REF (Trfc)
This setting determines the time RFC takes to read from and write to a memory cell. Setting options: [12T] to [15T].

ACT (0) to ACT (1) (Trrd)
This setting controls the "DDR row active to row active delay." [2T] performance is better than [3T]. Setting options: [2T], [3T].

DRAM Command Rate
This setting controls the DRAM command rate. Selecting [1T] allows DRAM signal controller to run at 1T (T=clock cycles) rate. Selecting [2T] makes DRAM signal controller run at 2T rate. [1T] is faster than [2T]. Setting options: [1T], [2T].

DRAM Bus Selection
This setting determines the module type of DRAM Bus. Setting options: [Auto], [Single Channel], [Dual Channel].

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

```
        AGP Timing Control

AGP 3.0 Mode                    8x
AGP Driving Control             Auto
AGP Driving Value               CB
AGP Fast Write                  Enabled
AGP Aperture Size               64 MB
AGP Master 1 WS Write           Disabled
AGP Master 1 WS Read            Disabled
AGP Read Synchronization        Disabled
```

AGP 2.0/3.0 Mode
AGP 2.0/3.0 Mode appears depending on the AGP card installed on the mainboard. This item sets an appropriate mode for the installed AGP card. Setting options for AGP 2.0 Mode: [1X], [2X], [4X]. Setting options for AGP 3.0 Mode: [4X], [8X].

AGP Driving Control
This item is used to adjust the AGP driving force. Selecting [Manual] allows you to select an AGP driving force in AGP Driving Value. It is strongly recommended to select [Auto] to avoid any system error caused.

AGP Driving Value
This item specifies an AGP driving force.

AGP Fast Write
The field enables or disables the AGP Fast Write feature. The Fast Write technology allows CPU to write directly to the graphics card without passing anything through the system memory and improves the AGP 4X speed. Select [Enabled] only when the installed AGP card supports the function.

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 [32MB], [64MB], [128MB], and [256 MB]. Two extra options of [512MB] and [1GB] will be available when AGP 3.0 card is installed.

AGP Master 1 WS Write
When [Enabled] is selected, writes to the AGP bus are executed with one wait state inserted.

AGP Master 1 WS Read
When [Enabled] is selected, one wait state is inserted in the AGP read cycle.

AGP Read Synchronization
The field allows you to enable or disable the AGP Read Synchronization feature.

Top Performance
Set this item to [Enabled] to increase the system performance. Setting options: [Enabled], [Disabled].

PCI Delayed Transaction
The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select [Enabled] to support compliance with PCI specification version 2.1.

VLink 8X Supported
This item enables or disables the 8X VLink Data Rate. Setting options: [Enabled], [Disabled].

VLink Mode Selection
This item selects the mode of VLink. Setting options: [Auto], [Mode 1], [Mode 2], [Mode 3], [Mode 4].

Power Management Setup

```
AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

    Power Management Features              [  Setup Help  ]

Sleep State                      Auto
Re-Call VGA BIOS at S3 Resuming  Disabled
Suspend Time Out (Minute)        Disabled
Power Button Function            Power Off
After AC Power Lost              Off
▶ Set Wake Up Events ...




 F1:Help        ↑↓:Select Item      +/-:Change Values     F7:Setup Defaults
 Esc:Previous Menu                  Enter:Select ▶Sub-Menu F6:Hi-Performance
```
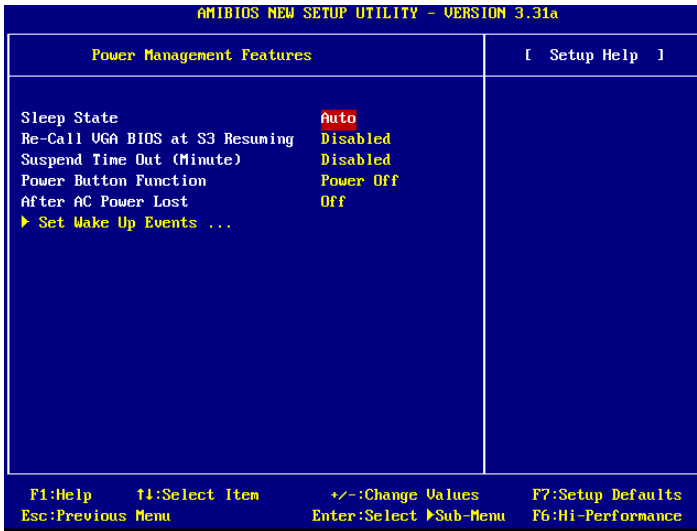
MSI **MSI Reminds You...**
S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.

Sleep State
This item specifies the power saving modes for ACPI function. 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 mode 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.

Suspend Time Out (Minute)

If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off. Settings: [Disabled], [1 Min], [2 Min], [4 Min], [8 Min], [10 Min], [20 Min], [30 Min], [40 Min], [50 Min], [60 Min].

Power Button Function
This feature sets the function of the power button. Settings are:
    [Power 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.

After AC Power Lost
This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:
    [Off]   Leaves the computer in the power off state.
    [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 Wake Up Events
Press <Enter> and the following sub-menu appears.

```
          Set Wake Up Events ...


USB Wake Up From S3              Disabled
Wake Up By Keyboard From S3      Disabled
   Wake-Up Key                   Any Key
      Wake-Up Password           N/A
Resume On PS/2 Mouse From S3     Disabled
Wake UP On PME#                  Disabled
Resume On RTC Alarm              Disabled
RTC Alarm Date                   15
RTC Alarm Hour                   12
RTC Alarm Minute                 30
RTC Alarm Second                 30
```
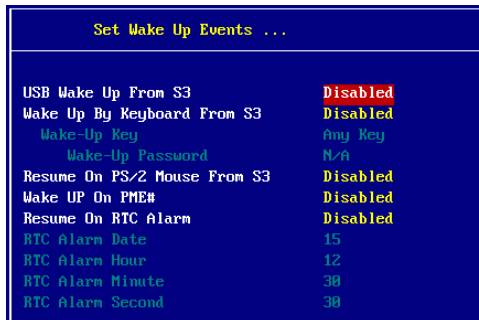
USB Wake-Up from S3
This item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) sleep state. Settings: [Enabled], [Disabled].

Wake Up By Keyboard From S3
The item specifies how the system will be awakened from power saving mode when input signal of the keyboard is detected. Settings: [Enabled], [Disabled].

Wake-Up Key
This setting only works When *Wake Up By Keyboard From S3* is set
to [Enabled]. This setting specifies how the system will be awakened
from power saving mode when input signal of the keyboard is detected.
Setting options: [Any Key], [Specific Key].

Wake-Up Password
This setting specifies the keyboard wake-up *Password* and works
only when the *Wake-Up Key* setting is set to [Specific Key].

Resume On PS/2 Mouse From S3
The setting determines whether the system will be awakened from the S3
power saving mode when input signal of the PS/2 mouse is detected. Setting
options: [Enabled], [Disabled].

Wake Up On PME#
When setting to [Enabled], this setting allows your system to be awakened
from the power saving modes through any event on PME (Power Manage-
ment Event). Setting options: [Enabled], [Disabled].

Resume On RTC Alarm
This is used to enable or disable the feature of booting up the system on a
scheduled time/date from the S3, S4, and S5 state. Setting options: [Enabled],
[Disabled].

Alarm Date/Hour/Minute/Second
If *Resume On RTC 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:

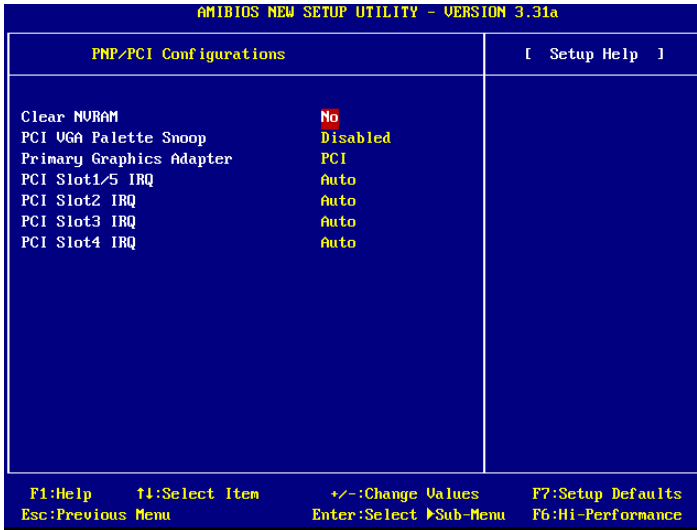| RTC Alarm Date | *01 ~ 31*, *Every Day* |
RTC Alarm Hour	*00 ~ 23*
RTC Alarm Minute	*00 ~ 59*
RTC Alarm Second	*00 ~ 59*

MSI

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.

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.

```
                AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

    PNP/PCI Configurations                          [ Setup Help ]

 Clear NVRAM                        No
 PCI VGA Palette Snoop              Disabled
 Primary Graphics Adapter          PCI
 PCI Slot1/5 IRQ                    Auto
 PCI Slot2 IRQ                      Auto
 PCI Slot3 IRQ                      Auto
 PCI Slot4 IRQ                      Auto




 F1:Help       ↑↓:Select Item      +/-:Change Values      F7:Setup Defaults
 Esc:Previous Menu                 Enter:Select ▶Sub-Menu  F6:Hi-Performance
```

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 wil reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to [No] automatically.

PCI VGA Palette Snoop
When set to [Enabled], multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA) and the:

VGA Palette Snoop Bit Setting	Action
[Disabled]	Data read or written by the CPU is only directed to the PCI VGA device's palette registers.
[Enabled]	Data read or written by the CPU is directed to both the PCI VGA device's palette registers and the ISA VGA device's palette registers, permitting the palette registers of both VGA devices to be identical.

The setting must be set to [Enabled] if any ISA bus adapter in the system requires VGA palette snooping.
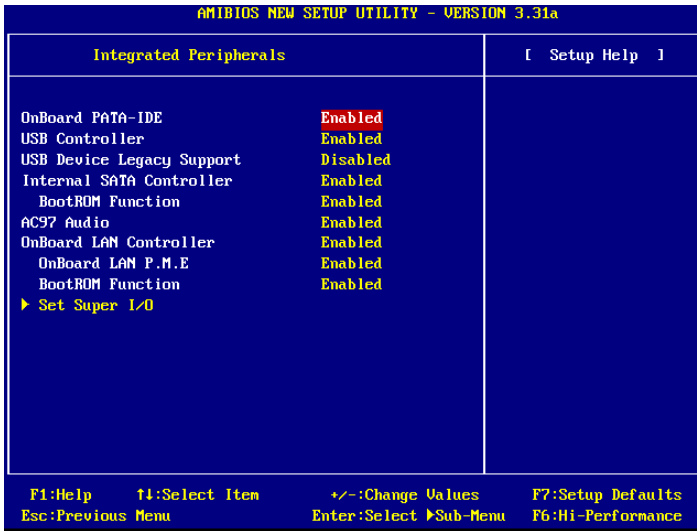
Primary Graphics Adapter
This item specifies which VGA card is your primary graphics adapter. Settings: [PCI] and [AGP].

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

Integrated Peripherals

```
          AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

   Integrated Peripherals                      [  Setup Help  ]


 OnBoard PATA-IDE              Enabled
 USB Controller               Enabled
 USB Device Legacy Support    Disabled
 Internal SATA Controller     Enabled
   BootROM Function           Enabled
 AC97 Audio                   Enabled
 OnBoard LAN Controller       Enabled
   OnBoard LAN P.M.E          Enabled
   BootROM Function           Enabled
 ▶ Set Super I/O




  F1:Help      ↑↓:Select Item      +/-:Change Values      F7:Setup Defaults
  Esc:Previous Menu               Enter:Select ▶Sub-Menu   F6:Hi-Performance
```

OnBoard PATA-IDE
This setting controls the onboard Parallel ATA IDE controller. Setting options: [Enabled], [Disabled].

USB Controller
This setting is used to enable/disable the onboard USB controller. Setting options: [Enabled], [Disabled].

USB Device Legacy Support
Set to [Enabled] if you need to use any 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 want to use any USB device other than the USB mouse. Setting options: [Enabled], [Disabled].

Internal SATA Controller (Optional)
This item is used to enable/disable the Internal SATA controllers. Setting options: [Enabled], [Disabled].

Boot ROM Function (Optional)
This item enables or disables the initialization of the onboard SATA Boot ROMs during bootup. Selecting [Disabled] will speed up the boot process.

AC97 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].

Onboard LAN Controller
This setting controls the onboard LAN controller. Setting options: [Enabled], [Disabled].

> **OnBoard LAN P.M.E.** *(Available only when VIA LAN chipset is intergrated)*
> This setting is used to enable/disable the onboard LAN PME (Power Management Event). Setting options: [Enabled], [Disabled].

> **Boot ROM Function**
> This item enables or disables the initialization of the onboard LAN Boot ROM during bootup. Selecting [Disabled] will speed up the boot process.

Set Super I/O
Press <Enter> and the following sub-menu appears.
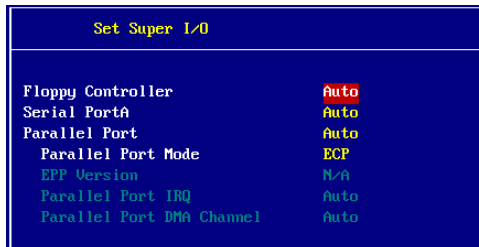
> **Floopy Controller**
> The item is used to enable or disable the onboard Floppy controller. Select [Enabled] when you have installed a floppy disk drive and want to use it. Options: [Auto], [Enabled], [Disabled].

> **Serial PortA**
> The items specify the base I/O port address and IRQ for the onboard Serial Port A. Selecting [Auto] allows BIOS to automatically determine the correct base I/O port address. Settings: [Auto], [Disabled], [3F8/COM1], [2F8/COM2], [3E8/COM3], [2E8/COM4].

> **Parallel Port**
> These items specify the base I/O port addresses of the onboard parallel port. Selecting [Auto] allows AMIBIOS to automatically determine the correct base I/O port address. Settings: [Auto], [Disabled], [378], [278], [3BC].

Parallel Port Mode
Select an operating mode for the onboard parallel (printer) port.
[Normal]: Standard Parallel Port
[EPP]: Enhanced Parallel Port
[ECP]: Extended Capability Port
[Bi-Dir]: Extended Capability Port + Enhanced Parallel Port
To operate the onboard parallel port as Standard Parallel Port only, choose [Normal]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [Bi-Dir] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously.

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

```
           AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

     PC Health Status                    [  Setup Help  ]


      SYSTEM Temperature        -1°C/-33°F
      CPU Temperature           -1°C/-33°F
      CPU FAN Speed             0 RPM
      Vcore                     4.080 V
      +3.3V                     4.163 V
      +5.0V                     6.923 V
      +12V                      15.830 V
      -12V                      -6.194 V
      -5.0V                     -5.178 V
      Battery                   4.080 V








   F1:Help      ↑↓:Select Item    +/-:Change Values    F7:Setup Defaults
   Esc:Previous Menu              Enter:Select ▶Sub-Menu   F6:Hi-Performance
```
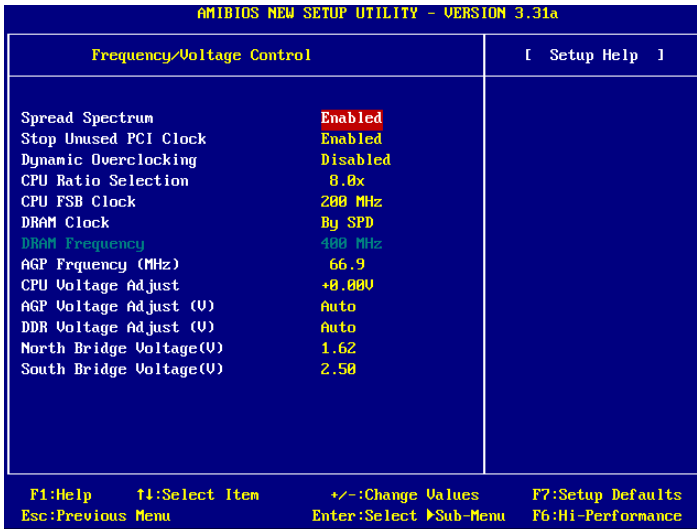
System/CPU Temperature, CPU Fan Speed, Vcore, +3.3V, +5.0V, +12V, -12V, -5.0V, Battery
These items display the current status of all of the monitored hardware devices/ components such as CPU voltages, temperatures and all fans' speeds.

Frequency/Voltage Control

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

```
             AMIBIOS NEW SETUP UTILITY - VERSION 3.31a

      Frequency/Voltage Control              [  Setup Help  ]


   Spread Spectrum               Enabled
   Stop Unused PCI Clock         Enabled
   Dynamic Overclocking          Disabled
   CPU Ratio Selection            8.0x
   CPU FSB Clock                 200 MHz
   DRAM Clock                    By SPD
   DRAM Frequency                400 MHz
   AGP Frquency (MHz)             66.9
   CPU Voltage Adjust            +0.00V
   AGP Voltage Adjust (V)        Auto
   DDR Voltage Adjust (V)        Auto
   North Bridge Voltage(V)        1.62
   South Bridge Voltage(V)        2.50




   F1:Help       ↑↓:Select Item    +/-:Change Values    F7:Setup Defaults
   Esc:Previous Menu              Enter:Select ▶Sub-Menu  F6:Hi-Performance
```

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, set to [Enabled] 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.

Stop Unused PCI Clock
This item enables or disables the PCI slot clock. Setting options: [Enabled], [Disabled].

Dynamic Overclocking
Dynamic Overclocking Technology is the automatic overclocking function, included in the MSI™ 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 that the 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 needs to be boosted up to enhance the overall performance. Setting options:

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

MSI Reminds You...

1. *Even though the Dynamic Overclocking Technology is more stable than manual overclocking, basically, it is still risky. We suggest that users make sure that the 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.*
2. *Meanwhile, there are two functions to protect user's system from crashing.*
   - *There is a safe key "Ins" in BIOS. In case the overclocking fails, you can press "Ins" key while system rebooting to restore to the BIOS defaults.*
   - *If the system incidentally reboot for four times, the BIOS will also be restored to the defaults.*

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.

CPU FSB Clock
This setting shows the current CPU Front Side Bus clock frequency.

DRAM Clock
Use this field to configure the clock frequency of the installed DRAM. Setting options:
> FSB100: [By SPD], [DDR 266 (3:4)], [DDR 333 (3:5)], [DDR 400 (1:2)], [DDR 433], [DDR 450], [DDR 466], [DDR 500]
> FSB133: [By SPD], [DDR 266 (1:1)], [DDR 333 (4:5)], [DDR 400 (2:3)], [DDR 433], [DDR 450], [DDR 466], [DDR 500]
> FSB200: [By SPD], [DDR 266 (3:2)], [DDR 333 (6:5)], [DDR 400 (1:1)], [DDR 433], [DDR 450], [DDR 466], [DDR 500]

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

DRAM Frequency
This setting shows the current frequency of DDR DRAM (read only).

AGP Frequency (MHz)
This item is used to configure the AGP frequency.

CPU Voltage Adjust
The setting allows you to adjust the CPU Vcore voltage, which depends on the CPU.

AGP Voltage Adjust (V)
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.

DDR Voltage Adjust (V)
This setting is used to adjust the DRAM core voltage (Vcore), making overclocking possible.

North Bridge/South Bridge Voltage (V)
These two items configure the voltage of the North Bridge and the South Bridge for overclocking purposes.

MSI

MSI Reminds You...
The settings shown in different color in CPU Voltage, DDR Voltage, AGP Voltage, and North Bridge/South Bridge Voltage help 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.

*Changing CPU/DDR/AGP/North Bridge/South Bridge Voltage may result in the instability of the system; therefore, it is **NOT** recommended to change the default settings for long-term usage.*

Set Supervisor/User Password

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

```
[ Enter new supervisor password ]
```

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 *Security Option* of the *Advanced BIOS Feature* menu. If the *Security 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

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 Optimal/High Performance Defaults

The two options on the main menu allow users to restore all of the BIOS settings to High Performance Defaults or Optimal 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 Optimal Defaults are the default values also set by the mainboard manufacturer for stable performance of the mainboard.
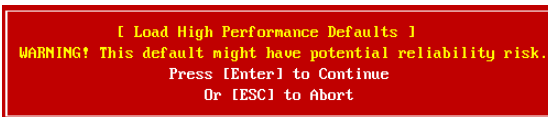
When you select Load Optimal Defaults, a message as below appears:

```
[ Load optimized settings ]

Press [Enter] to Continue
      Or [ESC] to Abort
```

Pressing [Enter] loads the default factory settings for stable system performance.

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 BIOS values that enable the best system perfor-mance 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.*

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

The mainboard is equipped with VIA VT1617A chip, which provides support for 6-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. VT1617A 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 VIA VT1617 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 **VIA Smart5.1CH Sound Drivers**.

Click here
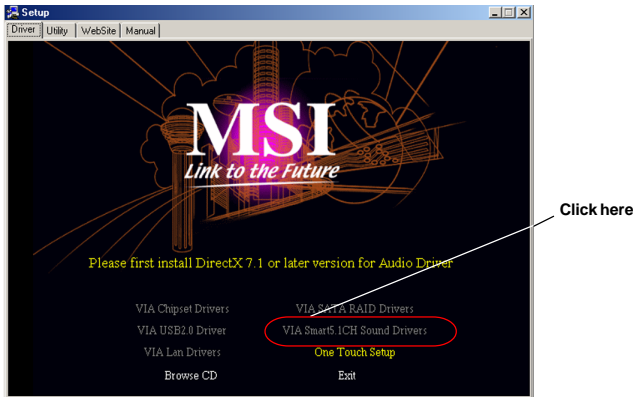
Special Notice during Installation
Once you are finishing the installation of your system, please right-click on [My Computer] on the desktop, and choose [Properties] ---> [Hardware] ---> [Device Manager]. If you can see the question mark (?) next to the <Other devices> & <Multimedia Audio Controller>, it means the system detects the audio codec in your system item and the **VIA Smart5.1CH Sound Drivers** will appear on your CD.
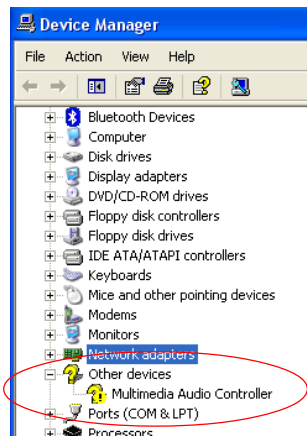
3. Click **Next** to install the AC'97 Audio software, and click **Finish** to restart the system.

4. You will find the [icon] icon in the system tray and on the desktop. Double-click the icon on the desktop or right-click on the icon in the system tray. Also, you can right-click on the icon in the system tray and choose **Properties**, and the following screen will appear to show some basic settings about the audio configuration.
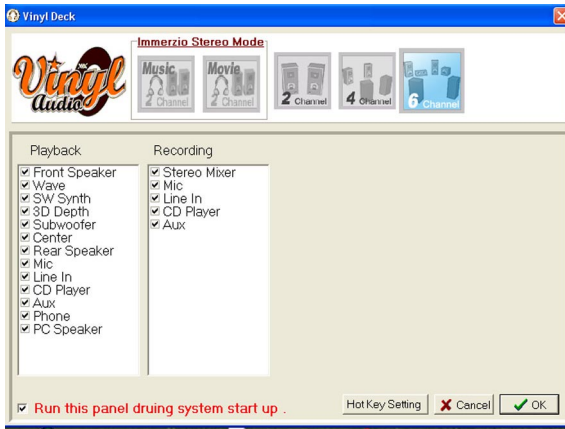
Software Configuration

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**.

Playback

Here you can regulate the volume of each output. Chick on **Link** to regulate the left-right speakers simultaneously, or uncheck it to regulate them separately. Use the bar scrolling to the right for more outputs.

Select the channels you'd like to use here.
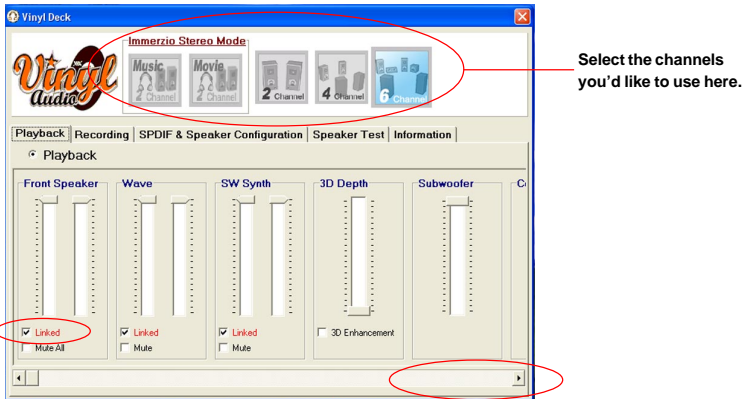
Recording

Here you can choose the preferred recording input. Click **Select** to choose the one you like. Choosing **Mic** allows you to record the audio through the connected microphones, **Line In** allows you to record to record through the connected line-in device, and etc. Choosing **Stereo Mixer** allows you to record the audio through all inputs.
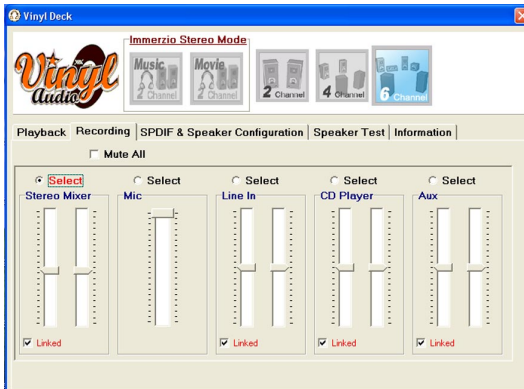
SPDIF & Speaker Configuration

Here you can configure and enable the functions related to S/PDIF & speakers. Move between the items in **S/PDIF Control** and **Advanced control** and the representing description and illustrations will display.

If you'd like to use the S/PDIF function for digital audio transmission, please check the **S/PDIF Enable** and/or **Analog in to S/PDIF Out** check boxes as wished.
While enabling **Analog in to S/PDIF Out** function, the volumes should be adjusted in the **Mic**, **Line In** and **CD Player** parts in the **Recording** tab.

For the expander and Center/Subwoofer speaker exchange, please check the **EXpander** and/or **Exchange Center/LFT** check boxes as wished.
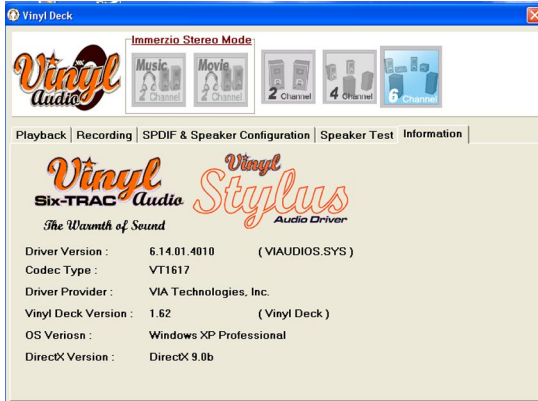

Detail description of the selected items in the right
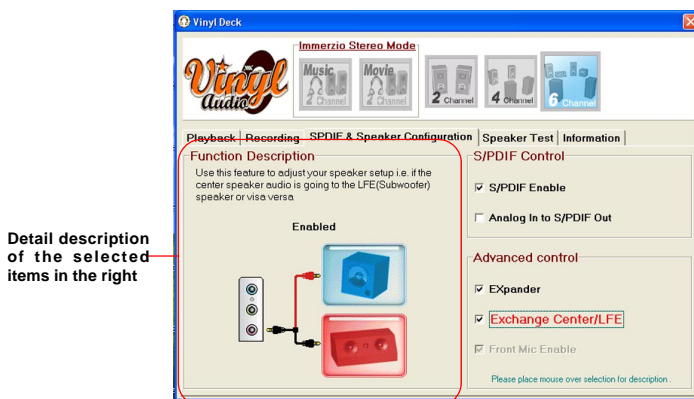
Speaker Test

Here you can click on each speaker to test its function, and increase/decrease the volume.

Information

Here it provides the information about Vinyl Deck, including the driver version, codec type, and OS version... etc.

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

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.
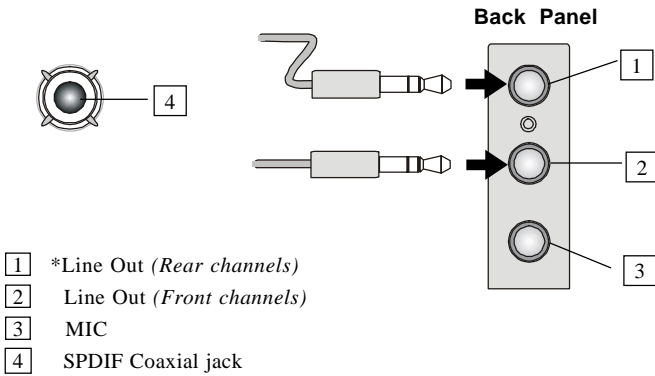
■ **2-Channel Mode for Stereo-Speaker Output**

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. SPDIF Coaxial jack
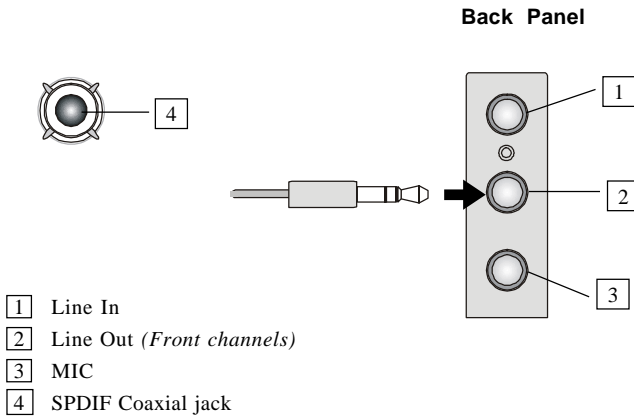
■ **4-Channel Mode for 4-Speaker Output**

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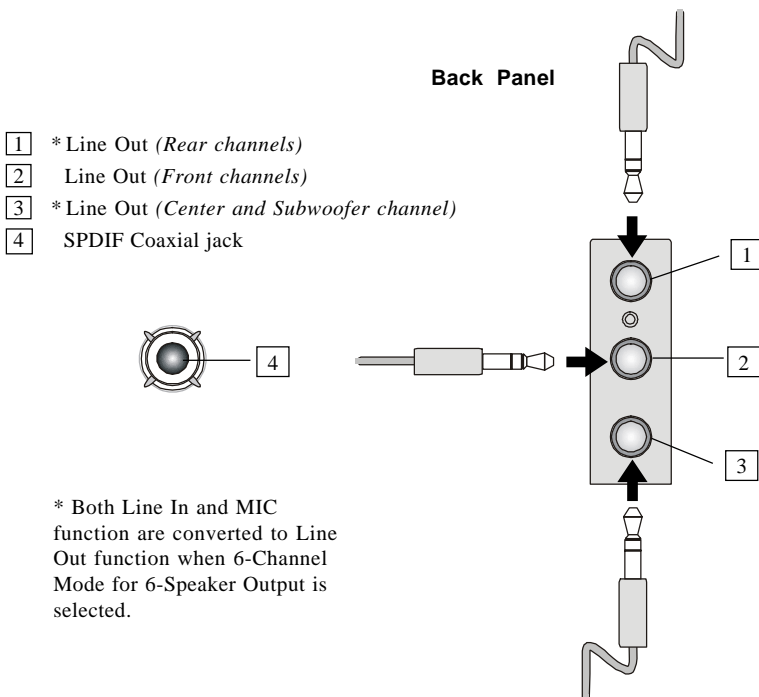
Refer to the following diagram and caption for the function of each jack on the back panel when 4-Channel Mode is selected.

Back Panel

1　 *Line Out *(Rear channels)*
2　 Line Out *(Front channels)*
3　 MIC
4　 SPDIF Coaxial jack

* 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.

Back Panel

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 con-
verter may be required to exchange center and subwoofer audio
signals. The converter can be purchased from a speaker store.*

Appendix B: VIA VT8237 Serial ATA RAID

The Southbridge VT8237 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 VT8237 SATA RAID are:

1. Support two SATA + two PATA hard disk drives.
2. Only SATA supports RAID.
3. Supports ATA 133 high performance hard disk drive.
4. Dual independent ATA channels and maximum connection of four hard disk drives allowed.
5. Supports Ultra DMA mode 6/5/4/3/2/1/0, DMA mode 2/1/0, and PIO mode 4/3/2/1/0.
6. Supports RAID 0 and RAID 1.
7. 4 KB to 64 KB striping block size support.
8. Bootable disk or disk array support.
9. Windows-based RAID configure and management software tool. (Compatible with BIOS)
10. Supports hot-swap failed disk drive in RAID 1 array.
11. ATA SMART function support.
12. Microsoft Windows 98, Me, NT4.0, 2000, XP operating systems support.
13. Event log for easy troubleshooting.

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 VT8237 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 * 2	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection

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.

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 VT6420 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

 ▶ Create Array                    Create a RAID array with
 ▶ Delete Array                    the hard disks attached to
 ▶ Create/Delete Spare             VIA IDE controller
 ▶ Select Boot Array
 ▶ Serial Number View              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                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>.
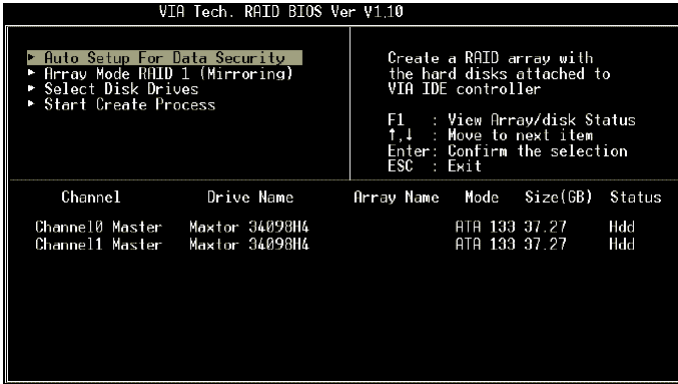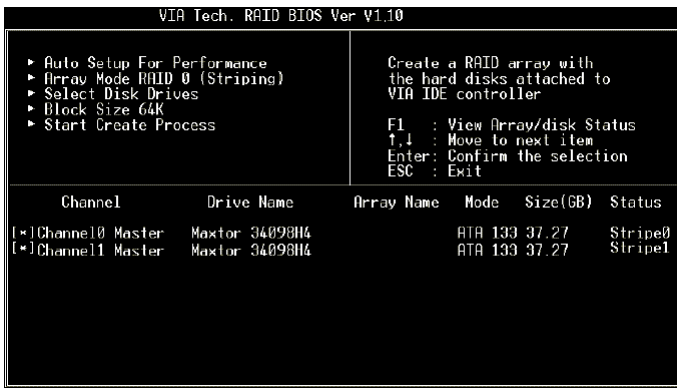

MSI Reminds You...
The "Channel", "Drive Name", "Mode" and "Size (GB)" in the following example might be different from your system.

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.


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.
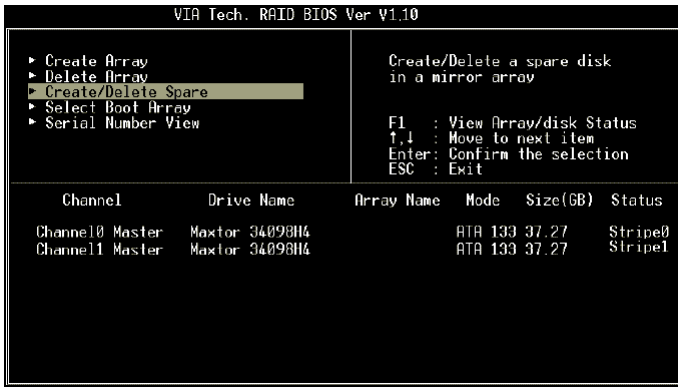
View Serial Number of Hard Drive

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.
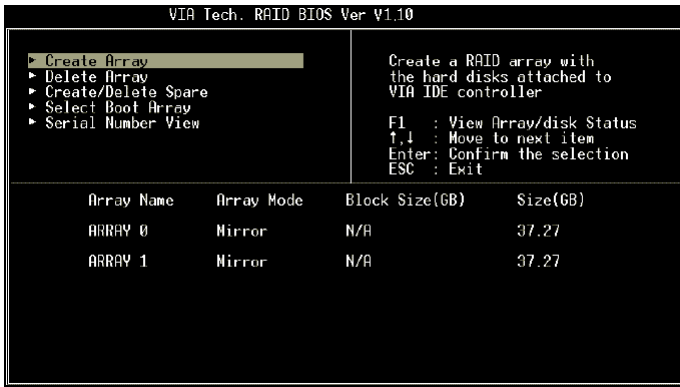
Duplicate Critical RAID 1 Array

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.

```
┌─ Critical RAID 1 ──────────────────┬─── Critical Status ───
│ Duplicate now                      │ The RAID 1  array needs to
│ Continue to boot                   │ be duplicated to ensure
│                                    │ data consistancy.
│                                    │
│                                    │ Fault Hdd Found:
│                                    │ Channel 1 Device 0 Fault
│                                    │
├─ Remaining members of the failed array ─────────────────────
│    Channel        Drive Name      Array Name  Mode   Size(GB)  Status
│ Channel1 Device0  IC35L040AVVA07-0   Array0   ATA 100  38.34   Mirror
│ Channel0 Device0  IC35L040AVVA07-0   Array0   ATA 100  38.34   Source
│
│
│ Note:
│ 1)Press <ESC> to Exit.
│ 2)After Execute,Press <TAB> immediately can into Utility Window!
```

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.

```
┌─ Broken RAID 1 ─────────────────────┐┌─── Critical Status ───┐
│ Power off and check the failed drive││ A disk member of a mirroring │
│ Destroy the Mirroring Relationship  ││ array has failed or is not   │
│ Choose replacement drive and rebuild││ responding. The array is     │
│ Continue to boot                    ││ stilling functional,but fault│
│                                     ││ tolerance is disabled.       │
│                                     ││                              │
│                                     ││                              │
│                                     ││                              │
└─────────────────────────────────────┘└──────────────────────────────┘
┌─ Remaining members of the failed array ──────────────────────────────┐
│     Channel        Drive Name      Array Name   Mode   Size(GB) Status│
│ Channel0 Device0  IC35L040AVVA07-0   Array0   ATA 100  38.34   Broken │
│                                                                       │
│                                                                       │
│ Note:                                                                 │
│ 1)Press <ESC> to Exit.                                                │
│ 2)After Execute,Press <TAB> immediately can into Utility Window!      │
└───────────────────────────────────────────────────────────────────────┘
```

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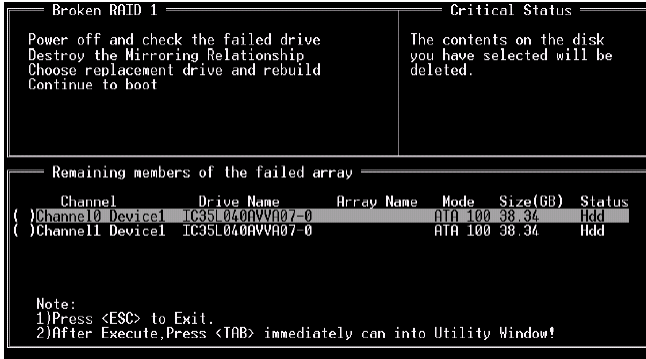
Highlight the target hard drive and press <Enter>, a warning message will appear. Press **Y** to use that hard drive to rebuild, or press **N** to cancel. Please note selecting option **Y** will destroy all the data on the selected hard drive.

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

⑥ **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 s p e c i f y a n 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

⑥ **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.

⑥ **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

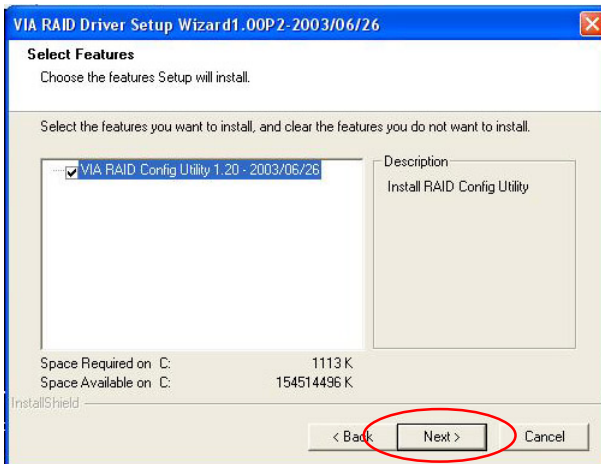Insert the MSI CD and click on the **VIA SATA RAID Utility** to install the software.
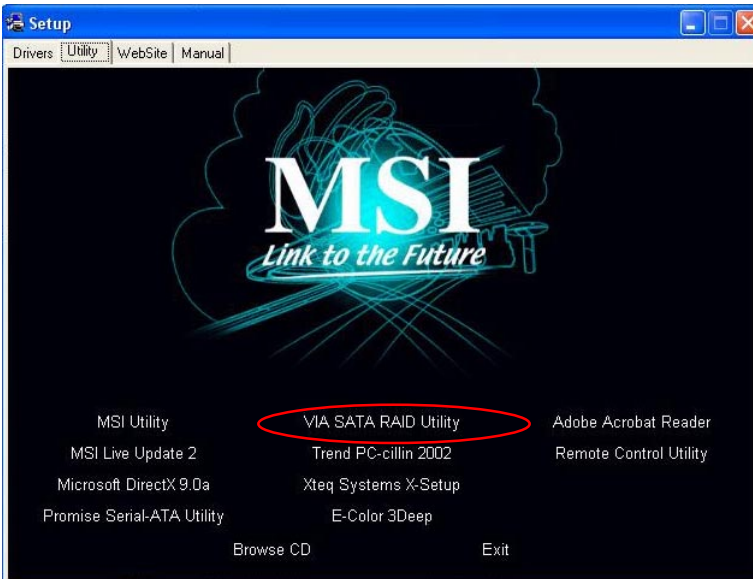
The **InstallShield Wizard** will begin automatically for installation. Click on the **Next** button to proceed the installation in the welcoming window.
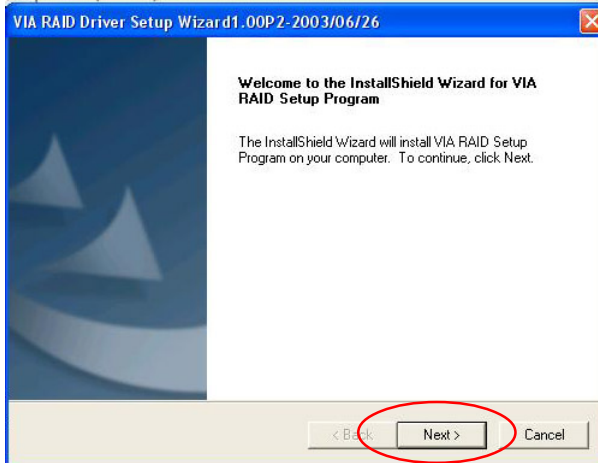
Put a check mark in the check box to install the feature you want. Then click **Next** button to proceed the installation.

Using VIA RAID Tool

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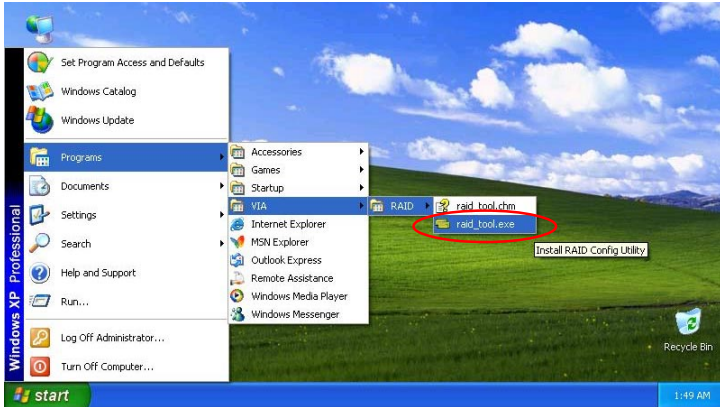
After the software is finished installation, it will automatically started every time Windows is initiated. You may double-click on the icon shown in the system tray of the tool bar to launch the **VIA RAID Tool** utility.

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. The available features are as following:

View by Controller

View by Devices

View Event log

Help Topics

It means that VT8237 SATA RAID only has the feature of monitoring the statuses of RAID 0 and RAID 1.

Click on [icon] or [icon] 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.
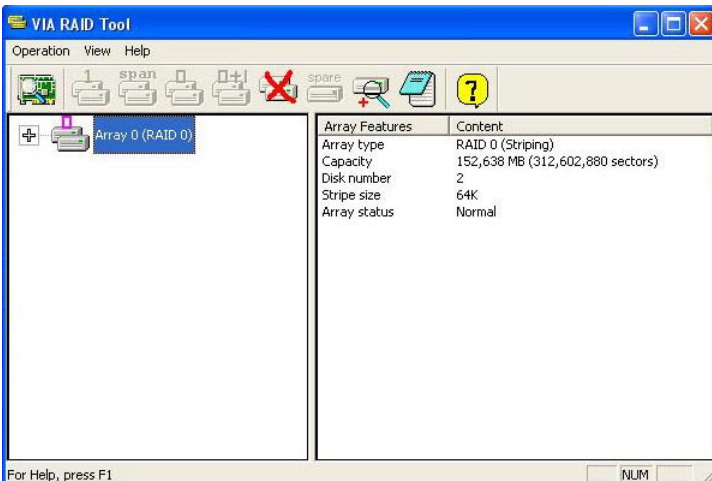
Click on the plus (+) symbol next to Array 0---RAID 0 to see the details of each disk.
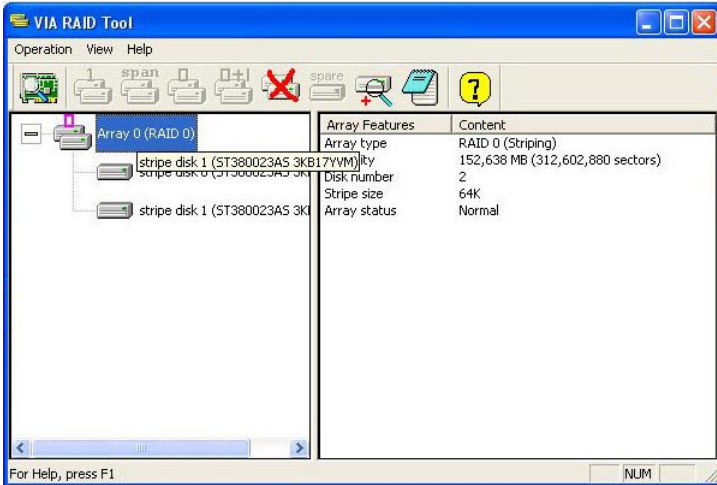
You may also use the same or button to view the statuses of Array 0---RAID 1.
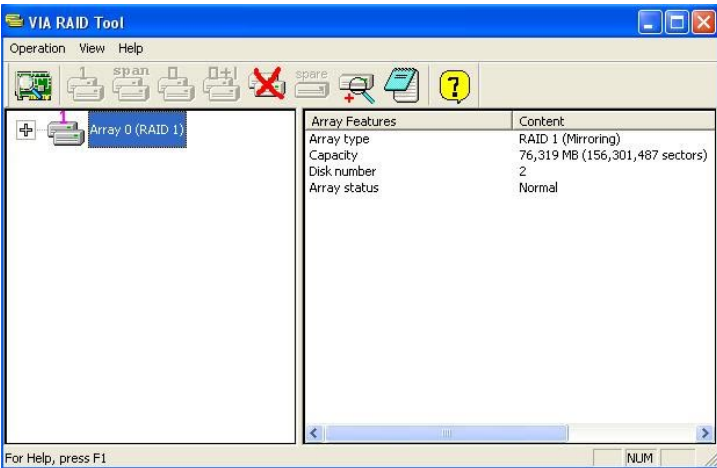
Click on the plus (+) symbol next to Array 0---RAID 1 to see the details of each disk.