MSI

661FM2 Series

MS-7060 (v1.X) Micro ATX Mainboard

G52-M7060X4

Manual Rev: 1.2
Release Date: July 2004

$C\epsilon$ **☑ N1996**

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.
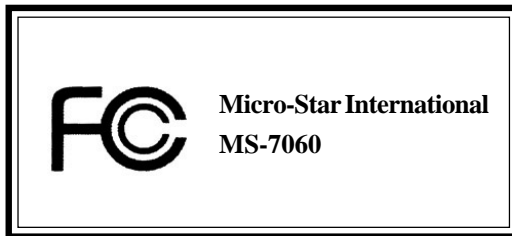
Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIRLANOTICED'INSTALLATIONAVANTDERACCORDERAURESEAU.

FC   **Micro-Star International**
     MS-7060

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Revision History

Revision	Revision History	Date
V1.0	First release for PCB 1.x with chipsets SiS661FX & SiS964	May 2004
V1.1	Special version for Medion	June 2004
V1.2	Update marketing name and add RAID content	July 2004

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 60^0 C (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.

CONTENTS

1

Getting Started

Thank you for purchasing 661FM2 Series (MS-7060 v1.X) Micro ATX mainboard. The 661FM2 series is based on **SiS® 661FX** & **SiS® 964** chipsets for optimal system efficiency. Designed to fit the advanced **Intel® Pentium 4** processor in the 478-pin package, the 661FM2 series delivers a high performance and professional desktop platform solution.

Mainboard Specifications

CPU
➤ Socket 478 for P4 Celeron/Celeron D(FSB 400/533 Mhz)/Northwood/
   Prescott CPUs with FSB400/533/800MHz up to 3.4GHz.

(For the latest information about CPU, please visit http://www.msi.com.tw/program/

products/mainboard/mbd/pro_mbd_cpu_support.php)

Chipset
➤ SiS® 661FX
   - Supports Intel Pentium 4 processors with data transfer rate up to 800MHz
   - Supports 64-bit high performance DDR400/DDR333/DDR266 memory controller
   - Supports high performance & high quality 3D Graphic Accelerator
   - Supports AGP 8x/4x interface
   - Supports bi-directional 16-bit data bus with 1GHz bandwidth
➤ SiS® 964
   - Supports Dual IDE ATA 100/133
   - Integrated audio controller with AC97 interface
   - Supports HyperTransport Technology
   - Advanced power management and PC2001 compliance
   - Serial ATA host controller
   - Dual IDE Master/Slave Controller

Main Memory
➤ Supports two memory banks using two 184-pin unbuffered DDR DIMMs.
➤ Supports up to 2GB memory size without ECC.
➤ Supports DDR266/333/400.

(For the updated supporting memory modules, please visit http://www.msi.com.tw/

program/products/mainboard/mbd/pro_mbd_trp_list.php)

Slots
➤ One 8x/4x AGP (Accelerated Graphics Port) universal slot.
➤ Three PCI 2.2 32-bit Master PCI Bus slots.

On-Board IDE
➤ Dual IDE controllers integrated in SiS® 964.
➤ Support Bus Master, Ultra DMA 33/66/100/133 operation modes.
➤ Can connect up to four IDE devices.

On-Board Peripherals
➤ On-Board Peripherals include:
  - 1 floppy port supports 2 FDDs with 360K, 720K, 1.2M, 1.44M and 2.88 Mbytes.
  - 2 serial ports (one is pinheader) + 1 VGA port
  - 1 PS2 keyboard + 1 PS2 mouse connectors
  - 1 parallel port supports SPP/EPP/ECP mode
  - 8 high speed USB 2.0/1.1 ports (Rear * 4 / Front * 4)
  - 1 audio (Line-In/Line-Out/Mic-In) port
  - 1 SPDIF-Out pinheader
  - 1 RJ-45 LAN connector
  - 2 IEEE 1394 ports (Real * 1/ Front * 1 with pinheader) (Optional)
  - 1 CD-In pinheader

Audio
➤ AC97 link controller integrated in SiS® 964.
➤ 5.1 channels Realtek ALC655 S/W audio codec
  - Comply with AC97 2.3 Spec
  - Meets PC2001 audio performance requirement
  - Can support SPDIF out via a 3-pin SPDIF-Out pinheader.

LAN
➤ Fast Ethernet integrated in SiS® 964.
➤ Realtek 8201BL LAN PHY.
➤ IEEE 802.3 and 802.3x Standard Compatible
➤ Supports ACPI v1.0b and PCI power management v1.1 Standard

BIOS
➤ 4MB Award BIOS with PNP BIOS, ACPI, SMBIOS 2.3, Green and Boot Block.
➤ Provides DMI 2.0, WFM 2.0, WOL, WOR, chassis intrusion, and SMBus for system management.

Dimension
➤ Micro-ATX Form Factor: 9.6 inch (L) x 9.6 inch (W).

Mounting
➤ 9 mounting holes.

Mainboard Layout
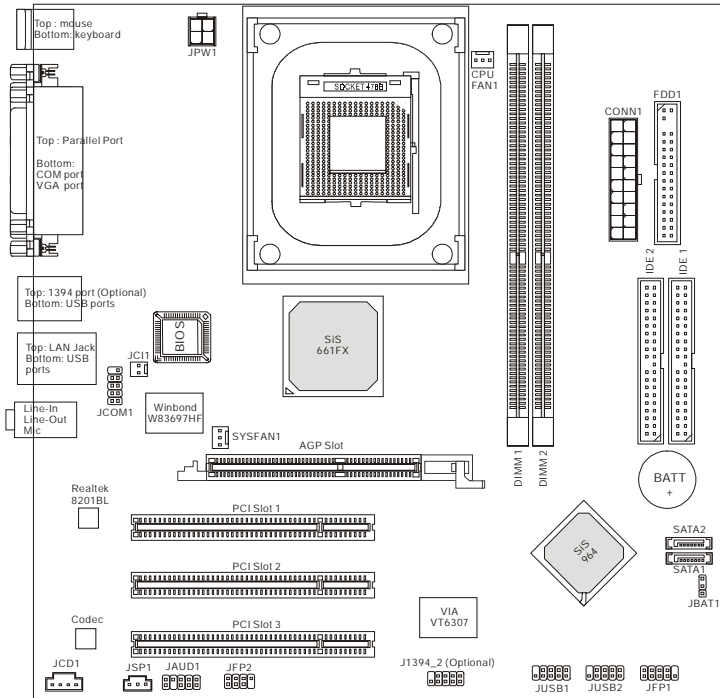
661FM2 Series (MS-7060) v1.X Micro ATX Mainboard

2

Hardware Setup

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

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

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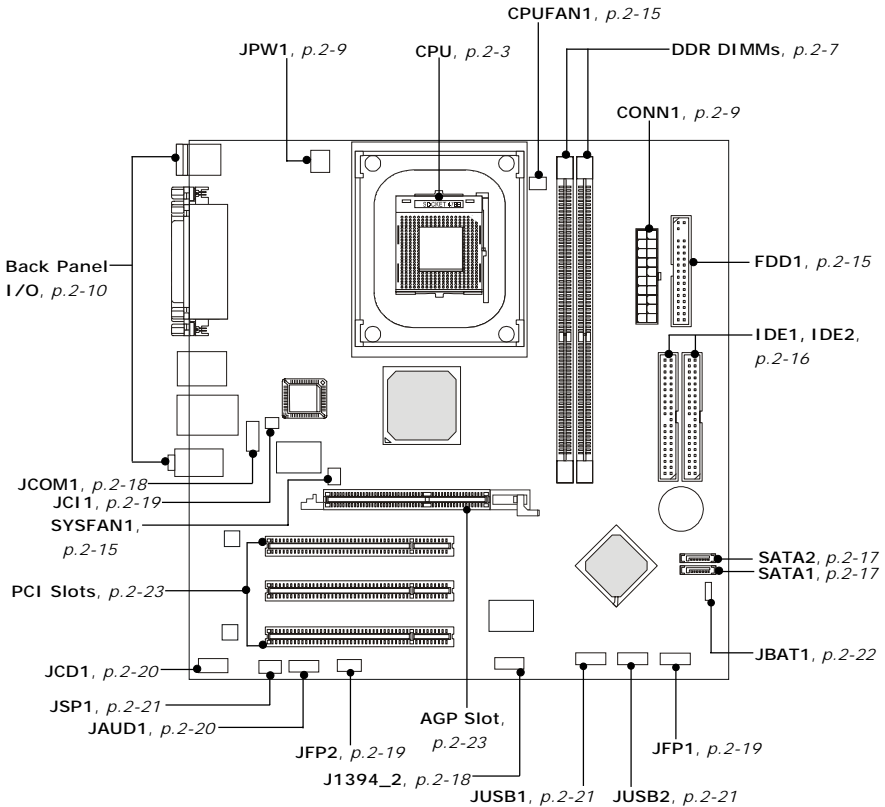
Central Processing Unit: CPU

The mainboard supports Intel® Pentium® 4 Prescott & Northwood processor in the 478 pin package. The mainboard uses a CPU socket called PGA478 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not find the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer. (For the latest information about CPU, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php)

CPU Core Speed Derivation Procedure

If	CPU Clock	=	100MHz
	Core/Bus ratio	=	17
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	100MHz x 17
		=	1.7 GHz

Memory Speed/CPU FSB Support Matrix

Memory FSB	DDR266	DDR333	DDR400
400 MHz	OK	OK	OK
533 MHz	OK	OK	OK
800 MHz	OK	OK	OK

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.

Replacing the CPU
While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from grounded outlet first to ensure the safety of CPU.

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

Gold arrow   Correct CPU placement   O

Gold arrow   Incorrect CPU placement   X

Press down the CPU   Close Lever
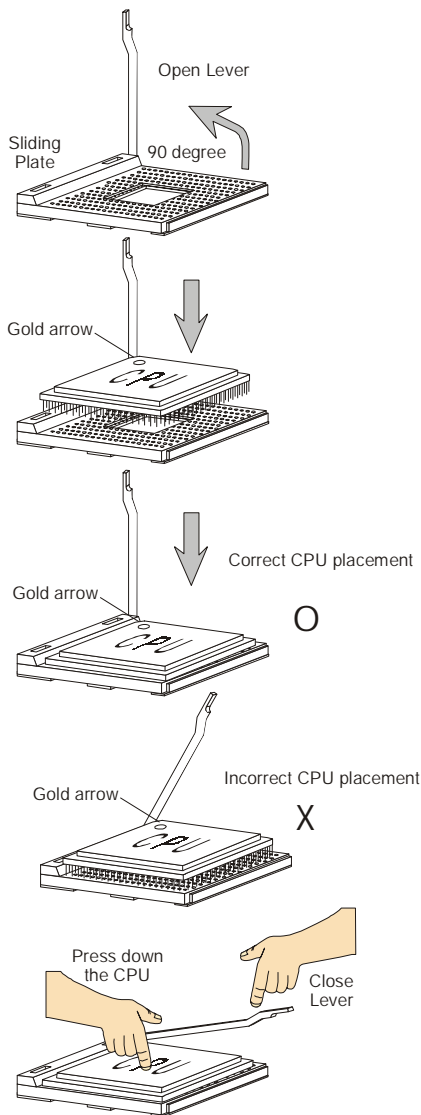
Installing the CPU Fan

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 motherboard.

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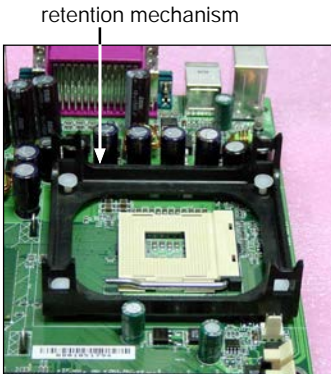
2. Position the heatsink onto the retention mechanism.
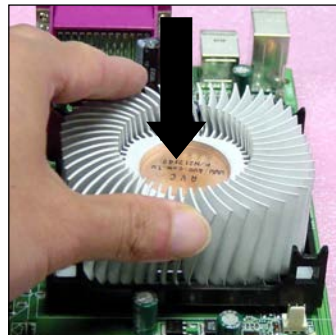
3. Mount the fan on top of the heatsink. Press down the fan until its four clips get wedged in the holes of the retention mechanism.
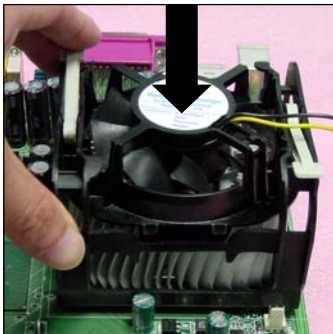
4. Press the two levers down to fasten the fan. Each lever can be pressed down in only ONE direction.

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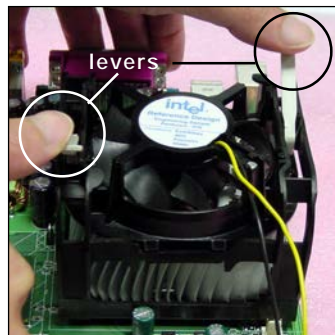
5. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the board.
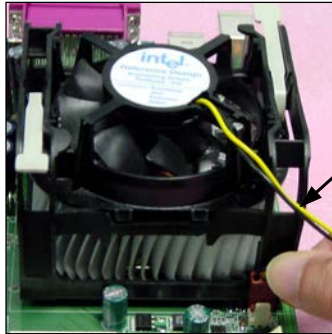
fan power cable

NOTES

Memory

The mainboard provides two 184-pin unbuffered DDR266/DDR333/DDR400 DDR SDRAM, and supports the memory size up to 2GB without ECC. To operate properly, at least one DIMM module must be installed.

(For the updated supporting memory modules, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_trp_list.php)

DDR DIMM Slots
(DDR 1~2)

Introduction to DDR SDRAM
DDR (Double Data Rate) SDRAM is similar to conventional SDRAM, but doubles the rate by transferring data twice per cycle. It uses 2.5 volts as opposed to 3.3 volts used in SDR SDRAM, and requires 184-pin DIMM modules rather than 168-pin DIMM modules used by SDR SDRAM.

DDR Module Combination

Install at least one DIMM module on the slots. Memory modules can be installed on the slots in any order. You can install either single- or double-sided modules to meet your own needs.

Memory modules can be installed in any combination as follows:

Slot	Memory Module	Total Memory
DDR 1 (Bank 0 & 1)	S/D	64MB~1GB
DDR 2 (Bank 2 & 3)	S/D	64MB~1GB
Maximum System Memory Supported		64MB~2GB

S: Single Side   D: Double Side

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.

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

Volt   Notch
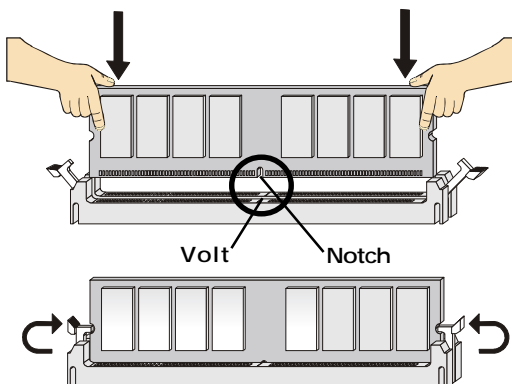
MSI Reminds You...
You can barely see the golden finger if the module is properly *inserted in the socket.*

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: CONN1
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.
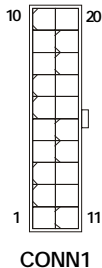
CONN1 Pin Definition

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

CONN1

10 20

1 11

ATX 12V Power Connector: JPW1
This 12V power connector is used to provide power to the CPU.
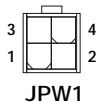
JPW1 Pin Definition

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

3 4
1 2

JPW1

MSI Reminds You...
Power supply of 300-watt (and above) is highly recommended for system stability.

Back Panel

The back panel provides the following connectors:

L-in
L-out

Mouse　　**Parallel**　　**1394**　　**LAN**
　　　　　　　　　　　(Optional)

Keyboard　**COM Port**　　**VGA Port**　　**USB Port**　**USB Port**　**MIC**
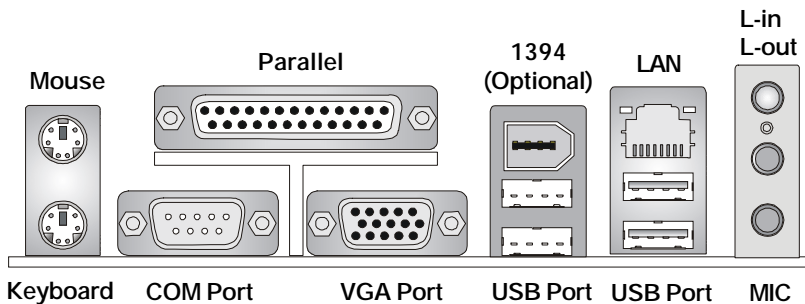
Mouse Connector

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin assignments are as follows:
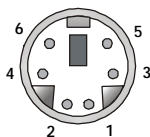
PS/2 Mouse (6-pin Female)

Pin Definition

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

Keyboard Connector

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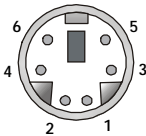
Pin Definition

PS/2 Keyboard (6-pin Female)

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

USB Connectors

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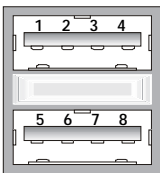
USB Port Description

USB Ports

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

Serial Port Connector

The mainboard offers one 9-pin male DIN connector. It is 16550A high speed communication port that sends/receives/ 16 bytes FIFOs. You can attach a serial mouse or other serial device directly to it.

Pin Definition

1 2 3 4 5		
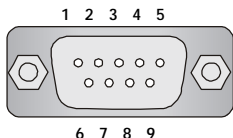
9-Pin Male DIN Connector

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

VGA Connector

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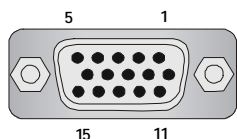
VGA Connector,DB 15-pin

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

IEEE 1394 Port (Optional)

The back panel provides one standard IEEE 1394 port. The standard IEEE 1394 port connects to IEEE 1394 devices without external power. The IEEE 1394 high-speed serial bus complements USB by providing enhanced PC connectivity for a wide range of devices, including consumer electronics audio/video (A/V) appliances, storage peripherals, other PCs, and portable devices.

1394 Port

RJ-45 LAN Jack

The mainboard provides one standard RJ-45 jack for connection to Local Area Network (LAN). You can connect a network cable to the LAN jack.
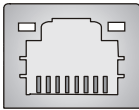
Pin Definition

RJ-45 LAN Jack

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

Audio Port Connectors

Line Out is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape player, or other audio devices. **Mic** is a connector for microphones.

1/8″ Stereo Audio Connectors

Line In

Line Out

MIC
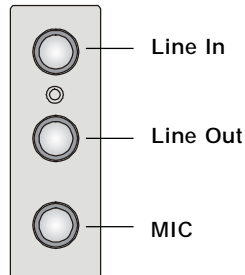
MSI Reminds You...
*For advanced audio application, Realtek ALC 655 is provided to offer support for **6-channel audio operation** and can turn rear audio connectors from 2-channel to 4-/6-channel audio. For more information on **6-channel audio operation**, please refer to Appendix. Using 4- or 6-Channel Audio Function.*

Parallel Port Connector: LPT1

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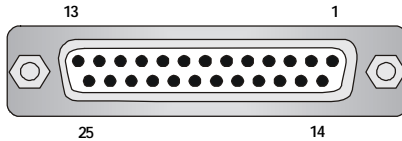
Pin Definition

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

Connectors

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

Floppy Disk Drive Connector: FDD1
The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.

FDD1
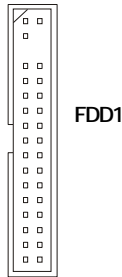
Fan Power Connectors: CPUFAN1 & SYSFAN1
The CPUFAN1 (processor fan) and SYSFAN1 (system fan) support system cooling fan with +12V. They support three-pin head connector. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

+12V

SENSOR   GND

CPUFAN1

SENSOR
+12V
GND
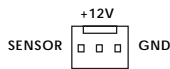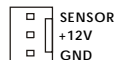
SYSFAN1

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

Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect up to four hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices. These connectors support the provided IDE hard disk cable.
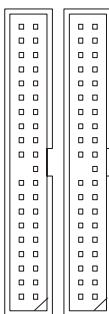
IDE2   IDE1

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 HDD Connectors: SATA1 & SATA2
The mainboard provides dual high-speed Serial ATA interface ports. The ports support
1st generation Serial ATA data rates of 150MB/s and are fully compliant with Serial ATA
1.0 specifications. Each Serial ATA connector can connect to 1 hard disk drive.

SATA2

1   7

SATA1
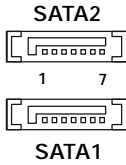
Pin Definition

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

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

Optional Serial ATA cable

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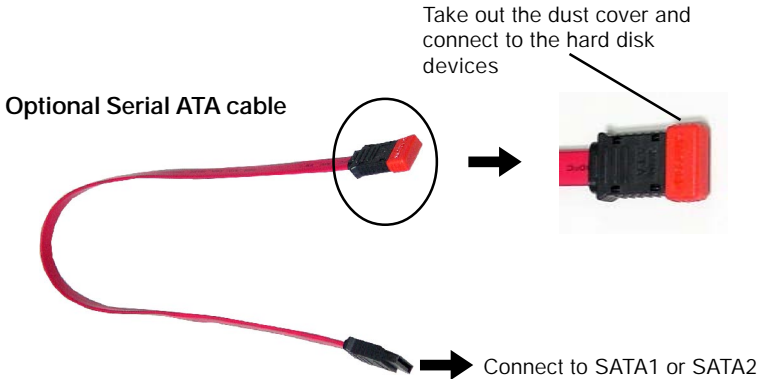
MSI Reminds You...
Please do not fold the Serial ATA cable into 90-degree angle. Otherwise,
the loss of data may occur during transmission.

IEEE 1394 Connector: J1394_2 (Optional)

The mainboard provides one IEEE1394 pin header that allows you to connect IEEE 1394 ports via an external IEEE1394 bracket (optional).

Pin Definition

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

J1394_2

Connected to J1394_2

IEEE1394 Bracket (Optional)

Foolproof design
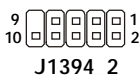
Serial Port Connector: JCOM1

The mainboard offers one serial port JCOM1. It is 16550A high speed communication ports that senda/receivea/ 16 bytes FIFOs. You can attach a serial mouse or other serial device directly to it.

Pin Definition

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

JCOM1
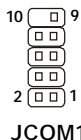
Chassis Intrusion Switch Connector: JCI1

This connector is connected to 2-pin connector chassis switch. If the Chassis is open, the switch will be short. The system will record this status. To clear the warning, you must enter the BIOS setting and clear the status.

GND
CINTRU   JCI1
1
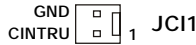
Front Panel Connectors: JFP1 & JFP2

The mainboard provides two front panel connectors JFP1/JFP2 for electrical connection to the front panel switches and LEDs. It is compliant with Intel® Front Panel I/O Connectivity Design Guide.

Speaker

Power Power
LED   Switch

JFP2   2   8   2   10   JFP1
       1   7   1   9

Power   HDD   Reset
LED   LED   Switch
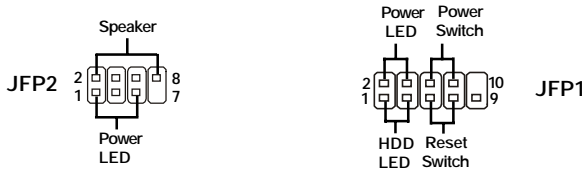
JFP1 Pin Definition

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

JFP2 Pin Definition

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

CD-In Connector: JCD1

The connector is for CD-ROM audio connector.

JCD1

R GND L
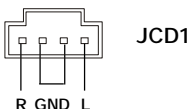
Front Panel Audio Connector: JAUD1

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

9   1
10   2

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

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.

9   5
10   6

Front USB Connectors: JUSB1 & JUSB2

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

JUSB1/JUSB2 Pin Definition

JUSB1/JUSB2
(USB 2.0/Intel spec)

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	USBOC

SPDIF Connector: JSP1

The connector is used to connect SPDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.

JSP1 Pin Definition

JSP1

PIN	SIGNAL
1	VCCS
2	SPDIF0
3	GND

Connected to JSP1

The JSP1 supports SPDIF output only and can be connected to an external SPDIF Bracket for digital audio transmission.

SPDIF Bracket (Optional)

Jumpers

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

Clear CMOS Jumper: JBAT1

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

JBAT1

3   3

1   1

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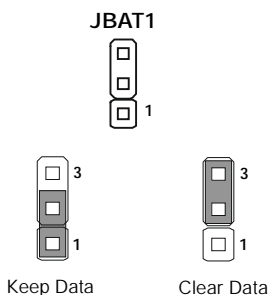
MSI Reminds You...
You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Slots

The motherboard provides one AGP slot, three 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.
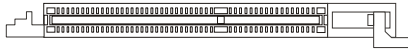
AGP Slot

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.
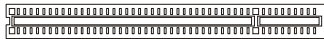
PCI Slot

PCI Interrupt Request Routing

The IRQ, abbreviation 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 B#	INT C#	INT D#	INT A#
PCI Slot 2	INT C#	INT D#	INT A#	INT B#
PCI Slot 3	INT D#	INT A#	INT B#	INT C#

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 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. While booting up, the BIOS version is shown in the 1st line appearing after the memory counting. It is usually in the format: e x a m p l e : W7060SMS V1.1 040104
where:
1st digit refers to BIOS maker as A=AMI(R); W=AWARD(R)
2nd - 5th digit refers to the model number.
6th - 7th digit refers to the customer, MS=all standard customers.
V1.1 refers to the BIOS version.
040104 refers to the date this BIOS is 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.

Press DEL to enter SETUP

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.

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
<F1>	General help, only for Status Page Setup Menu and Option Page Setup Menu
<F5>	Load Previous Values
<F6>	Load Fail-Safe Defaults
<F7>	Load Optimized Defaults

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the control keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu containing additional options can be launched from this field. You can use control keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press <Esc >.

▸ IDE Primary Master
▸ IDE Primary Slave
▸ IDE Secondary Master
▸ IDE Secondary Slave

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

MSI

MSI Reminds You...
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.

The Main Menu

Once you enter Award® BIOS CMOS Setup Utility, the Main Menu (figure below) will appear on the screen. The Main Menu allows you to select from twelve setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```
             Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features          ▶ Frequency/Voltage Control

   ▶ Advanced BIOS Features            Load Fail-Safe Defaults

   ▶ Advanced Chipset Features         Load Optimized Defaults

   ▶ Integrated Peripherals            Set Supervisor Password

   ▶ Power Management Setup            Set User Password

   ▶ PnP/PCI Configurations           Save & Exit Setup

   ▶ PC Health Status                 Exit Without Saving

   Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←  : Select Item
   F10 : Save & Exit Setup

                  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 Award® special enhanced features.

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

Integrated Peripherals
Use this menu to specify your settings for integrated peripherals.

Power Management Setup
Use this menu to specify your settings for power management.

PNP/PCI Configurations
This entry appears if your system supports PnP/PCI.

PC Health Status
This entry shows your PC health status.

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

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

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

Set Supervisor Password
Use this menu to set Supervisor Password.

Set User Password
Use this menu to set User Password.

Save & Exit Setup
Save changes to CMOS and exit setup.

Exit Without Saving
Abandon all changes and exit setup.

Standard CMOS Features

The items in Standard CMOS Features Menu are divided into 11 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

```
                    Phoenix - AwardBIOS CMOS Setup Utility
                            Standard CMOS Features

     Date (mm:dd:yy)           Mon, Apr 19 2004          Item Help
     Time (hh:mm:ss)            9 : 31 : 36
                                                    Menu Level  ▶
   ▶ IDE Primary Master
   ▶ IDE Primary Slave                              Change the day, month,
   ▶ IDE Secondary Master                           year and century
   ▶ IDE Secondary Slave

     Drive A                  [1.44M, 3.5 in.]
     Drive B                  [None]

     Video                    [EGA/VGA]
     Halt On                  [All , But Keyboard]

     Base Memory                     640K
     Extended Memory               65535K
     Total Memory                   1024K


  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Date
The date format is <day> <month> <date> <year>.

day	Day of the week, from Sun to Sat, determined by BIOS. Read-only.
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.

Time
The time format is <hour> <minute> <second>.

IDE Primary/Secondary Master/Slave
Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

Access Mode	The settings are CHS, LBA, Large, Auto.
Capacity	The formatted size of the storage device.
Cylinder	Number of cylinders.
Head	Number of heads.
Precomp	Write precompensation.
Landing Zone	Cylinder location of the landing zone.
Sector	Number of sectors.

Drive A/B
This item allows you to set the type of floppy drives installed. Setting options: [None], [360K], [5.25 in.], [1.2M], [5.25 in.], [720K, 3.5 in.], [1.44M, 3.5 in.], [2.88M, 3.5 in.]

Video
The setting controls the type of video adapter used for the primary monitor of the system. Setting options: [EGA/VGA], [CGA 40], [CGA 80], [MONO].

Halt On
The setting determines whether the system will stop if an error is detected at boot. Setting options are:

All Errors	The system stops when any error is detected.
No Errors	The system doesn't stop for any detected error.
All, But Keyboard	The system doesn't stop for a keyboard error.
All, But Diskette	The system doesn't stop for a disk error.
All, But Disk/Key	The system doesn't stop for either a disk or a keyboard error.

Base/Extended/Total Memory
The three items show the memory status of your system (read only).

Advanced BIOS Features

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

    Quick Boot               [Enabled]              Item Help
    Full Screen LOGO Show     [Enabled]
    Anti-Virus Protection     [Disabled]       Menu Level    ▶
  ▶ Boot Sequence            [Press Enter]
    Hard Disk S.M.A.R.T       [Disabled]
    Boot Up Num-Lock LED      [On]
    CPU L1 & L2 Cache         [Enabled]
    CPU L3 Cache              [Enabled]
    Swap Floppy               [Disabled]
    Seek Floppy               [Disabled]
    Typematic Rate Setting    [Disabled]
  x Typematic Rate (Chars/Sec) 6
  x Typematic Delay (Msec)     250
    Security Option           [Setup]
    Boot OS/2 For DRAM > 64MB [No]
    Limit CPUID MaxVal        [Disabled]
    HT CPU Function           [Enabled]
    APIC Function             [Enabled]
    MPS Table Version         [1.4]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```

Quick Boot
Setting the item to [Enabled] allows the system to boot within 5 seconds since it will skip some check items. Setting options: [Disabled], [Enabled].

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.

Anti-Virus Protection
The item is to set the Virus Warning feature for IDE Hard Disk boot sector protection. If the function is [Enabled] and any attempt to write data into this area is made, BIOS will display a warning message on screen and beep. Setting options: [Disabled], [Enabled].

Boot Sequence

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

```
1st Boot Device         [Floppy]
2nd Boot Device         [HDD-0]
3rd Boot Device         [CDROM]
Boot Other Device       [Enabled]
```

1st/2nd/3rd Boot Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

Boot Other Device
Setting the option to [Enabled] allows the system to try to boot from other device if the system fails to boot from the 1st/2nd/3rd boot device. Setting options: [Enabled], [Disabled].

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. Setting options: [Auto], [Enabled], [Disabled].

> **MSI Reminds You...**
> 1. *Available settings for "1st/2nd/3rd Boot Device" vary depending on the bootable devices you have installed. For example, if you did not install a floppy drive, the setting "Floppy" does not show up.*
> 2. *If you want to boot from any of the USB-interface devices, please set* **USB Keyboard/Mouse Support** *in* **SiS OnChip PCI Device** *of* **Integrated Peripherals** *to* **Enabled.**

Boot Up NumLock LED
This setting 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 users to use the arrow keys on the numeric keypad. Setting options: [On], [Off].

CPU L1 & L2 Cache
The item allows you to turn on or off CPU's internal (L1) and external (L2) cache. Setting options: [Enabled], [Disabled].

CPU L3 Cache
This item is only for CPU that supports L3 Cache; e.g. Intel® Pentium 4 Extreme Edition. Setting options: [Enabled], [Disabled].

Swap Floppy
Setting to [Enabled] will swap floppy drives A: and B:.

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

Typematic Rate Setting
This item is used to enable or disable the typematic rate setting including Typematic Rate & Typematic Delay. Setting options: [Disabled], [Enabled].

> **Typematic Rate (Chars/Sec)**
> After **Typematic Rate Setting** is [Enabled], this item allows you to set the rate (characters/second) at which the keys are accelerated. Setting options: [6], [8], [10], [12], [15], [20], [24], [30].

Typematic Delay (Msec)
> This item allows you to select the delay between when the key was first pressed and when the acceleration begins. Setting options: [250], [500], [750] and [1000].

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.
[System]	A password prompt appears every time when the computer is powered on or when end users try to run Setup.

Boot OS/2 for DRAM > 64MB
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose [No], you cannot run the OS/2® operating system with DRAM larger than 64MB. But it is possible if you choose [Yes]. Setting options: [Yes], [No].

Limit CPUID MaxVal
If installing Windows NT series OS with Prescott CPU, you must [Enable] this item function; if you use other OS except Windows NT, you have to [Disable] this item function. Setting options: [Enabled], [Disabled].

HT CPU Function
This field is used to [Enabled] or [Disabled] the Intel Hyper Threading CPU function. Setting to [Enabled] will increase the system performance. Setting options: [Enabled], [Disabled]. **Please disable this item if your operating system doesn't support *HT Function*, or unreliability and instability may occur.**

APIC Function
This field is used to [Enabled] or [Disabled] the APIC (Advanced Programmable Interrupt Controller). Due to compliance to PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQs resources for the system. Setting options: [Enabled], [Disabled].

MPS Table Version
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. Setting options: [1.4], [1.1].

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: Only Microsoft® Windows 2000 and XP can support HT technology.

Advanced Chipset Features

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

  ▶ DRAM Clock/Timing Control  [Press Enter]      Item Help
  ▶ AGP & P2P Bridge Control   [Press Enter]
  ▶ OnChip AGP Control         [Press Enter]   Menu Level   ▶




↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```
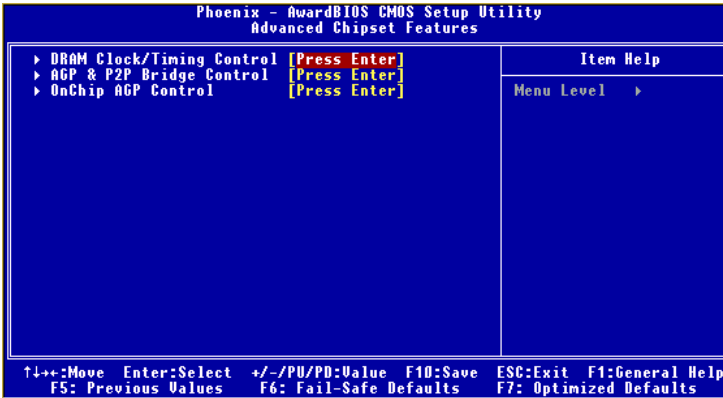
MSI Reminds You...
Change these settings only if you are familiar with the chipset.

DRAM Clock/Timing Control
Press <Enter> and the following sub-menu appears:

```
         Phoenix - AwardBIOS CMOS Setup Utility
                DRAM Clock/Timing Control

    Current CPU Frequency                          Item Help
    Current DRAM Frequency
    Current DDR Frequency                       Menu Level   ▶▶
    Performance Mode          [Disabled]
    DRAM Frequency            [By SPD]
    DRAM Timing Control       [By SPD]
  x DRAM CAS Latency           2.5T
  x RAS Active Time(tRAS)      6T
  x RAS Precharge Time(tRP)    3T
  x RAS to CAS Delay(tRCD)     3T
    MA 1T/2T Select           [AUTO]
```

Current CPU/DRAM/DDR Frequency
These items allow you to view the current CPU/DRAM/DDR frequency.

Performance Mode
This setting particularly provided by SiS gives the proper suggestion for user to set timing. The Timings programmed into this register are dependent on the sys tem design. Setting options: [Enabled], [Disabled].

DRAM Frequency
This allows you to determine the DRAM frequency manually. Setting options: [By SPD], [100 MHz], [133 MHz], [166 MHz], [200 MHz].

DRAM Timing Control

This field allows you to select the DRAM timing setting. Setting to [By SPD] enables Max Memclock (Mhz) automatically to be determined by SPD. Selecting [Manual] allows users to configure these fields manually.

DRAM CAS Latency

When the *DRAM Timing Control* is set to [Manual], this field is adjustable. The field controls the CAS latency, which determines the timing delay before SDRAM starts a read command after receiving it. Setting options: [2T], [2.5T], [3T]. [2T] increases system performance while [3T] provides more stable system performance.

RAS Active Time (tRAS)

When the *DRAM Timing Control* is set to [Manual], this field is adjustable. This setting determines the time RAS takes to read from and write to a memory cell. Setting options: [4T] to [9T].

RAS Precharge Time (tRP)

When the *DRAM Timing Control* is set to [Manual], this field is adjustable. 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, refreshing 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].
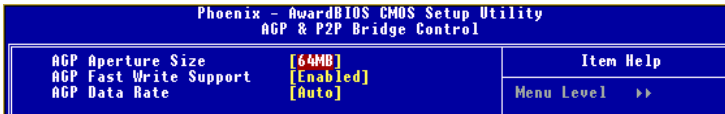
RAS to CAS Delay (tRCD)

When the *DRAM Timing Control* is set to [Manual], this field is adjustable. 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].

MA 1T/2T Select

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

AGP & P2P Bridge Control
Press <Enter> and the following sub-menu appears:

```
             Phoenix - AwardBIOS CMOS Setup Utility
                  AGP & P2P Bridge Control

   AGP Aperture Size      [64MB]              Item Help
   AGP Fast Write Support [Enabled]
   AGP Data Rate          [Auto]          Menu Level   ▶▶
```

AGP Aperture Size
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], [256MB], [512MB].

AGP Fast Write Support
This option [Enabled] or [Disabled] the AGP Fast Write feature. The Fast Write technology allows the CPU to write directly to the graphics card without passing anything through the system memory and improves the AGP 4X speed.

AGP Data Rate
This option allows you to specify the transferring data rate of AGP. Setting options: [Auto], [1X], [2X], [4X], [8X].

OnChip AGP Control
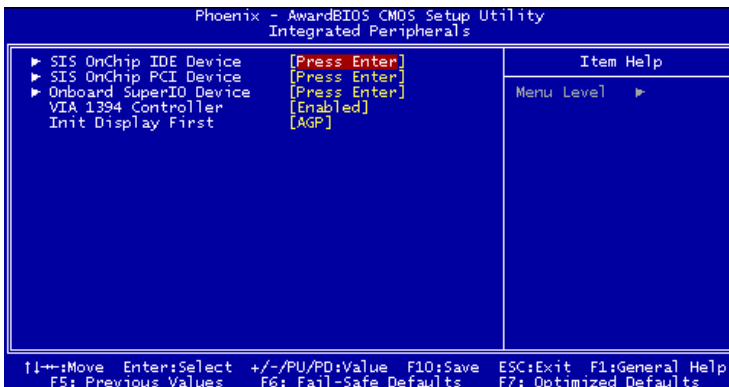Press <Enter> and the following sub-menu appears:

```
             Phoenix - AwardBIOS CMOS Setup Utility
                     OnChip AGP Control

   VGA Share Memory Size  [32  MB]            Item Help
   Graphics Engin Clock   [133MHz]
                                          Menu Level   ▶▶
```

VGA Shared Memory Size
Specify the size of system memory to allocate for video memory, from [16] to [128] MB.
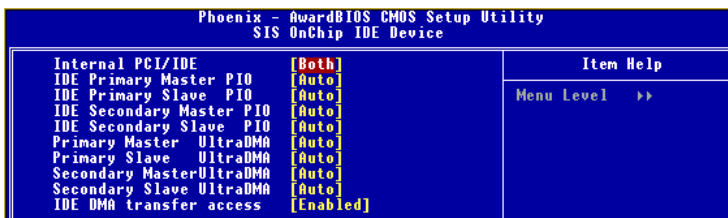
Graphics Engin Clock
This option allows you to choose the performance of graphics engin clock. Setting options:[100MHz], [133MHz], [166MHz], [200MHz]

Integrated Peripherals

```
              Phoenix - AwardBIOS CMOS Setup Utility
                     Integrated Peripherals

  ► SIS OnChip IDE Device      [Press Enter]        Item Help
  ► SIS OnChip PCI Device      [Press Enter]
  ► Onboard SuperIO Device     [Press Enter]    Menu Level  ►
    VIA 1394 Controller        [Enabled]
    Init Display First         [AGP]










  ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values      F6: Fail-Safe Defaults   F7: Optimized Defaults
```

SiS OnChip IDE Device
Press <Enter> and the following sub-menu appears:

```
              Phoenix - AwardBIOS CMOS Setup Utility
                     SIS OnChip IDE Device

    Internal PCI/IDE          [Both]              Item Help
    IDE Primary Master PIO    [Auto]
    IDE Primary Slave  PIO    [Auto]          Menu Level  ►►
    IDE Secondary Master PIO  [Auto]
    IDE Secondary Slave  PIO  [Auto]
    Primary Master  UltraDMA  [Auto]
    Primary Slave   UltraDMA  [Auto]
    Secondary MasterUltraDMA  [Auto]
    Secondary Slave UltraDMA  [Auto]
    IDE DMA transfer access   [Enabled]
```

Internal PCI/IDE
The field specifies the internal primary and secondary PCI/IDE controllers. Setting options: [Disabled], [Primary], [Secondary], [Both].

IDE Primary/Secondary Master/Slave PIO
The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In [Auto] mode, the system automatically determines the best mode for each device. Setting options: [Auto], [Mode 0], [Mode 1], [Mode 2], [Mode 3], [Mode 4].

**Primary/Secondary Master/Slave Ultra DMA**
Ultra DMA 33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows ME, XP or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66, Ultra DMA/100 and Ultra DMA/133, select [Auto] to enable BIOS support. Setting options: [Auto], [Disabled].

IDE DMA transfer access
Setting to [Enabled] will open DMA bus master and execute DMA action in DOS, which will make the data transferring faster. Setting options: [Disabled], [Enabled].

SiS OnChip PCI Device
Press <Enter> and the following sub-menu appears:
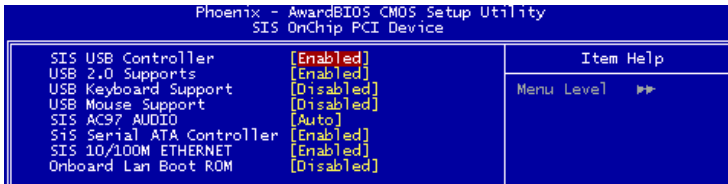
SiS USB Controller
Select [Enabled] if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. Setting options: [Enabled], [Disabled].

USB 2.0 Supports
This item is used to [Enabled] / [Disabled] the USB 2.0 Support. Setting options: [Enabled], [Disabled].

USB Keyboard/Mouse Support
Set to [Enabled] if you need to use a USB keyboard/mouse in the operating system that does not support or does not have any USB driver installed, such as DOS and SCO Unix.

SiS AC97 Audio
[Auto] allows the mainboard to detect whether an audio device is used. If an audio device is detected, the onboard AC97 (Audio Codec'97) controller will be enabled; if not, it is disabled. Disable the controller if you want to use other controller cards to connect an audio device. Setting options: [Auto], [Disabled].

SiS Serial ATA controller
This allows you to enable or disable onchip Serial ATA controller. Setting options: [Disabled], [Enabled].
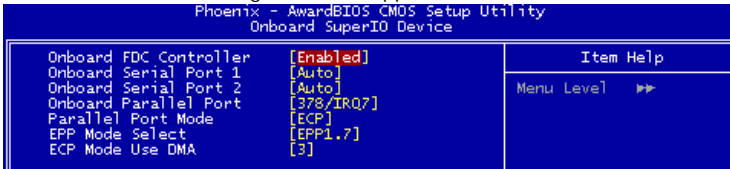
SiS 10/100M Ethernet
This item is used to enable/disable the 10/100M Ethernet function. Setting options: [Enabled], [Disabled].

Onboard Lan Boot ROM
This item is used to decide whether to invoke the Boot ROM of the Onboard LAN Chip. Setting options: [Enabled], [Disabled].

Onboard SuperIO Device

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

```
          Phoenix - AwardBIOS CMOS Setup Utility
                  Onboard SuperIO Device

 Onboard FDC Controller    [Enabled]              Item Help
 Onboard Serial Port 1     [Auto]
 Onboard Serial Port 2     [Auto]          Menu Level    ▶▶
 Onboard Parallel Port     [378/IRQ7]
 Parallel Port Mode        [ECP]
 EPP Mode Select           [EPP1.7]
 ECP Mode Use DMA          [3]
```

Onboard FDC Controller

Select [Enabled] if your system has a floppy disk controller (FDD) installed on the system board and you wish to use it. If you install add-on FDC or the system has no floppy drive, select [Disabled] in this field. Setting options: [Enabled], [Disabled].

Onboard Serial Port 1/Serial Port 2

This item specifies the base I/O port address and IRQ for the onboard Serial Port 1 (LPT1B)/Serial Port 2 (JCOM1). Selecting [Auto] allows BIOS to automatically determine the correct base I/O port address. Setting options: [Disabled], [3F8/IRQ4], [2F8/IRQ3], [3E8/IRQ4], [2E8/IRQ3], [Auto].

Onboard Parallel Port

This specifies the I/O port address and IRQ of the onboard parallel port. Setting options: [378/IRQ7], [278/IRQ5], [3BC/IRQ7], [Disabled].

Parallel Port Mode

This item selects the operating mode for the parallel port: [Normal], [SPP], [EPP], [ECP], or [ECP+EPP].

[SPP]	Standard Parallel Port
[EPP]	Enhanced Parallel Port
[ECP]	Extended Capability Port
[ECP+EPP]	Extended Capability Port + Enhanced Parallel Port
[Normal]	Standard Parallel Port + Bi-Directional Mode.

EPP Mode Select

This item selects the EPP mode. Setting options: [EPP1.9], [EPP1.7].

ECP Mode Use DMA

The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA." At this time, the user can choose between DMA channel [3] or [1].
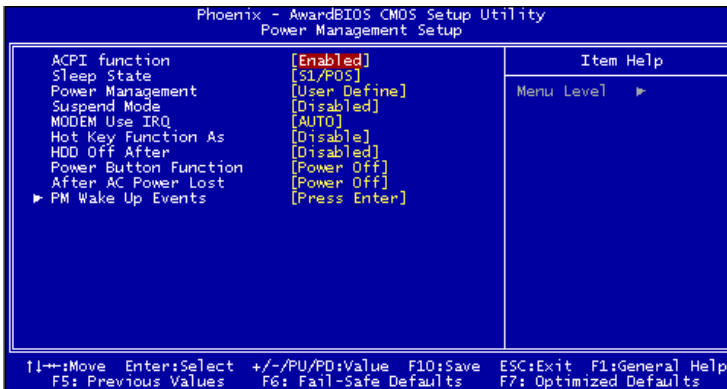
VIA 1394 Controller

This item allows you to enable/disable the onboard IEEE1394 controller. Setting options: [Enabled], [Disabled].

Init Display First

This item specifies which VGA card is your primary graphics adapter. Setting options: [PCI Slot], [AGP].

Power Management Setup

```
         Phoenix - AwardBIOS CMOS Setup Utility
                 Power Management Setup
  ACPI function          [Enabled]         ┌──────────────────┐
  Sleep State            [S1/POS]          │    Item Help     │
  Power Management       [User Define]     ├──────────────────┤
  Suspend Mode           [Disabled]        │ Menu Level   ▶   │
  MODEM Use IRQ          [AUTO]            │                  │
  Hot Key Function As    [Disable]         │                  │
  HDD Off After          [Disabled]        │                  │
  Power Button Function  [Power Off]       │                  │
  After AC Power Lost    [Power Off]       │                  │
▶ PM Wake Up Events      [Press Enter]     │                  │

↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

ACPI Function

This item is to activate the ACPI (Advanced Configuration and Power Management Interface) function. If your operating system is ACPI-aware, such as Windows 98SE/2000/ME, select [Enabled]. Setting options: [Enabled], [Disabled].

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.

Power Management

This item is used to select the degree (or type) of power saving and is related to the mode: *Suspend Mode*. There are three options for power management:

[Min Saving]   Minimum Power Management. Suspend Mode = 1 Hour.
[Max Saving]   Maximum Power Management. Suspend Mode = 1 Min.
[User Define] Allows end users to configure the Suspend Mode field.

Suspend Mode

When you choose [User Define] in the *Power Management* item, this item is selectable. This setting allows you to select the type of Suspend mode. Setting options: [Disabled] (default setting), [1 min] to [1 hour].

MODEM Use IRQ
This setting names the interrupt request (IRQ) line assigned to the modem (if any) on your system. Activity of the selected IRQ always awakens the system. Setting options: [3], [4], [5], [7], [9], [10], [11], [Auto].

Hot Key Function As
This setting specifies the function of the preset hot key (Ctrl+Alt+Backspace). Setting options: [Disable], [Power Off], [Suspend].

HDD Off After
After the selected period of system inactivity, the Hard Disk will be shut off. Setting options: [Disabled], [1-15 Mins].

Power Button Function
This feature allows users to configure the Power Button function. Setting options:

[Power Off]   The power button functions as a normal power-on/-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 item specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Power Off]   Leaves the computer in the power off state.

[Power On]   Leaves the computer in the power on state.

[Last State]   Restores the system to the status before power failure or interrupt occurred.

PM Wake Up Events
Press <Enter> and the following sub-menu appears:

```
          Phoenix - AwardBIOS CMOS Setup Utility
                    PM Wake Up Events
  IRQ [3-7,9-15],NMI        [Enabled]         ┌─────────────────┐
  IRQ 8 Break Suspend       [Disabled]        │    Item Help    │
  MACPME Power Up Control    [Enabled]         ├─────────────────┤
  Wake Up On PME            [Enabled]         │ Menu Level  ▶▶  │
  USB Wake up from S3       [Disabled]
  PS2KB Wakeup from S3/S4/S5[Hot Key]
  PS2MS Wakeup from S3/S4/S5[Disabled]
  Resume by Alarm           [Disabled]
x Month Alarm                 NA
x Day of Month Alarm          0
x Time (hh:mm:ss) Alarm     0 : 0 : 0

  ** Reload Global Timer Events **
  Primary IDE               [Disabled]
  Secondary IDE             [Disabled]
  FDD,COM,LPT Port          [Disabled]
  PCI PIRQ[A-D]#            [Disabled]
```

IRQ [3-7, 9-15], NMI; **IRQ 8 Break Suspend**
These fields specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected. Setting options: [Enabled], [Disabled].

MACPME Power Up Control
These fields specify whether the system will be awakened from power saving modes when activity or input signal of onboard LAN is detected only. Setting options: [Enabled], [Disabled].

Wake Up On PME, USB Wakeup From S3
These fields specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected. Setting options: [Enabled], [Disabled].

PS2KB Wakeup From S3/S4/S5
This setting allows you to wake up the system from S3/S4/S5 states with the options of [Any Key], [Hot Key] and [Password] (max. 8 numbers).

PS2MS Wakeup From S3/S4/S5
This controls how the PS/2 mouse can power on the system. Setting options: [Click], [Move & Click], [Disabled].

MSI Reminds You...
S3-related functions described in this section are available only when your BIOS supports S3 sleep mode.

Resume By Alarm
The field is used to enable or disable the function of Resume By Alarm. Setting options: [Disabled], [Enabled].

Month Alarm
When Resume By Alarm is set to Enabled, the field specifies the month for *Resume By Alarm*. Setting options: [NA], [1-12].

Date of Month Alarm
When Resume By Alarm is set to Enabled, the field specifies the date for **Resume By Alarm**. Setting options: [0] ~[31].

Time (hh:mm:ss) Alarm
When Resume By Alarm is set to Enabled, the field specifies the time for **Resume By Alarm**. Format is <hour><minute><second>.

** Reload Global Timer Events **
Primary/Secondary IDE, FDD/COM/LPT Ports, PCI PIRQ [A-D]#
The global timer is the hardware timer that counts down to the power saving modes. If the monitoring of the listed hardware peripherals or components is enabled, the activity of the specified peripherals or components will awaken the system or reload the original count of global timer when they are accessed. Setting options: [Disabled], [Enabled]

PNP/PCI Configurations

This section describes configuring the PCI bus system and PnP (Plug & Play) feature. PCI, or Peripheral Component Interconnect, 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.

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

   Clear ESCD             [Disabled]            │      Item Help

   Resources Controlled By  [Auto(ESCD)]        │  Menu Level    ►
 ► IRQ Resources          [Press Enter]         │
                                                │  Default is Disabled.
   PCI/VGA Palette Snoop   [Disabled]           │  Select Enabled to
                                                │  reset Extended System
                                                │  Configuration Data
                                                │  ESCD) when you exit
                                                │  Setup if you have
                                                │  installed a new add-on
                                                │  and the system
                                                │  reconfiguration has
                                                │  caused such a serious
                                                │  conflict that the OS
                                                │  cannot boot

 ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
      F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults
```

Clear ESCD
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 *Enabled*, the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to [Disabled] automatically. Setting options: [Disabled], [Enabled].

Resources Controlled By
The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 98/2000. If you set this field to [Manual], choose specific resources by going into each sub-menu that follows this field. Setting options: [Auto(ESCD)], [Manual].

IRQ Resources

The items are adjustable only when *Resources Controlled By* is set to *Manual*. Press <Enter> and you will enter the sub-menu of the items.
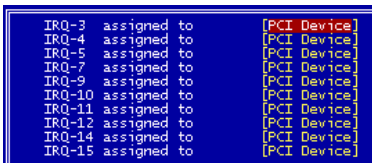
IRQ Resources list IRQ 3/4/5/7/9/10/11/12/14/15 for users to set each IRQ a type depending on the type of device using the IRQ. Setting options:

[PCI Device]	For Plug & Play compatible devices designed for PCI bus architecture.
[Reserved]	The IRQ will be reserved for further request.

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.

PC Health Status

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

```
                  Phoenix - AwardBIOS CMOS Setup Utility
                            PC Health Status
┌──────────────────────────────────────────────┬─────────────────────┐
│ Smart Fan Target Temp.(°C)[50]                │      Item Help      │
│ Smart Fan Temp. Tolerance [ 0]                │                     │
│ Case Open Warning         [Disabled]          │ Menu Level   ▶      │
│ CPU Warning Temperature   [Disabled]          │                     │
│ System Temperature                            │                     │
│ CPU  Temperature                              │                     │
│ System FAN Speed                              │                     │
│ CPU  FAN Speed                                │                     │
│ Vcore                                         │                     │
│ 3.3V                                          │                     │
│ + 5 V                                         │                     │
│ +12 V                                         │                     │
│ -12 V                                         │                     │
│ VBAT(V)                                       │                     │
│ 5VSB(V)                                       │                     │
│ Shutdown Temperature      [Disabled]          │                     │
│                                               │                     │
├──────────────────────────────────────────────┴─────────────────────┤
│ ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults │
└─────────────────────────────────────────────────────────────────────┘
```

Smart Fan Target Temp. (°C)
W83697HF provides the Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it with in a specific range. Setting options: Min: [0](°C), Max: [100](°C).

Smart Fan Temp. Tolerance
You can select a fan tolerance value here for the specific range for the "Smart Fan Target Temp. (°C)" item. If the current temperature of the fan reaches to the maximum threshold (the temperature set in the "Smart Fan Target Temp.(°C)" plus the tolerance values you set here), the fan will speed up for cooling down. On the contrary, if the current temperature reaches to the minimum threshold (the set temperature minus the tolerance value), the fan will slow down to keep the temperature stable. Setting options: Min: [0](°C), Max: [15](°C). (0°C means Smart Fan is disabled.)

Case Open Warning
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. This item is available only when your mainboard has JCI1 jumper. To clear the warning message, set the field to *Reset*. The setting of the field will automatically return to [Enabled] later. Setting options: [Enabled], [Reset], [Disabled].

System/CPU Temperature, CPU/System FAN Speed, Vcore, 3.3 V, +5 V, +12 V, -12 V, VBAT(V), 5VSB(V)
These items display the current status of all of the monitored hardware devices/components such as CPU voltages, temperatures and all fans' speeds.

Shutdown Temperature
If the CPU temperature reaches the limit preset in this setting, the system will shutdown automatically.

Frequency/Voltage Control

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

```
         Phoenix - AwardBIOS CMOS Setup Utility
              Frequency/Voltage Control

 CPU Clock Ratio          [ 0 X]              Item Help
 Auto Detect DIMM/PCI Clk [Enabled]
 Spread Spectrum          [Enabled]      Menu Level    ▶
 CPU Frequency            [Default]








 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```
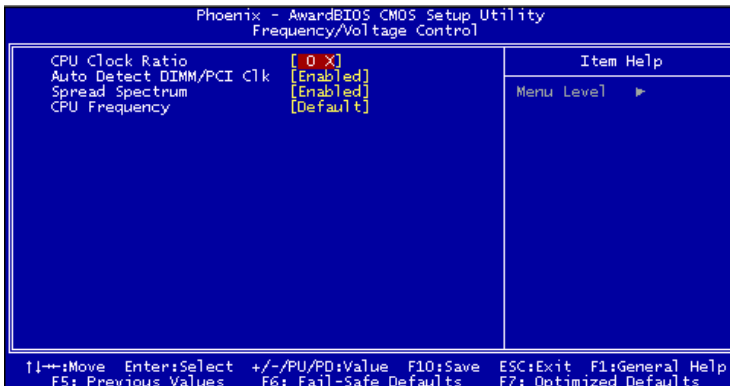
CPU Clock Ratio
End users can overclock the processor (only if the processor supports so) by speci-
fying the CPU ratio (clock multiplier) in this field. It is available only when **Set CPU
Ratio** is set to [Manual]. Setting options: Min: [8], Max: [50].

Auto Detect DIMM/PCI Clk
This item is used to auto detect the PCI slots. When set to [Enabled], the system will
remove (turn off) clocks from empty PCI slots to minimize the electromagnetic interfer-
ence (EMI). Setting options: [Enabled], [Disabled].

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. Setting options:
[Enabled], [Disabled].

CPU Frequency
Use this item to select the appropriate clock frequency of the CPU host bus. Setting
options: [100MHz], [133MHz], [200MHz], [Default].

Load Fail-Safe/Optimized Defaults

The two options on the main menu allow users to restore all of the BIOS settings to the default Fail-Safe or Optimized values. The Optimized Defaults are the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard. The Fail-Safe Defaults are the default values set by the BIOS vendor for stable system performance.

When you select Load Fail-Safe Defaults, a message as below appears:

Load Fail-Safe Defaults (Y/N)? N

Pressing *Y* loads the BIOS default values for the most stable, minimal system performance.

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

Load Optimized Defaults (Y/N)? N

Pressing *Y* loads the default factory settings for optimal system performance.

Set Supervisor/User Password

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

Enter Password:

Type the password, up to eight 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 BIOS 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 in the *Security Option* of the Advanced BIOS Feature menu. If the *Security Option* is set to [System], 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.*

Introduction to SiS964 SATA RAID

The optional southbridge SiS964 SATA controller only support two Serial ATA on two independent ports.

Serial ATA (SATA) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds 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 most outstanding features are:

1. Supports 150 MB/s transfers with CRC error checking.

2. Large LBA support for drives over 137 GB.

3. Data handling optimizations including tagged command queuing, elevator seek and packet chain command.

Serial/Ultra ATA RAID function supports striping (RAID 0), mirroring (RAID 1) and span (JBOD). *Please note that the function supports hard disk drives only.*

With striping, identical drives can read and write data in parallel to increase performance. Mirroring increases read performance through load balancing and elevator sorting while creating a complete backup of your files. Span would increase the logic hard disk space.

> **MSI Reminds You...**
> *All the information/volumes listed in your system might differ from the illustrations in this appendix.*

Introduction

System Requirement

Operating System Support

Microsoft Windows 98 Second Edition
Microsoft Windows ME
Microsoft Windows 2000 Professional and Server
Microsoft Windows XP

RAID Basics

This section will give you an overview about the RAID system and introduce the basic background and glossary which you need to know before using "SiS RAID Controller Application".

1. **RAID**: (Redundant Array of Independent Disk Drives) use jointly several hard drives to increase data transfer rates and data security. It depends on the number of drives present and RAID function you select to fulfill the security or performance purposes or both.

2. **RAID 0**: Also known as "Stripping". All of the data are distributed evenly to all of the existing drives. You gain benefits on performance because the data transfer rate is multiplied by the number of drives. However, RAID 0 has high risks of data security. All of the stored data will be lost if even any one drive in the RAID set crashes.

3. **RAID 1**: Also known as "Mirroring". Two hard drives are required. The goal of RAID 0 is to ensure data security. Data is written to two or more drives synchronously. That is, 100% duplication of data from one drive to another.

4. **JBOD**: (Just a Bunch of Drives). Also known as "Spanning". Two or more hard drives are required. Several hard disk types configured as a single hard disk. The hard drives are simply hooked up in series. This expands the capacity of your drive and results in a useable total capacity. However, JBOD will not increase any performance or data security.

Performance hints and recommend setting

For the best performance and reliability, please read the following suggestions.

1. In Serial ATA port, use Native Serial ATA drives. Parallel ATA to Serial ATA converter board is *NOT* suggested.
2. Use the same model hard drives.
3. If you have only two Serial ATA drives, the auto-configure function will assign each on a different channel as a master drive.
4. Always use 80-conductor cables.
5. We strongly recommend you should use "DMA" transfer mode.
6. The recommended block size is "64K" when creating RAID 0.

RAID 0 (Striping array)

Any combination to 2, 3 or 4 Hard disks would combine to a stripe system.

HDD Population Rules for RAID 0 (Striping)			
Ultra ATA (Master)	Ultra ATA (Slave)	Serial ATA (Master 1)	Serial ATA (Master 2)
X	X	V	V

V = Selected; X = Unselected

NOTE: Storage Capacity: the number of hard drives times the capacity of the smallest drive in the disk array
Working Speed: the speed of the lowest drive in the disk array

RAID 1 (Mirror array)

Any of 2 Hard disks would make a mirror system

HDD Population Rules for RAID 1 (Striping)			
Ultra ATA (Master)	Ultra ATA (Slave)	Serial ATA (Master 1)	Serial ATA (Master 2)
X	X	V	V

V = Selected; X = Unselected

NOTE: Storage Capacity: the capacity of the smallest drive is in the disk array
Working Speed: the speed of the lowest drive in the disk array

JBOD (Spanning array)

Any combination to 2, 3 or 4 Hard disks would combine to a JBOD system.

HDD Population Rules for RAID 0 (Striping)			
Ultra ATA (Master)	Ultra ATA (Slave)	Serial ATA (Master 1)	Serial ATA (Master 2)
X	X	V	V

V = Selected; X = Unselected

NOTE: Storage Capacity: the number of hard drives times the capacity of the smallest drive in the disk array
Working Speed: the speed of the lowest drive in the disk array

System BIOS 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.

For Award BIOS:

Press DEL to enter SETUP

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.

Once you enter BIOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to move among the configurable functions on the Main Menu and press <Enter> to enter **Integrated Peripherals**. Under **Integrated Peripherals**, select SiS OnChip PCI Device, and set the **SiS Seriel ATA Controller** to **[Enabled]** or **[Disabled]**.
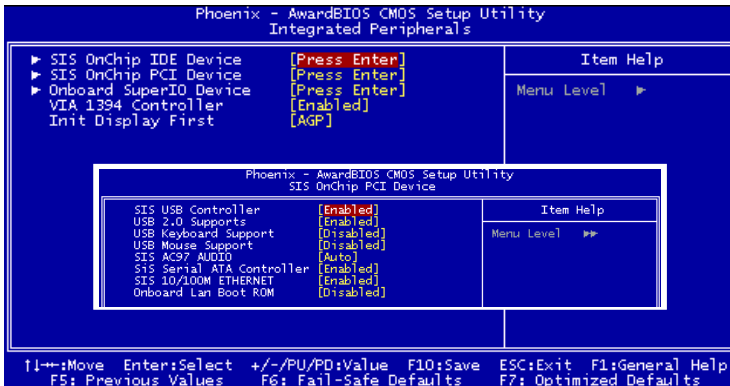
BIOS Configuration

Starting BIOS Utility

1. Boot your system. If this is the first time you have booted with the SiS964 and the drives installed, the BIOS will display the following screen:

```
Silicon Integrated Systems Corp. RAID BIOS Setting Utility v1.04_964
(c) 2003-2005 Silicon Integrated Systems Corp. All Rights Reserved.

Press <Ctrl><S> to enter Setup Menu or <ESC> to skip waiting.
Scan Devices.  Please wait…………

    Primary Master      :   < SATA Device Not Found >
    Secondary Master   :   < SATA Device Not Found >


[ RAID Information ]
```

[RAID Information] includes some statements. See below :

  a. **No RAID Install !!** -> Not any completed RAID exists.

  b. **Raid 1 (Mirror) : [Disk X] [Disk X]** -> Have a RAID set.

  c. **Broken RAID detected. Do you want to enter Setup Menu (Y/N)? Y** -> You can select [Y] to enter setup menu to handle it. Or you can select [N] to ignore this message.

  d. **Found a new HD! Do you want to rebuild RAID 1? Y** ->Occurs when the controller has broken Raid 1 and single HDD existing simultaneously and the location of single HDD is just conformed it's rebuild conditions.

  e. **The Raid is wrong!! Do you want to fix it??(Y/N)** -> Occurs when the locations of two SATA HDD change owing to ATA HDD existing or not.

2. Press <Ctrl-S> keys to display the SiS964 Utility Main Menu.
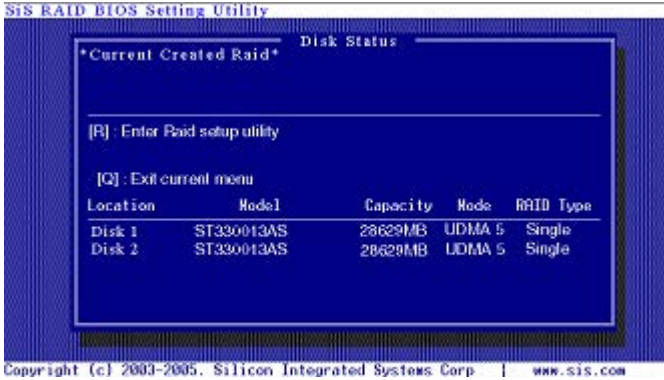
3. Press <R> to display the RAID setup menu below. This is the fastest and easiest method to create your first array. The [A] and [D] key will appear randomly in the different conditions.

[a]. No RAID existing but have available disks existing:
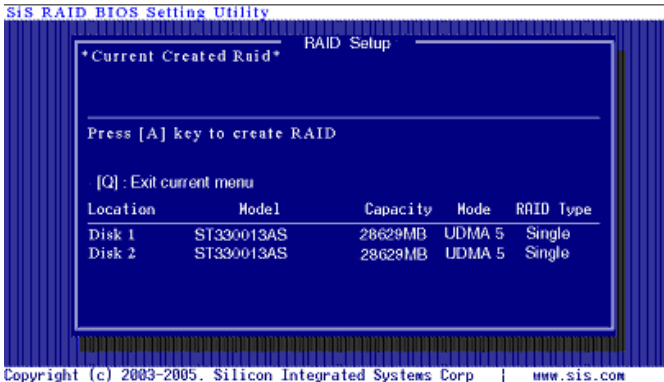
[b]. No available disk existing but have RAID existing:
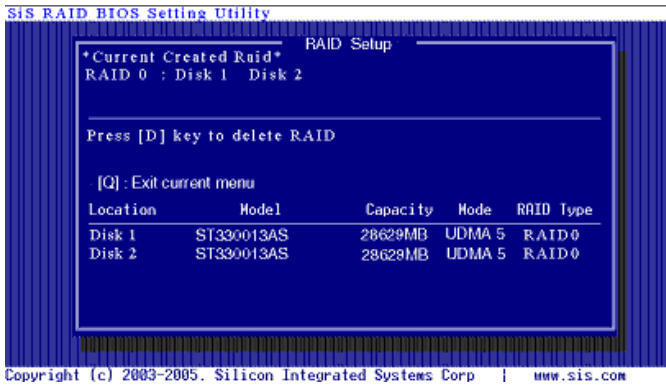
[c]. Available disks and RAID existing simultaneously:
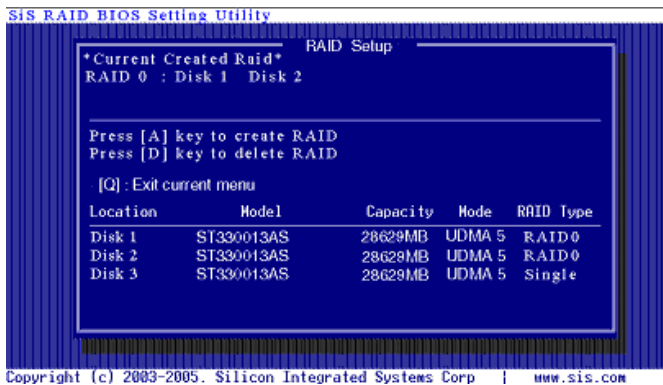
[d]. Available disk is not enough to create RAID:
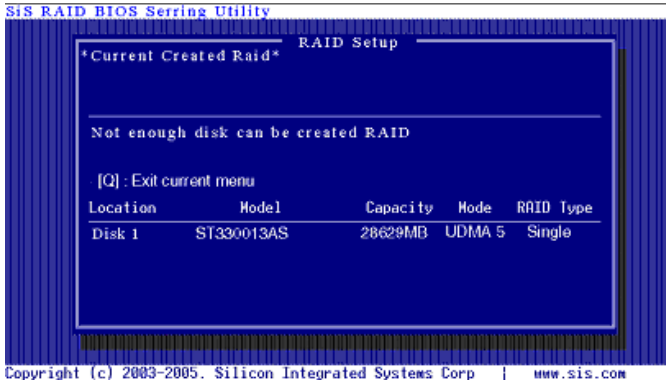
Create a RAID 0 (Stripe) Array for performance

To create an array for best performance, please follow these steps:
1. Press <A> to start creating a RAID array.
2. Press <2> and <Enter> to select RAID 0.
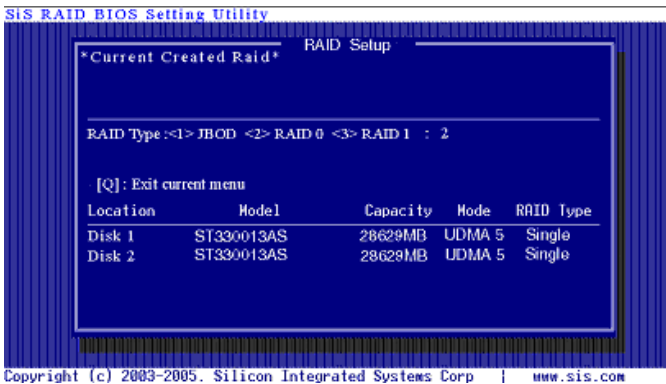
3. You will have two selections to create a RAID 0 array. **The default value is <1>**. If you select **<1>Auto Create**, you can create a RAID 0 array faster and easier. The Blocksize will be selected by its default value **"64K"**. The result after auto creating will be shown on **step 6**. Besides, you also can select **<2>Manual Create**, see following steps.
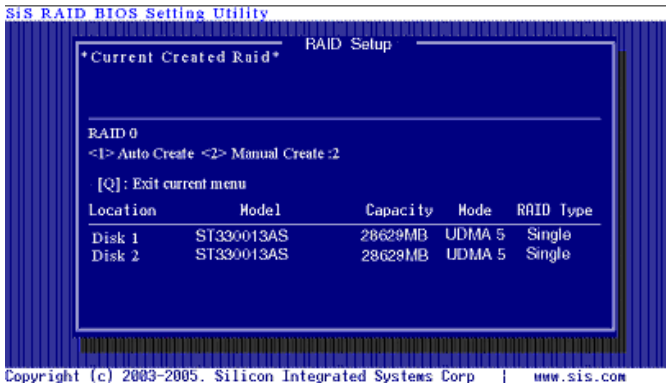
4. Press <1>--<5> keys and <Enter> to select Block Size. (Default: 64K)
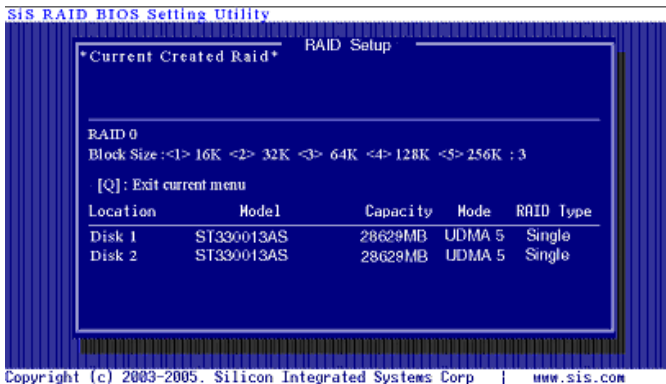
5. Use <↓> <↑> to select disk , and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from **Single** to **RAID 0**. And the disk you select first will be the SOURCE disk.
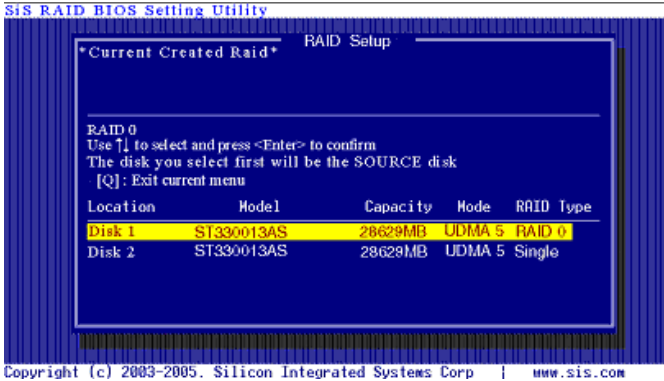

6. Next, you will see a message "**Split the SOURCE(Disk x) data to RAID disks?**". Press <N> and <Enter> to create RAID 0 array only or press <Y> and <Enter> to split the data from source disk to other disks.
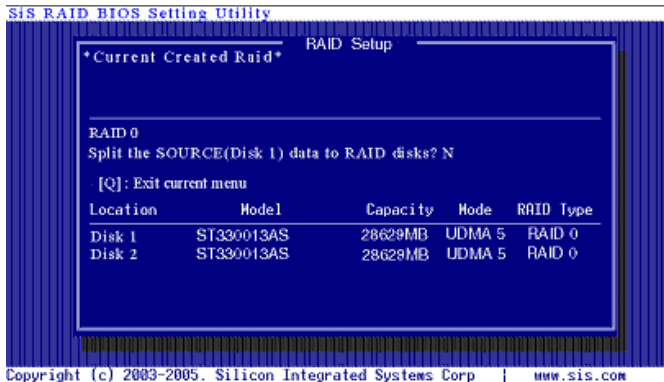
7. Starting splitting action, the following frame will be shown.
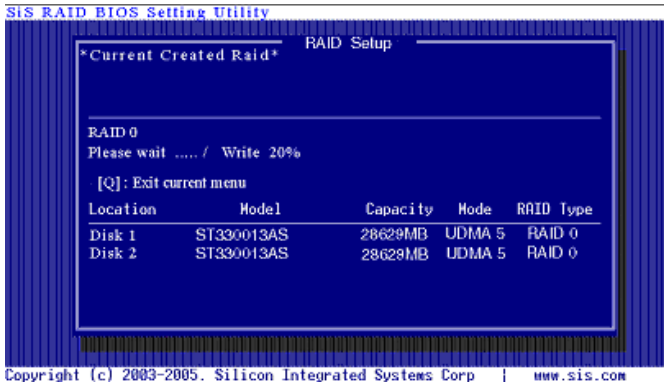
8. After all steps finished, press <Q> until escape the setup menu and RAID 0 array will be shown on the top of the main frame.
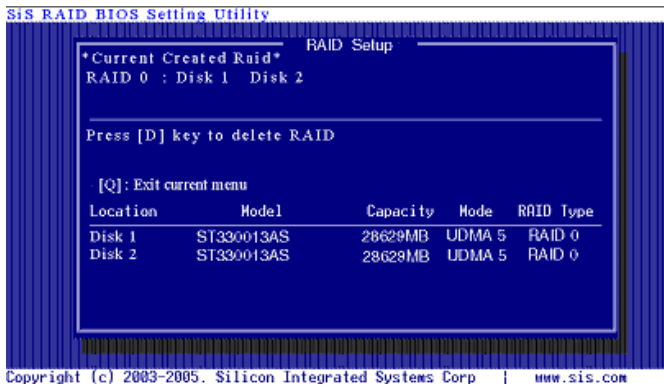
9. Press <Q> until exit this BIOS utility and the red message frame will show. Press <Y> and <Enter> to save changes.
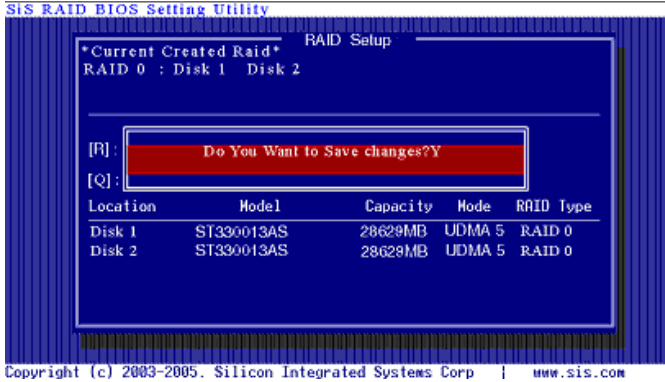
10. Once the array has been created, you will need to FDISK and FORMAT the array as if it were a new single hard drive.

Create a RAID 1 (Mirror) Array for performance

To create a Mirror array for best performance, please follow these steps:
1. Press <A> to start creating a RAID array.
2. Press <3> and <Enter> to select Mirror.
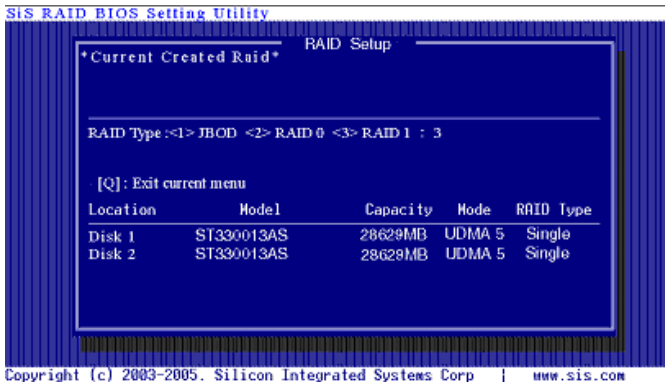
3. You will have two selections to create a RAID 1 array. **The default value is <1>**. If you select **<1>Auto Create**, you can create a RAID 1 array faster and easier. The result after creating will be shown on **step 5**. Besides, you also can select **<2> Manual Create**, see following steps.
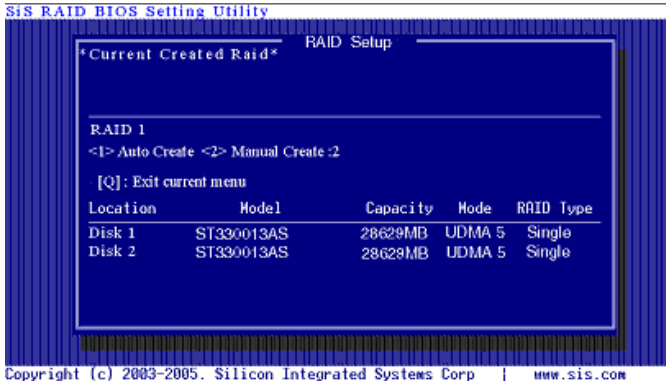
4. Use<↓> <↑> to select disk , and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from **Single** to **RAID 1**. The same as RAID 0, the disk you select first will be the SOURCE disk.
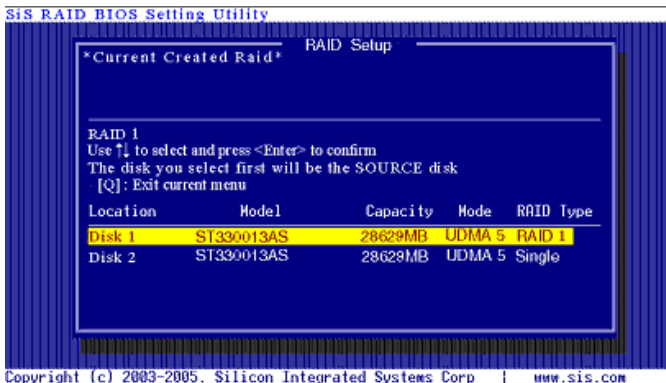
5. Next, you will see a message "**Duplicate the SOURCE(Disk x) data to RAID disks?**". Press <N> and <Enter> to create RAID 1 array only or press <Y> and <Enter> to duplicate the data from source disk to mirror disk.
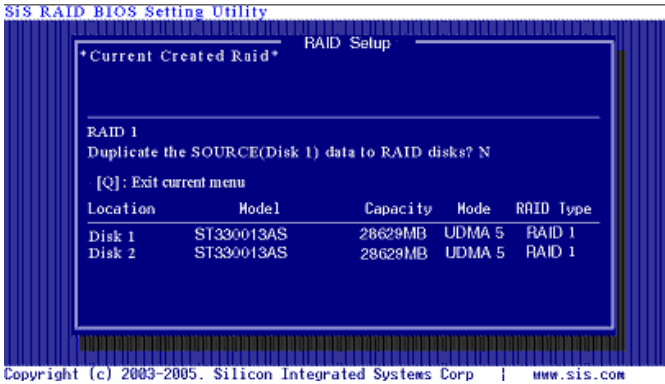
6. Starting duplicating action, the following frame will be showing.
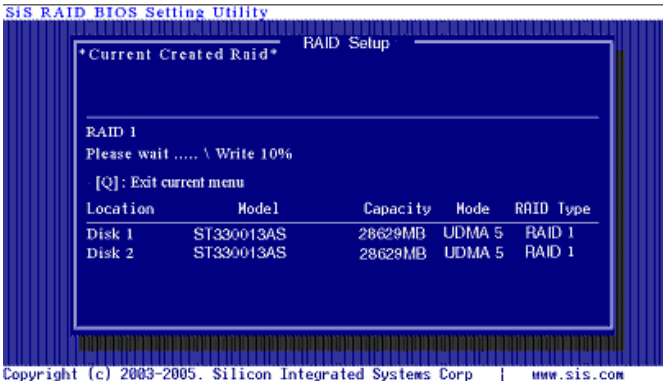
7. After all steps finished, press <Q> until escape the setup menu and RAID 1 array will be shown on the top of the main frame.
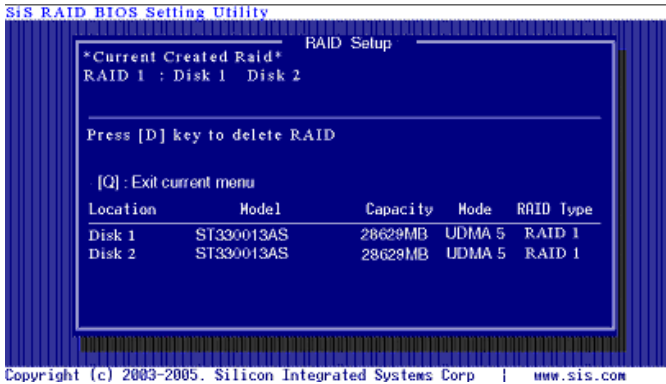
8. Press <Q> until exit this BIOS utility and the red message frame will show as the same as the creation of the RAID 0 array. Press <Y> and <Enter> to save changes.
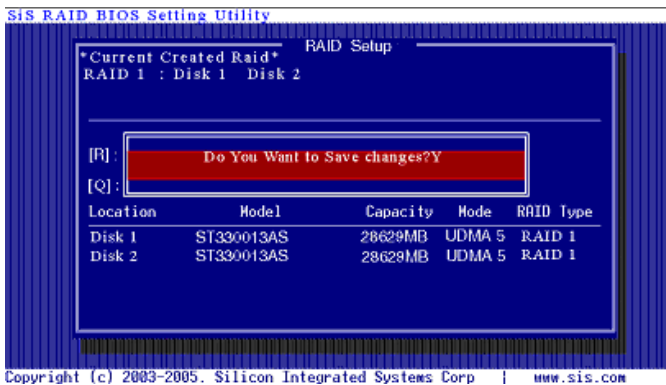
9. Once the array has been created, you will need to FDISK and FORMAT the array as if it were a new single hard drive.

Create a JBOD Array for performance

To create a JBOD array for best performance, please follow these steps:
1. Press <A> to start creating a RAID array.
2. Press <1> and <Enter> to select JBOD.
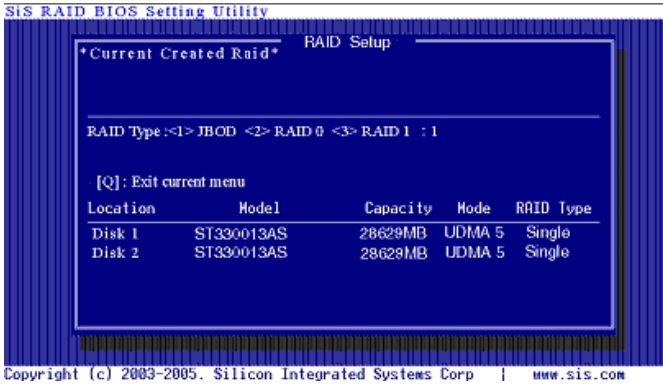
3. You will have two selections to create a JBOD array. **The default value is <1>**. If you select **<1>Auto Create**, you can create a JBOD array faster and easier. The result after creating will be shown on **step 5**. Besides, you also can select **<2> Manual Create**, see following steps.
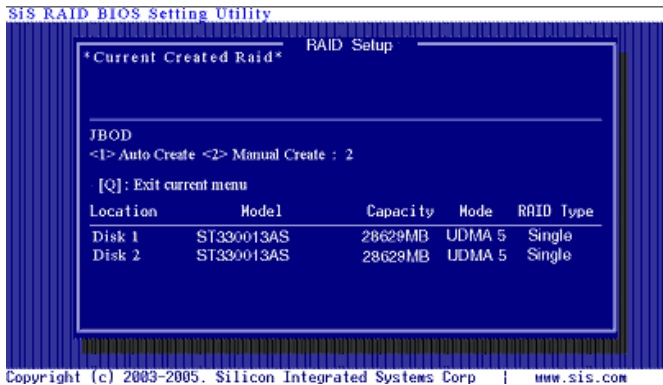
4. Use<↓> <↑> to select disk , and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from **Single** to **JBOD**.
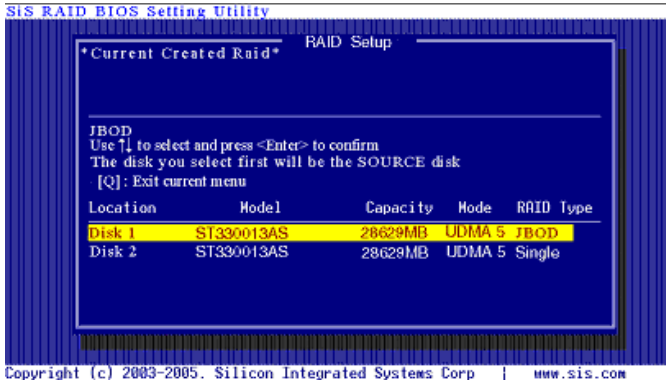
5. After all steps finished, press <Q> until escape the setup menu and JBOD array will be shown on the top of the main frame.
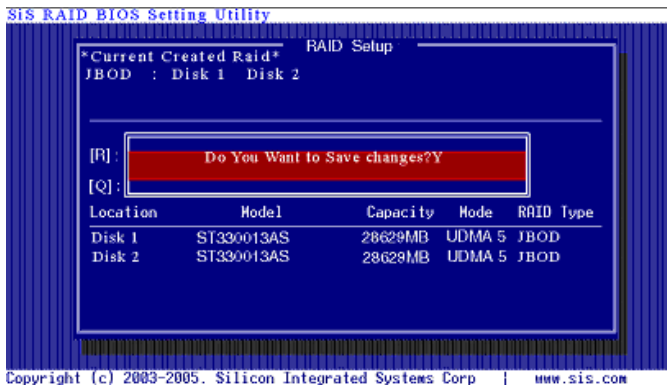
6. Once the array has been created, you will need to FDISK and FORMAT the array as if it were a new single hard drive.

Delete a RAID array

1. After enter the SiS964 Utility Main Menu, press <R> to display the RAID setup menu below. This is the fastest and easiest method to delete your first array.
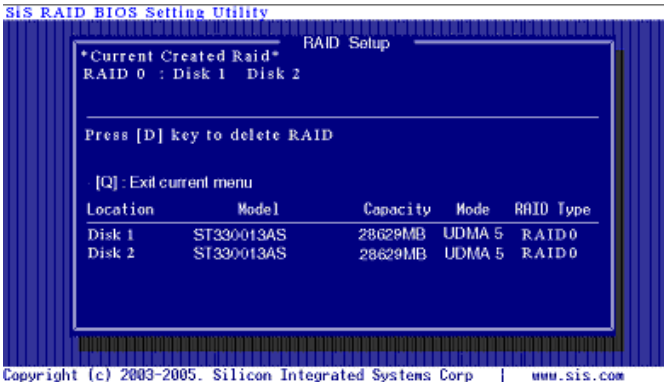
2. Press <D> to start deleting a RAID array, and use<↓> <↑> to select RAID array you wanted to delete.
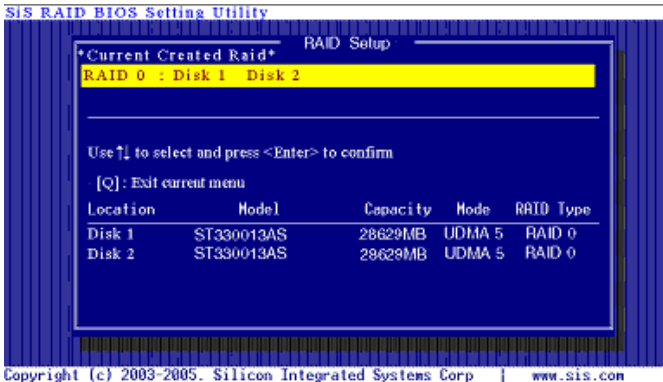
3. Press <Enter> to select the RAID array that you want to delete. And a message "**Are you sure to delete this RAID?**" will show on this frame.
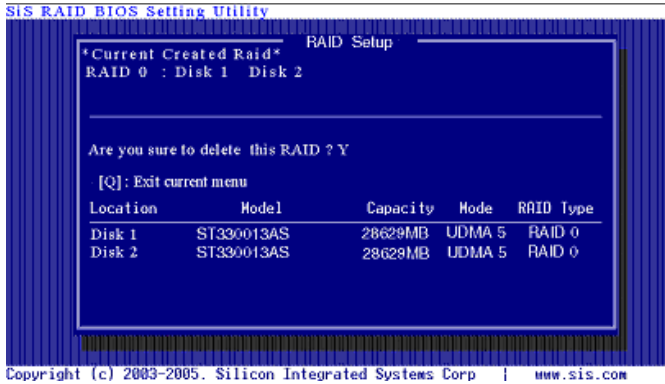
4. Press <Y> and <Enter>, the deleting action finish. And the RAID Type of all disk members of this RAID array will be changed from **RAID 0** to **Single**.
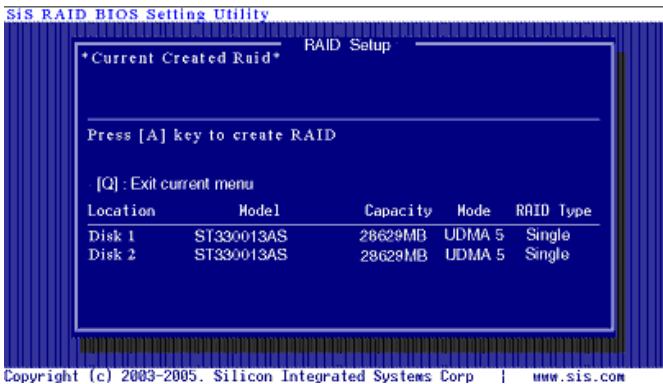
5. Press <Q> until escape the BIOS Utility, and the red message frame will show on it.
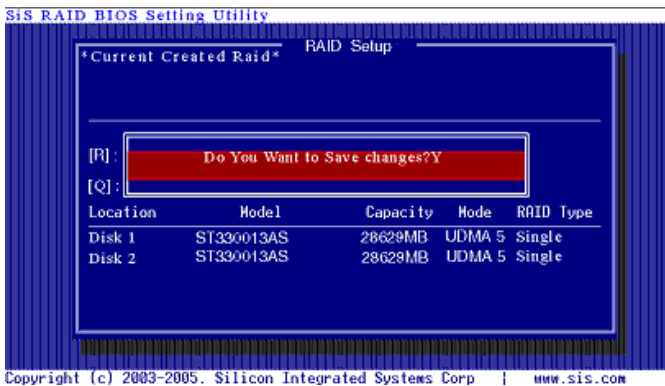
6. Press <Y> and <Enter> to save all changes.

Installing Software

Install Driver in Windows XP / 2000

MSI Reminds You...
If you would like to install windows to any RAID set, you should create RAID from BIOS RAID setting Utility first and then follow the steps below.

➤ **New Windows XP / 2000 Installation**
The following details the installation of the drivers while installing Windows XP / 2000.
1. Start the installation:
Boot from the CD-ROM. Press F6 when the message "Press F6 if you need to install third party SCSI or RAID driver" appears.
2. When the Windows XP/2000 Setup window is generated, press S to specify an Additional Device(s).
3. Insert the driver diskette into drive A: and press <Enter>.
(The information of this driver diskette exists in MSI CD. Please prepare for one formatted floppy disk to copy the contents in the Floppy folder of the following access: Insert MSI CD and start the menu --> click IDE folder --> SIS --> 180RAID --> Floppy)
4. Choose one of the following items: *"WinXP SiS Raid/IDE Controller"*, *"Win2000 SiS Raid/IDE Controller"* from the drop-down list that appears on screen, and 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/2000 Setup screen, press the <Enter> key. Setup will now load all device files and then continue the Windows XP/2000 installation.
7. **Please install the driver package again (ex. SiS RAID driver v1.02) while the operation system has been setup.**

➤ **Existing Windows XP/2000 Driver Installation**
1. Insert the MSI CD into the CD-ROM drive.
2. Install the driver by execute SiS RAID driver setup utility.
3. The drivers will be automatically installed.

➤ **Confirming Windows XP/2000 Driver Installation**
  1. From Windows XP/2000, open the **Control Panel** from **My Computer** followed by the System icon.
  2. Choose the **Hardware** tab, then click the **Device Manager** tab.
  3. Click the "**+**" in front of the **SCSI and RAID Controllers** hardware type. The driver *SiS 964 RAID Controller* should appear.

➤ **Confirming Windows ME/98SE Driver Installation**
  1. From Windows ME/98SE, 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 **IDE ATA/ATAPI Controllers** hardware type. The driver *SiS 964 IDE Dual Channel* should appear.

Installation of SiS SATA RAID Driver

SiS RAID driver supports Microsoft Windows XP/2000/ME/98SE.

South Bridge SiS964 SATA controller support Serial ATA w/ RAID0, RAID 1 and JBOD by installing SiS RAID driver.

Insert the MSI CD and click on the **SiS SATA RAID Driver** to install the software.
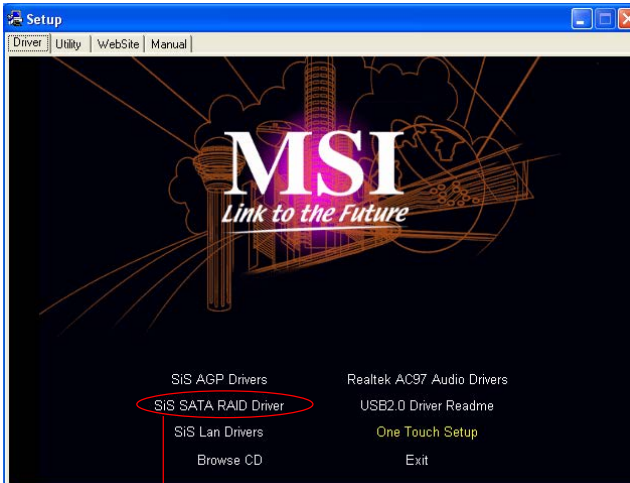
Click on this item

Appendix: Using 4- or 6-Channel Audio Function

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

Installing the Audio Driver

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

Installation for Windows 98SE/ME/2000/XP
For Windows® 2000, you must install Windows® 2000 Service Pack2 or later before installing the driver.

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

1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear. (*Please note the screen below might be different depending on the different mainboard you purchased.)*

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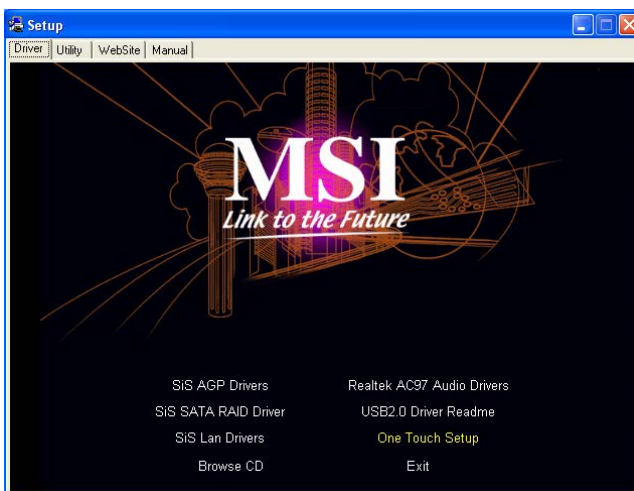
MSI Reminds You...
*The **AC97 Audio Configuration** software utility is under continuous update to enhance audio   applications. Hence, the program screens shown here in this appendix may be slightly different from the latest software utility and shall be held for reference only.*

3. Click **Next** to start installing files into the system.
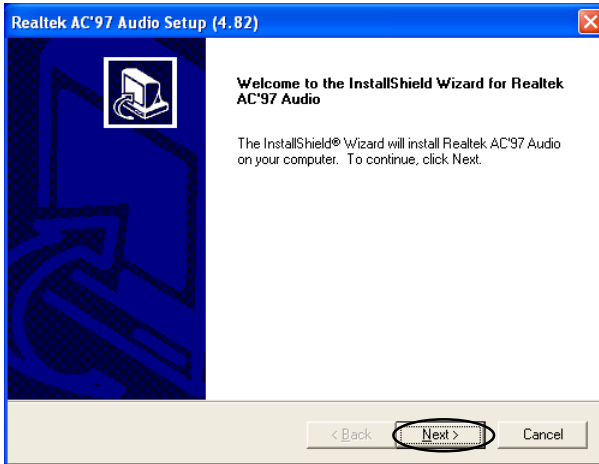
4. Click **Finish** to restart the system.

Select this option
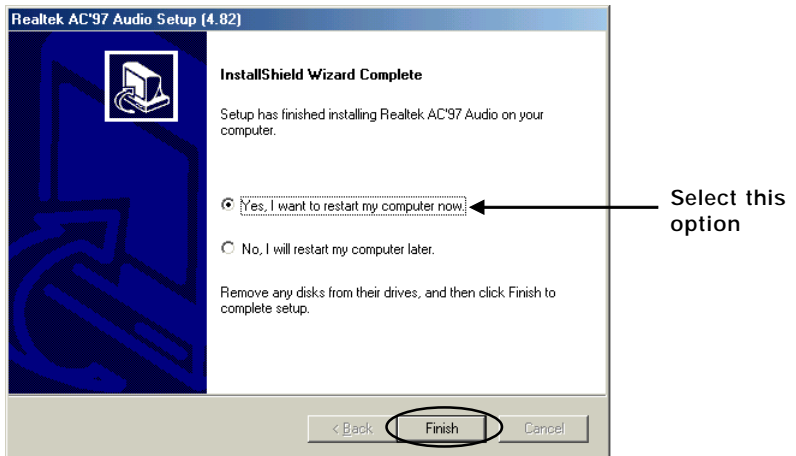
Using 4- or 6-Channel Audio Function

After installing the audio driver, you are able to use the 4-/6-channel audio feature now. To enable 4- or 6-channel audio operation, first connect 4 or 6 speakers to the appropriate audio connectors, and then select 4- or 6-channel audio setting in the software utility.

Using the Back Panel
In addition to a default 2-channel analog audio output function, the audio connectors on the Back Panel also provide 4- or 6-channel analog audio output function if a proper setting is made in the software utility.

Read the following steps to have the Multi-Channel Audio Function properly set in the software utility, and have your speakers correctly connected to the Back Panel.

Configuration in the Software Utility

1. Click the audio icon from the window tray at the lower-right corner of the screen.

2. Select a desired surround sound effect from the "Environment" drop-down menu.

3. Click the **Speaker Configuration** tab.

4. Select **Synchronize the phone jack switch with the settings**.

5. Select a desired multi-channel operation from **No. of Speakers**.

    a. Headphone

    b. 2-Channel Mode for Stereo-Speaker Output

    c. 4-Channel Mode for 4-Speaker Output

    d. 6-Channel Mode for 5.1-Speaker Output

6. Click **OK** to close this window.
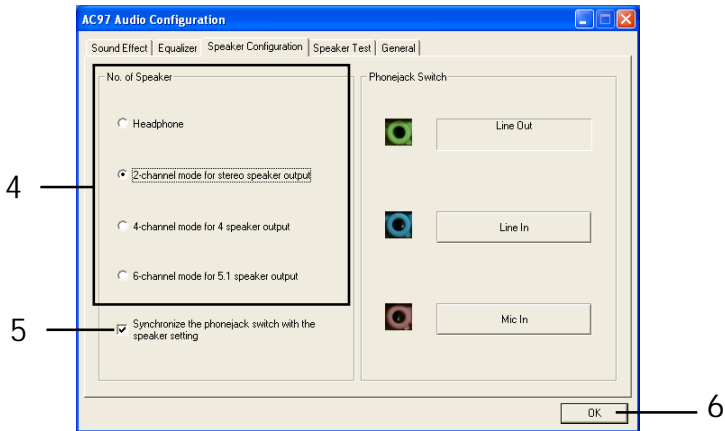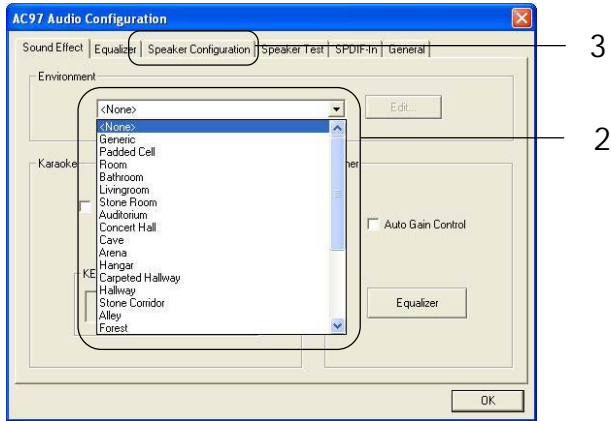
Connecting the Speakers

When you have set the Multi-Channel Audio Function mode properly in the soft-
ware 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
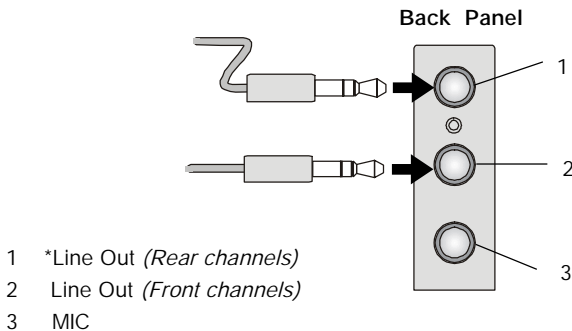 on the back panel when 2-Channel Mode is selected.

1   Line In
2   Line Out *(Front channels)*
3   MIC
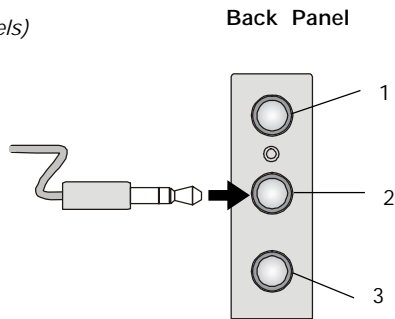
Back Panel

■ **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

* 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)*

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

1
2
3
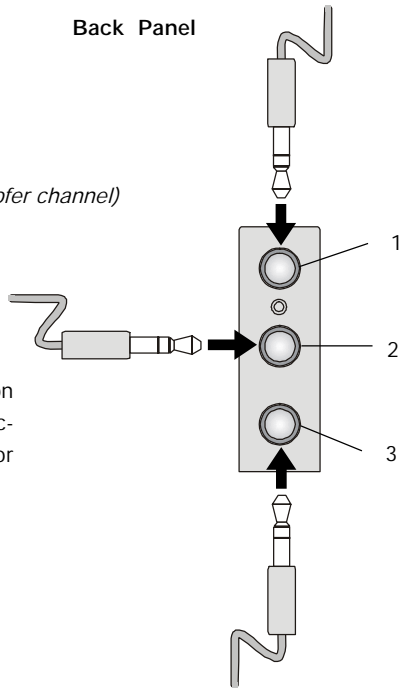
MSI Reminds You...

If the Center and Subwoofer speaker exchange their audio channels when you play video or music on the computer, a converter may be required to exchange center and subwoofer audio signals. You can purchase the converter from a speaker store.

Testing the Connected Speakers

To ensure that 4- or 6-channel audio operation works properly, you may need to test each connected speaker to make sure every speaker work properly. If any speaker fails to make sound, then check whether the cable is inserted firmly to the connector or replace the bad speakers with good ones.

Testing Each Speaker

1. Click the audio icon 🔲 from the window tray at the lower-right corner of the screen.

2. Click the **Speaker Test** tab.

3. The following window appears. Select the speaker which you want to test by clicking it.
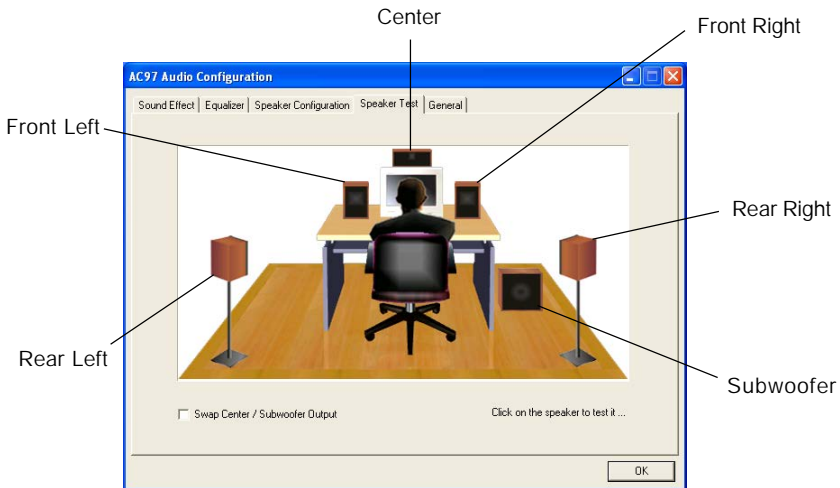
> **MSI Reminds You...**
> *6 speakers appear on the "Speaker Test" window only when you select "6-Channel Mode" in the "No. of Speakers" column. If you select "4-Channel Mode", only 4 speakers appear on the window.*

4. While you are testing the speakers in 6-Channel Mode, if the sound coming from the center speaker and subwoofer is swapped, you should select **Swap Center/ Subwoofer Output** to readjust these two channels.

Select this function

Playing KaraOK

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

Playing KaraOK

1. Click the audio icon from the window tray at the lower-right corner of the screen.

2. In the Sound Effect tab, select **Voice Cancellation** under "KaraOK."

3. Click **OK** to close this window.