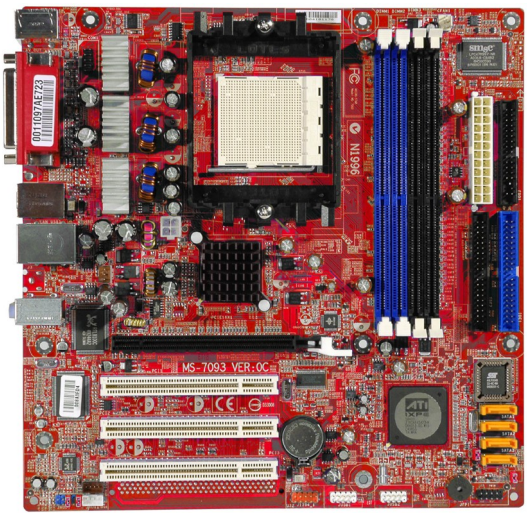
RS480M2/RX480M2

MS-7093 (v1.X) M-ATX Mainboard



English Version
G52-M7093X8

Manual Rev: 1.6
Release Date: April 2005

CE 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.

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

FC **Micro-Star International**
MS-7093

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

Copyright Notice

Trademarks

Revision History

Revision	Revision History	Date
V1.6	removing overclocking function, adding ATI RAID settings & Surroundview™	April 2005

Technical Support

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

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

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.

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

CONTENTS

Getting Started

Thank you for choosing the RS480M2/RX480M2 Series (MS-7093 v1.X) Micro ATX mainboard. The RS480M2/RX480M2 Series mainboards are based on **ATi® RS480/RX480 & ATi® SB400** chipsets for optimal system efficiency. Designed to fit the advanced **AMD® K8 Athlon 64 FX** processor, the RS480M2/RX480M2 Series deliver a high performance and professional desktop platform solution.

Mainboard Specifications

CPU

† Supports 64-bit AMD® Athlon 64 and Athlon 64 FX processor (Socket 939)
† Supports up to 3500+, 3800+ Athlon 64 FX 53, or higher CPU
(For the latest information about CPU, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php)

Chipset

† ATI® RS480/RX480 Chipset
- HyperTransport™ connection to AMD K8 Athlon64 processor
- 8 or 16 bit control/address/data transfer both directions
- 1000/800/600/400/200 MHz "Double Data Rate" operation both direction
- Compliant with PCI Express 1.0a specifications (one x16 graphics interface, which can be divided into two smaller links for use by other devices)
- Graphic integrated (RS480)

† ATI® SB400 Chipset
- Supports dual channel native SATA controller up to 150MB/s with RAID 0 or 1
- Integrated Hardware Sound Blaster/Direct Sound AC97 audio
- Ultra DMA 66/100/133 master mode PCI EIDE controller
- ACPI & PC2001 compliant enhanced power management
- Supports USB2.0 up to 8 ports

Main Memory

† Supports dual channel, eight memory banks DDR 333/400, using four 184-pin DDRDIMMs
† Supports a maximum memory size up to 4GB without ECC
† Supports 2.5v DDR SDRAM DIMM
(For the updated supporting memory modules, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_trp_list.php.)

Slots

† One PCI Express x16 slot (supports PCI Express Bus specification v1.0a compliant)
† Three 32-bit Master 3.3V/5V PCI Bus slots

Onboard IDE

† An IDE controller on the ATI® SB400 chipset provides IDE HDD/CD-ROM with PIO, Bus Master and Ultra DMA 133/100/66 operation modes
† Can connect up to 4 IDE devices

Onboard Serial ATA

† Supports 4 SATA ports with up to 150MB/s transfer rate

MSI Reminds You...

1. *Please note that users cannot install OS, either WinME or Win98, in their SATA hard drives. Under these two OSs, SATA can only be used as an ordinary storage device.*
2. *To create a bootable RAID volume for a Windows 2000 environment, Microsoft's Windows 2000 Service Pack 4 (SP4) is required. As the end user cannot boot without SP4, a combination installation CD must be created before attempting to install the operating system onto the bootable RAID volume.*
   To create the combination installation CD, please refer to the following website:
   http://www.microsoft.com/windows2000/downloads/servicepacks/sp4/HFdeploy.htm

USB Interface

† 8 USB ports
- 4 ports in the rear I/O, 4 ports via the external bracket

LAN

† Realtek® 8100C 10/100 LAN chip
- Integrated Fast Ethernet MAC and PHY in one chip
- Supports 10Mb/s and 100Mb/s
- Compliance with PCI v2.2
- Supports ACPI Power Management

IEEE 1394 (Optional)

† VIA® 6307 IEEE 1394 controller
- Supports up to two 1394 ports (rear panel x 1, pinheader x 1).
- Transfer rate is up to 400Mbps

Audio

† RealTek ALC658C 6-channel software audio codec
- Compliance with AC97 v2.3 Spec.
- Meets PC2001 audio performance requirement.

On-Board Peripherals

† On-Board Peripherals include:
- 1 floppy port supports 1 FDD with 360K, 720K, 1.2M, 1.44M and 2.88Mbytes
- 1 serial port (optional)
- 1 VGA port (only for RS480)
- 1 composite TV-Out connector (only for RS480)
- 1 S-Video connector (only for RS480)
- 1 SPDIF-Out connector
- 1 parallel port supporting SPP/EPP/ECP mode

- 8 USB2.0 ports (Rear*4/Front*4)
- 1 Audio (Line-In/Line-Out/MIC) port
- 1 RJ-45 LAN Jack
- 2 IDE ports support 4 IDE devices
- 4 serial ATA ports
- 2 IEEE1394s (Rear * 1 / Front * 1) (Optional)

BIOS

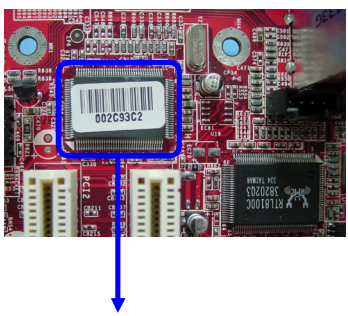
† The mainboard BIOS provides “Plug & Play” BIOS which detects the peripheral devices and expansion cards of the board automatically.
† The mainboard provides a Desktop Management Interface (DMI) function which records your mainboard specifications.
† Supports boot from LAN, USB Device 1.1 & 2.0, and SATA HDD.

Dimension

† Micro-ATX Form Factor: 24.4cm X 24.4cm

Mounting

† 8 mounting holes

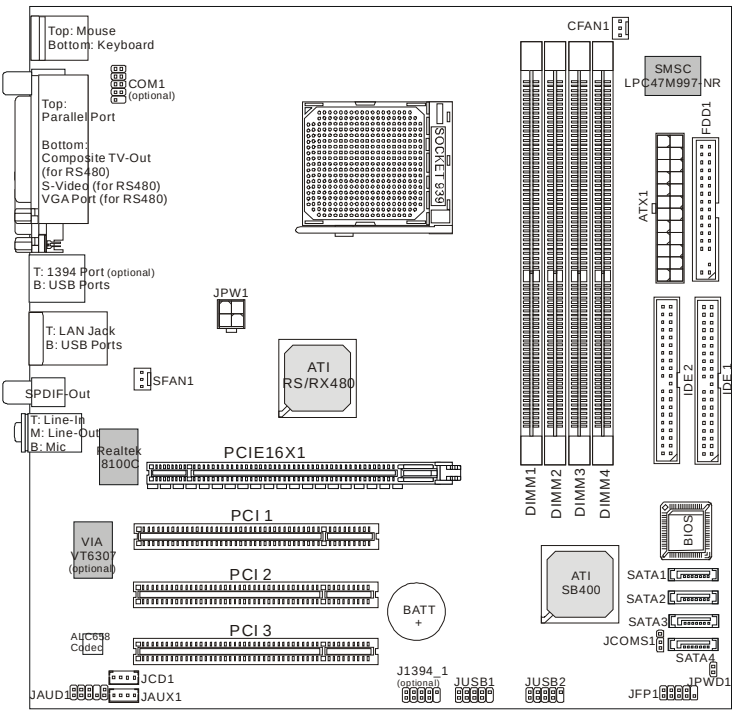


1394 GUID address Label (optional)

MSI Reminds You...

1. Each board will be given a unique 1394 GUID from the manufacturer’s default settings in the system BIOS.
2. Use the flash utility or Live Update from MSI’s website for BIOS update. The 1394 GUID address is burnt in the BIOS core. If the 1394 GUID address is lost due to an unpredictable event, such as replacing a new BIOS chip, users can use the utility from MSI’s website by entering the 1394 GUID address to recover its original one.

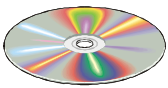
Mainboard Layout



RS480M2/RX480M2 (MS-7093 v1.X) M-ATX Mainboard

Packing Checklist

MSI motherboard



MSI Driver/Utility CD

SATA Cable (Optional)

Power Cable

Standard Cable for Floppy Disk

Standard Cable for IDE Devices

1394 Bracket (Optional)

USB Bracket (Optional)

Back IO Shield

User's Guide

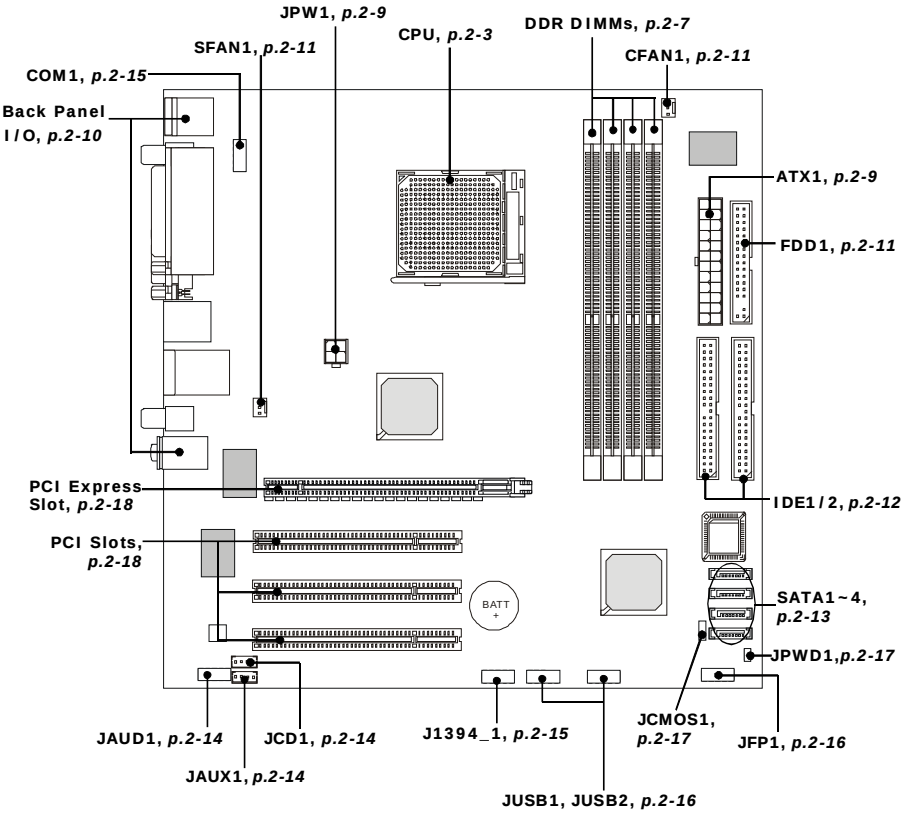
* The pictures are for reference only. Your packing contents may vary depending on the model you purchased.

Hardware Setup

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

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

Quick Components Guide



Central Processing Unit: CPU

The mainboard supports AMD® Athlon64 processor. The mainboard uses a CPU socket called Socket-939 for easy CPU installation. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

For the latest information about CPU, please visit http://www.msi.com.tw/program/products/mainboard/mbd/pro_mbd_cpu_support.php.

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 939

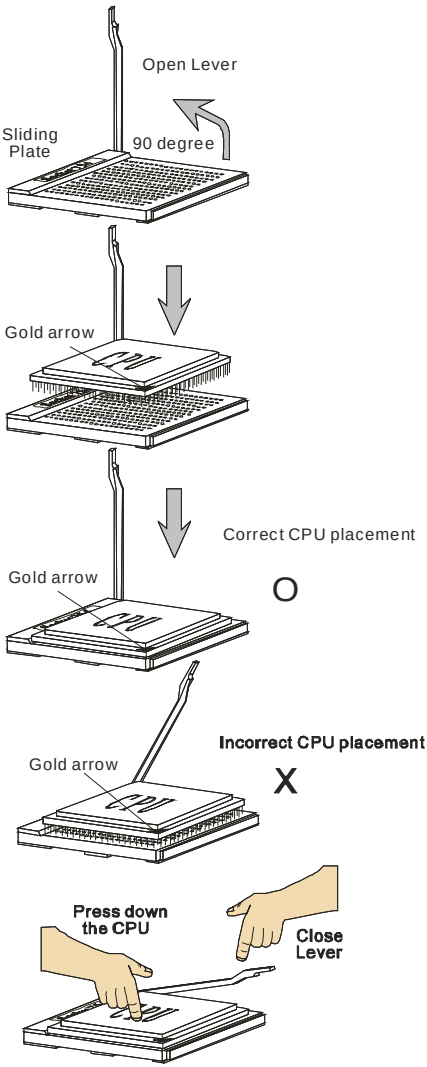
1. Please turn off the power and unplug the power cord before installing the CPU.

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 of the CPU. The gold arrow should point as shown in the picture. The CPU can only fit in the correct orientation.

4. If the CPU is correctly installed, the pins should be completely embedded into the socket and can not be seen. Please note that any violation of the correct installation procedures may cause permanent damages to your mainboard.

5. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing tightly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.



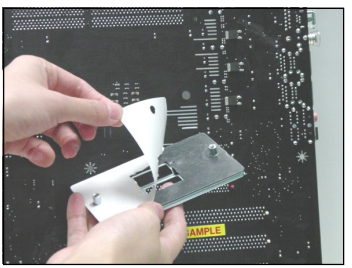
Installing AMD Athlon64 CPU Cooler Set

When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

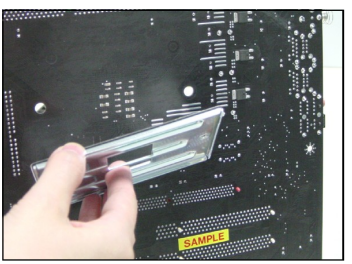
MSI Reminds You...

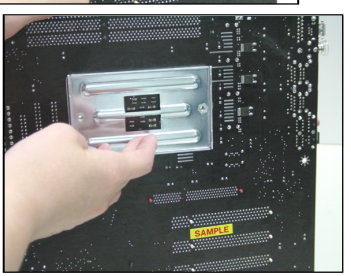
Mainboard photos shown in this section are for demonstration of the cooler installation for Socket 939 CPUs only. The appearance of your mainboard may vary depending on the model you purchase.

1. Detach the shield off the backplate's paster.

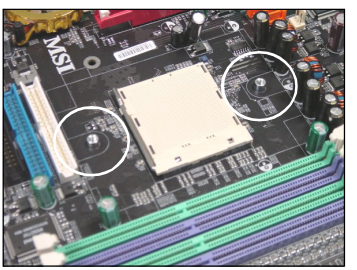


2. Turn over the mainboard, and install the backplate to the proper position.



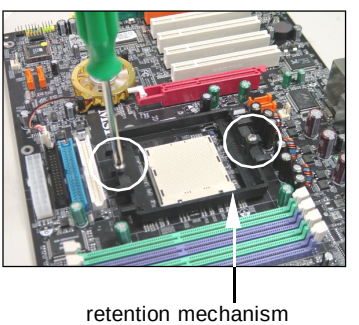


3. Turn over the mainboard again, and place the mainboard on the flat surface. Locate the two screw holes of the mainboard.



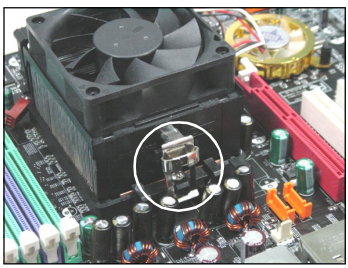
4. Align the retention mechanism and the backplate.

   Fix the retention mechanism and the backplate with two screws.



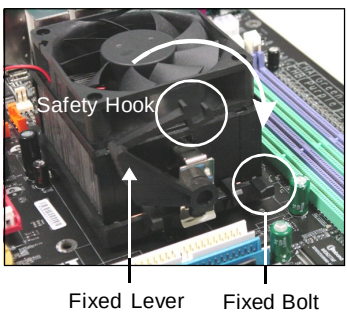
5. Position the cooling set onto the retention mechanism.

   Hook one end of the clip to hook first, and then press down the other end of the clip to fasten the cooling set on the top of the retention mechanism.

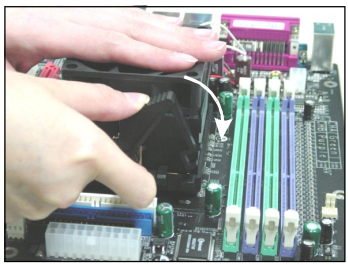


6. Locate the Fix Lever, Safety Hook and the Fixed Bolt.

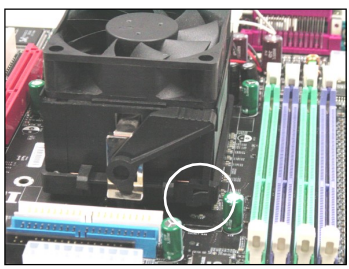
   Lift up the intensive fixed lever.



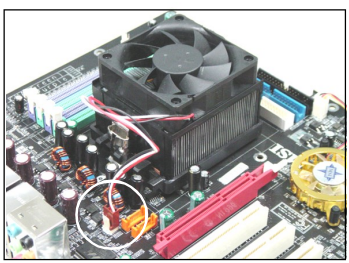
7. Fasten down the lever.



8. Make sure the safety hook completely clasps the fixed bolt of the retention mechanism.



9. Attach the CPU Fan cable to the CPU fan connector on the mainboard.



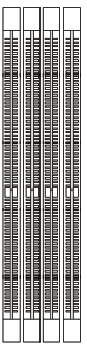
MSI Reminds You...

While disconnecting the Safety Hook from the fixed bolt, it is necessary to keep an eye on your fingers, because once the Safety Hook is disconnected from the fixed bolt, the fixed lever will spring back instantly.

Memory

The mainboard provides 4 slots for 184-pin DDR DIMM (Double In-Line Memory Module) modules and supports the memory size up to 4GB. You can install DDR 333/ 400 modules on the DDR DIMM slots (DIMM 1~4).

DIMM1~DIMM4
(from left to right)



DIMM Module Combination

Install at least one DIMM module on the slots. Each DIMM slot supports up to a maximum size of 1GB. Users can install either single- or double-sided modules to meet their own needs. Users may install memory modules of different type and density on different-channel DDR DIMMs. However, ***memory modules of the same type and density*** are required while using dual-channel DDR, or instability may happen.

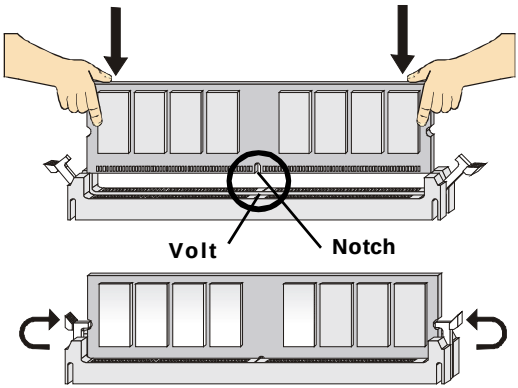
BLUE Slots		BLACK Slots		
DIMM1 (CH A)	DIMM2 (CH B)	DIMM3 (CH A)	DIMM4 (CH B)	Mode
128MB~1GB				Single Channel
		128MB~1GB		Single Channel
128MB~1GB		128MB~1GB		Single Channel
128MB~1GB	128MB~1GB			Dual Channel
		128MB~1GB	128MB~1GB	Dual Channel
128MB~1GB	128MB~1GB	128MB~1GB	128MB~1GB	Dual Channel

MSI Reminds You...

- *The system operates ONLY when the DDR modules are installed in accordance with the above-mentioned memory population rules.*
- *In dual-channel mode, make sure that you install memory modules of **the same type and density** on DDR DIMMs.*
- *To enable successful system boot-up, always insert the memory modules into the **Channel A slots (DIMM1 or DIMM3) first.***
- *This mainboard DO NOT support the memory module installed with more than 18 pieces of IC (integrated circuit).*
- *Do not support three memory modules.*

Installing DDR Modules

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

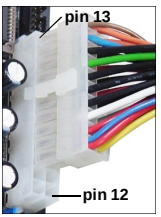


Power Supply

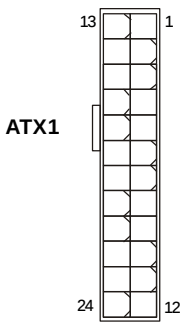
The mainboard supports ATX power supply for the power system. Before inserting the power supply connector, always make sure that all components are installed properly to ensure that no damage will be caused.

ATX 24-Pin Power Connector: ATX1

This connector allows you to connect an ATX 24-pin power supply. To connect the ATX 24-pin 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.



You may use the 20-pin ATX power supply as you like. If you'd like to use the 20-pin ATX power supply, please plug your power supply along with pin 1 & pin 13 (refer to the image at the right hand). There is also a foolproof design on pin 11, 12, 23 & 24 to avoid wrong installation.

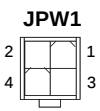


Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWROK	20	Res
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	NC	24	GND

ATX 12V Power Connector: JPW1

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



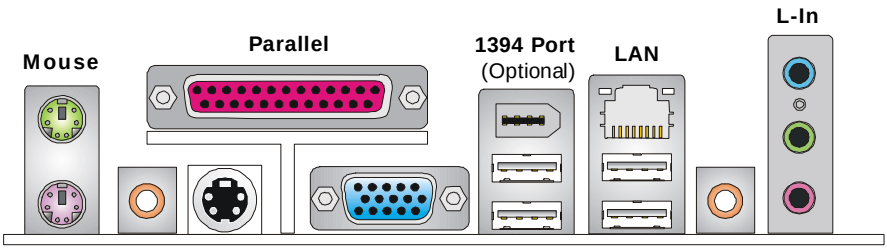
JPW1 Pin Definition

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

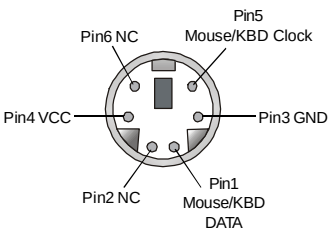
MSI Reminds You...

1. *These two connectors connect to the ATX power supply and have to work together to ensure stable operation of the mainboard.*
2. *Power supply of 350 watts (and above) is highly recommended for system stability.*
3. *ATX 12V power connection should be greater than 18A.*

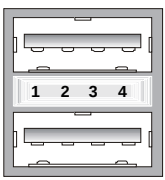
Back Panel



Mouse/Keyboard Connector

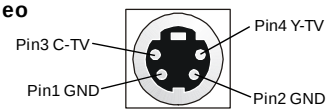


USB Ports

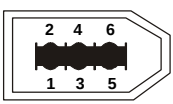


PIN	SIGNAL
1	VCC
2	-Data
3	+Data
4	GND

S-Video

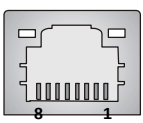


IEEE 1394 Port

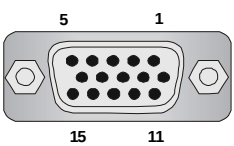


PIN	SIGNAL
1	PWR
2	GND
3	TPB-
4	TPB+
5	TPA-
6	TPA+

RJ-45 LAN Jack



VGA Port



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

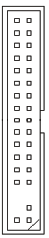
10/100 LAN

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

Connectors

Floppy Disk Drive Connector: FDD1

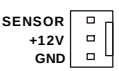
The mainboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.



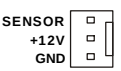
FDD1

Fan Power Connectors: CFAN1 / SFAN1

The fan power connectors support system cooling fan with +12V. 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.



CFAN1



SFAN1

MSI Reminds You...

Please refer to the recommended CPU fans at AMD® official website or consult the vendors for proper CPU cooling fan.

ATA133 Hard Disk Connectors: IDE1 & IDE2

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

The Ultra ATA133 interface boosts data transfer rates between the computer and the hard drive up to 133 megabytes (MB) per second. The new interface is one-third faster than earlier record-breaking Ultra ATA/100 technology and is backwards compatible with the existing Ultra ATA interface.

IDE2 **IDE1**

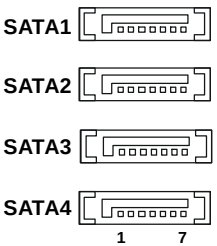
IDE1 (Primary IDE Connector)
The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

IDE2 (Secondary IDE Connector)
IDE2 can also connect a Master and a Slave drive.

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

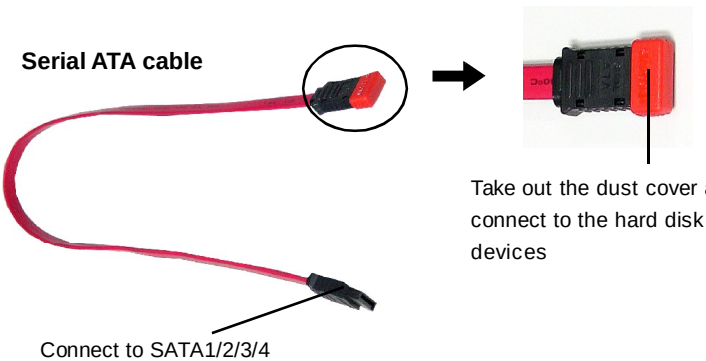
Serial ATA Connectors: SATA1~SATA4

The ATI SB400 SouthBridge supports four serial ATA connectors SATA1~SATA4. SATA1~SATA4 are high-speed Serial ATA interface ports. Each supports 1st generation serial ATA data rates of 150MB/s and is fully compliant with Serial ATA 1.0 specifications. Each Serial ATA connector can connect to 1 hard disk device.



SATA1~ SATA4 Pin Definition

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



MSI Reminds You...

Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

CD-In Connector: JCD1

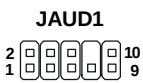
This connector is provided for CD-ROM audio.

Aux Line-In Connector: JAUX1

The connector is for DVD add-on card with Line-in connector.

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.

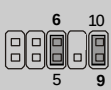


Pin Definition

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

MSI Reminds You...

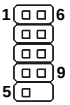
If you don't want to connect to the front audio header, pins 5 & 6, 9 & 10 have to be jumpered in order to have signal output directed to the rear audio ports. Otherwise, the Line-Out connector on the back panel will not function.



Serial Port Header: COM1 (Optional)

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

COM1



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

IEEE 1394 Connectors: J1394_1 (Optional)

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

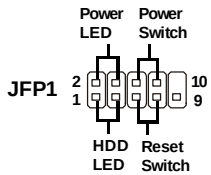
J1394_1

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

Front Panel Connectors: JFP1

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



JFP1 Pin Definition

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.

Front USB Connectors: JUSB1 / JUSB2

The mainboard provides two standard USB 2.0 pin headers *JUSB1 & JUSB2* . USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

JUSB1, JUSB2
(USB 2.0)

JUSB1 & JUSB2 Pin Definition

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

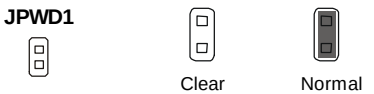
MSI Reminds You...
Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

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.

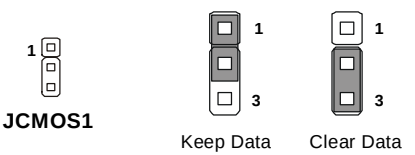
Clear BIOS Password Jumper: JPWD1

The jumper is used to clear the BIOS password. To clear the password, open the jumper and restart your computer.



Clear CMOS Jumper: JCMOS1

There is a CMOS RAM onboard 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, set the JCMOS1 (Clear CMOS Jumper) to clear data.



MSI Reminds You...

To clear CMOS you should:

1. *switch off the system and short 2-3 pin of the JCMOS1;*
2. *switch on the system again and the message "CMOS checksum error" should appear;*
3. *switch off the system and return to 1-2 pin (Keep Data) position;*
4. *switch on again for operation.*

Please avoid clearing CMOS while the system is on; it will damage the mainboard.

Slots

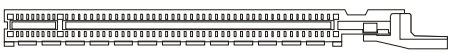
The motherboard provides one PCI Express x16 slot and three 32-bit PCI bus slots.

PCI Express Slots

The PCI Express slot, as a high-bandwidth, low pin count, serial, interconnect technology, supports Intel highest performance desktop platforms utilizing the Intel Pentium 4 processor with HT Technology.

PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a PCI Express x1 lane for Gigabit Ethernet, TV Tuners, 1394 controllers, and general purpose I/O. Also, desktop platforms with PCI Express Architecture will be designed to deliver highest performance in video, graphics, multimedia and other sophisticated applications. Moreover, PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP8x designs with transfer rates of 4.0 GB/s over a PCI Express x16 lane for graphics controllers.

You can insert the expansion cards to meet your needs. When adding or removing expansion cards, make sure that you unplug the power supply first.



PCI Express x16 slot

PCI (Peripheral Component Interconnect) Slots

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

PCI Slots

PCI Interrupt Request Routing

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

	Order 1	Order 2	Order 3	Order 4
PCI Slot 1	INT E#	INT F#	INT G#	INT H#
PCI Slot 2	INT F#	INT G#	INT H#	INT E#
PCI Slot 3	INT G#	INT H#	INT E#	INT F#

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

W7093MS V1.0 150304 where:

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

Entering Setup

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

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>	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
<F6>	Load the default CMOS value from Fail-Safe default table, only for Option Page Setup Menu
<F7>	Load Optimized defaults
<F10>	Save all the CMOS changes and exit

Getting Help

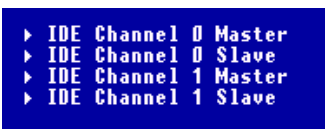
After entering the Setup menu, the first menu you will see is the Main Menu.

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 >.

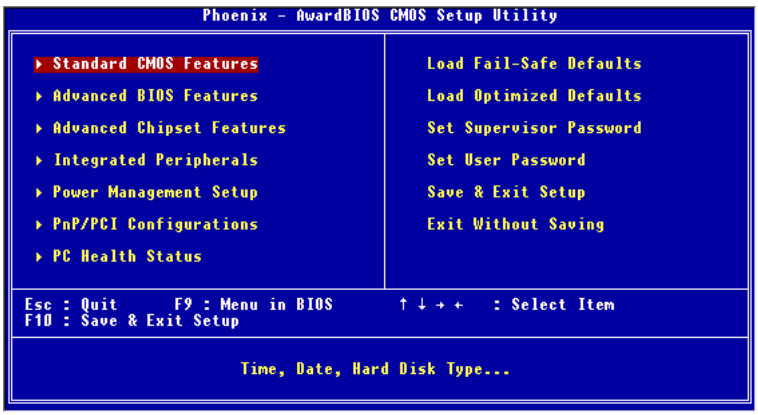


General Help <F1>

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.

The Main Menu

Once you enter Phoenix-Award® BIOS CMOS Setup Utility, the Main Menu (Figure 1) 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.



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.

Load Fail-Safe Defaults
Use this menu to load the default values set by the BIOS vendor for stable system performance.

Load Optimized Defaults
Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

Set Supervisor Password
Use this menu to set Supervisor Password.

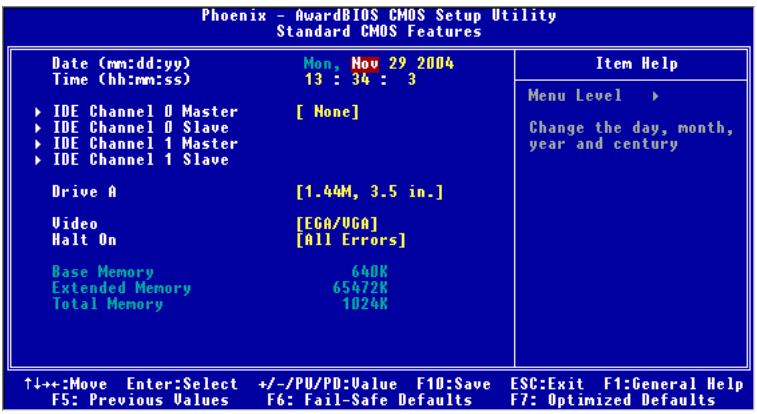
Set User Password
Use this menu to set User Password.

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 several 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.



Date

This allows you to set the system to the date that you want (usually the current date). The 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

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

IDE Channel 0/1 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
This item allows you to set the type of floppy drives installed. Available 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.].

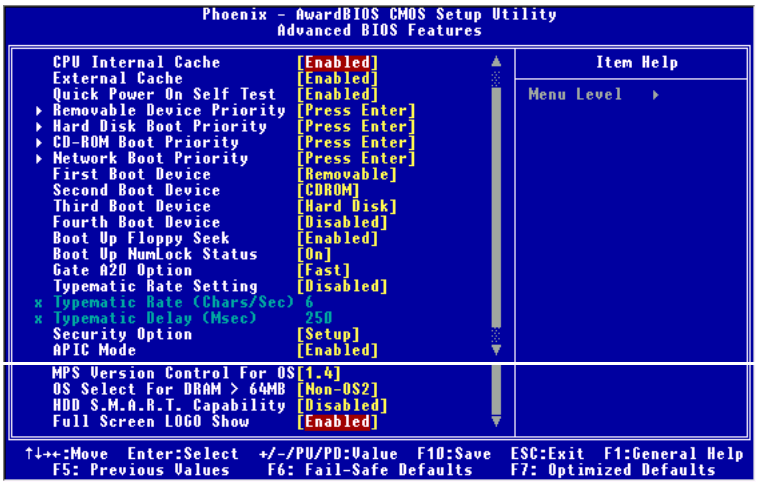
Video
The setting controls the type of video adapter used for the primary monitor of the system. Available options are [EGA/VGA], [CGA 40], [CGA 80], and [Mono].

Halt On
The setting determines whether the system will stop if an error is detected at boot. Available 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



CPU Internal Cache/External Cache
Cache memory is additional memory that is much faster than conventional DRAM (system memory). When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. The settings enable/disable the internal cache (also known as L1 or level 1 cache) and external cache (also known as L2 or level 2 cache). Setting options: [Enabled], [Disabled].

Quick Power On Self Test
Select Enabled to reduce the amount of time required to run the power-on self-test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. It is better to find a problem during POST than lose data during your work. Options: [Enabled], [Disabled].

Removable Device Priority
This feature allows you to specify the priority of removable devices.

Hard Disk Boot Priority
This feature allows you to specify the hard disk boot priority.

CD-ROM Boot Priority
This feature allows you to specify the CD-ROM boot priority.

Network Boot Priority
This feature allows you to specify the network boot priority.

First/Second/Third/Fourth Boot Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

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

Boot Up NumLock Status
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].

Gate A20 Option
This item is to set the Gate A20 status. A20 refers to the first 64KB of extended memory. When the default value [Fast] is selected, the Gate A20 is controlled by Port92 or chipset specific method resulting in faster system performance. When [Normal] is selected, A20 is controlled by a keyboard controller or chipset hardware.

Typematic Rate Setting
This item is used to enable or disable the typematic rate setting including Typematic Rate & Typematic Delay.

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.

Typematic Delay (Msec)
This item allows you to select the delay between when the key was first pressed and when the acceleration begins.

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.

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

MPS Version Control For OS
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system. Settings: [1.4], [1.1].

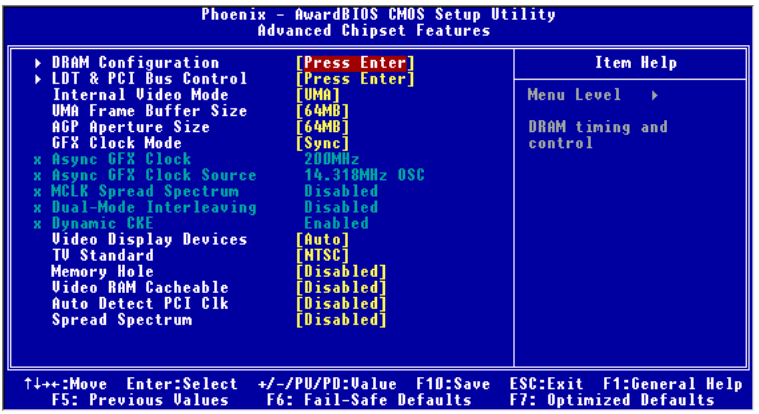
OS Select for DRAM > 64MB
This allows you to run the OS/2® operating system with DRAM larger than 64MB. When you choose [Non-OS2], you cannot run the OS/2® operating system with DRAM larger than 64MB. Settings: [OS2], [Non-OS2].

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

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

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

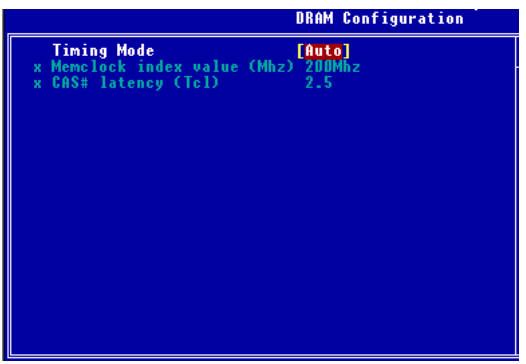
Advanced Chipset Features



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

DRAM Configuration

Press <Enter> to enter the submenu and the following screen appears.



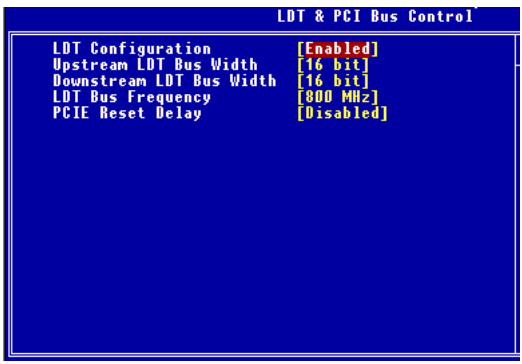
Timing Mode

This field allows you to select the DDR timing setting. Setting to [Auto] enables ***Memclock Index Value (Mhz)*** & ***CAS# Latency (Tcl)*** automatically to be determined by SPD. Selecting [Manual] allows users to configure these fields manually.

Memclock Index Value (Mhz)
User can place an artificial memory clock limit on the system. Please note that memory is prevented from running faster than this frequency.

CAS# Latency (Tcl)
This controls the CAS latency, which determines the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Settings: [Auto], [2.0], [2.5], [3.0]. [2.0] increases the system performance the most while [3.0] provides the most stable performance.

LDT & PCI Bus Control
Press <Enter> to enter the submenu and the following screen appears.



LDT Configuration
This item disables/enables the LDT configuration.

Upstream/Downstream LDT Bus Width
These two items control the utilized widths of the HyperTransport link. Setting options: [8 bit], [16 bit].

LDT Bus Frequency
This item specifies the maximum operating frequency of the link's transmitter clock.

PCIE Reset Delay
This item disables/enables the reset delay of the PCI Express slot.

Internal Video Mode
This setting specifies the internal video mode. Setting options: [Disabled], [UMA], [UMA+SidePort], [SidePort].

UMA Frame Buffer Size
Frame Buffer is the video memory that stores data for video display (frame). This field is used to determine the memory size for Frame Buffer. Larger frame buffer size increases video performance.

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], [1GB], [2GB] and [None].

GFX Clock Mode
This setting controls the GFX clock mode. Setting options: [Sync], [Async].

Video Display Devices
Use the field to select the type of device you want to use as the display(s) of the system. Settings: [Auto], [CRT Only], [CLD Only], [DFP Only], [TV Only], [CRT Force, Other Auto], [TV Force, Other Auto], [CRT Force, TV Force].

TV Standard
Select the TV standard which is used as the video signal format of your TV if you have connected a TV to the system. Setting are: [NTSC], [PAL], [PAL-M], [PAL-60], [NTSC-JAP], [PAL-CN], [PAL-N], [SCART_RGB].

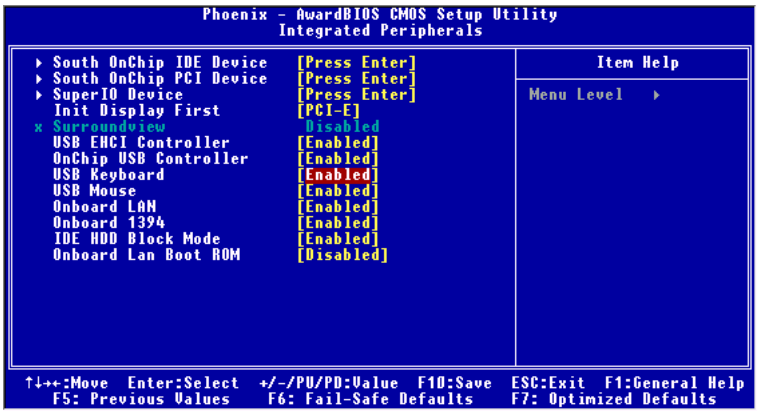
Memory Hole
In order to improve performance, certain space in memory can be reserved for ISA peripherals. This memory must be mapped into the memory space below 16MB. When this area is reserved, it cannot be cached. Settings: [Disabled], [Enabled].

Video RAM Cacheable
Selecting *Enabled* allows caching of the video memory (RAM) at A0000h to AFFFFh, resulting in better video performance. However, if any program writes to this memory area, a memory access error may result. Setting options: [Disabled], [Enabled].

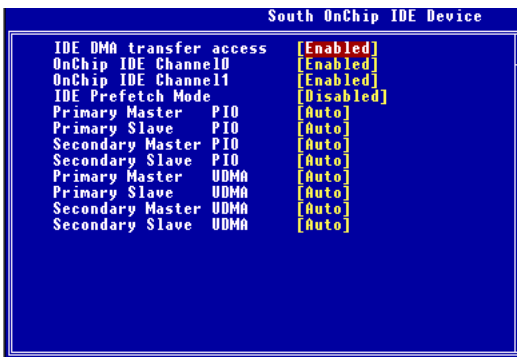
Auto Detect PCI Clk
This feature enables the BIOS to auto detect PCI device and set PCI slot clock. Options are: [Enabled], [Disabled].

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, select [Enabled] for EMI reduction. Remember to disable Spread Spectrum if you are overclocking because even a slight jitter can introduce a temporary boost in clockspeed which may just cause your overclocked processor to lock up. Available options: [Enabled], [Disabled].

Integrated Peripherals



South OnChip IDE Device
Press <Enter> to enter the sub-menu and the following screen appears:



IDE DMA Transfer Access
This item is used to enable or disable the DMA transfer function of the IDE Hard Drive. The settings are: [Enabled], [Disabled].

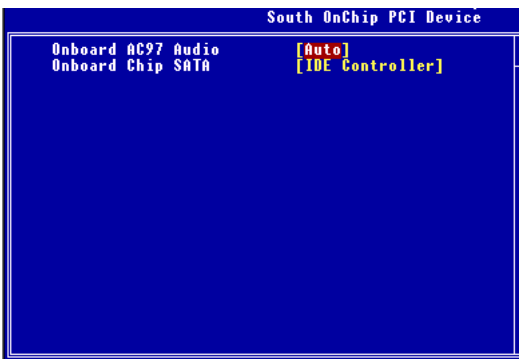
OnChip IDE Channel 0/1
The integrated peripheral controller contains an IDE interface with support for two IDE channels. Choose [Enabled] to activate each channel separately. Settings: [Enabled], [Disabled].

IDE Prefetch Mode
The onboard IDE drive interfaces support IDE prefetching, for faster drive accesses. When you install a primary and/or secondary add-in IDE interface, set this option to [Disabled] if the interface does not support prefetching. Settings: [Enabled], [Disabled].

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. The settings are: [Auto], [Mode 0], [Mode 1], [Mode 2], [Mode 3], [Mode 4].

Primary/Secondary Master/Slave UDMA
Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66 and Ultra DMA/100 select [Auto] to enable BIOS support. The settings are: [Auto], [Disabled].

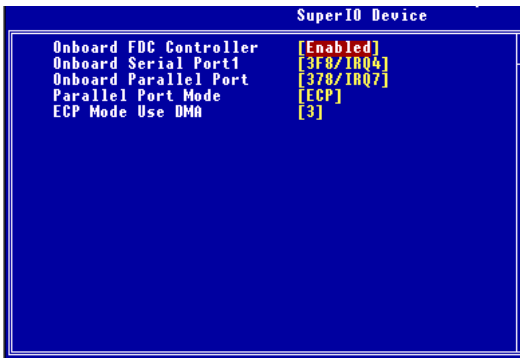
South OnChip PCI Device
Press <Enter> to enter the sub-menu and the following screen appears:



Onboard AC97 Audio
[Auto] allows the mainboard to detect whether an audio device is used. If an audio device is detected, the onboard AC'97 (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. Settings: [Auto], [Disabled].

Onboard Chip SATA
This setting controls the onboard SATA controller. Settings: [SATA Disabled], [IDE Controller], [RAID Controller], [Other Mass Storage].

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



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. The settings are: [Enabled] and [Disabled].

Onboard Serial Port 1
Select an address and corresponding interrupt for Serial Port 1. The settings are: [3F8/IRQ4], [2E8/IRQ3], [3E8/IRQ4], [2F8/IRQ3], [Disabled], [Auto].

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

Parallel Port Mode
This setting specifies the parallel port mode.

SPP: Standard Parallel Port
EPP: Enhanced Parallel Port
ECP: Extended Capability Port

Setting options: [SPP], [EPP1.9+SPP], [ECP], [EPP1.9+ECP], [EPP1.7+SPP], [EPP1.7+ECP].

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].

Init Display First
This setting specifies which VGA card is your primary graphics adapter.

Surroundview
SURROUNDVIEW™ provides the power and convenience of multi-adapter, multi-monitor support for computers that use an AGP- or PCI Express®-based graphics card in conjunction with ATI integrated graphics processors (IGPs). Setting options: [Enabled], [Disabled].

USB EHCI Controller
This setting disables/enables the USB EHCI controller. The Enhanced Host Controller Interface (EHCI) specification describes the register-level interface for a Host Controller for the Universal Serial Bus (USB) Revision 2.0. Setting options: [Enabled], [Disabled].

OnChip USB Controller
This setting disables/enables the onchip USB controller. Setting options: [Enabled], [Disabled].

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

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

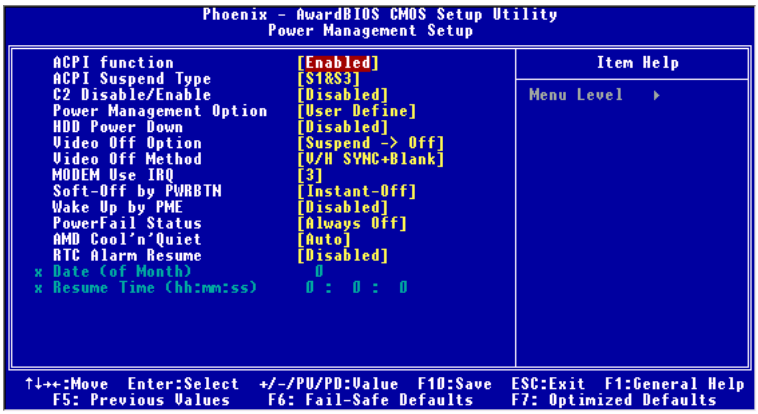
Onboard LAN
This setting allows you to enable/disable the onboard LAN controller. Setting options: [Enabled], [Disabled].

Onboard 1394
This setting allows you to enable/disable the onboard IEEE 1394 controller. Setting options: [Enabled], [Disabled].

IDE HDD Block Mode
Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select [Enabled] for automatic detection of the optimal number of block read/writes per sector the drive can support. Settings: [Enabled], [Disabled].

Onboard LAN Boot ROM
This setting enables/disables the initialization of the onboard LAN Boot ROM during bootup. Selecting [Disabled] will speed up the boot process.

Power Management Setup



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

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]. Settings: [Enabled] and [Disabled].

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

S1(POS)	The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.
S3(STR)	The S3 sleep mode is a lower power state where the in formation 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.
S1 & S3	The system will decide when to enter S1 or S3 state.

Power Management Option
This item is used to select the degree (or type) of power saving and is related to

these modes: *Suspend Mode* and *HDD Power Down*. 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 each mode separately.

HDD Power Down
If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active. Settings are [Disabled] and [1] through [15] Min.

Video Off Option
This setting is used to control the mode in which the monitor will shut down. Setting options:

[Always On]	Monitor remains on during power-saving modes.
[Suspend -> Off]	Monitor blanked when system enters Suspend mode.

Video Off Method
This determines the manner in which the monitor is blanked.

[V/H SYNC+Blank]	This selection will cause the system to turn off the vertical and rizontal synchronization ports and write blanks to the video buffer.
[Blank Screen]	This option only writes blanks to the video buffer.
[DPMS Support]	Initial display power menagement signaling

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], [NA].

Soft-Off by PWRBTN
This feature allows users to configure the power button function. Settings are:

[Instant-Off]	The power button functions as a normal power-on/-off button.
[By HardWare]	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.

Wake Up by PME
When setting to [Enabled], the feature allows your system to be awakened from the power saving modes through any event on PME (Power Management Event). Setting options: [Enabled], [Disabled].

PowerFail Status
This item specifies whether your system will reboot after a power failure or interrupt occurs. Setting options: [Always Off], [Always On], [Hardware Strap], [Previous].

AMD Cool 'n' Quiet

This feature is especially designed for AMD Athlon processors, which provides a CPU temperature detecting function to prevent your CPU's from overheating due to heavy workloads. Setting options: [Disabled], [Auto].

MSI Reminds You...

To ensure stability of the Cool'n'Quiet function, it is always recommended to have the memory modules plugged in DIMM1.

RTC Alarm Resume

When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode. Setting options: [Disabled], [Enabled].

Date (of Month)

When ***RTC Alarm Resume*** is set to [Enabled], the field specifies the month for ***RTC Alarm Resume***. Settings: [NA], [1]-[12].

Resume Time (hh:mm:ss)

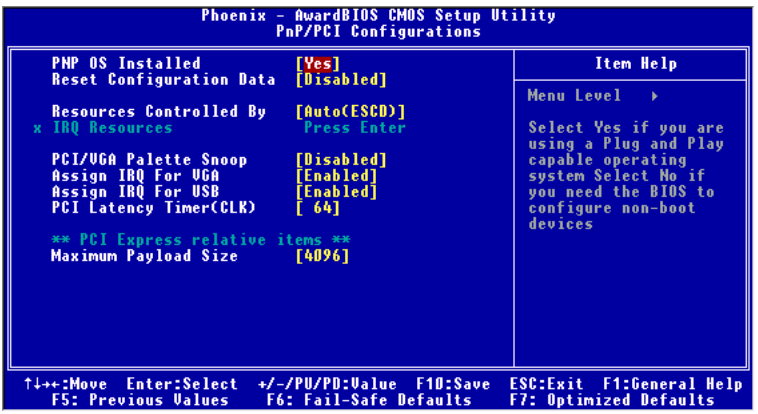
You can choose what hour, minute and second the system will boot up.

MSI Reminds You...

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

PNP/PCI Configurations

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



PNP OS Installed
When set to [Yes], BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows 98. When set to [No], BIOS will initialize all the PnP cards. So, select [Yes] if your operating system is Plug & Play aware.

Reset Configuration Data
Normally, you leave this field [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 operating system cannot boot. Setting options: [Enabled] and [Disabled].

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® 95/98. If you set this field to “manual” choose specific resources by going into each of the sub menu that follows this field (a sub menu is preceded by a “**Ø**”). 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. Settings are:

[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.

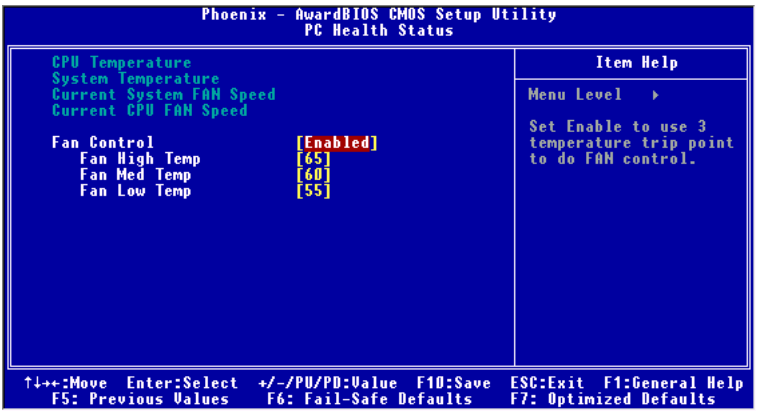
Assign IRQ for VGA/USB
The items allow you to assign an IRQ line to the VGA card and USB device separately. Options: [Enabled], [Disabled].

PCI Latency Timer (CLK)
This feature controls how long each PCI device can hold the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. As each access to the bus comes with an initial delay before any transaction can be made, low values for the PCI Latency Timer will reduce the effective PCI bandwidth while higher values improve it. Key in a DEC number between [0] and [255].

Maximum Payload Size
This setting specifies the maximum TLP payload size for the PCI Express devices. The unit is byte. Setting options: [128], [256], [512], [1024], [2048], [4096].

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.



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

Fan Control/Fan High Temp/Fan Med Temp/Fan Low Temp
The BIOS provides the Smart Fan system which can control the fan speed automatically depending on the current temperature to keep it within the preset temperature range.

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:

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:

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:

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 is 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 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 DigiCell

DigiCell, the most useful and powerful utility that MSI has spent much research and efforts to develop, helps users to monitor and configure all the integrated peripherals of the system, such as audio program, power management, MP3 files management and communication / 802.11g WLAN settings. Moreover, with this unique utility, you will be able to activate the MSI well-known features, Live Update and Core Center, which makes it easier to update the BIOS/drivers online, and to monitor the system hardware status (CPU/Fan temperature and speed) or to overclock the CPU/memory.

Once you have your DigiCell installed (locate the setup source file in the setup CD accompanying with your mainboard, path: **Utility --> MSI Utility --> MSI DigiCell**), it will have an icon in the system tray, a short cut icon on the desktop, and a short cut path in your "Start-up" menu. You may double-click on each icon to enable DigiCell.

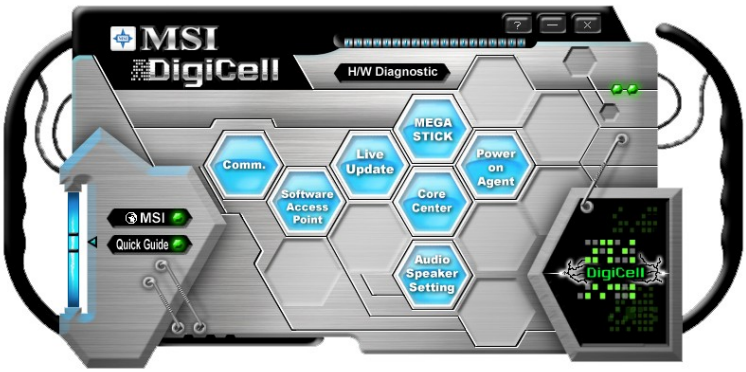
short-cut icon in the system tray

short-cut path in the start-up menu (path: Start-->Programs-->MSI-->DigiCell)

Main

Before using this utility, it is required to have all the integrated peripherals/cards (LAN card, Wireless LAN card, MegaStick... etc.) and all the necessary drivers (onboard LAN driver, audio driver, CoreCenter, Live Update... etc.) installed correctly.

The icon representing each item will be lit up if it is inserted/installed correctly and properly. Otherwise, the icon will remain gray and user is not able to view the functionality/connection of that item.



Introduction:

Click on each icon appearing above to enter the sub-menu to make further configuration.

MSI

Click on this button to link to MSI website: http://www.msi.com.tw.

Quick Guide

Click on this button and the quick guide of **DigiCell** will be displayed for you to review.

H/W Diagnostic

In this sub-menu, it provides the information of each DigiCell button for you to check if the representing peripherals/cards/drivers are correctly installed.

Comm.

In this sub-menu, you can see the configuration details for communication products, including the status, strength, speed and channel of the connection of the Ethernet LAN & Wireless LAN.

Software Access Point

In this sub-menu, you can change your connection mode to different ones, and configure the advanced settings for each mode, such as the authentication encryption... etc.

Live Update
You can take advantage of **Live Update** to detect and update BIOS and drivers online.

Core Center
You can take advantage of **Core Center** to monitor the health status of your system and to overclock under Windows OS if your system supports overclocking function.

MEGA STICK
If you have your MEGA STICK connected to your system, this icon will be lit up. Click this blue icon to turn DigiCell into a MP3 player, and then you can load media files from your MEGA STICK or the system, and edit the preferred playlist.

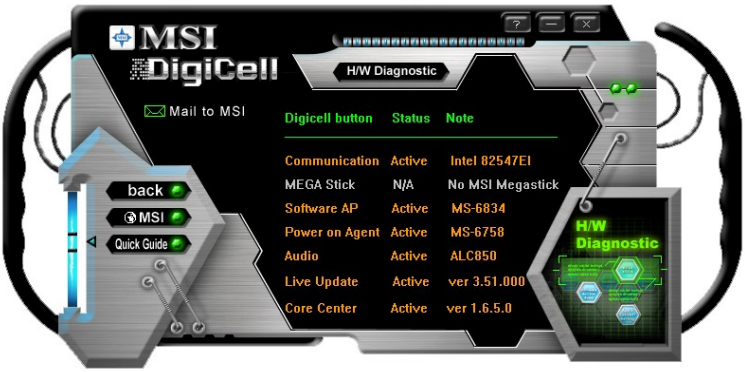
Audio Speaker Setting
In this sub-menu, you can configure and test the multi-channel audio function, speakers, sound effect and environment.

Power on Agent
In this sub-menu, you can configure date, time and auto-executed programs of the power-on, power-off and restarting features.

MSI Reminds You...
*Click on **back** button in every sub-menu and it will bring you back to the main menu.*

H/W Diagnostic

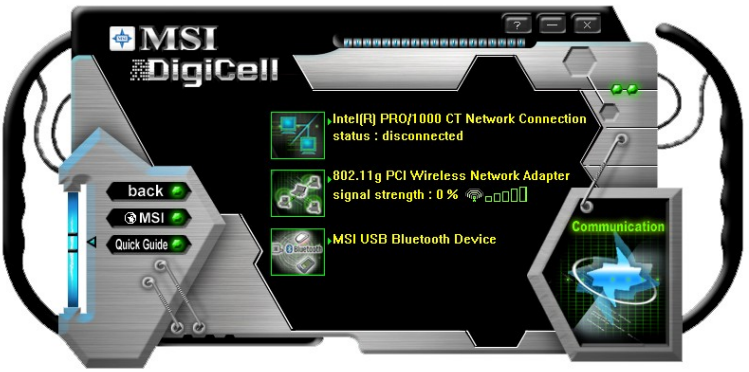
In the **H/W Diagnostic** sub-menu, you can see the information, status and note of each DigiCell. You may double check the connection and installation of the item marked as gray.



You may also click on the **Mail to MSI** button to send your questions or suggestions to MSI's technical support staff.

Communication

In the **Communication** sub-menu, you can see the status of all the LAN / WLAN / Bluetooth on the screen if the hardware is installed. The first icon indicates the onboard LAN on your system, the second icon indicates the wireless LAN status, and the third one is the information about the bluetooth on your system. Click on each item for details.



This icon indicates the information and connection status of onboard LAN, which is read-only.

The second icon indicates the wireless connection. You may click this icon to configure the advanced settings in the **WLAN Card Mode** dialogue box (see the image on p.4-8). Please note that it is only available when the **Software Access Point** is set to **WLAN Card Mode**.

The third icon indicates the connection using bluetooth devices. If your system is connected to the bluetooth device, the icon will light up.

Software Access Point

In the **Software Access Point** sub-menu, you can see the communication status on your system and choose the desired software access point mode by clicking on the desired icon, in which the default settings are configured for your usage. The default software access point mode is set to **WLAN Card Mode**. For more advanced security settings and channels switching, click on **"Setting"** button to enter its sub-menu.

Terminology

Here are the introduction of WLAN / AP communication terminology.

WEP Key

In the wireless network environment, the administrator can set up password (Network Key) to protect the network from being attacked or unauthorized access. When building the network, you can set up 4 sets of WEP keys, which can be 5 characters (10 hex-adecimal digital) or 13 characters (26 hex-adecimal digital) and specify one of them to use.

Ad-hoc Mode

An Ad-hoc network is a local area network or other small network, especially one with wireless or temporary plug-in connections, in which some of the network devices are part of the network only for the duration of a communications session. Users in the network can share files, print to a shared printer, and access the Internet with a shared modem. In this kind of network, new devices can be quickly added; however, users can only communicate with other wireless LAN computers that are in this wireless LAN workgroup, and are within range.

Infrastructure Mode

The difference between Infrastructure network and Ad-hoc network is that the former one includes an Access Point. In an Infrastructure network, the Access Point can manage the bandwidth to maximize bandwidth utilization. Additionally, the Access Point enables users on a wireless LAN to access an existing wired network, allowing wireless users to take advantage of the wired networks resources, such as Internet, email, file transfer, and printer sharing. The scale and range of the Infrastructure networking are larger and wider than that of the Ad-hoc networking.

Access Point Mode

Click on **"Setting"** button of the **Access Point Mode** and the following screen will display.

IP Sharing

Click on this icon to enable/disable the IP sharing. The default of this setting is disabled.

 Disabled.

 Enabled.

Enabling/disabling IP sharing depends on the different situation. For example:

1. If your family and you are getting on Internet at home with multi computers, and your ISP only provides one IP for you, you may need to enable **IP Sharing** function in order to use this one IP to get on Internet with multi computers simultaneously.
2. If you are getting on Internet in office, usually the LAN card will automatically get the IP this computer uses. In this case you don't have to enable this function.

SSID

Means Service Set Identifier, a ***unique*** name shared among all points in a wireless network. It must be ***identical*** for all points in the network. Then the card will be able to connect to an access point with the same SSID.

Channel

Specifies the operating radio frequency channel in **Infrastructure mode**, which should be set to an available one (ex: with less traffic to ensure the stable and better connection).

Associated Client List

This option is to display information of stations that are currently associated to your wireless gateway.

Association Control

This option allows you to control which PC can connect to the wireless LAN. If you

enable this feature, only PCs with MAC address located in Association Control List can connect to the wireless LAN.

MAC Address
MAC stands for Media Access Control. A MAC address is the hardware address of a device connected to a network.

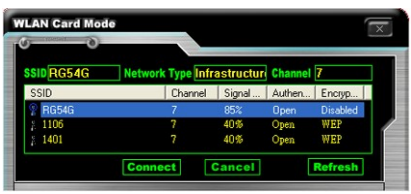
Security
This option allows you to enable/disable the authentication function.

Authentication
Open: Communicates the key across the network.
Shared: Devices must have identical WEP settings to communicate.

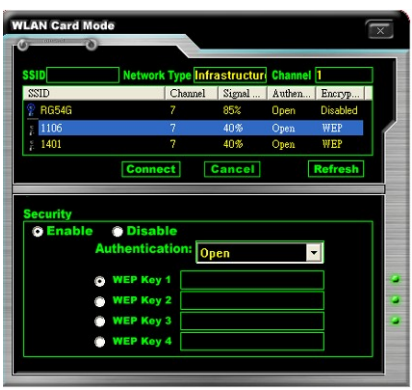
WLAN Card Mode

Click on **"Setting"** button of the **WLAN Card Mode** for the WEP status of your APs.

If the AP you are selecting (the highlighted one) is not encrypted (***Disabled*** shown in the **Encryption** column), the screen will display as below. You can click "**Connect**" to make connection to that AP, click "**Cancel**" to close this dialogue box, or click **"Refresh"** button to update the available WLAN connections.



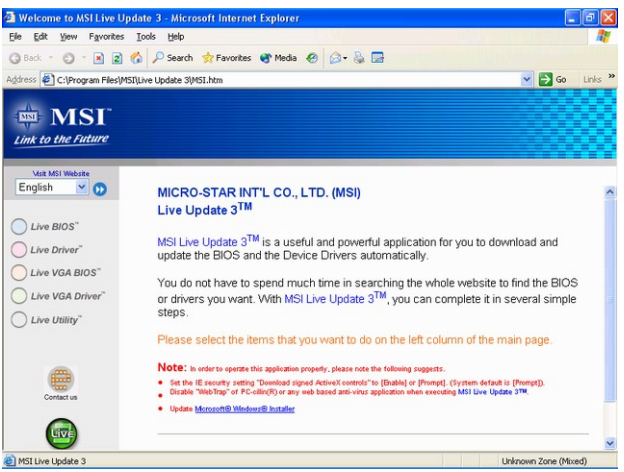
If the network you are selecting is encrypted (***WEP*** shown in the **Encryption** column), the screen will display as below. You need to enter the correct WEP key defined by AP in the specified **WEP Key 1~4** fields to make the connection.



Live Update

Click on the **Live Update** icon in the main menu and the **Live Update** program will be enabled.

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



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

Live BIOS – Updates the BIOS online.
Live Driver – Updates the drivers online.
Live VGA BIOS – Updates the VGA BIOS online.
Live VGA Driver – Updates the VGA driver online.
Live Utility – Updates the utilities online.

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

MEGA STICK

In the **MEGA STICK** sub-menu, you can configure the settings of MSI MEGA STICK and the media files (*.m3u, *.mp3, *.wav, *.cda, *.wma) on your system.

Basic Function

Here you can edit your own play list with the buttons **"load", "save", "delete", "shuttle", "repeat"** & **"print".**

Load To load media files or the playlist of mp3 files (*.m3u) on your system or on your MEGA STICK.

Save To save a loaded playlist of mp3 files (*.m3u) on your system or on your MEGA STICK.

Delete Click on the media files in the **Play List:** field and use **"Delete"** button to remove the media file from the play list. You may remove multi media files simultaneously by using "Ctrl" to select multi files.

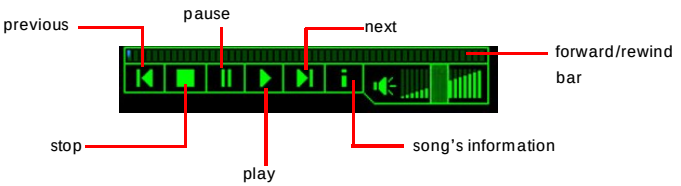
Shuffle To play the media file in the **Play List:** in a random order.

Repeat To repeat the selected files in the **Play List:**.

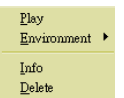
Print This button has 2 functions:

1. To print out the details of current play list through your printer with the following information:
   Song title --- Song length --- Singer name
2. To save the details of current play list and save the file in the plain text file format in the *\\Program files\MSI\DigiCell\MyMusic.txt* for your reference. The *MyMusic.txt* file is with the following information:
   Song title --- Song length --- Singer name

There is also a toolbar for you to execute some basic function, like play, stop, pause, previous/next song, song info and volume adjust. There is also a scroll bar on the top for you to forward/rewind**.**



Right-click on the MP3 file and choose **"Info"**, a **MP3 Info** dialogue will pop up to show the information of the file, including the title, artist, album, release year and others. You may also add your own comment in the **comment** field. Then click **"Save"** to save the change, click **"Cancel"** to discard the change, or click **"Remove"** to remove all this information.

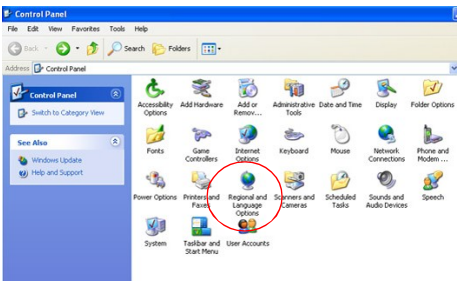


Non-Unicode programs supported

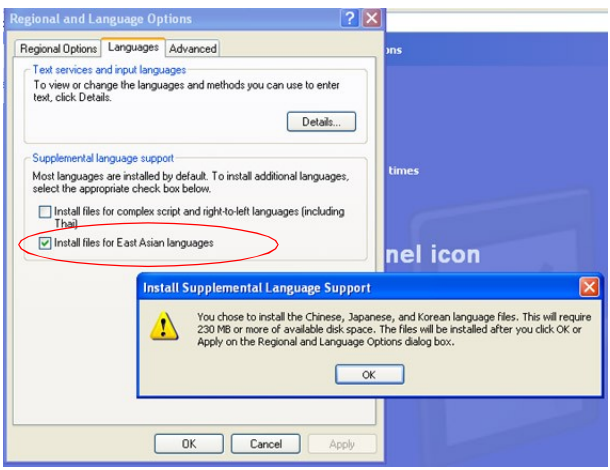
If you are using an operating system in European languages, and you'd like to play the media files in MEGA STICK with East-Asian languages (such as Chinese, Japanese... etc.), it is possible that the file names display incorrectly.

However, you can install the ***Supplemental Language Support*** provided by Microsoft to solve this problem. You need to have your Microsoft Setup CD prepared in the CD-ROM. The system will start to install the necessary components after the settings are configured here. Follow the steps described below.

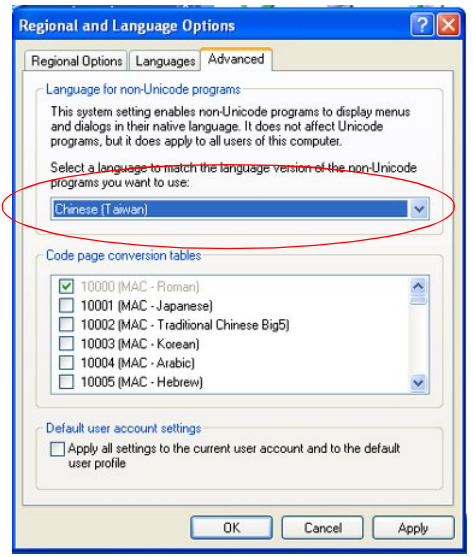
1. Go to [Control Panel] and choose [Regional and Languages Options].



2. Go to the [Languages] tab and enable the check box of [Install files for East Asian languages]. A dialogue box will pop up to remind you the above selection is chosen.

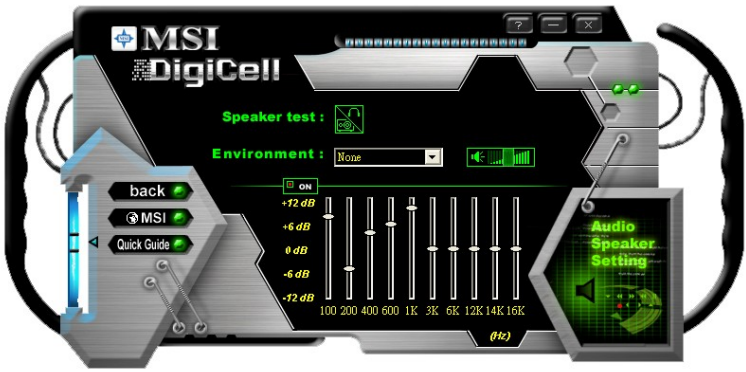


3. Then go to the [Advanced] tab and select ***the language you want to be supported*** (the language of the filename in the MegaStick) from the drop-down list in the [Language for non-Unicode programs], then click [Apply]. The system will install the necessary components from your Microsoft Setup CD immediately.

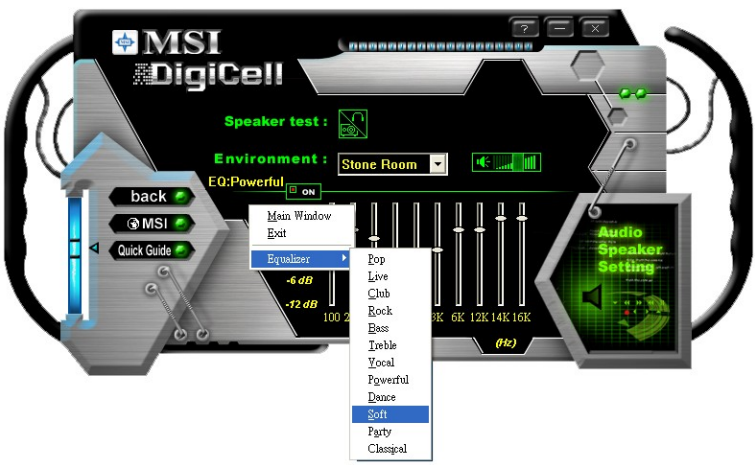


Audio Speaker Setting

In the **Audio Speaker Setting** sub-menu, you can configure the multi-channel audio operation, perform speaker test, and choose the environment you prefer while enjoying the music.

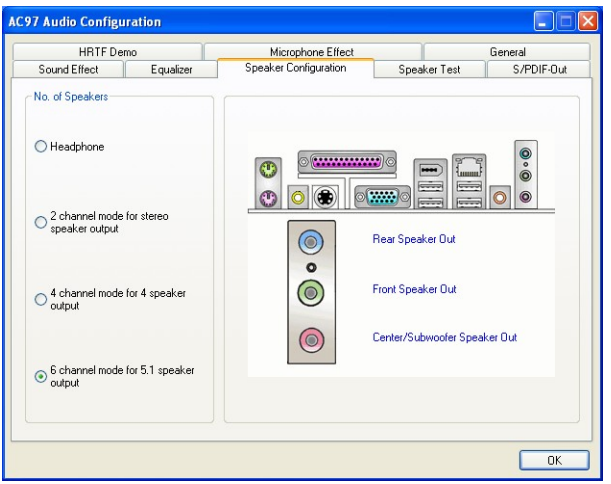


You can scroll the bar of each equalizer to regulate the current playing digital sound source. Also you may click on the **"on"** button to enable/disable the equalizer function. Once the equalizer function is enabled, you can choose several preset equalizers for your preference. You may also right-click anywhere to execute this function. After you have chosen one equalizer, it will be indicated next to the "**on**" button in yellow.

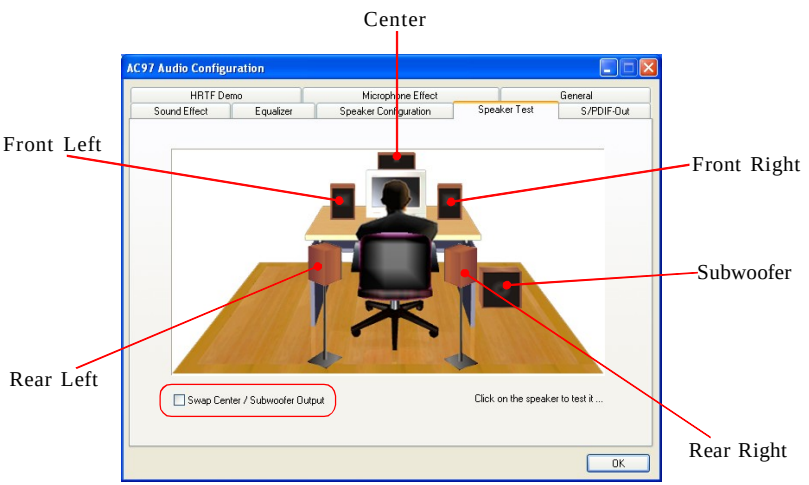


The **Environment** setting lets you select the environment you like, such as ***Cave*** or ***Convert Hall***.

Click on the **"Speaker test"** button and the following dialogue box will appear:



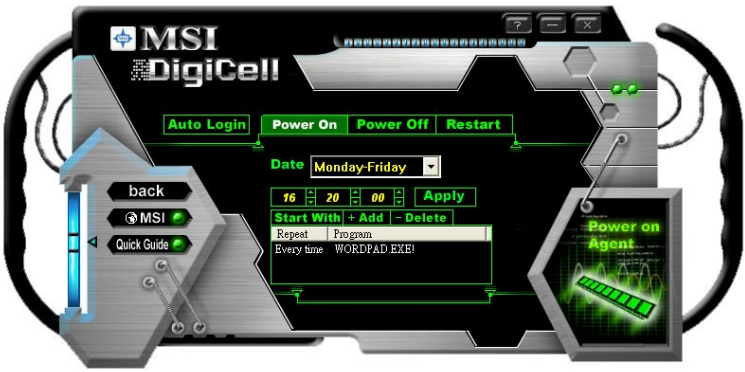
In this **Speaker Configuration** dialogue box, first select a desired multi-channel operation from the ***No. of Speakers*** pane. Then switch to the "**Speaker Test**" tab to test the connected speakers. The one you select will light up and make testing sound. If any speaker fails to make sound, check whether the cable is inserted firmly to the connector, or replace the bad speakers with good ones.



Power on Agent

In the **Power on Agent** sub-menu, you can configure setting of power-on, power-off and restarting status.

In the screen below, you can set the date, time, start-up programs respectively for power-on, power-off and restarting.

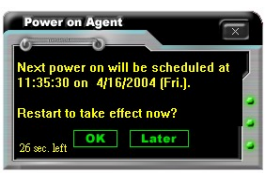


Power On

Here are the available settings for **Power On** function:

Date Use the drop-down list to select the date for power-on.

Time Use the arrow keys to select the hour/minute/second for power-on, power-off and restarting. Then click **"Apply"** to save the changes. As you click **"Apply"**, the following dialogue will appear to show you the next power-on schedule, and the system will start to count down to restart. Click **"OK"** to restart the computer right away or click **"Later"** to restart your computer later.



MSI Reminds You...

Please note that the new setting will not take effect until you restart your computer.

Power Off / Restart

You may configure the time (in the format hh:mm:ss) for the next power-off / restart.

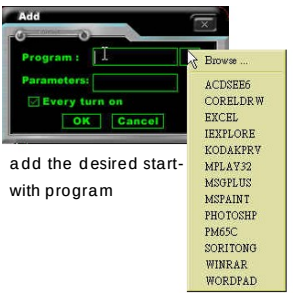
Start With

Use the button **"+Add"** to add the start-up programs as DigiCell is activated next time. For example, you may like to have Outlook activated or a specified website linked when you get to the office every morning.

Step 1: Click on the **Program:** field and click **">>"** button to browse for the path of Outlook or Internet Explorer.

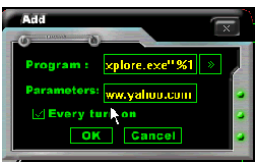
Step 2: Click on **"OK"** to apply the setting.

Step 3: For specified file or specified website, you may enter the file name with the complete path or the website link in the **Parameters:** field.



add the desired start-with program

To activate Outlook as DigiCell is enabled next time



To activate a specified website as DigiCell is enabled next time

Of course you may use the button **"-Delete"** to remove the added programs, or you can right-click on the selected program and click **Delete**.

delete the added program

MSI Reminds You...

*You can also enable the **Every turn on** function, which will enable the specified program(s) and file(s) every time the Digi Cell utility runs.*

Auto Login

Since the **Power On** function allows the system to power on automatically, you may have to enable this **Auto Login** function in the following situations:

1. If you are using a computer belonging to a domain in office, and you need to enter your user name & password everytime when you boot up your computer.
2. If there are multi users using the same computer and you'd like to power on the computer automatically with one specific user.

Enable Auto Login

Enable this setting if you want to use the **Auto Login** feature. It supports the following operating systems: Win9X, Windows ME, Windows 2000 & Windows XP.

Default User Name

It is only available for Windows 2000 & Windows XP.

-- If you are using a computer belonging to a domain in office, please enter your login user name in this field.

-- If you are using a computer with multi users (for Windows XP operating system), please enter the user name you'd like to auto power-on in this field.

Default Password

It is only available for Windows 2000 & Windows XP.

-- If you are using a computer belonging to a domain in office, please enter your login password in this field.

-- If you are using a computer with multi-users (for Windows XP operating system), please enter the password for the user name you'd like to auto power-on in this field.

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

The mainboard is equipped with Realtek ALC658C chip, which provides support for 6-channel audio output, including 2 Front, 2 Rear, 1 Center and 1 Subwoofer channel. ALC658C allows the board to attach 4 or 6 speakers for better surround sound effect. The section will tell you how to install and use the 2-/4-/6-channel audio function on the board.

Installing the Audio Driver

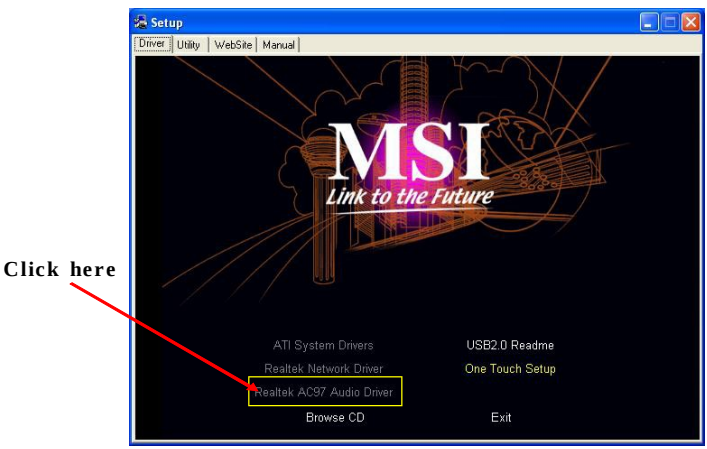
You need to install the driver for Realtek ALC658C chip to function properly before you can get access to 2-/4-/6-channel audio operations. Follow the procedures described below to install the drivers for different operating systems.

Installation for Windows 98SE/ME/2000/XP

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

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

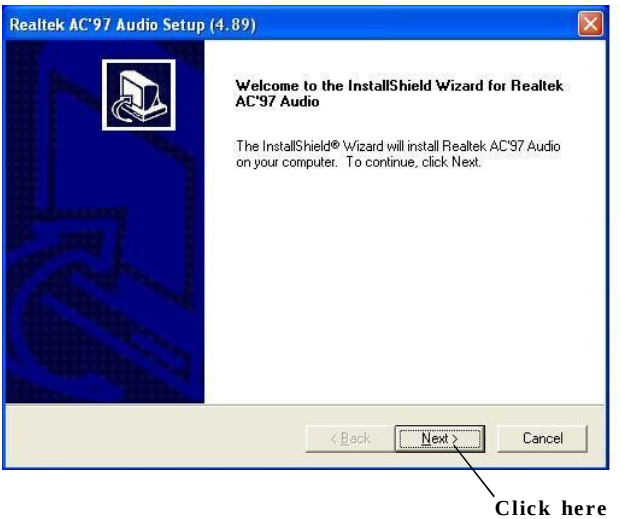
1. Insert the companion CD into the CD-ROM drive. The setup screen will automatically appear.
2. Click **Realtek AC97 Audio Driver**.



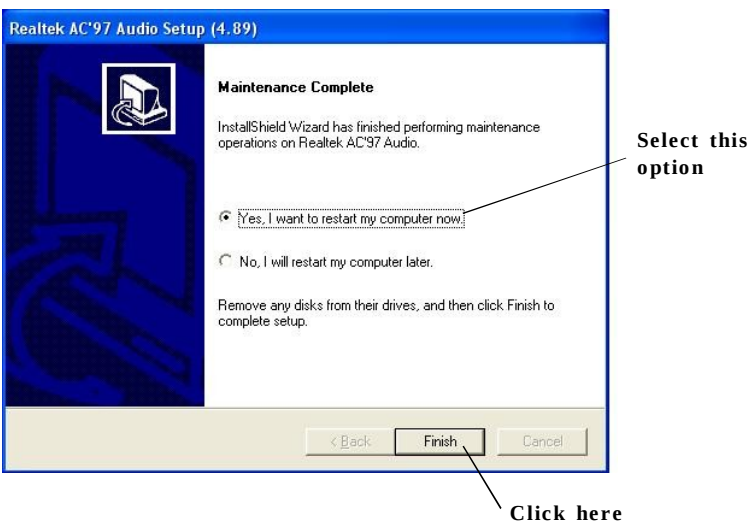
MSI Reminds You...

*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 install the AC'97 Audio software.



4. Click **Finish** to restart the system.

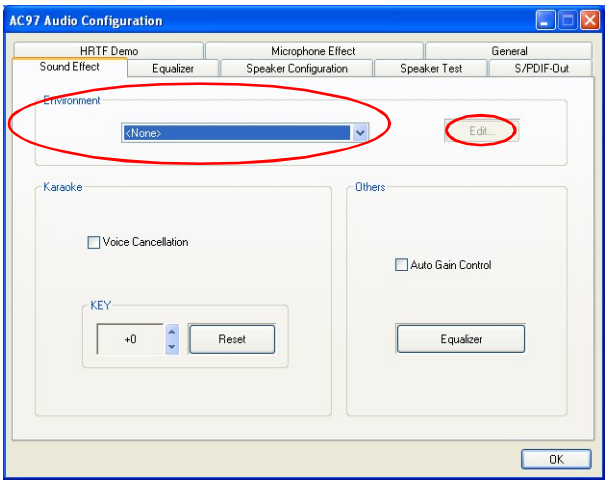


Software Configuration

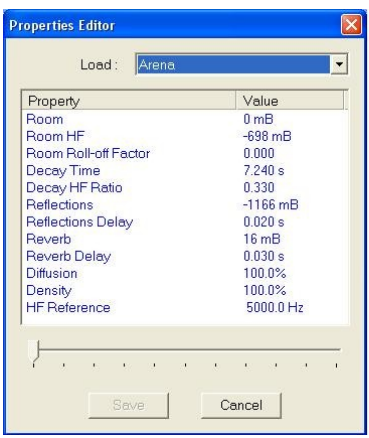
After installing the audio driver, you are able to use the 2-/4-/6-channel audio feature now. Click the audio icon from the window tray at the lower-right corner of the screen to activate the **AC97 Audio Configuration**.

Sound Effect

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

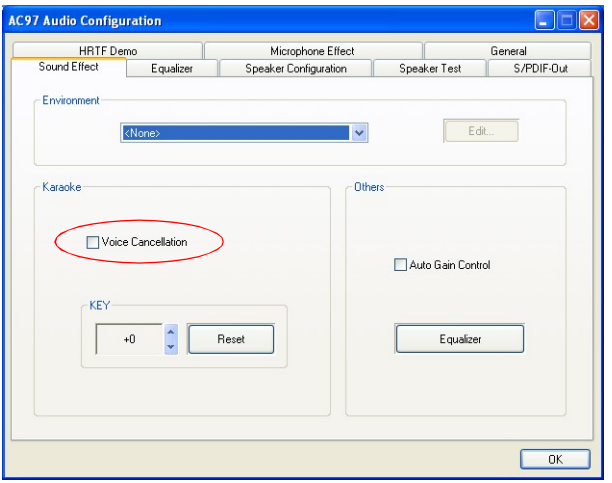


You may also edit the properties for an environment as you wish by clicking the **Edit** button, then just scroll the bar in the bottom for each property to adjust.



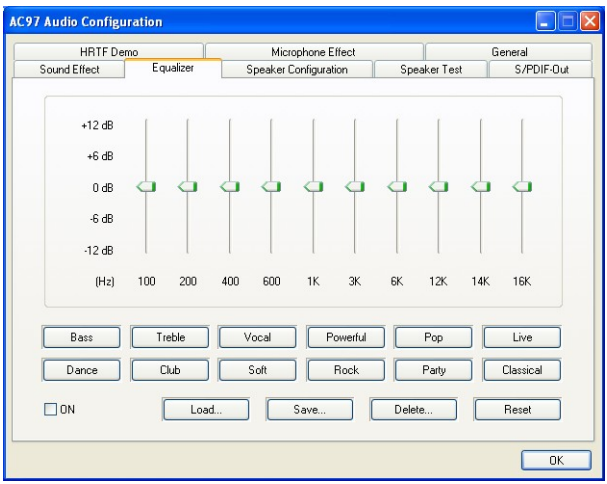
Here it provides the Karaoke function which will automatically remove human voice (lyrics) and leave melody for you to sing the song. Note that this function applies only for 2-channel audio operation.

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



Equalizer

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



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

Speaker Configuration

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

First select a desired multi-channel operation from ***No. of Speakers***.

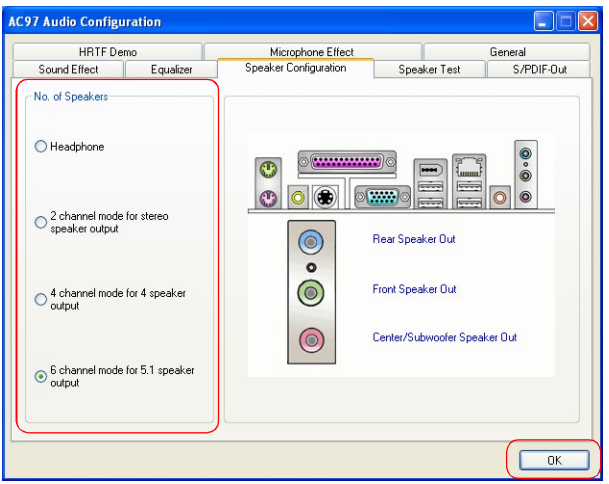
a. Headphone for the common headphone

b. 2-Channel Mode for Stereo-Speaker Output

c. 4-Channel Mode for 4-Speaker Output

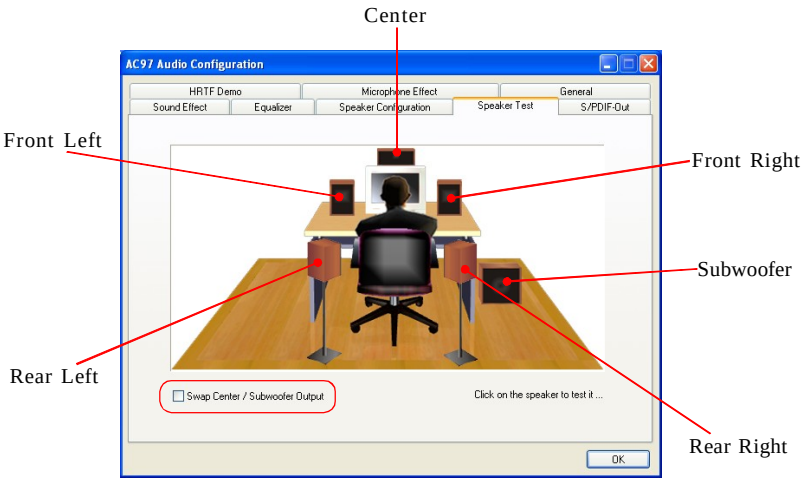
d. 6-Channel Mode for 5.1-Speaker Output

And then click **OK** to apply the configuration.

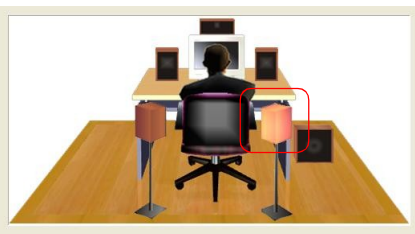


Speaker Test

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

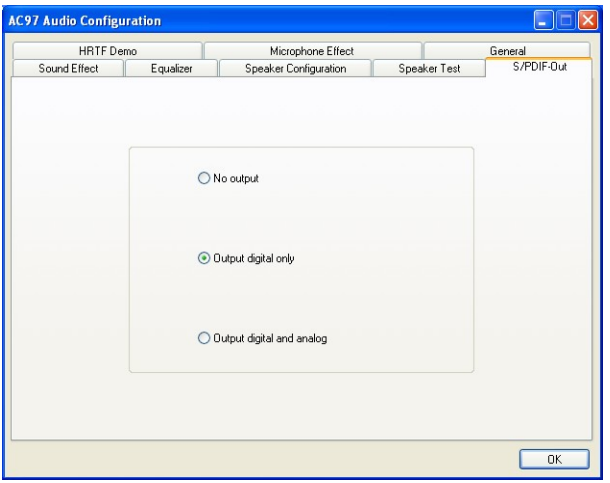


Select the speaker by clicking it to test its functionality. The one you select will light up and make testing sound.



S/PDIF-Out

In this tab you may slelect the format of SPDIF out.

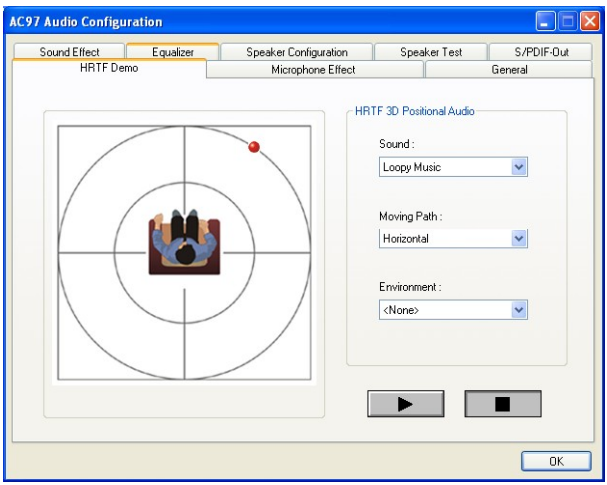


MSI Reminds You...

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

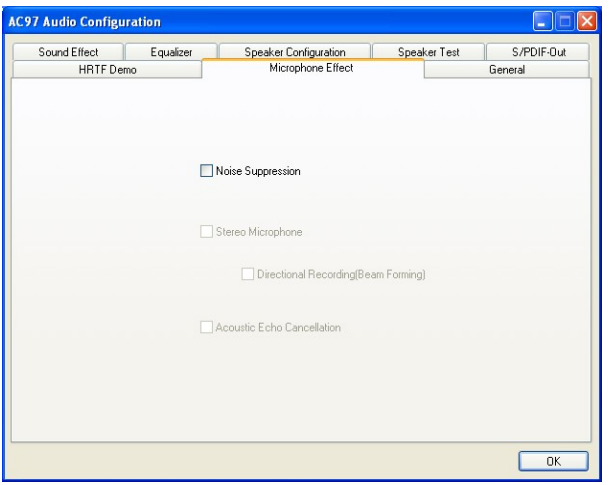
HRTF Demo

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



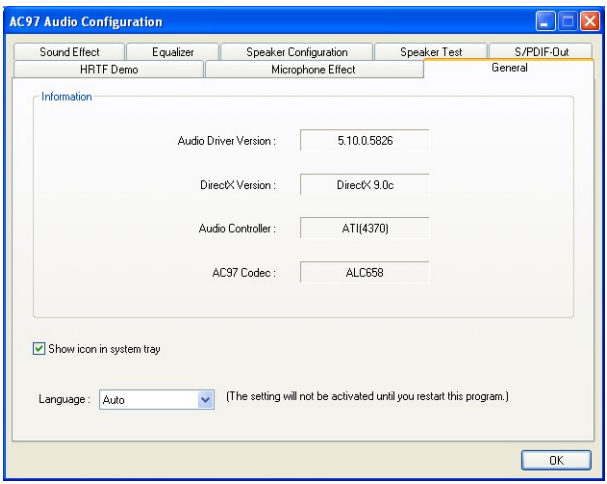
Microphone Effect

In this tab you may add special effects to the connected microphone.



General

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



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

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.

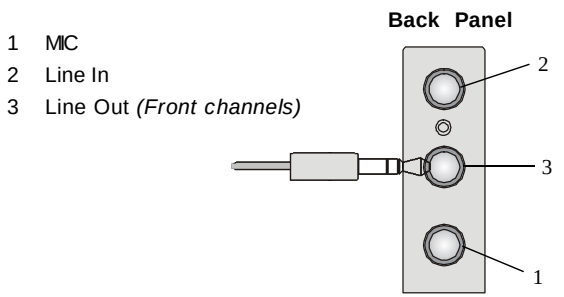
Read the following steps to have the Multi-Channel Audio Function properly set in the software utility, and have your speakers correctly connected to the Back Panel.

Connecting the Speakers

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

n 2-Channel Mode for Stereo-Speaker Output

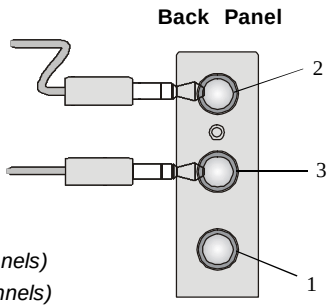
Refer to the following diagram and caption for the function of each phone jack on the back panel when 2-Channel Mode is selected.



n 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 founction of each jack on the back panel when 4-Channel Mode is selected.



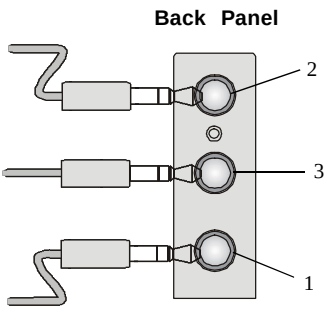
1 MIC
2 * Line Out *(Rear channels)*
3 Line Out *(Front channels)*

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

n 6-Channel Mode for 6-Speaker Output

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

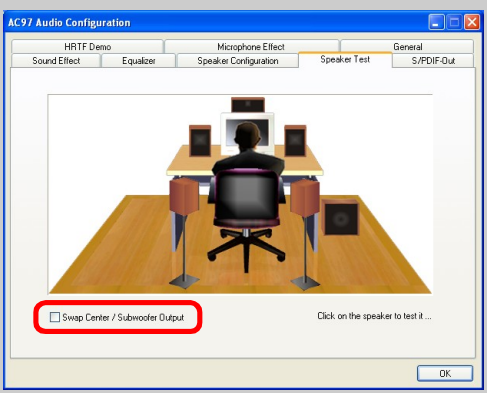
1 * Line Out *(Center and Subwoofer channel)*
2 * Line Out *(Rear channels)*
3 Line Out *(Front channels)*



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

MSI Reminds You...

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.*



Appendix B: ATI SATA RAID Setup Guide

Two major challenges facing the storage industry today are (1): keep pace with increasing performance demands of computer systems by improving disk I/O throughput, and (2): provide data accessibility in the event of hard disk failure.

To meet these two challenges, ATI south bridge SB400 supports four SATA ports and incorporates Silicon Image's SiI 3112 Serial ATA host controller, together with Silicon Image's Serial ATA RAID Management Software (SATARaid™).

SATARaid software provides support for RAID Striping and RAID Mirroring. RAID Striping greatly improves hard disk I/O performance by concurrently striping data across multiple drives. RAID Mirroring makes sure data is not lost if a drive fails as data is simultaneously written to two drives. Drives configured for RAID Striping are said to form a RAID 0 set, while drives configured for RAID Mirroring are said to form a RAID 1 set.

The SATARaid software includes a Graphical User Interface (GUI) that provides continuous monitoring of the RAID set(s) supported.

SATA RAID Features

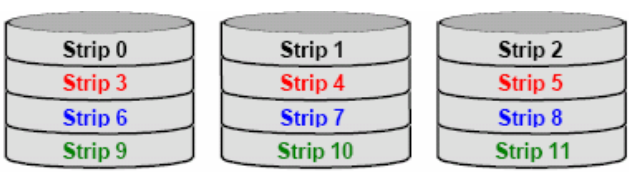
- RAID 0 and RAID 1
- On-line Mirror Rebuilding
- RAID GUI Monitoring Utility:
  - Displays/Logs/Alerts Users to Vital RAID Set Information
  - Manages RAID Set Functions (configures, rebuilds, etc.)
- RAID Set accommodates multiple size HDDs
- HDDs function normally when not in RAID Sets
- Adjustable stripe size for RAID 0
- Automatically selects highest available transfer speed for all ATA and ATAPI devices
- Supports:
  - UDMA up to 150MB/Sec.
  - All UDMA and PIO Modes
  - Up to 4 SATA devices
  - ACPI and ATA/ATAPI6

RAID (Redundant Array of Independent Disks) technology manages multiple disk drives to enhance I/O performance and to provide redundancy in order to withstand the failure of any individual member, without loss of data.

SATARaid™ provides two RAID Set types: Striped Set (RAID 0) and Mirrored Set (RAID 1).

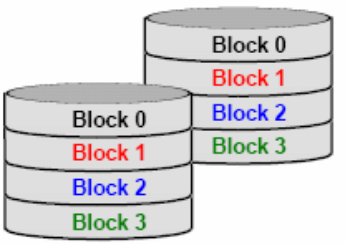
Disk Striping (RAID 0)

Striping is a performance-oriented, non-redundant data mapping technique. It does not provide fault tolerance. With modern SATA and ATA bus mastering technology, multiple I/O operations can be performed in parallel, enhancing performance. Striping arrays use multiple disks to form a larger virtual disk.



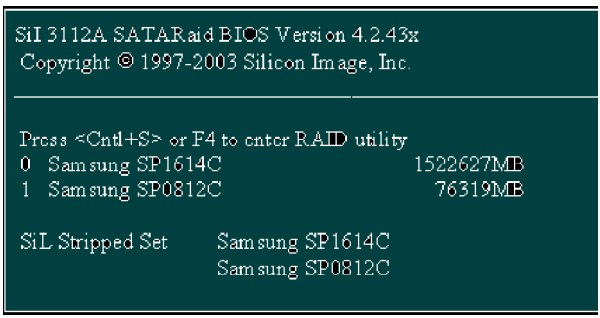
Disk Mirroring (RAID 1)

Disk mirroring creates an identical twin for a selected disk by having the data simultaneously written to two disks. This redundancy provides protection from a single disk failure. If a read failure occurs on one drive, the system reads the data from the other drive.

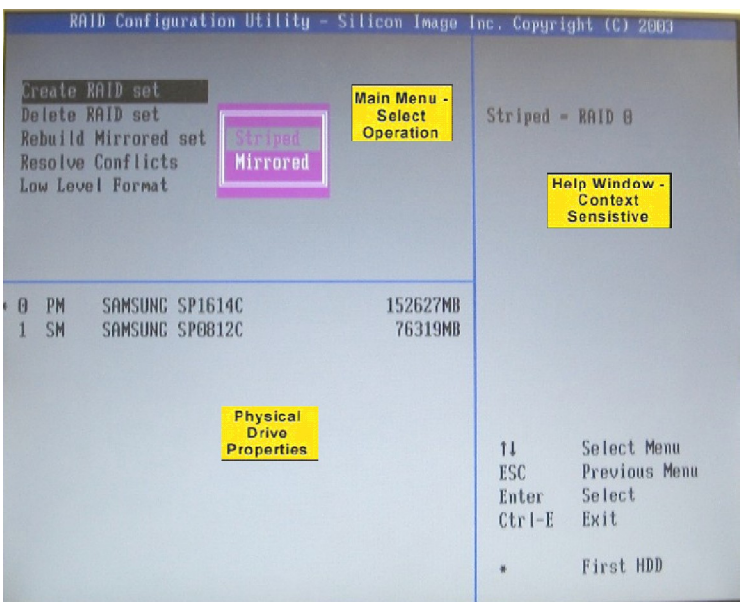


Creating RAID Sets

Creating and deleting RAID sets and performing other RAID setting up operations are done in the BIOS. During bootup, a screen similar to the one below will appear for about 5 seconds. Press CTRL+S or the F4 key to enter the BIOS RAID Utility.



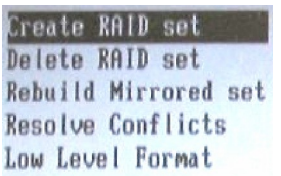
The BIOS RAID Utility menu screen will appear. A brief description of each item on the screen is given on the next page.



BIOS RAID Utility Screen Description

u Main Menu

The Main Menu in the upper left corner is used to choose the operation to be performed.



The selections are:

1. **Create RAID Set** is used to create a new RAID Set (RAID 0 or RAID 1).
2. **Delete RAID Set** is used to delete a RAID Set.
3. **Rebuild Mirrored Set** is used to initiate the rebuild of a RAID 1 set after, for example, a drive in the Set has been replaced.
4. **Resolve Conflicts** is used to automatically find the member drives of a RAID set which has been disrupted (physical drives swapped around, for example) and restore the Set to proper operation.
5. **Low Level Format** allows a single drive to have its data completely wiped out. Drives assigned to Sets cannot be low level formatted.

These operations are described in the pages that follow.

u Help Window

This window displays context-sensitive help and status messages.

u Physical Drive Properties

This window displays the model number and capacities of the drives physically attached to the SATA host adapter.

Description of RAID Setup Operations

u Creating RAID Sets

As previously discussed, the SATA host controller supports RAID 0 and RAID 1 configurations. The selection of the RAID configuration should be based upon factors including performance, data security, and the number of drives available. It is best to carefully consider the long-term role of the system and plan the data storage

strategy. RAID sets can be created either automatically, or to allow the greatest flexibility, manually.

1. Select “Create RAID Set.”
2. Choose a RAID 0 Striped, or a RAID 1 Mirrored set.
3. Select if you want the utility to Automatically Configure or if you want to manually configure the RAID Set.
4. If you chose manual configuration, for Striped Sets, you can change the chunk size. For Mirrored Sets, you assign which drive is the Source and which is the Target.
5. The message “Are You Sure?” will display before completing the configuration. Answer “N” to abort the creation of the new RAID set, or “Y” to proceed with the RAID set creation.

u Deleting RAID Sets

1. To remove one or more RAID sets, select “Delete RAID Set.”
2. Select the desired set and press Enter.
3. Press “Y” when asked “Are You Sure?”
4. The drives will be returned to the selection of logical drives from which a new RAID set can be created

u Rebuild RAID 1 Set

This menu selection is used to initiate the copying of data from an existing drive to a replacement drive that has been installed in a RAID 1 set after the failure of one of the members.

1. Select “Rebuild RAID1 set.”
2. Select the desired set and press Enter.
3. Press “Y” when asked “Are You Sure?”
4. The set will be rebuilt. The status of the rebuild is displayed in the MAIN MENU window.

u Resolving Conflicts

When a RAID set is created, the metadata written to the disk includes drive connection information including the channel on the host controller to which it is connected. If after a drive failure the replacement drive was previously part of a RAID set or used in another system, it may have conflicting metadata, specifically in reference to the drive connection information. If so, this will prohibit the RAID set from being either created or rebuilt. In order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To correct this, select “Resolve Conflict”, and the correct metadata, including the correct drive connection information, will automatically be written to the replacement drive.

1. Select “Resolve Conflicts”
2. Select the “Invalid RAID drive” entry in the Logical Drive Status window and press Enter.
3. Follow the prompts to resolve the conflict.

Note that some conflict resolutions may result in the drive letter assignment changing; for example the RAID set may have been drive D: but after the conflict resolution, it may become drive E:. To maintain the same drive lettering, you may need to swap the SATA cable connected to the drive, or in the case of a SATA-based removable drive unit, you may need to change the order of the drives within the chassis.

u Low Level Formatting

The Low Level Format item selection allows you to completely erase the data on a hard drive. However this is a very drastic process and not typically needed. Formatting the drive under Windows is usually sufficient to delete the data.

Installing RAID Drivers (for Windows 2000/XP only)

Installing RAID Drivers during OS Install

Follow the instructions in this section if you are performing a new installation of the OS (Windows 2000/XP), and wish to boot from a RAID drive connected to the SATA controller.

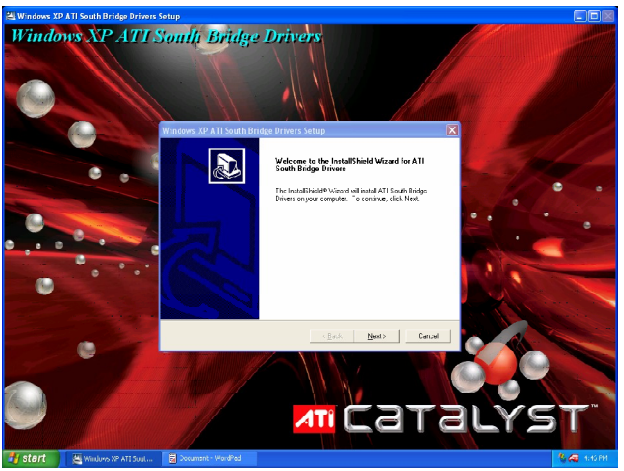
1. Install the new SATA drives
   a. Power off the system.
   b. Connect the hard drives to the RAID controller ports.
   c. Insert your Windows 2000/XP CD into the CD-ROM/DVD drive, or the 2000/XP boot diskette #1 in the floppy drive if your system cannot boot from the CD.
   d. Power up the system.
2. Install the driver during OS boot
   a. Press F6 for third party SCSI or driver installation at the beginning of the text mode installation.
   b. Press 's' when setup asks if you want to specify an additional device, and insert the diskette or CD labelled 'ATI SATARaid Driver Installation Disk'. (You'll have to remove the OS installation CD first.)
   c. Press 'Enter' and select 'ATI Serial ATA Controller'
   d. Press 'Enter' to continue with text mode setup.

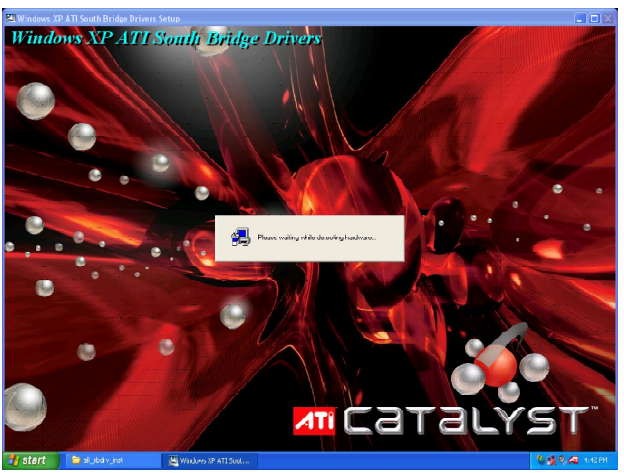
3. Partition and format the Master RAID drive
   a. Follow the setup instructions to select your choice of partition and file system.
4. Install OS on the Master RAID drive
   a. After setup has examined your drives, it will copy files to Windows installation folders and restart the system.
   b. The setup program will continue and finish the installation after restart.
   c. Wait until Windows 2000/XP finishes installing devices, regional settings, networking settings, components, and final set of tasks, reboot the system if it is required.
5. Verify driver installation under Windows 2000 and XP
   a. Right click on 'My Computer' icon, select 'Properties', left click on 'Hardware' tab, and then on 'Device Manager' button.
   b. Double click on 'SCSI and RAID Controllers', If there is no yellow '! ' or ' ? ' in front of 'ATI Serial ATA Controller', the driver is installed correctly.

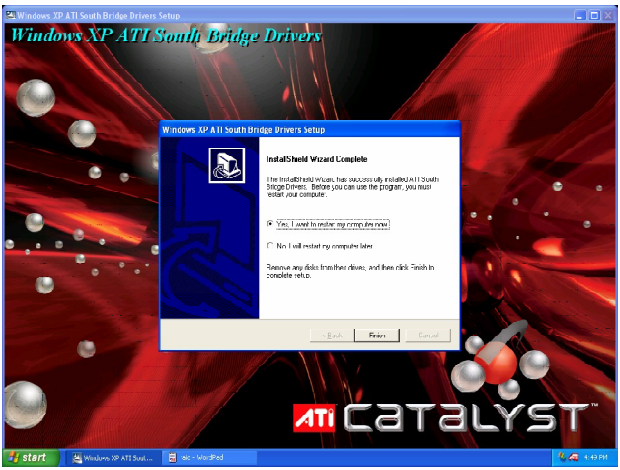
Updating Previously Installed RAID Drivers

1. Insert your Windows 2000/XP ATI driver CD into the CD-ROM/DVD drive. The ATI driver installation Wizard will start.
2. Follow the setup instructions to complete the driver installation.

The following screen shots are taken from the ATI driver installation wizard.



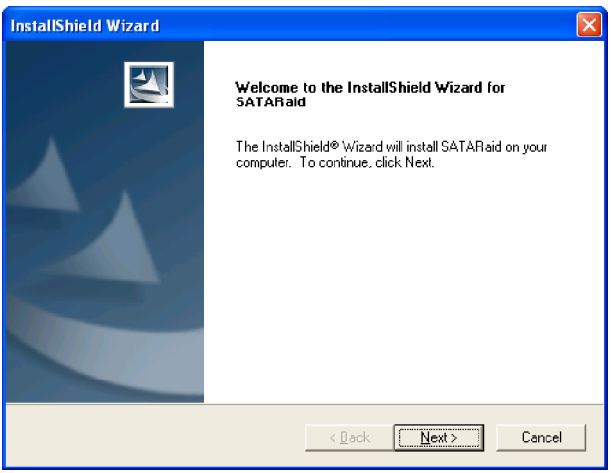


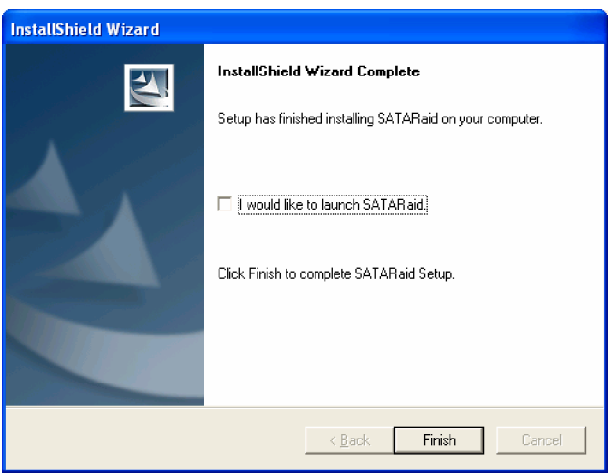

Windows XP ATI South Bridge Drivers Setup
Windows XP ATI South Bridge Drivers
Windows XP ATI South Bridge Drivers Setup
InstallShield Wizard Complete
Yes, I want to restart my computer now.
No, I will restart my computer later.
Finish
ATi CATALYST
start

Installing SATARaid Utility

Insert your Windows 2000/XP ATI driver CD into the CD-ROM/DVD drive.
Run the setup.exe program on the CD and follow the setup instructions to complete the installation.

The following screen shots are taken from the installation of SATARaid.



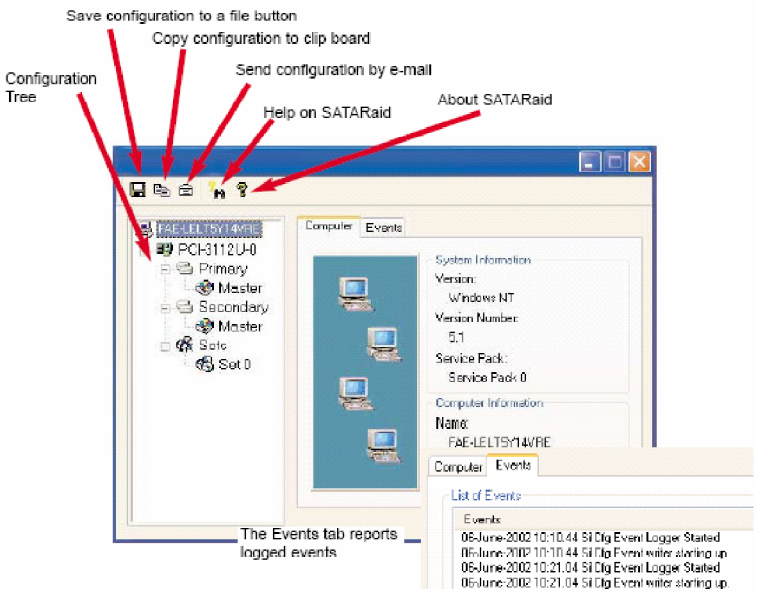


SATARaid GUI can be launched from the Task Bar

SATARaid GUI

The SATARaid GUI offers the user the ability to easily monitor the RAID Set. To launch the GUI, simply double-click on the icon located in the bottom right hand corner of the Desktop. If the icon does not appear in the bottom right hand corner of the desktop, find where the SATARaid application was saved and launch from there. Upon launching the GUI, the main window, which identifies the computer running SATARaid, should look the following:

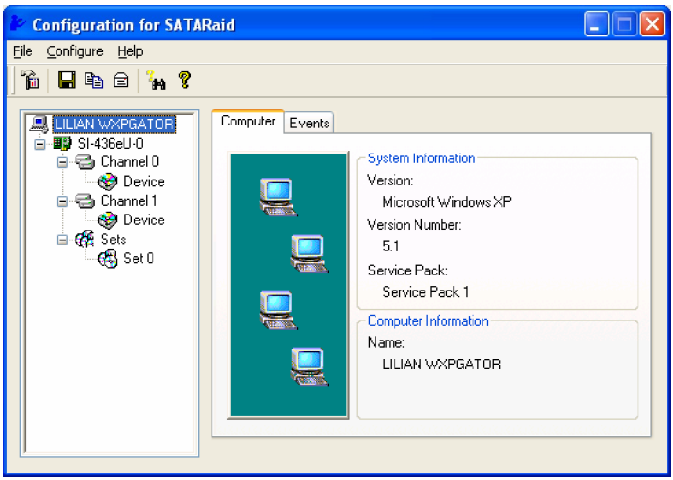
Note: You must have created RAID set(s) in the BIOS as described earlier before you can see the set(s) in the GUI.

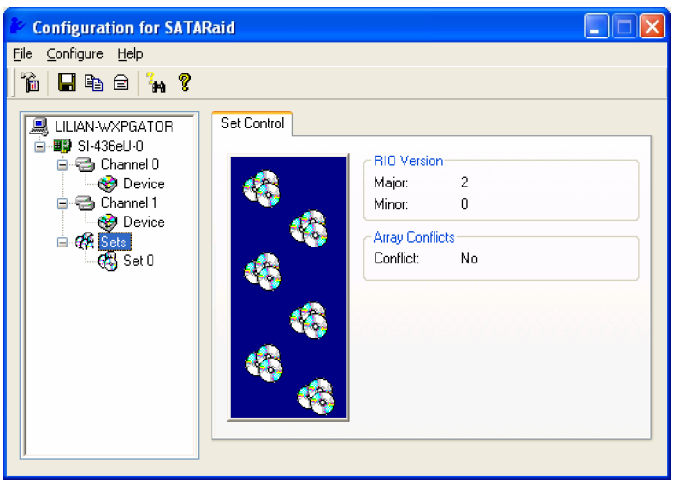


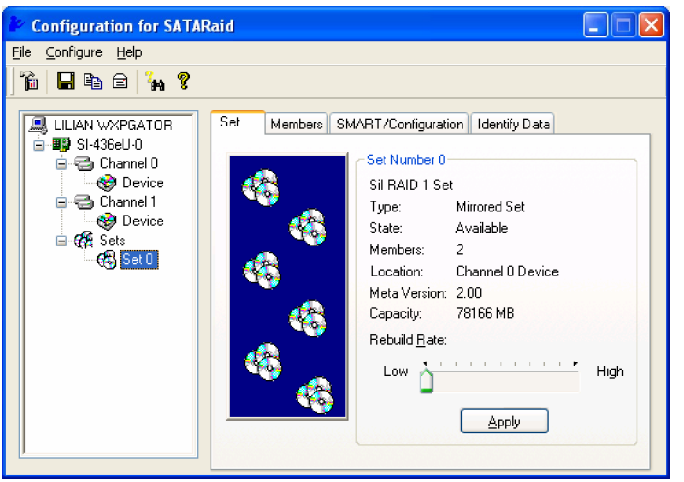
Use Help to find out about the features offered by SATRaid.

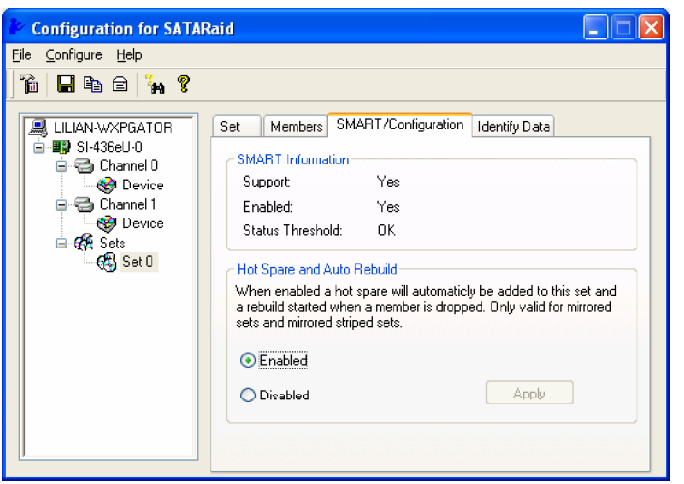
The main function of SATARaid is to monitor and report activities of RAID devices. The settings for monitoring and reporting are performed under the item SATARaid Configuration. The following screen shots show some of the settings performed through SATARaid GUI.

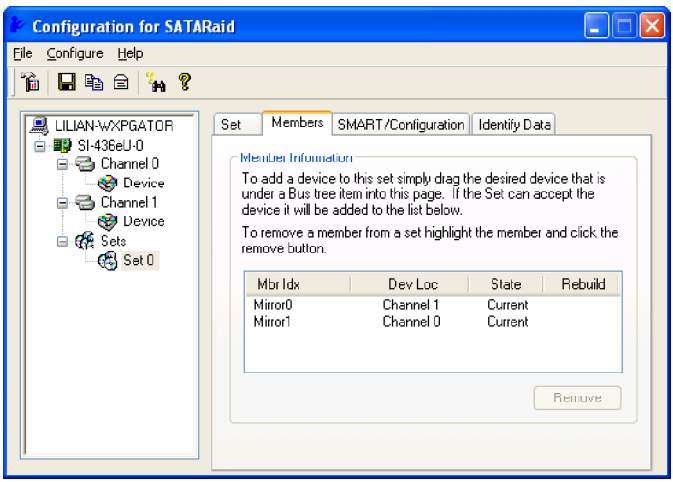
A RAID 1 Set Monitoring Example

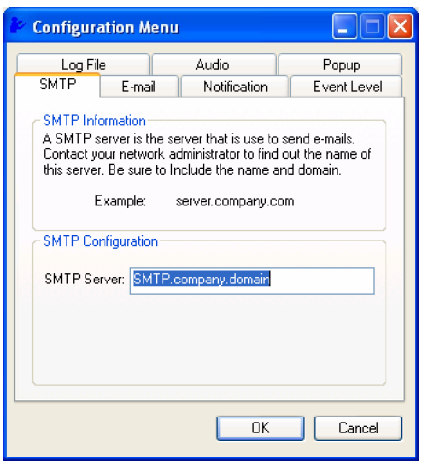




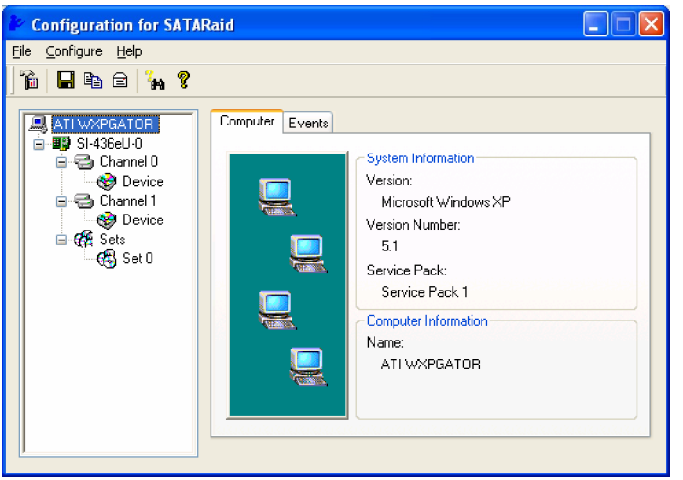

Configuration for SATARaid
File Configure Help
LILIAN-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
Set Number 0
Sil RAID 1 Set
Type: Mirrored Set
State: Available
Members: 2
Location: Channel 0 Device
Meta Version: 2.00
Capacity: 78166 MB
Rebuild Rate:
Low
High
Apply

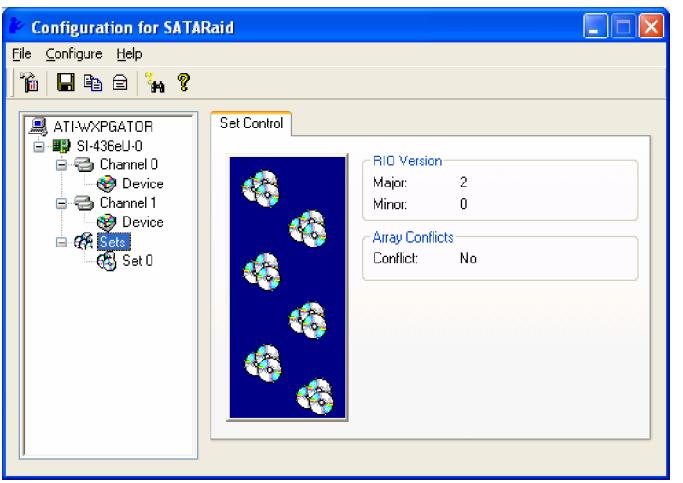

Configuration for SATARaid
File Configure Help
LILIAN-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
SMART Information
Support: Yes
Enabled: Yes
Status Threshold: OK
Hot Spare and Auto Rebuild
When enabled a hot spare will automaticly be added to this set and a rebuild started when a member is dropped. Only valid for mirrored sets and mirrored striped sets.
Enabled
Disabled
Apply

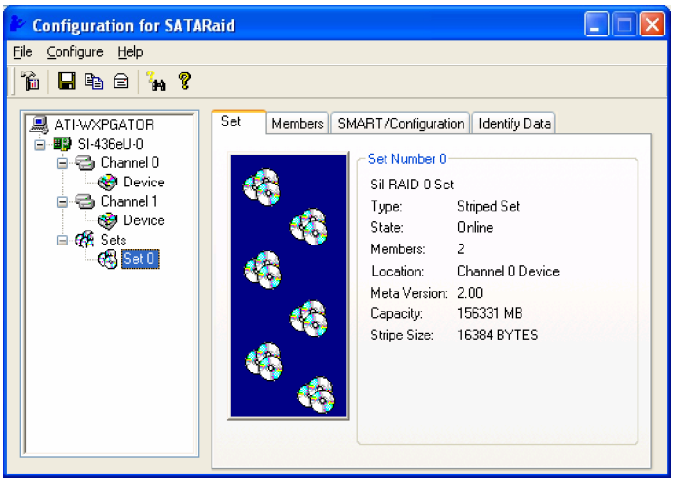

Configuration for SATARaid
File Configure Help
LILIAN-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
Member Information
To add a device to this set simply drag the desired device that is under a Bus tree item into this page. If the Set can accept the device it will be added to the list below.
To remove a member from a set highlight the member and click the remove button.
Mbr Idx
Dev Loc
State
Rebuild
Mirror0
Channel 1
Current
Mirror1
Channel 0
Current
Remove

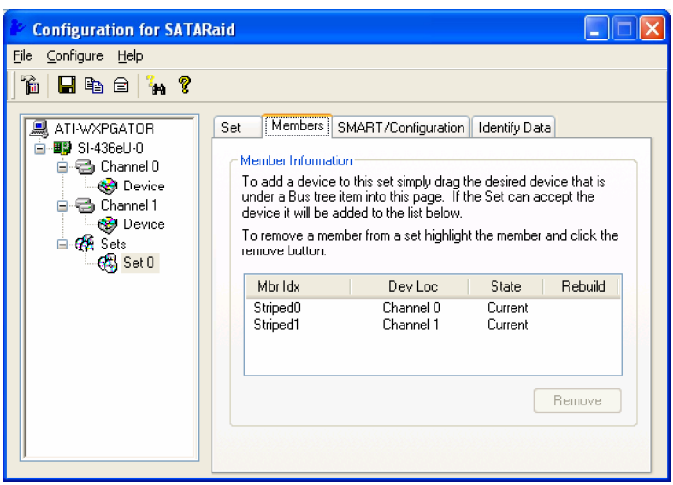

Configuration Menu
Log File
Audio
Popup
SMTP
E-mail
Notification
Event Level
SMTP Information
A SMTP server is the server that is use to send e-mails. Contact your network administrator to find out the name of this server. Be sure to include the name and domain.
Example: server.company.com
SMTP Configuration
SMTP Server: SMTP.company.domain
OK
Cancel

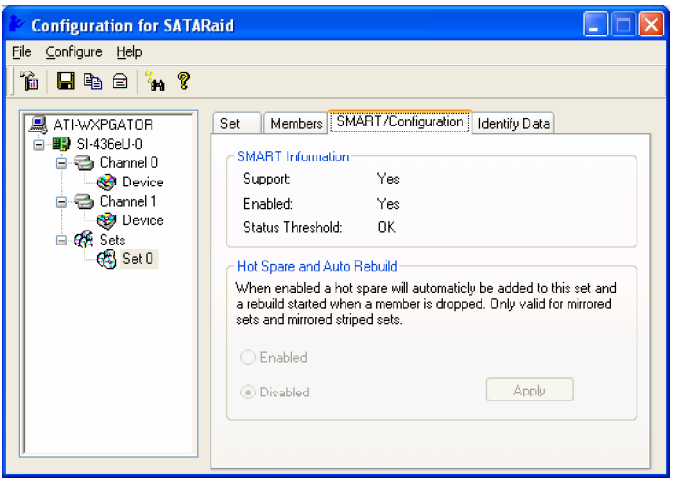
A RAID 0 Set Monitoring Example

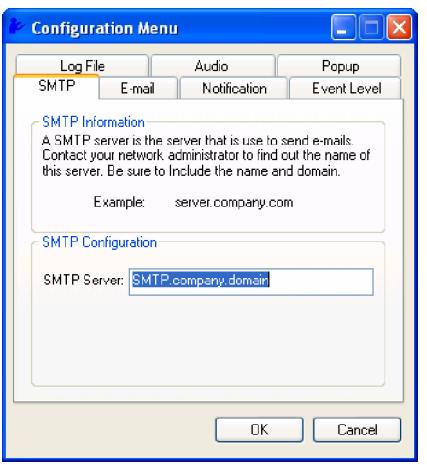


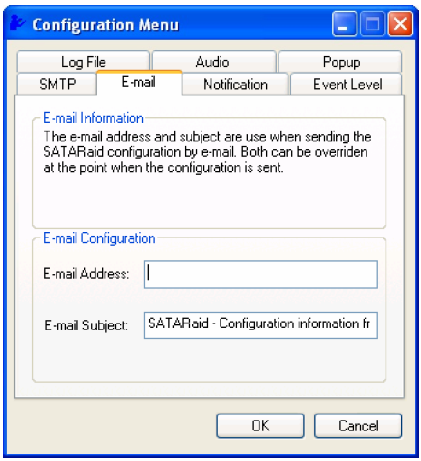


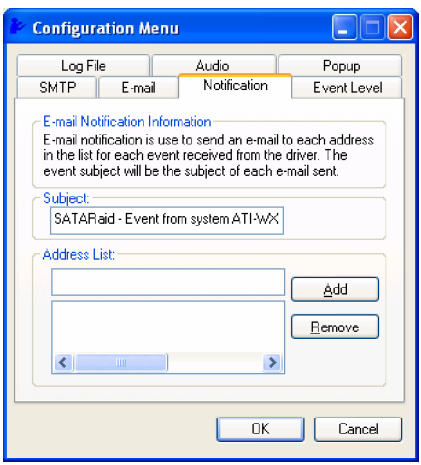

Configuration for SATARaid
File Configure Help
ATI-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
Set Number 0
Sil RAID 0 Set
Type: Striped Set
State: Online
Members: 2
Location: Channel 0 Device
Meta Version: 2.00
Capacity: 156331 MB
Stripe Size: 16384 BYTES

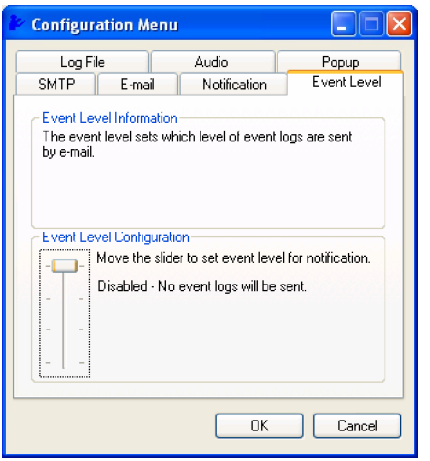

Configuration for SATARaid
File Configure Help
ATI-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
Member Information
To add a device to this set simply drag the desired device that is under a Bus tree item into this page. If the Set can accept the device it will be added to the list below.
To remove a member from a set highlight the member and click the remove button.
Mbr Idx
Dev Loc
State
Rebuild
Striped0
Channel 0
Current
Striped1
Channel 1
Current
Remove

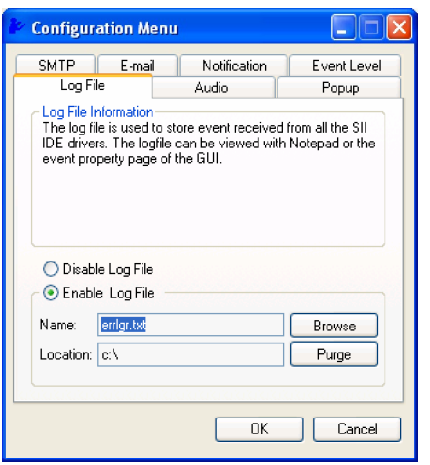

Configuration for SATARaid
File Configure Help
ATI-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Set
Members
SMART/Configuration
Identify Data
SMART Information
Support: Yes
Enabled: Yes
Status Threshold: OK
Hot Spare and Auto Rebuild
When enabled a hot spare will automaticly be added to this set and a rebuild started when a member is dropped. Only valid for mirrored sets and mirrored striped sets.
Enabled
Disabled
Apply

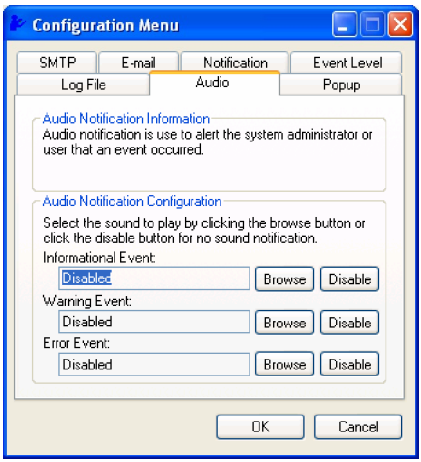

Configuration Menu
Log File
Audio
Popup
SMTP
E-mail
Notification
Event Level
SMTP Information
A SMTP server is the server that is use to send e-mails. Contact your network administrator to find out the name of this server. Be sure to include the name and domain.
Example: server.company.com
SMTP Configuration
SMTP Server: SMTP.company.domain
OK
Cancel

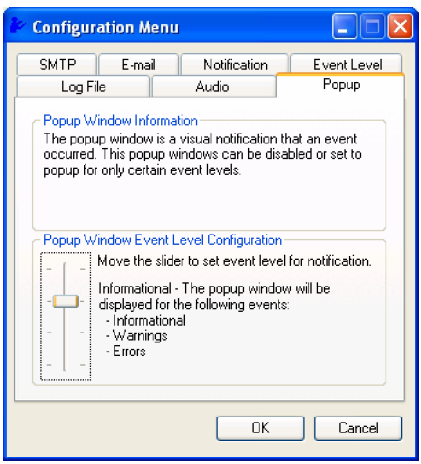

Configuration Menu
Log File
Audio
Popup
SMTP
E-mail
Notification
Event Level
E-mail Information
The e-mail address and subject are use when sending the SATARaid configuration by e-mail. Both can be overriden at the point when the configuration is sent.
E-mail Configuration
E-mail Address:
E-mail Subject:
SATARaid - Configuration information fr
OK
Cancel

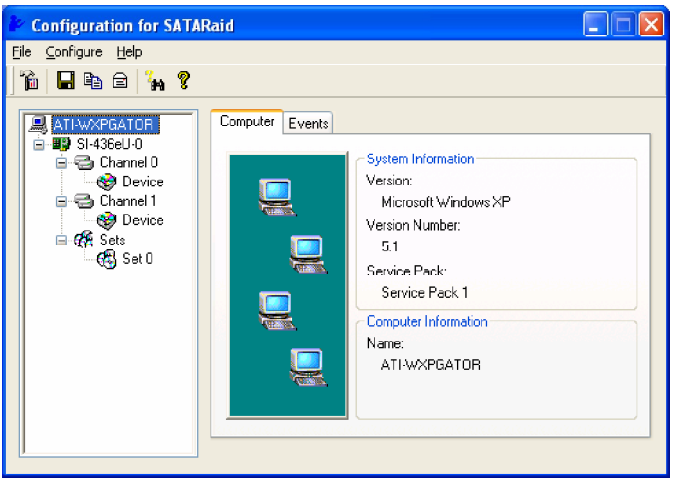

Configuration Menu
Log File
Audio
Popup
SMTP
E-mail
Notification
Event Level
E-mail Notification Information
E-mail notification is use to send an e-mail to each address in the list for each event received from the driver. The event subject will be the subject of each e-mail sent.
Subject:
SATARaid - Event from system ATI-WX
Address List:
Add
Remove
OK
Cancel


Configuration Menu
Log File
Audio
Popup
SMTP
E-mail
Notification
Event Level
Event Level Information
The event level sets which level of event logs are sent by e-mail.
Event Level Configuration
Move the slider to set event level for notification.
Disabled - No event logs will be sent.
OK
Cancel


Configuration Menu
SMTP
E-mail
Notification
Event Level
Log File
Audio
Popup
Log File Information
The log file is used to store event received from all the SII IDE drivers. The logfile can be viewed with Notepad or the event property page of the GUI.
Disable Log File
Enable Log File
Name:
errlgr.txt
Browse
Location:
c:\
Purge
OK
Cancel


Configuration Menu
SMTP
E-mail
Notification
Event Level
Log File
Audio
Popup
Audio Notification Information
Audio notification is use to alert the system administrator or user that an event occurred.
Audio Notification Configuration
Select the sound to play by clicking the browse button or click the disable button for no sound notification.
Informational Event:
Disabled
Browse
Disable
Warning Event:
Disabled
Browse
Disable
Error Event:
Disabled
Browse
Disable
OK
Cancel


Configuration Menu
SMTP
E-mail
Notification
Event Level
Log File
Audio
Popup
Popup Window Information
The popup window is a visual notification that an event occurred. This popup windows can be disabled or set to popup for only certain event levels.
Popup Window Event Level Configuration
Move the slider to set event level for notification.
Informational - The popup window will be displayed for the following events:
- Informational
- Warnings
- Errors
OK
Cancel


Configuration for SATARaid
File
Configure
Help
ATI-WXPGATOR
SI-436eU-0
Channel 0
Device
Channel 1
Device
Sets
Set 0
Computer
Events
System Information
Version:
Microsoft Windows XP
Version Number:
5.1
Service Pack:
Service Pack 1
Computer Information
Name:
ATI-WXPGATOR

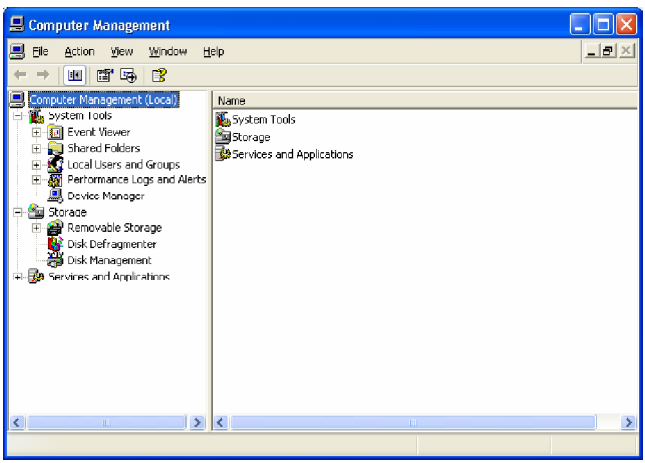
Configuring RAID 0 Set(s) with Windows Disk Manager

Note: This section is only applicable to non-initiated drives. It is not applicable if the drives have been set up as RAID 0 with the BIOS utility.

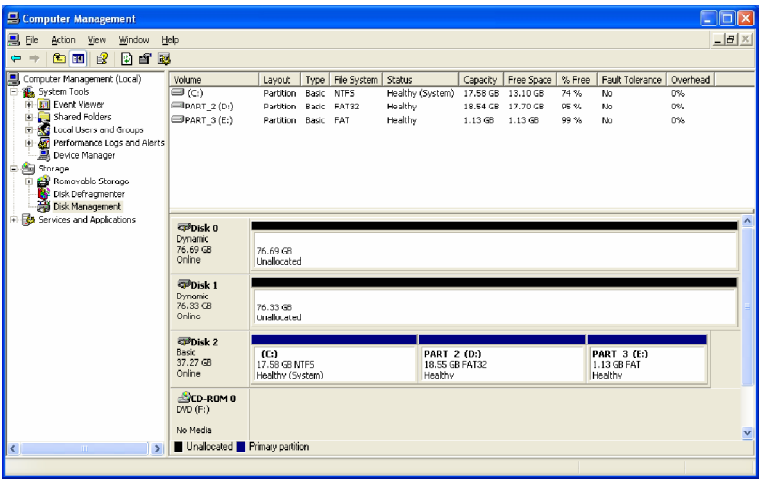
The Windows XP built-in Disk Manager can be used to set up installed SATA drives in Disk Striping (RAID 0) configuration.

The difference between using the Disk Manager and using the BIOS utility is that the former can select the size of the Striped Disk, while the latter assigns the entire volume of the SATA drives to RAID 0.

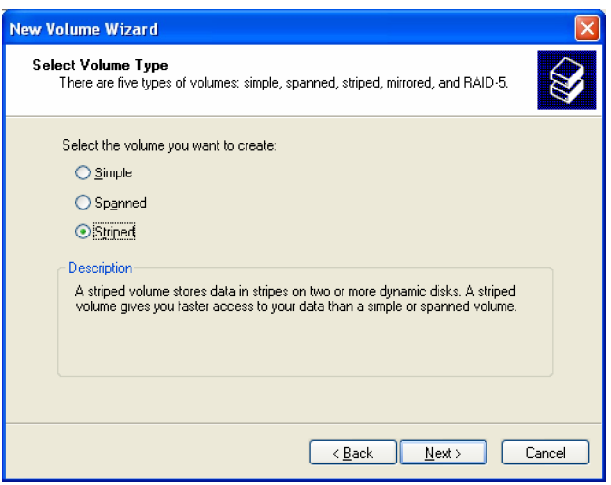
Right clicking on the My Computer icon will access Computer Management. The following screen will appear when Computer Management is started. Select Disk Management under the Storage tree.



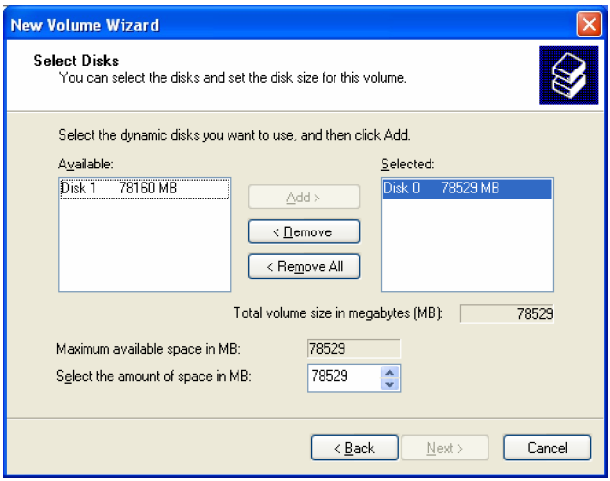
If SATA drives had not been initialized, initialize the disk as Dynamic.

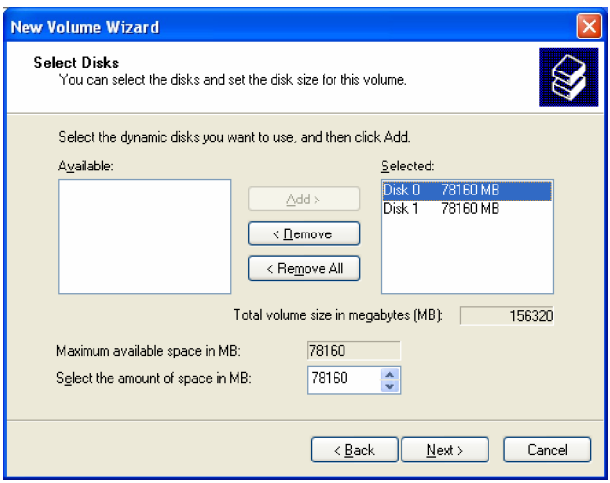


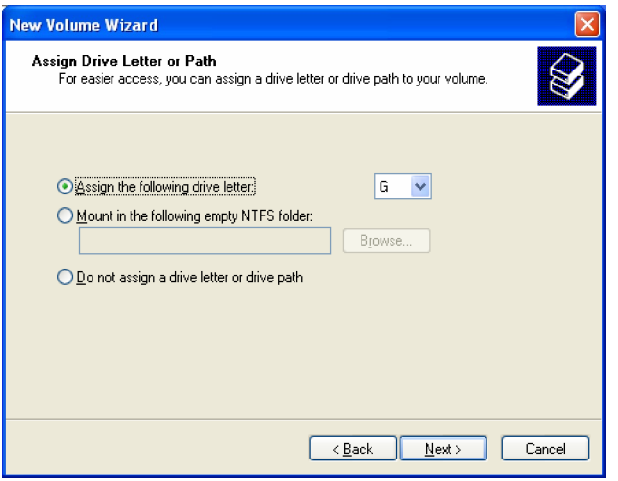
Right click on Disk 0 and select ‘New Volume’. At ‘New Volume Wizard’ select Striped for type of volume.

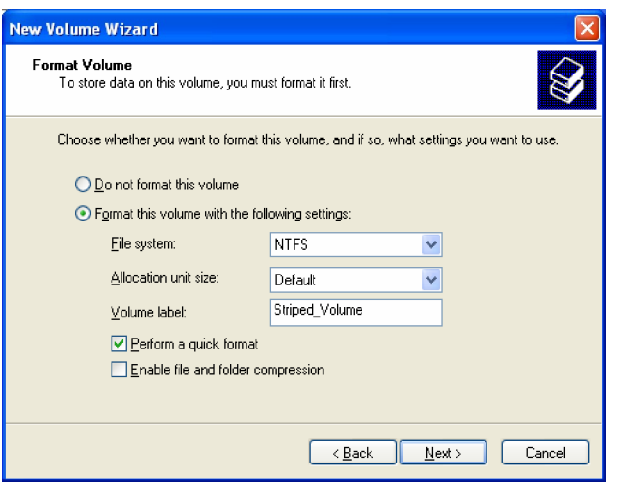


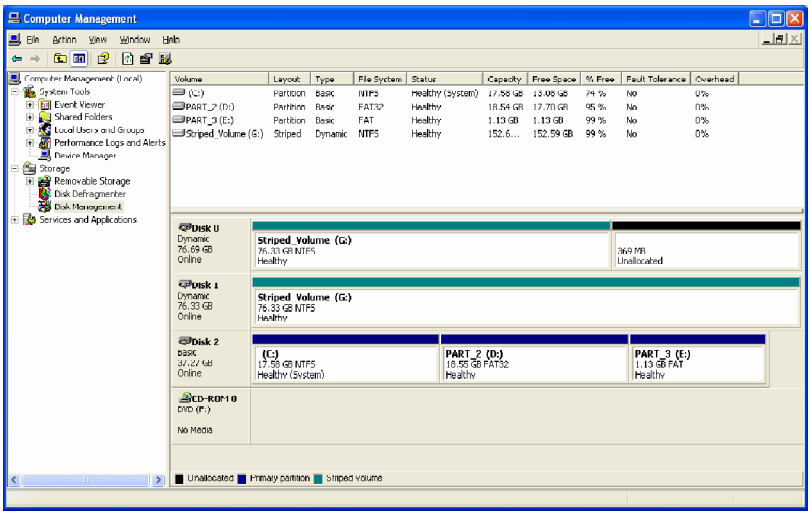
Total size of disk set for striping is set next.






New Volume Wizard
Assign Drive Letter or Path
For easier access, you can assign a drive letter or drive path to your volume.
Assign the following drive letter:
G
Mount in the following empty NTFS folder:
Browse...
Do not assign a drive letter or drive path
< Back
Next >
Cancel


New Volume Wizard
Format Volume
To store data on this volume, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system:
NTFS
Allocation unit size:
Default
Volume label:
Striped_Volume
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel


Computer Management
File Action View Window Help
Computer Management (Local)
System Tools
Event Viewer
Shared Folders
Local Users and Groups
Performance Logs and Alerts
Device Manager
Storage
Removable Storage
Disk Defragmenter
Disk Management
Services and Applications
Volume Layout Type File System Status Capacity Free Space % Free Fault Tolerance Overhead
(C:) Partition Basic NTFS Healthy (System) 17.56 GB 13.06 GB 74 % No 0%
PART_2 (D:) Partition Basic FAT32 Healthy 16.54 GB 17.70 GB 95 % No 0%
PART_3 (E:) Partition Basic FAT Healthy 1.13 GB 1.13 GB 99 % No 0%
Striped_Volume (G:) Striped Dynamic NTFS Healthy 152.6... 152.59 GB 99 % No 0%
Disk 0
Dynamic
76.69 GB
Online
Striped_Volume (G:)
76.33 GB NTFS
Healthy
369 MB
Unallocated
Disk 1
Dynamic
76.33 GB
Online
Striped_Volume (G:)
76.33 GB NTFS
Healthy
Disk 2
Basic
37.27 GB
Online
(C:)
17.56 GB NTFS
Healthy (System)
PART_2 (D:)
16.55 GB FAT32
Healthy
PART_3 (E:)
1.13 GB FAT
Healthy
CD-ROM 0
DVD (F:)
No Media
Unallocated
Primary partition
Striped volume

Appendix C: ATI SURROUNDVIEW™

ATI SURROUNDVIEW™ is an integrated feature supported by the onboard ATI northbridge chipset. It provides the power and convenience of multi-adapter, multi-monitor support for computers that use an AGP- or PCI Express®-based graphics card in conjunction with specific ATI integrated graphics processors (IGPs).

Getting Started

SURROUNDVIEW™ provides the power and convenience of multi-adapter, multi-monitor support for computers that use an AGP- or PCI Express®-based graphics card in conjunction with the following ATI integrated graphics processors (IGPs):

- RADEON® XPRESS 200
- RADEON® 9100 Pro
- RADEON® 9100
- RADEON® 9000

SURROUNDVIEW™ enables support for up to three independent monitors.

Multi-monitor capability increases productivity, allowing you to read e-mail on one screen, work on a spreadsheet on another, and create a document on yet another. SURROUNDVIEW™ is also ideal for an office environment. For example, a brokerage can monitor trades, place orders, and sell—each on a different display.

When the home-office computer is not being used for work, it can be used to play the latest games, several of which can take advantage of SURROUNDVIEW™'s multi-monitor display capabilities. For example, with Microsoft® Flight Simulator, cyber pilots can move different views to separate monitors.

Enabling the SURROUNDVIEW™ feature requires only a few steps:

1. Installing a graphics card in the motherboard's PCIe™ slot.
2. Enabling the integrated graphics processor (if necessary).
3. Enabling SURROUNDVIEW™ in the BIOS.

System Requirements

Supported ATI Products	Integrated graphics processors (enabled by system BIOS): • RADEON® XPRESS 200 • RADEON® 9100 Pro • RADEON® 9100 IGP • RADEON® 9000 IGP AGP/PCIe™ graphics cards: • RADEON® X800 series • RADEON® X700 series • RADEON® X600 series • RADEON® X300 series • RADEON® 9800 SE / PRO / XT • RADEON® 9600 Series • RADEON® 9500 / PRO • RADEON® 9200 / SE / PRO • RADEON® 9000 Series • All All-in-Wonder® cards
Expansion Slot	• AGP 2X, 8X, or 2X/4X/8X • PCIe™ X16
Operating System	• Windows® 2000 • Windows® XP (Home or Pro)
CPU	Pentium® 4 2.0 GHz or equivalent; 3.0 GHz recommended.
System Memory	256 MB minimum; 512 MB recommended.
AGP Aperture (for AGP-based cards)	128 MB minimum; 256 MB recommended.
UMA Frame Buffer	64 MB minimum; 128 MB recommended.

Installing a Graphics Card

MSI Reminds You...
*This section provides **generic** installation instructions only. In most cases a graphics card will come with **specific** installation instructions, in which case users should consult their graphics card manual and follow the instructions therein.*

Before You Begin

Before you begin installing your graphics card, please do the following:

1. Record any serial numbers printed on the card itself.
2. Update your PCIe™ chipset drivers to the latest version. Consult your motherboard manual or manufacturer's Web site for more information.
3. Uninstall the graphics drivers for any previously installed graphics card if you are installing a new ATI graphics card.

MSI Reminds You...
Your integrated graphics processor will have separate drivers from your PCIe™ graphics card. Do not uninstall the drivers for your IGP.

Basic Graphics Card Installation

u To install a graphics card

1. Turn off the computer, monitor, and other peripheral devices.
2. Unplug the computer's power cord and disconnect all cables from the back of your computer.

MSI Reminds You...
WARNING - Wait approximately 20 seconds after unplugging the power cord before disconnecting a peripheral or removing a component from the motherboard to avoid possible damage to the motherboard.

3. Remove the computer cover. If necessary, consult your computer's manual for help in removing the cover.

MSI Reminds You...
WARNING - Remember to discharge your body's static electricity by touching the power supply or the metal surface of the computer chassis.

4. Unscrew or unfasten and remove any existing graphics card from your computer.
5. Locate the appropriate slot and, if necessary, remove the metal back-plate cover.
6. Align your graphics card with the slot and press it in firmly until the card is fully seated.
7. Screw in or fasten the graphics card securely and replace the computer cover.
8. Reconnect any cables you have disconnected and plug in the computer's power cord.
9. Turn on the monitor and then your computer. If you have properly installed your graphics card, operating system messages will appear once the boot procedure is finished.

Your monitor will be running in a basic video mode. Higher refresh rates are not available at this stage of the installation. Once you have installed the proper drivers and software, you can use the Display Properties control panel to adjust the video settings and configure multiple monitors.

Enabling SURROUNDVIEW™

Enabling the Integrated Graphics Processor

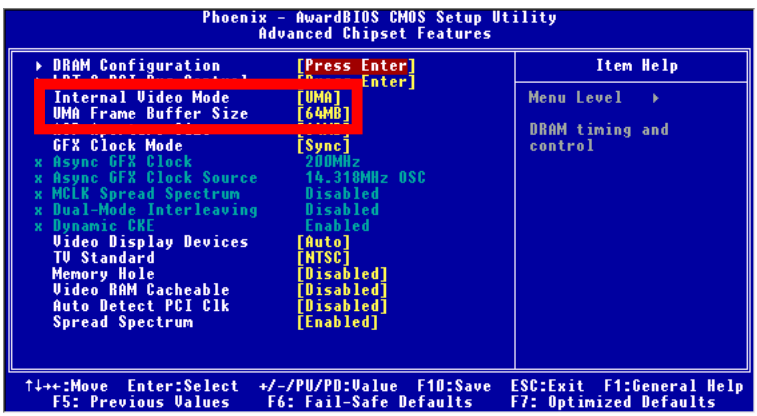
In order to use SURROUNDVIEW™, the integrated graphics processor (IGP) on the motherboard must be enabled in addition to the graphics card in the PCIe™ slot. Make sure the IGP is enabled (using the BIOS setup utility) in addition to the graphics card before continuing.

- BIOS options (under "***Advanced Chipset Features***" and "***Integrated Peripherals***").

Enabling SURROUNDVIEW™

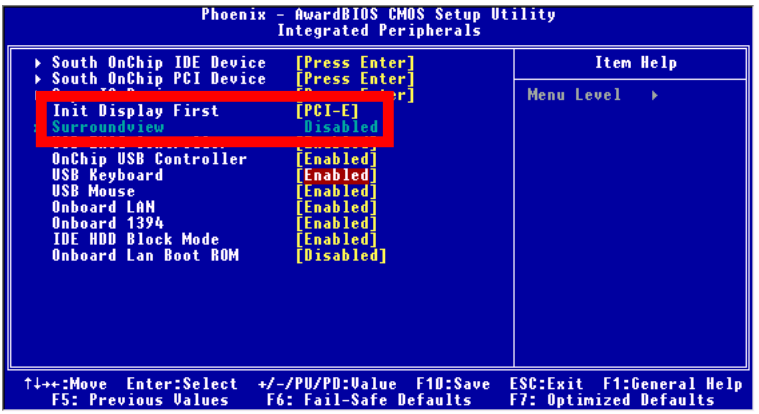
To enable SURROUNDVIEW™, you must first alter your computer's BIOS settings.

1. Restart your system, and enter CMOS setup. CMOS is part of your system's BIOS (Basic Input/Output System). When restarting, press **DEL** key to enter Setup. The CMOS Setup screen appears.
2. Use the arrow keys to navigate to **Advanced Chipset Features**, and then press Enter. The Advanced Chipset Features screen appears.



3. Use the arrow keys to navigate to **Internal Video Mode** and set it to **UMA**.
4. Use the arrow keys to navigate to **UMA Frame Buffer Size** and set it to **64MB**.
5. Press **Esc** to return to the CMOS Setup screen.

6. Use the arrow keys to navigate to **Integrated Peripherals**, and then press Enter. The Integrated Peripherals screen appears.



7. Use the arrow keys to navigate to **Init Display First** and set it to **PCI-E**.
8. Use the arrow keys to navigate to **Surroundview** and set it to **Enabled**.
9. Press **F10** to Save your changes. When the **Save to CMOS and Exit** prompt appears, press **Y**.

Frequently Asked Questions

Using SURROUNDVIEW™	
Question	**Answer**
Does the Windows® "Standby" function work when SURROUNDVIEW™ is enabled?	Yes, Standby should work properly with SURROUNDVIEW™.
Do all ATI cards support SURROUNDVIEW™?	No, only the ATI graphics cards noted in System Requirements will support SURROUNDVIEW™.
Can SURROUNDVIEW™ run with other manufacturers' graphics cards?	
If the integrated graphics processor (IGP) is enabled and I install a PCI graphics card, is SURROUNDVIEW™ available?	No, this function is called "dual adaptor," and functions similarly to using two, discrete graphics cards. SURROUNDVIEW™ requires an AGP- or PCIe-based graphics card.

Using Multiple Displays

Setting Up Multiple Displays

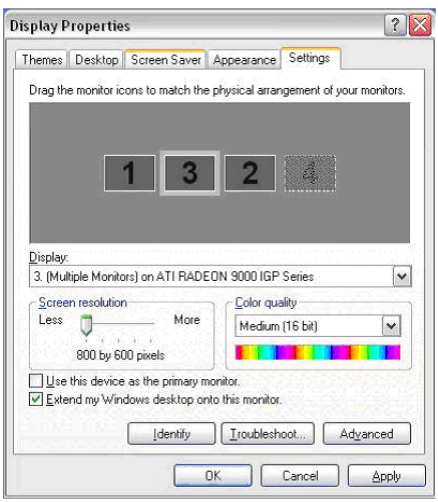
To use SURROUNDVIEW™, connect display devices to the output connections of both your integrated graphics processor (IGP) and your PCI Express® graphics card.

There will normally be three connections: one from the IGP and two from the graphics card.

u To connect your monitors

1. **Power off** your computer and monitors.
2. **Plug** the monitor cables into their appropriate connectors.
3. **Power on** your monitors first, and then restart your computer so that Windows® can detect the new hardware settings.

Once your monitors are connected, you can configure them for a multi-monitor display using SURROUNDVIEW™.



Windows® Display Properties Dialog with Multiple Monitors

u To set up a multi-monitor display

1. Right-click on a clear area of your desktop and choose **Properties**. The Display Properties dialog opens.
2. Select the **Settings** tab.
3. Click the **Identify** button to display a large number on each monitor.
4. Right-click the display icon in the Display Properties dialog that you wish to be your primary (main) monitor, and choose **Primary**.

   Note: When you use multiple monitors with your card, one monitor will always be Primary. All additional monitors will be designated as Secondary.
5. Select the display icon identified by the number **2**.
6. Click **Extend my Windows desktop onto this monitor**.
7. Right-click the display icon and choose **Attached**, if necessary.
8. Set the **Screen Resolution** and **Color Quality** as appropriate for the second monitor. Click **Apply** or **OK** to apply these new values.
   - u Refer to your Windows® online help and documentation for further information on using the **Settings** tab.

   Note: Each display can use a different screen resolution. For games, it is recommended that you use the same resolution on all displays.
9. Repeat steps 5 through 7 for the display icon identified by the number three.
10. Click and drag the display icons to positions that represent the physical setup of your monitors that you wish to use. The placement of display icons determines how you move items from one monitor to another.
    - u To move items by dragging left and right, place the display icons side by side.
    - u To move items by dragging up and down, play the display icons one above the other.

Using SURROUNDVIEW™

Business Applications

Using SURROUNDVIEW™, you can run multiple applications simultaneously — for example, a spreadsheet, a Web browser and a stock trader could be run and viewed on separate screens at the same time.

u To enable SURROUNDVIEW™ for business applications

1. Right-click a clear area of your desktop, click **Properties**, click the **Settings** tab, and then click the **Identify** button to display a large number on each monitor, showing which monitor corresponds with each icon.

Identifying your screens

2. Open your spreadsheet program. Your spreadsheet opens in the primary monitor.

Launching a spreadsheet in your primary monitor

3. Open your Web browser, and then drag it to monitor 2.

Web browser displayed on monitor 2

4. Launch another instance of your Web browser, and then drag it to monitor 3.

Another Web browser displayed on monitor 3

Games

The following section uses Microsoft® Flight Simulator as an example of using SURROUNDVIEW™ for games.

Using SURROUNDVIEW™, you can display a different Flight Simulator view on each of your monitors.

MSI Reminds You...
*For best results, in the **Flight Simulator Settings Display** dialog, set the full screen resolution for each video adapter to match the desktop resolution for the corresponding display.*
Because the simulation creates additional information that is sent to the video hardware and monitors, running multiple displays always affects performance compared to a single-display configuration.

u To enable SURROUNDVIEW™ for Microsoft® Flight Simulator

1. Start with Flight Simulator running in windowed mode, so that you can move windows off the primary display.

   To switch between full-screen and windowed mode, press **Alt + Enter** or, in the **Views** menu, click **Full Screen**.

   Your displays will look like the following:

Initial Start Up Screen for Microsoft® Flight Simulator

u **Monitor 2**

v **Monitor 1 (Primary)**

w **Monitor 3**

2. Click the **FLY NOW!** button to start Flight Simulator. Then click the "X" button to continue. You are now "flying".

"Flying" in Microsoft® Flight Simulator using primary monitor only

3. From the **Views** menu, create a new window, and then drag it to monitor 2.

Microsoft® Flight Simulator with both Primary and Monitor 2 running

MSI Reminds You...

1. *When moving a 3D window, you may see some hesitation when crossing the boundary to a secondary display. After you move the 3D window to the secondary display, that scene will be displayed in 3D. You can return to full-screen mode on each display after you move the windows.*
2. *Multiple full-screen setups are not saved in the Flight Simulator or Flight Configuration (.cfg) files. You can save a Flight while each display is in windowed mode, and then switch to full-screen mode after you launch Flight Simulator.*

4. From the **Views** menu, create another new window, and then drag it to monitor 3.

Microsoft® Flight Simulator using all three monitors