

# Preface

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Version 1.0

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## Federal Communications Commission (FCC)

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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment onto an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Shielded interconnect cables and a shielded AC power cable must be employed with this equipment to ensure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.

## Declaration of Conformity

This device complies with part 15 of the FCC rules. Operation is subject to the following conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation

## Canadian Department of Communications

This class B digital apparatus meets all requirements of the Canadian Interference-causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## About the Manual

The manual consists of the following:

### Chapter 1

#### Introducing the Motherboard

Describes features of the motherboard.

Go to  page 1

### Chapter 2

#### Installing the Motherboard

Describes installation of motherboard components.

Go to  page 7

### Chapter 3

#### Using BIOS

Provides information on using the BIOS Setup Utility.

Go to  page 25

### Chapter 4

#### Using the Motherboard Software

Describes the motherboard software

Go to  page 49

### Chapter 5

#### SIS964 SATA RAID Setup Guide

Provides information about SATA RAID Setup

Go to  page 53

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## Chapter 1

### *Introducing the Motherboard*

---

#### **Introduction**

Thank you for choosing the 648FX-A2 motherboard. This motherboard is a high performance, enhanced function motherboard that supports Socket 478 Pentium 4 processors for high-end business or personal desktop markets.

The motherboard incorporates the SiS648FX Northbridge (NB) and SiS964/964L Southbridge (SB) chipsets. The SiS648FX Northbridge chipset features the AGTL & AGTL+ compliant bus driver technology with integrated on-die termination to support Intel Pentium 4 series processors with FSB 800/533/400 MHz. The memory controller supports DDR only. It can offer bandwidth up to 3.2 GB/s under DDR 400 to sustain the bandwidth demand from host processors, as well as the multi I/O masters and AGP masters.

The SiS964/964L Southbridge supports Hi-Precision Event Timer (HPET) for Microsoft Windows with multiple DMA bus architecture that supports isochronous request and continuous packet transmission. It implements an EHCI compliant interface that provides 480Mb/s bandwidth for eight USB 2.0 ports, integrates AC'97 v2.3 compliant audio controller that features a 6-channels of audio speaker out and HSP v.90 modem support. The Southbridge integrates a Serial ATA host controller that is SATA v1.0 compliant, supporting Ultra DMA 150 (SiS964 only). SiS964/964L provide dual independent IDE channels and each of them support PIO mode 0,1,2,3,4 and multiword DMA mode 0,1,2 and UltraDMA 133/100/66.

The 648FX-A2 motherboard is equipped with advanced full set of I/O ports in the rear panel, including PS/2 mouse and keyboard connectors, COM1, LPT1, four USB ports, one optional LAN port, and audio jacks for microphone, line-in and line-out.

## Feature

### Processor

The 648FX-A2 uses a 478-pin socket type of Pentium 4 that carries the following features:

- Accommodates Intel P4 processors
- Supports a system bus (FSB) of 800/533/400MHz
- Supports “Hyper-Threading” technology CPU

“Hyper-Threading” technology enables the operating system into thinking it’s hooked up to two processors, allowing two threads to be run in parallel, both on separate “logical” processors within the same physical processor.

### Chipset

The SiS648FX Northbridge (NB) and SiS964/964L Southbridge (SB) chipset is based on an innovative and scalable architecture with proven reliability and performance.

- |                         |  |
|-------------------------|--|
| <b>SiS648FX(NB)</b>     | <ul style="list-style-type: none"> <li>• Supports 12 outstanding transactions and out-of-order completion</li> <li>• Accommodates high throughput SiS MuTIOL 1G interconnecting to SiS964 MuTIOL 1G media I/O with bi-directional 16-bit data bus to perform 1GB/s bandwidth in 133 MHz x 4 mode</li> <li>• Supports AGP 8X/4X Interface with Fast Write Transaction</li> <li>• Supports DDR400/333/266 SDRAM</li> <li>• Supports up to three unbuffered DIMM with 3 GB maximum memory size</li> </ul>   |
| <b>SiS964/964L (SB)</b> | <ul style="list-style-type: none"> <li>• Concurrent servicing of all DMA Devices: Dual IDE Controllers, SATA controller (except for SiS964L), three USB 2.0/1.1 host controller, LAN MAC Controller and Audio/Modem DMA Controller</li> <li>• Compliant with PCI 2.3 specification</li> <li>• Compliant with Serial ATA 1.0 specification, supports power saving mode (SiS964 only)</li> <li>• Compliant with AC'97 v2.3 supporting 6 Channels of audio outputs and V.90 HSP-Modem</li> </ul> <p>Integrated USB 2.0 Controller with three root hubs and eight function ports</p> |

### Memory

- Supports DDR400/333/266 MHz DDR SDRAM memory module
- Accommodates three unbuffered DIMM of 2.5 volt DDR SDRAM
- Up to 1 GB per DIMM with maximum memory size up to 3 GB

### Audio

- 648FX-A2 supports 18-bit stereo full-duplex AC'97 audio CODEC that is compliant with AC'97 v2.3 specification
- It comes with independent and variable sampling rate and advanced power management

- It is incorporated with proprietary converter technology
- The digital interface circuitry operates from a 3.3V power supply and supports an AC'97 2.3 compliant SPDIF out function that allows easy connection from the PC to other electronic products
- It supports four analog line-level stereo inputs

## Expansion Options

The motherboard comes with the following expansion options:

- One AGP 3.0 compliant slot with 8X/4X speed (supports 1.5V AGP interface only)
- Five 32-bit PCI v2.3 compliant slots
- Two 40-pin IDE low profile headers that support four IDE devices
- One floppy disk drive interface
- Two 7-pin SATA connector
- A Communications Networking Riser (CNR) slot

The 648FX-A2 motherboard supports UltraDMA bus mastering with transfer rates of 133/100/66 MB/s.

## Onboard LAN (Optional)

The onboard LAN provides the following features:

- Supports 10Mb/s and 100Mb/s N-way Auto-negotiation operation
- Supports half/full duplex operation
- Supports Wake-On-LAN(WOL) function and remote wake-up
- Supports power down mode

## Integrated I/O

The motherboard has a full set of I/O ports and connectors:

- Two PS/2 ports for mouse and keyboard
- One serial port
- One parallel port
- Four USB ports
- One LAN port (optional)
- Audio jacks for microphone, line-in and line-out

## BIOS Firmware

This motherboard uses Award BIOS that enables users to configure many system features including the following:

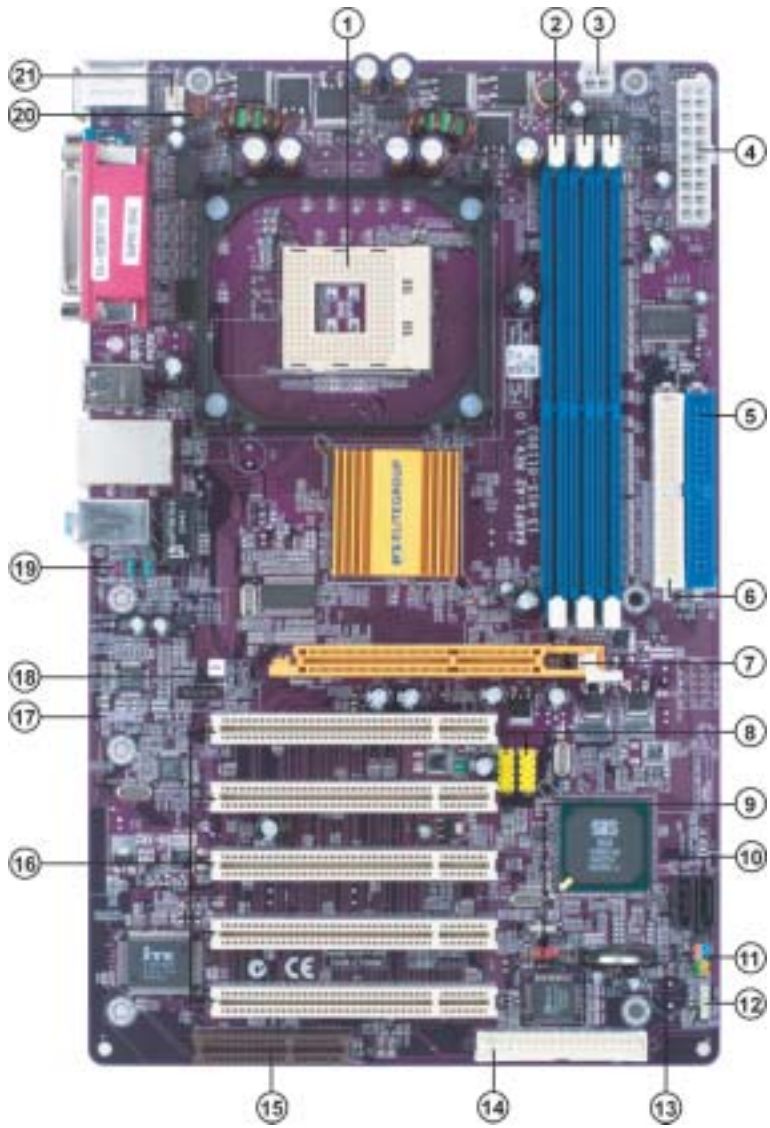
- Power management
- Wake-up alarms
- CPU parameters
- CPU and memory timing

The firmware can also be used to set parameters for different processor clock speeds.



*Some hardware specifications and software items are subject to change with out prior notice.*

# Motherboard Components



Introducing the Motherboard



*Table of Motherboard Components*

<b>LABEL</b>	<b>COMPONENT</b>
1 CPU Socket	mPGA478 socket for Pentium 4 CPUs
2 DIMM1~DIMM3	184-pin DDR SDRAM slots
3 ATX12V	Auxiliary 4-pin power connector
4 ATX1	Standard 20-pin ATX power connector
5 IDE1	Primary IDE channel
6 IDE2	Secondary IDE channel
7 AGP1	Accelerated Graphics Port slot
8 USB3-4	Front Panel USB headers
9 JP1	Clear CMOS jumper
10 SATA1~SATA2	Serial ATA connectors
11 JP3	BIOS Flash Protect jumper
12 SPK1	Speaker header
13 PANEL1	Panel connector for case switches and LEDs
14 FDD1	Floppy diskette drive connector
15 CNR1	Communications Networking Riser slot
16 PCI1~PCI5	32-bit add-on card slots
17 SPDIFO1	SPDIF out header
18 CDIN1	CD-in connector
19 AUDIO1	Front panel audio header
20 CPUFAN1	CPU cooling fan connector
21 CASFAN1	Case cooling fan connector

This concludes Chapter 1. The next chapter explains how to install the motherboard.

*Memo*

## Chapter 2

### *Installing the Motherboard*

---

#### **Safety Precautions**

- Follow these safety precautions when installing the motherboard
- Wear a grounding strap attached to a grounded device to avoid damage from static electricity
- Discharge static electricity by touching the metal case of a safely grounded object before working on the motherboard
- Leave components in the static-proof bags they came in
- Hold all circuit boards by the edges. Do not bend circuit boards

#### **Choosing a Computer Case**

There are many types of computer cases on the market. The motherboard complies with the specifications for the ATX system case. First, some features on the motherboard are implemented by cabling connectors on the motherboard to indicators and switches on the system case. Make sure that your case supports all the features required. Secondly, 648FX-A2 supports one or two floppy diskette drives and four enhanced IDE drives. Make sure that your case has sufficient power and space for all drives that you intend to install.

Most cases have a choice of I/O templates in the rear panel. Make sure that the I/O template in the case matches the I/O ports installed on the rear edge of the motherboard.

This motherboard carries a ATX form factor of 305 x 190 mm. Choose a case that accommodates this form factor.

#### **Installing the Motherboard in a Case**

Refer to the following illustration and instructions for installing the motherboard in a case.

Most system cases have mounting brackets installed in the case, which correspond the holes in the motherboard. Place the motherboard over the mounting brackets and secure the motherboard onto the mounting brackets with screws.

Ensure that your case has an I/O template that supports the I/O ports and expansion slots on your motherboard.



*Do not over-tighten the screws as this can stress the motherboard.*

## Checking Jumper Settings

This section explains how to set jumpers for correct configuration of the motherboard.

### Setting Jumpers

Use the motherboard jumpers to set system configuration options. Jumpers with more than one pin are numbered. When setting the jumpers, ensure that the jumper caps are placed on the correct pins.

The illustrations show a 2-pin jumper. When the jumper cap is placed on both pins, the jumper is SHORT. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is OPEN.



**SHORT**



**OPEN**

This illustration shows a 3-pin jumper. Pins 1 and 2 are SHORT





## Checking Jumper Settings

The following illustration shows the location of the motherboard jumpers. Pin 1 is labeled.



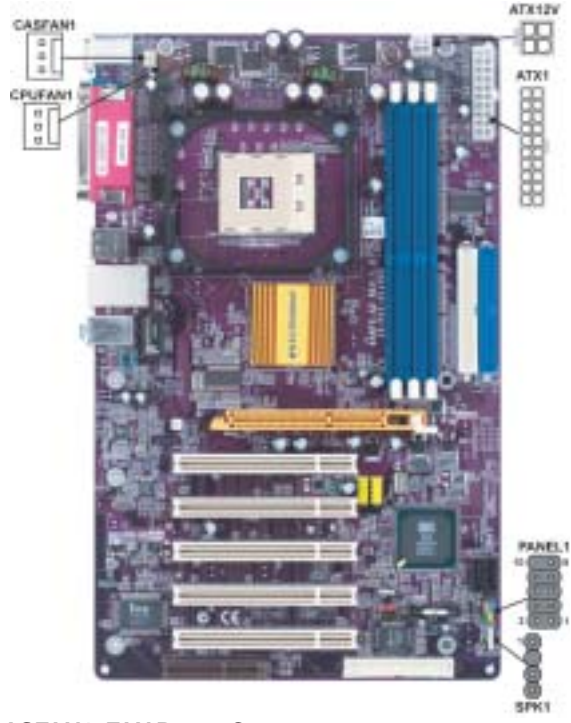
## Jumper Settings

Jumper	Type	Description	Setting (default)	
<b>JP1</b>	3-pin	FLASH CMOS SWITCH	1-2: NORMAL 2-3: CLEARING  Before clearing the CMOS, make sure to turn off the system.	 <b>JP1</b>
<b>JP3</b>	3-pin	BIOS FLASH PROTECT	1-2: DISABLE 2-3: ENABLE	 <b>JP3</b>

## Connecting Case Components

After you have installed the motherboard into a case, you can begin connecting the motherboard components. Refer to the following:

- 1 Connect the CPU cooling fan cable to **CPUFAN1**.
- 2 Connect the case cooling fan connector to **CASFAN1**.
- 3 Connect the case speaker cable to **SPK1**.
- 4 Connect the case switches and indicator LEDs to the **PANEL1**.
- 6 Connect the standard power supply connector to **ATX1**.
- 7 Connect the auxiliary case power supply connector to **ATX12V**.



### CPUFAN1/CASFAN1: FAN Power Connectors

Pin	Signal Name	Function
1	GND	System Ground
2	+12V	Power +12V
3	Sense	Sensor

### SPK1: Internal speaker

Pin	Signal Name
1	VCC
2	Key
3	GND
4	Signal

## ATX1: ATX 20-pin Power Connector

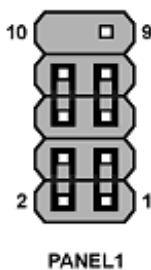
Pin	Signal Name	Pin	Signal Name
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	PS ON#
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	PWRGD	18	-5V
9	+5VSB	19	+5V
10	+12V	20	+5V

## ATX12V: ATX 12V Power Connector

Pin	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

## Front Panel Connector

The front panel connector (PANEL1) provides a standard set of switch and LED connectors commonly found on ATX or micro-ATX cases. Refer to the table below for information:



Pin	Signal	Function	Pin	Signal	Function
1	HD_LED_P	Hard disk LED+	2	FP PWR/SLP	*MSG LED+
3	HD_LED_N	Hard disk LED-	4	FP PWR/SLP	*MSG LED-
5	RST_SW_N	Reset Switch	6	PWR_SW_P	Power Switch
7	RST_SW_P	Reset Switch	8	PWR_SW_N	Power Switch
9	RSVD	Reserved	10	NC	No pin

\* MSG LED (dual color or single color)

### **Hard Drive Activity LED**

Connecting pins 1 and 3 to a front panel mounted LED provides visual indication that data is being read from or written to the hard drive. For the LED to function properly, an IDE drive should be connected to the onboard IDE interface. The LED will also show activity for devices connected to the SCSI (hard drive activity LED) connector.

### **Power/Sleep/Message waiting LED**

Connecting pins 2 and 4 to a single or dual-color, front panel mounted LED provides power on/off, sleep, and message waiting indication.

### **Reset Switch**

Supporting the reset function requires connecting pin 5 and 7 to a momentary-contact switch that is normally open. When the switch is closed, the board resets and runs POST.

### **Power Switch**

Supporting the power on/off function requires connecting pins 6 and 8 to a momentary-contact switch that is normally open. The switch should maintain contact for at least 50 ms to signal the power supply to switch on or off. The time requirement is due to internal debounce circuitry. After receiving a power on/off signal, at least two seconds elapses before the power supply recognizes another on/off signal.

## **Installing Hardware**

### **Installing the Processor**



*Caution: When installing a CPU heatsink and cooling fan make sure that you DO NOT scratch the motherboard or any of the surface-mount resistors with the clip of the cooling fan. If the clip of the cooling fan scrapes across the motherboard, you may cause serious damage to the motherboard or its components.*

*On most motherboards, there are small surface-mount resistors near the processor socket, which may be damaged if the cooling fan is carelessly installed.*

*Avoid using cooling fans with sharp edges on the fan casing and the clips. Also, install the cooling fan in a well-lit work area so that you can clearly see the motherboard and processor socket.*

### **Before installing the Processor**

This motherboard automatically determines the CPU clock frequency and system bus frequency for the processor. You may be able to change these settings by making changes to jumpers on the motherboard, or changing the settings in the system Setup Utility. We strongly recommend that you do not over-clock processors or other components to run faster than their rated speed.





*Warning: Over-clocking components can adversely affect the reliability of the system and introduce errors into your system. Over-clocking can permanently damage the motherboard by generating excess heat in components that are run beyond the rated limits.*

This motherboard has a Socket 478 processor socket. When choosing a processor, consider the performance requirements of the system. Performance is based on the processor design, the clock speed and system bus frequency of the processor, and the quantity of internal cache memory and external cache memory.

## CPU Installation Procedure

The following illustration shows CPU installation components.

- 1 Install your CPU. Pull up the lever away from the socket and lift up to 90-degree angle.
- 2 Locate the CPU cut edge (the corner with the pin hold noticeably missing). Align and insert the CPU correctly.
- 3 Press the lever down and apply thermal grease on top of the CPU.
- 4 Put the CPU Fan down on the retention module and snap the four retention legs of the cooling fan into place.
- 5 Flip the levers over to lock the heat sink in place and connect the CPU cooling Fan power cable to the CPUFAN connector. This completes the installation.



*To achieve better airflow rates and heat dissipation, we suggest that you use a high quality fan with 4800 rpm at least. CPU fan and heatsink installation procedures may vary with the type of CPU fan/heatsink supplied. The form and size of fan/heatsink may also vary.*

## Installing Memory Modules

This motherboard accommodates three memory modules. It can support three 184-pin 2.5V unbuffered DIMM, DDR400/333/266. The total memory capacity is 3GB (DDR400 up to 2GB only).

### DDR SDRAM memory module table

Memory module	No. of DIMMs	Memory Bus
DDR266	3 DIMMS	133MHz
DDR333	3 DIMMS	166MHz
DDR400	2 DIMMS	200MHz

You must install at least one module in any of the three slots. Each module can be installed with 128 MB to 1 GB of memory; total memory capacity is 3 GB.



*Do not remove any memory module from its antistatic packaging until you are ready to install it on the motherboard. Handle the modules only by their edges. Do not touch the components or metal parts. Always wear a grounding strap when you handle the modules.*

## Installation Procedure

Refer to the following to install the memory modules.

- 1 This motherboard supports unbuffered DDR SDRAM only.
- 2 Push the latches on each side of the DIMM slot down.
- 3 Align the memory module with the slot. The DIMM slots are keyed with notches and the DIMMs are keyed with cutouts so that they can only be installed correctly.
- 4 Check that the cutouts on the DIMM module edge connector match the notches in the DIMM slot.
- 5 Install the DIMM module into the slot and press it firmly down until it seats correctly. The slot latches are levered upwards and latch on to the edges of the DIMM.
- 6 Install any remaining DIMM modules.



**Table A: DDR (memory module) QVL (Qualified Vendor List)**

The following DDR400 memory modules have been tested and qualified for use with this motherboard.

Size	Vendor	Module Name
<b>128MB</b>	SAMSUNG	M368L1713DTM-CC4
	Micron	MT8VDDT1664AG-403B2
	NANYA	NT128D64SH4B1G-5
	Infineon	HYS64D16301GU-5-B
	NANYA	NT128D64SH4B1G-5T
<b>256MB</b>	SAMSUNG	M368L3223DTM-CC4
	NANYA	NT256D64S88B1G-5
	Micron	MT16VDDT3264AG-403B2
	Infineon	HYS64D32300GU-5-B
	Micron	MT8VDDT3264AG-40BC4
	NANYA	NT256D64S88B1G-5T
	Infineon	HYS64D32300HU-5-C
<b>512MB</b>	SAMSUNG	M368L6423DTM-CC4
	NANYA	NT512D64S8HB1G-5
	Micron	MT16VDDT6464AG-40BC4
	NANYA	NT512D64S8HB1G-5T
	Apacer	Infineon
	Apacer	MOSEL
	Apacer	PSC
	SAMSUNG	M368L6423ETM-CC4
	Infineon	HYS64D64320HU-5-C

## ***Installing a Hard Disk Drive/CD-ROM/SATA Hard Drive***

This section describes how to install IDE devices such as a hard disk drive and a CD-ROM drive.

### **About IDE Devices**

Your motherboard has a primary and secondary IDE channel interface (IDE1 and IDE2). An IDE ribbon cable supporting two IDE devices is bundled with the motherboard.



*You must orient the cable connector so that the pin1 (color) edge of the cable corresponds to the pin 1 of the I/O port connector.*

### **IDE1: Primary IDE Connector**

The first hard drive should always be connected to IDE1.



### **IDE2: Secondary IDE Connector**

The second drive on this controller must be set to slave mode. The configuration is the same as IDE1.



IDE devices enclose jumpers or switches used to set the IDE device as MASTER or SLAVE. Refer to the IDE device user's manual. Installing two IDE devices on one cable, ensure that one device is set to MASTER and the other device is set to SLAVE. The documentation of your IDE device explains how to do this.

## About SATA Connectors

Your motherboard features two SATA connectors supporting a total of two drives. SATA refers to Serial ATA (Advanced Technology Attachment) is the standard interface for the IDE hard drives which are currently used in most PCs. These connectors are well designed and will only fit in one orientation. Locate the SATA connectors on the motherboard (see page 21) and follow the illustration below to install the SATA hard drives.

## Installing Serial ATA Hard Drives

To install the Serial ATA (SATA) hard drives, use the SATA cable that supports the Serial ATA protocol. This SATA cable comes with an SATA power cable. You can connect either end of the SATA cable to the SATA hard drive or the connector on the motherboard.



**SATA cable** (optional)



**SATA power cable** (optional)

Refer to the illustration below for proper installation:

- 1 Attach either cable end to the connector on the motherboard.
- 2 Attach the other cable end to the SATA hard drive.
- 3 Attach the SATA power cable to the SATA hard drive and connect the other end to the power supply.



*This motherboard does not support the "Hot-Plug" function.*

## ***Installing a Floppy Diskette Drive***

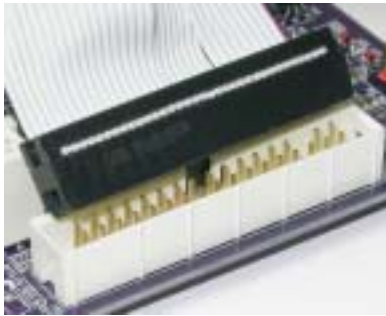
The motherboard has a floppy diskette drive (FDD) interface and ships with a diskette drive ribbon cable that supports one or two floppy diskette drives. You can install a 5.25-inch drive and a 3.5-inch drive with various capacities. The floppy diskette drive cable has one type of connector for a 5.25-inch drive and another type of connector for a 3.5-inch drive.



*You must orient the cable connector so that the pin 1 (color) edge of the cable corresponds to the pin 1 of the I/O port connector.*

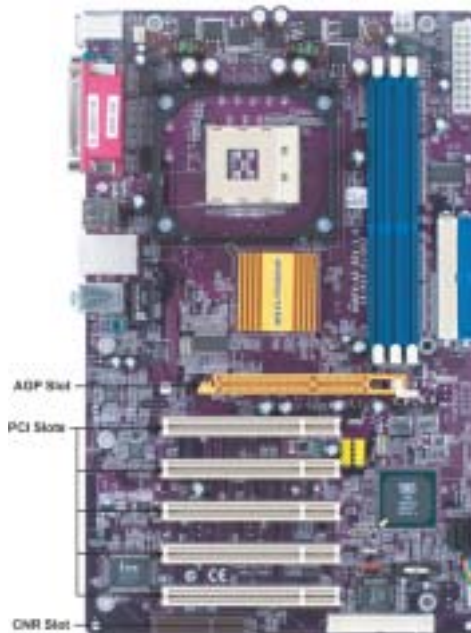
### **FDD1: Floppy Disk Connector**

This connector supports the provided floppy drive ribbon cable. After connecting the single end to the onboard floppy connector, connect the remaining plugs on the other end to the floppy drives correspondingly.



## *Installing Add-on Cards*

The slots on this motherboard are designed to hold expansion cards and connect them to the system bus. Expansion slots are a means of adding or enhancing the motherboard's features and capabilities. With these efficient facilities, you can increase the motherboard's capabilities by adding hardware that performs tasks that are not part of the basic system.



**AGP Slot** The AGP slot is used to install a graphics adapter that supports the 8X/4X AGP specification. It is AGP 3.0 compliant.

**PCI Slots** This motherboard is equipped with five standard PCI slots. PCI stands for Peripheral Component Interconnect and is a bus standard for expansion cards, which for the most part, is a supplement of the older ISA bus standard. The PCI slots on this board are PCI v2.3 compliant.

**CNR Slot** This slot is used to insert CNR cards with Modem and Audio functionality.



*Before installing an add-on card, check the documentation for the card carefully. If the card is not Plug and Play, you may have to manually configure the card before installation.*

Follow these instructions to install an add-on card:

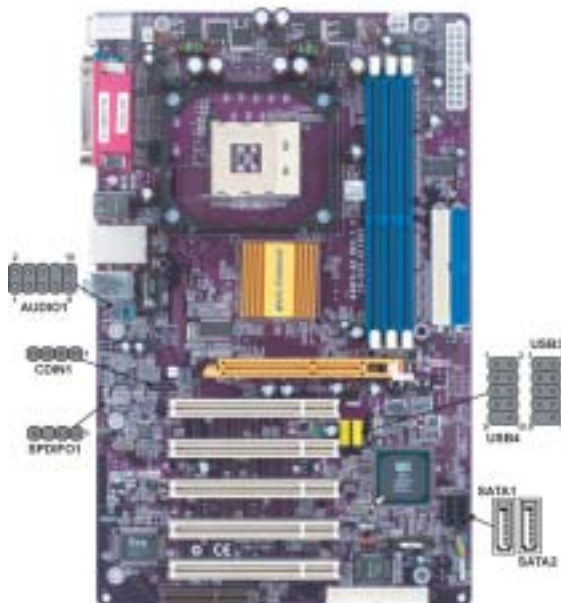
- 1 Remove a blanking plate from the system case corresponding to the slot you are going to use.
- 2 Install the edge connector of the add-on card into the expansion slot. Ensure that the edge connector is correctly seated in the slot.
- 3 Secure the metal bracket of the card to the system case with a screw.



*For some add-on cards, for example graphics adapters and network adapters, you have to install drivers and software before you can begin using the add-on card.*

### ***Connecting Optional Devices***

Refer to the following for information on connecting the motherboard's optional devices:



Installing the Motherboard



### SPDIF01: SPDIF out header

This is an optional header that provides an S/PDIF (Sony/Philips Digital Interface) output to digital multimedia device through optical fiber or coaxial connector.

Pin	Signal Name	Function
1	SPDIF	SPDIF digital output
2	+5VA	5V analog Power
3	NC	Not connected
4	GND	Ground

### AUDIO1: Front Panel Audio header

This header allows the user to install auxiliary front-oriented microphone and line-out ports for easier access.

Pin	Signal Name	Function
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_F_R	Right Channel audio signal to Front Panel
6	AUD_RET_R	Right Channel Audio signal to Return from Front Panel
7	REVD	Reserved
8	Key	No Pin
9	AUD_F_L	Left Channel Audio signal to Front Panel
10	AUD_RET_L	Left Channel Audio signal to Return from Front Panel

### CD-in: CD Audio Input header

Pin	Signal Name	Function
1	CD in_L	CD In left channel
2	GND	Ground
3	GND	Ground
4	CD in_R	CD In right channel

### SATA1/SATA2: Serial ATA connectors

These connectors are used to support the new Serial ATA devices for the highest data transfer rates (150 MB/s), simpler disk drive cabling and easier PC assembly. It eliminates limitations of the current Parallel ATA interface. But maintains register compatibility and software compatibility with Parallel ATA.

Pin	Signal Name	Pin	Signal Name
1	Ground	2	TX+
3	TX-	4	Ground
5	RX-	6	RX+
7	Ground	-	-

### USB3/USB4: Front Panel USB header

The motherboard has four USB ports installed on the rear edge I/O port array. Additionally, some computer cases have USB ports at the front of the case. If you have this kind of case, use auxiliary USB connector to connect the front-mounted ports to the motherboard.

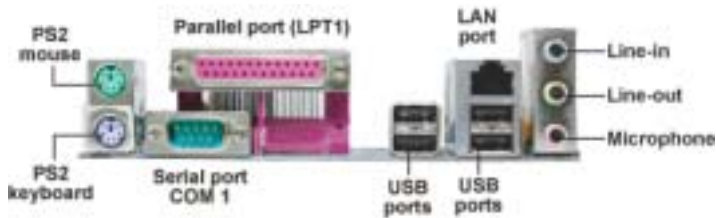
Pin	Signal Name	Function
<b>1</b>	<b>USBPWR</b>	<b>Front Panel USB Power</b>
<b>2</b>	<b>USBPWR</b>	<b>Front Panel USB Power</b>
<b>3</b>	<b>USB_FP_P0-</b>	<b>USB Port 0 Negative Signal</b>
<b>4</b>	<b>USB_FP_P1-</b>	<b>USB Port 1 Negative Signal</b>
<b>5</b>	<b>USB_FP_P0+</b>	<b>USB Port 0 Positive Signal</b>
<b>6</b>	<b>USB_FP_P1+</b>	<b>USB Port 1 Positive Signal</b>
<b>7</b>	<b>GND</b>	<b>Ground</b>
<b>8</b>	<b>GND</b>	<b>Ground</b>
<b>9</b>	<b>Key</b>	<b>No pin</b>
<b>10</b>	<b>NC</b>	<b>Not connected</b>



*Please make sure that the USB cable has the same pin assignment as indicated above. A different pin assignment may cause damage or system hang-up.*

## Connecting I/O Devices

The backplane of the motherboard has the following I/O ports:



- PS2 Mouse** Use the upper PS/2 port to connect a PS/2 pointing device.
- PS2 Keyboard** Use the lower PS/2 port to connect a PS/2 keyboard.
- Parallel Port (LPT1)** Use LPT1 to connect printers or other parallel communications devices.
- Serial Port (COM1)** Use the COM port to connect serial devices such as mice or fax/modems. COM1 is identified by the system as COM1/3.
- LAN Port (optional)** Connect an RJ-45 jack to the LAN port to connect your computer to the Network.
- USB Ports** Use the USB ports to connect USB devices.
- Audio Ports** Use the three audio ports to connect audio devices. The first jack is for stereo line-in signal. The second jack is for stereo line-out signal. The third jack is for microphone.

This concludes Chapter 2. The next chapter covers the BIOS.

*Memo*

## Chapter 3

### *Using BIOS*

---

#### **About the Setup Utility**

The computer uses the latest Award BIOS with support for Windows Plug and Play. The CMOS chip on the motherboard contains the ROM setup instructions for configuring the motherboard BIOS.

The BIOS (Basic Input and Output System) Setup Utility displays the system's configuration status and provides you with options to set system parameters. The parameters are stored in battery-backed-up CMOS RAM that saves this information when the power is turned off. When the system is turned back on, the system is configured with the values you stored in CMOS.

The BIOS Setup Utility enables you to configure:

- Hard drives, diskette drives and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power Management features

The settings made in the Setup Utility affect how the computer performs. Before using the Setup Utility, ensure that you understand the Setup Utility options.

This chapter provides explanations for Setup Utility options.

#### ***The Standard Configuration***

A standard configuration has already been set in the Setup Utility. However, we recommend that you read this chapter in case you need to make any changes in the future.

This Setup Utility should be used:

- when changing the system configuration
- when a configuration error is detected and you are prompted to make changes to the Setup Utility
- when trying to resolve IRQ conflicts
- when making changes to the Power Management configuration
- when changing the password or making other changes to the Security Setup

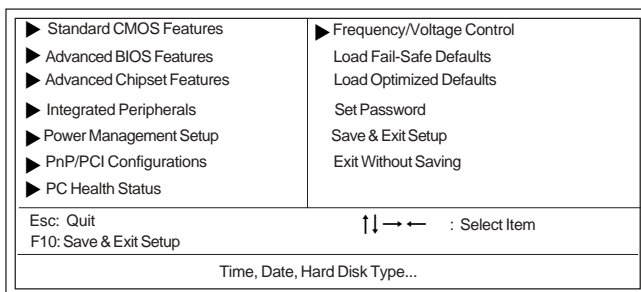
#### ***Entering the Setup Utility***

When you power on the system, BIOS enters the Power-On Self Test (POST) routines. POST is a series of built-in diagnostics performed by the BIOS. After the POST routines are completed, the following message appears:

***Press DEL to enter SETUP***

Pressing the delete key accesses the BIOS Setup Utility:

Phoenix-AwardBIOS CMOS Setup Utility:

***BIOS Navigation Keys***

The BIOS navigation keys are listed below:

KEY	FUNCTION
<b>ESC</b>	Exits the current menu
<b>← ↑ ↓ →</b>	Scrolls through the items on a menu
<b>+/-/PU/PD</b>	Modifies the selected field's values
<b>F10</b>	Saves the current configuration and exits setup
<b>F1</b>	Displays a screen that describes all key functions
<b>F5</b>	Loads previously saved values to CMOS
<b>F6</b>	Loads a minimum configuration for troubleshooting
<b>F7</b>	Loads an optimum set of values for peak performance

## ***Updating the BIOS***

You can download and install updated BIOS for this motherboard from the manufacturer's Web site. New BIOS provides support for new peripherals, improvements in performance, or fixes for known bugs. Install new BIOS as follows:

- 1 If your motherboard has a BIOS protection jumper, change the setting to allow BIOS flashing.
- 2 If your motherboard has an item called Firmware Write Protect in Advanced BIOS features, disable it. (Firmware Write Protect prevents BIOS from being overwritten.)
- 3 Create a bootable system disk. (Refer to Windows online help for information on creating a bootable system disk.)
- 4 Download the Flash Utility and new BIOS file from the manufacturer's Web site. Copy these files to the system diskette you created in Step 3.
- 5 Turn off your computer and insert the system diskette in your computer's diskette drive. (You might need to run the Setup Utility and change the boot priority items on the Advanced BIOS Features Setup page, to force your computer to boot from the floppy diskette drive first.)
- 6 At the A:\ prompt, type the Flash Utility program name and press <Enter>.
- 7 Type the filename of the new BIOS in the "File Name to Program" text box. Follow the onscreen directions to update the motherboard BIOS.
- 8 When the installation is complete, remove the floppy diskette from the diskette drive and restart your computer. If your motherboard has a Flash BIOS jumper, reset the jumper to protect the newly installed BIOS from being overwritten.

## **Using BIOS**

When you start the Setup Utility, the main menu appears. The main menu of the Setup Utility displays a list of the options that are available. A highlight indicates which option is currently selected. Use the cursor arrow keys to move the highlight to other options. When an option is highlighted, execute the option by pressing <Enter>.

Some options lead to pop-up dialog boxes that prompt you to verify that you wish to execute that option. Other options lead to dialog boxes that prompt you for information.

Some options (marked with a triangle ►) lead to submenus that enable you to change the values for the option. Use the cursor arrow keys to scroll through the items in the submenu.

In this manual, default values are enclosed in parenthesis. Submenu items are denoted by a triangle ►.

## Standard CMOS Features

This option displays basic information about your system.

Phoenix-AwardBIOS CMOS Setup Utility  
Standard CMOS Features

Date (mm:dd:yy)	Mon, Nov 17 2003	Item Help
Time (hh:mm:ss)	13 : 4 : 54	
▶ IDE Channel 0 Master		Menu Level ▶  Change the day, month, year and century.
▶ IDE Channel 0 Slave		
▶ IDE Channel 1 Master		
▶ IDE Channel 1 Slave		
Drive A	[1.44M, 3.5 in.]	
Drive B	[None]	
Floppy 3 Mode Support	[Disabled]	
Video	[EGA/VGA]	
Halt On	[All Errors]	
Base Memory	640K	
Extended Memory	65535K	
Total Memory	1024K	

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

### Date and Time

The Date and Time items show the current date and time on the computer. If you are running a Windows OS, these items are automatically updated whenever you make changes to the Windows Date and Time Properties utility.

### ▶ IDE Devices (None)

Your computer has two IDE channels (Primary and Secondary) and each channel can be installed with one or two devices (Master and Slave). Use these items to configure each device on the IDE channel.

Press <Enter> to display the IDE submenu:

Phoenix-AwardBIOS CMOS Setup Utility  
IDE Primary Master

IDE HDD Auto-Detection	[ Press Enter]	Item Help
IDE Channel 1 Master	[Auto]	
Access Mode	[Auto]	Menu Level ▶▶  To auto-detect the HDD's size, head...on this channel
Capacity	0 MB	
Cylinder	0	
Head	0	
Precomp	0	
Landing Zone	0	
Sector	0	

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

### IDE HDD Auto-Detection

Press <Enter> while this item is highlighted to prompt the Setup Utility to automatically detect and configure an IDE device on the IDE channel.



*If you are setting up a new hard disk drive that supports LBA mode, more than one line will appear in the parameter box. Choose the line that lists LBA for an LBA drive.*



**IDE Channel 0/1 Master/Slave (Auto)**

Leave this item at Auto to enable the system to automatically detect and configure IDE devices on the channel. If it fails to find a device, change the value to Manual and then manually configure the drive by entering the characteristics of the drive in the items described below.

Refer to your drive's documentation or look on the drive casing if you need to obtain this information. If no device is installed, change the value to None.



*Before attempting to configure a hard disk drive, ensure that you have the configuration information supplied by the manufacturer of your hard drive. Incorrect settings can result in your system not recognizing the installed hard disk.*

**Access Mode (Auto)**

This item defines ways that can be used to access IDE hard disks such as LBA (Large Block Addressing). Leave this value at Auto and the system will automatically decide the fastest way to access the hard disk drive.

Press <Esc> to return to the Standard CMOS Features page.

**Drive A/Drive B (1.44M, 3.5 in./None)**

These items define the characteristics of any diskette drive attached to the system. You can connect one or two diskette drives.

**Floppy 3 Mode Support (Disabled)**

Floppy 3 mode refers to a 3.5-inch diskette with a capacity of 1.2 MB. Floppy 3 mode is sometimes used in Japan.

**Video (EGA/VGA)**

This item defines the video mode of the system. This motherboard has a built-in VGA graphics system; you must leave this item at the default value.

**Halt On (All Errors)**

This item defines the operation of the system POST (Power On Self Test) routine. You can use this item to select which types of errors in the POST are sufficient to halt the system.

**Base Memory, Extended Memory, and Total Memory**

These items are automatically detected by the system at start up time. These are display-only fields. You cannot make changes to these fields.

## Advanced BIOS Features

This option defines advanced information about your system.

Phoenix-AwardBIOS CMOS Setup Utility  
Advanced BIOS Features

<ul style="list-style-type: none"> <li>▶ Hard Disk Boot Priority [Press Enter]</li> <li>CPU L1&amp;L2 Cache [Enabled]</li> <li>Hyper-Threading Technology [Enabled]</li> <li>Quick Power On Self Test [Enabled]</li> <li>First Boot Device [Floppy]</li> <li>Second Boot Device [Hard Disk]</li> <li>Third Boot Device [CDROM]</li> <li>Boot Other Device [Enabled]</li> <li>Swap Floppy Drive [Disabled]</li> <li>Boot Up Floppy Seek [Disabled]</li> <li>Boot Up NumLock Status [On]</li> <li>Gate A20 Option [Fast]</li> <li>BIOS Write Protect [Disabled]</li> <li>ATA 66/100 IDE Cable Msg. [Enabled]</li> <li>Typematic Rate Setting [Disabled]</li> <li>X Typematic Rate (Chars/Sec) 6</li> <li>X Typematic Delay (Msec) 250</li> <li>Security Option [Setup]</li> </ul>		<p style="text-align: center;">Item Help</p> <hr/> <p style="text-align: center;">Menu Level ▶</p>
---	--	--

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

### ▶ Hard Disk Boot Priority (Press Enter)

Scroll to this item and press <Enter> to view the following screen:

Phoenix-AwardBIOS CMOS Setup Utility  
Hard Disk Boot Priority

<ol style="list-style-type: none"> <li>1. Pri. Master:</li> <li>2. Pri. Slave:</li> <li>3. Sec. Master:</li> <li>4. Sec. Slave:</li> <li>5. USBHDD0:</li> <li>6. USBHDD1:</li> <li>7. USBHDD2:</li> <li>8. Bootable Add-in Cards</li> </ol>	<p style="text-align: center;">Item Help</p> <hr/> <p style="text-align: center;">Menu Level ▶▶</p> <p>Use &lt; ↑ &gt; or &lt; ↓ &gt; to select a device, then press &lt;+&gt; to move it up, or &lt;-&gt; to move it down the list. Press &lt;ESC&gt; to exit this menu.</p>
---	---

↑↓ : Move PU/PD/+/-/: Change Priority F10:Save ESC:Exit

### CPU L1&L2 Cache (Enabled)

All processors that can be installed in this mainboard use internal level 1 (L1) and external level 2 (L2) cache memory to improve performance. Leave this item at the default value for better performance.

### Hyper-Threading Technology (Enabled)

This item is only available when the chipset supports Hyper-Threading and you are using a Hyper-Threading CPU.

**Quick Power On Self Test (Enabled)**

Enable this item to shorten the power on testing (POST) and have your system start up faster. You might like to enable this item after you are confident that your system hardware is operating smoothly.

**First/Second/Third Boot Device (Floppy/Hard Disk/CDROM)**

Use these three items to select the priority and order of the devices that your system searches for an operating system at start-up time.

**Boot Other Device (Enabled)**

When enabled, the system searches all other possible locations for an operating system if it fails to find one in the devices specified under the First, Second, and Third boot devices.

**Swap Floppy Drive (Disabled)**

If you have two floppy diskette drives in your system, this item allows you to swap the assigned drive letters so that drive A becomes drive B, and drive B becomes drive A.

**Boot Up Floppy Seek (Disabled)**

If this item is enabled, it checks the size of the floppy disk drives at start-up time. You don't need to enable this item unless you have a legacy diskette drive with 360K capacity.

**Boot Up NumLock Status (On)**

This item defines if the keyboard Num Lock key is active when your system is started.

**Gate A20 Option (Fast)**

This item defines how the system handles legacy software that was written for an earlier generation of processors. Leave this item at the default value.

**BIOS Write Protect (Disabled)**

This option protects the BIOS from accidental corruption by unauthorized users or computer viruses. When enabled, the BIOS' data cannot be changed when attempting to update the BIOS with a Flash utility. To successfully update the BIOS, you'll need to disable this BIOS Write Protect function.

**ATA 66/100 IDE Cable Msg. (Enabled)**

This item enables or disables the display of the ATA 66/100 Cable MSG.

**Typematic Rate Setting (Disabled)**

If this item is enabled, you can use the following two items to set the typematic rate and the typematic delay settings for your keyboard.

- **Typematic Rate (Chars/Sec):** Use this item to define how many characters per second are generated by a held-down key.
- **Typematic Delay (Msec):** Use this item to define how many milliseconds must elapse before a held-down key begins generating repeat characters.

**Security Option (Setup)**

If you have installed password protection, this item defines if the password is required at system start up, or if it is only required when a user tries to enter the Setup Utility.

**APIC Mode (Enabled)**

This item allows you to enable or disable the APIC (Advanced Programmable Interrupt Controller) mode. APIC provides symmetric multi-processing (SMP) for systems, allowing support for up to 60 processors.

**OS Select For DRAM > 64 MB (Non-OS2)**

This item is only required if you have installed more than 64 MB of memory and you are running the OS/2 operating system. Otherwise, leave this item at the default.

**HDD S.M.A.R.T Capability (Disabled)**

The S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance. S.M.A.R.T. software resides on both the disk drive and the host computer.

**Video BIOS Shadow (Enabled0)**

This item determines whether the BIOS will be copied to RAM for faster execution.

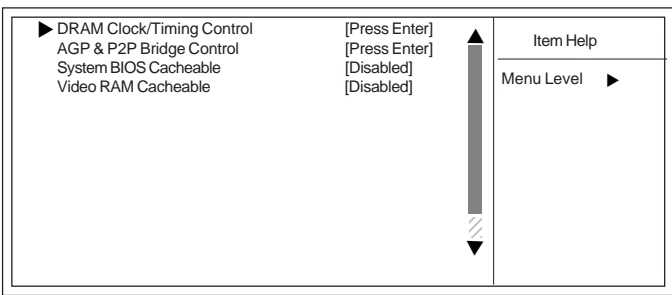
**Small Logo (EPA) Show (Disabled)**

Enables or disables the display of the EPA logo during boot.

*Advanced Chipset Features*

These items define critical timing parameters of the motherboard. You should leave the items on this page at their default values unless you are very familiar with the technical specifications of your system hardware. If you change the values incorrectly, you may introduce fatal errors or recurring instability into your system.

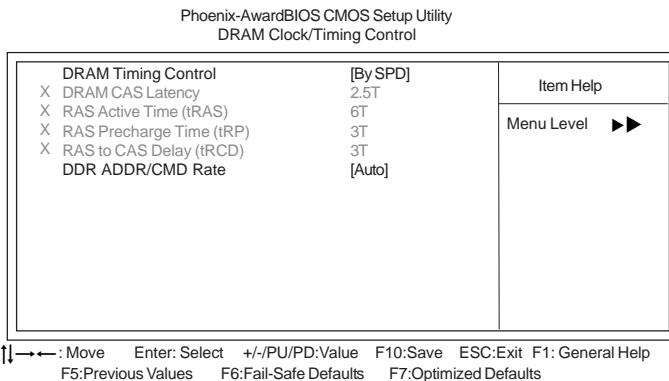
Phoenix-AwardBIOS CMOS Setup Utility  
Advanced Chipset Features



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

## ►DRAM Clock/Timing Control

Scroll to this item and press <Enter> to view the following screen:



### DRAM Timing Control (By SPD)

Enables you to select the CAS latency time in HCLKs of 2, 2.5, or 3. The value is set at the factory depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

- **DRAM CAS Latency (2.5T):** This item controls the timing delay (in clock cycles) before the DRAM starts a read command after receiving it.
- **RAS Active Time (tRAS) (6T):** This item allows you to set the amount of time a RAS can be kept open for multiple accesses. High figures will improve performance.
- **RAS Precharge Time (tRP) (3T):** This is the duration of the time interval during which the Row Address Strobe signal to a DRAM is held low during normal Read and Write Cycles. This is the minimum interval between completing one read or write and starting another from the same (non-page mode) DRAM. Techniques such as memory interleaving, or use of Page Mode DRAM are often used to avoid this delay. Some chipsets require this parameter in order to set up the memory configuration properly. The RAS Precharge value is typically about the same as the RAM Access (data read/write) time.
- **RAS to CAS Delay (tRCD) (3T):** This is the amount of time a CAS is performed after a RAS. This lower the better, but some DRAM does not support low figures.

### DRAM ADDR/CMD Rate (Auto)

This option allows you to set the lead off DRAM read and write cycles. When set to Delay 1T, memory read/write commands are sent one clock cycle behind the memory address. When set to Normal, read/write and memory address commands are sent simultaneously.

Press <Esc> to return to the Advanced Chipset Features page.

## ▶AGP & P2P Bridge Control (Press Enter)

Scroll to this item and press <Enter> to view the following screen:

Phoenix-AwardBIOS CMOS Setup Utility  
AGP & P2P Bridge Control

AGP Aperture Size [128M] Graphic Window (CACHE WC) [Enabled]	Item Help Menu Level ▶▶
---	----------------------------

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

### **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.

### **Graphic Window (CACHE WC) (Enabled)**

This item determines whether the graphic windows base address is valid or not.

Press <Esc> to return to the Advanced Chipset Features screen.

### **System BIOS Cacheable (Disabled)**

When this item is enabled, the System BIOS will be cached for faster execution.

### **Video RAM Cacheable (Disabled)**

When this is enabled, the Video RAM will be cached resulting to better performance. However, if any program was written to this memory area, this may result to system error.

### ***Integrated Peripherals***

These options display items that define the operation of peripheral components on the system's input/output ports.

Phoenix-AwardBIOS CMOS Setup Utility  
Integrated Peripherals

<ul style="list-style-type: none"> <li>▶ SIS OnChip IDE Device [Press Enter]</li> <li>▶ SIS OnChip PCI Device [Press Enter]</li> <li>▶ Onboard SuperIO Device [Press Enter]</li> <li>IDE HDD Block Mode [Enabled]</li> <li>Init Display First [PCI Slot]</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Item Help</td></tr> <tr><td style="padding: 2px;">Menu Level ▶</td></tr> </table>	Item Help	Menu Level ▶
Item Help			
Menu Level ▶			

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

### **▶SIS OnChip IDE Device**

Scroll to this item and press <Enter> to view the following screen:

Phoenix-AwardBIOS CMOS Setup Utility  
SIS OnChip IDE Device

<ul style="list-style-type: none"> <li>Internal PCI/IDE [Both]</li> <li>IDE Primary Master PIO [Auto]</li> <li>IDE Primary Slave PIO [Auto]</li> <li>IDE Secondary Master PIO [Auto]</li> <li>IDE Secondary Slave PIO [Auto]</li> <li>Primary Master UltraDMA [Auto]</li> <li>Primary Slave UltraDMA [Auto]</li> <li>Secondary Master UltraDMA [Auto]</li> <li>Secondary Slave UltraDMA [Auto]</li> <li>IDE DMA transfer access [Enabled]</li> <li>IDE Burst Mode [Enabled]</li> </ul>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Item Help</td></tr> <tr><td style="padding: 2px;">Menu Level ▶▶</td></tr> </table>	Item Help	Menu Level ▶▶
Item Help			
Menu Level ▶▶			

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

### **Internal PCI/IDE (Both)**

Use these items to enable or disable the internal PCI IDE channels that are integrated on the motherboard.

### **IDE Primary/Secondary Master/Slave PIO (Auto)**

Each IDE channel supports a master device and a slave device. These four items let you assign the kind of PIO (Programmed Input/Output) was used by the IDE devices. Choose Auto to let the system auto detect which PIO mode is best, or select a PIO mode from 0-4.

### **IDE Primary/Secondary Master/Slave UltraDMA (Auto)**

Each IDE channel supports a master device and a slave device. This mainboard supports UltraDMA technology, which provides faster access to IDE devices.

If you install a device that supports UltraDMA, change the appropriate item on this list to Auto. You may have to install the UltraDMA driver supplied with this mainboard in order to use an UltraDMA device.

**IDE DMA transfer access (Enabled)**

This item allows you to enabled the transfer access of the IDE DMA then burst onto the PCI bus and nonburstable transactions do not.

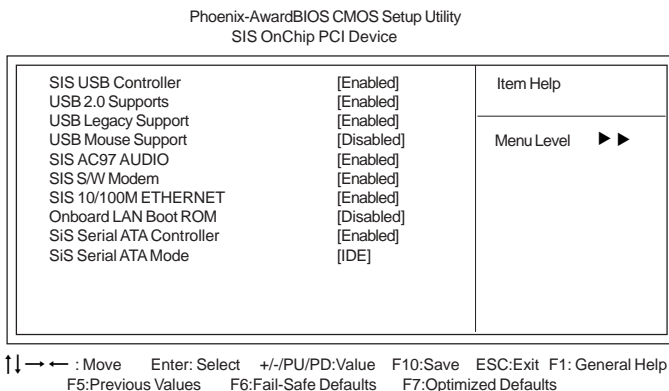
**IDE Burst Mode (Enabled)**

This option, when enabled will instruct the system to send every write transaction to the write buffer. Burstable transactions then burst onto the PCI bus and nonburstable transactions do not.

Press <Esc> to return to the Integrated Peripherals screen.

**►SIS OnChip PCI Device**

Scroll to this item and press <Enter> to view the following screen:

**SIS USB Controller (Enabled)**

This item enables the USB controller. Leave this at the default “Enabled” if you want to connect USB devices to your computer.

**USB 2.0 Support (Enabled)**

Enable this item if want to use the USB 2.0.

**USB Legacy Support (Enabled)**

This item allows the BIOS to interact with a USB keyboard or mouse to work with MS-DOS based utilities and non-Windows modes.

**USB Mouse Support (Disabled)**

Enable this item if you plan to use a mouse connected through the USB port in a legacy operating system (such as DOS) that does not support Plug and Play.

**SIS AC97 AUDIO (Enabled)**

This option allows you to control the onboard AC97 audio. Disable this item if you are going to install a PCI audio add-on card.

**SIS S/W Modem (Enabled)**

This option allows you to control the onboard S/W modem. Disable this item if you are going to install an external modem.



**SIS 10/100M ETHERNET (Enabled)**

This option allows you to control the onboard LAN.

**Onboard LAN Boot ROM (Disabled)**

Use this item to enable and disable the booting from the onboard LAN or a network add-in card with a remote boot ROM installed.

**SiS Serial ATA Controller (Enabled)**

This item allows you to control the SiS Serial ATA controller.

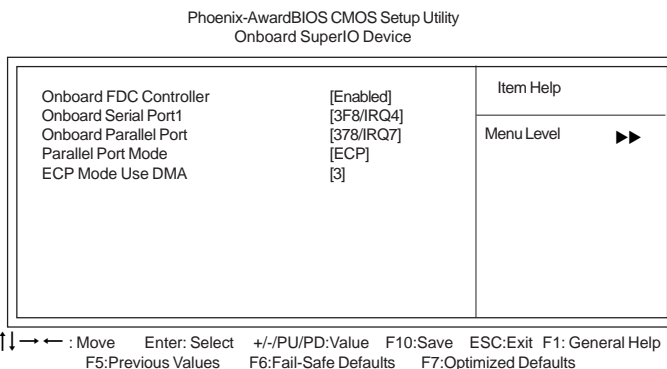
**SiS Serial ATA Mode (IDE)**

This item allows you to change SiS Serial ATA mode.

Press <Esc> to return to the Integrated Peripherals screen.

**►Onboard SuperIO Device**

Scroll to this item and press <Enter> to view the following screen:

**Onboard FDC Controller (Enabled)**

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

**Onboard Serial Port1 (3F8/IRQ4)**

This option is used to assign the I/O address and interrupt request (IRQ) for onboard serial port1 (COM1).

**Onboard Parallel Port (378/IRQ7)**

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

**Parallel Port Mode (ECP)**

Enables you to set the data transfer protocol for your parallel port. There are four options: SPP (Standard Parallel Port), EPP (Enhanced Parallel Port), ECP (Extended Capabilities Port), and ECP+EPP.

SPP allows data output only. Extended Capabilities Port (ECP) and Enhanced Parallel Port (EPP) are bi-directional modes, allowing both data input and output. ECP and EPP modes are only supported with EPP- and ECP-aware peripherals.

**ECP Mode Use DMA (3)**

When the onboard parallel port is set to ECP mode, the parallel port can use DMA3 or DMA1.

Press <Esc> to return to the Integrated Peripherals screen.

**IDE HDD Block Mode (Enabled)**

Enable this field if your IDE hard drive supports block mode. Block mode enables BIOS to automatically detect the optimal number of block read and writes per sector that the drive can support. It also improves the speed of access to IDE devices.

**Init Display First (PCI Slot)**

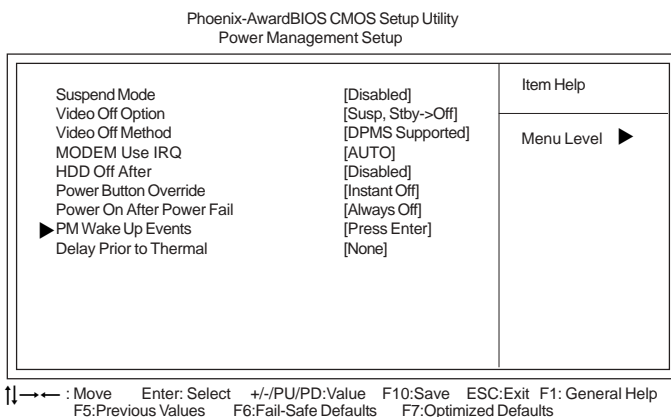
Use this item to specify whether your graphics adapter is installed in one of the PCI slots or is integrated on the motherboard.

## Power Management Setup

This option lets you control system power management. The system has various power-saving modes including powering down the hard disk, turning off the video, suspending to RAM, and software power down that allows the system to be automatically resumed by certain events.

The power-saving modes can be controlled by timeouts. If the system is inactive for a time, the timeouts begin counting. If the inactivity continues so that the timeout period elapses, the system enters a power-saving mode. If any item in the list of Reload Global Timer Events is Enabled, then any activity on that item will reset the timeout counters to zero.

If the system is suspended or has been powered down by software, it can be resumed by a wake up call that is generated by incoming traffic to a modem, a LAN card, a PCI card, or a fixed alarm on the system realtime clock



### Suspend Mode (Disabled)

The CPU clock will be stopped and the video signal will be suspended if no Power Management events occur for a specified length of time. Full power function will return when a Power Management event is detected. Options are from 1 Min to 1 Hour and Disable.

### Video Off Option (Susp, Stby-.Off)

This option defines if the video is powered down when the system is put into suspend mode.

### Video Off Method (DPMS Supported)

This item defines how the video is powered down to save power. This item is set to DPMS (Display Power Management Software) by default.

### MODEM Use IRQ (AUTO)

If you want an incoming call on a modem to automatically resume the system from a power-saving mode, use this item to specify the interrupt request line (IRQ) that is used by the modem. You might have to connect the fax/modem to the motherboard Wake On Modem connector for this feature to work.

## HDD Off After (Disabled)

The IDE hard drive will spin down if it is not accessed within a specified length of time. Options are from 1 Min to 15 Min and Disable.

## Power Button Override (Instant Off)

Under ACPI (Advanced Configuration and Power management Interface) you can create a software power down. In a software power down, the system can be resumed by Wake Up Alarms. This item lets you install a software power down that is controlled by the power button on your system. If the item is set to Instant-Off, then the power button causes a software power down. If the item is set to Delay 4 Sec. then you have to hold the power button down for four seconds to cause a software power down.

## Power On After Power Fail (Always Off)

This item enables your computer to automatically restart to its last operating status after power returns from a power failure.

## ► PMWake Up Events

Scroll to this item and press <Enter> to view the following screen:

Phoenix-AwardBIOS CMOS Setup Utility  
PM Wake Up Events

IRQ [3-7, 9-15], NMI	[Enabled]	Item Help
X IRQ 8 Break Suspend	[Disabled]	
X Resume By RING	[Disabled]	
X Resume By MACPME	[Enabled]	Menu Level ►►
Resume By PCIPME	[Enabled]	
USB Port WakeUp from S3	[Disabled]	
PS2KB Wakeup from S3	[Hot Key]	
PS2MS Wakeup from S3	[Disabled]	
Power Up by Alarm	[Disabled]	
Month Alarm	NA	
Day of Month Alarm	0	
Time (hh:mm:ss) Alarm	0 : 0 : 0	
** Reload Global Timer Events **		
Primary IDE	[Disabled]	
Secondary IDE	[Disabled]	
FDD, COM, LPT Port	[Disabled]	
PCI PIRQ [A-D]	[Disabled]	

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

This item opens a submenu that enables you to set events that will resume the system from a power saving mode.

### **IRQ [3-7, 9-15], NMI (Enabled)**

This option determines whether any activity for IRQ 3-7/9-15 will cause the system to wake from a power saving mode.

- **IRQ 8 Break Suspend (Disabled):** Determines whether the system will monitor IRQ 8 activity and wake the system from a power saving mode when IRQ 8 is activated.
- **Resume by RING (Disabled):** An input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft off state.

- **Resume by MACPME (Enabled):** Use this item to enable MAC activity to wakeup the system from a power saving mode.

**Resume by PCI PME (Enabled)**

This item specifies whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.

**USB Port Wakeup from S3 (Disabled)**

This option allows you to specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.

**PS2KB Wakeup from S3 (Hot Key)**

This option allows you to set hot key combination to turn on the system by keyboard.

**PS2MS Wakeup from S3 (Disabled)**

This option allows you to set the mouse action to turn on the system.

**Power Up by Alarm (Disabled)**

When set to Enabled, the following three fields become available: Month Alarm, Day of Month Alarm, and Time Alarm Upon arrival of the alarm time, it will instruct the system to wake up.

When set to 0 (zero) for the day of the month, the alarm will power on your system every day at the specified time.

**\*\* Reload Global Timer Events \*\***

These fields determine which events waken the system from power saving mode.

**Primary/Secondary IDE (Disabled)**

When this item is enabled, the system power will resume the system from a power saving mode if there is any activity on primary or secondary IDE channels 0 or 1.

**FDD, COM, LPT Port (Disabled)**

When this item is enabled, the system will restart the power-saving timeout counters when any activity is detected on the floppy disk drive, serial ports, or the parallel port.

**PCI PIRQ[A-D] (Disabled)**

When this item is enabled, any activity from one of the listed devices wakes up the system.

Press <Esc> to return to the Power Management Setup screen.

**Delay Prior to Thermal ( None)**

Enables you to set the delay time before the CPU enters auto thermal mode.

## PNP/PCI Configurations

These options configure how PnP (Plug and Play) and PCI expansion cards operate in your system. Both the ISA and PCI buses on the motherboard use system IRQs (Interrupt ReQuests) and DMAs (Direct Memory Access). You must set up the IRQ and DMA assignments correctly through the PnP/PCI Configurations Setup utility for the motherboard to work properly. Selecting PnP/PCI Configurations on the main program screen displays this menu:

Phoenix-AwardBIOS CMOS Setup Utility  
PnP/PCI Configurations

		Item Help
Reset Configuration Data	[Disabled]	
Resources Controlled by	[Auto (ESCD)]	
x IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
INT Pin 1 Assignment	[Auto]	Menu Level ► Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot
INT Pin 2 Assignment	[Auto]	
INT Pin 3 Assignment	[Auto]	
INT Pin 4 Assignment	[Auto]	
INT Pin 5 Assignment	[Auto]	
INT Pin 6 Assignment	[Auto]	
INT Pin 7 Assignment	[Auto]	
INT Pin 8 Assignment	[Auto]	

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

### Reset Configuration Data (Disabled)

If you enable this item and restart the system, any Plug and Play configuration data stored in the BIOS Setup is cleared from memory.

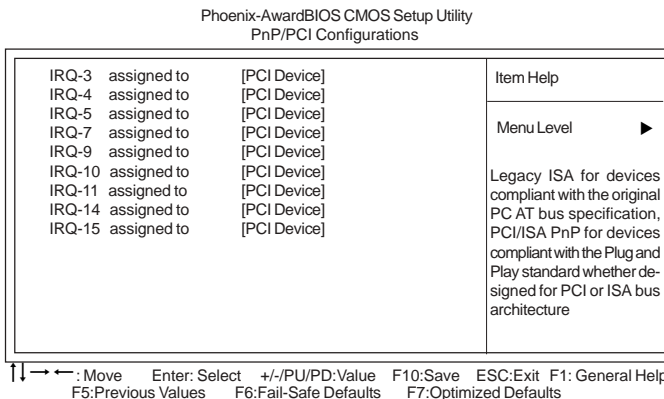
### Resources Controlled By (Auto(ESCD))

You should leave this item at the default Auto(ESCD). Under this setting, the system dynamically allocates resources to Plug and Play devices as they are required.

If you cannot get a legacy ISA (Industry Standard Architecture) expansion card to work properly, you might be able to solve the problem by changing this item to Manual, and then opening up the IRQ Resources submenu.

## ► IRQ Resources

The submenu allows you to individually assign an interrupt type for interrupts IRQ-3 to IRQ-15.



In the IRQ Resources submenu, if you assign an IRQ to Legacy ISA, then that Interrupt Request Line is reserved for a legacy ISA expansion card. Press <Esc> to close the IRQ Resources submenu.

In the Memory Resources submenu, use the first item Reserved Memory Base to set the start address of the memory you want to reserve for the ISA expansion card. Use the section item Reserved Memory Length to set the amount of reserved memory. Press <Esc> to close the Memory Resources submenu.

### PCI/VGA Palette Snoop (Disabled)

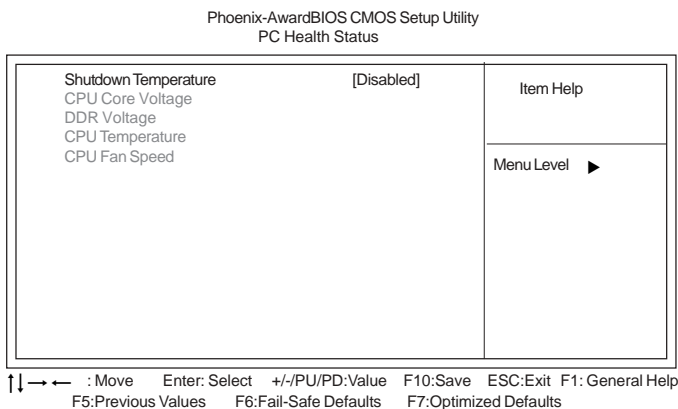
This item is designed to overcome problems that can be caused by some non-standard VGA cards. This board includes a built-in VGA system that does not require palette snooping so you must leave this item disabled.

### INT Pin 1-8 Assignment (Auto)

Identifies the interrupt request (IRQ) line assigned to a device connected to the PCI interface of your system.

## PC Health Status

On motherboards that support hardware monitoring, this item lets you monitor the parameters for critical voltages, critical temperatures, and fan speeds.



### Shutdown Temperature (Disabled)

Enables you to set the maximum temperature the system can reach before powering down.

### System Component Characteristics

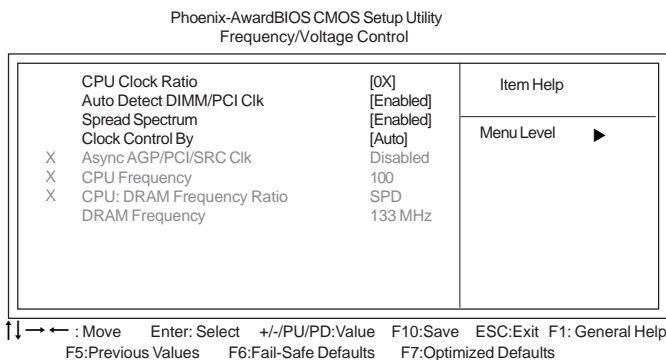
These items allow end users and technicians to monitor data provided by the BIOS on this motherboard. You cannot make changes to these fields.

- CPU Core Voltage
- DDR Voltage
- CPU Temperature
- CPU Fan Speed



## Frequency/Voltage Control

This item enables you to set the clock speed and system bus for your system. The clock speed and system bus are determined by the kind of processor you have installed in your system.



### CPU Clock Ratio (0X)

Enables you to set the CPU clock. The CPU clock ratio times the CPU Host/PCI Clock should equal the core speed of the installed processor. (For unlock Ratio CPU only.)

**Example:**

<b>CPU Clock Ratio</b>	<b>8</b>
<b>CPU Frequency</b>	<b>X100</b>
<b>Installed CPU Clock Speed</b>	<b>800 MHz</b>

### Auto Detect DIMM/PCI Clk (Enabled)

When this item is enabled, BIOS will disable the clock signal of free DIMM and PCI slots.

### Spread Spectrum (Enabled)

If you enable spread spectrum, it can significantly reduce the EMI (Electro-Magnetic Interference) generated by the system.

### Clock Control By (Auto)

You can select auto or manual to set the system-operating clock by type and speed of your CPU and DDR.

- **Async AGP/PCI/SATA Clk** :This item allows you to select the fixed clock to generate the output to AGP/PCI/SATA frequency.
- **CPU Frequency**: This item allows you to set the CPU frequency.
- **CPU: DRAM Frequency Ratio**: This item controls the ratio of the CPU FSB clock and DRAM Frequency to enable the CPU and DRAM to run at different frequency combination.

### DRAM Frequency (133MHz)

This item displays the memory (DRAM) frequency. This is a display-only item.

### ***Load Fail-Safe Defaults Option***

This option opens a dialog box that lets you install fail-safe defaults for all appropriate items in the Setup Utility:

Press <Y> and then <Enter> to install the defaults. Press <N> and then <Enter> to not install the defaults. The fail-safe defaults place no great demands on the system and are generally stable. If your system is not functioning correctly, try installing the fail-safe defaults as a first step in getting your system working properly again. If you only want to install fail-safe defaults for a specific option, select and display that option, and then press <F6>.

### ***Load Optimized Defaults Option***

This option opens a dialog box that lets you install optimized defaults for all appropriate items in the Setup Utility. Press <Y> and then <Enter> to install the defaults. Press <N> and then <Enter> to not install the defaults. The optimized defaults place demands on the system that may be greater than the performance level of the components, such as the CPU and the memory. You can cause fatal errors or instability if you install the optimized defaults when your hardware does not support them. If you only want to install setup defaults for a specific option, select and display that option, and then press <F7>.

### ***Set Password***

When this function is selected, the following message appears at the center of the screen to assist you in creating a password.

#### **ENTER PASSWORD**

Type the password, up to eight characters, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection.

To disable password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is disabled, the system will boot and you can enter BIOS Setup freely.

#### **PASSWORD DISABLED**

If you have selected “System” in “Security Option” of “BIOS Features Setup” menu, you will be prompted for the password every time the system reboots or any time you try to enter BIOS Setup.

If you have selected “Setup” at “Security Option” from “BIOS Features Setup” menu, you will be prompted for the password only when you enter BIOS Setup.

Supervisor Password has higher priority than User Password. You can use Supervisor Password when booting the system or entering BIOS Setup to modify all settings. Also you can use User Password when booting the system or entering BIOS Setup but can not modify any setting if Supervisor Password is enabled.

### ***Save & Exit Setup Option***

Highlight this item and press <Enter> to save the changes that you have made in the Setup Utility and exit the Setup Utility. When the Save and Exit dialog box appears, press <Y> to save and exit, or press <N> to return to the main menu:

### ***Exit Without Saving***

Highlight this item and press <Enter> to discard any changes that you have made in the Setup Utility and exit the Setup Utility. When the Exit Without Saving dialog box appears, press <Y> to discard changes and exit, or press <N> to return to the main menu.



*If you have made settings that you do not want to save, use the “Exit Without Saving” item and press <Y> to discard any changes you have made.*

This concludes Chapter 3. Refer to the next chapter for information on the software supplied with the motherboard.

*Memo*

## Chapter 4

### *Using the Motherboard Software*

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#### **About the Software CD-ROM**

The support software CD-ROM that is included in the motherboard package contains all the drivers and utility programs needed to properly run the bundled products. Below you can find a brief description of each software program, and the location for your motherboard version. More information on some programs is available in a README file, located in the same directory as the software.



*Never try to install all software from folder that is not specified for use with your motherboard.*

Before installing any software, always inspect the folder for files named README.TXT, INSTALL.TXT, or something similar. These files may contain important information that is not included in this manual.

#### **Auto-installing under Windows 98/ME/2000/XP**

The Auto-install CD-ROM makes it easy for you to install the drivers and software for your motherboard.



*If the Auto-install CD-ROM does not work on your system, you can still install drivers through the file manager for your OS (for example, Windows Explorer). Refer to the Utility Folder Installation Notes later in this chapter.*

The support software CD-ROM disc loads automatically under Windows 98/ME/2000/XP. When you insert the CD-ROM disc in the CD-ROM drive, the autorun feature will automatically bring up the install screen. The screen has three buttons on it, Setup, Browse CD and Exit.



*If the opening screen does not appear; double-click the file "setup.exe" in the root directory.*

## Setup Tab

<b>Setup</b>	Click the <b>Setup</b> button to run the software installation program. Select from the menu which software you want to install.
<b>Browse CD</b>	<p>The <b>Browse CD</b> button is the standard Windows command that allows you to open Windows Explorer and show the contents of the support CD.</p> <p>Before installing the software from Windows Explorer, look for a file named README.TXT, INSTALL.TXT or something similar. This file may contain important information to help you install the software correctly.</p> <p>Some software is installed in separate folders for different operating systems, such as DOS, WIN NT, or WIN98/95. Always go to the correct folder for the kind of OS you are using.</p> <p>In install the software, execute a file named SETUP.EXE or INSTALL.EXE by double-clicking the file and then following the instructions on the screen.</p>
<b>Exit</b>	The <b>EXIT</b> button closes the Auto Setup window.

## Application Tab

Lists the software utilities that are available on the CD.

## Read Me Tab

Displays the path for all software and drivers available on the CD.

## Running Setup

Follow these instructions to install device drivers and software for the motherboard:

1. Click **Setup**. The installation program begins:

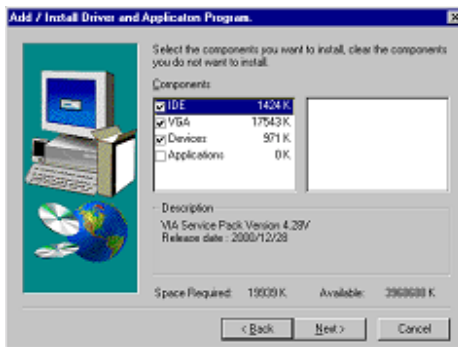


The following screens are examples only. The screens and driver lists will be different according to the motherboard you are installing.

The motherboard identification is located in the upper left-hand corner.

## Using the Motherboard Software

2. Click **Next**. The following screen appears:



3. Check the box next to the items you want to install. The default options are recommended.
4. Click **Next** run the Installation Wizard. An item installation screen appears:



5. Follow the instructions on the screen to install the items.

Drivers and software are automatically installed in sequence. Follow the onscreen instructions, confirm commands and allow the computer to restart a few times to complete the installation.

## Manual Installation

Insert the CD in the CD-ROM drive and locate the PATH.DOC file in the root directory. This file contains the information needed to locate the drivers for your motherboard.

Look for the chipset and motherboard model; then browse to the directory and path to begin installing the drivers. Most drivers have a setup program (SETUP.EXE) that automatically detects your operating system before installation. Other drivers have the setup program located in the operating system subfolder.

If the driver you want to install does not have a setup program, browse to the operating system subfolder and locate the readme text file (README.TXT or README.DOC) for information on installing the driver or software for your operating system.

## Utility Software Reference

All the utility software available from this page is Windows compliant. They are provided only for the convenience of the customer. The following software is furnished under license and may only be used or copied in accordance with the terms of the license.



*These software(s) are subject to change at anytime without prior notice. Please refer to the support CD for available software.*

### **AWARD Flash Memory Utility**

*This utility lets you erase the system BIOS stored on a Flash Memory chip on the motherboard, and lets you copy an updated version of the BIOS to the chip. Proceed with caution when using this program. If you erase the current BIOS and fail to write a new BIOS, or write a new BIOS that is incorrect, your system will malfunction. Refer to Chapter 3, Using BIOS for more information.*

### **WinFlash Utility**

The Award WinFlash utility is a Windows version of the DOS Award BIOS flash writer utility. The utility enables you to flash the system BIOS stored on a Flash Memory chip on the motherboard while in a Windows environment. This utility is currently available for WINXP\ME\2000\98SE. To install the WinFlash utility, run WINFLASH.EXE from the following directory: \UTILITY\WINFLASH 1.51

### **PC-CILLIN 2002**

The PC-CILLIN 2002 software program provides anti-virus protection for your system. This program is available for Windows 2000/ME/98SE/XP and Windows NT. Be sure to check the readme.txt and install the appropriate anti-virus software for your operating system.

We strongly recommend users to install this free anti-virus software to help protect your system against viruses.

This concludes Chapter 4.



## Chapter 5

### *SiS 964 SATA RAID Setup Guide*

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#### **Introduction for SiS964 SATA RAID Function**

The 964 S-ATA controller only support two serial ATA on two independent ports. The Serial ATA RAID is designed to provide a cost-effective, high performance RAID solution that adds performance and/or reliability to PC desktops and/or servers using Serial ATA/150 hard disks.

Serial ATA RAID function supports striping (RAID 0), mirroring (RAID 1), and span (JBOD). Please note that the function supports hard disk drives only and the 964 S-ATA controller don't support Striping + mirroring (Raid 0+1).

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

Serial ATA RAID striped arrays can double the sustained data transfer rate of Serial ATA/150. Serial ATA RAID fully supports Serial ATA/150 specification of up to 150MB/sec per drive, depending on individual drive specifications.

#### **Features**

- The SiS 964 controller only support two Serial ATA (Serial ATA RAID) drivers.
- Support RAID function: RAID 0, RAID 1, JBOD.
- Support bootable disk.
- Windows-based RAID Utility software tool (only support Windows XP and 2000).
- BIOS Utility.

#### **Support Operating Systems**

Support Microsoft Windows 98/98SE/ME/2000 Professional and Server/XP.

#### **What is RAID?**

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

- 1 **RAID:** (Redundant Array of Independent Disk Drives) use jointly several hard drives to increase data transfer rates and data security. It depends on the number of drives present and RAID function you select to fulfill the security or performance purposes or both.
- 2 **RAID 0:** Also known as "Striping". All of the data are distributed evenly to all of the existing drives. You gain benefits on performance because the data transfer rate is multiplied by the number of drives. However, RAID 0 has high risks of data security. All of the stored data will be lost if even any one drive in the RAID set crashes.
- 3 **RAID 1:** Also known as "Mirroring". Two hard drives are required. The goal of RAID 0 is to ensure data security. Data is written to two or more drives synchronously. That is, 100% duplication of data from one drive to another.

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

## Installing Software Drivers

SiS provides RAID driver for SiS 964 SATA with RAID function.

- 1 For RAID function, SiS 964 support RAID0, RAID1 and JBOD by software RAID driver only.
- 2 Support the function of installing windows to RAID array.

### *New Windows 2000/XP Installation*

- 1 Start the installation:  
Boot from the CD-ROM. Press F6 when the message “Press **F6** key if you need to install third party SCSI or RAID driver” appears.
- 2 When the Windows 2000/XP Setup window is generated, press **S** key to specify an Additional Device(s).
- 3 Insert the driver diskette into drive A: and press Enter.
- 4 Choose one of the following items:  
**“WinXP SiS Raid/IDE Controller”,**  
**“Win2000 SiS Raid/IDE Controller”,**  
that appears on screen, and then press the Enter key.
- 5 Press Enter to continue with installation or if you need to specify any additional devices to be installed, do so at this time. Once all devices are specified, Press Enter to continue with installation.
- 6 From the Windows 2000/XP Setup screen, press the Enter key. Setup will now load all device files and then continue the Windows 2000/XP installation.
- 7 Please install the driver package again (ex. SiS RAID driver v1.00) while the operation system has been setup.



*If you would like to install windows to any RAID set, you should create RAID from BIOS utility or SiS 964 RAID Utility first and then follow the steps above.*

### *Existing Windows 2000/XP/98/Me Installation*

- 1 Install the driver by executing SiS driver setup utility.
- 2 The drivers will be automatically installed.

### *Confirming Windows 2000/XP Driver Installation*

- 1 From Windows 2000/XP, open the Control Panel from “My Computer” followed by the System icon.
- 2 Choose the “Hardware” tab, then click the “Device Manager” tab.
- 3 Click the “+” in front of “SCSI and RAID Controllers” hardware type. The driver **“SiS 180 Raid Controller”** should appear.

## Confirming Windows 98/Me Driver Installation

- 1 From Windows 98/Me, open the Control Panel from “My Computer” followed by the System icon.
- 2 Choose the “Device Manager” tab.
- 3 Click the “+” in front of “IDE ATA/ATAPI Controllers” hardware type. The driver “**SiS 180 IDE Dual Channel**” and “**SiS 180 IDE/RAID Controller**” should appear.

## BIOS Utility Operation

BIOS Utility supports windows 2000/XP/98/Me.

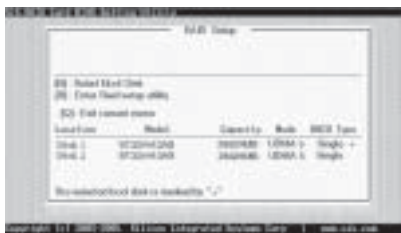
### Starting BIOS Utility

- 1 Boot your system. If this is the first time you have booted with the SiS 964 and the drives installed, the BIOS will display the following:

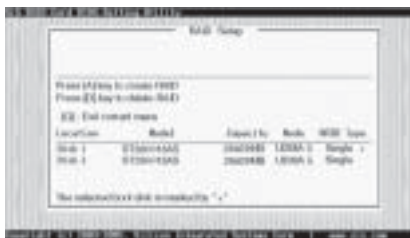
Silicon Integrated Systems Corp. RAID BIOS Setting Utility v0.XX  
(c) 2003-2005 Silicon Integrated Systems Corp. All Rights Reserved.

Press <Ctrl.<S> to run BIOS Setting Utility

- 2 Press <Ctrl-S> keys to display the SiS 964 Utility Main Menu.



- 3 You can press <B> key to select the boot disk on the 964 controller. The yellow highlight will show on the disk and you can switch it to select the disk you wanted. Press “Enter” key to select it and the selected boot device will be marked by “\*”. The default boot device will be set as **Disk 1**.
- 4 Press <R> to display the RAID setup menu below. This is the fastest and easiest method to creating your first array.

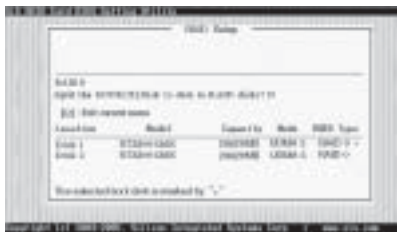




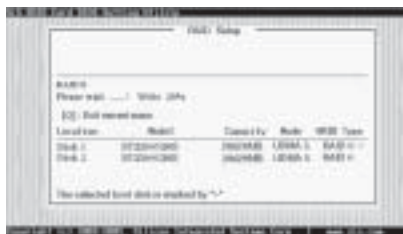
- 5 Use <↑ > <↓ > to select disk, and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from Single to RAID 0. An the disk you select first will be the SOURCE disk.



- 6 Next, you will see a message “Split the SOURCE(DISK x) data to RAID disks?”. Press <N> and <Enter> to create RAID 0 array only or press <Y> and <Enter> to split the data from source disk to other disks.



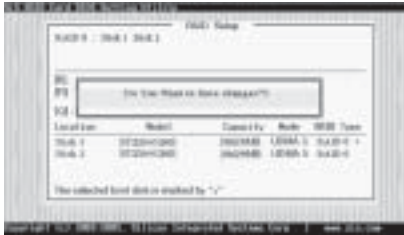
- 7 Starting splitting action, the following frame will be shown.



- 8 After all steps finished, press ,<Q> until escape the setup menu and RAID 0 array will be show on the top of the main frame.



- 9 Press <Q> again to exit this BIOS utility and the red message frame will show. Press <Y> and <Enter> to save changes.
- 10 Once the array has been created, you will need to FDISK and format the array as if it were a new single hard drive.



### Creating a RAID 1 (Mirror) Array



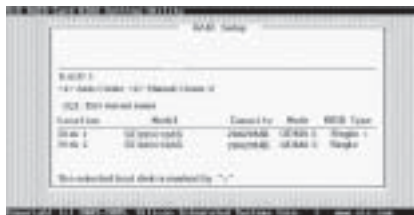
SIS 964/180 enables users to create Mirror arrays with 2 drives only.

To create a Mirror array, follow these steps:

- 1 Press <A> to start creating a RAID array.
- 2 Press <3> and <Enter> to select Mirror.



- 3 You will have two selections to create a RAID 1 array. **The default value is <1>.** If you select <1>**Auto Create**, you can create a RAID 1 array faster and easier. The result after creating will be show on **step 7**. Besides, you also can select <2>**Manual Create**, see following steps.



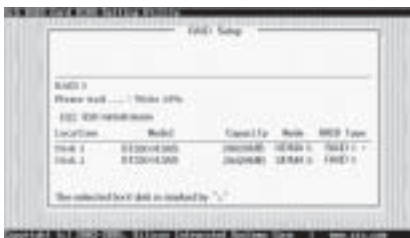
- 4 Use <↑> <↓> to select disk, and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from **Single** to **RAID 1**. The same as RAID 0, the disk you select first will be the SOURCE disk.



- 5 Next, you will see a message “Duplicate the SOURCE (DISK x) data to RAID disks?”. Press <N> and <Enter> to create RAID 1 array only or press <Y> and <Enter> to duplicate the data from source disk to mirror disk.



- 6 Starting duplicating action, the following frame will be showing.



- 7 After all steps finished, press <Q> until escape the setup menu and RAID 1 array will be show on the top of the main frame.



- 8 Press <Q> again to exit this BIOS utility and the red message frame will show as the same as the creation of the RAID 0 array. Press <Y> and <Enter> to save changes.
- 9 Once the array has been created, you will need to FDISK and format the array as if it were a new single hard drive.

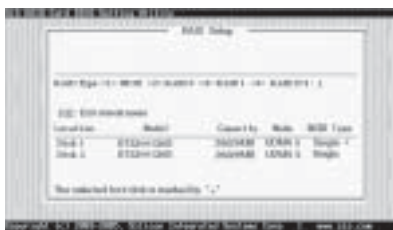
### Creating a JBOD Array



- 1 SIS 180 enables users to create JBOD arrays with 2,3, or 4 drives.
- 2 SIS 964 only supports 2 SATA drivers to create a JBOD arrays.

To create an JBOD array, follow these steps:

- 1 Press <A> to start creating a RAID array.
- 2 Press <1> and <Enter> to select JBOD.
- 3 You will have two selections to create a JBOD array. **The default value is <1>.** If you select <1>**Auto Create**, you can create a JBOD array faster and easier. The result after creating will be show on **step 5**. Besides, you also can select <2>**Manual Create**, see following steps.



- 4 Use <↑> <↓> to select disk, and press <Enter> to select disk, <Q> to exit. When you press <Enter> on the disk you wanted, the RAID Type will be changed from **Single** to **JBOD**.



- 5 After all steps finished, press <Q> until escape the setup menu and JBOD array will be show on the top of the main frame.





- 6 Press <Q> again to exit this BIOS utility and the red message frame will show as the same age as the creation of the RAID 0 array. Press <Y> and <Enter> to save changes.
- 7 Once the array has been created, you will need to FDISK and format the array as if it were a new single hard drive.

This concludes Chapter 5.