939GT4-SLI-D
939GT4-SLI-G / 939GT4-SLI -P
939GT4-Ultra-G / 939GT4-STD-G

USER'S MANUAL

M/B For Socket 939 64-bit & Dual Core Ready AMD Athlon64FX Processor

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TABLE OF CONTENT

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Manual Revision Information

Reversion	Revision History	Date
4.0	Forth Edition	June 2005

Item Checklist

- ☑ 939GT4-SLI-D/ 939GT4-SLI-G/ 939GT4-Ultra-G / 939GT4-STD-G motherboard
- ☑ Cable for IDE/Floppy
- ☑ CD for motherboard utilities
- ☑ SLI Supported Bridge
- ☑ Cable for Serial ATA IDE Port
  SPDIF-IN/SPDIF-OUT Adaptor
- ☑ 939GT4-SLI-D/ 939GT4-SLI-G/ 939GT4-Ultra-G / 939GT4-STD-G User's Manual

AMD K8 Processor Family
Cooling Solutions

As processor technology pushes to faster speeds and higher performance with increasing operation clock, thermal management becomes increasingly crucial while building computer systems. Maintaining the proper computing environment without thermal increasing is the key to reliable, stable, and 24 hours system operation. The overall goal is keeping the processor below its specified maximum case temperature. Heatsinks induce improved processor heat dissipation through increasing surface area and concentrated airflow from attached active cooling fans. In addition, interface materials allow effective transfers of heat from the processor to the heatsink. For optimum heat transfer, AMD recommends the use of thermal grease and mounting clips to attach the heatsink to the processor.

Please refer to the website below for collection of heatsinks evaluated and recommended for Socket-939 processors by AMD. In addition, this collection is not intended to be a comprehensive listing of all heatsinks that support Socket-939 processors.

For vendor list of heatsinks and Active cooling fans, please visit
http://www.amd.com/us-en/Processors/DevelopWithAMD/0,,30_2252_869_9460^9515,00.html

Chapter 1

Introduction of 939GT4 Motherboard Series

1-1 Features of motherboard

The 939GT4-SLI-D／939GT4-SLI-G／939GT4-SLI-P／939GT4-Ultra-G／939GT4-STD-G motherboard is based on NVIDIA nForce4-SLI, nForce4-Ultra, and nForce4 single chip technology which supports the innovative 64-bit AMD Athlon64 FX and dual core multi-tasking Athlon64 X2 processors with HyperTransport Technology. The 939GT4 SLI motherboard series deliver the leading-edge performance with both of the benefits from 64-bit multi-tasking dual core AMD processors and NVIDIA Scalable Link Interface Technology with the latest Dual PCI Express for NVIDIA Dual Graphic Processing Unit ready platform. Utilize the 64-bit multi-tasking socket 939 solution and the dual channel PC3200 DDR memory size expandable to 4.0GB, the 939 GT4 SLI motherboard series meet the demanding usage of computing in the future.

The motherboards carry the advanced dual GPU supported NVIDIA nForce4, nForce4-SLI, and nForce4-Ultra single chip with 1000 MHz HyperTransport system bus of data transferring and provided with 133MHz／166MHz／200MHz memory clock frequency for DDR266/DDR333/DDR400 DDR Module and Dual channel function. NVIDIA nForce4 single chipset offers ULTRA **ATA 133, Serial ATA RAID 0, 1, 0+1, and Serial ATA2 RAID0, 1, 0+1(Only for 939GT4-SLI and 939GT4-Ultra motherboard series)** functions to accelerate hard disk drives and guarantee the data security without failed in advanced computing performance.

The 939GT4 motherboard provides optional 10／100 LAN function with Realtek 8201CL LAN PHY or dual Gigabit LAN function by using the Marvell 88E8053 Giga-LAN controller or Marvell 88E1111 10 /100/1000 LAN PHY which supports 10M／100Mbps or 10M／100M／1Gbps data transfer rate. Embedded 8-channel AC'97 CODEC is fully compatible with Sound Blaster Pro® standards that offers you with the home cinema quality and absolutely software compatibility.

Colorful and Intuitional SLI placement design offers three PCI-Express x16 graphics slots (Two symmetrical PCI-Express x16 graphics slots in light green deliver up to 2Gbyte/sec data transfer rate at each relative direction which is fully compatible with the latest NVIDIA SLI Technology. One PCI-Express x16 graphics slot offers 4Gbyte/sec data transfer rate at each relative direction which get 3.5 times of bandwidth more than AGP8X and up to 8Gbyte/sec concurrent bandwidth at full speed.) to guarantee the fully operational multi-GPUs graphics power and avoid the possible SLI hardware installation error. One PCI Express x1 I/O slot offers 512Mbyte/sec concurrently, over 3.5 times more bandwidth than PCI at 133Mbye/sec, tackling the most demanding multimedia tasks nowadays.

Embedded USB controller as well as capability of expanding to 10 of USB2.0 functional ports delivering 480Mb/s bandwidth and rich connectivity, these motherboards meet the

future USB demands which are also equipped with hardware monitor function on system to monitor and protect your system and maintain your non-stop business computing.

Some special features---*CPU Thermal Throttling/ CPU Vcore 7-shift/ CPU Smart Fan/ Debug Port(Option)* in this motherboard are designed for power user to use the over-clocking function in more flexible ways. But please be caution that the over-clocking maybe cause the fails in system reliabilities. This motherboard provides the guaranteed performance and meets the demands of the next generation computing. But if you insist to gain more system performance with variety possibilities of the components you choose, please be careful and make sure to read the detailed descriptions of these value added product features, please get them in the coming section.

1-1.1   Special Features of motherboard

CPU Thermal Throttling Technology---(The CPU Overheat Protection Technology)
To prevent the increasing heat from damage of CPU or accidental shutdown while at high workload, the CPU Thermal Throttling Technology will force CPU to enter partially idle mode from 87.5% to 12.5% according to preset CPU operating temperature in BIOS (from 40 to 90   ). When the system senses the CPU operating temperature reaching the preset value, the CPU operating bandwidth will be decreased to the preset idle percentage to cool down the processor. When at throttling mode the beeper sound can be optionally selected to indicate it is in working. *(for detail operating please read Section 3-11 Bi-turbo Configuration)*

Debug Port (Option)--- (The Professional Hardware Diagnosis System)
Being bugged of abnormal system failure through the tossed and turned nights no more, the embedded Hardware Debug Port offers you the real-time visual system healthy for the demanding usage of computing. No more bugging by unknown system failure and no more time wasted in the first moment of 24-hour nonstop ping business computing, the embedded Debug Port will turn you into a well training hardware professional with the seeing system situation. (The Post Code please refer Appendix)

CPU Smart Fan---(The Noise Management System)
It's never been a good idea to gain the performance of your system by sacrificing its acoustics. CPU Smart Fan Noise Management System is the answer to control the noise level needed for now-a-day's high performance computing system. The system will automatically increase the fan speed when CPU operating loading is high, after the CPU is in normal operating condition, the system will low down the fan speed for the silent operating environment. The system can provide the much longer life cycle for both CPU and the system fans for game use and business requirements.

CPU Vcore 7-Shift--- (Shift to Higher Performance)
The CPU voltage can be adjusted up by 7 steps for the precisely over-clocking of extra demanding computing performance.

1-2 Specification

| Spec	Description
Design	* ATX form factor 4 layers PCB size: 30.5x24.4cm
Chipset	* NVIDIA nForce4, nForce4 SLI / Ultra Single Chip Technology
CPU Socket 939	* Support 64bit AMD Athlon64 939-Pin package utilizes Flip-Chip Pin Grid Array package processor * Support for future AMD Athlon64 939-pin Dual –Core processors up to 4800+ with HTT Frequency 1GHz
Memory Socket	* 184-pin DDR Module socket x 4 * Support 4pcs DDR266/DDR33/DDR400 DDR Modules Expandable to 4.0GB * Support Dual channel function
Expansion Slot	* PCI-Express x16 slot 3pcs deliver up to 8GB/s concurrent bandwidth in Non-SLI mode and 4GB/s concurrent bandwidth while SLI mode being activated * PCI-Express x1 slot 1pcs delivers up to 512MB/s concurrent bandwidth * 32-bit PCI slot x 3pcs
Integrate Serial ATA2 RAID	* Four Serial ATA2 ports provide 300 MB/sec data transfer rate with RAID 0, 1, 0+1 functions for 939GT4-SLI and 939GT4-Ultra motherboard series.
Integrate IDE and Serial ATA RAID	* Two PCI IDE controllers support PCI Bus Mastering, ATA PIO/DMA and the ULTRA DMA 33/66/100/133 functions that deliver the data transfer rate up to 133 MB/s; four Serial ATA ports provide 150 MB/sec data transfer rate with RAID 0, 1, 0+1 functions
Dual LAN **(only for 939GT4SLI –D)**	* Integrated Realtek8201CL PCI-10 /100 LAN PHY for 939GT4-SLI / -Ultra / -STD -P series and optional Marvel 88E1111 PCI-Express Gigabit LAN for 939 GT4-SLI / -Ultra / -STD-G series. * Supports Fast Ethernet LAN function provide 10Mb/100Mb / s or 10Mb/100Mb/ 1Gb /s data transfer rate
8CH-Audio	* AC'97 Digital Audio controller integrated * 8-channel AC'97 Audio CODEC on board * SPDIF-In/ SPDIF-Out Optical support (Module optional) * Audio driver and utility included
BIOS	* Award 4MB Flash ROM
Multi I/O	* PS/2 keyboard and PS/2 mouse connectors * Floppy disk drive connector x1 * Parallel port x1 * Serial port x2 * USB2.0 port x 4 and headers x 4 (connecting cable option) * Audio connector (Line-in, Line-out, MIC/ 8CH Audio)

1-3 Performance List

The following performance data list is the testing result of some popular benchmark testing programs. These data are just referred by users, and there is no responsibility for different testing data values gotten by users (the different Hardware & Software configuration will result in different benchmark testing results.)

Performance Test Report

CPU: AMD K8 Athlon64 3200+ Support (Socket 939, 512k L2 cache)
DRAM: KingMax MPTC220D-38HT 512MB DDR500 X 2 (1Gbyte) Memory
VGA Card : GeForce6600GT 128M PCI-E VGA CARD X 2 (1024X768X32BIT Color)
Hard Disk Driver: Seagate Barracude 7200.7 SATA150
BIOS: Award Optimal default
OS: Windows XP Professional (SERVICE PACK 2)

	SLI / 200/200 Dual channel	Ultra / 200/200 Dual channel	STD / 200/200 Dual channel
3D Mark 2001SE	18975	18286	18280
3D Mark 2003	13642	8101	8137
3D Mark 2005	6184	3532	3545
AQUAMRK3	63572 (9999 / 8727)	53014 (7545 / 8912)	53336 (7569 / 9021)
PCMark2004			
System / CPU / Memory	3810 / 3829 / 4386	4072 / 3846 / 4401	4089 / 3854 / 4427
Graph / HDD	5096 / 4676	4436 / 4663	4391 / 4619
Content Creation Winstone 2004	31.1	31.5	31.7
Business Winstone 2004	23	22.8	23
Winbench 99 V2.0:			
Business/Hi-end Disk Winmark99	20100 / 42800	18700 / 41000	20300 / 41900
Business/Hi-end Graphic Winmark	1120 / 1930	1240 / 1930	1170 / 1990
SISMark 2004: SISMark Rating(Internet Content Creation / Office Productivity)			
SISMark 2004	171 (182 / 161)	175 (184 / 167)	178 (184 / 172)
3D Creation / 2D Creation	168 / 222	169 / 255	170 / 228
/ Web publication	161	163	161
Communication / Document Creation	181 / 156	179 / 175	191 / 175
/ Data Analysis	149	150	153
SISOFT Sandra 2004 : 1.CPU Arithmetic Benchmark 2.Memory bandwidth Benchmark 3.CPU Multi-Media Benchmark			
1.Dhrystone ALU MIPS	10366	8576	8574
Whetstone FPU iSSE2 FLOPS	8531	3293 / 4275	3279 / 4256
2.Int/Float Buffered iSSE2 MB/S	3278 / 4237	4828 / 4828	4640 / 4643
3.Integer/Floating-Point SSE2 IT/S	4810 / 4800	19137 / 20650	19117 / 20669
UT2003 Benchmark (flyby/botmatch)	297.82 / 94.94	247.92 / 83.34	253.46 / 85.33
Quake3 DEMO1 / DEMO2 FPS	234.04 / 81.74	N / A	N / A
Return to Castle Wolfenstein FPS	85.4	75.0	75.4
Super Pi (1M) Second	44s	44s	43s
CPUZ System / CPU Clock	200 / 200 / 2000.9	200.9 / 200.9 / **2009.3**	200.9 / 200.9 / **2009.3**

1-4 Layout Diagram & Jumper Setting

PS/2 Mouse

PS/2 Keyboard

PRINTER

Optional 10 /100 or Giga LAN

Optional Giga LAN

Surrback

Line-IN

CEN/LFE

Line-OUT

MIC-IN

Surround

COM1   **COM2**   **USB0**   **USB**

ATX 12V Power Connector

PS2 KB/Mouse Port

PC99 Back Panel

KBMS/USB Power On Jumper **(JP1)**

USB Port/ Giga LAN Connector

USB Port/ 10/100M LAN Connector

Audio Connector

Optional Marvel 88E1111 1G LAN Chip
Optional Realtek8201CL 10 / 100 LAN Chip

1st PCI EXPRESS x8 for SLI

Optional Marvel 88E8053 10 /100 LAN Chip

PCI EXPRESSx16

2nd PCI EXPRESS x8 for SLI

8-CH AC'97 Audio Codec

PCI Slot

Front Panel Audio

CD Audio In

SPDIF Connector

USB Power On Jumper **(JP3)**

USB Port **(USB1, USB2, USB3)**

CPU FAN

CPU Socket

FINTEK F71805F I/O chip

DDR Socket X4

ATX Power Connector

Floppy Connector

ATA 133 IDE Connector **(IDE1, IDE2)**

PCI EXPRESS x1

NVIDIA nForce4 SLI Chip
NVIDIA nForce4 Ultra Chip
NVIDIA nForce4 STD Chip

Serial-ATA Connector **(SATA1, 2, 3, 4)**

CHAFAN

4MBit Flash ROM BIOS

De-Bug Port

SFAN1

Speaker/Power LED Connector

Front Panel Connector

SFAN2

Clear CMOS **(JBAT)**

939GT4-SLI and 939GT4-Ultra motherboard series support Serial ATA & Serial ATA2 with RAID functions.

5

Jumpers

Jumper	Name	Description	Page
JBAT	CMOS RAM Clear	3-pin Block	P.7
JP1	Keyboard/USB0,1 Power On Enabled/Disabled	3-pin Block	P.8
JP3	USB Power On Enabled/Disabled	3-pin Block	P.8

Connectors

Connector	Name	Description	Page
ATXPWR24P	ATX Power Connector	24-pin Block	P.14
ATX12V	ATX 12V Power Connector	4-pin Block	P.14
PS2KBMS	PS/2 Mouse & PS/2 Keyboard Connector	6-pin Female	P.15
USB / USB0	USB Port Connector	4-pin Connector	P.15
USB / LAN1	10 / 100 or Giga LAN Port Connector	RJ-45 Connector	P.15
USB / LAN2	Optional Giga -LAN Port Connector	RJ-45 Connector	P.15
PARALLEL	Parallel Port Connector	25-pin Female	P.15
J1	8-CH Audio Connector	6 phone jack Connector	P.15
COM1/COM2	Serial Port COM1/COM2 Connector	9-pin Connector	P.15
FDD	Floppy Driver Connector	34-pin Block	P.15
IDE1/IDE2	Primary/Secondary IDE Connector	40-pin Block	P.16
SATA1~4	Serial ATA IDE Connector	7-pin Connector	P.17

Headers

Header	Name	Description	Page
AUDIO	SPEAKER, MIC header	9-pin Block	P.17
USB1, USB2, USB3	USB Port Headers	9-pin Block	P.17
SPEAK	PC Speaker connector	4-pin Block	P.18
PWR LED	Power LED	3-pin Block	P.18
JW_FP (Power LED/Reset/ IDE LED/Power Button)	Front Panel Header (including Power LED/ IDE activity LED/Reset switch / Power On Button lead)	9-pin Block	P.18
SFAN1, SFAN2 CPUFAN	FAN Headers	3-pin Block	P.18
CDIN	CD Audio-In Header	4-pin Block	P.19
SPDIF	Optical In/Out Header	9-pin Block	P.19

Expansion Sockets

Socket/Slot	Name	Description	Page
ZIF Socket 939	CPU Socket	939-pin mPGAB Athlon64 CPU Socket	P.9
DIMM1~4	DDR Module Socket	184-pin DDR Module Socket	P.10
PCI1~ PCI3	PCI Slot	32-bit PCI Local Bus Expansion slots	P.11
PE1	PCI-Express x1 Slot	PCI-Express x1 Expansion Slot	P.12
PE3	PCI-Express x16 Slot	PCI-Express x16 Expansion Slot	P.12
PE2,PE4	PCI-Express x16 Slot	PCI-E x 8 Bandwidth for SLI Tech.	P.12

Chapter 2

Hardware Installation

2-1 Hardware installation Steps

Before using your computer, you had better complete the following steps:
1. Check motherboard jumper setting
2. Install CPU and Fan
3. Install System Memory (DIMM)
4. Install Expansion cards
5. Connect IDE and Floppy cables, Front Panel /Back Panel cable
6. Connect ATX Power cable
7. Power-On and Load Standard Default
8. Reboot
9. Install Operating System
10. Install Driver and Utility

2-2 Checking Motherboard's Jumper Setting

(1) CMOS RAM Clear (3-pin) : JBAT

A battery must be used to retain the motherboard configuration in CMOS RAM short 1-2 pins of JBAT to store the CMOS data.

To clear the CMOS, follow the procedure below:
1. Turn off the system and unplug the AC power
2. Remove ATX power cable from ATX power connector
3. Locate JBAT and short pins 2-3 for a few seconds
4. Return JBAT to its normal setting by shorting pins 1-2
5. Connect ATX power cable back to ATX power connector

Note: When should clear CMOS
1. Troubleshooting
2. Forget password
3. After over clocking system boot fail

JBAT 1-2 closed   Normal   JBAT 2-3 closed   Clear CMOS

CMOS RAM Clear Setting
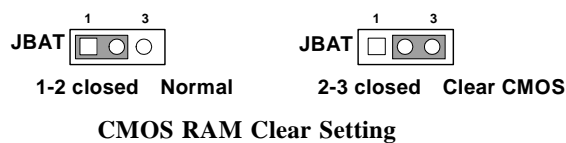
(2) Keyboard function Enabled/Disabled: JP1

JP1

1-2 closed
KB/USB Power ON Disable (Default)

JP1

2-3 closed
KB/USB Power ON Enabled

Keyboard/Mouse & USB Power On Setting
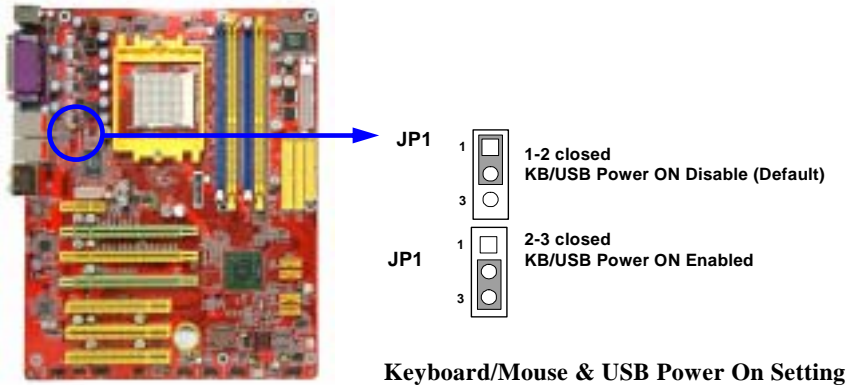
(3) USB Power On function Enabled/Disabled: JP3

JP3

1-2 closed   USB Power On Disable
(Default)

JP3

2-3 closed   USB Power On Enabled

USB2/USB3 Power On Setting
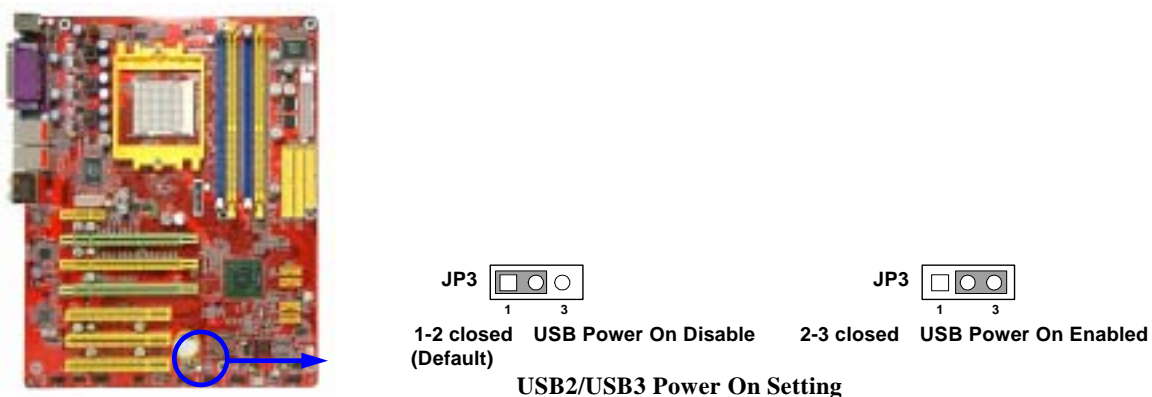
2-3 Install CPU
2-3-1 Glossary

Chipset (or core logic) - two or more integrated circuits which control the interfaces between the system processor, RAM, I/O devises, and adapter cards.

Processor slot/socket - the slot or socket used to mount the system processor on the motherboard.

Slot (PCI-E, PCI, RAM) - the slots used to mount adapter cards and system RAM.

AGP - **A**ccelerated **G**raphics **P**ort - a high speed interface for video cards; runs at 1X (66MHz), 2X (133MHz), or 4X (266MHz), or 8X (533MHz).

PCI - **P**eripheral **C**omponent **I**nterconnect - a high speed interface for video cards, sound cards, network interface cards, and modems; runs at 33MHz.

PCI Express- Peripheral Component Interconnect Express- a high speed interface for video cards, sound cards, network interface cards, and modems.

Serial Port - a low speed interface typically used for mouse and external modems.

Parallel Port - a low speed interface typically used for printers.

PS/2 - a low speed interface used for mouse and keyboards.

USB - **U**niversal **S**erial **B**us - a medium speed interface typically used for mouse, keyboards, scanners, and some digital cameras.

Sound (interface) - the interface between the sound card or integrated sound connectors and speakers, MIC, game controllers, and MIDI sound devices.

LAN (interface) - **L**ocal **A**rea **N**etwork - the interface to your local area network.

BIOS (**B**asic **I**nput/**O**utput **S**ystem) - the program logic used to boot up a computer and establish the relationship between the various components.

Driver - software, which defines the characteristics of a device for use by another device or other software.

Processor - the "central processing unit" (CPU); the principal integrated circuit used for doing the "computing" in "personal computer"

Front Side Bus Frequency - the working frequency of the motherboard, which is generated by the clock generator for CPU, DRAM and PCI BUS.

CPU L2 Cache - the flash memory inside the CPU, normal it depend on CPU type.

2-3-2 About AMD Athlon64 939-pin CPU

This motherboard provides a 939-pin surface mount, Zero Insertion Force (ZIF) socket, referred to as the mPGA939 socket supports AMD Athlon64 processor in the 939 Pin package utilizes Flip-Chip Pin Grid Array package technology.

The CPU that comes with the motherboard should have a cooling FAN attached to prevent overheating. If this is not the case, then purchase a correct cooling FAN before you turn on your system.

WARNING!	Be sure that there is sufficient air circulation across the processor's heatsink and CPU cooling FAN is working correctly, otherwise it may cause the processor and motherboard overheat and damage, you may install an auxiliary cooling FAN, if necessary.

To install a CPU, first turn off your system and remove its cover. Locate the ZIF socket and open it by first pulling the level sideways away from the socket then upward to a 90-degree angle. Insert the CPU with the correct orientation as shown below. The notched corner should point toward the end of the level. Because the CPU has a corner pin for two of the four corners, the CPU will only fit in the orientation as shown.

Colden Arrow

Socket 939
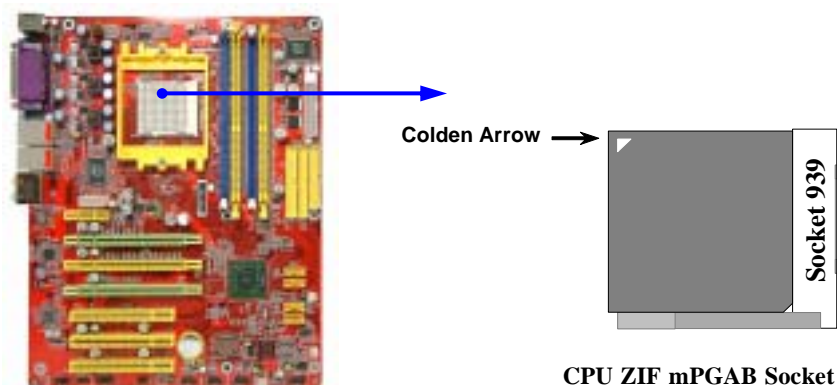
CPU ZIF mPGAB Socket

When you put the CPU into the ZIF socket. No force require to insert of the CPU, then press the level to Locate position slightly without any extra force.

2-4 Install Memory

This motherboard provides four 184-pin DDR DUAL INLINE MEMORY MODULES (DIMM) sites for DDR memory expansion available from minimum memory size of 128MB to maximum memory size of 4.0GB DDR SDRAM.

Valid Memory Configurations

Bank	184-Pin DIMM	PCS	Total Memory
Bank 0, 1 (DIMM1)	DDR266/DDR333/DDR400	X1	128MB~1.0GB
Bank 2, 3 (DIMM2)	DDR266/DDR333/DDR400	X1	128MB~1.0GB
Bank 4, 5 (DIMM3)	DDR266/DDR333/DDR400	X1	128MB~1.0GB
Bank 6,7 (DIMM4)	DDR266/DDR333/DDR400	X1	128MB~1.0GB
Total	System Memory (Max. 4.0GB)	4	128MB~4.0GB

Recommend DIMM Module Combination
1. *One DIMM Module ----Plug in DIMM1*
2. *Two DIMM Modules---Plug in DIMM1 and DIMM3 for Dual channel function*
3. *Four DIMM Modules---Plug in DIMM1/DIMM2/DIMM3/DIMM4.*

For Dual channel Limited!
4. Dual channel function only supports when 2 DIMM Modules plug in either both DIMM1 & DIMM3 or DIMM2 &DIMM4, or four DIMM Modules plug in DIMM1~DIMM4.
5. DIMM1 & DIMM3, or DIMM2 & DIMM4 must be the same type, same size, same frequency for dual channel function.

Generally, installing DDR SDRAM modules to your motherboard is very easy, you can refer to figure 2-4 to see what a 184-Pin DDR266/DDR333/DDR400 DDR SDRAM module looks like.

DIMM1 & DIMM3: Dual Channel 1

DIMM2 & DIMM4: Dual Channel 2
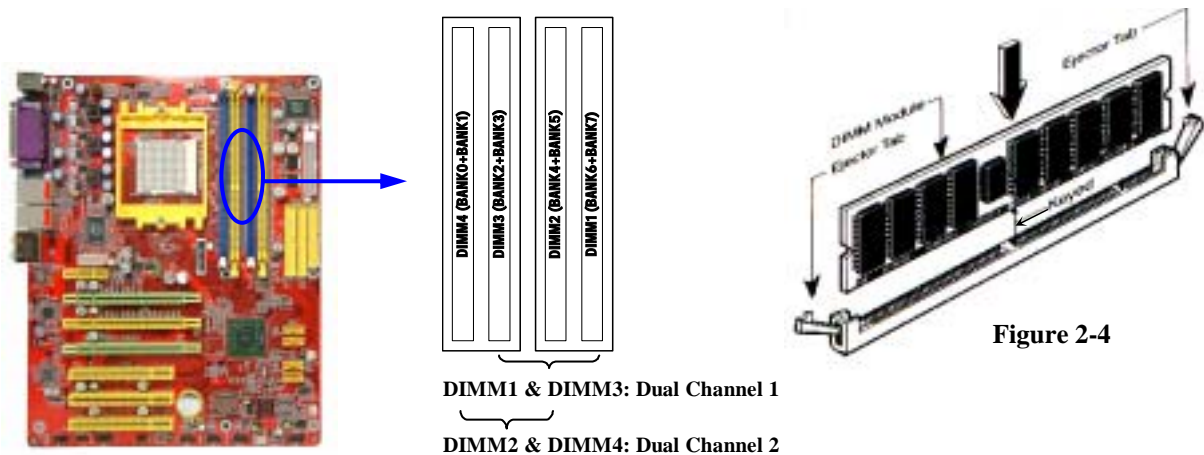
Figure 2-4

NOTE!	When you install DIMM module fully into the DIMM socket the eject tab should be locked into the DIMM module very firmly and fit into its indention on both sides.

2-5 Expansion Cards

2-5-1 Procedure For Expansion Card Installation

1. Read the documentation for your expansion card and make any necessary hardware or software setting for your expansion card such as jumpers.
2. Remove your computer's cover and the bracket plate on the slot you intend to use.
3. Align the card's connectors and press firmly.
4. Secure the card on the slot with the screen you remove above.
5. Replace the computer system's cover.
6. Set up the BIOS if necessary.
7. Install the necessary software driver for your expansion card.

2-5-2 Assigning IRQs For Expansion Card

Some expansion cards need an IRQ to operate. Generally, an IRQ must exclusively assign to one use. In a standard design, there are 16 IRQs available but most of them are already in use.

Standard Interrupt Assignments

IRQ	Priority	Standard function
0	N/A	System Timer
1	N/A	Keyboard Controller
2	N/A	Programmable Interrupt
3 *	8	Communications Port (COM2)
4 *	9	Communications Port (COM1)
5 *	6	Sound Card (sometimes LPT2)
6 *	11	Floppy Disk Controller
7 *	7	Printer Port (LPT1)
8	N/A	System CMOS/Real Time Clock
9 *	10	ACPI Mode when enabled
10 *	3	IRQ Holder for PCI Steering
11 *	2	IRQ Holder for PCI Steering
12 *	4	PS/2 Compatible Mouse Port
13	N/A	Numeric Data Processor
14 *	5	Primary IDE Channel
15 *	1	Secondary IDE Channel

* These IRQs are usually available for ISA or PCI devices.

## 2-5-3 Interrupt Request Table For This Motherboard

Interrupt request are shared as shown the table below:

	INT A	INT B	INT C	INT D	INT E	INT F	INT G	INT H
Slot 1		√						
Slot 2			√					
Slot 3				√				
Onboard USB 1	√							
Onboard USB 2		√						
AC97/MC97			√					

IMPORTANT!	If using PCI cards on shared slots, make sure that the drivers support "Shared IRQ" or that the cards don't need IRQ assignments. Conflicts will arise between the two PCI groups that will make the system unstable or cards inoperable.

2-5-4 PCI Express Slot

This motherboard provides three 16-lane PCI Express slot intended for Graphics Attach(Two symmetrical PCI-Express x16 graphics slots in light green deliver up to 2Gbyte/sec data transfer rate at each relative direction which is fully compatible with the latest NVIDIA SLI Technology. One PCI-Express x16 graphics slot offers 4Gbyte/sec data transfer rate at each relative direction.), and one x1 PCI Express Slot. Fully compliant to the *PCI Express Base Specification revision 1.0a* , support PCI Express VGA card, and other PCI Express device.

PCI-E x1 Slot

1st PCI-E x8 for SLI

PCI-E x16 for full bandwidth

2nd PCI-E x8 for SLI

SLI VGA Signal Output
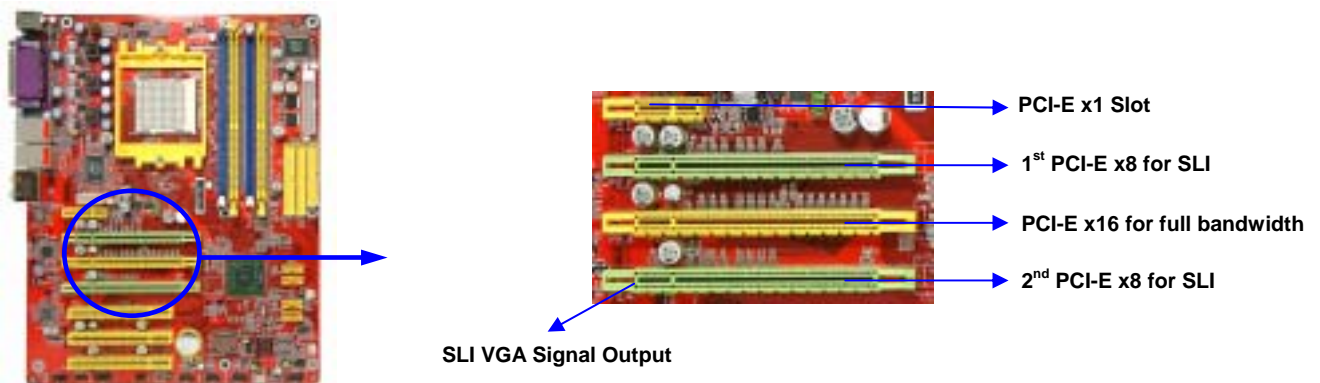
IMPORTANT!	**The SLI Technology supports only nForce4 SLI chipset based motherboard only. The modification for chipset is not an option for end users. Or you may get no warranty for the motherboard you purchased.** Please make sure the major display output is out from the NVIDIA SLI Supported VGA Card installed in the 2nd PCI EXPRESS x8 for SLI slot in light green while activating the SLI technology with one pair NVIDIA SLI Supported VGA Cards . And install the single PCI EXPRESS x16 interface supported VGA card to get the full speed of x16 bandwidth in the PCI EXPRESS x16 slot in light yellow as being marked above.

2-5-5 SLI Bridge for NVIDIA SLI Tech. Supported VGA Cards (For 939GT4-SLI Motherboard Series Only)

In order to activate the NVIDIA SLI technology, you have to install the embedded SLI Bridge for your NVIDIA SLI Tech. Supported VGA Cards before you activating the advance multi-GPUs functions.
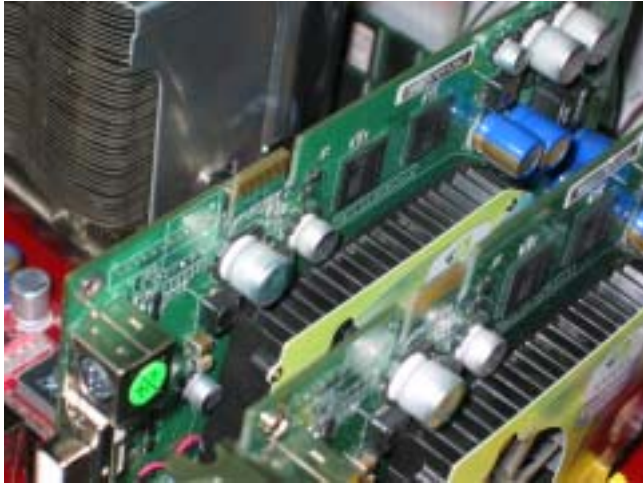
1. Install your NVIDIA SLI Tech Supported VGA Cards in the PCI-E x8 slots in the color of light green.

2. Prepare with the SLI Bridge with your NVIDIA SLI Tech Supported VGA Cards.

3. Be careful with the position for the pin you would like to set up.

4. Keep straight to force the SLI Bridge plug into both sides of NVIDIA SLI Tech Supported VGA Cards.

2-6 Connectors, Headers
2-6-1 Connectors

(1) Power Connector (24-pin block) : ATXPWR24P

ATX Power Supply connector. This is a new defined 24-pins connector that usually comes with ATX case. The ATX Power Supply allows to use soft power on momentary switch that connect from the front panel switch to 2-pins Power On jumper pole on the motherboard. When the power switch on the back of the ATX power supply turned on, the full power will not come into the system board until the front panel switch is momentarily pressed. Press this switch again will turn off the power to the system board.

** We recommend that you use an ATX 12V Specification 2.0-compliant power supply unit (PSU) with a minimum of 350W power rating. This type has 24-pin and 4-pin power plugs.

** If you intend to use a PSU with 20-pin and 4-pin power plugs, make sure that the 20-pin power plug can provide at least 15A on +12V and the power supply unit has a minimum power rating of 350W. The system may become unstable or may not boot up if the power is inadequate.

PIN	ROW1	ROW2
1	3.3V	3.3V
2	3.3V	-12V
3	GND	GND
4	5V	Soft Power On
5	GND	GND
6	5V	GND
7	GND	GND
8	Power OK	-5V
9	+5V (for Soft Logic)	+5V
10	+12V	+5V
11	+12V	+5V
12	+3V	GND

Pin 1 — **20-Pin**   Pin 1 — **24-Pin**
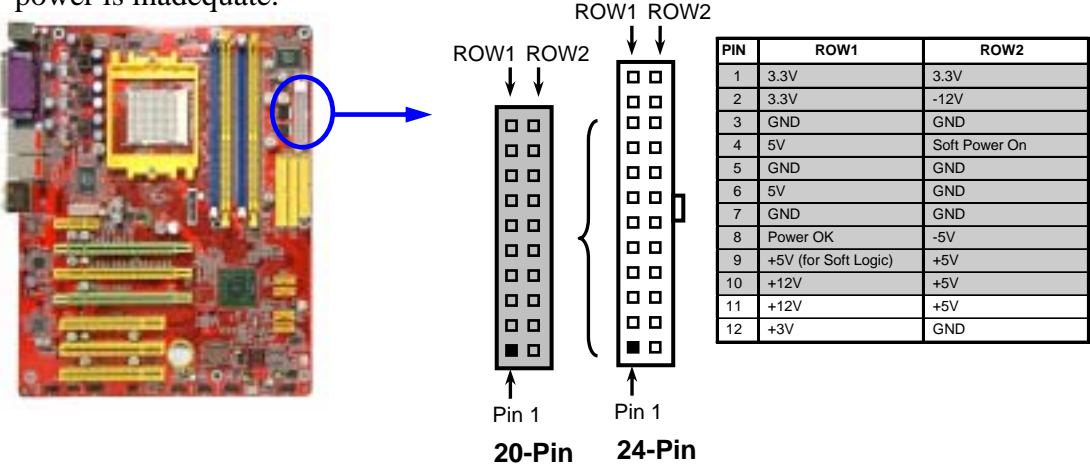
(2) ATX 12V Power Connector (4-pin block) : ATX12V

This is a new defined 4-pins connector that usually comes with ATX Power Supply. The ATX Power Supply which fully support Pentium 4 processor must including this connector for support extra 12V voltage to maintain system power consumption. Without this connector might cause system unstable because the power supply can not provide sufficient current for system.

Pin 1
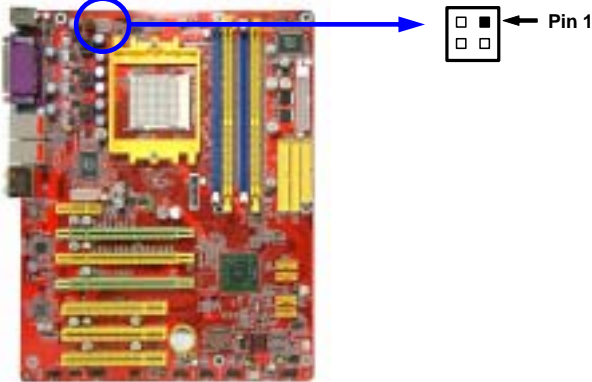
(3)   PS/2 Mouse & PS/2 Keyboard Connector: PS2KBMS
The connectors for PS/2 keyboard and PS/2 Mouse.

(4)   USB Port connector: USB /USB0
The connectors are 4-pin connector that connect USB devices to the system board.

(5)   LAN Port connector: USBLAN1 / USBLAN2
This connector is standard RJ45 connector for Network
The USBLAN1 support 10M/100M or 10M/100Mb/1G b/s data transfer rate
The USBLAN2 support 10M/100M/1G b/s data transfer rate (not for 939GT4SLI-G)

(6)   Parallel Port Connector (25-pin female): PARALLEL
Parallel Port connector is a 25-pin D-Subminiature Receptacle connector.   The On-board Parallel Port can be disabled through the BIOS SETUP. Please refer to Chapter 3 "INTEGRATED PERIPHERALS SETUP" section for more detail information.

(7)   Audio Line-In, Lin-Out, MIC, Surrback, Surround, CEN/LEF Connector : J1
This Connector are 6 phone Jack for LINE-OUT, LINE-IN, MIC, Surrback, Surround, CEN/LEF

|	
Line-in : (BLUE)	Audio input to sound chip
Line-out : (GREEN)	Audio output to speaker
MIC : (PINK)	Microphone Connector
Surrback : (ORANGE)	Audio output to speaker-Rear speaker out
CEN/LEF : (BLACKNESS)	Audio output to speaker-Center/Subwoofer speaker out
Surround: (GRAY)	Audio output to speaker-Side speaker out

(8)   Serial Port COM1/COM2 : COM1/COM2
COM1 is the 9-pin D-Subminiature male connector. The On-board serial port can be disabled through BIOS SETUP. Please refer to Chapter 3 "INTEGRATED PERIPHERALS SETUP" section for more detail information.
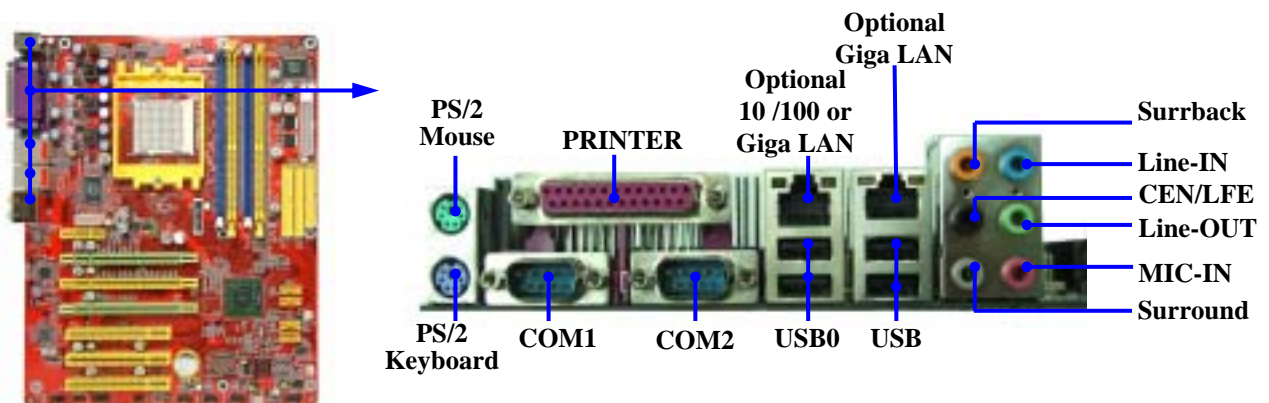

(9)   Floppy drive Connector (34-pin block): FDD
This connector supports the provided floppy drive ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to the floppy drives.

FDD

Pin 1 ←
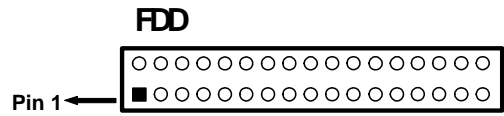
Floppy Drive Connector

(10) Primary IDE Connector (40-pin block): IDE1

This connector supports the provided IDE hard disk ribbon cable. After connecting the single plug end to motherboard, connect the two plugs at other end to your hard disk(s). If you install two hard disks, you must configure the second drive to Slave mode by setting its jumpers accordingly. Please refer to the documentation of your hard disk for the jumper settings.

IDE1

Pin 1
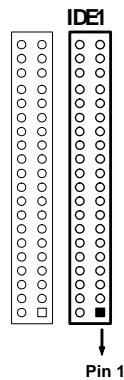
Primary IDE Connector

(11) Secondary IDE Connector (40-pin block): IDE2

This connector connects to the next set of Master and Slave hard disks. Follow the same procedure described for the primary IDE connector. You may also configure two hard disks to be both Masters using one ribbon cable on the primary IDE connector and another ribbon cable on the secondary IDE connector.

IDE2

Pin 1
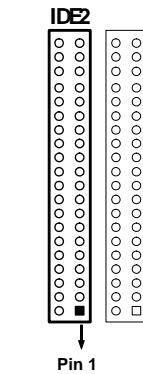
Secondary IDE Connector

- Two hard disks can be connected to each connector. The first HDD is referred to as the "Master" and the second HDD is referred to as the "Slave".
- For performance issues, we strongly suggest you don't install a CD-ROM or DVD-ROM drive on the same IDE channel as a hard disk. Otherwise, the system performance on this channel may drop.

(12) Serial-ATA Port connector: SATA1 / SATA2 / SATA3/ SATA4

This connector support the provided Serial ATA and Serial ATA2(Only for 939GT4-SLI & 939GT4-Ultra Series) IDE hard disk cable to connecting the motherboard and serial ATA hard disk.
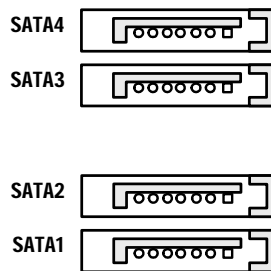
Serial-ATA1 & 2 Compatible Connectors

2-6-2 Headers

**(1)   Line-Out/MIC Header for Front Panel (9-pin): AUDIO**

This header connect to Front Panel Line-out, MIC connector with cable.
Without install the cable, this header default setting is 5-6 short, 9-10 short. When you install the cable you have take off these jumpers.
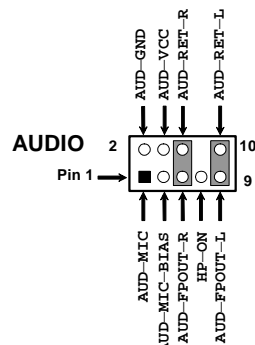
Line-Out, MIC Headers

(2)   USB Port Headers (9-pin) : USB1/USB2/USB3

These headers are used for connecting the additional USB port plug. By attaching an option USB cable, your can be provided with two additional USB plugs affixed to the back panel.

USB Port Headers
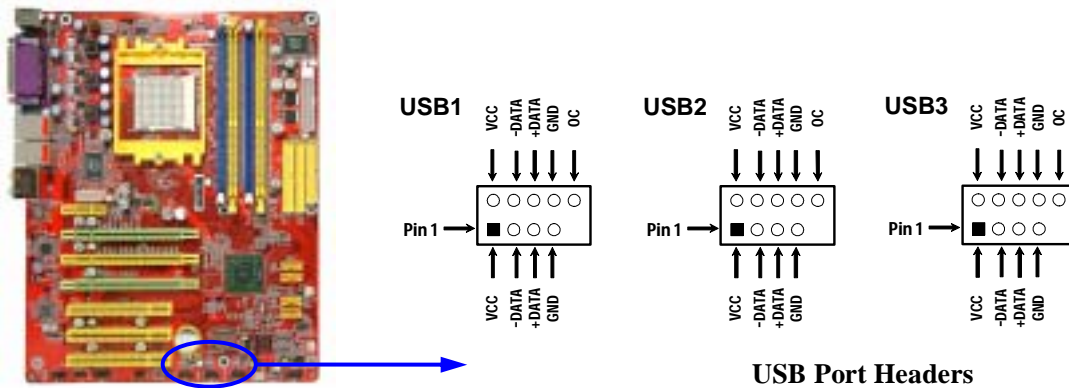
(3) Speaker connector: SPEAK
This 4-pin connector connects to the case-mounted speaker. See the figure below.

(4) Power LED: PWR LED
The Power LED is light on while the system power is on. Connect the Power LED from the system case to this pin.

(5) IDE Activity LED: HD LED
This connector connects to the hard disk activity indicator light on the case.

(6) Reset switch lead: RESET
This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting in order to prolong the lift of the system's power supply. See the figure below.

(7) Power switch: PWR BTN
This 2-pin connector connects to the case-mounted power switch to power ON/OFF the system.

System Case Connections
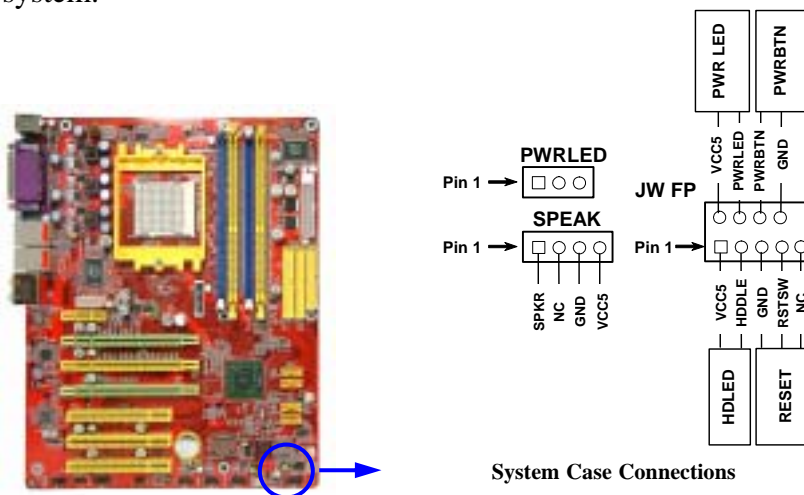
(8) FAN Headers (3-pin) : CHAFAN, SFAN1, SFAN2, CPUFAN
These connectors support cooling fans of 350mA (4.2 Watts) or less, depending on the fan manufacturer, the wire and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of connector.

CPUFAN

1   3

CHAFAN   1
3

SFAN1   1
3

3   1

SFAN2
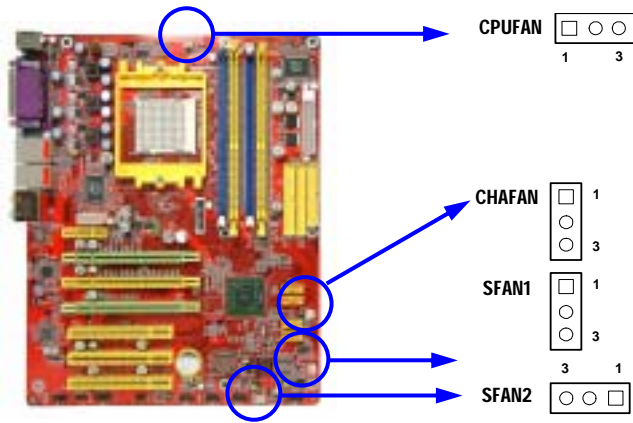
(9) CD Audio-In Headers (4-pin) : CDIN

CDIN are the connectors for CD-Audio Input signal. Please connect it to CD-ROM CD-Audio output connector.

CDIN

4   1

CD Audio-In Headers
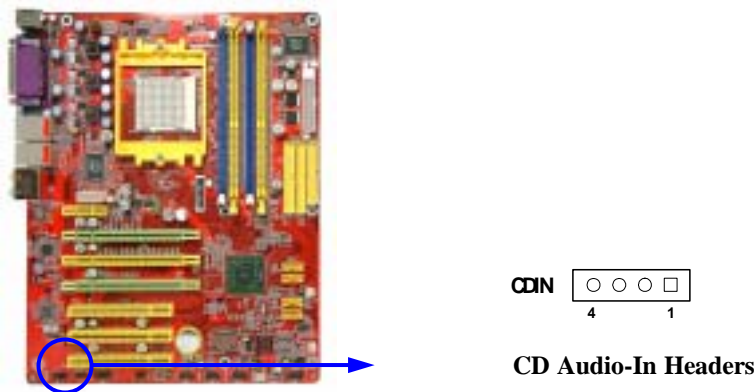
(10) In/Out Header: SPDIF (Module Optional)

SPDIF

SPDIF-OUT
GND
NC
GND

2   10
Pin1   9

12V
NC
NC
SPDIF-IN
NC

SPDIF-Bracket Connector
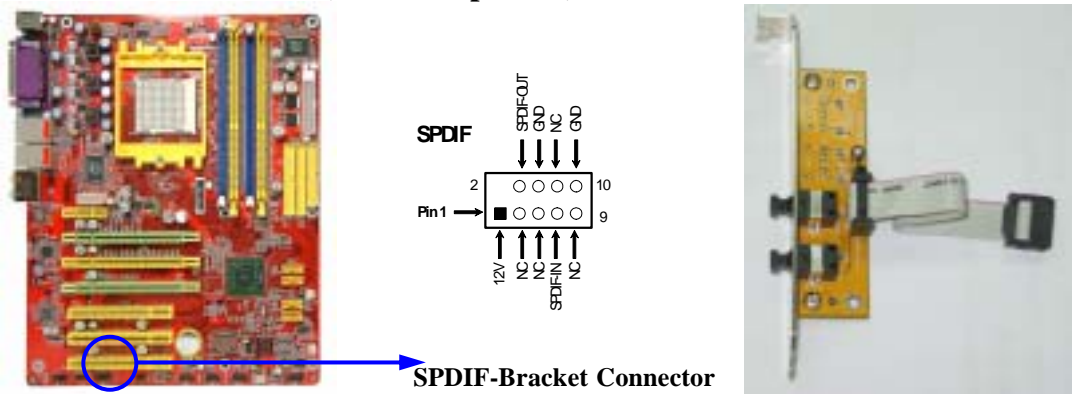
2-7 Starting Up Your Computer

1. After all connection are made, close your computer case cover.

2. Be sure all the switch are off, and check that the power supply input voltage is set to proper position, usually in-put voltage is 220V~240V or 110V~120V depending on your country's voltage used.

3. Connect the power supply cord into the power supply located on the back of your system case according to your system user's manual.

4. Turn on your peripheral as following order:
    a. Your monitor.
    b. Other external peripheral (Printer, Scanner, External Modem etc…)
    c. Your system power. For ATX power supplies, you need to turn on the power supply and press the ATX power switch on the front side of the case.

5. The power LED on the front panel of the system case will light. The LED on the monitor may light up or switch between orange and green after the system is on. If it complies with green standards or if it is has a power standby feature. The system will then run power-on test. While the test are running, the BIOS will alarm beeps or additional message will appear on the screen.

    If you do not see any thing within 30 seconds from the time you turn on the power. The system may have failed on power-on test. Recheck your jumper settings and connections or call your retailer for assistance.

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM install or detected
One long beep followed by three short beeps	Video card not found or video card memory bad
High frequency beeps when system is working	CPU overheated System running at a lower frequency

6. During power-on, press <Delete> key to enter BIOS setup. Follow the instructions in BIOS SETUP.

7. **Power off your computer:** You must first exit or shut down your operating system before switch off the power switch. For ATX power supply, you can press ATX power switching after exiting or shutting down your operating system. If you use Windows 9X, click **"Start"** button, click **"Shut down"** and then click **"Shut down the computer?"** The power supply should turn off after windows shut down.

Chapter 3

Introducing BIOS

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

In the BIOS Setup main menu of Figure 3-1, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press <Esc> to quit the BIOS Setup.
- Press ↑↓←→ (up, down, left, right) to choose, in the main menu, the option you want to confirm or to modify.
- Press <F10> when you have completed the setup of BIOS parameters to save these parameters and to exit the BIOS Setup menu.
- Press Page Up/Page Down or +/– keys when you want to modify the BIOS parameters for the active option.

3-1 Entering Setup

Power on the computer and by pressing <Del> immediately allows you to enter Setup.
If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press <F1> to continue, <Ctrl-Alt-Esc> or <Del> to enter Setup

3-2 Getting Help

Main Menu
The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Status Page Setup Menu/Option Page Setup Menu
Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

3-3 The Main Menu

Once you enter Award® BIOS CMOS Setup Utility, the Main Menu (Figure 3-1) will appear on the screen. The Main Menu allows you to select from fourteen setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

```
          Phoenix – AwardBIOS CMOS Setup Utility
 ┌────────────────────────────────────────────────────────────────┐
 │  Standard CMOS Features      Thermal Throttling Options         │
 │                                                                 │
 │  Advanced BIOS Features      Power User Overclock Settings      │
 │                                                                 │
 │  Advanced Chipset Features   Password Settings                  │
 │                                                                 │
 │  Integrated Peripherals      Load Optimized Defaults            │
 │                                                                 │
 │  Power Management Setup       Load Standard Defaults            │
 │                                                                 │
 │  Miscellaneous Control        Save & Exit Setup                 │
 │                                                                 │
 │  PC Health Status            Exit Without Saving                │
 ├────────────────────────────────────────────────────────────────┤
 │  Esc : Quit   F9 : Menu in BIOS    ↑↓→← : Select Item           │
 │  F10 : Save & Exit Setup                                        │
 ├────────────────────────────────────────────────────────────────┤
 │                                                                 │
 └────────────────────────────────────────────────────────────────┘
                        Figure 3-1
```

Standard CMOS Features
Use this Menu for basic system configurations.

Advanced BIOS Features
Use this menu to set the Advanced Features available on your system.

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.

Miscellaneous Control
Use this menu to specify your settings for Miscellaneous control.

PC Health Status
This entry shows your PC health status.

Thermal Throttling Options
The selection is set for activating the active CPU Thermal Protection by flexible CPU loading adjustment in the arrange of temperature you define.

Power User Overclock Settings
Use this menu to specify your settings (frequency, Voltage) for overclocking demand

Password Settings
This entry for setting Supervisor password and User password

Load Optimized Defaults
Use this menu to load the BIOS default values these are setting for optimal performances system operations for performance use.

Load Standard Defaults
Use this menu to load the BIOS default values for the stable performance system operation that are factory settings for normal use.

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

Exit Without Saving
Abandon all CMOS value changes and exit setup.

3-4 Standard CMOS Features

The items in Standard CMOS Setup 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.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                     Standard CMOS Features
 ┌────────────────────────────────────────────────┬──────────────────────┐
 │   Date (mm:dd:yy)          Wed, Mar, 09 2005     │      Item Help       │
 │   Time (hh:mm:ss)          16 : 48 : 35          │                      │
 │                                                  ├──────────────────────┤
 │ > IDE Channel 0 Master     None                  │                      │
 │ > IDE Channel 0 Slave      None                  │  Menu Level >        │
 │ > IDE Channel 1 Master     None                  │                      │
 │ > IDE Channel 1 Slave      None                  │  Change the day, month,│
 │ > SATA Channel 1           None                  │  year and century    │
 │ > SATA Channel 2           None                  │                      │
 │ > SATA Channel 3           None                  │                      │
 │ > SATA Channel 4           None                  │                      │
 │                                                  │                      │
 │   Drive A                  1.44M, 3.5 in.        │                      │
 │   Drive B                  None                  │                      │
 │   Halt On                  All, But Keyboard     │                      │
 │                                                  │                      │
 │   Base Memory                   640K             │                      │
 │   Extended Memory            522240K             │                      │
 │   Total Memory               523264K             │                      │
 ├────────────────────────────────────────────────┴──────────────────────┤
 │   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help│
 │       F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults│
 └────────────────────────────────────────────────────────────────────────┘
```

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

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

Year   The year depends on the year of the BIOS.

Time

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

IDE Channel 0 Master / Channel 0 Slave / Channel 1 Master / Channel 0 Slave

SATA Channel 1, 2, 3, 4

Press PgUp/<+> or PgDn/<–> to select Manual, None, 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 the type of hard disk drives 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.

If the controller of HDD interface is SCSI, the selection shall be "None".

If the controller of HDD interface is CD-ROM, the selection shall be "None"

Access Mode   The settings are Auto Normal, Large, and LBA.

Cylinder   number of cylinders

Head   number of heads

Precomp   write precomp

Landing Zone   landing zone

Sector   number of sectors

3-5 Advanced BIOS Features

```
                    Phoenix – AwardBIOS CMOS Setup Utility

                           Advanced BIOS Features
┌───────────────────────────────────────────────────────────────────────────┐
│  Removable Device Priority    Press Enter    │                              │
│  Hard Disk Boot Priority      Press Enter    │        Item Help             │
│  Virus Warning                Disabled       │                              │
│  L1 Cache                     Enabled        │                              │
│  L2 Cache                     Enabled        │   Menu Level >               │
│  Quick Power On Self Test     Enabled        │                              │
│  SATA &SCSI Boot Order        SATA, SCSI     │                              │
│  First Boot Device            Floppy         │                              │
│  Second Boot Device           HDD-0          │                              │
│  Third Boot Device            CDROM          │                              │
│  Boot other Device            Enabled        │                              │
│  Swap Floppy Drive            Disabled       │                              │
│  Boot Up Floppy Seek          Enabled        │                              │
│  Boot Up NumLock Status       On             │                              │
│  Typematic Rate Setting       Disabled       │                              │
│  Typematic Rate (Chars/Sec)   6              │                              │
│  Typematic Delay (Msec)       250            │                              │
│  Security Option              Setup          │                              │
│  APIC Mode                    Enabled        │                              │
│  MPS Version Control For OS    1.4           │                              │
│  OS Select For DRAM > 64MB    Non-OS2        │                              │
│  HDD S.M.A.R.T. Capability    Disabled       │                              │
│  Report No FDD For Windows    Yes            │                              │
│  Small Logo (EPA) Show        Enabled        │                              │
├───────────────────────────────────────────────────────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults    │
└───────────────────────────────────────────────────────────────────────────┘
```

Removable Device Priority

The selection is for you to choose the removable devices (Such as USB floppy or other related accessories) priorities to boot from.

Hard Disk Boot Priority

The selection is for you to choose the hard disk drives priorities to boot from.

Virus Warning

Allows you to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep.

    Disabled (default) No warning message to appear when anything attempts to access the boot sector or hard disk partition table.

    Enabled Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector of hard disk partition table.

CPU Internal Cache

The default value is Enabled.

    Enabled (default) Enable cache

    Disabled Disable cache

Note: The internal cache is built in the processor.

External Cache

Choose Enabled or Disabled. This option enables the Level 2 cache memory.

Quick Power On Self-Test

This category speeds up Power On Self Test (POST) after you power on the computer. If this is set to Enabled. BIOS will shorten or skip some check items during POST.

    Enabled (default) Enable quick POST

    Disabled Normal POST

First/Second/Third/Fourth Boot Device

The BIOS attempts to load the operating system from the devices in the sequence selected in these items. The settings are Floppy, LS/ZIP, HDD-0/HDD-1/HDD-3, SCSI, CDROM, LAD and Disabled.

Swap Floppy Drive

Switches the floppy disk drives between being designated as A and B. Default is Disabled.

Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Boot Up NumLock Status

The default value is On.

    On (default) Keypad is numeric keys.

    Off Keypad is arrow keys.

Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected. The settings are: Enabled/Disabled.

Typematic Rate (Chars/Sec)

Sets the number of times a second to repeat a keystroke when you hold the key down. The settings are: 6, 8, 10, 12, 15, 20, 24, and 30.

Typematic Delay (Msec)

Sets the delay time after the key is held down before is begins to repeat the keystroke. The settings are 250, 500, 750, and 1000.

Security Option

This category allows you to limit access to the system and Setup, or just to Setup.

> **System**   The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
>
> **Setup** (default)   The system will boot, but access to Setup will be denied if the correct password is not entered prompt.

Small Logo (EPA) Show

The selection is for you to choose the EPA small logo to show or not.

3-6 Advanced Chipset Features

The Advanced Chipset Features Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                    Advanced Chipset Features
┌──────────────────────────────────────────────────────────────────┐
│ > Hyper Transport Frequency    Auto    │                          │
│                                         │       Item Help          │
│ > Hyper Transport Width        Auto    │                          │
│                                         ├──────────────────────────┤
│ > DRAM Timing Settings         Press Enter │                      │
│ > System BIOS Cacheable        Enabled │     Menu Level >         │
│                                         │                          │
│                                         │                          │
│                                         │                          │
│                                         │                          │
│                                         │                          │
│                                         │                          │
├──────────────────────────────────────────────────────────────────┤
│  ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────┘
```

HperTransport Frequency

The default setting is "Auto" for this selection, and it provides with the frequency from 200 to 1000MHz for you to select manually. The AMD Athlon64 FX processor supports 1GHz HyperTransport bus to access. We recommend you to use the frequency for both performance and reliabilities of your system.

HperTransport Width

The default setting is "Auto" for this selection, and it provides with the adjustable bandwidth selection for you to choose the combination of stream with x16 and x8 bandwidth of updoad and down between the processor and system chip.

DRAM Timing Settings
Please refer to section 3-6-1

System BIOS Cacheable
Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The settings are: Enabled and Disabled.

3-6-1 DRAM Timing Settings

```
                  Phoenix – AwardBIOS CMOS Setup Utility

                             DRAM Timing Settings
 ┌─────────────────────────────────────────────────────────────────────────┐
 │                                                                           │
 │    Auto Configuartion          Auto                                       │
 │    DRAM CAS Latency            2.5T              Item Help                 │
 │    SDRAM Cycle Time            8T                                          │
 │    SDRAM RAS-to-CAS Delay      4T                                          │
 │    SDRAM Precharge Time        2T           Menu Level >>                  │
 │    DRAM Command Rate           2T                                          │
 │    MTRR Mapping Mode           Continuous                                  │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 │                                                                           │
 ├─────────────────────────────────────────────────────────────────────────┤
 │  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
 │      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults    │
 └─────────────────────────────────────────────────────────────────────────┘
```

SDRAM RAS-to-CAS Delay
This field let's you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. *Fast* gives faster performance; and *Slow* gives more stable performance. This field applies only when synchronous DRAM is installed in the system. The settings are: 4T and 3T.

SDRAM Precharge Time
If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain date. *Fast* gives faster performance; and *Slow* gives more stable performance. This field applies only when synchronous DRAM is installed in the system. The settings are: 2T and 3T.

DRAM CAS Latency
When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. The settings are: 2T and 2.5T.

3-7 Integrated Peripherals

```
                    Phoenix – AwardBIOS CMOS Setup Utility
                            Integrated Peripherals
┌─────────────────────────────────────────────┬─────────────────────────┐
│ > OnChip IDE Function          Press Enter    │                         │
│ > OnChip Device Function       Press Enter    │       Item Help         │
│ > OnChop Super IO Function     Press Enter    ├─────────────────────────┤
│   Init Display First           PCI Slot       │                         │
│                                               │   Menu Level >          │
│                                               │                         │
│                                               │                         │
│                                               │                         │
│                                               │                         │
├─────────────────────────────────────────────┴─────────────────────────┤
│  ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults    │
└────────────────────────────────────────────────────────────────────────┘
```

OnChip IDE Function
Please refer to section 3-7-1

OnChip Device Function
Please refer to section 3-7-2

OnChip Super IO Function
Please refer to section 3-7-3

Init Display First
This item allows you to decide to activate whether PCI Slot or AGP VGA first. The settings are: PCI Slot, AGP Slot.

3-7-1 OnChip IDE Function

```
                    Phoenix – AwardBIOS CMOS Setup Utility
                            OnChip IDE Function
┌─────────────────────────────────────────────┬─────────────────────────┐
│ SATA Function              Enabled            │                         │
│ OnChip IDE Channel0        Enabled            │       Item Help         │
│ Primary Master   PIO       Auto               ├─────────────────────────┤
│ Primary Slave    PIO       Auto               │                         │
│ Primary Master   UDMA      Auto               │   Menu Level >>         │
│ Primary Slave    UDMA      Auto               │                         │
│ OnChip IDE Channel1        Enabled            │                         │
│ Secondary Master UDMA      Auto               │                         │
│ Secondary Slave  UDMA      Auto               │                         │
│ Secondary Master UDMA      Auto               │                         │
│ Secondary Slave  UDMA      Auto               │                         │
│ SATA Channel 1&2           Auto               │                         │
│ SATA Channel 3&4           Auto               │                         │
│ IDE DMA Transfer Access    Enabled            │                         │
│ IDE Prefactch              Enabled            │                         │
│ IDE HDD Block Mode         Enabled            │                         │
│ Delay For HDD(Secs)        0                  │                         │
│                                               │                         │
├─────────────────────────────────────────────┴─────────────────────────┤
│  ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults    │
└────────────────────────────────────────────────────────────────────────┘
```

OnChip IDE Channal0/Channel1

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately. The settings are: Enabled and 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 and Ultra DMA/66, select Auto to enable BIOS support. The settings are: Auto, Disabled.

IDE Prefatch

The selection is for you to set the IDE device as the first priority to activate.

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. The settings are: Enabled, Disabled.

Delay for HDD (Secs)

The selection is set for you to extend the time to search for the HDD which needs more time to activate.

3-7-2 OnChip Device Function

```
                     Phoenix – AwardBIOS CMOS Setup Utility
                            OnChip Device Function
┌──────────────────────────────────────────────────┬─────────────────────────┐
│ On Board AC97 Audio Device        Auto            │                         │
│ On Board LAN BootROM              Disabled        │      Item Help          │
│ On Board LAN Device BootROM       Enabled         │                         │
│ On Board LAN BootROM                  Disabled    ├─────────────────────────┤
│ Machine MAC Address is   003018-xxxxxx            │    Menu Level >>        │
│ On Board MAC Address Input         Press Enter    │                         │
│ = = = = = = USB Controller System = = = = = =     │                         │
│ On Chip USB                       V1.1+ V1.2      │                         │
│ USB Memory Type                   Shadow          │                         │
│ USB Keyboard Support              Disabled        │                         │
│ USB Mouse Support                 Disabled        │                         │
│                                                   │                         │
├──────────────────────────────────────────────────┴─────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help  │
│       F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults     │
└─────────────────────────────────────────────────────────────────────────────┘
```

AC97 Sound Device

This item allows you to decide to enable/disable the chipset family to support AC97 Audio. The settings are: Enabled, Disabled.

USB Host Controller

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB peripherals. The settings are: Enabled, Disabled.

USB Keyboard Support

Select *Enabled* if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard. The settings are: Enabled, Disabled.

3-7-3 OnChip Super IO Function

```
                    Phoenix – AwardBIOS CMOS Setup Utility

                        Onboard Super IO Function
┌─────────────────────────────────────────────────────────────────────────┐
│   Onboard FDD Controller        Enabled                                   │
│   Onboard Serial Port 1         3F8/IRQ4              Item Help           │
│   Onboard Serial Port 2         2F8/IRQ3                                   │
│   UART Mode Select              Normal                                    │
│   IR Duplex Mode                Half            Menu Level >>             │
│   Onboard Parallel Port         378/IRQ7                                  │
│   Parallel Mode                 SPP                                       │
│   ECP Mode Use DMA              3                                         │
│                                                                           │
│                                                                           │
│                                                                           │
├─────────────────────────────────────────────────────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help│
│        F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults │
└─────────────────────────────────────────────────────────────────────────┘
```

Onboard FDD 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/Port 2

Select an address and corresponding interrupt for the first and the second serial ports. The settings are: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

Onboard Parallel Port

There is a built-in parallel port on the on-board Super I/O chipset that Provides Standard, ECP, and EPP features. It has the following option:

    Disabled
    (3BCH/IRQ7)/   Line Printer port 0
    (278H/IRQ5)/   Line Printer port 2
    (378H/IRQ7)   Line Printer port 1

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

SPP/EPP/ECP/ECP+EPP

To operate the onboard parallel port as Standard Parallel Port only, choose "SPP." To operate the onboard parallel port in the EPP modes simultaneously, choose "EPP." By choosing "ECP", the onboard parallel port will operate in ECP mode only. Choosing "ECP+EPP" will allow the onboard parallel port to support both the ECP and EPP modes simultaneously. 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 channels 3 to 1. The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: "EPP Mode Select." At this time either EPP 1.7 spec. or EPP 1.9 spec. can be chosen.

3-8 Power Management Setup

The Power Management Setup allows you to configure your system to most effectively save energy saving while operating in a manner consistent with your own style of computer use.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                      Power Management Setup
┌──────────────────────────────────────────┬─────────────────────────┐
│   ACPI Function             Enabled       │                         │
│   ACPI Suspend Type         S1(POS)       │        Item Help        │
│   Power Managerment         User Define   ├─────────────────────────┤
│   Video off Method          V/H SYNC+Blank│                         │
│   HDDD Power Down           Disabled      │   Menu Level >          │
│   Power Button Function     Instant-Off   │                         │
│   Power After Power Failure Always Off    │                         │
│   AMD K8 Cool'n'Quiet Control Auto        │                         │
│   Wake Up on PCI PME        Disabled      │                         │
│   Wake-Up on Ring           Disabled      │                         │
│   Wake-Up by Alarm          Disabled      │                         │
│                                           │                         │
├──────────────────────────────────────────┴─────────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults │
└─────────────────────────────────────────────────────────────────────┘
```

ACPI Function
This item allows you to Enabled/Disabled the Advanced Configuration and Power Management (ACPI). The settings are Enabled and Disabled.

Video Off Option
This determines the manner in which the monitor is blanked. The choice are Suspend → off, All Modes → Off, and Always On.

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

DPMS (default)	Initial display power management signaling.
Blank Screen	This option only writes blanks to the video buffer.
V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.

Modem Use IRQ
This determines the IRQ in which the MODEM can use.
The settings are: 3, 4, 5, 7, 9, 10, 11, NA.

Power Button Function
Pressing the power button for more than 4 seconds forces the system to enter the Soft-Off state. The settings are: Delay 4 Sec, Instant-Off.

Wake Up On Ring/PME
During Disabled, the system will ignore any incoming call from the modem. During Enabled, the system will boot up if there's an incoming call from the modem.

Wake-Up by Alarm
This function is for setting date and time for your computer to boot up. During Disabled, you cannot use this function. During Enabled, choose the Date and Time Alarm:

Date(of month) Alarm
You can choose which month the system will boot up. Set to 0, to boot every day.

Time(hh:mm:ss) Alarm
You can choose what hour, minute and second the system will boot up.

Note: If you have change the setting, you must let the system boot up until it goes to the operating system, before this function will work.

3-9 Miscellaneous Control

This section is for setting CPU Frequency/Voltage Control.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                        Miscellaneous Control
┌──────────────────────────────────────────────┬─────────────────────┐
│  CPU Spread Spectrum Clock          Enabled   │     Item Help       │
│  SATA Spread Spectrum               Disabled  │                     │
│  PCIE Spread Spectrum               Disabled  ├─────────────────────┤
│  Flash Part Write Protect           Enabled   │  Menu Level >       │
│                                               │                     │
│> IRQ Resources                      Press Enter│                    │
│  PCI/VGA Palette Snoop              Disabled  │                     │
│                                               │                     │
│  *** PCIExpress Relative Items ***            │                     │
│  Maximum Payload Size               4096      │                     │
│                                               │                     │
├──────────────────────────────────────────────┴─────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│     F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults     │
└─────────────────────────────────────────────────────────────────────┘
```

Auto Detect PCI Clock
This item allows you to enable/disable auto detect PCI Clock.

Spread Spectrum
This item allows you to set the CPU Host / SATA / PCI clock and Spread Spectrum.
The settings are: Enabled, Disabled.

IRQ Resources
When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.
Please refer to section 3-9-1

3-9-1 IRQ Resources

```
                Phoenix – AwardBIOS CMOS Setup Utility
                            IRQ Resources
┌─────────────────────────────────────────────────┬───────────────────┐
│   IRQ-3   assigned to        PCI Device          │     Item Help     │
│   IRQ-4   assigned to        PCI Device          │                   │
│   IRQ-5   assigned to        PCI Device          ├───────────────────┤
│   IRQ-7   assigned to        PCI Device          │                   │
│   IRQ-9   assigned to        PCI Device          │  Menu Level >>    │
│   IRQ-10  assigned to        PCI Device          │                   │
│   IRQ-11  assigned to        PCI Device          │                   │
│   IRQ-12  assigned to        PCI Device          │                   │
│   IRQ-14  assigned to        PCI Device          │                   │
│   IRQ-15  assigned to        PCI Device          │                   │
│                                                  │                   │
│                                                  │                   │
├──────────────────────────────────────────────────────────────────────┤
│ ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│     F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────────┘
```

3-10 PC Health Status

This section shows the Status of you CPU, Fan, Warning for overall system status. This is only available if there is Hardware Monitor onboard.

```
                Phoenix – AwardBIOS CMOS Setup Utility
                          PC Health Status
┌─────────────────────────────────────────────────┬───────────────────┐
│   Shutdown Temperature       Disabled            │     Item Help     │
│   Show PCHealth in Post      Enabled             │                   │
│ > Smart FAN Configurations   Press Enter         ├───────────────────┤
│   Vcore                      1.39V               │                   │
│   NB                         2.53V               │  Menu Level >     │
│   +5V                        4.99V               │                   │
│   +12V                       11.9V               │                   │
│   5VSB                       4.89V               │                   │
│   VDIMM                      2.67V               │                   │
│   VBAT                       3.12V               │                   │
│   CPU Temperature            40°C/104°F          │                   │
│   System 1 Temperature       36°C/96°F           │                   │
│   System 1 Temperature       29°C/84°F           │                   │
│   CPUFAN                     4440 RPM            │                   │
│   SFAN1                      3375 RPM            │                   │
│   SFAN2                      3375 RPM            │                   │
├──────────────────────────────────────────────────────────────────────┤
│ ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│     F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────────┘
```

Shutdown Temperature
This item can let users setting the Shutdown temperature, when CPU temperature over this setting the system will auto shutdown to protect CPU.

Show PC Health in Post
During Enabled, it displays information list below. The choice is either Enabled or Disabled

Smart FAN Configurations

Please refer to section 3-10-1

Current CPU Temperature/Current System Temp/Current FAN1, FAN2 Speed/Vcore/ Vdd/3.3V/+5V/+12V/-12V/VBAT(V)/5VSB(V)

This will show the CPU/FAN/System voltage chart and FAN Speed.

3-10-1   Smart FAN Configurations

```
              Phoenix – AwardBIOS CMOS Setup Utility
                       Smart FAN Configurations
┌────────────────────────────────────────────┬──────────────────────┐
│  CPUFAN Smart Mode            Enabled        │      Item Help       │
│  CPU SmartFAN Full-Speed      50             │                      │
│  CPU SmartFAN Idle Temp       30             ├──────────────────────┤
│                                              │                      │
│  SFAN1 Smart Mode             Enabled        │   Menu Level >       │
│  SFAN1 SmartFAN Full-Speed Temp  50          │                      │
│  SFAN1 SmartFAN Idle Temp     30             │                      │
│                                              │                      │
│                                              │                      │
├──────────────────────────────────────────────────────────────────┤
│   ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values    F6:Optimized Defaults    F7:Standard Defaults    │
└──────────────────────────────────────────────────────────────────┘
```

CPU/SFAN1 Smart FAN Full-Speed Temp

This item allows you setting the FAN works in full speed when the temperature over the value which out set. If the temperature below the value but over the Idle Temperature, the FAN will works over 60% of full speed, and the higher temperature will gain higher FAN speed, after over the temperature which this item setting, the FAN works in full speed.

CPU/SFAN1 Smart FAN Idle Temp

This item allows you setting the FAN works in 60% of full speed, when the temperature lower than the temperature which you setting.

3-11 Thermal Throttling Options

```
              Phoenix – AwardBIOS CMOS Setup Utility
                       Thermal Throttling Options
┌────────────────────────────────────────────┬──────────────────────┐
│  BiTurbo Technology Mode         Disabled    │      Item Help       │
│  BiTurbo Activated Threshold    60%(CPU Usage)│                     │
│  BiTurbo Activated Tim┌─────────────────────────┐                   │
│  BiTurbo CPU Clock Set│ CPU Thermal-Throttling  │                   │
│  CPU Thermal-Throttlin│  Disabled      [  ]     │u Level >           │
│  CPU Thermal-Throttlin│  Enabled       [  ]     │                   │
│  CPU Thermal-Throttlin│                         │                   │
│  CPU Thermal-Throttlin│                         │                   │
│                       │ ↑↓:Move ENTER:Accept ESC:Abort │            │
│                       └─────────────────────────┘                   │
├──────────────────────────────────────────────────────────────────┤
│   ↑↓→←  Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│       F5:Previous Values    F6:Optimized Defaults    F7:Standard Defaults    │
└──────────────────────────────────────────────────────────────────┘
```

```
        Phoenix - AwardBIOS CMOS Setup Utility
                Thermal Throttling Options
┌─────────────────────────────────────────────┬──────────────────┐
│ BiTurbo Technology Mode        Disabled      │    Item Help     │
│ BiTurbo Activated Threshold    60%(CPU Usage)│                  │
│ BiTurbo Activated Tim┌─────────────────────────┐                │
│ BiTurbo CPU Clock Set│ CPU Thermal-Throttling Temp            │  │
│ CPU Thermal-Throttlin│                         │    Level >     │
│ CPU Thermal-Throttlin│                         │                │
│ CPU Thermal-Throttlin│   Min =   40            │                │
│ CPU Thermal-Throttlin│   Max =   90            │                │
│                      │                         │                │
│                      │   Key in a Integral number:            │  │
│                      │ ↑↓:Move ENTER:Accept ESC:Abort         │  │
│                      └─────────────────────────┘                │
├─────────────────────────────────────────────┴──────────────────┤
│ ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults   │
└─────────────────────────────────────────────────────────────────┘


        Phoenix - AwardBIOS CMOS Setup Utility
                Thermal Throttling Options
┌─────────────────────────────────────────────┬──────────────────┐
│ BiTurbo Technology Mode        Disabled      │    Item Help     │
│ BiTurbo Activated Thr┌─────────────────────────┐                │
│ BiTurbo Activated Tim│ CPU Thermal-Throttling Duty            │  │
│ BiTurbo CPU Clock Set│   87.50%          [█]   │                │
│ CPU Thermal-Throttlin│   75.00%          [ ]   │    Level >     │
│ CPU Thermal-Throttlin│   62.50%          [ ]   │                │
│ CPU Thermal-Throttlin│   50.00%          [ ]   │                │
│ CPU Thermal-Throttlin│   35.50%          [ ]   │                │
│                      │   25.00%          [ ]   │                │
│                      │   12.50%          [ ]   │                │
│                      │ ↑↓:Move ENTER:Accept ESC:Abort         │  │
│                      └─────────────────────────┘                │
├─────────────────────────────────────────────┴──────────────────┤
│ ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults   │
└─────────────────────────────────────────────────────────────────┘
```

CPU Thermal Throttling Temp

This item allows you to activate the CPU Thermal Throttling function when the CPU temperature is over the value which you set to low down the CPU temperature when at high workload to protect processor from damage or accidental shutdown.

```
        Phoenix - AwardBIOS CMOS Setup Utility
                Thermal Throttling Options
┌─────────────────────────────────────────────┬──────────────────┐
│ Bi-Turbo Technology Mode       Disabled      │    Item Help     │
│ Bi-Turbo Activated Threshold   202MHz        │                  │
│ Bi-Turbo Activated  ┌─────────────────────────┐                │
│ Bi-Turbo CPU Clock  │ CPU Thermal-Throttling Beep            │  │
│ CPU Thermal-Throttl │   Disabled        [ ]   │ nu Level >     │
│ CPU Thermal-Throttl │   Enabled         [█]   │                │
│ CPU Thermal-Throttl │                         │                │
│ CPU Thermal-Throttl │                         │                │
│                     │                         │                │
│                     │ ↑↓:Move ENTER:Accept ESC:Abort         │  │
│                     └─────────────────────────┘                │
├─────────────────────────────────────────────┴──────────────────┤
│ ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults   │
└─────────────────────────────────────────────────────────────────┘
```

3-12 Power User Overclock Settings

```
              Phoenix – AwardBIOS CMOS Setup Utility
                     Power User Overclock Settings
┌──────────────────────────────────────────────┬──────────────────────┐
│  PCIE Clock                   100             │      Item Help       │
│  ** Current Host Frequency is 200MHZ **       ├──────────────────────┤
│  CPU Clock at Next Boot is    200             │                      │
│  *** Current DRAM Clock       200MHZ ***      │   Menu Level >       │
│  DRAM Clock at Next Boot      200MHz(Auto)    │                      │
│  CPU Ratio Select             Default   } Not support AMD Sempron Processor
│  CPU Vcore Select             Default         │                      │
│  CPU Vcore 7-Shift            Normal(Default) │                      │
│                                               │                      │
│  Over Voltage                 Enabled         │                      │
│  VDIMM Select                 2.50V(Default)  │                      │
│  NB Voltage                   1.50V(Default)  │                      │
│  LDT Voltage                  1.25V(Default)  │                      │
│                                               │                      │
├──────────────────────────────────────────────┴──────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────────┘
```

CPU/DRAM Clock at next Boot is

This item allows you change the CPU Host /DRAM clock for overclock demand. *When the CPU Host clock is over the CPU default value BIOS will auto disabled Bi-Turbo function.*

CPU Vcore 7-Shift

This item allows you select the CPU Vcore Voltage xx% more than the standard value, by this function for the precise over-clocking for extra demanding of performance.

VDIMM Select

This item allows you to select 2.5V of the DDR Module. The choice are: 2.55V, 2.6V, 2.65V, 2.7V.

NB Voltage

This item allows you to select value of Voltage for North Bridge Chipset.

LDT Voltage

This item allows you to select value of Voltage for LDT.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                     Power User Overclock Settings
┌──────────────────────────────────────────────┬──────────────────────┐
│   PCIE Clock                      100         │      Item Help       │
│                                               ├──────────────────────┤
│  ** Current CPU Clock     ┌─────────────────────────┐               │
│  CPU Clock at Next Boot    │  PCIE Clock            │               │
│  *** Current DRAM Clock    │                        │ evel >         │
│  DRAM Clock at Next Boot   │   Min=  100            │               │
│  CPU Ratio Select          │   Max=  150            │               │
│  CPU Vcore Select          │                        │               │
│  CPU Vcore 7-Shift         │                        │               │
│                            │  ↑↓:Move ENTER:Accept ESC:Abort │        │
│  Over Voltage              └─────────────────────────┘               │
│  VDIMM Select                 2.50V(Default)  │                      │
│  NB Voltage                   1.50V(Default)  │                      │
│  LDT Voltage                  1.25V(Default)  │                      │
├──────────────────────────────────────────────┴──────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values   F6:Optimized Defaults   F7:Standard Defaults │
└──────────────────────────────────────────────────────────────────────┘
```

Phoenix – AwardBIOS CMOS Setup Utility

Power User Overclock Settings

```
┌─────────────────────────────────────────────────────────────────────────────┐
│  PCIE Clock                          100                    Item Help         │
│                                 ┌─────────────────────┐                       │
│  ** Current CPU Clock           │ CPU Vcore 7-Shift   │                       │
│  CPU Clock at Next Bo           │ Normal       [ ]    │        enu Level >    │
│  *** Current DRAM Clo           │ +  5%        [  ]   │                       │
│  DRAM Clock at Next B           │ + 10%        [  ]   │                       │
│  CPU Ratio Select               │ + 15%        [  ]   │                       │
│  CPU Vcore Select               │ + 20%        [  ]   │                       │
│  CPU Vcore 7-Shift              │ + 25%        [  ]   │                       │
│                                 │ + 30%        [  ]   │                       │
│  Over Voltage                   │ + 35%        [  ]   │                       │
│  VDIMM Select                   └─────────────────────┘                       │
│  NB Voltage                     ↑↓:Move ENTER:Accept ESC:Abort                │
│  LDT Voltage                         1.25V(Default)                           │
│                  2.55V(Default)                                               │
├─────────────────────────────────────────────────────────────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help    │
│      F5:Previous Values    F6:Optimized Defaults    F7:Standard Defaults      │
└─────────────────────────────────────────────────────────────────────────────┘
```

Phoenix – AwardBIOS CMOS Setup Utility

Power User Overclock Settings

```
┌─────────────────────────────────────────────────────────────────────────────┐
│  PCIE Clock                          100                    Item Help         │
│                               ┌───────────────────────────┐                   │
│  ** Current CPU Clock         │ SBChip VDD Select         │                   │
│  CPU Clock at Next Boo        │ 2.55V(Default)      [ ]   │                   │
│  *** Current DRAM Clock       │ 2.60V               [  ]  │        Level >    │
│  DRAM Clock at Next Bo        │ 2.65V               [  ]  │                   │
│  CPU Ratio Select             │ 2.70V               [  ]  │                   │
│  CPU Vcore Select             │                           │                   │
│  CPU Vcore 7-Shift            │                           │                   │
│                               │ ↑↓:Move ENTER:Accept ESC:Abort                │
│  Over Voltage                 └───────────────────────────┘                   │
│  VDIMM Select                       2.50V(Default)                            │
│  NB Voltage                         1.50V(Default)                            │
│  LDT Voltage                        1.25V(Default)                            │
│                                                                               │
├─────────────────────────────────────────────────────────────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help    │
│      F5:Previous Values    F6:Optimized Defaults    F7:Standard Defaults      │
└─────────────────────────────────────────────────────────────────────────────┘
```

Phoenix – AwardBIOS CMOS Setup Utility

Power User Overclock Settings

```
┌─────────────────────────────────────────────────────────────────────────────┐
│  PCIE Clock                          100                    Item Help         │
│                             ┌───────────────────────────┐                     │
│  ** Current CPU Clock       │ NB Voltage                │                     │
│  CPU Clock at Next Boo      │ 1.50V               [  ]  │                     │
│  *** Current DRAM Clo       │ 1.60V(Default)      [ ]   │        Level >      │
│  DRAM Clock at Next Bo      │ 1.70V               [  ]  │                     │
│  CPU Ratio Select           │ 1.80V               [  ]  │                     │
│  CPU Vcore Select           │                           │                     │
│  CPU Vcore 7-Shift          │                           │                     │
│                             │ ↑↓:Move ENTER:Accept ESC:Abort                  │
│  Over Voltage               └───────────────────────────┘                     │
│  VDIMM Select                                                                 │
│  NB Voltage                         1.50V(Default)                            │
│  LDT Voltage                        1.25V(Default)                            │
├─────────────────────────────────────────────────────────────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help    │
│      F5:Previous Values    F6:Optimized Defaults    F7:Standard Defaults      │
└─────────────────────────────────────────────────────────────────────────────┘
```

3-13 Password Settings

```
┌─────────────────────────────────────────────────┬───────────────────────┐
│                                                   │                       │
│  Set Supervisor Password        Press Enter       │      Item Help        │
│  Set User Password              Press Enter       │                       │
│                                                   ├───────────────────────┤
│                                                   │                       │
│                                                   │   Menu Level >        │
│                                                   │                       │
│                                                   │                       │
│                                                   │                       │
├───────────────────────────────────────────────────────────────────────────┤
│  ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│      F5:Previous Values    F6:Optimized Defaults   F7:Standard Defaults    │
└───────────────────────────────────────────────────────────────────────────┘
```

You can set either supervisor or user password, or both of them. The differences are:

Supervisor password: Can enter and change the options of the setup menus.

User password: Can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

    ENTER PASSWORD:

Type the password, up to eight characters in length, 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 and not enter a password.

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

    PASSWORD DISABLED.

When a password has been enabled, 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 require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

3-14 Load Standard/Optimized Defaults

Load Standard Defaults

When you press <Enter> on this item, you get confirmation dialog box with a message similar to:

    Load Standard Defaults (Y/N)? N

Pressing <Y> loads the BIOS default values for the most stable, minimal-performance system operations.

Load Optimized Defaults

When you press <Enter> on this item, you get a confirmation dialog box with a message similar to:

    Load Optimized Defaults (Y/N)? N

Pressing <Y> loads the default values that are factory settings for optimal performance system operations.

Chapter 4

DRIVER & FREE PROGRAM INSTALLATION

Check your package and there is A MAGIC INSTALL CD included. This CD consists of all DRIVERS you need and some free application programs and utility programs. In addition, this CD also include an auto detect software which can tell you which hardware is installed, and which DRIVERS needed so that your system can function properly. We call this auto detect software MAGIC INSTALL.

MAGIC INSTALL supports WINDOWS 9X/NT/2K/XP

Insert CD into your CD-ROM drive and the MAGIC INSTALL Menu should appear as below. If the menu does not appear, double-click MY COMPUTER / double-click CD-ROM drive or click START / click RUN / type X:\SETUP.EXE (assuming X is your CD-ROM drive).
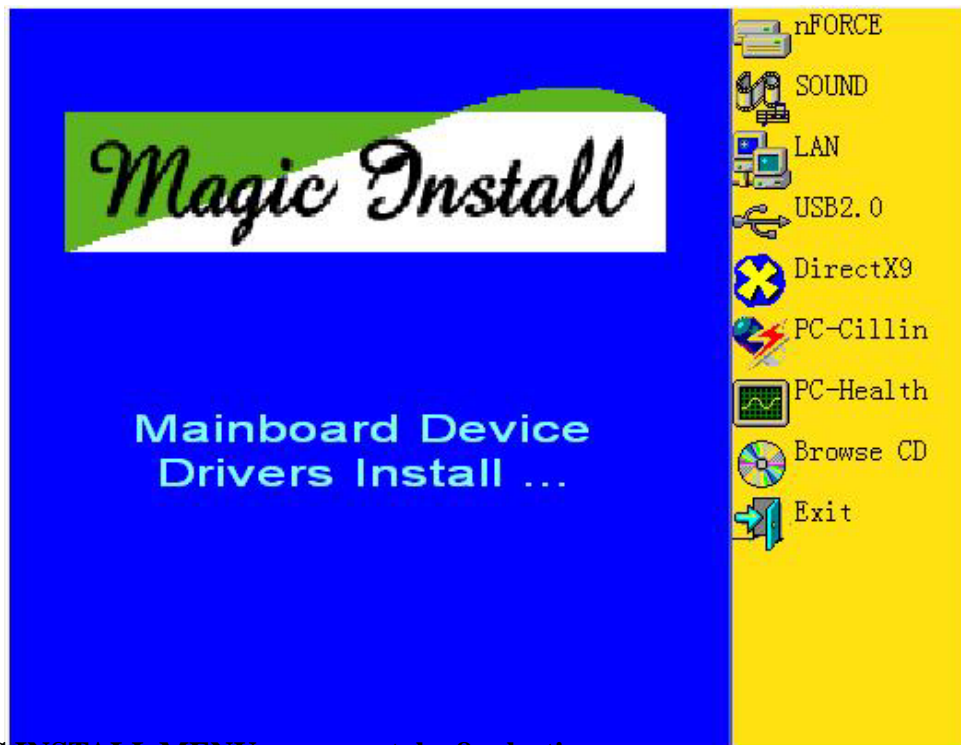
From MAGIC INSTALL MENU you may take 8 selections:

1. nFORCE   install nFORCE integrated driver
2. SOUND   install ALC850 AC97' Codec Audio driver
3. USB2.0   install USB 2.0 driver
4. LAN   install LAN driver
5. DirectX9   install Microsoft DirectX 9 driver
6. PC-CILLIN   install PC-CILLIN2005 anti-virus program
7. PC-HEALTH   install My Guard PC-Health utility
8. BROWSE CD   to browse the contents of the CD
9. EXIT   to exit from MAGIC INSTALL menu

4-1 nForce Install nForce Integrated Driver

*   nForce Integrated driver pack include following device driver:

NVIDIA GART driver :　　　　　If you are using an AGP VGA Card, please install NVIDIA
AGP GART driver which provides service routines to your
VGA driver and interface directly to the hardware for speedy
graphic access.

NVIDIA SMBUS driver :　　　　Install NVIDIA SMBUS driver

NVIDIA ETHERNET driver :　　Install NVIDIA 10/100 Fast Ethernet device driver.
Install NVIDIA firewall and Forceware Network Access
Manager utility.

NVIDIA IDE driver :　　　　　　Install NVIDIA IDE driver

1. Click nForce in the MAGIC INSTALL
    MENU

2. Click NEXT when nForce Integrated driver
    Install windows appears
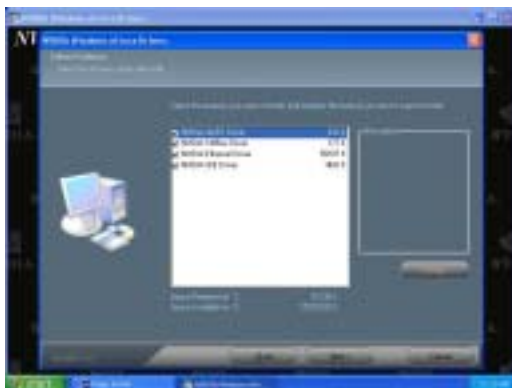
3. Please select the features you wish to install .

4. Click NEXT to install IDE driver and click
    "Yes" to proceed while system asking "Do you
    want to install the NVIDIA IDE SW Driver?"
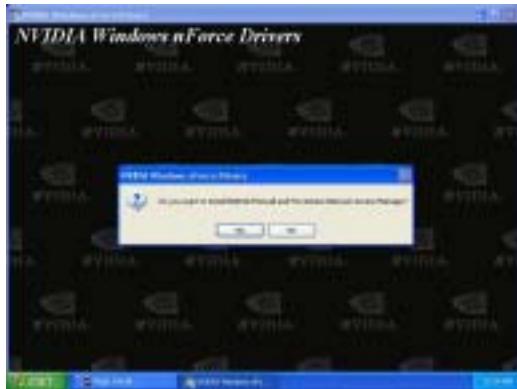
5. Please choose to install the NVIDIA firewall and Forceware Network Access Manager Utility Driver for demanding on you own.

6. If you want to install NVIDIA firewall and Forceware Network Access Manager utility
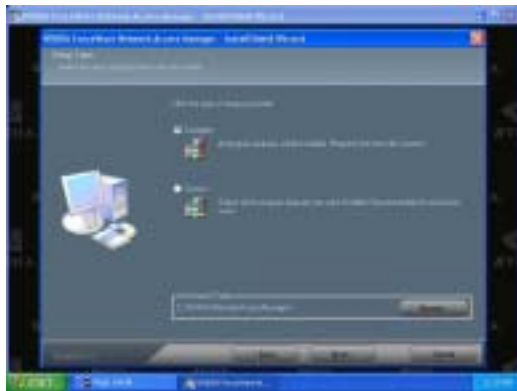
7. Select install complete software and Click NEXT

8. Select interface language and Click NEXT

9. Please choose NVIDIA or Windows firewall for your system.

10. Select Finish and restart your computer

*   The path of the file is X:\NFORCE4\DRIVER\SETUP.EXE

4-2 SOUND install ALC850 8-Channel Audio Driver

1. Click SOUND when MAGIC INSTALL MENU appears
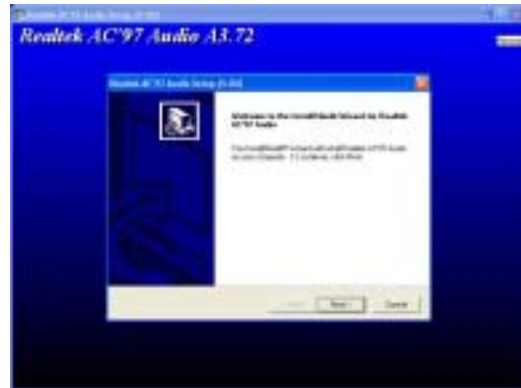
2. Click NEXT When Realtek AC97Audio driver windows appears

3. Click FINISH and restart your computer

4. Manual Sound Effect Setting

5. Speaker configuration setting

6. SPDIF N/OUT setting

4-3 LAN Marvell Yukon Gigabit Ethernet NIC Driver
(for 939GT4-SLI / 939GT4-Ultra Motherboard Series)

1. Click LAN when Magic Install Menu appear

2. Click Next to install Marvell LAN driver

3. Please Accept the license agreement and read the "Readme" file for detailed information , then click Next to proceed.

4. Click Install to install driver and Click Finish end the installation

4-4 USB2.0   Install Intel USB2.0 DRIVER

Windows 2000 OS

Please install Windows 2000 service pack 4 or later .

Windows XP OS

Please install Windows XP service pack 1 or later .

4-5 PC-CILLIN Install PC-CILLIN 2005 Anti-virus program

5. Click PC-CILLIN when MAGIC INSTALL MENU appears
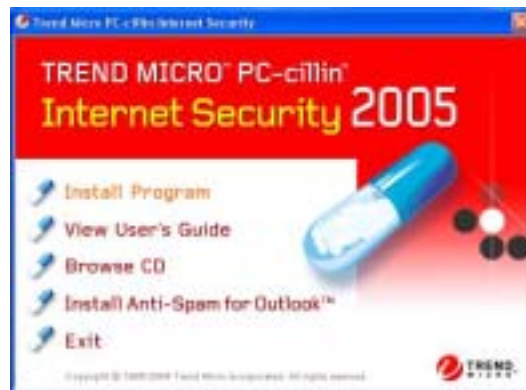
6. Please select "Install program" when the "Trend Micro internet security" installshield wizard windows appears

7. Click NEXT and Enter your Customer Information, Click NEXT or choose Change to change the path for the file to be stored

8. Please select install "FULL" function or install "Antivirus software" only
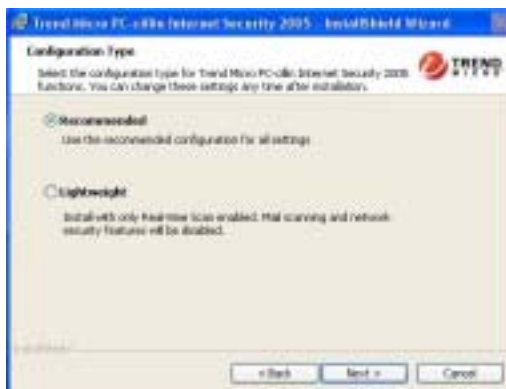
9. We suggest to use "Recommend configuration".
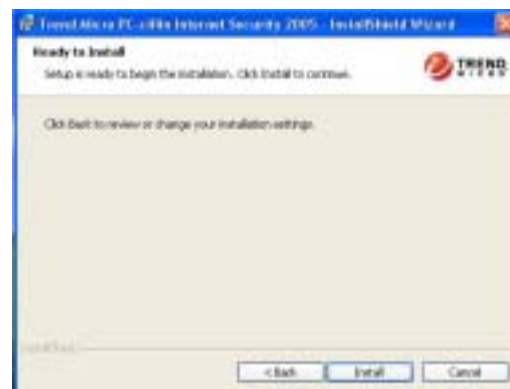
Click Install to install PCCILLIN 2005 internet security software , then select to restart your computer

Note : Please install ACROBAT READER for reading PC-CILLIN 2005 User Manual which locates at the path "X:\acrobat\adberdr6_enu_full.exe".

4-6 PC-HEALTH Install MyGuard Hardware monitor Utility

1. Click PC-HEALTH when MAGIC INSTALL MENU appears

2. Click Next when Install shield wizard Window appears, Choose destination location and click Next, when the start copy file windows appear, click next

3. Select Finish after setup complete

4. Execute MY GUARD utility, On-time Monitoring your system health

NOTE:
MAGIC INSTALL will auto detect file path X:\NFORCE4\MYGUARD\SETUP.EXE

4-7 HOW TO UPDATE BIOS

Before updating the BIOS, users have to "Disable" the "Flash Part Write Protect" selection in "Miscellaneous Control" of BIOS SETUP. Otherwise the system the will not allow you to upgrade BIOS by Award Flash Utility.

STEP 1. Prepare a boot disc. (you may make one by click START click RUN type SYS A: click OK)

STEP 2. Copy utility program to your boot disc. You may copy from DRIVER CD X:\FLASH\AWDFLASH.EXE or download from our web site.

STEP 3. Download and make a copy of the latest BIOS for 939GT4-SLI-D/ 939GT4-SLI-G/ 939GT4-SLI-P motherboard series from the web site to your boot disc.

STEP 4. Insert your boot disc into A:,
start the computer, type "Awdflash A:\939GT4xxx.BIN /SN/PY/CC/R"
939GT4xxx.BIN is the file name of latest BIOS it can be 939GT403.BIN or 939GT402.BIN
SN   means   don't save existing BIOS data
PY   means   renew existing BIOS data
CC   means   clear existing CMOS data
R   means   restart computer

STEP 5. Push ENTER to update and flash the BIOS, then the system will restart automatically.

4-8 Nforce4 Platform RAID Function Installation

Step 1.

Please get into the location: BIOS setup \ Integrated Peripherals \ Onchip IDE function \ RAID Configuration to enable the RAID function and choose the RAID hard drive channel.

```
              Phoenix – AwardBIOS CMOS Setup Utility
                          RAID Configuration
┌─────────────────────────────────────────────────────────────────────┐
│                                         │                             │
│  RAID Enable                 Enabled    │         Item Help           │
│  IDE Primary Master   RAID   Disabled   │                             │
│  IDE Primary Slave    RAID   Disabled   ├─────────────────────────────┤
│  IDE Secondary Master RAID   Disabled   │                             │
│  IDE Secondary Slave  RAID   Disabled   │    Menu Level >>            │
│  SATA Channel 1         RAID  Enabled   │                             │
│  SATA Channel 2         RAID  Enabled   │                             │
│  SATA Channel 3         RAID  Enabled   │                             │
│  SATA Channel 4         RAID  Enabled   │                             │
│                                         │                             │
│                                         │                             │
│                                         │                             │
├─────────────────────────────────────────────────────────────────────┤
│   ↑↓→← Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit  F1:General Help │
│        F5:Previous Values   F6:Optimized Defaults    F7:Standard Defaults   │
└─────────────────────────────────────────────────────────────────────┘
```

Step 2.

After the System boot up in the second page , you can find the NVIDIA RAID IDE ROM BIOS windows appear. It will ask you to "Press F10 to enter RAID setup utility …" ?
Please press "F10" key to RAID utility now , then you can select the RAID functions on your own with the optional RAID functions as below,
1. Mirroring 2. Striping 3. Striping Mirroring 4. Spanning
2.

<div align="center">

Array 1 : NVIDIA MIRROR 74.50G

- Array Detail -

</div>

```
    RAID Mode : Mirroring
     Striping Width : 1            Striping Block: 64K

    Adapt   Channel   M/S     Index   Disk Model Name          Capacity

     1       0          Master   0      WDC      WD800JB-75JMA0      75.50GB
     1       0          Master   0      WDC      WD800JB-75JMA0      75.50GB




            [R] Rebuild   [D] Delete  [C] Clear Disk  [ENTER]   Return
```

Step 3.

Making RAID driver diskette before Install WindowsXP/2000

Before you install the Windows XP or Windows 2000, you will need to make a RAID driver diskette before you start to install the Operating System.

How to make a RAID driver diskette?

1: Insert the diskette which is being formatted in floppy drive on a system which can start OS.
2: After booting OS insert the bundle CD in your CD-ROM
3: Copy all the files from \Nforce4\RAIDDisk to floppy diskette
Once you have the SATA driver diskette ready, you may start to install Windows XP or Windows 2000 on your System.

Installation of Windows XP/ Windows 2000

For installation of Windows XP or Windows 2000, please insert Windows XP or Windows 2000 CD into the CD-ROM drive. Then remove the floppy diskette, and boot the system. At the very beginning, you will see the message at the bottom of screen, "Press F6 if you need to install a third party SCSI or RAID driver…."
At this moment, please press <F6> key and follow the instructions of Windows XP or Windows 2000 for the proper installation.

Execute Start → programs → NVIDIA corporation → RAID manager , you can view RAID function status or rebuild RAID function from Windows OS
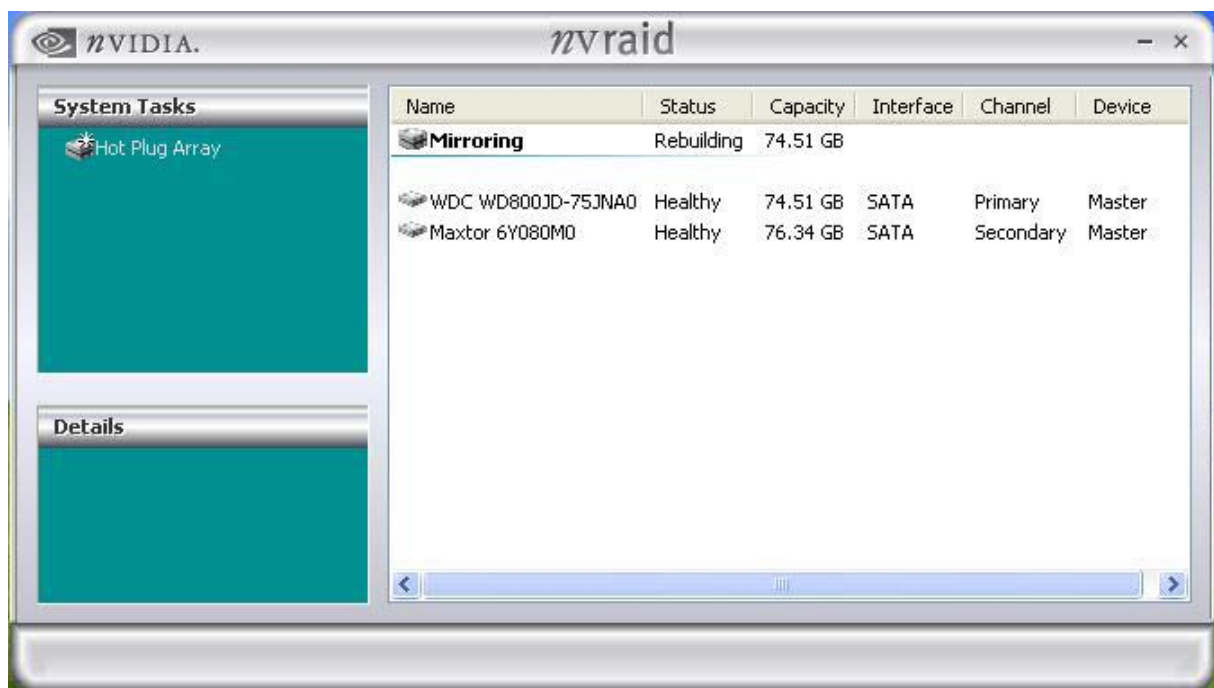
4-9　Pro Magic Plus Function Introduction

What's Pro Magic Plus?

Tired with reinstall OS each time when it doesn't work?　Does your computer often crash down or unable to work after installed new software? Have you had great loses and troubles because of computer problems? Still using time-consuming backup software that occupies lots of HD space?

Pro Magic Plus- an instant system recovery software tailored to solve these problems for you.　It combines various application tools (e.g. anti-virus, backup software, uninstall software, multi-boot software) to satisfy your needs of all sorts of system protections.

What functions does Pro Magic Plus have?

1. **Instant System Restoration** – Regardless of mis-operation or system crash, install Pro Magic Plus beforehand would allow you to instantly restore your system back by simply reboot your computer.

2. **Easy-to-use** – Auto installation from CD ROM; Supports Mouse

3. **System Uninstall** – Pro Magic provides a protection mode, which allows user to freely test any software.　If user does not want to keep the software, just reboot the computer to restore back to the previous state, and Pro Magic will remove it completely from you computer.

4. **Password Security** – Pro Magic provides double password protection, including user password for entering each OS and manager password for managing 'Pro Magic', which can effectively prevent others from using your computer without permission or data from being stolen. (disable item for OEM version)

5. **Complete Protection** – Pro Magic not only protects the system disk, but also can protect your data disk, and does not require to reboot when backup or restore data disk.

6. **Multipoint Save/Restore** – You can backup your system whenever you need and restore them back to anytime you wish, 1 hour, 1 day or 1 month ago.　Restore points are unlimited. (disable item for OEM version)

7. **Data Disk Protection** – Pro Magic Plus now comes with data disk protection, provides complete protection for your computer! (disable item for OEM version)

8. **You can choose to change the default path of 'My Document', 'My Favorite' and 'Outlook Express'**, so that when you are restoring the system, data in these folders will not be restored as well. (This is optional, you can leave it as it is).
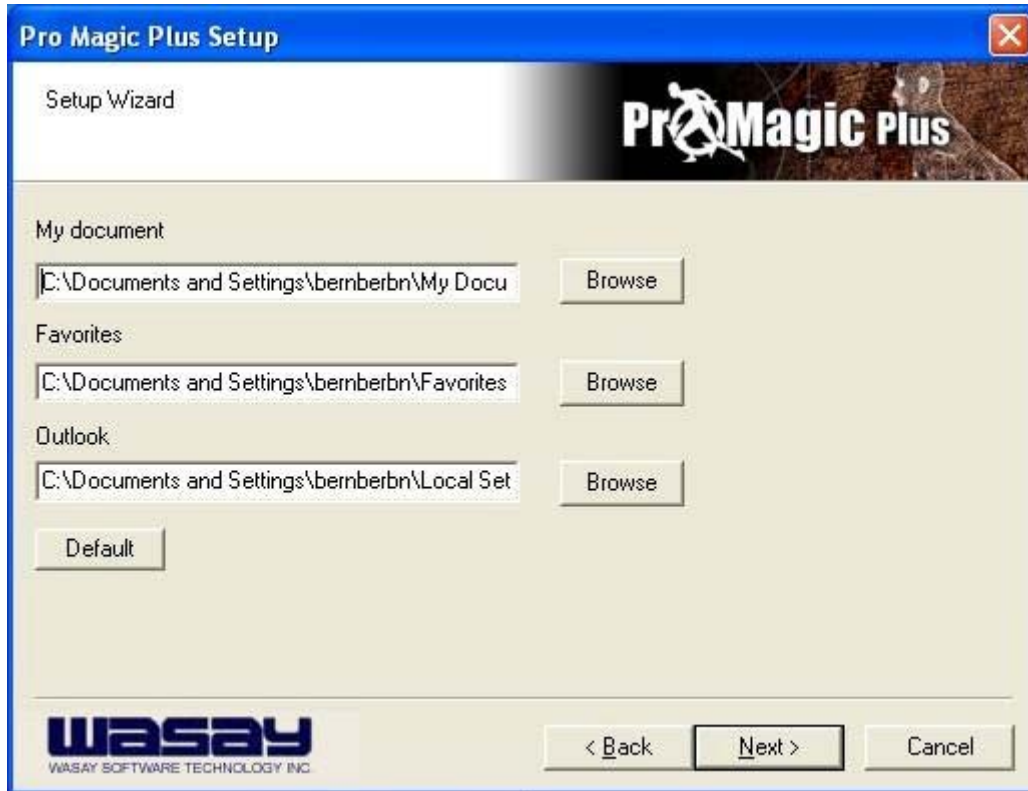
graph 4

📁**NOTE:** Functions of each version will differ from each other, and will be based on the function descriptions of each version.

System Requirements
First OS must be Windows 98 SE/ME/2000/XP
Support Only Windows OS (No Linux)
Windows server OS and Windows NT not supported
Minimum of Intel 486 or above, 16MB of memory or above
Minimum of 500MB free/usable space or above
Support for SCSI & SATA Hard disk

Pro Magic Plus only supports SCSI hard disk with Windows 2000 or OS above

Notice Before Installation
1. Before install Pro Magic Plus, turn off all anti-virus software. (Include BIOS anti-virus function)

2. Pro Magic Plus does not support multiple PRI partitions. If you have multiple PRI partitions, please repartition your HD before installation.

3. If your HDD is not fully partitioned (with un-partitioned/unused space at end of HDD), please repartition the HDD before install Pro Magic Plus.

APPENDIX

Debug Port Post Code

Normal POST Codes

NOTE: **EISA POST codes are typically output to port address 300h.**

ISA POST codes are output to port address 80h.

Code(hex)	Name	Description
C0	Turn Off Chipset And CPU test	OEM Specific-Cache control cache Processor Status (1FLAGS) Verification. Tests the following processor status flags: Carry, zero, sign, overflow, The BIOS sets each flag, verifies They are set, then turns each flag off and verifies it is off. Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00. RAM must be periodically refreshed to keep the memory from decaying. This function ensures that the memory refresh function is working properly.
C1	Memory Presence	First block memory detect OEM Specific-Test to size on-board memory. Early chip set initialization Memory presence test OEM chip set routines Clear low 64K of memory Test first 64K memory.
C2	Early Memory Initialization	OEM Specific- Board Initialization
C3	Extend Memory DRAM select	OEM Specific- Turn on extended memory Initialization Cyrix CPU initialization Cache initialization
C4	Special Display Handling	OEM Specific- Display/Video Switch Handling so that Switch Handling display switch errors never occurs
C5	Early Shadow	OEM specific- Early shadow enable for fast boot
C6	Cache presence test	External cache size detection
CF	CMOS Check	CMOS checkup
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
BF	Program Chip Set	To program chipset from defaults values
E1-EF	Setup Pages	E1- Page 1, E2 - Page 2, etc.
1	Force load Default to chipset	Chipset defaults program
2	Reserved	
3	Early Superio Init	Early Initialized the super IO

Code(hex)	Name	Description
4	Reserved	
5	Blank video	Reset Video controller
6	Reserved	
7	Init KBC	Keyboard controller init
8	KB test	Test the Keyboard
9	Reserved	
A	Mouse Init	Initialized the mouse
B	Onboard Audio init	Onboard audio controller initialize if exist
C	Reserved	
D	Reserved	
E	CheckSum Check	Check the intergraty of the ROM,BIOS and message
F	Reserved	
10	Auto detec EEPROM	Check Flash type and copy flash write/erase routines to 0F000h segments
11	Reserved	
12	Cmos Check	Check Cmos Circuitry and reset CMOS
13	Reserved	
14	Chipset Default load	Program the chipset registers with CMOS values
15	Reserved	
16	Clock Init	Init onboard clock generator
17	Reserved	
18	Identify the CPU	Check the CPU ID and init L1/L2 cache
19	Reserved	
1A	Reserved	
1B	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
1C	Reserved	
1D	Early PM Init	First step initialize if single CPU onboard
1E	Reserved	
1F	Re-initial KB	Re-init KB
20	Reserved	
21	HPM init	If support HPM, HPM get initialized here
22	Reserved	
23	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset
24	Reserved	
25	Reserved	
26	Reserved	
27	KBC final Init	Final Initial KBC and setup BIOS data area
28	Reserved	
29	Initialize Video Interface	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
2A	Reserved	
2B	Reserved	
2C	Reserved	
2D	Video memory test	Test video memory, write sign-on message to screen.
2E	Reserved	Setup shadow RAM - Enable shadow according to Setup.

Code(hex)	Name	Description
2F	Reserved	
30	Reserved	
31	Reserved	
32	Reserved	
33	PS2 Mouse setup	Setup PS2 Mouse and reset KB
34	Reserved	
35	Test DMA Controller 0	Test DMA channel 0
36	Reserved	
37	Test DMA Controller 1	Test DMA channel 1
38	Reserved	
39	Test DMA Page Registers	Test DMA Page Registers.
3A	Reserved	
3B	Reserved	
3C	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
3D	Reserved	
3E	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
3F	Reserved	
40	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
41	Reserved	
42	Reserved	
43	Test Stuck8259's Interrupt Bits Test 8259 Interrupt Functionality	Turn off interrupts then verify no interrupt mask register is on. Force an interrupt and verify the interrupt occurred.
44	Reserved	
45	Reserved	
46	Reserved	
47	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag.
48	Reserved	
49	Size Base and Extended Memory	Size base memory from 256K to 640K and extended memory above 1MB.
4A	Reserved	
4B	Reserved	
4C	Reserved	
4D	Reserved	
4E	Test Base and Extended Memory	Test base memory from 256K to 640K and extended memory above 1MB using various patterns. NOTE: This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.
4F	Reserved	
50	USB init	Initialize USB controller
51	Reserved	

Code(hex)	Name	Description
52	Memory Test	Test all memory of memory above 1MB using Virtual 8086 mode, page mode and clear the memory
53	Reserved	
54	Reserved	
55	CPU display	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features
56	Reserved	
57	PnP Init	Display PnP logo and PnP early init
58	Reserved	
59	Setup Virus Protect	Setup virus protect according to Setup
5A	Reserved	
5B	Awdflash Load	If required, will auto load Awdflash.exe in POST
5C	Reserved	
5D	Onboard I/O Init	Initializing onboard superIO
5E	Reserved	
5F	Reserved	
60	Setup enable	Display setup message and enable setup functions
61	Reserved	
62	Reserved	
63	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
64	Reserved	
65	PS2 Mouse special	Special treatment to PS2 Mouse port
66	Reserved	
67	ACPI init	ACPI sub-system initializing
68	Reserved	
69	Setup Cache Controller	Initialize cache controller.
6A	Reserved	
6B	Setup Entering	Enter setup check and auto-configuration check up
6C	Reserved	
6D	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
6E	Reserved	
6F	FDD install	Install FDD and setup BIOS data area parameters
70	Reserved	
71	Reserved	
72	Reserved	
73	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
74	Reserved	
75	Install HDD	IDE device detection and install
76	Reserved	
77	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
78	Reserved	
79	Reserved	
7A	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
7B	Reserved	

Code(hex)	Name	Description
7C	HDD Check for Write protection	HDD check out
7D	Reserved	
7E	Reserved	
7F	POST error check	Check POST error and display them and ask for user intervention
80	Reserved	
81	Reserved	
82	Security Check	Ask password security (optional).
83	Write CMOS	Write all CMOS values back to RAM and clear screen.
84	Pre-boot Enable	Enable parity checker Enable NMI, Enable cache before boot.
85	Initialize	Initialize any option ROMs present Option ROMs from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
86	Reserved	
87	Reserved	
88	Reserved	
89	Reserved	
8A	Reserved	
8B	Reserved	
8C	Reserved	
8D	Reserved	
8E	Reserved	
8F	Reserved	
90	Reserved	
91	Reserved	
92	Reserved	
93	Boot Medium detection	Read and store boot partition head and cylinders values in RAM
94	Final Init	Final init for last micro details before boot
95	Special KBC patch	Set system speed for boot Setup NumLock status according to Setup
96	Boot Attempt	Set low stack Boot via INT 19h.
FF	Boot	

Quick POST Codes

Code(hex)	Name	Description
65	Init onboard device	Early Initialized the super IO Reset Video controller Keyboard controller init Test the Keyboard Initialized the mouse Onboard audio controller initialize if exist. Check the intergraty of the ROM, BIOS and message Check Flash type and copy flash write/erase routines to 0F000h segments Check Cmos Circuitry and reset CMOS Program the chipset registers with CMOS values Init onboard clock generator

Code(hex)	Name	Description
66	Early System setup	Check the CPU ID and init L1/L2 cache Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL First step initialize if single CPU onboard. Re-init KB If support HPM, HPM get initialized here
67	KBC and CMOS Init	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset Final Initial KBC and setup BIOS data area.
68	Video Init	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter. Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
69	8259 Init	Init 8259 channel 1 and mask IRQ 9
6A	Memory test	Quick Memory Test
6B	CPU Detect and IO init	Detect CPU speed and display CPU vendor specific version string and turn on all necessary CPU features Display PnP logo and PnP early init Setup virus protect according to Setup. If required, will auto load Awdflash.exe in POST Initializing onboard superIO
6C	Reserved	
6D	Reserved	
6E	Reserved	
6F	Reserved	
70	Setup Init	Display setup message and enable setup functions Detect if mouse is present, initialize mouse, install interrupt vectors. Special treatment to PS2 Mouse port ACPI sub-system initializing
71	Setup Cache Controller	Initialize cache controller.
72	Install FDD	Enter setup check and auto-configuration check up Initialize floppy disk drive controller and any drives. Install FDD and setup BIOS data area parameters
73	Install HDD	Initialize hard drive controller and any drives. IDE device detection and install Initialize any serial and parallel ports (also game port).
74	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
75	HDD Check for Write protection	HDD check out
76	Reserved	

Code(hex)	Name	Description
77	Display POST error	Check POST error and display them and ask for user intervention Ask password security (optional).
78	CMOS and Option ROM Init	Write all CMOS values back to RAM and clear screen. Enable parity checker Enable NMI, Enable cache before boot. Initialize any option ROMs present from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
79	Reserved	
7A	Reserved	
7B	Reserved	
7C	Reserved	
7D	Boot Medium detection	Read and store boot partition head and cylinders values in RAM
7E	Final Init	Final init for last micro details before boot
7F	Special KBC patch	Set system speed for boot Setup NumLock status according to Setup
80	Boot Attempt	Set low stack Boot via INT 19h.
FF	Boot	

S4 POST Codes

Code(hex)	Name	Description
5A	Early Chipset Init	Early Initialized the super IO Reset Video controller Keyboard controller init Test the Keyboard Initilized the mouse
5B	Cmos Check	Check Cmos Circuitry and reset CMOS
5C	Chipset default Prog	Program the chipset registers with CMOS values. Init onboard clock generator
5D	Identify the CPU	Check the CPU ID and init L1/L2 cache
5E	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and INT 00h-1Fh according to INT_TBL First step initialize if single CPU Onboard. Re-init KB If support HPM, HPM get initialized Here.
5F	Test CMOS Interface and Battery status	Verifies CMOS is working correctly, detects bad battery. If failed, load CMOS defaults and load into chipset
60	KBC final Init	Final Initial KBC and setup BIOS data area

Code(hex)	Name	Description
61	Initialize Video Interface	Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
62	Video memory test	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
63	Setup PS2 mouse and test DMA	Setup PS2 Mouse and reset KB Test DMA channel 0
64	Test 8259	Test 8259 channel 1 and mask IRQ 9
65	Init Boot Device	Detect if mouse is present, initialize mouse, install interrupt vectors. Special treatment to PS2 Mouse port ACPI sub-system initializing Initialize cache controller.
66	Install Boot Devices	Enter setup check and auto-configuration check up Initialize floppy disk drive controller and any drives. Install FDD and setup BIOS data area Parameters Initialize hard drive controller and any drives. IDE device detection and install
67	Cache Init	Cache init and USB init
68	PM init	PM initialization
69	PM final Init and issue SMI	Final init Before resume
FF	Full on	

BootBlock POST Codes

Code(hex)	Name	Description
1	Base memory test	Clear base memory area (0000:0000--9000:ffffh)
5	KB init	Initialized KBC
12	Install interrupt vectors	Install int. vector (0-77), and initialized 00-1fh to their proper place
0D	Init Video	Video initializing
41	Init FDD	Scan floppy and media capacity for onboard superIO
FF	Boot	Load boot sector