



User's Manual

**nVIDIA nForce4 SLI Intel Edition
mainboard for Intel Socket 775 processor**

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Post Post Frequently Asked Questions

Below is a list of some basic POST Codes, possible problems and solutions. For more detailed information about POST Codes, refer to Appendix C in this manual.

POST CODE	Problem	Solution
FFh or CFh	<ol style="list-style-type: none">1. BIOS chip inserted incorrectly2. Incorrect BIOS update version3. Mainboard problem4. Add-on card inserted incorrectly.	<ol style="list-style-type: none">1. Reinsert the BIOS chip2. Download the correct BIOS version update from the manufacturer's Web site.3. Replace mainboard4. Remove and replace the add-on card
C1h - C5h	<ol style="list-style-type: none">1. Memory module inserted incorrectly2. Memory compatibility problem3. Memory module damaged	<ol style="list-style-type: none">1. Reinsert memory module2. Replace memory with correct type3. Replace memory module
2Dh	<ol style="list-style-type: none">1. Error occurred in VGA BIOS2. VGA card inserted incorrectly	<ol style="list-style-type: none">1. Replace VGA card2. Reinsert the VGA card
26h	Overclock error	Clear CMOS or press the insert key to power on the system
07h - 12h	<ol style="list-style-type: none">1. Initial Keyboard controller error2. RTC error	<ol style="list-style-type: none">1. Ensure that the keyboard and mouse are connected correctly.2. Replace the RTC battery.

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Section 1

INTRODUCTION

1-1 Package Contents

Contents

- A. Mainboard
- B. User's manual
- C. Floppy drive cable
- D. HDD drive cable
- E. CD (drivers and utilities)
- F. I/O Shield
- G. S-ATA II data and power cable
- H. Extra USB2.0 port cable
- I. SLI bridge card

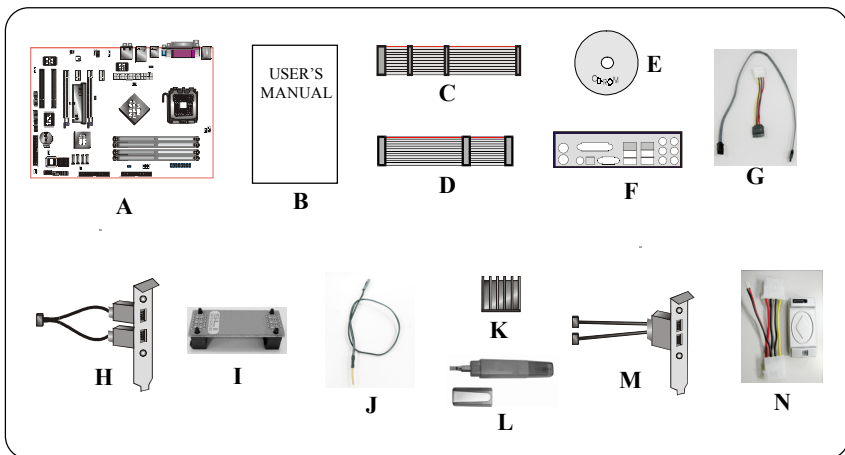
Powerpack items (Optional)

- J. Thermo Stick cable
- K. Mini heatsink
- L. Tool Pen

Optional Items

- M. IEEE 1394 two port cable
- N. SP-ATA Kit

If you need the optional item, please contact your dealer for assistance.



1-2 Mainboard Features

Brief Introduction

★ Intel® Pentium® 4 processors

The Pentium 4 processor is designed to deliver performance across applications and usages where end-users can truly appreciate and experience the performance. The Pentium 4 processor delivers this world-class performance for consumer enthusiasts and business professional desktop PC users as well as for entry-level workstation users.

Intel adds support for Hyper-Threading Technology to the Pentium 4 processor family. HT Technology allows a single, physical Pentium 4 processor to function as two logical processor for next generation multi threaded application.

For more information about all the new features the Pentium 4 delivers, check out the Intel website at <http://www.intel.com>

★ Chipset

The board is designed with NVIDIA chipset, nForce4 SLI Intel Edition as North Bridge and MCP04 as South Bridge, featuring performance and stability with the most innovative technology and features, including the world's first and only native Gigabit Ethernet interface and hardware-optimized Firewall security solution.

For more details about the NVIDIA nForce4, please visit the NVIDIA Web site at <http://www.nvidia.com>.

★ NVIDIA SLI



NVIDIA SLI™ technology revolutionizes PC performance by combining multiple PCI Express GPUs in a single and scalable system! Gamers and hardcore enthusiasts know that dual GPUs mean increased, supercharged 3D graphics and performance. Get unmatched PC security protection, reliable NVIDIA nForce Storage, and more. NVIDIA nForce4 SLI MCPs set the performance bar that other PCs can only dream of reaching

★ PCI-Express (PCI-E)

Next generation peripheral interface to succeed to current PCI bus for the next decade. With smaller slot size and 250MB/sec (PCI-E*1) or 4GB/sec(PCI-E*16) maximum transfer, PCI-Express overcomes PCI bus bottleneck.

★ **DDR2**

DDR2 ushers in the new era of DDR memory technology. DDR2 memory offers faster speed, higher data bandwidth and lower power consumption over DDR.

★ **Hardware Monitoring**

Hardware monitoring enables you to monitor various aspects of the system operation and status. This includes CPU temperature, voltage and fan speed in RPMs.

★ **GbE LAN**

The new Gigabit Ethernet LAN allows data transmission at 1,000 megabits per second (Mbps), which runs 10 times faster than conventional 10/100BASE-T Ethernet LANs.

★ **Serial ATA II**

The second generation SATA interface with double the transferring speed up to 300MB/sec. It supports NCQ to provide faster reading speed for your storage devices. Hot-plug has also become its standard function to plug/unplug whenever you want.

★ **SATA RAID**

RAID function available on chipset's S-ATA II ports.

★ **IEEE 1394 (Optional)**

Supports IEEE 1394a (or Firewire) for easy connection to Video Camcorder and external drives. The IEEE1394a specifications defines a transfer rate of up to 400Mbps.

★ **USB2.0**

A popular USB standard for plugging in peripherals with up to 480Mbps transfer speed while maintaining backward compatibility with older USB1.1 device.

★ **8ch**

Delivers 8 channel audio to bring you the latest in audio realism from DVD movies and games. Perfect for your home theatre system.

★ **NVIDIA ActiveArmor™**

Enhances networks security while delivers the highest system performance by off-loading CPU-intensive packet filtering tasks in hardware, providing users with a PC networking environment that is both fast and secure.

★ NV Firewall

An unprecedented addition design for nForce product, provide high performance & enhanced reliability of PC security solution to the users. The features would be more advanced than many stand-alone firewalls can provide!

Special Features

BIOS Features:

Magic Health

Reports your system hardware status for every boot-up to help detect faults early. Monitor hardware status including CPU temperature, CPU/Memory/ Chipset voltage, fan RPM speed for chassis fan, CPU fan & Power supply fan.

EZ-Boot

Simply press “ESC” to select your bootable device. No more hassle to search the BIOS menu, change and re-start.

PowerBIOS

Supporting a full range of overclocking setting via BIOS. Various adjustable feature include FSB/Chipset/Memory voltage tweaking.

H/W Features:

Post Port

An onboard LED-display trouble-shooting device, facilitating user to detect boot-up problems.

QuickSPDIF

On board SPDIF-out connector for quick connection to multi-channel speakers. Not only removes cable cluttering but also delivers loss-free digital audio to let you enjoy DVD movies and games with crystal clear sound.

EZ-Button

A handy power-on button located onboard to turn on/off the system easily, especially while debugging or testing the system.

👍 **Thermo Stick (Optional)**

Flexible thermometer to let you measure any temperature by software. Ideal for monitoring VGA card, chipset or even disk drives temperatures. Refer to page 3-16 for details.

👍 **LEDION (Optional)**

Onboard LED indicators to show the power status CPU, Chipset and DRAM. You know immediately where to look if the system fails to start.

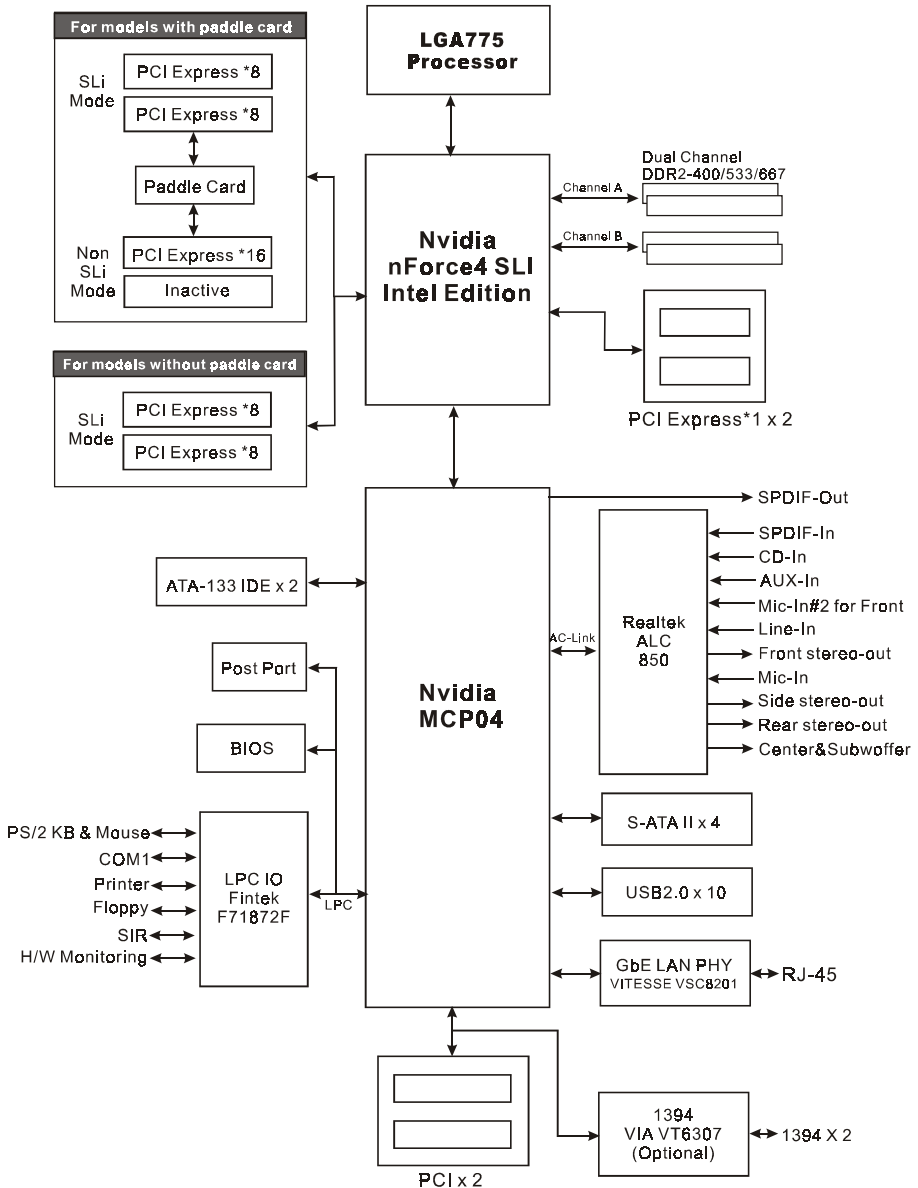
👍 **SP-ATA (Optional)**

A S-ATA to IDE conversion device included in this package. Older IDE hard-drives can now be plugged to new Serial-ATA interface through this transition kit. SP-ATA even works for CD-ROM and DVD-ROM drives.

👍 **Pulse-XT (Optional)**

LED memory throughput meter. Shows the amount of memory load using a spectrum of LEDs onboard.

1-3 System Block Diagram



Section 2

SPECIFICATION

Mainboard Specification

● **Processor**

- ◆ Socket LGA775 for Intel® Celeron D® 3xx series, Intel® Pentium 4® 5xx/6xx series, P4EE up to 3.8+GHz
- ◆ Support Pentium D dual core processor from 3.0GHz and above
- ◆ Support 533/800/1066 MHz front-side bus
- ◆ Support Intel® EM64T 64-bit Computing platform
- ◆ Supports Hyper-Threading Technology
See <<http://www.intel.com/info/hyperthreading>> for information including details on which processor support HT Technology

● **Chipset**

- ◆ NVIDIA nForce4 SLi Intel Edition + MCP04

● **Main Memory**

- ◆ Four 240-pin DDR2 SDRAM DIMM sockets for maximum 16GB system memory with 64-bit O/S
- ◆ Support 1.8v DDR2-400/533/667 DIMMs with dual channel architecture
- ◆ Support single-sided or double-sided, non-ECC DIMMs with 256Mb/512Mb/1Gb devices

● **Expansion Slots**

- ◆ Two PCI connectors compliant with PCI v2.3
- ◆ Two PCI-Express (x1) connectors compliant with PCI Express 1.0a
- ◆ Two PCI Express (x16) connectors to support NVIDIA SLi technology
- ◆ Paddle card to select single PCI-Ex16 or dual PCI-Ex8 speed for VGA (Optional)

● **USB**

- ◆ **Ten** USB connectors compliant with USB2.0 from embedded USB controller (4 connectors at rear panel)

Specification

● P-ATA IDE

- ◆ Two IDE interface (up to 4 IDE devices) with UDMA-33, ATA-66/100/133 support from embedded IDE controller

● 1394a (Optional)

- ◆ Two 1394a ports with up to 400Mbps bandwidth from onboard **VIA VT6307** 1394a controller

● S-ATA RAID

- ◆ Four S-ATA II ports with up to 300MB/s bandwidth from MCP04 with RAID 0, 1, 0+1, 5 and Hot-Plug support

● LAN

- ◆ 1Gbps Ethernet from VITESSE VSC8201 LAN PHY supports:
 - nVidia Fireware V2.0
 - nVidia ActiveArmor Secure Network Engine

● Audio

- ◆ Selectable 2, 6 or 8-CH audio from onboard **ALC850** AC'97 v2.3 compliant CODEC
 - Support CD-In, AUX-in
 - Optical & Coaxial S/PDIF-out available on rear panel
 - Support **Jack detection** for fool-proof audio device installation
 - Rear panel audio jacks configuration:

Phone Jack Color	2 channel	6 channel	8 channel
Light Blue	Line-in	Line-in	Line-in
Lime	Line-out	Front stereo-out	Front stereo-out
Pink	Mic-in	Mic-in	Mic-in
Gray			Side stereo-out
Black		Rear stereo-out	Rear stereo-out
Orange		Center&Subwoofer	Center&Subwoofer

● I/O

- ◆ Onboard Fintek F71872F LPC bus I/O controller
- ◆ Legacy peripheral interface for PS/2 keyboard & mouse, FDD, Parallel, Serial and IrDA (v1.0 compliant)
- ◆ Support Hardware Monitoring for fan speed monitoring, CPU/System temperature and ThermoStick temperature.

- ◆ Intelligent fan speed control for CPU-fan (PWM) and Chassis-fan (DC) for quiet operation

● BIOS

- ◆ Flash EEPROM with Award Plug&Play BIOS
- ◆ Support ACPI S3 (Suspend To RAM) mode in ACPI compliant O/S
- ◆ Support **EZ Boot** for fast bootable device selection
- ◆ Support **Magic Health** for system hardware status report during system boot-up

● Peripheral Interfaces

☞ At Rear Panel

- ◆ PS/2 keyboard and mouse ports
- ◆ One S/PDIF-Out Coaxial jack
- ◆ One S/PDIF-Out Optical
- ◆ One RJ45 LAN connector
- ◆ Four USB2.0 ports
- ◆ Six Audio jacks

☞ Onboard connector and pin-header

- ◆ One floppy drive connector
- ◆ Two ATA-100/133 IDE connector
- ◆ Six extra USB2.0 ports
- ◆ One CD-IN and AUX-IN connector
- ◆ One IR connector
- ◆ Two 1394a connectors (Optional)
- ◆ Four S-ATA II connectors
- ◆ Four Fan connectors
- ◆ One Paddle card connector for SLI mode (Optional)

● Front Panel Controller

- ◆ Supports Reset & Soft-Off switches
- ◆ Supports HDD & Power LEDs

Specification

- ◆ Supports PC speaker
- ◆ Supports Front Panel Audio connector

● **Special Features**

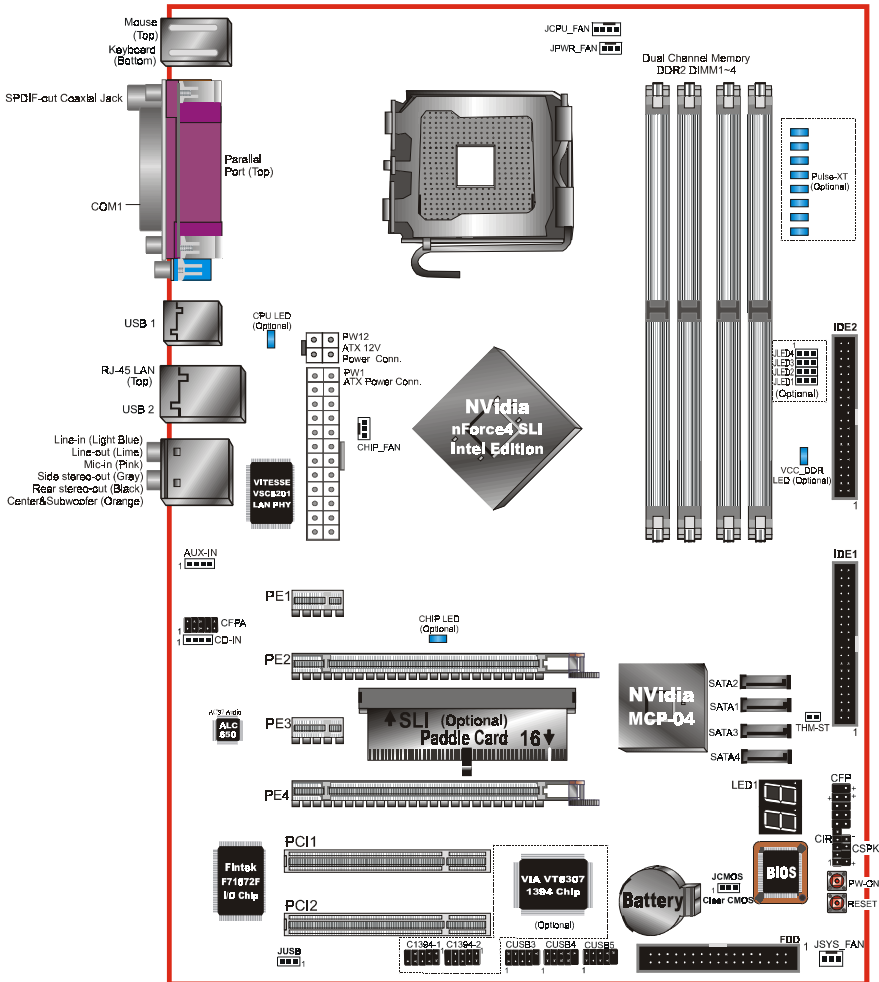
- ◆ Support KBPO function – Keyboard power on, turn on the computer from keyboard
- ◆ Support Wake-On-LAN by PME
- ◆ Support USB resume in S3
- ◆ Onboard Post Port LED display for system debugging
- ◆ Support LEDION – onboard LED power indicator for CPU, DDR and Chipset (Optional)
- ◆ Onboard Pulse-XT LED indicators for DDR usage display (Optional)
- ◆ Support Asynchronous clocking mode between FSB and PCI/PCI-E
- ◆ **PowerBIOS** for excellent overclocking features:
 - Programmable FSB and PCI Clock output frequency with 1MHz fine tuning
 - Support BIOS adjustable CPU multiplier, FSB clock, PCI-E x16 clock, DIMM frequency
 - Support BIOS adjustable CPU Core voltage, Chipset voltage, DIMM voltage settings

● **Form Factor**

- ◆ 305mm x 245 mm ATX size

Section 3 INSTALLATION

Mainboard Layout



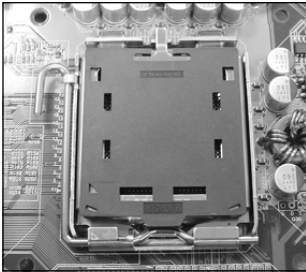
Note: Depending on the model you purchased, some components are optional and may not be available.

Easy Installation Procedure

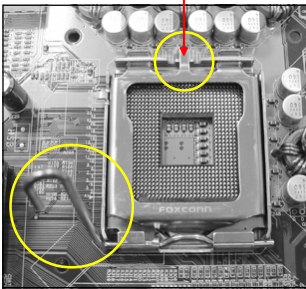
The following must be completed before powering on your new system:

- 3-1. CPU Installation
- 3-2. Jumper Settings
- 3-3. System Memory
- 3-4. VGA card installation
- 3-5. Device Connectors

3-1 CPU Installation



<Figure 1>



<Figure 2>

Step 2

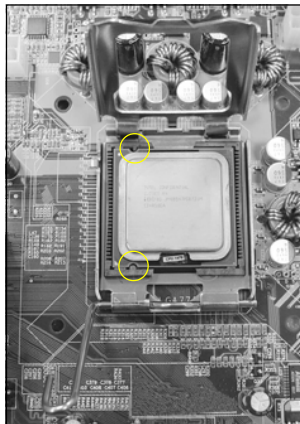
Open the socket by releasing the actuation lever, and press downwards at the tip shown by the arrow.

Step 1

Carefully remove the plastic protection plate from the socket.

Warning:

The pins inside the CPU socket are fragile and are easily broken. Be careful not to touch them when installing the CPU.



<Figure 3>

Step 3

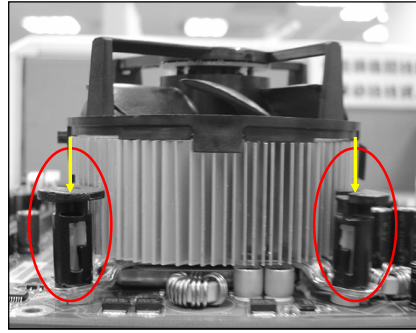
Before inserting the CPU, align the CPU according to the key slots shown in the picture. Gently place the CPU into the socket and make sure it is fully seated.



<Figure 4>

Step 4

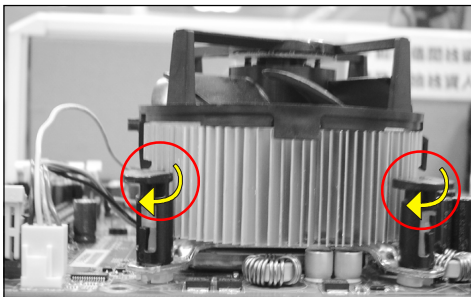
- Put the CPU lid on the socket, and close the socket by lowering and locking the actuation lever.
- Apply thermal compound to the top of the CPU and into the four holes around CPU area to install the cooler as shown.



<Figure 5>

Step 5

- Place the CPU cooler on top of the socket. Press its clips down firmly until it is completely seated in the hole.



<Figure 6>

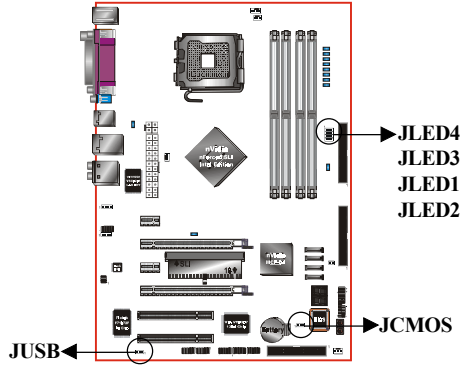
Step 6

- Rotate the clips 90 degrees to lock the CPU cooler in place.
- Plug the cooler fan power into the mainboard's CPU fan connector. The installation is complete.

CAUTION:

- Installing with incorrect CPU cooler and heatsink assemblies may damage the CPU. Use Intel's thermal solution shown in the illustrations above: an active heatsink; an extruded aluminum heatsink base; and a fan attached to the top of the fin array.
- Apply thermal compound or paste to the CPU to avoid CPU overheating and damage.
- In accordance with Intel guidelines specifications, do not install a CPU over 20 times to avoid damaging the pins on the CPU socket.

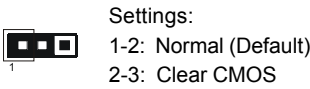
3-2 Jumper Settings



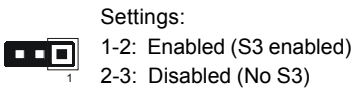
JCMOS: Clear CMOS data Jumper
If the CMOS data becomes corrupted or you forgot the supervisor or user password, clear the CMOS data to reconfigure the system back to the default values stored in the ROM BIOS.

To CMOS Clear data, please follow the steps below.

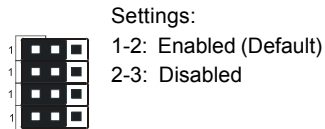
1. Turn off the system.
2. Change the jumper from “1-2” to “2-3” position for a few seconds.
3. Replace the jumper back to the “1-2” position.
4. Turn on the system and hold down the key to enter BIOS setup.



JUSB: USB S3 Wake up Jumper
This jumper disconnects 5V standby voltage to USB devices. This means USB devices will not be able to wake-up the system from S3 (Suspend to RAM) power saving mode.



JLED1 ~ JLED4: Pulse-XT Jumper (Optional)
Allows you to disable the Pulse-XT memory display function.



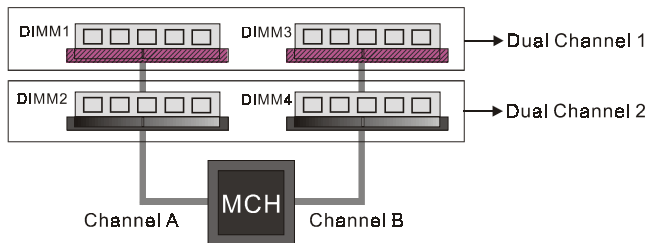
3-3 System Memory Configuration

The mainboard accommodates four 240-pin DDR2 DIMM sockets.

- Supports up to 16GB of 400/533/667MHz DDR2 SDRAM with 64-bit O/S.
- Supports dual channel memory interface.
- Supports non-ECC memory and non-Registered DIMMs only.
- SPD (Serial Presence Detect) scheme for DIMM detection support.
- Supports configurations defined in the JEDEC DDR2 DIMM specification only.

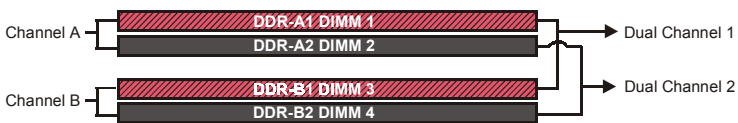
Dual Channel interface:

- Dual channel memory access offers increased system performance.
 <Figure 7> shows the logical memory layout for channel A and channel B.
- For dual channel to operate, both channel must be populated with same amount of memory, preferably of the same type.



<Figure 7>

- The four DIMM sockets are divided into two colors to help you identify the channel pairs <Figure 8>. Each dual channel pair has the same color, e.g. DIMM1 and DIMM3. **To obtain best performance, simply mount DIMM sockets of the same color.**



<Figure 8>

Installation

Memory configurations supported:

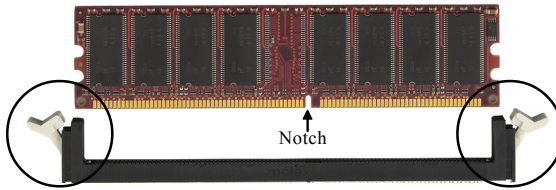
	1 DIMM (64-bit)				2 DIMM (128-bit)				3 DIMM (128-bit)		4 DIMM (128-bit)
DIMM#1	SS/DS				SS/DS			SS/DS	SS/DS	SS/DS	SS/DS
DIMM#2		SS/DS				SS/DS	SS/DS		SS/DS	SS/DS	SS/DS
DIMM#3			SS/DS		SS/DS		SS/DS		SS/DS		SS/DS
DIMM#4				SS/DS		SS/DS		SS/DS		SS/DS	SS/DS

* SS: Single-Sided DIMM, DS: Double-Sided DIMM

Note: Using non-compliant memory with higher bus speeds (overclocking) may severely compromise the integrity of the system.

Memory Installation :

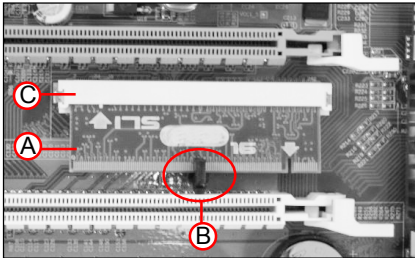
- ① To install, align the notch on the DIMM module with the connector.
- ② Press straight down as shown in the figure below until the white clips close and the module fits tightly into the DIMM socket.



3-4 VGA Card Installation

Important: Please setup the paddle card correctly before installing VGA card. If the paddle card is not available on your model, skip the paddle card installation below.

Paddle Card Installation (Optional)



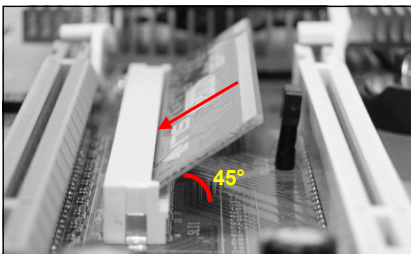
<Figure 9>

Note:

For SLI Mode to work, both VGA cards must be identical and must be SLI certified.



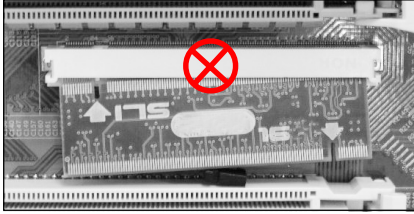
- ◆ The VGA slots for this mainboard can be configured for "Single Mode" (16) for single VGA only or "SLI Mode" for dual VGA combination.
- ◆ A paddle card (A) is located between the 2 PCI-E x16 slots. You need to determine the paddle card's direction before you install the VGA card. The paddle card has 2 sides, "SLI" and "16" :
 - If you choose to use single VGA card, insert "16" side of the paddle card to the white socket (C).
 - If you choose to use SLI mode (dual VGA card), insert "SLI" side of the paddle card to the white socket (C).
- ◆ To remove the paddle card, turn the clip (B) and the paddle card will pop up.



<Figure 10>

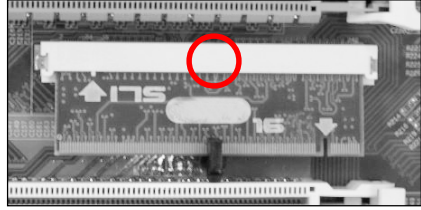
- ◆ To install the paddle card, insert the card carefully with a 45 degrees angle and make sure the card connector edge is fully inserted into the socket.

Installation



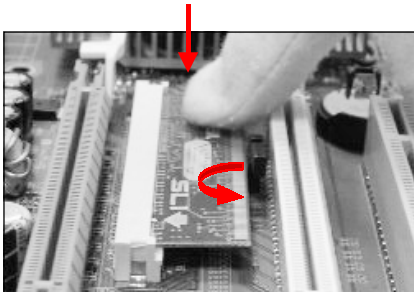
<Figure 11>

- ◆ The picture shows the paddle card is not inserted properly.



<Figure 12>

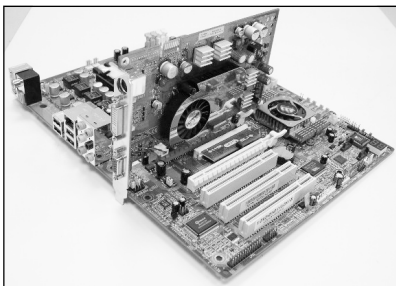
- ◆ The picture shows the paddle card is inserted properly.



<Figure 13>

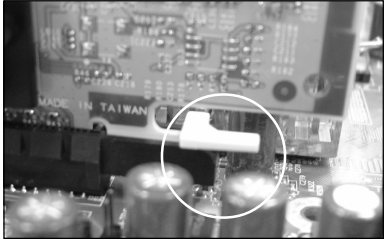
- ◆ Gently press the paddle card down and turn the clip to lock it.

VGA Card Installation



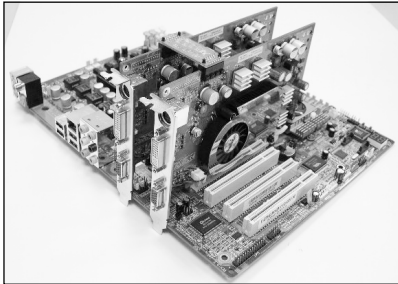
<Figure 14>

- ◆ To install a single VGA card in Single Mode, insert the VGA into the "Primary" VGA slot. (labeled on the board)
- ◆ In Single mode the "Secondary" VGA slot will become inactive.



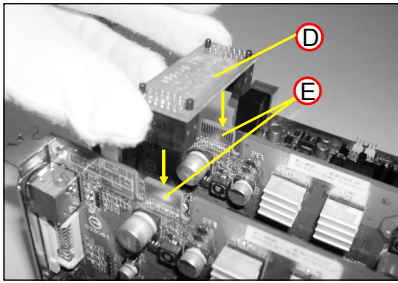
<Figure 15>

- ◆ When installing the VGA card, make sure the card edge connector is fully inserted into the slot and the clicker is locked properly.



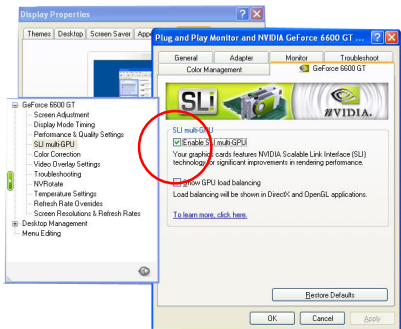
<Figure 16>

- ◆ To install the dual VGA card in SLI Mode mode, insert into both "Primary" and "Secondary" VGA slot.



<Figure 17>

- ◆ For SLI Mode, as "SLI Bridge" card (D) must be installed to the golden fingers (E) on the top of both VGA cards in order to link the cards together.
- ◆ For a single VGA in Single Mode, the "SLI Bridge" card is not necessary.

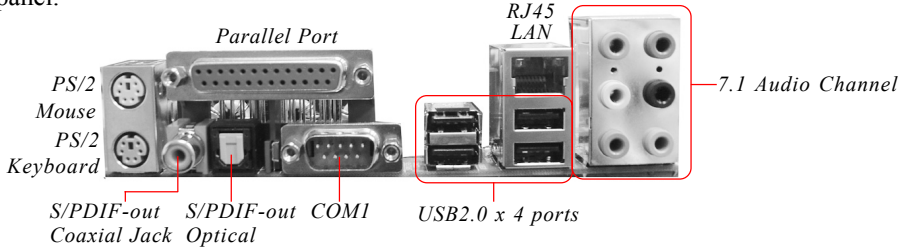


<Figure 18>

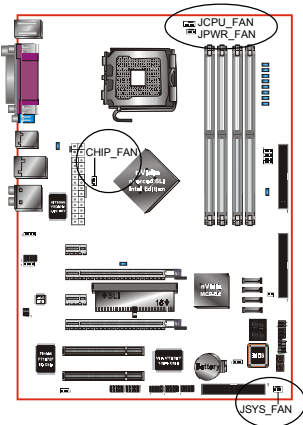
- ◆ After installing VGA driver, enable the Multi-Graphics Processor Unit (GPU) feature in the NVIDIA nView properties as shown left.

3-5 Device Connectors

The I/O back panel for this mainboard is shown below. When installing the mainboard into the computer case, use the bundled I/O shield to protect this back panel.



<Figure 19> - I/O Ports



JCPU_FAN / JPWR_FAN / JSYS_FAN / CHIP_FAN:
CPU/Power/Chassis/Chip Fan Power Connectors

JCPU_FAN: The CPU must be kept cool by using a heatsink with fan assembly.

JPWR_FAN: If you are installing an additional fan in the unit, connect to this fan connector.

JSYS_FAN: The chassis fan will provide adequate airflow throughout the chassis to prevent overheating the CPU.

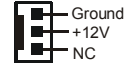
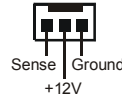
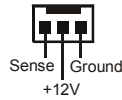
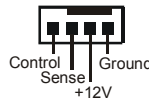
CHIP_FAN: If you are installing the chip fan in the unit, connect to this fan connector.

JCPU_FAN

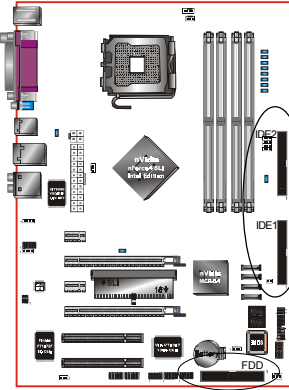
JPWR_FAN

JSYS_FAN

CHIP_FAN



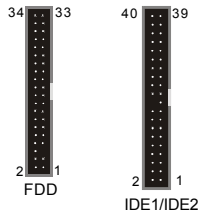
This mainboard is equipped with intelligent fan speed control. Refer to the PC Health Status submenu of the BIOS.



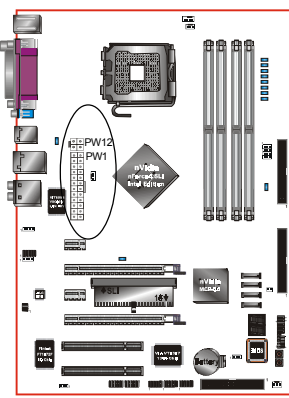
FDD: Floppy Controller Connector
This connects to the floppy disk drive.

IDE1/IDE2: Ultra DMA-100/133 Primary/Secondary IDE Connector

This mainboard is equipped with 2 IDE connectors to support up to 4 ATA-100/133 IDE drives. It supports PIO and DMA mode operations for maximum data transfer rate of 133MB/sec per channel.



When using two IDE drives on the same connector, one must be set to Master mode and the other to Slave mode. Refer to your disk drive user's manual for details.

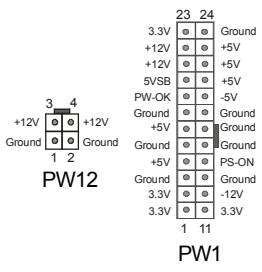


PW1: 24-pin ATX Power Connector

PW12: 4-pin ATX12V Power Connector

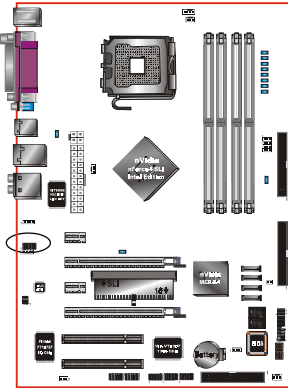
The mainboard is equipped with a standard 24-pin ATX main power connector and a 4-pin +12V power connector for connecting an ATX12V power supply. The plugs of the power cables are designed to fit in only one orientation. Insert the plugs into the connectors until they fit in place.

Caution:
The PW1 and PW12 Power Connector must be used simultaneously.



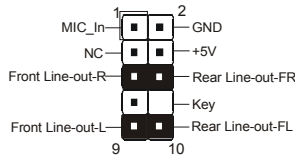
The board requires a minimum of 400 Watt power supply to operate. Your system configuration (amount of memory, add-in cards, peripherals, etc.) may exceed this minimum power requirement. To ensure adequate power, for SLi mode use a 550 Watt or greater power supply.

Installation

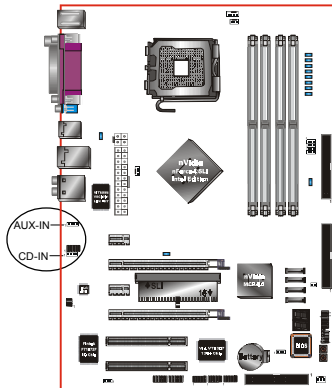


CFPA: Front Panel Audio Connector

When the jumpers are removed this connector can be used for front panel audio. The front panel phone jack should have “normal close” switch. Without phone plug inserted, the rear panel audio is enabled. With phone plug inserted, the rear panel audio will be disabled.



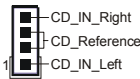
Settings:
 Pins (5-6) & (9-10) Short (default): Only the onboard rear panel audio jack can be used.
 Pins (5-6) & (9-10) Open: Only front panel audio jack can be used.



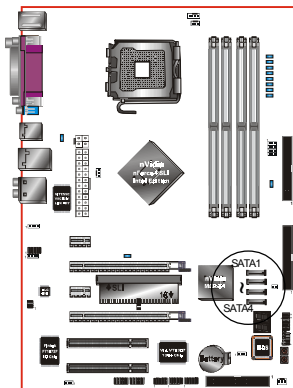
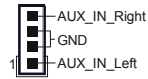
CD-IN/AUX-IN: CD Audio_IN Connector

The CD-IN and AUX-IN connectors are used to receive audio from a CD-ROM drive, TV tuner or MPEG card.

CD-IN

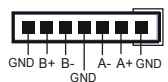


AUX-IN

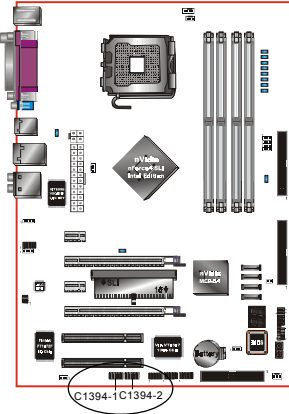


SATA1 ~ SATA4: Four S-ATA II Connectors

These connectors enable you to connect external Serial ATA II HDDs or optical drives type.



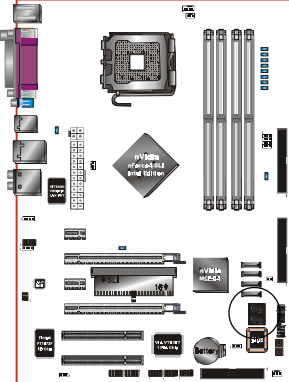
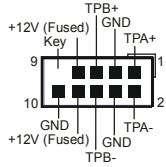
Use the optionally bundled SP-ATA Kit for older IDE hard drives to interface to S-ATA II.



C1394-1 / C1394-2 : (Optional)

IEEE 1394a (FireWire) Connectors

This mainboard has 2 IEEE 1394a ports. To use these ports, you need to attach the bundled 1394 bracket to these headers.

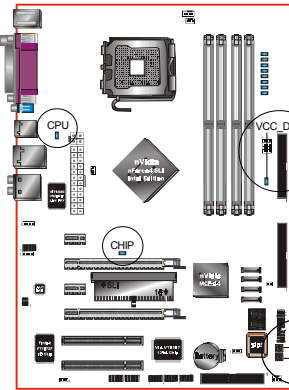


LED1: Post Port Debug LED

Provides two-digit POST code to show why the system fail to boot. Allows quick and easy optimization.



Post Port Debug 7-segment LED display (Refer to Appendix C for POST codes)



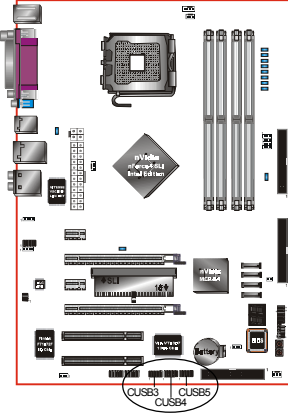
EZ-Button:

These onboard buttons lets you turn on/off the system easily, it is especially handy for debugging or testing the system.

LEDION: (Optional)

Onboard LED indicators to show the power status of CPU, Chipset and DRAM. You know immediately where to look if the system fails to start.

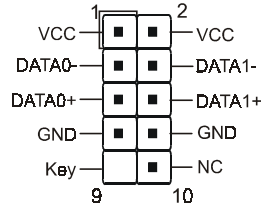
Installation



CUSB3/CUSB4/CUSB5: Six USB 2.0 ports

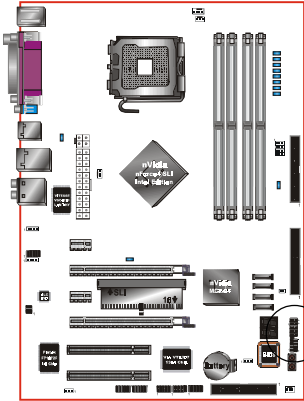
This mainboard includes additional USB2.0 ports, identified by 10-pin connector.

If you wish to use the additional USB ports, install the card-edge bracket to the system chassis then insert its cables to this 10-pin connector.



CAUTION !

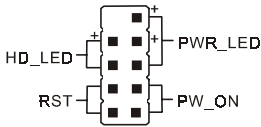
If you purchased a separate USB cable make sure it has the same pin assignment. A different pin assignment may damage the system. If you need the USB cable, please contact our retailer.



CFP: Front Panel Connector

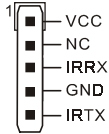
- ◆ **HD_LED**
This LED will light up whenever the hard drive is being accessed.
- ◆ **PWR_LED**
This connects to the power button of the system chassis
- ◆ **RST**
This switch allows you to reboot without having to power off the system thus prolonging the life of the power supply or system.

CFP



- ◆ **PW_ON**
This is connected to the power button on the case. To use the Soft-Off by PWR-BTTN feature, refer to the Power Management Setup in the BIOS setup section of this manual.

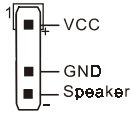
CIR



CIR: IR connector

Connect the IrDA cable (if available) to this IR connector.

CSPK



CSPK: Speaker

Connect to the system's speaker for beeping

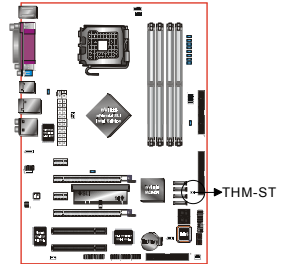
Installation

3-6 Thermo Stick Function (Optional)

This mainboard is equipped with a digital thermometer capability to monitor any temperature. This is useful for measuring heat on peripherals such as VGA cards, hard disk drives, DIMMs or even on-board components such as chipset, MOSFETS, etc.

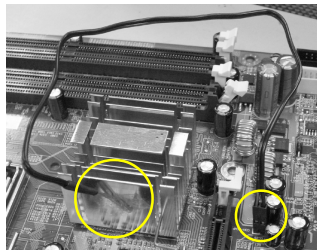
Thermo Stick consists of:

- 1) THM_ST header located on the mainboard
- 2) Thermo stick sensor cable with heat-tolerant adhesive sticker optionally bundled in the mainboard package
- 3) USDM software utility

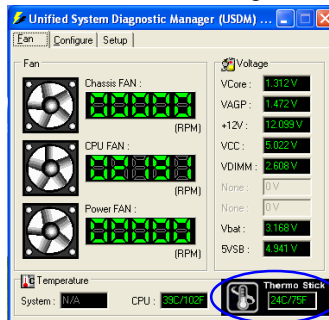


To setup Thermo Stick,

1. Insert the sensor cable to THM_ST header on the mainboard
2. Using the adhesive sticker, affix the sensor head of the cable to your desired point of measure. e.g. the chipset as in the picture below. Trim the adhesive sticker to a suitable size so that it will not affect the heat dissipation of any heatsink.



3. Ensure the cable is neatly tucked away from fans or other moving parts.
4. Install and run the USDM software. The temperature will be shown as below.



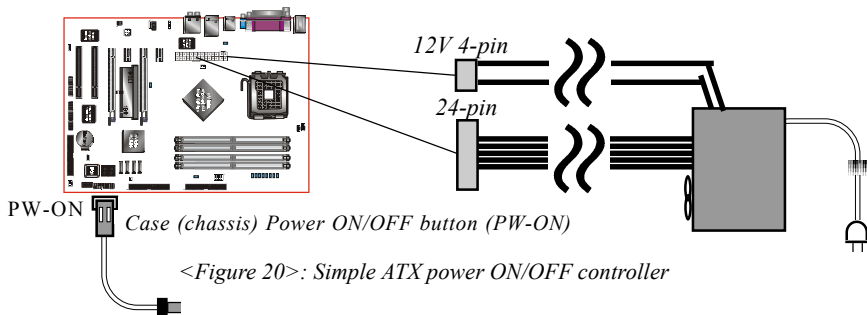
3-7 Power-On/Off (Remote)

This board has a 24-pin ATX and a 4-pin ATX12V power supply connector to support power supplies with **Remote On/Off** feature. The 4-pin ATX12V connector must be plugged in for the system to operate safely. The chassis power button should be connected to the mainboard front panel PW_ON header.

You can turn off the system in two ways: by pressing the front panel power On/Off button or using the "Soft Off" function that can be controlled by an operating system such as Windows®XP/ME/2000/98.

Note: For maintaining the DDR SDRAM power during STR (ACPI S3) function, it is strongly recommended to use power supplies that have a +5VSB current of (\geq) 2A. Please check the 5VSB's specification printed on the power supply's outer case.

Note: The board requires a minimum of 400 Watt power supply to operate. Your system configuration (amount of memory, add-in cards, peripherals, etc.) may exceed this minimum power requirement. To ensure that adequate power, use a 550 Watt (or higher) power supply and recommend to use PSU that have 12V current total of (\geq) 20A.



3-8 External Modem Ring-in Power ON


Modem-Ring Power ON Function

The mainboard supports External Modem Ring-in Power ON function. Once you connect an external modem to COM port, you can turn on the system through remote and host dial-up control.

3-9 ACPI S3 (Suspend To RAM) Function

This mainboard supports the STR (Suspend To RAM) power management scheme by maintaining the appropriate power states in the DDR SDRAM interface signals. The power source to the DDR SDRAM is kept active during STR (ACPI S3). Advanced Configuration Power Interface (ACPI) provides many Energy Saving Features for operating systems that support Instant ON and QuickStart™ function.

1. To enable STR functionality to save system power :
 - a. Install ACPI certified add-on cards (such as VGA, LAN, and modem cards).
 - b. In BIOS, under Power Management Setup (refer to Section 4), select “ACPI Suspend Type: S3(STR)”. If you have a USB mouse or keyboard, set “USB Resume from S3/S4” to “Enabled”.
 - c. When in Windows, open the Control Panel Power Management application, and click the Advanced tab. In the Power buttons section, select “Stand By” from the drop-down lists.
2. To activate the STR function:
 - a. Click the START button and choose Shut Down.
 - b. In the Shut Down Windows dialog box, select the Stand By option to enter STR mode.

 The following are the differences between STR power saving mode and Suspend (Power On Suspend) mode:

- a. STR is the most advanced Power Management mode.
 - b. STR cuts all the power supplied to peripherals except to memory - max. power saving.
 - c. STR saves and keeps all on-screen data including any executed applications to DDR SDRAM.
 - d. In STR mode, you must push the power button (connected to the onboard PW-On of CFP pin), click your USB mouse buttons, or press your USB keyboard keys to wake up your system to the last display.
-

Section 4

BIOS SETUP

Main Menu

The ROM BIOS contains a built-in Setup program which allows user to modify the basic system configuration and hardware parameters. The modified data is stored in a battery-backed CMOS, so that data will be retained even when the power is turned off. In general, the information saved in the CMOS RAM will stay unchanged unless there is a configuration change in the system, such as hard drive replacement or a device is added.

It is possible for the CMOS battery to fail causing CMOS data loss. If this happens you will need install a new CMOS battery and reconfigure your BIOS settings.



The BIOS setup screen and description are for reference only, and may not exactly match what you see on your screen. The contents of BIOS are subject to change without notice. Please visit our website for BIOS updates.

To enter the Setup Program :

Power on the computer and press the key during the POST (Power On Self Test). The BIOS CMOS SETUP UTILITY opens. (Figure 1)

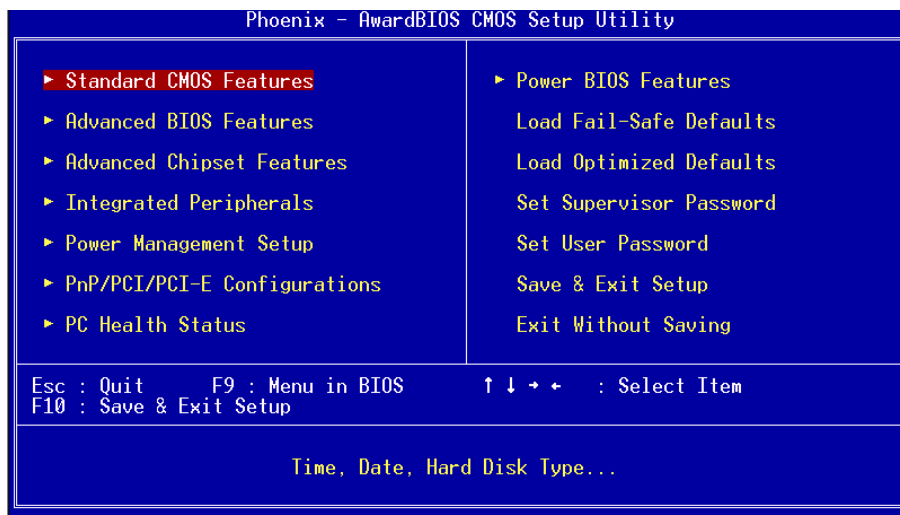


Figure 1: CMOS Setup Utility

BIOS

The main menu displays all the major selection items. Select the item you need to reconfigure. The selection is made by moving the cursor (press any direction (arrow key)) to the item and pressing the ‘Enter’ key. An on-line help message is displayed at the bottom of the screen as the cursor is moved to various items which provides a better understanding of each function. When a selection is made, the menu of the selected item will appear so that the user can modify associated configuration parameters.

4-1 Standard CMOS Setup

Choose “STANDARD CMOS FEATURES” in the CMOS SETUP UTILITY Menu (Figure 2). Standard CMOS Features Setup allows the user to configure system settings such as the current date and time, type of hard disk drive installed, floppy drive type, and display type. Memory size is auto-detected by the BIOS and displayed for your reference. When a field is highlighted (use direction keys to move the cursor and the <Enter> key to select), the entries in the field can be changed by pressing the <PgDn> or the <PgUp> key.

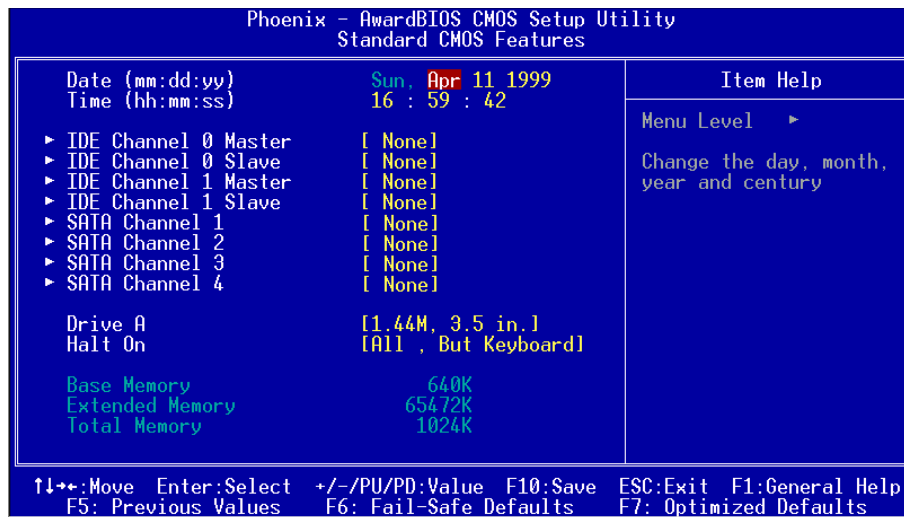


Figure 2: Standard CMOS Setup

Notes:

- If the hard disk Primary Master/Slave and Secondary Master/Slave are set to Auto, the hard disk size and model will be auto-detected.
- The “Halt On:” field is used to determine when the BIOS will halt the system if an error occurs.

4-2 Advanced BIOS Features

Selecting the “ADVANCED BIOS FEATURES” option in the CMOS SETUP UTILITY menu allows users to change system related parameters in the displayed menu. This menu shows all of the manufacturer’s default values for the board.

Pressing the [F1] key displays a help message for the selected item.

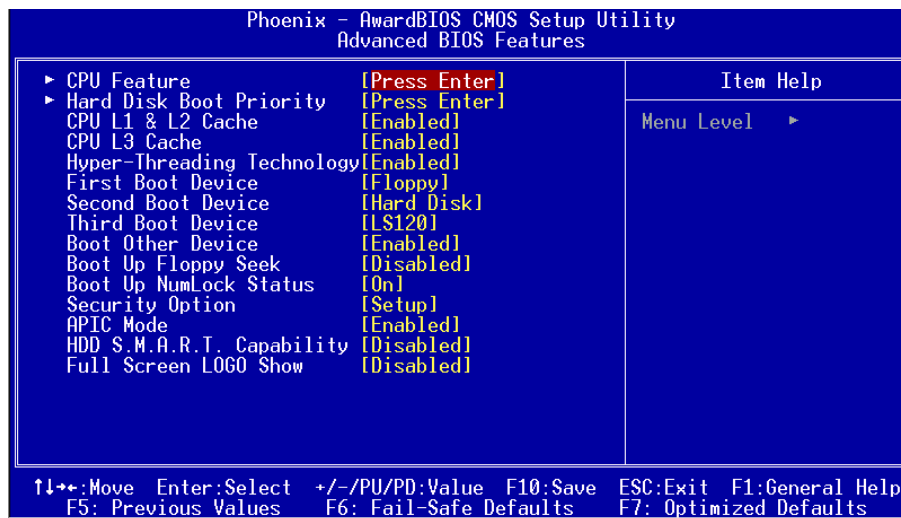


Figure 3: BIOS Features Setup

▶ CPU Feature

This field is available only for Pentium® CPU with Prescott core.

▶ Hard Disk Boot Priority

This item allows you to select the hard disk boot priority.

Options: Pri. Master, Pri. Slave, Sec. Master, Sec. Slave, USBHDD0, USBHDD1, USBHDD2, Bootable Add-in cards.

CPU L1 & L2 Cache

This controls the status of the processor’s internal Level One and Level Two cache.

Options: Enables, Disabled.

CPU L3 Cache

This controls the status of the processor’s internal Level Three cache.

Options: Enables, Disabled.

BIOS

Hyper-Threading Technology

Enables the CPU Hyper-Threading Technology.

Options: Enables, Disabled.



It is recommend to enable Hyper-Threading Technology on system with Windows XP and Linux 2.4 and disabling it for legacy OS.

First /Second/Third Boot Device

The BIOS attempts to load the operating system from the devices in the sequence selected in these items.

Options: Floppy, LS120, Hard Disk, CDROM, ZIP100, USB-FDD, USB-CDROM, Legacy LAN, Disabled.

Boot Other Device

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

Options: Enabled, Disabled.

Boot Up Floppy Seek

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

Options: Enabled, Disabled.

Boot Up NumLock Status

This controls the state of the NumLock key when the system boots.

On: The keypad acts as a 10-key pad.

Off: The keypad acts like cursor keys.

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 unless the correct password is entered at the prompt.

Setup: The system will boot, but access to Setup will be denied unless the correct password is entered at the prompt.

APIC Mode

This item allows you to enable APIC (Advanced Programmable Interrupt Controller) functionality.

Options: Enabled, Disabled.

HDD S.M.A.R.T. Capability

The S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance. S.M.A.R.T. Software resides on both the disk drive and the host computer. If a device failure is predicted, the host software, through the Client WORKS S.M.A.R.T applet, warns the user of the impending condition and advises appropriate action to protect the data.

Options: Enabled, Disabled.

Full Screen LOGO Show

This item allows you determine Full Screen LOGO display during POST.

Options: Enabled, Disabled.

4-3 Advanced Chipset Features

Choose the “ADVANCED CHIPSET FEATURES” option in the CMOS SETUP UTILITY menu to display following menu.

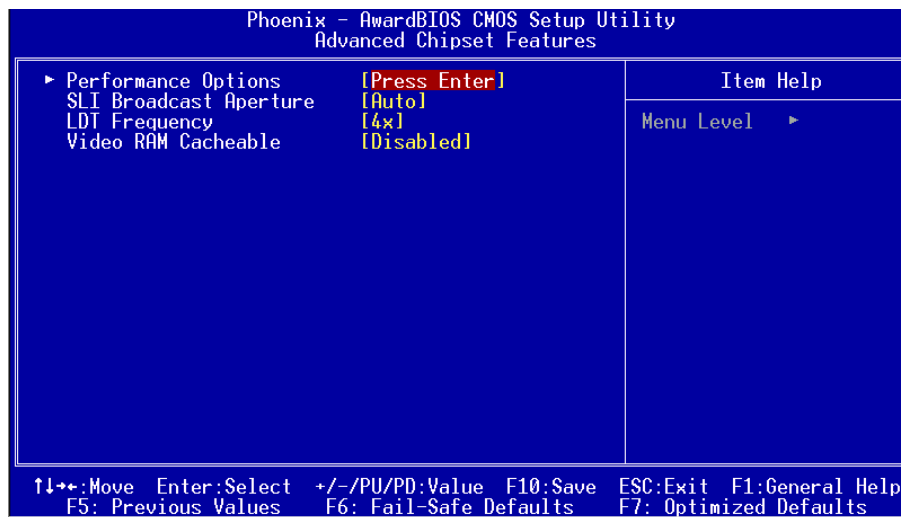


Figure 4: Chipset Features Setup

BIOS

SLI Broadcast Aperture

This item allows you select the SLI broadest aperture for faster execution.

Options: Auto, Disabled.

LDT Frequency

This item allows you select the Hyper Transport Frequency linking the chipsets.

Options: 1x, 2x, 3x, 4x, 5x. (1x-->200MHz, 2x-->400MHz, 3x-->600MHz, 4x-->800MHz, 5x-->1000MHz)

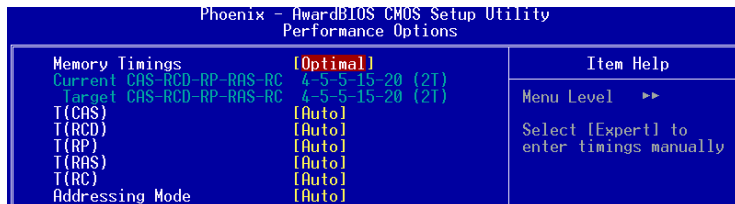
Video BIOS Cacheable

This item allows the video BIOS to be cached in memory for faster execution.

Options: Disabled, Enabled.

► Performance Options

Scroll to Performance Options and press <Enter>. The following screen appears:



Memory Timings

For setting DRAM timing, select “Expert” to enter timings manually.

Options: Optimal, Expert.

T(CAS)

This item specifies the number of clock cycles needed after a Column Address Strobe (CAS) signal before data can be read.

Options: Auto, 1 ~ 6.

T(RCD)

This field specifies the RAS# to CAS# delay to read/write command to the same bank.

Options: Auto, 1 ~ 7.

T(RP)

This field specifies the Row Precharge Time. Precharge to active or Auto-refresh of the same bank.

Options: Auto, 1 ~ 7.

T(RAS)

This field specifies the minimum RAS# active time.

Options: Auto, 1 ~ 31.

T(RC)

This field specifies the Row Cycle Time. RAS# active to RAS# active or auto refresh of the same bank.

Options: Auto, 1 ~ 31.

Addressing Mode

For setting DRAM command rate timing.

Options: Auto, 1T ~ 2T.

4-4 Integrated Peripherals

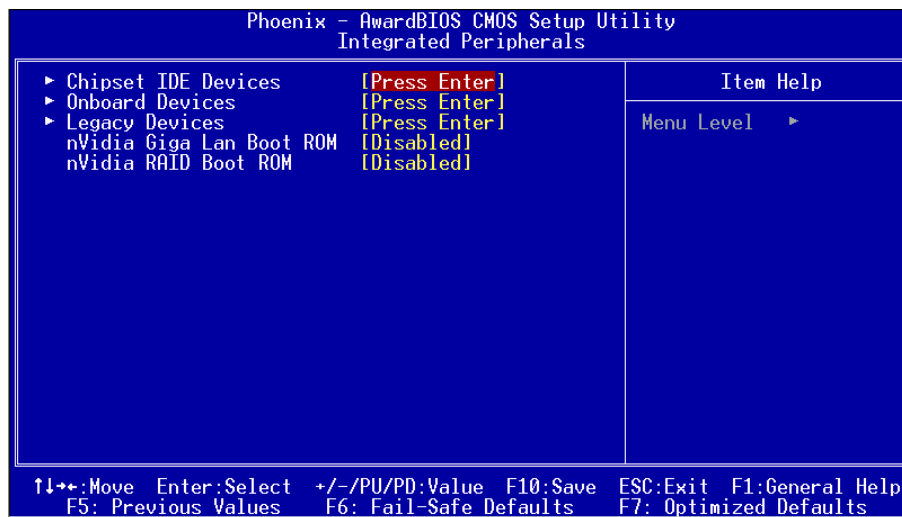


Figure 5: Integrated Peripherals

nVidia Giga Lan Boot ROM

Enables/disable the onboard nVidia Giga Lan Boot ROM for booting from LAN.

Options: Enabled, Disabled.

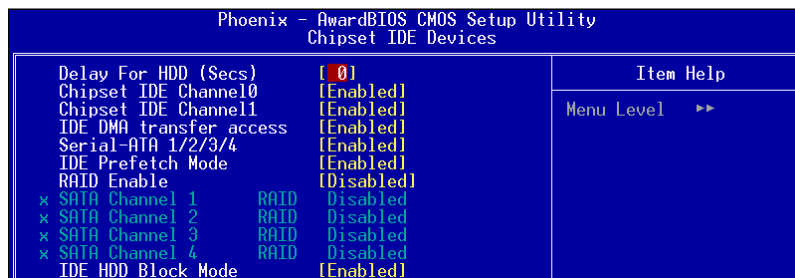
nVidia RAID Boot ROM

Set this to enabled to setup RAID for drives connected to nVidia chipset.

Options: Enabled, Disabled.

► Chipset IDE Devices

Scroll to Chipset IDE Devices and press <Enter>. The following screen appears:




Delay For HDD (Secs)

This item allows you to set longer time stand by before system Scan HDD at post screen. Some HDD may need a longer stand by time before it can be detected.

Options: 0 ~ 15.

Chipset IDE Channel 0/1

The mainboard supports two channel of ordinary IDE interface and one channel of serial ATA interface. Select “Enabled” to activate each channel separately.

 If you do not use the onboard IDE connector, set the Onboard Primary (Secondary) PCI IDE to “Disabled”.

IDE DMA transfer access

Automatic data transfer between system memory and IDE device with minimum CPU intervention. This improves data throughput and frees CPU to perform other tasks.

Serial-ATA 1/2/3/4

This item enables/disables the S-ATA 1/2/3/4 ports.

IDE Prefetch Mode

Selecting “Enabled” reduces latency between each drive read/write cycle, but may cause instability in IDE subsystems that cannot support such fast performance. If you are getting disk drive errors, try setting this value to Disabled. This field does not appear when the Internal PCI/IDE field, above, is Disabled.

Options: Enabled, Disabled.

RAID Enable

This item allows you to select the RAID mode. When set to “Enabled” the four fields become available to set RAID for each SATA.

Options: Enabled, Disabled.

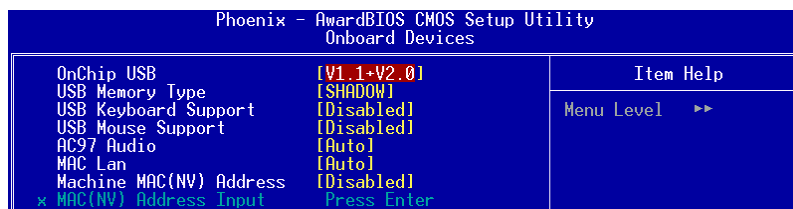
IDE HDD Block Mode

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

Options: Enabled, Disabled.

► Onboard Devices

Scroll to Onboard Devices and press <Enter>. The following screen appears:

**Onchip USB**

Enables the USB controller.

Options: Disabled, V1.1+V2.0, V1.1.

USB Memory Type

Select used memory space to record USB device information

Options: Base memory (640K), SHADOW.

USB Mouse Support

Enable/Disable support for USB mouse under DOS.

Options: Enabled, Disabled.

USB Keyboard Support

Enable/Disable support for USB keyboard under DOS.

Options: Enabled, Disabled.

AC97 Audio

This item allows you disable the chipset on-chip AC97 Audio.

Options: Auto, Disabled.

MAC Lan Control

Enables the onboard Gigabit LAN feature.

Options: Auto, Disabled.

Machine MAC(NV) Address

Machine MAC (NV) address selection.

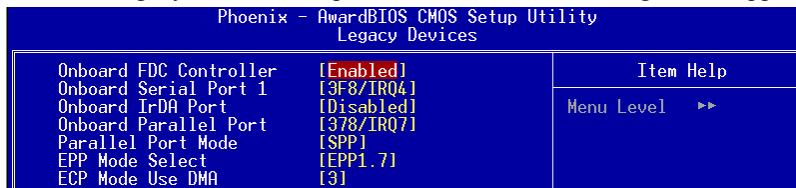
Options: Enabled, Disabled.

MAC (NV) Address Input

Allows you to input the MAC (NV) address.

► Legacy Devices

Scroll to Legacy Devices and press <Enter>. The following screen appears:



The screenshot shows the BIOS Legacy Devices menu. The title bar reads 'Phoenix - AwardBIOS CMOS Setup Utility' and 'Legacy Devices'. The menu items are listed in a table format with their current settings in brackets. The 'Onboard FDC Controller' is highlighted with a red background and shows '[Enabled]'. The 'Item Help' section shows 'Menu Level' with a right-pointing arrow.

Phoenix - AwardBIOS CMOS Setup Utility	
Legacy Devices	
Onboard FDC Controller	[Enabled]
Onboard Serial Port 1	[3F8/IRQ4]
Onboard IrDA Port	[Disabled]
Onboard Parallel Port	[378/IRQ7]
Parallel Port Mode	[SPP]
EPP Mode Select	[EPP1.7]
ECP Mode Use DMA	[3]

Onboard FDC Controller

Select “Enabled” if you wish to use onboard floppy disk controller (FDC). If you install an external FDC or the system has no floppy drive, select “Disabled” in this field.

Options: Enabled, Disabled.

Onboard Serial Port 1

Select an address and corresponding interrupt for the first serial port.

Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

Infrared Port Select

Select an address and corresponding interrupt for the Infrared Port.

Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

Onboard Parallel Port

This field allows the user to configure the LPT port.

Options: 378/IRQ7, 278/IRQ5, 3BC/IRQ7, Disabled.

Parallel Port Mode

This field allows the user to select the parallel port mode.

Options: SPP, EPP, ECP, ECP+EPP.

EPP Mode Select

This field allows the user to select the EPP mode for parallel port mode.

Options: EPP1.9, EPP1.7.

ECP Mode USE DMA

This field allows the user to select DMA1 or DMA3 for the ECP mode.

Options: 1, 3.

4-5 Power Management Setup

Choose the “POWER MANAGEMENT SETUP” in the CMOS SETUP UTILITY to display the following screen. This menu allows the user to modify the power management parameters and IRQ signals. In general, these parameters should not be changed unless it’s absolutely necessary.

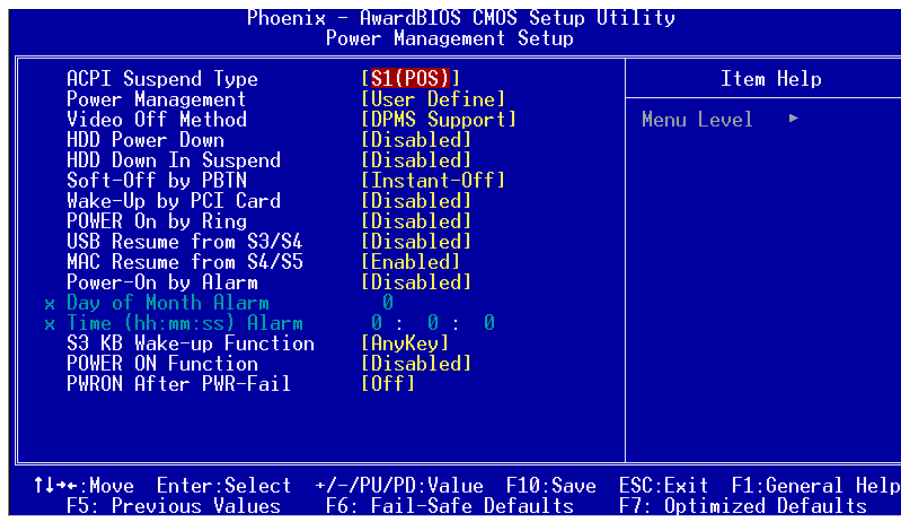


Figure 6: Power Management

ACPI Suspend Type

This item allows you to select S1(Power-On-Suspend) or S3(Suspend-To-RAM) function.

Options: S1(POS), S3(STR), S1&S3.

BIOS

Power Management Option

Use this to select your Power Management selection. The default is User define.

Max. saving: Maximum power savings. Inactivity period is 1 minute in each mode.

Min. saving: Minimum power savings. Inactivity period is 1 hour in each mode.

User define: Allows user to define PM Timers parameters to control power saving mode.

Video Off Method

This option allows you to select how the video will be disabled by the power management. The default is V/H Sync + Blank

V/H Sync + Blank: System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.

DPMS Support: Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied by your video subsystem to select video power management values.

Blank Screen: System only writes blanks to the video buffer.

HDD Power Down

Powers down the hard disk drive after a preset period of system inactivity.

Options: Disabled, 1min ~ 15min.

HDD Down In Suspend

Lets you enable the HDD to power off in suspend mode.

Options: Enabled, Disabled.

Soft-Off by PBTN

Use this to select your soft-off function. The default is Instant Off.

Instant Off: Turns off the system instantly.

Delay 4 Second : Turns off the system after a 4 second delay. If momentary press of button, the system will go into Suspend Mode. Press the power button again to make system back to work.

Wake-Up by PCI Card

An input signal from PME on the PCI card awakens the system from S3 suspend state.

Options: Enabled, Disabled.

Power On by Ring

When enabled, any modem activity awakens the system from soft-off state.

Options: Enabled, Disabled.

USB Resume From S3/S4

This item allows a USB device to wake-up the system from S3/S4 suspend state.

Options: Enabled, Disabled.

MAC Resume From S3/S4

When enabled, NV LAN activity awakens the system from soft-off state.

Options: Enabled, Disabled.

Power-On by Alarm

When set to Enable alarm resume, you can set the date (of month) and time (hh:mm:ss), that will awaken a system which has been powered down.

Options: Enabled, Disabled.

S3 KB Wake-up Function

This determines whether or not to enable keyboard/mouse activity to awaken the system from S3(STR) or S1&S3.

Options: Disabled, AnyKey, Mouse, Both.

POWER ON Function

Enables computer power on by the keypress activity.

Options: Disabled, Any key, Mouse, Both (Any key+Mouse).

PWRON After PWR-Fail

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

Off: The system stays off after a power failure.

Always On The system always on after a power failure.

4-6 PNP/PCI/PCI-E Configuration

This page lets the user to modify the PCI/PCI-E IRQ signals when various PCI/PCI-E cards are inserted.

WARNING: Conflicting IRQ's may cause system unable to locate certain devices.

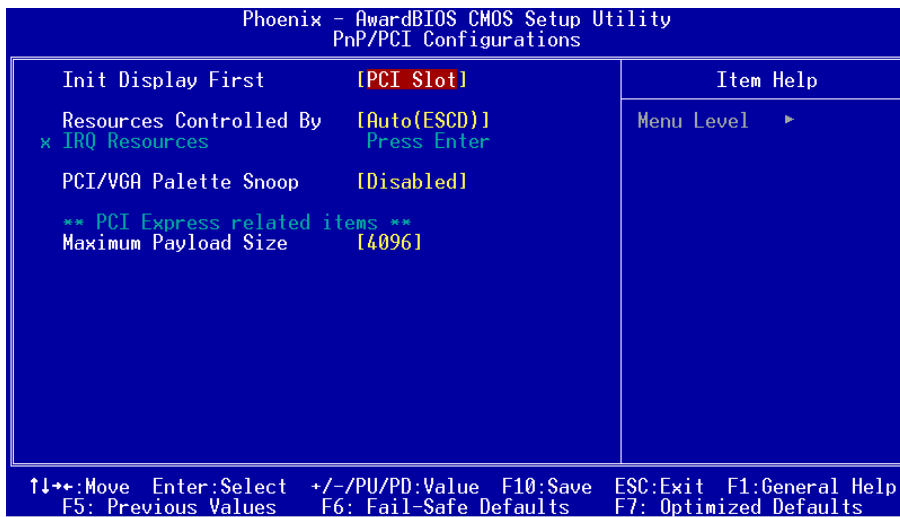


Figure 7: PNP/PCI/PCI-E Configuration Setup

Init Display First

This item is used to select whether to initialize the PCI-E or PCI first when the system boots.

Options: PCI Slot, PCIEx.

Resources Controlled By

Determines what controls system PNP/PCI resources. The default is Auto (ESCD).

Manual: PNP Card's resources are controlled manually. The "IRQ Resources" field becomes available and you can set which IRQ-X and DMA-X are assigned to PCI and onboard devices.

Auto: BIOS assigns the interrupt resource automatically.

PCI/VGA Palette Snoop

This item is designed to overcome problems that may be caused by some nonstandard VGA cards.

Options: Enabled, Disabled.

*** PCI Express related items ***

Maximum Payload Size

Set maximum TLP payload size for the PCI Express devices. The unit is byte.

Options: 128, 256, 512, 1024, 2048, 4096.

4-7 PC Health Status

Phoenix - AwardBIOS CMOS Setup Utility		Item Help
PC Health Status		Menu Level ▶
▶ SmartFan Function	[Press Enter]	
Show PC Health in POST	[Enabled]	
Current CPU Temperature	40°C/104°F	
Current System Temperature	35°C/ 95°F	
Thermo Stick Temperature	35°C/ 95°F	
Current CPU Fan Speed	4297 RPM	
Current Chassis Fan Speed	0 RPM	
Current Power Fan Speed	4178 RPM	
VCC +5V	4.87 V	
VDimm	1.84 V	
5VSB	4.70 V	
+12 V	11.79 V	
Chipset Voltage	1.41 V	
VCore	1.35 V	
3VSB	3.28 V	
VBAT	2.99 V	
ACPI Shutdown Temperature	[Disabled]	

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

Figure 8: PC Health Status

▶ SmartFan Function

Scroll to SmartFan Function and press <Enter>. The following screen appears:

Phoenix - AwardBIOS CMOS Setup Utility		Item Help
SmartFan Function		Menu Level ▶▶
Smart CPU Fan Function	[Full Speed]	
Current CPU Temperature	40°C/104°F	
Current CPU Fan Speed	4297 RPM	
× SmartFan Duty Cycle	90%	
Full FAN Speed	[100%]	
× Temp H-Full FAN Threshold	60°C/140°F	
× Fast FAN Speed	75% (3318RPM)	
× Temp M-Quiet Threshold	40°C/104°F	
× Quiet FAN Speed	50% (2212RPM)	
× Temp L-Start/Stop FAN	20°C/ 68°F	
Stop FAN Speed	[0%]	

Smart CPU FAN Function

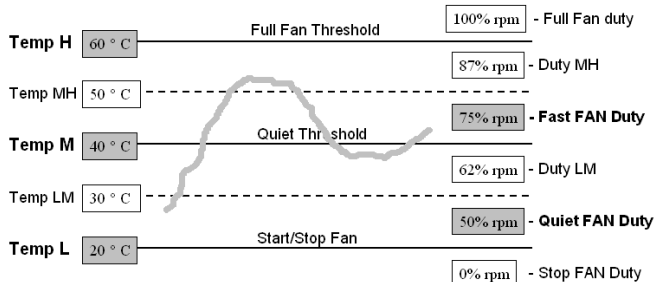
This item selects how the fan speed should be set. Full speed fixes fan speed at 100% duty cycle. Control the Fan by Duty-Cycle directly. By Temperature calculates the fan speed according to different temperature range.

To use By Temperature setting, refer to the example below to set the temperature and duty cycle.

Current CPU Temperature/Fan Speed

Display the current CPU Temperature/Fan speed.

Smart Fan example:



- ◆ Only need to set the items in gray. The system will automatically calculate intermediate temperature Temp LM and Temp MH and the corresponding Duty LM and Duty MH.
- ◆ How effective Smart CPU Fan is will depend on fan design. Most fans have built-in thermistor and may self adjust its speed. Some fans have very limited duty cycle range open to fan control.
- ◆ For best results use the bundled Thunder Probe to tune your fan.

Show PC Health in POST

When this function is enabled the PC Health information is displayed during the POST (Power On Self Test).

Options: Enabled, Disabled.

Current CPU/System Temperature

Displays the current system /CPU temperature.

Thermo Stick Temperature

Displays the current Thermo Stick temperature.

Current Power/CPU/Chassis FAN Speed

Displays the current speed of the CPU, chassis, and power fan speed in RPMs.

VDimm

The voltage level of the DRAM.

Chipset Voltage

The voltage level of the chipset.

VCore

The voltage level of the CPU(Vcore).

VBAT

The voltage level of the battery.

VCC +5V, 5VSB, +12V, 3VSB

The voltage level of the switching power supply.

3VSB

The voltage level of 3V standby.

ACPI Shutdown Temperature

This is the temperature that the computer will turn off the power to combat the effects of an overheating system. (requires ACPI to be enabled in Power Management BIOS and ACPI compliant operating system.) The default is Disabled.

Options available are 60°C/140°F to 95°C/203°F in increments of 5°C.

4-8 POWER BIOS Features

This page lets you adjust various parameters to obtain improved performance for overclocking.

Warning:

Overclocking requires expert knowledge and risks permanent damage to system components. We recommend you leave these parameters at their default values for proper operation.

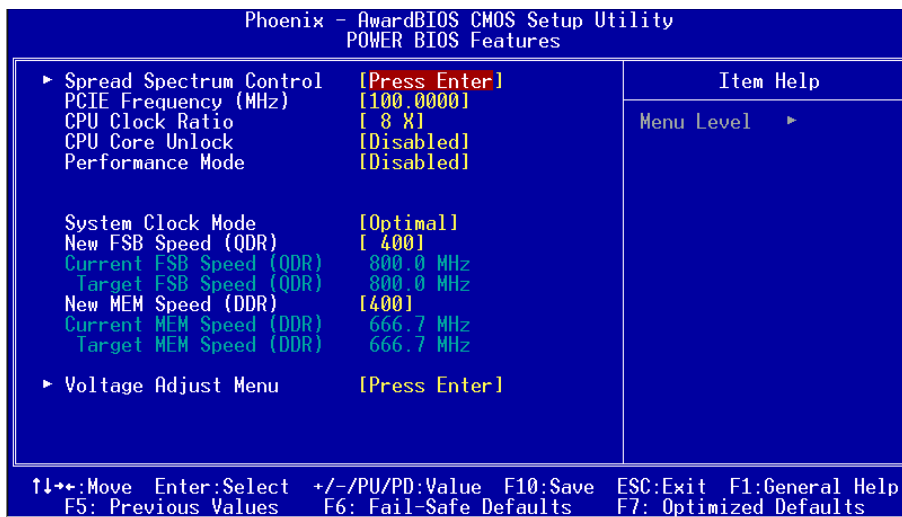
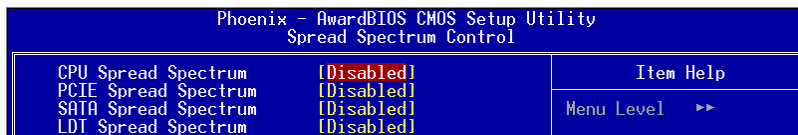


Figure 9: Frequency/Voltage Control

▶ Spread Spectrum Control

Scroll to Spread Spectrum Control and press <Enter>. The following screen appears:



CPU Spread Spectrum

This option reduces the EMI (Electromagnetic Interference) generated by the CPU.

Options: Disabled, Center Spread, Down Spread, 0.5%++ Spread.

PCIe Spread Spectrum

This option reduces the EMI generated by the PCI-E.

Options: Disabled, Down Spread.

SATA Spread Spectrum

This option reduces the EMI generated by the S-ATA.

Options: Disabled, Down Spread.

LDT Spread Spectrum

This option reduces the EMI generated by the LDT.

Options: Disabled, Center Spread.

PCIe Frequency (MHz)

Enables you to subtly tune the PCIe frequency.

Options: 100.0000 to 148.3475 in 1.5625MHz increments.

CPU Clock Ratio

Use this item to select a multiplier to set the CPU frequency. See New FSB Speed (QDR) item below for explanation.

Options: 8X ~ 50X.

CPU Core Unlock

Select "Enabled" if you wish to unlock the multiplier to run the CPU at lower core frequency.

Options: Enabled, Disabled.

Performance Mode

Select "Enabled" to automatically increase the FSB under heavy system load.

Options: Enabled, Disabled.

System Clock Mode

This item allows you to select the system clock mode. Choose "Expert" to key in a FSB speed in the next selection.

Options: Optimal, Linked, Expert.

New FSB Speed (QDR)

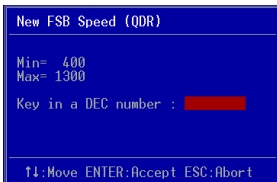
Enables you to increment the CPU's clock generator at 1 MHz step. This works together with CPU Clock Ratio (above) to set the CPU operating frequency.

CPU Clock Generator x CPU Clock Ratio = CPU Frequency

BIOS

For example, if you have a processor that is rated at 2.4GHz and the clock generator is 200MHz, then $200\text{MHz} \times 12 = 2.4\text{GHz}$

Press <Enter> to display the following screen:



Key in the DEC (decimal) number for the New FSB Speed (QDR).

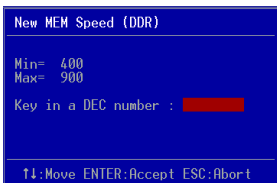


Overclocking failure will cause no display on the monitor. To overcome this switch off the power supply and switch on again. Restart the system, press and hold <Insert> key. This will revert the BIOS to default or initial setting.

New MEM Speed (DDR)

Enables you to increment the memory speed at 1 MHz step.

Press <Enter> to display the following screen:



Key in the DEC (decimal) number for the New MEM Speed (DDR).

► Voltage Adjust Menu

Scroll to Voltage Adjust Menu and press <Enter>. The following screen appears:

Phoenix - AwardBIOS CMOS Setup Utility		Item Help
Voltage Adjust Menu		Menu Level ▶▶
Default CPU Vcore Voltage	1.3875 V	
CPU Vcore Voltage	[+0.000 V]	
New CPU Vcore Voltage	1.3875 V	
Default Chipset Voltage	1.40 V	
Chipset Voltage	[+0.00 V]	
New Chipset Voltage	1.40 V	
Default VDIMM Voltage	1.80 V	
VDIMM Voltage	[+0.00 V]	
New VDIMM Voltage	1.80 V	



In the following items, “Default Voltage” indicates the original factory value, and “New Voltage” indicates the value that you assign.

CPU Voltage

This item allows you to adjust the CPU Vcore voltage.

Options: -0.100V to +0.2875V in 0.0125V increments. We recommend that you leave this at the default value.

DIMM Voltage

This item allows you to adjust the DIMM slot voltage.

Options: for PCB V1.0 --> 0.00V to 0.35V in 0.05V increments.
for PCB V1.2 --> 0.00V to 0.70V in 0.10V increments.

We recommend that you leave this at the default value.

Chipset Voltage

This item allows you to adjust the chipset voltage.

Options: 0.00V, 0.05V, 0.10V, 0.15V. We recommend that you leave this at the default value.

4-9 Defaults Menu

Selecting “Defaults” from the main menu shows you two options which are described below

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box:

Load Fail-Safe 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:

Load Optimized Defaults (Y/N) ? N

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

4-10 Supervisor/User Password Setting

This function lets you set either Supervisor or User Password, or both, to prevent unauthorized changes to BIOS menus.

supervisor password: full rights to enter and change options of the setup menus.

user password: only enter but no rights to change 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 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 key in each time you 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 can determine when the password is required within the Advanced BIOS Features 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.

4-11 Exiting BIOS

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing “Y” stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? Y

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

Section 5

RAID CONFIGURATION

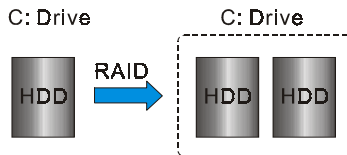
Introduction

This section gives a brief introduction on RAID-related background knowledge and a general procedure to setup RAID system on this mainboard.

RAID Basics

RAID (Redundant Array of Independent Disks) is a method of combining two or more hard disk drives into one logical unit known as a RAID array. The advantage of RAID is to provide better performance or data fault tolerance. Fault tolerance is achieved through data redundant operation, where if one drives fails, a mirrored copy of the data can be found on another drive. This can prevent data loss if the operating system fails or hangs.

Below is an example of a RAID array with 2 drives.



The individual disk drives in an array are called “members”. All disk members in a formed disk array are recognized as a single physical drive to the operating system.

Hard disk drives can be combined together through a few different methods. The different methods are referred to as different RAID levels. Different RAID levels represent different performance levels, security levels and implementation costs.

The table below briefly introduced these RAID levels.

RAID Level	No. of Drives	Capacity	Benefits
RAID 0 (Striping)	2	Number drivers *Smallest size	Highest performance without data protection
RAID 1 (Mirroring)	2	Smallest size	Data protection
JBOD (Spanning)	2	Sum of All drivers	No data protection and performance improving, but disk capacity fully used.

RAID Configuration

RAID 0 (Striping)

RAID 0 reads and writes sectors of data interleaved between multiple drives. If any disk member fails, it affects the entire array. The disk array data capacity is equal to the number of drive members times the capacity of the smallest member. The striping block size can be set from 4KB to 64KB. RAID 0 does not support fault tolerance.

RAID 1 (Mirroring)

RAID 1 writes duplicate data onto a pair of drives and reads both sets of data in parallel. If one of the mirrored drives suffers a mechanical failure or does not respond, the remaining drive will continue to function. Due to redundancy, the drive capacity of the array is the capacity of the smallest drive. Under a RAID 1 setup, an extra drive called the “spare drive” can be attached. Such a drive will be activated to replace a failed drive that is part of a mirrored array. Due to the fault tolerance, if any RAID 1 drive fails, data access will not be affected as long as there are other working drives in the array.

JBOD (Spanning)

A spanning disk array is equal to the sum of the all drives when the drives used are having different capacities. Spanning stores data onto a drive until it is full, then proceeds to store files onto the next drive in the array. When any disk member fails, the failure affects the entire array. JBOD is not really a RAID and does not support fault tolerance.

Others

Other RAID derivatives are RAID 10 and RAID 5. These RAID levels require more than 2 drives to operate, combining the benefits of RAID 0 and RAID 1.

nVidia RAID Features

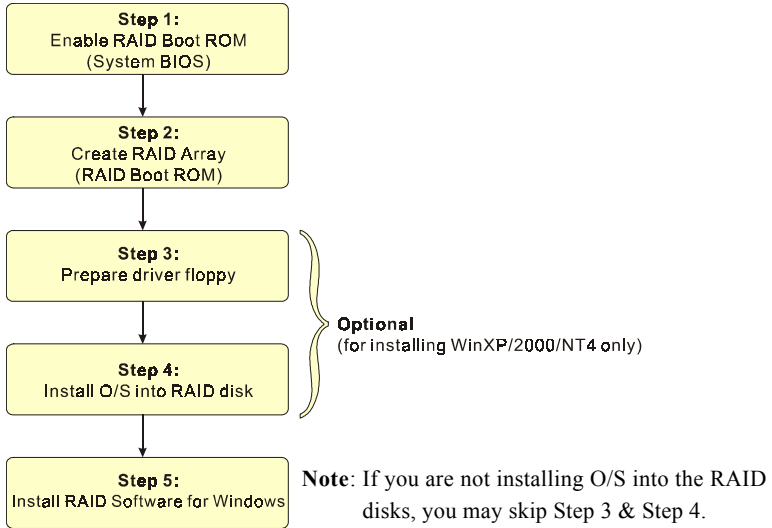
The nVidia RAID solution uses the nForce4 series chip as a RAID controller, which is a 4-channel S-ATA solution. Listed below are the main features and benefits of nVidia RAID:

- Support four S-ATA hard disk drives.
- Supports hard disk drive larger than 137 GB (48-bits LBA).
- Supports RAID 0, 1, JBOD, 0+1, 5
- Free Disk and Dedicated Spare Disk
A Free Disk or Dedicated Disk can be automatically used in case one drive of a mirrored array fails. A free disk can be used by any available mirrored array, while a dedicated disk can be used only by the array to which it is assigned.
- Bootable RAID
NVRAID can be configured in a way to make it bootable. For example, two hard drives can be configured as a bootable mirrored RAID array.
- RAID on Multiple Disk Controllers
Unlike other RAID solutions that limits the user to a dedicated RAID controller, NVRAID software can use a drive on one RAID controller and another drive on a second RAID controller.
- Disk Alert system
Disk Alert system informs user when a disk fails, indicating the location of failed port.

RAID Configuration

Enable RAID Function

For any RAID controller, the general procedure to enable RAID function are shown below:



Step 1: Enable RAID ROM

The system BIOS may disable all RAID function by default. To enable any RAID controller you must enable its RAID Boot ROM. Enter the BIOS CMOS Setup and jump to Integrated Peripherals Page.



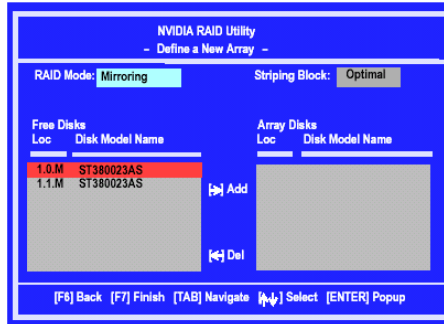
Select the controller's Boot ROM and set it to Enabled. Press "F10" to Save & Exit.

Step 2: Create RAID Array

RAID arrays are created using the RAID controller's BIOS utility.

▶ **NVIDIA MCP04**

Power-on the system and wait for the RAID BIOS Setting utility message on the screen. Press the "F10" key to enter its BIOS configuration utility.



Refer to Appendix B-1 for details about creating RAID array using this utility. After the RAID array is created, press "F10" to exit.

Step 3: Prepare driver floppy

When installing Windows XP/2000/NT4.0 into any RAID disk, the O/S setup will require a floppy disk containing the RAID driver. This step will show you how to prepare this driver floppy. There are 2 methods to prepare this floppy:

▶ **Method 1**

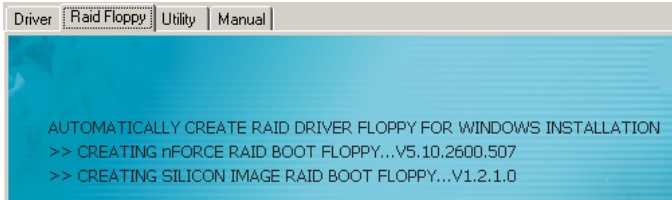
1. Insert the bundled CD into the CD-ROM drive
2. Boot the system from the CD-ROM
3. A menu of driver for various RAID controllers will appear
4. Insert a blank floppy into the A:drive
5. Select the appropriate RAID controller to begin copy into the floppy

▶ **Method 2**

1. Locate another computer and insert the bundled CD into its CD-ROM drive.

RAID Configuration

2. A main menu screen will appear (Autorun feature)
3. Select the page “RAID floppy”



4. Insert a blank floppy into the A:drive
5. Click on the required driver to begin copy into the floppy

Step 4: Install O/S into RAID disk

Proceed to install Windows XP/2000/NT4.0. When installing the O/S from CD, press <F6> so that it will request for RAID driver. Insert the floppy created earlier in Step 3.

Step 5: Install Software utility for Windows

After the O/S has been installed, you may install the RAID driver and software. The RAID software is a Windows-based utility with graphical user interface that provides an easy operating tool to configure and manage RAID arrays.

- 1) Insert the bundled CD into the CD-ROM drive.
- 2) When the main menu appears, click on the RAID driver corresponding to the RAID controller you have configured in Step 2. See driver installation in section 6 for more details.

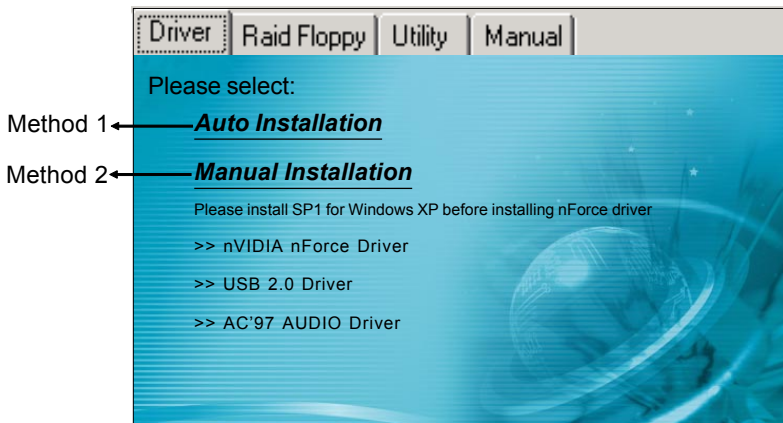
Note: For information on using the software utility, refer to the user guide in the bundled CD.

Section 6

DRIVER INSTALLATION

Easy Driver Installation

Once the operating system has been installed, you need to install the drivers for the mainboard.



Insert the bundled CD into the CD-ROM and the main menu screen will appear. The main menu displays links to the supported drivers, utilities and software.

► **Method 1**

This item can install all drivers automatically.

► **Method 2**

This item can allow you to install the drivers selectively.

Step 1 : Click "**nVIDIA nForce Driver**" to install chipset driver.

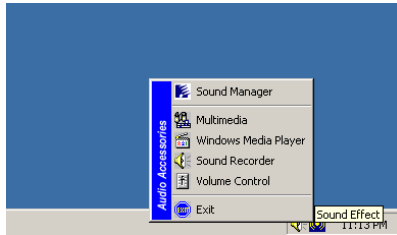
Step 2 : Click "**USB V2.0 Driver**" to install USB 2.0 driver.

Step 3 : Click "**AC'97 AUDIO Driver**" to install audio driver.

Realtek Sound Manager Quick User-guide

◆ Introduction

To obtain the best performance from your audio system, run the "Sound Manager" utility to adjust the settings to suit your needs. This section of the manual is intended to provide a quick user-guide to setup "Sound Manager". For more detailed information, refer to "Sound Manager manual" in the CD.



<Figure 1>

1. Right-click "Sound Effect" button on the task bar and select "Sound Manager".



Sound Effect :

<Figure 2>

2. Select "Sound Effect" page to set the desired audio environment from the pull-down menu.

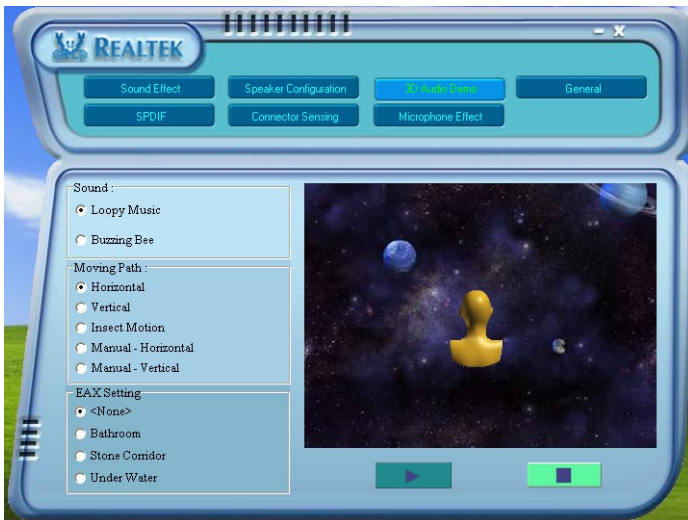


Speaker Configuration:

<Figure 3>

3. This page displays the mainboards's phone jack function when a corresponding audio mode is selected.

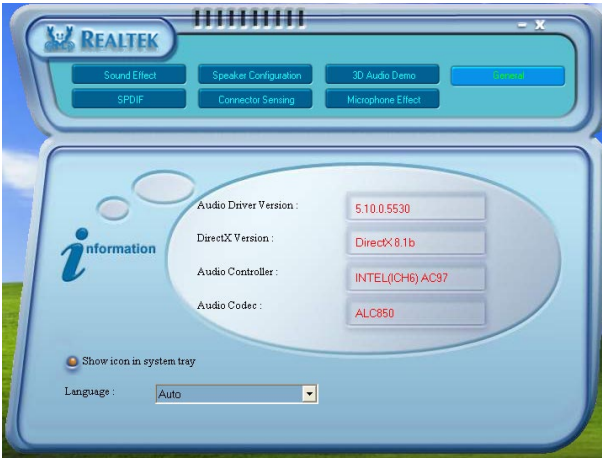
Figure 3 above shows the phone jack setup for 8 channel mode.



HRTF Demo:

<Figure 4>

4. This page lets you test the HRTF 3D Positional Audio features.



General:

<Figure 5>

5. This page displays information regarding the audio hardware and software. To remove "Sound Manager" icon from Windows Task bar, uncheck "Show icon in system tray".



SPDIF:

<Figure 6>

6. This page shows S/PDIF-In and S/PDIF-Out function on your system.
S/PDIF-In: a. Click "Auto Lock" to detect S/PDIF input and display its information.
b. Check "Real-time S/PDIF-In monitor" to listen to the S/PDIF In signal through Line-out connector.
S/PDIF-Out: Choose the type of audio source that will appear on the S/PDIF-out connector.

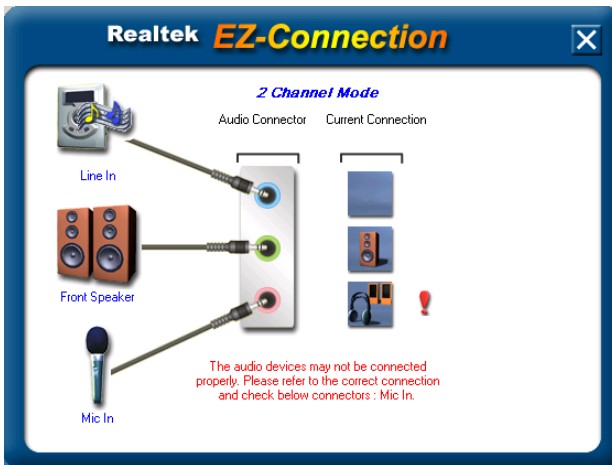
This board is equipped with Jack Sensing capability. If an audio device is plugged into the wrong connector, a warning message will appear to remind users to check the connection.



Connector Sensing:

<Figure 7>

7. Push "Start" button to start the sensing. Please remember to terminate all audio applications before starting the sensing.



Connector Sensing:

<Figure 8>

8. EZ-Connection shows the result of the detection. "Audio Connector" column reflects the settings used in the "Speaker Configuration" page. "Current Connection" column shows the type of device detected. If the results do not match, an exclamation mark will appear on the right side.



Connector Sensing:

<Figure 9>

9. After closing EZ-Connector, this page will show the latest connector status as above.



Microphone Effect:

<Figure 10>

10. The “Noise Suppression” feature uses software to reduce background delay microphone recording.

Appendix A

A-1 Update Your System BIOS

Download the xxxxx.EXE file corresponding to your model from our website to an empty directory on your hard disk or floppy. Run the downloaded xxxxx.EXE file and it will self extract. Copy these extracted files to a bootable floppy disk.

Note: The floppy disk should contain NO device drivers or other programs.

1. Type "A:\AWDFLASH and press <Enter> Key.
2. You will see the following setup screen.
3. Please key in the xxxxx.bin BIOS file name.

```
FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved

For xxxx-W83627-6A69LPA9C-0  DATE: 05/11/2000
Flash Type -
File Name to Program : _____

Error Message:
```

4. If you want to save the previous BIOS data to the diskette, please key in [Y], otherwise please key in [N].

```
FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved

For xxxx-W83627-6A69LPA9C-0  DATE: 05/11/2000
Flash Type - xxxxx E82802AB /3.3V
File Name to Program : xxxxx.bin

Error Message: Do You Want To Save Bios (Y/N)
```

Appendix

5. Key in File Name to save previous BIOS to file.

```
FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved

For xxx-W83627-6A69LPA9C-0 DATE: 05/11/2000
Flash Type - xxxxx E82802AB /3.3V

File Name to Program : xxxxx.bin
File Name to Save    : xxxxx.bin

Error Message:
```

6. To confirm and proceed, please key in [Y] to start the programming.

```
FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved

For xxx-W83627-6A69LPA9C-0 DATE: 05/11/2000
Flash Type - xxxxx E82802AB /3.3V

File Name to Program : xxxxx.bin
Checksum             : 938EH
File Name to Save    : xxxxx.bin

Error Message: Are you sure to program (y/n)
```

7. The BIOS update is finished.

```
FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved

For xxx-W83627-6A69LPA9C-0 DATE: 05/11/2000
Flash Type - xxxxx E82802AB /3.3V

File Name to Program : xxxxx.bin
Checksum             : 4B04H
Verifying Flash Memory - 7FE00 OK

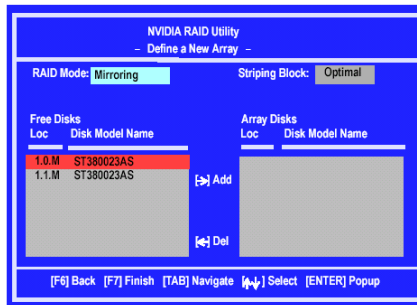
█ Write OK █ No Update █ Write Fail

F1: Reset F10: Exit
```


Appendix B

B-1 NVIDIA RAID BIOS Utility

Power-on the system and wait for the following screen to appear. Press the "F10" key to enter its BIOS configuration utility.



Using the Define a New Array Window

If necessary, press the tab key to move from field to field until the appropriate field is highlighted.

- **Selecting the RAID Mode**
By default, this is set to Mirroring. To change to a different RAID mode, press the down arrow key until the mode that you want appears in the RAID Mode box—either Mirroring, Striping, Spanning, or Stripe Mirroring.
- **Selecting the Striping Block Size**
Striping block size is given in kilobytes, and affects how data is arranged on the disk. It is recommended to leave this value at the default Optimal, which is 32KB, but the values can be between 4 KB and 128 KB.
- **Assigning the Disks**
The disks that you enabled from the RAID Config BIOS setup page appear in the Free Disks block. These are the drives that are available for use as RAID array disks.

Appendix

To designate a free disk to be used as a RAID array disk,

- 1) Tab to the Free Disks section.

The first disk in the list is selected

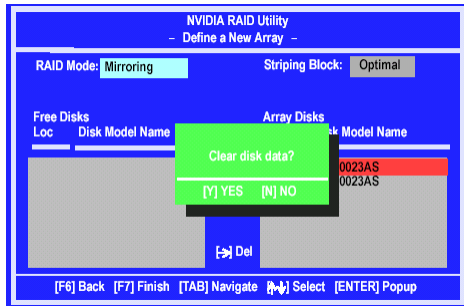
- 2) Move it from the Free Disks block to the Array Disks block by pressing the rightarrow key (->).

The first disk in the list is moved, and the next disk in the list is selected and ready to be moved.

- 3) Continue pressing the right-arrow key (->) until all the disks that you want to use as RAID array disks appear in the Array Disks block.

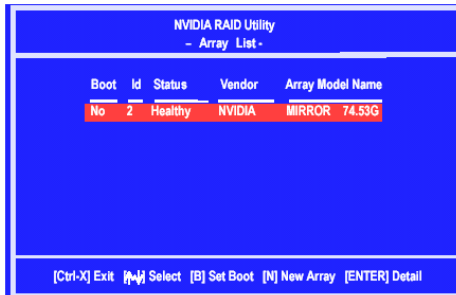
Completing the RAID BIOS Setup

After assigning your RAID array disks, press **F7**. The Clear disk data prompt appears.

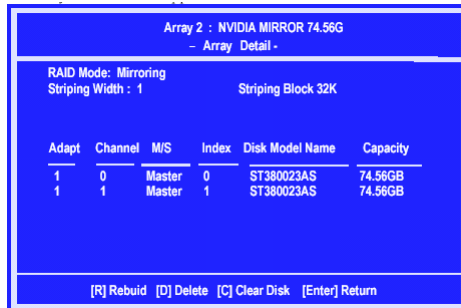


Press **Y** if you want to wipe out all the data from the RAID array, otherwise press **N**. You must choose **Yes** if the drives were previously used as RAID drives.

The **Array List** window appears, where you can review the RAID arrays that you have set up.



Use the arrow keys to select the array that you want to set up, then press **Enter**. The **Array Detail** window appears.



```
Array 2 : NVIDIA MIRROR 74.56G
- Array Detail -

RAID Mode: Mirroring
Striping Width : 1          Striping Block 32K

Adapt  Channel  M/S  Index  Disk Model Name  Capacity
-----
  1      0      Master  0     ST380023AS      74.56GB
  1      1      Master  1     ST380023AS      74.56GB

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

The Array Detail window shows information about the array that you selected, such as Striping Block used, RAID Mode, Striping Width, Disk Model Name, and disk capacity.

If you want to mark this disk as empty and wipe out all its contents then press **C**.

At the prompt, press **Y** to wipe out all the data, otherwise press **N**.

Press **Enter** again to go back to the previous window and then press **F10** to exit the RAID setup.

Appendix C**C-1 POST CODES**

POST (hex)	DESCRIPTION
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: <ul style="list-style-type: none"> - Disable shadow RAM - Disable L2 cache (socket 7 or below) - Program basic chipset registers
C1h	Detect memory <ul style="list-style-type: none"> - Auto-detection of DRAM size, type and ECC. - Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	<ol style="list-style-type: none"> 1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	<ol style="list-style-type: none"> 1. Clear 8042 interface 2. Initialize 8042 self-test
08h	<ol style="list-style-type: none"> 1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	<ol style="list-style-type: none"> 1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0B-0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved

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18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19-1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	<ol style="list-style-type: none">1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute.2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots.5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24-26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	<ol style="list-style-type: none">1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address.2. Initialize the APIC for Pentium class CPU.3. Program early chipset according to CMOS setup. Example: onboard IDE controller.4. Measure CPU speed.5. Invoke video BIOS.
2A-2Ch	Reserved
2Dh	<ol style="list-style-type: none">1. Initialize multi-language2. Put information on screen display, including Award title, CPU type, CPU speed
2E-32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34-3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved

43h	Test 8259 functionality.
44h	Reserved
45-46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	<ol style="list-style-type: none"> 1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4A-4Dh	Reserved
4Eh	<ol style="list-style-type: none"> 1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53-54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	<ol style="list-style-type: none"> 1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	<ol style="list-style-type: none"> 1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onboard_AUDIO switch.
5E-5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61-64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	<ol style="list-style-type: none"> 1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".

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6Eh	Reserved
6Fh	<ol style="list-style-type: none">1. Initialize floppy controller2. Set up floppy related fields in 40:hardware.
70-72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.....
76h	Reserved
77h	Detect serial ports & parallel ports.
78h-79h	Reserved
7Ah	Detect & install co-processor
7B-7Eh	Reserved
7Fh	<ol style="list-style-type: none">1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue:<ul style="list-style-type: none">• Clear EPA or customization logo.
80h-81h	Reserved
82h	<ol style="list-style-type: none">1. Call chipset power management hook.2. Recover the text font used by EPA logo (not for full screen logo)3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	<ol style="list-style-type: none">1. USB final Initialization2. NET PC: Build SYSID structure3. Switch screen back to text mode4. Set up ACPI table at top of memory.5. Invoke ISA adapter ROMs6. Assign IRQs to PCI devices7. Initialize APM8. Clear noise of IRQs.
86-92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	<ol style="list-style-type: none">1. Enable L2 cache2. Program boot up speed3. Chipset final initialization.4. Power management final initialization5. Clear screen & display summary table6. Program K6 write allocation7. Program P6 class write combining
95h	<ol style="list-style-type: none">1. Program daylight saving2. Update keyboard LED & typematic rate
96h	<ol style="list-style-type: none">1. Build MP table2. Build & update ESCD3. Set CMOS century to 20h or 19h4. Load CMOS time into DOS timer tick5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)