User's Manual

nVIDIA *nForce2 Ultra 400* mainboard
for AMD Socket A processor

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80 Port 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	1.BIOS chip inserted incorrectly 2. Incorrect BIOS update version 3. Mainboard problem 4. Add-on card inserted incorrectly.	1. Reinsert the BIOS chip 2. Download the correct BIOS version update from the manufacturer's Web site. 3. Replace mainboard 4. Remove and replace the add-on card
C1h - C5h	1. Memory module inserted incorrectly 2. Memory compatibility problem 3. Memory module damaged	1. Reinsert memory module 2. Replace memory with correct type 3. Replace memory module
2Dh	1. Error occured in VGA BIOS 2. VGA card inserted incorrectly	1. Replace VGA card 2. Reinsert the VGA card
26h	Overclock error	Clear CMOS or press the insert key to power on the system
07h - 12h	1. Initial Keyboard controller error 2. RTC error	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 data and power cable

Optional Items

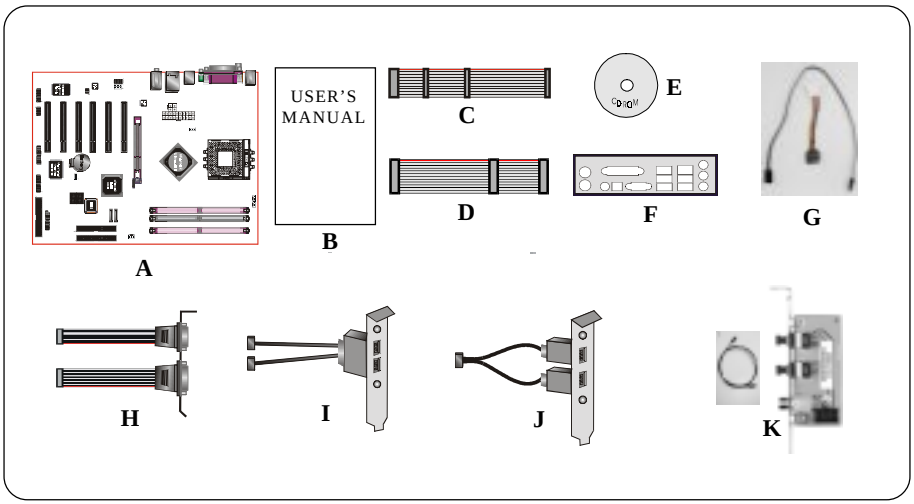
H. Game & COM bracket cable

I. IEEE 1394 two ports bracket

J. Extra USB2.0 port cable

K. S/PDIF Module

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



1-2 Mainboard Features

Brief Introduction

★ Athlon™ Processor

The AMD Athlon™ is a seventh-generation micro architecture with an integrated L2 cache, which is powerful enough to support the bandwidth requirements of a large range of applications, hardware, graphics, and memory technologies.

For more information about all the new features Athlon™ Processor deliver, check out the AMD website at http://www.amd.com

★ Chipset

This board is designed with nVidia chipset, nForce2™ Ultra 400 as North Bridge and nForce2™ RAID MCP as South Bridge, The nForce2 Ultra 400 delivers twice the bandwidth by implementing the new NVIDIA DualDDR™ Memory Architecture speed to DDR 400 memories. This generation System Platform Processor also implements the AGP 8X interface, HyperTransport Link, and is fully compliant with industry standard power management specifications such as ACPI 2.0 and PCI Power Management Interface (PMI) Spec 1.1.

For more details about the NVIDIA nForce2 MCPs, please visit the NVIDIA Web site at http://www.nvidia.com.

★ Accelerated Graphics Port (AGP)

The AGP slot on the board is compliant with the new AGP 3.0 specification. This new specification enhances the functionality of the original AGP specification by allowing 8X data transfers (8 data samples per clock) resulting in maximum bandwidth of 2.1GB/s. Only 1.5V AGP cards are supported.

★ Ultra ATA100/133

The mainboard provides an Ultra ATA100/133 Bus Master IDE controller. This controller supports Ultra ATA100/133 protocols which are ideal to support demanding applications such as real-time video, multimedia, and a high performance operating system. A new IDE cable is required for Ultra ATA100/133.

★ 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.

★ 10/100 LAN

This mainboard is mounted with an ethernet LAN PHY. It allows the mainboard to connect to a local area network by means of a network hub.

★ Serial ATA

Support Serial ATA, an evolutionary replacement for Parallel ATA IDE storage interface .Increases the peak data transfer speed up to 150MB/sec and allows future enhancements to the computing platform.

★ IEEE 1394 (Optional)

The IEEE 1394a standard provides transfer rates up to 400Mbits/sec. IEEE 1394 provides enhanced PC connectivity for consumer electronics audio/video appliances, storage peripherals, portable devices such as digital cameras, and inter-PC communications.

★ 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.

★ 6ch

Delivers 6 channel audio to bring you the latest in audio realism from DVD movies and games. Perfect for your home theatre system.

Special Features

- 80 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.

- Magic Health

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

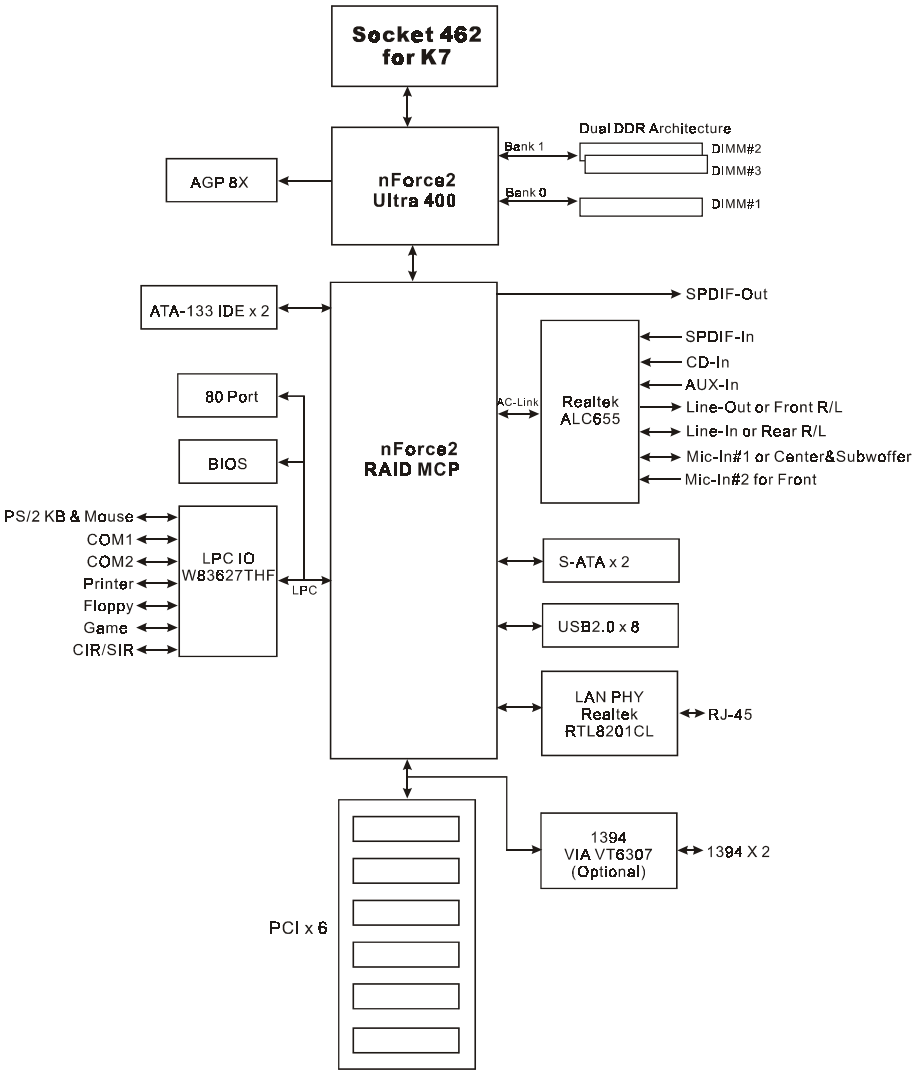
- EZ-Boot

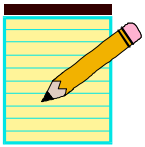
  Simply press “ESC” to select your bootable device. No more hassle to search the BIOS menu, change and re-start.

- PowerBIOS

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

1-3 System Block Diagram





Section 2
SPECIFICATION

Mainboard Specification

Processor

- Supports 462-pin SocketA for AMD Athlon XP and Barton processors with 266/333/400MHz Front Side Bus
  - Athlon XP (1500+ to 3000+) with 266/333MHz Front Side Bus,
  - Barton (2500+ to 3200+) with 333/400MHz Front Side Bus

Chipset

- nVidia AGPset : nForce2 Ultra 400 + RAID MCP

Main Memory

- Three 184-pin DDR DIMM sockets for 64-bit, Unbuffered, Single/Double-side and DDR-266/333/400 DIMMs
- Supports 128-bit dual channel memory architecture
- Supports up to 3GB memory size

BIOS

- Flash EEPROM with Award BIOS
  - ACPI v2.0 compliant
  - S3 (Suspend to DRAM) sleep-state support
  - SMBIOS (System Management BIOS) v2.2 compliant
  - Supports Power failure recovery
  - Able to wake the computer from specific states by LAN, Power switch, PME#, RTC alarm, USB, PS2 K/B, PS2 Mouse, Modem Ring-in COM#1…

Onboard PCI Devices

- 1394 --> (Optional) Integrated VIA VT6307 1394 controller with 2 ports solution
  - IEEE-1394a compliant with up to 400Mbps bandwidth
- LAN --> 10/100Mbps Fast Ethernet with onboard Realtek RTL8201CL LANPHY

Legacy IO Controller

- Winbond W83627THF LPC IO controller with floppy, printer, game, serial and SIR interface
- Supports Hardware Monitoring function

Audio

- Six channel audio with analog and digital output using Realtek ALC655 AC'97CODEC
  - AC'97 v2.3 compliant
  - Supports CD-In, AUX-IN and S/PDIF-in interface
  - Supports Line-out and Mic-In for front panel
  - Supports automatic "Jack-sensing"
  - Rear panel audio jacks configuration:

Audio Jack Color	2 channel	6 channel
Light Blue	Line-in	Rear stereo-out
Lime	Line-out	Front stereo-out
Pink	Mic-in	Center&Subwoofer

- Supports S/PDIF-out from nForce2 RAID MCP south bridge

Peripheral Interfaces

☞ At Rear Panel

- PS/2 keyboard and mouse ports
- One Parallel (printer) port
- One S/PDIF-Out Coaxial jack
- One Serial port
- One RJ45 LAN connector
- Four USB2.0 ports
- Three Audio jacks

☞ Onboard connector and pin-header

- One floppy drive connector
- Two ATA-133 IDE connectors

- Four extra USB2.0 ports
- Two CD-IN connectors
- One S/PDIF in/out connector
- One IR connector
- One Game port connector
- One Serial Port (COM2) connector
- Two S-ATA connectors
- Two 1394 connectors (Optional)
- Three Fan connectors

Front Panel Controller

- Supports Reset & Soft-Off switches
- Supports HDD & Power LEDs
- Supports PC speaker
- Supports Front Panel Audio connector

Expansion Slots

- One AGP slot supporting 1.5v 4X/8X AGP card
  - AGP v3.0 compliant
- Six PCI slots with Bus Master support
  - PCI v2.2 compliant

Other Features

- Magic Health – A quick "dashboard" display at POST to show hardware status. Helps to detect faults early.
- EZ Boot – An easy way let end-user can choose to boot from hard drive, CD-ROM, floppy, …
- KBPO – Keyboard power on, turn on the computer from keyboard
- **PowerBIOS** for excellent Overclocking capabilities through
  - subtle voltage tuning for CPU, Memory, AGP
  - subtle frequency tuning on FSB with 1MHz increment

- Supports complete Asynchronous FSB/Memory and Asynchronous FSB/ AGP, PCI scheme for overclocking

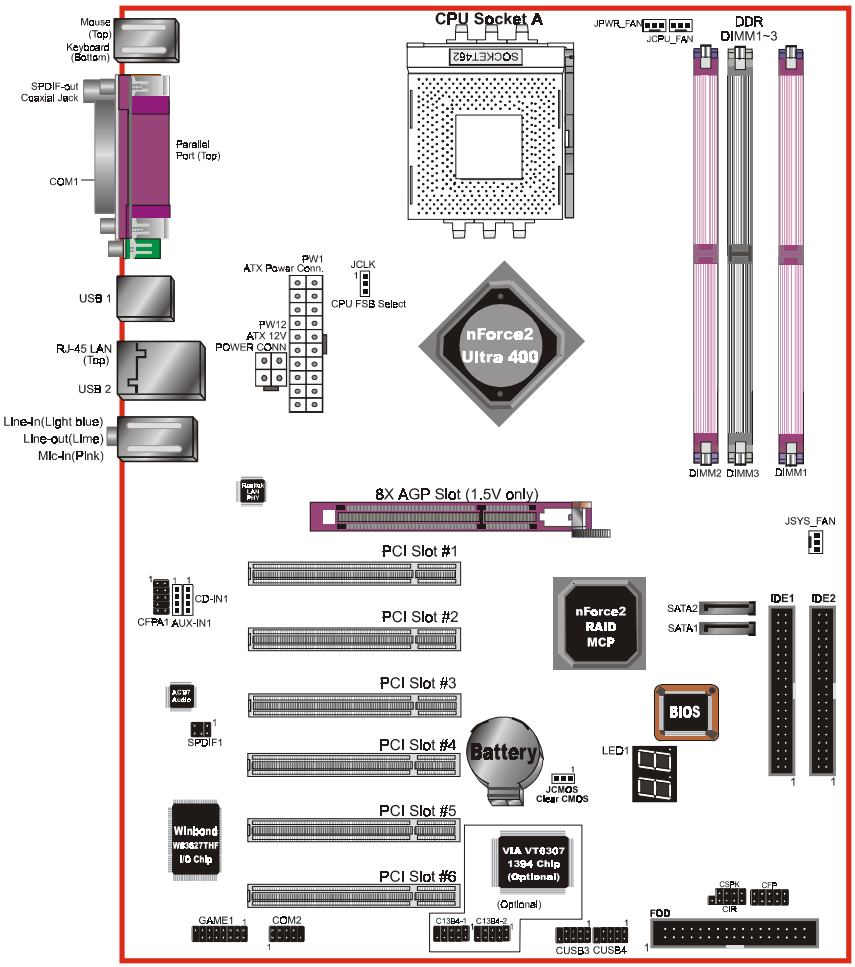
- CPU Overheating Protection
- P80P for system debugging

Form Factor

- 305mm x 245 mm ATX size

Section 3
INSTALLATION

MainboardLayout



<Figure 1>

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

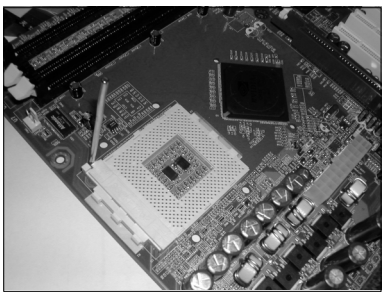
3-3. System Memory Configuration

3-4. Expansion Slots

3-5. Device Connectors

3-1 CPU Installation

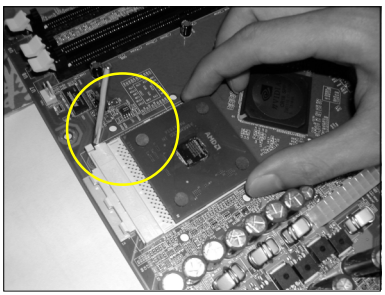
CPU Insertion: (use AMD Athlon™ as reference)



<Figure 2>

Step 1

Open the socket by raising the actuation lever.



<Figure 3>

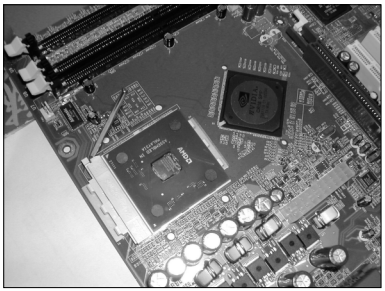
Step 2

Insert the processor.

Ensure proper pin 1 orientation by aligning the FC-PGA corner marking with the socket corner closest to the actuation arm tip. The pin field is keyed to prevent mis-oriented insertion.

Don't force processor into socket. If it does not go in easily, check for mis-orientation and debris.

Make sure the processor is fully inserted into the socket on all sides.



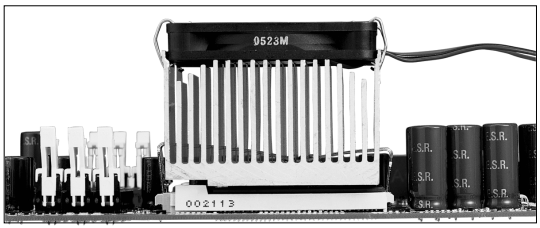
<*Figure 4*>

Step 3

Close the socket by lowering and locking the actuation lever.

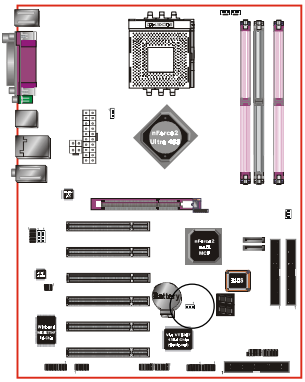
Step 4

Thermal compound and qualified heatsink recommended by AMD are a must to avoid CPU overheat damage. For more information about installing your CPU, please refer to the AMD website article "Socket A AMD processor and Heatsink Installation Guide" http://www.amd.com/products/cpg/athlon/pdf/23986.pdf.



<*Figure 5*>

3-2 Jumper Settings



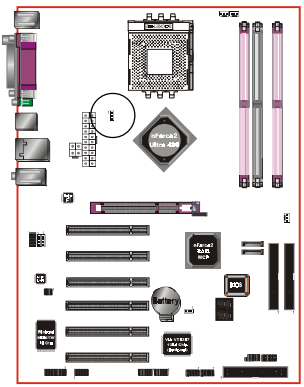
JCMOS: Clear CMOS data Jumper

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.

Settings:
1-2: Normal (Default)
2-3: Clear CMOS

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 <Del> key to enter BIOS setup.



JCLK: CPU FSB Select Jumper

This jumper is used to select the front side bus of the CPU installed on the mainboard.

Settings:
1-2: 100/133 MHz
2-3: 133/166/200 MHz (Default)

Note: Overclocking may cause system instability and are not guaranteed to provide better system performance.

3-3 System Memory Configuration

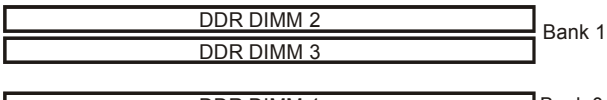
Memory Layout

The mainboard accommodates three PC1600/2100/2700/3200 184-pin DIMMs (Dual In-line Memory Modules):

- Supports up to 3.0GB of 200/266/333/400MHz DDR SDRAM
- Supports up to 3 DDR DIMMs (refer to Table 1)
- Supports 64/128/256/512Mb, 1Gb x8 & x16 DRAMs
- Supports 128-bit dual channel memory architecture
- Supports unbuffered and non-ECC DIMMs
- Supports configurations defined in the JEDEC DDR DIMM specification

Figure 6 and Table 1 show several possible memory configurations.

<Figure 6>



<Table 1>

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

NOTES:

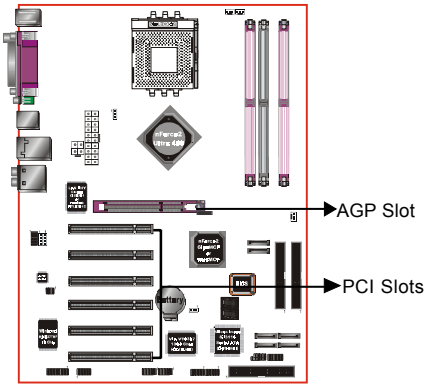
- DIMM#2 & #3 shared same memory bus and DIMM#1 is dedicated for 2nd channel memory bus.

  We recommend you to use DIMM socket of the same color to obtain the best memory performance.

  - For one DIMM memory configuration, the DIMM can be located on any of DIMM#1 to DIMM#3 in 64-bit mode
  - For two DIMMs memory configuration, the DIMMs should be located on DIMM#2/#3 and DIMM#1 in 128-bit mode. It is preferable to use DRAM DIMM of the same type and size.
  - For three DIMMs memory configuration, the DIMMs can be located on all DIMM sockets in 128-bit mode.

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

3-4 Expansion Slots



AGP Slot

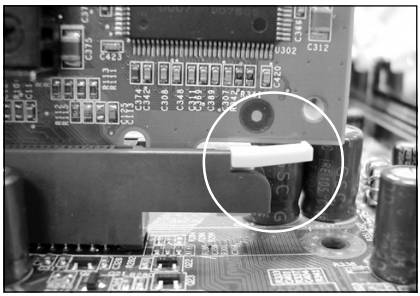
The mainboard is equipped with an AGP slot. Make sure you install a card that supports the 1.5V specification.

PCI Slots

The mainboard is equipped with 6 PCI slots.

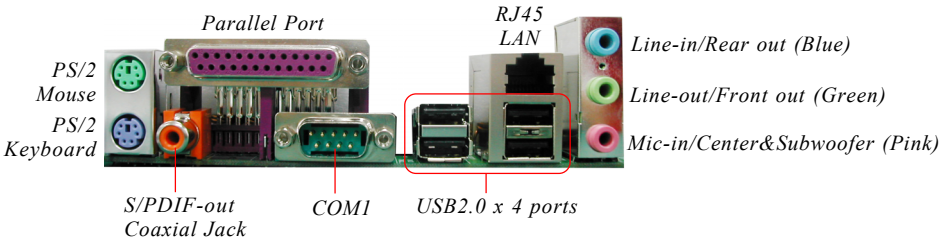
AGP Card Installation Caution

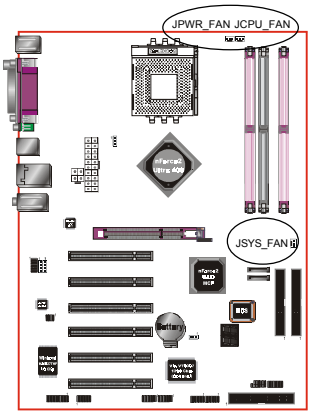
When installing the AGP card make sure the AGP card edge connector is inserted fully into the slot and the slot clicker is locked.



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.





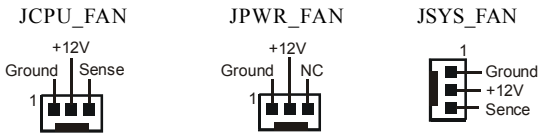
JCPU_FAN / JPWR_FAN / JSYS_FAN:

CPU/Power/Chassis Fan Power Connectors

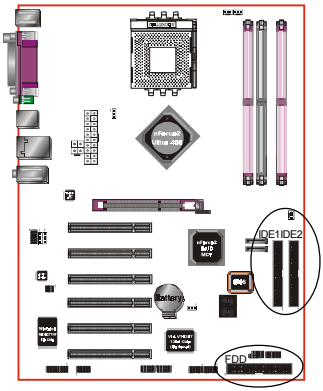
JCPU_FAN: The CPU must be kept cool by using a heatsink with fan assembly.

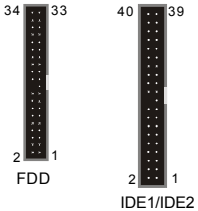
JPWR_FAN: If you are installing an additional fan in the unit, connect to this fan connector.

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



The system is capable of monitoring the fan speed in RPM (Revolutions Per Minute). Refer to the PC Health Status submenu of the BIOS for the current speed of the CPU fan , power fan and chassis fan.





FDD: Floppy Controller Connector

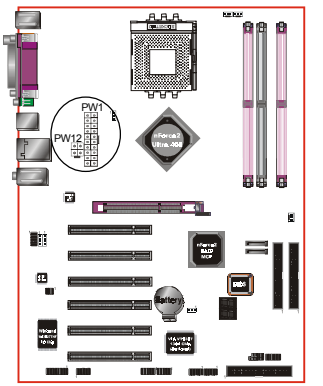
This connects to the floppy disk drive.

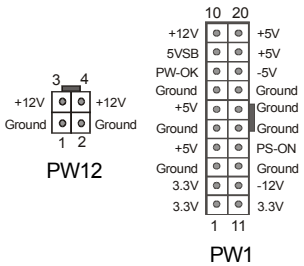
IDE1/IDE2: Ultra DMA-100/133 Primary/Secondary IDE Connector

This mainboard is equipped with 2 IDE connectors to support up to 4 ATA-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, one must be set to Master mode and the other to Slave mode. Refer to your disk drive user's manual for information about selecting the proper drive switch settings.





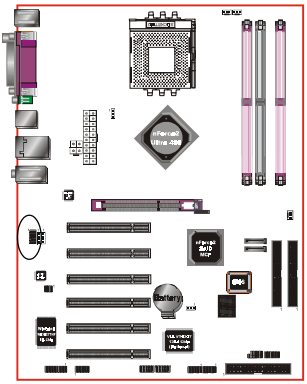
PW1: 20-pin ATX Power Connector

PW12: 4-pin ATX12V Power Connector

The mainboard is equipped with a standard 20-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.

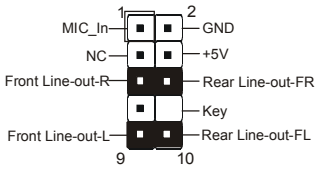
Caution:
The PW1 and PW12 Power Connector must be used simultaneously for the system to work safely.

The board requires a minimum of 250 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 300 Watt or greater power supply.



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.

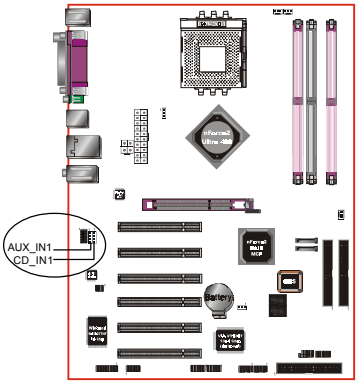


Settings:

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

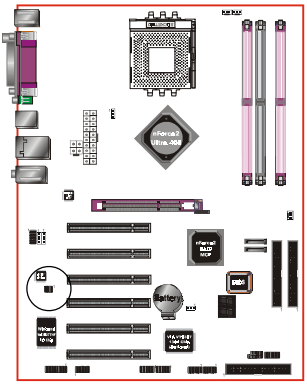
Pins (5-6) & (9-10) Open: Only front panel audio jack can be used.

In 2-Channel audio mode, Mic-In is shared for both front panel and rear panel. In 6-Channel audio mode, the Mic-In is dedicated for front panel use, and rear panel Mic-In function will switch to Center and Subwoofer support.



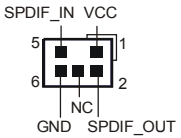
CD_IN1/AUX_IN1: CD Audio_IN Connector

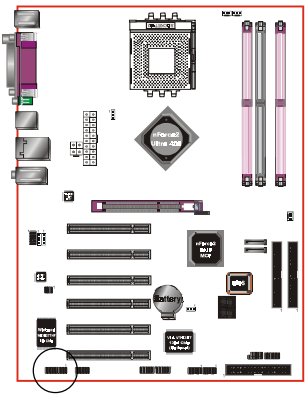
These connectors are used to receive audio form a CD-ROM drive, TV tuner or MPEG card.



SPDIF: Sony/Philips Digital InterFace connector

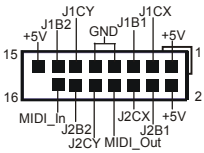
This connector links digital audio between the mainboard and your audio devices, such as CD player, sampler or DAT recorder. It allows the digital transmission of audio data in S/PDIF format.

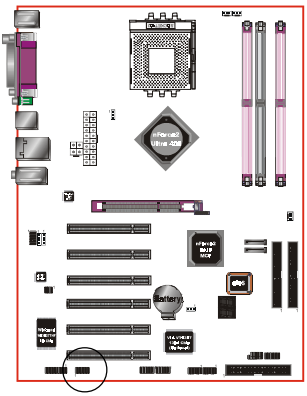




GAME1: Game/MIDI connector

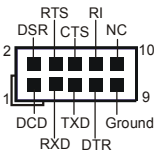
This port works well with any application that is compatible with the standard PC joystick.

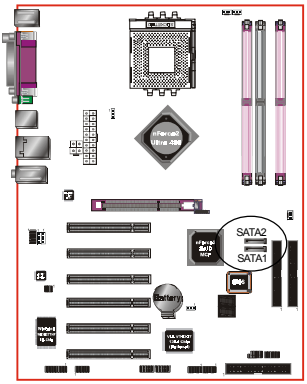




COM2: Serial Port Connector

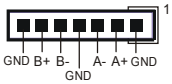
The serial port can be used with modems, serial printers, remote display terminals, and other serial device.

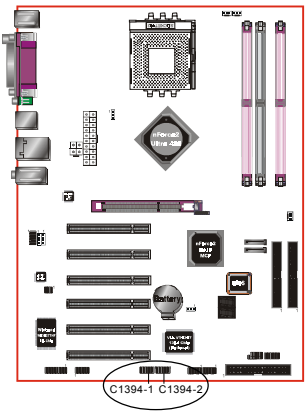




SATA1 / SATA2: Serial ATA Connectors

These connectors enable you to connect Serial ATA devices that conform to the Serial ATA specification.

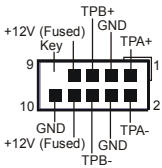


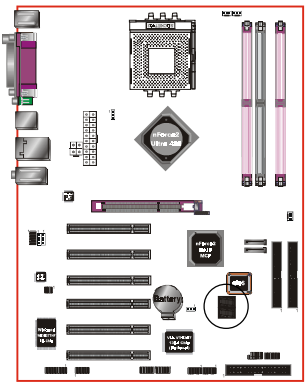


C1394-1 / C1394-2 : (Optional)

400Mbps 1394a (FireWire) Connectors

C1394-1 and C1394-2 enable you to connect two IEEE 1394 ports for use with external devices that conform to the IEEE 1394a specification.

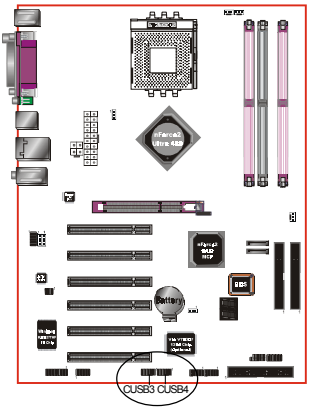




LED1: 80 Port Debug LED

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

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

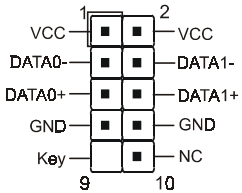


CUSB3/CUSB4: USB 2.0 ports

USB2.0 allows data transfer speed up to 480Mbps.

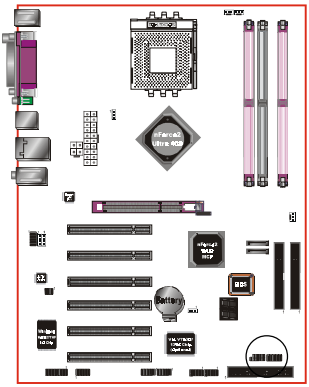
This mainboard includes 4 additional USB2.0 ports, identified by two 10-pin connector.

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.

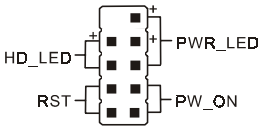


CAUTION!

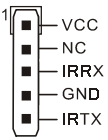
Please make sure the USB cable has the same pin assignment. A different pin assignment may cause damage to the system.
If you need the USB cable, please contact our retailer.



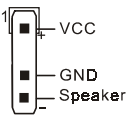
CFP



CIR



CSPK



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.

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

CSPK: Speaker
Connect to the case speaker.

3-6 Power-On/Off (Remote)

This board has a 20-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 (Figure 7).
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 (>=) 2A. Please check the 5VSB's specification printed on the power supply's outer case.

Note: The board requires a minimum of 250 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 300 Watt (or higher) power supply.

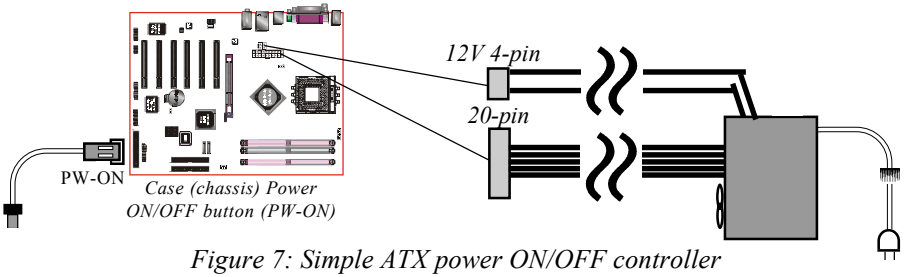


Figure 7: Simple ATX power ON/OFF controller

3-7 External Modem Ring-in Power ON and Keyboard Power ON Functions (KBPO)

Modem-Ring Power ON Function

The mainboard supports External Modem Ring-in Power ON function. Once you connect an external modem to COM1 or COM2, you can turn on the system through remote and host dial-up control.

Keyboard Power ON Function

The mainboard features a keyboard power on function to turn on the power supply using a keypress. Refer to the Power Management Setup in the BIOS setup section for details. To enable this feature, the BIOS default setting is Keyboard Hot Key (<Ctrl> + <F1>). To power off the system, use the Soft-OFF function under Windows XP/ME/2000/98. (refer to Windows online help).

3-8 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 AGP, LAN, and modem cards).
   b. In BIOS, under Power Management Setup (refer to Section 4), select "ACPI Suspend Type: S3(STR)".
   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) to wake up your system to the last display.

3-9 CPU Overheating Protection

This mainboard is equipped with CPU Overheating Protection. It will automatically shutdown the system when CPU temperature reaches approximately 110°C to prevent long term damage to the CPU. When this happens, the speaker produces a sustained beep sound and the system will not be able to power on. This protection is designed through hardware and no BIOS setup is required.

To power on your system again,

Step 1: Unplug the ATX power cord (or turn off the ATX power supply switch)

Step 2: Wait a few minutes for the CPU to cool.

Step 3: Check that the CPU heatsink and cooling fan assembly is properly installed. **Be careful when touching the heatsink as it may be hot.**

Step 4: Plug back the ATX power cord (or turn on the ATX power supply switch) and power -on the system.

If the beeping sound persists, repeat Step 1 to remove the power source.

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 updates.

To enter the Setup Program :

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

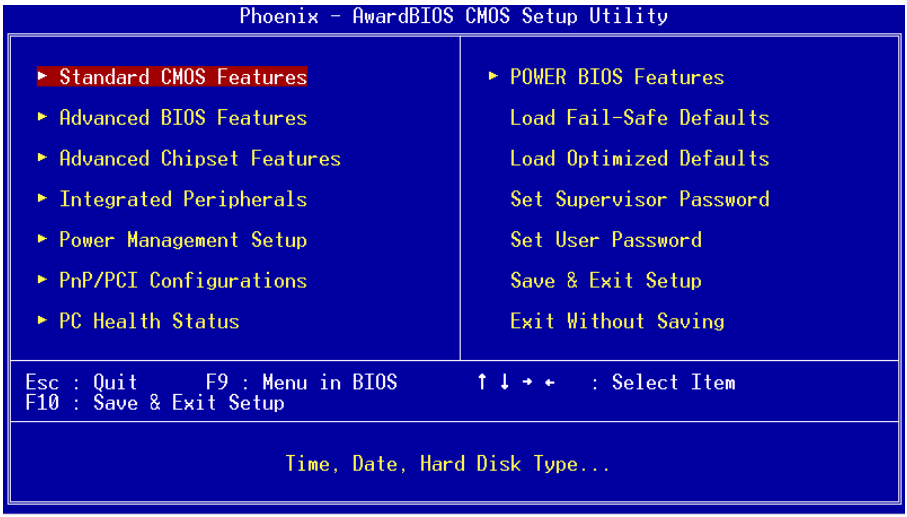


Figure 1: CMOS Setup Utility

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.

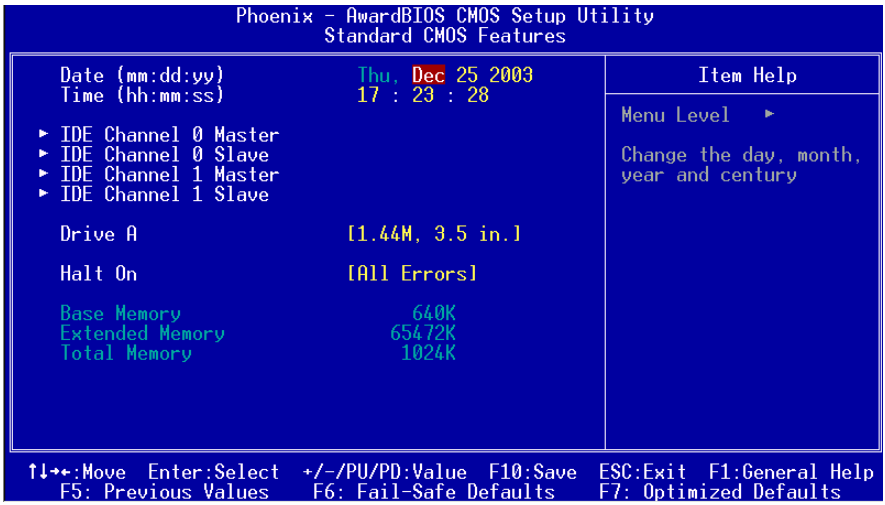


Figure 2: Standard CMOS Setup

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.

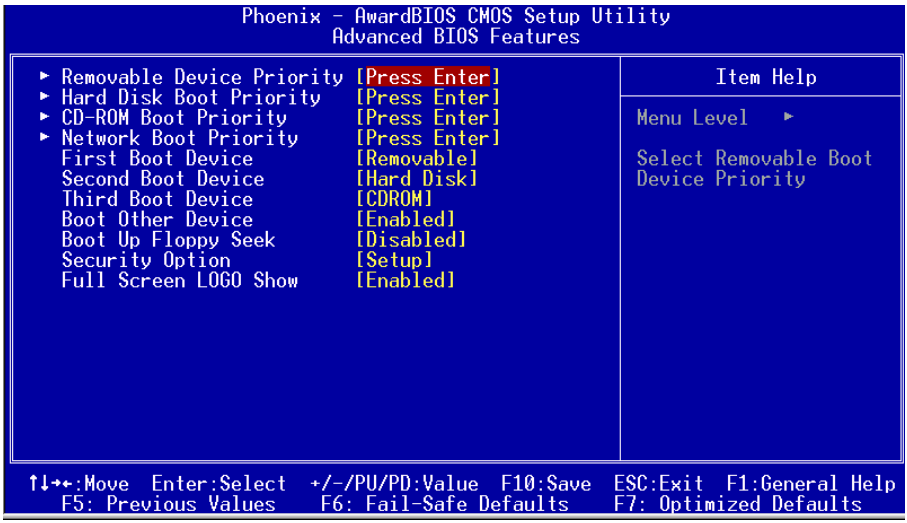


Figure 3: BIOS Features Setup

▸Removable Device / Hard Disk / CD-ROM / Network Boot Priority

This item allows you to select the removable device/hard disk/CD-ROM/network boot priority.

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-ZIP, 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.

Security Option

This category allows you to limit access to the System and Setup, or just to Setup. The default is 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.

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.

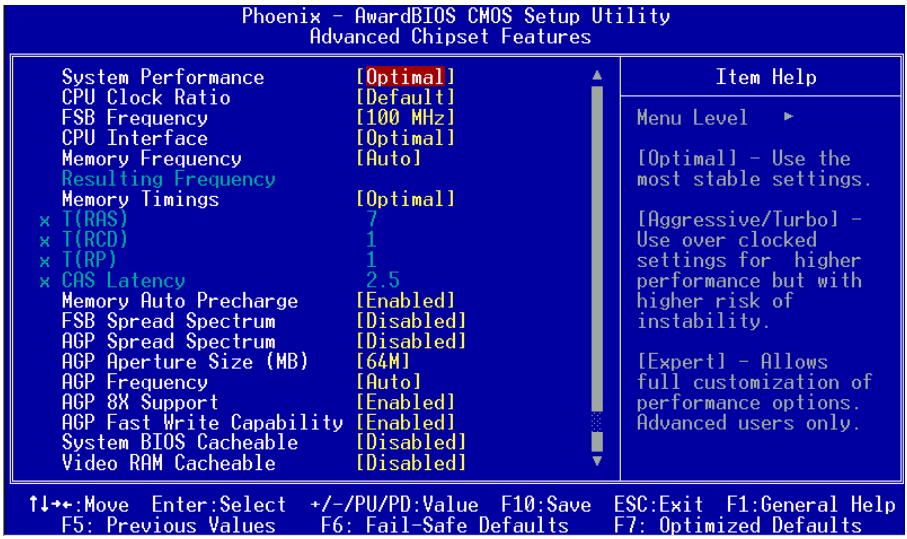


Figure 4: Chipset Features Setup

System Performance

This item will help you to configure your system performance, selecting higher performance may cause instability.

Options: Optimal, Aggressive, Turbo, Expert.

CPU Clock Ratio

Use this item to select a multiplier to set the CPU frequency. See FSB Frequency item below for explanation.

FSB Frequency

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

For example, if you have a processor that is rated at 2.4GHz and the clock generator is 200MHz, then 200MHz x 12 = 2.4GHz

Note: 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.

CPU Interface

Allows you to set CPU/FSB parameters for CPU most stable or overclocked.

Options: Optimal, Aggressive.

Memory Frequency

Enables you to select the memory frequency.

Options: By SPD, 50%, 60%, 66%, 75%, 80%, 83%, 100%, 120%, 125%, 133%, 150%, 166%, 200%, Auto.

Below is a list of Auto mode table for reference.

FSB	SPD/Memory	Sync/Async and Speed set
200	266	Sync 200
200	333	Sync 200
200	400	Sync 200
266	266	Sync 266
266	333	Sync 266
266	400	Sync 266
333	266	Async 333/266
333	333	Sync 333
333	400	Sync 333
400	266	Async 400/266
400	333	Async 400/333
400	400	Sync 400

Note: Auto mode ensures the memory init module initializes the memory controller for the best performance based on the FSB and DDR SPD capabilities.

Memory Timings
For setting DRAM Timing.
Options: Optimal, Aggressive, Turbo, Expert.

T (RAS)
This item specifies the number of clock cycles needed after a bank active command before a precharge can occur (sets the minimum RAS pulse width.).
Options: 1 ~ 15.

T (RCD)
This item sets the timing parameters for the system memory such as the CAS (Column Address Strobe) and RAS (Row Address Strobe).
Options: 1 ~ 7.

T (RP)
This item refers to the number of cycles required to return data to its original location to close the bank or the number of cycles required to page memory before the next bank activate command can be issued.
Options: 1 ~ 7.

CAS Latency
This item specifies the number of clock cycles needed after a Column Address Strobe (CAS) signal before data can be read. The default is by DRAM SPD.
Options: 2.0, 2.5, 3.0.

Memory Auto Precharge
Enables Memory Auto Precharge function.
Options: Enabled, Disabled.

FSB Spread Spectrum
This item can significantly reduce the EMI (ElectroMagnetic Interference) generated by the CPU.
Options: Disabled, 0.50%, 1.00%.

AGP Spread Spectrum
This item can significantly reduce the EMI (ElectroMagnetic Interference) generated by the AGP.
Options: Disabled, 0.50%, 1.00%.

AGP Aperture Size (MB)

This item defines the size of the aperture if you use an AGP graphics adapter. It refers to a section of the PCI memory address range used for graphics memory.
Options: 32, 64, 128, 256, 512 MB.

AGP Frequency

This item allows you to select the AGP frequency.
Options: Auto, 90MHz, 93MHz, 95MHz, 97MHz, 100MHz, 50MHz ~87MHz in 1MHz increments.

AGP 8X Support

Enables AGP 8X supports.
Options: Disabled, Enabled.

AGP Fast Write Capability

This item allows you to use Fast Write transfer for CPU write to graphics adapter's memory.
Options: Disabled, Enabled.

System BIOS Cacheable

This item allows the system BIOS to be cached in memory for faster execution.
Options: Disabled, Enabled.

Video RAM Cacheable

This option allows the CPU to cache read/writes of the video RAM.
Options: Disabled, Enabled.

4-4 Integrated Peripherals

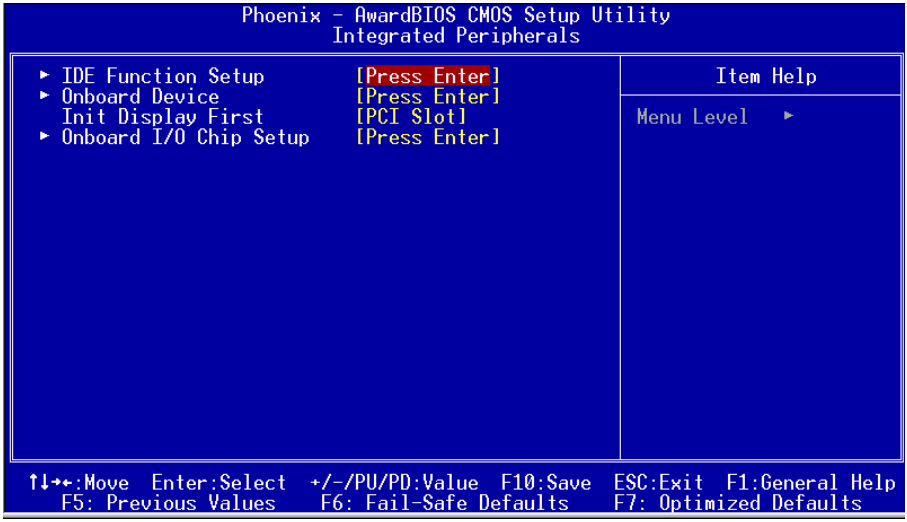


Figure 5: Integrated Peripherals

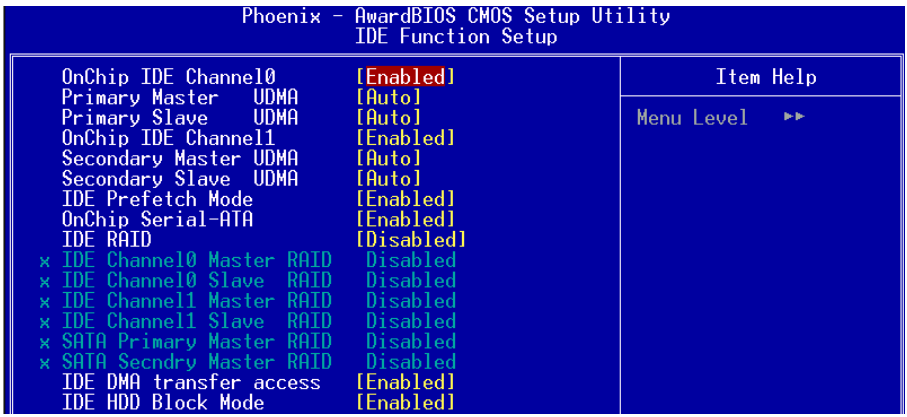
Init Display First

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

Options: PCI Slot, Onboard/AGP.

▸ *IDE Function Setup*

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



OnChip 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.

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

Primary/Secondary Master/Slave UDMA

Select the mode of operation for the IDE drive. Ultra DMA-100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver. If your hard drive and your system software both support Ultra DMA-100/133, select Auto to enable UDMA mode by BIOS.
Options: Auto, Disabled.

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.

OnChip Serial-ATA

This item enables/disables the S-ATA ports.

IDE RAID

This item allows you to enable RAID mode for IDE and SATA ports. When set to "Enabled" the following six fields become available.
Options: Enabled, Disabled.

IDE DMA transfer access

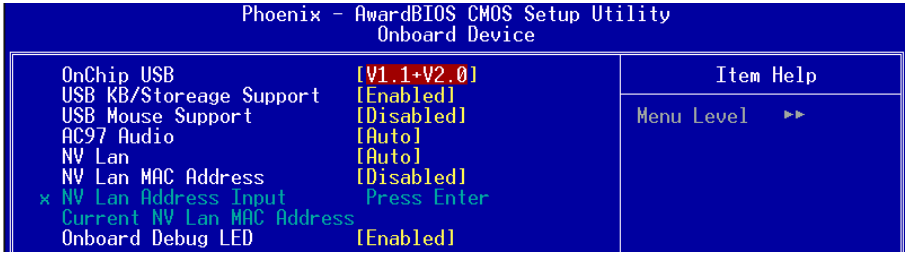
Automatic data transfer between system memory and IDE device with minimum CPU intervention. This improves data throughput and frees CPU to perform other tasks.
Options: Enabled, Disabled.

IDE HDD Block Mode

IDE Block Mode allows the controller to access blocks of sectors rather than a single sector at a time. The default is Enabled.
Options: Enabled, Disabled.

Onboard Device

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



Onchip USB

Enables the USB controller.

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

USB KB/Storage Support

Enable/Disable support for USB keyboard/Storage under DOS.

Options: Enabled, Disabled.

USB Mouse Support

Enable/Disable support for USB mouse under DOS.

Options: Enabled, Disabled.

AC97 Audio

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

Options: Auto, Disabled.

NV Lan

Enables the onboard LAN feature.

Options: Auto, Disabled.

NV Lan MAC Address

Machine MAC (NV) address selection.

Options: Enabled, Disabled.

NV Lan Address Input

Allows you to input the MAC (NV) address.

Current NV Lan MAC Address

Display the current MAC (NV) address.

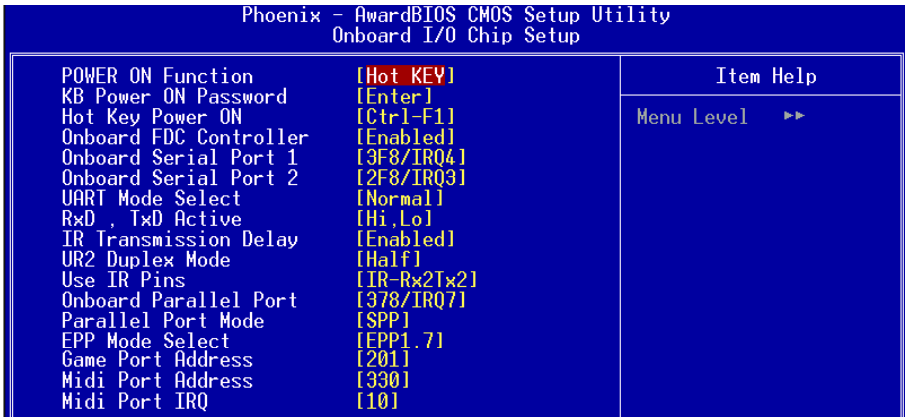
Onboard Debug LED

Enables the onboard Debug LED feature.

Options: Enabled, Disabled.

▸ *Onboard I/O Chip Setup*

Scroll to Onboard I/O Chip Setup and press <Enter>. The following screen appears:



POWER ON Function

Enables computer power on by keyboard, mouse, or hotkey activity.

Password: Requires you to enter a password when using the keyboard to power on. Set the password in the next field "KB Power ON Password."

Hot KEY: (default) Enables you to use a hot key combination to power on the computer. Set the hot key combination in the "Hot Key Power ON" field.

AnyKEY: Enables you to set any keyboard activity to power on the computer.

Button Only: Requires you to push the computer power button to power on the system.

Keyboard 98: Enables you to set the Windows 98 key to power on the system.

KB Power ON Password

Press "Enter" to create a password that is required when you use the keyboard to power on the system. You must set the POWER ON Function to "Password" to be prompted for a password at power on.

Hot Key Power ON
Enables you to set a hot key combination to be used for powering on the system. The default is Ctrl-F1.
Options: Ctrl+F1 ~ Ctrl+F12.

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 1/2
Select an address and corresponding interrupt for the first and second serial ports.
Options: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

UART Mode Select
This field configures the 2nd serial port for IR application. Select the required IR protocol or select "Normal" to disable IR mode.
Options: Normal, IrDA and ASKIR.

RxD, TxD Active
When the above UART Mode Select is in IR mode, this field configures the receive and transmit signals generated from the IR port.
Options: Hi-Hi, Hi-Lo, Lo-Hi, and Lo-Lo.

IR Transmission delay
This item allows you to enabled/disable IR transmission delay.
Options: Enabled, Disabled.

UR2 Duplex Mode
This item allows you to select IR half/full duplex function.
Options: Half, Full.

Use IR Pins
This item allows you to select IR transmission routes, one is RxD2, TxD2 (COM Port) and the other is IR-Rx2Tx2.
Options: IR-Rx2Tx2; RxD2, TxD2.

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: DMA1, DMA3.

Game Port Address
Select an address for the Game port.
Options: 201, 209, Disabled.

Midi Port Address
Select an address for the Midi port.
Options: 290, 300, 330, Disabled.

Midi Port IRQ
Select an interrupt for the Midi port.
Options: 5, 10.

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.

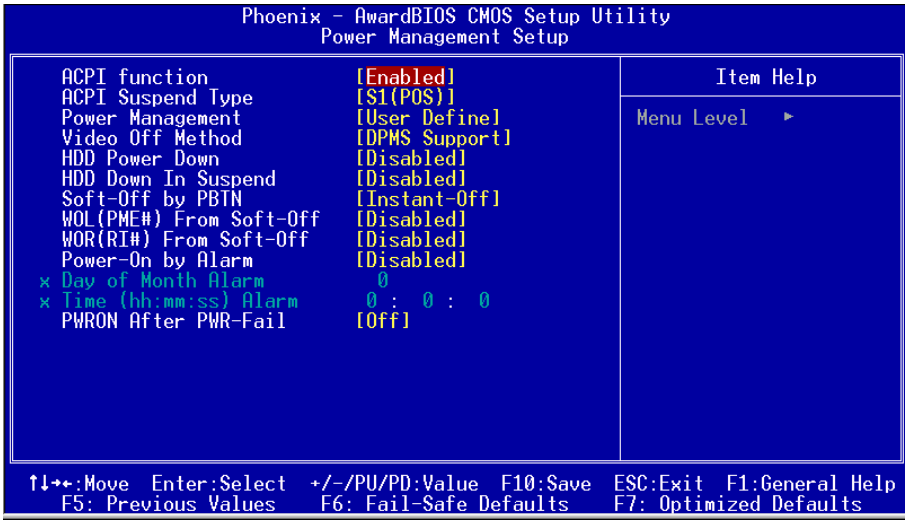


Figure 6: Power Management

ACPI Function

Enables the ACPI Function.

Options: Enabled, Disabled.

ACPI Suspend Type

This item allows you to select S1(Power-On-Suspend) or S3(Suspend-To-RAM) function. When set to "S3(STR)" or "S1&S3" the following two fields become available.

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

Power Management

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 for 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.

WOL (PME#) From Soft-Off

An input signal from PME on the PCI card awakens the system from soft-off state.
Options: Enabled, Disabled.

WOR (RI#) From Soft-Off

An input Ring-In signal from the modem awakens the system from a 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.

PwerOn 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.

Former-Sts: The system returns to the state it was in just prior to the power failure.

4-6 PNP/PCI Configuration

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

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

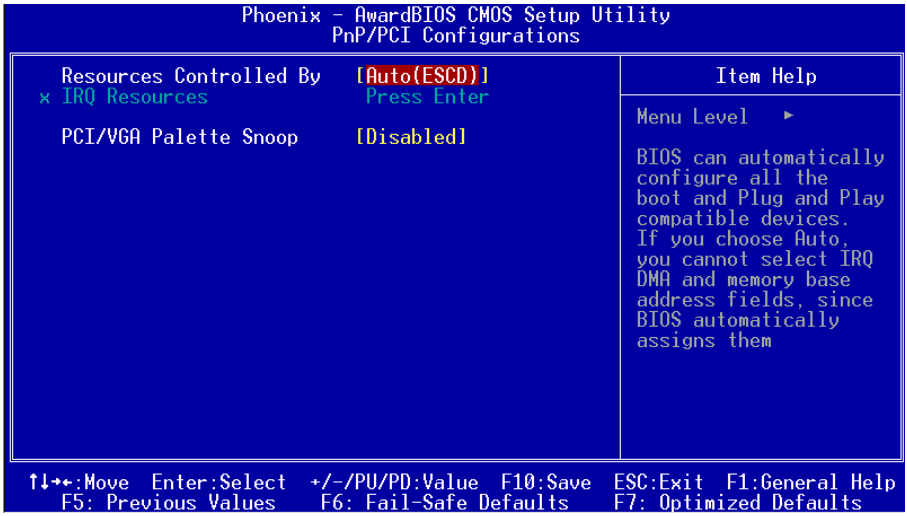


Figure 7: PNP/PCI Configuration Setup

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.

Interrupt requests are shared as shown below:

	INT A	INT B	INT C	INT D	INT E
AGP Slot					V
AC97	V				
Slot 1			V		
Slot 2				V	
Slot 3	V				
Slot 4		V			
Slot 5			V		
Slot 6				V	
Onboard 1394		V			
Onboard LAN	V				
Onboard USB	V				
Onboard USB		V			
USB 2.0			V		
SM BUS	V				

IMPORTANT!
When using PCI cards on shared IRQ slots, make sure its drivers support “Shared IRQ”, or that the cards do not need IRQ assignments. IRQ conflicts between the two PCI groups will make the system unstable or cards inoperable.

4-7 PC Health Status

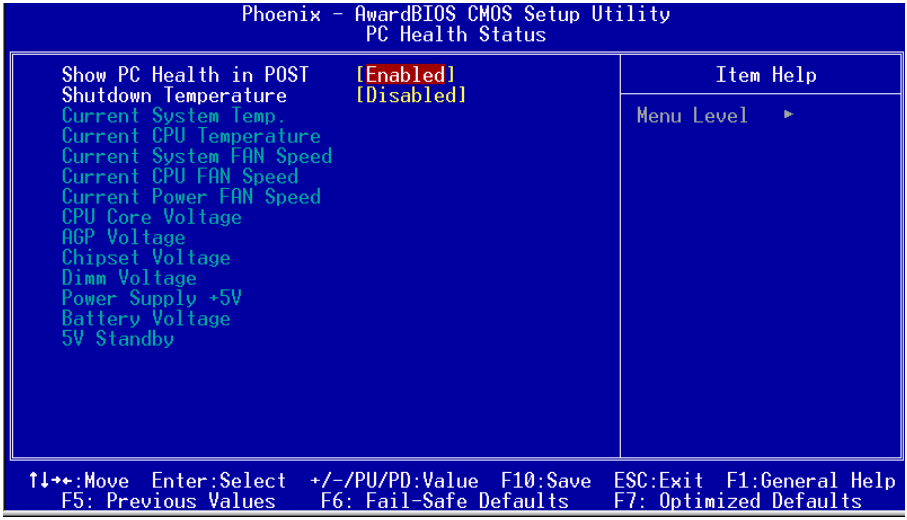


Figure 8: PC Health Status

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.

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 75°C/167°F in increments of 5°C.

Current System/CPU Temperature

Displays the current system /CPU temperature.

Current CPU/Chassis/Power FAN Speed

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

CPU Vcore Voltage

The voltage level of the CPU(Vcore).

AGP Voltage

The voltage level of power supplied to AGP card.

Chipset Voltage
The voltage level of the Chipset.

Dimm Voltage
The voltage level of the DRAM.

Battery Voltage
The voltage level of the battery.

Power Supply + 5V, 5V Standby
The voltage level of the switching power supply.

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.

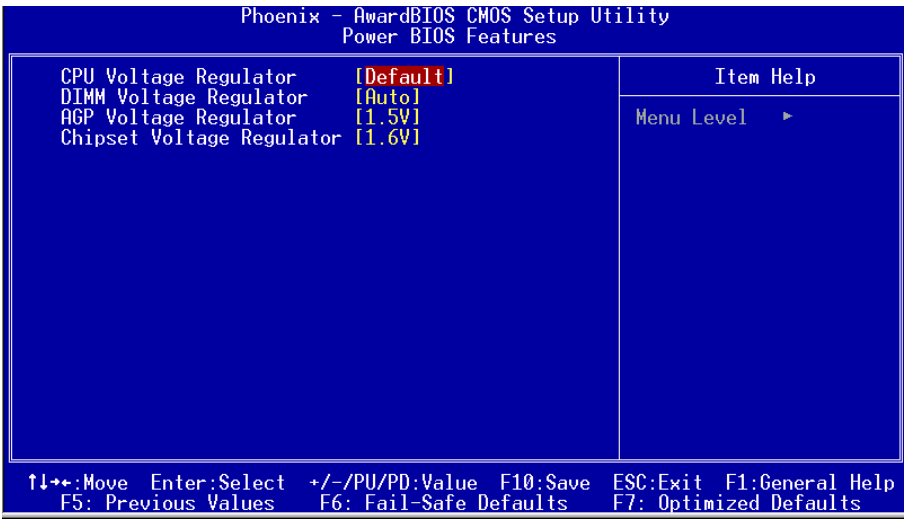


Figure 9: Power BIOS Features

CPU Voltage Regulator
This item allows you to set the CPU Vcore voltage.
Options: 1.400V to 2.200V in 0.025V increments.

AGP Voltage Regulator
This item allows you to set the AGP slot voltage.
Options: 1.5V to +1.8V in 1V increments.

DIMM Voltage Regulator
This item allows you to set the DIMM slot voltage.
Options: 2.50V, 2.63V, 2.77V, 2.90V.

Chipset Voltage Regulator
This item allows you to set the chipset slot voltage.
Options: 1.6V, 1.8V, 2.0V.

> **Warning:**
> Default chipset voltage is 1.6V. Setting higher voltage may cause damage to chipset. Please ensure proper cooling for Northbridge and Southbridge.

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
S-ATA RAID CONFIGURATION

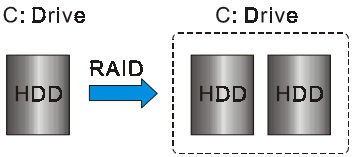
Introduction

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 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.

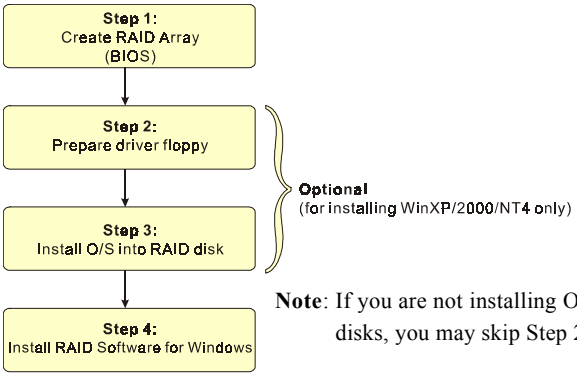
nVidia S-ATA RAID Features

The nVidia S-ATA RAID solution uses the nForce2 RAID MCP chip as a RAID controller, which is a 2-channel S-ATA and 1-channel ATA133 solution. Listed below are the main features and benefits of nVidia S-ATA RAID:

- Support two S-ATA hard disk drives.
- Supports hard disk drive larger than 137 GB (48-bits LBA).
- Supports RAID 0, 1 and JBOD.
- 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.
- RAID Across PATA and SATA
  NVRAID can span across both Parallel ATA as well as Serial ATA controllers. RAID operations can be performed on Parallel ATA hard drives, Serial ATA hard drives, or both Parallel and Serial ATA hard drives.
- 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.

Enable RAID Function

For any RAID controller, the general procedure to setup a RAID system is shown below:



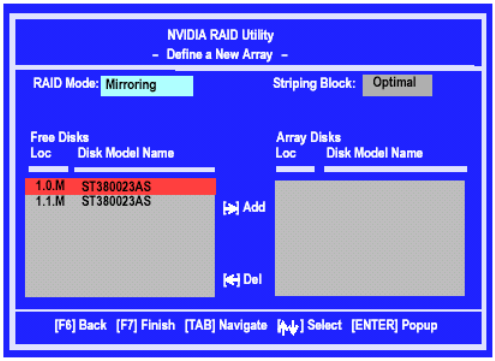
Note: If you are not installing O/S into the RAID disks, you may skip Step 2 & Step3.

☞Step 1: Create RAID Array

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

- ***NVIDIA nForce2 MCP***

  Power-on the system and wait for the following screen to appear. 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 2: 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.
2. A main menu screen will appear (Autorun feature)
3. Select the page "RAID floppy" as shown below

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

☞Step 3: Install O/S into RAID disk

Continue to install Windows XP/2000/NT4.0 as normal. When requested by Windows Setup for RAID driver, insert the floppy created earlier in Step 2.

☞Step 4: Install Software utility for Windows

After the O/S has been installed, you may install the RAID controller's 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.

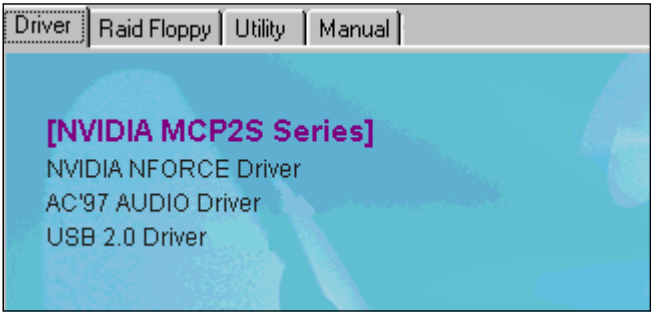
1) Insert the bundled CD into the CD-ROM drive.

2) When the main menu appears, click on the RAID driver corresponding to the controller you have configured in Step 1. 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



Insert the bundled CD-disk, the main menu screen will appear. The main menu displays buttons that link you to the supported drivers, utilities and software.

Step 1 : Click **"NVIDIA NFORCE Driver"** to install chipset driver.

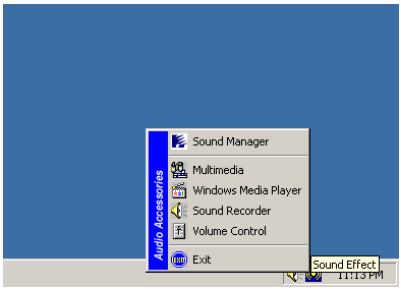
Step 2 : Click **"AC'97 AUDIO Driver"** to install audio driver.

Step 3 : Click **"USB 2.0 Driver"** to install USB 2.0 driver.

Realtek Sound Manager Quick User-guide

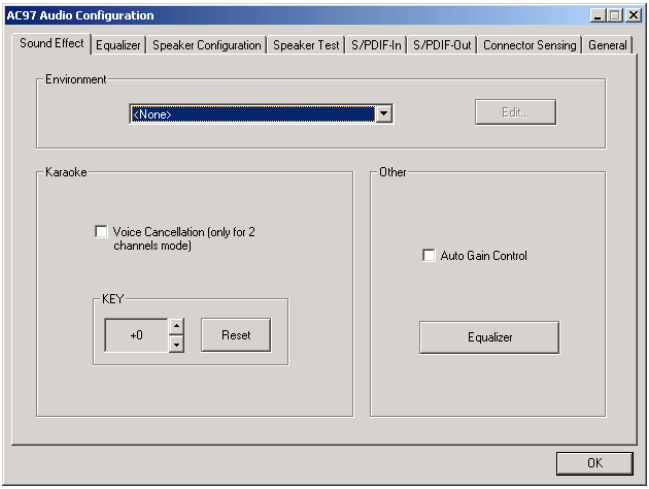
◆ Introduction

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>

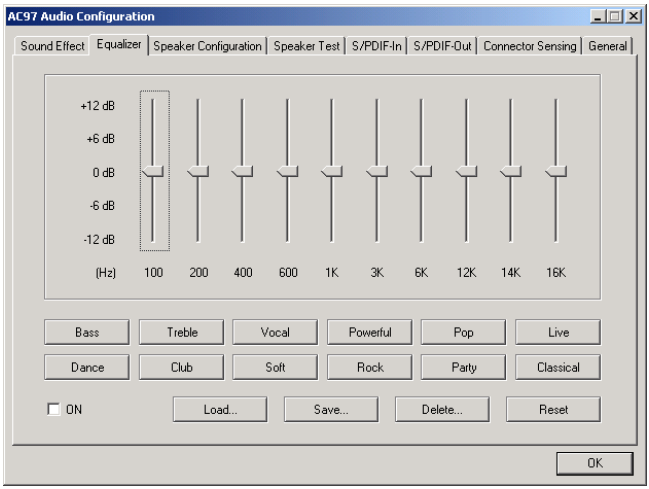
1. Right-click “Sound Effect” button on the task bar and select “Sound Manager”.



Sound Effect:

<Figure 2>

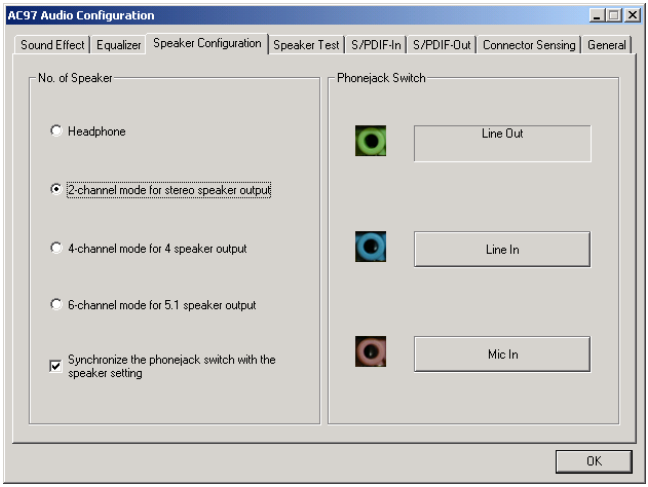
2. Select "Sound Effect" page to set the desired audio environment from the pull-down menu. There are in total 23 kinds of sound effect.
   a. For Karaoke function, "Voice Cancellation (only for 2 channels mode)" removes the human voice. "Key" lets you adjusts the key pitch.
   b. "Auto Gain Control" avoids saturation when adjusting the equalizer.



Equalizer:

<Figure 3>

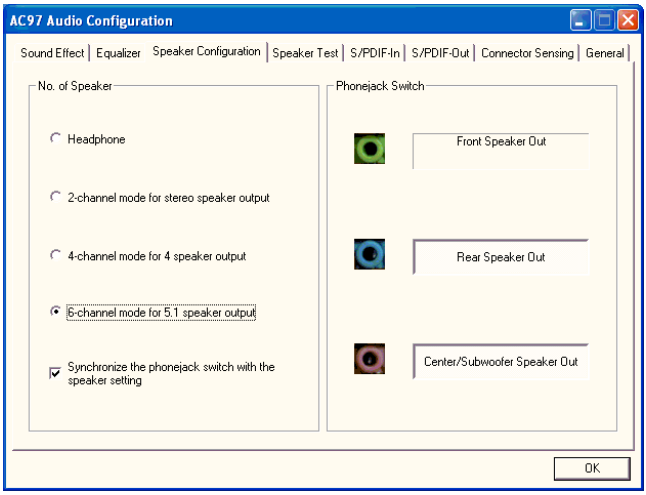
3. There are 10 bands of equalizer control, check "ON" when you want to adjust the equalizer.



Speaker Configuration:

<Figure 4>

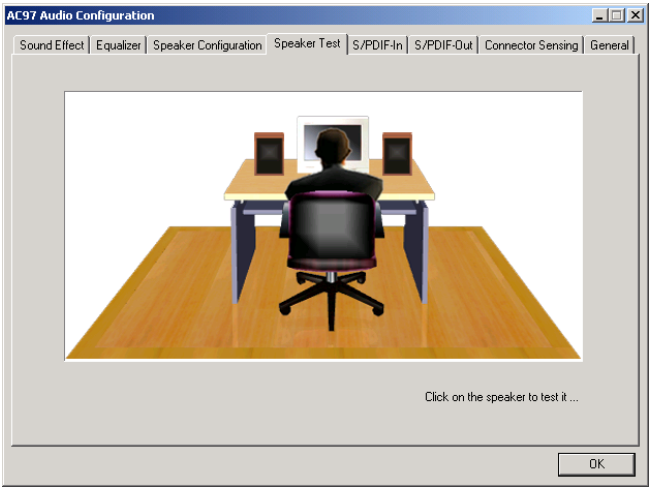
4. This page displays the mainboards's phone jack function when a corresponding audio mode (no. of speaker) is selected.
   Figure 4 above shows the phone jack setup for 2 channel mode.



Speaker Configuration:

<Figure 5>

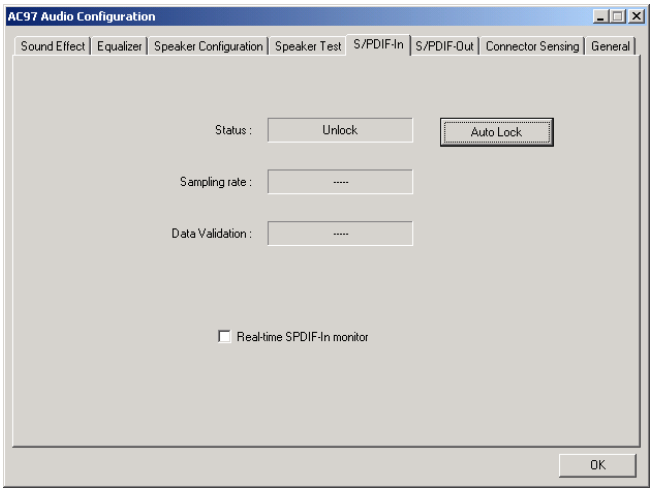
5. For 6 channel mode, the audio combination is shown above.



Speaker Test:

<Figure 6>

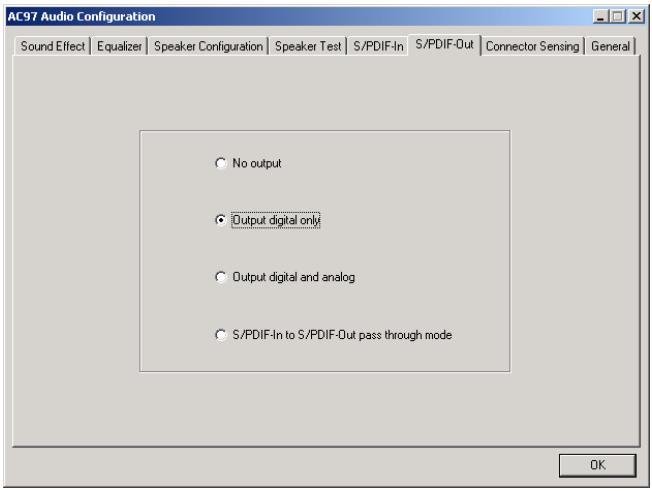
6. To test the speaker , select the **"Speaker Test"** page and click directly on the speakers shown on the screen.



SPDIF-In:

<Figure 7>

7. This page shows S/PDIF IN function on your system.
   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.

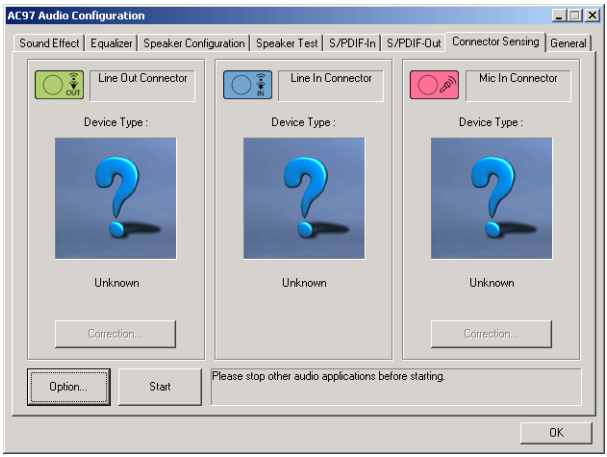


SPDIF-Out:

<Figure 8>

8. This page lets you choose the type of audio source that will appear on the S/PDIF-out connector.

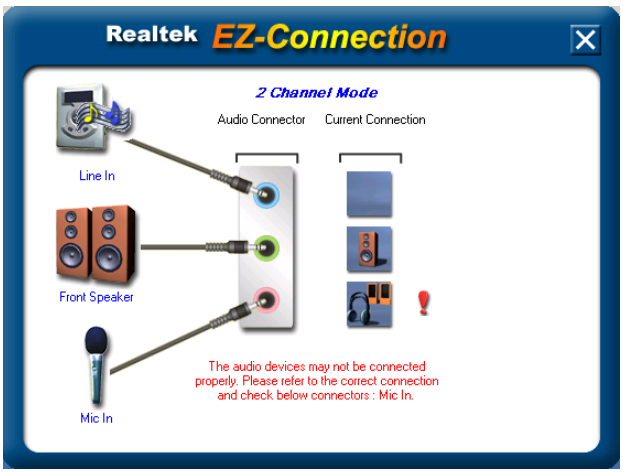
This board is equipped with Jack Sensing capability. If an audio device is plugged into the wrong connector, a warning message will appear to remind users to check the connection.



Connector Sensing:

<Figure 9>

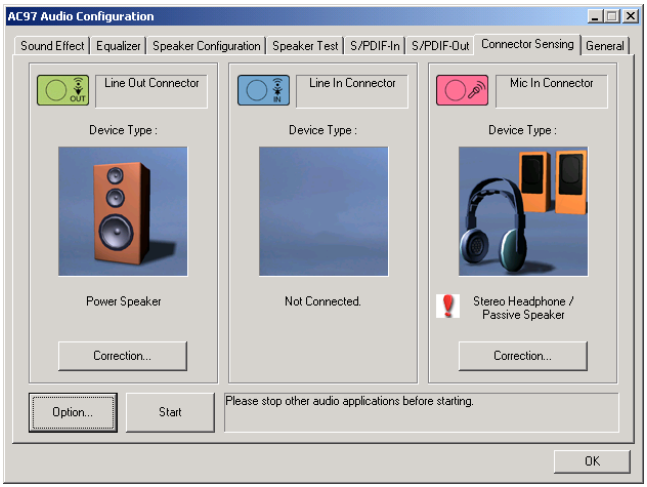
9. Push "Start" button to start the sensing. Please remember to terminate all audio applications before starting the sensing.



Connector Sensing:

<Figure 10>

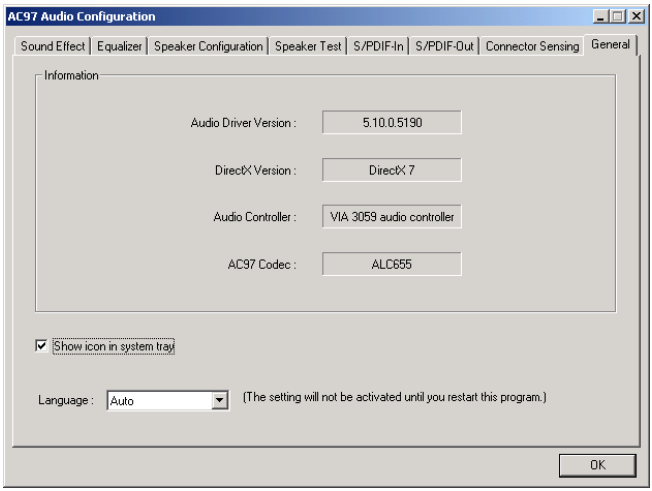
10. EZ-Connection shows the result of the detection.
    "Audio Connector" column reflects the settings used in the "Speaker Configuration" page.
    "Current Connection" column shows the type of device detected. If the results do not match, an exclamation mark will appear on the right side.



Connector Sensing:

<Figure 11>

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



General:

<Figure 12>

12. 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".

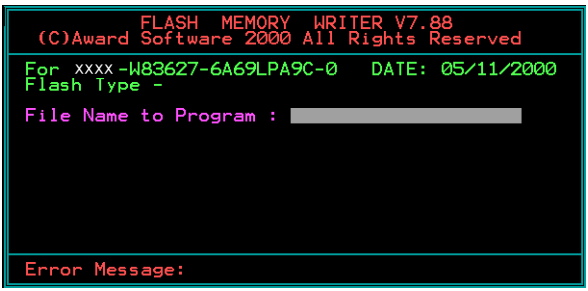
Appendix A

A-1 Update Your System BIOS

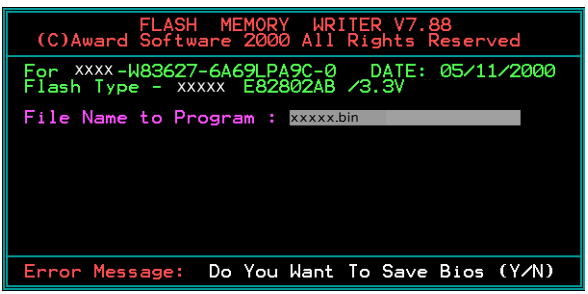
Download the xxxxx.EXE file corresponding to your model from our website to an empty directory on your hard disk or floppy. Run the downloaded xxxxx.EXE file and it will self extract. Copy these extracted files to a bootable floppy disk.

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

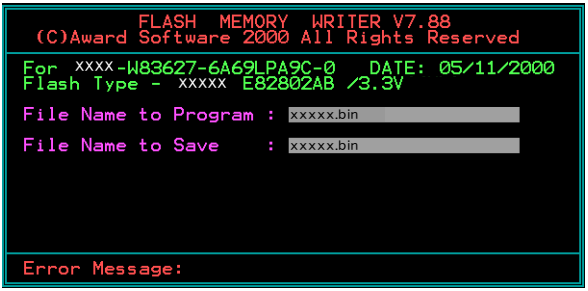
1. Type "A:\AWDFLASH and press <Enter> Key.
2. You will see the following setup screen.
3. Please key in the xxxxx.bin BIOS file name.



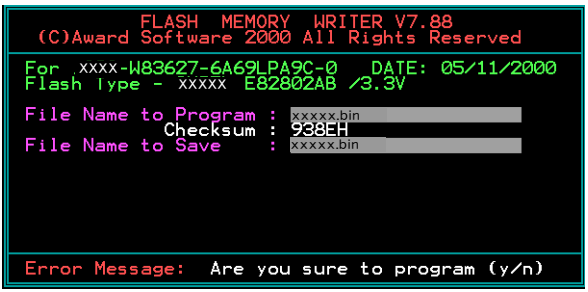
4. If you want to save the previous BIOS data to the diskette, please key in [Y], otherwise please key in [N].



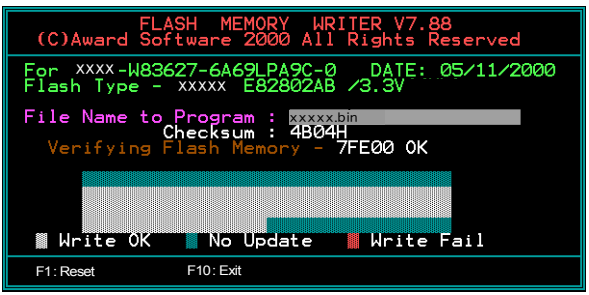
5. Key in File Name to save previous BIOS to file.



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



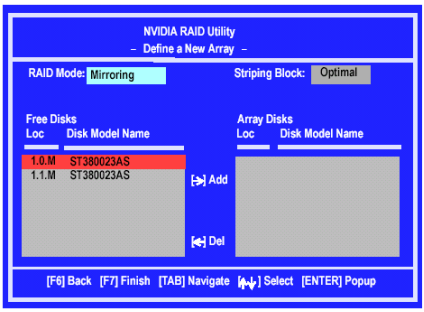
7. The BIOS update is finished.



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.

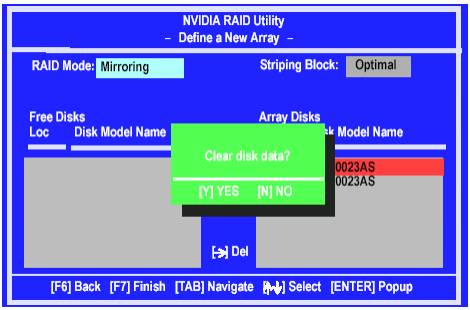
- Selecting the RAID Mode
  By default, this is set to Mirroring. To change to a different RAID mode, press the down arrow key until the mode that you want appears in the RAID Mode box—either Mirroring, Striping, Spanning, or Stripe Mirroring.
- Selecting the Striping Block Size
  Striping block size 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.

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.

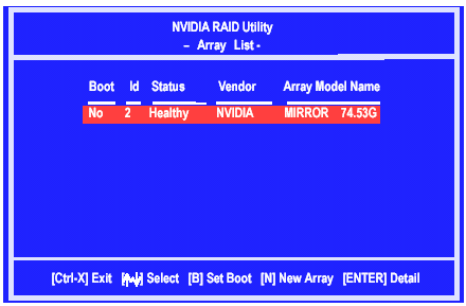
Completing the RAID BIOS Setup

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

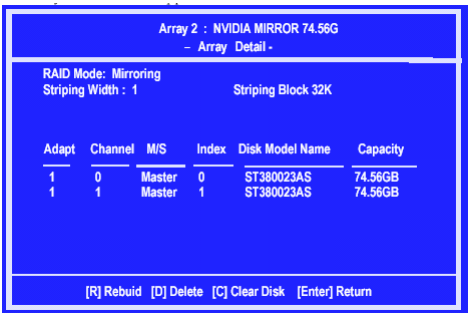


Press **Y** if you want to wipe out all the data from the RAID array, otherwise press **N**. You must choose **Yes** if the drives were previously used as RAID drives.

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.



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: - Disable shadow RAM - Disable L2 cache (socket 7 or below) - Program basic chipset registers
C1h	Detect memory - 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	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	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

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	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	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	1. Initialize multi-language 2. 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	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	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	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	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_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	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”.

6Eh	Reserved
6Fh	1. Initialize floppy controller 2. 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	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: ◆ Clear EPA or customization logo.
80h-81h	Reserved
82h	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	1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86-92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)