



User's Manual

**VIA K8T800 mainboard for AMD Socket
754 based Athlon 64 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	<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

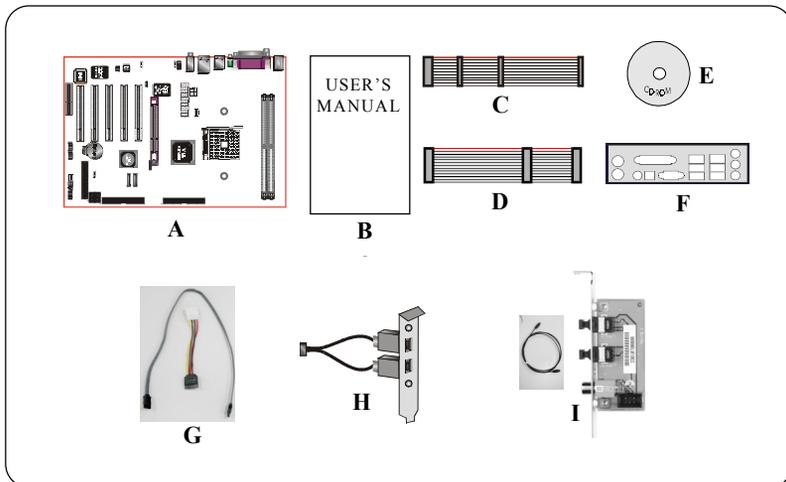
Contents

- A. Mainboard
- B. User's manual
- C. Floppy drive cable
- D. HDD drive cable
- E. CD (drivers and utilities)
- F. I/O Shield

Optional Items

- G. S-ATA data and power cable
- H. Extra USB2.0 port cable
- I. S/PDIF Module

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



1-2 Mainboard Features

Brief Introduction

★ **Athlon™ 64 Processor**

The AMD Athlon™ 64 processor family is designed to support performance desktop. It provides a high performance HyperTransport™ link to I/O, as well as a single 64-bit high-performance DDR memory controller.

For more information about all the new features Athlon™ 64 Processor deliver, check out the AMD website at <http://www.amd.com>

★ **Chipset**

The board is designed with VIA chipset, K8T800 as North Bridge and VT8237R as South Bridge, providing a feature rich and scalable platform. The K8T800 North Bridge is designed with an ultra fast HyperTransport link to the Athlon™ 64 and comes equipped with AGP 8X features for VGA card expansion.

The K8T800 North Bridge connects to the VT8237R South Bridge through the fast Ultra V-Link connection at 1.06GB/s. With support for two Serial ATA channels at 150MB/s bandwidth, integrated RAID (0, 1 & JBOD) capability as well as up to eight USB 2.0 ports, the VT8237R offers the highest possible peripheral performance for professional users.

★ **Accelerated Graphics Port (AGP)**

The AGP slot 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.

★ **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 (Optional)**

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

★ **GbE LAN (Optional)**

This mainboard is optionally equipped with the ethernet LAN feature. 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**

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.

★ **S-ATA RAID**

RAID function available on chipset S-ATA ports.

★ **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**

Mainboard is equipped with 6 channel of audio to support Dolby Digital 5.1 audio for DVD-playback. The onboard audio jacks can be configured for normal 2 channel mode or 6 channel mode.

★ **AMD Cool'n'Quiet™ Technology**

AMD's Cool'n'Quiet™ Technology lowers CPU operating voltage when the system is in idle mode. This helps to reduce heat dissipation and in effect lowers the fan speed to noise from your PC. To enable Cool'n'Quiet™ the BIOS must support this feature.

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:

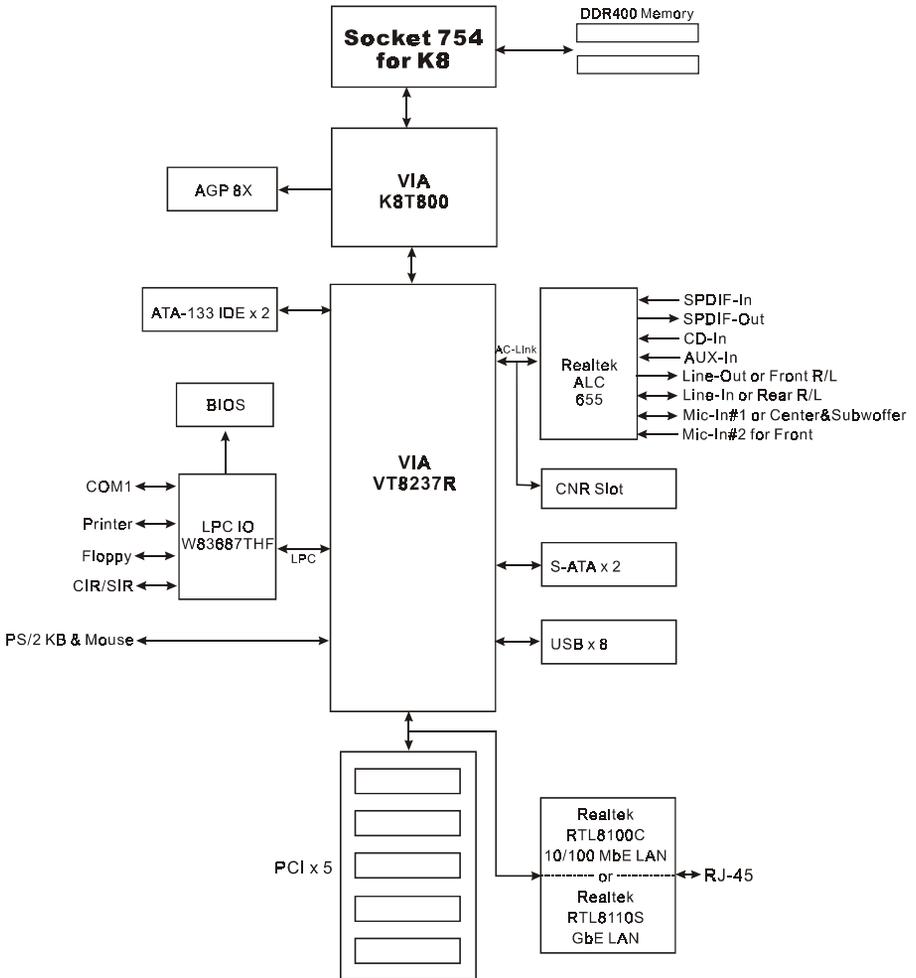
 **80 Port**

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.

1-3 System Block Diagram



Section 2

SPECIFICATION

Mainboard Specification

● **Processor**

- ◆ Support Socket-754 based AMD Athlon-64/Sempron 1.6GTs Hyper Transport processors with up to 3700+

● **Chipset**

- ◆ VIA K8T800+ VT8237R Chipset

● **Main Memory**

- ◆ Two 184-pin DDR SDRAM DIMM sockets
- ◆ Support single or double sided 2.5v DDR-266/333/400 DIMMs architecture in 128/256/512Mb technologies
- ◆ Supports up to 2GB memory size

● **Expansion Slots**

- ◆ Five PCI connectors compliant with PCI v2.2
- ◆ One 1.5v AGP- 8X/4X connector compliant with AGP v3.0
- ◆ One CNR (Communication & Networking Riser) slot for V.92 analog Modem in Secondary mode

● **USB**

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

● **P-ATA IDE**

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

● **S-ATA RAID**

- ◆ Two S-ATA ports from VT8237R with up to 150MBps bandwidth with RAID 0,1 10, Smart RAID (by VIA)

Specification

● LAN

- ◆ 10/100Mbps Fast Ethernet with onboard Realtek RTL8100C LAN chip, or 1Gbps Fast Ethernet with onboard Realtek RTL8110S LAN chip

● Audio

- ◆ Selectable 2, 6 channel audio from onboard RealTek ALC655 AC'97 v2.3 compliant CODEC
 - Support Aux-In, CD-In, S/PDIF-in and S/PDIF-out
 - Coaxial S/PDIF-out available on rear panel
 - Support **Auto Jack Sensing** for fool-proof audio device installation
 - 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

● I/O

- ◆ Onboard Winbond **W83687THF** LPC 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

● 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 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-100/133 IDE connector
- ◆ Four extra USB2.0 ports
- ◆ One CD-IN and AUX-IN connector
- ◆ One S/PDIF-in/out connector
- ◆ One IR connector
- ◆ Two S-ATA connectors
- ◆ Two Fan connectors

● **Front Panel Controller**

- ◆ Supports Reset & Soft-Off switches
- ◆ Supports HDD & Power LEDs
- ◆ 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 80 Port LED display for system debugging
- ◆ Supports “Cool’n’ Quiet” power saving technology
- ◆ **Power BIOS** for excellent over clocking features:
 - Support Asynchronous FSB/DIMM timing mode
 - 1MHz fine tuning on AGP clock

Specification

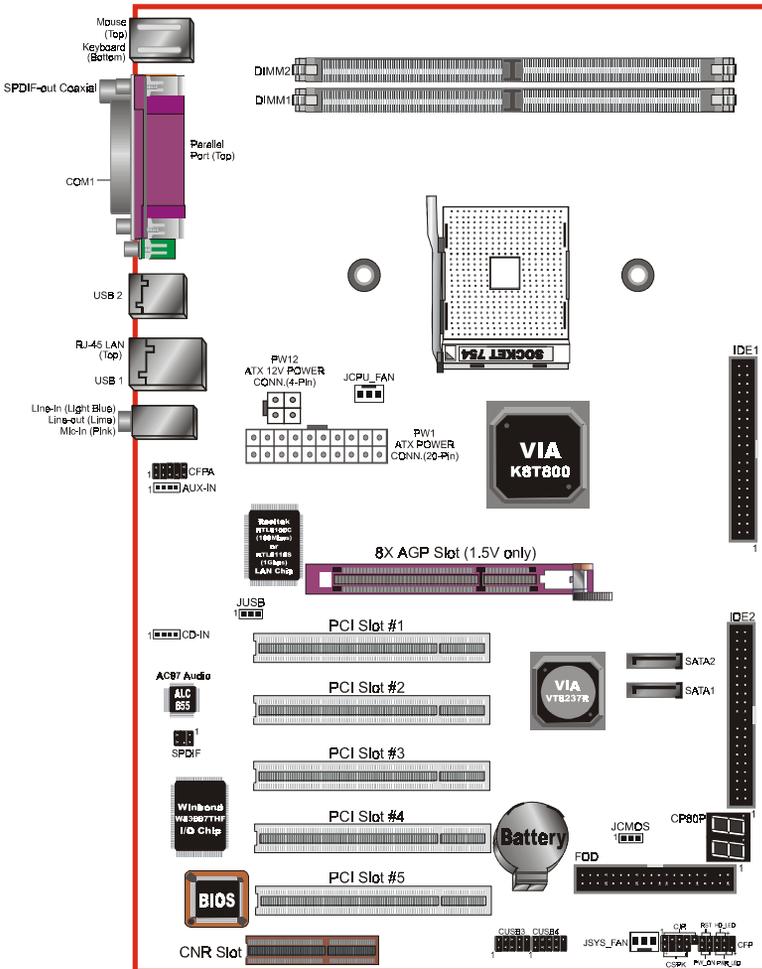
- Support BIOS adjustable CPU clock and voltage, AGP voltage, DIMM frequency and voltage settings.

● **Form Factor**

- ◆ 305mm x 210 mm ATX size

Section 3 INSTALLATION

Mainboard Layout



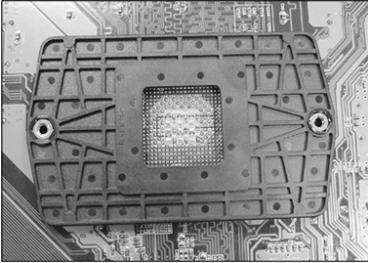
Note: Depending on the model you purchased, some components are optional and may not be available.

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. Expansion Slots
- 3-5. Device Connectors

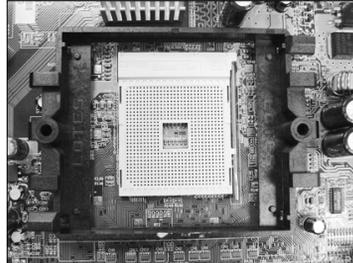
3-1 CPU Installation



<Figure 1>

Step 1

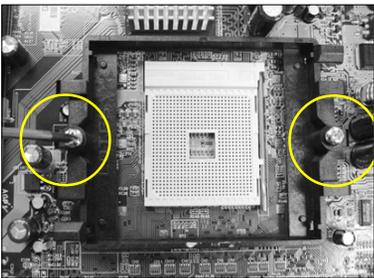
Place the back plate into the two holes around the CPU area behind the mainboard.



<Figure 2>

Step 2

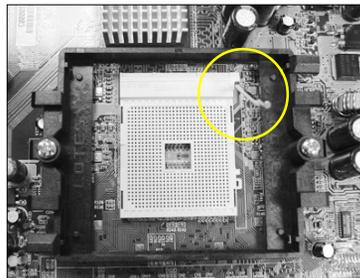
Place the retention mechanism on the mainboard as shown.



<Figure 3>

Step 3

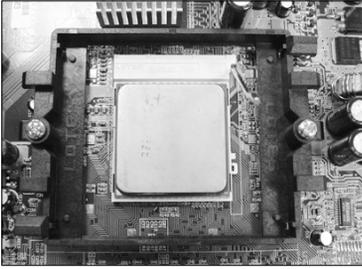
Screw in the two pan head screws.



<Figure 4>

Step 4

Open the socket by raising the actuation lever.

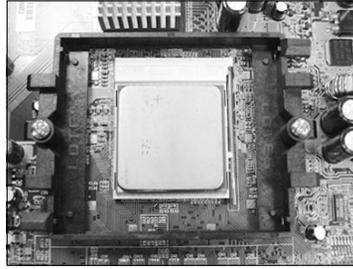


<Figure 5>

Step 5

Align pin 1 on the CPU with pin 1 on the CPU socket and gently insert the CPU. The CPU is keyed to prevent incorrect insertion. Do not force the processor into the socket. If it does not go in easily, check for mis-orientation and reinsert the CPU.

Make sure the processor is fully inserted into the socket.



<Figure 6>

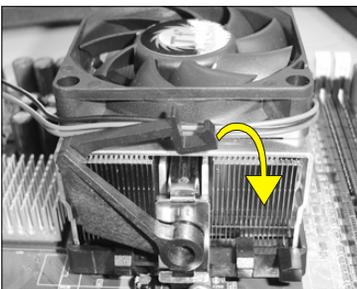
Step 6

Close the socket by lowering and locking the actuation lever.

Apply thermal compound to the top of the CPU.

Note:

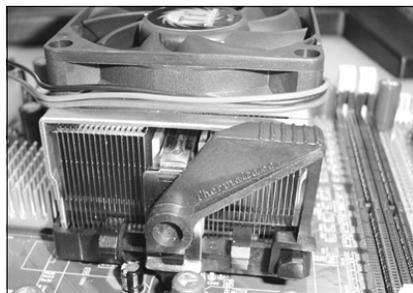
Thermal compound and qualified heatsink recommended by AMD are a must to avoid CPU overheat damage.



<Figure 7>

Step 7

Insert the heatsink as shown above. Press the clips in the direction of the arrows shown in Figure 7 to secure the assembly to the CPU socket.



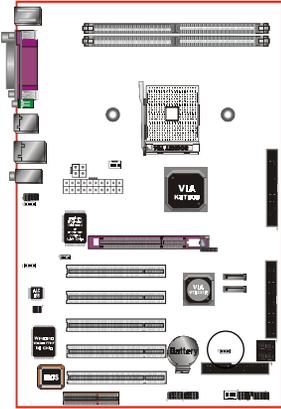
<Figure 8>

Step 9

Plug the CPU fan power into the mainboard's CPU fan connector.

The installation is complete.

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.

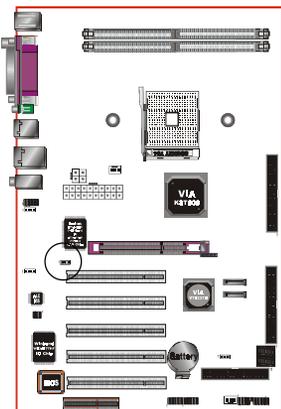


Settings:

- 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 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.



Settings:

- 1-2: Connect (S3 enabled)
- 2-3: Disconnect (No S3)

3-3 System Memory Configuration

Memory Layout

The mainboard accommodates two PC2100/PC2700/PC3200 184-pin DIMMs (Dual In-line Memory Modules):

- Supports up to 2.0GB of 266/333/400MHz DDR SDRAM.
- The DDR400 only support two maximum unbuffered DIMMs and not available on registered DIMMs.
- Supports unbuffered DIMM configurations defined in JEDEC DDR DIMM specification.



Memory configurations supported:

Slot No	1 DIMM		2 DIMMs
DIMM#1	DS/SS		DS/SS
DIMM#2		DS/SS	DS/SS

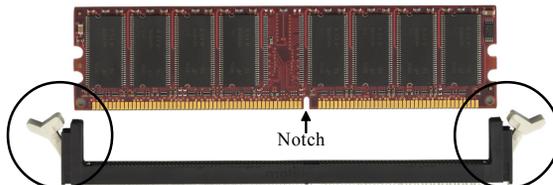
* DS - Double-sided DIMM, * SS - Single-sided DIMM

NOTES:

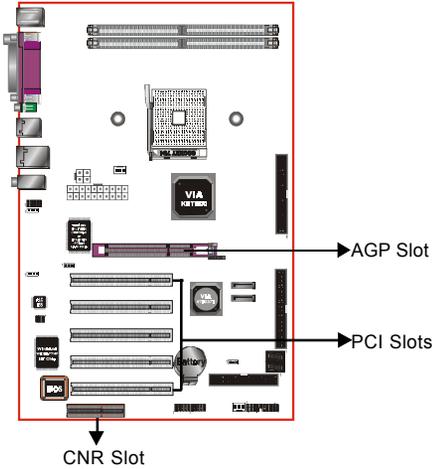
- Using non-compliant memory with higher bus speeds (overclocking) may severely compromise the integrity of the system.

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 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

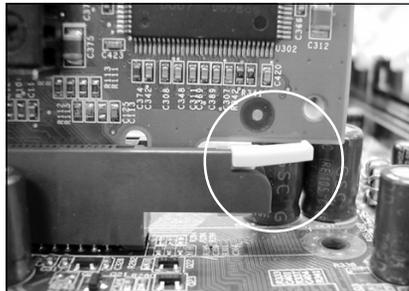
The mainboard is equipped with 5 PCI slots.

CNR Slot

The mainboard is equipped with 1 CNR slot.

AGP Card Installation Caution

1. Remove the bracket (on the PC case) for the slot you intend to use.
2. Firmly press down the card into the slot until it is completely seated. Ensure the AGP slot clicker is locked as shown in the picture below.



3. Secure the card's bracket to the PC case with a screw.

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.

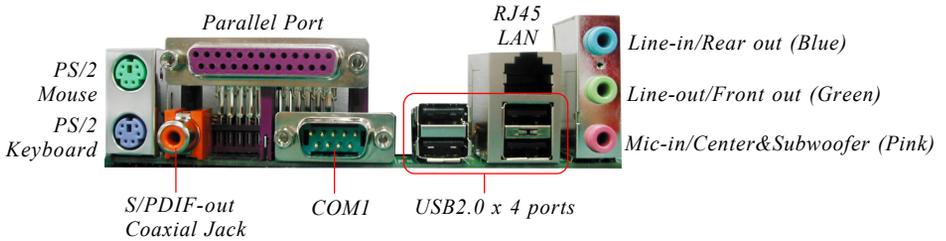
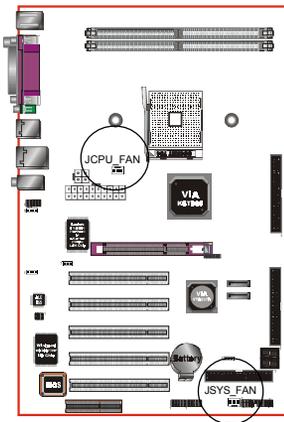


Figure 10 - I/O Ports

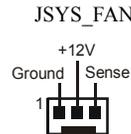
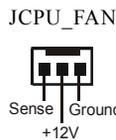


JCPU_FAN/ JSYS_FAN:

CPU/Chassis Fan Power Connectors

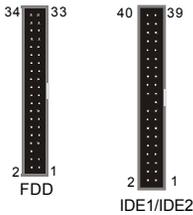
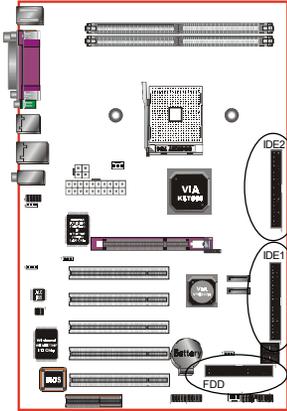
JCPU_FAN: The CPU must be kept cool by using a heatsink with fan assembly.

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 , and chassis fan.

Installation

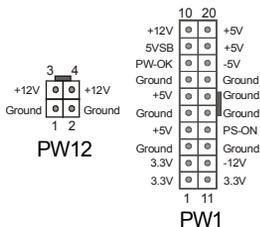
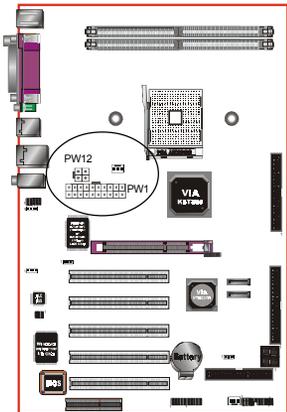


FDD: Floppy Controller Connector
This connects to the floppy disk drive.

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.



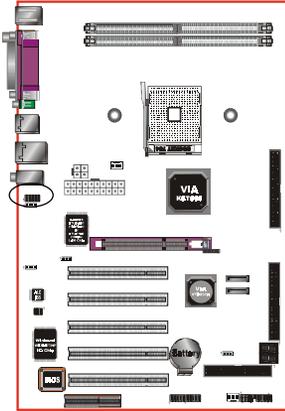
PW1: 20-pin ATX Power Connector

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.

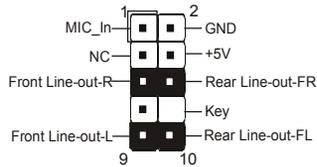
Caution:
The PW1 and PW12 Power Connector must be used simultaneously.

The board requires a minimum of 300 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 350 Watt or greater power supply.



CFPA: Front Panel Audio Connector

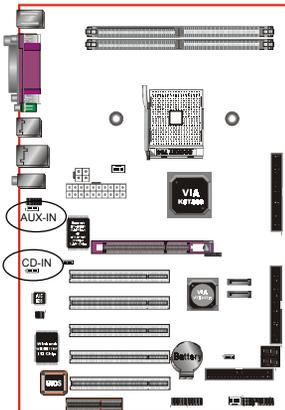
When the jumpers are removed this connector can be used for front panel audio. The front panel phone jack should have “normal close” switch. Without phone plug inserted, the rear panel audio is enabled. With phone plug inserted, the rear panel audio will be disabled.



Settings

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

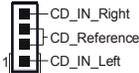
Pins (5-6) & (9-10) Open: Only front panel audio jack can be used.



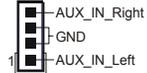
CD-IN/AUX-IN: CD Audio_IN Connector

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

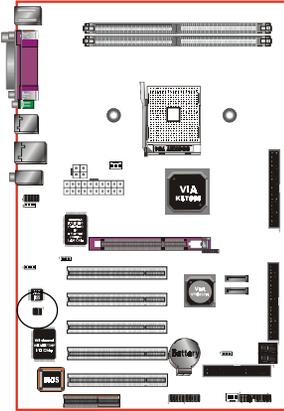
CD-IN



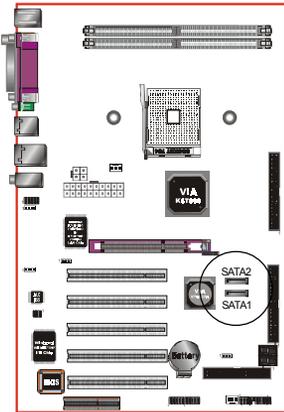
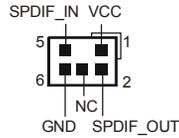
AUX-IN



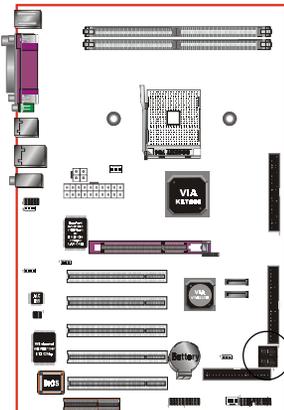
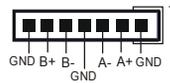
Installation



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.



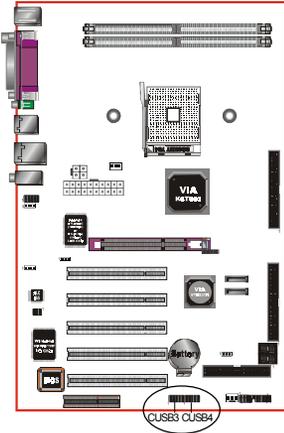
SATA1 / SATA2: Two Serial ATA Connectors
These connectors enable you to connect Serial ATA devices that conform to the Serial ATA specification.



CP80P: 80 Port Debug LED
Provides two-digit POST code to show why the system fail to boot. Allows quick and easy optimization.



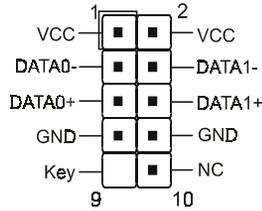
80 Port Debug 7-segment LED display
(Refer to Appendix C for POST codes)



CUSB3/CUSB4: Four USB 2.0 ports

This mainboard includes 2 additional USB2.0 ports, identified by two 10-pin connector.

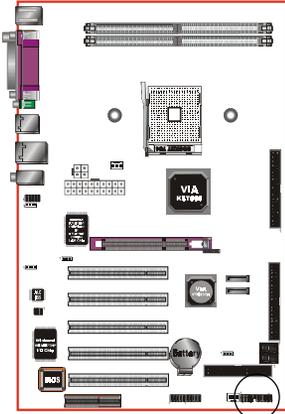
If you wish to use the additional USB ports, install the card-edge bracket to the system chassis then insert its cables to this 10-pin connector.



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.

Installation



CFP: Front Panel Connector

◆ HD_LED

This LED will light up whenever the hard drive is being accessed.

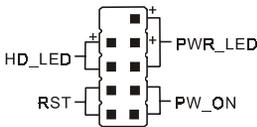
◆ PWR_LED

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.

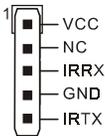
CFP



◆ 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.

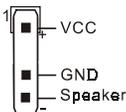
CIR



CIR: IR connector

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

CSPK



CSPK: Speaker

Connect to the system's speaker for beeping

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.

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 300 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 350 Watt (or higher) power supply.

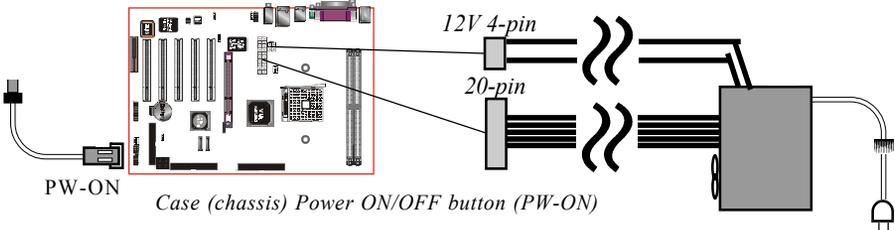


Figure 10: Simple ATX power ON/OFF controller

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 COM port, 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)”. If you have a USB mouse or keyboard, set “USB Resume from S3” 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.

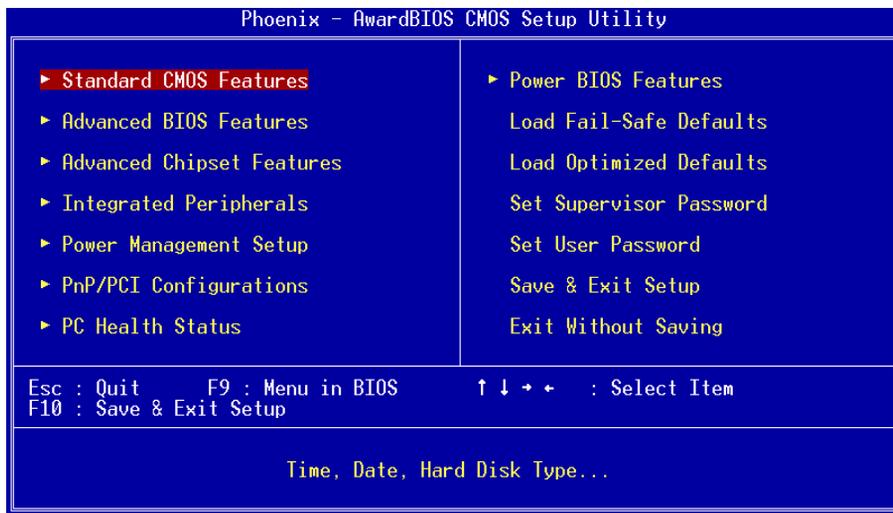


Figure 1: CMOS Setup Utility

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.

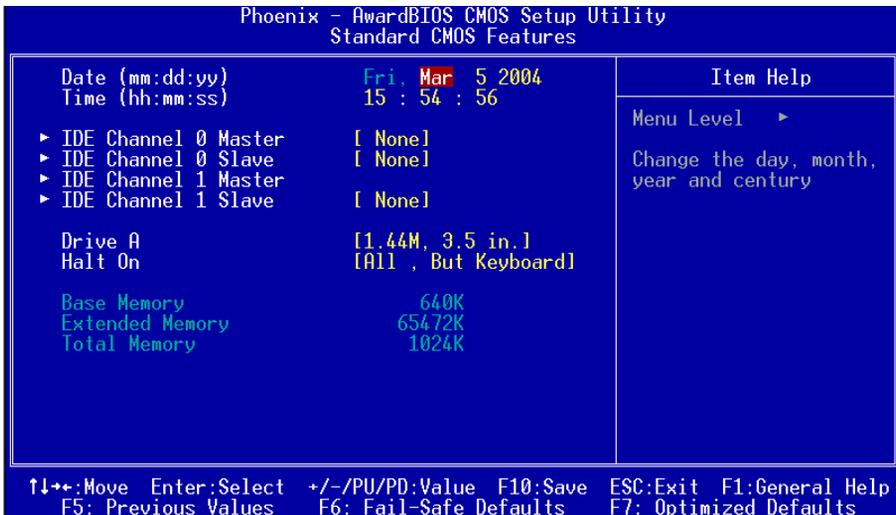


Figure 2: Standard CMOS Setup

- 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.

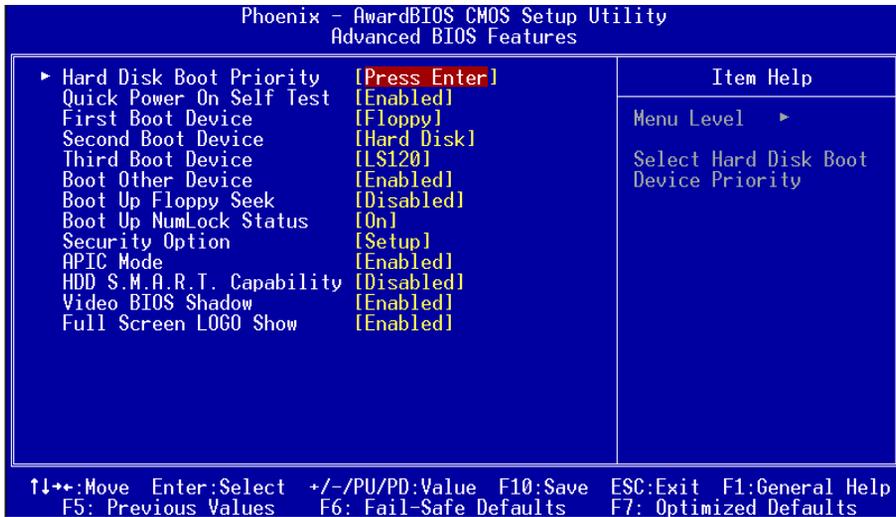
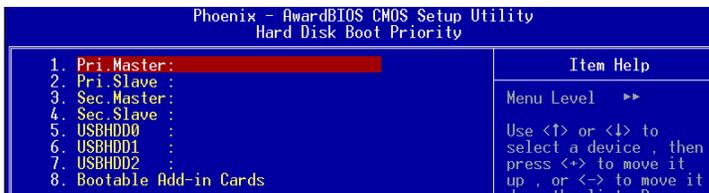


Figure 3: BIOS Features Setup

Hard Disk Boot Priority

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



Quick Power On Self Test

This category speeds up the Power On Self Test (POST). This setting will shorten or skip some items checked during POST.

Options: Enables, Disabled.

BIOS

First /Second/Third/Other 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. The default is Enabled.

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. The default is On.

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 the access to Setup will be denied if the correct password is not entered at the prompt.

Setup: The system will boot; but the access to Setup will be denied if the incorrect password is not entered at the prompt.

APIC Mode

This item allows you to enable APIC (Advanced Programmable Interrupt Controller) functionality. APIC is a chip that provides symmetric multiprocessing (SMP) for its Pentium systems.

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.

MPS Version Control For OS

Specifies the Multiprocessor Specification (MPS). Version 1.4 supports multiple PCI bus configurations by incorporating extended bus definitions. Enable this for Windows NT or Linux. For older operating systems, select Version 1.1.

Options: 1.1, 1.4.

Video BIOS Shadow

This option allows video BIOS to be copied into RAM. Video Shadowing will increase the video performance of your system.

Options: Enabled, Disabled.

4-3 Advanced Chipset Features

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

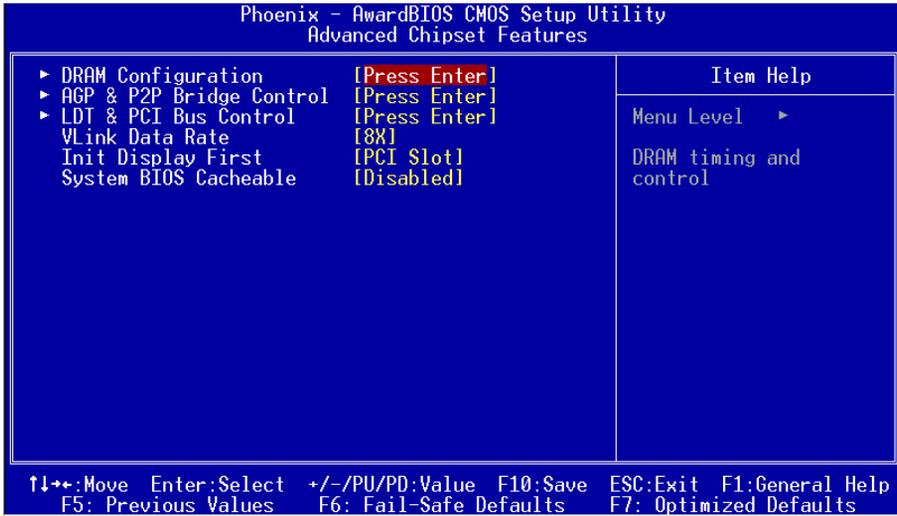


Figure 4: Chipset Features Setup

VLink Data Rate

This item allows you to select VLink Data Rate.

Options: 4X, 8X.

Init Display First

If two video cards are used (1 AGP and 1 PCI) this specifies which one will be the primary display adapter. The default is PCI Slot.

Options: PCI Slot, AGP.

System BIOS Cacheable

This item allows the system to be cached in memory for faster execution. The default is Enabled.

Options: Disabled, Enabled.

► DRAM Configuration

Scroll to DRAM Configuration and press <Enter>. The following screen appears:

```

Phoenix - AwardBIOS CMOS Setup Utility
DRAM Configuration

Current FSB Frequency
Current DRAM Frequency
1T/2T Memory Timing      [Auto]
----- Value/Current Status
CAS# latency (Tcl)      [Auto/Unknown]
Min RAS# active time (Tras) [Auto/15]
RAS# to CAS# delay (Trcd) [Auto/2]
Row precharge time (Trp) [Auto/7]
Row to Row delay (Trrd) [Auto/7]
Row cycle time (Trc) [Auto/22]
Row refresh cyc time (Trfc) [Auto/24]
Write recovery time (Twr) [Auto/3]
Write to Read delay (Twt) [Auto/2]
Read to Write delay (Trwt) [Auto/8]
Refresh period (Tref) [Auto /3.9us]
Write CAS Latency (Tcwl) [Auto/8]
DQS Skew Contrl [Auto /Increase]
x DQS Skew Value 0/255
Read Preamble value [Auto /9.5 ns]
Async Latency value [Auto/15 ns]
IdleCycle Limit [Auto/256]
Dynamic IdleCycle Counter [Auto /Enabled]
R/W Queue Bypass Count [Auto/16]
Bypass Max [Auto/ 7]

Item Help
Menu Level  ►►

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

```

Current FSB Frequency

Display the current CPU front side bus frequency information.

Current DRAM Frequency

Display the current DRAM frequency information.

1T/2T Memory Timing

For setting DRAM Timing.

Options: Auto, 1T, 2T.

CAS# Latency (Tcl)

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

Options: Auto, 2, 2.5, 3.

Min RAS# active time (Tras)

This field specifies the minimum RAS# active time.

Options: Auto, 5T ~ 15T.

RAS# to CAS# delay (Trcd)

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

Options: Auto, 2T ~ 7T.

Row precharge Time (Trp)

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

Options: Auto, 2T ~ 7T.

Row to Row delay (Trrd)

This filed specifies the Row to Row delay of different banks.

Options: Auto, 2T ~ 4T.

Row cycle time (Trc)

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

Options: Auto, 7T ~ 21T.

Row refresh cyc time (Trfc)

This filed specifies the Row Refresh Cycle Time. Auto-refresh active to RAS# or RAS# to auto refresh.

Options: Auto, 9T ~ 23T.

Write recovery time (Twr)

This bits specifies the Write Recovery Time. Called Trd1 by Samsung, measures when the last write datum is safely registered by the DRAM. It measures from the last data to precharge.

Options: Auto, 2, 3.

Write to Read delay (Twtr)

This bits specifies the Write to Read delay. Samsung Calls this Tcd1r (last data in to read command). It is measured from the rising edge following the last non-masked data strobe to the rising edge of the next Read Command. (Jedec spec this as exactly one clock).

Options: Auto, 1, 2.

Read to Write delay (Trwt)

This filed specifies the Read to write delay. This is not a DRAM specified timing parameter but must be considered due to routing latencies on the clock forwarded bus. It is counted from first address but slot which was not associated with part of the read burst.

Options: Auto, 1 ~ 6.

Refresh period (Tref)

This field specifies the number of clock cycles between refresh.

Options: Auto, 15.6us, 7.8us, 3.9us.

► AGP & P2P Bridge Control

Scroll to AGP & P2P Bridge Control and press <Enter>. The following screen appears:

Phoenix - AwardBIOS CMOS Setup Utility		
AGP & P2P Bridge Control		
AGP Aperture Size	[128M]	Item Help
AGP 2.0 Mode	[4X]	
AGP Driving Control	[Auto]	Menu Level ▶▶
* AGP Driving Value	[0]	
AGP Fast Write	[Disabled]	
AGP Master 1 WS Write	[Enabled]	
AGP Master 1 WS Read	[Enabled]	
AGP 3.0 Calibration cycle	[Disabled]	
DBI Output for AGP Trans.	[Disabled]	

AGP Aperture Size

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: 32M, 64M, 128M, 256M.

AGP Mode

Chipset AGP Mode support.

Options: 1X, 2X, 4X, 8X.

AGP Driving Control

This item allows you to adjust the AGP driving force. Choose “Manual” to key in a AGP Driving Value in the next selection. This field is recommended to set in “Auto” to avoid any error to your system.

Options: Auto, Manual.

AGP Fast Write

Selecting Enabled allows to use Fast Write Protocol for 4X AGP card.

Options: Enabled, Disabled.

AGP Master 1 WS Write

When Enabled, Writes to the AGP (Accelerated Graphics Port) are executed with one wait states.

Options: Enabled, Disabled.

AGP Master 1 WS Read

When Enabled, Reads to the AGP (Accelerated Graphics Port) are executed with one wait states.

BIOS

Options: Enabled, Disabled.

AGP 3.0 Calibration cycle

This item allows you to select AGP 3.0 Calibration cycle function.

Options: Enabled, Disabled.

► **LDT & PCI Bus Control**

Scroll to LDT & PCI Bus Control and press <Enter>. The following screen appears:

Phoenix - AwardBIOS CMOS Setup Utility	
LDT & PCI Bus Control	
Upstream LDT Bus Width	[16 bit]
Downstream LDT Bus Width	[16 bit]
LDT Bus Frequency	[Auto]
PCI1 Master 0 WS Write	[Disabled]
PCI2 Master 0 WS Write	[Disabled]
PCI1 Post Write	[Disabled]
PCI2 Post Write	[Disabled]
PCI Delay Transaction	[Disabled]

Item Help
Menu Level ▶▶

Upstream LDT Bus Width

Options: 8 bit, 16 bit.

Downstream LDT Bus Width

Options: 8 bit, 16 bit.

LDT Bus Frequency

This item sets CPU Hyper Transport front size bus.

Options: Auto, 800MHz, 600MHz, 400MHz, 200MHz.

PCI1/2 Master 0 WS Write

When Enabled, Writes to the PCI bus are commanded with zero wait states.

Options: Enabled, Disabled.

PCI1/2 Post Write

Enables CPU to PCI bus POST write.

Options: Enabled, Disabled.

PCI Delay Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.2.

Options: Enabled, Disabled.

4-4 Integrated Peripherals

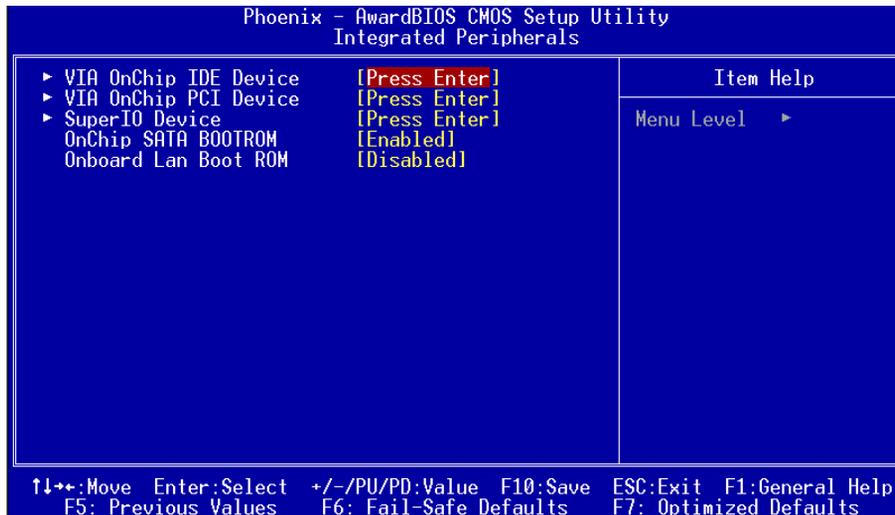


Figure 5: Integrated Peripherals

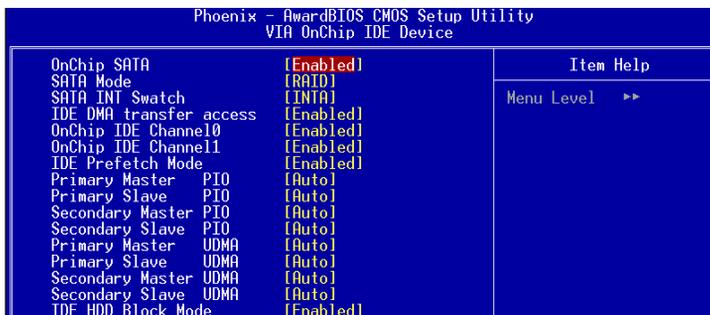
OnChip SATA BOOTROM/Onboard Lan Boot ROM

Enables/disable the onboard SATA/LAN Boot ROM.

Options: Enabled, Disabled.

▶ VIA OnChip IDE Device

Scroll to VIA Onchip IDE Device and press <Enter>. The following screen appears:



Onchip SATA

Enables the onboard SATA feature.

Options: Enabled, Disabled.

SATA Mode

This allows you to set RAID mode for Serial ATA devices. Refer to section 5 for more RAID information.

Options: RAID, IDE.

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.

OnChip IDE Channel0/1

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

Options: Enabled, Disabled.

Note: If you do not use the onboard IDE connector, set the Onboard Primary PCI IDE and Onboard Secondary PCI IDE to “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.

Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 to 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

Options: Auto, Mode 0 ~ 4.

Primary/Secondary Master/Slave UDMA

Select the mode of operation for the IDE drive. Ultra DMA-33/66/100/133 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-33/66/100/133, select Auto to enable UDMA mode by BIOS.

Options: Auto, 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.

► VIA Onchip PCI Device

Scroll to VIA Onchip PCI Device and press <Enter>. The following screen appears:

Phoenix - AwardBIOS CMOS Setup Utility		VIA OnChip PCI Device	
VIA AC97 Audio	[Auto]	Item Help	
VIA AC97 Modem	[Auto]	Menu Level	▶▶
Onboard Lan Device	[Enabled]		
OnChip USB Controller	[Enabled]		
OnChip EHCI Controller	[Enabled]		
USB Device Function	[Disabled]		
USB Keyboard Support	[Disabled]		
USB Mouse Support	[Disabled]		

AC97 Audio

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

Options: Auto, Disabled.

AC97 Modem

This item allows you to disable the chipset on-chip support for AC97 Modem.

Options: Auto, Disabled.

Onboard LAN Device

Enables the onboard LAN feature.

Options: Auto, Disabled.

Onchip USB Controller

Enables the USB controller.

Options: Enabled, Disabled.

Onchip EHCI Controller

Enables the EHCI (USB2.0) controller.

Options: Enabled, Disabled.

USB Keyboard Support

Enable/disable support for USB keyboard under DOS.

Options: Enabled, Disabled.

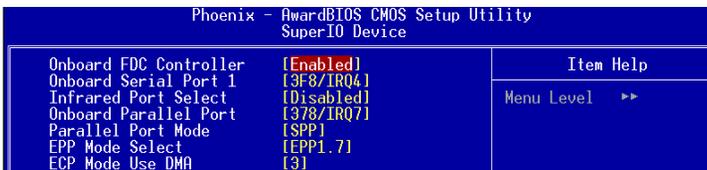
USB Mouse Support

Enable/disable support for USB mouse under DOS.

Options: Enabled, Disabled.

► Super IO Device

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



The screenshot shows the Phoenix - AwardBIOS CMOS Setup Utility SuperIO Device screen. It is a blue background with white text. The screen is divided into two main sections. The left section lists various SuperIO devices and their current settings. The right section contains a 'Menu Level' indicator and a 'Item Help' label.

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

Item Help
Menu Level >>

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 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.

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.

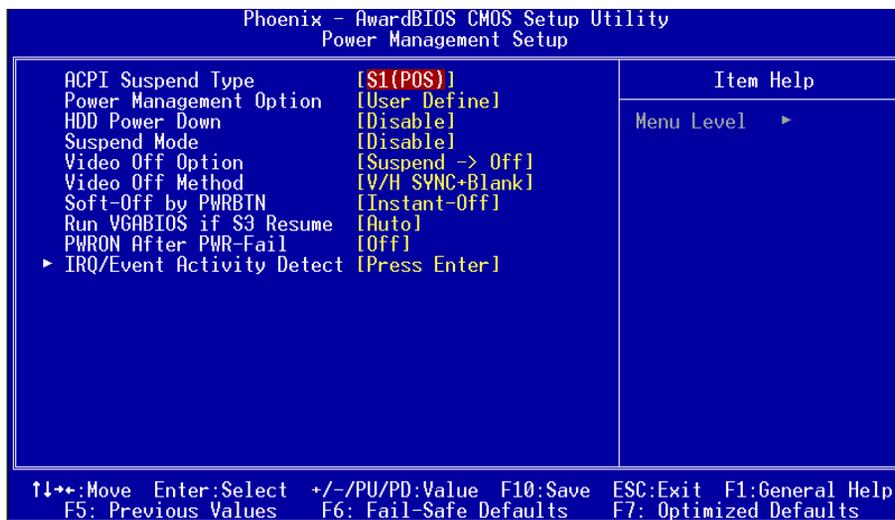


Figure 6: Power Management

ACPI Suspend Type

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

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.

HDD Power Down

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

Options: Disabled, 1min ~ 15min.

BIOS

Suspend Mode

Automatically, shuts off all devices except the CPU after a preset period of system inactivity.

Options: Disabled, 1, 2, 4, 6, 8, 10, 20, 30, 40 min and 1 hour.

Video Off Option

When enabled, this feature allows the VGA adapter to operate in a power saving mode.

Always On: Monitor will remain on during power saving modes.

Suspend->Off: Monitor blanked when the systems enters the suspend 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.

Soft-Off by PWRBTN

Pressing the power button for more than 4 seconds forces the system to enter the Soft-Off state when the system has "hung." The default is Instant-off.

Options: Delay 4 Sec, Instant-Off.

Run VGABIOS if S3 Resume

This determines whether or not to enable the system to run the VGA BIOS when resuming from S3(STR) or S1&S3.

Options: Auto, Yes, No.

PWRON After PWR-Fail

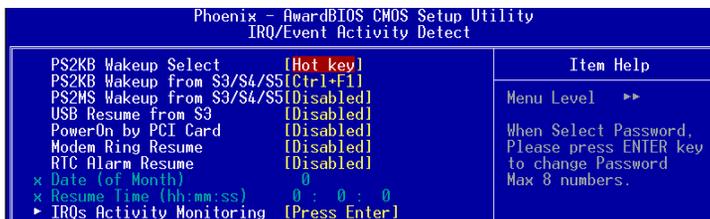
This item enables your computer to automatically restart or return to its last operating status after power returns from a power failure.

Off: The system stays off after a power failure.

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

► **IRQ/Event Activity Detect**

Scroll to IRQ/Event Activity Detect and press <Enter>. The following screen appears:



PS2KB Wakeup Select

This item allows you to select Hot Key or Password to wake-up the system by PS2 Keyboard. If Password is selected, press <Enter> key to change a password with max 8 numbers.

Options: Hot key, Password.

PS2KB Wakeup form S3/S4/S5

This item allows you to set a Hot Key to wake-up the system by PS2 Keyboard.

Options: Disabled, Ctrl+F1, Ctrl+F2, Ctrl+F3, Ctrl+F4, Ctrl+F5, Ctrl+F6, Ctrl+F7, Ctrl+F8, Ctrl+F9, Ctrl+F10, Ctrl+F11, Ctrl+F12, Power, Wake, Any key.

Note: Power and Wake are Windows98 Keyboard button.

PS2MS Wakeup form S3/S4/S5

This item allows you to wake-up the system by PS2 Mouse.

Options: Enabled, Disabled.

USB Wake-Up From S3

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

Options: Enabled, Disabled.

PowerOn by PCI Card

An input signal from PME on the PCI card awakens the system from soft-off state.

Options: Enabled, Disabled.

Modem Ring Resume

When set to “Enabled”, any event occurring to the Modem Ring will awaken the system from suspend state.

Options: Enabled, Disabled.

RTC Alarm Resume

When set to Enable rtc 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.

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.

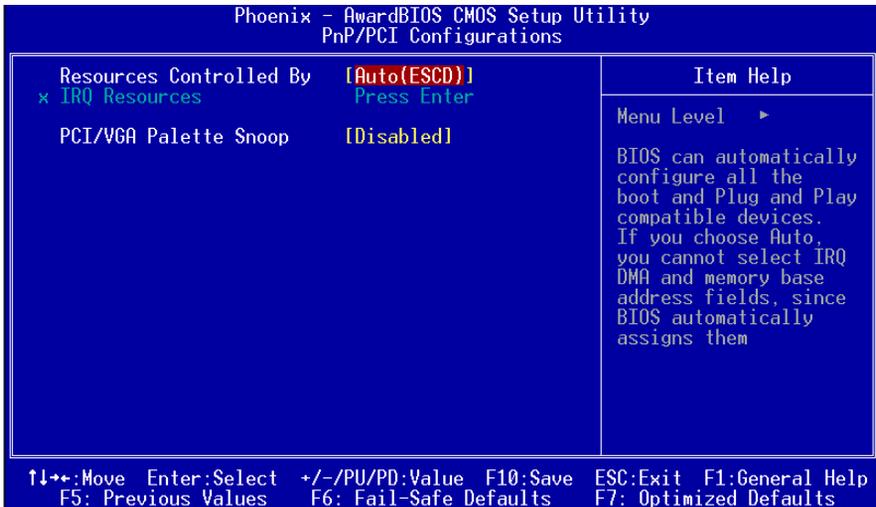


Figure 7: PNP/PCI Configuration Setup

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.

4-7 PC Health Status

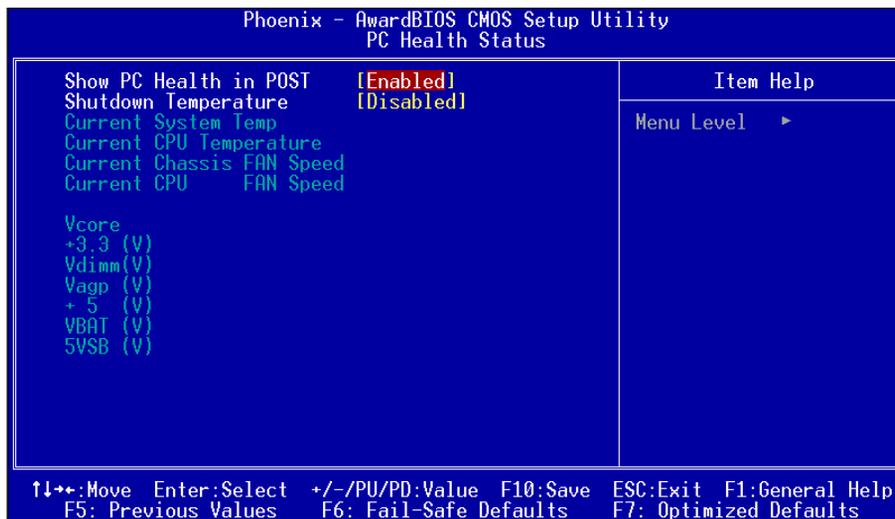


Figure 8: PC Health Status

Show PC Health in POST

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

Options: Disabled, Enabled.

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 70°C/158°F in increments of 5°C.

Current System/CPU Temperature

Displays the current system/CPU temperature.

Current CHASSIS/CPU FAN Speed

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

Vcore

The voltage level of the CPU(Vcore).

Vdimm

The voltage level of the DRAM.

BIOS

Vagp

The voltage level of power supplied to AGP card.

VBAT(V)

The voltage level of the battery.

+3.3(V), +5(V), 5VSB(V)

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.

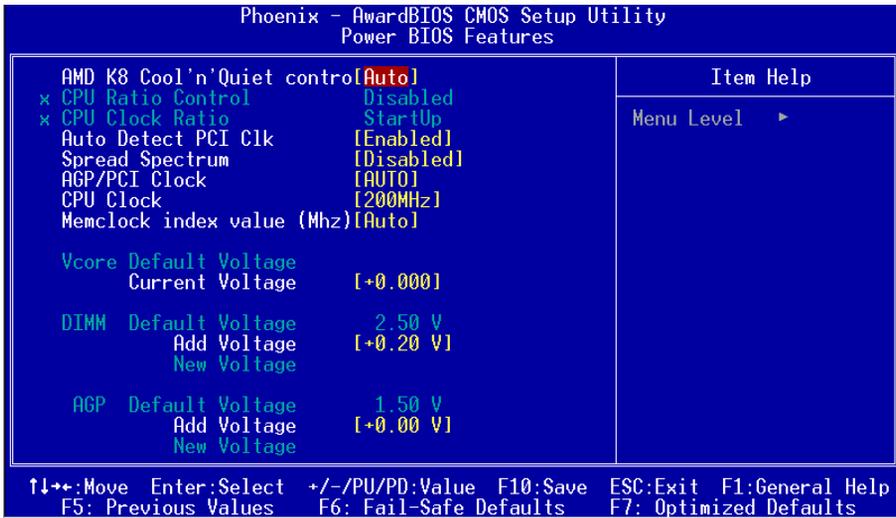


Figure 9: Frequency/Voltage Control

AMD K8 Cool'n'Quiet control

Reduce the noise and heat from you PC when AMD's Cool'n'Quiet™ technology is enabled.

Options: Auto, Disabled.

CPU Ratio Control

This item allows you to enable the CPU clock ratio control. Choose “Enabled” to key in a CPU clock Ratio in the next selection.

Options: Enabled, Disabled.

CPU Clock Ratio

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

Auto Detect PCI Clk

When enabled the mainboard automatically disables the clock source for a PCI slot which does not have a module in it, reducing EMI (ElectroMagnetic Interference).

Options: Enabled, Disabled.

Spread Spectrum

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

Options: Disabled, Enabled.

AGP/PCI Clock

Enables you lock the AGP/PCI clock to a defined frequency or float with the host bus.

Options: Auto, By FSB, 66.6/33.3MHz, 75.0/37.5MHz.

 AGP clock is always double of PCI clock.

AGP clock = PCI clock x 2

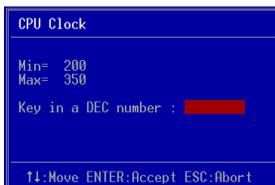
CPU Clock

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

$$\text{CPU Clock Generator} \times \text{CPU Clock Ratio} = \text{CPU Frequency}$$

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

Press <Enter> to display the following screen:



Key in the DEC (decimalism) number for the CPU clock.



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.

Memclock index value (Mhz)

This item sets the memory clock. By placing an artificial memory clock limit on the system, memory is prevented from running faster than this frequency. Example, “200” will set to DDR400 speed.

Options: Auto, 100Mhz, 133Mhz, 166Mhz, 200Mhz.



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

CPU Vcore Voltage

This item allows you to adjust the CPU Vcore voltage.

Options: -0.175V to +0.475V in 0.025V increments. We recommend that you leave this at the default value.

DIMM Voltage

This item allows you to adjust the DIMM slot voltage.

Options: +0.00V to +0.70V in 0.10V increments. We recommend that you leave this at the default value.

AGP Voltage

This item allows you to adjust the AGP slot voltage.

Options: +0.00V to +0.30V in 0.10V increments. 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

S-ATA RAID CONFIGURATION

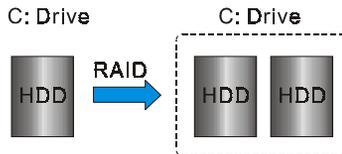
Introduction

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.

S-ATA 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.

This mainboard is equipped with the following SATA RAID controllers:

VIA S-ATA RAID Features

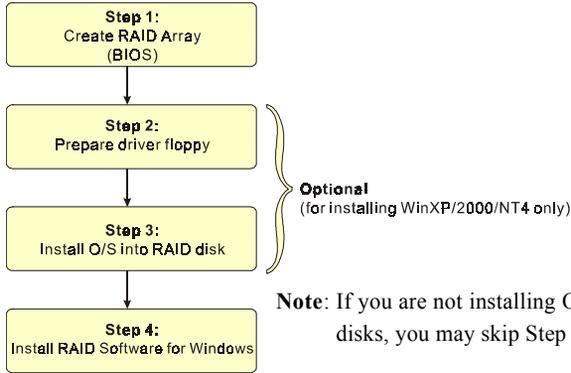
The VIA S-ATA RAID solution uses the VT8237R chip as a RAID controller, which is a 2-channel S-ATA and 1-channel ATA133 solution. Listed below are the main features and benefits of VIA S-ATA RAID:

- Support two S-ATA hard disk drives.
- Supports hard disk drive larger than 137 GB (48-bits LBA).
- Supports RAID 0, 1 and JBOD.
- 4 KB to 64 KB striping block size support.
- Bootable disk or disk array support.
- Windows-based RAID configure and management software tool. (Compatible with BIOS)
- Real-time monitoring of device status and error alarm with popup message box and beeping.
- Mirroring automatic background rebuilds support.
- ATA SMART function support.
- Microsoft Windows 98, Me, NT4.0, 2000, XP operating systems support.
- Event log for easy troubleshooting.
- On-line help for easy operation for RAID software.

S-ATA RAID Configuration

Enable RAID Function

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



Step 1: Create RAID Array

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

▶ VIA VT8237R

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

```
VIA Technologies, Inc. VIA VT6420 RAID BIOS Setting Utility V0.94
Copyright (C) VIA Technologies, Inc. All Right reserved.

Press < Tab > key into User Window!
Scan Devices, Please wait...
Channel 0 Master: Maxtor 6Y060M0
Channel 1 Master: Maxtor 6Y060M0
```

The main interface of the BIOS utility is as below:

```
VIA Tech. RAID BIOS Ver 0.94

> Create Array
> Delete Array
> Create/Delete Spare
> Select Boot Array
> Serial Number View

Create a RAID array with
the hard disks attached to
VIA IDE controller

F1 : View Array/disk Status
F1 : Move to next item
Enter: Confirm the selection
ESC : Exit

Channel Drive Name Array Name Mode Size(GB) Status
-----
Channel0 Master Maxtor 6Y060M0 ATA 133 57.26 Hdd
Channel1 Master Maxtor 6Y060M0 ATA 133 57.26 Hdd
```

Refer to Appendix B for details about creating RAID array using this utility. After the RAID array is created, press “ESC” to exit.

Step 2: Prepare driver floppy

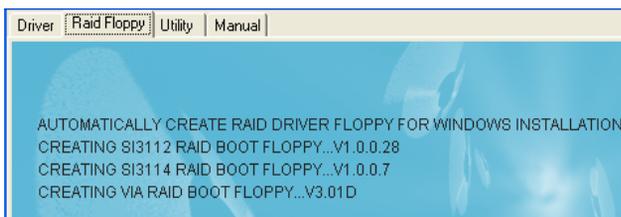
When installing Windows XP/2000/NT4.0 into any RAID disk, the O/S setup will require a floppy disk containing the RAID driver. This step will show you how to prepare this driver floppy. There are 2 methods to prepare this floppy:

▶ **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”



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 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 SATA RAID driver corresponding to the SATA 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

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 installs all drivers automatically.

► **Method 2**

This item allows you to install the drivers selectively.

Step 1 : Click “**VIA SERIES 4_IN_1 Driver**” to install chipset driver.

Step 2 : Click “**AC'97 Audio Driver**” to install audio driver.

Step 3 : Click “**USB V2.0 Driver**” to install USB 2.0 driver.

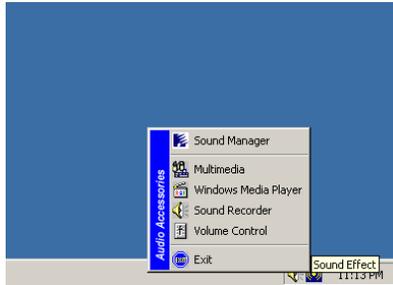
Step 4 : Click “**REALTEK LAN Driver**” to install LAN driver.

Step 5 : Click “**VIA SATA RAID Driver**” to install Serial ATA RAID driver.

Realtek Sound Manager Quick User-guide

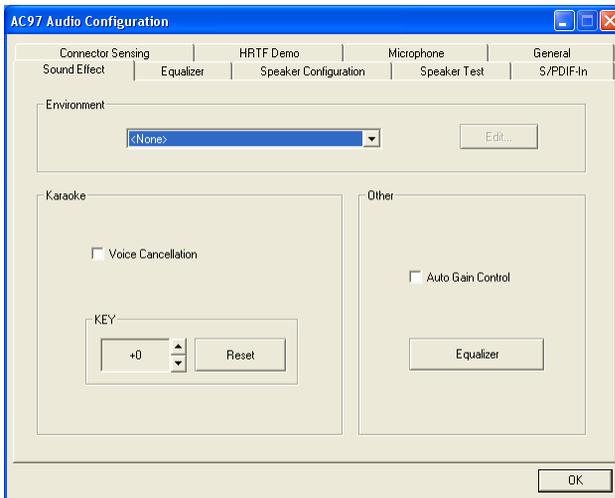
◆ Introduction

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>

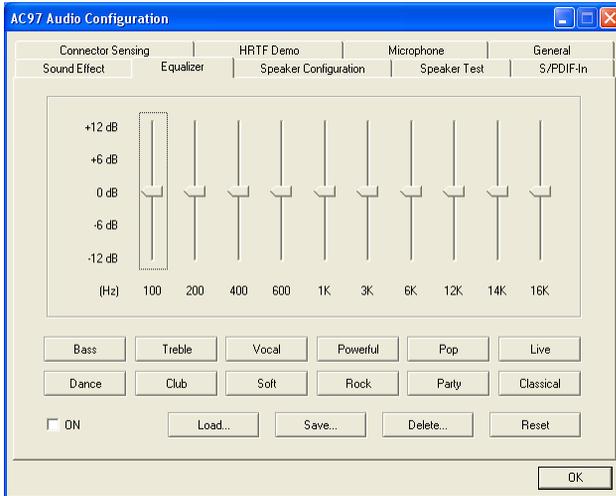
1. Right-click "Sound Effect" button on the task bar and select "Sound Manager".



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 adjust 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 Test:

<Figure 5>

- 5. To test the speaker , select the “Speaker Test” page and click directly on the speakers shown on the screen.

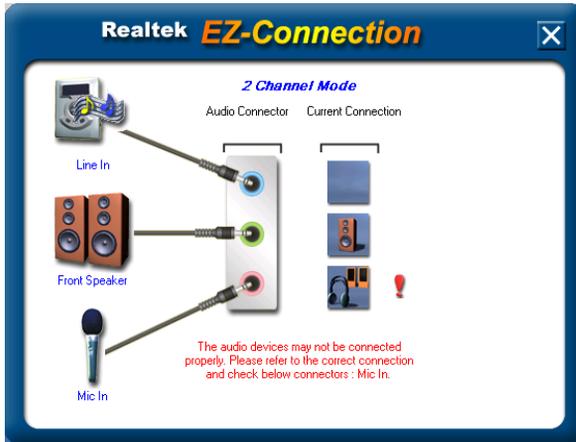
This board is equipped with Jack Sensing capability. If an audio device is plugged into the wrong connector, a warning message will appear to remind users to check the connection.



Connector Sensing:

<Figure 6>

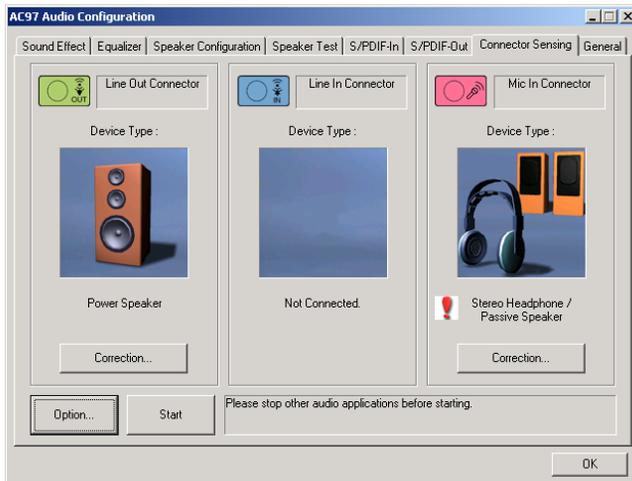
- 6. Push "Start" button to start the sensing. Please remember to terminate all audio applications before starting the sensing.



Connector Sensing:

<Figure 7>

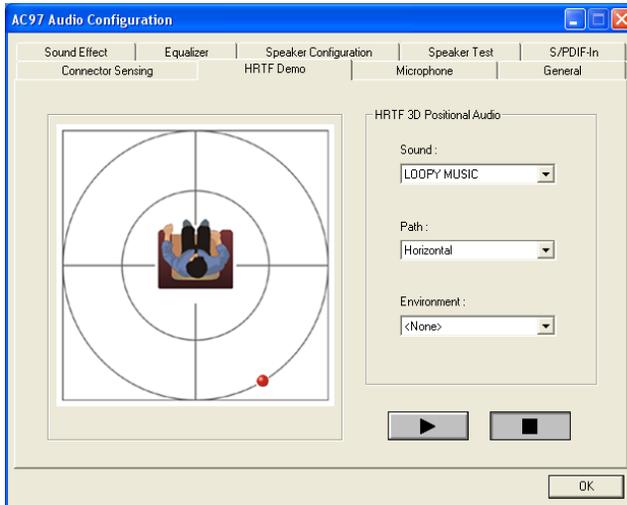
7. EZ-Connection shows the result of the detection. "Audio Connector" column reflects the settings used in the "Speaker Configuration" page. "Current Connection" column shows the type of device detected. If the results do not match, an exclamation mark will appear on the right side.



Connector Sensing:

<Figure 8>

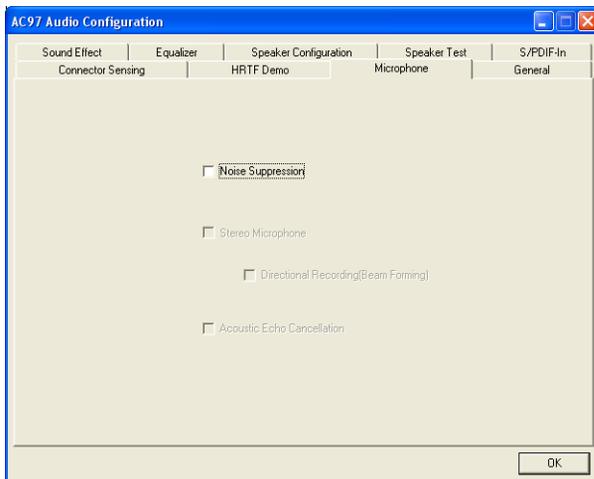
8. After closing EZ-Connector, this page will show the latest connector status as above.



HRTF Demo:

<Figure 9>

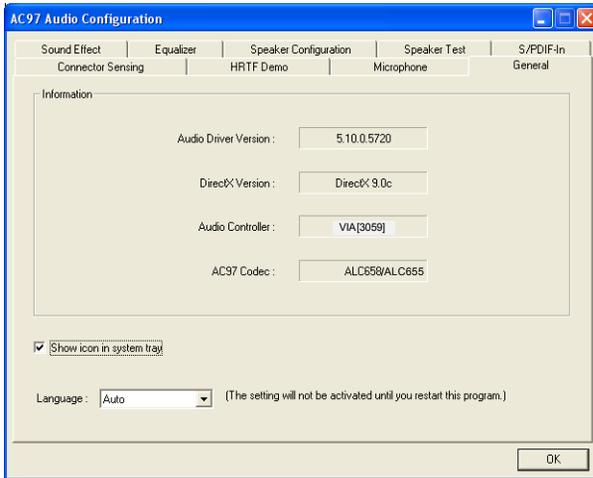
9. This page lets you test the HRTF 3D Positional Audio features.



Microphone:

<Figure 10>

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



General:

<Figure 11>

11. 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.

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

For xxx-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 xxx-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 VIA RAID BIOS Utility

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

```

VIA Technologies, Inc. VIA UT6420 RAID BIOS Setting Utility 00.94
Copyright (C) VIA Technologies, Inc. All Right reserved.

Press < Tab > key into User Window!
Scan Devices. Please wait...
Channel 0 Master: Maxtor 6Y060M0
Channel 1 Master: Maxtor 6Y060M0

```

The main interface of the BIOS utility is as below:

```

VIA Tech. RAID BIOS Ver 0.94

```

<pre> > Create Array > Delete Array > Create/Delete Spare > Select Boot Array > Serial Number View </pre>	<pre> Create a RAID array with the hard disks attached to VIA IDE controller F1 : View Array/disk Status ↑,↓ : Move to next item Enter: Confirm the selection ESC : Exit </pre>				
Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel0 Master	Maxtor 6Y060M0		ATA 133	57.26	Hdd
Channel1 Master	Maxtor 6Y060M0		ATA 133	57.26	Hdd

Create Disk Array

1. Use the arrow keys to navigate the main menu. Use the up and down arrow keys to select the **Create Array** command and press <Enter> to call out the list of creation steps.

```

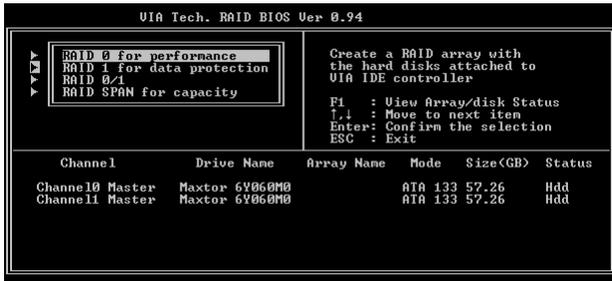
VIA Tech. RAID BIOS Ver 0.94

```

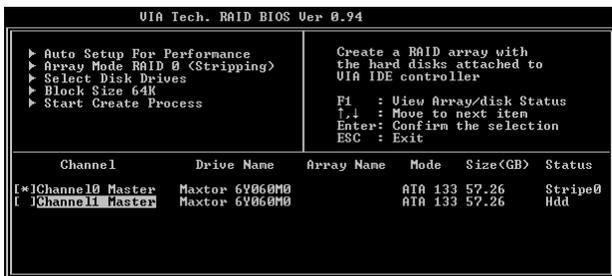
<pre> > Auto Setup For Data Security > Array Mode RAID 1 (Mirroring) > Select Disk Drives > Start Create Process </pre>	<pre> Create a RAID array with the hard disks attached to VIA IDE controller F1 : View Array/disk Status ↑,↓ : Move to next item Enter: Confirm the selection ESC : Exit </pre>				
Channel	Drive Name	Array Name	Mode	Size(GB)	Status
Channel0 Master	Maxtor 6Y060M0		ATA 133	57.26	Hdd
Channel1 Master	Maxtor 6Y060M0		ATA 133	57.26	Hdd

Appendix

2. Select **Array Mode** and press <Enter>, a list of array modes will appear. Highlight the target array mode that you want to create, and press <Enter> to confirm the selection. If RAID 1 is selected, an option list will popup and enable the users to select **Create only** or **Create and duplicate**. **Create only** will allow BIOS to only create an array. The data on the mirroring drive may be different from the source drive. **Create and duplicate** lets BIOS copy the data from the source to the mirroring drive.



3. After array mode is selected, there are two methods to create a disk array. One method is "**Auto Setup**" and the other one is "**Select Disk Drives**". **Auto Setup** allows BIOS to select the disk drives and create arrays automatically, but it does not duplicate the mirroring drives even if the user selected **Create and duplicate** for RAID 1. It is recommended all disk drives are new ones when wanting to create an array. **Select Disk Drives** lets the user select the array drives by their requirements. When using **Select Disk Drives**, the channel column will be activated. Highlight the target drives that you want to use and press <Enter> to select them. After all drives have been selected, press <Esc> to go back to the creation steps menu.



- If user selects a RAID 0 array in step 2, the block size of the array can also be selected. Use the arrow key to highlight **Block Size** and press <Enter>, then select a block size from the popup menu. The block size can be 4KB to 64KB.

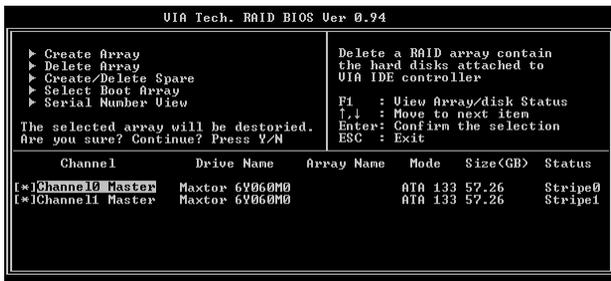


- Use the arrow key to highlight **Start Create Process** and press <Enter>. A warning message will appear, Press **Y** to finish the creation, or press **N** to cancel the creation.
- Important note: All existing content in the hard drive will be destroyed after array creation.

Delete Disk Array

A RAID can be deleted after it has been created. To delete a RAID, use the following steps:

- Select **Delete Array** in the main menu and press <Enter>. The channel column will be activated.
- Select the member of an array that is to be deleted and press <Enter>. A warning message will show up, press **Y** to delete or press **N** to cancel.



Appendix

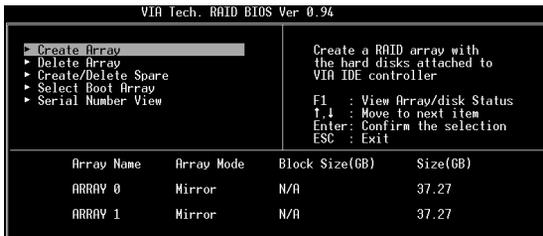
Deleting a disk array will destroy all the data on the disk array except RAID 1 arrays. When a RAID is deleted, the data on these two hard disk drives will be reserved and become two normal disk drives.

View Serial Number of Hard Drive

Highlight **Serial Number View** and press <Enter>. Use arrow key to select a drive, the selected drive's serial number can be viewed in the last column. The serial number is assigned by the disk drive manufacturer.

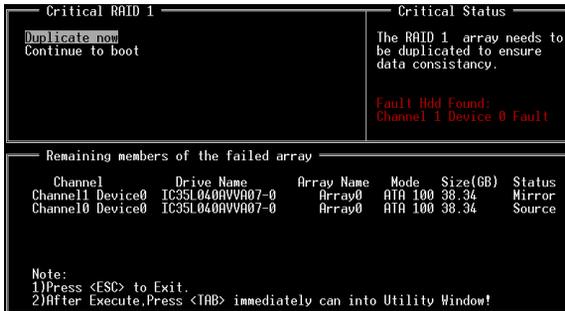
View Array Status

Press the **F1** key to show the array status on the lower screen. If there are no disk arrays then nothing will be displayed on the screen.



Duplicate Critical RAID 1 Array

When booting up the system, BIOS will detect if the RAID 1 array has any inconsistencies between user data and backup data. If BIOS detects any inconsistencies, the status of the disk array will be marked as critical, and BIOS will prompt the user to duplicate the RAID 1 in order to ensure the backup data consistency with the user data.



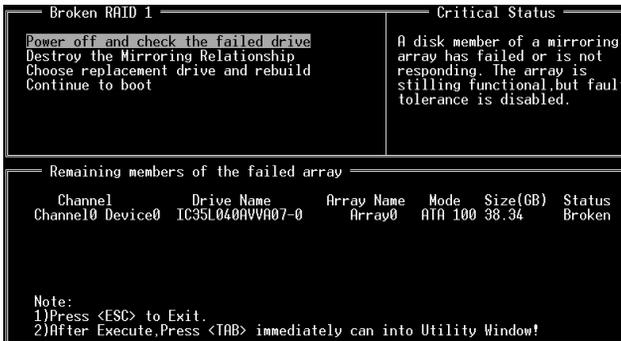
If user selects **Continue to boot**, it will enable duplicating the array after booting into OS.

Rebuild Broken RAID 1 Array

When booting up the system, BIOS will detect if any member disk drives of RAID has failed or is absent. If BIOS detects any disk drive failures or missing disk drives, the status of the array will be marked as broken.

If BIOS detects a broken RAID 1 array but there is a spare hard drive available for rebuilding the broken array, the spare hard drive will automatically become the mirroring drive. BIOS will show a main interface just like a duplicated RAID 1. Selecting **Continue to boot** enables the user to duplicate the array after booting into operating system.

If BIOS detects a broken RAID 1 array but there is no spare hard drive available for rebuilding the array, BIOS will provide several operations to solve such problem.



1. Power off and Check the Failed Drive:

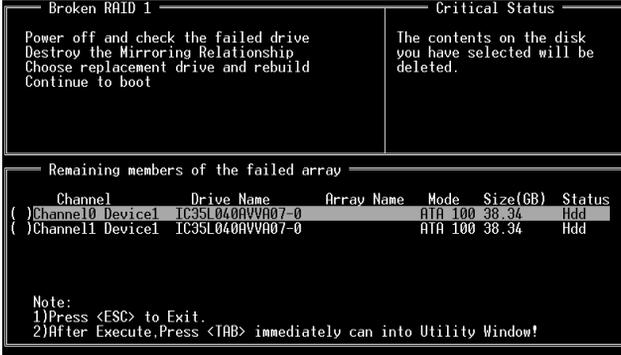
This item turns off the computer and replaces the failed hard drive with a good one. If your computer does not support APM, you must turn off your computer manually. After replacing the hard drive, boot into BIOS and select **Choose replacement drive and rebuild** to rebuild the broken array.

2. Destroy the Mirroring Relationship:

This item cancels the data mirroring relationship of the broken array. For broken RAID 1 arrays, the data on the surviving disk will remain after the destroy operation.

3. Choose Replacement Drive and Rebuild:

This item enables users to select an already-connected hard drive to rebuild the broken array. After choosing a hard drive, the channel column will be activated.



Highlight the target hard drive and press <Enter>, a warning message will appear. Press **Y** to use that hard drive to rebuild, or press **N** to cancel. Please note selecting option **Y** will destroy all the data on the selected hard drive.

4. Continue to boot:

This item enables BIOS to skip the problem and continue booting into OS.

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)