Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions contained in this manual, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- REORIENT OR RELOCATE THE RECEIVING ANTENNA
- INCREASE THE SEPARATION BETWEEN THE EQUIPMENT AND THE RECEIVER
- CONNECT THE EQUIPMENT INTO AN OUTLET ON A CIRCUIT DIFFERENT FROM THAT OF THE RECEIVER
- CONSULT THE DEALER OR AN EXPERIENCED AUDIO/TELEVISION TECHNICIAN

NOTE: Connecting this device to peripheral devices that do not comply with Class B requirements, or using an unshielded peripheral data cable, could also result in harmful interference to radio or television reception.

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.

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Trademarks

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Table of Contents

HARDWARE CONFIGURATION

Key Features :

Chipset
- ATI® RX480 + SB450 Chipset.

Processor
- Support for AMD™ K8 Processor in a Socket 939 package.
- Support Hypertransport interface bus.

VRM (Voltage Regulator Modules) on Board
- Flexible motherboard design with on board VRM, easy to upgrade with future AMD™ K8 processors.
- 0.800V to 1.55V in 25mV steps.

System Memory
- A total of four 184-pin DDR RAM sockets.
- DIMM size support from 64MB to 4GB.
- Support of dual channel 128-bit wide memory interface.
- Support of 266/333/400 DDR RAM memory type.

System BIOS
- PnP, APM, ATAPI and Windows® 2000/XP.
- Full support of ACPI & DMI.
- Auto detects and supports LBA harddisks with capacities over 160GB.
- Easy to upgrade BIOS.

Plug and Play
- Supports Plug and Play specification 1.1.
- Plug and play for Windows® 2000 and XP.
- Fully assignable PCI interrupts.

Onboard I/O
- Onboard two PCI fast IDE ports supporting up to four ATA, ATA2 , Ultra ATA33/66/100/133 IDE HDDs, CD-ROMs, ZIP drives and LS-120 drives as boot drive.
- One floppy port supports two FDD of 360KB, 720KB, 1.2MB, 1.44MB and 2.88MB capacity.
- Eight USB ports (four ports via two headers)
- PS/2 keyboard connector
- PS/2 mouse connector
- One front panel sound connector

Extended USB Support
- Includes 2 OHCI host controllers, increasing the number of external ports to eight.
- Includes 1 OHCI USB2.0 host controller that supports all eight ports (Bandwidth shared between eight ports).
- This motherboard support USB 2.0 feature only on Windows ® 2000 (with SP4 or above) and XP (with SP1 or above) OS.

Onboard Marvell 88E8052 PCI Express Gigabit LAN
- Full compliance with IEEE 802.3u 100 Base-T specifications and IEEE 802.3X Full Duplex Flow Control.
- Supports 10 Mb/s, 100 Mb/s and 1000 Mb/s operation.
- Supports Wake-On-LAN function and remote wake-up.

PCI Express x16 Graphics Interface
- One 16-lane (x16 port) PCI Express port intended for external graphics.
- Fully compliant to the PCI Express Base Specification revision 1.0a.
- The base PCI Express frequency of this interface is 4GB/s.
- PCI Express supports an enhanced addressing mechanism.
- An optional ADD2 card can utilize PCI Express Graphics x16 connection.

PCI Express x1 Ports
- Two 1-lane (x1 port) PCI Express port.
- Fully compliant to the PCI Express Base Specification revision 1.0a.
- Two virtual channel support for full unsynchronized data transfers.
- Supports full 2.5Gb/s bandwidth in each direction per x1 lane.

Power Management
- Supports SMM, APM and ACPI.
- Break switch for instant suspend/resume on system operations.
- Energy star "Green PC" compliant.
- Hardware monitoring circuit is supported, provide voltage, fan speed, etc. monitoring.
- Wake-On-LAN (WOL) support.
- Supports Suspend-To-RAM (STR).

Onboard ALC880 7.1 Audio
- Integrated Realtek ALC880 controller.
- Fully Sound and Sound Blaster compatible.
- Full-Duplex 4 24-bit two-channel DACs and 3 stereo 20-bit ADCs.
- PnP and APM 1.2 support.
- Windows® 2000/XP drivers ready.
- Line-in, Line-out, Mic-in, SPDIF-in, SPDIF-out.
- Supports ALC880 codec for eight channel sound output.

Onboard IEEE1394
- Compliant with IEEE 1394 OHCI specifications v1.0 and v1.1.
- Integrated 400Mb 2-port PHY.

Onboard Serial ATA Host Controller
- Independent DMA operation on four ports.
- Data transfer rates of 150MB/s.
- RAID 0/1 feature support .

Onboard Serial ATA-II Host Controller
- Independent DMA operation on two ports.
- Data transfer rates of 300MB/s.
- RAID 0/1 feature support .

Expansion Slots
- 1 PCI Express X16 slot
- 2 PCI Express X1 slots
- 2 PCI bus master slots - ver. 2.2 compliant

MOTHERBOARD LAYOUT

The following diagram shows the relative positions of the jumpers, connectors, major components and memory banks on the motherboard.
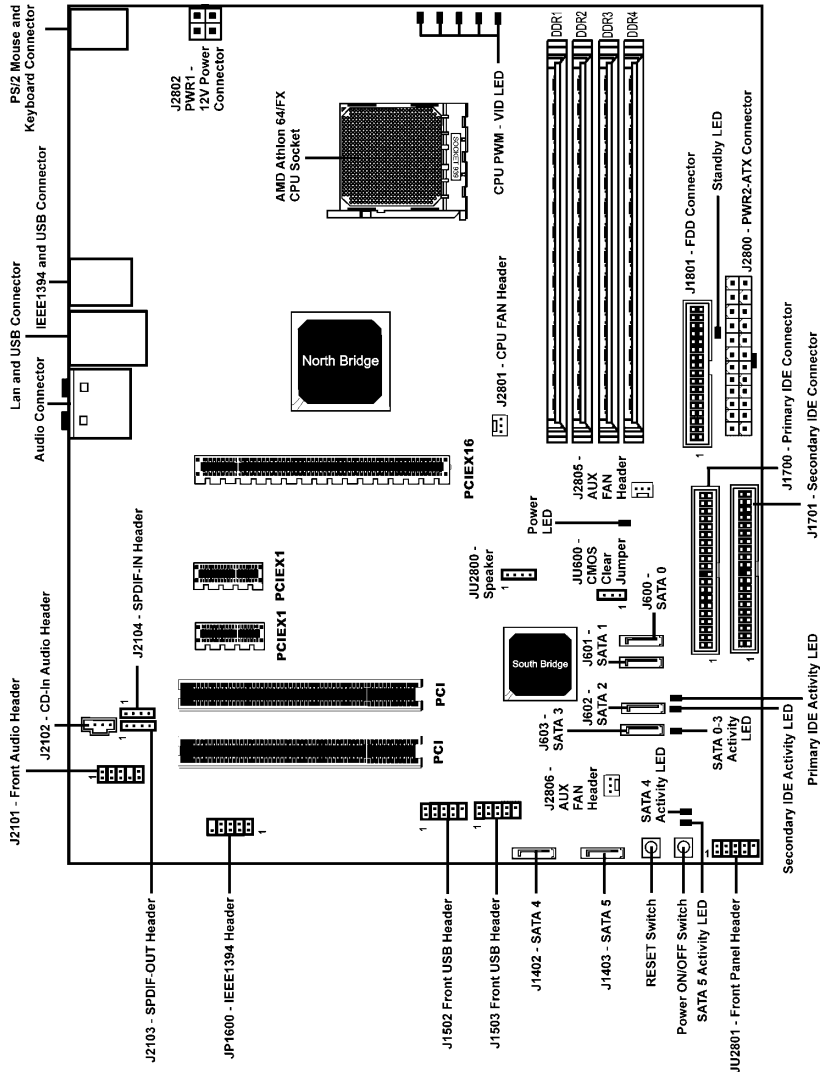
NOTE : 1) Be sure to check the HDD cable orientation in order to match the colored strip to the pin1 end of the connector.

2) When you start up the system, please wait for 5 seconds after you power on AC.

3) It is not recommended to add a metal spacer plate on the back of the Socket 939. Otherwise, some components will be short and damaged.

REAR PANEL

The back panel provides the following connectors:
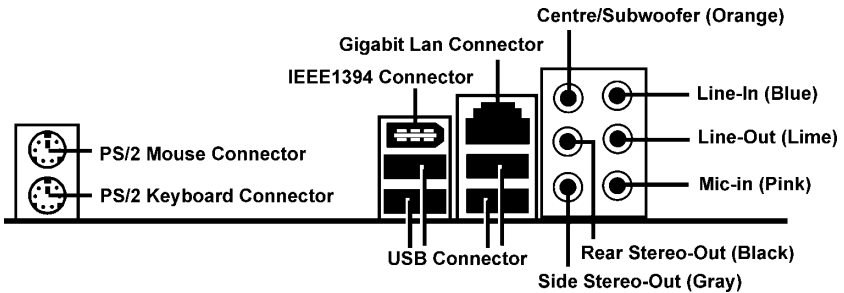
PS/2 Mouse Connector
The Sapphire motherboard provides a standard PS/2 mouse mini DIN connector for attaching a PS/2 mouse. You can plug a PS/2 mouse directly into this connector.

PS/2 Keyboard Connector
The Sapphire motherboard provides a standard PS/2 keyboard mini DIN connector for attaching a PS/2 keyboard. You can plug a PS/2 keyboard directly into this connector.

USB 2.0 Connector
The Sapphire motherboard provides an OHCI (Open Host Controller Interface) Universal Serial Bus root for attaching USB devices such as keyboard, mouse or other USB-compatible devices. You can plug the USB device directly into the connector.
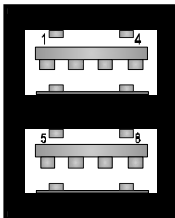
USB 2.0 Connector   USB 2.0 - Pin Definition

PIN	SIGNAL	DESCRIPTION
1	VCC	+5V/5VSB (optional)
2	-Data 0	Negative Data Channel 0
3	+Data0	Positive Data Channel 0
4	GND	Ground
5	VCC	+5V/5VSB (optional)
6	-Data 1	Negative Data Channel 1
7	+Data 1	Positive Data Channel 1
8	GND	Ground

VIA VT6307 IEEE 1394 Connector
The Sapphire motherboard provides a IEEE 1394 Connector and allows you
to connect a IEEE 1394 device directly to the connector.

Gigabit LAN
The onboard Marvell 88E8052 PCI-E x1 controller supports
10/100/1000 Mb/s operations.

8 Channel HD Audio
Option select of 2, 6, or 8 channel audio from onboard ALC880 High
Definition audio compliant CODEC with 20-bit ADC and 24-bit DAC resolution.
    - Support CD-In, SPDIF-in and SPDIF-out.
    - Optical & Coaxial SPDIF-out available on rear panel.
    - Support jack detection for easy audio device installation.

Rear panel audio jacks configuration:

Audio Jack Color	2 Channel	6 Channel	8 Channel
Blue	Line-In	Line-In	Line-In
Lime	Line-Out	Front Stereo-Out	Front Stereo-Out
Pink	Mic-In	Mic-In	Mic-In
Gray	--	--	Side Stereo-Out
Black	--	Rear Stereo-Out	Rear Stereo-Out
Orange	--	Centre & Subwoofer	Centre & Subwoofer

CONNECTORS AND HEADERS

The Sapphire motherboard provides connectors to connect to FDD, IDE HDD, USB Ports and CPU/System FAN etc.

Floppy Disk Drive Connector - J1801
The Sapphire motherboard provides a standard floppy disk drive connector that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types.

IDE Connectors - J1700 & J1701
The Sapphire motherboard features two 40-pin dual-channel IDE device connectors (IDE1/IDE2) providing support for up to four devices, such as CD-ROM and hard disk drives.

Primary IDE Connector - J1700
The first hard drive should always be connected to J1700. J1700 can connect a Master and a Slave drive.

Secondary IDE Connector - J1701
J1701 can also connect a Master and a Slave drive.
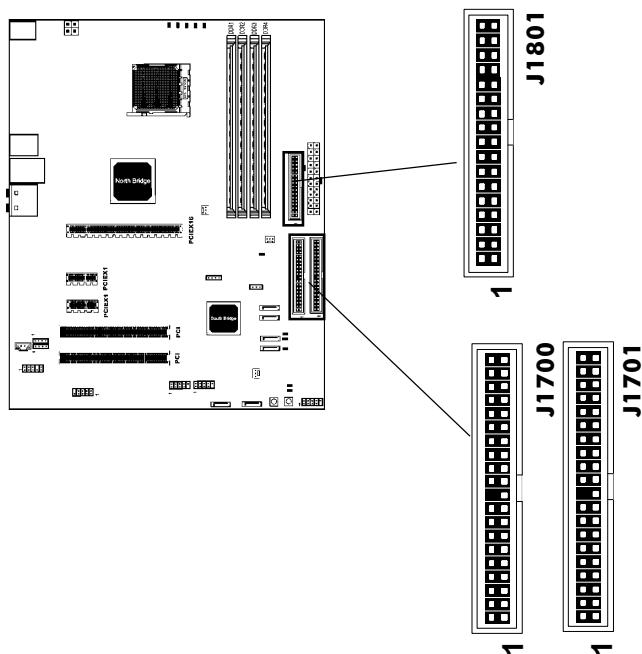
IEEE 1394 Header - JP1600

The Sapphire motherboard provides two 1394 pin headers that allow you to connect IEEE1394 ports.
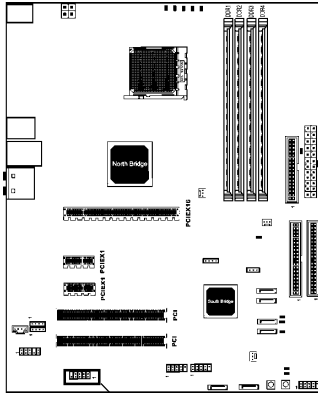
JP1600 - Pin Definition

PIN	SIGNAL
1	TPA+
2	TPA-
3	Ground
4	Ground
5	TPB+
6	TPB-
7	Cable power
8	Cable power
9	Key (no pin)
10	Ground

JP1600

IEEE 1394 Cable
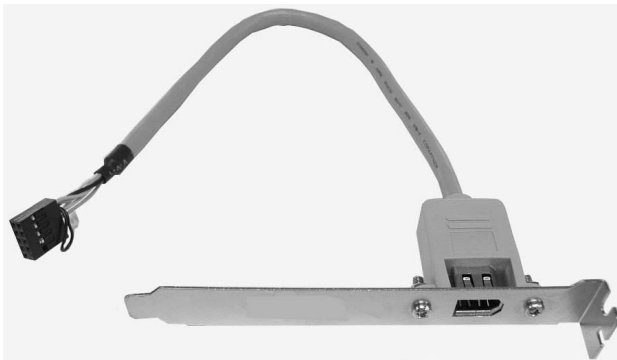
Fan Power Header - J2801, J2805, J2806
The J2801 (processor fan), J2805 / J2806 (system fan) support system cooling fan with +12V. It supports three-pin head connector.
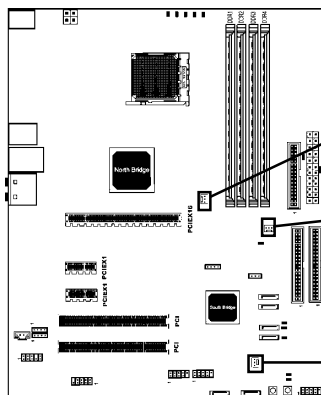
J2801 - CPU FAN

J2805 - FAN

J2806 - FAN

CD-IN Header - J2102
This header allows for connection of audio from CD-ROM drive.
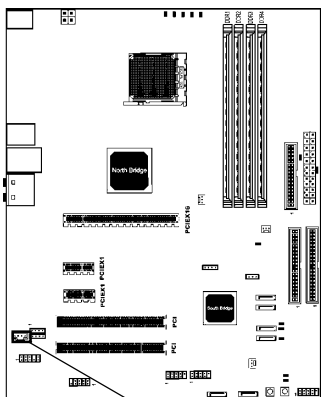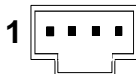
J2102 - Pin Definition

PIN	SIGNAL
1	CD-L
2	GND
3	GND
4	CD-R

J2102

Front Panel Audio Header - J2101

J2101
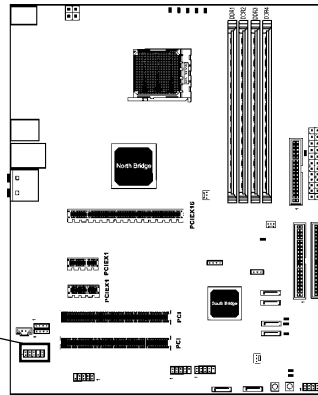
J2101 - Pin Definition

Pin	Signal	Description
1	PORT 1L	Analog Port 1 - Left channel
2	GND	Ground
3	PORT 1R	Analog Port 1 - Right channel
4	PRESENCE	Active low signal - signals BIOS that a High Definition Audio dongle is connected to the analog header. PRESENCE=0 when a High Definition Audio dongle is connected.
5	PORT 2R	Analog Port 2 - Right channel
6	SENSE1_RETIRN	Jack detection return from front panel JACK 1
7	SENSE_SEND	Jack detection sense line from the High Definition Audio Codec jack detection resistor network
8	KEY	Connector Key
9	PORT 2L	Analog Port 2 - Left channel
10	SENSE2_RETIRN	Jack detection return from front panel JACK 2

Note: In order to utilize the front audio header, your chassis must have a front audio connector. Also please make sure the pin assignment on the cable is the same as the pin assignment on the motherboard header. To find out if the chassis you are buying supports front audio connection, please contact your dealer.

USB Headers - J1502, J1503

This Sapphire motherboard has up to eight USB ports. Some computer cases have a special module that mounts USB ports at the front of the case. If you have this kind of case, use auxiliary USB connector J1502 / J1503 to connect the front mounted ports to the motherboard.
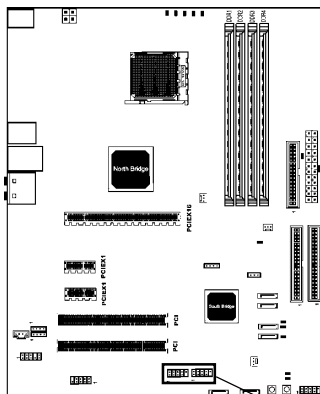
J1502, J1503 - Pin Definition

PIN	SIGNAL
1	VCC
2	VCC
3	USBP0-
4	USBP1-
5	USBP0+
6	USBP1+
7	GND
8	GND
9	KEY
10	OC#

J1502

2 ... 10
1 ... 9

J1503

2 ... 10
1 ... 9
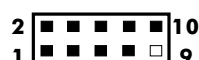
Speaker Header - JU2800

This Sapphire motherboard provides a speaker connection to the external PC speaker.
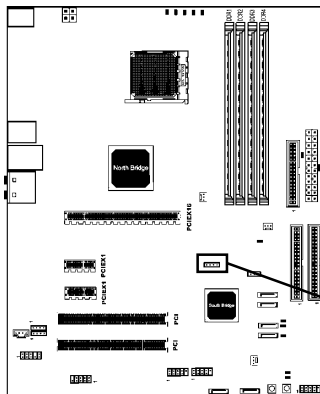
JU2800 - Pin Definition

PIN	SIGNAL
1	VCC
2	GND
3	GND
4	SPEAKER

JU2800

1 ....

Front Panel Header - JU2801

The Sapphire motherboard provides a front panel connection to the front panel switches and LEDs. JU2801 is compliant with the Front Panel I/O Connectivity Design Guide.
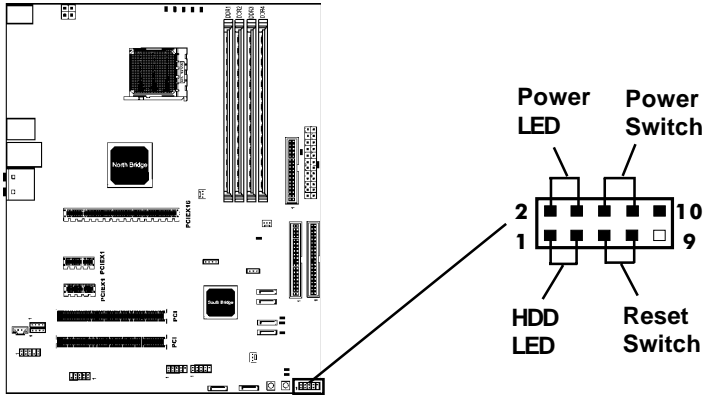
JU2801 - Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED_P	Hard disk LED pull-up
2	FP PWER/SLP	MSG LED +
3	HD_LED_N	Hard disk active LED
4	FP PWER/SLP	MSG LED -
5	RST_SW_N	Reset Switch low reference pull-down to GND
6	PWR_SW_P	Reset Switch high reference pull-up
7	RST_SW_P	Reset Switch high reference pull-up
8	PWR_SW_N	Reset Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

SPDIF Out Header - J2103
SPDIF In Header - J2104

This header provides a SPDIF (Sony/Philips Digital Interface) output to digital multimedia device through fiber or coaxial connector.
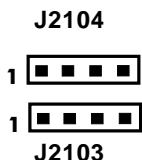
J2104

J2103

J2103, J2104 - Pin Definition

PIN	SIGNAL
1	SPDIF
2	+5VA
3	Key
4	GND
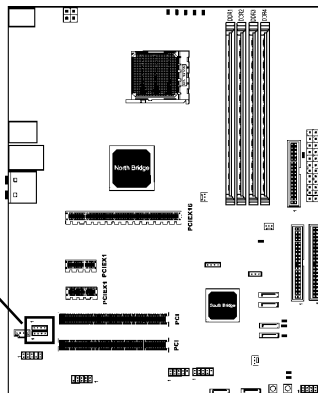
Serial ATA-I Hard Disk Connectors - J600, J601, J602, J603

The Sapphire motherboard has four SATA connectors: J600, J601, J602, J603. Each supports 1st generation SATA data rates of 150 MB/s. All connectors are fully compliant with Serial ATA 1.0 specifications. Each SATA connector can connect to one hard disk device. Please refer to SATA Raid Setup (P.25) for details on software installation procedure.
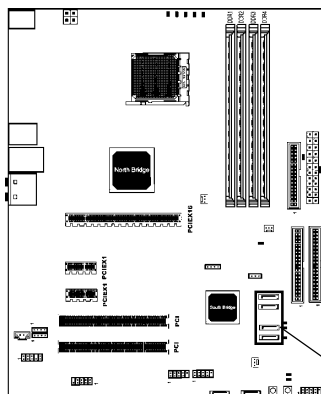
J600, J601, J602, J603 - Pin Definition

PIN	SIGNAL
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

J600
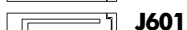
J601
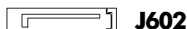
J602
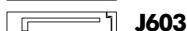
J603

Serial ATA-II Hard Disk Connectors - J1402, J1403

The Sapphire motherboard has two SATA-II connectors: J1402, J1403. Each supports 2**nd** generation serial ATA data rates of 300 MB/s. All connectors are fully compliant with Serial ATA 2.0 specification. Each SATA -II connector can connect to 1 hard disk device. Please refer to SATA Raid Setup (P.25) for details on software installation procedure.
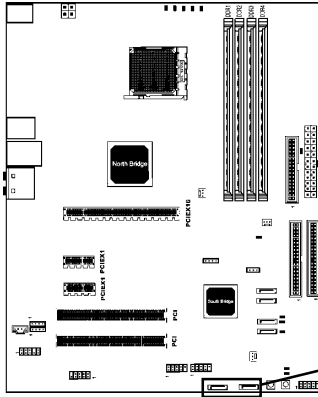
J1402, J1403 - Pin Definition

PIN	SIGNAL
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

J1402   **J1403**
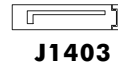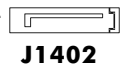
Serial ATA Cable

This cable is compatible for use with SATA and SATA-II devices.

Serial ATA Cable

Serial ATA Devices
Power Cable (optional)

Please do not fold the serial ATA cable, which may lead to loss of data during transmission.

CAUTION!

JUMPER SETTING

The Sapphire motherboard provides jumpers enabling configuration of the motherboard's hardware.

Clear CMOS Jumper - JU600

If you want to clear the system configuration, use the JU600 (Clear CMOS Jumper) to clear data.
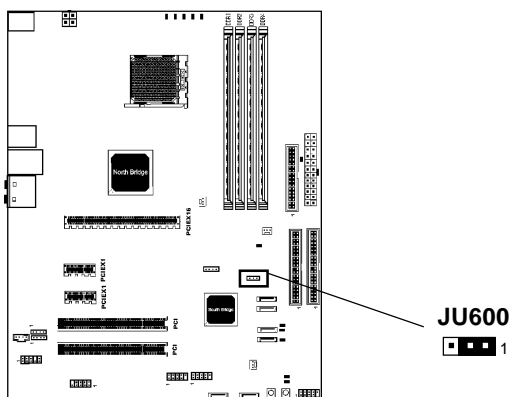
JU600

JU600		Selection
1 1-2*	Normal*
1 2-3	Clear CMOS

■ Close   ▯ Open   * = *Default setting.*

SLOTS

The Sapphire motherboard provides one PCI-E x16 slot, two PCIE x1 slot and two 32-bit PCI bus slots.
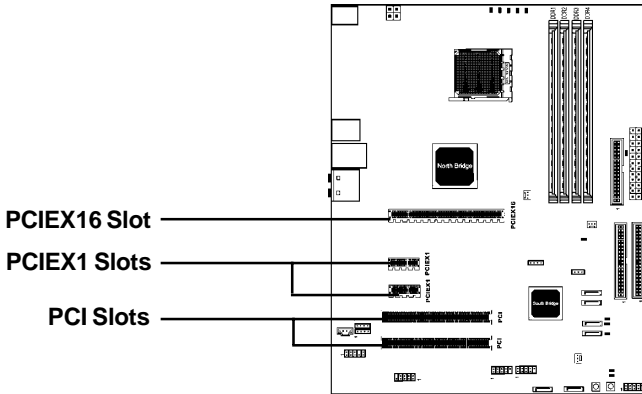
PCI Express x16 Graphics Interface
- One 16-lane (x16 port) PCI Express port intended for external graphics.
- Fully compliant to the PCI Express Base Specification revision 1.0a.
- The base PCI Express frequency of this interface is 4GB/s.
- PCI Express supports an enhanced addressing mechanism.
- An optional ADD2 card can utilize PCI Express Graphics x16 connection.

PCI Express x1 Ports
- Two 1-lane (x1 port) PCI Express ports intended for external graphics.
- Fully compliant to the PCI Express Base Specification revision 1.0a.
- Two virtual channel support for full unsynchronized data transfers.
- Supports full 2.5Gb/s bandwidth in each direction per x1 lane.

PCI (Peripheral Component Interconnect) Slots
- Two 32-bit PCI ports for add-in card connections.

CPU INSTALLATION

Please refer to the following steps to install the CPU.

1. Please turn off the power and unplug the power cord before installing the CPU. Pull the lever slightly sideways away from the socket to unlock the lever, and then raise the lever up to a full 90 degree angle.
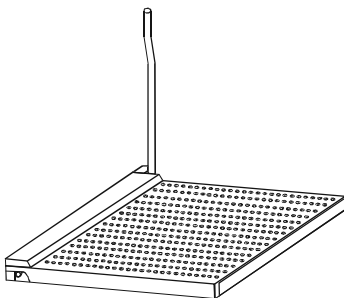
2. Look for the gold arrow. The gold arrow should point towards the lever pivot. The CPU can only fit in the correct orientation and requires no excessive force.
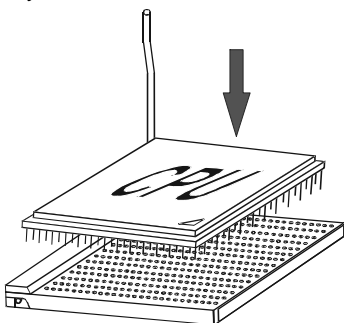
3. If the CPU is correctly installed, the pins should be completely embedded into the socket allowing for no gaps in-between CPU and socket. Please note that any violation of the correct installation procedures may cause permanent damage to your Sapphire motherboard.
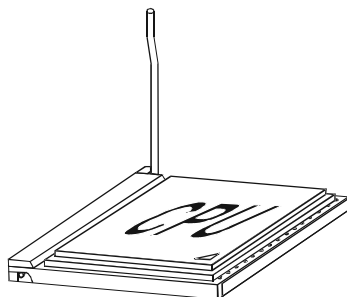
4. Press the CPU down firmly into the socket and close the lever. As the CPU is likely to move while the lever is being closed, always close the lever with your fingers pressing firmly on top of the CPU to make sure the CPU is properly and completely embedded into the socket.
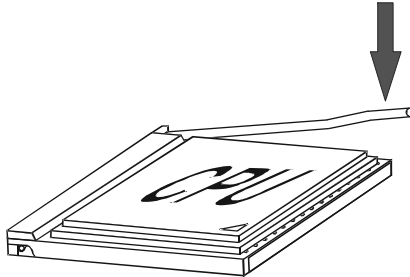
5. When you are installing the CPU, please make sure the CPU has a heatsink and a cooling fan attached on the top to prevent overheating. If you do not have a heatsink or cooling fan, contact your dealer to purchase and install them before turning on the computer. Please follow below steps to install the CPU cooler.

Step 1.
Position the cooler onto the retention mechanism. Hook one end of the clip first, and then press down the other end of the clip to fasten the cooler onto the top of the retention module.

Step 2.
Locate the Fixed Lever on the side of the cooler and lift the lever upwards.

Fixed Lever

Step 3.
Fasten down the lever.
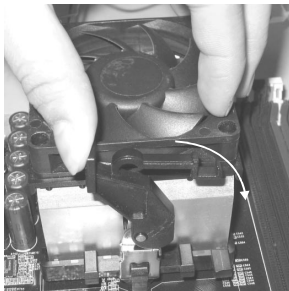
Step 4.
Make sure the safety hook
 completely clasps the fixed bolt
 of the retention module.

MEMORY CONFIGURATIONS
DDR DIMM Sockets Location
Please refer to the following figure for the location of the DDR DIMM Sockets.
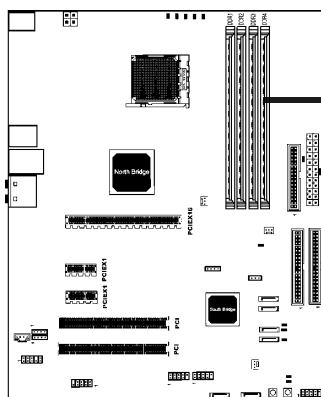
Install DDR DIMMs
Please follow the below mentioned steps to install DDR DIMMs.
1. Hold the DDR DIMM module by the edges and remove it from its antistatic package.
2. Make sure the clips at either end of the DIMM socket are pushed away from the socket.
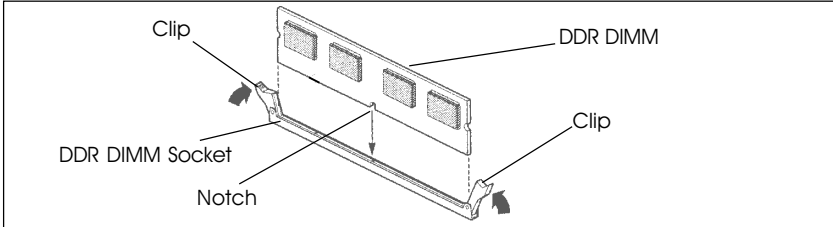
3. Position the DDR DIMM module above the socket and align the notch in the bottom edge of the module with the key in the socket.
4. Insert the bottom edge of the DDR DIMM module into the socket.
5. When the module is seated, press down on the top edge of the DDR DIMM module until the retaining clips at the ends of the socket snap into place.

Note: Please unplug the power supply before installing and removing any device, otherwise you may cause the system damage.

Memory Configurations
Please refer to the following recommended memory configurations.

Mode / (DIMM Type)	Case	Sockets			
		DDR1	**DDR2**	**DDR3**	**DDR4**
Single-channel /	1*	Populated	----	----	----
(DDR400/DDR333/DDR266)	2*	----	----	Populated	----
Dual-channel /	1#	Populated	Populated	----	----
(DDR400/DDR333/DDR266)	2#	----	----	Populated	Populated
	3#	Populated	Populated	Populated	Populated

* When using only one DDR DIMM, insert the DDR DIMM into DDR1 or DDR3 socket.
* You can install a pair of identical DIMMs in DDR1 and DDR2 and another pair of identical DIMMs in DDR3 and DDR4.

Note: • In dual channel mode, always install an identical (the same type and size) DDR DIMM pair in sockets.
      • It is not recommended to use a three DIMM configuration.
      • Memory channel speed is determined by slowest DIMM populated in system.

 * *Please visit Sapphire's web site for approved memory compatibility list.*

SATA RAID SETUP

Creating and deleting RAID sets is a function found in the RAID utility. During bootup, the following message will appear, pausing for a few seconds to allow the user to enter the RAID utility:

Press Ctrl+S or F4 to enter RAID utility

An easy-to-use screen will appear with the following choices:

Create RAID Set   Delete RAID Set   Rebuild RAID Set   Resolve Conflicts

Below this will be a list of drives currently installed on the system.

Creating RAID Sets

SATA Raid supports two drives. Please follow the below mentioned steps.
1. Select "Create RAID Set" and choose either a "Striped" or "Mirrored" RAID Set.
2. Select if you want the utility to Auto Configure the RAID Set or if you want to manually configure the RAID Set. For Striped Sets, you can change the chunk size. For Mirrored Sets, you can assign Source and Target drives, as well as if you want Disk Copy.

What is a Striped RAID Set? Also known as RAID Level O, a Striped RAID Set allows for high speed storage without redundancy. This requires 2 identical drives allowing for data to be split across the drives resulting in faster data throughput. Choose this selection if you want to gain performance.

What is a Mirrored RAID Set? Also known as RAID Level 1, a Mirrored RAID Set allows for both high speed storage and redundancy. This requires 2 identical drives allowing for data to be copied from a source drive and duplicated onto the second drive. Choose this selection if you prefer security options to prevent data loss.

What is a Disk Copy? In the case where you have a drive that already contains data and you would like to create a new RAID Set, you will need to purchase an identical drive and select Disk Copy to allow the contents of your source drive to be copied to your new destination drive.

Deleting RAID Sets

1. To remove one or more RAID sets, select "Delete RAID Set."
2. Select desired set and press Y when asked "Are You Sure?"

Rebuilding RAID Sets

In case your RAID set has encountered an error or it has been changed, you can recover the RAID set using this option.

Resolving Conflicts

When a RAID set is created, the metadata is written to the disk includes drive connection information (Primary Channel, Secondary Channel). If, after a disk failure, the replacement disk was previously part of a RAID set (or used in another system), it may have conflicting metadata, specifically in reference to the drive connection information. If so, this will prohibit the RAID set from being either created or rebuilt, In order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To resolve this, select "Resolve Conflict" and the correct metadata, including the correct drive connection information, will be written to the replacement disk.

Driver and RAID Software Installation

1. For Windows 2000 and XP, after Windows has finished booting up, the system will automatically find the newly installed adapter and prompt the **Found New Hardware Wizard** window. Click **Cancel** to skip it.

2. Insert the bundled driver CD DISC into your CD-ROM drive, select **"ATI Chipset\ATI_Raid Driver" installation** bar on the dialogue Window to begin the driver and software installation. (Please follow the instruction to finish the installation).

When you install a new Windows 2000 or XP operating system on your RAID set, please follow the below procedure:

1. Insert the bundled driver CD DISC into CD-ROM (D:).
    Copy all files from directory (D:**ATI chipset\ATI_Raid**) to a floppy disk.
2. Install OS from CD-ROM.
3. Press "**F6**" when display "
    Press **F6** if you need to install a third party SCSI or RAID driver..."
4. Insert floppy disk.
5. Choose the OS device driver wanted for loading.
6. Install OS.
7. Install driver after OS is installed.

BIOS SETUP

About the Setup Utility

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

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

The BIOS Setup Utility enables you to configure:

Hard drives, diskette drives and peripherals

Video display type and display options

Password protection from unauthorized use

Power Management features

Overclocking features

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

This chapter provides explanations for Setup Utility options.

The Standard Configuration

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

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

Entering the Setup Utility

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

Press DEL to enter SETUP

Pressing the delete key accesses the BIOS Setup Utility:

Phoenix - AwardBIOS Workstation BIOS CMOS Setup Utility	
▶ Standard CMOS Features ▶ Advanced BIOS Features ▶ Advanced Chipset Features ▶ Integrated Peripherals ▶ Power Management Setup ▶ PnP/PCI Configurations ▶ OverClocking Features	▶ PC Health Status Load Fail-Safe Defaults Load Optimized Defaults Set Supervisor Password Set User Password Save & Exit Setup Exit Without Saving
Esc: Quit : F10: Save & Exit Setup	↑↓→←: Select Item
Time, Date, Hard Disk Type...	

BIOS Navigation Keys

The BIOS navigation keys are listed below:

KEY	FUNCTION
↑↓→←	Move
Enter	Select item or option
+/-/PU/PD	Value
ESC	Exit
F1	Display the General Help
F5	Restore the Previous Values
F6	Load the Fail-Safe Defaults
F7	Load the Optimized Defaults
F10	Save configuration

Updating the BIOS

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

1. Create a bootable system disk. (Refer to Windows online help for information on creating a bootable system disk.)
2. Download the Flash Utility and new BIOS file from the manufacturer's Web site. Copy these files to the system diskette you created in Step 1.
3. Turn off your computer and insert the system diskette in your computer's diskette drive. (You might need to run the Setup Utility and change the boot priority items on the Advanced BIOS Features Setup page, to force your computer to boot from the floppy diskette drive first.) Also see page 58 for more information.
4. At the A:\ prompt, type the Flash Utility program name and press <Enter>.
5. Type the file name of the new BIOS in the "File Name to Program" text box. Follow the onscreen directions to update the motherboard BIOS.

6. When the installation is complete, remove the floppy diskette from the diskette drive and restart your computer. If your motherboard has a Flash BIOS jumper, reset the jumper to protect the newly installed BIOS from being overwritten.

Using BIOS

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

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

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

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

Standard CMOS Features

This option displays basic information about your system.

Phoenix - AwardBIOS WorkstationBIOS CMOS Setup Utility

Standard CMOS Features

Date (mm:dd:yy)	Sat, July 2 2005	
Time (hh:mm:ss)	23 : 21 : 34	Item Help
▶ IDE Channel 0 Master	[None]	Menu Level ▶
▶ IDE Channel 0 Slave	[None]	Change the day, month,
▶ IDE Channel 1 Master	[None]	year and century
▶ IDE Channel 1 Slave	[None]	
Drive A	[1.44M, 3.5 in.]	
Halt On	[All Errors]	
Base Memory	640K	
Extended Memory	260096K	
Total Memory	261120K	

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

Date and Time
The Date and Time shows the current date and time on the computer. If you are running Windows, it is automatically updated whenever you make changes to the Windows Date and Time Properties utility.

IDE Devices (None)
Your computer has two IDE channels (Primary and Secondary) and each channel can be installed with one or two devices (Master and Slave). Use these items to configure each device on the IDE channel.

Press <Enter> to display the IDE submenu:

<div align="center">Phoenix - AwardBIOS WorkstationBIOS CMOS Setup Utility
IDE Channel 0 Master</div>

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

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

IDE HDD Auto-Detection
Press <Enter> while this option is highlighted to prompt the Setup Utility to automatically detect and configure an IDE device on the IDE channel.

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

IDE Channel 0/1 Master/Slave (Auto)
Leave this option at Auto to enable the system to automatically detect and configure IDE devices on the channel. If it fails to find a device, change the value to Manual and then manually configure the drive by entering the characteristics of the drive in the items described below. Refer to your drive's documentation or look on the drive casing if you need to obtain this information. If no device is installed, change the value to None.

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

Access Mode (Auto)

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

Press <Esc> to return to the Standard CMOS Features Page

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

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

Halt On (All Errors)

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

Base Memory, Extended Memory, and Total Memory

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

Advanced BIOS Features

This section defines advanced information about your system.

Phoenix - AwardBIOS WorkstationBIOS CMOS Setup Utility
Advanced BIOS Features

		Item Help
▶ Hard Disk Boot Priority	[Press Enter]	
Virus Warning	[Disabled]	Menu Level ▶
CPU Internal Cache	[Enabled]	
External Cache	[Enabled]	Select Hard Disk
Quick Power On Self Test	[Enabled]	Boot Device Priority
First Boot Device	[Floppy]	
Second Boot Device	[Hard Disk]	
Third Boot Device	[CDROM]	
Boot Other Device	[Enabled]	
Boot Up Floppy Seek	[Enabled]	
Boot Up Num Lock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
x Typematic Rate (Chars/Sec0X)	6	
x Typematic Delay (Msec)	250	
Security Option	[Setup]	
APIC Mode	[Enabled]	
MPS Version Control For OS	[1.4]	
OS Select for DRAM > 64MB	[Non-OS2]	

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

Hard Disk Boot Priority

Navigate to this section and press <Enter> to view the following screen:

Phoenix - AwardBIOS WorkstationBIOS CMOS Setup Utility
Hard Disk Boot Priority

1. Bootable Add-in Cards	Item Help
	Menu Level ▶▶ Use <↑> or <↓> to select a device, then press <+> to move it up, or <-> to move it down the list. Press <ESC> to exit this menu.

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

Virus Warning (Disabled)
If this function is enabled and someone attempts to write data into this area, BIOS will show a warning message on screen and alarm beep

CPU Internal Cache (Enabled)
All processors that can be installed in this motherboard use internal level 1 (L1) cache memory to improve performance. Leave this item at the default value for better performance.

External Cache (Enabled)
Most processors that can be installed in this system use external level 2 (L2) cache memory to improve performance. Leave this item at the default value for better performance.

Quick Power On Self Test (Enabled)
To allow the system to skip certain tests while booting. This will decrease the time needed to boot the system. You might like to enable this option when you are confident that your system hardware is operating smoothly.

First/Second/Third Boot Device (Floppy/Hard Disk/CDROM)
Use these three options to select the priority and order of the devices that your system searches for an operating system at start-up time.

Boot Other Device (Enabled)
When this option enabled, the system searches all other possible locations for an operating system if it fails to find one in the devices specified among the First, Second, and Third boot devices.

Boot Up Floppy Seek (Enabled)
When this option is enabled, it checks the size of the floppy disk drives at start-up time.

Boot Up Num Lock Status (On)
This option defines if the keyboard Num Lock key is active when your system is started, default is on.

Gate A20 Option (Fast)
This option defines how the system handles legacy software that was written for an earlier generation of processors.

Typematic Rate Setting (Disabled)
If this option is enabled, you can use the following two options to set the typematic rate and the typematic delay settings for your keyboard.
- **Typematic Rate (Chars/Sec)**:
  This option defines how many characters per second are generated by a held-down key.
- **Typematic Delay (Msec):**
  This option defines how many milliseconds must elapse before a held-down key begins generating repeat characters.

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

APIC Mode (Enabled)
This option allows you to enable or disable the APIC (Advanced Programmable Interrupt Controller) mode. APIC provides symmetric multiprocessing (SMP) for systems, allowing support for up to 60 processors. It is recommended to enable this option.

MPS Version Control For OS (1.4)
This option can improve support for multiple PCI bus configurations and improve future expendability. The default is 1.4.

OS Select For DRAM > 64 MB (Non-OS2)
This item is only required if you have installed more than 64 MB of memory and you are running the OS/2 operating system. Otherwise, leave this item at the default.

HDD S.M.A.R.T Capability (Disabled)
The S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) system is a diagnostics technology that monitors and predicts device performance S.M.A.R.T. software resides on both the disk drive and the host computer. The disk drive software monitors the internal performance of the motors, media, heads and electronics of the drive. The host software monitors the overall reliability status of the drive. If a device failure is predicted, the host software warns the user of the impending condition and advises appropriate actions to protect the data.

Advanced Chipset Features

These options define critical timing parameters of the Sapphire motherboard. You should leave the options on this page at their default values unless you are familiar with the technical specification of your system hardware. Changing the values to a incorrect setting may result in fatal errors or may cause your system to run unstable.

Phoenix - AwardBIOS WorkstationBIOS CMOS Setup Utility
Advanced Chipset Features

		Item Help
▶LDT & PCI Bus Control	[Press Enter]	
PCIE GFX Core Payload Size	[64 Bytes]	Menu Level ▶
PCIE GPP Core Payload Size	[64 Bytes]	
Memory Hole	[Disabled]	
System BIOS Cacheable	[Disabled]	

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

LDT & PCI Bus Control

Navigate to this option and press <Enter> to view the following screen:
LDT is the abbreviation for Lightning Data Transport.

Phoenix - Award WorkstationBIOS CMOS Setup Utility
LDT & PCI Bus Control

		Item Help
LDT Configuration	[Enabled]	
Upstream LDT Bus Width	[16 bit]	Menu Level ▶▶
Downstream LDT Bus Width	[16 bit]	
LDT Bus Frequency	[Auto]	

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

LDT Configuration (Enabled)
This option enables or disables the LDT configuration.

Upstream LDT Bus Width (16 bit)
This option allows users to manually adjust the upstream LDT bus width to be 8 bit or 16 bit.

Downstream LDT Bus Width (16 bit)
This option allows users to manually adjust the downstream LDT bus width to be 8 bit or 16 bit.

LDT Bus Frequency (Auto)
This option allows users to manually adjust the LDT Bus Frequency.

Press <Esc> to return to the Advanced Chipset Features Page

PCIE GFX Core Payload Size (64 Bytes)
Select the DMA write buffer size to the PCI Express graphic channel (PCIE X16).

PCIE GPP Core Payload Size (64 Bytes)
Select the DMA write buffer size to the PCI Express peripheral channel (PCIE X1).

Memory Hole (Disabled)
In order to improve performance, certain space in memory can be reserved for ISA peripherals. This memory must be mapped into the memory space below 16MB. When this area is reserved, it cannot be cached.

System BIOS Cacheable (Disabled)
Selecting Enabled allows caching of the system BIOS, resulting in better performance. However, if any program writes to this memory area, a memory access error may result.

Integrated Peripherals

This section displays options that define the operation of peripheral components on the system's input/output ports.

Phoenix - Award WorkstationBIOS CMOS Setup Utility
Integrated Peripherals

▶ South OnChip IDE Device	[Press Enter]	Item Help
▶ South OnChip PCI Device	[Press Enter]	
▶ Onboard Devices	[Press Enter]	Menu Level ▶
Init Display First	[PCIEx]	
OnChip USB OHCI Controller	[Enabled]	
OnChip USB EHCI Controller	[Enabled]	
OnChip USB KBC Controller	[Enabled]	
IDE HDD Block Mode	[Enabled]	
Onboard FDC Controller	[Enabled]	
PWRON After PWR-Fail	[Off]	

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

South OnChip IDE Device

Navigate to this option and press <Enter> to view the following screen:

Phoenix – Award WorkstationBIOS CMOS Setup Utility
South OnChip IDE Device

IDE DMA transfer access	[Enabled]	Item Help
OnChip IDE Channel 0	[Enabled]	
OnChip IDE Channel 1	[Enabled]	Menu Level ▶ ▶
Primary Master PIO	[Auto]	
Primary Slave PIO	[Auto]	
Secondary Master PIO	[Auto]	
Secondary Slave PIO	[Auto]	
Primary Master UDMA	[Auto]	
Primary Slave UDMA	[Auto]	
Secondary Master UDMA	[Auto]	
Secondary Slave UDMA	[Auto]	

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

IDE DMA transfer access (Enabled)

This option allows you to enable the transfer access of the IDE DMA. If you disable this function you will only have PIO modes 1-4 available.

OnChip IDE Channel 0/1 (Enabled)

Use this option to enable or disable the PCI IDE channels that are integrated on the motherboard.

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

Primary/Secondary Master/Slave UDMA (Auto)
Each IDE channel supports a master device and a slave device. This motherboard supports Ultra DMA technology, which provides faster access to IDE devices. If you install a device that supports Ultra DMA, change the appropriate item on this list to Auto.

Press <Esc> to return to the Integrated Peripherals Page

South OnChip PCI Device
Navigate to this option and press <Enter> to view the following screen:

Phoenix - Award WorkstationBIOS CMOS Setup Utility
South OnChip PCI Device

		Item Help
Onboard Azalia AUDIO	[Auto]	
OnChip SATA Controller	[Both]	Menu Level ▶▶
OnChip SATA Type	[IDE Controller]	
Onboard 1394	[Enabled]	

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

Onboard Azalia AUDIO (Auto)
This option allows you to control the onboard Azalia (High Definition) audio. Disable this option if you do not need the high definition onboard sound.

OnChip SATA Controller (Both)
This option allows you to enable or disable the Serial ATA controller.

OnChip SATA Type (IDE Controller)
This option allows you to control the Serial ATA controller as IDE mode or RAID mode. (Please refer to page 25 for more information on RAID mode).

Onboard 1394
This option allows you to enable or disable the onboard IEEE1394 function.

Press <Esc> to return to the Integrated Peripherals Page

Onboard Devices
Navigate to this option and press <Enter> to view the following screen:

Phoenix – Award WorkstationBIOS CMOS Setup Utility
Onboard Devices

Onboard PCIE SIL3132 SATA	[Both]	Item Help
Onboard SIL3132 SATA Type	[RAID Controller]	
Onboard Marvel PCIE NIC	[Enabled]	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

Onboard PCIE SIL3132 SATA (Both)
This option allows you to enable or disable the onboard PCI Express SIL3132 SATA-II controller.

Onboard SIL3132 SATA Type (RAID Controller)
This option allows you to control the Onboard PCIE SIL3132 SATA-II controller as IDE mode or RAID mode.

Onboard Marvel PCIE NIC
This option allows you to enable or disable the onboard PCIE Marvel LAN device.

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

Init Display First (PCIEx)
Use this option to specify whether your graphics adapter is installed in one of the PCI Express or PCI slots.

OnChip USB OHCI Controller (Enabled)
This option allows you to enable or disable the onboard USB OHCI controller.

OnChip USB EHCI Controller (Enabled)
This option allows you to enable or disable the onboard USB EHCI controller.

OnChip USB KBC Controller (Enabled)
This option allows you to enable or disable the USB Keyboard support.

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

Onboard FDC Controller (Enabled)
Select Enabled if your system has a floppy drive controller (FDC) installing in the system board and you want to use it. If you install add-in FDC or the system has no floppy drive, select Disabled.

PWRON After PWR-Fail (Off)
This option enables your computer to automatically restart or return to its operating status after a power down.

Power Management Setup

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

Phoenix-Award WorkstationBIOS CMOS Setup Utility
Power Management Setup

ACPI function	[Enabled]	Item Help
ACPI Suspend Type	[S1&S3]	
Power Management	[User Define]	Menu Level ▶
HDD Power Down	[Disabled]	
Video Off Option	[Suspend -> Off]	
Video Off Method	[V/H SYNC + Blank]	
MODEM Use IRQ	[3]	
Soft-Off by PWRBTN	[Instant-Off]	
PowerOn by PCI Card	[Disabled]	
AMD K8 Cool'n'Quite control	[Auto]	
RTC Alarm Resume	[Disabled]	
* Date (of Month)	0	
* Resume Time (hh:mm:ss)	0 : 0 : 0	
PS2 Keyboard Resume	[Disabled]	
PS2 Mouse Resume	[Disabled]	
PCIE Wake Pin for S5	[Disabled]	

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

ACPI function (Enabled)
Select Enabled only if your computer's operating system supports the Advanced Configuration and Power Interface (ACPI) specification.
ACPI Suspend Type (S1 & S3)
Use this item to define the suspend mode for your system.

Power Management Option (User Define)
This option allows you to select the type (or degree) of power saving for Doze, Standby, and Suspend modes.
  - User Define – Select time-out period in the section for each mode stated below.
  - 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 (except the hard driver)

HDD Power Down (Disabled)
The IDE hard drive will spin down if it is not accessed within a specified length of time. Options are from 1 Min to 15 Min and Disabled.

Video Off Option (Suspend—> Off)
This option defines if the video is powered down when the system is put into suspend mode.

Video Off Method (V/H SYNC + Blank)
This item defines how the video is powered down to save power.
MODEM Use IRQ (3)
If you want an incoming call on a modem to automatically resume the system from a power-saving mode, use this item to specify the interrupt request line (IRQ) that is used by the modem. You might have to connect the fax/modem to the motherboard Wake On Modem connector for this feature to work.

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

PowerOn by PCI Card (Disabled)
This options allows the system to be awakened from power saving modes when activity or input signal of the PCI Card is detected.

AMD K8 Cool'n'Quite control (Auto)
This option helps the system to lower the frequency when CPU idles. When the frequency decreases, the temperature will drop automatically as well.

RTC Alarm Resume (Disabled)
When set to Enabled, you can set the date (day of the month), hour, minute and second to turn on your system. When set to 0 (zero) for the day of the month, the alarm will power on your system every day at the specified time.
   - **Date of Month**: Use this field to define the date of month when using the RTC alarm to resume the system.
   - **Resume Time**: Use this field to define the time when using the RTC alarm to resume the system.

PS2 Keyboard Resume (Disabled)
This option lets you decide if the system should be awakened from power saving mode by keyboard activity.

PS2 Mouse Resume (Disabled)
This option lets you decide if the system should be awakened from power saving mode by mouse activity.

PCIE Wake Pin for S5 (Disabled)
This option specifies whether the system will be awakened from power saving mode when activity or input signal of the PCIE Card is detected.

PnP/PCI Configurations

This section configures how PnP (Plug and Play) and PCI expansion cards operate in your system. The PCI bus on the motherboard use system IRQs (Interrupt ReQuests) and DMAs (Direct Memory Access). You must set up the IRQ and DMA assignments correctly through the PnP/PCI Configurations Setup utility for the motherboard to work properly. This screen appears after entering:

```
                        Phoenix-AwardBIOS CMOS Setup Utility
                              PnP/PCI Configurations
┌─────────────────────────────────────────────────────┬──────────────────────────┐
│  Reset Configuration Data          [Disabled]        │ Item Help                │
│                                                       │                          │
│                                                       │ Menu Level  ▶            │
│  Resources Controlled By           [Auto(ESCD)]       │ Default is Disabled.     │
│  *  IRQ Resources                  Press Enter        │ Select Enabled to reset  │
│                                                       │ Extended System          │
│                                                       │ Configuration Data       │
│     PCI/VGA Palette Snoop          [Disabled]         │ ESCD) when you exit      │
│     Assign IRQ For VGA             [Enabled]          │ Setup if you have        │
│     Assign IRQ For USB             [Enabled]          │ installed a new add-on   │
│     PCI Latency Timer (CLK)        [64]               │ and the system           │
│                                                       │ reconfiguration has      │
│  ** PCI Express relative items **                     │ caused such a serious    │
│                                                       │ conflict that the OS     │
│                                                       │ cannot boot              │
│                                                       │                          │
└─────────────────────────────────────────────────────┴──────────────────────────┘

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

Reset Configuration Data (Disabled)

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

Resources Controlled By (Auto(ESCD))

You should leave this option at the default (Auto (ESCD)). Enabling this setting, the system dynamically allocates resources to Plug and Play devices as they are required. If you cannot get a legacy ISA (Industry Standard Architecture) expansion card to work properly, you might be able to solve the problem by changing this item to Manual, and then opening up the IRQ Resources submenu.

> *** IRQ Resources:**
> In the IRQ Resources submenu, if you assign an IRQ to Legacy, then that Interrupt Request Line is reserved for a legacy ISA expansion card. In the Memory Resources submenu, use the first item Reserved memory Base to set the start address of the memory you want to re serve for the ISA expansion card. Use the second item Reserved Memory Length to set the amount of reserved memory. Press <Esc> to close the Memory Resources submenu.

PCI/VGA Palette Snoop [Disabled]

This option is designed to overcome problems that can be caused by some nonstandard VGA cards.

Assign IRQ For VGA [Enabled]

This option assigns an interrupt request (IRQ) to the VGA on your system. Activity of the selected IRQ always awakens the system.

Assign IRQ For USB [Enabled]

This option assigns an interrupt request (IRQ) to the USB on your system. Activity of the selected IRQ always awakens the system.

PCI Latency Timer (CLK) [64]

This feature controls how long each PCI device can hold the bus before another takes over. The larger the value, the longer the PCI device can retain control of the bus. As each access to the bus comes with an initial delay before any transaction can be made, low values for the PCI Latency Timer will reduce the effective PCI bandwidth while higher values improve it.

Overclocking Features (Expert only)

Phoenix-AwardBIOS CMOS Setup Utility
Overclocking Features

		Item Help
▶ DRAM Configuration	[Press Enter]	
		Menu Level ▶
CPU Fid Control	[StartUp]	
CPU Vid Control	[StartUp]	DRAM timing and
CPU VID Offset	[0.00v]	control
CPU/HT Reference Clk (MHz)	[200]	
PCIE clock	[100]	
Radeon Xpress 200 Voltage	[1.22 V]	
HT Link Voltage	[1.22 V]	
PCI-E 1.2 Voltage	[1.22 V]	
PCI-E 1.8 Voltage	[1.8 V]	
NB HT PLL CONTROL	[AUTO]	
x PLL High Speed Mode	Low Speed	
x PLL Stability Calibration	00	

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

DRAM Configuration

Navigate to this section and press <Enter> to view the following screen:

Phoenix - Award WorkstationBIOS CMOS Setup Utility
DRAM Configuration

Timing Mode		Item Help
x Memclock index value (Mhz)	133MHz	
x CAS# latency (Tcl)	2.5	Menu Level ▶▶
x Min RAS# active time(Tras)	6T	
x RAS# to CAS# delay (Trcd)	3T	
x Row precharge Time (Trrd)	3T	
x Row to Row delay (Trrd)	2T	
x Row to cycle time (Trc)	9T	
x Row refresh cyc time (Trfc)	24T	
x Read-to-Write time (Trwt)	4T	
x Refresh Rate (Tref)	200MHz 7.8ps	
x Write to Read Delay (TWtr)	2 buds clocks	
x Write Recovery Time (Twr)	3 bus clock	
User Config mode	[Auto]	
x 1T/2T Memory Timing	1T	
x Read preamble value	7ns	
x Async Latency value	7ns	
x R/W Queue Bypass Count	8	

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

Timing Mode (Auto)
This option allows you to set up the DRAM timing manually or automatically. This item is set to [Auto] by default. When setting to [Manu] the following options are adjustable.
- **Memclock index value (Mhz) (200MHz)**: When DDR Timing Setting is set to Manual, use this option to set the DRAM frequency.
- **CAS# latency (Tcl) (2.5):** This option determines the operation of SDRAM memory CAS (column address strobe). It is recommended that you leave this option at the default value. The 2T setting requires faster memory that specifically supports this mode.
- **Min RAS# to active time (Tras) (6T) This** option determines the time RAS takes to read from and write to a memory cell.
- **RAS to CAS Delay (Trcd) (3T):** This is the amount of time a CAS is performed after a RAS. The lower the better, but some DRAM does not support low figures.
- **Row precharge Time (Trrd) (3T)** This option specifies the Row precharge to Active or Auto-Refresh of the same bank.
- **Row to Row delay (Trrd) (2T)** This option specifies the active-to-active delay of different banks.
- **Row cycle time (Trc) (9T)** This option determines the minimum number of clock cycles a memory row takes to complete a full cycle, from row activation up to the precharging of the active row.

- **Row refresh cyc time (Trfc) (24T)** Auto-refresh active to RAS#-active or RAS# auto-refresh.
- **Read-to-Write time (Trwt) (4T)** This option specifies the Read-to-Write cycle time.
- **Refresh Rate (Tref) (200MHz 7.8ps)** This option specifies the Refresh Rate.
- **Write to Read Delay (Twtr) (2 bus clocks)** This option specifies the time measured from the rising edge following the last non-masked data strobe to the rising edge of the next read command.
- **Write Recovery Time (Twr) (3 bus clocks)** This option specifies the time measured from the last write datum is safely registered by the DRAM.

User Config mode (Auto)

This option has the capability to automatically detect all of the following fields default values. This item is set to [Auto] by default. When setting to [Manu], the following options are available:

- **1T/2T Memory Timing (1T)** This option controls the SDRAM command rate.
- **Read Preamble value (7ns)** This option allows you to set Read Preamble value from 2ns, to 9.5ns, and it is specified in units of 0.5ns.
- **Async Latency value (7ns)** This option allows you to set Async Latency value from 2ns to 11ns, and it is specified in units of 1 ns.
- **R/W Queue Bypass Count (8)** This option allows you to set R/W Queue Bypass Count.
- **Dynamic Idle Cycle Counter (Disabled)** This option allows you to en able/disable the Dynamic Idle Cycle Counter.
- **Idle Cycle Limit (16 Cycles)** This option allows you to set Idle Cycle Limit.
- **Bypass Max (4)** This option allows you to set Bypass Max from 0 to 7.
- **Memory DQ Drive Strength (Not Reduced)** This option allows you to set the amount of Memory DQ Drive Strength to be reduced.
- **Odd Divisor Correct (Disabled)** This option allows you to enable/ disable the Odd Divisor Correct.
- **DRAM Drive Strength (Normal Drive)** This option allows you to set the DRAM Drive Strength.
- **DQS Hysteresis (Enabled)** This option allows you to enable/disable the DQS Hysteresis.
- **Digital Locked Loop (DLL) (Enabled)** This option allows you to enable/ disable the Digital Locked Loop.
- **DDR Memory Drive Strength (Nominal)** This option allows you to set the DDR Memory Drive Strength.

DRAM Bank Interleaving (Enabled)
This option allows you to enable/disable the DRAM Bank Interleaving.

Burst Length (4 beats)
DDR SDRAM modules provide a Burst mode that means an auto precharge function for programmable READ or WRITE burst lengths of 2, 4, or 8 locations.

This means that if we set burst length to 8, the address bus will access 8 bytes each cycle to precharge, etc.

MTRR mapping mode
The item selects the MTRR mapping mode. The MTRR (Memory-Type and Range Registers) controls the access and cacheability of memory regions in the processor.

DRAM VOLTAGE (VDIMM) (AUTO)
This field allows you to manually adjust the DRAM DIMM voltage.

DRAM VTT Offset (0.0%)
This field allows you to manually adjust the DRAM DIMM VTT termination voltage (by % variation from the nominal value).

CPU Fid control (StartUp)
This field allows you to adjust the CPU frequency; the range will be varied according to different CPUs.

CPU Vid control (StartUp)
This field allows you to adjust the CPU voltage.

CPU VID Offset (0.00v)
This field is the amount of offset applied to CPU VID Control. Final applied CPU voltage is CPU VID Control + CPU VID Offset.

CPU/HT Reference Clk (MHz) (200)
This field allows you to manually adjust the CPU clock.

PCIE clock (100)
This field allows you to manually adjust the PCIE clock.

Radeon Xpress 200 Voltage (1.22V)
This field allows you to manually adjust the North Bridge, Radeon Xpress 200, voltage.

HT Link Voltage (1.22V)
This field allows you to manually adjust the Hypertransport Link voltage.

PCI-E 1.2 Voltage (1.22V)
This field allows you to manually adjust the PCI Express 1.2V supply voltage.

PCI-E 1.8 Voltage (1.8V)
This field allows you to manually adjust the PCI Express 1.8V supply voltage.

NB HT PLL CONTROL (AUTO)
This field allows you to manually adjust the Northbridge HT PLL (Phase Lode Loop). But it is highly recommended to leave this field set "Auto" for setting a stable platform.

   - PLL High Speed Mode (Low Speed)
   This field defines the speed mode of the Northbridge PLL.

   - PLL Stability Calibration (00)
   This field set the Stability Calibration factor of the Northbridge PLL.

Overclocking Retry Count (5)
If the system does not boot for the specified number of times, then the overclocking defaults will be loaded automatically. Set to "0" to disable this feature.

Press <Esc> to return to the Overclocking Features page.

PC Health Status

Your Sapphire motherboard supports hardware monitoring; this section lets you monitor the parameters for critical voltages, temperatures and fan speeds.

Phoenix-AwardBIOS CMOS Setup Utility
PC Health Status

Shutdown Temperature	[Disabled]	Item Help
Motherboard 1.8V	1.77V	
CPU Core Voltage (1.30V-1.55V)	1.37V	Menu Level ▶▶
Motherboard 3.3V	3.34V	
Motherboard 5V	5.05V	
Motherboard 12V	11.71V	
DRAM VDD (2.5V - 2.6V)	2.52V	
Radeon Xpress 200 (1.2V)	1.18V	
HT Link Voltage (1.2V)	1.45V	
CPU VRM Temperature	27^{0}C	
North Bridge Temperature	33^{0}C	
Ambient Temperature	25^{0}C	
Fan 1 Speed	3125 RPM	

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

Shutdown Temperature [Disabled]
Enables you to set the maximum temperature the system can reach before powering down.

System Component Characteristics
These fields provide you with information about the systems current operating status. You cannot make changes to these fields.

- Motherboard 1.8V
- CPU Core Voltage (1.30V-1.55V)
- Motherboard 3.3V
- Motherboard 5V
- Motherboard 12V
- DRAM VDD (2.5V - 2.6V)
- Radeon Xpress 200 (1.2V)
- HT Link Voltage (1.2V)
- CPU VRM Temperature
- North Bridge Temperature
- Ambient Temperature
- Fan 1 Speed

Load Fail-Safe Defaults
If you select this item and press Enter a dialog box will appear. If you select [OK], and then Enter, the Setup Utility loads a set of performance default values. These default settings are quite demanding and your system might not function properly if you are using slower CPU, memory, or other low-performance components.

Note: To load Performance settings may make your system become unstable or unbootable. When loading the Performance Defaults fails, users can choose "either" step to return the motherboard to its defaults BIOS:

1. Power on the system and press "Insert" key. The system will bypass the previous BIOS setting and automatically reload the default BIOS. (This procedure is BIOS setup only!)
2. Apply to the jumper setting reference onboard and proceed with the "Clear CMOS" to recover the default BIOS setting. Please refer to Chapter 2, page 9, to complete the clear CMOS action. (This procedure requires opening the chassis!)

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

Note: Users please remain the factory BIOS default setting of "Load optimized Defaults" when install Operation System onto your system.

Set Supervisor/User Password

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

ENTER PASSWORD

Type the password, up to eight characters, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection. To disable password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is disabled, the system will boot and you can enter BIOS Setup freely.

PASSWORD DISABLED

If you have selected "**System**" in "Security Option" of "BIOS Features Setup" menu, you will be prompted for the password every time the system reboots or any time you try to enter BIOS Setup. If you have selected "**Setup**" at "Security Option" from "BIOS Features Setup" menu, you will be prompted for the password only when you enter BIOS Setup.

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

Save & Exit Setup

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

Exit Without Saving

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

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

Realtek HD Audio Driver Setup

Getting Started

After installing the Realtek HD Audio Driver (insert the driver CD and follow the on-screen instructions), "Realtek HD Audio Manager" icon will show in System tray as below. Double click the icon and the control panel will appear.

Double click to enable
Realtek HD Audio Manager

Sound Effect

After clicking on the "Sound Effect" tab, three sections "Environment", "Equalizer" and "Karaoke" are available for selection.


Environment Simulation

You will be able to enjoy a total of 23 kinds of different sound experiences by selection from the dropdown menu. Realtek HD Audio Sound Manager also provides five popular settings "Stone Corridor", "Bathroom", "Sewer Pipe", "Arena" and "Audio Corridor" for quick enjoyment.

Equalizer Selection
The Equalizer section allows you to create your own preferred settings by utilizing this tool.

A standard of 10 equalizer bands ranging from 100Hz to 16KHz are available:
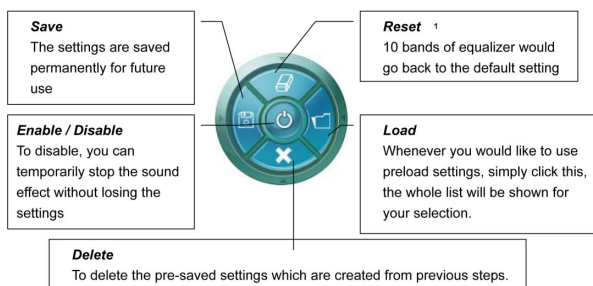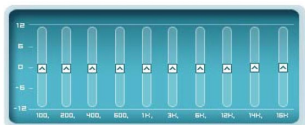
Frequently Used Equalizer Setting
Realtek recognizes the needs that you might have. By leveraging our long experience in the audio field, Realtek HD Audio Sound Manager provides you certain optimized equalizer settings that are frequently used for your easy access enjoyment.

How to Use
Other than the buttons "Pop" "Live" "Club" & "Rock" shown on the page, by using the dropdown menu in "Others" selection, you will find more optimized settings available to you.

Karaoke Mode
Karaoke mode brings Karaoke fun back home by simply using the music you usually play, Karaoke mode can help you eliminate the vocal of the song or adjust the key to accommodate your range.

Vocal Cancellation: By clicking on "Voice Cancellation", the vocals of the songs will be erased, while the background music is still playing which lets you take over the vocal part.
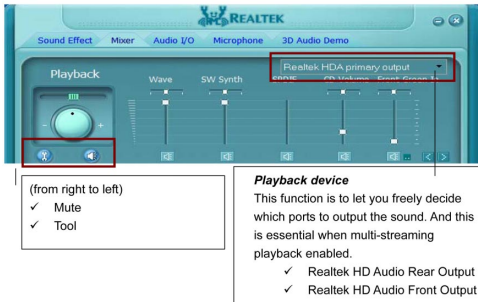
Key Adjustment: Using "Up / Down Arrow" allows you to find a key which better fits your vocal range.

Mixer

Realtek HD Audio Sound Manager integrates Microsoft's "Volume Control" functions into the Mixer page. This gives you the advantage to you to create your favorite sound effect via one single tool.

Playback control

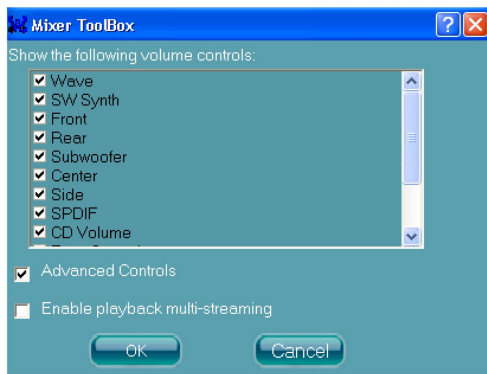| (from right to left)	*Playback device*
✓ Mute	This function is to let you freely decide
✓ Tool	which ports to output the sound. And this
	is essential when multi-streaming
	playback enabled.
	✓ Realtek HD Audio Rear Output
	✓ Realtek HD Audio Front Output

Mute

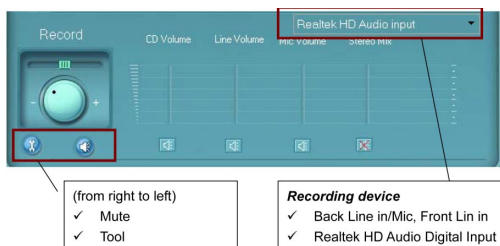You may choose to mute single or multiple volume controls or to completely mute sound output.

Tool

⬜ **Show the following volume control**
   This allows you to freely decide which volume control items to be displayed. A total of 13 items can be selected.

⬜ **Advanced controls**

⬜ **Enable playback multi-streaming**

With this function, you will be able to have an audio chat with your friends via headphone (stream 1 from front panel) while still have music (stream 2 from back panel) playing. At any given period, you can have a maximum of 2 streams operating simultaneously.

Recording control

(from right to left)	Recording device
✓ Mute	✓ Back Line in/Mic, Front Lin in
✓ Tool	✓ Realtek HD Audio Digital Input

Mute
You may choose to mute single or multiple volume controls or to completely mute sound input.

Tool

 Show the following volume controls
   This is to let you freely decide which volume control items to be displayed.

 Advanced controls.
   Advanced control is a "Microphone Boost" icon.
   Once this item is checked, you will find an "advanced" icon beside "Front Mic In" & "Mic Volume". With this, the input signal into "Front Mic In" & "Mic Volume" will be strengthened.

 Enable recording multi-streaming
   At any given period, you can have a maximum of 2 streams operating simultaneously.

Audio I/O

Realtek HD Audio Manager frees you from default speaker settings. Each jack is no longer limited to performing certain functions. Instead, each jack is now able to be chosen to perform either output (i.e. playback) function or input (i.e. recording) function. We call this "Retasking."

Audio I/O aims to help you set the jacks as you wish. Moreover, other than blue to blue, pink to pink, the way that you are used to doing, Audio I/O can guide you to other correct jacks that can also serve as microphone / speaker / head-phone.
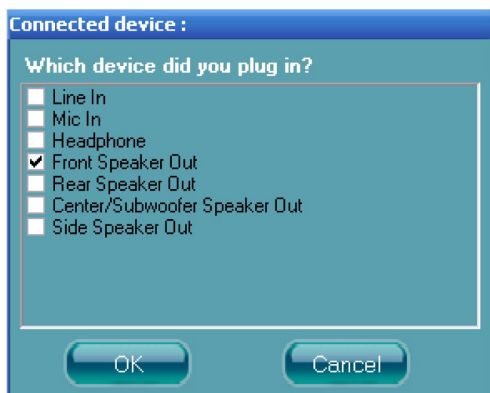
Speaker Configuration

Step 1: Plug in the device in any available jack.

Step 2: "Connected device" window will pop up for your selection. Please select the device you are trying to plug in.

* If the device is being plugged into the correct jack, you will be able to find the icon beside the jack changed to the one that is same as your device.

* If not correct, Realtek HD Audio Manager will guide you to plug the device into the correct jack.

*Indicates **pull-out***
(Find the arrow is at opposite direction to the jack?)

*Indicates **plug in***
(Find the arrow is exactly into the jack?)

The warning message to hint you the device was plugged into a wrong jack.

Global Connector Settings

Click [icon] to access global connector settings

Global Connector Settings
☐ Disable front panel jack detection
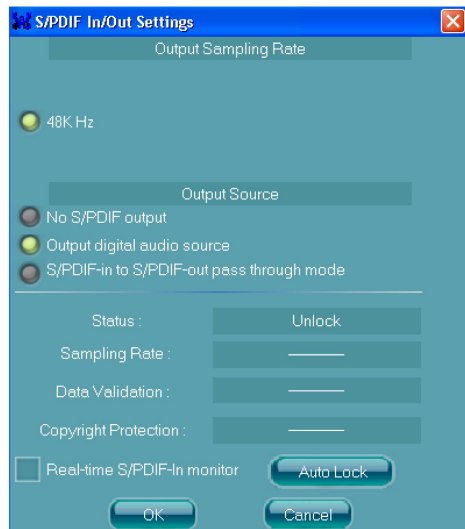☑ Mute rear panel output when front headphone plugged in.
☑ Enable auto popup dialog, when device has been plugged in.
OK   Cancel

 Mute rear panel when front headphone plugged in
Once this option is selected, whenever the front headphone is plugged in, the music that is playing from the back panel will be stopped.

 Disable front panel jack detection (option)
Are your front panel jacks not working?
Please check if front jacks on your system are so-called AC97 jacks. If so, please check this item to disable front panel jack detection.

 Enable auto popup dialogue, when device has been plugged in.
Once this item checked, the dialog "Connected device", would not automatically pop up when device plugged in.

S/PDIF
Short for *Sony/Philips Digital Interface*, a standard audio file transfer format. S/PDIF allows the transfer of digital audio signals from one device to another without having to be converted first to an analog format. Maintaining the viability of a digital signal prevents the quality of the signal from degrading when it is converted to analog.

S/PDIF In/Out Settings
Output Sampling Rate
⦿ 48K Hz
Output Source
○ No S/PDIF output
⦿ Output digital audio source
○ S/PDIF-in to S/PDIF-out pass through mode
Status :   Unlock
Sampling Rate :   ———
Data Validation :   ———
Copyright Protection :   ———
☐ Real-time S/PDIF-In monitor   Auto Lock
OK   Cancel

◻ **Output Sampling Rate**
- 44.1KHz: This is recommend while playing CD
- 48KHz: This is recommended while playing DVD or Dolby.
- 96KHz: This is recommended while playing DVD-Audio.

◻ **Output Source**
- Output digital audio source: The digital audio format (such as .wav, .mp3, .midi etc) will come out through S/PDIF-Out.

- S/PDIF-in to S/PDIF -out pass though mode: The data from S/PDIF-In can be real-time played from S/PDIF-Out.

S/PDIF In Status
Lock:
This is to express if the S/PDIF In data has been successfully caught by codec Sampling Rate

Data Validation:
This indicates if the input data is known to Realtek HD Audio Manager.
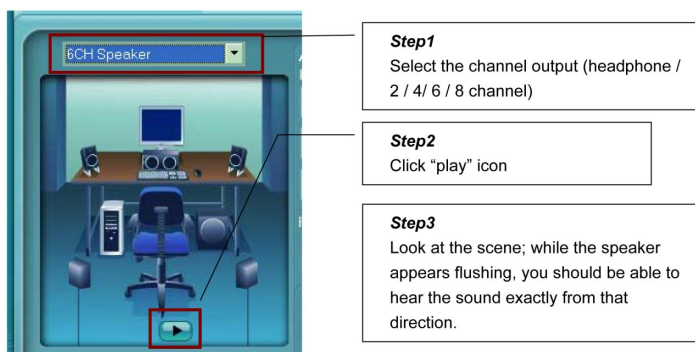
Copyright protection:
The input data can only be copied while "Copy Free" is shown; while "No Copy" indicates the data is read only.

Real time S/PDIF-in monitor:
Not only S/PDIF out, but also other analog out (such as front /side/surround speakers) can also output S/PDIF-in data real-time.

Speaker Calibration
After you have successfully plugged in your speakers and assigned them to the correct jacks, you are only one step away to enjoying full sound experience. We have provided "Speaker Calibration" to help you check if the speakers are located in the correct position.

Step1
Select the channel output (headphone / 2 / 4/ 6 / 8 channel)

Step2
Click "play" icon

Step3
Look at the scene; while the speaker appears flushing, you should be able to hear the sound exactly from that direction.

Microphone

This page is designed to provide you better microphone / recording quality.

Below picture indicates both "Noise Suppression" & "Acoustic Echo Cancellation" are both enabled.

Noise Suppression

Do you feel that the background noise, especially the sound generated from the fan inside PC, is too loud? Try "Noise Suppression" which will allow you to cut off and suppress disturbing noise.

Beam Forming

Also known as "directional recording", this option allows you do the following: Once beam forming is enabled, only the sound from a certain direction will be recorded. You will get the best quality if you chose 90° position, which we recommend, which means that you will speak right into the microphone.

Note: A Stereo Microphone is required when using Beam Forming function.

Acoustic Echo Cancellation

This function prevents playback sound from being recorded by microphone together with your sound. For example, when using the VOIP function through Internet with your friend, the voice of your friend will come out from speakers (playback). However, the voice of your friend might also be recorded into your microphone then go back to your friend through the Internet. In that case, your friend will hear his/her own voice again. With AEC (Acoustic Echo Cancellation) enabled at your side, your friend can hear you with less echo.

Audio Demo

The section "Audio Demo" grants you another possibility to enjoy your sound. The Audio Demo allows you to listen to sound in an extraordinary way.

Information
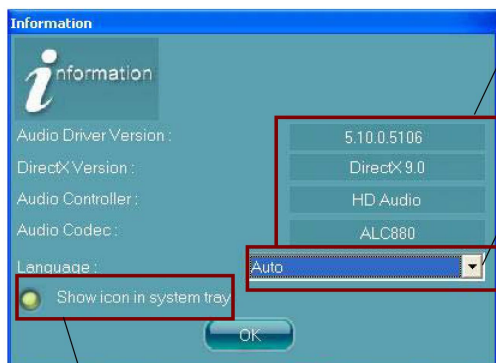
Hardware / Software information of your audio system

Language setting
When "Auto" is chosen, this language setting would accommodate to OS language on your systems

Quick launch button at System tray

This section provides information about your current system audio device.

Flash Update Procedure

The program AWDFLASH.EXE is included on the driver CD (D:\Utility\ AWDFLASH.EXE). It is recommended to follow the procedure below to update the BIOS.

1. Create a DOS-bootable floppy diskette. Copy the new BIOS file (down loaded from SAPPHIRE website) and the utility program AWDFLASH.EXE to the diskette.
2. Allow the PC system to boot from the DOS diskette.
3. At the DOS prompt, type

    AWDFLASH<ENTER>

4. Enter the file name of the new BIOS.
5. The question: "Do you want to save BIOS (Y/N)?" is displayed.

    Press "N" if there is no need to save the existing BIOS.
    Press "Y" if a backup copy of the existing BIOS is needed.
    (A file name has to be assigned to the existing BIOS binary file.)

6. The message : "Press "Y" to program or "N" to exit" is displayed. Type

    "Y"<ENTER>

7. Wait until the flash-update is completed.
8. Restart the PC.

Warning :	- Do not turn off or RESET the computer during the flash process.
	- If you are not sure how to upgrade the BIOS, please take your computer to an Authorized Service Center and have a trained technician do the work for you.

Note to User:

The bundled driver CD includes an automated software feature for all drivers that the motherboard need. Please select the drivers that you want to install and click the button on the installation panel.