RIOWORKS   HDAMD
Motherboard
User's Manual

HDAMD Version 1.0

FCC Compliance Statement

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

1.   Reorient or relocate the receiving antenna
2.   Move the equipment away from the receiver
3.   Plug the equipment into an outlet on a circuit different from that to which the receiver is connected
4.   Consult the dealer or an experienced radio/television technician for additional suggestions

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

This device complies with Part 15 of the FCC Rules. Operation is subjected to the following two conditions

1.   This device may not cause harmful interference
2.   This device must accept any interference received, including interference that may cause undesired operation.

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Table of Contents

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Package

HDAMD Motherboard

SATA cable+ SATA power cable

Rear panel I/O shield

3 jumper caps (Extra caps in case original caps get lost)

CD (contains drivers and manuals)

ATA-66/100 IDE cable

Floppy disk drive cable

Two heatsink retention modules

YOU MUST HAVE ENOUGH SYSTEM INTEGRATION KNOWLEDGE BOFORE THE INSTALLATION

GENERAL SAFETY PRECAUTIONS

- Keep the area around the Server clean and free of clutter.

- Servers weigh a lot. They can average about 50 lbs. (~22.68 kg)

  When lifting the system, two people should lift slowly from opposite ends with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose items such as neckties and unbuttoned shirtsleeves. They can come into contact with electrical circuits or get pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors and can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

ESD PRECAUTIONS

Electrostatic discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.

- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

■ Touch a grounded metal object before removing the board from the antistatic bag.

■ Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

■ Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

■ When handling chips or modules, avoid touching their pins.

■ Put the motherboard and peripherals back into their antistatic bags when not in use.

■ For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the motherboard.

■ After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

OPERATING PRECAUTIONS

Care must be taken to insure that the chassis cover is in place when the server is operating to assure proper cooling. **Out of warranty** damage to the server can occur if this practice is not strictly followed.

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GETTING HELP

If a problem arises with yours system during Installation or Operation, you should first ask your dealer for help as they have most likely configured your system. They generally have the best grasp of your issues and the fastest response for your symptoms. If your dealer is near your location, it is recommended that you first bring your system to them to have it serviced instead of attempting to solve the problem yourself.

If those options don't work for you, RIOWORKS also provides some helpful resources to help you.

1. Visit RIOWORKS® website at www.rioworks.co.jp and navigate to this product's page which contain links to product updates such as Jumper settings or BIOS updates.

2. The FAQ (Frequently Asked Questions) sections in the RIOWORKS website are often helpful since other users often have the same questions.

3. Email us at: support@rioworks.co.jp and we will try to answer your questions within 5 business days.

WORKSTATION BOARD SPECIFICATIONS

Processor	● AMD Dual Opteron Socket 940 CPUs ● Supports 1.8 GHz and faster ● HyperTransport of 6.4 GB/s bandwidth ● Built-In Memory Controller Hub (MCH)
Chipset	● nVIDIA nFORCE3 Pro250 ● AMD 8131 (PCI-X Tunnel)
Memory	● 4 + 4 socket for 184-pin DDR DIMM sockets ● Uses Registered PC2700/PC2100 ECC DDR memory ● Supports total system memory size of up to 16 GB
Internal I/O connector	● 34-pin Floppy Connector ● 4-pin CD-In audio input connector
Accelerated Graphics Port	● AGP 8x/Pro slot
IDE Bus	● 2x 40-pin IDE connectors, supports up to four (4) Enhanced IDE devices ● Dual Channel Master Mode ● Ultra DMA 133/100/66/33
On-Board LAN	● Gigabit Ethernet Controller
Audio	● Integrated Realtek® ALC-655, Professional 6-channel Audio with S/PDIF ready ● AC '97 CODEC ● S/PDIF Out
USB	● Four (4) USB 2.0 ports ● 4 x internal USB 2.0 ports
Expansion Slots	● 1x PCI 32-bit / 33 MHz ● 2x PCI-X 64-bit / 66 MHz ● 2x PCI-X 64 bit/100 MHz or 1x PCI-X 64 bit/133 MHz

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Rear Panel I/O	• PS/2 mouse and keyboard connectors with Wake-Up function • 1 x UART 16550 serial port (COM1) • 1 x 25-pin parallel port with ECP/EPP support • 4 x on board USB 2.0 ports • 8 x USB 2.0 ports (4 x external, 4 x internal) • 1 x GigaBit Ethernet LAN RJ-45 port • Audio Phone Jacks – Line Out, Mic In, Line-In. • 1x IEEE-1394 port • Center Out, Rear Out, S/PDIF Out
System Management	• Hardware Monitor (CPU Thermal, Fan, Voltage, Intrusion) • WINBOND W83627THF
System BIOS	• 4Mb Flash EEPROM with AMI BIOS • I2C support. SMBIOS 2.3 and DMI 2.0 compliant • Soft Power-Down • Secure Boot, Multiple Boot support
Form Factor	• Extended ATX form factor • EPS 12V power connectors (24 pin + 8 pin)
Serial ATA	• Silicon® Image Sil3114 chipset • 4 Serial ATA ports with RAID 0, 1 and 10 • Two SATA ports from nForce3 Pro250
IEEE 1394	• Integrated TI® TSB43AB22 for IEEE 1394 port (1x onboard, 1x header)

MAINBOARD MAP

Jumper Setting

CN32: Clear CMOS Header

The onboard button cell battery powers the CMOS RAM. It contains all the BIOS setup information. Keep the jumper connected to pins 1-2 (Default) to retain the RTC data as shown below.

1-2	2-3
Normal (Default)	Clear CMOS
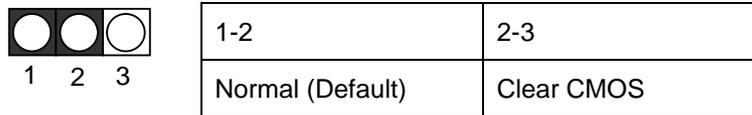
Under certain circumstances, you will need to reset system settings. Follow these instructions to clear the CMOS RTC data:

1. Turn off the computer.
2. Short pins 2 and 3 with a jumper for a few seconds.
3. Replace the jumper to pins 1 and 2.
4. Turn on your computer by pressing the power-on button.
5. Hold down <F2> during boot and select either <Load Optimal Defaults> or <Load Failsafe Defaults> in the "Exit" section. Then go through the BIOS setup to re-enter user preferences. Refer to Chapter 2 BIOS SETUP for more information.

CN21: PCI-X Speed Select Jumper

This header lets you determine the bus speed of the PCI-X 64-bit slots. The speed can be set to either 64 MHz (default) or 33 MHz

1-2	2-3
66MHz	33MHz

1 2 3
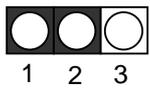
CN25: PCI-X Speed Select Jumper

This header lets you determine the bus speed of the PCI-X slots. The speed can be set to either 133 MHz (default) or 100 MHz.
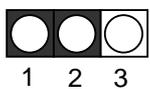
1-2	2-3
PCI-X 133	PCI-X 100

1 2 3

Memory Installation Procedure

INSTALLING MEMORY

This Mainboard uses Dual Inline Memory Modules (DIMM). Eight DIMM socket memory banks are available, four memory bank for each CPU socket. The DIMM sockets accommodate 184-pin PC3200/PC2700 (DDR400/DDR333) and Double Data Rate (DDR) memory modules in 128MB, 256MB, 512MB, 1GB and 2GB size combinations. Total installed memory size is between a minimum of 128MB to a maximum of 16GB.

IMPORTANT

* The Mainboard has strict memory and timing requirements. Before buying DDR (Double Data Rate) DIMMs for use with the Mainboard, it is recommended that you consult your local reseller for the best and most compatible memory to use.

* This Mainboard only supports Registered PC3200/PC2700 (DDR400/DDR333) compliant modules.

Memory Installation Procedures

This section outlines how to install Registered PC3200/PC2700 DDR DIMMs into the Mainboard.

1. Locate the Memory Bank on the Mainboard, where you will be installing the DIMMs.

2. Make sure the DIMM's pins are facing down, and check that the pin arrangement on the memory module resembles the one pictured below.
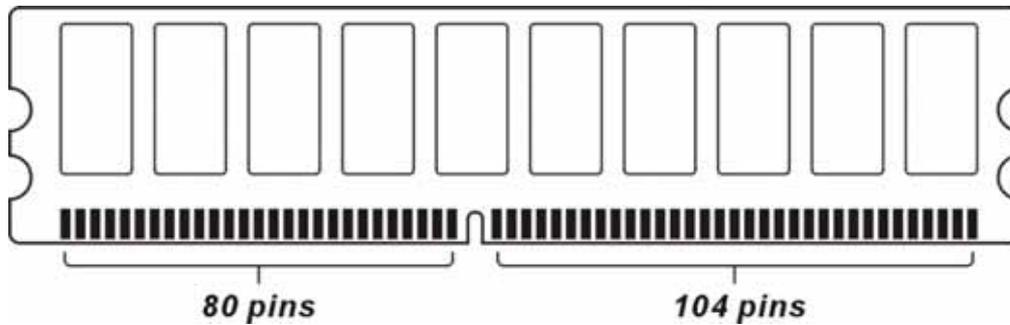
3. Insert the module into the DIMM socket and press down evenly on both ends firmly until the DIMM module is securely in place. (The tabs of the DIMM socket will close-up to hold the DIMM in place when the DIMM is properly installed on the socket's bottom.)
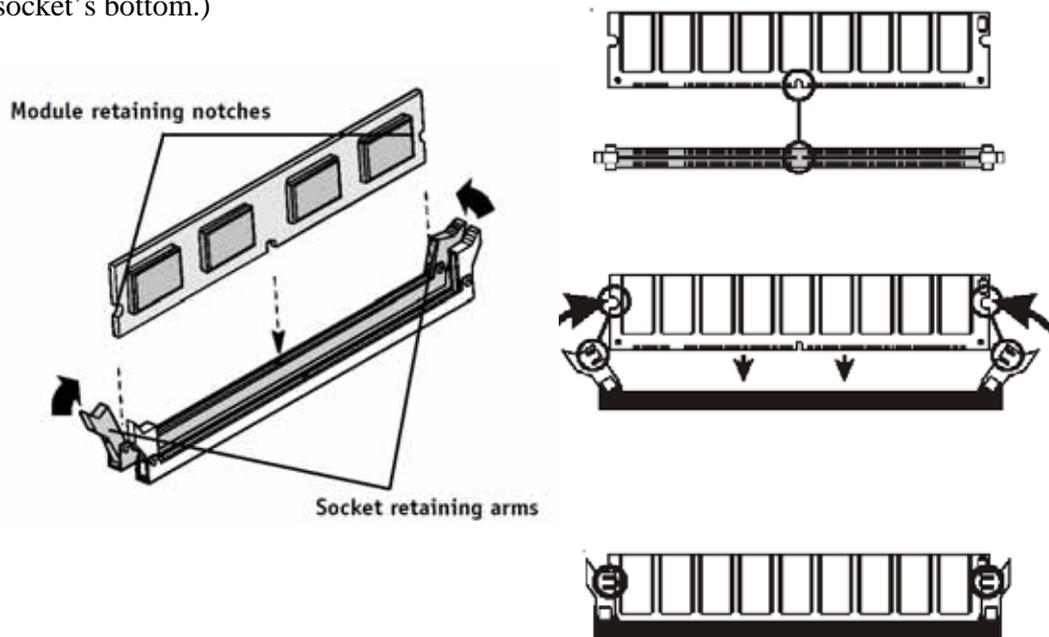
4. Repeat step 1 to step 3 for all additional DIMM modules.

IMPORTANT

● The Opteron features a 128-bit wide DDR memory interface. To take advantage of the 128-bit interface, you must install DIMMs in pairs of two (2). DIMM slots DIMM0 and DIMM1 are paired, and slots DIMM2 and DIMM3 are paired. If you are only installing two DIMMS into a Memory Bank, it is recommended that you install them in slots DIMM0 and DIMM1 to get the full bandwidth.

● To ensure compatibility, only use DIMM pairs of the same exact type and size and made by the same company.

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RECOMMENDED MEMORY CONFIGURATIONS

The AMD Opteron processors have very specific memory module requirements, and due to the design of the Mainboard, there are certain configurations of memory that work best to make the most effective use of the memory bandwidth.

The AMD Opteron features 128-bit DDR memory channels. DDR Memory Modules are only 64-bit. In order to benefit from the full bandwidth, you should always install the DIMMs in pairs. The Mainboard is designed to pair up DIMM slots H0 DIMM0/H0 DIMM1, H0 DIMM2/H0 DIMM3, H1 DIMM0/H1 DIMM1 and slots H1 DIMM2/H1 DIMM3 for the 128-bit pathway.

The DIMM memory banks are shared over the dual CPU sockets. It is possible to operate a system with two CPUs and only a pair of DIMMs in the memory bank.

The following is our recommended DIMM installation path based on the number of DIMMS being installed (Remember to check that the DIMMS are 2.5V Registered ECC DDR PC3200/ PC2700/ DDR400/ DDR333 DIMMs)

P.S If you only install one DIMM, please install on H0 DIMM0.

Heatsink and CPU Installation

CAUTION: As with all computer equipment, the processor and motherboard components may be damaged by electrostatic discharge (ESD). Please take proper ESD precautions when handling any board.

Warning: Do not apply voltage until the heatsink is fully installed. If voltage is applied before the heatsink is fully installed, the processor will overheat and failure will result. Read through the entire installation instructions completely to make sure you understand them before you begin.

Step 1.
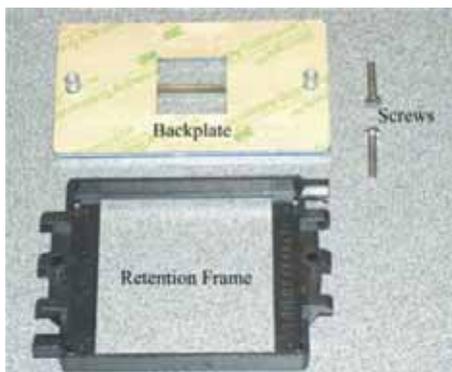
1. Take proper electrostatic discharge precautions before handling motherboard or processor.
2. The heatsink/fan assembly shown in this poster may not exactly match the one provided in this PIB.
3. The AMD OpteronTM processor heatsink requires the retention frame and the backplate to be attached to the motherboard. If the retention frame and backplate are already attached to the motherboard, proceed to step 7.

Step 2.

1. Place the backplate on a flat surface.
2. Peel the release liner off the backplate

Step 3
1. Gently lift the motherboard by the edges over the backplate.
2. Align the backplate's two threaded standoffs with the two mounting holes near the socket.
3. Gently lower the motherboard until the standoffs fit through the holes in the motherboard and the backplate makes complete contact with the motherboard.

Step 4
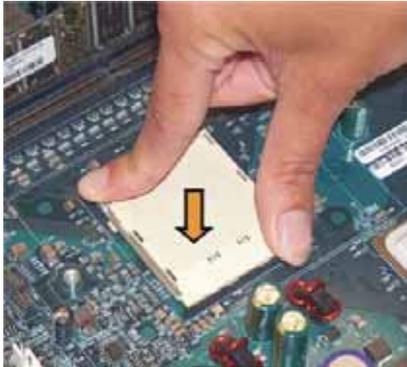
Press firmly on the socket to ensure proper contact of the backplate and motherboard.

Step 5.
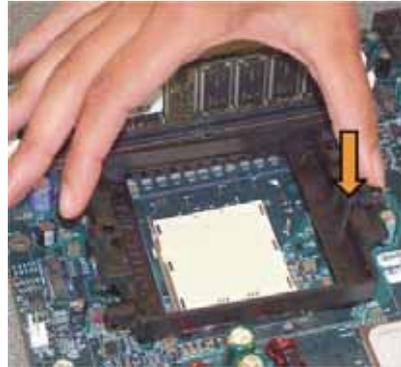
Carefully place the retention frame on the motherboard.
The screw holes must align with the backplate standoffs.

Step 6
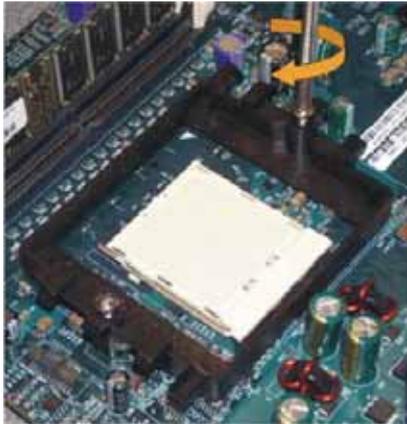
1. Place the screws and tighten down the retention frame.
2. Do not over-tighten the screws.
3. Ensure that the retention frame is flat with the motherboard.

Step 7

Warning: Do not apply voltage until the heatsink is fully installed. If voltage is applied before the heatsink is fully installed, the processor will overheat and failure will result.

1. The AMD Opteron processor will have a small triangle marking on one corner. This will correspond to the alignment on the motherboard.
2. To insert the processor, the socket locking lever must be raised (Pull out slightly, then lift up).
3. Gently place the processor into the socket. The corner with the triangle must be located near the marking on the motherboard.
4. Be careful not to bend the processor pins.

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Step 8

1. Gently push down on the processor while lowering the locking lever and latching it into the fully locked position.
2. Do not apply any power (voltage) to the system until the heatsink is fully installed.

Step 9

1. The heatsink has a thermal interface material pre-applied on the bottom. This material is protected by a plastic cover.
2. Inspect the thermal interface material for scratches or gaps. Do not use if thermal material has scratches or gaps. If replacement thermal interface material is needed,
3. Remove plastic cover and discard. Be careful not to touch or scratch the thermal interface material.

Step 10
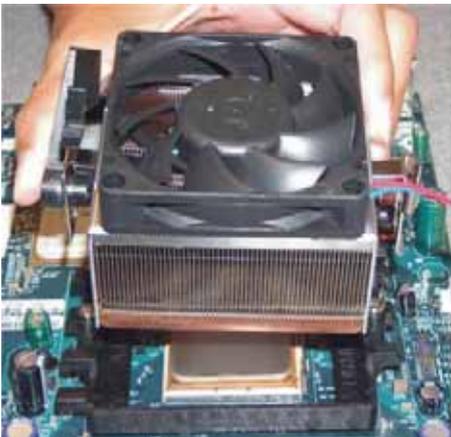
1. Place the heatsink on the processor with it centered in the retention frame matching the heatsink clip with the socket mounting lug.
2. The heatsink should have full contact with the processor.

Step 11
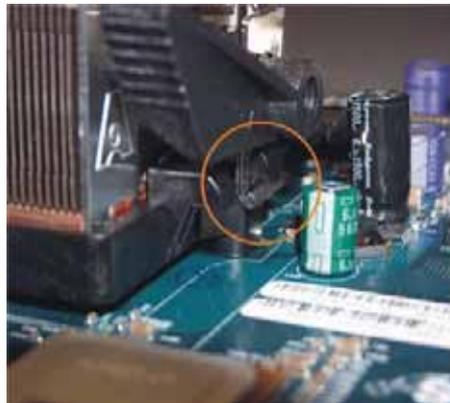
Hook the spring clip under the cam lever to the mounting lug on the retention frame first. Some force may need to be applied.

Step 12

1. Make sure the retention clip is aligned with the plastic lug on the retention frame.
2. Carefully push straight down on the clip. This may take more force than the first side.

Step 13

The spring clip must be installed as shown.

Step 14

Carefully turn the cam lever to lock into place.

Step 15

Ensure the cam lever is locked into the retention frame.

Connect the fan power lead to the proper connector to the motherboard.

Check the installation completely to make sure heatsink is installed correctly before starting the system. When the system is first powered-on, verify that the processor heatsink/fan is turning at a rapid rate.

If the fan is spinning at a slow rate or not spinning at all, power-down the system immediately to avoid any thermal damage.

Important: In single CPU mode, please place CPU on the position of CPU0

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THE AGP PRO SLOT

The Mainboard does not feature an integrated video solution. Therefore, you will need to install a video card to use the Mainboard. The Accelerated Graphics Port Pro (AGP Pro) slot is specifically designed to support a new generation of AGP graphics cards with ultra-high memory bandwidths (up to 8x).

IMPORTANT

* Only 1.5V AGP 4X/8X cards are supported by this 8x AGP Pro slot. Refer to the documentation that came with your AGP card for more information on Card Settings.

Connector Installation

J11: Audio for Front Panel

This jumper, J11, allows users to switch audio function to the front panel if front panel is installed.

Pin Assignment:

Pin 1 Audio VERF	Pin 5&6 Line-Out R
Pin 2 GND	Pin 7 Mic-In L
Pin 3 Mic-In R	Pin 8 NC KEY
Pin 4 VCC	Pin 9-10 Line-Out L

9   7   5   3   1

10   8   6   4   2
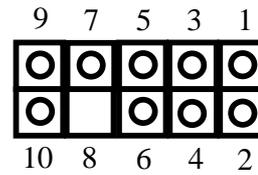
CN806: Chassis Intrusion Switch Connector

This feature uses a mechanical switch on the chassis that connects to the chassis intrusion connector on the motherboard. The motherboard circuitry will detect the intrusion when the chassis cover is removed.

1   2
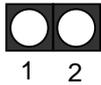
J6 S/PDIF Header

Pin 1 VCC, Pin 2 SPDIF OUT, Pin 3 SPDIF IN, and Pin 4 GND

4   3   2   1

PCI-X (100/133MHz)
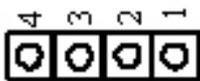
EPS12V POWER CONNECTORS

Find the proper orientation of the connectors and push down firmly to make sure that the pins are aligned (the connector will only insert properly when properly aligned). The 8-pin connector is a dedicated power connector to supply power for the CPUs. For Wake on LAN support, the 5-volt Stand-by lead (+5VSB) from the ATX power supply must supply at least 2A.

24-pinPowerSupply
Connector

8-pinPowerSupply
Connector (+12V)

+3.3V		COM
+12V		+5V
+12V		+5V
5VSB		+5V
PWR_OK		Reserved
COM		COM
+5V		COM
COM		COM
+5V		PS_ON
COM		COM
+3.3V		-12V
+3.3V		+3.3V

+12V		GND
+12V		GND
+12V		GND
+12V		GND
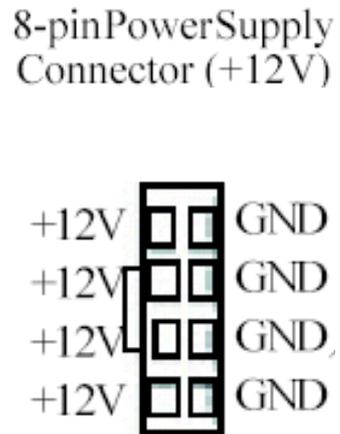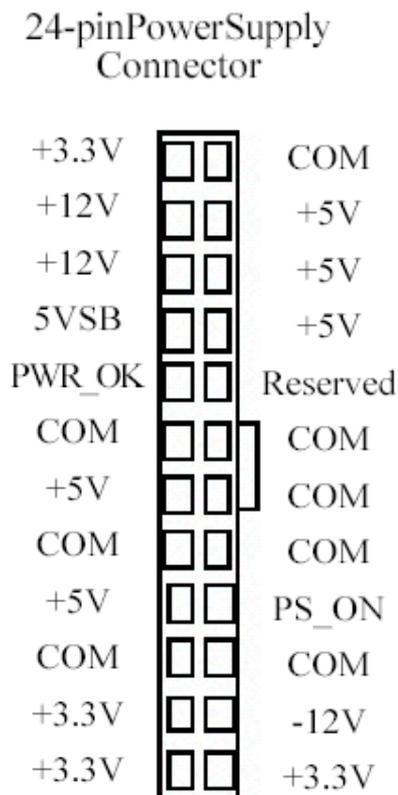
Power Connectors:
These are for the re-quired EPS 12V power supply.

EPS12V PSU Only

2x12 24-pin connector
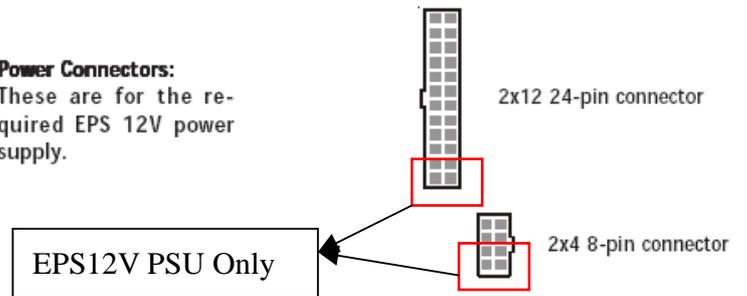
2x4 8-pin connector

FLOPPY DISK DRIVE CONNECTOR

This 34-pin connector supports the standard floppy disk drive ribbon cable. Connect the single connector end to the Mainboard. Then, plug the other end of the ribbon into the floppy drive. Make sure you align the Pin 1 on the connector with the Pin 1 alignments on the Mainboard and the floppy drive.

PRIMARY IDE CONNECTORS

The two 40-pin IDE connectors (primary and secondary channels) support 80-conductor IDE ribbon cables. Connect the single connector end to the Mainboard. Then, connect the two connectors at the other end to your IDE device(s). If you connect two hard disks to the same cable, you must set the second drive as a Slave through its jumpers settings. Refer to the IDE device's documentation for the specific jumper settings. (Pin 20 is removed to prevent the connector from being insertied in the wrong orientation when using ribbon cables with pin 20 plugged in). The BIOS supports Ultra DMA 33/66/100/133.
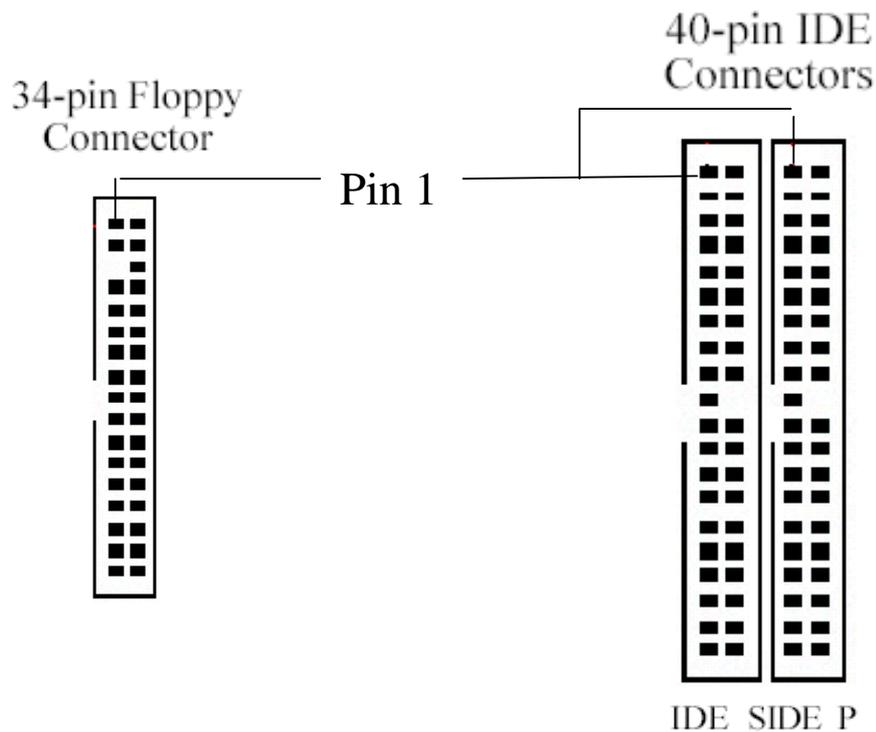
IMPORTANT

Ribbon cables should always be connected with the red stripe on the Pin 1 side of the connector. IDE ribbon cables must be less than 46 cm (18 inches) long, with the second drive connector no more than 15 cm (6 inches) away from the first connector.

CN48 FRONT PANEL SWITCHES

The front panel switches header connects the front control panel buttons and LEDs to the Mainboard.

Front Panel
Switch Headers

| Power On | Power Led + | Power Led - | | Speaker + | | Speaker - |

Power On   NC   GND   HDD LED -   Reset Button

HDD LED +
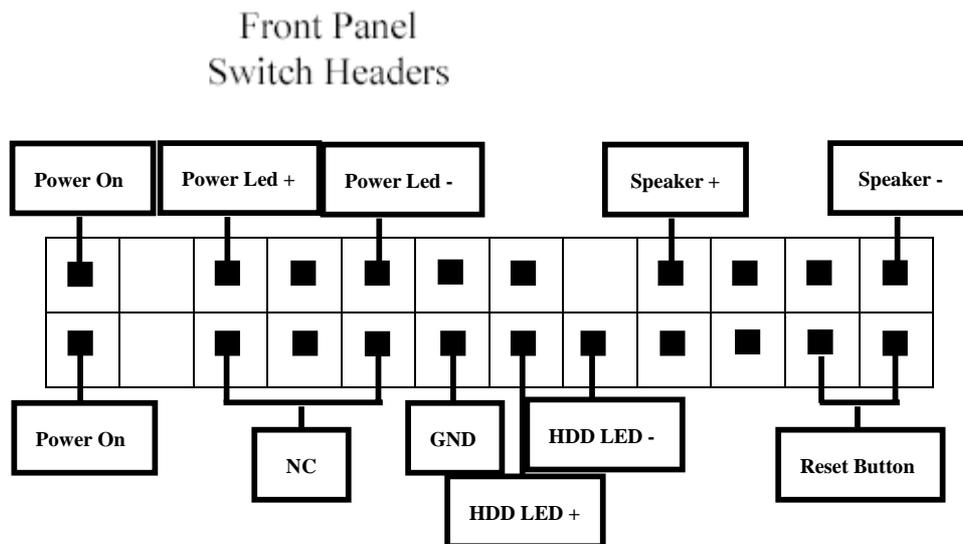
Reset Button (2-pin RST)

This 2-pin connector connects to the chassis-mounted reset switch for rebooting your computer without turning your power switch off and on. This is a preferred method of rebooting your system to prolong the life of your system's power supply.

Hard Disk Activity LED (2-pin HDD_LED)

This connector supplies power to the chassis's HDD/IDE activity LED. Read and Write activity by devices connected to the Primary or Secondary IDE connectors will cause the front panel LED to light up.

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CPU/ SYSTEM FAN CONNECTORS

There are six 3-pin fan connectors in the Mainboard motherboard. Two fans are used for CPU0 and CPU1; four fans are for system and front. These connectors support cooling fans of 500mA (6W) or less. Depending on the fan manufacturer, the wiring and plug may be different. Connect the fan's plug to the Mainboard with respect to the polarity of the fan connector.

3-pin Fan Connector

Sensor   +12V   GND
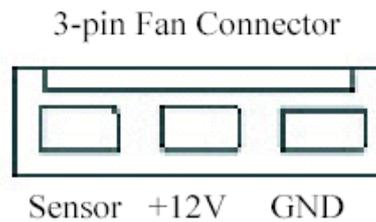
WARNING

The CPU and/or motherboard will overheat if there is not enough airflow across the CPU and onboard heatsink. Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used. These are NOT jumpers; do NOT place jumper caps over these pins.

REAR PANEL I/O PORTS

This is an illustration of the Mainboard rear I/O port array
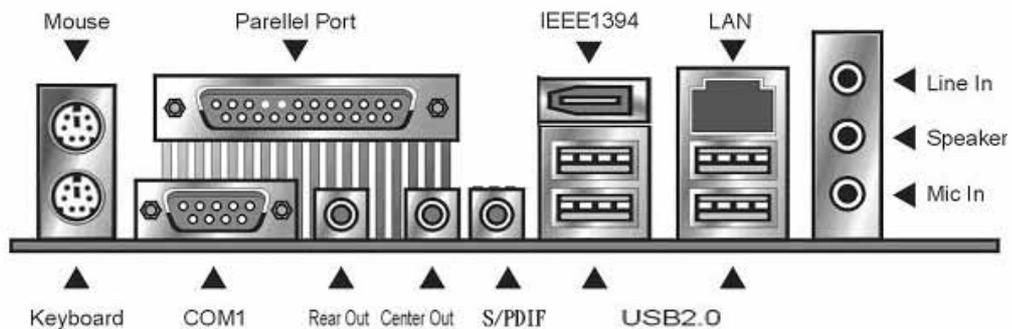
PS/2 Mouse Connector (6-pin Female)

The system will direct IRQ12 to the PS/2 mouse if one is detected. If no mouse is detected, IRQ12 will be free for expansion cards to use.

PS/2 Keyboard Connector (6-pin Female)

This connection is for standard keyboards using a PS/2 (mini DIN) plug. This connector will not accept standard AT size (large DIN) keyboard plugs. You may need a DIN to mini DIN adapter for standard AT keyboards.

Universal Serial Bus Ports (4-pin Female)

Four onboard external USB 2.0 ports are available for connecting USB devices.   Refer to USB 2.0 Ports & Header for more information.

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IEEE 1394/ FireWire Connector (6-pin Male)

You have one (1) onboard IEEE 1394 connector port for connecting FireWire devices. Refer to IEEE 1394 Ports & Header for more information.

Serial Port (COM1) Connector (9-pin Male)

The COM1 serial port can be used for pointing devices or other serial devices. See BIOS for more on serial port setup.

Parallel Printer Connector (25-pin Female)

You can enable the parallel port and choose an IRQ through the BIOS. You can choose between ECP and EPP support through the BIOS setup.

Onboard LAN Port (RJ-45)

This Mainboard uses the MAC+ Mervell PHY Gigabit Ethernet Controller. Refer to the Onboard LAN User Guide for further information.

Audio Jacks (Phone Jacks)

The interface is supported by the onboard RealTek ALC-655. It has 3 phone jacks for Speaker-Out, Microphone In, and Line-In. Besides; there are two phone jacks for Rear Out and Center Out, and a S/PDIF Out.

ADDITIONAL I/O CONNECTORS

The Mainboard also contains connectors for adding additional ports and devices to the Mainboard.

CD_In Audio Inputs (4-pin)

There is CD-In 4-pin connectors to connect your internal sound devices to the Sound Card.   See Audio for setup information.

4-pin Onboard Audio Header

Audio Pin Assignments	
Pin	Description
1	Audio- L
2	Ground
3	Ground
4	Audio - R

CN44 COM 2 Header

Pin 1	DCD	Pin 2	RXD
Pin 3	TXD	Pin 4	DTR
Pin 5	GND	Pin 6	DSR
Pin 7	RTS	Pin 7	CTS
Pin 9	RI	Pin 10	NC KEY

1	6
2	7
3	8
4	9
5	10

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USB 2.0 PORTS AND HEADER

nVIDIA nForce3 Pro 250 chip supports eight (8) USB 2.0 ports. USB 2.0 supports transfer rates of up to 480MB/s. Four ports show up on the on-board I/O array, and four ports are internal.

```
1 3 5 7 9
┌─┬─┬─┬─┬─┐
│O│O│O│O│O│
├─┼─┼─┼─┼─┘
│O│O│O│O│
└─┴─┴─┴─┘
2 4 6 8
```

Pin	Assignment	Pin	Assignment
1:	+5V	2:	+5V
3:	USB DATA −	4:	USB DATA −
5:	USB DATA +	6:	USB DATA +
7:	GND	8:	GND
9:	NC	10:	NC
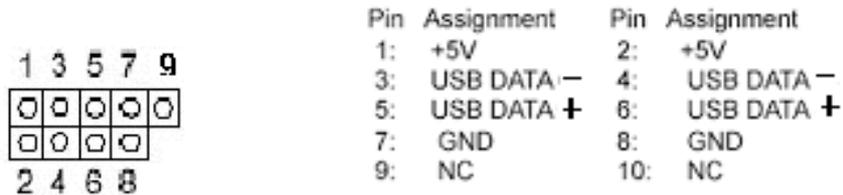
IEEE 1394 (FIREWIRE) PORTS AND HEADER

This Mainboard features an integrated Texas Instrument TSB43AB22 chip that supports two (2) IEEE 1394 (Firewire) ports. IEEE 1394 (FireWire) supports transfer rates of up to 400MB/s. One port is installed on the on-board I/O array, and a header completes the last port for external installation.

```
10 ┌─┐
   │O│
 8 ┌─┬─┐ 7
   │O│O│
 6 │O│O│ 5
   │O│O│
 4 │O│O│ 3
   │O│O│
 2 └─┴─┘ 1
```

Pin Assignment	Pin Assignment
1: TPA1+	2: TPA1-
3: GND	4: GND
5: TPB+	6: TPB-
7: +12V	8: GND
9: NC	10: +12V
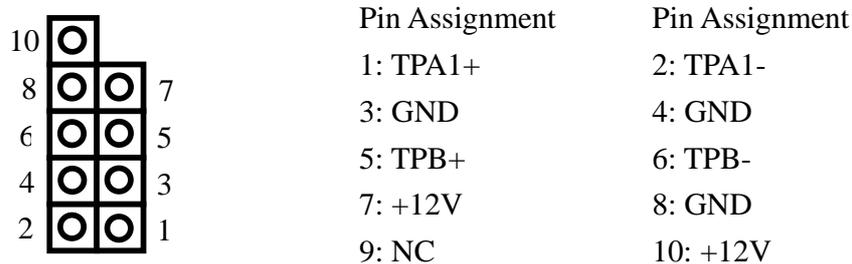
INSTALLING EXPANSION CARDS

This outlines the procedure for adding expansion cards to your Mainboard. Remember to read the documentation for your expansion cards and make the necessary hardware and software setting changes (i.e. jumper settings).

The Mainboard features one (1) PCI-32 (32-bit, 33MHz) slots, two (2) PCI-X (64-bit, 66/MHz) slot and two (2) PCI-X (64/100MHz) slots or one (1) PCI-X (64/133MHz) to accommodate PCI expansion cards.

1. Remove the bracket plate on the slot you intend to use. Keep the bracket for possible future use.
2. Insert the PCI card into the correct slot on the Mainboard, pushing down with your thumbs evenly on both sides of the card.
3. Secure the card on the slot with the screw you removed above.
4. Assign IRQs for PCI expansion card: An IRQ number is automatically assigned to PCI expansion card. In the PCI bus design, the BIOS automatically assigns an IRQ to a PCI slot that contains a card requiring an IRQ.

WARNING

Please completely power OFF your power supply when adding or removing any expansion cards or other system components. Failure to do so may cause severe damage to both your Mainboard and expansion cards.

J16, J17 SATA Connector From nVIDIA nForce

J1, J2, J3, J4 SATA Connector From SILICON-IMAGE

SILICON IMAGE CHIPSET AND SERIAL ATA

The Serial version of this Mainboard is equipped with an integrated Silicon Image Sil3114 Serial ATA chipset. This chipset supports up to 4 SATA devices at transfer rates of up to 150MB/s.

The Silicon Image Chipset also supports RAID configurations. RAID stands for "Redundant Array of Independent Devices" and provides different levels of safety, redundancy and performance. This chipset supports RAID 0, 1, and 10, which are defined as follows:

RAID Type	Description
RAID 0	Striping: high performance, designed to connect multiple drives to act as one
RAID 1	Mirroring: writes data to two drives at once in case one drive fails, the other one will be a complete replica and can continue on. Full fail-over
RAID 10	Combination of RAID 0 and 1: over 4 drives, The drives are split in half and striped together, and the 2 new striped drives are then mirrored.

This Mainboard features six (6) Serial ATA ports for 6 Serial ATA devices. Refer to the documentation that came with the drives for more information about settings and installation.

Serial ATA Drive Connectors

SerialATAPinAssignments	
Pin	Description
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

POWERING ON YOUR SYSTEM

Follow these instructions to power on the computer after you have installed the Mainboard and all system devices.

1. Be sure that all switches are off (in some systems, Off is marked by "O").
2. After double-checking all jumper settings and connections, close the system chassis cover.
3. Connect the power cord to the power cord connector located on the power supply at the back of your system chassis and plug the power cord into a power outlet that is equipped with a surge protector.
4. Turn on your devices in the following order:
   - Monitor
   - External SCSI devices (starting with the last device on the chain if connected)
   - System power For power supplies, you need to switch On the power supply, then press the:
1. Power switch on the front of the chassis the first time you start up the system.
2. The power LED on the front panel of the system case will light up. For power supplies, the system LED will light up when the power switch is pressed. The monitor LED may light up after the system's LED if it complies with "Green" standards or if it has a power standby feature. The system will first run its "power-on" tests. While the tests are running, additional messages will appear on the screen. If you do not see anything on the screen within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Re-check your jumper settings and connections. Contact your retailer/dealer for assistance if everything else fail.
3. During power-on, hold down <F2> to enter BIOS setup. Follow the instructions in BIOS for further setup information.

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BIOS Setup

This chapter discusses the AMIBIOS Setup program built into the ROM BIOS. The Setup program allows users to modify the basic system configuration.

The BIOS is the Basic Input / Output System used in all IBM PC, XT, AT, and PS/2 compatible computers. The AMIBIOS flash chip stores the system parameters, such as type of disk drives, video displays, etc. in the CMOS. When the computer is turned off, a back-up battery provides power to the BIOS flash chip, enabling it to retain system parameters. Each time the computer is powered-on the computer is configured with the values stored in the BIOS ROM by the system BIOS, which gains control at boot-up.

The AMIBIOS installed in your computer system's ROM (Read Only Memory) is a custom version of an industry standard BIOS. The BIOS provides critical low-level support for standard devices such as disk drives and serial and parallel ports.

STARTING THE BIOS SETUP

The AMIBIOS is immediately activated every time you power on the system. The BIOS reads the system information contained in the CMOS and begins the process of checking the system and configuring it. After configuring the system, the BIOS will follow the Boot Order to seek out an operating system. The BIOS then turns control of the system over to the operating system.

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility.

1. Power on the System.

    Note: Normally, the only visible POST (Power On Self Test) routine is the

    memory test.

2. As the memory is being tested, you can access the BIOS Setup Utility by pressing the <F2> key when "Press < F2> to enter SETUP" appears briefly at the bottom of the screen.

From the main menu of the BIOS Setup Utility, you can access the other setup screens, such as the Security and Power menus.

USING THE BIOS SETUP UTILITY

Navigating through the BIOS Setup Utility is straightforward. Use the arrow keys to highlight items, press <Enter> to select items in menus, and press <Esc> to quit. The following table provides more details about how to navigate in the Setup program using the keyboard.

Up ArrowKey	Move to the previous item
Down Arrow Key	Move to the next item
Left Arrow Key	Move to the previous menu
Right Arrow Key	Move to the next menu
<Esc> key	In the Submenu: Exit the submenu. In the BIOS main menu: Jump to the Exit Menu
<Enter> Key	Select the highlighted item. When available, a pop-up list will display for you to select the item value or select a submenu
<PgUp> Key	Previous page on Scrollable menus or Jump to the first interactive item listed
<PgDn> Key	Next page on Scrollable menus or Jump to the last interactive item listed
<F1> Key	General Help on Setup navigation keys.
<F2>/<F3> Key	Change Colors
<F7> Key	Discard Changes

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<F8> Key	Load Failsafe Defaults
<F9> Key	Load Optimal Defaults
<F10> Key	Save and Exit
Home	Go to Top of Screen
END	Go to Bottom of Screen
ESC	Exit

IMPORTANT

The BIOS does NOT automatically save values that you have modified. If you do not save your values before you exit the BIOS Setup Utility, all your changes will be lost.

If after making and saving system changes with the BIOS Setup Utility, you discover that your computer is no longer able to boot, the AMIBIOS supports an override, which will reset your system to the Failsafe defaults. If that fails, it is possible to manually clear the present CMOS information through the "Clear CMOS Header" on the motherboard (Refer to Jumper Settings for more information).

The best advice is to ONLY alter settings that you thoroughly understand. The default settings have been carefully chosen by AMIBIOS to provide the maximum system performance and reliability. Even a slight change to the chipset setup may cause potential and unpredictable failure to the system.

Main Menu

This is the first screen that is displayed when you enter the BIOS Setup Utility. Each tab lined on the top of the screen represents each different menu. The following picture shows the main menu. Main menu shows the information of BIOS version, date and ID; processor type, speed and count; system size. In addition, system time and date is adjustable using + / - key or number keys.
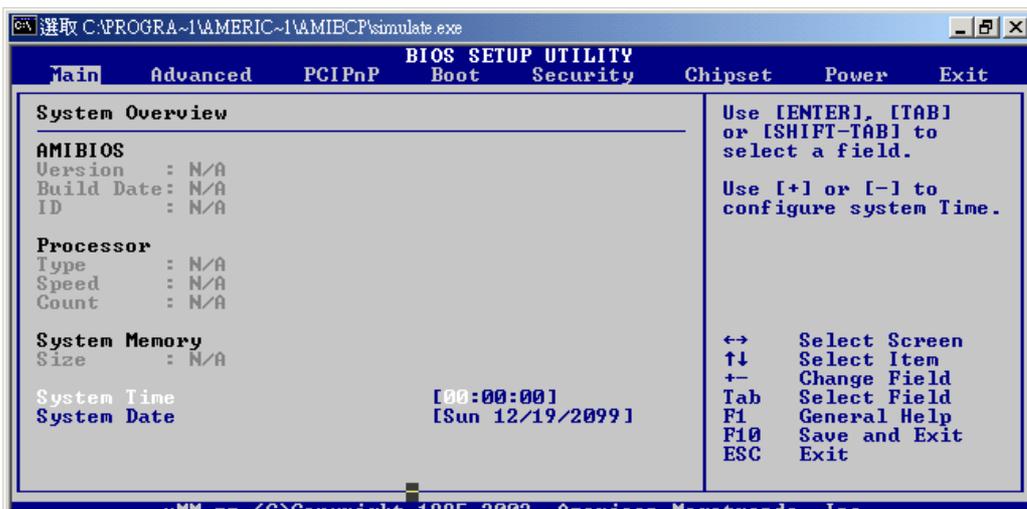
Advanced Menu

This is the Advanced Menu screen.

```
C:\PROGRA~1\AMERIC~1\AMIBCP\simulate.exe                              _ |□| ×|
                          BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Power    Exit

  Advanced Settings                                   Options for CPU

  WARNING: Setting wrong values in below sections
           may cause system to malfunction.

  ▶ CPU Configuration
  ▶ IDE Configuration
  ▶ Floppy Configuration
  ▶ SuperIO Configuration
  ▶ Hardware Health Configuration
  ▶ ACPI Configuration
  ▶ Hyper Transport Configuration
  ▶ USB Configuration                       ←→      Select Screen
  ▶ Onboard Device Configuration            ↑↓      Select Item
                                            Enter   Go to Sub Screen
                                            F1      General Help
                                            F10     Save and Exit
                                            ESC     Exit

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```

You can make these modifications on the Advanced Menu. Select the Submenus to modify those settings.

Feature	Option	Description
CPU Configuration	GART Error Reporting	Enable **only** for testing purpose
IDE Configuration		See **P. 3-7**
SuperIO Configuration		See **P. 3-8**
Floppy Configuration	Disabled 360 KB, 5 1/2" 1.2 MB, 5 1/2" 720 KB, 3 1/2" 1.44 MB, 3 1/2" 2.88 MB, 3 1/2"	Select Floppy A or Floppy B and then selects floppy-diskette type installed in your system.
Hardware Health Configuration	H/W health function and H/W thermal throttling Disabled/Enabled	1. Enable/Disable H/W health function 2. Thermal throttling allows the user to reduce CPU duty cycle to a user

_____

Feature	Option	Description
		defined percentage when the temperature reaches a user defined value 3. H/W health event
ACPI Configuration	ACPI Aware O/S Yes/No	Enable: If O/S supports ACPI Disable: If O/S doesn't support ACPI
Hyper Transport Configuration	CPU0: CPU1 HT Link Speed/Width	Hyper Transport link speed/width is adjustable
USB Configuration	Legacy USB Support Disabled/Enabled/Auto USB Mass Storage Device Configuration	1. Enables support for legacy USB. Auto option disables legacy support if no USB devices are connected 2. Configure the USB mass storage class devices
Onboard Device Configuration	SATA and 1394 controller	Enable or disable onboard SATA and 1394 controller

IDE Configuration Submenu

You can also setup your PCI IDE controller on Advance menu.

```
C:\PROGRA~1\AMERIC~1\AMIBCP\simulate.exe                          _ □ ×

                          BIOS SETUP UTILITY
         Advanced

 IDE Configuration                              DISABLED: disables the
                                                integrated IDE
 OnBoard PCI IDE Controller    [Disabled]       Controller.
                                                PRIMARY: enables only
 ▶ Primary IDE Master              :            the Primary IDE
 ▶ Primary IDE Slave               :            Controller.
 ▶ Secondary IDE Master            :            SECONDARY: enables
 ▶ Secondary IDE Slave             :            only the Secondary IDE
 ▶ Third IDE Master                :            Controller.
 ▶ Third IDE Slave                 :            BOTH: enables both IDE
 ▶ Fourth IDE Master               :            Controllers.
 ▶ Fourth IDE Slave                :
                                                ↔     Select Screen
 Hard Disk Write Protect       [Disabled]       ↑↓    Select Item
 IDE Detect Time Out (Sec)     [0]              +-    Change Option
 ATA(PI) 80Pin Cable Detection [Host & Device]  F1    General Help
 First Boot Device from        [P-ATA]          F10   Save and Exit
                                                ESC   Exit


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```

Super IO Configuration Submenu

```
                          BIOS SETUP UTILITY
        Advanced

  Configure Win627 Super IO Chipset                 Allows BIOS to Enable
                                                    or Disable Floppy
  OnBoard Floppy Controller        [Disabled]       Controller
  Serial Port1 Address             [N/A]
  Parallel Port Address            [N/A]
    Parallel Port Mode             [N/A]
      EPP Version                  [N/A]
      ECP Mode DMA Channel         [N/A]
    Parallel Port Irq              [N/A]
  OnBoard Game/Midi Port           [Disabled]
  Keyboard PowerOn Function        [Disabled]
                                                    ↔    Select Screen
                                                    ↑↓   Select Item
                                                    +-   Change Option
                                                    F1   General Help
                                                    F10  Save and Exit
                                                    ESC  Exit

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```

Feature	Option	Description
Onboard Floppy Controller	Disabled Enabled	Allows BIOS to enable or disable floppy controller
Onboard Game/Midi Port	Disabled 200/300, 200/330 208/300, 208/330	Allows BIOS to enable or disable Game/Midi port
Keyboard PowerOn Function	Disabled Any Key	

PCIPnP Menu

```
                        BIOS SETUP UTILITY
  Main    Advanced   PCIPnP   Boot    Security   Chipset    Power    Exit
 ┌──────────────────────────────────────────────┬─────────────────────────┐
 │ Advanced PCI/PnP Settings                   ▲ │ NO: lets the BIOS       │
 │                                               │ configure all the       │
 │ WARNING: Setting wrong values in below sections│ devices in the system. │
 │          may cause system to malfunction.     │ YES: lets the           │
 │                                               │ operating system        │
 │ Plug & Play O/S              [No]             │ configure Plug and      │
 │ PCI Latency Timer           [32  ]           │ Play (PnP) devices not  │
 │ Allocate IRQ to PCI VGA     [Yes]            │ required for boot if    │
 │ Palette Snooping            [Disabled]       │ your system has a Plug  │
 │ PCI IDE BusMaster           [Disabled]       │ and Play operating      │
 │ OffBoard PCI/ISA IDE Card   [Auto]           │ system.                 │
 │                                               │                         │
 │ IRQ3                        [Available]       │ ↔    Select Screen      │
 │ IRQ4                        [Available]       │ ↑↓   Select Item        │
 │ IRQ5                        [Available]       │ +-   Change Option      │
 │ IRQ7                        [Available]       │ F1   General Help       │
 │ IRQ9                        [Available]       │ F10  Save and Exit      │
 │ IRQ10                       [Available]       │ ESC  Exit               │
 │ IRQ11                       [Available]       │                         │
 │ IRQ14                       [Available]     ▼ │                         │
 └──────────────────────────────────────────────┴─────────────────────────┘
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```

```
                        BIOS SETUP UTILITY
  Main    Advanced   PCIPnP   Boot    Security   Chipset    Power    Exit
 ┌──────────────────────────────────────────────┬─────────────────────────┐
 │ IRQ15                       [Available]     ▲ │ Available: Specified    │
 │                                               │ DMA is available to be  │
 │ DMA Channel 0               [Available]       │ used by PCI/PnP         │
 │ DMA Channel 1               [Available]       │ devices.                │
 │ DMA Channel 3               [Available]       │ Reserved: Specified     │
 │ DMA Channel 5               [Available]       │ DMA is reserved for     │
 │ DMA Channel 6               [Available]       │ use by legacy ISA       │
 │ DMA Channel 7               [Available]       │ devices.                │
 │                                               │                         │
 │ Reserved Memory Size        [Disabled]        │                         │
 │                                               │ ↔    Select Screen      │
 │                                               │ ↑↓   Select Item        │
 │                                               │ +-   Change Option      │
 │                                               │ F1   General Help       │
 │                                               │ F10  Save and Exit      │
 │                                             ▼ │ ESC  Exit               │
 └──────────────────────────────────────────────┴─────────────────────────┘
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```

Feature	Option	Description
Plug & Play O/S	Yes No	Yes: lets the O/S configure PnP devices not required for boot if your system has a Plug and Play O/S
PCI Latency Timer	32, 64, 96, 128, 160, 192, 224, 248	Value in units of PCI clocks for PCI device latency timer register
Allocate IRQ to PCI VGA	Yes No	Yes: Assign IRQ to PCI VGA card if card requests IRQ No: Doesn't assign IRQ To PCI VGA cars even if card requests IRQ
Palette Snooping	Disabled Enabled	Enabled: informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly
PCI IDE BusMaster	Disabled Enabled	Enabled: BIOS uses PCI busmastering for reading/writing to IDE drives
Offboard PCI/ISA IDE card	Auto PCI Slot1 PCI Slot2 PCI Slot3 PCI Slot4 PCI Slot5 PCI Slot6	Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card.

Feature	Option	Description
IRQ3,4,5,7,9,10,11,14,15	Available Reserved	Available: specified IRQ is available to be used by PCI/PnP devices Reserve: specified IRQ is reserved for use by legacy ISA devices
DMA Channel 0, 1, 3, 5, 6, 7	Available Reserved	Available: specified DMA is available to be used by PCI/PnP devices Reserve: specified DMA is reserved for use by legacy ISA devices
Reserved Memory Size	Disabled 16K 32K 64K	Size of memory block to reserve for legacy ISA devices

_____

Boot Menu

```
C:\PROGRA~1\AMERIC~1\AMIBCP\simulate.exe                                  _ □ X
                           BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Power    Exit

 Boot Settings                                        Specifies the
                                                      Boot Device
 ▶ Boot Settings Configuration                        Priority sequence
                                                      from available
 ▶ Boot Device Priority                               CD/DVD Drives.
 ▶ Hard Disk Drives
 ▶ Removable Drives
 ▶ CD/DVD Drives

 ▶ BIOS Boot Configuration Options


                                                      ←→   Select Screen
                                                      ↑↓   Select Item
                                                      Enter Go to Sub Screen
                                                      F1    General Help
                                                      F10   Save and Exit
                                                      ESC   Exit


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```

Feature	Description
Boot Device Priority	Specify the boot device priority sequence
Hard Disk Drives	Specify the boot device priority sequence from available hard drives
Removable Drives	Specify the boot device priority sequence from available removable drives
CD/DVD Drives	Specify the boot device priority sequence from available CD/DVD drives

Boot Setting Configuration Submenu
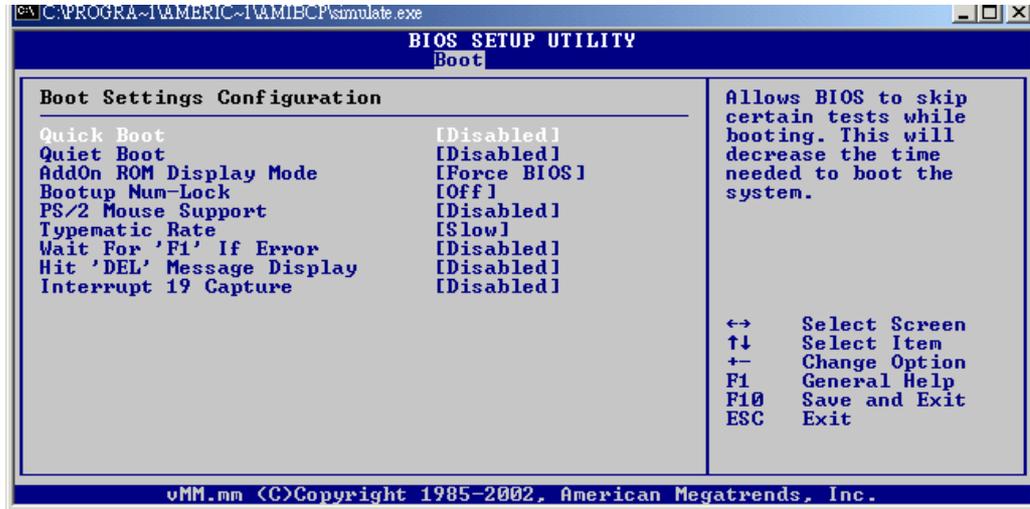
Feature	Option	Description
Quick Boot	Disabled Enabled	Allows BIOS to skip tests while booting
Quiet Boot	Disabled Enabled	Disabled: display normal POST messages Enabled: display OEM logo
AddOn ROM Display Mode	Force BIOS Keep Current	Set display mode for option ROM
Bootup Num-Lock	Off On	Select power on state for NumLock
PS/2 Mouse Support	Disabled Enabled	Select support for PS/2 mouse
Typematic Rate	Slow Fast	Select keyboard typematic rate

_____

Wait for "F1" if error	Disabled	Wait for F1 key to be pressed if error occurs
	Enabled	
Hit 'DEL' Message Display	Disabled	Display "Press DEL to run Setup" in POST
	Enabled	
Interrupt 19 Capture	Disabled	Enabled: allows option ROMs to trap interrupt 19
	Enabled	

Security Menu

```
                        BIOS SETUP UTILITY
  Main     Advanced    PCIPnP    Boot    Security    Chipset    Power    Exit

  Security Settings                                 Install or Change the
                                                    password.
  Supervisor Password :N/A
  User Password       :N/A

  Change User Password
  Clear User Password
  Password Check              [N/A]

  Boot Sector Virus Protection    [Disabled]


                                                ←→     Select Screen
                                                ↑↓     Select Item
                                                Enter  Change
                                                F1     General Help
                                                F10    Save and Exit
                                                ESC    Exit


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```
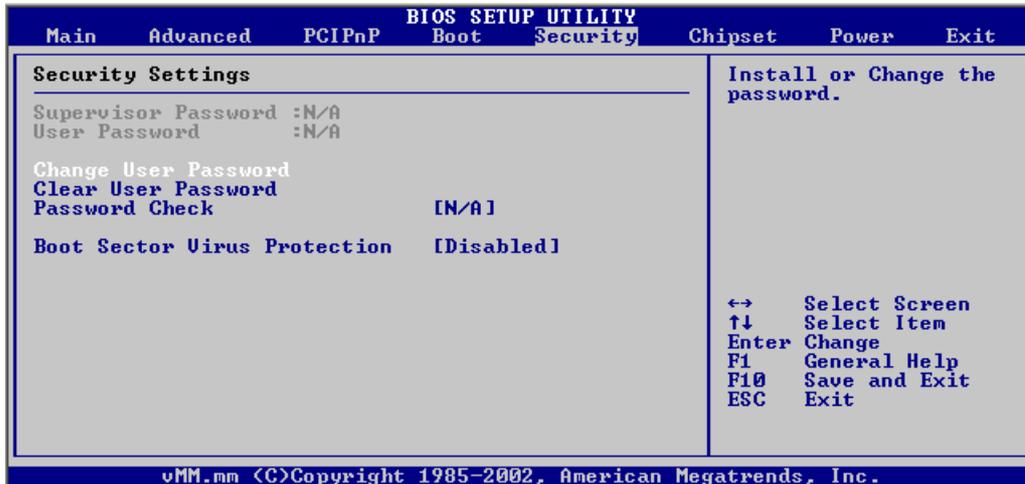
Feature	Option	Description
Change User Password		Install or change the password
Clear User Password		Immediately clears the User password
Password Check		Setup: check password while invoking setup Always: check password while invoking setup as well as on each boot
Boot Sector Virus Protection	Disabled Enabled	Enable/Disable Boot Sector Virus Protection

Chipset Menu

There are three submenus inside Chipset menu: NorthBridge Configuration, SouthBridge Configuration and AGP Configuration.
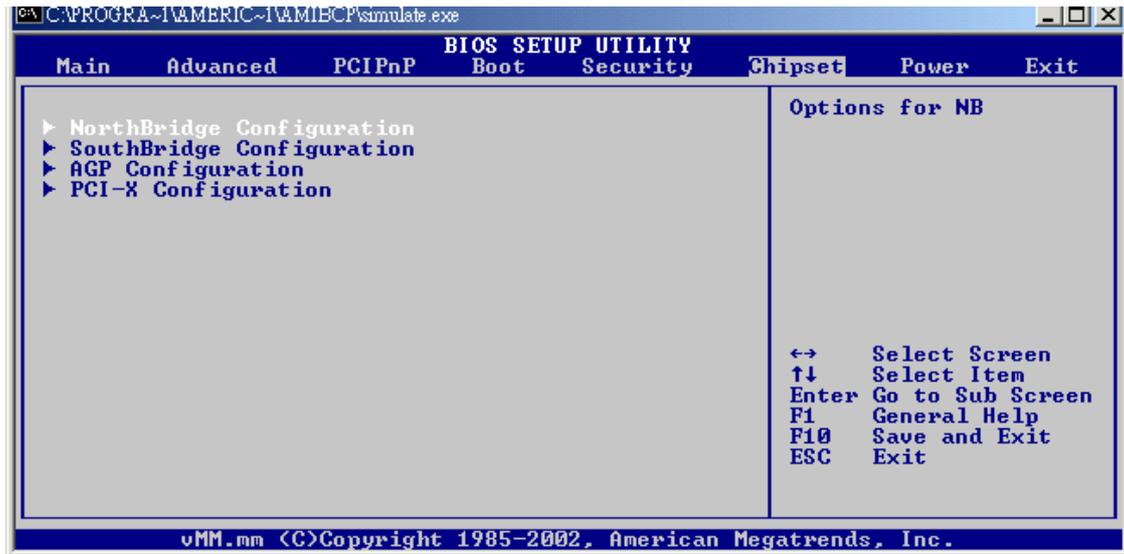
NothBridge Configuration Submenu

    Memory Configuration Submenu
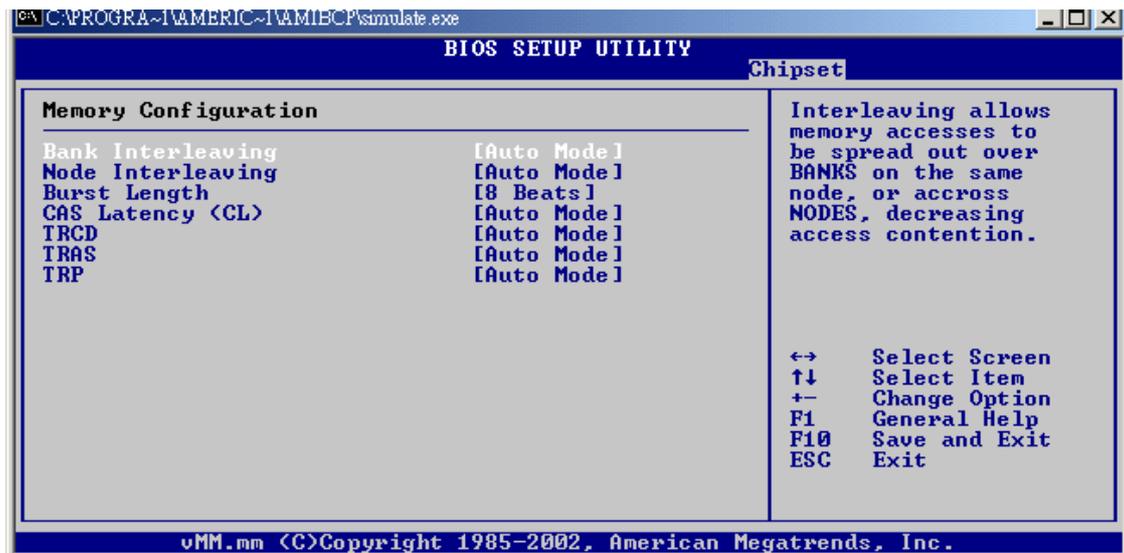
Feature	Option	Description
Bank Interleaving	Auto Disabled	Interleaving allows memory accesses to be spread out over BANKS on the same node, or across NODES, decreasing access contention
Node Interleaving	Auto Disabled	Interleaving allows memory accesses to be spread out over BANKS on the same node, or across NODES, decreasing access contention
Burst Length	8 Beats 4 Beats	Burst length can be set to 8 or 4 beats. 64 bit Dq must use the 4 beats
CAS Latency (CL)	Auto 2.0 3.0 2.5	
TRCD	Auto and 2~6 CLK	
TRAS	Auto and 5~15 CLK	
TRP	Auto and 2~6 CLK	

_____

ECC Configuration Sub-submenu

```
                        BIOS SETUP UTILITY
                                          Chipset
 ECC Configuration                              Master ECC Enables
                                                support on all nodes
 Master ECC Enable           [Disabled]         for ECC error detect
                                                and correction.




                                          ↔      Select Screen
                                          ↑↓     Select Item
                                          +−     Change Option
                                          F1     General Help
                                          F10    Save and Exit
                                          ESC    Exit

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```

Feature	Option	Description
Master ECC Enable	Disabled Enabled	Master ECC Enables support on all nodes for ECC error detect and correction

---

SouthBridge Configuration Submenu

```
C:\PROGRA~1\AMERIC~1\AMIBCP\simulate.exe                              _ □ ×
                      BIOS SETUP UTILITY
                                              Chipset

South Bridge Chipset Configuration            Enable or Disable
                                              SMBus Controller.
SMBus Interface           [Enabled]
Audio CODEC Interface     [Enabled]
MAC Interface             [Enabled]
MAC Bridge Mode           [Enabled]
MAC Media Interface       [Pin_Strap]

PCA Device Ctrl           [Enabled]
Onboard IO APIC           [Disabled]

CPU0-LDT to CK8S Frequency   [200 MHz]
CPU0-LDT to CPU1 Frequency   [200 MHz]      ←→   Select Screen
CPU0-LDT to PCI-X Frequency  [200 MHz]      ↑↓   Select Item
                                            +-   Change Option
Clock Spread Spectrum     [Disabled]        F1   General Help
                                            F10  Save and Exit
SATA0 IDE Interface       [Enabled]         ESC  Exit
▶ Configuration nVidia RAID ROM

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```

Feature	Option	Description
SMBus Controller	Disabled Enabled	Enable or Disable SMBus Controller
ACI	Disabled Enabled	Enable or Disable Internal ACI
MAC Interface	Disabled Enabled	Enable or Disable Internal 802.3 MAC
MAC Bridge Mode	Disabled Enabled	Enable or Disable Personal Firewall
MAC Media Interface	Pin_Strap MAC_MII MAC_RGMII	Setup 10/100 or GbE LAN
PCA Device Ctrl	Disabled Enabled	Enable or Disable PCA Device Controller

_____

Onboard IOAPIC	Disabled Enabled	Enable or Disable IO APIC
CPU0-LDT to CK8S Frequency	200~1000MHz	Frequency Selection
CPU0-LDT to CPU1 Frequency	200~1000MHz	Frequency Selection
CPU0-LDT to PCI-X Frequency	200~800MHz	Frequency Selection

Configuration nVidia RAID Rom Sub-submenu
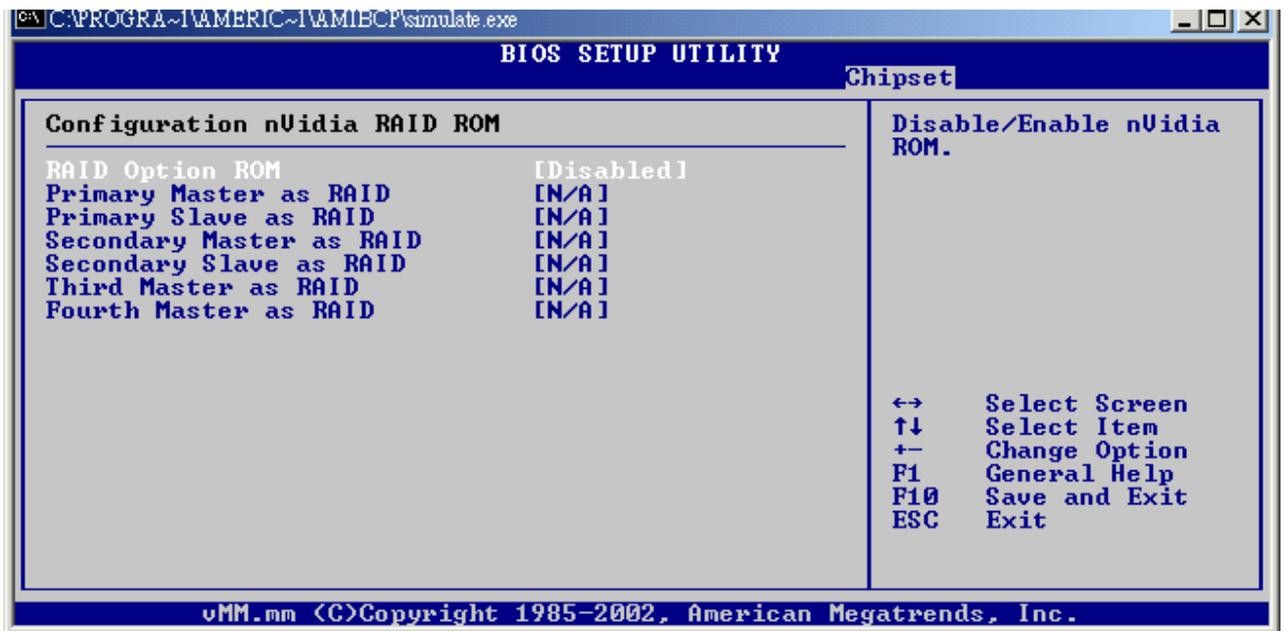
AGP Configuration Submenu
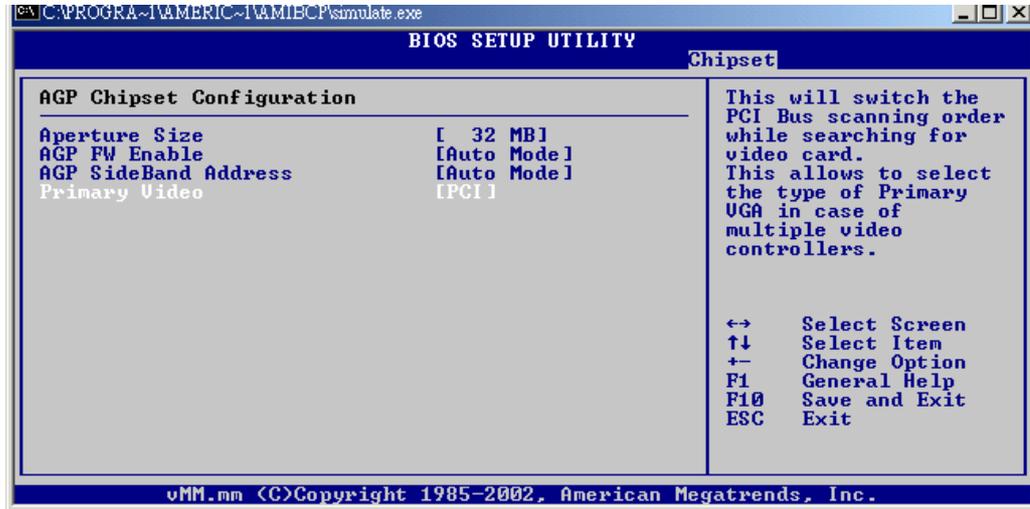
Feature	Option	Description
Aperture Size	32, 64, 128, 256, 512MB	Aperture size defines a Window into system memory for the AGP video controller. It doesn't consume real system memory
AGP FW Enable	Auto Mode Disabled	
AGP SideBand Address	Auto Mode Disabled	
Primary Video	PCI AGP	This allows selecting the type of Primary VGA.

PCI-X Configuration Submenu

```
C:\PROGRA~1\AMERIC~1\AMIBCP\simulate.exe                    _ □ ×

                          BIOS SETUP UTILITY
                                                         Chipset

   PCI-X Chipset Configuration                      AUTO causes hardware
                                                    compensation values.
   HT Link 0 P-Comp Mode         [Auto Mode]        Other choices allow
   HT Link 0 N-Comp Mode         [Auto Mode]        the user to override
   HT Link 0 RZ-Comp Mode        [Auto Mode]        default compensation
   HT Link 1 P-Comp Mode         [Auto Mode]        with an absolute
   HT Link 1 N-Comp Mode         [Auto Mode]        value, add to the
   HT Link 1 RZ-Comp Mode        [Auto Mode]        hardware generated
                                                    value, or subtract
                                                    a value from the
                                                    generated value.

                                                    ←→     Select Screen
                                                    ↑↓     Select Item
                                                    +-     Change Option
                                                    F1     General Help
                                                    F10    Save and Exit
                                                    ESC    Exit

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```

Feature	Option	Description
HT Link Mode	Auto Mode Data Calcomp+Data Calcomp-Data	

Exit Menu

```
                         BIOS SETUP UTILITY
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Power    Exit

 Exit Options                                        Exit system setup
 ─────────────────────────────────────────          after saving the
 Save Changes and Exit                               changes.
 Discard Changes and Exit
 Discard Changes                                     F10 key can be used
                                                     for this operation.
 Load Optimal Defaults
 Load Failsafe Defaults



                                                     ←→    Select Screen
                                                     ↑↓    Select Item
                                                     Enter Go to Sub Screen
                                                     F1    General Help
                                                     F10   Save and Exit
                                                     ESC   Exit

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Feature	Description
Save Changes and Exit	Exit system setup after saving the changes. F10 key can be used for this operation
Discard Changes and Exit	Exit system setup without saving the changes. ESC key can be used for this operation
Discard Changes	Discard changes done so far to any of the setup questions. F7 key can be used for this operation
Load Optimal Defaults	Load optimal default values for all the setup questions. F9 key can be used for this operation
Load Failsafe Defaults	Load Failsafe default values for all the setup questions. F8 key can be used for this operation

When you install **dual AMD Opteron**, there is some information you should know before you install Linux RedHat 9.0.

1. **"Installation Type"**, please select **"Custom"**
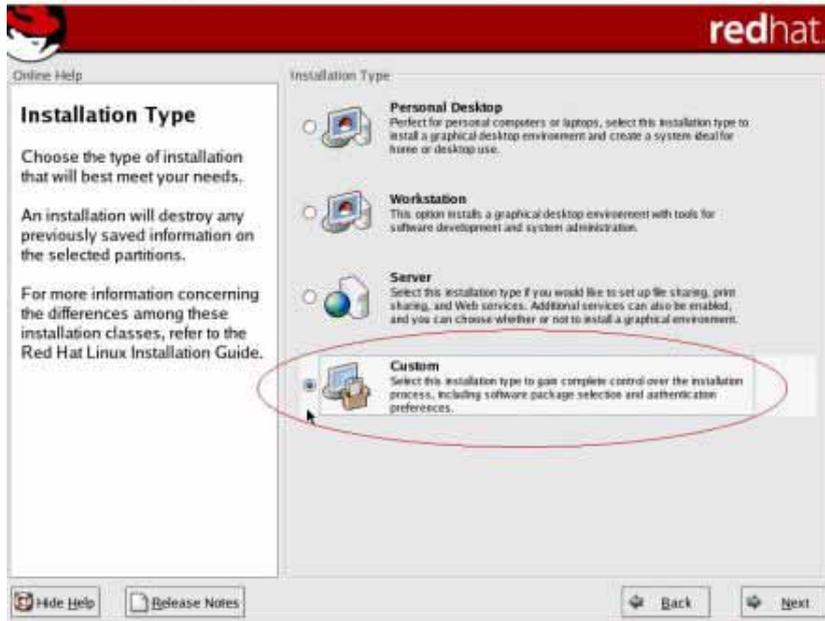
2. "Package Group Selection", after selection of what you needed packages, please select **"Select individual packages"**

3. "System Environment" -> "Kernel" -> kernel-bigmem (for upper than 4GB memory using)

Kernel-smp   (for dual processors using)