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# Chapter 1

## Introduction

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This mainboard is **Intel 440BX** 100MHz highly integrated high-performance mainboard based on the advanced Pentium® II microprocessor and featuring the high-end AGPset chipset. The mainboard offers high flexibility in configuration and is fully IBM PC/AT compatible.

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## Key Features

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The advanced features of the mainboard include:

- Supports Pentium™ II 233~500 MHz and Celeron 266~333 MHz CPUs with Frequency at 66/100 MHz in Slot 1 for **Micro ATX** Form Factor;
- Provides 3 DIMMs for SDRAM/EDO memory modules and is expandable up to 768MB, PC100 SDRAM modules spec. needed when 100MHz bus clock is being used;
- Supports ACPI, Legacy PMU and the Ultra DMA/33, fully compliant to PC97 & PC98;
- **Built-in Hardware Monitor** Circuit supports thermal, power and fan speed monitor, optional Intel LANdesk Client Manager (LDCM) support;
- Bundled **AMI Desktop Client Manager** for abnormal condition detect and thermal management through the network link or self take care;
- Provides ATX power connector, and supports various features of ATX power, such as Power Button/Suspend, Alarm Wake Up, Modem Ring On, Wake On LAN, and Keyboard Power ON;
- Provides 1 AGP, 3 PCI, 1 ISA slots, and PCI Bus Master IDE interface supports 4 IDE devices with 2 channels;
- Onboard super Multi-I/O chip supports 2 serial ports with 16550 compatible Fast UART, 1 IR port, 1 parallel port with EPP and ECP capabilities, and one floppy disk drive interface with 1 Mb/s transfer rate;
- Bundled **PC-cillin98** (OEM) Provides automatic virus protection for Windows 95/98 and the Internet;
- BIOS supports Trend's **ChipAwayVirus** option to ensure the entire boot process is virusfree, no installation and configuration worries;
- **Onboard 3D Sound Pro** meets PC98' spec. and support HRTF Positional Audio, Direct Sound 3D provide drivers for 3D games that use Aureal software interface, Software Wave-table Synthesizer, and Digital Audio Interface (SPDIF) IN/OUT.

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## Unpacking the Mainboard & Static Electricity Precautions

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This Mainboard package contains the following items:

1. This Mainboard and the Device Driver
2. The Slot1 holder and AT cables
3. This User's Guide
4. SPDIF/IN cable

The mainboard is easily damaged by static electricity. Follow the precautions below while unpacking or installing the mainboard.

1. Do not remove the mainboard from its original package until you are ready to install it.
2. Frequently ground yourself to discharge any static electric charge that may build up in your body while working on installation and/or configuration. For example, you may ground yourself by grasping an unpainted portion of the system's metal chassis.
3. Remove the mainboard from its anti-static packaging and place it on a grounded surface, component side up.
4. Handle the mainboard by its edges or by the mounting bracket to avoid touching its components.
5. Check the mainboard for damage. If any integrated circuit appears loose, press carefully to seat it firmly in its socket.
6. Do not apply power if the mainboard appears damaged. If there is damage to the board contact your dealer immediately.

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## **Chapter 2**

# **Hardware Configuration**

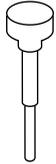
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Before you install the mainboard into the system chassis, you may find it convenient to first configure the mainboard's hardware. This chapter describes how to set jumpers and install memory modules, and where to attach components.

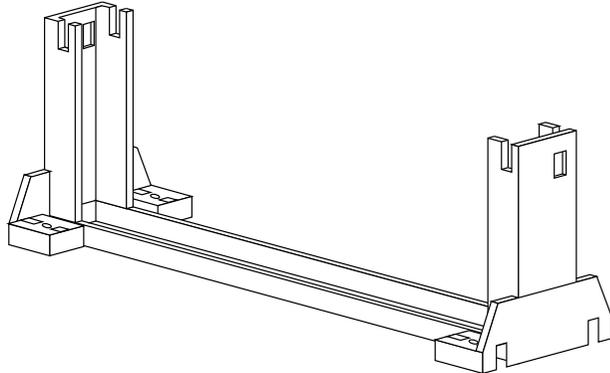
## CPU Installation

This mainboard supports Intel Pentium® II CPU using a Single Edge Contact (SEC) slot. Make sure that you have the following items (which should be included in the package) before doing any installation. All parts are labeled here with item numbers which will be referred to in the Installation Procedures section. Item 1 and 2 together are the retention mechanism, please refer to following procedures to complete your CPU installation.

- 1) 4 screws:



- 2) 1 retention clip:

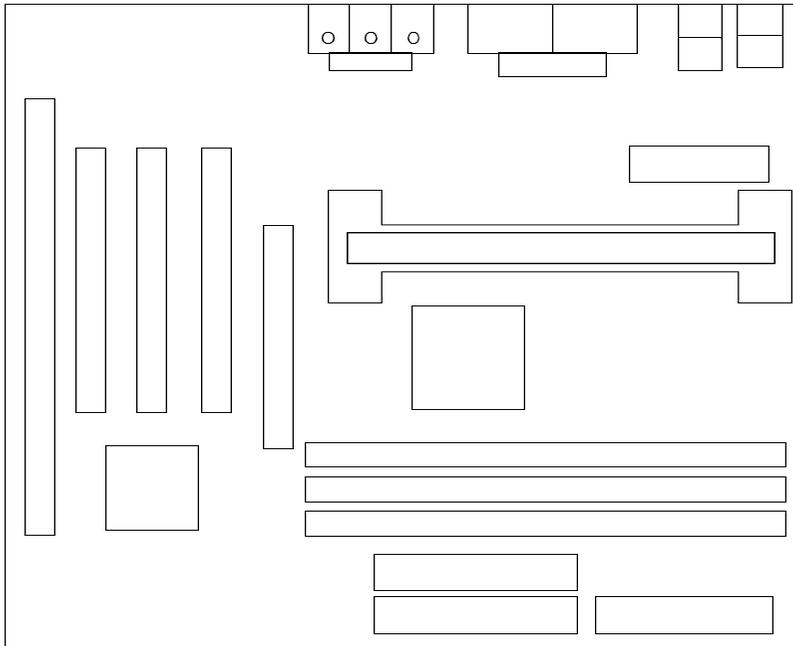


**Installation procedures**

Follow the following steps in order to install your intel Pentium® II properly.

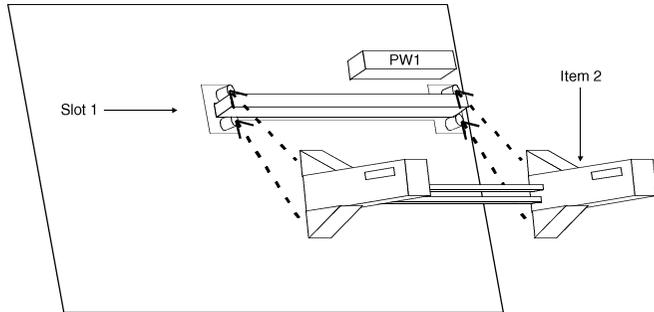
**Step 1:**

Make sure that the mainboard is set the same direction as the following drawing before doing any installation.



**Step 2:**

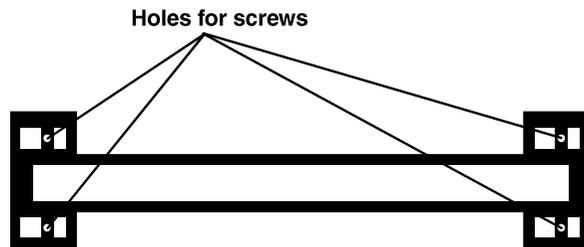
There are 2 sets of small holes along Slot 1 of your motherboard: two on the top and two on the bottom. Snap the retention clip (2) right into those 2 sets of holes



If the retention clip is installed incorrectly, you will not be able to insert the retention clip into the CPU and in this situation you might need to rotate the retention clip by 180°.

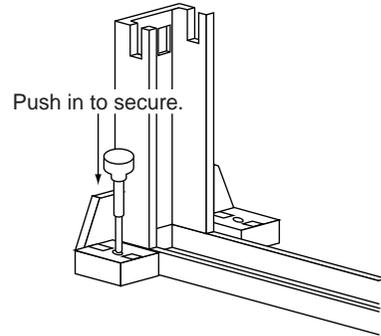
**Step 3:**

Find the hole in each corner of the retention clip then insert the 4 screws from the top of the motherboard.

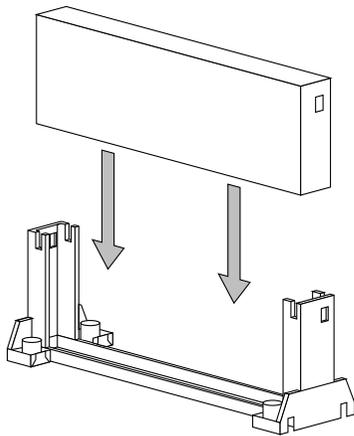


**Step 4:**

And then simply push the screws downward to secure the retention clip.

**Step 5:**

Flatten the two latches on the side of CPU. Insert the CPU into the retention clip. Lock the two latches to secure the CPU.



## Mainboard Component Locations

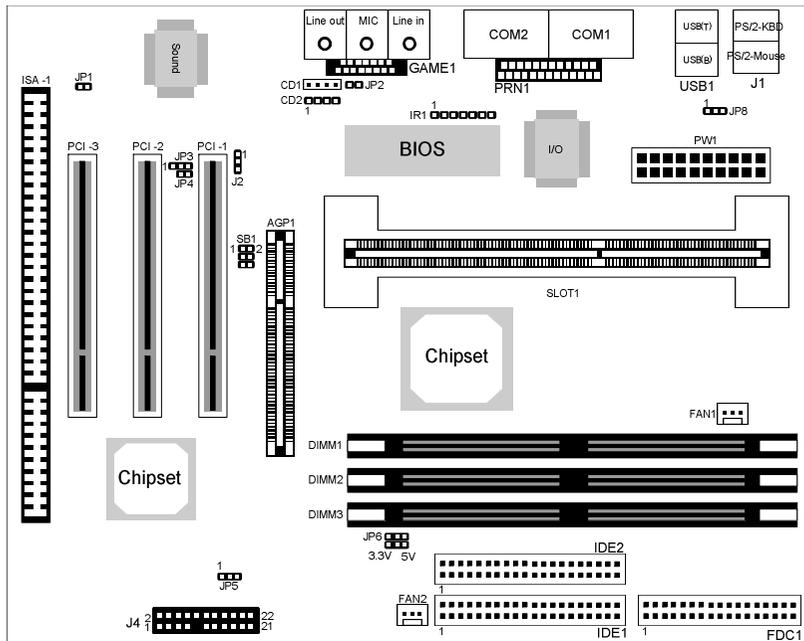


Figure 2-1. Mainboard Component locations

## Connectors

Attach system components and case devices to the mainboard via the mainboard connectors. A description of each connector follows. See figure 2-1 for the location of the connectors on the mainboard.

*Note: Make sure that the power is turned off before making any connection to the board.*

### PW1 - ATX Power Connector

### Software Power-Off

Follow the steps below to use the "Software Power-Off Control" function in Windows 95/98.

1. Click the **START** button on the Windows 95/98 task bar.
2. Select **Shut Down The Computer** to turn off the computer. The message "**It is now safe to turn off your computer.**" will not be shown when using this function.

### Modem Ring Power-On

While in Soft-off/Suspend state, if an external modem ring-up signal occurs, the system wakes up and can be remotely accessed. Make sure that the IRQ3(COM2) option in the Power Management Setup of the BIOS Setup section is set to monitor.

### Alarm Wake Up

If you want to autoboot the system at a certain time, set the function of RTC Alarm time properly and the function of RTC Alarm Power On option in the BIOS Setup section will be set to *Enabled*.

### Keyboard Power-On

Press the hot key to power-on the system when the Keyboard Power On option is set to *Enabled* in the BIOS Setup section.(set hot key in the Stroke Keys Selected option.)

## J4 (21, 22) – ATX Power Button and Suspend Switch Connector

Attach the ATX Power Button or Suspend Switch cable to this connector.

In the AT power system, this connector will act as a suspend switch; and in the ATX power system, this connector will be not only an ATX power button but a Suspend switch as well. Details are described below:

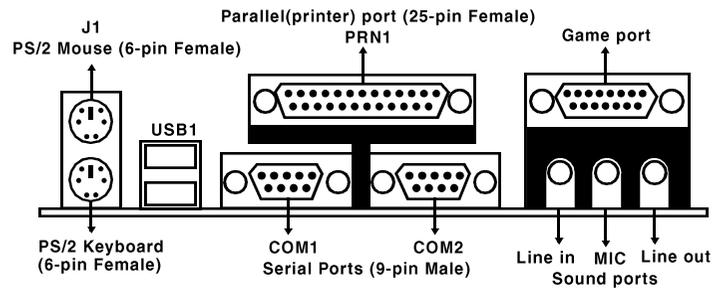
When the system is off, push the power button to turn the system on. When the system is on, push the power button rapidly to switch the system to the Suspend mode, and, by pushing and holding the button for more than 4 seconds, it will turn the system completely off. When the system is in the Suspend mode, push the power button rapidly to turn the system on.

## J2 – Wake On LAN Connector

While in Soft-off/Suspend state, if an external LAN signal occurs, the system wakes up and can be accessed with the LAN card.

Pin	Description
1	5V Stand By
2	Ground
3	Active High

## External Connectors Location



Side View

**FDC1 - Floppy Disk Drive Connector**

**IDE1/IDE2 - Primary/Secondary IDE Connectors**

**FAN1,FAN2 - Cooling Fan Connector**

**SB1 - SB Link**

Creative PCI Sound Blaster card support

**IR1 - InfraRed Connector**

Pin	Signal
1	Vcc
2	FIRRX
3	IRRX
4	GND
5	IRTX
6	Vcc
7	GND

**J4 (2, 4, 6, 8, 10) – Keylock & Power LED Connector**

Keylock connector enables and disables the keyboard key-in function on the case.

Pin	Description
2	LED Output
4	N.C.
6	Ground
8	Keylock
10	Ground

**J4 (1, 3, 5, 7) – Speaker Connector**

Pin	Description
1	Data Out
3	N.C.
5	Ground
7	+5V

**J4 (15, 16) – HDD LED Connector**

Pin	Description
15 (+)	+5V
16 (-)	Active Low

**J4 (17, 18) – Reset Switch Connector**

Setting	Description
Open	Normal Mode
Close	Reset System

## Sound Pro Connectors

### Sound and Game (on the External Connectors)

Sound ports contains Line-in, MIC(Microphone), and Line-out(Speaker).

Game port is also used as the Joystic.

### CD1/CD2 - Analog Audio for Panasonic/Sony

Connect to " AUDIO " on the CD-ROM drive, and the signal for Panasonic jack is G-S-G-S and S-G-G-S for sony

### JP4 - Digital Audio IN

Connect Digital Audio IN to "DIGITAL AUDIO" on the CD-ROM drive (depending on the type of your CD-ROM drive) by using SPDIF/IN cable.

### JP3 - Digital Audio OUT

Using optional SPDIF/OUT cable (or bracket) to connect the external Audio Amplifier or Minidisk connection.

Pin	Signal
1	5V
2	Ground
3	0.5V

## Jumper Settings

### JP5 - CMOS RAM Clear Selector

Description	Setting
Clear CMOS (while shipping)	
Normal Mode	

Note: 1. Make sure the jumper is set to Normal Mode before use.  
2. Once you need to clear the CMOS, make sure your system is truned off and the power core is unplugged.

### JP6 - DIMM Voltage Selectors\*

Description	Setting
3.3V	
5V	

### JP8 - Keyboard Power On Selector

Description	Setting
Enabled	
Disabled (default)	

Note: Make sure the system power can provide 300mA on +5VSB(+5V Standby) signal before using Keyboard Power On function.

### JP1 - Onboard Sound Selector

Description	Setting
Enabled	
Disabled	

### JP2 - Microphone Type Selector

Description	Setting
Standard (default)	
Special	

## Memory Installation

The mainboard lets you add up to 768MB of system memory through DIMM sockets on the board. Three DIMM sockets are divided into three banks: Bank 0, Bank 1, and Bank 2. The mainboard supports the following memory configurations.

Bank	Memory Module
Bank 0	
DIMM1	4MB, 8MB, 16MB, 32MB, 64MB, 128MB, 256MB
Bank 1	
DIMM2	4MB, 8MB, 16MB, 32MB, 64MB, 128MB, 256MB
Bank 2	
DIMM3	4MB, 8MB, 16MB, 32MB, 64MB, 128MB, 256MB
Total System Memory = Bank 0 + Bank 1 + Bank 2	

- Notes:
1. The speed of SDRAM DIMM modules have to be faster than 12ns ("–12"parts), while 100MHz clock speed used, the speed of SDRAM DIMM should meet the PC100 SDRAM specification (8ns or "–8" SDRAM at least).
  2. The EDO DRAM are not recommended for the performance purpose of the system.

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## Chapter 3

### BIOS Setup

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This chapter explains how to configure the mainboard's BIOS setup program. The setup program provided with the mainboard is the BIOS from AMI.

After you have configured the mainboard and have assembled the components, turn on the computer and run the software setup to ensure that the system information is correct.

The software setup of the system board is achieved through Basic Input-Output System (BIOS) programming. You use the BIOS setup program to tell the operating system what type of devices are connected to your system board.

The system setup is also called CMOS setup. Normally, you need to run system setup if either the hardware is not identical with information contained in the CMOS RAM, or if the CMOS RAM has lost power.

*Note: Hold down the <End> key then power on to reboot the system when installing newer BIOS into this mainboard .*

## Entering BIOS Setup

To enter the BIOS Setup program:

1. Turn on or reboot the system. A screen appears with a series of diagnostic checks.
2. When “Hit <DEL> if you want to run SETUP” appears, press the <DEL> key to enter the BIOS setup program. The following screen appears:

AMIBIOS SIMPLE SETUP UTILITY - VERSION 1.1X  
(C)1998 American megatrends, Inc. All Rights Reserved

Standard CMOS Setup	Peripheral Setup
Advanced CMOS Setup	CPU Plug and Play Setup
Advanced Chipset Setup	Change Supervisor Password
Power Management Setup	Auto-Detect Hard Disks
PCI/Plug and Play Setup	Save Settings and Exit
Load Optimal Settings	Exit Without Saving
Load Best Performance Settings	
Esc: Quit    ↑ ↓ → ←: Select Item    (Shift) F2: Change Color    F5: Old Values	
F6: Optimal values    F7: Best performance values    F10 : Save&Exit	
Standard CMOS setup for changing time, date, hard disk type, etc.	

3. Use your keyboard or mouse to choose options. Modify system parameters to reflect system options. Press Alt-H for Help.

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## Default

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Every option in the BIOS Setup contains two default values: Best default and the Optimal default value.

### Load Optimal Settings

The Optimal default values provide optimum system settings for all devices and system features.

### Load Best Performance Settings

The Best default values provide best performance settings for all devices and system features, however depending on the devices used, these settings are not recommend for long hours of work load.

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## Setup Items

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### Standard CMOS Setup

Choosing the item from the BIOS Setup main menu. All Standard Setup options are described in this section.

**Date/Time**      Select the Date/Time option to change the date or time. The current date and time are displayed. Enter new values through the displayed.

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<b>Pri Master; Pri Slave; Sec Master; Sec Slave</b>	Choose these icons to configure the hard disk drive named in the option. When you click on an icon, the following parameters are listed: Type, LBA/Large Mode, Block Mode, 32Bit Mode, and PIO Mode. All parameters relate to IDE drives except <b>Type</b> . Choose the <b>Type</b> parameter and select Auto BIOS automatically detects the IDE drive parameters and displays them. Choose on <b>LBA Mode</b> and choose <i>On</i> to enable support for IDE drives with capacities greater than 528MB. Click on <b>Blk Mode</b> and choose <i>On</i> to support IDE drives that use Blk Mode. Click on <b>32Bit Mode</b> and click on <i>On</i> to support IDE drives that permit 32-bit accesses.
<b>Floppy Drive A; B</b>	Choose the Floppy Drive A or B icon to specify the floppy drive type. The settings are 360KB 5 <sup>1</sup> / <sub>4</sub> ", 1.2MB 5 <sup>1</sup> / <sub>4</sub> ", 720KB 3 <sup>1</sup> / <sub>2</sub> ", 1.44MB 3 <sup>1</sup> / <sub>2</sub> ", or 2.88MB 3 <sup>1</sup> / <sub>2</sub> ".

## Advanced CMOS Setup

Choosing the item from the BIOS Setup main menu.  
All Advanced Setup options are described in this section.

- Quick Boot** Set this option to *Enabled* BIOS to boot within 5 seconds.
- 1st Boot Device;**  
**2nd Boot Device;**  
**3rd Boot Device** Set these options to select the boot sequence from different booting devices.
- Try Other Boot Devices** Choose *Yes* to search other boot devices to boot up the system when all the options in the previous function failed.
- SMART for Hard Disks** This option allows you to utilize the SMART function of HDDs.
- Boot Up Num-Lock** Set this option to turn on *Num Lock* key when the system is powered on.
- Floppy Drive Swap** This option allows you to swap floppy drives between A: and B:.
- Floppy Drive Seek** Set *Disabled* to provide a faster boot and reduces the possibility of damaging the floppy heads.
- PS/2 Mouse Support** Set this option to *Enable* BIOS to support a PS/2 type mouse.

<b>Password Check</b>	<p>This option specifies the type of BIOS password protection that is implemented. The settings are:</p> <p>Setup: The password prompt appears only when an end user attempts to run WinBIOS Setup.</p> <p>Always: A password prompt appears every time the computer is powered on or rebooted.</p> <p>The BIOS password does not have to be enabled. The end user sets the password by choosing the Password icon on the WinBIOS Setup screen.</p>
<b>Boot to OS/2 Over 64MB</b>	<p>You need to set this option to Enabled when using the OS/2 operating system with installed DRAM which is greater than 64MB.</p>
<b>Internal Cache</b>	<p>This option selects to enable the internal cache or not. Choices are Disabled and Enabled.</p>
<b>System BIOS Cacheable</b>	<p>BIOS always copies the system BIOS from ROM to RAM for faster execution. Set this option to <i>Enabled</i> to permit the contents of the F0000h RAM memory segment to be written to and read from cache memory.</p>



## Advanced Chipset Setup

Choose the item from the BIOS Setup main menu.  
All Chipset Setup options are described in this section.

<b>Trend ChipAway Virus</b>	Set this option to <i>Enabled</i> the Trend ChipAway Virus function.
<b>Set SDRAM Timing By SPD</b>	Set this option to <i>Enabled</i> setting SDRAM timing by PC SDRAM SPD(Serial Presence Detect).
<b>SDRAM RAS# to CAS# delay</b>	Set this option to select the proper delay for SDRAM RAS# to CAS#.
<b>SDRAM RAS# Precharge</b>	Set this option to select the proper SDRAM RAS# Precharge.
<b>SDRAM CAS# Latency</b>	Set this option to select the proper SDRAM CAS# Latency.
<b>SDRAM Leadoff Timing</b>	Set this option to select the proper SDRAM Leadoff timing.
<b>EDO RASx,CASx Wait State</b>	Set these options to select the proper Wait State for EDO RASx,CASx, and these two options only support the running 66MHz-base system.
<b>DRAM Integrity Mode</b>	Choose Non-ECC, EC-Only, or ECC. Non-ECC: Has byte-wise write capability but no provision for protecting data integrity in the DRAM array. EC-Only: Data errors are detected but not corrected. ECC: Allows a detecton between single-bit and multiple-bit errors and recovery of single-bit errors.

<b>DRAM Refresh Rate</b>	Set this option to select the proper DRAM refresh rate.
<b>Graphics Aperture Size</b>	Set this option to select the memory-mapped, graphics data structures can reside in the Graphics Aperture. Use the default setting.
<b>8,16 bit I/O Recovery Time</b>	Set these options to specify the length of a delay inserted between consecutive 8-bit,16-bit I/O operations.
<b>PCI 2.1 Support</b>	Set this option to <i>Enable</i> support the PCI v2.1 specification.
<b>OnBoard USB</b>	Set this option to <i>Enable</i> the system BIOS USB (Universal Serial Bus) functions.
<b>USB Function for DOS</b>	Set this option to <i>Enable</i> the USB keyboard to support DOS mode.
<b>Keyboard Power On</b>	Set this option to <i>Enable</i> the Keyboard Power On function.
<b>Stroke Keys Selected</b>	Set this option to specify the stroke keys for keyboard power on.

\*\*\* **Hardware Monitor** \*\*\*

**CPU, System Temperature;** These options are displayed only show the status of system hardware.  
**Fan 1, Fan 2 Speed;**  
**Vcc; Vcc3; Vcore;**  
**+12V**

## Power Management Setup

Choosing the item from BIOS Setup main menu.

<b>Power Management/ APM</b>	Set this option to enable power management features and APM (Advanced Power Management).
<b>Green Monitor Power State</b>	This option specifies the power state that the green PC-compliant video monitor enters when AMIBIOS places it in a power savings state after the specified period of display inactivity has expired.
<b>Video Power Down Mode</b>	This option specifies the power conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity has expired.
<b>Hard Disk Power Down Mode</b>	This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.
<b>Standby Time out (Minute)</b>	This option specified the length of system inactivity while in Full power on state. When this length of time expires, the computer enters Standby power state.
<b>Suspend Time out (Minute)</b>	This option specified the length of a period of system inactivity while in Standby state. When this length of time expires, the computer enters Suspend power state.

**Display Activity;** When set to *Yes*, these options enable event monitoring on the specified hardware  
**Serial Port 1;**  
**Serial Port 2;** interrupt request line and the computer is in a power saving state, BIOS watches for activity on the specified IRQ line. The computer enters the full on power state if any activity occurs.  
**Parallel Port;**  
**Floppy Disk;**  
**Primary Master IDE;**  
**Primary slave IDE;**  
**Secondary Master IDE;**  
**Secondary Slave IDE**

**RTC Alarm Power On** Set this option to enable the RTC Alarm to wake up the system which is Soft Off.

**RTC Alarm Date;** Set these options to specify the RTC Alarm time on Date/Hour/Minute/Second.  
**RTC Alarm Hour;**  
**RTC Alarm Minute;**  
**RTC Alarm Second**

## PCI / Plug and Play Setup

Choose the item from the BIOS Setup main menu.

- |   |  |
|---|--|
| <b>Plug and Play Aware OS</b>           | Set this option to <i>Yes</i> if the operation system in this computer is aware of and follows the Plug and Play specification. Currently, Windows 95/98 are PnP-aware.  |
| <b>Primary Graphics Adapter</b>         | Set this option to select AGP or PCI VGA for primary graphics adapter.   |
| <b>PCI VGA Palette Snoop</b>            | When this option is set to <i>Enabled</i> , multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit.   |
| <b>Assign IRQ for VGA</b>               | This option is used to assign IRQ for PCI VGA. Recommendation is set to <i>No</i> .  |
| <b>OffBoard PCI IDE Card</b>            | This option specifies if an offboard PCI IDE controller adapter card is installed in the computer. You must specify the PCI expansion slot on the motherboard where the offboard PCI IDE controller is installed. If an offboard PCI IDE controller is used, the onboard IDE controller is automatically disabled. If an offboard PCI IDE controller adapter card is installed in the computer, you must also set the <b>Pri. OffBoard PCI IDE IRQ</b> and <b>Sec. OffBoard PCI IDE IRQ</b> options. |
| <b>Pri. , Sec. OffBoard PCI IDE IRQ</b> | These two options specify the PCI interrupt used by the primary (or secondary) IDE channel on the offboard PCI IDE controller.   |

- DMA Channel 0, 1, 3, 5, 6, 7** These options specify the bus that the specified DMA channel is used on.
- IRQ3, 4, 5, 7, 9, 10, 11, 14, 15** These options specify the bus that the specified IRQ line is used on. These options allow you to reserve IRQs for legacy ISA adapter cards.
- Reserved Memory Size** This option is designed to be used for reserving memory for the IO card.
- Reserved Memory Address** This option is designed to be used for reserving memory address for the IO card.

## Peripheral Setup

Choose the item from the BIOS Setup main menu.

- OnBoard FDC** This option enables the FDC (Floppy Drive Controller) on the motherboard or auto detects the FDC.
- OnBoard Serial Port1** This option specifies the base I/O port address of serial port 1.
- OnBoard Serial Port2** This option specifies the base I/O port address of serial port 2.
- Serial Port2 Mode** This option specifies the serial port2 mode.  
Normal: The normal serial port mode is being used.  
IrDA/ASKIR: The serial port2 will be redirected to support IR function when this option is set to IrDA or ASKIR.

- Duplex Mode** This option is to specify the Duplex mode of Serial Port 2.
- OnBoard Parallel Port** This option specifies the base I/O port address of the parallel port on the motherboard.
- Parallel Port Mode** Depends on the type of your external device which connects to this port to choose Normal, EPP, or ECP mode.
- Parallel Port IRQ** This option specifies IRQ to parallel port.
- Parallel Port DMA Channel** This option is only available if the setting of the Parallel Port Mode option is EPP/ECP.
- OnBoard IDE** This option specifies the channel used by the IDE controller on the motherboard.

### **CPU Plug and Play Setup**

Choose this item from the BIOS Setup main menu.

- CPU Speed(MHz)** Select a correct CPU speed to match your CPU.

## Change Supervisor Password

This item lets you configure the system password which is required every time when the system boots up or an attempt is made to enter the Setup program. The password cannot be longer than six characters.

*Note: Keep a safe record of the new password. If you forget or lose the password, the only way to access the system is to clear CMOS memory by holding down the <End> key then powering on to reboot the system.*

## Auto-Detect Hard Disks

If your system has an IDE hard drive, you can use this utility to detect its parameters and automatically enter them into the Standard CMOS Setup. This utility will autodetect up to four IDE devices.

## Save Settings and Exit

Select this item to save the values entered during the current session and then exit the BIOS setup program.

## Exit Without Saving

Select this item to exit the BIOS setup program without saving the values which has been entered during the current session.