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# Chapter 1

## Introduction

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This mainboard is a high-performance mainboard based on the advanced Pentium™ microprocessor, **100MHz CPU external clock speed capability feature**, and PCI Local Bus and the high-end AGP chipset. The mainboard offers a high degree of flexibility in configuration and is fully IBM PC/AT compatible.

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## Key Features

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The advanced features of this mainboard include:

- Supports P54C/P55C Pentium™ (MMX) CPUs and Cyrix/IBM 6x86L/6x86MX/MII, AMD K6/**K6-2** (3.2V & **2.2V**), IDT C6 133~500MHz CPUs with Frequency at 66/75/83/95/**100 MHz**;
- Provides three DIMMs for SDRAM/EDO/FPM memory modules, memory expandable up to 768MB, however, it is not recommended to use EDO/FPM DRAM when 83 ~ 100MHz CPU frequency is being used and SDRAM has to meet the requirement of PC-100 if using 100MHz;
- Supports 64M-bit (8Mx8, 4Mx16) EDO DRAM/SDRAM;
- **Onboard 1MB Pipeline Burst synchronous L2 cache**;
- Provides both ATX/AT power connector, and supports various ATX power functions, such as: Modem Ring On, ATX Power Button, Suspend Switch, and Alarm Wake Up;
- Supports ACPI and Legacy PMU, and the Ultra DMA/33, fully compliant to PC97 & PC98;
- Provides Accelerated Graphics Port (AGP), 3 PCI Bus slots, 2 ISA Bus slots and PCI Bus Master IDE interface with 2 connectors which supports 4 IDE devices in 2 channels;
- Super Multi-I/O chip supports 2 serial ports with 16550 compatible fast UART, 1 parallel port with EPP and ECP capabilities, and one floppy disk drive interface with 1Mb/s transfer rate;

- Provides **ATX Form Card** containing PS/2 Mouse, 2 USB interface, and Infrared connectors;
- Onboard **3D Sound Pro** meets PC98' SPEC and supports HRTF Positional Audio, Direct Sound 3D with **Aureal 3D** driver, Software Wave-table Synthesizer, and Digital Audio Interface (SPDIF) IN/OUT;
- Bundled **PC-cillin** (OEM) provides automatic virus protection for Window95/98 and the Internet;
- System BIOS supports Trend's **ChipAway Virus** function to ensure the entire boot process is virusfree, no installation and configuration worries.

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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 a Device Driver
2. This User's Guide and AT cable set
3. Sound & Game ribbon cables/bracket and SPDIF/IN cable
4. ATX Form Card

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 this 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.



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## Connectors

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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.*

### **PWR2 – AT Power Supply Connectors**

### **COM1/2 – Serial Port #1/#2**

### **PRN1 – Parallel Port**

### **FDC1 – Floppy Disk Port**

### **IDE1/IDE2 – Primary/Secondary IDE Ports**

### **KBD1 – Keyboard Connector**

### **FAN1 – FAN Power Connector**

### **J1 – ATX Form Card Connector**

This connector contains 2 sets of USB interface, PS/2 Mouse, and Infrared connectors. Connect the ATX Form Card cable to this connector.

**JP11 (2, 4, 6, 8, 10) (KEYLOCK) – Keylock & Power LED Connector**

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

**JP11 (1, 3, 5, 7) (SPK) – Speaker Connector**

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

**JP11 (13, 14) (SUSLED) – Suspend LED Connector**

Pin	Description
13 (+)	+5V
14 (-)	Active Low

**JP11 (15, 16) (HDDLED) – HDD LED Connector**

Pin	Description
+	+5V
-	Active Low

### JP11 (17, 18) (RST) – Reset Switch Connector

Setting	Description
Open	Normal Mode
Close	Reset System

### JP11 (21, 22)(PWB) – ATX Power Button

Refer to Chapter 3.

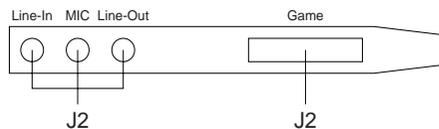
## Sound Pro Connectors

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

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.

### J2 – Sound and Game

Sound contains Line-in/MIC (Microphone), and Line-out (Speaker). Game connector is also the Joystic connector. Connect this connector to the Sound & Game ribbon cable/bracket as the following drawing:



### JP7 – Digital Audio IN

Depending on the type of your CD-ROM drive to connect this connector to “DIGITAL AUDIO” on the CD-ROM drive by using SPDIF/IN cable.

## JP8 – Digital Audio OUT

Connect to the Digital Audio device (the Audio Amplifier or Minidisk) by using optional SPDIF/OUT cable/bracket.

## Memory Installation

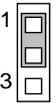
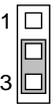
The mainboard lets you add up to 768MB of system memory through three DIMM sockets on the board, and system memory are divided into three banks: Bank 0, Bank 1, and Bank 2. The mainboard supports the following memory configurations.

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). When 100MHz clock speed is being used, then the speed of SDRAM DIMM should meet the PC100 SDRAM specification (8ns or “-8” SDRAM at least).
  2. The speed of EDO/FPM DRAM have to be faster than 70ns, but it is not recommended for the performance purpose of the system.

## Jumper Settings

### JP6 – CMOS RAM Clear Selector

Description	Setting
Normal Mode (default)	
Clear CMOS	

- Note:
1. Make sure that this jumper is set to Normal Mode before installing the mainboard and the power is off before clearing the CMOS.
  2. If using the ATX power, you need to unplug the power cable and then plug the cable back on after clearing the CMOS.

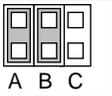
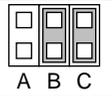
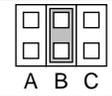
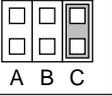
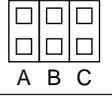
### JP3 – DIMM Voltage Selectors

Voltage	Setting
5V	
3.3V (default)	

### JP4 – Microphone Type Selector

Description	Setting
Special Mode	
Normal Mode (default)	

### JP12 – CPU Frequency Selectors

Fre.	Setting	Fre.	Setting	Fre.	Setting
66MHz (default)		75MHz		83MHz	
95MHz		100MHz			

**JP14 – CPU Core Voltage Selectors**

Vcc	Setting	Vcc	Setting	Vcc	Setting	Vcc	Setting
2.0V		2.4V		2.8V (default)		3.2V	
2.1V		2.5V		2.9V		3.3V	
2.2V		2.6V		3.0V		3.4V	
2.3V		2.7V		3.1V		3.5V	

**JP13 – CPU Multiplier Selectors**

Mul.	Setting	Mul.	Setting	Mul.	Setting
2.0X (default)		3.5X		5.0X	
2.5X		4.0X		5.5X	
3.0X		4.5X			

**JP9 – CPU Type Selectors**

CPU	Setting	Example
P55C (Dual Voltage) (default)	P54C  P55C	Intel MMX, AMD K6/K6-2, IBM/Cyrix 6x86L/6x86MX (MII)
P54C (Single Voltage)	P54C  P55C	Intel P54C, IDT C6, AMD K5, IBM/Cyrix 6x86

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# Chapter 3

## ACPI Functions & Connectors with ATX Power

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### PWR1 – ATX Power Connector

The ATX power supply provides a single 20-pin connector and supports the ACPI specification.

Pin	Description	Pin	Description
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	PS-ON
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	Power OK	18	-5V
9	5VSB	19	+5V
10	+12V	20	+5V

The functions and connectors described below work with the ATX power supply.

### Software Power-Off

Follow the steps below to use the “Software Power-Off Control” function in Windows 95 with ATX power supply.

1. Click the **START** button on the Windows 95 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 Ring Resume From Soft Off option is set to Enabled in the BIOS setup section (Refer to the Power Management section in Chapter 4.)

### 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 Resume From Soft Off option in the BIOS Setup section will be set to Enabled.

### **JP11 (21, 22) (PWB) – 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.

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## Chapter 4

### 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: When installing newer BIOS into this mainboard, you need to clear CMOS for a moment then set back to Normal Mode or hold down the <End> key then power on to reboot the system.*

## 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	Change Supervisor Password
Advanced Chipset Setup	Auto-Detect Hard Disks
Power Management Setup	Save Settings and Exit
PCI/Plug and Play Setup	Exit Without Saving
Load Optimal Settings	
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 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 window.

<b>Pri Master</b>	Choose these options 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> .
<b>Pri Slave</b>	
<b>Sec Master</b>	
<b>Sec Slave</b>	
<b>Floppy Drive A, B</b>	Choose the Floppy Drive A or B option 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

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

<b>1st Boot Device</b>	Set these options to select the boot sequence from different booting devices.
<b>2nd Boot Device</b>	
<b>3rd Boot Device</b>	
<b>4th Boot Device</b>	
<b>S.M.A.R.T for Hard Disks</b>	Select this option to enable or disable the S.M.A.R.T. function of HDDs.
<b>Quick Boot</b>	Set this option to <i>Enabled</i> to permit BIOS to boot within 5 seconds.
<b>Boot Up Num-Lock</b>	When this option is set to <i>On</i> , BIOS turns off the <i>Num Lock</i> key when the system is powered on so the end user can use the arrow keys on both the numeric keypad and the keyboard.
<b>Floppy Drive Swap</b>	Set this option to <i>Enabled</i> to specify that floppy drives A: and B: are swapped.

<b>Floppy Drive Seek</b>	Set this option <i>Disabled</i> to provide a faster boot and reduce the possibility of damaging the heads.
<b>PS/2 Mouse Support</b>	When this option is set to <i>Enabled</i> , BIOS supports a PS/2-type mouse.
<b>Primary Display</b>	This option configures the primary display subsystem in the computer.
<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 BIOS 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 BIOS Setup screen.</p>
<b>Boot to OS/2 Over 64MB</b>	Select this option to boot to OS/2 system and memory over 64MB.
<b>Internal Cache</b>	Select this option to enable the internal cache.
<b>External Cache</b>	Select this option to enable External Cache.
<b>System BIOS Cacheable</b>	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.

<b>Video BIOS Shadow;</b> <b>C800, 16K Shadow;</b> <b>CC00, 16K Shadow;</b> <b>D000, 16K Shadow;</b> <b>D400, 16K Shadow;</b> <b>D800, 16K Shadow;</b> <b>DC00, 16K Shadow</b>	Disabled:	The specified ROM is not copied to RAM.
	Enabled:	The contents of the ROM area are not only copied from ROM to RAM for faster execution, the contents of the RAM area can be written to or read from cache memory.
	Cached:	The contents of the ROM area are copied from ROM to RAM for faster execution.

### Advanced Chipset Setup

Choose the Chipset item from the BIOS Setup main menu. All Chipset Setup options are then displayed and are described in the following section:

<b>Trend ChipAway Virus</b>	Set this option to enable Trend's virus-function in BIOS.
<b>SDRAM CAS Latency</b>	This option is used to select a proper SDRAM CAS Latency.
<b>SDRAM Burst Function</b>	Set this option to enable the SDRAM Burst function.
<b>DRAM Timing</b>	Set this option to select the proper DRAM timing.
<b>Pipe Function</b>	Set this option to enable Pipe cache function.
<b>Gated Clock</b>	Set this option to enable Gated clock.
<b>Graphic Aperture Size</b>	This option is used to select a proper Graphic Aperture size.

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<b>Primary Frame Buffer</b>	Set this option to enable frame buffer for the primary display.
<b>VGA Frame Buffer</b>	Set this option to enable frame buffer for the VGA.
<b>Data Merge</b>	Set this option to enable Data Merge for the VGA frame buffer.
<b>Passive Release</b>	Set this option to enable the Passive Release function.
<b>ISA Line Buffer</b>	Set this option to enable the Line buffer for ISA bus.
<b>Delay Transaction</b>	Set this option to enable Delay Transaction function.
<b>AT Bus Clock</b>	Set this option to select the proper ISA bus clock.
<b>OnBoard USB Function</b>	Set this option to <i>Enabled</i> to enable the system BIOS USB (Universal Serial Bus) functions.
<b>USB function for DOS</b>	Set this option to <i>Enabled</i> to enable passive release on the universal serial bus.

## Power Management Setup

The BIOS Setup options described in this section are selected by choosing the Power Management Setup from the 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 BIOS 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</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</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.

<b>Monitor Parallel Port, Serial Port, Floppy, VGA, Audio, Pri-HDD, Sec-HDD</b>	When set to <i>Yes</i> , these options enable event monitoring on the specified hardware interrupt request line and the computer is in a power saving state, BIOS watches for activity on the specified IRQ line. The system enters the full power on state if any activity occurs.
<b>Power Button Function</b>	This option specifies the operation of Soft-Off by the Power Button. Select "Suspend" function to enter "On-Suspend-Off" or select "Soft Off" function to enter "On-Off" operation cycle.
<b>Ring Resume From Soft Off</b>	Set this option to enable the modem ring to wake up the system which is Soft Off.
<b>RTC Alarm Resume</b>	Set this option to enable the RTC Alarm to wake up the system which is Soft Off.
<b>RTC Alarm Date; RTC Alarm Hour; RTC Alarm Minute; RTC Alarm Second</b>	Set these options to specify the RTC Alarm time on Month/Date/Hour/Minute/Second.

## PCI/Plug and Play Setup

Choose the PCI/PnP 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, only Windows 95 is PnP-aware.
<b>Primary Graphic Adapter</b>	Set this option to select AGP or PCI VGA for primary graphic adapter.

- PCI VGA Palette Snoop** When this option is set to Enabled, 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 (0 is disabled).
- OffBoard PCI IDE Card** 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 **Offboard PCI IDE Primary IRQ** and **Offboard PCI IDE Secondary IRQ** options.
- Pri. OffBoard PCI IDE IRQ;**  
**Sec. OffBoard PCI IDE IRQ** These options specify the PCI interrupt used by the Primary (or secondary) IDE channel on the offboard PCI IDE controller.
- Assign IRQ to PCI VGA** Set this option to *Enabled* to assign IRQ to PCI VGA Card.
- PCI Slot 1/2/3 IRQ Priority** These options specify the priority IRQ to be used for any PCI devices installed in PCI expansion slots 1 through 4.
- 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, 12, 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.

## Peripheral Setup

Choose the Peripheral item from the BIOS Setup main menu.

- OnBoard FDC** This option enables the FDC (Floppy Drive Controller) on the motherboard.
- 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.
- IR Half-Duplex Timeout** Set this option to enable the IR Half-Duplex timeout for IR port.
- OnBoard Parallel Port** Set this option to specify the base IO address for parallel port.
- Parallel Port Mode** Depends on the type of your external device which connects to parallel port to choose Normal, EPP, or ECP mode.

<b>EPP Version</b>	Set this option to select EPP specification version.
<b>Parallel Port IRQ</b>	This option specifies IRQ to parallel port.
<b>Parallel Port DMA</b>	This option is only available if the setting of the Parallel Port Mode is ECP.
<b>OnBoard IDE</b>	This option specifies the channel used by the IDE controller on the motherboard.
<b>OnBoard Sound PRO</b>	Set this option to enable the Sound Pro functions.

### 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 .*

### 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.

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### **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.