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Chapter 1

Introduction

This mainboard is a high-performance mainboard based on the advanced Pentium® II microprocessor and featuring Accelerated Graphics Port (AGP) and the **i440LX AGPset** chipset. The mainboard offers a high degree of flexibility in configuration and is fully IBM PC/AT compatible.

Key Features

The advanced features of the **i440LX** mainboard include:

- **Intel i440LX AGPset** chipset
- Supports Pentium® II 233 ~ 333 MHz CPUs at slot1
- Provides CPU “Plug& Play” function for faster and easier CPU installation.
- Provides 3 x 168-pin DIMM sockets to support 8MB/16MB/32MB/64MB/128MB SDRAM/EDO memory modules up to 384MB
- Supports Accelerated Graphics Port (AGP) v1.0
- Supports 512KB or 256KB Pipelined Burst L2 cache in Pentium® II Single Edge Contact (SEC) cartridge.
- Supports Ultra DMA/33 and Advanced Configuration Power Interface (ACPI)
- PCI Bus Master IDE controller supports PIO Mode 0 to Mode 4, and the Ultra DMA/33 is at the maximum transfer rate of 33MB/sec and Bus Master IDE DMA Mode2
- Supports 2.88MB, Iomega ZIP-100M, and IDE LS-120 FDD, bootable from floppy, HDD ,CD-ROM, SCSI, NetWork, LS-120, ZIP, or others
- Provides four 32-bit PCI Local Bus slots (all four slots support master mode) and three 16-bit ISA Bus slots
- Provides ATX power which supports various functions, such as Suspend/Shutdown
- Onboard PCI Bus Master IDE interface supports 4 IDE devices with 2 channels; BIOS supports 4 IDE harddisk drives which do not need device driver for S/W application and the capacity of each harddisk can be larger than 528MB and up to 8.4 GB

- Onboard super Multi-I/O chip supports 2 serial ports with 16550 fast UART compatible, 1 parallel port with EPP and ECP capabilities, and one floppy disk drive interface
- Supports PS/2 Mouse and Keyboard connectors, Universal Serial Bus (USB) interface, and Infrared connector
- External cards supports Fan Status Monitoring and Alarm, Temperature Monitor and Alert, Voltage Monitor and Alert, System Resources Alert, and Virus Write Protection through the optional LM78 Hardware Monitor and Intel® LANDESK Client Manager (LDCM) software
- BIOS Green feature function, and “Plug & Play” Flash ROM

Static Electricity Precautions

Static electricity can easily damage your mainboard. Following procedures can help you to protect your mainboard from electrostatic discharge:

1. Keep the mainboard and other system components in their antistatic packaging until you are ready to install them.
2. Ground yourself before removing any system component from its protective anti-static packaging. A grounded surface within easy reach is the expansion slot covers at the rear of the system case or any other unpainted portion of the system chassis.

3. Frequently ground yourself to discharge any static electric charge that may build up in your body while working on installation and/or configuration.
4. Handle the mainboard by its edges or by the mounting bracket to avoid touching its components.

Unpacking the Mainboard

This Mainboard package contains the following items:

1. The **i440LX** Mainboard
2. This User's Guide
3. Cables: 1 slot1 supporter and holder;
1 floppy ribbon cable;
1 IDE ribbon cable
4. The Device Driver for **i440LX**

Note: Do not remove the mainboard from its original package until you are ready to install it.

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

1. Before handling the mainboard, ground yourself by grasping an unpainted portion of the system's metal chassis.
2. Remove the mainboard from its anti-static packaging and place it on a grounded surface, component side up.

3. Check the mainboard for damage. If any integrated circuit appears loose, press carefully to seat it firmly in its socket.

Do not apply power if the mainboard appears damaged. If there is damage to the board contact your dealer immediately.

Chapter 2

Hardware Configuration

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.

Mainboard Component Locations

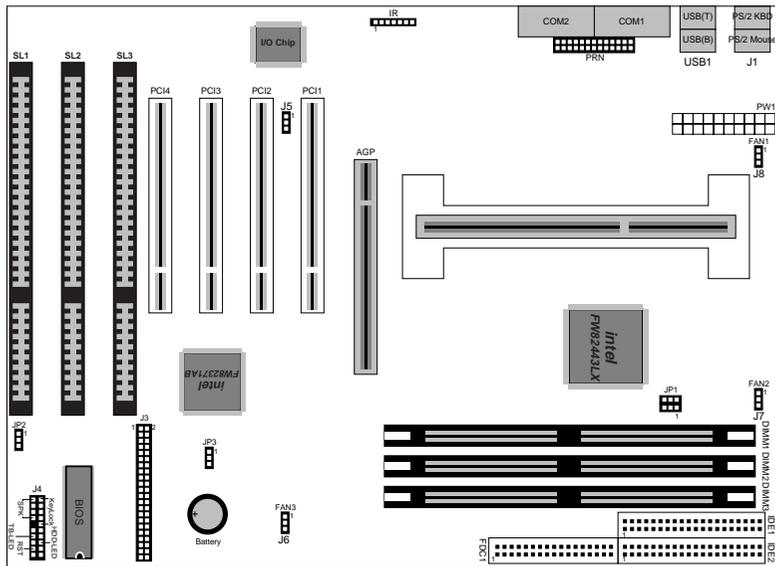
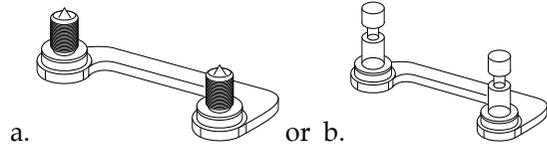


Figure 2–1. Mainboard Component Locations

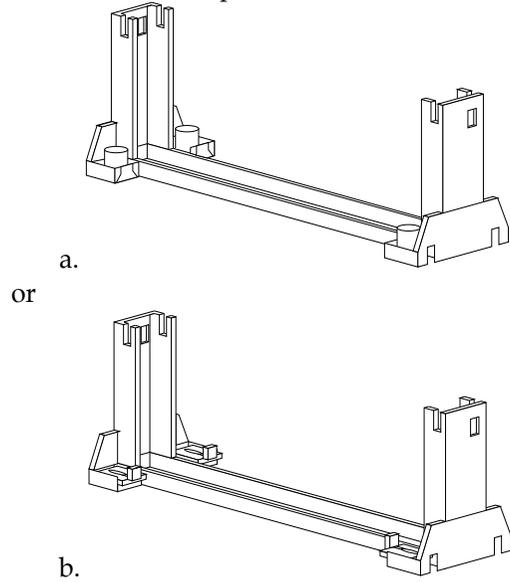
CPU Installation

This mainboard supports Intel Pentium® II CPU using 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 by the Installation Procedures section. And, item 1 and 2 together are the retention mechanism which the manufacture ships in two different types (a or b), refer to the proper procedures according to the type you received.

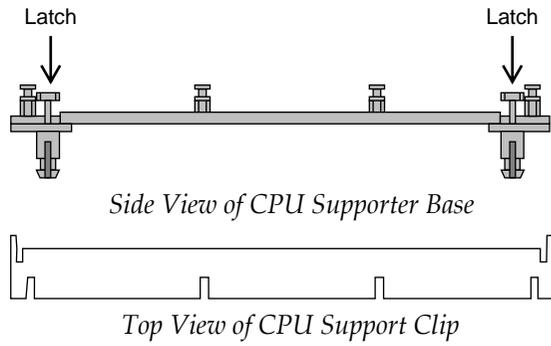
1) 2 screws:



2) 1 retention clip:



3) 1 heatsink support base and clip:

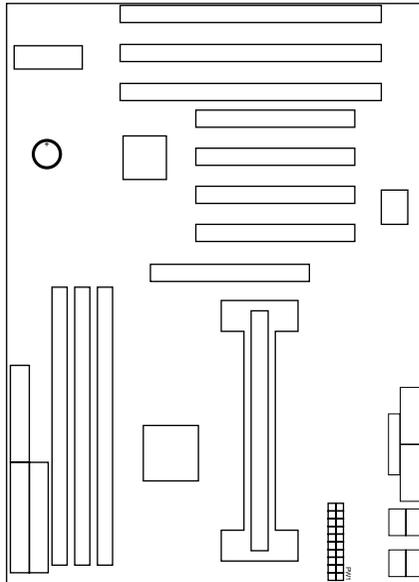


Installation Procedures

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

Step 1:

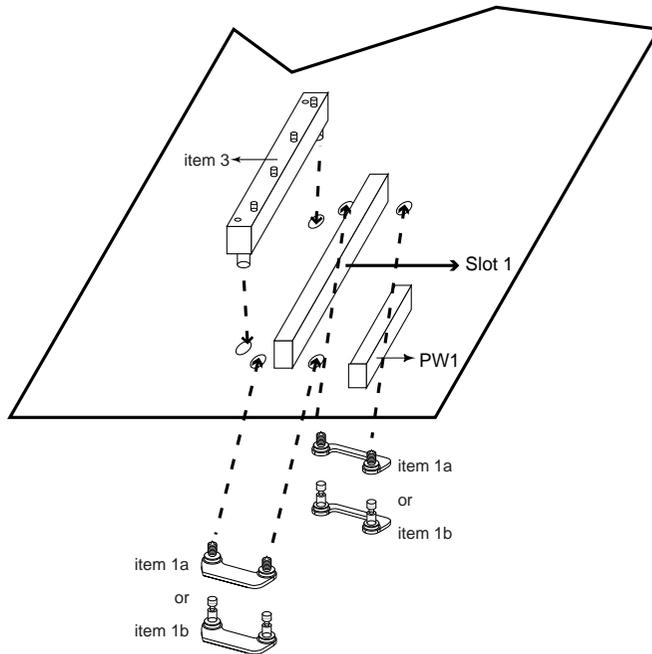
Make sure that the mainboard is set the same direction as the following drawing before doing any installation.



Insert the 2 pairs of screws (1a or 1b, depending on the type you received) from the bottom of the motherboard upward onto the mainboard.

Step 2:

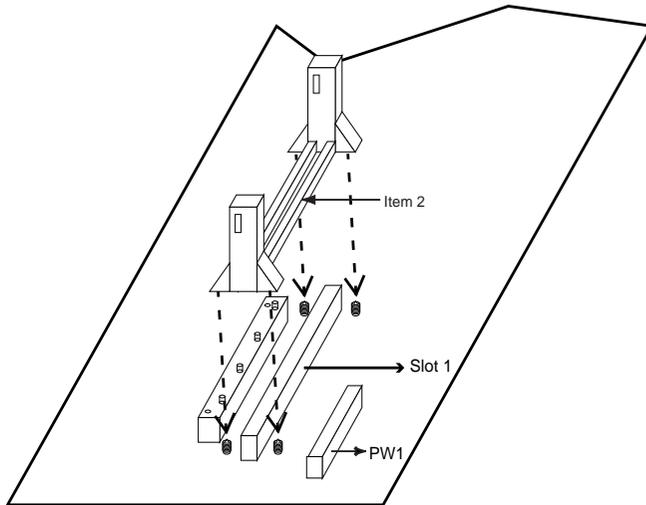
Insert the supporting base (3), which is shown below, into the two holes directly to the left of the 2 sets of screws that have just been inserted on to the board.



Insert the 2 latches into the two holes of the supporting base and then turn them 90° to secure the CPU.

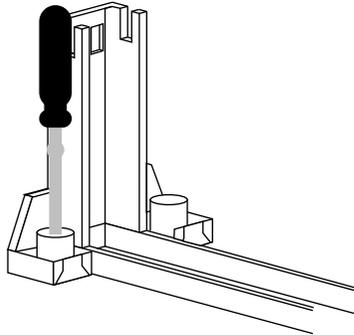
Step 3:

Set the retention clip (2) right on the top of the 2 sets of screws which are along the sides of Slot1.

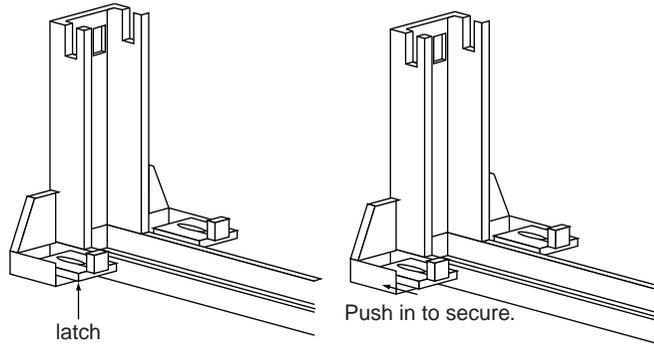


If the retention clip is installed incorrectly, you will not be able to insert the CPU into the retention clip and in this situation you might need to rotate the retention clip by 180°.

For the retention mechanism 1a and 2a, you need to tighten the 4 screws on the retention clip till the neck of the screws can not be seen from the bottom of the board

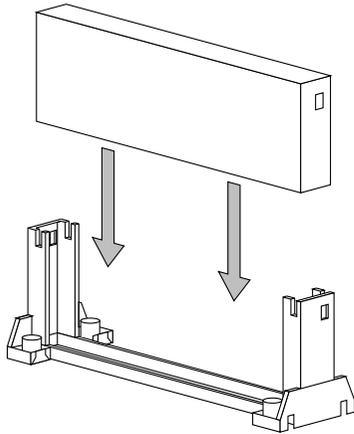


And for 1b and 2b retention mechanism, simply push the latches in to secure the screws.



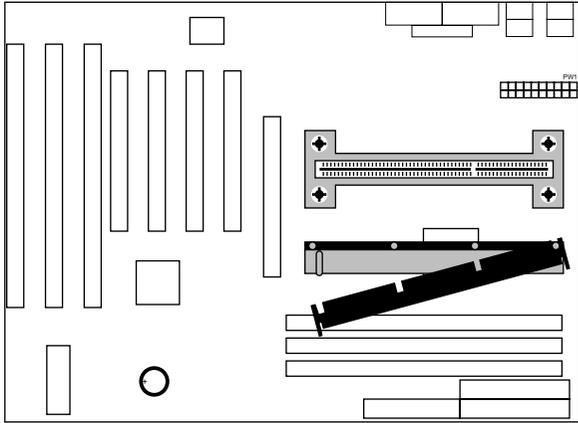
Step 4:

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



Step 5:

Insert the clip portion of the CPU supporter (3b) so that the heat sink can sit on the top of the whole CPU supporter.



Connectors

Attach system components and case devices to the mainboard via the mainboard connectors. A description of each connector and its connector pins 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 Style Power Connector

The ATX power supply provides a single 20-pin connector.

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

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.

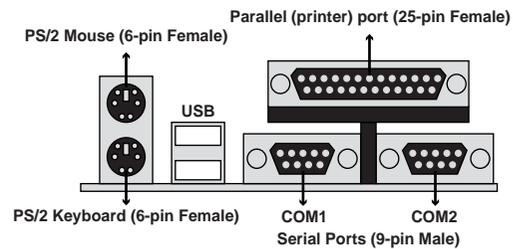
External Connectors Location

COM1/2 – Serial Port #1/#2

PRN – Parallel Printer Connector

FDC1 – Floppy Disk Drive Connector

IDE1/IDE2 – Primary/Secondary IDE Connectors



Side View

J1 (Bottom) – PS/2 Keyboard Connector

A standard 6-pin female DIN keyboard connector is located at the rear bottom part of the board. Figure 2-1 and 2-2 show you where J1 is located on the board and the relation with other external connectors.

Pin	Description
1	Ground
2	Keyboard Data
3	N.C.
4	+5V
5	Keyboard Clock
6	N.C.

J1 (Top) – PS/2 Mouse Connector

PS/2 mouse connector is a standard 6-pin female connector. Refer to Figure 2-1 and 2-2 for its location.

USB1 (Top, Bottom) – 2 sets of Universal Serial Bus (USB) Connectors

USB1 (Top, Bottom)	
Pin	Description
1	+5V
2	Data -
3	Data +
4	Ground

Jumper Settings

JP1 – DIMM Voltage Selectors

Voltage	Setting
5V	
3.3V (default)	

Note: The 3.3V type of DRAM is required, if this mainboard has no JP1.

JP2 – Flash ROM Voltage Selector

Description	Setting
12V	
5V	

JP3 – CMOS RAM Discharge Selector*

Description	Setting
Normal Mode	
Clear CMOS (default)	

J3 – LM78 Upgrade Kit**J4 (2, 4, 6, 8, 10) (KEY LOCK) – 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) (SPK) – Speaker Connector

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

J4 (13, 14) (TB-LED) – Turbo LED Connector

Pin	Description
13 (+)	Anode
14 (-)	Ground

J4 (15, 16) (HDD-LED) – HDD LED Connector

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

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

Attach the Reset push button cable to this connector.

Setting	Description
Open	Normal Mode
Close	Reset System

J4 (19, 20) – Over-Ride Power Button

When the system is turned off, Push the power button to turn the system back 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 to turn the system completely off.

When the system is in the Suspend mode, push the power button rapidly to turn the system on.

J5 – Wake-on-LAN Connector

Pin	Description
1	5VSB
2	Ground
3	Wake Up

J6 (FAN3) – Chassis Fan Connector**J7 (FAN2) – CPU Fan Connector****J8 (FAN1) – Power Supply Fan Connector**

Pin	Description
1	to LM78
2	+12V
3	Ground

IR – Infrared Module Connector

Pin	Description
1	IRRXL
2	Ground
3	IRTX
4	+5V
5	IRRXH
6	+5V
7	Ground

Memory Installation

The mainboard lets you add up to 384MB of system memory through DIMM sockets on the board. Each bank consists of three 168-pin 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 (168-pin DIMM)	4MB, 8MB, 16MB, 32MB, 64MB, 128MB
Bank 1 DIMM2 (168-pin DIMM)	4MB, 8MB, 16MB, 32MB, 64MB, 128MB
Bank 2 DIMM3 (168-pin DIMM)	4MB, 8MB, 16MB, 32MB, 64MB, 128MB
Total System Memory = Bank 0 + Bank 1 + Bank 2	

- Notes:
1. The speed of all DIMM modules have to be faster than 70ns.
 2. Use 2 DRAM types: Extend Data Out (EDO), or Synchronous DRAM (SDRAM) for DIMM socket.

Chapter 3

BIOS Setup

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.

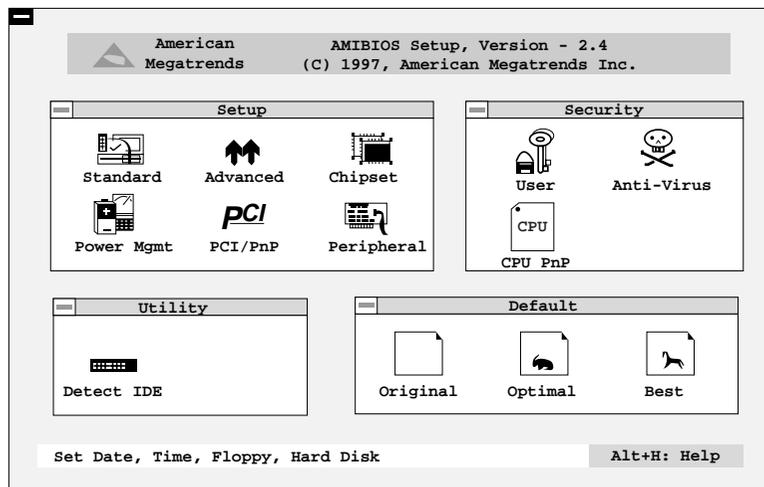
The system setup is also called CMOS setup. Normally, you need to run system setup if either the hardware is not identical with information contained in the CMOS RAM, or if the CMOS RAM has lost power.

Note: When installing newer BIOS into this mainboard, JP3 must be set to clear CMOS position for a moment then set back to Normal Mode, or hold down the <End> key then power on to reboot the system.

Entering WinBIOS Setup

To enter the WinBIOS Setup program:

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



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

Default

Every option in the BIOS Setup contains three default values: Original default, Best default, and the Optimal default value.

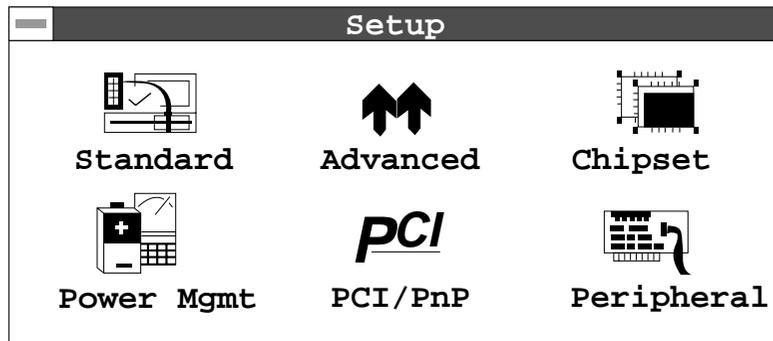
Original: The original default values recover the modified settings to the original values.

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

Best: The Best default values provide best performance settings for all devices and system features, but dependent used devices and we aren't guaranty that system run overnight on these settings.

Setup Window

The Setup window has six icons that allow you to set system configuration options.



Standard Setup

The WinBIOS Setup options described in this section are displayed by choosing the Standard icon from the Setup section on the WinBIOS Setup main menu. All Standard Setup options are described in this section.

- Pri Master** Choose these icons to configure the hard disk drive named in the option. When you click on an icon, the following parameters are listed:
- Pri Slave**
- Sec Master**
- Sec Slave** Type, LBA/Large Mode, Block Mode, 32Bit Mode, and PIO Mode. All parameters relate to IDE drives except **Type**. Choose the **Type** parameter and select Auto BIOS automatically detects the IDE drive parameters and displays them. Choose on **LBA Mode** and choose *On* to enable support for IDE drives with capacities greater than 528MB. Click on **Blk Mode** and choose *On* to support IDE drives that use Blk Mode. Click on **32Bit Mode** and click on *On* to support IDE drives that permit 32-bit accesses.
- 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.
- Floppy Drive A; B** Choose the Floppy Drive A or B icon to specify the floppy drive type. The settings are 360KB 5¹/₄", 1.2MB 5¹/₄", 720KB 3¹/₂", 1.44MB 3¹/₂", or 2.88MB 3¹/₂".

Advanced Setup

The WinBIOS Setup options described in this section are displayed by choosing the Advanced icon from the Setup section on the WinBIOS Setup main menu. All Advanced Setup options are described in this section.

Quick Boot	Set this option to <i>Enabled</i> to permit 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 <i>Yes</i> or <i>No</i> to search other boot devices to boot up the system when all the options in the previous function failed.
S.M.A.R.T for Hard Disks	Choose <i>Enabled</i> or <i>Disabled</i> . This option allows you to utilize the S.M.A.R.T. function of HDDs.
Floppy Drive Swap	This option allows you to swap floppy drives between A: and B:.
Floppy Drive Seek	Choose <i>Enabled</i> or <i>Disabled</i> . <i>Disabled</i> provides a faster boot and reduces the possibility of damaging the heads.
PS/2 Mouse Support	When this option is set to <i>Enabled</i> , BIOS supports a PS/2-type mouse.
Primary Display	This option configures the primary display subsystem in the computer. The settings are <i>Mono (monochrome)</i> , <i>40CGA</i> , <i>80CGA</i> , or <i>VGA/EGA</i> .

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

C000, 16K Shadow; C400, 16K Shadow; C800, 16K Shadow; CC00, 16K Shadow; D000, 16K Shadow; D400, 16K Shadow; D800, 16K Shadow; DC00, 16K Shadow	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.

Chipset Setup

Choose the Chipset icon from the Setup section on the WinBIOS Setup main menu. All Chipset Setup options are then displayed and are described in the following section:

Auto Configure EDO DRAM Timing	Set this option to enable the Auto Configuration of DRAM Timing.
EDO DRAM Speed (ns)	Based on the type of your EDO RAM, set this option to either 60ns or 70ns.
EDO Read Burst Timing	Set this option to select the proper EDO DRAM Read Timing.
EDO Write Burst Timing	Set this option to select the proper EDO DRAM Write Timing.
8 bit I/O Recovery Time	This option specifies the length of a delay inserted between consecutive 8-bit I/O operations.

16 bit I/O Recovery Time	This option specifies the length of a delay inserted between consecutive 16-bit I/O operations.
DRAM Integrity Mode	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 detection between single-bit and multiple-bit errors and recovery of single-bit errors.
A.G.P. Aperture Size (64MB)	Choose 4MB, 8MB, 16MB, 32MB, 64MB, 128MB, or 256MB. Memory-mapped, graphics data structures can reside in the Graphics Aperture. Use the default setting.
On Board USB	Choose Enabled or Disabled. Set this option to enable the system BIOS USB (Universal serial Bus) functions.
USB Function for DOS	Choose Enabled or Disabled. Set this option to enable the passive release on the USB (Universal Serial Bus).
System Hardware Monitor; Current CPU Temperature; Current System Temperature	The onboard hardware monitor is able to detect the temperatures of CPU and mainboard. These values refresh upon any key entry. Set to Ignore Only if necessary.

Current CPU Fan Speed;	The onboard hardware monitor is able to detect the chassis fan speed, CPU fan speed, and the power supply fan speed in Rotations Per Minute (RPM). These values refresh upon any key entry in the BIOS setup screen. Set to Ignore if one of these options are not used and no error message will be given.
Current Fan#1 Speed;	
Current Fan#2 Speed	
VCore;	The onboard hardware monitor is able to detect the voltage which is put out by the voltage regulators. These values refresh upon any key entry. Set to Ignore only if necessary.
Vtt;	
Vio;	
+5.000V	

Power Management Setup

The BIOS Setup options described in this section are selected by choosing the Power Mgmt icon from the Setup section on the WinBIOS Setup main menu.

Power Management/APM	Set this option to enable power management features and APM (Advanced Power Management).
Green PC Monitor Power State	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.
Video Power Down Mode	This option specifies the power conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity has expired.

- Hard Disk Power Down Mode** This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.
- Standby Time out (Minute)** 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.
- Suspend Time out (Minute)** 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 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.
- Device 6 (Serial Port 1);**
Device 7 (Serial Port 2);
Device 8 (Parallel Port);
Device 5 (Floppy Disk);
Device 0 (Primary Master IDE);
Device 1 (Primary slave IDE);
Device 2 (Secondary Master IDE);
Device 3 (Secondary Slave IDE)
- CPU Critical Temperature** System will alarm when the temperature of CPU is over the preset value.

RTC Alarm Resume From Soft Off 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
RTC Alarm Hour; time on Date/ Hour /Minute/Second.
RTC Alarm Minute;
RTC Alarm Second

PCI/PnP Setup

Choose the PCI/PnP icon from the Setup section on the WinBIOS Setup main menu.

Plug and Play Aware OS Set this option to *Yes* if the operation system in this computer is aware of and follows the Plug and Play specification. Currently, only Windows 95 is PnP-aware.

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).

Assign IRQ to PCI VGA This option is used to allocate IRQ to PCI VGA. Recommendation is set to *NO*.

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.

OffBoard PCI IDE Primary IRQ; These options specify the PCI interrupt used by the Primary (or secondary) IDE channel on the offboard PCI IDE controller.
OffBoard PCI IDE Secondary IRQ

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.

Peripheral Setup

Choose the Peripheral icon from the Setup section on the WinBIOS 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.
- IR Duplex Mode** This option shows up only when either IrDA or ASKIR is chosen in the previous option (Serial Port2 Mode).
- 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.

Security

User

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 discharge CMOS memory using Jumper JP3.

Anti-Virus

This item protects the boot sectors and partitions table of your hard disk against accidental modifications. Any attempt to write to boot sectors and partitions will cause the system to halt and you need to use a bootable none virus floppy disk to reboot the system and then run the virus checking program to make sure that your system is ok.

The default setting is "Disabled." This setting is recommended due to the conflicts within new operating systems.

CPU PnP

CPU Speed Ratio Select this option to specify the speed of CPU.

Utility

Detect IDE

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.

Exit WinBIOS Setup

Press the <ESC> key to exit the BIOS setup program while in the main menu of the WinBIOS Setup and the following three options will be displayed on the screen.

Save Changes and Exit

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

Do Not Save Changes and Exit

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

Continue

Select this item to return to the WinBIOS setup program.