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M596, Version 1.3
October 1998

Notice :

Make sure the CMOS Clear jumper is set to Normal mode before use.
The shipped mainboard is set to Clear CMOS that will be not boot up the system.
See CMOS Clear Selector in Jumper Settings section!

Chapter 1
Introduction

This mainboard is a high-performance mainboard based on the advanced Pentium™ microprocessor and featuring PCI Local Bus and the high-end chipset. The mainboard offers a high degree of flexibility in configuration and is fully IBM PC/AT compatible.

Key Features

The advanced features of this mainboard include:

- Supports P54C/P55C (MMX) Pentium® CPUs and Cyrix/IBM 6x86L/6x86MX/MII, AMD K6/K6-2, IDT C6 CPUs with Frequency at 50/55/60/66/75 MHz.
  Provides **CPU Plug and Play** feature for faster and easier CPU installation.

- Provides 2 DIMMs for SDRAM/EDO/FP memory modules.
  Supports a maximum size of 512MB system memory.
  Onboard 64-bit 512KB L2 cache.

- Provides 3 PCI and 1 ISA slots, supports 5V PCI bus Interface.

- Onboard 2 channel IDE,
  - maximum four IDE devices support.
  - supports PIO, PCI Bus Master and Ultra DMA/33 operation modes.

- Provides ATX power connectors and features of ATX power,
  - Power Button Power On.
  - Modem Wake Up.

- Onboard **64-bit VGA Graphics Accelerator**,
  - high performance 64-bit GUI accelerator with excellent video playback capability.
  - system memory shares up to 4MB with frame buffer.
  - high resolution graphic modes up to 1024x768.

- Onboard **3D Sound Pro** meets PC98' specifications,
  - supports both Sound Blaster 16/Pro and Windows Sound System.
  - supports HRTF 3D Positional Audio technology.
  - provides drivers for Windows Direct Sound 3D.
  - provides drivers for 3D games that use Aureal software interface.
  - Digital Audio Interface(SPDIF) IN/OUT.
  - Software Wave-table Synthesizer.
  - full Duplex 16-bits CODEC with filters.
  - Stereo Mixer supports analog mixing from CD-Audio, Line-In, and digital mixing from voice, FM/Wave-table and digital CD-Audio.

- Onboard Multi-I/O and Peripheral interface, include:
  - 1 floppy port with 1 Mb/s transfer rate.
  - 2 serial ports with 16550 compatible Fast UART.
  - 1 parallel port with EPP and ECP capabilities.
  - 2 USB ports & PS/2 keyboard/mouse ports.
  - 1 IR interface.

- Onboard **2M Flash ROM** supports complete ACPI and Legacy PMU and is fully compatible with PC97 and PC98.
  BIOS provides Plug & Play function which detects the peripheral devices and expansion cards automatically.
  Supports Trend's **ChipAwayVirus** option to ensure the entire boot process is virus free, no installation and configuration worries.

- Bundled **PC-cillin98** (OEM) provides automatic virus protection for Windows 95/98 and the Internet.

- Dimension: Micro ATX Form Factor, 24.4cm(L) x 19cm(W).

Unpacking & Static Electricity Precautions

This mainboard package contains the following items:

1. The mainboard & device driver
2. This user's guide
3. SPDIF/IN cable
4. AT cables
5. VGA cable/bracket

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.

Chapter 2
Hardware Configuration

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.

Mainboard Component Locations

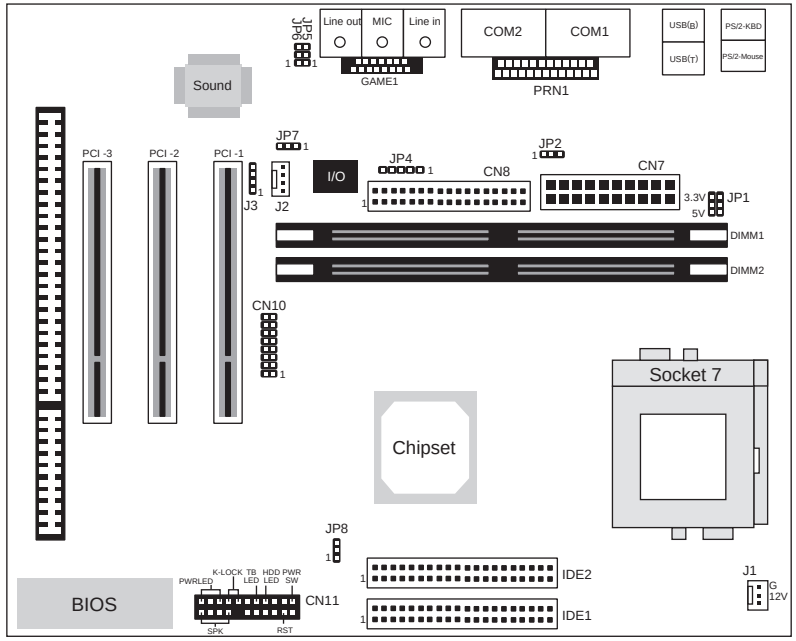


Figure 2-1. Mainboard Component locations

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.

CN7 – 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 95/98.

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 menu is set to

Monitor and the Ring Active option is set to *Enabled* in the BIOS setup section (Refer to the Power Management section in Chapter 3.)

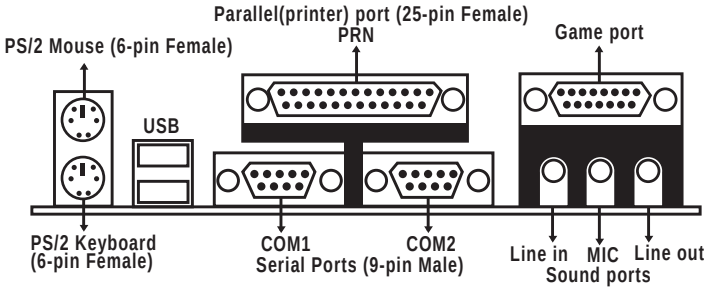
CN11(PWRSW) - Power Button Connector

When the system is off, push the power button to turn the system on. When the system is on, push the power button to turn the system completely off.

CN10 - VGA Connector

Pin	Signals	Pin	Signals	Pin	Signals	Pin	Signals
1	R	5	Ground	9	Vcc	13	H SYNC
2	G	6	Ground	10	Ground	14	V SYNC
3	B	7	Ground	11	NC	15	DDC CLK
4	NC	8	Ground	12	DDC DATA		

External Connectors Location



Side View

CN8 - Floppy Disk Port
IDE1/IDE2 - Primary/Secondary IDE Ports

CN11(PWRLED & K-LOCK) - Power LED & Keylock Connector

Pin	Description
1	LED Output
2	N.C.
3	Ground
4	Keylock
5	Ground

CN11(SPK) - Speaker Connector

Pin	Description
1	+5v
2	Ground
3	Ground
4	Data Out

CN11(TB LED) -Turbo LED Connector

Pin	Description
+	Anode
−	Ground

CN11(HDD LED) - HDD LED Connector

Pin	Description
+	+5V
−	Active Low

CN11(RST) - Reset Switch Connector

Attach the Reset push button cable to this connector.

Setting	Description
Open	Normal Mode
Close	Reset System

CN11(PWRBT) - Power Button Connector

Refer to Page 12.

JP4 - Infrared Connector

Pin	Signals
1	+5 VDC
2	Reserved
3	IR In
4	Ground
5	IR Out

J1 - Fan Power Connector

Pin	Signals
1	N.C.
2	+12V
3	Ground

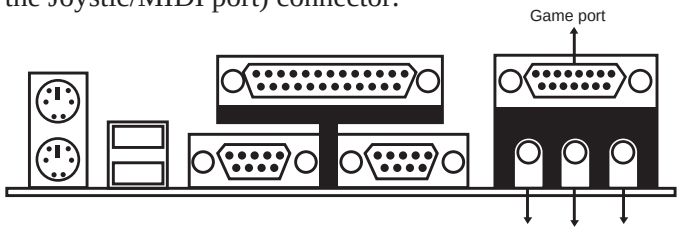
Sound Pro Connectors

J2/J3 - Analog Audio from CD-ROM

Connect to "AUDIO" port of the CD-ROM drive. For Panasonic or compatible type of CD-ROM, connect to J2 (signals assignment G-L-G-R). For Sony or compatible type of CD-ROM, connect to J3(signals assignment L-G-G-R).

Sound and Game(on the External Connectors)

Mainboard provides Line-IN, MIC(microphone), Line-OUT (speaker) audio jack and Game port(which is also used as the Joystic/MIDI port) connector.



Side View

JP6 - Digital Audio IN

Connect to "DIGITAL AUDIO" port of the CD-ROM drive by using the SPDIF/IN cable, which gives you the non-distortion digital audio from CD-ROM. Connect to pin1 & pin2 for 5V device, connect to pin3 & pin2 for 0.5V device.

JP5 - Digital Audio OUT

Connect to the external Audio Amplifier or Mini-Disk by using optional SPDIF/OUT bracket/cable set, selectable output signal level depends on the device need. Connect to pin1 & pin2 for 5V device, connect to pin3 & pin2 for 0.5V device.

Notice for Sound Pro drivers install and application

1. Before you install the Sound Pro drivers, make sure your Operating System has been installed, otherwise the Sound Pro might be detect as "Other Device" by the device manager of your OS.
2. After the drivers install, select MULTIMEDIA icon within CONTROL PANEL. Select WSS(Windows Sound System) as the equipment while playback, and select the SB16(Sound Blaster 16) as the equipment while recording, then click "OK" to confirm, thus ensure the chip to work with full duplex applications.
3. If you wants to use Software Wave-Table drivers as MIDI output device, select MULTIMEDIA icon within CONTROL PANEL. Select MIDI page, and click on "SoftMidi Driver" then click "OK" to confirm.
4. A Windows application named Audio Rack is provided within Sound Pro drivers, which gives you control over all audio functions through a user interface as simple to use a home stereo system, we recommended you to use the System Mixer within Audio Rack to control the volume, recording device select and recording gain.
5. If you using devices that use Midi port as the control interface, you need to enable the "MPU-401 MIDI" through the MIDI device setting of Sound Pro Audio Rack.
6. See details of Sound Pro manual within the CD attached with the mainboard.

Jumper Settings

JP8 - CMOS RAM Clear Selector

Description	Setting
Normal Mode	
Clear CMOS (while shiping)	

JP1 - DIMM Voltage Selectors

Voltage	Setting
3.3V	
5V	

JP7 - Onboard Sound Selector

Description	Setting
Disabled	
Enabled (default)	

Memory Installation

The mainboard lets you add up to 512MB of system memory. Two DIMM sockets are divided into two banks: Bank 0, Bank 1. 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
System Memory =	Bank 0 + Bank 1

Notes: 1. The speed of all DIMM modules have to be faster than 70 ns.

2. The DRAM must be installed in DIMM1 first, if onboard VGA is being used.

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.

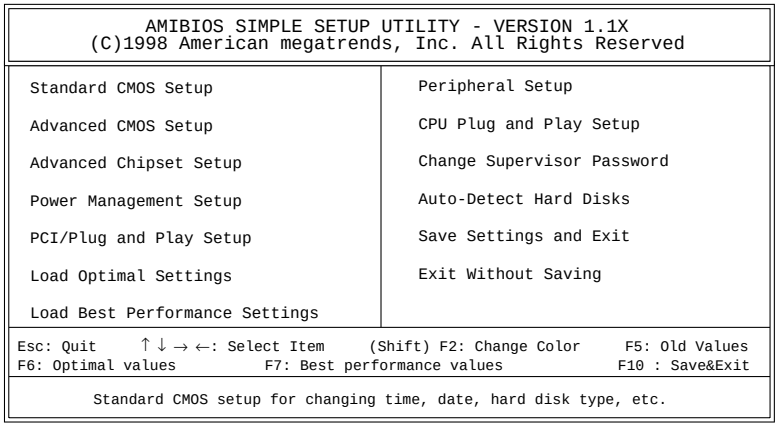
Note: When installing newer BIOS into this mainboard, JP8 must be set to clear CMOS position for a moment then set back to Normal Mode or hold down the <End> key then power on to reboot the system.

Entering 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:



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

Default

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

This option provides the best performance settings for all devices and system features, but, the manufacturer is not guaranty that the system will run smoothly overnight for these devices.

BIOS Setup

Standard CMOS Setup

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

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

Pri Master
Pri Slave
Sec Master
Sec Slave

Choose these options to configure the hard disk drive named in the option. When you click on an option, the following parameters are listed: Type, LBA Mode, Blk Mode, PIO Mode, and 32Bit 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.

Floppy Drive A, B Choose the Floppy Drive A or B option to specify the floppy drive type. The settings are 360KB $5^1/_4$", 1.2MB $5^1/_4$", 720KB $3^1/_2$", 1.44MB $3^1/_2$", or 2.88MB $3^1/_2$".

Advanced CMOS Setup

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

1st Boot Device
2nd Boot Device
3rd Boot Device
4th Boot Device
Set these options to select the boot sequence from different booting devices.

Try Other Boot Devices Set this option to enable other booting devices.

Quick Boot Select this option to Enabled to permit BIOS to boot within 5 seconds.

Boot Up Num-Lock When this option is set to *On*, BIOS turns off the *Num Lock* key when the system is powered on so the end user can use the arrow keys on both the numeric keypad and the keyboard.

Floppy Drive Swap Set this option to *Enabled* to specify that floppy drives A: and B: are swapped.

Floppy Drive Seek Choose Enabled or Disabled. *Disabled* provides a fast boot and reduces the possibility of damaging the heads.

PS/2 Mouse Support When this option is set to *Enabled*, BIOS supports a PS/2-type mouse.

Boot To OS/2 You need to set this option to Enabled when using the OS/2 operating system with installed DRAM which is greater than 64MB.

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 BIOS 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 Change Supervisor Password option on the BIOS Setup main menu.

Internal Cache This option selects to enable the internal cache or not.

External Cache This option selects to enable ExternalCache or not.

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; Enabled: The contents of the ROM areaare
C400, 16K Shadow; not only copied from ROMto RAM
C800, 16K Shadow; for faster execution, thecontents of
CC00, 16K Shadow; the RAM area canbe written to or
D000, 16K Shadow; read from cachememory.
D400, 16K Shadow; Cached: The contents of the ROM areaare
D800, 16K Shadow; copied from ROM to RAMfor
DC00, 16K Shadow faster execution.

Advanced Chipset Setup

Choose the Advanced Chipset Setup from the BIOSSetup main menu. All Chipset Setup options are thendisplayed and are described in the following section.

Trend ChipAway Virus Set this option to Enabled the ChipAwayVirus function.

DRAM Auto Configuration Set this option to enable the Auto ConfigurationDRAM Timing and Refresh Cycle Time by CPU CLK functions.

SDRAM Access Time There are 3 optional timings for this item: 10ns, 12ns, 15ns. Depends on the type of SDRAM you use to select the propersetting.

EDO DRAM Access Time; FP DRAM Access Time	Choose either 60ns or 70ns. Depends on the type of DRAM you use to select the proper setting.
MEMORY HOLE at 15M - 16M	Set this option to Enabled Memory Hole at 15 MB ~ 16 MB memory address, that will be permit the memory management program under legacy operating system (ex. DOS) to control the block memory at 15 MB ~ 16 MB .
USB Function	Set this option to *Enabled* to enable USB functions on Chipset.
USB Legacy Support	Set this option to *Enabled* to enable the system BIOS USB functions for DOS.
OnBoard VGA	Set this option to *Enabled* to enable the VGA feature on the chipset.
VGA Shared Memory Size	When OnBoard VGA is set to *Enabled,* the system must share memory with VGA.
VGA Frequency	Choose 55MHz for Fast Page Mode DRAM and 65MHz for EDO DRAM.
VGA Read Wait State	Set this option to Enabled the Wait State for VGA Read.

Power Management Setup

Choosing the Power Management Setup from the BIOS 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 BIOS 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.
Slow Clock Ratio	This option specifies the ratio of system clock while in standby state.

IRQ3(COM2/COM4); IRQ4(COM1/COM3); IRQ5 (LPT2);IRQ7 (LPT1);IRQ9; IRQ10; IRQ11; IRQ12 (PS2 Mouse);IRQ13(Math Coprocessor);IRQ14; IRQ15 When set to Monitor, these options enable the event monitoring on the specified hardware interrupt request line. If set to Monitor and the computer is in a power saving state, BIOS watches for any activities on the specified IRQ line. The computer will enter the full on power state if any activity occurs.

Ring Resume From Soft Off Set this option to enable the Modem Ring to wake up the system which is in the Green mode.

PCI/PnP Setup

Choose the PCI/Plug and Play Setup from the BIOSSetup 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 95/98 are PnP-aware.

Clear NVRAM Set this option to Yes to clear NVRAM.

PCI Latency Timer This option specifies the latency timings (in PCI clocks) for all PCI devices on the PCI bus.

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.

PCI IDE Bus Master Set this option to Enabled bus master for the PCI IDE.

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.

PCI IDE Primary IRQ; PCI IDE Secondary 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 Card 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. However, IRQ12 option will be disappeared while PS/2 Mouse Support option in the Advanced CMOS Setup is set to *Enabled*.

ReservedMemory Size, Address Set **t**hese options to select reserved memory size and started address for the IO card.

Peripheral Setup

Choose this Setup item from the BIOS Setup main menu.

Onboard FDC This option enables the FDC (Floppy Drive Controller) on the motherboard.

Serial Port1 This option specifies the base I/O port address of serial port 1.

Serial Port2 This option specifies the base I/O port address of serial port 2.

OnBoard Ir Port Set this option to *Enabled* the IR port.

Ir Mode; Ir Duplex Set these option to select the type of IR module.

On-board Parallel Port This option specifies the base I/O port address of the parallel port on themotherboard.

Parallel Port Mode This option specifies the parallel port mode.
Normal: The normal parallel port mode is used.
EPP: The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.

Parallel Port Mode (Continued) ECP: The parallel port can be used with devices that adhere to the Extended Capabilities Port(ECP) specification. ECP uses the DMA protocol to achieve data transfer rates up to 2.5MB per second. ECP provides symmetric bidirectional communication.

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 ECP

Onboard PCI IDE This option specifies the channel used by the IDE controller on the motherboard.

Pri. Master/Slave Prefetch; Sec. Master/Slave Prefetch These options are available if the setting of the Onboard IDE is not set to Disabled.

CPU Plug and Play

Choose this Setup item from the BIOS Setup main menu.

CPU Plug and Play Set this option to select CPU Plug and Play by *Auto* or *Manual*.

Processor Name This option was displayed only show the CPU name.

CPU Core Voltage; CPU Frequency Ratio; CPU External Frequency Set these options to select CPU Core Voltage/ Frequency ratio/external Frequency to match your CPU when CPU Plug and Play option is set to *Manual*.

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.