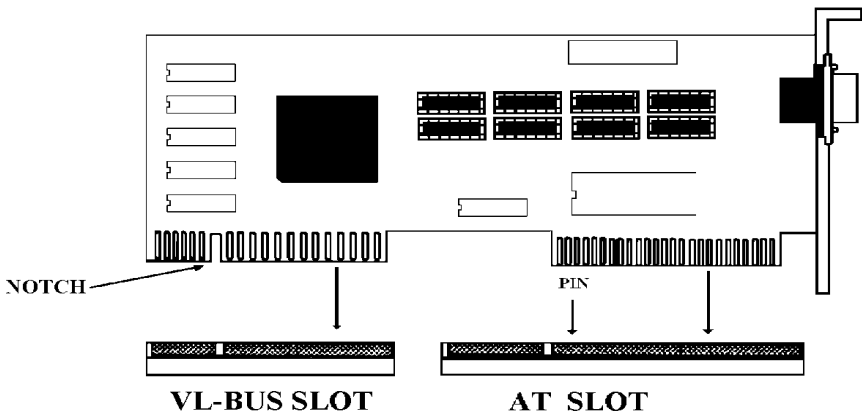# 486VP

VL/PCI System Board

USER'S MANUAL

Revision 1.0

!!! WARNING !!!

Be careful while installing VESA Local Bus cards on to your system board. Keep the following tips in mind to properly install and remove a VESA Local Bus card.

1. Always install/remove the card vertically straight down/up. **Never at an angle!** Inserting the card at an angle may damage the pins in both the AT and VESA Local Bus slots.

2. To install the board vertically, hold the card in the middle. Make sure that the card is even with both slots. Then gently fit the card into the slots with equal pressure at both ends.

> **Manufacturer warranty does not cover damage caused to the system board by improper installation or removal of VESA Local Bus cards.**

NOTCH

PIN

VL-BUS SLOT   **AT SLOT**

486VP QUICK REFERENCE

I. STANDARD CMOS SETUP

Date: Current date
Time: Current time
Hard Disk C: Type: Hard disk parameters
Hard Disk D: Type: Hard disk parameters
Floppy Drive A: Type of floppy drive installed
Floppy Drive B: Type of floppy drive installed
Video: Type of video card installed

II. BIOS FEATURES SETUP

Virus Warning: Disabled
CPU Internal Cache: Enabled
External Cache: Enabled
Boot Sequence: A,C
Swap Flopp Drive: Disabled
Boot Up Floppy Seek: Enabled
Boot Up Numlock Status: On
IDE HDD Block Mode Transfer: Disabled
Memory Parity Error Check: Enabled
Security Option: Setup
System BIOS Shadow: Enabled
Video BIOS Shadow: Enabled
C8000-CBFFF Shadow: Disabled
CC000-CFFFF Shadow: Disabled
D0000-D3FFF Shadow: Disabled
D4000-D7FFF Shadow: Disabled
D8000-DBFFF Shadow: Disabled
DC000-DFFFF Shadow: Disabled
E0000-E3FFF Shadow: Disabled
E4000-E7FFF Shadow: Disabled
E8000-EBFFF Shadow: Disabled
EC000-EFFFF Shadow: Disabled

II. CHIPSET FEATURES SETUP

	25 MHz	33 MHz	40 MHz	50 MHz
AT Bus Clock	CLK/3 or CLK/6	CLK/2 or CLK/4	CLK/2.5 or CLK/5	CLK/3 or CLK/6
SRAM Read Burst	3111	3222	3222	3222
SRAM Write WS	0WS	0WS	1WS	1WS
Special SRAM Wait State (WS)	Disabled	Enabled	Disabled	Disabled
DRAM Write WS	0WS	1WS	1WS	1WS
DRAM Read WS	2WS	3WS	3WS	3WS
RAS Precharge	2 Sysclk	3 Sysclk	3 Sysclk	3 Sysclk
RAS to CAS Delay	1 Sysclk	1 Sysclk	2 Sysclk	2 Sysclk

F0000 Cacheable: Enabled
C0000 Cacheable: Enabled
Cacheable Range: 0-128M
DRAM Page Mode: Slow Page Mode
15-16MB Access: Normal
1MB Cache Memory: Disabled
VGA Type: Standard
PCI Arbitration Rotate Priority: Disabled
PCI Post-Write Fast: Disabled
CPU Master Post-Write Buffer: 4
CPU Master Post-Write Burst Mode: Disabled
CPU Master Fast Interface: Disabled
PCI Master Post-Write Buffer: 4
PCI Master Post-Write Burst Mode: Disabled
PCI Master Fast Interface: Disabled
CPU Master DEVSEL# Time-Out: 6 PCICLK
PCI Master DEVSEL# Time-Out: 4 PCICLK

PREFACE

Thank you for purchasing the 486VP system board. This document gives an aid to the configuration and installation of this system board.

The information in this document is subject to change without notice.

This document contains information protected by copyright. All rights are reserved. No part of this document may be used or reproduced in any forms or by any means, or stored in a database or retrieval system, without prior written permission.

TRADEMARKS

Intel is a registered trademark of Intel Corporation.

IBM is a registered trademark of International Business Machines Corporation.

Microsoft is a registered trademark of Microsoft Corporation.

VESA is a registered trademark of Video Electronics Standard Association.

All other trademarks used in this manual are the property of their respective owners.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

The 486VP system board adds to our 486 product line high integration and cost effective solution without compromising performance and quality. With top speed at 50 MHz, VL-Bus and PCI Bus on the same board, and maximum 1MB Write-Back cache, the 486VP dramatically boosts system throughput for even the most demanding applications. The 486VP offers features and functionality exceeding any other system board in its class, including:

CPU:

- Intel i486DX4, i486DX2, i486DX, i486SX, i487SX, P24T, and Overdrives.

Cache Memory:

- Supports 256KB, 512KB, and 1MB cache sizes.

Main Memory:

- Supports 1Mx9, 4Mx9, 1Mx36, 2Mx36, 4Mx36, and 8Mx36 SIMM modules for up to 32 MBytes on-board memory.

Slots:

- Two 32-bit VESA Local Bus (VL-Bus) slots.

- Four PCI Local Bus slots.

- Four 16-bit ISA bus slots.

Green PC:

- Sophisticated system power management and system event monitoring through BIOS setup.

On-Board Battery:

- 3.6V/60mA on-board battery.

CHAPTER 2: JUMPERS & CONNECTORS

When working with the 486VP, it is extremely important that you avoid static electricity. Always ground yourself by wearing a wrist or ankle strap.

Figures 1 on the next page shows the component layout of the 486VP system board with locations of the system board jumpers and connectors. Note that most jumpers and connectors on the system board are labeled with proper names with pin 1 marked as "1" or thick line. To avoid damaging the board and to have proper operation caution should be taken when connecting these components.

SYSTEM BOARD JUMPERS

Jumpers are used to select between various operating modes. A jumper switch consists of two, three, or four gold pins projecting from the system board. Placing the plastic jumper cap over two pins connects those pins and makes a particular selection. Using the cap to cover two pins in this way is referred to as shorting those pins (ON position). If the cap is not placed on any pins at all, this is referred to as leaving the pins open (OFF position).

Note: When you open a jumper, leave the plastic jumper cap attached to one of the pins so you don't lose it.
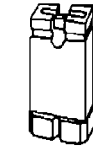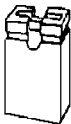
OPEN   SHORTED

2-pin jumper

PINS 1-2 SHORTED

3-pin jumper

FIGURE

If you are installing an i486DX or i486SX, the internal CPU clock speed is the same as the external CPU clock speed. This is different for i486DX4 or DX2 CPUs where the external speed is one-third or one-half of the internal speed respectively. For example, a 486DX2-66 has an external clock speed of 33 MHz.

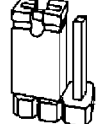| External Clock Speed	JP26	JP27	JP28	JP7	JP33	JP8	JP8A	JP61	JP13
25 MHz	ON	1-2*	2-3	ON	OFF	1-2	2-3	2-3	OFF
33 MHz	ON	2-3	1-2*	OFF	OFF	1-2	2-3	2-3	OFF
40 MHz	OFF	1-2	2-3	OFF	ON	2-3	1-2	1-2	ON
50 MHz	OFF	2-3	1-2	OFF	ON	2-3	1-2	1-2	ON

*Note :   For DX4 Only
Set JP27 OFF for 25Mhz
Set JP28 OFF for 33Mhz

CPU Type Jumpers

CPU TYPE	JP19	JP69	JP15	JP37	JP52	JP18
486DX4 486DX2 486DX	OFF	OFF	1-2	2-3	OFF	1-2,3-4
486SX	OFF	OFF	1-2	OFF	OFF	2-3
487SX P24T	OFF	OFF	1-2	1-2	OFF	1-2,3-4

Care should be taken when installing the CPU into the Pin Grid Array (PGA) socket on the system board. Make certain that pin 1 of the CPU chip is correctly aligned with pin 1 of CPU socket. The location of pin 1 on the CPU is denoted by a small notch.

Pin 1
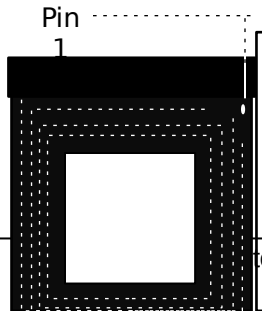
CPU Power Voltage Jumper

At the time of this writing, only i486DX4 requires 3.3-Volt power input. Select 5-Volt option for all other Intel CPUs.

JP80 Pin positionS

CPU VOLTAGE	JP80
5-V	1-3 , 2-4
3.3-V DX4	3-5, 4-6

2	4	6
1	3	5

Cache Size Jumpers

The system board supports 256KB, 512KB, and 1MB cache sizes.

Cache Size Jumper Selection

Cache Size	JP20	JP21	JP62
256KB	1-2	1-2	OFF
512KB	2-3	2-3	OFF
1MB	2-3	OFF	2-3

Cache Size and SRAM Locations

Cache Size	Tag RAM U28	Data Bank 0 U29, U30, U31, U32	Data Bank 1 U24, U25, U26, U27
256KB	32Kx8	32Kx8	32Kx8
512KB	32Kx8	NONE	128Kx8
1MB	128Kx8	128Kx8	128Kx8

For 1MB cache only: Go to Chipset Feature BIOS Setup to enable 1MB Cache Memory option.

Memory Bank Jumpers

The 486VP supports up to 2 banks of SIMM modules. SIM1 through SIM8 sockets support 30-pin SIMM modules. SIM9 and SIM10 support 72-pin modules.

SIM5-SIM8	SIM1-SIM4	SIM9	SIM10	JP22	JP23	JP24	JP25
BANK0 (1Mx9, 4Mx9)	BANK1 (1Mx9, 4Mx9)	NONE	NONE	1-2	1-2	2-3	2-3
NONE	NONE	BANK0 (1Mx36, 4Mx36)	BANK1 (1Mx36, 4Mx36)	2-3	2-3	1-2	1-2
BANK0 (1Mx9, 4Mx9)	NONE	NONE	BANK1 (1Mx36, 4Mx36)	1-2	2-3	1-2	2-3

PCI Bus Interrupt Jumpers

If there is a PCI IDE controller, insert it on to slot PCI3 located near memory banks. Interrupt IRQ14 is reserved for IDE. Non-IDE controllers such as SCSI can be installed on slots PCI0, PCI1, or PCI2 where user can select one additional shareable interrupt line such as 9, 10, 11, 12, or 15. **For ISA or VL-Bus IDE controllers, jumper JP10K should be set to OFF.**

SLOTS PCI0, PCI1, PCI2	SLOT PCI3 (IDE Controller)	JP10F	JP10G	JP10H	JP10I	JP10J	JP10K
IRQ9	N/A	1-2	OFF	OFF	OFF	OFF	OFF
IRQ10	N/A	OFF	1-2	OFF	OFF	OFF	OFF
IRQ11	N/A	OFF	OFF	1-2	OFF	OFF	OFF
IRQ12	N/A	OFF	OFF	OFF	1-2	OFF	OFF
IRQ15	N/A	OFF	OFF	OFF	OFF	1-2	OFF
N/A	IRQ14	OFF	OFF	OFF	OFF	OFF	2-4

Display Type Jumper

Display Type	JP5
Video display is VGA, EGA, or Monochrome.	OFF (Default)
Video display is CGA.	ON

Clear CMOS Data Jumper

The CMOS jumper JP2 is used to clear the system configuration data currently stored in the CMOS RAM. All system setup information (hard disk type, date/time, etc.), stored in the CMOS, will be destroyed. This function would be useful if you were to forget the user password for the system.

Function	JP2
Normal CMOS Operation	1-2 (Default)
Clear CMOS Data	2-3

Follow these steps to clear CMOS data:

1. Turn power OFF.

2. Open the system cover and gain access to jumper JP2.

3. Change jumper JP2 to 2-3 position for few seconds then move the jumper block back to 1-2 position again.

4. Replace and secure the system cover.

5. Turn power ON, CMOS data should be cleared.

FLASH BIOS Jumper

FLASH BIOS is an optional feature, contact our sale representatives for detail.

FLASH BIOS Control	JP12
Disable FLASH (optional) programming. This is normal operation.	1-2 (Default)
Enable FLASH BIOS programming. Contents of system board BIOS can be re-programmed.	2-3

Green PC Jumpers

Pin	JP3
1	Use this pin for controlling general purpose Green PC device. When signal on this pin goes low, the external Green PC device connected to this pin should go into power saving state. The power management feature must be enabled through BIOS Power Management Setup.
2	No Connection

Pin	JP39
1	System power down can be invoked by shorting pin 1 to pin 2 of this jumper. Make sure the BIOS Power Management Setup options are enabled. Connect a 2-position switch from the front panel to this jumper for manual control.
2	Ground

Reserved Jumpers

Following jumpers are reserved for manufacturer. Please leave the settings as shown below.

JP38	1-2, 4-5, 7-8, 11-12
JP10A, B, C, D, J	OFF
JP42, JP50, JP51, JP67	OFF
JP40	OFF
JP9	2-3
JP11	2-3
JP59	1-2
JP60	1-2
JP81	ON
JP34	ON
JP35	1-2
JP58	2-3
JP29, JP30, JP31, JP32	2-3
JP6	OFF
JP56	OFF
JP36, JP64, JP65, JP66	1-2
JP53	1-2, 3-4
JP54	1-2, 3-4
JP41	1-2
JP68	1-2
JP63	OFF
JP71	OFF
JP55	OFF
JP57	1-2
JP70	2-3

SYSTEM BOARD CONNECTORS

Power Supply Connectors

The two Power Supply connectors are 6-pin AT standard power connectors. Most power supplies have two six-wire connectors, two of the wires on each connector are black. Align the two six-wire connectors so that the two black wires on each connector are in the middle as shown below.
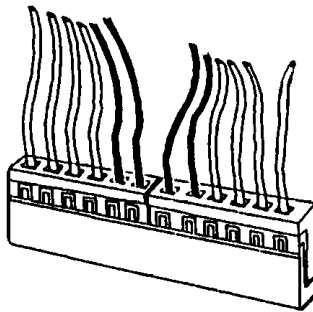
Pin	Connector J1	Connector J1
1	Power Good	Ground
2	+5 VDC	Ground
3	+12 VDC	-5 VDC
4	-12 VDC	+5 VDC
5	Ground	+5 VDC
6	Ground	+5 VDC

Keyboard Connector

The keyboard connector is a 5-pin, circular-type DIN socket. It is used to connect the system board keyboard interface to any standard AT-compatible keyboard (84 or 101 -key type keyboards).   The pin assignments are listed below:

Pin	Description
1	Keyboard Clock Signal
2	Keyboard Data Signal
3	Not Used
4	Ground
5	+5V Fused VDC

Power LED and Keyboard Lock Connector

The Power LED and Keyboard Lock connector (JP44) is 5-pin keyed BERG strip. It is used to connect +5 VDC power to the power indicator LED at the front panel and connect security keyboard lock to the keyboard controller. This allows you to switch off the keyboard and so provide limited security against casual intruders. The pin assignments are indicated below:

Pin	Description
1	LED Power
2	Key (No Connection)
3	Ground
4	Keyboard Lock
5	Ground

Speaker Connector

The Speaker connector (JP43) is a 4-pin keyed BERG strip. It is used to connect an external 2-inch, 8-ohm speaker to the system board to provide sound capability. The pin assignments are defined below:

Pin	Description
1	Speaker Data Out
2	Key (No Connection)
3	Ground
4	+5 VDC

Speaker Connection
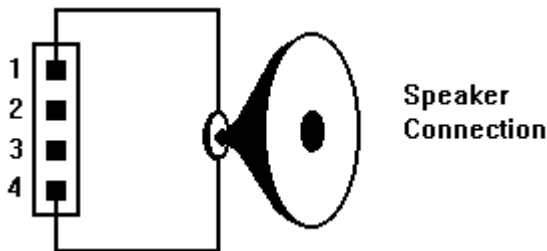
Reset Connector

The system RESET connector (JP45) is a 2-pin BERG strip. It is used to connect the push button reset switch located on the front panel to the system board. System reset can be done by shorting pin 1 to pin 2 with the same effect as turning the power off and then on again.

Pin	Description
1	Reset Input
2	Ground

Turbo Switch Connector

The Turbo switch (JP47) is a 2-pin BERG strip. It is used to connect the front panel 2-position push switch to the system board speed switching circuitry. In Turbo speed, the cache memory is enabled and full speed of 32-bit memory transfer is utilized. In non-turbo speed, the cache memory is disabled. In both speeds, the ISA expansion bus timing compatibility is still preserved.

Pin	Description
1	Turbo Speed
2	Ground

Notes:
- System runs at Turbo speed when pins 1 and 2 are OPEN.
- System runs at Slow speed when pins 1 and 2 are SHORTED.

Turbo LED Connector

The Turbo LED connector, marked as "JP46", is a 2-pin BERG strip. It is used to connect a CPU operating frequency indicator LED from the front panel to the system board. The pin assignments are indicated below:

Pin	Description
1	LED Cathode
2	LED Anode

CHAPTER 3: HARDWARE INSTALLATION

THE DRAM SIMMs

The 486VP supports up to 2 banks of SIMM modules. SIM1 through SIM8 sockets support 30-pin SIMM modules. SIM9 and SIM10 support 72-pin modules. DRAM speed must be 70ns or 60ns. You can configure the memory of the 486VP in a variety of ways. The chart below shows the possible combinations. Jumpers JP22 through JP25 also should be set accordingly.

Total Memory	SIM5, SIM6, SIM7, SIM8	SIM1, SIM2, SIM3, SIM4	SIM9	SIM10	JP22	JP23	JP24	JP25
4MB	1Mx9				1-2	1-2	2-3	2-3
8MB	1Mx9	1Mx9						
20MB	1Mx9	4Mx9						
16MB	4Mx9							
32MB	4Mx9	4Mx9						
4MB			1Mx36		2-3	2-3	1-2	1-2
8MB			1Mx36	1Mx36				
20MB			1Mx36	4Mx36				
8MB			2Mx36					
16MB			4Mx36					
32MB			4Mx36	4Mx36				
32MB			8Mx36					
8MB	1Mx9			1Mx36	1-2	2-3	1-2	2-3
20MB	1Mx9			4Mx36				
20MB	4Mx9			1Mx36				
32MB	4Mx9			4Mx36				

Installing DRAM SIMMs

STOP When working with DRAM SIMMs, it is extremely important that you avoid static electricity. Always ground yourself by wearing a wrist or ankle strap.

1. Insert the SIMM at a 45 degree angle.

2. Gently push the SIMM to an upright position until it "snaps" into place.

3. Repeat above steps until the entire bank is filled.
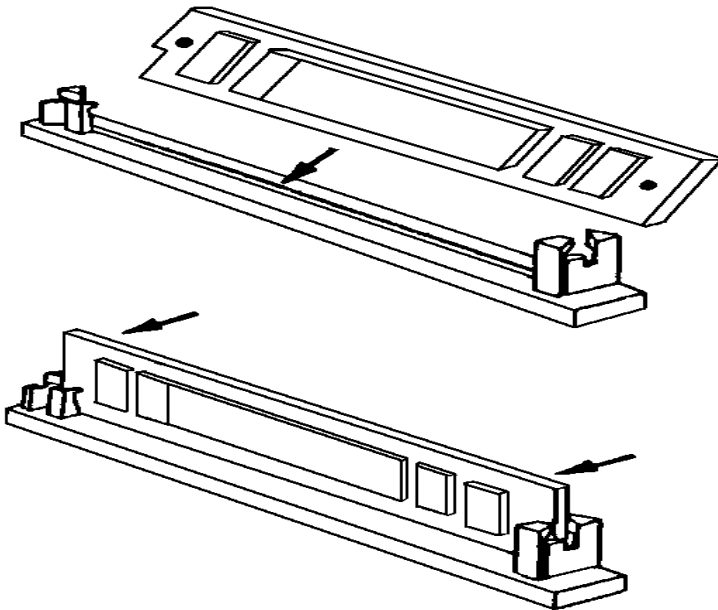
INSTALLING A VL-BUS CARD

Carefully follow these steps to install a VL-Bus card:

1. Turn off your computer and unplug the power cord.

2. Turn off the power to all peripheral devices, such as your printer.

3. Disconnect the cables from the back of the system in order to give more room to work. Note how all cables are connected prior to disconnection.

4. Remove the computer's cover.

5. Choose an unused VL-Bus slot.

6. Setting the VL-Bus card according to its user's manual.

7. Holding the card at the center of the top edge, gently push straight down with equal pressure at both ends.

8. Replace the screw to hold the card into place.

9. Replace and secure the system cover.

10. Reconnect all the wires and cables.

NOTCH   PIN

VL-BUS SLOT   AT SLOT
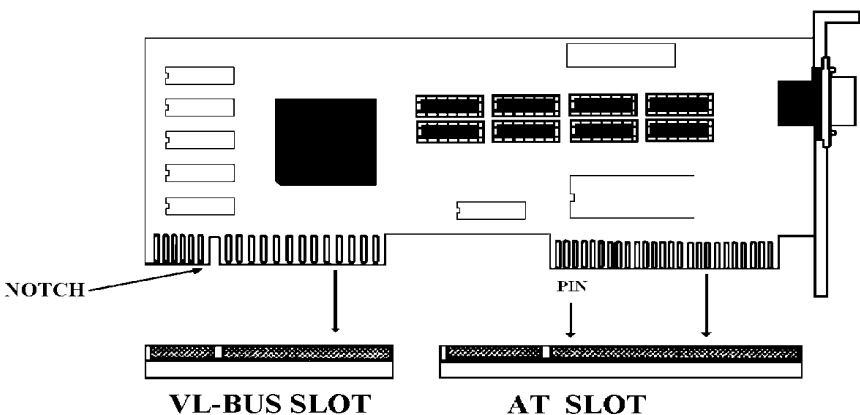
EQUIPMENT REQUIRED

The dimension of the 486VP system board is designed to fit perfectly in a PC/XT (or PC/AT) standard case. To build a complete high performance system based on the 486VP system board, the following equipment are needed:

A chassis with dimension similar to PC/XT/AT standard chassis.

A standard AT 220W power supply which is capable to provide a continuous power within a +4.85 VDC to +5.25 VDC range. A power line filter may be needed for areas with noisy transmission.

A 2-inch, 8-Ohm speaker to provide sound capability.

A 2-position switch with a 2-pin connector for speed function.

A push button switch with 2-pin connector for reset function.

One floppy drive (360K or 1.2M or 1.44M).

Hard disk drive.

A video card (Monochrome, CGA, EGA, VGA).

A set of flat cables for floppy drive and hard disk drive.

An AT-compatible keyboard (84 or 101 Keyboard) with cable.

A video display monitor.

Following additional equipment will be useful to enhance the system:

A bus or serial mouse.

A tape pack up drive.

CHAPTER 4: BIOS SETUP

You need to setup a system once every time:

- You start a new and unconfigured system.

- You receive a start-up error message indicating the configuration information stored in the non-volatile CMOS RAM has somehow become corrupted.

- You add, remove or change peripherals from your system.

The first time you power up the system, the configuration information stored in the battery-backed CMOS RAM may not be correct. The BIOS detects this condition and prompts user to go through the SETUP section. This chapter explains how to use the BIOS SETUP program and make the appropriate entries.

Some of the parameters are already factory preset and do not need to be changed. Please read the instructions carefully and only change the settings if necessary.

ENTERING SETUP

1. Reset the system by turning it OFF then ON or pushing the "RESET" button on the system front panel.

2. Hit the <**Del**> key momentarily as soon as the following message appears:

"Press DEL to enter SETUP"

3. After you press the <**Del**> key, the following BIOS Setup screen appears:

ROM PCI/ISA BIOS CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FEATURES SETUP	SAVE & EXIT SETUP
POWER MANAGEMENT SETUP	EXIT WITHOUT SAVING
PCI CONFIGURATION SETUP	
LOAD BIOS DEFAULTS	
LOAD SETUP DEFAULTS	
Esc : Quit F10 : Save & Exit Setup	↓→← : Select Item (Shift)F2 : Change Color
Time, Date, Hard Disk Type	

4. Choose an option and press <**Enter**>. Modify the system parameters to reflect the options installed in the system.

5. Press <**Esc**> at anytime to return to the Main Menu.

6. In the Main Menu, choose "**SAVE AND EXIT SETUP**" to save your changes and reboot the system. Choosing "**EXIT WITHOUT SAVING**" ignores your changes and exits the BIOS SETUP program.

In each setup screen, the following common keyboard controls may be used:

<**F1**>	:	Help
<**Shift**> <**F2**>	:	Change screen color
<**F5**>	:	Old Setup Values
<**F6**>	:	Load BIOS Default Values
<**F7**>	:	Load Setup Default Values
<**ESC**>	:	Exit Setup Section or Quit
<↓→←>	:	Select Setup Item

<**PG UP/ PG DN/ +/ ->**   :   Modify the Setup Item

STANDARD CMOS SETUP

Use the standard CMOS Setup screen to check or modify general configuration information such as the date, time, floppy type, hard disk type, video type, etc.

- *Date* (Month/Date/Year): You manually set the electronic calendar only if the values are incorrect.

- *Time* (Hour/Minute/Second): The time here is 24-hour time. You would enter 5:30 P.M. as 17:30:00.

- *Hard Disk C:/D: Type*: The BIOS provides 46 predefined types of popular hard disk drives. Relevant specifications include the number of cylinders and heads, write pre-compensation time, read/write head landing zone, number of sectors per track. A hard disk will not work properly if your enter incorrect drive parameters.

  If your particular drive is not one of the 46 pre-defined types, simply scroll down to select type "User" and enter the appropriate values for **cylinders**, **heads**, **WPcom**, **LZone**, and **sectors**.   **Size** is automatically determined by the other entries. You can also let the BIOS to determine the drive type by selecting "**IDE HDD AUTO DETECTION**" from the Main Menu.

- *Floppy Drive A: Type* (360KB, 720KB, 1.2MB, 1.44MB, 2.88MB, or None): Specify the type of the first floppy drive installed on the system. "None" could be used as an option for diskless workstations.

- *Floppy Drive B: Type*: Specify the type of the second floppy drive installed on the system.

- *Video:* (EGA/VGA, CGA 40, CGA 80, MONO) Normally select "EGA/ VGA".

After all selections have been done, press <**Esc**> key to exit this section.

BIOS FEATURES SETUP

"BIOS FEATURES SETUP" lists some system features that allows you to fine tune your system setup.

- **Virus Warning**: Select "Enabled" to protect the Boot sector of your hard disk from software virus such as "Michael Angelo".

- **CPU Internal Cache**: Select "Enabled" to enable the cache memory inside the 486 CPU chip.

- **External Cache**: Select "Enabled" to enable external on-board cache memory.

- **Boot Sequence**: If "A, C" (default), the BIOS will look for bootable operating system files from floppy drive A: first before looking for them in drive C:. You can reverse this sequence by selecting "C, A".

- **Swap Floppy Drive**: If this option is enabled, floppy drive A: will become floppy drive B: and vice versa.

- **Boot Up Floppy Seek**: Normally select "Enabled".

- **Boot Up NumLock Status**: When the computer boots, it selects the numeric values rather than the cursor control functions on the numeric keypad of IBM compatible keyboards. Most extended compatible keyboards have separate cursor control keys. It is therefore unnecessary to use the numeric keypad for this. The default setting is "On".

- **IDE HDD Block Mode Transfer**: Some latest IDE hard disks support multiple sector (Block Mode) transfer for faster performance. Users select "Enabled" to take advantage of this feature.

- **Memory Parity Error Check**: Default is "Enabled" to test for transmission errors in data read from memory.

- **Security Option**: Choose "Setup" or "System". Default setting is "Setup". The password feature can be used to prevent unauthorized system boot-up or unauthorized use of BIOS SETUP.

    "System"   Each time the system is turned on, the pass word prompt appears.

"Setup"   If there is a password set, the Password prompt only appears if you attempt to enter the BIOS Setup program. If there is no set password, the Password Checking Option is disabled. You create a password by using "PASSWORD SETTING" in the Main Menu.

● **System BIOS Shadow**: Shadowing helps to speed up BIOS access by copying BIOS code to fast 32-bit RAM area and executes it from there. The default setting is "Enabled".

● **Video BIOS Shadow**: Shadowing helps to speed up BIOS access by copying BIOS code to fast 32-bit RAM area and executes it from there. The default setting is "Enabled".

● **Adapter ROM Shadow**: Default setting is "Disabled". If you have other expansion cards with ROMs on them such as SCSI controller, you will need to know which addresses the ROMs use.

CHIPSET FEATURES SETUP

- **Auto Configuration**: Normally select "Disabled" to manually control system timing parameters as recommended below.

	25 MHz	33 MHz	40 MHz	50 MHz
AT Bus Clock	CLK/3 or CLK/6	CLK/2 or CLK/4	CLK/2.5 or CLK/5	CLK/3 or CLK/6
SRAM Read Burst	3111	3222	3222	3222
SRAM Write WS	0WS	0WS	1WS	1WS
Special SRAM Wait State (WS)	Disabled	Enabled	Disabled	Disabled
DRAM Write WS	0WS	1WS	1WS	1WS
DRAM Read WS	2WS	3WS	3WS	3WS
RAS Precharge	2 Sysclk	3 Sysclk	3 Sysclk	3 Sysclk
RAS to CAS Delay	1 Sysclk	1 Sysclk	2 Sysclk	2 Sysclk

- *F0000 Cacheable*: When enabled, the system BIOS block F (F0000h-FFFFFh) address range will be cacheable.

- *C0000 Cacheable*: When enabled, the Video BIOS block C (C0000h-C7FFFh) address range will be cacheable.

- *Cacheable Range*:   The range of addresses that are cacheable. Default all DRAM addresses are cacheable up to 128MB.

- *DRAM Page Mode*: Normally select Slow Page Mode.

- *15-16MB Access*: In Normal mode, access to address 15-16MB range will be mapped to local DRAM memory. Some Video Capture cards require that this area must be mapped to AT memory space.

- *1MB Cache Memory*:   Enabled if 1MB of cache is installed.   Else disabled.

- *VGA Type*: If "Standard" is selected, BIOS will support any kinds of VGA cards (PCI, ISA, and VESA). However, minor performance will be degraded due to extra decoding. In "PCI" mode, BIOS will only

support PCI VGA card. In "ISA/VESA" mode, BIOS will support both ISA and VESA VGA. These two settings "PCI" and "ISA/VESA" can improve VGA performance, but extra precaution must be taken to choose the correct setting for the correct type of cards.

- *PCI Arbitration Rotate Priority*:   When enabled, PCI masters arbitrates for PCI bus ownership using rotate priority.   When disabled, fixed priority is used.

- *PCI Post-Write Fast*:   If enabled, the PCI post write performance is enhanced.

- *CPU Master Post-Write Buffer*:   The number of levels of post write buffer depth used when CPU is a bus master. Default is 4.

- *CPU Master Post-Write Burst Mode*:   Burst mode for post write cycle when CPU is master.   This feature is useful when the PCI card supports burst feature. If the PCI card does not support burst mode, enabling this feature may cause performance to degrade.

- *CPU Master Fast Interface*:   Enhanced the performance between CPU and PCI when CPU is master.

- *PCI Master Post-Write Buffer*:   The number of levels of post write buffer depth used when PCI is master. Default is 4.

- *PCI Master Post-Write Burst Mode*:   Burst mode for post write cycle when PCI is master.

- *PCI Master Fast Interface*:   Enhanced the performance between CPU and PCI when PCI is master.

- *CPU Master DEVSEL# Time-Out*:   The maximum delay for a target (PCI device) to respond to a master (CPU) initiated transaction by asserting DEVSEL# signal. Default is 6 PCICLK.

- *PCI Master DEVSEL# Time-Out*:   The maximum delay for subtractive decoder from motherboard chipset respond to a master (PCI master device) initiated transaction by asserting DEVSEL# signal. Default is 4 PCICLK.

POWER MANAGEMENT SETUP

The Power Management Setup provides a programming way to slow down/stop CPU clock speed and put other system devices such as Video Monitor into power saving mode.

- **Power Management**:

  Disabled: All the power management events and timers setup will be ignored, except the Hard Disk Drive (HDD) power down feature.
  User Defined: Users are abled to enter a pre-defined time after the system has been idle and before the system go into power saving mode.

  Maximum Saving: System will wait for a minimum time after it has been idle and before the system goes into power saving mode.

  Minimum Saving: System will wait for a maximum time after it has been idle and before the system goes into power saving mode.

- **Power Management (PM) Timers**:

  HDD Power Down: 1 to 15 minutes. This is the timer for Hard Disk Drive power down mode.

  System Power Down: 30 seconds to 260 minutes. This is the timer for system power down mode.

- **Power Management (PM) Events**:

  This is the system events or activities monitoring. If the power management is enabled, the system will go into power saving mode after all the events have been idle for a pre-defined time shown on the system power down timer. Any detected event will wake up the system immediately and the timer is reset to zero. Each of these events can be controlled (enabled or disabled) individually.

Video Activities	Monitoring video activities.
DMA/MASTER/AT Refresh	Monitoring the DMA/MASTER/AT Refresh activities
HDD Activities	Monitoring the hard disk activities

LPT Activities	Monitoring the Parallel port activities
COM Activities	Monitoring the Serial port activities
KB Activities	Monitoring the Keyboard pressing activities
FDD Activities	Monitoring the Floppy drive activities
VESA/PCI Activities	Monitoring the VESA/PCI bus master activities

PCI CONFIGURATION SETUP

In this section, users can select the PCI bus master Latency Time and PCI interrupt line. Make sure that the interrupt selection does not conflict with interrupts used by adapters residing on the AT bus.

- *Latency Timer*: 0 to 255 PCI clocks. The maximum amount of time that a PCI Bus Master can own the PCI bus. Default is 255.

- **IRQ Line**:   Select the PCI adapters interrupt request (IRQ) that matched with JP10 jumper settings. Default is N/A.

LOAD BIOS DEFAULTS

Use this option to load the default configuration values directly from ROM. If the stored record created by the Setup program becomes corrupted, these defaults will load automatically when you turn the computer on.

LOAD SETUP DEFAULTS

Use this option to load the settings detected by the system when you turn it on. If your system behaves erratically you can use this feature to check for incorrect settings.

PASSWORD SETTING

Follow these steps to change system password. Note that the pass word can not be longer than eight characters.

1. Choose "PASSWORD SETTING " from the Setup Main Menu and press <**Enter**>.

2. The screen will display the following message.

Enter Password:

    If you want to disable the password option just press <**Enter**>, otherwise enter a string of maximum eight characters.

5. After entering the new password, the following message appears:

Confirm Password:

6. Re-enter the new password. If the password is miskeyed, the first message will reappear:

Enter Password:

IDE HDD AUTO DETECTION

Use this BIOS utility to automatically detect popular IDE hard disk type if it is not readily available. It is not guaranteed than this utility will work with all IDE hard disk. There is no need to use this utility if you already have hard disk type information.

SAVE AND EXIT SETUP

After you have made any changes during setup, use this option to store those new information into non-volatile CMOS memory. The system should reboot with the correct system board configuration.

EXIT WITHOUT SAVING

After you have/have not made any changes during setup and decided not to store those information into non-volatile CMOS memory, use this option to exit Setup. The system should reboot with the current configuration stored in CMOS memory.

CHAPTER 5: KEYBOARD HOT KEYS

SYSTEM SPEED

System speed can also be changed through keyboard. There are two available speeds as shown below:

Turbo speed: Cache memory and 32-bit DRAM transfer mode are ON. Set by pressing <**+**> key once while holding <**Ctrl**>, <**Alt**>, and <**Shift**> keys.
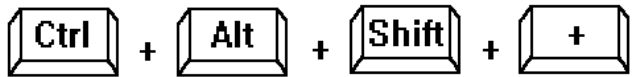
Slow speed: Cache memory and 32-bit DRAM transfer mode are OFF.   Set by pressing <**-**> key once while holding <**Ctrl**>, <**Alt**>, and <**Shift**> keys.

APPENDIX A: BIOS HARD DISK TYPE

Type	Cylinder	Heads	Write Precomp	Landing Zone	Sectors	Size
1	306	4	128	305	17	10MB
2	615	4	300	615	17	20MB
3	615	6	300	615	17	31MB
4	940	8	512	940	17	62MB
5	940	6	512	940	17	47MB
6	615	4	65535	615	17	20MB
7	462	8	256	511	17	31MB
8	733	5	65535	733	17	30MB
9	900	15	65535	901	17	112MB
10	820	3	65535	820	17	20MB
11	855	5	65535	855	17	35MB
12	855	7	65535	855	17	50MB
13	306	8	128	319	17	20MB
14	733	7	65535	733	17	43MB
16	612	4	0	663	17	20MB
17	977	5	300	977	17	41MB
18	977	7	65535	977	17	57MB
19	1024	7	512	1023	17	60MB
20	733	5	300	732	17	30MB
21	733	7	300	732	17	43MB
22	733	5	300	733	17	30MB
23	306	4	0	336	17	10MB
24	925	7	0	925	17	54MB
25	925	9	65535	925	17	69MB
26	754	7	754	754	17	44MB
27	754	11	65535	754	17	69MB
28	699	7	256	699	17	41MB
29	823	10	65535	823	17	68MB
30	918	7	918	918	17	53MB
31	1024	11	65535	1024	17	94MB
32	1024	15	65535	1024	17	128MB
33	1024	5	1024	1024	17	43MB
34	612	2	128	612	17	10MB
35	1024	9	65535	1024	17	77MB
36	1024	8	512	1024	17	68MB
37	615	8	128	615	17	41MB
38	987	3	987	987	17	25MB
39	987	7	987	987	17	57MB
40	820	6	820	820	17	41MB
41	977	5	977	977	17	41MB
42	981	5	981	981	17	41MB
43	830	7	512	830	17	48MB
44	830	10	65535	830	17	69MB
45	917	15	65535	918	17	114MB

46	1224	15	65535	1223	17	152MB
47	USER"S	TYPE				

APPENDIX B: MEMORY MAPPING

Address (hex)	Function	Comments
00000000-0007FFFF	512K System RAM	Cached
00080000-0009FFFF	128K System RAM	Cached
000A0000-000BFFFF	128K Video RAM	Not Cached
000C0000-000C7FFF	32K Video BIOS	Cached
000C8000-000CFFFF	32K I/O ROM	Not Cached
000D0000-000DFFFF	64K I/O ROM	Not Cached
000E0000-000EFFFF	64K Extended BIOS	Not Cached
000F0000-000FFFFF	64K On-Board BIOS ROM	Cached
00100000-00BFFFFF	System Memory (RAM)	Cached
00C00000-00FFFFFF	System Memory (RAM)	Not cached if memory mapped I/O board is used in this range
01000000-BFFFFFFF	System Memory (RAM)	Cached
C0000000-C1FFFFFF	System Memory (RAM)	Cached
C2000000-FFFDFFFF	System Memory	Cached
FFFE0000-FFFFFFFF	128K On-Board BIOS ROM	Not cached

APPENDIX C: AT I/O ADDRESS MAP

I/O ADDRESS (HEX)	I/O DEVICE
000 - 01F	DMA Controller 1, 8237A-5
020 - 03F	Interrupt Controller 1, 8259A
040 - 05F	System Timer, 8254-2
060 - 06F	8742 Keyboard Controller
070 - 07F	Real-Time Clock/CMOS and NMI Mask
080 - 09F	DMA Page Register, 74LS612
0A0 - 0BF	Interrupt Controller 2, 8259A
0C0 - 0DF	DMA Controller 2, 8237A-5
0F0 - 0FF	CPU''s Internal Math Coprocessor
1F0 - 1F8	Fixed Disk Drive Adapter
200 - 207	Game I/O
20C - 20D	Reserved
21F	Reserved
278 - 27F	Parallel Printer Port 2
2B0 - 2DF	Alternate Enhanced Graphic Adapter
2E1	GPIB Adapter 0
2E2 - 2E3	Data Acquisition Adapter 0
2F8 - 2FF	Serial Port 2 (RS-232-C)
300 - 31F	Prototype Card
360 - 363	PC Network (Low Address)
364 - 367	Reserved
368 - 36B	PC Network (High Address)
36C - 36F	Reserved
378 - 37F	Parallel Printer Port 1
380 - 38F	SDLC, Bisynchronous 2
390 - 393	Cluster
3A0 - 3AF	Bisynchronous 1
3B0 - 3BF	Monochrome Display and Printer Adapter
3C0 - 3CF	Enhanced Graphics Adapter
3D0 - 3DF	Color/Graphics Monitor Adapter
3F0 - 3F7	Diskette Drive Controller
3F8 - 3FF	Serial Port 1 (RS-232-C)
6E2 - 6E3	Data Acquisition Adapter 1
790 - 793	Cluster Adapter 1

AE2 - AE3	Data Acquisition Adapter 2
B90 - B93	Cluster Adapter 2
EE2 - EE3	Data Acquisition Adapter 3
1390 - 1393	Cluster Adapter 3
22E1	GPIB Adapter 1
2390 - 2393	Cluster Adapter 4
42E1	GPIB Adapter 2
62E1	GPIB Adapter 3
82E1	GPIB Adapter 4

APPENDIX D: INTERRUPT ASSIGNMENTS

LEVEL	TYPICAL INTERRUPT SOURCE
NMI	Parity, AT Channel Check
IRQ0	Interval Timer 1, Counter 0 Out
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupts from IRQ8 to IRQ15
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Parallel Port 2
IRQ6	Diskette Controller
IRQ7	Parallel Port 1
IRQ8	Real Time Clock
IRQ9	Expansion Bus Pin
IRQ10	Expansion Bus Pin
IRQ11	Expansion Bus Pin
IRQ12	Expansion Bus Pin
IRQ13	Coprocessor Error
IRQ14	Fixed Disk Drive Controller
IRQ15	Expansion Bus Pin

APPENDIX E: SPECIFICATION

PHYSICAL DIMENSION

Length: 11.800"   Width: 8.600"

POWER REQUIREMENT

5.25V to 4.75V tolerance on the AT power supply.

5 Amp maximum.

Ripple/Noise 100mV maximum

TEMPERATURE RANGE

Operating: 50° to 104° Fahrenheit (10° to 40° Celsius)

Non-Operating: 50° to 104° Fahrenheit (10° to 40° Celsius)

Shipping: -22° to 140° Fahrenheit (-30° to 60° Celsius)

RELATIVE HUMIDITY (NON-CONDENSING)

Operating: 20% to 80%

Non-Operating: 5% to 90%