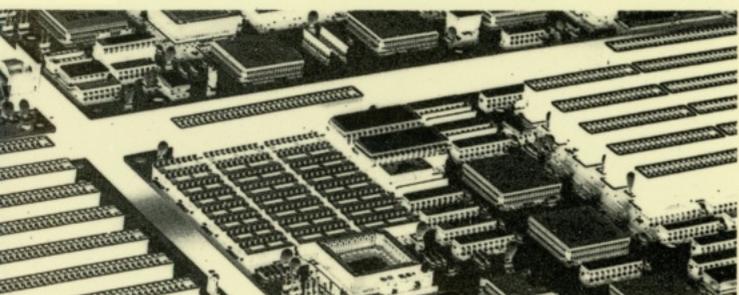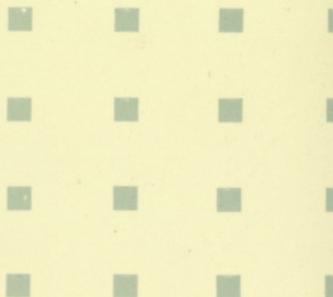# VESA 486

USER'S MANUAL

INTRODUCTION

This manual has been designed to be useful for several purposes. If the VESA 486 is already set up in functioning system, it will be helpful to review the manual to become familiar with the features of the board and where things are. This will be helpful in the unlikely event there is a problem with the system.

For those who want to alter the board's configuration or to upgrade it, the manual will serves as a guide to both procedure and specifications. While the necessary information is included in the manual, we recommend that unless you feel confident of your ability to do the work, it would be best to have your dealer or a local service shop do it. Before making alterations to the system, check to see that doing so will not violate the system warranty. If it does, have the work done by an authorized dealer.

The "chipset" consists of a VLSI device, the UM82C480, which incorporates most of the logic required for a low-cost, highly integrated IBM PC AT-compatible computer.

IMPORTANT: The chipset requires correct configuration information; otherwise a malfunction may result.

CAUTION: Static electricity can cause serious damage to integrated circuit chips. To avoid building up a static electric charge on your body, touch a grounded object before touching the chips and at frequent intervals as you handle the chips. If chips are handed from one person to another, the two should touch hands first, then pass the chips.

Information presented in this publication has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. The information contained in this document is subject to change without notice.

Contact your dealer for warranty details.

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Chapter 1
Introduction

This chapter will cover the general specifications and features of the VESA 486.

1.1 General Specifications and features

The VESA 486 is a cost-effective high performance mainboard based on IBM PC/AT compatible systems. The board form factor is a 2/3 baby size and is designed to fit into a standard PC/AT case.

General Specifications

- Microprocessor
  Support 80486 PGA CPU running at 25/33/50 MHz in 1 x clock.
  Supports Intel 80486DX, DX2, SX, 80487SX, overdrive and P24T.

- Chipset
  UM82C481B (Integrated Memory Controller, IMC)
  UM82C482AF (Integrated System Controller, ISC)
  UM82C206 (Integrated Peripheral Controller, IPC)

- Architecture
  IBM PC/AT - compatible

- Cache Size and Structure
  Supports write-through cache size 64/256 KB for two banks, 128 KB for one bank. Read burst cycle, at 33 MHz is 3-1-1-1 cycle, and at 50 MHz is 3-2-2-2.

- Memory
  Supports 2 banks DRAM with memory size up to 32MB.
  Supports mixable 256KB/ 1MB/ 4MB modules.

- BIOS
  AMI System BIOS.

- Clock Source
  ICS 2494 (Clock Chip)

- Expansion Slot
  Six 16-bit ISA slots including two VESA VL-Bus Slots.

- Form Factor
  2/3 baby AT size, 4 layers.

Features

- Fully compatible with PC/AT architecture.
- Use 1X clock in 80486 mode to ease system design.
- Synchronous AT bus clock with programmable CPU clock (divide by 2,3,4,5,6,8).
- Programmable I/O recovery time.
- DMA interface logic, refresh address counter and control logic.
- 8742 emulation for fast gate A20 generation.
- Data bus conversion logic between PD and XD buses.
- Parity generation and checking logic.
- Supports 512 KB EPROMs with single EPROM BIOS configuration.
- TURBO function for 80486.
- Build in cache controller
  - Cache controller can be enabled/ disabled.
  - Programmable 80486 read hit state for burst mode (AT 33 MHz is 3-1-1-1 cycle, and at 50 MHz is 3-2-2-2 cycle.
  - Flexible cache size: 64/ 128/ 256 KB.
  - Hidden DRAM refresh to boost system performance.
  - Supports three independence non-cacheable regions.
  - Supports fast Gate A20 to optimize OS/2 operations.
- Support non-turbo mode for old programs.
- Sophisticated DRAM controller
  - Supports 2 banks of CPU speed DRAM with memory size up to 32MB.
  - Supports mixable 256Kx9, 1Mx9, 4Mx9 modules.
  - Programmable DRAM wait states (0,1,2).
  - Supports 80486 burst mode.
  - Supports 64KB BIOS ROM.
  - Supports automatic memory size detection.

1.2 Major Components

The VESA 486 mainboard is composed of many integrated circuits, chips, jumpers and connectors. (Please refer to Figure 3.1)

The major components and their basic features and functions are outlined as below:

■ CPU (Central Processing Unit)

The central processing unit is the brain of a computer system that interprets and executes instructions, such as performing calculations, routing information, and temporarily storing data. In personal computers, the CPU is a highly integrated chip called the microprocessor.

■ UM82C480 chip set

The UM82C480 is a highly integrated, IBM PC/AT compatible chip set for high performance 80486 based personal computer system. Built with exquisite cache controller in advanced 1.0 μm CMOS technology, UM82C481B (Integrated Memory Controller, IMC), UM82C482AF (Integrated System Controller, ISC), UM82C206F (Integrated Peripheral Controller, IPC), and limited counts commerical parts, it constitutes a low-cost, highly reliable, advanced personal computer system.

    ¤   UM82C481BF Integrated Memory Controller
        The UM82C481BF Integrated Memory Controller (IMC) is part of UMC's high-performance 80486 PC/AT chip set. It conatins a sophisticated direct-mapped cache controller with write-back operation and full page mode DRAM controller. Incorporated with UM82C482AF, Integrated System Controller (ISC), and UM82C206F Integrated Pheripheral Controller (IPC), IMC provides main memory management function for the PC/AT computer system.

    ¤   UM 82C482AF Integrated System Controller
        The UM82C482AF, Integrated System Controller (ISC), is part of UMC's high performance 80486 PC/AT chip set. It contains AT bus control logic, data bus conversion logic, CPU reset logic, clock generation for CPU, keyboard and timer, DMA/ refresh logic and peripheral interface logic. Incorporated with UM82C481BF, Integrated Memory Controller (IMC), and UM82C206F, Integrated Peripheral Controller (IPC), ISC performs system control functions for the overall PC/AT computer system.

¤ UM82C206F Integrated Peripheral Controller
The UM82C206F Integrated Peripheral Controller includes two 8237 DMA controllers, two 8259 interrupt controllers, one 8254 timer/ counter, one MC146818 compatible real time clock, an additional 64 bytes CMOS RAM, one 74LS612 memory mapper, and some top level decoder/ configuration logic circuits. It is a single chip integration of all main peripheral parts attached to a bus of PC/AT architecture. While providing full compatibility with PC/AT architecture, the UM82C206F also offers some en-hanced features and improved speed performance.

■ BIOS

The VESA 486 is intentionally designed to use single EPROM chip for the system BIOS instead of conventional 2 chips design to reducing space and cost.

■ Jumpers

On the VESA 486 there are several jumpers which should be properly set according to the system configuration.

Detailed information regarding all jumpers can be obtained from Chapter 3.

■ Connectors

Several connectors are used to connect the power supply, keyboard and LED indicators. Refer to Chapter 3 for more information.

■ Expansion Slot

Six 16-bit ISA include two VESA slave mode slots are provided for insert-ing add-on cards, including cards for monitors, disk drives, etc.
These two VESA slots support the following configurationn.
(1) Two slaved.
(2) One master and one slave
in either slot.

Chapter 2

Memory Configuration

The VESA 486 DRAM configurations are discussed, followed by DRAM module installation and removal. Users are recommended to read through this chapter before installing or removing memory.

2.1 System Memory

The VESA 486 provides tremendous flexibility to support a number of different on-board DRAM configurations. The on-board DRAM is installed with SIMM (Single-In-Line Memory Module). There are two banks of DRAM module slots seated on the VESA 486, to support up to 32 MB of on-board memory.

The location and layout of all the SIMM banks is illustrated shown in Figure 3.1:

The two banks are composed of four standard 30-pin SIMM sockets. These sockets take 256-KB, 1-MB or 4-MB SIMM.

Note that all of the four SIMMs within a bank must be of the same type; you can not mix 256-KB, 1-MB and 4-MB modules in the same bank.

The total size of on-board memory depends on the combinations of different types of DRAM modules installed on the memory banks. The table below list all the possible DRAM module combinations and the total memory amount for each option.

Option	Bank 1	Bank 2	Memory Amount
1	256 KB	None	1MB
2	256 KB	256 KB	2 MB
3	256 KB	1 MB	5 MB
4	1 MB	None	4 MB
5	1 MB	1 MB	8 MB
6	1 MB	4 MB	20 MB
7	4 MB	None	16 MB
8	4 MB	4 MB	32 MB

2.1.1 DRAM Module Insertion

The SIMMs must be seated on the sockets as firmly as possible, and because of the fragility of the slot, you must be careful when inserting or removing the module.

1. Align the module so the pin-1 marking and corner notch of the module correspond to the SIMM socket pin 1 marking at the rear of the board. The module can fit in the socket one way only. Do not force it!

2. Push the module against the clip arms with your thumbs until a "click" sound is heard; the little plastic tabs appear in the latching holes on the RAM module board, and the clip arms fully grab the module board.

2.1.2 DRAM Module Removal

If possible, use a SIMM extraction tool; otherwise use the following method:

1. Carefully use your thumbs to bend outward the plastic tab ends on both sides of the slot.

2. The RAM module board is automatically ejected off the clip arms.

3. Take it out of the socket.

4. Repeat the steps 1 through 3 to release the other RAM modules.

2.2 Cache Memory Subsystem

The VESA 486 accepts optional 64-KB, 128-KB or 256-KB of SRAM for cache memory support. The SRAM chip should be 8Kx8 bit or 32Kx8 bit. The TAG RAM is for addressing code or data from main memory to Cache memory. The table below lists all the possible cache size selections.

Option	Cache SRAM (U21-U24)	Cache SRAM (U26-U29)	TAG RAM (U25)
64 KB	8Kx8 bit (20 ns)	8Kx8 bit (20 ns)	8Kx8 bit (20 ns)
128 KB	32Kx8 bit (20 ns)	None	8Kx8 bit (20 ns)
256 KB	32Kx8 bit (20 ns)	32Kx8 bit (20 ns)	32Kx8 bit (20 ns)

Chapter 3

Jumper Settings and Connectors

This chapter will assist you in setting up the VESA 486 before you install it in a system case. If your VESA 486 has already been installed and you do not wish to change the configuration settings, you can skip over this section.

3.1 Jumper Settings

The VESA 486 has several jumper switches that must be set to define a system configuration. These switches are three-pin components on the mainboard. They are turned off and on by placing or removing a cover cap over the pins. This is called a short or closed jumper. All jumpers must be set to one of the possible two settings.

Figure 3.1 shows the location of the jumpers and connectors.

Figure 3.1 VESA 486 Board Layout

The table below summarizes the function and settings of each jumper on the VESA 486.

Function		Jumper Settings
Type of display adapter	Monochrome	**JP1** pin 1,2 closed
	Color	**JP1** pin 2,3 closed
Type of CPU Setting	486DX	**JP14** pin 1,2 & 3,4 closed **JP15** pin 1,2 closed
	486SX	**JP14** pin 2,3 closed **JP15** opened
	487SX & Overdrive	**JP14** pin 1,2 & 3,4 closed **JP15** pin 2,3 closed
Cache Memory Size Setting	64 KB	**JP8** opened **JP9** opened **JP10** pin 1,2 closed **JP11** pin 1,2 closed
	128 KB	**JP8** closed **JP9** opened **JP10** pin 2,3 closed **JP11** pin 2,3 closed
	256 KB	**JP8** closed **JP9** closed **JP10** pin 2,3 closed **JP11** pin 1,2 closed
VESA ID Selection	0 Wait Write	**JP13** opened **JP12** opened
	1 Wait Write	**JP13** closed **JP12** closed (Default)
CPU Clock Setting	25 MHz	**JP4** closed **JP5** closed **JP6** opened **JP7** opened
	33 MHz	**JP4** closed **JP5** opened **JP6** opened **JP7** opened
	50 MHz	**JP4** opened **JP5** opened **JP6** opened **JP7** opened

3.2   Conectors

There are several connectors located on the VESA 486. They are used to connect with some peripheral devices to enhance the operating performance of the system.

Refer to Figure 3.1 for the positions of all the connectors on the mainboard. Their functions are listed below:

Connector	Function
J1	External Battery Connector
J2	Keyboard Connector
J3	Connects the Power Supply
J4	Turbo Speed LED Connector
J5	H/W Turbo Switch Connector
J6	Reset Connector
J7	Speaker Connector
J8	Keylock/ Power LED Connector

Chapter 4
Built-in BIOS Setup Program

This chapter provides detailed instructions on how to configure your system using the Built-in BIOS Setup program and gives some technical information about your computer. If you are not very familiar with microcomputers, please read this chapter carefully before proceeding. If you do not want to change the system's configuration, you can skip this chapter.

Before you start to add optional devices to your system, you should first learn how to set up your system and adjust its jumpers (Refer to Chapter 3 for detailed information). You may run the Setup program of the VESA 486 only after all jumper setting adjustments have been completed. At this time you should record what the configuration is, and keep it for reference.

4.1 Setup Summary

1. Install any extra memory SIMMs.
2. Set jumper JP1 for color or monochrome monitor.
3. Make all connections to board.
4. Install control cards, monitor, and any peripheral devices and drivers.
5. Turn on system.
6. At setup prompt, press the **Del** key.
7. Type the password if you set the password checking option to "Setup" or "Always" in the Advanced CMOS Setup program.
8. Choose Standard CMOS, Advanced CMOS or Advanced Chipset Setup.
9. Follow screen prompts.

4.2 BIOS Setup

Every AT-compatible computer has battery supported CMOS memory otherwise called "non-volatile" RAM. It stores information about your computer and peripheral device configuration. Unlike ordinary RAM, it retains the information even after you turn off your computer.

A computer needs to know certain things about itself so it can operate correctly when powered on. A special type of software called BIOS (Basic Input Output System) is contained in read-only memory (ROM) chips on the mainboard. The BIOS reads information from the CMOSmemory every time you power on the computer. It then instructs the CPU and other devices

to operate according to this information. If the information it retrieves is incorrect or insufficient, the system may not be able to operate properly until accurate information is supplied. You do this by means of the SETUP program built in the system BIOS.

4.2.1 When Should You Run Setup ?

1. Although someone may have set up the system for you, you may want to adjust the system to fit your needs.

2. Whenever you change some components in your system, (for example, if you add a hard disk or more memory), you must run Setup to record the new system configuration. If you don't do so after adding memory, the computer will prompt you to run Setup.

3. The last and most unlikely possibility is the loss of information in the CMOS memory. You may never encounter this situation. But if you do, you can restore the information by running the Setup.

4.2.2 How to Recall the Setup Program ?

You can run the built-in SETUP program in several ways:

1. When powering-on the system
   When you turn on the system power or press the reset button on the system case while the system is running (not every system has this button), the BIOS will first test the functionality of the system components and display a start-up message similar to the following:

   ```
   XXXX KB OK
   Hit <Del>,If you want to run Setup
   ```

   The numeral digits will continue to count at the top left of the screen. This represents the BIOS testing the mainboard memory chips. Before the above message disappears, you can press the < Del > key to run the Setup program.

2. To reset the system
   By pressing < Ctrl > < Alt > < Del > key combination when the system is up and running (assuming you are running under DOS or other environments that support this feature), the system will immediately reset itself and boot up. Before booting up from a diskette or hard disk, you can also see the below start-up message :

   ```
   Hit <Del>,if you want to run Setup
   ```

3. When the BIOS prompts you

In the self-test process, if the BIOS detects inconsistent or incorrect configuration information or some physical system error, it will display an error message on the screen, and prompt you to take action; for example:

```
Run SETUP UTILITY
Press <F1> to RESUME
```

Press the **<F1>** key, and continue.

4. To Enter password

If you set the password checking option to the "Setup" or "Always" field in the Advanced CMOS Setup program, after pressing the **"Del"** key to run the Setup program, the Enter password message will be displayed on the screen. Refer to section 4.6, Using the Change Password Setup.

4.2.3 Running the SETUP Program

When you call up the Setup program, the screen displays a "main menu" similar to the following:

```
BIOS SETUP PROGRAM - AMI BIOS SETUP UTILITIES
(C) 1991 American Megatrends Inc., All Rights Reserved


              STANDARD CMOS SETUP
              ADVANCED CMOS  SETUP
              ADVANCED  CHIPSET SETUP
       AUTO CONFIGURATION WITH BIOS DEFAULTS
              CHANGE PASSWORD
            WRITE TO CMOS AND EXIT
          DO NOT WRITE TO CMOS AND EXIT


  Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.

————— ESC:EXIT ↓ → ←:Sel F2/F3:Color F10:Save&Exit —————
```
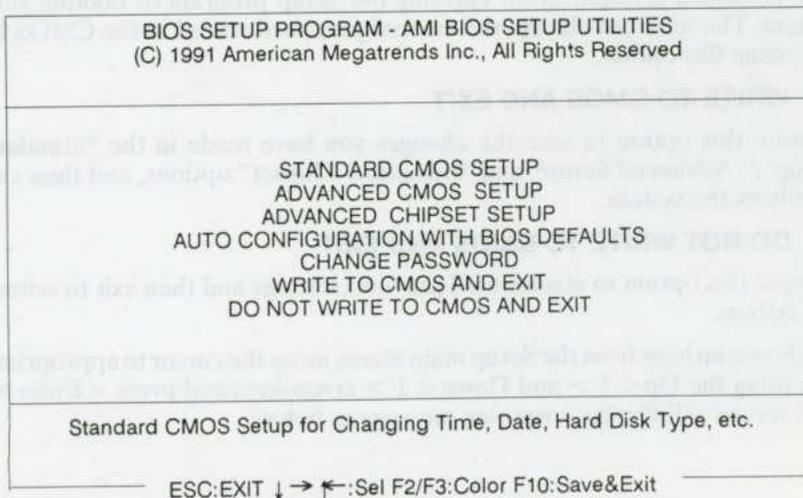
Figure 4.1 BIOS Setup Main Menu Options

On-screen instructions at the bottom of the screen explain how to use the program.

The following is a brief description of the six options of the Setup main menu:

■ STANDARD CMOS SETUP

Display the standard CMOS Setup screen to check or modify general configuration information. The standard CMOS setup displays the date, time, floppy type, hard disk type, video type, etc.

■ ADVANCED CMOS SETUP

The ADVANCED CMOS SETUP option is used to set the various system options for the user, including the above 1 MB memory test, scratch RAM area for BIOS, coprocessor detection, video ROM shadow and system ROM shadow.

■ ADVANCED CHIPSET SETUP

This Setup option is for the user who wishes to program the chipset registers. The chipset registers control most of the system options in the computer.

■ AUTO CONFIGURATION WITH BIOS DEFAULTS

This option allows for automatic configuration of all the options in the Advanced CMOS Setup/Advanced Chipset Setup with the BIOS defaults.

■ CHANGE PASSWORD

The password is required for entering the Setup program or booting your system. The user can change the current password stored in the CMOS by accessing this option.

■ WRITE TO CMOS AND EXIT

Choose this option to save the changes you have made in the "Standard Setup"," Advanced Setup" and "Advanced Chipset" options, and then exit to reboot the system.

■ DO NOT WRITE TO CMOS AND EXIT

Choose this option to abandon all previous settings and then exit to reboot the system.

To choose an item from the Setup main menu, move the cursor to appropriate line using the Up < ↑ > and Down < ↓ > arrow keys and press < Enter >. The screen will display a warning message as below:
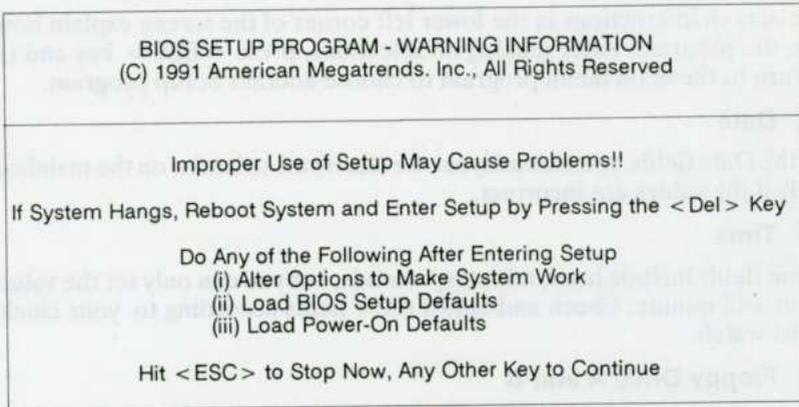
```
          BIOS SETUP PROGRAM - WARNING INFORMATION
        (C) 1991 American Megatrends. Inc., All Rights Reserved


              Improper Use of Setup May Cause Problems!!

   If System Hangs, Reboot System and Enter Setup by Pressing the < Del > Key

                  Do Any of the Following After Entering Setup
                     (i) Alter Options to Make System Work
                     (ii) Load BIOS Setup Defaults
                     (iii) Load Power-On Defaults

         Hit < ESC > to Stop Now, Any Other Key to Continue
```

Figure 4.2   BIOS Setup Warning Message

4.3 Running the Standard CMOS Setup

To check or modify the general system configuration, choose "STANDARD CMOS SETUP" from the Setup main menu and press < Enter > . The screen will display the following:
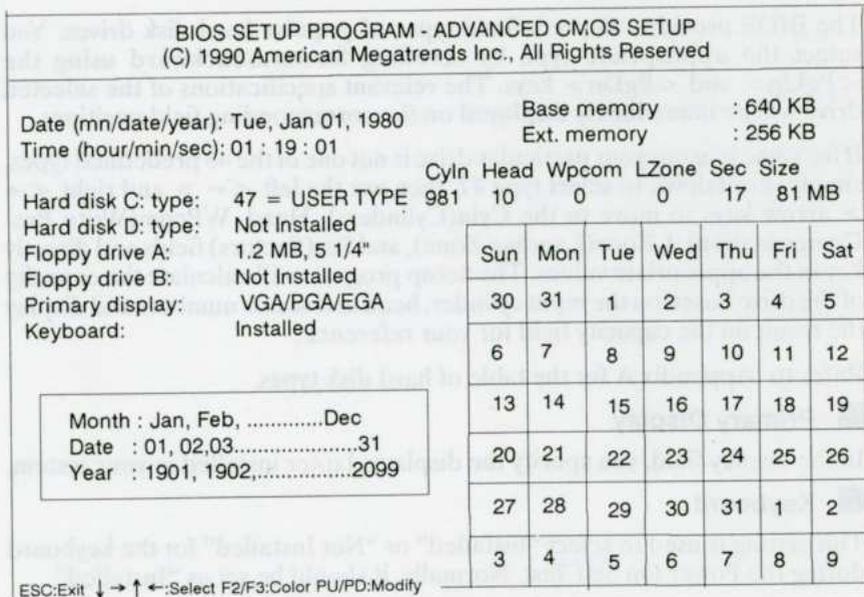
```
          BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
        (C) 1990 American Megatrends Inc., All Rights Reserved
```

Date (mn/date/year): Tue, Jan 01, 1980			Base memory		: 640 KB		
Time (hour/min/sec): 01 : 19 : 01			Ext. memory		: 256 KB		

		Cyln	Head	Wpcom	LZone	Sec	Size
Hard disk C: type:	47 = USER TYPE	981	10	0	0	17	81 MB
Hard disk D: type:	Not Installed						

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Floppy drive A: 1.2 MB, 5 1/4"							
Floppy drive B: Not Installed							
Primary display: VGA/PGA/EGA	30	31	1	2	3	4	5
Keyboard: Installed							
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
Month : Jan, Feb, ...Dec	20	21	22	23	24	25	26
Date : 01, 02,03......................31							
Year : 1901, 1902,.................2099	27	28	29	30	31	1	2
	3	4	5	6	7	8	9

ESC:Exit ↓ → ↑ ←:Select F2/F3:Color PU/PD:Modify

Figure 4.3 The Standard CMOS Setup Program Screen

On-screen instructions in the lower left corner of the screen explain how to use the program. After making all selections, press <ESC> key and then return to the main menu program to choose another Setup program.

■ Date

In the Date fields, you manually set the electronic calendar on the mainboard only if the values are incorrect.

■ Time

Time fields include hour, minutes, seconds, but you can only set the value of hour and minute. Check and adjust these fields according to your clock or wrist watch.

■ Floppy Drive A and B

In this field you may specify the capacity and format of the floppy drives installed in your system.

■ Hard Disk C: and Hard Disk D:

In these fields, you specify the physical and electronic properties of the "standard" hard disk drives installed in your system. Relevant specifications include the number of cylinders and heads, write pre-compensation time, read/write head landing zone, number of sectors per track.

The BIOS provides 46 predefined types of popular hard disk drives. You select the appropriate type by scrolling forward/backward using the <PgUp> and <PgDn> keys. The relevant specifications of the selected drive will be immediately displayed on the corresponding field positions.

If for some reasons your particular drive is not one of the 46 predefined types, simply scroll down to select type 47, then use the left < ← > and right < → > arrow keys to move to the Cyln(Cylinders), Head, WPcom(Write Pre-Compensation), LZone(Landing Zone), and Sec(Sectors) fields and directly key in the appropriate values. The Setup program will calculate the capacity of the drive based on the input cylinder, head and sector numbers and display the result on the capacity field for your reference.

Refer to Appendix A for the table of hard disk types.

■ Primary Display

In the display field, you specify the display adapter installed in your system.

■ Keyboard

This setting is used to select "Installed" or "Not Installed" for the keyboard during the Power On Self Test. Normally, it should be set as "Installed".

■ Base Memory and Extended Memory

A small section in the upper right corner of the screen displays important
status information on your system, including base and extended memory
amount. They are updated automatically by the Setup program according to
status detected by the BIOS self-test; no manual change is allowed.

4.4 Running the Advanced CMOS Setup

When you choose the "RUN Advanced CMOS Setup" option in the Setup
main menu, the screen displays the following menu:

```
            BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
          (C)1991 American Megatrends Inc., All Rights Reserved

  Above 1 MB Memory Test        : Disabled
  Hard Disk Type 47 RAM Area    : 0:300
  System Boot Up Num Lock       : On
  Cache Memory                  : Both
  Password Checking Option      : Setup
  Video ROM Shadow C000,16K   : Enabled
  Video ROM Shadow C400,16K   : Enabled
  System ROM Shadow F000,64K: Enabled



  ─────┤ ESC:Exit ↓ → ↑ ←: Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color ├──
       ┤ F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults    ├──
```

Figure 4.4 The Advanced CMOS Setup Program Screen

■ Above 1 MB Memory Test

You can disable this option to bypass the memory test if a lot of memory is
installed in the system, or you can enable this option to test all the memory.

■ Hard Disk Type 47 RAM Area

The purpose of this field is to specify the address of the memory area used
by the system BIOS for storing extended information, such as to save the user
definable drive type 47.
You have the following options:

● 0:300
  To reserve the stack area at address 30h:0.

- DOS 1KB
  To reserve the top 640 KB in the DOS base memory and reduce the size of base memory by 1 KB.

■ System Boot Up Num Lock

This option can set the "Num Lock" key to "On" or "Off" after system boot up.

■ Cache Memory

Due to constraint of technology, speed of currently available DRAM may not be high enough to catch up with the speed of the CPU, which means that at every step of program execution, the CPU must wait for the DRAM to respond.

In fact, for CPU to run faster, the system must be designed to use another kind of fast RAM chip — SRAM (Static-column RAM).

■ Password Checking Option

The purpose of this field is to determine whether the password is asked for in every boot (set to "Always") when entering into the Setup program (set to "Setup") or never asked for (set to "Disabled").

■ Video ROM Shadow

Choose these two options for better video display performance. It enables the shadow RAM operation for the video BIOS on display cards such as VGA or EGA. The video card should be checked to see whether it has 16 K or 32 K of ROM. If there is no ROM in the display card, there is no need to shadow the video BIOS. If it has 16K of ROM, the video BIOS should be shadowed at C000,16K. If the card has 32K of ROM, the Video BIOS should be shadowed at both C000,16K and C400,16K.

■ System ROM Shadow F000,64K

This option enables the shadowing of the system BIOS (addressed between F0000 - FFFFF, 64KB). It is best to enable this option for proper BIOS performance.

4.5 Running the Advanced Chipset Setup

To program the registers of the chipset, choose the "Advanced Chipset Setup" option from the Setup main menu and press < Enter >. The screen will display the following menu:

```
              BIOS SETUP PROGRAM - ADVANCED CHIPSET  SETUP
           (C)1990 American Megatrends Inc., All Rights Reserved

Auto-Configuration          : Enabled    Non-Cacheable Block-1 Base  : 0KB
DMA Address/Data Hold Time  : 1-2 T      Non-Cacheable Block2 Enable : Disabled
AT BUS Clock Select         : CPUCLK/6   Non-Cacheable Block-2 Size  : 16MB
I/O Recovery Time Delay     : 8BCLK      Non-Cacheable Block-2 Base  : 0KB
Cache Read Hit Burst        : 3-2-2-2    Local Bus Ready Delay       : Disabled
Cache Write Hit Wait State  : 2WS
DRAM Read Wait State        : 3WS
DRAM Write Wait State       : 3WS
Memory Remapping            : Enabled
Memory Above 16MB
Cacheable                   : No
C000-C3FFF, 16K Cacheable   : Yes
C4000-C7FFF, 16K Cacheable  : Yes
F0000-FFFFF, 64K Cacheable  : No
Non-Cacheable Block1 Enable : Disabled
Non-Cacheable Block-1 Size  : 1MB

     ESC: Exit Sel  (Ctrl) Pu/Pd: Modify F1: Help   F2/F3: Color
     F5: Old Values F6: BIOS Setup Defaults F7: Power-On Defaults
```

Figure 4.5 The Advanced Chipset Setup

■ Auto-Configuration

If enabled, following parameters will be automatically configured with values depending on CPU clock speed:

- DMA Address/Date Hold Time
- AT BUS Clock Select
- Cache Read Hit Burst
- Cache Write Hit Wait State
- DRAM Read Wait State
- DRAM Write Wait State

If disabled, user selected values for above parameters will be used. The available options are listed below:

- Disabled
- Enabled

■ DMA Address/Data Hold Time

During the DMA/Master cycle, the address and data from X-bus or S-bus are latched and held to local bus to DRAM/CACHE-RAM operation.

The available options are listed below:

- 1-2T
- 2-3T (50 MHz is recommended)

■ AT BUS Clock Selection

The AT BUS Clock is an output clock for the I/O channel. This field is used to specify the I/O BUS clock source used by the system. The user does not need to change this setting.

The available options are listed below:

- CPUCLK/8
- CPUCLK/6 (50 MHz is recommended)
- CPUCLK/5
- CPUCLK/4 (33 MHz is recommended)
- CPUCLK/3 (25 MHz is recommended)
- CPUCLK/2 (16/20 MHz is recommended)

■ I/O Recovery Time Delay

This field is used to specify the I/O command recovery time except for some add-on cards which cannot work properly. It is recommended to set this option at "low" value to enhance the I/O performance.

■ Cache Read Hit Burst

Due to constraint for technology, speed of currently available SRAM may not be high enough to catch up with the speed of the CPU, which means that at every step of program execution, the CPU must wait for the SRAM to respond. This option determines the number of cycle times to be inserted when CPU read data to SRAM.

Moreover, the setting depends on the speed of the CPU and SRAM. If the CPU is of high speed, the timing of SRAM processing data needs an extension, except for some SRAMs that can be high enough to catch up with the speed of CPU .
The available options are as follows:

- 2-1-1-1
- 3-1-1-1
- 3-2-2-2

■ Cache Write Hit Wait State

The setting of Cache Write Hit Wait State makes no difference from that of Cache Read Hit Burst. It is important to check your speed of the CPU & SRAM before you change the default value.

The options are available as follows:

- 0 WS
- 1 WS
- 2 WS

■ DRAM Read/Write Wait State

This option determines the number of wait states to be inserted when the CPU writes data into the local DRAM. The available options are as follows:

- 0 WS
- 2 WS
- 1 WS
- 3 WS

■ Memory Remapping

This option enables or disables the system to map the 384KB memory to address above the 1MB boundary. This function cannot be used when the system memory is beyond 1MB. If shadow RAMs are enabled, only 256KB memory can be remapped.

■ Memory above 16MB Cacheable

This option determines above 16MB of the system memory that will be cached into SRAM. Under normal circumstances, you can set this option at "Yes" to enable this memory cacheable function.

NOTE: The setting should be "No" with 64 KB cache memory whose maximum cacheable size is 16 MB.

■ C0000-C3FFF, 16K Cacheable

If you have a shadowing of the video BIOS at C0000-C3FFF, 16K, you can enable this memory cacheable function.

■ C4000-C7FFF, 16K Cacheable

If you have a shadowing of the video BIOS at C4000-C7FFF, 16K, you can enable this memory cacheable function.

■ F0000-FFFFF, 64K Cacheable

If you have a shadowing of the system BIOS, you can enable this option for memory cacheable function.

■ Non-Cacheable Block1/Block2 Enable

If this function is disabled, the setting of Non-Cacheable Block-1/Block-2 Size and Non-Cacheable Block-1/Block-2 Base will be invalid.

■ Non-Cacheable Block-1/Block-2 Size

For some special I/O cards which need to use system memroy, you should reserve some memory space for use. The size of the block-1/block-2 can be as samll as 4KB/64KB or as large as 1MB/16MB. The address of the block-1/block-2 is a mulitiple number of its size.

The options of Non-Cacheable Block-1 Size are as follows:

- 4 KB
- 8 KB
- 16 KB
- 64 KB
- 128 KB
- 256 KB
- 512 KB
- 1 MB

The options of Non-Cacheable Block-2 Size are as follows:

- 64 KB
- 128 KB
- 256 KB
- 512 KB
- 1 MB
- 2 MB
- 4 MB
- 8 MB
- 16 MB

According to the above settings, you should set the proper address.

■ Non-Cacheable Block-1/Block-2 Base

This function is to set the address of Non-Cacheable Block-1/Block-2 Base from starting.

■ Local Bus Ready Delay

In normal use, you should disable this option to enhance the system I/O performance. If some add on cards can't work properly with the VESA bus slot, you should then set this option at "Enabled".

4.6 Using the Change Password Setup

To change the password, choose the "CHANGE PASSWORD" option from the Setup main menu and press < Enter >.

1. If the CMOS is bad or if this option has never been used, the user is asked to enter new password. The screen will display the following message:

    ```
    Enter NEW Password:
    ```

    If you want to disable the password function, you can press < Enter > key to return to the Main Setup menu.
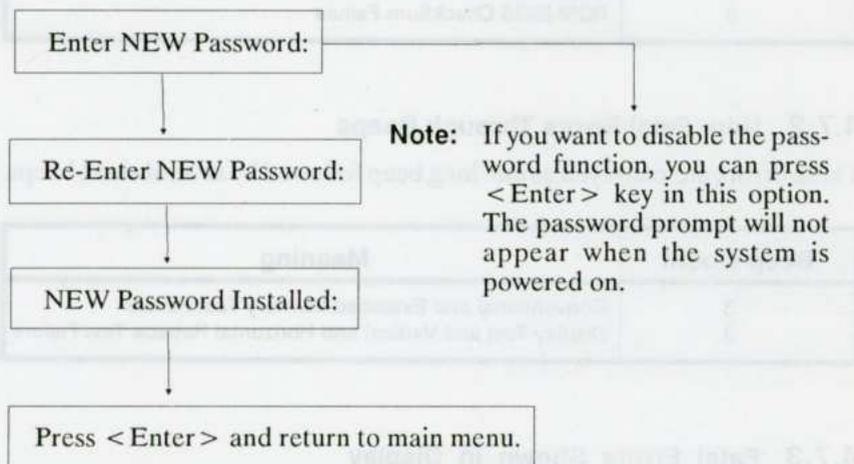
2. If the CMOS is good or if this option has been used to enter the password, the user is asked for the password stored in the CMOS. The screen will display the following message:

```
Enter Current Password:
```

Enter the correct password and continue to change the password.

After pressing the current password , you can change the password stored in the CMOS. The password can be at most 6 characters long.
To change the password, please follow the steps below:

| Enter NEW Password: |

| Re-Enter NEW Password: |

Note: If you want to disable the password function, you can press < Enter > key in this option. The password prompt will not appear when the system is powered on.

| NEW Password Installed: |

| Press < Enter > and return to main menu. |

4.7 BIOS Errors and Messages

After entering setup choices, the system will reboot. The setup summary and system information will appear on screen along with messages. These may include ERROR messages concerning the system or setup.

AMI BIOS performs various diagnostic tests at the time the system is turned on. Whenever an error is encountered during these tests, there will be either a few short beeps or an error displayed on the monitor. If the error occurs before the display device is initialized, the system reports the error with several short beeps.

If the error is FATAL, the system halts after reporting the FATAL error. If the error is NON-FATAL, the process continues after reporting the error.

4.7.1 Fatal Errors Through Beeps

These errors are conveyed through a number of beeps.

Beep Count	Meaning
1	DRAM Refresh Failure
2	Base 64 KB RAM Failure
4	System Timer Failure
5	Processor Failure
6	Keyboard Controller-GATE A20 Error
7	Virtual Mode Exception Error
9	ROM-BIOS CheckSum Failure

4.7.2 Non- Fatal Errors Through Beeps

These errors are conveyed as one long beep followed by several short beeps.

Beep Count	Meaning
3	Conventional and Extended Memory Test Failure
8	Display Test and Vertical and Horizontal Retrace Test Failure

4.7.3 Fatal Errors Shown in Display

When these errors are displayed, the screen is cleared, and the error message display is followed by a line saying **SYSTEM HALTED**.

1. **CMOS INOPERATIONAL**: indicates failure of CMOS shutdown register test.
2. **8042 GATE-A20 ERROR**: error in getting into protected mode.
3. **INVALID SWITCH MEMORY FAILURE**
4. **DMA ERROR:** DMA controller page register test failed.
5. **DMA #1 ERROR:** DMA Unit 1 register test failed.
6. **DMA #2 ERROR:** DMA Unit 2 register test failed.

4.7.4 Non- Fatal Errors In Display

There are two types of errors in this category:

1.   One that requires you to press the **F1** key and give you the option of running SETUP.

2.   One that requires you to press the **F1** key and don't give you the SETUP option.

4.7.5 Errors With Setup Option

1.   **CMOS battery state low** indicates failure of CMOS battery or a failure in the set and checksum tests.

2.   **CMOS system options not set** indicates failure of CMOS battery or a failure in the set and checksum tests.

3.   **CMOS checksum failure** indicates CMOS battery low or a failure in the set and checksum tests.

4.   **CMOS display type mismatch** indicates failure of display verification.

5.   **CMOS memory size mismatch** indicates system configuration and setup failure.

6.   **CMOS time & date not set** indicates system configuration verification error and setup error (in timer).

4.7.6 Errors Without Setup Option

1.   **CH-2 timer error** indicates channel 2,1,0 timer test failure.

2.   **keyboard error** indicates keyboard test failure.

3.   **KB/Interface error** indicates keyboard test failure.

4.   **Display switch setting not proper** indicates display type verification error.

5.   **Keyboard is locked....Unlock it.**

6.   **FDD controller error** indicates system configuration verification error in diskette setup.

7.   **HDD controller failure** indicates system configuration verification error in hard disk setup.

8.   **C:Drive error** indicates hard disk setup error.

9.   **D:Drive error** indicates hard disk setup error.

10. **D:Drive failure** indicates hard disk failure.

Appendix A

Hard Disk Types

Type	Cylinders	Heads	Write-Precomp	Landing Zone	Sectors	Capacity (Mbytes)
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	31
4	940	8	512	940	17	62
5	940	6	512	940	17	47
6	615	4	65535	615	17	20
7	462	8	256	511	17	31
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	50
13	306	8	128	319	17	20
14	733	7	65535	733	17	43
15	000	0	000	000	17	00
16	612	4	0000	663	17	20
17	977	5	300	977	17	41
18	977	7	65535	977	17	57
19	1024	7	512	1023	17	60
20	733	5	300	732	17	30

Table A.1   AMI BIOS Hard Disk Types

Table A.1 AMI BIOS Hard Disk Types Continued

|						
21	733	7	300	732	17	43
22	733	5	300	733	17	30
23	306	4	0000	336	17	10
24	325	7	0000	925	17	54
25	925	9	65535	925	17	69
26	754	7	754	754	17	44
27	754	11	65535	754	17	69
28	699	7	256	699	17	41
29	823	10	65535	823	17	68
30	918	7	918	918	17	53
31	1024	11	65535	1024	17	94
32	1024	15	65535	1024	17	128
33	1024	5	1024	1024	17	43
34	612	2	128	612	17	10
35	1024	9	65535	1024	17	77
36	1024	8	512	1024	17	68
37	615	8	128	615	17	41
38	987	3	987	987	17	25
39	987	7	987	987	17	57
40	820	6	820	820	17	41
41	977	5	977	977	17	41
42	981	5	981	981	17	41
43	830	7	512	830	17	48
44	830	10	65535	830	17	69
45	917	15	65535	918	17	114
46	1224	15	65535	1223	17	152

Appendix B

Setting the System Speed

There are two methods to select the system processing speed. You can change the speed during operation while you are working with your application program.
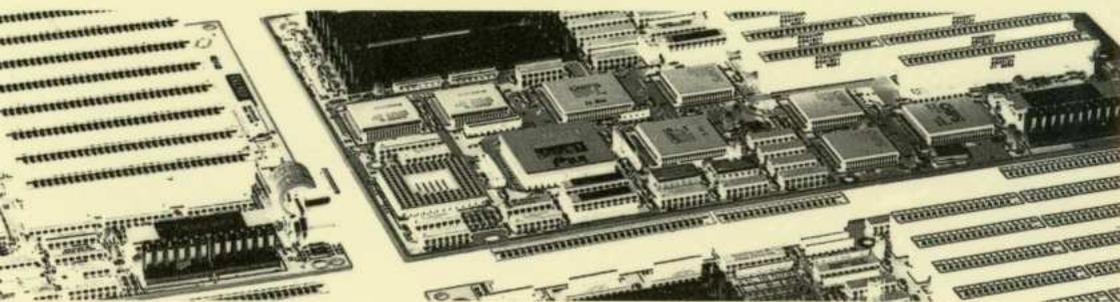
■ **High Speed**

Ctrl + Alt + +

■ **Low Speed**

Ctrl + Alt + −
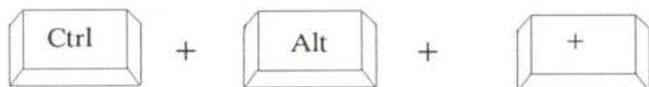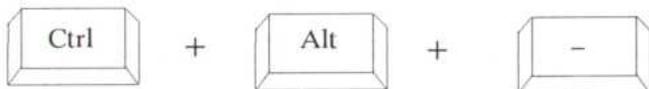
*   " + " means one must press the keys simultaneously.

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