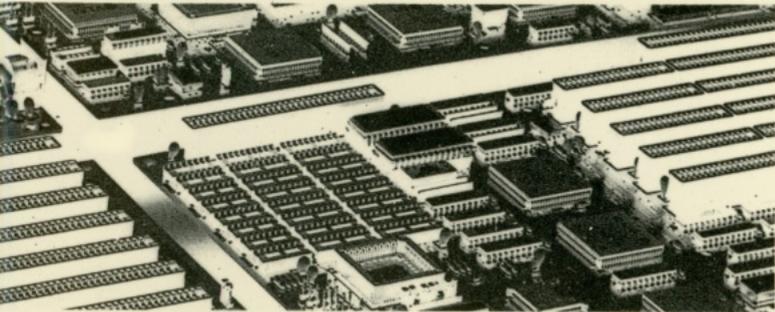


FE 386



U S E R ' S M A N U A L



INTRODUCTION

This manual has been designed to be useful for several purposes. If the FE 386 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 serve 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.

Trademarks

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Chapter 1

Introduction

This chapter will cover the general specifications and features of the FE 386 as well as its major components including the CPU, brief specifications of the UM 82C480 chipset, etc.

1.1 General Specifications and Features

The FE 386 mainboard is based on the powerful 80386 microprocessor, and incorporates advanced computer technology to meet the requirements of the next generation operating systems and applications. Yet it retains full compatibility with the original IBM PC/AT and uses existing PC software and hardware.

- 100% IBM PC/AT compatible
- Support 80386 CPU running at 33/40 in 2X clock
- Support 80387 coprocessor
- Support cache size 64/128/256 KB
- Support two banks DRAM with memory size up to 32 MB
- Support mixable 256 KB/ 1 MB/ 4 MB DRAM modules
- Programmable DRAM wait states
- Support 256 KB or 384 KB relocation to the top of DRAM memory
- Support sophisticated shadow RAM for video and system BIOS
- Support fast gate A20 and fast CPU reset to optimize OS/2 operations
- Synchronous AT bus clock with programmable clock (divided by 2, 3, 4, 5, 6, 8)
- Support parity generation and checking
- 4-layer PCB with surface mounting technology
- Support 6 AT slots

1.2 Major Components

The FE 386 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 below:

■ CPU (Central Processing Unit)

The central processing unit is the brain of a computer system. It 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 Chipset

The UM82C480 is a highly integrated, IBM PC/AT compatible chipset for high performance 80386 based personal computer system. Built with exquisite cache controller, UM82C391A (Integrated Memory Controller, IMC), UM82C482AF (Integrated System Controller, ISC), UM82C206F (Integrated Peripheral Controller, IPC), and limited counts of commercial parts, it constitutes a low-cost, highly reliable, advanced personal computer system.

- **UM82C391A Integrated Memory Controller**
The UM82C391A Integrated Memory Controller (IMC) is part of UMC's high-performance 80386 PC/AT chipset. It contains a sophisticated direct-mapped cache controller with write-back operation and full page mode DRAM controller.
- **UM 82C482 AF Integrated System Controller**
The UM82C482AF Integrated System Controller (ISC) is part of UMC's high performance 80386 PC/AT chipset. 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.

□ **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 enhanced features and improved speed performance.

■ **BIOS**

In addition to reducing space and cost, it allows use of enabling the BIOS shadow feature for access to the fast DRAM, instead of the slow EPROM chip.

■ **Jumpers**

On the FE 386, 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.

■ **Slots**

Six 16-bit I/O slots are provided for inserting add-on cards, including cards for monitors, disk drives, etc.

Chapter 2

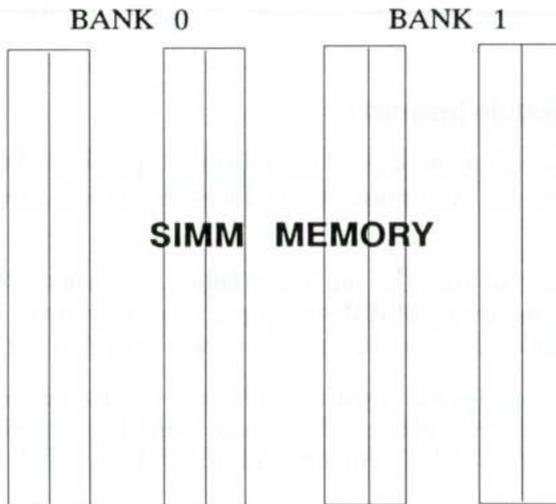
Memory Configuration

In this chapter, the FE 386 DRAM configurations are discussed, followed by instructions for DRAM module installation and removal. Users are recommended to read through this chapter before installing or removing memory.

2.1 System Memory

The FE 386 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 FE 386 to support up to 32 MB of on-board memory.

The locations and layouts of all the SIMM banks are illustrated below and 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 lists all the possible DRAM module combinations and the total memory amount for each option.

| Option | Bank 0 | Bank 1 | Memory Amount |
|--------|--------|--------|---------------|
| 1 | 256 KB | None | 1 MB |
| 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 that 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 "clicking" 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 will be automatically ejected off the clip arms.
3. Take it out of the socket.
4. Repeat steps 1 through 3 to release the other RAM modules.

2.2 Cache Memory Subsystem

The FE 386 accepts optional 64-KB, 128-KB or 256-KB of SRAM for cache memory support. The SRAM chip should be 8 K x 8 bit or 32 K x 8 bit with the speed of 20ns. The TAG RAM should be paired with cache SRAM speed at the speed of the CPU clock which the mainboard might support.

The table below lists all the possible SRAM locations and the total amount of cache RAM memory for each option.

| Option | U1,U2,U4,U5 | U6,U7,U9,U10 | U11 | Cache Memory Amount | Max Cacheable Size |
|--------|-------------------|------------------|----------------------|---------------------|--------------------|
| 1 | 8 K x 8 bit SRAM | 8 K x 8 bit SRAM | 8 K x 8 bit TAG RAM | 64 KB | 16 MB |
| 2 | 32 K x 8 bit SRAM | 0 | 8 K x 8 bit TAG RAM | 128 KB | 32 MB |
| 3 | 32K x 8 bit SRAM | 32K x 8 bit SRAM | 32 K x 8 bit TAG RAM | 256 KB | 64 MB |

2.2.1 Cache RAM Memory Installation

1. Insert the SRAM chips
The SRAM chips should be positioned at locations U1, U2, U4, U5, U6, U7, U9 and U10.
2. Insert the TAG RAM chips
The TAG RAM chip should be at location U11.

3. Set the Jumpers

For proper setting of each cache memory size, refer to the Table of Jumper Settings on Chapter 3.

4. Enable the cache function in the CMOS SETUP menu

To run the SETUP program and enable the cache function, refer to Chapter 5 for details.

Chapter 3

Jumper Settings and Connectors

This chapter will assist you in setting up the FE 386 before you install it in a system case. If your FE 386 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 FE 386 has several jumper switches that must be set to define a system configuration. They are turned off and on by placing or removing a cover cap over the pins. This is called an opened or a closed jumper. All jumpers must be set to one of the possible two settings.

Figure 3.1 shows the locations of the jumpers and connectors.

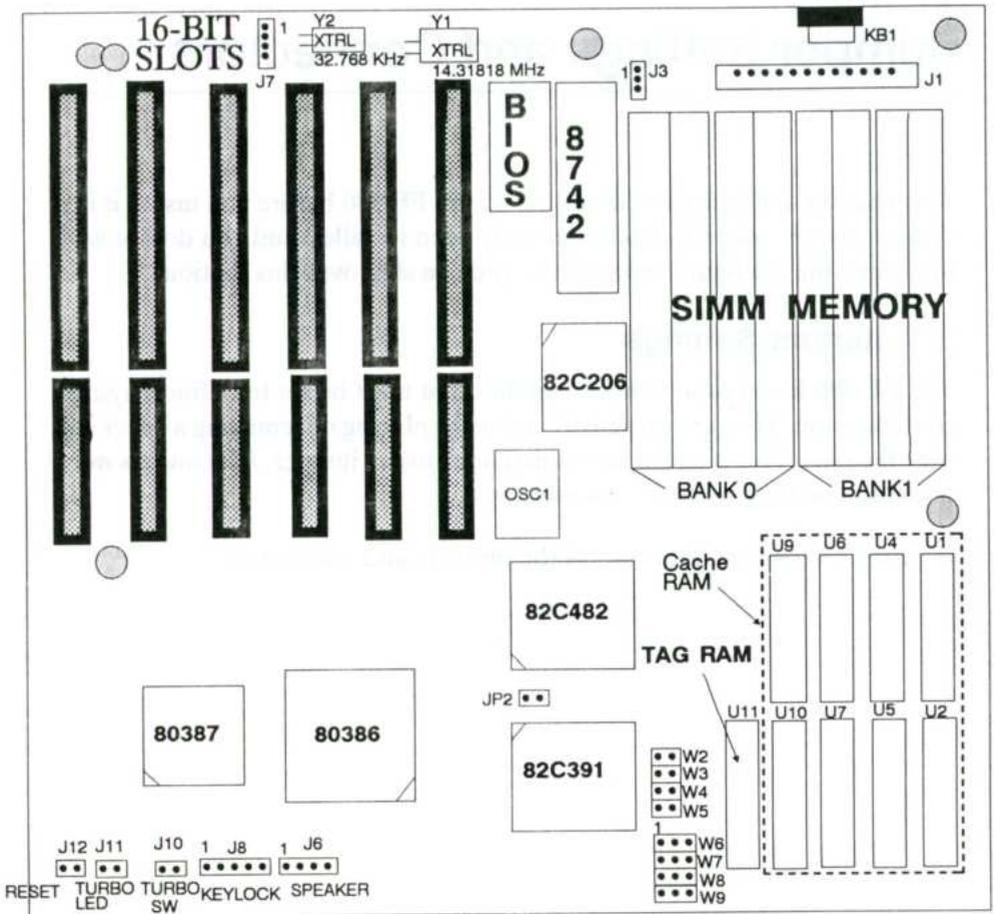


Figure 3.1 Board Layout

The table below summarizes the functions and settings of each jumper on the FE 386.

| Function | | Jumper Setting |
|---------------------------|-----------------|--|
| Type of display adapter | Monochrome | J3 pin 2,3 closed |
| | Color | J3 pin 1,2 closed |
| Coprocesor Setting | 80387 installed | JP2 closed |
| | Without 80387 | JP2 opened |
| Cache memory size setting | 64 KB | W2 opened W3 opened W4 opened W5 opened W6 pin 1,2 closed W7 opened W8 pin 1,2 closed W9 pin 1,2 closed |
| | 128 KB | W2 opened W3 opened W4 closed W5 closed W6 pin 2,3 closed W7 pin 1,2 closed W8 pin 2,3 closed W9 pin 1,2 closed |
| | 256 KB | W2 closed W3 closed W4 closed W5 closed W6 pin 1,2 closed W7 pin 2,3 closed W8 pin 2,3 closed W9 pin 2,3 closed |

3.2 Connectors

There are several connectors located on the FE 386. They are used to connect with some peripheral devices to enhance the operating performance of the system.

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

| Connector | Function |
|-----------|---------------------------------|
| J1 | Connects the Power Supply |
| KB1 | Keyboard Connector |
| J6 | Speaker Connector |
| J7 | External Battery Connector |
| J8 | Keylock Connector |
| J10 | Hardware Turbo Switch Connector |
| J11 | Turbo Speed LED Connector |
| J12 | Reset 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 carefully read this chapter 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 setup your system and adjust its jumpers (Refer to Chapter 3 for detailed information). Running the Setup Program of the FE 386 takes place after all jumper setting adjustments have been completed. You should at that time record what the configuration is, and keep it for reference.

4.1 Setup Summary

1. Install any extra memory SIMMs.
2. Set jumper J3 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 CMOS memory everytime 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 You Should 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 the system configuration is changed, 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 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> key, If you want to run Setup
```

The numeral digits will continue to count at the top left of the screen. This is 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> 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> key, 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, it will display the Enter password message on the screen. Refer to section 5.6, 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:

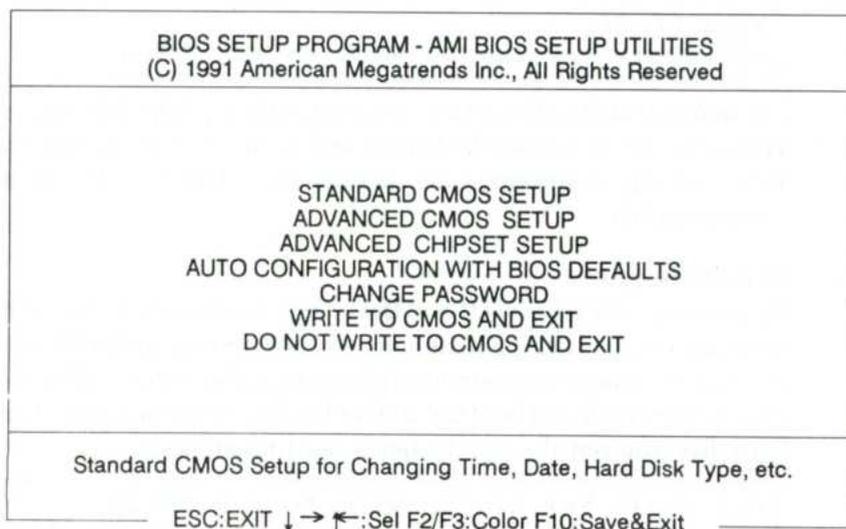


Figure 4.1 BIOS Setup Main Menu Options

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 for 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, Co-processor detection, Video ROM Shadow and System ROM Shadow.

■ ADVANCED CHIPSET SETUP

This Setup option is for the user who wishes to program the chip set registers. The chip set 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 boot your system. The user can change the ROM default or current (user) password stored in the CMOS by accessing this option. The ROM default password is the <Enter> key. When you want to use this option, you must be enabled the password option in ADVANCED CMOS SETUP.

■ WRITE TO CMOS AND EXIT

Choose this option to save the changes you have made in the “Standard Setup”, “Advanced Setup” and “Advanced Chipset” option, 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:

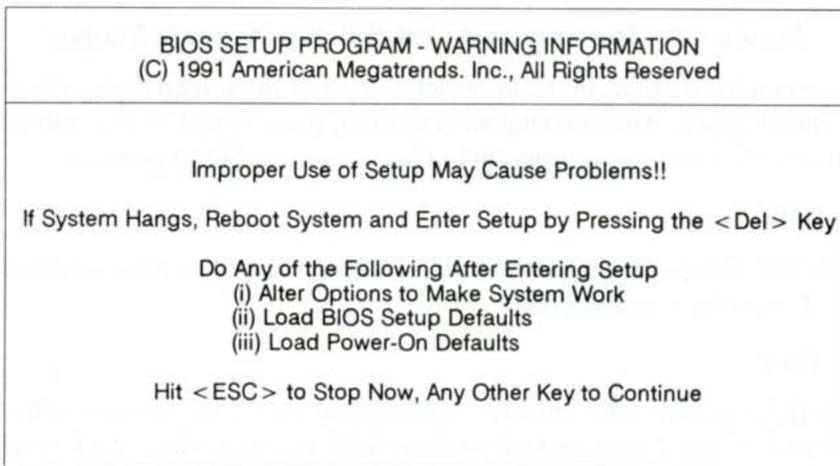


Figure 4.2 BIOS Setup Warning Message

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 | | : 3456 KB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hard disk C: type: 47 = USER TYPE | | | | Cyln | Head | Wpcom | LZone | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hard disk D: type: Not Installed | | | | 981 | 10 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floppy drive A: 1.2 MB, 5 1/4" | | | | | | | Sec | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Floppy drive B: Not Installed | | | | | | | Size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Primary display: VGA/PGA/EGA | | | | | | | 17 81 MB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Keyboard: Installed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; padding: 5px; width: fit-content;"> Month : Jan, Feb,Dec Date : 01, 02,03.....31 Year : 1901, 1902,.....2099 </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Sun</th> <th>Mon</th> <th>Tue</th> <th>Wed</th> <th>Thu</th> <th>Fri</th> <th>Sat</th> </tr> </thead> <tbody> <tr> <td>30</td> <td>31</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>6</td> <td>7</td> <td>8</td> <td>9</td> <td>10</td> <td>11</td> <td>12</td> </tr> <tr> <td>13</td> <td>14</td> <td>15</td> <td>16</td> <td>17</td> <td>18</td> <td>19</td> </tr> <tr> <td>20</td> <td>21</td> <td>22</td> <td>23</td> <td>24</td> <td>25</td> <td>26</td> </tr> <tr> <td>27</td> <td>28</td> <td>29</td> <td>30</td> <td>31</td> <td>1</td> <td>2</td> </tr> <tr> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> <td>9</td> </tr> </tbody> </table> | | | | | | | | Sun | Mon | Tue | Wed | Thu | Fri | Sat | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Sun | Mon | Tue | Wed | Thu | Fri | Sat | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 31 | 1 | 2 | 3 | 4 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 as you would a 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:

- 360KB, 5 1/4"
- 1.2 MB, 5 1/4"
- 720KB, 3 1/2"
- 1.44MB, 3 1/2"
- Not Installed

■ 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 reason 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 Size

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 | : Disabled |
| Video ROM Shadow C000,16K | : Enabled |
| Video ROM Shadow C400,16K | : Enabled |
| System ROM Shadow F000,64K | : Enabled |
| Main Memory Relocation | : 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 (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 C0000,16K. If the card has 32K of ROM, the Video BIOS should be shadowed at both C0000,16K and C4000,16K.

■ System ROM Shadow F000,64K

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

■ Main Memory Relocation

This option enables or disables the system to map the unused 256KB/ 384 KB reserved memory to address space immediately above normal extended memory. You should normally enable this field.

For example, if 2 MB of memory installed, there will be 1 MB of normal extended memory resides at address from 1024 KB to 2048 KB. By relocation, the 256 KB or 384 KB extra memory can mapped to address exactly above 2048 KB.

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 | |
|--|------------|
| BUS Clock Selection | : CLKIN/4 |
| Fast Cache Read Hit | : Disabled |
| Fast Cache Write Hit | : Disabled |
| Fast Page Mode DRAM | : Disabled |
| DRAM Wait State | : 2 WS |
| Non-Cacheable Block1 Size | : Disabled |
| Non-Cacheable Block-1 Base | : 0 KB |
| Non-Cacheable Block-2 Size | : Disabled |
| Non-Cacheable Block-2 Base | : 0 KB |
| Memory Above 16 MB Cacheable: | No |
| 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

■ Bus Clock Selection

The 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 Bus Clock options are as follows:

- CLKIN/6
- CLKIN/5 (Recommend for 40 MHz FE 386)
- CLKIN/4 (Recommend for 33 MHz FE 386)
- CLKIN/3
- CLKIN/2

■ Fast Cache Read Hit & Fast Cache Write Hit

When the cache memory has two banks (64K/256K), you can enable this option to enhance the system performance. If the cache memory is of single bank (128K), the option should be disabled.

■ Fast Page Mode DRAM

In normal use, you should enable this option to enhance the system performance. Except for some DRAM that can't support fast page mode, you should disable this option.

■ DRAM Wait State

This option determine the number of wait states to be inserted when CPU write data to the local DRAM. The available options are as following:

- 0 W/S
- 1 W/S (Recommend)
- 2 W/S

■ Non-Cacheable Block Size and Addr.

For some special I/O card need to use system memory, you should reserve space of memory for use. There are two continuous address areas for non-cacheable blocks in the FE 386

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

- | | |
|------------|----------|
| ● Disabled | ● 64 KB |
| ● 4 KB | ● 128 KB |
| ● 8 KB | ● 256 KB |
| ● 16 KB | ● 512 KB |
| ● 32 KB | ● 1 MB |

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

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

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

■ Memory above 16MB Cacheable

This option determines above 16 MB 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.

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 this option has never been used, there is default password which is stored in the ROM. The screen will display the following messages:

Enter ROM Password:

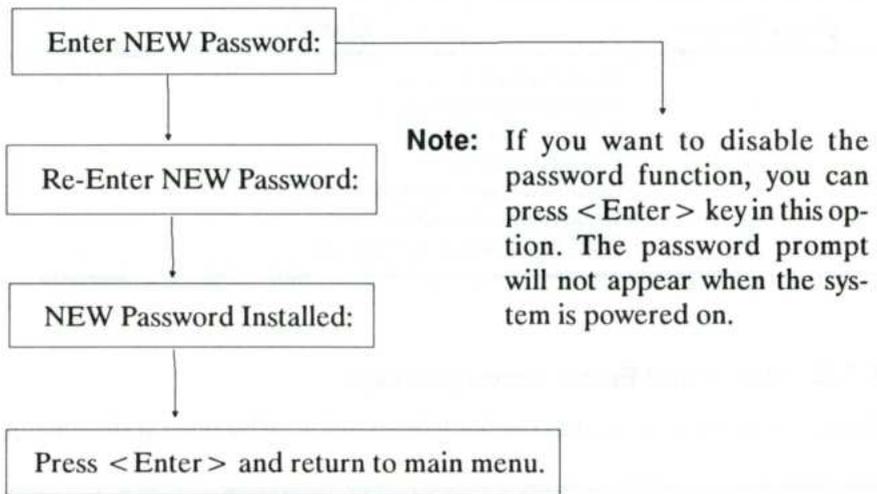
Press the <Enter> key and continue to change the password.

2. If the CMOS is good or this option has been used to change the default 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.

3. After pressing the <Enter> key (ROM password) or current password (user-defined 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:



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. Ones that require you to press the **F1** key and give you the option of running **SETUP**.
2. Ones that require 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 set and checksum tests.
3. **CMOS checksum failure** indicates CMOS battery low or a failure in 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

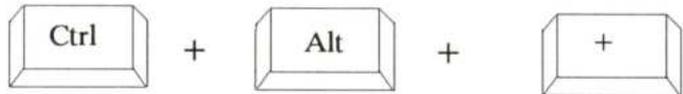
| | | | | | | |
|----|------|----|-------|------|----|-----|
| 21 | 733 | 7 | 300 | 732 | 17 | 43 |
| 22 | 733 | 5 | 300 | 733 | 17 | 30 |
| 23 | 306 | 4 | 0000 | 336 | 17 | 10 |
| 24 | 325 | 7 | 0000 | 925 | 17 | 54 |
| 25 | 925 | 9 | 65535 | 925 | 17 | 69 |
| 26 | 754 | 7 | 754 | 754 | 17 | 44 |
| 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

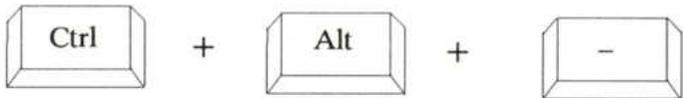
Setting the System Speed

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.

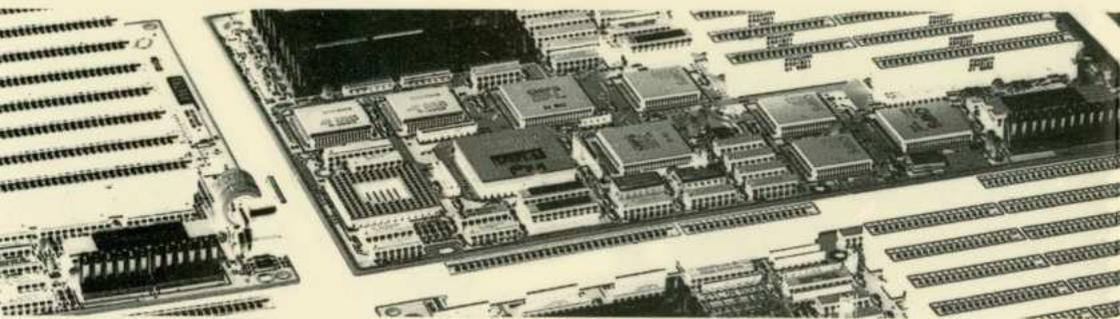
■ High Speed



■ Low Speed



* "+" means one must press the keys simultaneously.



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