

MYLEX

MDE486 System Board

Installation and Operations Guide

P/N: 771026-D02
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PREFACE

Thank you for your choice of a Mylex MDE486 System Board product. With proper installation and care, your Mylex System Board will operate for years without any service requirement. This Installation and Operation Guide will guide you in the installation process. The information contained herein is subject to change without notice.

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- 2) Each returned unit will be inspected for damage or other irregularities. If a unit is shown to be modified, the customer will be notified before any action is taken.
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Introduction

Thank you for making the decision to purchase the Mylex MDE486. With proper installation and maintenance, the MDE486 will provide years of trouble-free operation.

Package Contents

- MDE486 System Board
- Cable Kit (2 serial cables and 1 parallel cable)
- EISA Configuration Utility diskettes
- This manual
- EISA Configuration Utility User's Guide
- Warranty Card
- Any pertinent release notes available at the time of shipment.
- System Problem Report Form

Handling Precautions



The MDE486 contains electronic components that are highly sensitive to electrostatic discharge. Use extra caution when handling the MDE486 to ensure there is adequate grounding around the work area the board is being installed. **ALWAYS** wear a ground strap or ground your body by touching a grounded object such as an un-painted metal device connected to power ground.

The MDE486 has delicate crystal oscillators that can break if subjected to sudden shock such as being tossed on a table. Use care when moving the MDE486 from point to point.

If Troubles are Encountered

If, during the course of installation or operation of the MDE486, the board displays improper operation, first consult this manual's Trouble shooting section, paying particular attention to the jumper settings, as well as the BIOS section of this manual. Then contact your dealer or distributor for additional information. Dealers and Distributors may contact Mylex Technical Support Department at (510) 796-6100. Be sure to have the enclosed System Problem Report completely filled out.

Overview

General Description: The MDE486 is a Baby AT form factor EISA bus system board based upon the Intel 80486 series CPU. The highly integrated ASIC design provides high performance coupled with a long list of features including: 6 Bus Master EISA slots, 486SX, 486DX, 486DX2 and future upgrade processor support, up to 512KB of direct-map write-back cache, up to 256MB of DRAM, integrated I/O for serial, parallel, IDE and high speed floppy drive control, FLASH ROM BIOS, ZIF (Zero Insertion Force) CPU socket and frequency synthesizer. A brief description of major feature follows:

EISA BUS Architecture: EISA has emerged as the de facto standard for a 32-bit PC BUS. Backward compatible with the original AT BUS as well as providing the highest performance available from a PC standard bus - 33 MB/sec - EISA is the architecture of choice. All slots on the MDE486 are "Bus Master" and "Burst Mode" compatible ensuring EISA adapter compatibility.

Upgradeable CPU: The MDE486 includes a special ZIF (Zero Insertion Force) socket that allows easy processor changes. The MDE will handle the full spectrum of the i486 series of processors from the Intel486™ SX-20 through the 80486DX-50 as well as the available speeds of the 486DX2s and the new OverDrive™ processors. Installation of a processor is easy with the special ZIF (Zero Insertion Force) socket; Simply lift the tension lever, remove the old CPU and drop in the new processor. There are no special tools required. A series of jumpers are clearly marked to select the processor type.

4-256MB of DRAM Memory: While most system boards only support 32 or 64MB, the MDE486 quadruples that memory capacity up to 256MB. This is a must for network file servers and multi-user, time-sharing systems. The MDE486 supports the new 16MB SIMM module along with the other standard sizes including 1MB and 4MB. The unique design of the MDE486 provides half the memory on the main system board itself and when the need to expand beyond the base 128MB, an optional memory daughter-board attaches directly over existing SIMM modules so you don't lose an expansion slot.

64-512K of Write-back Cache Memory: Cache memory is an essential part of maintaining high system performance. In most cases, the larger the cache memory, the greater the system performance. Repetitive programs such as spread-sheet and CAD applications will benefit the most. The MDE486 can be upgraded to 256K using 8 pieces of 32K x 8 SRAMs, or 512K using four 128K x 8 SRAM chips.

Unlike other cache architectures that require the CPU to write directly to DRAM, (usually 3 wait states or more) the write-back cache is the most efficient way for a cache to write information back to main memory. This is because the cache can be written to within a Zero Waitstate cycle. Then the cache circuit writes the information to the DRAM by itself.

Embedded I/O: The MDE486 includes the latest generation of Super I/O controllers which provides 2 serial ports, a parallel port, IDE disk interface and floppy disk controller. The floppy disk controller is capable of supporting the new "4MB" floppy disk drives. Just as important, the floppy controller is capable of data rates of 1MB/sec - This is a significant benefit in performance on various floppy tape drives compatible with the 1MB/sec transfer rates. In addition, the serial port UARTS are compatible with the National™ 16450 with 16-byte FIFO.

OPTIONAL FLASH ROM BIOS: At one time or another, the need can arise to update the system BIOS. Usually this means that the system must be partially dis-assembled, the old ROM chip removed, dis-

carded, the new ROM chip installed and the system re-assembled. With FLASH technology, BIOS updates are made simply by running a program. With the MDE486 there are no chassis to open, no jumpers to set; Simply run a DOS program that reads a BIOS .BIN file and then programs the new BIOS into the FLASH memory chip. Note: This is an option, at depending upon your source, a FLASH BIOS may or many not be installed. To determine whether a FLASH BIOS is installed, examine location U38 on the left hand edge of the board. If device installed occupies all available pins of the socket it is a FLASH part. If to rows of pins are empty, then the MDE486 is equipped with a standard EPROM BIOS.

Frequency Synthesizer: Selecting a processor speed is simple as setting a couple of jumpers. There are no oscillators to purchase, no components to desolder and resolder. The clear benefit of this feature is the ability select what ever processor speed desired. **Note:** A special factory configured board is required for system clocks of 50-MHz or more. However, DX2 or OverDrive processors (known as clock doublers), with a maximum input clock frequency of 33-MHz may be run on any standard board.

Contents: This Section is broken down into 6 major chapters.
Section 1 The following is a description of each chapter.

Chapter 1: Installation — This describes the major steps for installing the MDE486 into a chassis and making all necessary hardware connections including I/O cables.

Chapter 2: Troubleshooting — This section provides hints on resolving technical problems with the MDE486 system board.

Chapter 3: Upgrading — This section describes the steps necessary to upgrade the CPU and cache on the MDE486.

Chapter 4: Technical Reference: — This section covers some of the major aspects of the MDE486's design, as well as pin assignments and compatibility and benchmark information.

Appendix A: System Planning Worksheet

Appendix B: Upgrade Order Information

**Contents:
Section 2**

This section covers the Mylex BIOS installed on your MDE486. It is broken down into four chapters.

Chapter 1: BIOS Overview — provides an overview of the Mylex system BIOS and describes its features.

Chapter 2: BIOS Setup — describes how to use the setup program to configure your system board.

Chapter 3: BIOS Diagnostics — describes how to diagnose common problems you may have when setting up your system.

Appendix A: Error Messages

Appendix B: CMOS Hard Drive Table

What You Will Need

Before you begin to install the MDE486 in a chassis, the following tools will be required: A Phillips and flat blade screwdriver, plastic stand-offs (these are normally supplied with the chassis) and assorted screws.

A good working knowledge of computers is highly recommended for installing a system board. It is not advised that a novice attempt installation of the MDE486.

Chapter 1: Installation

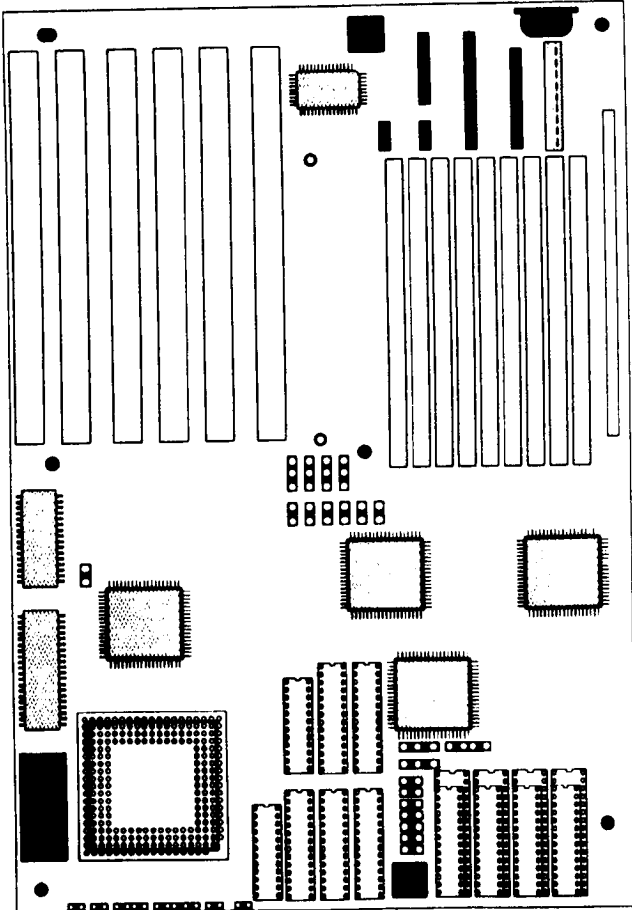


Figure 1-1: MDE486 System Board

Installation

There are 5 easy steps for installing the MDE486 system board into a chassis.

1. Planning the system configuration.
2. Installing SIMM memory.
3. Changing any of the hardware jumpers if the system configuration requires them to be changed.
4. Installing the board into the chassis.
5. Powering-up the system and setting the CMOS configuration information.

Planning the System

Using the simple form located in Appendix A, the resources available can be planned and any problems such as hardware conflicts can be avoided ahead of time. It would be a good idea to complete this form before system assembly is performed.

Installing Memory

The MDE486 provides two banks of memory (4 SIMM sockets per bank) on the main system board and an additional two banks on an optional memory daughter card. If your system board did not come with the optional daughter card and there is a need for it, review the ordering information contained in Appendix B.

The MDE486 supports 3 different SIMM sizes - 1MB, 4MB and 16MB. Each memory segment or bank consists of 4 SIMMs. Banks 0 and 1 are on the main board and banks 2 and 3 are on the daughter card. 1MB and 4MB SIMMs can be mixed between banks. 16MB SIMMs cannot be mixed with other size SIMMs. The speed and quality of the SIMM is essential for

reliable system performance. While the MDE486 can use 70 or 60ns SIMMs, at a minimum use 80ns, fast page-mode SIMMs. Review the following table for possible memory configurations:

Table 1-1: Support of SIMM Memory

| Bank 0 | Bank 1 | Bank 2 | Bank 3 | Total |
|---------------|---------------|---------------|---------------|--------------|
| 4, 1MB | 0 | 0 | 0 | 4MB |
| 4, 1MB | 4, 1MB | 0 | 0 | 8MB |
| 4, 1MB | 4, 1MB | 4, 1MB | 0 | 12MB |
| 4, 1MB | 4, 1MB | 4, 1MB | 4, 1MB | 16MB |
| 4, 4MB | 0 | 0 | 0 | 16MB |
| <i>4, 1MB</i> | <i>4, 4MB</i> | <i>0</i> | <i>0</i> | <i>20MB</i> |
| <i>4, 1MB</i> | <i>4, 1MB</i> | <i>4, 4MB</i> | <i>0</i> | <i>24MB</i> |
| <i>4, 1MB</i> | <i>4, 4MB</i> | <i>4, 1MB</i> | <i>4, 1MB</i> | <i>28MB</i> |
| 4, 4MB | 4, 4MB | 0 | 0 | 32MB |
| <i>4, 4MB</i> | <i>4, 4MB</i> | <i>4, 1MB</i> | <i>0</i> | <i>36MB</i> |
| <i>4, 4MB</i> | <i>4, 4MB</i> | <i>4, 1MB</i> | <i>4, 1MB</i> | <i>40MB</i> |
| 4, 4MB | 4, 4MB | 4, 4MB | 0 | 48MB |
| <i>4, 4MB</i> | <i>4, 4MB</i> | <i>4, 4MB</i> | <i>4, 1MB</i> | <i>52MB</i> |
| 4, 4MB | 4, 4MB | 4, 4MB | 4, 4MB | 64MB |
| 4, 16MB | 0 | 0 | 0 | 64MB |
| 4, 16MB | 4, 16MB | 0 | 0 | 128MB |
| 4, 16MB | 4, 16MB | 4, 16MB | 0 | 192MB |
| 4, 16MB | 4, 16MB | 4, 16MB | 4, 16MB | 256MB |

Note: Fields listed in italics denote mixed SIMM sizes.

Installing the SIMM Memory

When installing the SIMM modules, start with the inside (towards the center of the board) and work outward. The DRAM chips on the SIMM will face inward toward the center of the board. Insert the SIMM in the socket at a 45 degree angle, and then slide into an upright position. See figure 1-2. There are no jumpers that need to be set for memory related configurations.

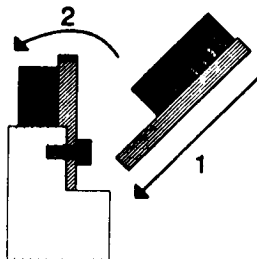


Figure 1-2: Simm Installation

To install memory on the optional memory daughter card, it will be easier to position the board so that the long row of pins is off the edge of a table. Then carefully hold the board in place, while the SIMMs are being inserted. **Use caution when handling the board to make sure the pins on the memory daughter card are not bent.**

Note: It may be easier to install the memory daughter card after the system board has been mounted into the chassis. Refer to "Installing the Memory Daughter Card" later in this chapter for more information.

Installing or Upgrading the CPU

The MDE486 is equipped with a special ZIF (Zero Insertion Force) Upgrade socket. This socket allows the system board to be installed with or upgraded to a wide variety of processors. The standard MDE486 is designed and is capable of running these types of processors:

80486SX 20, 25, 33-MHz

80486DX 25, 33, 50-MHz

80486DX2 50, 66-MHz

OverDrive 50-MHz

Once the processor that will be installed has been obtained, follow these simple steps.

1. Lift the lever on the upgrade socket.

2. Locate the pin 1 indicator on the 486 or OverDrive processor chip. This is usually indicated by a small black dot or a diagonal notch on one corner of the chip. See figure 1-3.

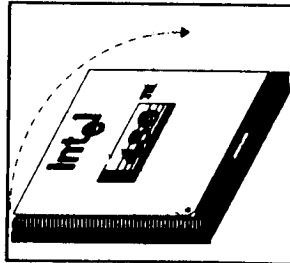


Figure 1-3: ZIF Socket

3. Place the chip into position so that the pin one indicator is properly aligned with socket. See figure 1-3.
4. Once pin 1 orientation is confirmed, close the lever.
5. Use the following two tables to set the processor type and speed.

Table 1-2: Processor Types

| PROCESSOR TYPE | | |
|------------------|----------|------|
| | J10 | J9 |
| 486SX | 2-3 | OPEN |
| 486DX, DX2 | 1-2, 3-4 | 2-3 |
| 487SX, OverDrive | 1-2, 3-4 | 1-2 |

Note: Jumper J10 is a four position jumper. For 487SX, Overdrive, DX and DX2, there are two jumpers, one over pins 1 and 2 and the other covering pins 2 and 3. If a 486SX processor is installed, only a single jumper is used covering pins 2 and 3.

Table 1-3: Processor Speeds

| PROCESSOR SPEED | | | | |
|-----------------|--------|--------|--------|--------|
| | 20-MHz | 25-MHz | 33-MHz | 50-MHz |
| J7 | CLOSE | OPEN | OPEN | OPEN |
| J13 | OPEN | CLOSE | OPEN | OPEN |
| J14 | OPEN | CLOSE | CLOSE | OPEN |
| J15 | CLOSE | OPEN | OPEN | OPEN |
| J16 | OPEN | OPEN | CLOSE | CLOSE |
| J17 | OPEN | OPEN | OPEN | CLOSE |
| J18 | 1-2 | 1-2 | 1-2 | 2-3 |
| J19 | 1-2 | 2-3 | 2-3 | 2-3 |

Color or Mono Video Selection

Jumper P1 located in the lower left corner of the board is used set the type of video adapter. Placed over the two pins (closed) indicates a color video adapter is installed. Removed, (open) indicates a monochrome adapter is installed. If both a color and mono adapter are installed, placed the jumper in the position to indicate which video adapter will be used during boot-up.

Chassis Installation

The MDE486 is designed to fit both "Baby AT" and "Full AT" style chassis. While both these styles of chassis are generally recognized throughout the system board and chassis industry, some chassis may have slightly off-set dimensions due to manufacturing

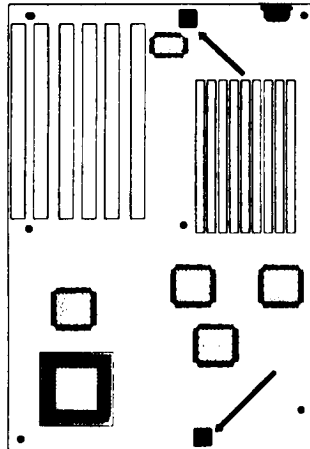


Figure 1-4 : MDE Mounting Holes

tolerances or design implementation. Therefore, it is suggested that before the system board is physically installed, the board be put into place to assure proper fit. Note the locations where screws can be installed and where the nylon stand-offs can be used. For proper grounding, at least 2 screws should be used to lock the system down. See figure 1-4. These two locations are the most commonly used points for screw mounting locations. If more screw mounting locations are available, it is highly recommended that they be used as well.

Note: If the optional memory daughter card is going to be installed at this time, review the procedures detailed in the following section before the system board is installed. It is usually easier to install the memory daughter card after the system board has been mounted and cables connected.

Once the locations for both the screws and the nylon stand-offs have been identified, remove the board, insert the nylon stand-offs, making sure all the stand-offs are in their proper position and are not causing the board to warp. Then install the board into the chassis. Then lock the system board into place by installing the screws. Do not over-tighten. Usually 1/8 turn after the screw-head makes contact is sufficient to assure a good ground.

Memory Daughter Card Installation

The daughter card is accompanied by two plastic and/or nylon stand-offs to hold the daughter card in place. Using figure 1-5, locate the two mounting holes for the stand-offs on the main system board. See figure 1-6.

Install the system board and install all applicable ribbon cables that will be used for the I/O. Once the ribbon cables are in place, **carefully** install the daugh-

ter card making sure each pin is properly inserted in its socket on the main board. Use the two nylon stand-offs to fasten the board into place. The nylon

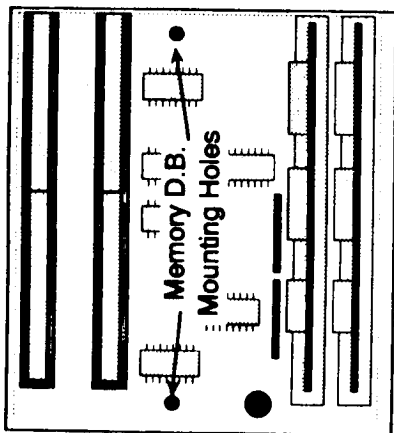


Figure 1-5 : Daughter Board Mounting Holes

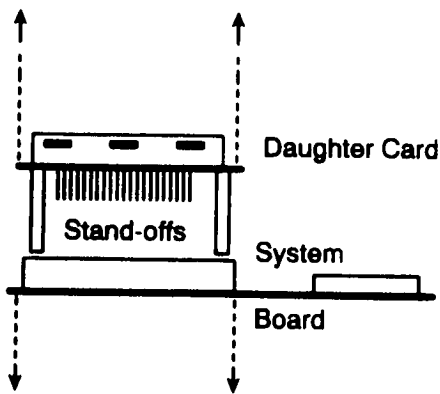


Figure 1-6: Daughter Card Installation

Installation

stand-offs are "press fit" type. You must press them firmly until you hear a "click".

Connecting Cables

Connect the power cables from the power supply to the system board. Then install any ribbon cables from the internal peripheral controllers to the disk drive(s) and I/O port connectors. Be sure the red or blue stripe along the edge of the ribbon cable is connected to Pin 1. See figure 1-7.

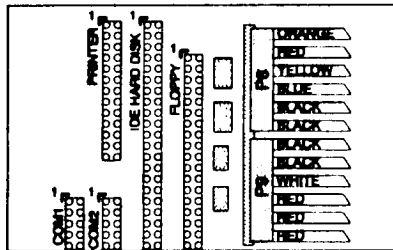


Figure 1-7: I/O Cable Guide

Note: Pin 1 for all the I/O interfaces is marked by both the number 1 and a white triangle located in the corner of the connector.

Connect all the control panel cables. See figure 1-8.

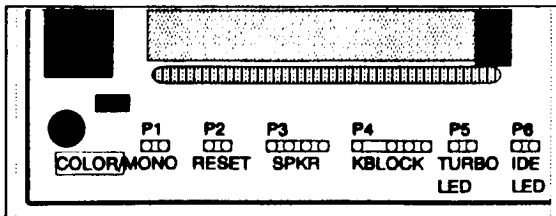


Figure 1-8: Cable Control Panel

Finishing Hardware Installation

Once the system board has been mounted and screwed in place, install the video adapter and any other peripheral adapters into the board. Check each of the cables to ensure they are properly installed.

Configuring the BIOS

Note: The Mylex BIOS has its own section that was included with this manual. There is only minimal information provided within this section and the Mylex 486 ISA BIOS Users Guide Section should be consulted for more information.

The Mylex BIOS that is installed on the MDE486 has a built-in CMOS setup program like many other BIOS's available. To access the setup screen, press the F2 function key at any time when prompted during the POST. (Power On Self Test)

Use the setup screen to configure the floppy drives, hard drives, video display type, and I/O options. For cursor movement and other commands, follow the on-screen prompts.

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Chapter 2: Upgrading

There are two major components that may be upgraded on the MDE486 system board. They are: the CPU, and the Cache memory. This section covers the Cache upgrade in detail.

Please refer to Chapter 1 for CPU upgrade information.

Upgrading the Cache

The MDE486 supports a total of 4 different cache sizes - 64, 128, 256 and 512K. Generally, increasing the cache size, increases system performance. While the increase in performance is not linear, programs with repetitive routines or average size data blocks with benefit the most from a larger cache size. These programs include spread sheets and CAD programs.

The cache on the MDE486 has 4 major components:

- The cache controller - This is the logic that controls the cache and is built into the chip set.
- The cache memory - A set of high speed, SRAM memory where the data is stored.
- The cache tags - One or two SRAM chips that keep track of what locations of main memory are stored in the cache.
- Dirty bit buffers - Two smaller SRAM chips that are used to control whether the information in the cache needs to be written back to main memory.

When upgrading the cache, the cache memory, and cache tags are affected. Table 2-1 lists the various

cache sizes, and where SRAM chip sizes and speeds should be installed. Use this table to determine what SRAM chips need to be purchased. Please refer to Appendix B for Cache Upgrade part numbers.

Table 2-1: Cache RAM Guide

| | Cache Bank 1 U4, U6, U8, U7 | Cache Bank 0 U9, U10/11, U12/13, U14/15 | Tag RAM 0 U19 | Tag RAM 1 U20 |
|---------------|--------------------------------|---|------------------|------------------|
| 64K Cache | 8K x 8 20ns | 8K x 8 20ns | 8K x 8 15ns | EMPTY |
| 128K Cache | EMPTY | 32K x 8 20ns | 8K x 8 15ns | EMPTY |
| 256K Cache | 32K x 8 20ns | 32K x 8 20ns | 8K x 8 15ns | 8K x 8 15ns |
| 512K Cache | EMPTY | 128K x 8 20ns | 32K x 8 15ns | EMPTY |

Installing the Cache Memory

Warning: *SRAM Chips are highly static sensitive devices. Precautions should be taken to prevent static damage to these components.*

Cache bank 0 supports two size SRAM chips - 28 and 32 pins. The smaller sub-set sockets are used for 8K x 8 and 32K x 8 chips and are labeled U9, U11, U13 and U15. The larger set of sockets are used only for 128K x 8 SRAMs and are labeled U8, U10, U12 and U14. See Figure 2-1.

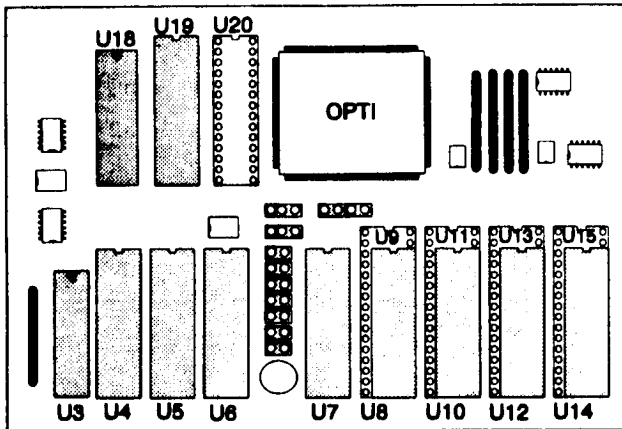


Figure 2-1: MDE486 Cache

Installation Steps:

1. Remove the MDE486 board from the chassis.
2. Using figure 2-1, locate which chips need to be removed and installed.
3. Carefully remove (if any) chips from their sockets by using a chip removal tool or sliding a small flat blade screwdriver under the chip and gently rocking the chip out of its socket.
4. Carefully insert the new chips. Make sure to orient pin 1 in the correct position - toward the top (keyboard connector) of the board. Visually inspect each chip after it is installed to make sure that none of the pins were bent under the chip.
5. Set the jumpers for the new cache size. See table 2-2.
6. Re-install the system board into the chassis.

7. When the system is powered back on, the BIOS should identify the new cache size and adjust the CMOS configuration automatically. If the BIOS does not identify the correct size of cache, immediately disconnect power and check the jumper settings and SRAM chip installation. Contact your supplier if problems persist.

Table 2-2: Cache Jumper Table

| | J1 | J2 | J3 | J4 | J5 | J6 | J8 |
|------|-------|-------|-------|-------|-------|-------|-----|
| 64K | OPEN | OPEN | OPEN | OPEN | OPEN | OPEN | 2-3 |
| 128K | OPEN | OPEN | CLOSE | OPEN | CLOSE | OPEN | 1-2 |
| 256K | OPEN | CLOSE | CLOSE | CLOSE | CLOSE | OPEN | 2-3 |
| 512K | CLOSE | CLOSE | CLOSE | CLOSE | CLOSE | CLOSE | 1-2 |

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Chapter 3: Troubleshooting

This section contains a brief series of problems and solutions that comprise the most common questions posed during the troubleshooting of an EISA bus system board. Please review these questions before contacting your supplier's technical support. In addition to this section, please review the BIOS Users Guide for additional information on BIOS generated error messages.

- P. No video and a series of beeps.
- S. Check the BIOS section of this manual to identify the beep codes and follow the procedures identified; check the video card in a different slot and/or different computer.

- P. Floppy light is always on.
- S. The floppy cable was installed backwards. Reverse the cable.

- P. System will not boot from floppy.
- S. Confirm the setting within the CMOS table is correct; make sure the cable is good; make sure there is a terminating resistor on the floppy drive.

- P. The IDE hard disk will not spin up.
- S. Check the power cable and IDE cable.

- P. The HD LED on the system board does not operate.
- S. Some IDE disk drives do not support the LED function on the IDE cable. Rather they provide an LED on the disk drive itself or, an LED connection on the disk drive. Connect the control panel LED to the disk drive.

- P. The system's I/O ports do not work.
- S. Confirm the CMOS setup has been correctly configured; check the ribbon cable installation.

- P. Ethernet adapter does not work.
- S. Most ethernet cards use IRQ3 as a default setting. The MDE486 uses IRQ3 for the COM2 serial port. Either disable COM2 or change the ethernet adapter settings.

- P. Serial ports will not properly run a serial mouse.
- S. Make sure the power supply has adequate +/- 12 volt supply being delivered to the system board.

- P. OS/2 will not print from the parallel port.
- S. OS/2 requires the IRQ for the parallel port to be active. Make sure the parallel port(s) have the IRQ line correctly configured.

Chapter 4: Technical Reference

The following pages of this section cover the basic specifications, benchmarks and pin-out assignments of connectors on the MDE486. Please note this data is provided for informational purposes only and is subject to change without notice.

Specifications

| System | Description |
|----------------|------------------------|
| Processor Type | Intel 80486DX or DX2 |
| System Speed | 25, 33, or 50-MHz |
| Host Interface | EISA |
| Slots | Six 32-bit BUS Masters |

| Memory | Description |
|----------------|---|
| Memory Type | 9-bit, 80 ns, fast page-mode SIMM |
| Memory Sizes | 4-Mbytes, 1-Mbyte and 16-Mbytes |
| Configurations | 4/8/12/16/20/24/28/32/36/40/48/52/64/128/192/256 Mbytes |
| Cache Type | Direct-Map, Write-Back |
| Cache Size | 64-Kbytes, upgradable to 256-Kbytes or 512Kbytes |

| I/O interfaces | Description |
|-----------------------|--|
| Serial Ports | Two, COM1 and COM2, up to 54Kbaud on DB9 connectors with 16 Byte FIFO. |
| Parallel Ports | Centronics-compatible DB25 |
| FloppyControls | Two, 5-1/4" or 3-1/2" 2.88, 1.44, 1.2 720 and 360 K sizes |
| IDE | For drives with Integrated Drive Electronics (AT BUS) |
| I/O settings | All I/O configurations executed through BIOS |

| BIOS Subsystem | Description |
|-----------------------|--|
| BIOS Type | Mylex 486 EISA BIOS |
| BIOS Features | Built-in setup, Power-on self-test (POST), drive table optimized for IDE drives, user-definable drive type, auto ID for disk IDE disk drives, password protection. |
| BIOS Shadowing | System and video shadowing supported Optional C000, D000 and E000 Segment Shadowing |

| Operating Environment | Description |
|-----------------------|--|
| Power Requirements | 5 amps typical at 5 volts, 30 milliamps at 12 volts |
| Temperature | 32°F to 132°F (0°C to 50°C) |
| Humidity | Up to 90% noncondensing |

| Physical Specifications | Description |
|-------------------------|---|
| On-Board Battery | Integrated in real time clock chip (DS 1387) |
| Size | 13" x 8.6" (Baby AT form factor) |
| Weight | 1.6 lbs net |

I/O Port Connections

| Serial Port | | Parallel Port | |
|-------------|----------|-------------------------------|----------|
| PIN | Function | PIN | Function |
| 1 | DCD | 1 | STB |
| 2 | DSR | 2 | AFD |
| 3 | RxD | 3, 5, 7, 9, 11, 13, 15, 17 | D0-7 |
| 4 | RTS | 4 | ERR |
| 5 | TxD | 6 | INIT |
| 6 | CTS | 8 | SLIN |
| 7 | DTR | 19 | ACK |

Reference

| | | | |
|----|-----|--|------|
| 8 | RI | 21 | BUSY |
| 9 | GND | 23 | PE |
| 10 | N/C | 25 | SLCT |
| | | 10, 12, 14, 16, 18, 20, 22, 24, 26 | GND |

Appendix A: System Planning Worksheet

| ADAPTER | IRQ | I/O Address | Memory Address |
|-----------------|-----|-------------|-----------------|
| COM1 | 4 | 3F8-3FF | N/A |
| COM2 | 3 | 2F8-2FF | N/A |
| LPT1 | 7 | 378-37F | N/A |
| LPT2 | 5 | 278-27F | N/A |
| EGA/VGA-RAM | 2/9 | 3C0-3CF | A000:0 - A7FF:0 |
| EGA/VGA-ROM | | | C000:0 - C7FF:0 |
| Mono | | 3B0-3BF | B000:0 - B7FF:0 |
| Bus Mouse | | | |
| FAX/Modem | | | |
| Hard Disk Ctlr. | | | |
| Network Card 1 | | | |
| Network Card 2 | | | |
| Other 1 | | | |
| Other 2 | | | |

Instructions: For each adapter that is installed in the system, fill out the pertinent information in the space provided. Make sure that no two components occupy the same IRQ, I/O Address and Memory Address.

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Appendix B: Upgrading the MDE486

The MDE486 can be upgraded in three areas: The CPU, the DRAM memory and cache size. Your supplier should be able to provide all three upgrades. However, since the memory daughter card option is made only by Mylex and SRAM chips can be hard to find, it may be necessary to contact Mylex to identify a local dealer or distributor who carries these parts. Mylex customer service phone number is (510) 796-6100 and is available Monday through Friday 8:00 a.m. - 5:00 p.m. Pacific Time.

The following information may assist in locating approved parts or ordering upgrade kits/parts from Mylex.

Cache Memory

Tested and approved SRAM chips include:

Table B-1: Approved SRAM Chips

| CHIP | MANUFACTURER | PART NUMBER |
|----------|-------------------|-------------|
| 8K x 8 | Micron Technology | MT5C6408 |
| | Motorola | MCM6264P |
| | Performance | P4C164 |
| 32K x 8 | Micron Technology | MT5C2568 |
| | ISSI | IS61C256 |
| 128K x 8 | Micron Technology | MT5C1008 |

Note: Other SRAM chips may be acceptable. Check with your supplier to confirm specifications.

Mylex Upgrade Kits

Table B-2: Mylex Upgrade Kits

| DESCRIPTION | PART NUMBER |
|------------------------|--------------------|
| 128K Cache Upgrade Kit | MDE-128KIT |
| 256K Cache Upgrade Kit | MDE-256KIT |
| 512K Cache Upgrade Kit | MDE-512KIT |
| Memory Daughter Card | MDE-RAMDB |

MYLEX

MDE486 EISA System BIOS

SECTION 2

Chapter 1: BIOS Overview

The Mylex System BIOS was developed to ensure compatibility for building advanced personal computer systems or workstations. The 486 System BIOS supports the highest performance 80486, as well as the widest range of products on the Extended Industry Standard Architecture (EISA) bus.

BIOS Structure

The EISA specification for system boards provides for ROM based firmware that is integrated within the overall system. Mylex has developed this software, usually referred to as the "BIOS" for use with their 80486-based EISA system boards. The system BIOS contains three functional components:

- **System BIOS (Basic I/O system).** This is a collection of routines and interrupt handlers that are used by industry standard software to perform I/O operations on commonly used devices.
- **System POST (Power-on Self Test).** This program receives control when power is initially applied to the system or a system reset operation is performed.
- **System SETUP.** This program is run when the CMOS database provided on the system board requires modification.

This manual describes the POST routine, the SETUP routine, and the operational error messages provided by the system BIOS from a user's point of view.

Chapter 2: BIOS Setup

Invoking Setup

The SETUP program allows the user to edit the CMOS configuration information provided on the system board. Whenever the power is first applied to the system, or the system is reset, the CMOS RAM is accessed to determine the configuring parameters.

There are two conditions that invoke SETUP:

- Whenever an error occurs during the POST routine, an option to enter setup is displayed.
- When instructed by the BIOS, before the operating system is loaded.

If the system detects an error with the CMOS database, it will inform the user with a screen message or series of beeps. If a screen message appears, SETUP can then be invoked by pressing the function key as indicated in the message.

The setup program is accessed by pressing the [F2] key when prompted after the POST test and prior to BOOT-UP. The POST test may be displayed by pressing the [P] key when prompted.

The CMOS setup program is similar to many other ROM based setup programs on the market and is completely menu driven.

Move the cursor, shown as inverse video, between fields by using the up and down arrow keys.

For fixed variable fields, such as "enable, disable" the options available will be displayed to the right of the cursor. Select from the displayed variables with the numeric keypad plus "+" and minus "-" keys.

For fields with a larger number of variables such as "Date" use the plus "+" and minus "-" keys to toggle the field value up or down respectively.

Once you have completed the SETUP, save it by pressing the "S" key. If a mistake was made, or if you do not wish to save your changes, press the "Q" key to quit.

On the following pages are examples of the setup screens for the MDE486 system board.

Proceeding those figures are detailed descriptions of each field and their options.

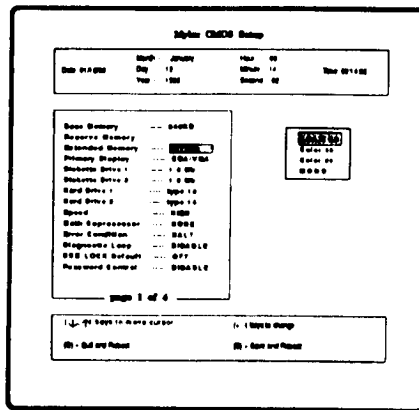


Figure 2-1: Mylex CMOS Setup Screen 1 for the MDE486

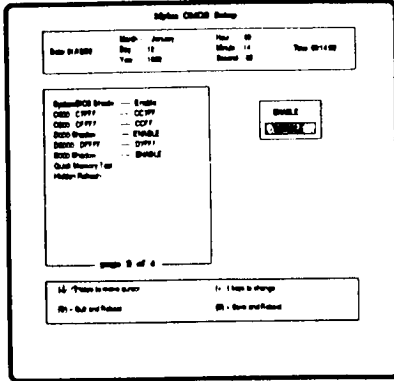


Figure 2-2: Mylex CMOS Setup Screen 2 for the MDE486

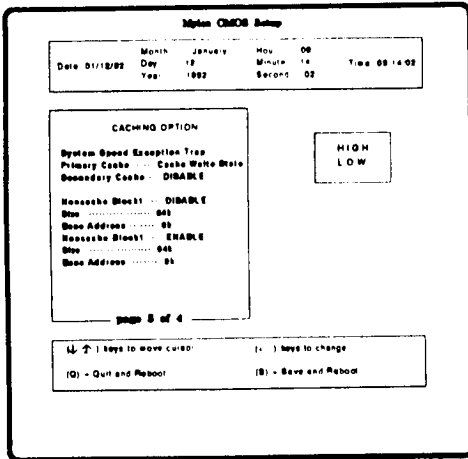


Figure 2-3: Mylex CMOS Setup Screen 3 for the MDE486

Setup

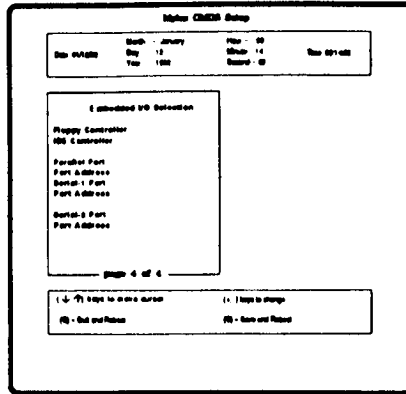


Figure 2-4: Mylex CMOS Setup Screen 4 for the MDE486

Setting the Options

The following options cover current options available.

- Time and Date** Use the arrow keys to move from field to field. Use the plus and minus keys to change the months, days, years and time. You will notice a calendar will appear when setting the date.
- Base Memory** The base memory setting should be set automatically by the system based upon the jumper settings. Normally this is 640K. This provides the maximum amount of memory for DOS and non-protected mode applications to run.
- Reserve Memory** This feature allows the system to subtract a specific amount of memory from the base memory in order for some peripheral adapters to run in lower memory. You may subtract 64, 128 and 192-KBytes of

RAM from the base memory allocation. When this option is used, ensure the base memory field is set to reflect the "subtracted" amount of memory or errors may result.

Note: This option removes useable memory from DOS applications. It should be used only when required by a peripheral adapter.

Important: When running the EISA configuration utility, make sure this option is enabled and correctly specified in the "View Configuration- Memory" field.

Extended Memory

This is the remaining memory available in the system. The value in this field is automatically set by the the system based upon the jumper settings for memory. The amount shown should be the total amount of RAM installed minus 128K for systems with less than 8MB and 384K with systems of 8MB or greater. This de-allocation of memory is done regardless of cache or shadow settings.

Base and Extended Memory

These two fields are automatically set by the BIOS. Confirm the numbers displayed match the actual amount of memory. **Note:** 384K of memory will always be de-allocated from Extended Memory. Use description from 486-EISA Manual - Base, Reserved and Extended.

Primary Display

The available options are: EGA/VGA, CGA40, CGA80 and MONO.

Diskette Drive 1 and 2

Diskette drive "1" refers to the "A:" floppy drive, "2" refers to the "B:" drive (if any). There are six options available: None (for disk-less applications) 360 Kb, 1.2 Mb for 5 1/4" floppy drives, 720 Kb, 1.44 and 2.88 Mb for 3 1/2" floppy drives.

Hard Drive 1 and 2

Note: Some disk controllers, ESDI and SCSI in particular, are commonly referred to as "smart" controllers because they use the drive type "1" setting for any size disk drive installed. If an IDE or "AT BUS" drive is installed, the Mylex BIOS is capable

of automatically setting the configuration. Use "Type2/Auto" in the BIOS for IDE drives if you wish to have the BIOS automatically set the drive parameters. If a problem arises using the "Type2/Auto" setting, review the documentation provided with the disk/drive controller and set the params manually.

Hard drive "1" refers to the first physical drive in the system, "2" refers to the second drive in the system. Additional drives must be configured with device drivers. For more information on device drivers, refer to the operating guide of the operation system being used.

There are 49 options available: None, for no hard disk installed, 47 pre-defined disk drives and one user definable drive option. Refer to information provided with the disk drive for the proper drive setting. If none of the pre-set listings apply to the drive being installed, select type "48" and then "P" to begin programming. Use the right and left arrow keys to move through the fields and the "+" and "-" keys to change the variables in each field defining particular information on the number of cylinders (CYLND), heads (HEAD), sectors per track (SEC/TK), write precompensation (PRECOM), and landing zone (LZONE). The total capacity of the drive will automatically be determined after the definable fields have been specified. Once all the definable fields have been specified, press "E" to exit the programming option for drive types.

**Math
Coprocesor**

The option should always read "Installed." If it does not, check the microprocessor.

**Error
Condition**

The three options are: Halt, No Halt (on any error), NoKB/Video. When an error occurs during the POST, the "Halt" selection will cause a prompt to be displayed providing the option to continue or enter SETUP. The "No Halt" option will simply display the error but will continue to boot the system without stopping. The NoKB/Video option will halt the system on any error except a missing keyboard or video adapter. This latter option is useful for net-

work servers that have keyboards removed or keylocks turned off.

Diagnostic Loop

When enabled, this option will place the board into a continuous POST loop. Should an error occur during the loop, it will be displayed on the screen. To break out of the loop, press the F2 function key after the completion of the memory cycle. **Note:** This loop requires the use of the same memory that is used for the user definable drive type. If the Diagnostic Loop is enabled, the user definable drive (if any is be used) will have to be re-set.

Password

Use this option to enable or disable password protection. If this field is enabled, the password input selection screen appears after "S" for save and exit has been depressed. Once this option is enabled, a password must be input before the system will boot or any change to the SETUP can be made. **Note:** The password is case and space sensitive. Use caution when selecting a password. Once the password is enabled, the only way to disable or change it is with the password previously entered. **DO NOT LOSE THE PASSWORD.**

BIOS Shadow

This option copies the system board's ROM BIOS information from slower ROM type of memory to faster RAM. Enabling this option will help to increase the performance of the system.

C/D/E000 Shadow

Like the previous shadow option, information that may reside in ROM in the C000-C7FF, C800-CFFF, D000-DFFF and E000-EFFF (hex) ranges of memory are copied from ROM to faster RAM. This option should not be enabled unless an expansion board has ROM memory that resides in that address block, and no RAM type of memory is used in that same block. **Note:** If these options are enabled, make sure that EMS drivers or "Load High" routines do not use the corresponding ranges of shadowed memory.

Hidden Refresh

This feature enables the chipset to refresh the DRAM during CPU cycles not otherwise used for refresh. This improves system performance by about 3%.

Note: Depending upon the DRAM being used, (commonly 4 and 16MB SIMMs) the hidden refresh feature may exceed the timing parameters of the DRAM. If memory problems are encountered, disable this feature.

Quick Memory Test

This option, when enabled will reduce the amount of time the POST will spend testing DRAM memory.

**I/O Ports
(Floppy, IDE,
Serial, Parallel)**

Use these fields to enable or disable the port(s) and/or select the port address.

Note: Since some operating systems assign a logical "COM1 or LPT1" to a physical port, use the following data to select the serial and parallel port settings.

| | Address | IRQ | Normalcy |
|----------|----------------|------------|-----------------|
| Parallel | 3BCh | 7 | LPT1 |
| Parallel | 378h | 7 | LPT2 |
| Parallel | 278h | 5 | LPT3 |
| Parallel | 378h | 5 | Optional* |
| Serial | 3F8h | 4 | COM1 |
| Serial | 2F8 | 3 | COM2 |
| Serial | 3E8 | 4 | COM3 |
| Serial | 2E8 | 3 | COM4 |

* Note: This is optional setting and may not be compatible with all operating systems.

- System Speed** The two options are: "Low" and "High." Selecting "High" will run the system board at the maximum clock speed, i.e. 33MHz. The "Low" option will run the system board at 8MHz. This option is useful for debugging problems or running speed sensitive software.
- Exception Trap** This option is used to enable or disable a feature in the Mylex BIOS that traps illegal instructions made by software programs. When this feature is enabled, errors will be trapped and the location in memory where the error occurred will be displayed in hex. With this option disabled, the system may either ignore the instruction or hang depending upon the circumstances. For more information review Appendix A in this section.
- Primary Cache** This option may be used to enable or disable the 486's internal cache memory.
- Secondary Cache** This option may be used to enable or disable the external cache on the MDE486.
- Noncache Block 1/2** Because certain expansion boards have shared memory, that is memory used by both the adapter and the system board that resides on the adapter, this option was created to ensure compatibility with those products. If an expansion board that uses shared memory that is addressed above 1MB (decimal) is installed, use this option to disable caching in the memory segment the expansion board resides in.
- For example, an adapter board such as a frame grabber that uses 512K of shared memory is installed at 15.5MB (decimal). The None Cache Block 1 should be enabled. The size of the non-cache block should be set at 512K and the base address of the non-cache block should be set at 15.5MB. (Note: Except normal video memory addresses, memory in the 384K "shadow zone" between 640K and 1MB is never cached.)

Chapter 3: The POST Routine

When power is first applied to the system, or the system is reset, the initial boot screen appears. The first line of the screen indicates the type and version of BIOS that is installed. The system will then perform the Power On Self Test (POST). POST tests the different components of the system and compares them to the CMOS SETUP configuration. If there is a discrepancy or a hardware fault is detected, one of the following actions will be taken:

If POST has not been able to initiate a video system, a coded sequence of tones will be played on the system speaker. If a video system is available, an error message will be displayed.

Part of the POST is the RAM test. The RAM test checks all available RAM on the system board twice. During the test, the amount of base memory and extended memory is reported on the screen. To abort this process, any key can be pressed.

Speaker Output (BEEP) Codes

A sequence of BEEP sounds will be output to the Speaker when:

- POST detects a fatal error.
- A BEEP code will be output when the BIOS detects a fatal error, then halt the system.
- When the Diagnostic (Loop) Mode is enabled
- At the end of every POST this BEEP sequence will be outputted to identify the problem.

There are only two BEEP sounds used to decode the error:

- Long Beep (LB) = ERROR
- Short Beep (SB) = NO ERROR

Error Beep Decoding:

An error can be decoded by remembering the number of beeps you hear when you hear a long beep (LB).

The following are the beep code definitions according to the position number of the long beeps (LB).

- | | |
|----|--|
| 1 | — Always a long beep to signify the start of beep decoding |
| 2 | — Video card BAD or no video card |
| 3 | — Keyboard controller error |
| 4 | — Keyboard error |
| 5 | — Programmable interrupt controller (8259-1) error |
| 6 | — Programmable interrupt controller (8259-1) error |
| 7 | — DMA page register error |
| 8 | — RAM refresh error |
| 9 | — RAM data test error |
| 10 | — RAM parity error |
| 11 | — DMA controller 1 error |
| 12 | — CMOS RAM failure |
| 13 | — DMA controller 2 error |

- 14 — CMOS RAM battery failure
- 15 — CMOS checksum failed
- 16 — BIOS ROM checksum failed

Example 1:

If errors are: (Keyboard error) and (RAM parity error) you will hear:

LB - sb - sb - LB - sb - sb - sb - sb - sb - sb - LB
 1 2 3 4 5 6 7 8 9 10

Example 2:

If errors are: (No Video), (RAM refresh) and (RAM data) you will hear:

LB - LB - sb - sb - sb - sb - sb - LB - LB
 1 2 3 4 5 6 7 8 9

POST Code (Port 80h) Definitions:

| | |
|----|--|
| 01 | CPU TEST |
| 02 | DMA PAGE REGISTER TEST |
| 03 | KEYBOARD CONTROLLER TEST |
| 04 | BIOS ROM CHECKSUM |
| 05 | SEND KEYBOARD COMMAND TEST |
| 06 | CMOS RAM TEST |
| 08 | RAM REFRESH TEST |
| 09 | FIRST 64K MEMORY TEST |
| 0A | DMA CONTROLLER TEST |
| 0B | INITIALIZE DMA |
| 0C | INTERRUPT TEST |
| 0D | DETERMINE RAM SIZE |
| 0E | INITIALIZE VIDEO OF EGA/VGA CHECKSUM |
| 10 | SEARCH FOR MONOCHROME CARD |
| 11 | SEARCH FOR COLOR CARD |
| 12 | WORD SPLITTER AND BYTE SHIFTER TEST |
| 13 | KEYBOARD TEST |
| 14 | RAM TEST |
| 15 | TIMER TEST |
| 16 | INITIALIZE OUTPUT PORT OF KEYBOARD CONTROLLER |
| 17 | KEYBOARD INTERRUPT TEST |

POST Code (Port 80h) Definitions

(continued)

| | |
|----|--------------------------------------|
| 18 | INITIALIZE KEYBOARD |
| 19 | REALTIME CLOCK TEST |
| 1A | COPROCESSOR TEST |
| 1B | RESET HARDDISK/FLOPPY CONTROLLER |
| 1C | INITIALIZE FLOPPY |
| 1D | INITIALIZE HARDDISK |
| 1E | CHECK OPTION ROM (C800 - DFFF) |
| 1F | INITIALIZE SERIAL AND PARALLEL PORTS |
| 20 | INITIALIZE TIME OF DAY |
| 21 | CHECK OPTION ROM (E000-EFFF) |
| 22 | LOOK FOR BOOT DEVICE |
| 23 | BOOT FROM FLOPPY DISK |
| 24 | BOOT FROM HARD DISK |
| 25 | A20 ENABLE/DISABLE FAILURE |
| 26 | PARITY ERROR |
| FF | FATAL ERROR OCCURED (SYSTEM HALTED) |

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Chapter 4: Installation

Precautions

Observe the following precautions before handling and installing the system board and its components:

Handling the System BIOS

Your system BIOS is a sensitive component that is prone to damage from electrostatic discharge. This is an electrical charge that every human body carries, will discharge when you touch the metal of the system BIOS and may damage the component. Therefore, discharge all of the electrostatic charges from your body to earth ground before touching the system BIOS and avoid touching any of the system BIOS metal legs.

Caution: *Wear a ground strap before touching the system board.*

Removing the Old BIOS

First locate the BIOS on the system board (refer to the User Manual if necessary). Carefully remove any peripheral cards that obstruct access to the BIOS. The system BIOS can be removed most easily with a ROM (or chip) puller. If a puller is not available, then the BIOS can be carefully pried out of its socket with a small flat-blade screwdriver. The BIOS should be first loosened from the socket by prying from one side, and then the other.

This process should be repeated until the BIOS is removed. This will reduce the stress on the legs of the BIOS, and will allow it to be reused (after erasing and reprogramming).

Replacing the BIOS

Usually the system board is shipped with the BIOS ROM chip already installed. If you must replace the ROM chip, use these steps:

Check the New BIOS

Verify that the BIOS to be installed is compatible with the chip set and cache memory controller installed on the system board.

Verify that the BIOS chip is a 28-pin, 27512 chip, with a 200 ns access time.

Verify that the BIOS chip is marked MDE BIOS.

Installing the New BIOS

Locate where the chip will be installed.

Make sure pin 1 on the chip corresponds to pin 1 of the socket by aligning the notch on the chip with the silkscreened notch on the system board. Make sure the chip faces the front of the chassis (away from the I/O connectors). Align the pins with the socket hole, then push the chip down carefully until the pins are seated securely in the socket. Be careful not to bend any of the pins.

You are now ready to power up the system, and run the SETUP Utility (see chapter 2 SETUP for more information).

Appendix A: Error Messages

Power On Self Test and Initialization Error Messages

The following messages are fatal, or rather prevent the computer from continuing further and may require service by Mylex. Before contacting Mylex technical support, turn the power off for a few minutes then attempt to reboot. If the problem persists, contact Mylex technical support.

FAULTY DMA PAGE REGISTERS

FAULTY KEYBOARD CONTROLLER

FAULTY RAM REFRESH CIRCUITRY

FIRST 64K OF RAM FAILURE

Note: This error is caused by a faulty SIMM in the first bank. Changing the SIMMs should correct this error.

RAM PARITY ERROR IN FIRST 64K

Note: This error is caused by a faulty SIMM in the first bank. Changing SIMMs should correct this error.

ROM CHECKSUM INCORRECT

DMA CONTROLLER 1 FAULTY

DMA CONTROLLER 2 FAULTY

FAILURE OF WORD SPLITTER OR BYTE SHIFTER

NO REPLY FROM INTERRUPT CONTROLLER(S)*

KEYBOARD CONTROLLER FAILED SELF-TEST

NO INTERRUPTS FROM TIMER 0

UNEXPECTED INTERRUPT WHILE TESTING TIMER 0

NO INTERRUPTS FROM KEYBOARD CONTROLLER

UNEXPECTED INTERRUPT WHILE TESTING KEYBOARD CONTROLLER

The following list of messages are also fatal, but may be resolved by performing some simple operations. The BIOS message is in bold, followed by recommended procedures to fix the problem. If the problem persists, contact Mylex technical support.

MISSING OR FAULTY KEYBOARD

Check the keyboard key lock; Check to make sure the keyboard is plugged in; Try a different keyboard.

BATTERY DISCHARGED

Reboot the system and re-run the CMOS SETUP. Make sure you save the SETUP.

HARDWARE INFORMATION LOST - RUN SETUP

Run SETUP. Make sure you save the SETUP.

HARDWARE INFORMATION CORRUPTED - RUN SETUP

Run SETUP. Make sure you save the SETUP.

HARDWARE INFORMATION DOES NOT MATCH VIDEO CARD - RUN SETUP

Run SETUP. Make sure the video card is correctly identified. Save SETUP.

COLOR/MONO SWITCH ON PCB INCORRECT

Check the hardware configuration on the system board. Check the CMOS SETUP.

STUCK KEY OR KEY PRESSED

Reboot; Try a different keyboard.

UNEXPECTED AMOUNT OF MEMORY FOUND -RUN SETUP

Check hardware memory jumpers and run SETUP

CLOCK NOT TICKING CORRECTLY -RUN SETUP

Run SETUP.

TIME AND DATE CORRUPT - RUN SETUP

Run SETUP.

MACHINE IS LOCKED - TURN KEY

Unlock the keylock

FLOPPY DISK ERROR MESSAGES

These errors are specific to the floppy disk drive(s). Follow any suggestions listed, and if the problem persists, contact your supplier's technical support.

NO BOOTABLE FLOPPY DRIVE 0 INSTALLED

There is no floppy device installed, but the CMOS SETUP has been configured for one. Run SETUP.

FLOPPY HARDWARE INFORMATION IS INCORRECT - RUN SETUP

Run SETUP.

FLOPPY HARDWARE INFORMATION IS SELF-CONTRADICTIONARY

Run SETUP.

FAILURE OF TRACK-ZERO SIGNAL IN FLOPPY DISK DRIVE

Either the floppy diskette or the drive is defective. Replace the media and then the drive.

FAILURE OF FLOPPY CONTROL HARDWARE

Replace the drive controller.

HARD DISK ERROR MESSAGES

These errors are specific to the hard disk drive(s). Follow any suggestions listed and, if the problem persists, contact your supplier's technical support.

HARD DISK # CONTROLLER FAILURE

The controller is not responding. Check the installation of the controller; Replace the controller.

HARD DISK # ERROR

The hard disk drive is not responding to the controller. Check the installation, both hardware and software; Replace the drive.

BOOT ERROR MESSAGES

The following messages are or may be displayed during the "boot" process. Following the instructions displayed on screen.

Press 'H' to retry Hard Disk, any other Key to boot from Floppy

Booting from Floppy Disk...

Please insert Boot-Disk and press any key...

Please insert valid Boot-Disk and press any key...

Non-System Disk, Please insert Boot-Disk and press any key

Booting from Hard Disk...

Hard disk absent/failed.

Hard disk boot sector invalid.

This means that the boot sector of the hard disk has been improperly installed or has been altered. Re-install the boot portion of your operating system.

MESSAGES FOR RUN-TIME FATAL ERRORS

The following errors are generated by the BIOS during operation of the system.

RAM PARITY ERROR BETWEEN ADDRESSES XXXXXXXX AND XXXXXXXX
- RESET MACHINE

A RAM parity error has occurred. You must reset the machine. If this error recurs again, check the memory with a diagnostic program.

ILLEGAL INSTRUCTION TRAPPED AT ADDRESS XXXX:XXXX - RESET MACHINE

The BIOS has encountered an instruction that it cannot execute. Many times this is a result of an application that has not been properly written and should occur during the same operation each time it is run. If the error does not occur each time, the system board may have a cache or memory error which is causing the data to become corrupt. Check the system board with a diagnostic program and/or contact your supplier.

SEGMENT BOUNDARY OVERRUN TRAPPED AT ADDRESS XXXX:XXXX - RESET MACHINE

Like the ILLEGAL INSTRUCTION TRAP, an application has made a call that overflows a buffer or jumps to a memory location that does not exist.

Appendix B: CMOS Hard Drive Table

| Drive No. | Cyl | Heads | Pre-comp | L-ZONE | Sectors | Capacity | Examples |
|-----------|----------|-------|----------|--------|---------|----------|-------------------------------|
| 1 | 306 | 4 | 128 | 306 | 17 | 10.65 | |
| 2 | 615 | 4 | 300 | 615 | 17 | 21.41 | ST-225, ST-4026 |
| 3 | 615 | 6 | 300 | 615 | 17 | 32.12 | |
| 4 | 940 | 8 | 512 | 940 | 17 | 65.45 | |
| 5 | 940 | 6 | 512 | 940 | 17 | 46.09 | |
| 6 | 615 | 4 | -1 | 615 | 17 | 21.41 | |
| 7 | 482 | 8 | 256 | 511 | 17 | 32.17 | |
| 8 | 733 | 5 | -1 | 733 | 17 | 31.90 | ST-4036 |
| 9 | 900 | 15 | -1 | 901 | 17 | 117.50 | |
| 10 | 620 | 3 | -1 | 620 | 17 | 21.41 | |
| 11 | 655 | 5 | -1 | 655 | 17 | 37.21 | |
| 12 | 655 | 7 | -1 | 655 | 17 | 52.09 | |
| 13 | 306 | 8 | 128 | 319 | 17 | 21.31 | |
| 14 | 733 | 7 | -1 | 733 | 17 | 44.66 | |
| 15 | Reserved | | | | | | |
| 16 | 965 | 5 | -1 | 965 | 17 | 42.00 | Quantum Pro-40AT |
| 17 | 960 | 5 | -1 | 960 | 17 | 42.65 | Conner CP-3044/WDA-14000 |
| 18 | 620 | 6 | -1 | 620 | 17 | 42.62 | ST-251 |
| 19 | 1024 | 5 | -1 | 1024 | 17 | 44.56 | Miniscribe 3053, 6053, ST157A |
| 20 | 762 | 4 | -1 | 762 | 39 | 60.66 | Conners Hopl 60 |
| 21 | 1024 | 7 | -1 | 1024 | 17 | 62.39 | |
| 22 | 620 | 6 | -1 | 620 | 26 | 65.50 | ST-277R |
| 23 | 1024 | 8 | -1 | 1024 | 17 | 71.30 | Maxtor 1065, ST-260A |
| 24 | 1224 | 7 | -1 | 1224 | 17 | 74.56 | Maxtor 2065 |
| 25 | 1024 | 9 | -1 | 1024 | 17 | 80.22 | ST-4096 |
| 26 | 965 | 10 | -1 | 965 | 17 | 83.99 | Quantum Pro-60AT |
| 27 | 632 | 8 | -1 | 632 | 33 | 84.34 | Conner CP-3184 |
| 28 | 960 | 10 | -1 | 960 | 17 | 85.30 | WDAC-28000 |
| 29 | 918 | 11 | -1 | 918 | 17 | 87.69 | Maxtor 1170 |
| 30 | 1024 | 10 | -1 | 1024 | 17 | 88.13 | ST-1102A |
| 31 | 1024 | 5 | -1 | 1024 | 39 | 94.37 | CDC94216-106 |
| 32 | 1024 | 11 | -1 | 1024 | 17 | 98.04 | Maxtor 1105 |
| 33 | 776 | 8 | -1 | 776 | 33 | 104.69 | Conner CP-3104 |
| 34 | 1024 | 12 | -1 | 1024 | 17 | 108.95 | |

| | | | | | | | |
|----|----------------|----|----|------|----|--------|---------------------|
| 35 | 1024 | 13 | -1 | 1024 | 17 | 115.87 | |
| 36 | 1224 | 11 | -1 | 1224 | 17 | 117.19 | Maxtor 2140 |
| 37 | 918 | 15 | -1 | 918 | 17 | 119.86 | Maxtor 1140/CP30104 |
| 38 | 1024 | 9 | -1 | 1024 | 26 | 122.68 | ST-4144R |
| 39 | 1024 | 14 | -1 | 1024 | 17 | 124.78 | |
| 40 | 1001 | 15 | -1 | 1001 | 17 | 130.89 | ST-1144A |
| 41 | 1024 | 16 | -1 | 1024 | 17 | 142.61 | |
| 42 | 914 | 9 | -1 | 914 | 34 | 143.20 | ST-1162A |
| 43 | 969 | 9 | -1 | 969 | 36 | 160.75 | CDC94166-182 |
| 44 | 1015 | 9 | -1 | 1015 | 45 | 210.47 | ST-1239A/WDA-P4200 |
| 45 | 883 | 16 | -1 | 883 | 38 | 212.62 | Conner CP-3204 |
| 46 | 1224 | 15 | -1 | 1224 | 36 | 338.41 | CDC94186-383H |
| 47 | 1632 | 15 | -1 | 1632 | 54 | 676.82 | CDC94196-766 |
| 48 | User Definable | | | | | | |

Note: Unlisted numbers have no entries, and are invalid.