EISA 486
SYSTEM BOARDS

REVISION 1.0 APRIL, 1990

MYLEX

USER MANUAL

PREFACE

Thank you for your choice of a Mylex 486/EISA System Board product. With proper installation and care, your Mylex System Board will operate for years without any service requirement. This manual will guide you in the installation process. The information contained herein is subject to change without notice.

Mylex Corporation shall not be held liable for technical or editorial omissions or errors made herein; nor for incidental or consequential damages resulting from the furnishing, performance, or use of this material.

Revision 1.0
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WARNING

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class Acomputing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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Introduction

This Installation and Operation Guide describes how to configure and install the MAE486 and MBE486 system boards. Any information that pertains to one system board, but not the other, will be clearly identified.

Precautions

Before you unpack your components, observe the following precautions:

Handling the system board

Use extreme care when handling the system board. Your system board contains very sensitive components that are prone to damage from electrostatic charge. The charge that every human body carries will discharge when you touch the metal of the system board and may damage the components. Avoid touching any of the system board metal leads. Before touching the system board or its components, all of the electrostatic charges must be discharged from your body to earth ground.

Unpacking and installing

All unpacking and installation should be done on an antistatic mat connected to earth ground through a one MegOhm resistor. You should wear an antistatic wristband connected through a one MegOhm resistor to earth ground at the same point as the antistatic mat.

Storing the system board

If you will be storing the system board, use an antistatic bag and an antistatic mat. This should protect your system board and its components until you are ready to use it.

Unpacking your components

After reading the precautions on page I-l, mal sure you received the following components:

- One MAE486 or MBE486 system board.
- One diskette that contains the configuration utility for configuring and testing the system board.
- This Installation and Operation Guide.
- A BIOS User's Manual for the appropriate BIOS on the system board.
- A warranty registration card.

If any components are missing or damaged, contact your dealer immediately.

Please complete the warranty registration car and return it to Mylex Corporation. This will protect your system board if it ever needs service.

What else YOU need

You will need the following items to configure and install the MAE486 and MBE486 system boards:

- A large, clear, flat surface that provides easy access to the system board.
- An industry-compatible enclosure with a power supply sufficient to drive all components in your system. (If you are upgrading a existing system, the enclosure and power sup ply must be industry standard.) Make sure you check the power output capacity of the

power supply to make sure it can drive all the componets in your system.

- A small Phillips screwdriver.
- A flat-blade screwdriver.
- A small pair of scissors or diagonal cutter.
- A ballpoint pen.
- An ashtray or other receptacle to hold loose screws.
- A grounded (3-prong) AC power outlet.

Using this Guide

This Installation and Operation Guide contains all the information you need to set up and install your MAE486 and MBE486 system boards.

Conventions

In this Guide, any steps you are to perform are prefaced by an arrow. Any result that occurs will appear in *italics* after the step. For example:

- Press **CTRL-ALT-DEL.**

  The system resets.

Contents

This Installation and Operation Guide is organized to let you configure and install your system board in the shortest possible time. Here is a summary of the contents in this Guide.

Chapter 1, Product overview — provides an overview of the MAE486 and MBE486 system boards and describes their features.

Chapter 2, Configuring the MAE486 — describes how to use the on-board jumpers to configure the MAE486 system board. If you have the MBE486 system board, you can skip this chapter; the

MBE486 system board has no user-configurable jumpers.

Chapter 3, Connectors — describes the pin assignments for the MAE486 and MBE486 systt board connectors.

Chapter 4, Installation -describes how to install components onto the system boards and how to install the system boards into a system chassis.

Appendix A, Specifications — lists specifications for the MAE486 and MBE486 system boards.

Appendix B, Bank and bit locations-shows the memory organization as laid out on the system boards.

Appendix C, Quick reference — shows the layout of the MAE486 and MBE486 system boards, summarizes the jumper settings for the MAE486 system board, and lists the connectors found c both the MAE486 and MBE486 system boards.

The Warranty and Index appear at the end of this Guide.

Chapter 1, Product overview

The MAE486 and MBE486 system boards are ideal for building advanced personal computer systems or workstations. Both the MAE486 and MBE486 system boards provide high-performance 80486 processing capabilities, fast 25MHz operation, and an Extended Industry Standard Architecture (EISA) bus.

This chapter describes the features of the MAE486 and MBE486 system boards.

MAE486 features

The MAE486 system board is a high-performance system board that offers the following features:

Microprocessor

INTEL 25MHz 80486 microprocessor.

BUS architecture

The MAE486 supports the EISA specification. The MAE486 provides two files of nonvolatile RAM. A standard 128-byte RAM in the Dallas DS1287 part provides standard SETUP information found in all ISA-compatible systems. An additional 8K-byte RAM is also included in a Dallas DS1225 part, which is required for EISA compatibility.

The MAE486 bus provides six slots for bus master devices. These are the six slots closest to the power supply connector. The remaining two slots are designed to accept EISA devices other than bus master devices.

On-board memory

The MAE486 provides two SIMM memory banks. Each bank provides four SIMM sockets, which can accommodate standard, 9-bit single in-line memory modules (SIMMs). Possible memory configurations using combinations 256KB, 1024KB, and 4096KB DRAM memory modules include 1, 2, 4, 8, 16, and 32 Megabytes.

Memory cache

For added performance in multitasking environments, the MAE486 provides 128KB of write-back cache in addition to the 8KB internal cache of the 80486.

Shadow RAM

Shadow RAM provides much faster RAM access to the information normally stored in ROM. The MAE486 supports shadow RAM for both system BIOS and video BIOS.

Of the total system memory installed, 128KB is reserved for shadow RAM purposes, regardless of whether this feature is used. For 1MB, 2MB, and 4MB configurations, the total amount memory available to the user will be the actu amount of memory installed minus 128KB. For configurations of 8MB and above, the total amount of memory available will be the actual amount of memory installed minus 384KB.

The SETUP utility provided by the BIOS has two entries that can be used to enable this feature. (For more information, refer to the manual for the BIOS installed in the system.)

Nonvolatile RAM

This memory is programmed by the EISA configuration utility and is used by the EISA Power On Self Test (POST) routine of the BIOS. If the configuration memory has not been programmed, the POST routine will indicate an error. This is correct operation and does not indicate a board defect.

Math coprocessor

A socket is available for the Weitek 4167 math coprocessor *(untested as of 5/4/90)*.

Jumpers

There are 14 BERG option jumpers on the MAE486 system board, 10 of which are used for setting the memory size, and four set permanently at the factory. For more information, refer to Chapter 2.

Connectors

The MAE486 provides a connector for the turbo light, keyboard lock/power, reset, and speaker. No external battery is required. The basic SETUP and EISA databases are stored in non-volatile RAM modules. For more information, refer to Chapter 2.

MBE486 features

The MBE486 system board is a cost-effecti system board designed for entry-level work stations. The MBE486 provides the following features:

Microprocessor INTEL 25MHz 80486 microprocessor.

BUS architecture The MBE486 supports the EISA specification. The MBE486 provides two files of nonvolatile RAM. A standard 128-byte RAM in the Dallas DS1287 part provides standard SETUP information found in all ISA-compatible systems. An additional 8K-byte RAM is also included in a Dallas DS8825 part, which is required for EISA compatibility.

On-board memory The MBE486 provides two SIMM memory banks. Each bank provides four SIMM socket, which can accommodate standard, 9-bit single in-line memory modules (SIMMs). Possible memory configurations using combinations of 256KB, 1024KB, and 4096KB DRAM memory modules include 2, 8, and 32 Megabytes.

Shadow RAM Memory addresses between 640KB (AOOOOH) and 1024KB (FFFFFH) are reserved by DOS for read-only memory (ROM), video RAM, and other special uses (such as network management and LIM/EMS page frames). The information in this range can be copied into RAM on the MBE486 using the same addresses. This 32-bit shadow RAM provides much faster RAM access to the information normally stored in ROM.

Note that of the total system memory installed, 384KB is reserved for shadow RAM purpose (both system BIOS and video BIOS), regardles. of whether this feature is used. The total amount of memory available to the user (as reported by

the POST memory count) will be the actual amount of memory installed minus 384KB.

The configuration of the shadow RAM is achieved by the BIOS installed on the MBE486 or by other user-supplied software. The shadow RAM must be enabled by the system SETUP program for the BIOS. The SETUP utility provided by Phoenix BIOS, for example, has two entries that can be used to enable this feature; some earlier versions of the Phoenix BIOS always keep the video shadow RAM enabled, regardless of the option selected. (For more information, refer to the manual for the BIOS installed in the system.)

Nonvolatile RAM

This memory is programmed by the EISA configuration utility and is used by the EISA Power On Self Test (POST) routine of the BIOS. If the configuration memory has not been programmed, the POST routine will indicate an error. This is correct operation and does not indicate a board defect.

Math coprocessor

The MBE486 does not require an external math coprocessor. The 80486 provides all of the functions of the Intel 80387.

Jumpers

The MBE486 automatically senses the presence of the memory installed. There are no user-configurable jumpers that require setting by the user.

Connectors

The MBE486 provides a connector for the turbo light, keyboard lock/power, reset, and speaker. No external battery is required. The basic SETUP and EISA databases are stored in nonvolatile RAM modules. For more information, refer to Chapter 2.

Chapter 2, Configuring the MAE486

This chapter describes the functions of the jumpers found on the MAE486 system board.

The MAE486 system board has several user-configurable jumpers. Before you install the MAE486 system board into a computer chassis, set all on-board jumpers to the configuration you desire.

Note: If you have the MBE486 system board, you can skip this chapter and proceed to Chapter 3. The MBE486 system board has no user-configurable jumpers.

Jumper locations

The MAE486 system board has 14 BERG-type jumpers, 10 of which are setable by the user.

Figure 2-l shows the jumper locations on the MAE486 system board.

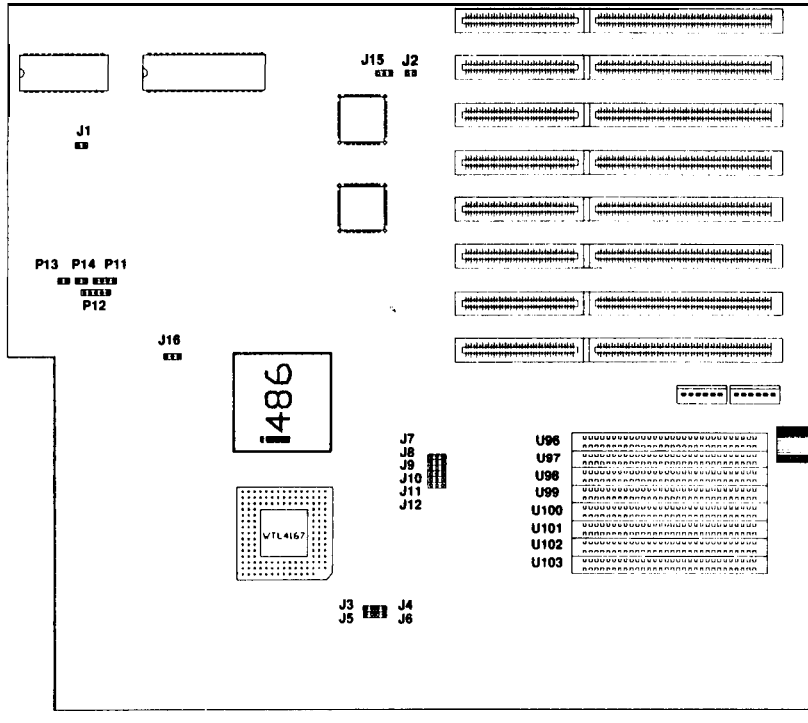

Figure 2-1. Jumper locations on the MAE486 system board

Note: Earlier revision boards have different locations for option jumpers. However, the number assigned to each jumper will be the same.

Summary of jumper settings

Table 2-l lists the jumpers on the MAE486 system board, their function, and the page to turn to for more information about them.

Table 2-1. MAE486 jumper summary

Jumper	Function	Refer to Page
J1 (factory use only)	1-2 — Enable external cache *(default)* OPEN — Disable external cache	2-4
J2 (factory use only)	1-2 — **25MHz** operation ***(default)*** **2-3 — 33MHz** operation	2-4
J15 (factory use only)	1-2 — Factory setting ***(default)***	**N/A**
J16 (factory use only)	1-2 — Factory setting ***(default)***	**N/A**
J3 through **J12**	Specifies the amount of on-board memory (see Table 2-2).	2-5
U96 through **U103**	Accept SIMM memory modules.	2-6

Jumper functions

The following sections describe the functions the jumpers found on the MAE486 system board.

External cache (J1)

l-2 — enable external cache *(default)*

OPEN — disable external cache

Jumper **J1** is a reserved jumper, intended to be used only at the factory. It determines whether the MAE486 external cache is enabled or disabled. This jumper does not affect the internal 8K cache of the 80486.

The default setting (l-2) enables the external cache. If you use this setting, the power-on self test (POST) routine in the BIOS, or other software, must also enable the external cache for the cache to operate.

To disable the external cache, remove the jumper from pins l-2 at location **J1** on the system board.

Operating speed (J2)

l-2 — **25MHz** operation *(default)*

2-3 — **33MHz** operation

Jumper **J2** determines the operating speed of the microprocessor. The default setting (**1-2**) selects an operating speed of **25MHz**.

If you set the jumper to pins 2-3 at location **J2** on the system board, you specify an operating speed of **33MHz.**

Note: The MAE486 is **not** upgradeable from 25 MHz to 33 MHz. This jumper is intended to be used only at the factory.

On-board system memory (J3 through 512)

Jumpers **J3** through **J12 define** the amount of on-board memory installed on the MAE486 system board, as shown in Table 2-2.

Table 2-2. Jumper settings for on-board memory

Jumper	1MB	2MB	4MB	8MB	16MB	32MB
J3	OPEN	1-2	OPEN	1-2	OPEN	1-2
J4	OPEN	1-2	OPEN	1-2	OPEN	1-2
J5	OPEN	1-2	OPEN	1-2	OPEN	1-2
J6	OPEN	1-2	OPEN	1-2	OPEN	1-2
J7	OPEN	OPEN	OPEN	OPEN	2-3	1-2
J8	2-3	1-2	1-2	1-2	1-2	1-2
J9	OPEN	OPEN	2-3	1-2	1-2	1-2
J10	1-2	1-2	1-2	2-3	2-3	2-3
J11	1-2	1-2	1-2	1-2	1-2	2-3
J12	1-2	2-3	2-3	2-3	2-3	2-3

SIMM sockets (U96 through U103)

Sockets U96 through U103 accept SIMM memory modules. For information on installing SIMM modules, refer to Chapter 3.

Chapter 3, Connectors

This chapter describes the connectors found on the MAE486 and MBE486 system boards. The pin assignments for these connectors are included in this chapter.

Connector locations

The MAE486 and MBE486 system boards have several connectors. Before you install these system boards into a computer chassis (described in Chapter **4**), locate all connectors to ensure proper connection to other system hardware.

Figure 3-l shows the connector locations on the MAE486 system board. Figure 3-2 shows the connector locations on the MBE486 system board.

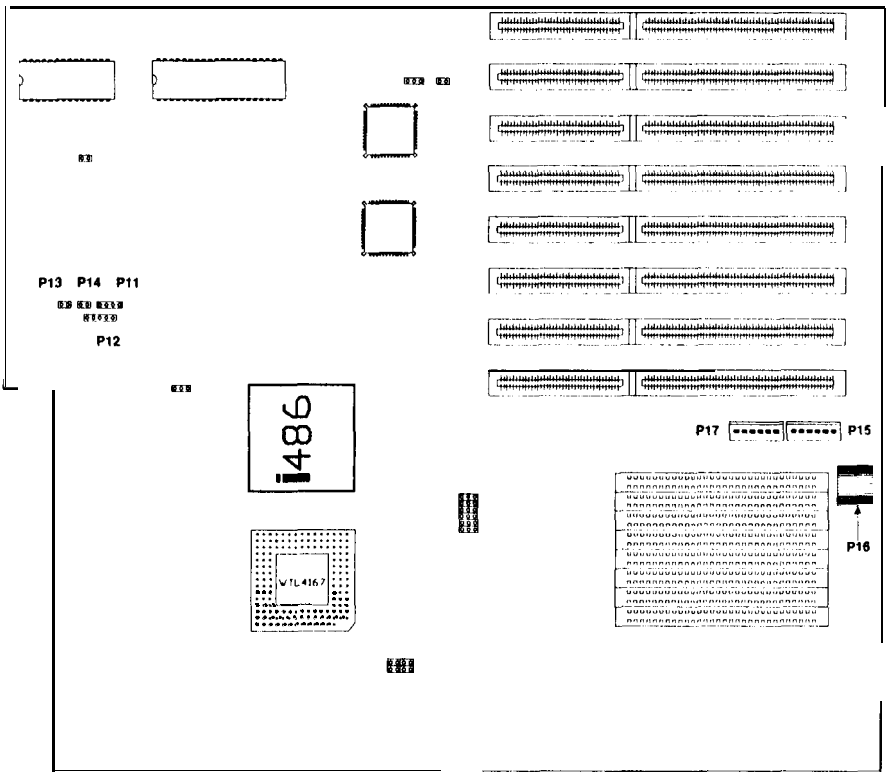

Figure 3-1. Connector locations on the MAE486 system board

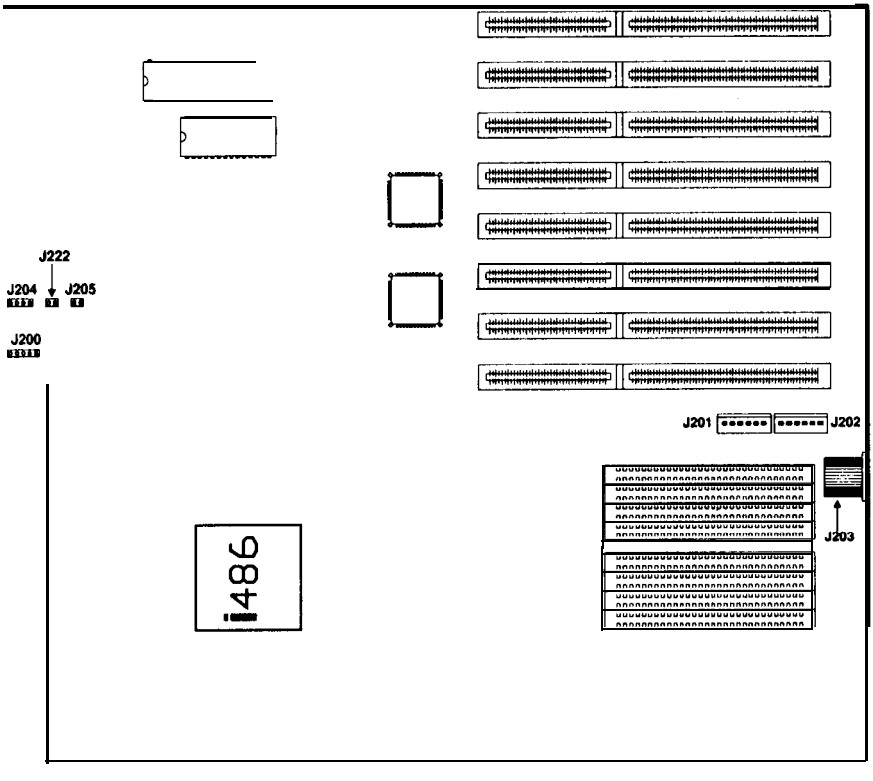

Figure 3-2. Connector locations on the MBE486 system board

Connectors and pin assignments

The MAE486 and MBE486 system boards h four connectors. Table 3-1 summarizes t. functions of these connectors.

Note: No external battery is required on the system boards. The basic EISA SETUP and EISA databases are stored in nonvolatile RAM modules located on the system boards,

Table 3-1. System board connectors

Function	Connector Reference		Refer to Page
	MAE466	MBE486	
Turbo light	P13	J205	3-5
Keyboard lock/power	P12	5200	3-6
Beset	P14	5222	3-7
Speaker	P11	5204	3-8

Turbo light connector

A connection to indicate CPU operating frequency with an external LED is provided at connector **P13** (for the **MAE486**) or **J205** (for the MBE486).

The LED is ON when the CPU is operating at the higher clock speed. The LED is OFF when the CPU is operating at the lower speed.

Table 3-2 shows the pin assignments for this connector.

Table 3-2. Turbo light connector pin assignments

Pin	Function
1	Turbo LED cathode
2	Turbo LED anode

Keyboard lock/power light connector

A standard IBM PC AT connector is provided f the keylock and front panel "Power" LED at connector P12 (for the MAE486) or J200 (for the MBE486).

External resistors to limit the power LED current are not required.

Table 3-3 shows the pin assignments for this connector.

Table 3-3. Keyboard lock/power LED connector pin assignments

Pin	Function
1	LED power (+5 Volts DC)
2	Not used (key)
3	Ground
4	Keyboard lock
5	Ground

Reset switch connector

A connection for a reset switch is provided at connector P14 (for the MAE486) or 5222 (for the MBE486).

If you short pin 1 to pin 2 on this connector, the system will go through a "cold boot" (power-on) reset operation.

Table 3-4 shows the pin assignments for this connector.

Table 3-4. Reset switch connector pin assignments

Pin	Function
1	Ground
2	Reset input

Speaker connector

A standard speaker connection is provided connector **P11** (for the **MAE486**) or **J204** (for th. **MBE486**).

Table 3-5 shows the pin assignments for this connector.

Table 3-5. Speaker connector pin assignments

Pin	Function
1	Speaker drive
2	Not used (key)
3	Ground
4	Power (+5 Volts DC)

Chapter 4, Installation

This chapter describes:

- Additional components for building a complete system.
- How to install components onto the system boards.
- How to install the system board into a computer chassis.

Building a complete system

You will need the following components to build a complete system using the MAE486 or MBE486 system board:

- A standard chassis. The MAE486 and MBE486 system boards are 13.8 inches long by 12 inches wide. This size allows the system boards to fit into an AT-compatible chassis.
- Good-quality 250 Watt power supply capable of providing at least 5 Volts continuously.
- An 8 Ohm speaker to provide sound.
- Hard disk drive.
- One floppy drive (360K or 1.2M).
- Combination of hard disk drive and floppy drive controller card.

- Video card (monochrome, CGA, EGA, or PGA).
- Monitor.
- AT-compatible keyboard (84 or 101 keyboard'
- Flat-ribbon cables between the hard drive/floppy controller and the drives.
- Combination of serial and parallel peripheral cards.
- Modem and/or FAX peripheral boards.
- Tape backup drive.

Precautions

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

Handling the system board

USE EXTREME CARE WHEN HANDLING THE SYSTEM BOARD. Your system board contains very sensitive components that are prone to damage from electrostatic charge. The charge that every human body carries will discharge when you touch the metal of the system board and may damage the components. Therefore, discharge all of the electrostatic charges from your body to earth ground before touching the system board and avoid touching any of the system board metal leads.

Installing the system board

Leave the system board in its original antistatic package until you are ready to install it. All installation should be performed on an antistatic mat connected to earth ground through a on MegOhm resistor. The installer should wear a. antistatic wristband connected through a one MegOhm resistor to earth ground at the same point as the antistatic mat.

Power supply

Do not install any components on the system board, and do not install the system board into the computer chassis, unless the power supply has been turned off and the power cord has been disconnected.

Uninstalled components

Any components that you will not be installing immediately (such as a math coprocessor or BIOS chips) should be left on an antistatic foam mat until they are installed.

Installing system board components

The following sections describe how to install the following components onto the system board:

- Installing a BIOS chip on the MAE486 or MBE486 system board (see page 4-6).
- Installing a math coprocessor on the MAE486 system board (see page 4-7).
- Installing SIMM memory modules on the MAE486 or MBE486 system board (see page 4-8).

Figure 4-l shows the layout of the MAE486 system' board. Figure 4-2 shows the layout of the MBE486 system board.

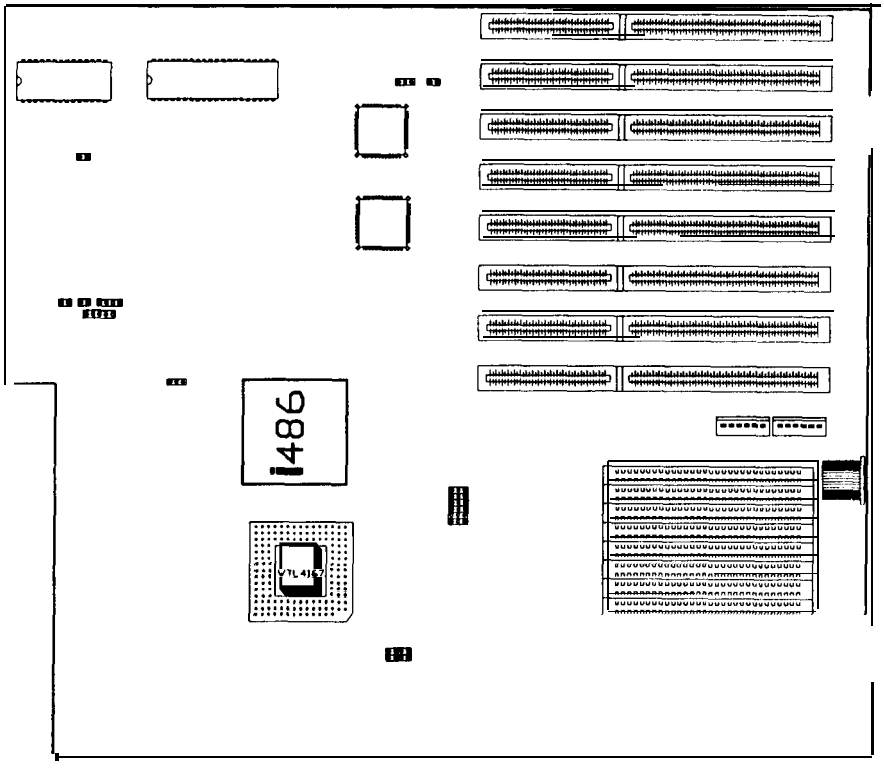

Figure 4-1. MAE488 system board layout

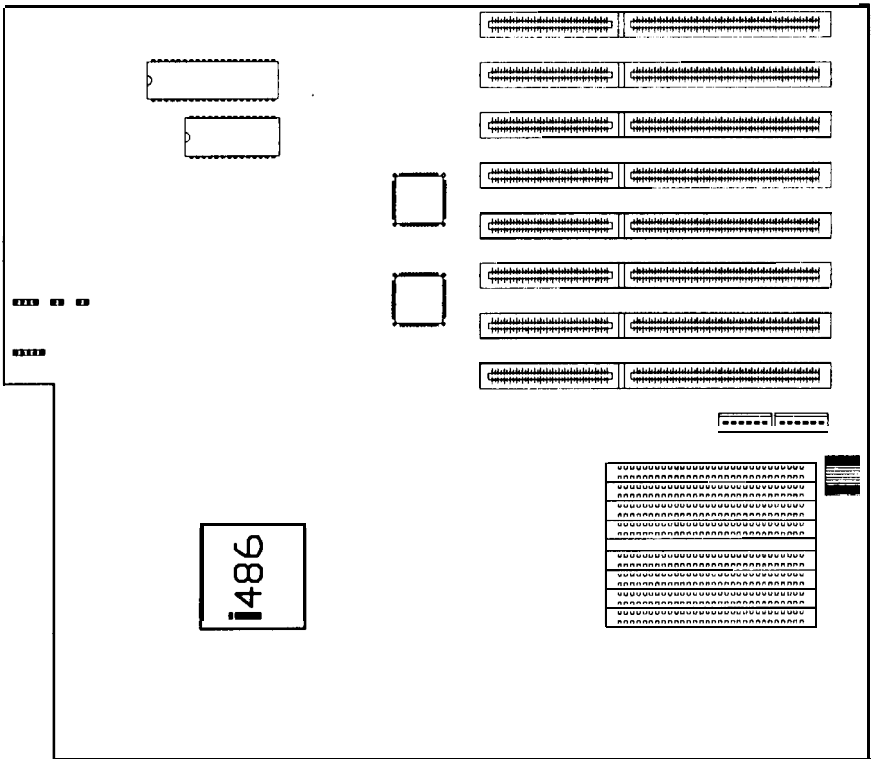

Figure 4-2. MBE486 system board layout

Installing BIOS chips

Usually the MAE486 and MBE486 system boards are shipped with the BIOS ROM chip already installed. If you must replace the ROM chip, use these steps:

- 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.

➤ For the MAE486 — verify that the BIOS chip is marked **"EISA BIOS 486 MAE rev xx"**

OR

For the MBE486 — verify that the BIOS chip is marked **"EISA BIOS 486 MBE rev xx"**

➤ Locate the appropriate system board socket where the chip will be installed:

- For the MAE486 — U7 (see Figure 4-1)

OR

- For the MBE486 — U035 (see Figure 4-2)

➤ 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 IU connector). 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.

Installing a math coprocessor in the MAE486

A Weitek 4167 math coprocessor can be installed on the MAE486 system board (no external math coprocessor is required on the MBE486 system board).

To install the math coprocessor:

- Make sure that the math coprocessor to be installed operates at the same speed (in MHz) as the 80486 processor installed on the MAE486 system board.
- Locate socket **U80** where the chip will be installed (see Figure 4-l).
- 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 IU connector). 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.

Note: You do not have to use the SETUP utility to reconfigure the MAE486 system board when adding a math coprocessor.

Installing SIMM memory

The MAE486 and MBE486 system boards provide two banks of four SIMM sockets.

- On the MAE486 system board, these sockets are labeled U96 through **U103** (see Figure 4-l).
- On the MBE486 system board, these sockets are labeled **U110, U111, U070**, U071, **U120, U080, U121,** and **U081** (see Figure 4-2).

These SIMM sockets can accept **256KB, 1024KB**, or 4096KB DRAM memory modules. This arrangement allows the system boards to be configured for the memory configurations described in the following sections.

MAE486 memory configurations

The MAE486 system board can be set up for single-bank or double-bank operation.

- In single-bank operation, SIMMs are installed in only the first bank of memory sockets (**U96** through **U99**) on the system board; sockets **U100** through **U103** are not to be used. Possible memory configurations in single-bank mode are **1, 4,** or 16 MB.
- In double-bank operation, SIMMs are installed in both memory banks (**U96** through **U103**) on the system board. Possible memory configurations in double-bank mode are 2, 8, or 32 MB.

MBE486 memory configurations

On the MBE486, SIMMs must be installed in all memory banks on the system board (**U110, U111 U070**, U071, **U120, U080, U121,** and **U081**).

Installing SIMMs

To install SIMM memory modules on the system boards, use the following procedure:

- Verify that the SIMMs to be installed are 256KB x 9, 1MB x 9, or 4MB x 9 modules. If you will be adding SIMMs to a system board that already has SIMMs on it, make **sure the existing** SIMMs and the new SIMMs are the same type. Do not install different capacity SIMMs on the same system board.

- Verify that the memory to be installed has the proper access time. Memory installed on the MAE486 and MBE486 system boards must have an access time of 80ns or faster with fast page mode support (20ns CAS access time or faster).

Note: Do not use memory with a slower access time; that is, do not use memory modules that have an access time greater than 80ns.

➤ If you are installing memory on the MAE486 system board, make sure that enough SIMMs are available for either single-bank or double-bank operation.

OR

If you are installing memory on the MBE486 system board, make sure that enough SIMMs are available for two complete banks. All memory module sockets must be filled. A partially filled bank will not work.

- Locate the SIMM sockets between the expansion bus backplane connectors on the system board (see Figure 4-3). If the system board is installed in a computer chassis, remove any peripheral boards adjacent to the SIM sockets installed in the system.

Note: On the MAE486, banks U96 through U99 must be filled before the next bank is used.

- Make sure the SIMM faces the front of the chassis (away from the IU connector). Align the SIMM with the socket hole and gently push the edge of the SIMM sockets, as shown in Figure 4-4, to release the module. Release one side of the SIMM first, then remove the other side to prevent breaking through the socket.

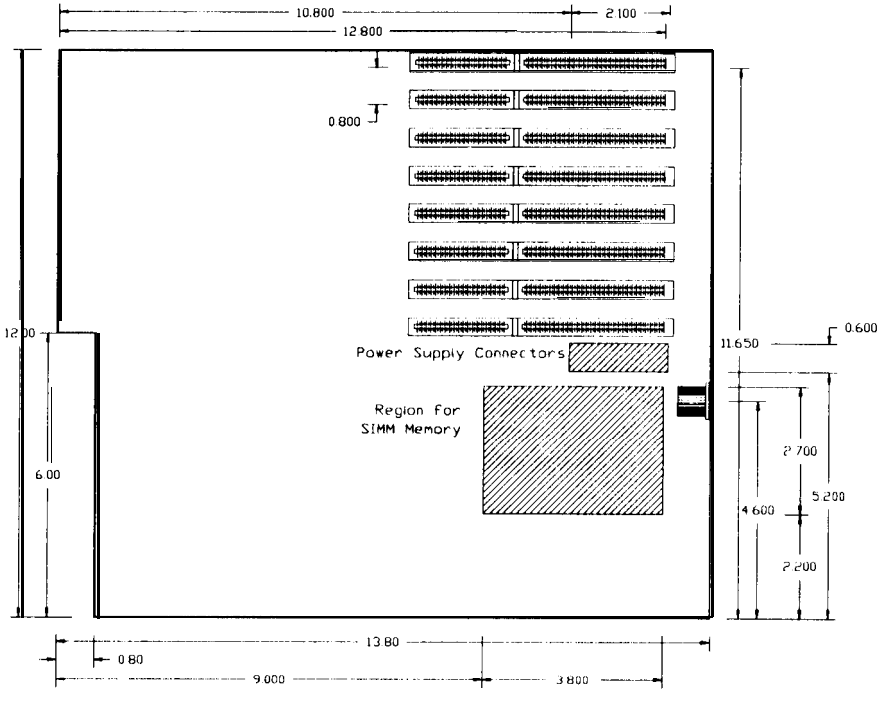

Figure 4-3. SIMM socket locations

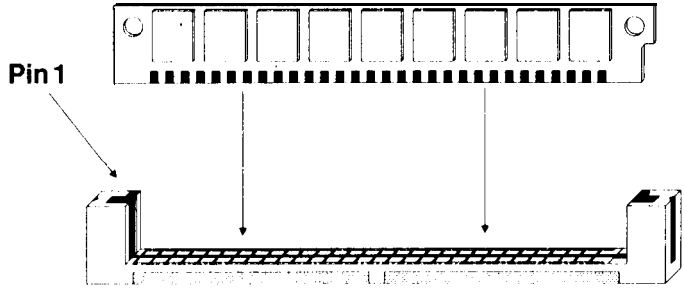

Figure 4-4. Installing SIMMs onto the system board

- For the MAE486, set the system board jumpers to reflect the current amount of on-board memory, shown in Table 4-l. (The MBE486 does not require user settable jumpers to be changed for different memory configurations).

- Turn on the system.

- The Power On Self Test (POST) should report the correct amount of memory. (If the POST does not show the correct amount of on-board memory for the MAE466 system board, check the switch settings in Table 3-l.)

- Run the SETUP utility (refer to the manual that accompanied the BIOS). You must run SETUP any time you add RAM — either on the MAE486 or MBE486 system board or with a peripheral board. This utility stores configuration information in the system board's CMOS RAM.

Table 4-1. MAE486 Jumper settings for on-board memory

Jumper	1MB	2MB	4MB	8MB	16MB	32M'
J3	OPEN	1-2	OPEN	1-2	OPEN	I-2
J4	OPEN	1-2	OPEN	1-2	OPEN	I-2
J5	OPEN	1-2	OPEN	1-2	OPEN	I-2
J6	OPEN	1-2	OPEN	1-2	OPEN	I-2
J7	OPEN	OPEN	OPEN	OPEN	2-3	I-2
J8	2-3	1-2	1-2	1-2	1-2	I-2
J9	OPEN	OPEN	2-3	1-2	1-2	I-2
J10	1-2	1-2	1-2	2-3	2-3	2-3
J11	1-2	1-2	1-2	1-2	1-2	2-3
J12	1-2	2-3	2-3	2-3	2-3	2-3

Installing the system board

The MAE486 and MBE486 system boards are manufactured with holes for mounting screws and standoffs for several AT-compatible chassis. Not all mounting holes will be used during the installation.

When installing the system board, verify that the system board fits the computer chassis by checking the alignment of the keyboard connector and the chassis access hole, as described below. Figure 4-l shows the dimensions of the system board.

- Place the system board on top of the stand-offs in the chassis.

- Make sure the location of the keyboard connector on the system board is aligned with respect to the access hole at the rear of the chassis.

If the keyboard connector and/or the mounting holes do not fit the chassis, do not try to alter the system board. Any alterations will invalidate the warranty If you need a different configuration, stop the installation and contact Mylex Corporation for assistance.

Note: Most desktop and some tower-style enclosures will use four standoff pieces and two mounting screws, as shown in Figure 4-5. Some tower-style enclosures use six mounting screws in all positions.

➤ If the connector and access holes are properly aligned, lower the system board down onto the stand-offs.

- Install the mounting screws.

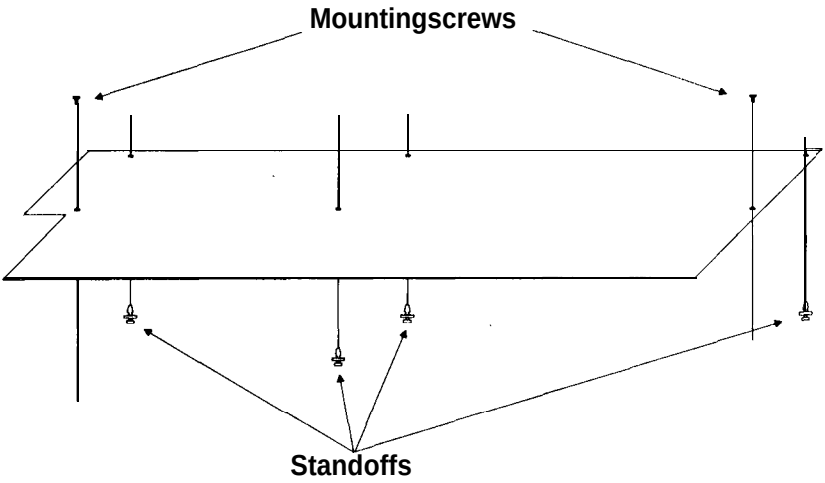

Figure 4-5. Standoff pieces on the chassis

- Connect the following cables from the syste to the system board (refer to Chapter 3):
  - Power supply,
  - Speaker.
  - Keyboard lock/power LED front panel display
  - Reset.
  - Turbo LED.

- Install the desired peripheral boards with the edge connectors facing down toward the slot on the system board.

- Install the system cover.

- Connect the AC power cord, monitor, and keyboard.

Before turning on the power switch to the system, review the manual that accompanied the

BIOS installed on the system board. The SETUP utility must be used when the system is first turned on. The manual for the BIOS used on the MAE486 and MBE486 system boards provides important information about the execution and operation of the SETUP utility.

Appendix A, Specifications

General

Products	MAE486 and MBE486 system boards
Microprocessor	INTEL 25MHz 80486
On-board memory	MAE486 — 1, 2, 4, 8, 16, or 32 Megabytes, using 256KB, 1024KB, and 4096KB DRAM MBE486 — 2, 8, or 32 Megabytes, using 256KB, 1024KB, and 4096KB DRAM
Word size	32 bits
Jumpers	MAE486 — 14 BERG jumpers (10 user configurable and 4 factory set) MBE486 — no on-board jumpers or switches required (the MBE486 automatically senses the presence of the memory installed)
Connectors	Turbo light, keyboard lock/power, reset, and speaker. No external battery is required.
Other features	128KB of write-back cache plus an 8KB internal cache (MAE486 only) Socket for Weitek 4167 math coprocessor (MAE486) 8KB nonvolatile RAM RAM shadowing of system BIOS and video BIOS External reset switch connector
Warranty	One year limited parts and labor (factory repair or replacement)

Expansion slots

Eight EISA slots, accepting any combination of 32-bit, 16-bit, and 8-bit peripheral boards.

Power requirements

+5Volts: 9.0A typical
-5Volts: 0.0A typical
+12Volts: O.OA typical
-12Volts: O.OA typical

Operating environment

Temperature	32°F to 131°F (0°C to 50°C)
Humidity	Up to 90% (noncondensing)

Dimensions

Refer to Figure A- 1.

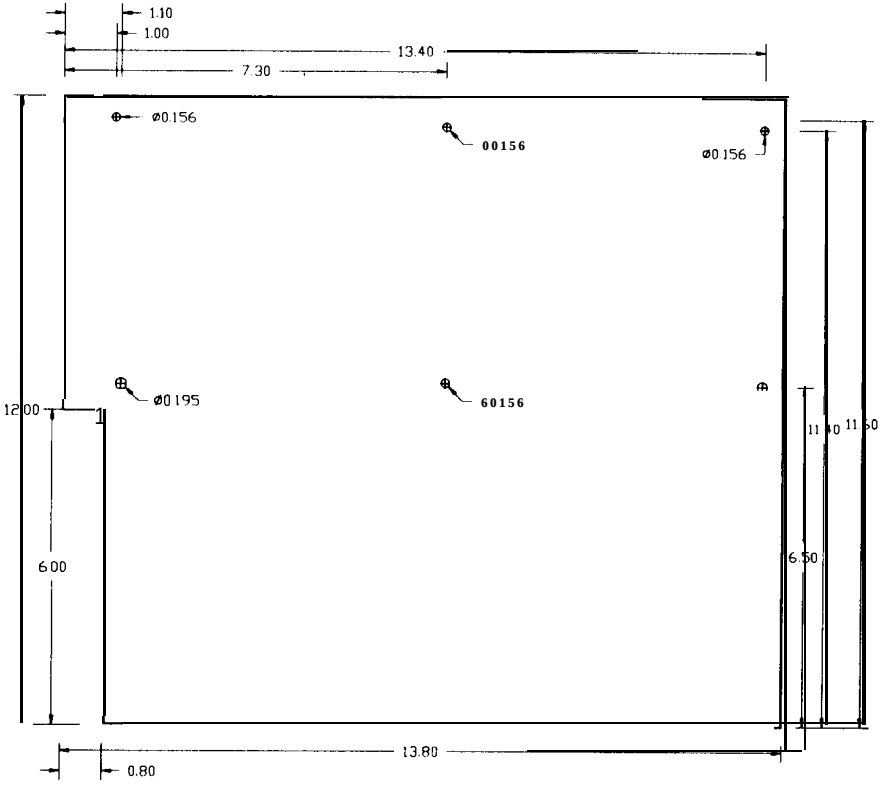

Figure A-l. System board dimensions

Appendix B, Bank and bit locations

Memory organization

The MAE486 and MBE486 system boards on-board memory is divided into two SIMM memory banks. Each bank consists of four SIMM sockets.

- **MAE486** — possible memory configurations include 1, 4, or 16 Megabytes (for single-bank operation) or 2, 8, or 32 Megabytes (for double-bank operation).
- **MBE486** — possible memory configurations include 2, 8, or 32 Megabytes.

The memory bank numbers for each bank are shown above each row of SIMM modules. The component number and the bit numbers for each SIMM module are also shown.

Diagnostic information

If a diagnostic test shows a memory error, the problem may be isolated to a particular SIMM module if the test pinpoints the exact location of the error, including bit number.

When you test the system DRAM memory repetitively, you must disable the cache memory to avoid confusion between the actual memory locations and locations mapped into the cache. If a memory location with an intermittent error is read with the cache enabled, for example, additional testing of the suspect location will be read from cache. The "successful" test

results would not show the true status of the system memory. Disabling the cache forces the repetitive memory tests to access the actual DRAM memory location.

SIMM locations

The MAE486 and MBE486 system board memory is accessed by linear address. The chip corresponding to a particular location may be determined from the address (in KB) and bit number.

The memory mapping for the system boards depends on the type of SIMM modules installed (256KB x 9, 1MB x 9, or 4MB x 9).

Table B-l shows the extended memory bank usage on the MAE486 system board. Table B-2 shows the extended memory bank usage on the MBE486 system board.

Table B-I. MAE486 address locations

Single Bank

Memory Type	Memory Location	Bit 0-7	Bit8-15	Bit 16-23	Bit 24-31
256KB x 9	0-1024KB	Bank 0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)
1 MB x 9	0-4096K.B	Bank0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)
4MB x 9	0-16384KB	Bank 0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)

Double Bank - Even Addresses

Memory Type	Memory Location	Bit 0-7	Bit8-15	Bit 16-23	Bit 24-31
256KB x 9	0-2048KB	Bank 0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)
1 MB x 9	0-8192KB	Bank 0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)
4MB x 9	0-32768KB	Bank 0 (U96)	Bank 0 (U97)	Bank 0 (U98)	Bank 0 (U99)

Double Bank - Odd Addresses

Memory Type	Memory Location	Bit 0-7	Bit8-15	Bit 1623	Bit 24-31
256KB x 9	0-2048KB	Bank 1 (U100)	Bank 1 (U101)	Bank 1 (U102)	Bank 1 (U103)
1 MB x 9	0-8192KB	Bank 1 (U100)	Bank 1 (U101)	Bank 1 (U102)	Bank 1 (U103)
4MB x 9	0-32768KB	Bank 1 (U100)	Bank 1 (U101)	Bank 1 (U102)	Bank 1 (U103)

Table B-2. MBE486 address locations

Memory Type	Relative Memory Location	Bit 0-7	Bit8-15	Bit 18-23	Bit 24–31
256KB x 9	0-1024KB	Bank 0 (U110)	Bank 0 (U111)	Bank 0 (U070)	Bank 0 (U071)
	1024-2048KB	Bank 1 (U120)	Bank 1 (U080)	Bank 1 (U121)	Bank 1 (U081)
1 MB x 9	0-4096KB	Bank 0 (U110)	Bank 0 (U111)	Bank 0 (U070)	Bank 0 (U071)
	4096-8192KB	Bank 1 (U120)	Bank 1 (U080)	Bank 1 (U121)	Bank 1 (U081)
4MB x 9	0-16384KB	Bank 0 (U110)	Bank 0 (U111)	Bank 0 (U070)	Bank 0 (U071)
	16384-32768KB	Bank 1 (U120)	Bank 1 (U080)	Bank 1 (U121)	Bank 1 (U081)

To use these tables:

- Start on the left side of the table and choose the type of SIMM installed on the system board.
- Select the memory location reported by the diagnostic.
- Select the bit location reported by the diagnostic to determine the location of the SIMM module, as shown in Tables B-l and B-2.

For example, assume an MAE486 system board contains 1MB SIMMs and that a diagnostic reports the address 2306KB. Using Table B-l,

you can find that this address is located in Bank 0.

After you select the correct bank based on the reported address, you can isolate the faulty SIMM with the corresponding column in Table B-l or B-2.

Note: Do not remove a SIMM module without first turning off the system, removing the system's power cord from the AC outlet, and using the proper tools and training to remove and replace SIMMS.

Appendix C, Quick reference

Appendix C provides the following quick-reference information:

- A layout of the MAE486 and MBE486 system boards.
- A summary of the MAE486's jumper settings.
- A summary of the connectors on the MAE486 and MBE486 system boards.

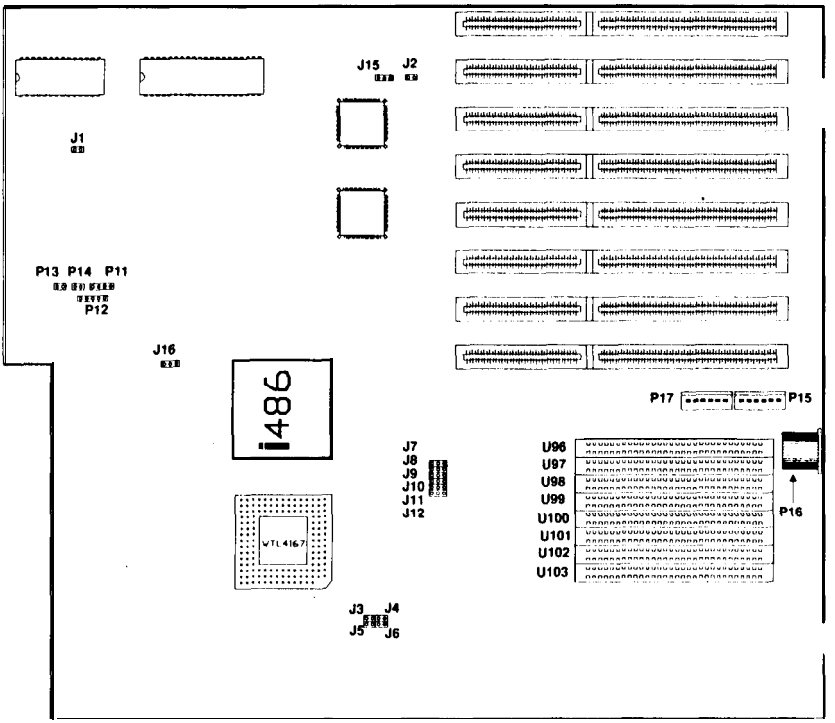

Figure C-l. Layout of the MAE486 system board

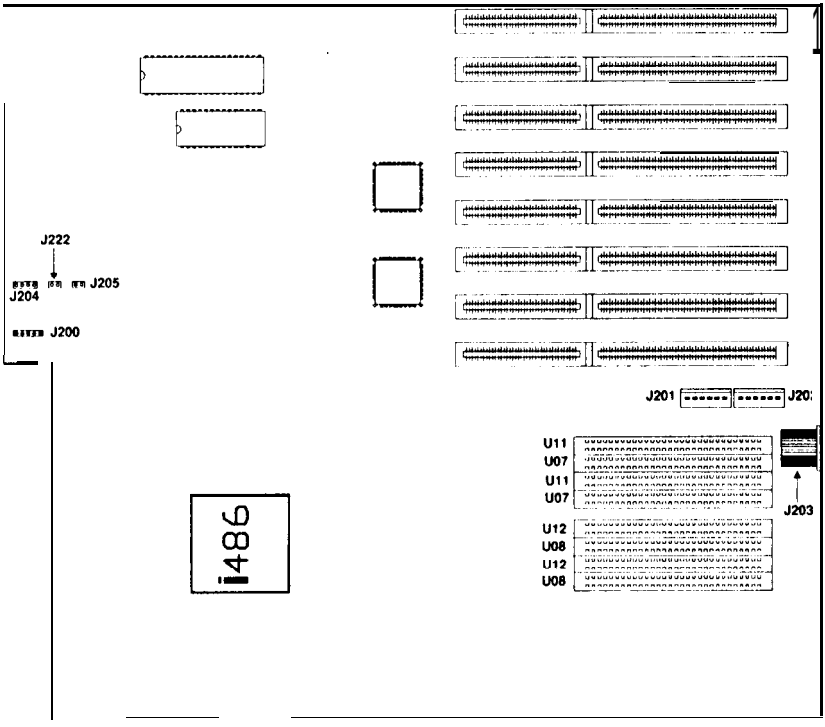

Figure C-2. Layout of the MBE488 system board

Table C-l. Jumper settings on the MAE486

Jumper	Function	Refer to Page
J1 (factory use only)	1-2 — Enable external cache *(default)* OPEN — Disable external cache	2-4
J2 (factory use only)	1-2 — 25MHz operation *(default)* 2-3 — 33MHz operation	2-4
J3 through J12	Specifies the amount of on-board memory (see Table C-2).	2-5
U96 through U103	Accept SIMM memory modules.	2-6

Table C-2. Jumper settings for the MAE486 on-board memory

Jumper	1MB	2MB	4MB	8MB	16MB	32MB
J3	OPEN	1-2	OPEN	1-2	OPEN	1-2
J4	OPEN	1-2	OPEN	1-2	OPEN	1-2
J5	OPEN	1-2	OPEN	1-2	OPEN	1-2
J6	OPEN	1-2	OPEN	1-2	OPEN	1-2
J7	OPEN	OPEN	OPEN	OPEN	2-3	1-2
J8	2-3	1-2	1-2	1-2	1-2	1-2
J9	OPEN	OPEN	2-3	1-2	1-2	1-2
J10	1-2	1-2	1-2	2-3	2-3	2-3
J11	1-2	1-2	1-2	1-2	1-2	2-3
J12	1-2	2-3	2-3	2-3	2-3	2-3

Table C-3. Turbo light connector pin assignments

Pin	Function
1	Turbo LED cathode
2	Turbo LED anode

This connector is labeled **P13** on the MAE486 and **J205** on the MBE486.

Table C-4. Keyboard lock/power LED connector pin assignments

Pin	Function
1	LED power (+5 Volts DC)
2	Not used (key)
3	Ground
4	Keyboard lock
5	Ground

This connector is labeled **P12** on the MAE486 and 5200 on the MBE486.

Table C-5. Reset switch connector pin assignments

Pin	Function
1	Ground
2	Reset input

This connector is labeled P14 on the MAE486 and 5222 on the MBE486.

Table C-6. Speaker connector pin assignments

Pin	Function
1	Speaker drive
2	Not used (key)
3	Ground
4	Power (+5 Volts DC)

This connector is labeled P11 on the MAE486 and 5204 on the MBE486.

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Warranty and service

Mylex Corporation warrants that this equipment will be free from defects in material or workmanship for a period of one year from the date of purchase, or if proof of purchase is not provided, one year from date of shipment.

Myiex Corporation **makes no other warranty, express or implied, and ail implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed.**

This warranty does not apply to any products which have been damaged by lightning storms, water or power surges or products which have been neglected, altered, abused, used for a purpose other than the one for which it was manufactured, repaired by the customer or any party without Mylex Corporation's written authorization, or used in any manner inconsistent with Mylex Corporation's instructions.

Mylex Corporation's entire obligation under this warranty shall be limited (at Mylex Corporation's option) to repair or replacement of any products which prove to be defective under the terms of this warranty, subject to the provisions and specific exclusions listed herein. At Mylex Corporation's option, Mylex Corporation may issue a refund of the purchase price to remedy the warranty obligation. **Myiex Corporation will not be liable for consequential damages and under no circumstances will its liability exceed the purchase price for defective products.**

Customer support and service

Mylex Corporation is happy to assist and support its customers. If you have trouble or questions relating to any purchased equipment, please call our support number (415) 683-4600. Do not return any equipment without first calling this number.

Warranty service shall be performed at the manufacturing facility, 47650 Westinghouse Drive, Fremont, California 94539. The owner must obtain a Returned Material Authorization number (RMA) from the seller's customer support department for each shipment of returned material. Shipping charges for the returned equipment will be paid by the buyer, and warranted repairs will be returned to the buyer at the expense of the manufacturer.

MYLEX

47650 WESTINGHOUSE **DRIVE**

FREMONT. CALIFORNIA 94539

415/683-4600 415/656-7857 FAX

Mylex Product Bulletin

Product:	MAE488
Title:	Release Notes
Date:	8/23/90

This bulletin covers information about the latest release of the MAE466, which includes three new PAL chips and a new EISA Configuration Utility, offering increased compatibility with add-in boards.

☐ Phoenix BIOS Notes (v 2.0 and earlier)

1) The Phoenix BIOS will not operate property with the EISA Configuration Utility. 2) The Phoenix BIOS does not operate the Turbo light correctly. 3) The Phoenix BIOS will occasionally generate the error message "Time of Day Clock Stopped" at POST time. If the clock has been previously verified to work, this message should be ignored. 4) The Phoenix BIOS will not correctly boot a fbppy disk when in the low-speed mode. Note: These problems are under investigation.

Anal note: Different verslons of the Phoenix BIOS may produce different results on the Landmark SPEED test in the low speed mode of the MAE466. The Revision 1.04 and earlier versions resulted in a 19MHz rating, while Revison 2.0 results in a 50 MHz rating. Other benchmarks may be similarly affected.

☐ Double reset on VGA boards

The POST routine on Phoenix BIOS Version 2.0 and prior will reset VGA video boards twice. This feature was added when it was discovered that some popular VGA BIOS routines would cause the video system to come up in monochrome mode on a 466 unless this was done. Video Seven has released a new VGA BIOS that does not require a double reset on a 466. However, since this feature is still required for other popular VGA boards, it will be kept in future revisions.

☐ ISA Bus Master Cards

Some older ISA bus master products do not check the I/O Channel Ready signal (CHRDY) and are, therefore, not compatible with EISA.

Current versions of the WD 7000 controller and **Pixelworks** Graphics board will work properly. Older versions may have to be updated.

☐ All **EISA** slots

The current version of the MAE486 has been manufactured with eight **32-bit I/O** slots. Prior versions of the MAE486 had one ISA **16-**bit slot and one ISA **8-bit** slot. Note that **EISA** bus-master boards, such as the Mylex DCE376, are supported only in the first six **32-bit** slots (those closest to the power supply connector). The remaining two **32-bit** slots will support other **32-bit** boards such as the Mylex LNE390 and ISA boards, including ISA bus-master boards.

Also note that older 8-bit boards that have an "apron" will not fit in the **EISA** connector; therefore, they cannot be used.

Cl **Qualified SIMM Memories**

The following SIMM memories have been tested and approved for use with the MAE486:

Vendor	256KB	1024KB	4096KB
Samsung	Not Tested	KMM59100A-8	Not Tested
Mitsubishi	Not Tested	MHM1M09A0J-8	Not Tested
Toshiba	Not Tested	Not Tested	THM94000S-80

The following SIMM memories have been tested and/or examined and explicitly **disapproved for** use with the MAE466. Note: Although individual samples of these parts may work, Mylex is not responsible for the reliability of an MAE486 installed with these components.

Vendor	256KB	1024KB	4096KB
NEC	Not Tested	MC-421000A9B-80	Not Tested
Fujitsu	Not Tested	81C1000-80 (device)	Not Tested
OKI	MSC2331A-80	Not Tested	Not Tested

☐ MAE486 Release History

The following table the production history of the MAE486.

Date	Component	Change Description
2/90	Hardware	Rev. P --> 4A - First release
	BIOS	Phoenix v 1.04
3/90	Hardware	Rev. 4A-B --> C - new PALs - "AEU14-1A" and "AEU42-1 B" - to add EISA ID & accommodate ISA bus-masters
4/90	Hardware	Rev. 4A-C --> D - PAL change - AEU200-1A --> 1B - improved UNIX reliability and compatibility
	BIOS	Phoenix v1.04 --> 2.0
5/90	Hardware	Rev. 4A-D --> E - PAL change AEU42-1B --> 1C - improve compatibility with ISA bus-master in single bank memory configuration
	BIOS	Phoenix 2.0 --> 2.02
6/90	Hardware	Rev. 4A-E --> F - pull-up resistor at U57
	BIOS	Phoenix BIOS 2.02 --> 2.00 due to 2.02 problems with EISA Configuration Utility
	Software	EISA Configuration Utility - Ver. 1 .01
6/90	Hardware	Rev. 4A --> 4B-1A - Fab change incorporated prior jumper and PAL changes
07/90	Hardware	Rev. 4B-1C --> 1D - new PALs: AEU40-2B, AEU42-2C, and AEU43-2A - to improve compatibility with EISA bus-masters

☐ Compatibility Notes

The following add-in products have been tested with the MAE486, and the following observations have been noted:

Hardware Product	Notes
AdaptecACB-2322D	Floppy format problem with Phoenix BIOS.
Adaptec AHA-1 54x	1) Requires Rev. 4B-1 D or later to run single bank of memory (1, 4, or 16MB) 2) Adaptec 154x and 2322 have problems formatting floppy disks. Requires Phoenix BIOS fix (in process). 3) For Rev. 4A, PAL U42 should be Rev 1C (or later).
AquillaAQ_EISA	Shared RAM must be located at D000h.
Novell NE3200	Requires Rev. 4B-1 D.
Weitek4167	Not supported until next revision.
WD1007	This board has 8K of BIOS of which the last 256 bytes is shared RAM; therefore, user can't shadow this ROM area. If a VGA card is used, disable Video BIOS shadowing.

The **MAE486/25** has been tested with the following software products, and the following observations have been noted:

Software Product	Notes
AutoCAD v9.0	No problems reported.
Check-it **(v2.1)**	Clock and calendar test fails, although working properly.
MCS **EISA** Configuration Utility	Need Phoenix BIOS **v2.0.**
Novell Netware **2.15c** and 3.0	No problems reported.
OS/2 1.1 and 1.2	No problems reported.
QA Plus **(v2.x)**	1) Fails serial port loop-back test (due to speed of **MAE486),** although serial port working. 2) Clock and calendar test fails, although working properly 3) Hard disk diagnostic may fail, though no hardware errors.
wlndows 3.0	Phoenix BIOS **v2.0** has problems. Mylex BIOS **v5.02** is in beta testing (no reported problems with Windows 3.0).
UNIX V 3.2 **- SCO v3.2,** Interactive v 2.0, and AT&T	No problems reported.

❑ Common Installation Problems & Answers

Configuration Utility Program and Utility File

Question: Why do I need the EISA Configuration Utility?

Answer: The EISA Configuration Utility is a software program that needs to be run after the system is first assembled, or whenever any boards in the system are changed.

Problem: After installing the DCE376 and running the system configuration utility, the system gives the "CONFIGURATION ERROR SLOT X" error message during POST (where X is the slot in which the DCE376 is installed).

Answer: The file !MLX0020.CFG on the DOS Driver diskette should be copied onto the configuration utility diskette.

Problem: If you have a system with an early Phoenix BIOS, the system may power up with no errors; yet when the DCE software drivers are loaded, the system hangs.

Answer: It is necessary to do a warm boot after power-up to write EISA programming information from the non-volatile RAM to any EISA peripheral board. Phoenix engineers are working on this problem. The Mylex BIOS v5.02 is in beta testing and does not have this problem.

☐ File Directory of Driver Diskettes

The following flier are contained on the MCS EISA Conflguratlon diskette:

!MLX0010	CFG	2674
!MLX0020	CFG	4928
!MLX0030	CFG	4717
!MLX0040	CFG	803
!MLXFE01	CFG	1694
!MLXFF01	CFG	7320
CF	EXE	353940
LOGO	EXE	6115
SD	EXE	16609
SD_UTIL	EXE	173155
SYSTEM	SCI	502

☐ Documentation Errata

The following errata on Revision 1 .O (April, 1990) of *EISA 486 System Boards* have been found. Replacement manual pages are provided with these release notes. The replaced pages should be discarded.

Page 2-2: Jumper **J2** is shown in Figure 2-l as a **2-pin** BERG connector. It is actually a 3-pin connector.

Page 2-2: The following note has been added.

> "Note: Pin 1 for each option jumper appears on the **left**-hand side of the drawing."

Page 2-3: The jumper setting for J2 has been reversed. The proper setting is l-2 for **33MHz** operation and 2-3 for **25MHz** operation (default).

Page 2-4: The jumper setting for J2 has been reversed. The proper setting is l-2 for **33MHz** operation and 2-3 for **25MHz** operation (default).

Page 3-1: The following note has been added.

> "Note: Pin 1 for each connector appears on the left-hand side of the drawing."

Page 3-2: The following note has been added.

> "Note: Pin 1 for each connector appears on the left-hand side of the drawing."

Page C-2: The same error occurs as described in Page 2-2 above.

Page C-4: In Table C-l, the same error occurs as described on Page 2-3 above.