



MSI/MDI486 System Board

Installation and Operations Guide

Version D03

10/21/91

PREFACE

Thank you for your choice of a Mylex MSI/MDI486 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) this device must accept any interference received, including interference that may cause undesired operation.

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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.
- 3) Mylex will not be responsible for non-Mylex products shipped with an RMA unit. This includes memory, math co-processors and other internal and external peripherals.

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Introduction

Thank you for making the decision to purchase the Mylex MSI486 or MDI486. With proper installation and maintenance, the MSI/MDI486 will provide years of trouble-free operation.

Package Contents

- MSI486 or MDI486 System Board
- Cable Kit (2 serial cables and 1 parallel cable)
- This manual
- Warranty Card
- Any pertinent release notes available at the time of shipment.
- System Problem Report Form



Handling Precautions

The MSI/MDI486 contains electronic components that are highly sensitive to electrostatic discharge. Use extra caution when handling the MSI/MDI486 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 MSI/MDI486 has delicate crystal oscillators that can break if subjected to sudden shock such as being tossed on a table. Use care when moving the MSI/MDI486 from point to point.

If Troubles are Encountered

If, during the course of installation or operation of the MSI/MDI486, the board displays improper operation, first consult this manual's Troubleshooting 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. Should problems still exist, you may contact Mylex Technical Support Department at (510) 796-6100. Be sure to have the enclosed System Problem Report completely filled out.

Overview

The MSI486 and MDI486 are "sister" products as the only difference between them is the microprocessor installed at the factory and the pertinent jumpers have been set for the proper processor. This manual applies to both the MSI486 as well as the MDI486.

The unique feature of the MSI486 is that it can be easily upgraded from a 486SX CPU to a 487SX or 486DX. Since a special frequency synthesizer is used, the need to change oscillators is eliminated.

Contents: Section 1

This Section is broken down into 6 major sections. The following is a description of each section.

Chapter 1: Installation — This describes the major steps for installing the MSI/MDI486 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 MSI/MDI486 system board.

Chapter 3: Upgrading — This section describes the steps necessary to upgrade the CPU and cache on the MSI/MDI486.

Chapter 4: Technical Reference: — This section covers some of the major aspects of the MSI/MDI486's design, as well as pin assignments and compatibility and benchmark information.

Appendix A: System Planning Worksheet

Appendix B: Jumper Settings

**Contents:
Section 2**

This section covers the Mylex BIOS installed on your MSI/MDI486. It is broken down into six 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.

Chapter 4: BIOS Installation — details the proper procedure for removing/installing a system BIOS.

Appendix A: ISA Error Messages

Appendix B: CMOS Hard Drive Table

What You Will Need

Before you begin to install the MSI/MDI486 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 MSI/MDI486.

MYLEX

MSI/MDI486 System Board

SECTION 1

Chapter 1: Installation

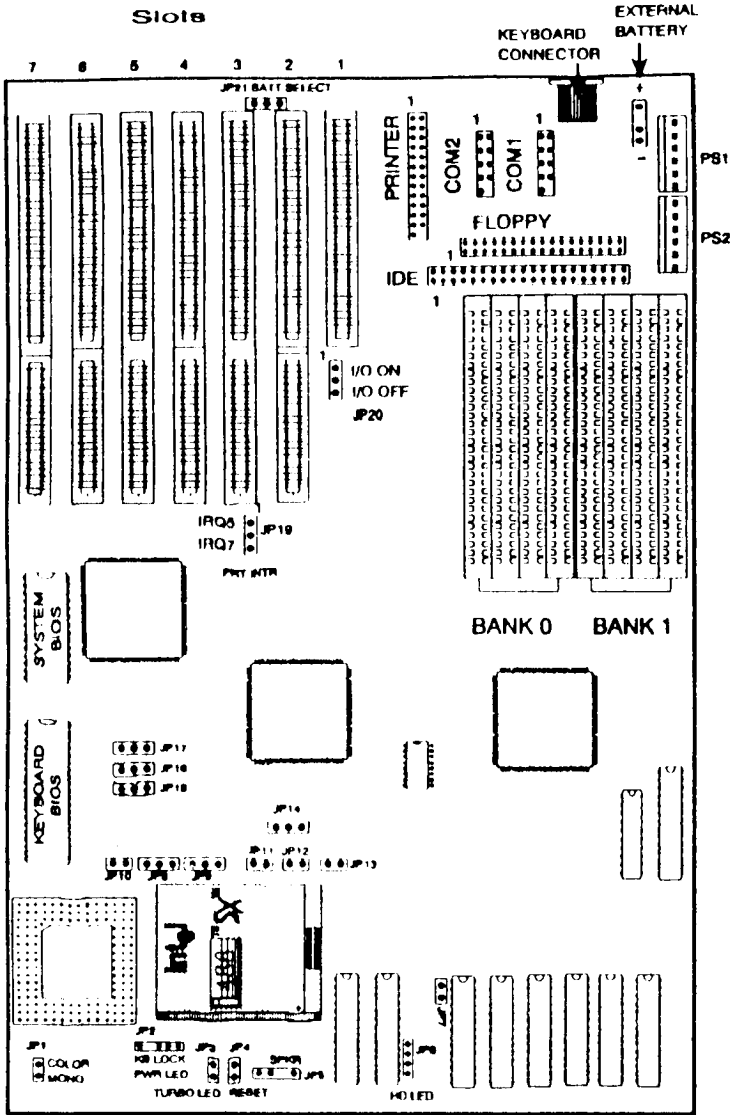


Figure 1-1: MSI/MDI486 System Board

There are 5 easy steps for installing the MSI/MDI486 system board into a chassis.

1. Planning the system configuration.
2. Installing SIMMs and a math coprocessor.
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.

Installing Memory

The MSI/MDI486 supports 80ns "fast page mode" SIMM memory. SIMMs are available in three common sizes, all of which are supported: 256K x 9, 1MB x 9, and 4MB x 9. These SIMMs should be available from your system supplier.

The MSI/MDI486 uses a 32-bit address bus for the memory. As a result, four or eight SIMMs must always be used in the system. They are broken down into two banks - Bank 0 and Bank 1. The MSI/MDI486 supports seven different memory configurations: 1, 2, 4, 5, 8, 16, 20 and 32MB. **4 M-byte SIMM sizes cannot be mixed.**

Orient the SIMMs so that the RAM chips face toward the I/O expansion slots. Make sure the SIMMs are

firmly in place and even with each other on a horizontal plane. Review figure 1-2 and the table below it for SIMM module installation.

Note: When installing a SIMM into a socket, an audible click sound will occur when the SIMM has been fully seated.

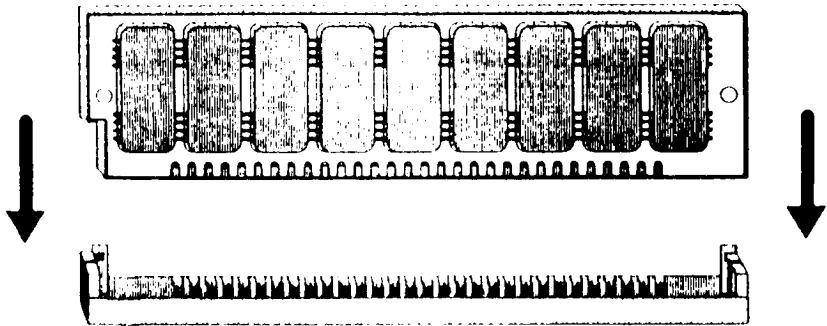


Figure 1-2: Inserting a SIMM Module

Table 1-1: SIMM Memory Configurations

Size	Bank 0	Bank 1
1-Mbyte	4 x 256K	-----
2-Mbytes	4 x 256K	4 x 256K
4-Mbytes	4 x 1MB	-----
5-Mbytes	4 x 1MB	4 x 256K
8-Mbytes	4 x 1MB	4 x 1MB
16-Mbytes	4 x 4MB	-----
20-Mbytes	4 x 4MB	4 x 1MB
32-Mbytes	4 x 4MB	4 x 4MB

Installing a Math Coprocessor

The MSI/MDI486 supports the Weitek™ 4167. The speed of the math co-processor must be matched to that of the CPU. A 20-MHz system board will require a 20-MHz co-processor, while a 33-MHz system board will require a 33-MHz co-processor.

CAUTION: Improper installation of the math coprocessor can cause permanent damage to the system board.

Locate the socket for the math coprocessor on the bottom of the board adjacent to the CPU. Using Figure 1-3 as a guide, ensure all the pins are perfectly lined up before pressing the chip down into the socket.

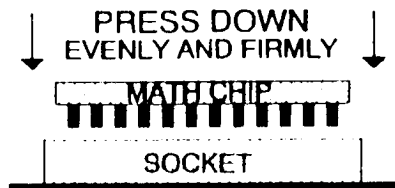


Figure 1-3: Math Co-processor Installation

Then press down with firm and even pressure until the chip will no longer move. Normally this will leave less than 1/10" clearance between the chip and the socket.

Note: Pin 1 on the math co-processor is marked either by a diagonal notch or by a small black dot one corner of the chip. Place this corner of the chip in the same position as the notch in the socket.

Setting the Jumpers

There are 4 configuration jumpers that should be confirmed before installation is completed. They are:

- JP1** This is the color/mono selection jumper. From the factory it is set for MONO mode. If color mode is desired, remove the jumper and place it on both pins only.

Jumper JP1 is located at the lower left hand corner, under the math co-processor socket.

- JP19** This selects the interrupt for the parallel printer port. If IRQ 7 (LPT1) is to be used, place the jumper over pins 2-3. If IRQ 5 (LPT2) is to be used, place the jumper over pins 1-2.

Jumper JP19 is located between and slightly below slots 2 and 3 (see Figure 1-1).

- JP20** This jumper is used to enable/disable all I/O ports on the MSI/MDI486. Move the jumper over pins 1-2 to enable the I/O and pins 2-3 to disable the I/O.

Jumper JP20 is located directly below slot 7.

- JP21** This jumper determines CMOS battery power source. If the on-board battery is going to be used, leave the jumper in place covering pins 2-3. If an external battery pack is used, remove the jumper and place it on a **single pin only**.

If a need arises to reset the CMOS registers, place the jumper over pins 1-2, turn on the power for 15 seconds, then turn off the power and place the jumper back on pins 2 & 3.

Jumper JP21 is located near the top-center of the board between slots 2 and 3 (see figure 1.1).

Chassis Installation

Use caution when sliding the MSI/MDI486 into the chassis so as not to scrape the bottom of the board against any rough edges. Use as many plastic stand-offs as possible to better support the board. Use a minimum of two screws (preferably in opposing corners) to lock the board in place.

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.

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 cables. Refer to Figure 1-4 for their locations on the MSI/MDI486.

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 Section should be consulted for more information.*

The Mylex BIOS that is installed on the MSI/MDI486 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.

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.

Chapter 2: Upgrading

There are two major components that may be upgraded on the MSI/MDI486 system board. They are: the CPU (assuming a MSI486 is being upgraded to a 487SX or 486DX), and the amount of cache memory that may be upgraded on either the MSI486 or MDI486. This section covers each of these upgrades in detail.

Upgrading the CPU

The MSI486 is equipped with a special ZIF (Zero Insertion Force) socket that allows the CPU to be removed and replaced without damaging the pins on the CPU itself. Several jumpers must also be changed depending upon the speed and type of CPU being installed.



**STATIC
WARNING**

The MSI/MDI486 contains electronic components that are highly sensitive to electrostatic discharge. Use extra caution when handling the MSI/MDI486 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.

Note: It may be easier to have the system board removed from the chassis to complete this operation.

After taking proper static precautions, lift the small metallic lever on the side of the CPU socket. See Figure 2-1. Carefully lift the CPU out of the socket and place it in proper anti-static material that can protect the pins of the chip.

Carefully line up the pins on the new CPU so that they easily drop into place. Make sure that the diagonal notch, and/or the small black dot for pin 1 is located directly at the pivot point of the lever. Gently press the chip into the socket.

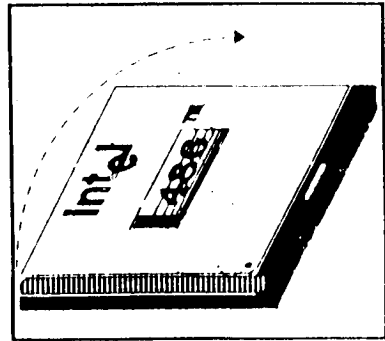


Figure 2-1: Zif Socket

Then move the lever down until it is flush with the socket and chip.

Review the table below for the proper jumper settings for the new configuration.

Table 2-1: CPU and Speed Selection Jumpers

JUMPER	486SX	487SX	486DX
JP8	OPEN	2-3	1-2
JP9	2-3	1-2	1-2
JP10	OPEN	CLOSED	CLOSED
	20-MHz	25-MHz	33-MHz
JP14	2-3	2-3	2-3
JP15	1-2	2-3	1-2
JP16	2-3	1-2	1-2
JP17	1-2	2-3	2-3

WARNING:

If you are increasing the processor speed, it may be necessary to upgrade the speed of the cache memory. A MSI486 20-MHz **will not** work when upgraded to 33-MHz unless the cache RAM has been upgraded. See Upgrading the Cache.

Upgrading the Cache

Both the MSI486 and MDI486 have the ability for the cache size to be upgraded from the standard 64-Kbytes to 256-Kbytes. To do this, eight (8) 32K x 8 35ns and one (1) 32K x 8 25ns SRAM chips must first be obtained. Your system supplier, or component vendor should be able to provide these parts.

Note: It may be easier to have the system board removed from the chassis to complete this operation.

Remove the existing eight (8) 8K x 8 35ns SRAMs currently installed. They are located along the bottom edge of the system board in sockets. (They are only DIP chips on the bottom in sockets.) Their silk screen locations are: U3, U4, U6, U7, U8, U9, U10 and U11. Remove the chip in the socket U19, which is located just above the other SRAMs on the right hand side of the board.

Then carefully insert the new 32K x 8 35ns chips in their place. Then place the remaining 32K x 8 25ns SRAM in location U19. Make sure that the pins to each of the chips do not get bent under the socket and that they are properly lined up in their sockets so that pin 1 of the chip is facing the same direction as the notch of the socket. (This is toward the keyboard connector.)

Set the jumpers for the proper size of the cache. Refer to the following table for jumper information.

Table 2-2: Cache Memory Size Jumper Settings

JUMPER	64-Kbytes	256-Kbytes
JP11	OPEN	CLOSED
JP12	OPEN	CLOSED OPEN
JP13	OPEN	OPEN CLOSED
JP7	OPEN	CLOSED

Increasing Cache Memory Speed

If the speed of the MSI486 is being increased from 20 or 25-MHz to 33-Mhz, it is necessary to upgrade the speed of the cache memory. This is achieved by replacing the current cache memory chips, as

described previously, as well as the two "tag RAM" chips. The "tag RAM" chips are a part of the cache circuit that store locations of data and not the cache data itself.

The tag RAMs, because they store the location data, are required to be 10ns faster than the rest of the cache. They are located on the right hand side of the board, above the row of cache RAMs in locations U19 and U20. Location U19 is a 8K x 8 SRAM (or 32K x 8 if a 256-Kbyte cache size is used) and the other chip, U20, is a 64K x 1 SRAM.

Refer to the table below for the proper speed of cache memory chips in relation to the speed of the system.

Table 2-3: Cache/Tag RAM Speed

	20-MHz	25-MHz	33-MHz
CACHE	35ns	30ns	25ns
TAG	25ns	25ns	15ns

Assuming you are upgrading the speed of a 64-Kbyte cache memory size, your system supplier or component vendor should be able to supply these parts: Eight (8) 8K x 8 35 or 25ns, one (1) 8K x 8 25 or 15ns and one (1) 64K x 1 25 or 15ns. If a 256-Kbyte cache is being used, the 8K x 8 cache RAMs should be replaced with 32K x 8 chips of the proper speed.

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 ISA 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 MSI/MDI486 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 MSI/MDI486. Please note this data is provided for informational purposes only and is subject to change without notice.

Specifications

System	Description
Processor Type	Intel 80486SX or DX
System Speed	20 or 33-MHz
Coprocessor	Optional Weitek 4167
Host Interface	ISA
Slots	Six 16-bit, one 8-bit

Memory	Description
Memory Type	9-bit, 80 ns. fast page-mode SIMM
Memory Sizes	256-Kbytes, 1-Mbyte and 4-Mbytes
Configurations	1/2/4/5/8/16/20/32-Mbytes, bank interleaved
Cache Type	Direct-Map, Write-Back
Cache Size	64-Kbytes, upgradable to 256-Kbytes

I/O Interfaces	Description
Serial Ports	Two, COM1 and COM2, up to 54Kbaud on DB9 connectors
Parallel Ports	Centronics-compatible DB25
FloppyControls	Two, 5-1/4" or 3-1/2" high or low density
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 ISA 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 Connections Keyboard/Power, Turbo LED, Reset, Hard Drive: LED, External 6-volt Battery and Speaker

Operating Environment	Description
Power Requirements	5 amps typical at 5 volts, 10 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	Rechargeable Ni-CAD
Size	13" x 8.6" (Baby AT form factor)
Weight	1.6 lbs net

Benchmarks

Power Meter v1.7			
	MSI(20-Mhz)	MDI(25-MHz)	MDI(33-MHz)
MIPS	8.9	11.2	14.9
Dhrystones	11.4 K/sec	14.3 K/sec	19.1 K/sec
Whetstones	120.9 K/sec	2523.5 K/sec	3364.7 K/sec

Landmark v2.0		
MSI(20-MHz)	MDI(25-MHz)	MDI(33-MHz)
90.8	113.6	151.9

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
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.

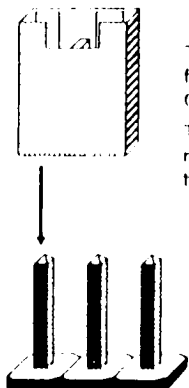
Appendix B: Jumper Settings

System Board Configuration Jumper Tables.

System Configuration Jumpers

Color/Mono	COLOR	MONO	-----
JP1	CLOSED	OPEN	-----
Battery	External	On-Board	Rest CMOS
JP21	OPEN	2-3	1-2
Printer IRQ	IRQ7	IRQ5	-----
JP19	2-3	1-2	-----
I/O Enable	Enable ALL	Disable ALL	-----
JP20	1-2	2-3	

The option jumper shown is making an electrical connection between pins 1 and 2, when jumper is attached. In the text, this setting is referred to as 1-2



The other possible settings for this jumper are 2-3, and OPEN

The OPEN setting is where no connection is made between any of the pins.

Figure B-1: Installing an Option Jumper

CPU and Speed Selection Jumpers

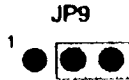
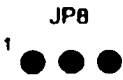
JUMPER	486SX	487SX	486DX
JP8	OPEN	2-3	1-2
JP9	2-3	1-2	1-2
JP10	OPEN	CLOSED	CLOSED
	20-MHz	25-MHz	33-MHz
JP14	2-3	2-3	2-3
JP15	1-2	2-3	1-2
JP16	2-3	1-2	1-2
JP17	1-2	2-3	2-3

Cache Memory Size Jumper Settings

	64-Kbytes	256-Kbytes
JP11	OPEN	CLOSED
JP12	OPEN	CLOSED
JP13	OPEN	OPEN
JP7	OPEN	CLOSED

Default Jumper Settings for the MSI486SX

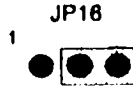
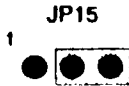
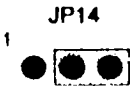
CPU TYPE SELECT



CACHE SIZE SELECT (All open 64k Cache)



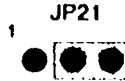
CLOCK SPEED SELECT



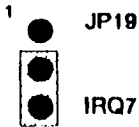
AT CLK SELECT



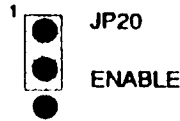
BATTERY OPTIONS (Use on board battery)



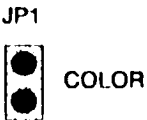
PRINTER IRQ SELECT (IRQ7)



I/O HARDWARE DISABLE/ENABLE

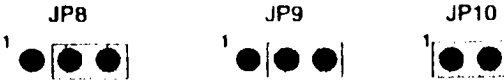


COLOR/MONO SELECT



Default Jumper Settings for the MSI487SX

CPU TYPE SELECT



CACHE SIZE SELECT (All open 64k Cache)



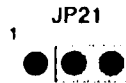
CLOCK SPEED SELECT



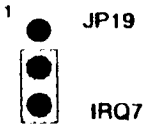
AT CLK SELECT



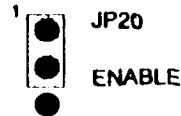
BATTERY OPTIONS (Use on board battery)



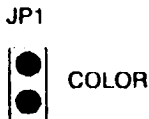
PRINTER IRQ SELECT (IRQ7)



I/O HARDWARE DISABLE/ENABLE



COLOR/MONO SELECT



Default Jumper Settings for the MDI486-25

PV TYPE SELECT



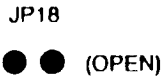
CACHE SIZE SELECT (All open 64k Cache)



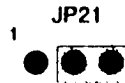
CLOCK SPEED SELECT



CLK (ISA Bus Clock) SELECT



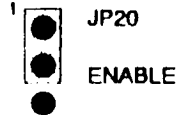
BATTERY OPTIONS (Use on board battery)



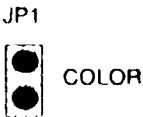
PRINTER IRQ SELECT (IRQ7)



I/O HARDWARE DISABLE/ENABLE



COLOR/MONO SELECT



Default Jumper Settings for the MDI486-33

CPU TYPE SELECT



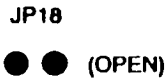
CACHE SIZE SELECT (All open 84k Cache)



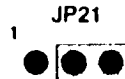
CLOCK SPEED SELECT



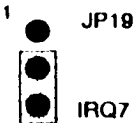
AT CLK (ISA Bus Clock) SELECT



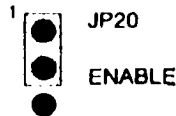
BATTERY OPTIONS (Use on board battery)



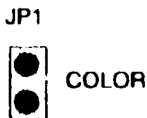
PRINTER IRQ SELECT (IRQ7)



I/O HARDWARE DISABLE/ENABLE



COLOR/MONO SELECT





MSI/MDI486 ISA 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 even the highest performance 80486 at both 25MHz and 33MHz, as well as the widest range of products on the Industry Standard Architecture (ISA) bus.

BIOS Structure

The ISA 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 ISA system boards. The system BIOS contains three function 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.

Mylex System BIOS Features

The 486 system BIOS supports high-performance system boards and offers the following features:

BIOS Shadowing

BIOS shadowing in RAM provides much faster access to the information normally stored in ROM. The 486 supports shadow RAM for both system BIOS, video BIOS, as well as locations E000h and D000h.

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 of memory available to the user will be the actual 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.

Floppy Drive Support

The BIOS supports all standard 5 1/4": 3 1/2" floppy diskette drives including (360K, 720K, 1.2MB, and 1.44MB).

Extensive Hard Disk Support

The Mylex BIOS supports 46 standard hard disk drive configurations and offers programmable entries, in case the drive parameters are not available.

Caching Options

System caching can be enabled/disabled from the Setup screen.

Power-up Speed

System speed at boot can be set from the Setup screen.

Chapter 2: BIOS Setup

Invoking Setup

The SETUP program allows the user to edit the CMOS database 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
- 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. The setup program allows the user to:

- set the system clock date and time.
- select size on board memory. (Auto sized).
- select video configuration. (Auto selected).
- select diskette drive types.
- set the first two hard drive types.
 - The drive tables are displayed in the setup program.

- Drive type 48 is user-programmable.
- select primary and secondary cache enable/disable selection.
- Run system diagnostics to ensure all components are working properly. The diagnostics can be run in a loop, when testing for extended time periods is desirable.
- select "system halt" or "no halt" on error condition. When an error occurs, the halt selection will result cause a prompt to be displayed providing the option to continue or enter the SETUP program. The "no halt" option will display the error message and then continue operation if possible.
- select system speed during power-up. Speed may be changed during operation by pressing [Ctrl] [Alt] [+] for high speed mode or [Ctrl] [Alt] [-] for low speed mode.
- shadowing the system and video BIOS. (or other BIOS at location D000h and E000h)

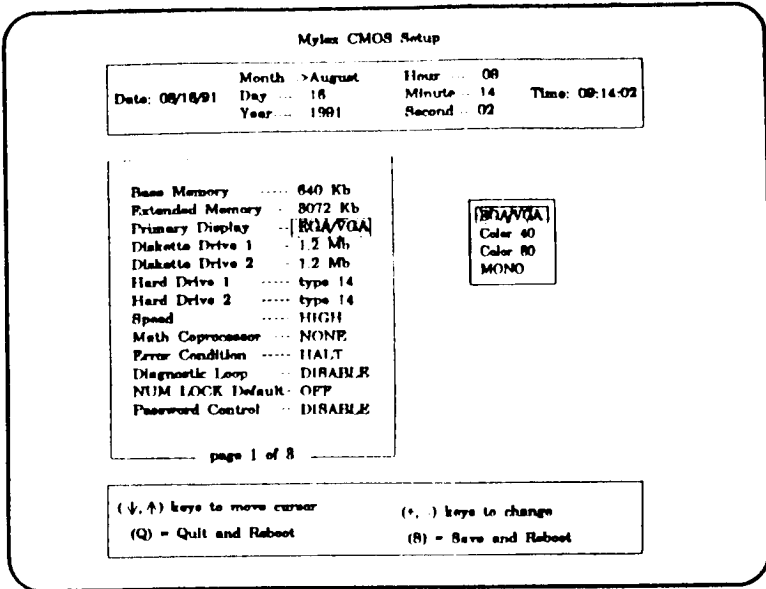


Figure 2-1: Mylex CMOS Setup Screen 1 for the MSI486 & MDI486

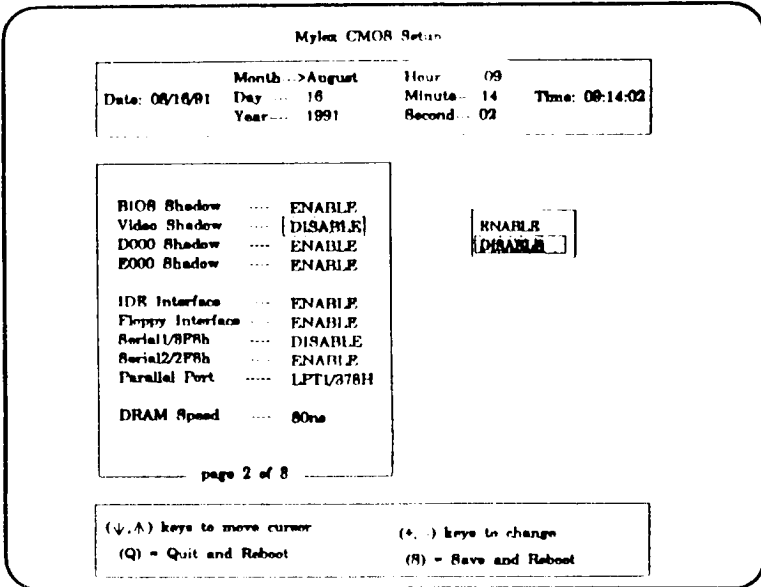


Figure 2-2: Mylex CMOS Setup Screen 2 for the MSI486 & MDI486

Setup

Mylex CMOS Setup

Date: 08/16/91	Month: >August Day: 16 Year: 1991	Hour: 09 Minute: 14 Second: 02	Time: 09:14:02
----------------	---	--------------------------------------	----------------

CACHING OPTION	
Primary Cache	ENABLE
Secondary Cache	DISABLE
Video(C000) Cache..	ENABLE
Noncache Block1	ENABLE
Size	64k
Base address	0k
Noncache Block2	DISABLE
Size	64k
Base address	0k

page 8 of 3

(↓,↑) keys to move cursor	(+, -) keys to change
(Q) = Quit and Reboot	(B) = Save and Reboot

Figure 2-3: Mylex CMOS Setup Screen 3 for the MSI486 & MDI486

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.
- 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.
- 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 five options available: None (for disk-less applications) 360 Kb, 1.2 Mb for 5 1/4" floppy drives, 720 Kb and 1.44 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. Review the documentation provided with the disk/drive controller if problems arise running the disk drive.

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.

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.

**Math
Coproprocessor**

The option should automatically be set by the BIOS. If there is a discrepancy, check the hardware settings and check the math coprocessor itself.

**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 option is useful for network 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 changed, the password input selection screen appears after "S" for save and exit has been depressed. Once this option is enabled, a password must 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. If the password is lost, the CMOS memory must be reset. (See Section 1, Chapter 1 for details on jumper JP21).

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.

Video Shadow

This option copies the video adapters ROM BIOS information from slower ROM type of memory to faster RAM.

Enabling this option will help to increase the performance of the system particularly on VGA systems.

**D/E000
Shadow**

Like the two previous shadow options, information that may reside in ROM in the 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 either 64K address block, and no RAM type of memory is used in that same block. Note: If either of these options are enabled, ensure that any EMS drivers do not use the corresponding ranges of shadowed memory.

**Ports
(Floppy, IDE,
Serial, Parallel)**

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

DRAM Speed

Use this option to identify the speed memory installed as 100ns or 80ns. Note: The MDI486-33 should always use 80ns memory.

CPU Clock

Set this option to reflect the actual speed of the system. The available options are 20, 25 and 33-MHz. Important: This field does not set the speed of the system, only the jumpers detailed in Section 1, chapter 2 set the speed of the system.

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 MSI/MDI486.

**Video Shadow
Cache**

The option is used in conjunction with the Video Shadow option and will cache the shadow memory for the video adapter to improve performance.

**Noncache
Block 1/2**

Because certain expansion boards have shared memory, this option was created to ensure compatibility with those products. If an expansion board that uses shared memory that is addressed above 1MB is installed, use this option to disable caching in the memory segment the expansion board resides in. For example, an adapter board that uses 512K of shared memory is installed at 15.5MB (decimal). The Noncache 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 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 - 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 Routine

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)

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.

Replacing the BIOS

Caution: "Wear a ground strap before touching the system"

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 MSI/MDI 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

RAM PARITY ERROR IN FIRST 64K

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

NO BOOTABLE FLOPPY DRIVE 0 INSTALLED

FLOPPY HARDWARE INFORMATION IS INCORRECT - RUN SETUP

FLOPPY HARDWARE INFORMATION IS SELF-CONTRADICTIONARY

FAILURE OF TRACK-ZERO SIGNAL IN FLOPPY DISK DRIVE

FAILURE OF FLOPPY CONTROL HARDWARE

HARD DISK ERROR MESSAGES

HARD DISK # CONTROLLER FAILURE

HARD DISK # ERROR

BOOT ERROR MESSAGES

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

Bootng 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

Bootng from Hard Disk...

Hard disk absent/failed.

Hard disk boot sector invalid.

MESSAGES FOR RUN-TIME FATAL ERRORS

RAM PARITY ERROR BETWEEN ADDRESSES XXXXXXXX AND XXXXXXXX
- RESET MACHINE

ILLEGAL INSTRUCTION TRAPPED AT ADDRESS XXXX:XXXX - RESET
MACHINE

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

Appendix B: CMOS Hard Drive Table

Drive Nr	Cyl	Heads	Pre-comp	L-ZONE	Sectors	Capacity	Examples
	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	49.09	
6	615	4	-1	615	17	21.41	
7	462	8	256	511	17	32.17	
8	733	5	-1	733	17	31.90	ST-4038
9	900	15	-1	901	17	117.50	
10	820	3	-1	820	17	21.41	
11	855	5	-1	855	17	37.21	
12	855	7	-1	855	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
	980	5	-1	980	17	42.65	Conner CP-3044/WDA-14000
18	820	6	-1	820	17	42.82	ST-251
19	1024	5	-1	1024	17	44.56	Miniscribe 3053.6053, ST157A
20	762	4	-1	762	39	60.86	Connors Hopi 60
21	1024	7	-1	1024	17	62.39	
22	820	6	-1	820	26	65.50	ST-277R
23	1024	8	-1	1024	17	71.30	Maxtor 1085, ST-280A
24	1224	7	-1	1224	17	74.58	Maxtor 2085
25	1024	9	-1	1024	17	80.22	ST-4096
26	965	10	-1	965	17	83.99	Quantum Pro-80AT
27	832	6	-1	832	33	84.34	Conner CP-3184
28	980	10	-1	980	17	85.30	WDAC-28000
29	918	11	-1	918	17	87.89	Maxtor 1170
30	1024	10	-1	1024	17	89.13	ST-1102A
	1024	5	-1	1024	36	94.37	CDC94216-106
32	1024	11	-1	1024	17	98.04	Maxtor 1105
33	776	8	-1	776	33	104.89	Conner CP-3104
34	1024	12	-1	1024	17	106.95	

35	1024	13	-1	1024	17	115.87	
36	1224	11	-1	1224	17	117.19	Maxtor 2140
37	918	15	-1	918	17	119.85	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	130.69	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	683	16	-1	683	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.

Mylex Product Bulletin

Product: **MDI486-50/2 System
Board
BIOS v6.13**
Title: **Release Notes**
Date: **March 12, 1992**

This Bulletin covers information about the new release of the Mylex MDI486-50/2 ISA system board and its BIOS.

Since the MDI486-50/2 is a member of the MSI/MDI product line family, the user manual is the same with the exceptions or changes outlined below.

The Intel[™] DX2[™] Microprocessor

This MDI486-50/2 system board is equipped with the new Intel i486DX2 microprocessor. This new processor has an internal processing speed that is twice that of the external clock speed. That is, the system board is running at 25-MHz and the processor is running at 50-MHz. As a result, you will note that the system-clock-frequency jumper settings are for 25-MHz and there is no setting for 50-MHz listed in the manual.

Heatsink

Included with this system board, is a heatsink. This heatsink will help dissipate much of the heat generated by the i486DX2 processor. Before installing the heatsink on the CPU, it is important to check the clearance of the chassis and system board.

First, install the plastic stand-offs provided with your chassis on the system board. Then gently put the system board in place inside the chassis. Visually inspect the area around the CPU to make there will be adequate clearance between the top of the CPU and the chassis for the heatsink (about 3/8"). Most chassis will not have a problem.

If, for some reason, there is not enough clearance for the heatsink, you should consider supplemental cooling with additional fans or a power supply equipped with larger fan to draw more air through the system. Intel recommends no less than 70 linear feet of air should move across the top of the CPU each minute.

If there is adequate clearance, install the heatsink by removing the blue backing from the the adhesive tape on the bottom of the heatsink and place-

ing the heatsink on top of the CPU chip. Be sure to center the heatsink and press gently but firmly to remove any air bubbles that may be under the heatsink.

OS/2

There is a known problem with OS/2 running with the DX/2 processor. OS/2, due to its dependency on its own timing loops during boot-strap operations may not load during warm or cold boots. Mylex testing has shown this failure to boot occurs randomly - About 5 to 10% of cold and warm boots fail. Once booted, however, OS/2 runs without fault. According to both Microsoft and IBM, there are revised versions of OS/2 available that are compatible with the DX2 processor. From Microsoft, the revised version is 1.30.1. IBM has available, through their authorized resellers, a maintenance version of OS/2 1.2 and above. Please contact your operating system supplier for more information.

MSI/MDI486 Cache Information

When the BIOS option to enable or disable the external cache is changed to "Disable," both the external 64K write-back cache as well as the internal 80486 8K cache is disabled.

When the low speed mode (non-turbo) is selected either through the BIOS SETUP or the (CTRL-ALT-Minus) hot-key, the external cache is automatically disabled during low speed operation.

Note to systems configured with 32MB of RAM - The direct-map cache architecture of the MSI/MDI486 system board will cache only 16MB of memory with 64K of cache memory installed. Any data or instructions located in memory above 16MB will not be cached unless the cache size is upgraded to 256K. This should not adversely affect system performance or compatibility of the system board. This is due to a limitation of the chip-set and cannot be changed.

Cache Upgrades

Due to a change in the price of SRAM memory, Mylex has updated the speed of cache memory on the MSI/MDI486 system board line. It is no longer necessary to upgrade the speed of the SRAM for cache memory when upgrading to a 33-MHz system clock. Please disregard the section of the user manual referring to cache memory speeds.

Due to a typographical error, the jumper settings for 256K cache size were incorrectly identified. Should a 256K cache be used, please refer to the following table

Jumper	Position
JP11	Closed
JP12	Open

JP13	Closed
JP7	Closed

Approved SRAM parts are:

Motorola	MCM6206
ISSI	61C256
Cypress	CY7C199

Upgrading the Speed or CPU

A step was omitted from the discussion of upgrading the CPU or Speed in the Installation and Operation Guide. It is:

Reset the CMOS memory whenever the CPU, system speed or cache size is changed. To reset the CMOS memory, place jumper JP21 over pins 1-2 for 15 seconds without power applied. Then re-set the jumper in its proper position, apply power and continue with running the BIOS SETUP.

Additional BIOS Features

The following entries have been added to the BIOS setup screens.

xxxx-xxxx Shadow

These settings determine whether various memory segments are copied into system memory (Shadowed). Available segments are C000-C7FF, C800-CFFF, D000-DFFF and E000-EFFF. Do not shadow memory intended for EMS memory or sections of memory intended for video RAM. In addition some disk controllers such as the Adaptec 2322A cannot be shadowed on the MSI/MDI486 Board.

DRAM Wait States

This setting allows the modification of the Wait State setting for the DRAM. This BIOS automatically defaults the system to the proper wait state setting for normal operation. If inconsistent operation is observed, or memory failures occur, the addition of one or two additional wait states is advisable.

Hidden Refresh

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

Important: The hidden refresh feature should be disabled if 4MB or 1MB "3-Chip-Solutions" are used. (A 1MB 3-Chip-Solution is a 1MB SIMM that

has only 3 DRAM chips installed). This is because of a timing problem with 4MB DRAM chips.

October 28, 1992

MDI486/MSI486 Compatibility Report Summary

1. Configurations tested:

BIOS : Mylex MDI/MSI BIOS ver 6.16

CPU Speeds : SX-16, SX-20, SX-25, SX-33
DX-25, DX-33, DX-50,
DX2-50, DX2-66

Cache Sizes (KB) : 64, 256

Memory Sizes (MB) : 1, 2, 4, 5, 8, 16, 20, 32

2. Keyboards & Input Devices:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
Northgate	555,0012 101 keybd	
Viglen	DFK202UKA08 101 keybd	
Zenith	ZKB-2 101 keybd	
Keytronics	EO3425XTAT, EO3601Q 101 keybd	
Zeos	KB-6251EA 101 keybd	
Mitsumi	KPQ-E99YC 101 keybd	
BTC	BTC-5339R 101 keybd	
Chicony	KB-5191 101 keybd	
Jameco	JE-1015 101 keybd	
Wang	725-7943-US 101 keybd	
Logitech	Serial Mouse	
MicroSoft	Serial Mouse	

3. Hard Disk Drives:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
Seagate	SCSI ST138N	
Seagate	SCSI ST157N	
Seagate	SCSI ST1096N	
Seagate	IDE ST157A	
Seagate	IDE ST1144A	
Seagate	IDE ST1239A	
Seagate	IDE ST3096A	
Seagate	IDE ST3283A	
Conner	IDE CP30101	
Maxtor	SCSI LXT213SY	
Maxtor	IDE LXT213A	
Quantum	IDE 105AT	
Toshiba	IDE MK234FCH-I	

772102-D01

Toshiba
Western Digital

MFM MK134FA-I
IDE WD280AC

4. Floppy Disk Drives:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
Teac	FD-235HF	1.44MB
Teac	FD-55GRF	1.2MB
Teac	FD-235F	720KB
Teac	FD-55BR	360KB
Fujitsu	F-5002-8501	360KB

5. Disk Controllers:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
Adaptec	SCSI AHA-1542B	
Adaptec	SCSI AHA-1542A	
Motherboard Factory	MBF-MBA-101 FD/IDE	w/2 ser,1 Par port
Seagate	ST08 FD/IDE	no serial,par port
Goldstar	Prime - 2 FD/IDE	w/2 ser,1 par port
Adaptec	23220 ESDI	
Western Digital	MFM WD1003	

6. Video Boards:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
ATI	VGA Charger	
ATI	VGA Wonder XL	
Diamond Comp. System	SpeedStar VGA	ROM V.4.23
HeadLand	Video Seven	
Mylex	GLI911 VGA	
OTI	OAK Tech VGA	
OTI	OAK Tech VGA	Auto Detect
Orchid	ProDesigner II	ROM V.5.0
Orchid	ProDesigner IIs	ROM V.1.1
TsengLab	TsengLab VGA	
TWC	TWC-MONO	
Western Digital	Paradize VGA	

7. LAN Boards:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
Mylex	LNI390 Ethernet	
Novell	NE2000	
Racal Interlan	NI6510 Ethernet	
Thomas Conrad	TC4045 Token Ring	

8. Operating Systems/Applications:

<u>Vendor</u>	<u>Product</u>	<u>Note</u>
SCO	UNIX 3.2.2	
SCO	UNIX 3.2.4	
Novell	Netware 286 V.2.15	
Novell	Netware 286 V.2.20	
Novell	Netware V.3.0	
Novell	Netware V.3.1	
Novell	Netware V.3.11	
MicroSoft	OS/2 V.1.21	
MicroSoft	OS/2 V.1.30	
IBM	OS/2 V.1.20	
IBM	OS/2 V.1.30 EE	
IBM	OS/2 V.2.0	
MicroSoft	DOS V.3.30A	
MicroSoft	DOS V.4.01	
MicroSoft	DOS V.5.0	
MicroSoft	Windows V.3.0	
MicroSoft	Windows V.3.1	
MicroSoft	EXCEL V.3.0	
MicroSoft	WORD V.2.0	For DOS
Word Perfect	Word Perfect V.5.1	For DOS
Word Perfect	Word Perfect V.5.1	For Windows
AutoDesk	AutoCad Release 11 C1	
Quarteddeck	Desqview386 V.6.0	
Symantec	Norton Utilities V.6.01	
Lotus	Lotus 123 V3.1	
Central Point	PCTOOLS V.7.0	
PC LAB	Bench V.5.6	
Data Base	Power Meter V.1.7	
DiagSoft	QAPLUS V.4.52	
DiagSoft	QAPLUS V.4.61	
DiagSoft	QAPLUS/FE V.5.03	
LandMark	Speed V.2.00	
MicroSoft	Flight Simulator V.4.0	