



# M4Li PCI/ISA System Board Manual

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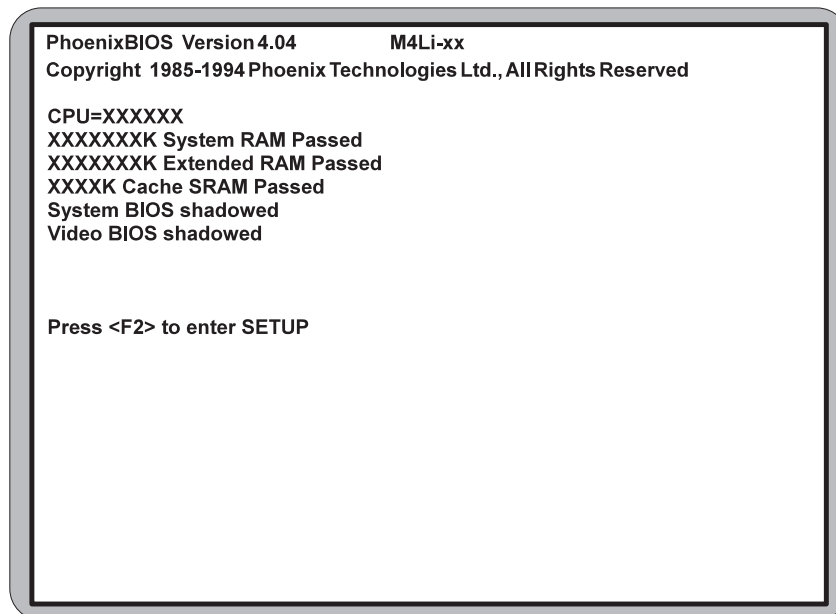
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## ***Micronics Quick Installation***

We know that many experienced people prefer to read as little of the documentation as possible. If this sounds like you, here's the short form:

1. Ground yourself to prevent damaging static discharge, then remove the M4Li from its packaging.
2. Configure and verify the system board's jumper settings. (See Jumper Settings in Chapter 2)
3. Install the CPU and the system memory (Chapter 3).
4. Install the motherboard into the system case and make all necessary case connections.
5. Install any peripherals (Chapter 3).
6. Turn the computer on and press the <F2> key when you see the screen below:



7. Set the time and date. Adjust the BIOS settings to match your configuration. If installing an IDE drive, select the IDE device you wish

to configure. Press <Enter> with Autotype Fixed Disk selected and the BIOS will automatically configure the drive for you. (See Chapter 4)

8. After you have configured the Main Setup menu, make any desired setting configurations in the Advanced and Security menu. When finished, go to the exit screen, select “Save Changes and Exit,” and you are finished with the BIOS configuration (Chapter 4).

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## Addendum 2

1. **Contents page v:** Delete line 3-9.
2. **Contents page viii:** Delete figures 3-6 and 3-7.
3. **Page 1-2:** Line “L2 Write-back cache support (0K, 128K, 256K, or 512K)” should be “L2 Write-back cache support (0K, 128K, or 256K)”.
4. **Page 2-2:** Replace Figure 2-1 M4Li System Board with page 2 of this addendum.
5. **Page 2-5:** Delete 512K cache jumper setting from Table 2-4.
6. **Page 2-6:** Change default setting for Jumper W28 (Table 2-6) from 1-2 to 2-3. Change default setting for Jumper W29 (Table 2-6) from 1-2 to 2-3.
7. **Page 2-6:** Change default setting for Jumper W33 to closed for both PS/2 and AT versions.
8. **Page 3-9:** Delete entire page.

## M4Li Components

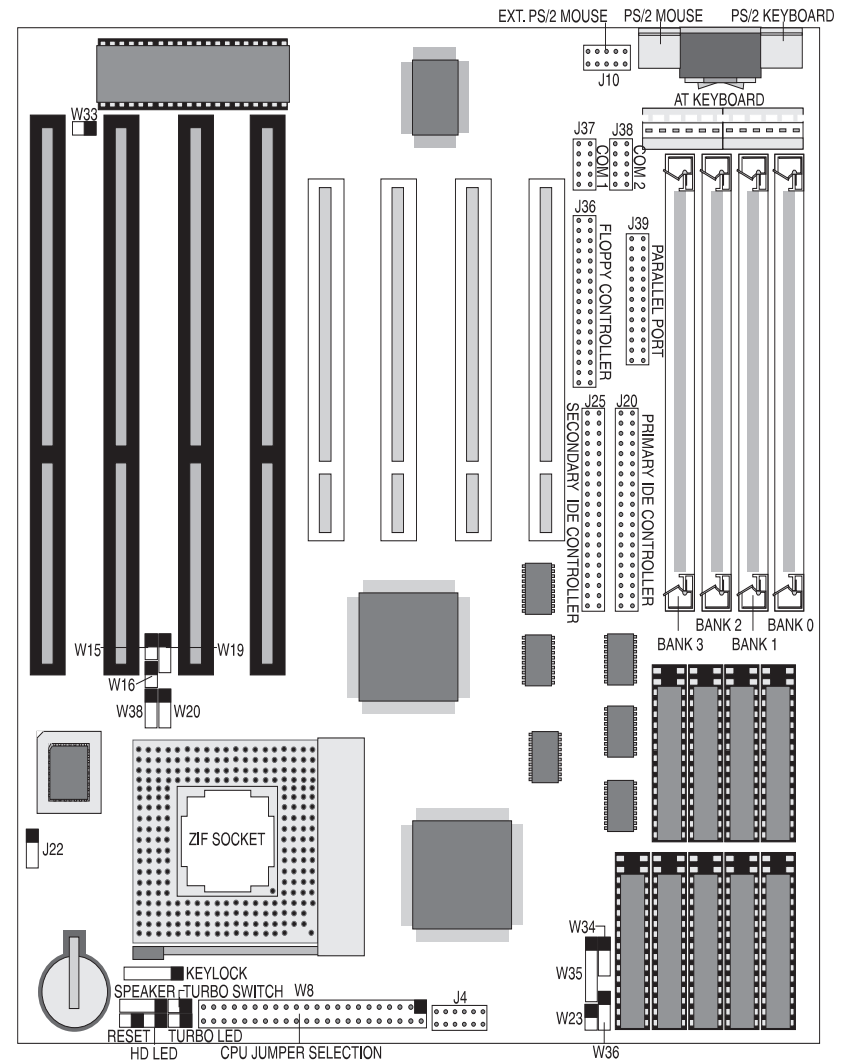


Figure 2-1 M4Li System Board

Note:

ISA Slot 4 and PCI Slot 1 are shared. Only one slot may be used at a time.

PCI slot 1 is not a bus-mastering slot.

# 1 Introduction

Congratulations for choosing the Micronics M4Li! The M4Li is a 486-based system board designed to be the foundation for advanced personal computers or workstations.

The M4Li is an integrated system board featuring PCI Local Bus architecture and a Mode 3 IDE controller. The PCI architecture provides high performance for Graphical User Interfaces (GUIs) and peripherals which perform high speed data transfers, such as disks and multimedia.

The M4Li's advanced power management features makes it a "**Green Board**" which means it adheres to the Environmental Protection Agency's strict Energy Star efficiency guidelines. See Chapter 4 for information and instructions on how to set up the "Green Section" of the BIOS.

Micronics builds all products to exacting standards, using the highest quality components available. We are proud to provide this system board and hope it brings you years of reliable service.

## Features

- ⊗ SIS 496/497 chipset with an external level 2 cache controller.
- ⊗ Mini-AT size system board (8.5" X 9.5").
- ⊗ L2 Write-back cache support (0K, 128K, 256K, or 512K).
- ⊗ Supports up to 128MB of on-board system memory.
- ⊗ Three PCI, three 16-bit ISA, and one shared slot.
- ⊗ PCI Mode 3 IDE controller (supports four drives).
- ⊗ Floppy controller (2.88, 1.44MB, 1.2MB, 720K, and 360K floppy drives).
- ⊗ Two high speed NS16550 compatible serial ports.
- ⊗ Bi-directional parallel port which is EPP and ECP compatible.
- ⊗ Upgradeable Phoenix Flash BIOS.
- ⊗ Supports the following processors:
  - 486SX, 25 or 33MHz
  - 486SX2, 50MHz
  - 486DX, 33MHz
  - 486DX2, 50, 66, or 80MHz
  - 486DX4, 75 or 100MHz (with optional power module)

## Software Compatibility

The M4Li system board has been thoroughly tested for compatibility with a variety of operating systems and environments, including:

- ⊗ Windows, Windows NT, and Windows 95.
- ⊗ OS/2.
- ⊗ SCO UNIX and Open Desktop.
- ⊗ Novell NetWare.
- ⊗ MS-DOS and PC-DOS.

# 2 Configuring the M4Li

Although the M4Li system board is packaged in protective materials, it is important to use care while unpacking and setting up.

## **Static Electricity**

The M4Li is shipped from the factory in an antistatic bag. To reduce the possibility of damage, it is important to neutralize any accumulated static charges on your body before handling the board. The best way to do this is to ground yourself using a special wrist or ankle strap. If you do not have a strap, you should touch both of your hands to a safely grounded object. After you have grounded yourself, ground the M4Li via the solder pads surrounding one of its mounting holes.

Once the M4Li is removed from its packaging, place it on top of the antistatic bag. Carefully inspect the board for damage which may have occurred during shipment.

## **Office Environment**

Make sure the finished computer system is in an area with good ventilation. The system should not be in direct sunlight, near heaters, or exposed to moisture, dust, or dirt.

# M4Li Components

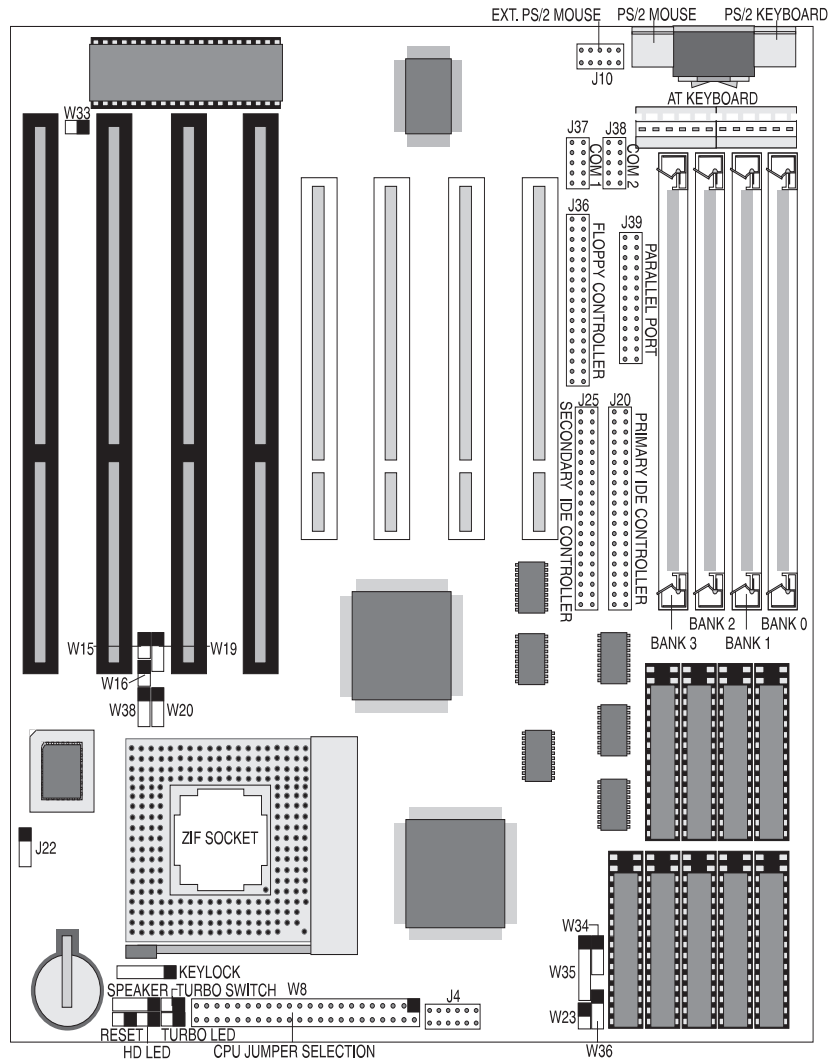


Figure 2-1 M4Li System Board

*Note:*

ISA Slot 4 and PCI Slot 1 are shared. Only one slot may be used at a time.

PCI slot 1 is not a bus-mastering slot.

## CPU Voltage

**Warning:**

*This system board has been factory set to support 5.0V processors. If using a 3.3V, 3.45V, or 4.0V processor, you must install a Power Module (Appendix E). Failure to install a Power Module could result in damage to the CPU.*

Table 2-1 lists the voltage requirements for CPUs supported by this system board.

CPU	Manufacturer(s)	Voltage
486SX	Intel	5.0V
486DX	Intel	5.0V
486DX2	Intel, TI	5.0V
486DX2	AMD	3.3V or 5.0V
486SL-series	Intel	5.0V
Write-Back Enhanced 486DX2	Intel	5.0V
486DX4	Intel, AMD	3.3V
Write-Back Enhanced 486DX4	Intel	3.3V
Pentium OverDrive	Intel	5.0V
Cyrix 486DX/DX2/DX4	Cyrix	5.0V
Cyrix 486DX2V-80	Cyrix	3.45V
Cyrix 5X86-100, 120	Cyrix	3.45V

**Table 2-1 CPU Voltage Requirements**

## Jumper Settings

The following diagram illustrates the W8 jumper settings to select the type of CPU installed (Figure 2-2).

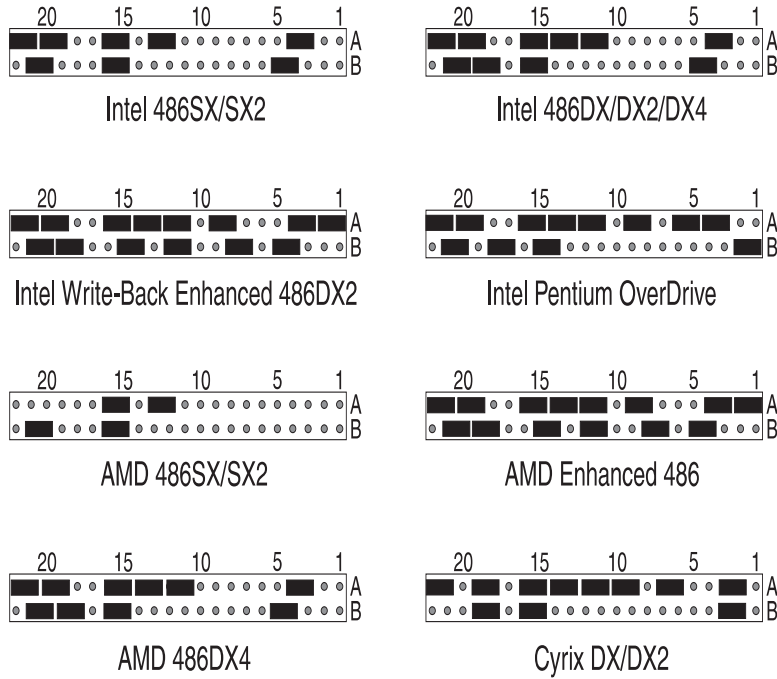


Figure 2-2 CPU Selection

Table 2-2 lists the jumper settings to select the external speed of the CPU.

Jumper	Speed	25MHz	33MHz (default)	40MHz
W15		open	closed	open
W16		open	closed	closed

**Table 2-2 CPU Speed Selection**

Table 2-3 lists the jumper settings to set the speed of the PCI bus.

Jumper	Function	Setting
W20	PCI Clock = CPU Clock (default)	1-2
	PCI Clock = 1/2 CPU Clock	2-3

**Table 2-3 PCI Clock Speed Selection**

*Note:*

*If a 40MHz CPU is installed and the system is not stable, configure Jumper W20 for pins 2-3.*

Table 2-4 lists the jumper settings to select the size of the external cache.

Jumper	W23	W34	W35	W36	W39
Cache					
0K	open	open	open	open	open
128K	open	1-2	1-2, 4-5	1-2	open
256K (one bank)	closed	1-2	1-2, 3-4	2-3	open
256K (two banks)	closed	2-3	2-3, 4-5	2-3	open
512K (one bank)	closed	1-2	1-2, 4-5	1-2	closed
512K (two banks)	closed	2-3	2-3, 4-5	2-3	closed

**Table 2-4 Cache Size Selection**



Table 2-5 lists the jumper settings to configure the parallel port for Plug and Play.

Jumper	W28	W29
DMA Channel		
Channel 3 (default)	2-3	2-3
Channel 1	1.2	1.2

**Table 2-5 Parallel Port Configuration**

Table 2-6 lists the jumper settings to reset the BIOS. With the computer's power off, short Jumper W40 for about five seconds and place the jumper back in the open position. *The jumper must be placed back into the open position for the system to function properly.*

Jumper	Function	Setting
W40	Normal (default)	open
	Clear CMOS RAM settings	closed

**Table 2-6 BIOS Reset Jumper**

*Note:*

*This will reset all BIOS settings to their defaults. Any changes you have made will be lost.*

Table 2-7 lists jumpers with factory reserved settings. **Do not reconfigure these jumpers.**

Jumper	Function	Setting
W19	Reserved	2-3
W33	Reserved	closed

**Table 2-7 Reserved Jumper Settings**

Table 2-8 lists the jumper settings for case and peripheral connections.

Jumper	Function	Notes
J20	Primary PCI IDE Connector	Can be disabled in CMOS.
J25	Secondary PCI IDE Connector	Can be disabled in CMOS.
J36	Floppy Connector	
J39	Parallel Port Connector	Can be disabled in CMOS.
J37	Serial Port (Com 1)	Can be disabled in CMOS.
J38	Serial Port (Com 2)	Can be disabled in CMOS.
J12 & J13	PS/2 Keyboard & Mouse	PS/2 Version
J15	AT Keyboard	AT Version
J10	External Mouse	AT Version
J26	Power Supply Connector	
J31	Speaker Connector	1-Speaker; 2-N/C; 3-Ground; 4-5V DC
J3	Turbo LED	1-5V DC; 2- Ground
J2	Turbo Switch	
J23	Reset	
J21	HD LED	1-5V DC; 2- Ground
J9	Keylock/ Power LED	1-Power; 2-N/C; 3-Ground; 4-5V DC
J4	Power Module Connector	See Appendix E

**Table 2-8 Case and Peripheral Connections**



# 3 Installing the M4Li, System Memory, CPUs, and Peripherals

This section explains how to install the M4Li system board, SIMMs, CPUs, and peripherals.

***Warning:***

***Before installing or removing any peripherals or components, make sure you have a clear work space and that you adhere to all anti-static precautions described on page 2-1. Micronics recommends that only trained technicians operate on the system board. Damage which occurs to the board while adding or removing peripherals or components may void the warranty.***

***If problems arise while installing peripherals, contact the computer outlet where you purchased the peripheral or Micronics' Technical Support Department.***

## Installation of the M4Li

The installation of the M4Li system board depends on the type of case you use. The M4Li is a Mini AT system board and can be installed in most cases.

Prior to installing the M4Li, make sure you have a clear work space available and adhere to all anti-static precautions.

If you are unfamiliar with installing a system board, Micronics highly recommends you read the computer user's manual or contact your dealer's technical support department.

### Tools Required

Micronics recommends using the following tools to install the M4Li:

- ⊞ Small Phillips screwdriver.
- ⊞ Tweezers or a pair of needle-nose pliers.
- ⊞ Tray (to hold loose screws).

### Equipment Required

Micronics recommends using the following equipment with the M4Li for a typical configuration:

- ⊞ Chassis with standard hardware.
- ⊞ A high quality power supply capable of providing continuous power within a 5 volt range, plus or minus 5% (eg., 4.75 to 5.25). A power filter may be used for a noisy AC power source.
- ⊞ AT style keyboard and mouse (AT version).
- ⊞ PS/2 style keyboard and mouse (PS/2 version).
- ⊞ Eight ohm speaker.
- ⊞ Standard ribbon cables for internal connections.
- ⊞ Standard power cord (grounded).
- ⊞ CPU heat sink.

## System Memory

System memory devices, commonly known as SIMMs (Single Inline Memory Modules) are necessary to operate the M4Li system board. The M4Li has four SIMM sockets and can be upgraded to 128 Megabytes of RAM. This section will explain the type of SIMMs supported, list the memory configurations supported, and show how to physically install the new SIMMs.

### **SIMMs Supported**

The M4Li supports the following 72 pin, 60 or 70ns SIMMs:

4MB (1Mx36 or 1Mx32)  
8MB (2Mx36 or 2Mx32)  
16MB (4Mx36 or 4Mx32)  
32MB (8Mx36 or 8Mx32)

*Note:*

*For long term reliability, Micronics recommends using SIMMs with tin-plated contacts. The use of gold-plated contacts may conflict with the tin alloy of the SIMM socket.*

## Memory Configurations

The following table (Table 3-1) lists the most common memory configurations supported.

Memory	Bank 0	Bank 1	Bank 2	Bank 3
4MB	1MBx36			
8MB	2MBx36			
8MB	1MBx36	1MBx36		
12MB	1MBx36	1MBx36	1MBx36	
16MB	1MBx36	1MBx36	1MBx36	1MBx36
16MB	4MBx36			
16MB	2MBx36	2MBx36		
24MB	2MBx36	2MBx36	2MBx36	
24MB	2MBx36	2MBx36	1MBx36	1MBx36
32MB	8MBx36			
32MB	4MBx36	4MBx36		
32MB	2MBx36	2MBx36	2MBx36	2MBx36
40MB	4MBx36	4MBx36	1MBx36	1MBx36
48MB	4MBx36	4MBx36	2MBx36	2MBx36
48MB	4MBx36	4MBx36	4MBx36	
64MB	8MBx36	8MBx36		
64MB	4MBx36	4MBx36	4MBx36	4MBx36
72MB	8MBx36	8MBx36	1MBx36	1MBx36
80MB	8MBx36	8MBx36	2MBx36	2MBx36
96MB	8MBx36	8MBx36	8MBx36	
96MB	8MBx36	8MBx36	4MBx36	4MBx36
128MB	8MBx36	8MBx36	8MBx36	8MBx36

Table 3-1 Common Memory Configurations

## Installing the SIMMs

To install the SIMMs, locate the SIMM sockets on the system board.

Start with bank 0 and perform the following steps to install the SIMMs:

1. Hold the SIMM so that the notched edge is aligned with the notch on the SIMM socket (Figure 3-1).
2. Insert the SIMM at a 45 degree angle.
3. Gently push the SIMM into an upright position until it locks into place (past the release tabs).

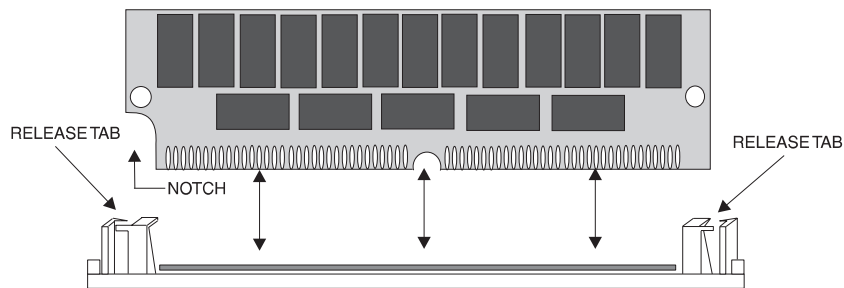


Figure 3-1 Installing a 72-Pin SIMM

4. After you have installed the SIMMs, the BIOS will automatically configure the memory size. You do not need to configure any jumpers.

## Removing SIMMs

Perform the following steps to remove SIMMs, if necessary:

1. With both thumbs (or fingers), press the release tabs away from the socket.
2. With the SIMM free from the release tabs, lift the module up and place it in an anti-static bag or package.



## Installing a CPU

The M4Li is specifically designed to support a large variety of CPU's from Intel, AMD, and Cyrix. To install an upgrade processor, perform the following steps:

1. Power off the system and locate the M4Li's ZIF socket (Figure 3-2).
2. Lift the lever of the socket.
3. Insert the new processor into the socket. Make sure pin 1 on the CPU lines up with pin 1 on the socket. Refer to Figure 3-2 for pin 1 location.
4. Push the lever down to its original position.
5. Configure the board using the tables in Chapter 2.

The new CPU is now ready to operate. The system board detects the installed CPU after it is inserted and configured.

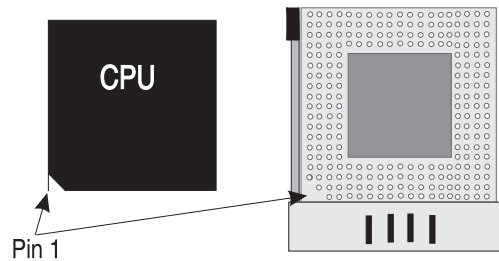


Figure 3-2 Installing a CPU

**Warning:**

*If the new processor includes a heat sink or cooling fan, be certain to install the device according to the manufacturer's instructions. Failure to provide adequate cooling of the processor may seriously affect system performance or cause permanent damage.*

## Installing 128K of Cache Memory

To upgrade to 128K cache, carefully install five 32Kx8-15ns SRAMs into SRAM sockets U8, U9, U10, U11, and U16 on the lower right-hand corner of the system board (Figure 3-3). After installing the cache upgrade, refer to Table 2-4 for the correct external cache jumper settings.

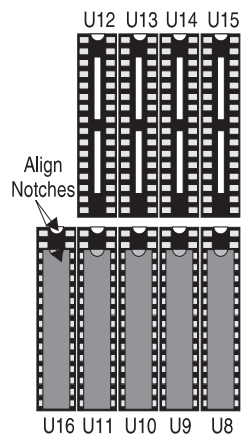


Figure 3-3 Installing 128K External Cache

## Installing 256K of Cache Memory

To upgrade to 256K cache, carefully install four 64Kx8-15ns SRAMs into sockets U8, U9, U10, and U11 and one 32Kx8-15ns SRAM into socket U12 (Figure 3-4). After installing the cache upgrade, refer to Table 2-4 for the correct external cache jumper settings.

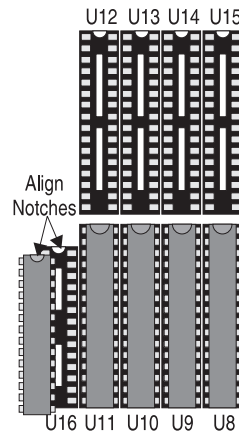


Figure 3-4 Installing 256K of Cache Memory (1 Bank)

Or, install one 32Kx8-15ns SRAM into each of the M4Li SRAM sockets (Figure 3-5).

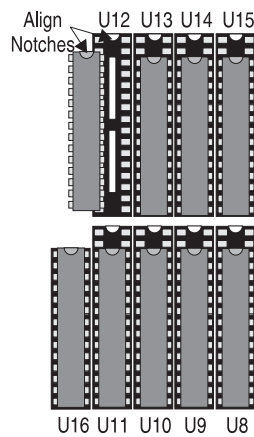


Figure 3-5 Installing 256K of Cache Memory (2 Banks)

## Installing 512K of Cache Memory

To upgrade to 512K cache, carefully install four 128Kx8-15ns SRAMs into sockets U8, U9, U10, and U11 and one 32Kx8-15ns SRAM into socket U12 (Figure 3-6). After installing the cache upgrade, refer to Table 2-4 for the correct external cache jumper settings.

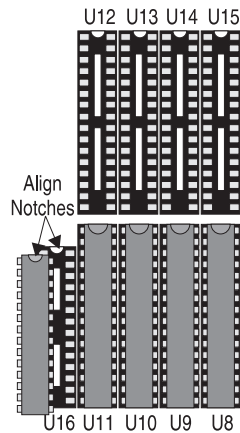


Figure 3-6 Installing 512K of Cache Memory (1 Bank)

Or, install eight 64Kx8-15ns SRAMs into sockets U8 through U15 and one 32Kx8-15ns SRAM into socket U16 (Figure 3-7).

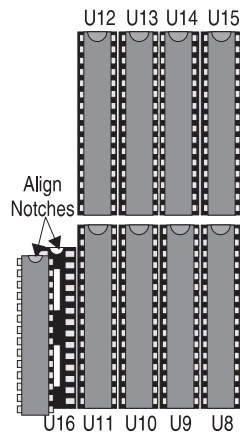


Figure 3-7 Installing 512K of Cache Memory (2 Banks)

## Installing the M4Li IDE Drivers

The M4Li IDE drivers are optional drivers that enhance the performance of Mode 3 IDE hard drives.

After you have physically installed an IDE hard drive in your system, locate the README.NOW file on the IDE Drivers diskette and open it as a text file in any word processor. It contains up to date information on whether or not you will need to install the drivers. If you require these drivers, print the README.NOW file.

To install the drivers, follow the instructions below:

1. Insert the IDE Drivers diskette into Drive A: and type A:INSTALL.
2. Select Install Driver. Choose the drivers for the operating systems and environments you will be using (Figure 3-8).

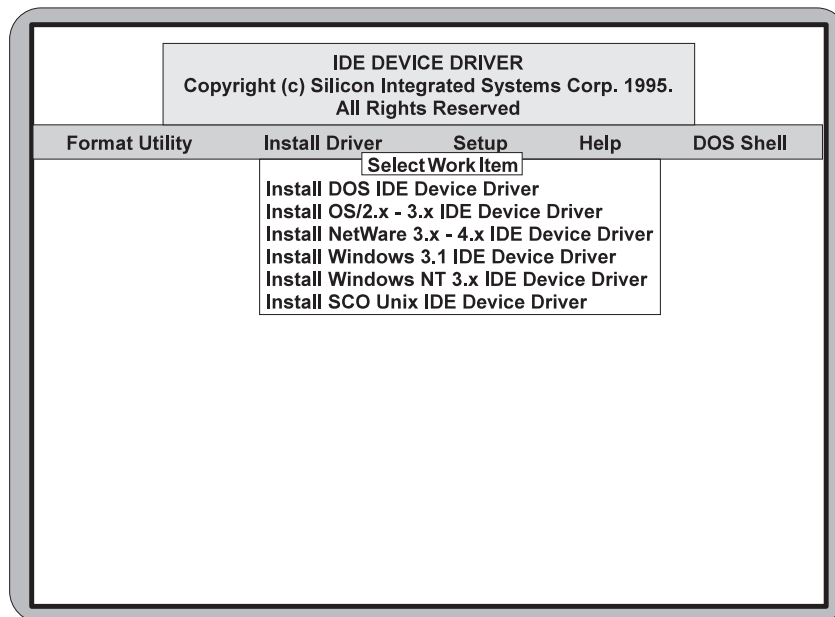


Figure 3-8 M4Li IDE Driver Screen

3. The drivers will automatically be installed for DOS and Windows. For other operating systems, you will receive detailed installation instructions.
4. Exit the utility and reboot the system. The drivers are now installed.

## Installing a PCI Peripheral Card

Micronics PCI slots accommodate all PCI peripherals which adhere to the PCI 2.0 specifications. Complete the following steps to install a PCI card:

1. Turn the computer system off and remove its cover.
2. Choose an unused PCI slot and remove the slot cover.
3. Insert the card with the bottom edge level to the slot. **Never insert the card at an angle!**
4. Carefully push the card straight down, making sure the card is fully inserted.
5. Replace the screw which holds the card into place.
6. Replace the computer cover.
7. Read the card's manual for additional instructions concerning installation and software drivers.

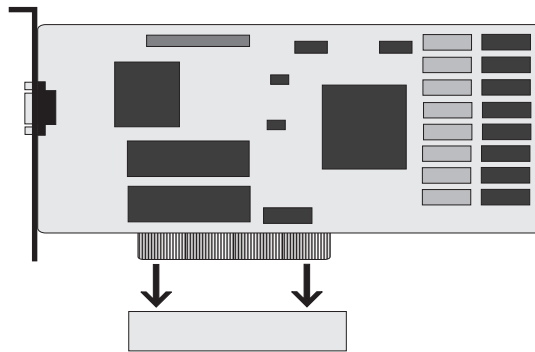


Figure 3-9 Installing a PCI Card

## Installing an ISA Peripheral Card

Micronics ISA slots accommodate all standard ISA peripherals. Complete the following steps to install an ISA card:

1. Turn the computer system off and remove its cover.
2. Choose an unused ISA slot and remove the slot cover.
3. Insert the card with the bottom edge level to the slot. **Never insert the card at an angle!**
4. Carefully push the card straight down, making sure the card is fully inserted.
5. Replace the screw which holds the card into place.
6. Replace the computer cover.
7. Read the card's manual for additional instructions concerning installation and software drivers.

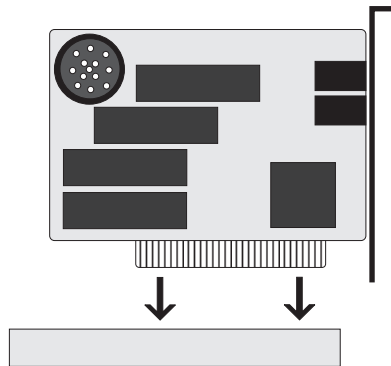


Figure 3-10 Installing an ISA Card

# 4 The BIOS Setup Utility

## Configuration

After the M4Li system board and all hardware is installed, the system is ready for configuration. Before turning on the computer, make sure all cables are correctly connected and all jumpers are correctly set.

It is recommended you keep the computer cover off the first time you boot the system. If you have any difficulties, they will be easier to correct.

## Initial Boot Up

Power up the M4Li. If the system doesn't properly boot, check all your cables and peripherals for bad connections. You may also get beep codes or error messages. If this occurs, consult Appendices A and/or B for a guide to possible solutions.

After the system properly boots, it is ready to be configured. The following pages explain the proper procedures for BIOS configuration.



## Setup

The Setup program is used to configure the computer's BIOS (Basic Input/Output System). The computer's BIOS is responsible for configuring the system board and providing hardware information to the operating system. In order for the computer to run properly, run the Setup procedure after first installing the system board and whenever you make a hardware change to the system.

After the system is turned on and goes through a memory test, the Power-Up Screen (Figure 4-1) will appear on your monitor:

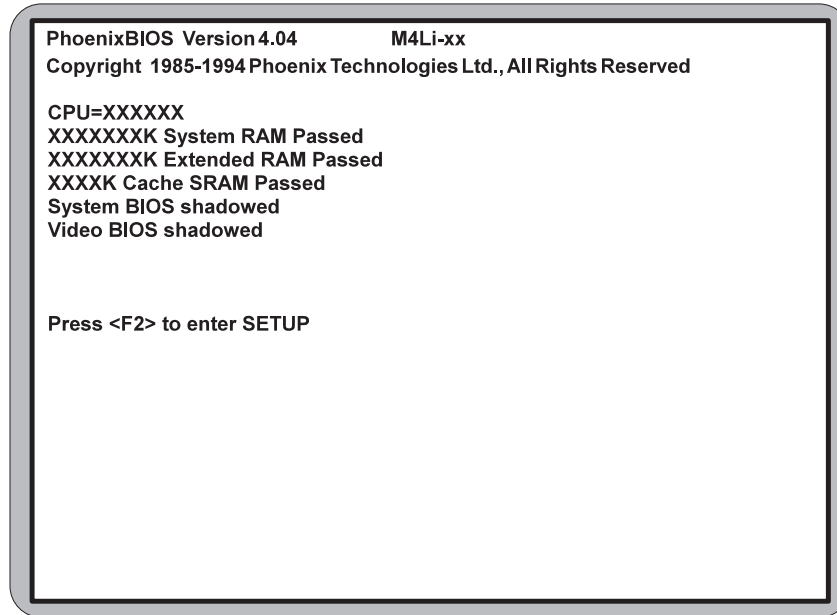


Figure 4-1 Power-Up Screen

When "Press <F2> to enter SETUP" appears at the bottom of the screen, press the <F2> key to begin the Setup procedure. The CMOS Main Screen (Figure 4-2) should appear and the prompt should be on the time line. The Setup procedure can only be activated during the boot sequence.

## Running the Setup Procedure

The M4Li system board has four primary CMOS configuration screens: the Main Screen (Figure 4-2), the Advanced Screen (Figure 4-8), the Security Screen (Figure 4-10), and the Exit Screen (Figure 4-12). To toggle between the screens, press the right arrow <→> and the left arrow <←> keys.

## Setting the Main Screen

The CMOS Main Screen (Figure 4-2) is used to set the time and date, to set the floppy drive types, to configure the hard disks, and to configure the video. This section explains how to configure each of these categories. To move between the categories, use the up arrow <↑> and the down arrow <↓>.

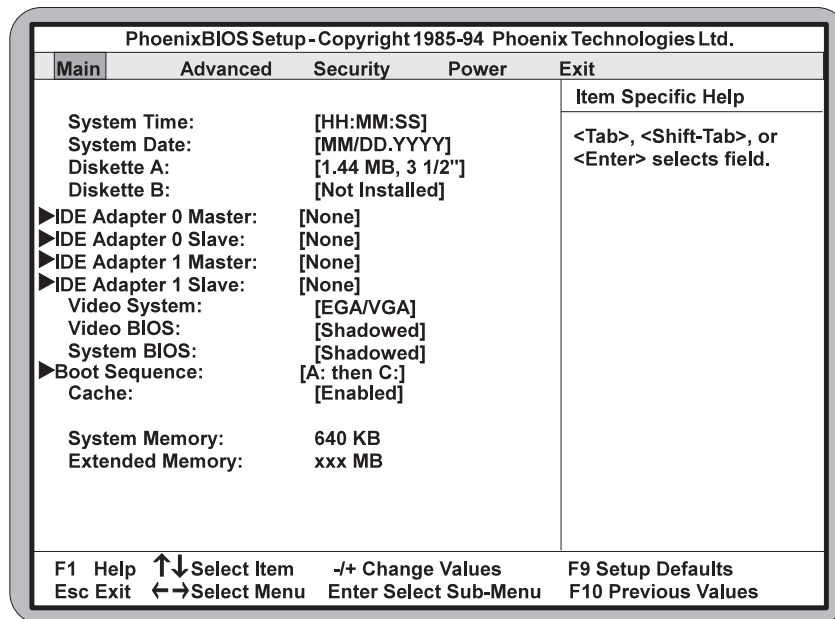


Figure 4-2 CMOS Main Screen

### System Time and Date

To set the time, use the <-> key to decrease the number and the <+> key to increase the number. To move the prompt forward, use the <Tab> key; to move the prompt backward, use the <Shift-Tab> key. To set the date, use the

up and down arrows<↑/↓> to highlight the System Date and follow the same procedure used to set the time.

### Diskette A or B

To configure a floppy drive added to or removed from your computer, use the up and down arrow keys <↑/↓> to select the drive you wish to set. Use the <+/-> keys to change the setting until it matches the floppy drive you have installed. The BIOS supports 2.88MB, 1.44MB, 1.2MB, 720KB, and 360KB floppy drives.

### IDE Adapters (Hard Disk Setup)

If you are setting up a SCSI hard disk, you will need to select None in the IDE Device parameters (see your SCSI card manual for more details).

To install an IDE device, select the device you wish to configure and press <Enter>. An IDE Device submenu will appear. (Figure 4-3).

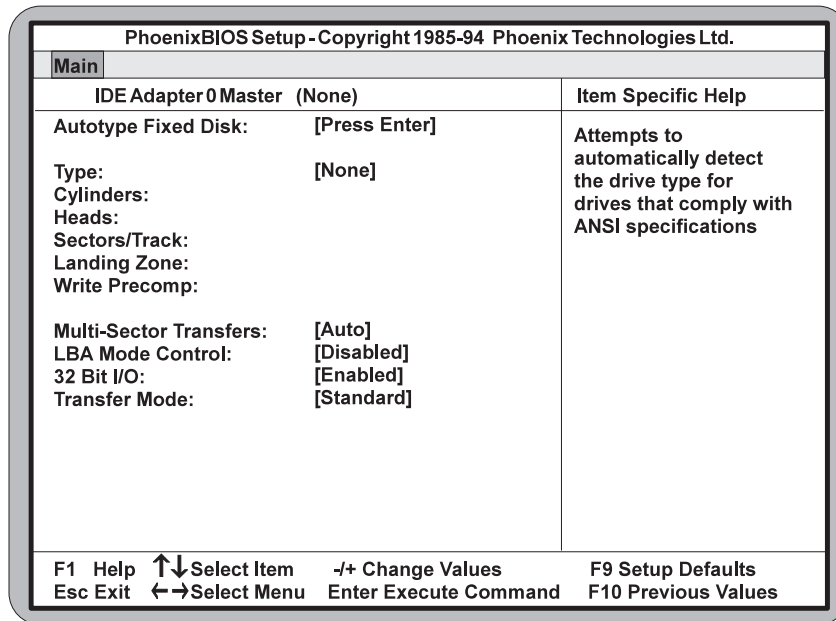


Figure 4-3 IDE Device Submenu

### Autotype Fixed Disk

The easiest way to set your IDE devices is to let the BIOS do it for you. When the IDE Device submenu first appears, the Autotype Fixed Disk selection will

be highlighted. Simply press <Enter>, and the remaining information will automatically be entered.

Do not adjust the rest of the settings unless absolutely necessary. The BIOS will automatically enter the correct settings.

### **Type**

This category selects the drive type installed in the system. The options are 1-39, User, and none. It is doubtful you will find your drive in 1-39.

If Autotype Fixed Disk does not find your drive's parameters, you will need to fill this information in manually under the User category. This information may be in the manual that came with your system. If not, contact your dealer or the hard drive manufacturer to fill in this category.

If you are using a SCSI hard drive, select None and refer the documentation which came with the SCSI adapter.

### **Multiple-Sector Transfers**

This category determines the number of sectors per block for multiple sector transfers. The options are Disabled (default), 2 Sectors, 4 Sectors, 8 Sectors, and 16 Sectors. If you used Autotype Fixed Disk, this section will automatically be filled in.

### **LBA Mode Control**

Enable LBA (Logical Block Addressing) to support IDE drives larger than 528MB in size. The default setting is Disabled.

### **32-Bit I/O**

This category allows the user to enable the 32-bit I/O function of the PCI IDE controller. Select Disabled if your drive will not run at this speed. The default setting is Enabled.

### **Transfer Mode**

This category provides the transfer modes for the PCI IDE controller. The options are Fast PIO 3, Fast PIO 2, Fast PIO 1, and Standard (default).

Fast PIO 3 is equivalent to Mode 3 supporting a minimum cycle time of 180ns (11.1 MB/sec.). Fast PIO 2 supports a minimum cycle time of 240ns (8.33 MB/sec.). Fast PIO 1 supports a minimum cycle time of 383ns (5.22 MB/sec.). Standard supports a minimum cycle time of 600ns (3.3 MB/sec.).

See your drive specifications before setting this category.

## Video System

This sets the type of video board installed into the system. You may choose from: EGA/VGA (default), CGA 80x25, MONO, and Not Installed.

## Video BIOS

The Video BIOS category allows you to Shadow or Shadow & Cache the video BIOS. Choosing Shadowed copies the video BIOS into RAM for faster execution. Choosing Shadowed & Cached caches the shadowed video BIOS for even higher performance. To disable the Video BIOS category, select Disabled.

## System BIOS

The System BIOS Option allows you to Shadow or Shadow & Cache the System BIOS Shadow on the system board. Choosing Shadowed copies the system's BIOS into RAM for faster execution. Choosing Shadowed & Cached caches the shadowed BIOS for even higher performance. To disable the System BIOS category, select Disabled.

## Boot Options Submenu

Move the prompt to Boot Sequence and press <Enter>. The following screen (Figure 4-4) will appear.

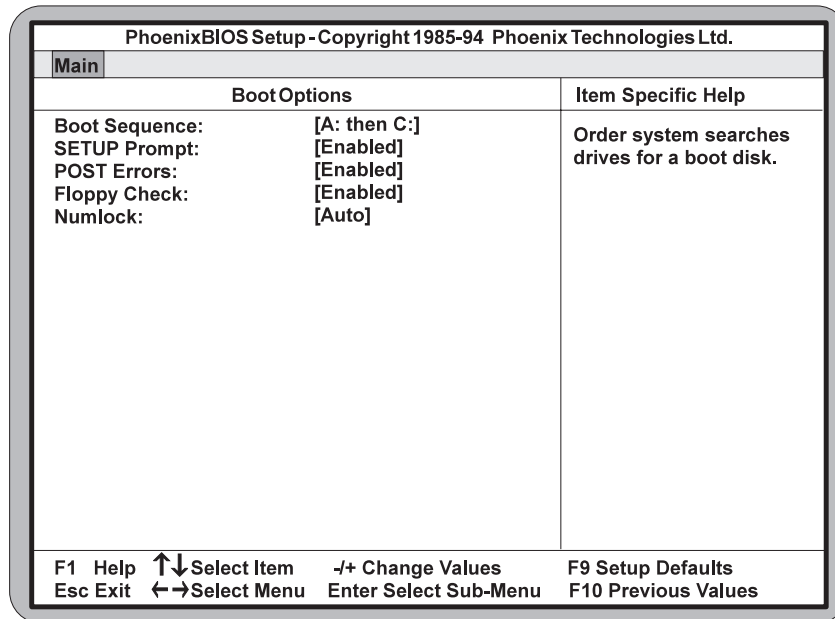


Figure 4-4 Boot Options Submenu

### **Boot Sequence**

This category selects the order the system searches for a boot disk and can be set for:

A: then C:

C: then A:

C: only (System never attempts booting from floppy.)

### **SETUP Prompt**

When enabled, this category allows the system to display the “Press <F2> to enter SETUP” message during boot.

### **Post Errors**

When enabled, this category allows the system to display the “Press <F1> to resume, <F2> to SETUP” message if errors occur during boot. If disabled, the system will ignore any errors and will always attempt to boot.

### **Floppy Check**

When enabled, this category verifies the floppy drive is installed while the system is booting. For faster booting, select DISABLED.

### **Numlock**

Setting this to On will activate Numlock upon boot. Setting this to Auto will activate Numlock if the BIOS detects a numeric keyboard. It may also be set to Off.

### **Cache**

This category allows you to enable the external cache. For optimal performance, select Enabled.

### **System Memory**

The System Memory category identifies the size of the base memory. It cannot be changed.

### **Extended Memory**

The Extended Memory category automatically detects the amount of memory installed above the amount in the System Memory category. Because the BIOS automatically calculates the amount of memory installed in your system, you cannot change this category without adding or removing memory.

## Setting the Advanced Screen

To move to the Advanced Screen, use the left and right arrow keys <←/→> keys until you see the screen below (Figure 4-5).

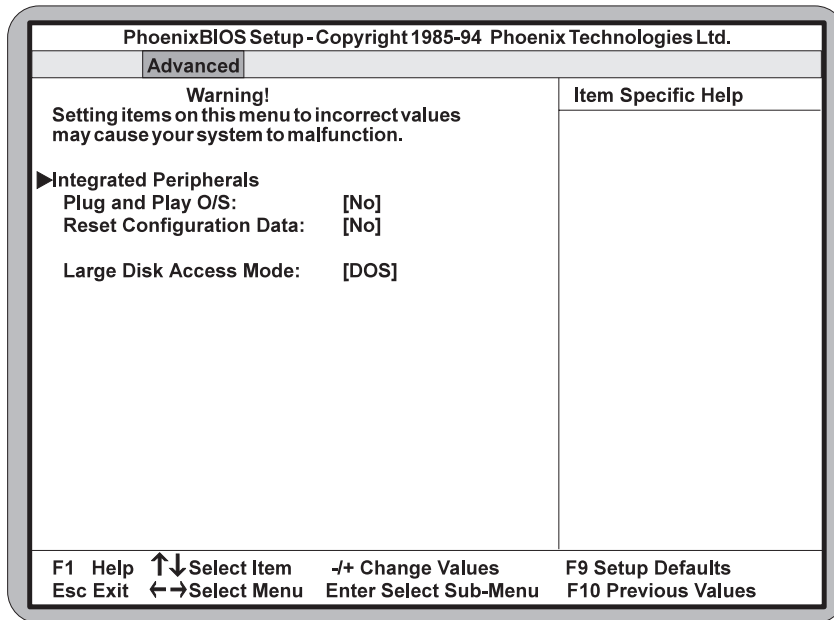


Figure 4-5 Advanced Screen

### Integrated Peripherals Submenu

The Integrated Peripherals submenu (Figure 4-6) allows you to individually enable or modify the disk controllers, I/O ports, and other settings. Use the up and down arrow keys <↑/↓> to select a category and the plus and minus keys <+/-> to change the settings.

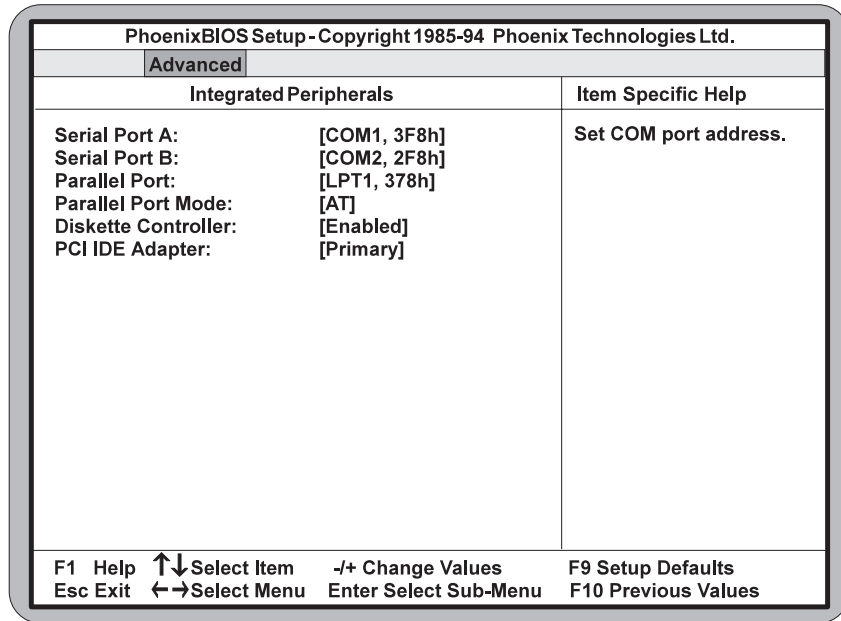


Figure 4-6 Integrated Peripherals Submenu

#### Serial Port A

Serial Port A may be set for Auto (default), COM1, COM2, COM3, COM4, or may be disabled.

#### Serial Port B

Serial Port B may be set for Auto (default), COM1, COM2, COM3, COM4, or may be disabled.

#### Parallel Port

The parallel port may be set for Auto (default), LPT1, LPT2, or may be disabled.

#### Parallel Port Mode

The parallel port may be set for output mode (AT) (default), bidirectional mode (PS/2), Enhanced Capabilities Port mode (ECP), or may be disabled.



**Diskette Controller**

The on board floppy disk controller may be enabled or disabled.

**PCI IDE Adapter**

The on board PCI IDE controller may be set for Primary (up to two hard disks), Both (up to four hard disks), or it may be disabled.

**Plug and Play O/S**

This category, when set to Yes, allows the system to work with a Plug and Play operating system such as Windows 95. The default setting is No.

**Reset Configuration Data**

Select Yes if you want to clear the system configuration data. The default setting is No.

**Large Disk Access Mode**

If you are using a DOS operating system (MS-DOS, DR-DOS, or PC-DOS), set this to DOS. If you are using anything else, set this to OTHER.

## Security Screen

The Security Screen (Figure 4-7) controls access to the computer. The security screen allows for settings of two passwords. The Supervisor Password allows access to the system and Setup. The User Password will allow access to the system, but not to all Setup features.

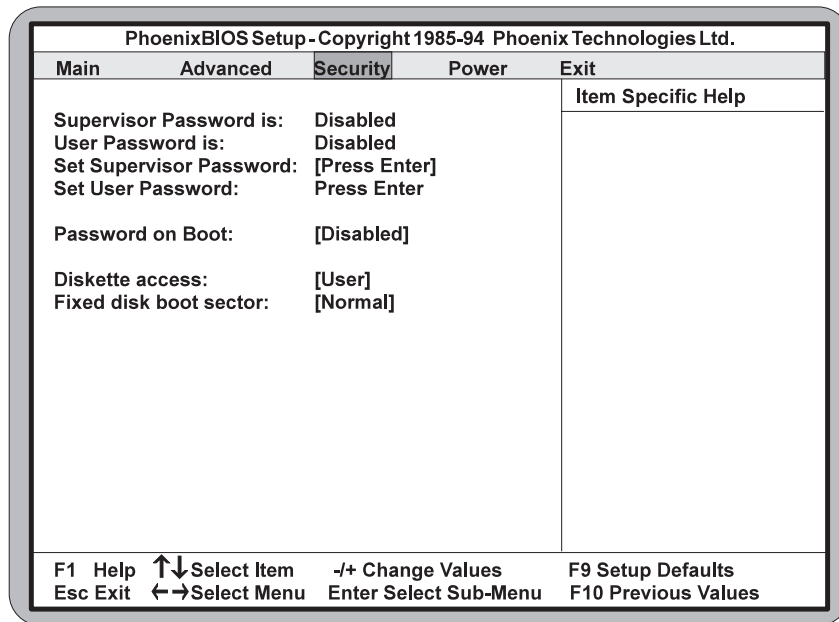


Figure 4-7 Security Setup Screen

### Supervisor Password is

If a Supervisor Password has been set up for the system, it will read “Supervisor Password is ENABLED.” If the password has not been set up, it will be disabled (default).

### User Password is

If a User Password has been set up for the system, it will read “User Password is ENABLED.” If the password has not been set up, it will be disabled (default).

### Set Supervisor Password

Press the <Enter> key to enter the Supervisor Password submenu (Figure 4-8).

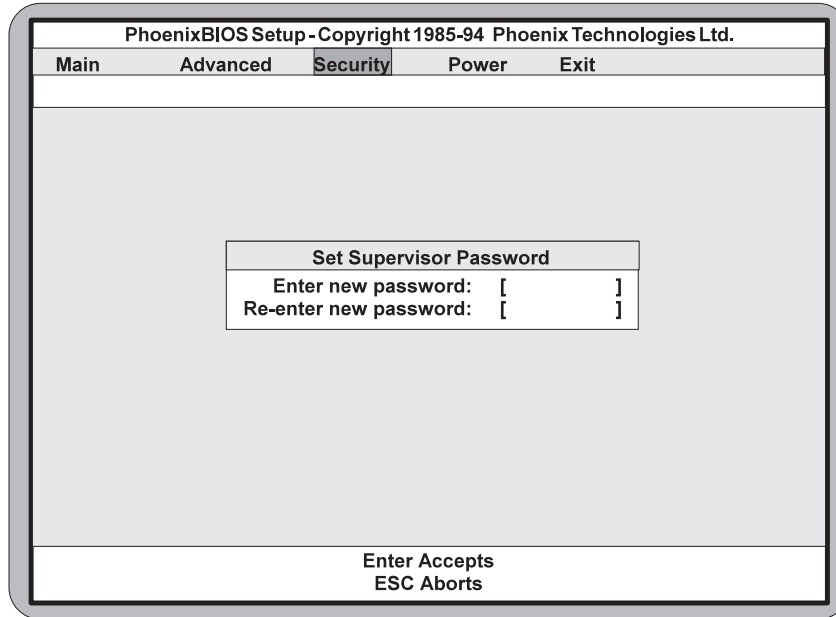


Figure 4-8 Supervisor Password Submenu

Type the password and press the <Enter> key. Retype the password and press the <Enter> key again. Write down the password somewhere safe so it will not be forgotten. The password may be disabled by setting the new password to nothing (pressing the <Enter> key without first typing a password).

**Warning:**

*If you forget the Supervisor Password, it cannot be disabled without discharging the CMOS.*

**Set User Password**

Follow the same procedure used to set the Supervisor Password.

**Note:**

*When a password has been entered, it is saved immediately. All other changes may still be discarded (see Exit Screen).*

**Password on Boot**

When enabled, the system will require a password to be entered upon boot. Either the Supervisor or User Password may be entered.

### **Diskette Access**

This category allows floppy disk access with an option of the supervisor or user. Selecting Supervisor will give floppy disk access to the supervisor only. Selecting User (default) will give floppy disk access to both the user and the supervisor. If the passwords are enabled, this option may only be changed by the supervisor.

### **Fixed Disk Boot Sector**

This category allows the boot sector of the fixed disk to be write protected. The default setting is Normal. When set for Write Protect, it serves as a form of virus protection. If the passwords are enabled, this option may only be changed by the supervisor.

## Power Screen

The Power Screen controls the power management functions or the “Green Section” of the system. To move to the Advanced Screen, use the left and right arrow keys <←/→> keys until you see the screen below (Figure 4-9) .

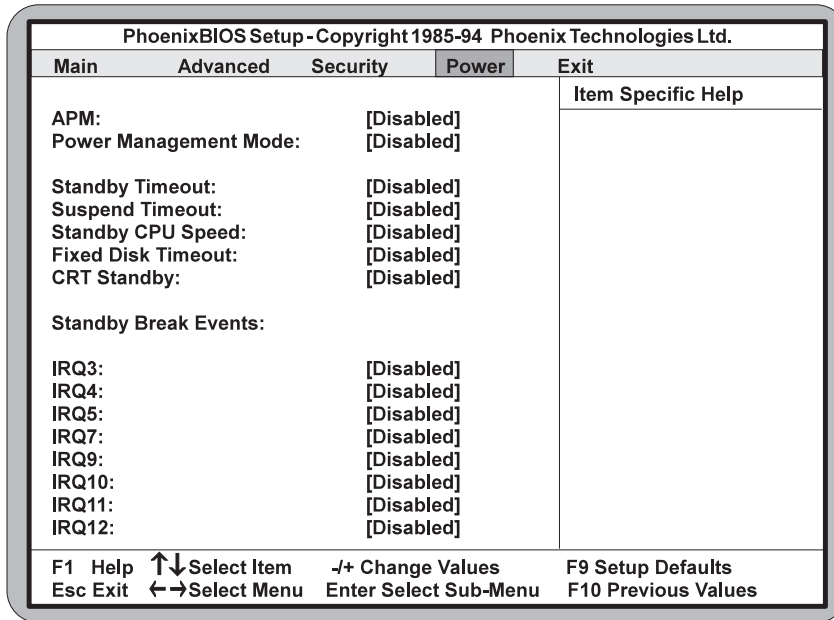


Figure 4-9 Power Screen

### APM

When enabled the power management features are active. The default setting is Disabled. If you enable this category, you must also set the other power management options below.

### Power Management Mode

This category may be set for Maximum Power Savings, Medium Power Savings, Minimum Power Savings, Customized, or Disabled (default). If you set this category for Maximum, Medium, or Minimum power savings, you do not need to make any more adjustments. If you select Customized, you must set the following five categories.

### Standby Timeout

The Standby Timeout category is used to set the amount of time that must elapse for the system to enter the power saving mode. The options are

Disabled (default), 1 min., 15 min., 30 min., 45 min., 60 min., 2 Hr., 3 Hr., or 4 Hr.. Before making changes, “Customized” must be selected in the Power Management Mode category.

### **Suspend Timeout**

The Suspend Timeout category is used to set the amount of time that must elapse after the Standby Timer is activated. The options are Disabled (default), 1 min., 15 min., 30 min., 45 min., 60 min., 2 Hr., 3 Hr., and 4 Hr.. Before making changes, “Customized” must be selected in the Power Management Mode category.

### **Standby CPU Speed**

This category is used to set the CPU speed during power saving mode. The options are Maximum, Medium, Minimum, and Slowest (default). Before making changes, “Customized” must be selected in the Power Management Mode category.

### **Fixed Disk Timeout**

This category is used to set the amount of time which must elapse before the IDE drive enters spin-down mode to conserve power. The options are Disabled (default), 1 min., 2 min., 5 min., 10 min., or 15 min. Before making changes, “Customized” must be selected in the Power Management Mode category.

*Note:*

*Do not enable this category unless your IDE drive supports spin-down mode.*

### **CRT Standby**

Selecting Enabled will power down the display while the system is in power saving mode. The default setting is disabled. Before making changes, “Customized” must be selected in the Power Management Mode category.

## Exit Screen

After you have completed configuring the BIOS, select the Exit Screen (Figure 4-10).

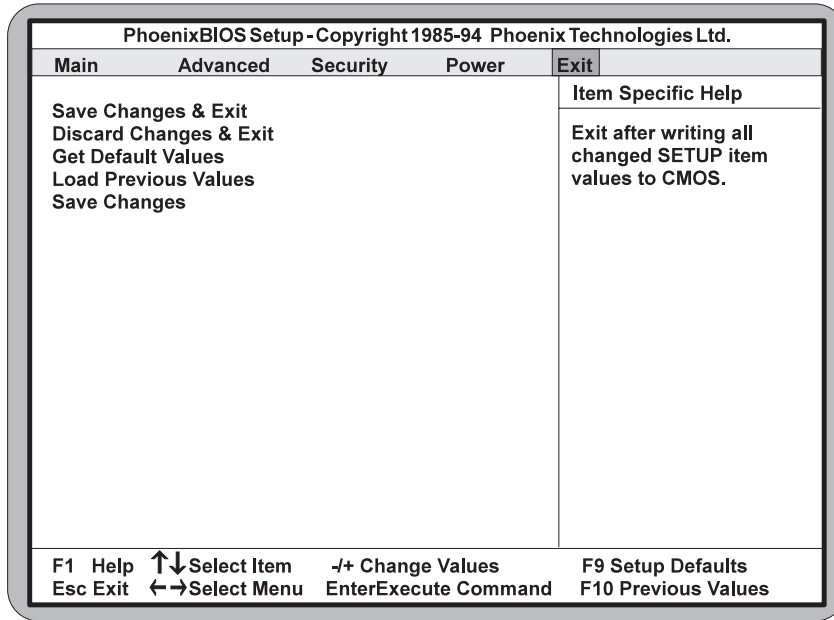


Figure 4-10 Exit Screen

Choose “Save Changes and Exit” and reboot the computer. The computer is ready for use.

# A POST Messages

The following table lists the Power On Self Test (POST) messages, possible causes, and solutions.

Message	Possible Cause	Solution
DISKETTE DRIVE A FAILURE	Drive A failed or is missing.	Check Setup and cable connections.
DISKETTE DRIVE B FAILURE	Drive B failed or is missing.	Check Setup and cable connections.
EXTENDED RAM FAILED AT OFFSET: nnnn	Extended memory not working or configured properly.	Replace defective memory.
FAILING BITS: nnnn	Memory failure in System, Extended, or Shadow memory.	Replace defective memory.
FIXED DISK X FAILURE (where X =0 or 1)	The hard disk is not configured or working properly.	Rerun SETUP and check connections, or replace hard disk.
FIXED DISK CONTROLLER FAILURE	The controller card has failed.	Check configuration and connections, or replace controller card.
INCORRECT DRIVE A TYPE	Floppy drive A: not set correctly in Setup.	Run Setup.
INCORRECT DRIVE B TYPE	Floppy drive A: not set correctly in Setup.	Run Setup.
INVALID NVRAM MEDIA TYPE	NVRAM chip is bad.	Requires repair of system board.
KEYBOARD ERROR, or KEYBOARD CONTROLLER ERROR	The keyboard or keyboard controller failed.	Check connections. You may have to replace the keyboard or controller.
KEYBOARD ERROR nn	A key is jammed or was held down during boot.	Make sure the keys are not jammed or dirty.
KEYBOARD LOCKED	Keyswitch on the front of the case is locked.	Unlock the keyswitch.



<b>Message</b>	<b>Possible Cause</b>	<b>Solution</b>
MONITOR TYPE DOES NOT MATCH CMOS	Monitor type not correctly identified in Setup.	Run Setup and enter correct monitor type.
OPERATING SYSTEM NOT FOUND	Operating system cannot be located on Drive C: or Drive A:	Check Setup to see if Drive A: and C: are properly configured, or put a bootable disk in Drive A:
PARITY CHECK 1 nnnn	Parity error found in the system bus.	Check Setup. Board repair may be required.
PARITY CHECK 2 nnnn	Parity error found in the I/O bus.	Check Setup. Board repair may be required.
PREVIOUS BOOT INCOMPLETE - DEFAULT CONFIGURATION USED	Previous POST did not complete successfully.	Run Setup, load default BIOS settings, make any necessary adjustments, and save the changes
REAL TIME CLOCK ERROR	Real-time clock failed BIOS test.	May require battery replacement or board repair.
SHADOW RAM FAILED AT OFFSET	Shadow RAM failed.	May require repair of system board.
SYSTEM BATTERY IS DEAD	System battery died.	Replace the system battery and run Setup to reconfigure the system.
SYSTEM CACHE ERROR - CACHE DISABLED	External (L2) cache failed BIOS test.	System will still run, but slower. Replace cache at convenience.
SYSTEM CMOS CHECKSUM BAD - RUN SETUP	System CMOS has been corrupted or modified incorrectly.	Run Setup and reconfigure the system.
SYSTEM RAM FAILED AT OFFSET: nnnn	System RAM failed.	Replace defective RAM.
SYSTEM TIMER ERROR	Timer test failed.	Requires repair of system board.

# B Beep and POST Codes

Beep codes are a series of beeps sent through the speaker which indicate a problem during the Power On Self Test (POST). If text appears on the video screen, the M4LI has completed POST; any other tone from the speaker indicates something other than a POST error. These tones **are not** described in Table B-1.

The beep error codes are a series of beeps. The duration of the beep tones are constant, but the length of the pauses between the beeps varies. For example: a 1-3-3 beep code will sound like one beep, a pause; three beeps consecutively, another pause; and then three more beeps.

One beep code is often misunderstood. If a video card is not installed or is failing, the system board will generate a long-short-long-short beep code. This is often interpreted as a 1-2-1 beep code. But POST errors always vary in the length of the pause and not the duration of the beep tone.

Another way of identifying a POST error is to use a device called a POST card. This peripheral card is inserted into one of the ISA slots and has an LED (or LCD) read out showing the contents of port 80h.

The following table provides a list of all beep codes and POST routines..

Code	Beeps	POST Routine Description
02		Verify Real Mode.
04		Get CPU type.
06		Initialize system hardware.
08		Initialize chipset registers with initial POST values.
09		Get in POST Reg.
0A		Initialize CPU registers.
0C		Initialize cache initial POST values.
0E		Initialize I/O.
0F		Initialize the localbus IDE.
10		Initialize Power Management.
11		Load alternate registers with initial POST values.
12		Jump to UserPatch0.
14		Initialize keyboard controller.
16	2-2-3	BIOS ROM checksum.
18		8254 timer initialization.
1A		8237 DMA controller initialization.
1C		Reset Programmable Interrupt Controller.
20	3-1-1	Test DRAM refresh.
22	3-1-3	Test 8742 Keyboard Controller.
24		Set ES segment register to 4 GB.
28		Autosize DRAM.
2A		Clear 512K base RAM.
2C	3-4-1	Test 512K base address lines.
2E	3-4-3	Test 512K base memory.
32		Test CPU bus-clock frequency.
34		Test CMOS RAM.
35		Initialize alternate chipset registers.
37		Reinitialize the chipset (MB only).
38		Shadow system BIOS ROM.
39		Reinitialize the cache (MB only).
3A		Autosize cache.
3C		Configure advanced chipset registers.
3D		Load alternate registers with CMOS values.
40		Set initial CPU speed.
42		Initialize interrupt vectors.
44		Initialize BIOS interrupts.
46	2-1-2-3	Check ROM copyright notice.
47		Initialize manager for PCI Option ROMs.
48		Check video configuration against CMOS.
49		Initialize PCI bus and devices.

Code	Beeps	POST Routine Description
4A		Initialize all video adapters in system.
4C		Shadow video BIOS ROM.
4E		Display copyright notice.
50		Display CPU type and speed.
51		Initialize EISA board.
52		Test keyboard.
54		Set key click if enabled.
56		Enable keyboard.
58	2-2-3-1	Test for unexpected interrupts.
5A		Display prompt "Press F2 to enter SETUP".
5C		Test RAM between 512 and 640k.
60		Test extended memory.
62		Test extended memory address lines.
64		Jump to UserPatch1.
66		Configure advanced cache registers.
68		Enable external and CPU caches.
6A		Display external cache size.
6C		Display shadow message.
6E		Display non-disposable segments.
70		Display error messages.
72		Check for configuration errors.
74		Test real-time clock.
76		Check for keyboard errors.
7C		Set up hardware interrupt vectors.
7E		Test coprocessor if present.
80		Disable onboard I/O ports.
82		Detect and install external RS232 ports.
84		Detect and install external parallel ports.
86		Re-initialize on-board I/O ports.
88		Initialize BIOSData Area.
8A		Initialize Extended BIOS Data Area.
8C		Initialize floppy controller.
90		Initialize hard-disk controller.
91		Initialize localbus hard-disk controller.
92		Jump to UserPatch2.
93		Build MPTABLE for multi-processor boards.
94		Disable A20 address line.
96		Clear huge ES segment register.
98		Search for option ROMs.
9A		Shadow option ROMs.

Code	Beeps	POST Routine Description
9C		Set up Power Management.
9E		Enable hardware interrupts.
A0		Set time of day.
A2		Check key lock.
A4		Initialize typematic rate.
A8		Erase F2 prompt.
AA		Scan for F2 keystroke.
AC		Enter SETUP.
AE		Clear in-POST flag.
B0		Check for errors.
B2		POST done - prepare to boot operating system.
B4		One beep.
B6		Check password (optional).
B8		Clear global descriptor table.
BC		Clear parity checkers.
BE		Clear screen (optional).
BF		Check virus and backup reminders.
C0		Try to boot with INT 19.
D0		Interrupt handler error.
D2		Unknown interrupt error.
D4		Pending Interrupt.
D6		Initialize option ROM error.
D8		Shutdown error.
DA		Extended Block Move.
DC		Shutdown 10 error.
		The following are for boot block in Flash ROM:
E2		Initialize the chipset.
E3		Initialize refresh counter.
E4		Check for Forced Flash.
E5		Check HW status of ROM.
E6		BIOS ROM is OK.
E7		Do a complete RAM test.
E8		Do OEM initialization.
E9		Initialize interrupt controller.
EA		Read in the bootstrap code.
EB		Initialize all vectors.
EC		Boot the Flash program.
ED		Initialize the boot device.
EE		Boot code was read OK.

# C Hard Disk Drive Types

The following table lists the hard disk types supported by M4Li.

Type	Cylinders	Heads	Write Precomp	Sectors	Size
1	306	4	128	17	10
2	615	4	300	17	21
3	615	6	300	17	32
4	940	8	512	17	65
5	940	6	512	17	99
6	615	4	none	17	21
7	462	8	256	17	32
8	733	5	none	17	31
9	900	15	none	17	117
10	820	3	none	17	21
11	855	5	none	17	37
12	855	7	none	17	52
13	306	8	128	17	21
14	733	7	none	17	44
15	N/A	N/A	N/A	N/A	N/A
16	612	4	0	17	21
17	977	5	300	17	42
18	977	7	none	17	59
19	1024	7	512	17	62
20	733	5	300	17	31
21	733	7	300	17	94
22	733	5	300	17	31
23	306	4	0	17	10
24	612	4	305	17	21
25	612	2	300	17	10
26	614	4	none	17	21
27	820	6	none	17	42
28	977	5	none	17	42
29	1218	15	none	36	336
30	1224	15	none	17	159

Type	Cylinders	Heads	Write Precomp	Sectors	Size
31	823	10	512	17	71
32	809	6	128	17	42
33	830	7	none	17	50
34	830	10	none	17	72
35	1024	5	none	17	44
36	1024	8	none	17	71
37	615	8	128	17	42
38	1024	8	none	26	109
39	925	9	none	17	72

# D Specifications

Processor Options	Intel 486DX 33MHz, PGA. Intel 486DX2 50 & 66MHz, PGA. Intel 486DX4 75 & 100MHz. Intel 486 DX2 3.3V Support. Intel Pentium <i>OverDrive</i> Processor. Intel 486 OverDrive Processor. AMD 486DX and DX2 processors. Cyrix 486DX and DX2 processors.
Chipset	SIS 486/497 Chipset SMC 665 Super I/O chip.
CPU Clock Select	Frequency synthesizer chip. Jumper selectable CPU speed.
Form Factor	Mini AT footprint (8.5" x 9.5"). 4 Layer PCB.
Expansion	Three ISA slots, three PCI slots, and one shared slot.
BIOS	Phoenix 4.04 Plug and Play BIOS on 1MB Flash EPROM. Mode 3 IDE drive support. Auto-detection of memory size. Auto-configuration of IDE hard disk drives.
RAM Capacity	4MB to 128MB.
Keyboard	AT compatible (AT Version). PS/2 compatible (PS/2 Version).
Internal Cache	Depends on type of CPU installed.
External Cache	0K, 128K, 256K, or 512K write-back or write-through.



I/O Ports	Built in support. Two high speed serial ports (16550 compatible). One bi-directional parallel port. Enhanced Parallel Port (EPP) compatible. Microsoft and Hewlett Packard Extended Capabilities Port (ECP) compatible.
Floppy Port	Supports two floppy drives (2.88, 1.44, 1.2, 720K, 360K).
PCI IDE Port	Supports four IDE hard disks. Mode 3 support. Multiple sector transfer support. LBA support.

## **Environmental Specifications**

The environment in which the M4Li is located is critical. Micronics recommends the following environmental specifications:

### **Temperature Range**

Operating: 50 to 104 degrees Fahrenheit (10 to 40 degrees Celsius).

Non -Operating: 50 to 140 degrees Fahrenheit (10 to 60 degrees Celsius).

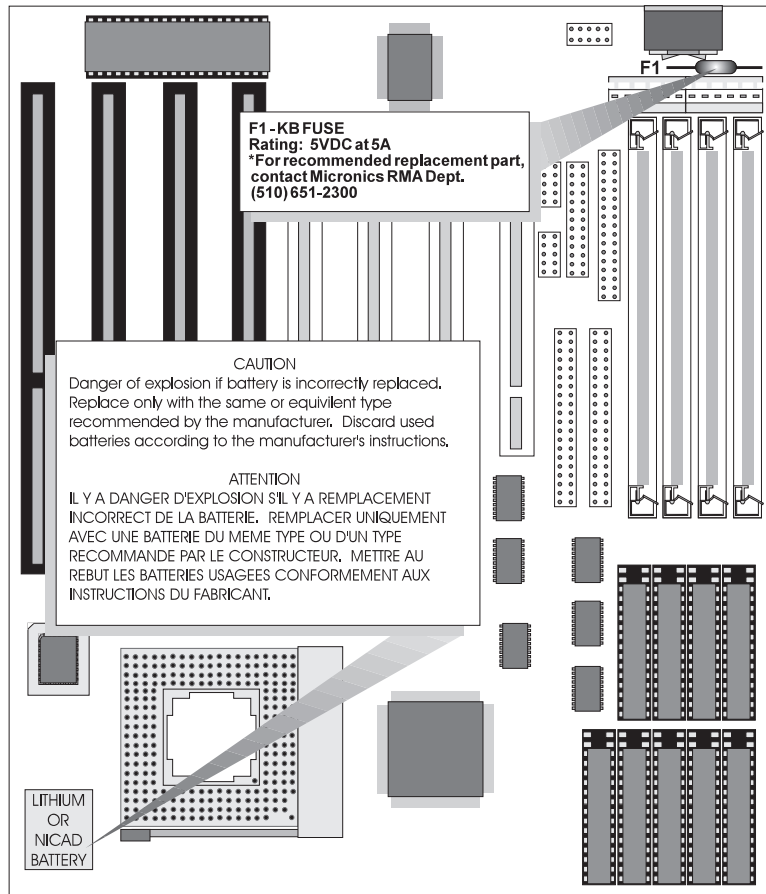
Shipping: -22 to 140 degrees Fahrenheit (-30 to 60 degrees Celsius).

### **Relative Humidity**

Operating: 20% to 80%.

Non-Operating: 5% to 90%.

# Battery Disposal



**Warning:**  
**DO NOT:** open battery; dispose of in fire; recharge; put in backwards, mix  
 with used or other battery types. May explode or leak and cause personal  
 injury.



# E Installing a Power Module

The M4Li will accommodate a large variety of 486 processors. When installing a 5.0V processor, locate J4 on your system board (see Figure 2-1), and configure it as shown below (Figure E-1).



Figure E-1 Configuring Jumper J4

To configure your system board for a 3.3V or 4.0V processor, you will need to order a Power Module. If you do not have one, contact Micronics' Customer Service department at (510) 661-3200.

To install a Power Module, remove all jumpers from Jumper J4 and install it as shown below (Figure E-2).

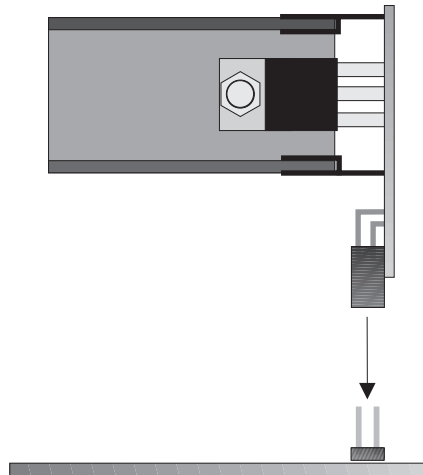


Figure E-2 Installing a Power Module

After you have installed the Power Module, secure it with a tie strap (Figure E-3) and your installation is complete.

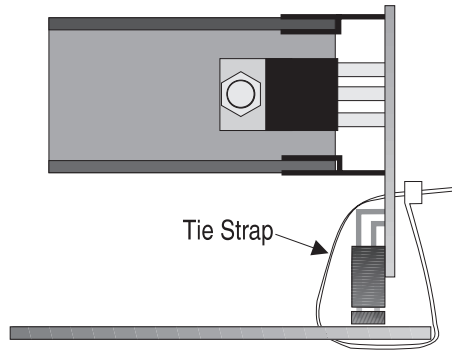


Figure E-3 Securing the Power Module