



M4Pe PCI/EISA System Board Manual

Document Number: 06-00218-02, Ver. 2A
August 1994
221 Warren Ave., Fremont, CA 94539-7085

Copyright Notices

Micronics Computers, Inc.

The information contained in the M4Pe system board manual has been carefully checked and is believed to be accurate. Micronics assumes no responsibility for any inaccuracies that may be contained in this document. Micronics makes no commitments to update or to keep the information in this manual at a current level when changes are made to the product.

Micronics reserves the right to make improvements to this document and/or product at any time and without notice.

All Rights Reserved. No part of this document may be photocopied, reproduced, translated, or reduced to any medium or machine form without prior, written consent from Micronics.

COPYRIGHT (C) 1994, Micronics Computers, Inc.

Portions of the Manual

Portions of this manual were copied (with permission) from Phoenix Technologies, Ltd. Copyright 1994. All rights reserved.

Trademarks

IBM is a registered trademark of International Business Machines. Microsoft, Microsoft Word, Windows are registered trademarks of Microsoft Corporation. Intel and PCI are registered trademarks of Intel Corporation. UNIX is a registered trademark of AT&T Corporation. Lotus 1-2-3 is a registered trademark of Lotus Development Corp. All other product names mentioned herein are used for identification purposes only and may be the trademarks of their respective companies.

Micronics Quick Installation

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

1. Make backup copies of your installation and configuration diskettes.
2. Ground yourself to prevent damaging static discharge, then remove the M4Pe from its packaging.
3. Configure and verify the system board's jumper settings. (See Jumper Settings in Chapter 2)
4. Install the CPU and the system memory. (See Chapter 3)
5. Install the motherboard into the system case and make all of the necessary case connections.
6. Install any ISA, PCI, and EISA add-on peripherals. (See Chapter 3)
Do not replace the computer cover until you have verified the system is working properly.
7. Turn the computer on and press the <Ctrl>, <Alt>, and <Esc> keys simultaneously when you see the screen below:

**Phoenix 80486 ROM BIOS, Version 0.10 M4Pe-XX
Copyright (c) 1985-1990 Phoenix Technologies Ltd.
All Rights Reserved**

**640K Base, xxxxK Extended
Internal Cache Enabled
External Cache Enabled
256K Cache Installed**

8. Set the time and date. Adjust the BIOS settings to match what is installed in your system. If installing an IDE drive, select the IDE device you wish to configure. Press <Enter> with AUTO CONFIG selected and the BIOS will automatically configure the drive for you. (See Chapter 4)
9. 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, press the <F4> key (Save Values, Exit SETUP, and Reboot), and you are finished with the BIOS configuration. (See Chapter 4)
10. Insert the MCS EISA Configuration Utility into Drive A or Drive B and type:

a:cf <Enter>
or
b:cf <Enter>

Follow the directions and install the necessary drivers for your EISA peripherals. (See Chapter 5)

Contents

Introduction	1-1
Features	1-2
Software Compatibility	1-2
Configuring the M4Pe	2-1
Static Electricity	2-1
Office Environment	2-1
M4Pe Components	2-2
Jumper Settings	2-3
Installing the M4Pe, System Memory, CPUs and Peripherals	3-1
Installation of the M4Pe	3-2
Tools Required	3-2
Equipment Required	3-2
System Memory	3-3
The SIMMs	3-3
Installing the SIMMs	3-3
Removing SIMMs	3-4
Memory Configuration	3-5
Installing a CPU	3-6
Installing Cache Memory	3-7
Upgrading to 256K Cache	3-7
Upgrading to 512K Cache	3-8
Installing a PCI Peripheral Card	3-9
Installing an EISA Peripheral Card	3-10
Installing an ISA Peripheral Card	3-11
The BIOS Setup Utility	4-1
Configuration	4-1
Initial Boot Up	4-1
Setup	4-2
Running the Setup Procedure	4-3
Setting the CMOS Main Screen	4-3

System Time and Date	4-4
Diskette A or B	4-4
Hard Disk 1, 2, 3, or 4 (IDE Drives Only)	4-4
Base Memory and Extended Memory	4-4
System Password	4-4
Setup Password	4-5
Video Card	4-5
Keyboard	4-5
NumLock at Boot	4-5
Setting the CMOS Extended Screen	4-6
On-Board PCI IDE	4-6
Master Speed (On-Board PCI IDE)	4-6
On-Board ISA IDE	4-6
On-Board Floppy	4-7
Serial Port A	4-7
Serial Port B	4-7
Parallel Port	4-7
Parallel Port IRQ	4-7
Parallel Port Mode	4-7
Boot Sequence	4-7
Swap Floppies	4-7
Cache State	4-7
Cache Mode	4-8
System BIOS	4-8
Video BIOS	4-8
Memory Gap	4-8
PCI IRQ	4-8
Exit Screen	4-9
EISA Utility	5-1
File Extensions	5-1
Starting the Utility	5-2
Main Menu	5-3
Step 1: Important EISA Configuration Information	5-4
Step 2: Add or Remove Boards	5-5
Step 3: View or Edit Details	5-6
Total System Board Memory	5-7
Step 4: Examine Required Switches	5-7
Step 5: Save And Exit	5-7
POST Messages	A-1

Beep Codes	B-1
Hard Disk Drive Types	C-1
Specifications	D-1
Environmental Specifications	D-2
Temperature Range	D-2
Relative Humidity	D-2
Battery Disposal	D-3
FCC Warning Statement	F-1
Glossary	G-1
Limited Warranty	W-1
Non-Warranty Service	W-2

List of Figures

Figure 2-1: M4Pe System Board	2-2
Figure 3-1: Installing a 72-Pin SIMM	3-4
Figure 3-2: Installing a CPU	3-6
Figure 3-3: Upgrading to 256K External Cache	3-7
Figure 3-4: Upgrading to 512K External Cache	3-8
Figure 3-5: Installing a PCI Card	3-9
Figure 3-6: Installing an EISA Card	3-10
Figure 3-7: Installing and ISA Card	3-11
Figure 4-1: Power-Up Screen	4-2
Figure 4-2: CMOS Main Screen	4-3
Figure 4-3: CMOS Extended Screen	4-6
Figure 4-4: Exit Screen	4-9
Figure 5-1: EISA Configuration Introduction Screen	5-2
Figure 5-2: EISA Configuration Main Menu	5-3
Figure 5-3: Important EISA Configuration Information	5-4
Figure 5-4: Add or Remove Boards Screen	5-5
Figure 5-5: View or Edit Details Menu	5-6
Figure 5-6: Total System Board Memory	5-7
Figure 5-7: Save and Exit Screen	5-8
Figure 5-8 Reboot Screen	5-8

List of Tables

Table 2-1: Cache Size Selection.....	2-3
Table 2-2: CPU Selection	2-4
Table 2-3: SL Enhanced CPU Selection	2-4
Table 2-4: PS/2 Mouse Selection	2-4
Table 2-5: DPU Selection	2-5
Table 2-6: Tag Selection.....	2-5
Table 2-7: IDE Selection	2-5
Table 2-8: Parity/Non Parity SIMM Settings	2-6
Table 2-9: Reserved Jumpers	2-6
Table 2-10: PCI Compliant IRQ Jumper Header	2-6
Table 2-11: Case and Peripheral Connections	2-7
Table 3-1: Common Memory Configurations.....	3-5

1 Introduction

Congratulations! You just purchased the Micronics M4Pe. The M4Pe is a high-performance system board designed to be the foundation of your personal computer, workstation or file server.

The M4Pe is a 486 based system board and supports all of the most popular 486 microprocessors.

The M4Pe also comes with many built in features. This includes built in support for four IDE hard drives, a floppy drive port, a bi-directional parallel port, and two high speed serial ports.

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

Features

The M4Pe includes the following features:

- ⊗ Clock synthesized support for 486 processors.
 - Intel 80486SX, 25MHz or 33MHz
 - Intel 80486DX. 33MHz
 - Intel 80486DX2, 50MHz or 66 MHz
 - Intel 80486DX4, 100MHz
- ⊗ Three 32-bit PCI slots and five 32-bit EISA slots.
- ⊗ L2 write-back cache support (128K, 256K, or 512K).
- ⊗ Supports up to 128MB of on-board memory.
- ⊗ PCI Local Bus IDE controller.
- ⊗ Secondary ISA IDE controller.
- ⊗ Floppy controller (Supports 2.88MB, 1.44MB, 1.2MB, 720K, and 360K floppy drive).
- ⊗ Two high speed NS16550 compatible serial ports.
- ⊗ Bi-directional parallel port.
- ⊗ Upgradeable Flash Phoenix BIOS.
- ⊗ Standard AT form-factor system board.

Software Compatibility

The M4Pe system board has been thoroughly tested for compatibility with a variety of operating systems and environments, including:

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

2 Configuring the M4Pe

Although the M4Pe system board is packaged in protective materials, it is important to use care while unpacking and setting up.

Static Electricity

The M4Pe 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. Then ground the M4Pe via the solder pads surrounding one of its mounting holes.

Once the M4Pe 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.

Jumper Settings

Table 2-1 lists jumper settings for cache configuration selections.

Jumper	Function	Setting
W1	Level 2 write-back cache (default) Level 2 write-through cache	2-3 1-2
W4	Internal write-through cache (default) Internal write-back cache	Not Installed Installed
W5	128K of Level 2 cache 256K of Level 2 cache (default) 512K of Level 2 cache	Not Installed Installed Installed
W21	Level 2 cache Installed (default) Level 2 cache Not Installed	Not Installed Installed
W22	128K of Level 2 cache 256K of Level 2 cache (default) 512K of Level 2 cache	Installed Not Installed Not Installed
W23	128K of Level 2 cache 256K of Level 2 cache (default) 512K of Level 2 cache	Not Installed Installed Not Installed
W25	Level 2 cache 0 wait state (default) Level 2 cache 1 wait state	Not Installed Installed
W51	128K of Level 2 cache 256K of Level 2 cache (default) 512K of Level 2 cache	Not Installed Not Installed Installed

Table 2-1 Cache Size Selection

Table 2-2 lists jumper settings for the type of CPU used on the system board.

Jumper	Function	Setting
W2	486SX	2-3
	All other CPUs (default)	1-2 & 3-4
W3	P24T CPU	Not Installed
	All other CPUs (default)	Installed
W16	25MHz	Not Installed
	33MHz	Installed
W20	25MHz	Installed
	33MHz	Not Installed
W33	486SX, DX, DX2, &DX4	Not Installed
	DX4 future use (reserved)	1-2
	DX4 internal double clock	2-3

Table 2-2 CPU Selection

Table 2-3 lists jumper settings for installing a SL Enhanced CPU.

Jumper	SL Enhanced CPU	Non-SL Enhanced CPU
W34	Installed	Not Installed
W45	Installed	Not Installed
W52	2-3	1-2
W53	Installed	Not Installed

Table 2-3 SL Enhanced CPU Selection

Table 2-4 lists jumper settings for the PS/2 mouse selection.

Jumper	Function	Setting
W10	PS/2 mouse installed (default)	Installed
	PS/2 mouse not installed	Not Installed

Table 2-4 PS/2 Mouse Selection

Table 2-5 lists the jumper setting for the Data Path Unit (DPU) selection.

Jumper	Function	Setting
W17	DPU generates parity	1-2
	CPU generates parity	2-3
W18	DPU forces parity error	1-2
	DPU does not force parity error	2-3

Table 2-5 DPU Selection

Table 2-6 lists the jumper settings for Tag selection.

Jumper	Function	Setting
W24	7-Bit tag	Not Installed
	8-Bit tag	Installed
	9-Bit tag	Installed
W26	7-Bit tag	Installed
	8-Bit tag	Installed
	9-Bit tag	Not Installed

Table 2-6 Tag Selection

Table 2-7 lists the jumper settings for IDE selection.

Jumper	Function	Setting
W35	PCI IDE uses IRQ14 (default)	Installed
	PCI IDE does not use IRQ14	Not Installed
W37	PCI IDE uses PCI INTA	Installed
	PCI IDE PCI INTA not used (default)	Not Installed
W38	PCI IDE uses IRQ15	Installed
	PCI IDE ISA IRQ not used (default)	Not Installed
W42	ISA IDE uses ISA IRQ14	1-2
	ISA IDE uses ISA IRQ15 (default)	2-3
W43	ISA IDE uses DMA channel 6	1-2
	ISA IDE uses DMA channel 7	2-3
	ISA IDE uses PIO transfer (default)	Not Installed
W44	ISA IDE uses DMA channel 6	1-2
	ISA IDE uses CMA channel 7	2-3
	ISA IDE uses PIO transfer (default)	Not Installed

Table 2-7 IDE Selection

Table 2-8 lists the jumper settings to select parity or non-parity SIMMs.

Jumper	Function	Setting
W60	Enable memory parity check (default)	Installed
	Disable memory parity check	Not Installed

Table 2-8 Parity/Non-Parity SIMM Settings

Warning:

Parity and non-parity SIMMs cannot be mixed.

Table 2-9 lists the jumpers with reserved settings. Do not reconfigure these jumpers.

Jumper	Function	Setting
W6	Reserved	2-3
W8	Reserved	Installed
W19	Reserved	Installed
W50	Reserved	Not Installed

Table 2-9 Reserved Jumpers

Table 2-10 lists the jumper settings for the compliant IRQ jumper header.

Jumper	Settings
J101	Open (Default) Pin 2: Reroute to ISA IRQ1 Pin 3: Reroute to ISA IRQ3 Pin 4: Reroute to ISA IRQ4 Pin 5: Reroute to ISA IRQ5 Pin 6: Reroute to ISA IRQ6 Pin 7: Reroute to ISA IRQ7 Pin 8: Reroute to ISA IRQ8 Pin 9: Reroute to ISA IRQ9 Pin 10: Reroute to ISA IRQ10 Pin 11: Reroute to ISA IRQ11 Pin 12: Reroute to ISA IRQ12 Pin 13: Reroute to ISA IRQ14 Pin 14: Reroute to ISA IRQ15

Table 2-10 PCI Compliant IRQ Jumper Header

Table 2-11 lists jumper settings for case and peripheral device connections.

Jumper	Function	Notes
J21	VL IDE Connector	Primary
J22	ISA IDE Connector	Secondary
J9	Floppy Connector	
J8	Parallel Port Connector	Can be disabled in CMOS.
J11	Serial Port (Com 1)	Can be disabled in CMOS.
J10	Serial Port (Com 2)	Can be disabled in CMOS.
J1	PS/2 Keyboard Connector	
J2	PS/2 Mouse Connector	
J6 & J7	Power Supply Connector	
W28	Turbo LED	1-5V DC; 2- Ground
W29	Turbo Switch	
W15	Reset	
W39	HD LED 1	1-5V DC; 2- Ground
W46	HD LED 2	1-5V DC; 2- Ground
W12	Keylock/ Power LED	1-Power; 2-N/C; 3-Ground; 4-5V DC
J5	Speaker Connector	1-Speaker; 2-N/C; 3-Ground; 4-5V DC
J102	Fan Power Connector	1-+12V DC; 2-Ground

Table 2-11 Case and Peripheral Connections

Installing the M4Pe, System

3 Memory, CPUs and Peripherals

This section explains how to install the M4Pe 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 (see page 2-1). Micronics recommends 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 M4Pe

The installation of the M4Pe system board depends on the type of case you have. Prior to installing the M4Pe, make sure you have a clear work space available and adhere to all anti-static precautions.

If you are unfamiliar with installing a motherboard, it is highly recommended 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 M4Pe:

- ⊞ 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 M4Pe 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 added for areas with noisy transmission.
- ⊞ AT compatible keyboard.
- ⊞ Eight ohm speaker.
- ⊞ Standard ribbon cables for internal connections.
- ⊞ Shielded AC power cable (grounded).
- ⊞ Heat sink (for DX2 and DX4 processors).

System Memory

The M4Pe will accommodate a maximum of 128MB using on-board 256Kx36 (1MB) through 8Mx36 (32MB) SIMMs.

The SIMMs

The M4Pe has four 36-bit (72-pin) SIMM sockets that must be filled two at a time. Fill bank 0 and bank 1 first. Then fill bank 2 and bank 3, if necessary. The SIMMs must be rated at 70ns or faster. Use the following guidelines when installing additional memory:

- ⊗ Banks 0 and 1 must be filled with identical SIMMs. When installing different size SIMMs, install the larger size SIMMs into banks 0 and one and the smaller size into banks 2 and 3.
- ⊗ Banks 2 and 3, if filled, must contain the same size SIMM.
- ⊗ All memory must be either all parity SIMMs or all non-parity SIMMs.

Note:

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

Installing the SIMMs

Perform the following steps to install the SIMMs:

1. Hold the SIMM so the NOTCHED edge points towards the CPU socket.
2. Insert the SIMM at a 45 degree angle.
3. Gently push the SIMM to an upright position until it “snaps” into place.

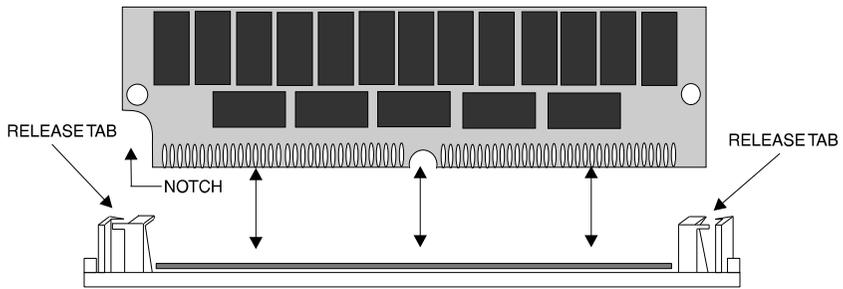


Figure 3-1 Installing a 72-Pin SIMM

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 out at a 45 degree angle, and place in an anti-static bag or package.

Memory Configuration

Table 3-1 lists the most common memory configuration. The BIOS automatically detects the amount of memory installed.

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

Table 3-1 Common Memory Configurations

Installing a CPU

The microprocessor chip (often called the CPU) regulates the basic functions of a personal computer and is arguably the most important component on a system board. On the M4Pe, the CPU can easily be replaced with a faster “upgrade” processor to increase the overall performance of the system.

To install an upgrade processor:

1. Power off the computer and remove its cover.
2. Ground yourself and exercise all anti-static precautions as explained in Chapter 2.
3. Locate the ZIF socket on the system board (refer to Figure 3-2).
4. Lift the lever of the socket.
5. Locate pin 1 on the processor and pin 1 on the socket (see Figure 3-2). Gently set the processor into the socket, making sure pin 1 on the processor and pin 1 on the socket are aligned.
6. Push the lever down until it locks into place.
7. Configure the board’s jumper settings (see Table 2-2).

The upgrade is complete and the system is ready to operate.

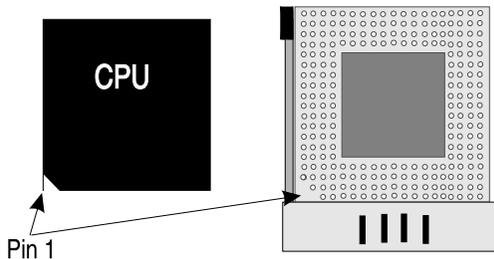


Figure 3-2 Installing a CPU

Warning:

Many processors require a heat sink or cooling fan. Failure to provide adequate cooling of the processor may seriously affect system performance or cause permanent damage to the processor.

Installing Cache Memory

Warning:

SRAM are very static sensitive. Follow all anti-static procedures explained in Chapter 2 before handling these devices.

In addition to the internal (L1) cache built into the 486 processor, the M4Pe also supports external (L2) cache. The M4Pe is available with 128K, 256K, or 512K external cache.

Upgrading to 256K Cache

Boards with 128K can be upgraded to 256K by adding four 32K x 8 SRAM chips, rated at 15 nanoseconds or faster (Figure 3-3). Complete the following steps to upgrade your system to 256K:

1. Turn off the computer system and remove its cover.
2. Locate Sockets U20, U21, U22, and U23.
3. Align the notch on the SRAM chip with the notch on the socket..
4. Carefully place the chips into place, making sure each pin is inserted into the proper receptacle.
5. Configure the jumpers for 256K of Level 2 Cache (Table 2-1).

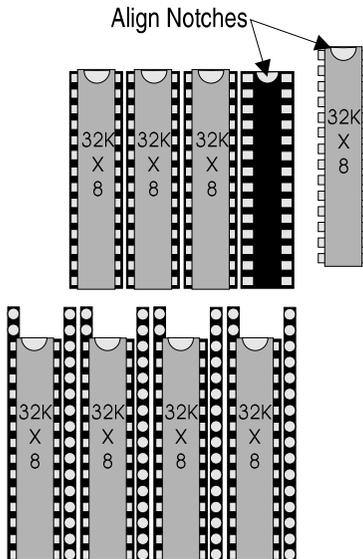


Figure 3-3 Upgrading to 256K External Cache

Upgrading to 512K Cache

Boards can be upgraded to 512K by removing any SRAM chips installed in Sockets U20, U21, U22, and U23 and adding four 128K x 8 SRAM chips, rated at 15 nanoseconds or faster (Figure 3-4). Complete the following steps to upgrade your system to 512K:

1. Turn off the computer system and remove its cover.
2. Locate sockets U20, U21, U22, and U23 and remove any SRAM chips installed in these sockets.
3. Locate sockets U24, U25, U26, and U27.
4. Align the notch on the SRAM chip with the notch on the socket.
5. Carefully place the chips into place, making sure each pin is inserted into the proper receptacle.
6. Configure the jumpers for 512K of Level 2 Cache (Table 2-1).

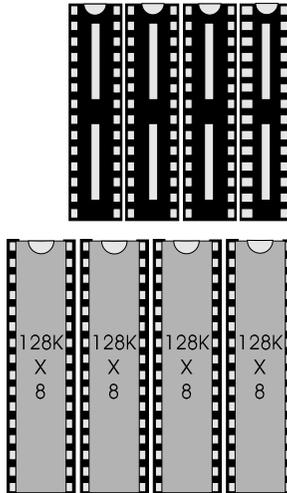


Figure 3-4 Upgrading to 512K External Cache

Installing a PCI Peripheral Card

Micronics PCI slots accommodate all PCI peripherals which meet Intel's PCI standard. 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.

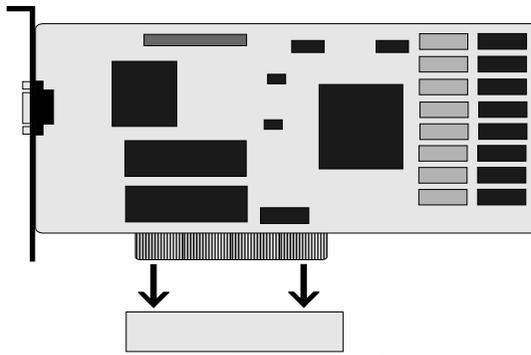


Figure 3-5 Installing a PCI Card

Installing an EISA Peripheral Card

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

1. Turn the computer system off and remove its cover.
2. Choose an unused EISA 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.
8. Run the EISA configuration utility discussed in Chapter 5.

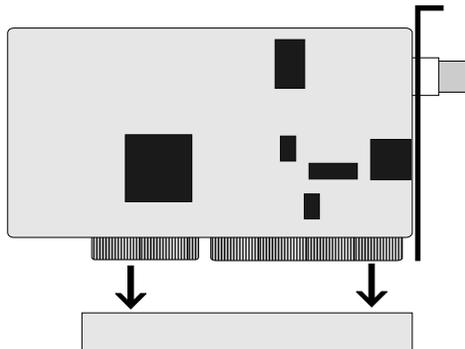


Figure 3-6 Installing an EISA Card

Installing an ISA Peripheral Card

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

1. Turn the computer system off and remove its cover.
2. Choose an unused EISA 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.

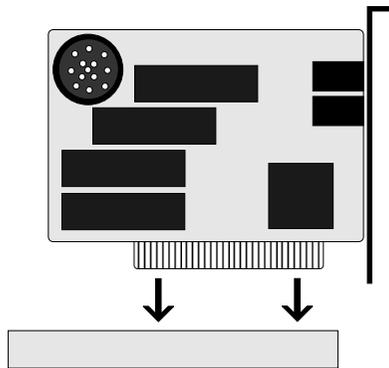


Figure 3-7 Installing an ISA Card

4 The BIOS Setup Utility

Configuration

After the M4Pe 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 M4Pe. 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 customizing the operating system to your specific computer. In order for the computer to run properly, run the Setup procedure after first installing the system board and whenever you make a major 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:

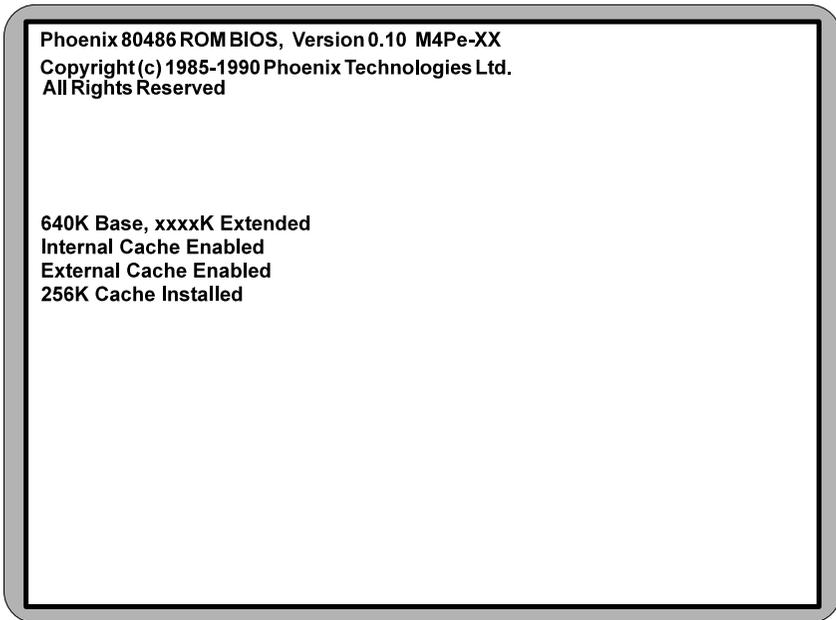


Figure 4-1 Power-Up Screen

After the screen appears, 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. If the Power-Up Screen does not appear but a DOS prompt does (ie. A:\ or C:\), press the <Ctrl>, <Alt>, and <s> keys simultaneously to begin the Setup procedure.

Running the Setup Procedure

The M4Pe system board has two CMOS configuration screens: the Main Screen (Figure 4-2) and the Extended Screen (Figure 4-3). To toggle between the screens, press the PgUp/PgDn keys.

Configure the computer’s parameters to match your specific requirements. The following pages describe the procedures to complete the BIOS Setup.

To return to the CMOS configuration screens at any time, press <Ctrl>, <Alt>, and <s> simultaneously.

Setting the CMOS 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 arrow keys <←↑↓→>. To change a category setting, use the <+/-> keys.

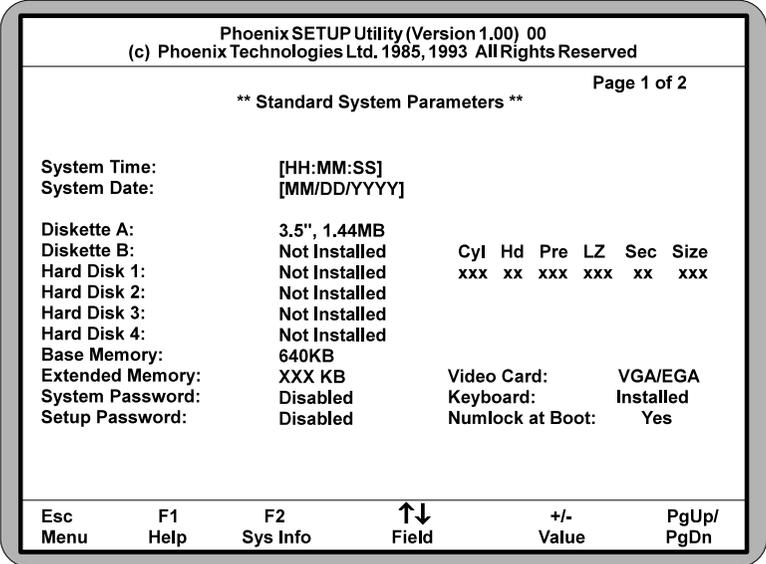


Figure 4-2 CMOS Main Screen

System Time and Date

To set the time, use the minus <-> key to decrease the number and the plus <+> key to increase the number. To move the prompt forward, use the right arrow <→> key; to move the prompt backward, use the left arrow <←> key. Follow the same procedure for the date.

Diskette A or B

This allows you to configure a diskette drive added or removed from your computer. Use the <+/-> keys to toggle between the options.

Hard Disk 1, 2, 3, or 4 (IDE Drives Only)

This selection allows you to configure a hard disk installed in your system. Use the <+/-> keys to toggle between the options. See Appendix C for a complete listing of all possible hard drive types.

To install SCSI hard drives, select NOT INSTALLED and follow the installation instructions that came with the SCSI adapter.

To manually configure a hard drive, select USER 1, 2, 3, or 4. Press the right arrow <→> key and type in the appropriate parameters.

To automatically configure an IDE hard drive, select AUTO. Drives which may be auto-configured report parameters to the BIOS.

Base Memory and Extended Memory

Both of these memory settings are automatically configured. Use the down arrow <↓> key to move to the next selection.

System Password

When enabled, a password will be required to enter the system.

To set a system password, set this category to ENABLED. After you have finished configuring the BIOS, press the <Esc> key to exit and the <F4> key to save the changes and reboot. When the system reboots, it will ask you to enter a new password. After you enter the new password, the System Password feature will be in effect.

Warning:

If you forget your password, it cannot be changed without discharging the CMOS.

Setup Password

When enabled, a password will be required to enter Setup.

To set a setup password, set this category to ENABLED. After you have finished configuring the BIOS, press the <Esc> key to exit and the <F4> key to save the changes and reboot. After the system reboots, press <Ctrl>, <Alt>, and <s> simultaneously to re-enter the setup program. On re-entering the Setup program, you will be asked to enter a new password. After you enter the new password, the Setup Password feature will be in effect.

Video Card

This sets the type of monitor installed in your computer. It may be set for VGA/EGA, Monochrome (MONO), CGA40, CGA80, or not installed. Use the <+/-> keys to toggle between the options.

Keyboard

If the keyboard category is set to INSTALLED, the computer will test the keyboard during boot. If set for NOT INSTALLED, the system will ignore any keyboard errors and always attempt to boot. Set this for INSTALLED unless using the system board in an application which does not require a keyboard.

NumLock at Boot

This sets the NUMLOCK on the keyboard to the ON position after the computer is “booted up.” NUMLOCK keeps the number keys as numbers. You can then disable the NUMLOCK after boot up by pressing the NUMLOCK key.

Setting the CMOS Extended Screen

Press the PgUp/PgDn key to set the parameters on the CMOS extended screen (Figure 4-3).

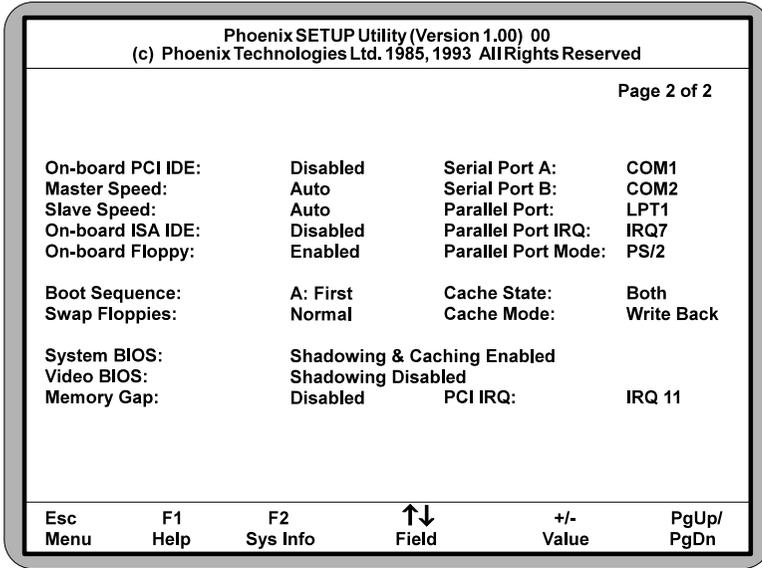


Figure 4-3 CMOS Extended Screen

On-Board PCI IDE

The Primary IDE can be selected as ENABLED or DISABLED. If enabled, be sure this setting does not conflict with any SCSI cards or other peripherals.

Master Speed (On-Board PCI IDE)

This option customizes the speed of the hard drive. The selections include Auto, Fast, Medium and Normal. Select Auto and the BIOS will automatically configure your hard drive for the highest performance it will support.

On-Board ISA IDE

The Secondary IDE can be selected as ENABLED or DISABLED. If enabled, be sure this setting does not conflict with any add-on peripherals.

On-Board Floppy

The On-Board Floppy controller may be set for ENABLED or DISABLED.

Serial Port A

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

Serial Port B

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

Parallel Port

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

Parallel Port IRQ

The Parallel Port IRQ can be selected as IRQ5 or IRQ7. The default for LPT1 is IRQ7. Be sure the IRQ setting is different than all other peripherals.

Parallel Port Mode

The parallel port may be set for AT (output mode) or PS/2 (bidirectional mode).

Boot Sequence

This category selects the order the system searches for a boot disk and can be set for "A: First" or "C: First."

Swap Floppies

This category can be set to remap the floppy drives. It can be set for NORMAL (default) or SWAPPED. For normal operation, Drive A: and Drive B: work normally. When "Swapped" is selected, Drive A: becomes Drive B:, and Drive B: becomes Drive A:.

Cache State

This selection allows you to enable the internal (80486) cache, or both the internal and external cache. For optimum performance, select BOTH .

Cache Mode

This option selects the type of level 2 cache installed in the system. The choices are WRITE-BACK or WRITE-THROUGH. When adding additional cache, make sure the jumpers are correctly set.

System BIOS

The System BIOS allows you to “shadow” the BIOS on the system board. Choosing SHADOWED & CACHED copies the system BIOS into RAM for faster execution and makes the memory region cacheable. This allows you to take advantage of the high-speed 32-bit bus and the 70 nanosecond RAM. Choosing SHADOWED copies the system BIOS into RAM, but does not cache any memory region. You can also select DISABLED.

Video BIOS

The Video BIOS allows you to “shadow” the BIOS on the video card. Choosing SHADOWED & CACHED copies the video BIOS into RAM for faster execution and makes the memory region cacheable. Choosing SHADOWED copies the video into RAM, but does not cache any memory region. If your video card cannot be shadowed, this selection must be set to DISABLED.

Memory Gap

When enabled, this category removes the memory between 15 and 16 megabytes from the system. This one megabyte hole will allow some ISA network cards to map into this memory space. Banyon ICA network cards require this feature. Enable this feature only if needed.

PCI IRQ

If you are using a PCI device that requires an IRQ, it is important that you set this category to match the IRQ of the adapter. It can be set for IRQ5, IRQ11, or IRQ15. If you are not using any PCI adapters which require an IRQ, set this to NONE.

Note:

When setting IRQs, make sure no peripherals share the same IRQ.

Exit Screen

Press the <Esc> key to reach the Exit Pop-Up screen (Figure 4-4). Now select <F4> to save and initialize the new Setup.

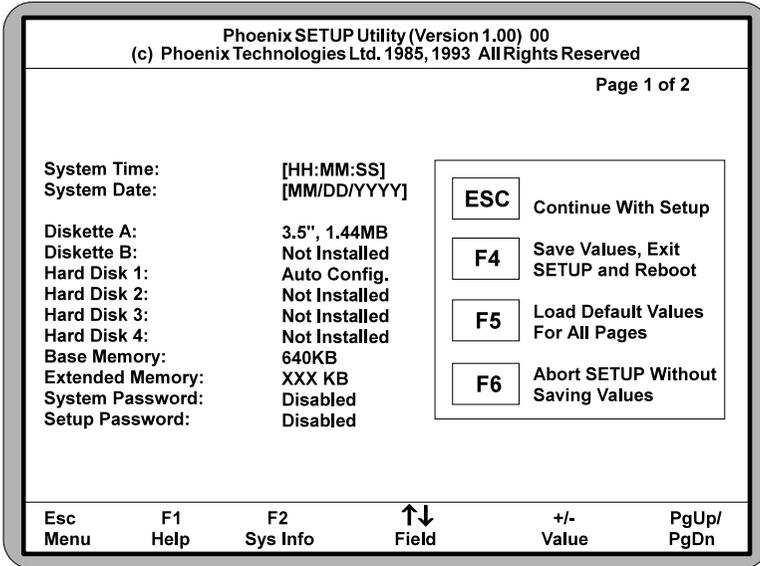


Figure 4-4 Exit Pop-Up Screen

5 EISA Utility

The M4Pe implements the Micro Computer System EISA Configuration Utility. The EISA Configuration Utility is a software utility designed to configure EISA peripherals. The utility is shipped on floppy diskette with each M4Pe.

Additional configuration is achieved through a series of initialization commands stored in non-volatile memory. The EISA Utility determines the configuration, creates the initialization commands, and makes sure the configuration is correct. The EISA Utility automatically generates conflict-free configuration information for EISA systems. It also provides the correct settings for the DIP switches and jumpers.

File Extensions

For each option in an EISA system, corresponding CFG files describe the characteristics and system resources for that board. The EISA Utility uses the information from the CFG to create a conflict-free configuration.

Despite the CFG's flexibility, there may be times when the EISA Utility cannot support all of the possible configuration options. Therefore, extension codes known as OVL (Overlay) files may be integrated into the EISA Utility.

The EISA Utility also creates the configuration information files which later may be used on other computer systems. These files, labeled with a "SCI" extension, are maintained by the EISA Utility as a backup for the computer's EISA non-volatile memory.

When the EISA Utility is executed, it determines if the non-volatile memory information is valid. If the non-volatile memory information is not valid, the configuration is restored by loading the SCI file from the configuration disk (or by manually selecting the CFG files) and reloading the information into non-volatile memory.

Starting the Utility

Perform the following steps to start the EISA utility:

1. Insert the System Configuration diskette into Drive A (or B).
2. At the A: prompt, type “cf” and press <Enter>. The Configuration Introduction screen will appear (Figure 5-1).

Note:

It is recommended you copy the files from the System Configuration diskette to a directory on your hard drive (eg. CFG).

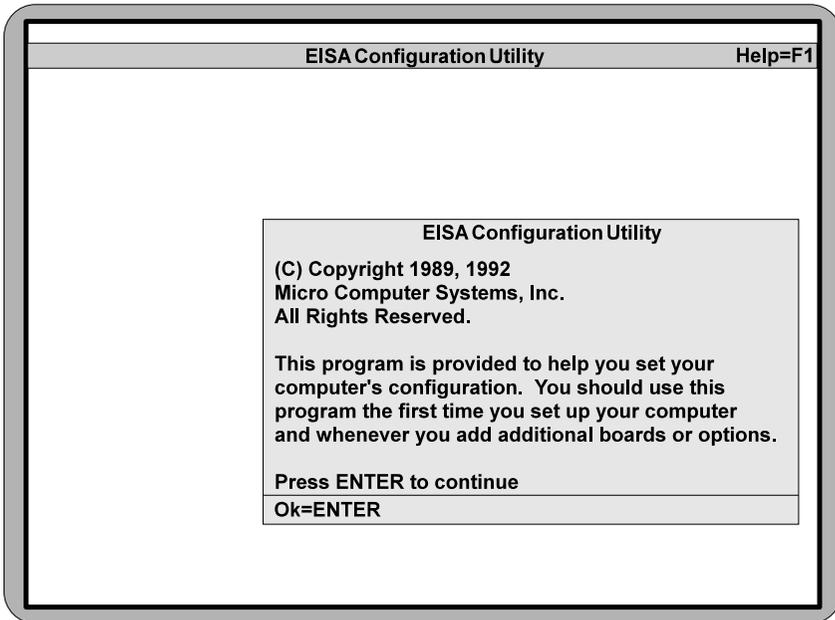


Figure 5-1 EISA Configuration Introduction Screen

Main Menu

After pressing <Enter>, the main menu appears. The EISA System Configuration menu appears (Figure 5-2) and lists 5 steps for configuring the system board. To select a step, highlight the appropriate selection, and press <Enter>.

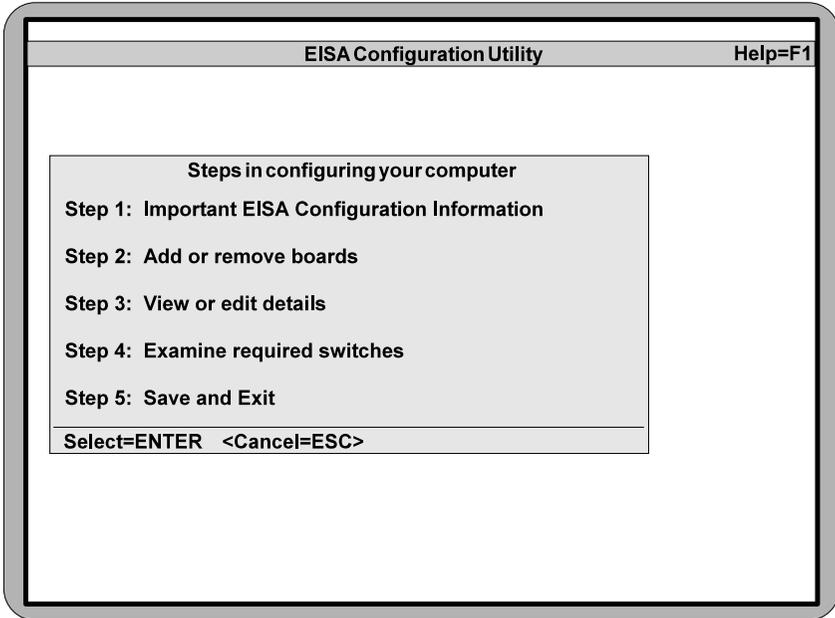


Figure 5-2 EISA Configuration Main Menu

Step 1: Important EISA Configuration Information

This step (Figure 5-3) provides seven pages of useful information on the configuration utility. Read this prior to using the utility.

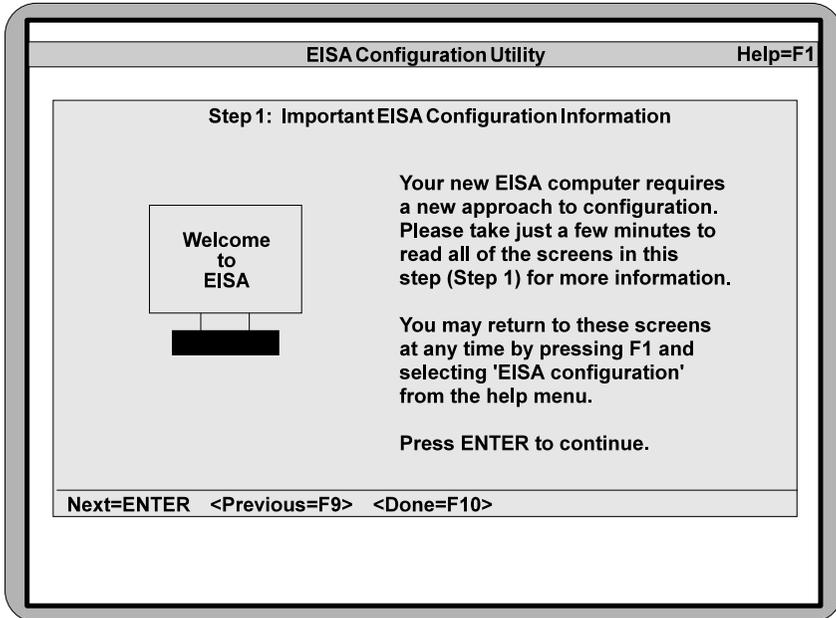


Figure 5-3 Step 1: Important EISA Configuration Information

Step 2: Add or Remove Boards

When this section is accessed, the utility scans and locates the EISA boards installed. The current configuration is listed. Figure 5-4 shows the Add or Remove Boards screen.

This section allows you to configure the system to the new EISA board(s) installed on or removed from the system. Follow the instructions on the screen.

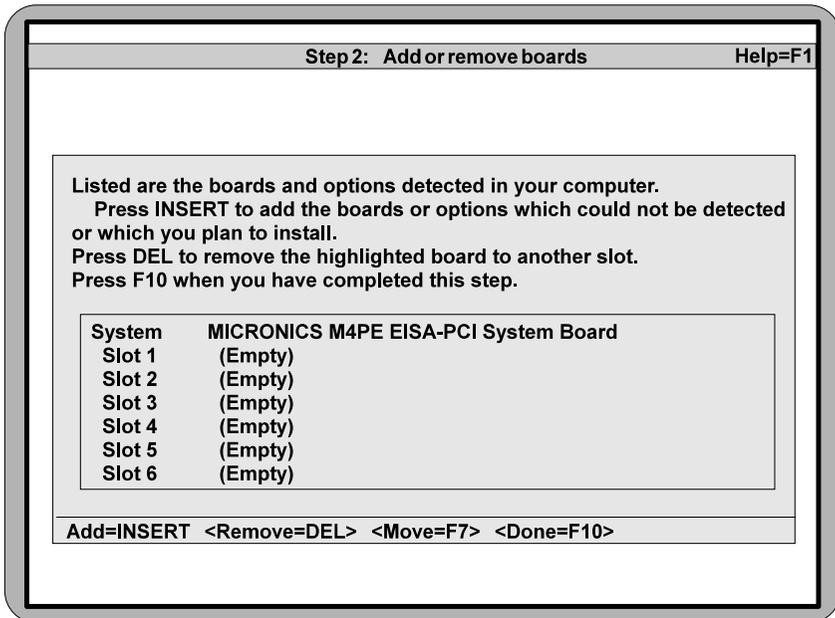


Figure 5-4 Add or Remove Boards Screen

Step 3: View or Edit Details

When this screen is accessed, the utility defaults to the last selected setting for the system. You may add or remove more memory with the Total System Board Memory section. Figure 5-5 shows the View or Edit Details screen.

The system board base memory can be accessed, but can not be changed. The base memory is always 640KB.

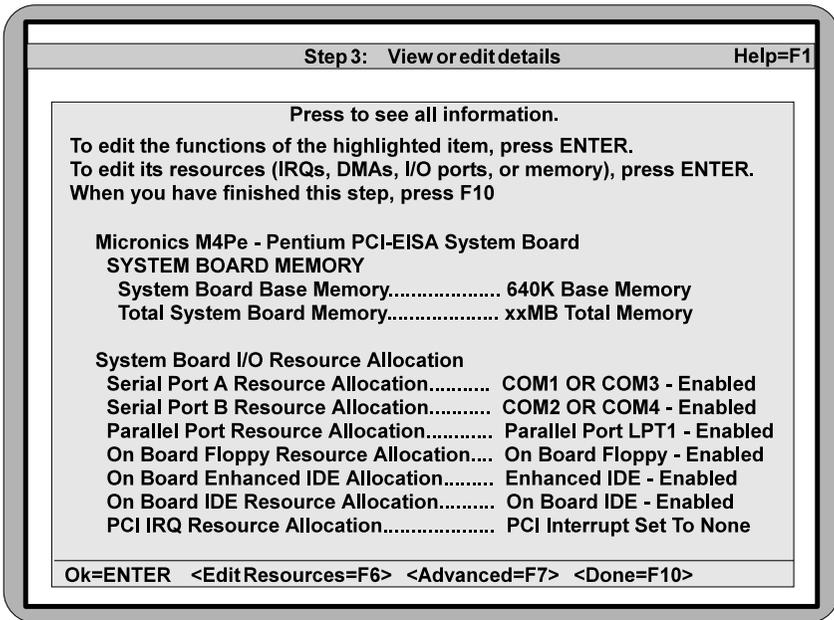


Figure 5-5 View or Edit Details Menu

Total System Board Memory

To change the total system board memory, highlight the selection and press <Enter>. The Total System Board Memory screen appears (Figure 5-6).

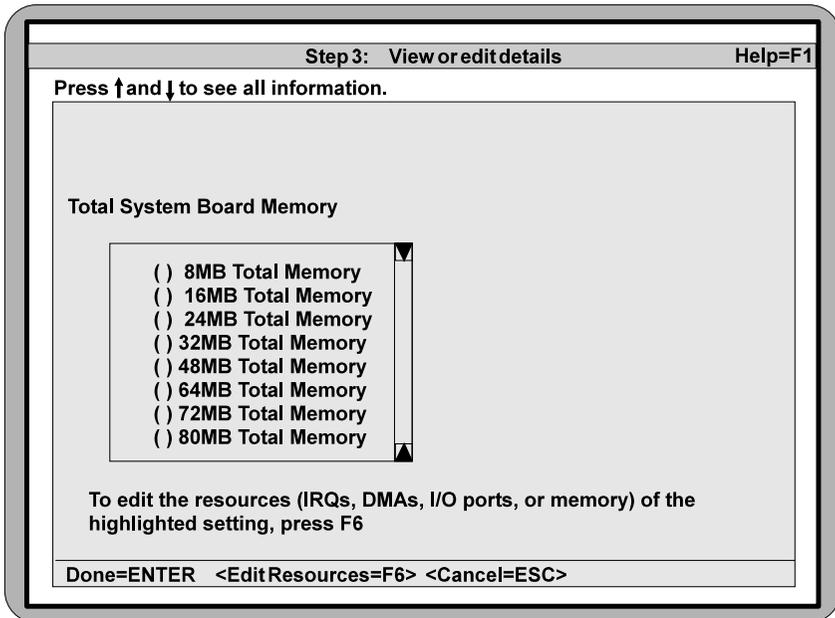


Figure 5-6 Total System Board Memory

To change the memory selection, use the mouse (or directional arrow keys) to scroll down to the correct memory size, highlight it, and press <Enter>. You may add up to 128MB of total Memory.

Step 4: Examine Required Switches

Step 4 does not have a function at this time.

Step 5: Save And Exit

Save the new configuration as you exit the utility. When you select Step 5, the Save and Exit screen (Figure 5-7) appears.

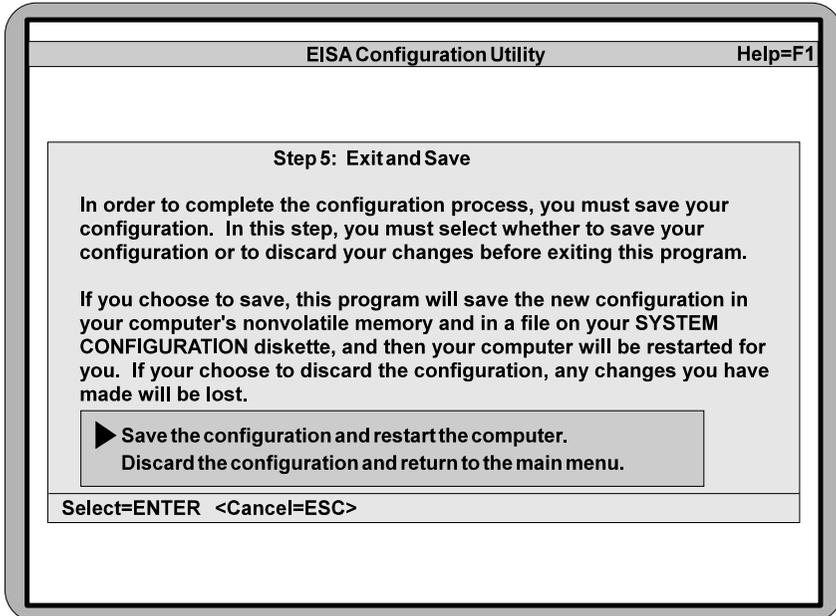


Figure 5-7 Save and Exit Screen

When you save and exit, the Reboot screen (Figure 5-8) appears. Follow the instructions on the screen to restart your system.

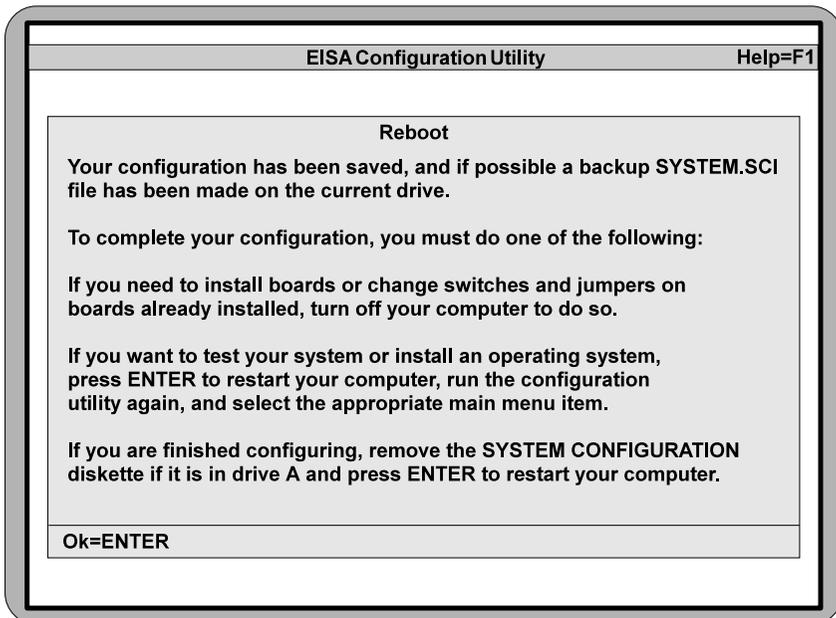


Figure 5-8 Reboot Screen

A POST Messages

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

Message	Possible Cause	Solution
NO DISKETTE CONTROLLER	Disk controller not found.	Change the Configuration.
DISKETTE DRIVE RESET FAILED	Disk adapter has failed or is improperly configured.	Check the disk adapter.
DISKETTE DRIVE A FAILURE	Drive A failed or is missing.	Check the A drive.
DISKETTE DRIVE B FAILURE	Drive B failed or is missing.	Check the B drive.
DISKETTE READ FAILURE; STRIKE F1 TO RETRY BOOT	Disk is not formatted or is defective.	Replace the diskette with a formatted diskette and retry.
DISPLAY ADAPTER FAILED USING ALTERNATE	The color/monochrome switch is not set correctly, or the primary video adapter failed.	Change the switch to the correct setting, or check the primary video adapter.
ERRORS FOUND; DISK X FAILED INITIALIZATION	Hard disk configuration information is incorrect.	Rerun SETUP and enter the correct hard disk information.
ERRORS FOUND; INCORRECT CONFIGURATION INFORMATION; MEMORY SIZE MISCOMPARE	The size of the base or the expansion memory, does not agree with configuration information.	Enter correct memory size and rerun SETUP procedure.

Message	Possible Cause	Solution
FIXED DISK CONFIGURATION FAILURE	The specified configuration is not supported.	Correct the hard disk configuration.
FIXED DISK CONTROLLER FAILURE	The controller card has failed.	Replace controller card.
FIXED DISK X FAILURE (where X =0 or 1)	The hard disk crashed.	Press F1 to reboot or rerun Setup. If this does not work, replace hard disk.
HARD READ FAILURE- STRIKE F1 TO RETRY BOOT	The hard disk failed.	Press F1 to reboot or rerun Setup. If this does not work, replace hard disk.
FDD CONTROLLER FAILURE	Diskette controller failed.	Replace controller card.
FDD A IS NOT INSTALLED	Cannot find diskette controller for drive A.	Install or replace controller card.
FDD B IS NOT INSTALLED	Cannot find diskette controller for drive B.	Install or replace controller card.
KEYBOARD CLOCK LINE FAILURE or KEYBOARD DATA LINE FAILURE	Keyboard logic failed.	Make sure the keyboard cable is connected correctly.
KEYBOARD STUCK KEY FAILURE	A key is jammed or was held down during boot.	Make sure the keys are not jammed or dirty.
REAL TIME CLOCK FAILURE	The real-time clock logic failed.	Check battery and replace, if necessary
TIME-OF-DAY NOT SET- RUN SETUP PROGRAM	The real-time clock time-of-day is not running.	Run SETUP utility.
BIOS XXXX ROM BAD CHECKSUM (where XXXX=C8000 to E0000)	The optional ROM checksum is bad.	Replace add-on card.

Message	Possible Cause	Solution
DISKETTE READ FAILURE, or NOT A BOOT DISKETTE, or NO BOOT DEVICE AVAILABLE	Hard/floppy disk failed or is not bootable.	Replace the diskette with a bootable diskette and retry.
DECREASING AVAILABLE MEMORY, or MEMORY FAILURE AT AAAAAAAA READ XXXX EXPECTING YYYY (where AAAAAAAA = failing address, XXXX=data read, and YYYY=data written)	The memory data integrity failed.	Check contact points between memory modules and system board. Replace memory modules if necessary.
INVALID EISA CONFIGURATION STORAGE- PLEASE RUN THE CONFIGURATION UTILITY	The EISA configuration storage checksum is bad.	Run EISA configuration utility.
CONFIGURATION ERROR FOR SLOT NN- PLEASE RUN THE CONFIGURATION UTILITY	The EISA configuration mismatched EISA NVRAM.	Run EISA configuration utility and the EISA configuration file provided by the add-on card dealer.
INVALID ISA CONFIGURATION	The ISA configuration is mismatched.	Run setup utility.
MEMORY HAS BEEN ADDED OR REMOVED	The memory amount has changed.	Run setup utility.

B Beep Codes

Beep codes are a series of beeps sent through the speaker which indicate a problem during POST. If text appears on the video screen, the M4Pe 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 three sets 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. With no video card installed, or if the video card 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 probable causes.

Beep code	Contents Port 80h	Description
None	01h	CPU register test in progress.
1-1-3	02h	CMOS read/write failure.
1-1-4	03h	ROM BIOS check failure.
1-2-1	04h	Programmable interval timer failure.
1-2-2	05h	DMA initialization failure.
1-2-3	06h	DMA page register write/read failure.
1-3-1	08h	RAM refresh verification failure.
None	09h	First 64K RAM test in progress.
1-3-3	0Ah	First 64K RAM chip or data line failure (multi-bit).
1-3-4	0Bh	First 64K RAM odd/even logic failure.
1-4-1	0Ch	Address line failure first 64K RAM.
1-4-2	0Dh	Parity failure first 64K RAM.
2-1-1	10h	Bit 0 first 64K RAM failure.
2-1-2	11h	Bit 1 first 64K RAM failure.
2-1-3	12h	Bit 2 first 64K RAM failure.
2-1-4	13h	Bit 3 first 64K RAM failure.
2-2-1	14h	Bit 4 first 64K RAM failure.
2-2-2	15h	Bit 5 first 64K RAM failure.
2-2-3	16h	Bit 6 first 64K RAM failure.
2-2-4	17h	Bit 7 first 64K RAM failure.
2-3-1	18h	Bit 8 first 64K RAM failure.
2-3-2	19h	Bit 9 first 64K RAM failure.
2-3-3	1Ah	Bit 10 first 64K RAM failure.
2-2-4	1Bh	Bit 11 first 64K RAM failure.
2-3-1	1Ch	Bit 12 first 64K RAM failure.
2-4-2	1Dh	Bit 13 first 64K RAM failure.

Beep code	Contents Port 80h	Description
2-4-3	1Eh	Bit 14 first 64K RAM failure.
2-4-4	1Fh	Bit 15 first 64K RAM failure.
3-1-1	20h	Slave DMA register failure.
3-1-2	21h	Master DMA register failure.
3-1-3	22h	Master interrupt mask register failure.
3-1-4	23h	Slave interrupt mask register failure.
None	25h	Interrupt vector loading in progress.
3-2-4	27h	Keyboard controller test failure.
None	28h	CMOS power failure and checks calculation in progress.
None	29h	CMOS configuration validation in progress.
3-3-4	2Bh	Screen initialization failure.
3-4-1	2Ch	Screen retrace test failure.
3-4-2	2Dh	Search for video ROM in progress.
None	2Eh	Screen running with video ROM.
None	30h	Screen operable.
None	30h	Screen running with video ROM.
None	31h	Monochrome monitor operable.
None	32h	Color monitor (40 column) operable.
None	33h	Color monitor (80 column) operable.

C Hard Disk Drive Types

The following table lists the hard disk types supported by M4Pe.

Type	Cyl	Hd	Pre	Lz	Sec	Size
1	306	4	128	305	17	10
2	980	5	-1	-1	17	40
3	980	10	-1	-1	17	81
4	872	8	-1	-1	35	119
5	1010	6	-1	-1	55	162
6	987	12	-1	-1	35	202
7	989	12	-1	-1	35	202
8	1010	9	-1	-1	55	244
9	1010	12	-1	-1	55	325
10	989	15	-1	-1	56	405
11	903	4	0	0	46	81
12	903	8	0	0	46	162
13	659	16	0	0	46	236
14	702	16	0	0	63	345
15	N/A	N/A	N/A	N/A	N/A	N/A
16	987	16	0	0	63	485
17	1023	16	0	0	63	503
18	895	5	0	0	55	120
19	904	8	0	0	46	162
20	683	16	0	0	58	309
21	895	10	0	0	55	240

Type	Cyl	Hd	Pre	Lz	Sec	Size
22	904	16	0	0	46	324
23	1023	16	0	0	63	503
24	1024	12	0	0	17	102
25	1001	15	0	0	17	124
26	978	14	0	0	35	233
27	1018	14	0	0	62	431
28	1024	12	0	0	34	204
29	768	14	0	0	62	325
30	1024	16	0	0	63	504
31	1001	15	0	0	34	249
32	936	16	0	0	17	124
33	883	16	0	0	38	262
34	967	16	0	0	63	475
35	790	16	0	0	57	351
36	615	4	-1	615	17	20
37	1024	4	-1	1023	17	34
38	1024	5	-1	1023	17	42
39	989	5	0	989	17	41
40	1024	8	1024	1024	17	68
41	820	6	-1	820	17	40
42	823	10	256	824	17	68
43	615	8	128	664	17	40
44	User 1					
45	User 2					
46	User 3					
47	User 4					
48	Auto-Config					
49	Not Installed					

D Specifications

Processor Options	80486 SX 25 & 33MHz 80486 DX 25 & 33MHz 80486 DX2 50 & 66MHz 486 DX4 75 & 100MHz
Chip Set	Intel 82420 PCI set (CDC, DPU, PCEB, and ESC chips) CMD 0640 PCI IDE controller SMC 37C665 Super I/O Controller
Expansion	Two 32-bit 120-pin PCI One shared PCI/EISA Five 32-bit EISA (all EISA bus masters)
RAM Capacity	Four 72-pin (x36 type) SIMM sockets, which accept up to 128MB of DRAM
Cache	8K of internal cache memory 128K of level 2 cache memory
Cache Upgrade	Option of up to 512K of level 2 cache memory (write-through or write-back)
IDE	Two resident 40-pin IDE connectors Auto detection of add-in IDE board
I/O Ports	Two 16550-compatible serial ports One bi-directional parallel port with ECP and EPP support
BIOS	Phoenix BIOS on 1MB Flash EPROM Auto detection of memory size Auto configuration of IDE hard disk drive types
Connectors	One floppy interface One keyboard interface
Burn-in	48 hours (minimum)

Environmental Specifications

The environment in which the M4Pe is located is critical. Micronics recommends the following environmental specifications.

Temperature Range

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

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

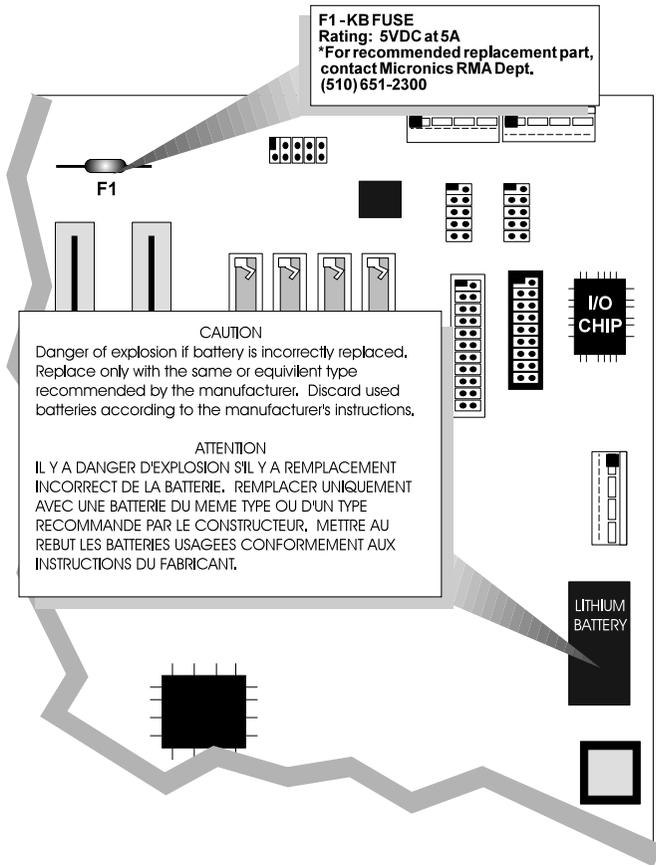
Shipping: -22 to 140 degrees Fahrenheit (-30 to 60 degrees Celsius).

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.

FCC Warning Statement

This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with the instructions, may cause harmful interference to radio communications. Interference to radio or television reception can be determined by turning the equipment off and on. The user is encouraged to try to correct the interference by one or more of the following measures:

- ④ Reorient the receiving antenna.
- ④ Increase the separation between the equipment and the receiver.
- ④ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ④ Consult your dealer or an experienced radio/TV technician for help.

To meet FCC requirements, shielded cables and power cords.

Note:

Changes or modifications not expressly approved by Micronics could void the user's authority to operate the equipment.

Glossary

BIOS:	for Basic Input Output System. Maintains and controls the entire functions of the computer.
Cache:	Fast memory used to enhance the efficiency and speed of the computer.
CPU:	Central Processing Unit. Essentially, the “brains” of the computer.
Disk Drive:	Either a hard disk or a floppy diskette.
DRAM:	Dynamic Random Access Memory.
EISA:	Extended Industry Standard Architecture.
ISA:	Industry Standard Architecture.
Jumpers:	A device on the system board used to configure certain information on the board.
POST:	Power On Self Test. The computer’s self-diagnostic test, which is executed whenever the system is booted.
Setup:	Steps used to configure the system board.
SIMM:	Single In-line Memory Module. SIMMs are banks of memory used to increase the performance of the computer.
SRAM:	Static Random Access Memory.

Limited Warranty

Except as described below, Micronics warrants the products to be free from defects in material and workmanship in normal use for a period of one (1) year after date of purchase. Should any product fail to perform according to this warranty at any time during the warranty period, except as provided below, Micronics or its authorized service centers will, at Micronics' option, repair or replace the product at no additional charge.

The warranty does not cover loss or damage which occurs in shipment or which is due to: (1) improper installation or maintenance, misuse, neglect or any cause other than ordinary commercial application, including without limitation, accidents or acts of God; (2) adjustment, repair or modification by other than a Micronics authorized service center; (3) improper environment, excessive or inadequate heating or air conditioning or electrical power failures, surges or other irregularities; (4) any statement about the product other than those set forth in this warranty; or (5) nonconformity to models or samples shown to the purchaser. Any models or samples were for the sole purpose of suggesting the character of the product and are not intended to form the basis of the bargain.

A receipt or copy of the invoice with the date of purchase from a Micronics reseller is required before any warranty service can be rendered. Service can be obtained by calling Micronics for a Return Merchandise Authorization (RMA) Number.

The RMA Number should be prominently displayed on the outside of the shipping carton of the returned product. Returned product should be shipped prepaid or hand carried to Micronics. The purchaser assumes risk of loss or damage in transit and, unless otherwise agreed to in writing by Micronics, will pay inbound shipping charges.

The exclusive remedy of the purchaser under this warranty above will be repair or replace at Micronics option, but if for any reason that remedy should fail of its essential purpose, the exclusive remedy of the purchaser shall then be actual damages up to amounts paid for the defective product by the purchaser. This limited warranty shall be deemed to "fail of its essential purpose" if, after repeated efforts, Micronics is unable to make the product operate as warranted. Micronics' liability for damages to the purchaser for any cause whatsoever, regardless of the form of action and whether in contract or in tort, shall be limited to the purchase price in effect when the cause of action arose for the product that is the basis of the claim.

Micronics will not be liable for any lost profits or any indirect, special incidental or consequential damages in connection with the product, even if Micronics has been advised of the possibility of such damages.

Micronics makes no warranties or representations as to performance of products or as to service to distributor or to any person, except as set forth in Micronics; limited warranty accompanying delivery of product.

Micronics disclaims all other warranties whether oral, written, expressed, or implied, including without limitation, the warranties of design, merchantability, or fitness for a particular purpose, if applicable, or arising from a course of dealing, usage or trade practice.

Non-Warranty Service

After the one year warranty service is no longer in effect, repair service is still available for Micronics products. For more information, contact Micronics' RMA department at (510) 683-0428 or (510) 683-0389. The RMA department is open between 8:30 A.M. and 5 P.M. Pacific Standard Time.