MICRONICS
COMPUTERS INC.

Mpower 4 plus
System Board Manual

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221 Warren Ave., Fremont, CA 94539-7085

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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 Mpower 4 plus from its packaging.

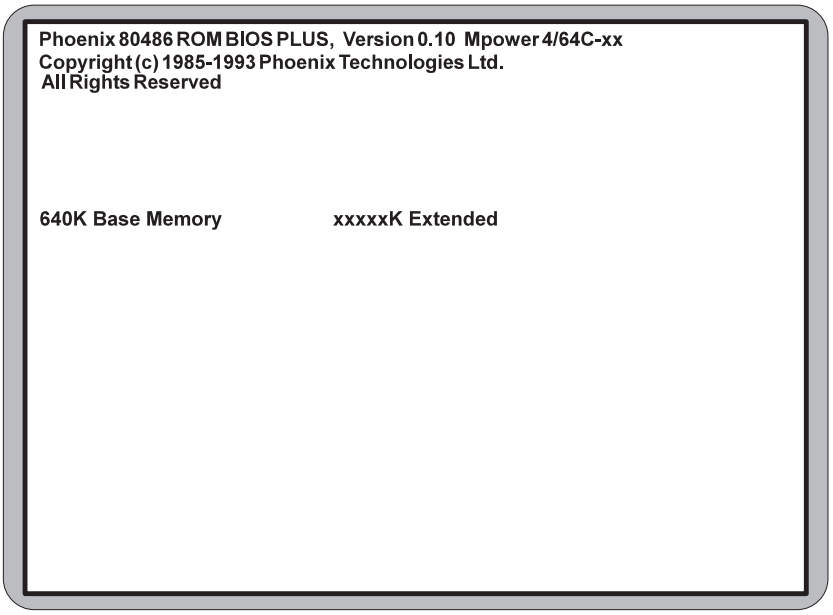
2. Configure and verify the system board's jumper settings. (See Jumper Settings in Chapter 2)

3. Install the CPU and the system memory. (See Chapter 3)

4. Install the system board into the system case and make all of the necessary case connections.

5. Install any peripherals (see Chapter 3). It is best not to put the computer cover on until you have verified the system is working properly.

6. Turn the computer on. The computer goes through a self-test and the following screen appears. If Setup detects any configuration errors, the message "Press <F1> to continue (boot up) or <F2> to run the Setup procedure" will appear. Press the <F2> key and make any necessary configurations.



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

7. 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. Select Auto Config and the BIOS will automatically configure the drive for you. (See Chapter 4)

8. After all configurations have been made, press <Esc> to exit. Then press <F4> to save the configuration and reboot. (See Chapter 4)

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1 Introduction

The Mpower 4 plus is an integrated, low-profile, LPX system board, featuring VESA Local bus architecture, a Mode 3 IDE controller, and 64-bit graphics. The Micronics Mpower 4 plus system board represents Micronics' third generation of VESA Local Bus system boards and makes an excellent foundation for an advanced personal computer or workstation.

Micronics is a forerunner in VESA Local Bus technology. The VESA Local Bus Architecture provides high performance for Graphical User Interfaces (GUIs) and peripherals that perform high speed data transfers, such as disks and multimedia.

The Mpower 4 plus is also a **"Green Board"** which means it adheres to the Environmental Protection Agency's strict Energy Star efficiency guidelines. **The Green features are not available when a DX4-100MHz is installed.** See Chapter 4 for information and instructions on how to set up the "Green Section" of the BIOS.

Features

The Mpower 4 plus includes the following features:

- LPX form factor system board (13.25" X 8.5")
- Micronics' X30 chipset with an on-chip external level 2 cache controller.
- Zero Insertion Force (ZIF) socket.
- One ISA/VL-Bus slot built onto the system board.
- 100 percent VESA VL-Bus compliant.
- On-board local bus video adapter, using the ATI 88800 GX *mach64* LX video controller with an 8-bit RAMDAC.
- Local bus IDE controller with Mode 3 local bus IDE support.
- 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 that is EPP and ECP compatible.
- Battery-backed real-time clock.
- Supports the following processors in the CPU ZIF socket:

    - 486SX, 25 or 33MHz
    - 486SX2, 50MHz
    - 486DX, 33MHz
    - 486DX2, 50 or 66MHz
    - 486DX4, 75 or 100MHz

2 Setting Up the Mpower 4 plus

Although the Mpower 4 plus system board is packaged in protective materials, it is important to use care while unpacking and setting it up.

Static Electricity

The Mpower 4 plus 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 (any silver part of the case should suffice). After you have grounded yourself, ground the Mpower 4 plus via the solder pads surrounding one of its mounting holes.

Once the Mpower 4 plus 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.

Mpower 4 plus Components

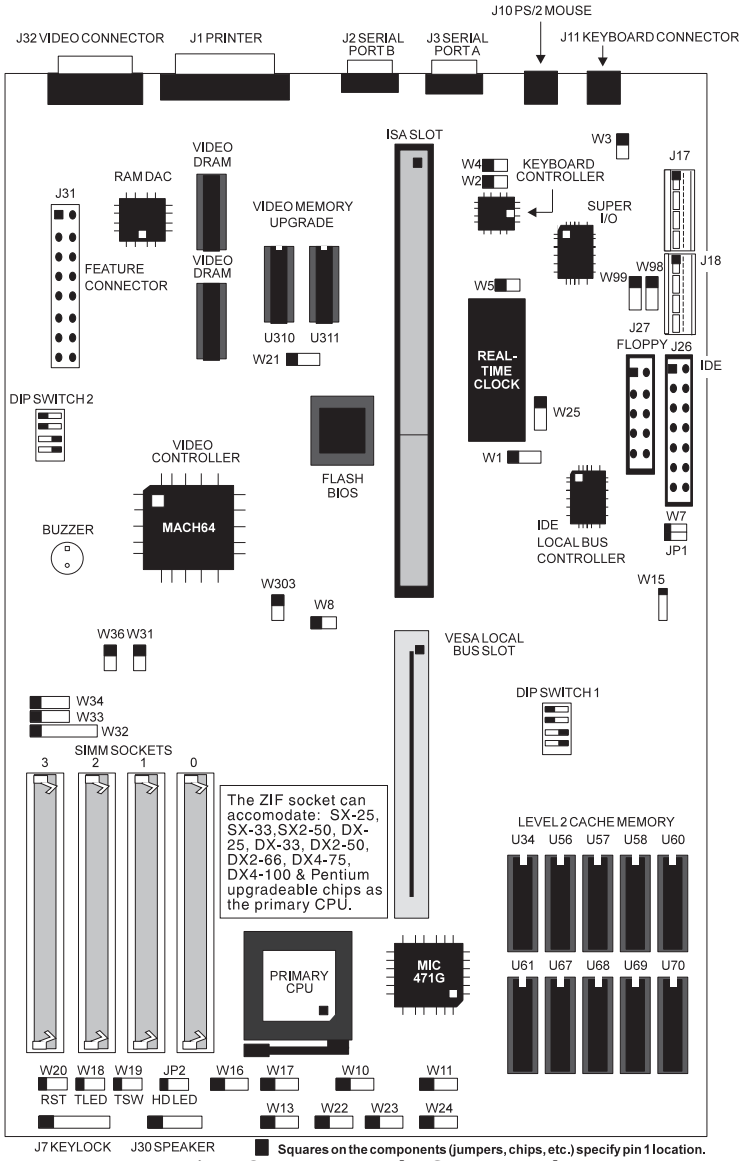


Figure 2-1 Mpower 4 plus System Board

Note:
For information on battery disposal or fuse replacement, see Appendix D.

Jumper Settings

Table 2-1 lists jumper settings for the real-time clock.

Jumper	Function	Setting
W1	DALLAS Real-Time Clock	Installed
W5	Discharge DALLAS Real-Time Clock Normal operation	Installed Not Installed

Table 2-1 Real-Time Clock Settings

Table 2-2 lists jumper settings for the type of video monitor display used with the system board.

Jumper	Function	Setting
W2	Color (Default) Monochrome	Installed Not Installed

Table 2-2 Video Monitor Display Selection

Table 2-3 lists the jumper settings for the mouse configuration.

Jumper	Function	Setting
W3	IRQ12 for PS/2 Mouse (Default) No PS/2 Mouse Supported	Installed Not Installed

Table 2-3 Mouse Configuration Selection

Table 2-4 lists the jumper settings for the parity configuration.

Jumper	Function	Setting
W4	Parity Enabled (Default) Parity Disabled	Installed Not Installed

Table 2-4 Parity Configuration Selection

Table 2-5 lists the jumper settings for the Super I/O.

Jumper	Function	Setting
W7	Enable Super I/O Disable Super I/O	Not Installed Installed
JP1	Enable CMD IDE (Default) Disable CMD IDE	Not Installed Installted

Table 2-5 Super I/O Selection

Note:
The floppy connector, serial ports, and parallel port are disabled when the Super I/O is disabled.

Table 2-6 lists the jumper settings for BIOS operation.

Jumper	Function	Setting
W8	Normal (Default) Recovery	Not Installed Installed
W21	BIOS Write Protect (Default) BIOS Write Enable (Flash)	 Open 1-2

Table 2-6 BIOS Operation Selection

NOTE:
Jumper W21 must be reconfigured to update (Flash) the BIOS. If problems occur during the flash procedure, reset W8 to the BIOS Recovery Mode. A special diskette is needed for the recovery mode. Contact your computer dealer for the Flash Utility diskette or call Micronics' BBS number at (510) 651-6837 to download the utility.

Table 2-7 lists jumper settings for external (L2) cache selection.

Jumper	64K	128K	256K
W10 (Tag)	1-2	1-2	2-3
W11 (Tag)	1-2	2-3	2-3
W22 (Data)	2-3	1-2	2-3
W23 (Data)	2-3	1-2	2-3
W24 (Data)	1-2	2-3	2-3

Table 2-7 External Cache Selection

Table 2-8 lists the jumper settings for the type of CPU used on the system board.

Jumper	Function	Setting
W13	PQFP Not Installed (Default) PQFP Disabled by *OverDrive*™ CPU PQFP Manually Disabled	Not Installed 1-2 2-3
W32	DX4 CPU All other CPUs	1-2 Not Installed
W33	486 SX, PGA 486 SX2, PGA All other CPUs, including the DX4	2-3 3-4 1-2 & 3-4
W34	DX4 CPU All other CPUs	3-4 Not Installed

Table 2-8 CPU Selection

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

Jumper	Function	Setting
W15	Reserved	1-2
W31	Reserved	Not Installed

Table 2-9 Reserved Jumpers

Table 2-10 lists jumper settings for external (L2) cache size configuration.

Jumper	64K	128K	256K
W16	1-2	1-2	2-3
W17	1-2	2-3	2-3

Table 2-10 External Cache Size Selection

Table 2-11 lists the jumper settings for the parallel port selection.

Jumper	Function	Setting
W25	IRQ7 for Parallel Port (Default) IRQ5 for Parallel Port	2-3 1-2
W98	DMA Channel 1 (Default) DMA Channel 3	1-2 2-3
W99	DMA Channel 1 (Default) DMA Channel 3	1-2 2-3

Table 2-11 Parallel Port Selection

Table 2-12 lists the jumper settings for the video selection.

Jumper	Function	Setting
W303	Disable VGA IRQ9 (Default) Enable VGA IRQ9	Not Installed Installed

Table 2-12 Video Selection

Table 2-13 lists the jumper settings for case and peripheral connections.

Jumper	Function	Notes
W18	Turbo LED	
W19	Turbo Switch	
W20	Reset Switch	1-Signal; 2-Ground
J1	Parallel Port Connector	
J2	Serial Port B	Can be Disabled at the CMOS configuration screen.
J3	Serial Port A	Can be Disabled at the CMOS configuration screen.
J7	Power LED/Keylock	1-Power LED; 2-N/C; 3-Ground; 4-Keybd Lock; & 5-Ground
J10	PS/2 Mouse Connector	
J11	Keyboard Connector	
J17 & 18	Power Supply Connector	
J26	IDE Connector	
J27	Floppy Connector	
J30	Speaker Connector	
J31	Video Feature Connector	
J32	Video Port Connector	
JP2	Hard Drive LED	

Table 2-13 Case and Peripheral Connections

Table 2-14 lists the jumper settings for DIP Switch 1.

Switch	Function	Setting
SW 1-1	SX25MHz/DX25MHz/DX2-50MHz/DX4-75MHz SX33MHz/DX33MHz/DX2-66MHz/DX4-100MHz	OFF ON
SW 1-2	Reserved	ON
SW 1-3	0 Wait Write Min 1 Wait Write Min	OFF ON
SW 1-4	CPU Speed less than or equal to 33 MHz CPU Speed greater than 33 MHz	OFF ON

Table 2-14 DIP Switch 1 Settings

Table 2-15 lists the settings for DIP Switch 2.

Switch	Function	Setting
SW 2-1*	Disable ATI Chip Enable ATI Chip	ON OFF
SW 2-2*	RAMDAC at Snooping Mode RAMDAC at Regular Mode	ON OFF
SW 2-3*	Disable On-board VGA BIOS Enable On-board VGA BIOS	ON OFF
SW 2-4**	Select On-board Buzzer Select External Speaker	ON OFF

Table 2-15 DIP Switch 2 Settings

3 Installing the Mpower 4 plus, System Memory, CPUs, and Peripherals

This section explains how to install the Mpower 4 plus system board, SIMMs, CPUs, and peripherals.

Warning:
Before installing or removing any peripherals or components, make sure you have a clear work space and you adhere to all anti-static precautions described on 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 Micronic's Technical Support Department.

Installation of the Mpower 4 plus

The installation of the Mpower 4 plus system board depends on the type of case you are using. The Mpower 4 plus is an integrated, low profile LPX system board and should be limited to installation in a low profile chassis.

Prior to installing the Mpower 4 plus, 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 Mpower 4 plus:

- 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 Mpower 4 plus for a typical configuration:

- LPX or Low Profile Chassis.
- 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.
- VGA monitor with a 15-pin connector.
- PS/2 or compatible keyboard.
- Eight ohm speaker.
- Standard ribbon cables for internal connections.
- Standard power cord (grounded).
- Heat-sink with cooling fan for each CPU (if needed).

System Memory

System memory devices, commonly known as SIMMs (Single Inline Memory Modules), are necessary to operate the Mpower 4 plus system board. The Mpower 4 plus has four banks of DRAM, which provide a maximum of 64MB using 1Mx32, 1Mx36, 4Mx32, or 4Mx36 SIMMs.

Memory Configuration

Table 3-1 lists the possible memory size configurations. The BIOS automatically detects the amount of memory installed.

Bank 0	Bank 1	Bank 2	Bank 3	Total
1MB				1MB
1MB	1MB			2MB
4MB				4MB
1MB	1MB	4MB		6MB
4MB	4MB			8MB
1MB	1MB	4MB	4MB	10MB
4MB	4MB	4MB		12MB
4MB	4MB	4MB	4MB	16MB
16MB				16MB
1MB	1MB	16MB		18MB
4MB	16MB			20MB
4MB	4MB	16MB		24MB
16MB	16MB			32MB
4MB	16MB	16MB		36MB
4MB	4MB	16MB	16MB	40MB
16MB	16MB	16MB		48MB
16MB	16MB	16MB	16MB	64MB

Table 3-1 Memory Configuration

Installing the SIMMs

With the SIMMs installed, memory can be increased up to 64MB. To install the SIMMs, first locate the four memory banks on the system board. Start with the bank marked “0”, then work your way up (0, 1, 2, 3).

Perform the following steps to install the SIMMs:

1. Hold the SIMM so that the NOTCHED edge is pointing toward the ISA slots (refer to Figure 2-1).

2. Insert the SIMM at a 45 degree angle.

3. Gently push the SIMM to an upright position until it “snaps” into place (past the release tabs).

The SIMM is ready to operate when it is firmly seated in the socket.

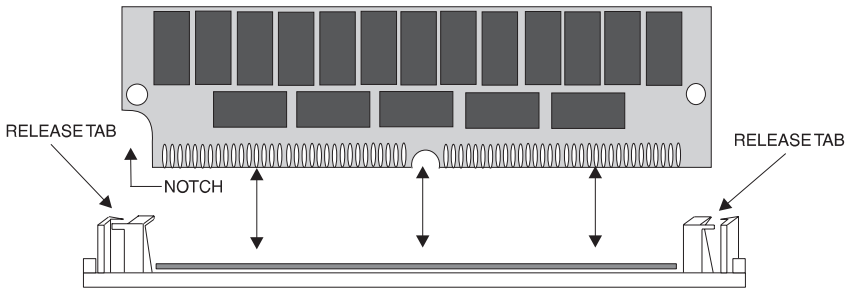


Figure 3-1 Installing a SIMM

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 up and place in an anti-static bag or package.

Installing the Upgrade *OverDrive* CPU

The Mpower 4 plus is specifically designed to support the Intel Clock Doubling 486DX2 CPU or the *OverDrive* processor. Perform the following steps to install an upgrade processor:

1. Locate the ZIF socket on the board (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.

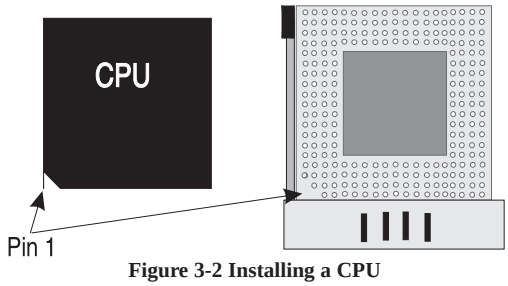


Figure 3-2 Installing a CPU

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 Cache Memory

The Mpower 4 plus supports 8K of four-way associative cache in the microprocessor. Level 2 cache is also available to provide 64K, 128K, or 256K of direct mapped cache.

64K of Level 2 Cache

For 64K bytes of level 2 cache, install eight 8Kx8-20ns SRAMs into sockets U56, through U58, U60, and U67 through 70. Install an 8Kx8-20ns SRAM into U34 for Tag RAM and an 8Kx8-20ns SRAM into socket U61 for write-back cache mode. Leave U61 empty for write-through mode. After installing the cache, refer to tables 2-7 and 2-10 for the correct jumper settings.

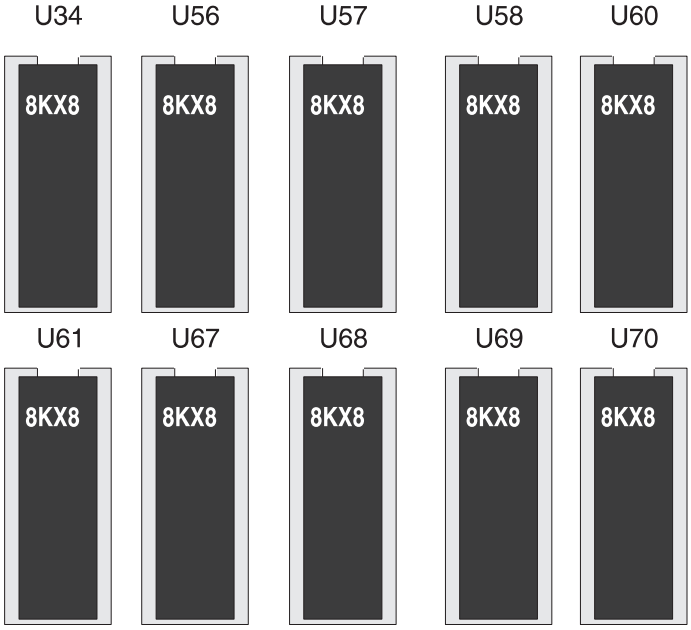


Figure 3-3 Installing 64K of Level 2 Cache

Note:
Make sure the notches on SRAMs match the notches on the sockets.

128K of Level 2 Cache

For 128K bytes of level 2 cache, install four 32Kx8-20ns SRAMs into sockets U56 through U58 and U60. Install a 32Kx8-20ns SRAM into U34 for Tag RAM and a 32Kx8-20ns SRAM into socket U61 for write-back mode. Leave U61 empty for write-through mode. After installing the cache, refer to tables 2-7 and 2-10 for the correct jumper settings.

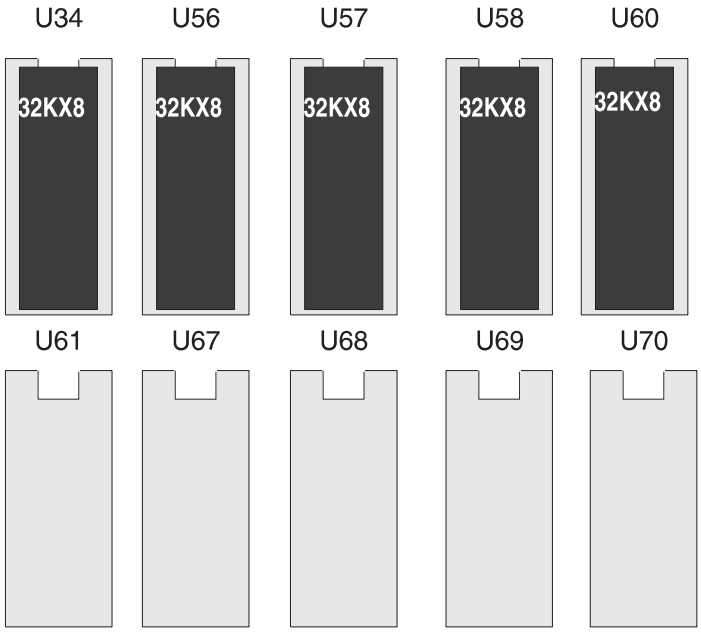


Figure 3-4 Installing 128K of Level 2 Cache

Note:
Make sure the notches on SRAMs match the notches on the sockets.

256K of Level 2 Cache

For 256K bytes of level 2 cache, install eight 32Kx8-20ns SRAMs into sockets U56 through U58, U60, and U67 through U70. Install a 32Kx8-20ns SRAM into U34 for Tag RAM and a 32Kx8-20ns SRAM into socket U61 for write-back mode. Leave U61 empty for write-through mode. After installing the level 2 cache, refer to tables 2-7 and 2-10 for the correct jumper settings.

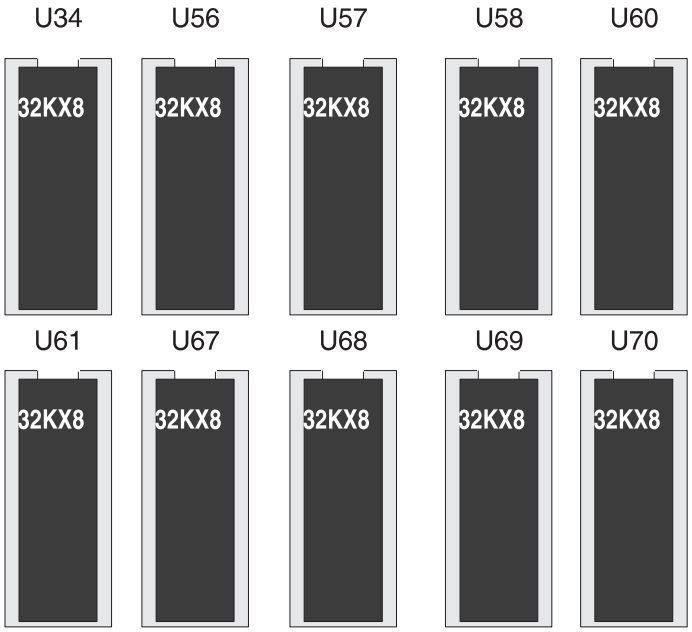


Figure 3-5 Installing 256K of Level 2 Cache

Note:
Make sure the notches on SRAMs match the notches on the sockets.

Installing Video Memory

The Mpower 4 plus has 1MB of video memory installed on-board. An additional 1MB of memory can be installed to provide faster video performance. For the additional 1MB of video memory, install two 256K x 16-60ns video memory chips into locations U310 and U311.

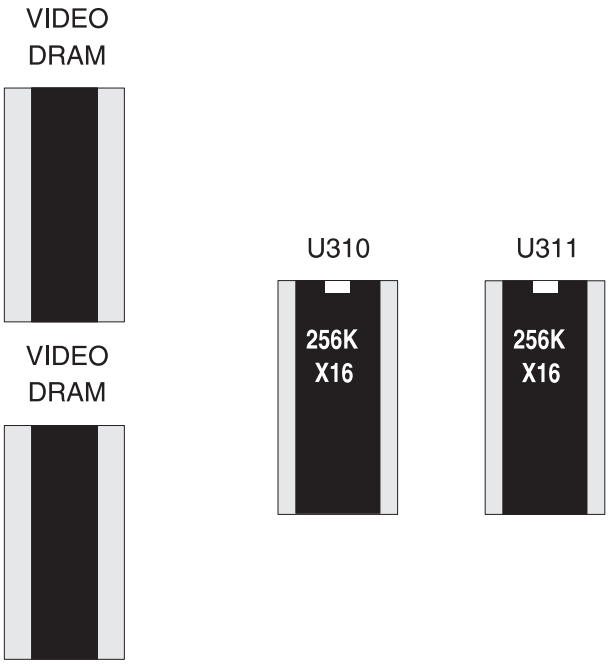


Figure 3-6 Installing Video Memory

Note:
Make sure the notches on the video memory match the notches on the sockets.

Installing a VL-Bus Riser Card

The Mpower 4 plus may include a riser card if the board is installed in a chassis. If the system board is not installed in a chassis, perform the following steps to install the riser card:

1. Locate the unused VL-Bus slot and ISA slot (refer to Figure 2-1).

2. Make sure no peripherals are installed on the riser card.

3. Insert the card with the bottom edge level. **Never insert the card at an angle.**

4. Holding the card at the center of the top edge, gently push straight in. Do not force the card. If it does not fit, take it out and try again.

5. Make sure the card is fully inserted.

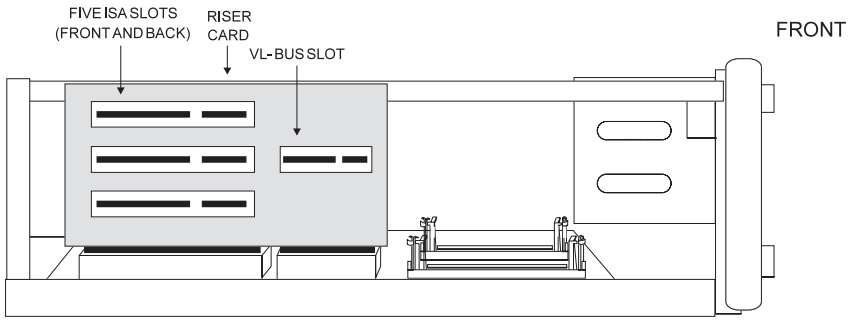


Figure 3-7 Inserting a VL-Bus Riser Card

Installing a VL-Bus Card

Micronics VL-Bus slot accommodates most VESA-approved Local Bus cards. The VL-Bus video card is installed onto the riser. Perform the following steps to install a VL-Bus Card

1. Power off the computer system and remove the computer cover.

2. Choose an unused VL-Bus slot on the riser card.

3. Insert the card with the bottom edge level. **Never insert the card at an angle.**

4. Holding the card at the center of the top edge, gently push the card straight down. Do not force the card in place. If it does not fit, take it out and try again.

5. Make sure the card is fully inserted.

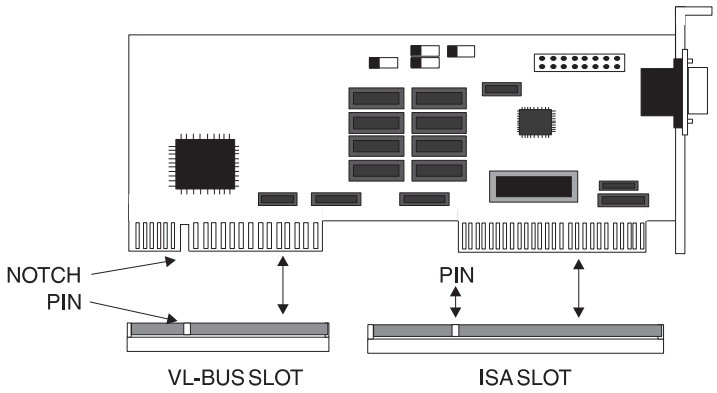


Figure 3-2 Inserting a VESA Local Bus Card

Note:
Always refer to the computer user guide for additional instructions concerning installation. Make sure the VESA Local Bus card is configured to accommodate the computer.

4 The BIOS Setup Utility

Configuration

After the Mpower 4 plus 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 Mpower 4 plus. 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 procedure is built into the system. Setup begins after the completed system is powered up. Once the system is powered up and goes through a memory test, the following screen appears on your monitor:

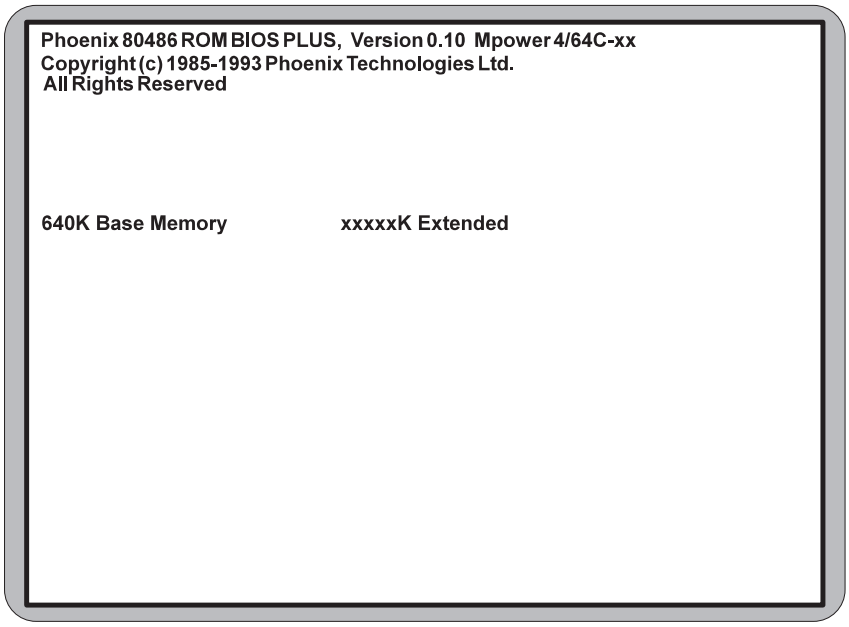


Figure 4-1 Power-Up Screen

If the systems detects a configuration error, it displays an error message. After the error message, another message displays indicating the choice to press <F1> to continue (boot up), or <F2> to run the Setup procedure. Normally, you will press <CTRL>, <ALT>, and <ESC> simultaneously to begin the Setup procedure.

Running the Setup Procedure

Upon pressing <F2>, 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 (i.e., A:\ or C:\), press the <Ctrl>, <Alt>, and <Esc> keys simultaneously to begin the Setup procedure.

The Mpower 4 plus 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.

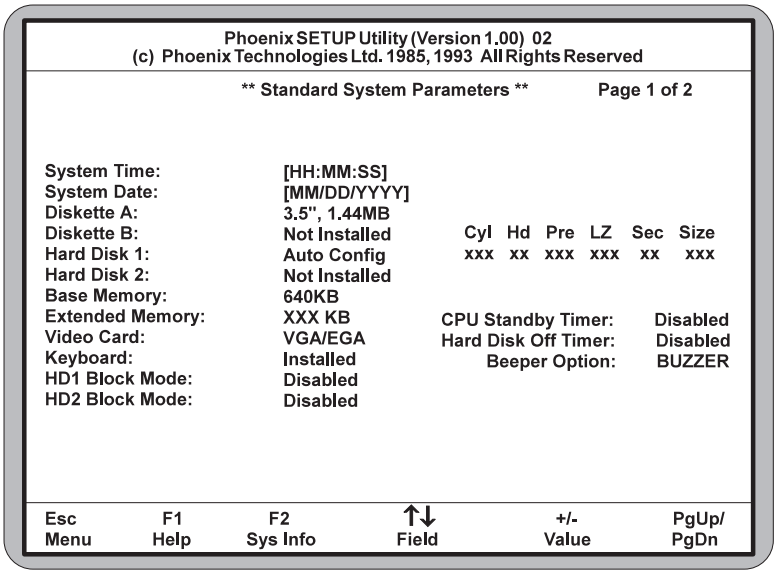


Figure 4-2 CMOS Main Screen

Now, configure the parameters to match your specific requirements. See the following pages for procedures on how to set the computer's parameters.

To return to the CMOS configuration screens at any time to change or view any of these parameters, press <Ctrl>, <Alt>, and <Esc> simultaneously.

Setting the CMOS Parameters

Before running the computer, certain parameters on the CMOS configuration screens must be set so the computer properly operates. First, set the parameters on the CMOS Main Screen, then press the PgUp/PgDn key and set the parameters on the CMOS Extended Screen.

Note:
Some of the parameters are already set and need not be changed. Only change the settings if necessary.

Setting the 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 or 2 (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 most SCSI hard drives, select NOT INSTALLED. To install ESDI or RLL hard drives, select TYPE 1. To manually configure the hard drive, select USER CONFIG. Press the down arrow <↓> key and type in the appropriate parameters. To automatically configure an IDE hard drive, select AUTO CONFIG. Drives that can be Auto-Configured report parameters to the BIOS.

Base Memory and Extended Memory

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

Video Card

This sets the type of monitor required for your computer. The display peripheral supports VGA/EGA, Monochrome (MONO), or no monitor at all. Use the <+/-> keys to toggle between the options.

Keyboard

The keyboard function is set to INSTALLED for keyboard error reporting. To turn off keyboard error reporting, use the left/right arrow keys to toggle the keyboard NOT INSTALLED.

HD1 and HD2 Block Modes (IDE Drives Only)

The Block Modes (HD1 and HD2) are designed to improve the data transfer performance in AT IDE drives. This reduces the number of data transfer interrupts and generates an interrupt on every block (block size of 8 sectors), instead of generating an interrupt on every sector transfer. Use the <+/-> keys to select ENABLED to activate this feature. This option may not work with older or slower IDE drives. Check with your drive manufacturer to see if your drive can perform this function.

Beeper Option

This option allows you to select the type of Beeper for the system. You can select the beeper to be DISABLED, as well.

The “Green Section” of the BIOS

The "Green Section" of the BIOS conserves energy by putting components parts of the computer into "sleep modes." When a component is in a sleep mode, it consumes less energy.

The computer puts components into sleep mode if a specified time elapses and no keystrokes have been performed on the keyboard. These selections will not recognize any mouse movement; only activity involving the keyboard. For each selection, use the <+/-> keys to toggle between the numbers. Use the directional arrow keys to move to the next selection.

CPU Standby Timer: This selection can be set to one minute or in increments of five minutes (up to 70 minutes). After the allotted time, the CPU will reduce its speed to 8MHz. **The CPU Standby Timer must be DISABLED if a DX4-100MHz is installed.** The Scroll Lock light will flash to indicate reduced speed. To return to full processing speed, press any key.

Hard Disk Off Timer: When set to ENABLED, the hard drive spins down after 15 minutes to conserve energy and remains spun down until accessed.

Note:
Only a certain number of hard drives support the “green” features of the BIOS. Consult Micronics’ Technical Support department for information on which peripherals support these features.

Setting the CMOS Extended Screen

Refer to Figure 4-3. CMOS Extended Screen. You can toggle between the Main and Extended screens using the PgUp and PgDn key.

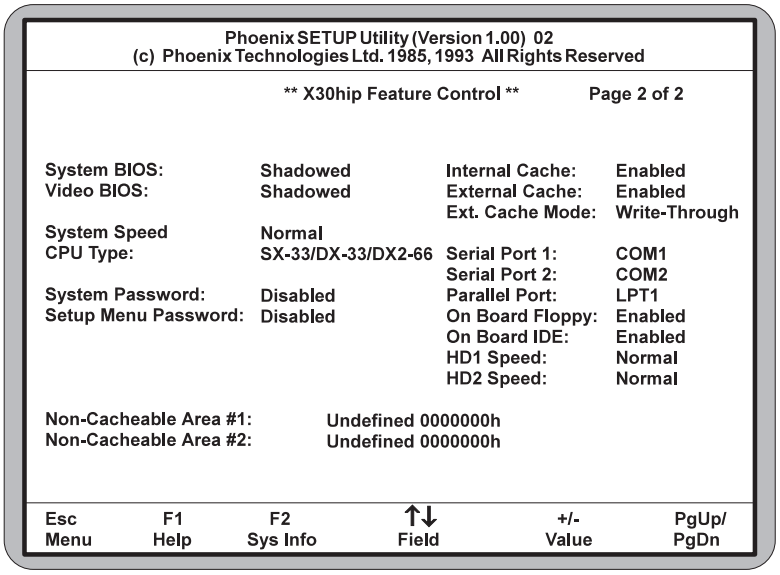


Figure 4-3 CMOS Extended Screen

System BIOS

The System BIOS Option allows you to Shadow, Shadow & Cache, or Disable the BIOS Shadow on the system board. Choosing SHADOWED copies the system BIOS into RAM for faster execution. Choosing SHADOWED & CACHED caches the shadowed system BIOS for even higher performance. This allows you to take advantage of the high-speed 32-bit bus and the 70 nanosecond RAM. Use the <+/-> key to toggle between the options.

Video BIOS

The Video BIOS Option allows you to Shadow, Shadow & Cache, or Disable the BIOS Shadow on the system board. Choosing SHADOWED copies the system's video BIOS into RAM for faster execution. Choosing SHADOWED & CACHED caches the shadowed video BIOS for even higher performance. Use the <+/-> key to toggle between the options. The System BIOS Shadow option must be set to SHADOW or SHADOW & CACHE before enabling the Video BIOS Shadow options.

System Speed

This parameter selects two speeds on the computer. When set to NORMAL, the system operates at full speed. For example, at 33MHz when the Turbo switch is on, the system has a Landmark 2.0 rating of 111.77 MHz. When set to SLOW, the system has a Landmark 2.0 rating of 55.5 MHz.

CPU Type

This option selects the CPU installed and has auto detection with corresponding jumper settings on board. You must choose the correct CPU selection with the corresponding CPU. This selection is for user-upgradeable CPUs.

System and Setup Menu Passwords

These parameters allow you to limit access to the system. The selections require a user-selected password be entered before allowing the system to boot or to allow entry into the setup screens.

The two passwords may or may not be the same. The passwords may be up to seven characters in length, include special characters, and are case sensitive. For example: PSWD$2, Pswd$2, psWD$2, and pswd$2 are all valid and are all different, even though they have the exact same characters.

After a password is entered and the system is rebooted, you are given three opportunities to enter the correct password. If an incorrect password is entered three times, the system no longer functions. The keyboard locks out and you need to press the reset button or turn the system off then on to restart the computer.

System Password

When enabled, the computer requires a password at boot. After entering the password, the system asks: “Do you want to change your password (Y/N)?” Press <Y> to change the password and <N> to keep it.

If no password has been entered or the CMOS memory has been cleared, the following message appears at boot up: “Password values are invalid. Do you want a password (Y/N)?”

Setup Password

If ENABLED, a password is required to enter Setup. If the password is lost or forgotten, the CMOS must be cleared.

Note:
After changing the setup menu and password to ENABLED, save the CMOS settings by pressing <Esc> followed by <F4>. After the system reboots, immediately press <Ctrl>, <Alt>, and <Esc> simultaneously. You will not be asked to enter a password until you attempt to enter the CMOS screen.

Internal Cache

The Mpower 4 plus has the option of activating or deactivating the internal 8K-byte cache of the 486 microprocessor. Choose ENABLED to activate the Internal Cache, or choose DISABLED to deactivate the on-chip cache. The Internal Cache must be ENABLED to activate the External Cache.

External Cache

The Mpower 4 plus has the option of either 64K, 128K or 256K of external cache memory. Choose ENABLED to activate the external cache memory.

External Cache Mode

This selection sets the secondary cache scheme. Setting the scheme to WRITE-BACK and placing jumper blocks on W16 and W17 will improve performance up to 4%. Refer to Tables 2-7 and 2-10 for cache jumper configuration.

Serial Port 1

The Serial Port 1 can be selected as COM1 or COM3. Be sure this setting does not conflict with any add-on peripherals. The Serial Port 1 can also be set to DISABLED if the on-board port is not used.

Serial Port 2

The Serial Port 2 can only be selected as COM2. The on-board ATI local bus video uses the I/O address normally used by COM4. Serial Port 2 can also be set to DISABLED if the on-board port is not used.

Parallel Port

The Parallel Port selection can be selected as LPT1 or LPT2. The Parallel Port can also be set to DISABLED, if the on-board port is not used. Be sure this setting does not conflict with any add-on peripherals.

On Board Floppy

The On Board Floppy controller can be set to ENABLED or DISABLED.

On Board IDE

The On Board IDE controller can be set to ENABLED or DISABLED.

HD1 Speed

The speed of Hard Disk 1 can be set for NORMAL, MEDIUM, or FAST. To improve the performance of your system, see the manufacturer's specifications to determine the optimal setting. The default setting is NORMAL.

HD2 Speed

The speed of Hard Disk 2 can be set for NORMAL, MEDIUM, or FAST. To improve the performance of your system, see the manufacturer's specifications to determine the optimal setting. The default setting is NORMAL.

Non-Cacheable Area #1 and #2

These two parameters allow a block of 32-bit memory to be set as NON-CACHEABLE. The size and address can be selected. The sizes include: 64K, 128K, 256K, 512K, 1M, 2M, and 4M.

To select the memory to be Non-Cacheable, use the <+/-> keys to change the first three zeros to the appropriate address (only these zeros can be changed). Area #1 must start from 0000000h to 0FF0000h (15.94MB), and area #2 must start from 0000000h to 3FF0000h (63.94MB). The default setting for both selections is UNDEFINED.

Re-Configuring Your Computer

Press the <Esc> key to reach the Exit Pop-Up Screen. Now select <F4> to save and initialize the new Setup.

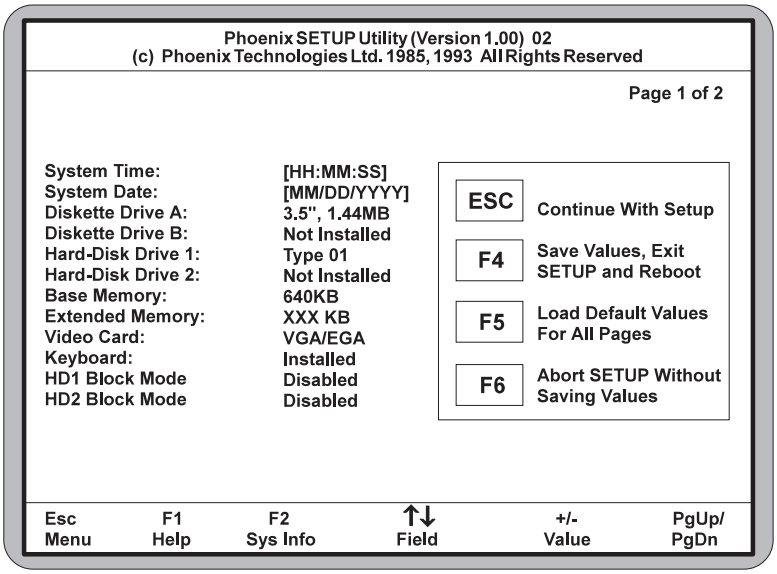


Figure 4-4 Exit Pop-up Screen

5 Installing Graphics Accelerator Software

The Mpower 4 plus comes standard with the ATI *mach64* video chip on board. The *mach64* chip is a 64-bit graphics accelerator offering superior video performance. Certain utilities must be run before using the *mach64*. For optimal performance, install the utilities completely.

Preparation

Make sure that no hardware (internal modems, Fax cards, or LAN cards) are using addresses between the range of 2E0 to 2EF, such as COM 4 (2E8). If they are occupied, change the device(s) to a different range outside of 2E0 through 2EF.

Make sure LAN cards, scanner cards and other adapters are not using memory addresses between C0000 and C7FFF. Check and record the amount of memory installed on the system board.

Review the CONFIG.SYS file to determine if a Memory Manager Device driver is loaded. Memory Manager Device drivers (for example; EMM386, QEMM, and 386MAX) may interfere with the *mach64* installation. Install the Memory Manager after the *mach64* is completely loaded.

Installation

Perform the following steps to install *mach64* graphic utilities:

1. Turn on the monitor and then the computer. (This allows *mach64* to read the monitor type from the monitor during power-up for proper card operation).

2. From the DOS prompt, insert Disk 1 of the utilities into the appropriate floppy drive.

3. From the drive where the utilities diskette is located, type INSTALL and press <Enter>.

4. After the INSTALL program is initialized and loaded, the Main Menu appears (see Figure 5-1).

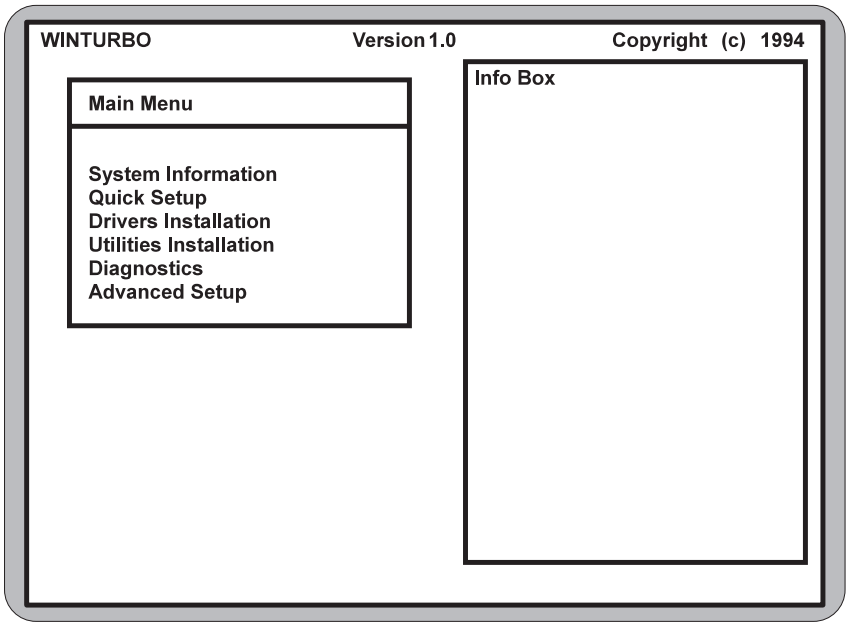


Figure 5-1 Main Menu

Main Menu Options

System Information-Checks your system configuration, displays detailed information, including boot-up files and any possible conflicts, based on your current system configuration and the card you are installing.

Quick Setup-Sets the card to an optimal configuration using the information acquired during system checking.

Drivers Installation-Installs enhanced graphics and multimedia drivers for popular operating system checking.

Diagnostics-Tests the proper functioning of your card in both VGA and accelerated display modes.

Advanced Setup-Should only be attempted by experienced computer users. Although some settings may improve the performance of your card, they may not be fully compatible with your system or specific software applications.

System Information

This program checks the system for possible conflicts and displays the card configuration in the INFO BOX. If a conflict exists, it issues a warning and suggests possible corrective actions. Perform the following steps to check your system:

1. From the Main Menu, select SYSTEM INFORMATION by highlighting the selection and pressing <Enter>.

2. Review the information in the INFO BOX and take any necessary action as directed.

Quick Setup

You must specify a monitor in QUICK SETUP. Proper monitor selection is necessary for correct resolution and refresh rate operation. Information on display modes supported by the highlighted monitor are displayed in the INFO BOX. Perform the following steps to install the monitor type:

1. Select QUICK SETUP from the Main Menu by highlighting the selection and pressing <Enter>. A Monitor Selection Menu will appear (see Figure 5-2).

2. Using the <↑/↓> keys, scroll the monitor list to highlight your monitor. If found, press <Enter> to select. If your monitor is not listed, follow step a) or b) described below:

   a) If a VESA Display Information Format file (VDIF) is available for your monitor, INSTALL can read it and get the necessary parameters to set up the card for optimal monitor operation. To do so, insert the disk containing the VDIF file into your floppy drive. Select READ VDIF... from the Monitor Selection Menu.

Change the DOS directory prompt to the drive containing the disk. INSTALL will read the file and configure *mach64* to support your monitor.

b) Select CUSTOM... to set up the card to any supported monitor specifications. You will need to manually test and configure each display mode separately. To do so, select CUSTOM... and press <Enter>. Select a resolution and press <Enter>. Pick a refresh rate that matches the specification of your monitor and press <Enter> to bring up the Adjustment Screen. If the monitor does not display a proper Adjustment Screen at the lowest refresh rate, set the resolution to Not Supported.

Warning:
Do not exceed the monitor specifications. Using a refresh rate (i.e., vertical frequency) that is higher than specified may damage your monitor.

A scrambled screen indicates your monitor is not capable of the selected display mode. In which case, immediately press <Esc> to exit.

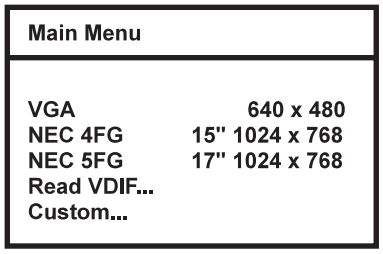


Figure 5-2 Monitor Selection Menu

Drivers Installation

Selecting this option brings up the INSTALL ENHANCED DRIVERS menu for installing ATI enhanced drivers. See Chapter 6 for detailed instructions.

Utilities Installation

This procedure is for copying the utilities and the INSTALL program to your hard drive. The boot files can be modified automatically so you can run these programs from any directory. Perform the following steps to run the UTILITIES INSTALLATION program:

Note:
It is recommended that you accept the defaults suggested during installation.

1. Select UTILITIES INSTALLATION from the Main Menu by using your arrow keys to highlight it and pressing <Enter>.

2. Enter the destination drive and directory and press <Enter>.

3. Enter the source drive and press <Enter>.

4. Utilities are in the root directory of the Install Disk #1. Accept the prompt for the root directory and press <Enter> to start copying.

5. When prompted for the boot drive, enter your boot drive (i.e., C) and press <Enter>.

6. To run the INSTALL program from any directory (in DOS), you must add the location of the utilities to the PATH statement in the AUTOEXEC.BAT file. The default directory name used by this installation is C:\MACH64.

7. When finished, press <Esc> and exit from the Main Menu.

8. Changes made to the boot files (CONFIG.SYS and AUTOEXEC.BAT) are active only if you reboot the computer. If you encounter errors or suspect the hard disk is full, refer to the Troubleshooting section in this chapter or your DOS manual for information.

Diagnostics

From this menu, you can test the various operations and circuitry of the *mach64*. The diagnostics screen can be displayed at any supported resolution and color depth for testing. These tests support mouse and keyboard operations and directions are displayed on the screen. Errors found by testing are discussed in the Troubleshooting section of this chapter.

Advanced Setup

The number of options in the Set Power-Up Configuration menu (see Figure 5-3) depends on the card type (i.e., ISA, VLB, or PCI). To set up these options, use the arrow keys to highlight ADVANCED SETUP and press <Enter>, then set the options to match your monitor and system type. If you need help, press <F1>.

Warning:
The Advanced Configuration option allows you to use certain features may add additional performance to your card; however, these options may not be compatible with your system. If problems occur after an advanced option is changed, return the card to factory defaults to correct them.

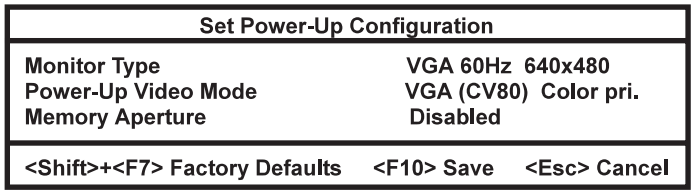


Figure 5-3 Set Power-Up Configuration Menu

Advanced Setup Options
Monitor Type-Lets you specify a monitor type as you did in QUICK SETUP.

Power-Up Video Mode-This card can be configured to power up in VGA color or VGA monochrome.

- *Auto Select*-This option automatically chooses a suitable mode for your system.
- *16-bit*-All coprocessor accesses are 16-bit wide. Certain computer systems may lock up when in this mode. If this happens, select 8-bit Host.
- *8-bit Host*-Only data transfers between the host bus and graphics memory are 8-bit; otherwise, coprocessor operations are 16-bit. If your computer has compatibility problems with this setting, select 8-bit.
- *8-bit Host*-I/O operations are 8-bit.

Memory Aperture This option controls usage of memory aperture.

The card can be reset to factory defaults by pressing <Shift><F7>. Once you have finished configuring the necessary parameters described above, save them to the card by pressing <F10>. If you choose not to save the current configuration changes, press <Esc> and choose Discard when prompted. The card then reverts to the previously saved settings in EPROM (or to factory defaults if the card had never been configured).

Troubleshooting

Listed below are several checks you can make to help determine the cause of any problems:

System Lockup

- If you are using a memory manager such as QEMM or 386MAX, you need to modify the command line in the CONFIG.SYS file so the address of the graphics card video BIOS, C0000-C7FFF, is excluded. For example, add "X=C000-C7FF" to the command line
- Remove all unnecessary boards.
- Disable shadow RAM.
- Ensure the board is seated correctly and the card has been installed using proper utilities.
- Try the card in a different system and reset to factory defaults using the INSTALL program. If the card works in another system, the problem is likely due to incorrect configuration.

Test Patterns OK; Applications Do Not Sync

- The wrong monitor type has been selected. Change the settings in the INSTALL program.

Window Driver Not Installing Properly

- Windows must be running in 386 Enhanced Mode. Incompatible commands or options within CONFIG.SYS may prevent Windows from starting in enhanced mode. If this occurs, remove the offending driver or reinstall the memory manager software.

AutoCAD Driver Not Installing Properly

- If using a 386, ensure AutoCAD has been configured for the appropriate ADI driver. The protected mode driver requires extended memory.

Error Codes and Messages

Table 5-1 lists problems and solutions for some common errors found by the test program.

Problem	Solution
EPROM BIOS failure	Try reinstalling or run the diagnostics using the **/F** switch. This returns the card to factory settings: **M64DIAG /F** <**Enter**>.
Memory aperture test failure, diagnostics program locks, or reboots during test (ISA card only)	If you receive an error message indicating the memory aperture location is conflicting with your system memory, restart the INSTALL program as follows**: INSTALL APMP** <**Enter**>. Now when you enable Memory Aperture, you must select a location *above but not overlapping* System Memory (S), BIOS (B), or Reserved (R) locations. If the problem is due to address limitations inherent with the ISA bus architecture (i.e., aperture + system RAM exceeds 16MB, disable aperture).
Desired resolution is disabled and displays in gray	A mode displayed in gray means the BIOS is told this mode is not available, based on the card configuration. Reinstall using custom monitor selection.
Menu item is disabled and displays in gray	The test program has determined the mode or test is not available under current configuration. Aperture tests are not available if the aperture is disabled, and CRT mode and pixel depth are determined by current installation, DAC type, and memory size and type.

Table 5-1 Error Codes and Messages

Problem	Solution
Adapter not detected	This message should only occur when a *mach64* ASIC is not detected. If this message occurs and a *mach64* board is present, it may indicate an I/O conflict exists between Extended Memory Manager (EMM and Video ROM). Try removing all other boards from the system and booting from a plain DOS disk. Try excluding the video BIOS address (C0000-C7FFF) from the memory manager. Refer to the documentation furnished with the memory manager software for information.
Any FIFO test error	The effects of a bad command FIFO should be visible (e.g., the screen does not come up, or it displays garbage.)
Quick memory test error	Run Detailed RAM Test to confirm the error and identify address of the error.
Detailed memory test error	Run Detailed RAM Test several times to confirm the error and take notes of any messages and error codes.
DAC LUT test failure	An error has occurred while testing the DAC LookUp Table. The problem should be visible on the top color bar of any 8bpp mode.
ROM checksum error	An error has been detected in the ROM.
Draw sequence failure	An error has occurred in the draw engine. If the error is intermittent, it might indicate a marginal RAM failure. The effects of this failure may not be immediately apparent.

Table 5-1 Error Codes and Messages (Cont'd)

The information provided in this user guide enables you to solve most problems. For further assistance, please contact your vendor.

The following error message may appear when the INSTALL program is programming the EPROM:

```
Selected Memory Aperture Configuration May Conflict...
```

Ignore this message if the system has 12MB or more system memory and the Memory Aperture feature is disabled. If the system CMOS configuration has Video BIOS Shadowing enabled, reboot the system once the programming of the EPROM has been completed. If this message does not appear, continue the installation procedure.

6 Installing Video Drivers

A README file is provided for each application driver in the *mach64* installation disks. These files summarize the latest product revisions, contain directions for installation, and use of enhanced drivers. For added convenience, you can load and print README files using any word processor after their corresponding drivers have been installed.

README files for AutoCAD and MicroStation drivers are automatically displayed as you install the drivers. If you install the driver for Microsoft Windows, a README icon will be installed and placed in a program group called "*mach64* DeskTop." Click on this icon for feature and usage information about the driver.

Installation

Applications use video device drivers to display data on the screen. The *mach64* drivers give you more screen resolutions and color depths than standard device drivers. Furthermore, *mach64* supports IBM standard VGA and VESA drivers that normally come with most major software packages. To fully utilize the enhanced speed, resolution, color depth, and other features of this chip, you should use *mach64* drivers.

Note:
To conserve hard disk space, install only the drivers you use. You may require application software disks during driver installation.

De-Installation

This installation program allows you to effortlessly de-install some *mach64* drivers and return your application or operating environment to VGA support. This feature is available for Windows 3.1 and OS/2 Manager. Details are given in the respective sections.

Microsoft Windows 3.1

The *mach64* driver for Windows delivers increased performance at high resolutions and color depths. You need to install this driver using the steps outlined below.

The DRIVERS INSTALLATION option in the Main Menu sets **FlexDesk+** and **WinSwitch** automatically. FlexDesk+ customizes the operational/display settings of the driver. WinSwitch adds the capability of switching screen resolution and/or colors with a key.

De-Installation Procedure

Skip this section if you have not previously installed any *mach64* window driver. The program removes all existing driver from your hard disk and cleans up all associated Windows and MVA files.

Perform the following steps to de-install driver using Microsoft Windows 3.1:

1. Record the location of the Windows application.

2. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the Main Menu.

3. From the list of applications:

   a) Select Microsoft Windows
   b) De-Install Windows 3.1 driver
   c) Follow screen instructions to completion.

Installation Procedure

Perform the following steps to install drivers using Microsoft Windows 3.1:

1. Ensure your card has been installed and configured as described in Chapter 5 before continuing with this procedure.

2. Start Microsoft Windows to ensure it is properly installed, then quit Windows.

3. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the Main Menu.

4. From the list of applications:

a) Select MICROSOFT WINDOWS.
b) Select INSTALL WINDOWS 3.1 DRIVER and note the messages.
c) Follow screen instructions to completion.

5. After copying is done, record the Windows setup instructions, then press <Esc> to exit.

6. Exit the INSTALL program and restart Windows.

7. The ATI DeskTop icon is created automatically during driver installation. Select it to customize the look-and-feel of Windows.

AutoCAD 386 R10/R11/R12

Perform the following steps to install driver using AutoCAD 386:

1. Run AutoCAD 386 (protected mode) to ensure it is properly installed on your system. Note the directory location of the AutoCAD program files before you start the *mach64* installation program. You will need this information later.

2. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the Main Menu.

3. From the list of applications, select AutoCAD. When asked for source drive and directory, type in the information and insert requested diskettes.

4. Follow instructions on the screen to install the DLXpress driver.

5. When driver installation is completed, exit the installation program. Run ADIACAD.BAT to set the necessary driver parameters for the DOS environment as follows:

   ADIACAD <**Enter**>

   ADIACAD.BAT was created by the *mach64* installation program for your convenience. The parameters it sets must be in the environment before you start AutoCAD.

TIP: If you are using a batch file to start AutoCAD, consider adding ADIACAD to your batch file.

6. Start AutoCAD and reconfigure it to use the enhanced display list driver. For example, if you start AutoCAD using a batch file called ACADR12.BAT, type:

   ACADR1 -R <**Enter**>

   The "-R" parameter is supported only by AutoCAD release. For other releases, refer to your AutoCAD manuals.

   Documentation for the DLXpress driver is provided on the installation diskette. See the README.DLX file for details.

IBM OS/2 Presentation Manager 2.1

Installation Procedure

Perform the following steps to install driver using the IBM OS/2:

1. Start OS/2 2.1 to ensure that it uses the Video Graphics Array (VGA) driver before continuing with this procedure.

2. Insert the *mach64* installation disk #1 into a floppy drive.

3. Open the DOS Full Screen icon.

   The *mach64* installation program does not run in a DOS window. The DOS Box must be Full Screen for successful operation.

   Do not switch out of Full Screen to run Diagnostic Tests. Doing so will result in a corrupted display.

4. Type: **A:\INSTALL** <Enter> (For drive B, substitute **B**: for **A:**)

5. Select DRIVERS INSTALLATION from the Main Menu.

6. This will copy the *mach64* driver to the MACH_OS2 directory.

7. Open an OS/2 Window or OS/2 Full Screen icon and type: **DPINSTL** <Enter>.

8. When the Display Driver Install panel appears, select Primary Display and choose OK to bring up the selection list.

9. Select ATI Technologies *mach64* from the list and choose OK.

10. When the source directory panel appears, choose Change. Select the drive and directory where the *mach64* driver resides (e.g., C:\MACH_OS2) then choose Set and Install.

11. After the driver is installed, do a shut down, then restart OS/2.

12. The OS/2 driver will first come up as 640x480 in 256 colors. Perform the following steps to change screen resolution and/or color depth:
    a) Open the “OS/2 System” icon.
    b) Open the “System Setup” icon.
    c) Open the “System” icon.
    d) Select the “Screen” tab in the “System-Settings” window.
    e) Select desired resolution and color depth from list.
    f) Close the “System-Settings” window.
    g) Do a shutdown of OS/2, then restart your computer.

Note:
The resolution you select for the OS/2 driver must be a supported and enabled resolution as defined by the Monitor Type setting chosen in the mach64 *installation program.*

De-Installation Procedure

Perform the following steps to de-install driver using IBM OS/2:

1. Open an OS/2 Window or OS/2 Full Screen icon and type:
   DPINSTL <Enter>

2. Select “Video Graphics Array (VGA)” as the Primary Display. The Source Directory panel appears.

3. Insert the OS/2 Display Driver disk in the floppy drive. Select the drive and directory where the VGA driver resides (typically A: or B:), choose Set, then choose Install.

4. After the driver is installed, do a shutdown of OS/2, then restart your computer.

Continue with the following steps if you wish to remove *mach64* files from your hard disk.

5. Open the DOS Full Screen icon.

6. Change to the *mach64* directory and type: **INSTALL**<Enter>

7. Select DRIVERS INSTALLATION from the Main Menu.

8. Select IBM OS/2 from the list of applications.

9. Select UN-INSTALL OS/2 Driver, then follow instructions on the screen.

Intergraph MicroStation 4.0

Perform the following steps to install driver using Intergraph MicroStation.

1. Ensure that MicroStation is properly installed on your system before continuing with this procedure.

2. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the Main Menu.

3. From the list of applications, select MicroStation. Enter the source drive and directory information, then insert the disk prompted.

4. Follow the instructions on screen to complete the driver installation.

5. When driver installation is completed, press <Esc> to exit.

6. Refer to the README.USD file that has been copied to your MicroStation directory for instructions and driver configuration details.

Microsoft Windows NT

Installation Procedure

Perform the following steps to install driver using Microsoft Windows NT:

1. Run the Windows NT Setup program. It is located in the Program Manager Main window.

2. Insert the ATI installation disk marked Windows NT Driver into your floppy drive.

3. Select Other, and supply the Setup program with the location of the NT files (i.e., B:\NT if using drive B). The program will install the ATI driver.

4. Restart Windows NT.

Note:
If the NT driver resolution selected is not supported, the display reverts to 640x480 regardless of the resolution setting selected in the Presentation Manager driver setup.

De-Installation Procedure

You may de-install the *mach64* driver for Windows NT using either of the following steps:

1. In the WINNT\SYSTEM32\DRIVERS directory, rename the ATI.SYS file, for example, to ATI.ATI. When you restart Windows NT, it will not find ATI.SYS, and boot up in VGA.

2. Run the Windows NT Setup program and select a non-ATI driver, for example, a VGA-Compatible driver. When you restart Windows NT, it boots up with the non-ATI driver you just selected.

Microsoft Word (for DOS) 5.x, 6.0

Mach64 drivers for Microsoft Word support 640x480, 800x600, and 1024x768 screen resolutions in 16 colors. Perform the following steps to install driver using Microsoft Word:

1. Run Microsoft Word to ensure it is properly installed on your system before continuing with this procedure.

2. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the main menu.

3. From the list of applications, select Microsoft Word.

4. Select an appropriate Word program version.

5. Follow the instructions on screen to complete the driver installation.

6. When driver installation is completed, press <Esc> to exit.

7. Refer to the README file that has been copied into your Word directory for instructions and driver configuration details.

WordPerfect (for DOS) 5.x, 6.0

WordPerfect Versions 5.0 and 5.1

The *mach64* drivers for WordPerfect 5.x support 800x600 and 1024x768 screen resolutions in 16 colors. Perform the following steps to install driver using WordPerfect Versions 5.0 and 5.1:

1. Run WordPerfect to ensure that it is properly installed on your system before continuing with this procedure.

2. Run the *mach64* installation program and SELECT DRIVERS INSTALLATION from the Main Menu.

3. From the list of applications, select WordPerfect.

4. When prompted, insert the disk and enter the source drive and directory information of the disk.

5. When asked, enter the directory where WordPerfect is installed. Press <Enter> to copy the necessary driver files to that directory.

6. When driver installation is completed, press <Esc> to exit.

7. Run the WordPerfect Setup program to select this enhanced driver, as follows:

   a) Run WordPerfect, press <Shift><F1> for the Setup option.
   b) Press <D> for Display.
   c) Press <G> for Graphics Screen Type.
   d) Select the *mach64* driver and press <Enter>.

WordPerfect Version 6.0

This chip supports the VESA SVGA BIOS Extension which supports several high resolution display modes. Perform the following steps to install driver using WordPerfect Version 6.0:

1. The *mach64* accelerator must be set up for the resolution intended to use.

2. Run the WordPerfect Setup program to select a VESA display mode as follows:

   a) Run WordPerfect, press <Shift><F1> for the Setup option.
   b) Press <D> for Display.
   c) Press <G> for Graphics Screen Type.
   d) Press <S> for Screen Type.
   e) Select VESA VBE (VESA BIOS Extension) and press <S>.
   f) Select one of the displayed modes and press <S>. A Driver Warning dialog may appear; if so, consult the WordPerfect documentation for information.
   g) Press <Enter> as prompted. When you exit the Setup program, you should be in the selected mode. If not, repeat Step1 to check if the card is correctly configured for this resolution.

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 the Power On Self Test (POST). If text appears on the video screen, the Mpower 4 plus 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. 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 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 Mpower 4 plus.

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	1023	15	-1	1023	17	127
45	1024	8	-1	1024	17	68
46	925	9	-1	925	17	69
47	699	7	256	700	17	40
48	User Config.					
49	Auto Config.					

D Specifications

Processor Options	Intel 486 SX 25 & 33MHz, PQFP Intel 486 DX 33MHz, PGA Intel 486 DX2 50 & 66MHz, PGA Intel 486DX4 75 & 100MHz Intel 486 DX2 3.3V Support Intel Pentium *OverDrive* Processor 486 OverDrive Processor
Expansion	One ISA/VL slot. Riser card allows 4 ISA and 1 ISA/VL slot (slot configuration may vary depending on case design).
Chip Set	Micronics X30 single chip ASIC CMD 640A Local bus IDE SMC 665 Super I/O controller
RAM Capacity	Four 72-pin (x36 type) SIMM sockets, accommodating up to 64MB of RAM
Form Factor	Baby AT footprint (8.5" x 13") 4 Layer PCB
Built-in Video	ATI 68800 *mach64* LX 1MB DRAM frame buffer Resolutions Supported: 640x480 (65,536 colors) 800x600 (256 colors) 1024x768 (256 colors) 1280x1024 (16 colors)
Keyboard	Standard PS/2 style keyboard and mouse connector
BIOS	Phoenix BIOS on 1MB Flash EPROM

Cache	8K of internal cache memory
Cache Upgrade	Optional 64K, 128K, or 256K of secondary cache memory (write-through or write-back)
I/O Ports	Two serial ports One parallel port One mouse interface One keyboard interface
Connectors	One floppy interface One keyboard interface
Burn-in	48 hours (minimum)

Environmental Specifications

The environment in which the M54Pe 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).

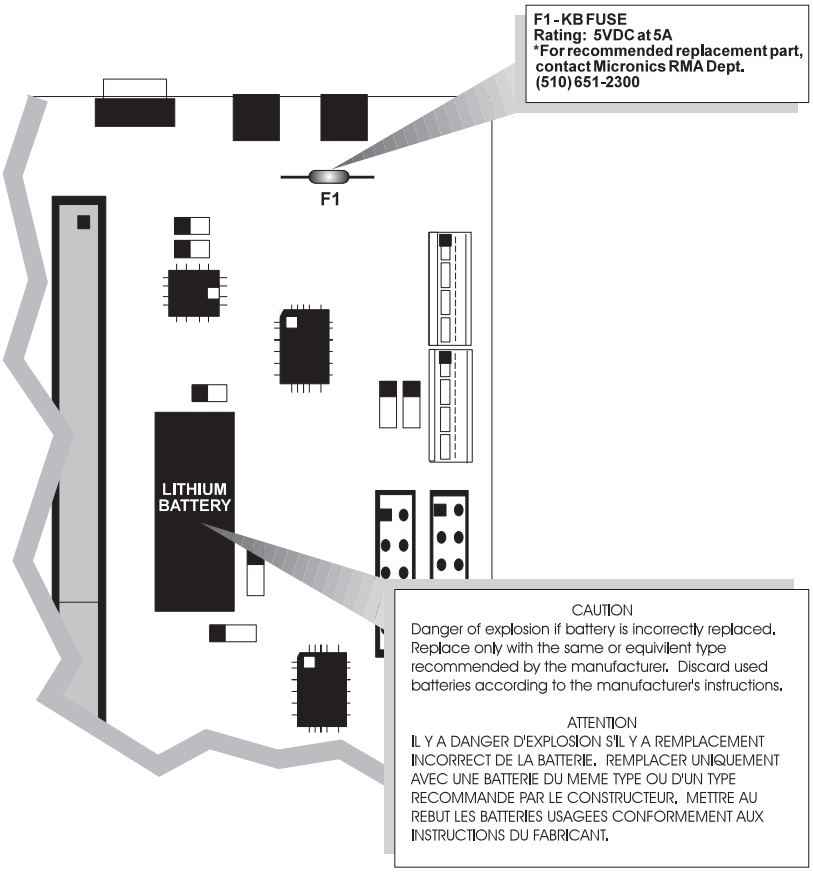
Shipping: -22 to 140 degrees Fahrenheit (-30 to 60 degrees Celsius).

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:

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

To meet FCC requirements, shielded cables and power cords are required to connect the device to the Mpower 4 plus.

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

Glossary

Baby Form-Factor: A small computer system board.

Battery Backup: Maintains the configuration settings (date, time, etc.) stored in the CMOS when the main power to the computer is turned off.

BIOS: 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.

CGA: Color Graphic Adaptor. Associated with the monitor.

CPU: Central Processing Unit. Essentially, the "brains" of the computer.

DIP Switches: Switches used to configure the system board according to the needs of the user.

Disk Controller: A computer card located in the system that controls the hard and/or floppy disk drives.

Disk Drive: A hard or floppy disk drive.

DRAM: Dynamic Random Access Memory.

EGA: Enhanced Graphic Adaptor.

EISA: Extended Industry Standard Architecture.

ISA: Industry Standard Architecture.

Jumpers: A device on the system board used to configure certain information on the board.

Math Coprocessor: An optional processor chip used to enhance the floating point operations of the computer.

Micro Channel: A proprietary bus architecture.

Monitor: The visual component of the computer.

Monochrome: Used to describe a single colored monitor.

POST: Power On Self Test. The computer's self-diagnostic test, which is executed whenever the system is booted.

Power Supply: A term used to describe electric energy, in or out, that powers the computer.

RMA: Returned Merchandise Authorization. An authorization provided by the department where warranty issue items are returned.

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.

VESA: Video Electronics Standards Association.

VGA: Video Graphics Array. Associated with the monitor.

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 from 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.