# *Twister LX Pentium II*
## *System Board Manual*

# MICR⊕NICS

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# *Introduction*

Thank you for choosing the Twister LX system board. The Twister LX is an advanced single processor solution for the industry's most demanding server and workstation applications.

Based on the Intel 440LX AGPset, the Twister LX supports the latest advanced processor architecture, the Pentium® II (processor-on-a-cartridge). The Pentium® II processor introduces a new level of performance for the business computing environment including enhanced multimedia and improved Internet and communications capabilities.

Features of Twister LX include an AGP (Accelerated Graphics Port) bus slot, Hardware Management support, Ultra DMA/33 IDE hard drive protocol and SDRAM memory support and Error Checking and Correction (ECC) on the L2 cache for improved data integrity and reliability.

Micronics builds all products to exacting standards, using the highest quality components available. We are proud to provide this system board and believe you will be pleased with your purchase.

# Features

The Twister LX includes the following features:

▲ Single Intel Slot 1® for:
Intel Pentium II® chip 233/266/300/333MHz

▲ Integrated Voltage Regulator Module

▲ Intel 440LX AGPset
Intel PIIX 4
National PC87309 Super I/O chip

▲ Four 32-bit PCI slots
Three 16-bit ISA slots
(One is a shared PCI/ISA slot)
One AGP slot

▲ Three 3.3V unbuffered 64/72-bit 168-pin DIMM sockets
Maximum memory 384MB for SDRAM
Maximum memory 768MB for EDO
ECC support via chipset

▲ Hardware Management - LM79 microprocessor system hardware monitor

▲ Ultra DMA/33 IDE support

▲ Baby AT form factor

# Software Compatibility

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

▲ Microsoft -
DOS 6.22
Windows NT 3.5x
Windows NT 4.0

▲ IBM -
OS/2 Warp 4.0

▲ SCO -
UNIXWare 2.1.1
Open Server 5.02

▲ Novell -
NetWare 3.12
NetWare 4.11 (IntranetWare)

# Before You Begin

This manual will familiarize you with the features, installation and use of your Twister LX. There are several symbols and conventions used throughout this manual to help draw your attention to a feature or to focus on important information:

When you see the Magnifying Glass, it refers to something you should take a closer look at before proceeding further.

When you see the Exclamation Mark, it gives important information on avoiding damage.

## Common Names

| | |
|---|---|
| **AGP** | Accelerated Graphics Port |
| **DIMM** | Dual Inline Memory Module |
| **DRAM** | Dynamic Random Access Memory |
| **ECC** | Error Checking and Correction |
| **EDO** | Extended Data Out |
| **IDE** | Integrated Drive Electronics |
| **PCI** | Peripheral Component Interconnect |
| **SDRAM** | Synchronous DRAM |
| **SPD** | Serial Presence Detect |
| **USB** | Universal Serial Bus |
| **VRM** | Voltage Regulator Module |

**Chapter**

# 1

# *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 to get up and running quickly.

## Installing the Twister LX

*STATIC!*
*Before handling the Twister LX, be properly grounded by using a special wrist or ankle strap, or touch a safely grounded object.*

1. Make backup copies of your installation and configuration diskettes.

2. Ground yourself to prevent damaging static discharge by using an anti-static wrist or ankle strap, or touch a safely grounded metal object.

3. Remove the Twister LX from its packaging.

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

5. Install the CPU and the system memory. Be sure to attach the Retention Mechanism as described in Chapter 3.

6. Install the system board in the chassis and make all necessary case connections.

7. Install any ISA, PCI and/or AGP add-on peripherals (refer to Chapter 2 for the location of the slots).

8. Connect any optional devices.

9. Turn the computer on and press the <DEL> key when you see the screen shown in Figure 1.1.

10. Set the time and date. Adjust the BIOS settings to match your configuration. If installing an IDE drive, select the IDE device you wish to configure. Press ENTER with Autotype Fixed Disk selected and the BIOS will automatically configure the drive for you (refer to Chapter 4).

```
Award Modular BIOS v4.51PG,  An Energy Star Ally
Copyright (C) 1984-98 Award Software, Inc.

Micronics Computers, Inc.              Twister LX -xx

PENTIUM-II MMX CPU at 300MHz
Memory Test: 32000K OK

Award Plug and Play BIOS Extension v1.0A
Copyright (C) 1998, Award Software, Inc.




Press DEL to enter SETUP
```
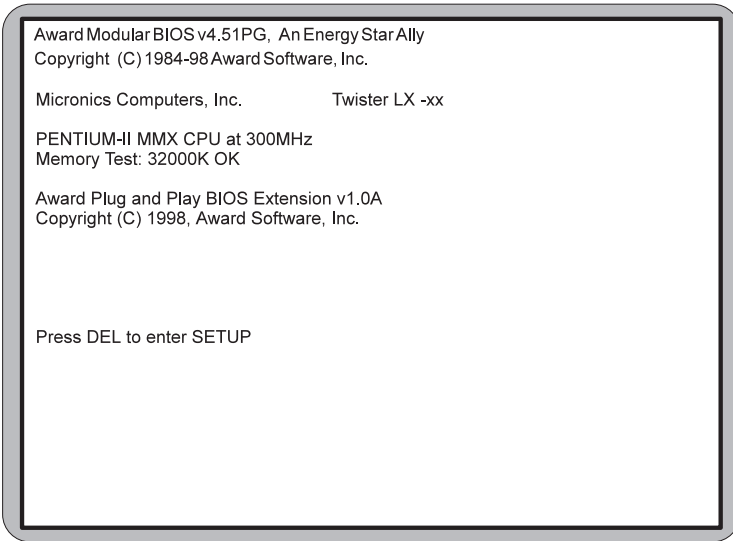
Figure 1.1: Power-Up Screen

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

Chapter

# 2

# *Configuring the Twister LX*

Although the Twister LX system board is packaged in materials that are designed to protect it from physical damage and static electricity, it is important to use care while unpacking the board and setting it up.

## Static Electricity

The Twister LX is shipped from the factory in an anti-static bag. To reduce the possibility of damage from static discharge, it is important to neutralize any static charges your body may have accumulated before handling the board.

The best way to do this is to ground yourself using a special anti-static wrist or ankle strap. If you do not have an anti-static strap available, touch both of your hands to a safely grounded object, such as the power supply or chassis of a computer that is connected to the power socket. After you have grounded yourself, ground the Twister LX board via one of the solder pads that surround its mounting holes. When you remove the Twister LX from its packaging, place it on top of the anti-static bag, and carefully inspect the board for damage which might have occurred during shipment.

## Environment Considerations

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.

# Twister LX System Board
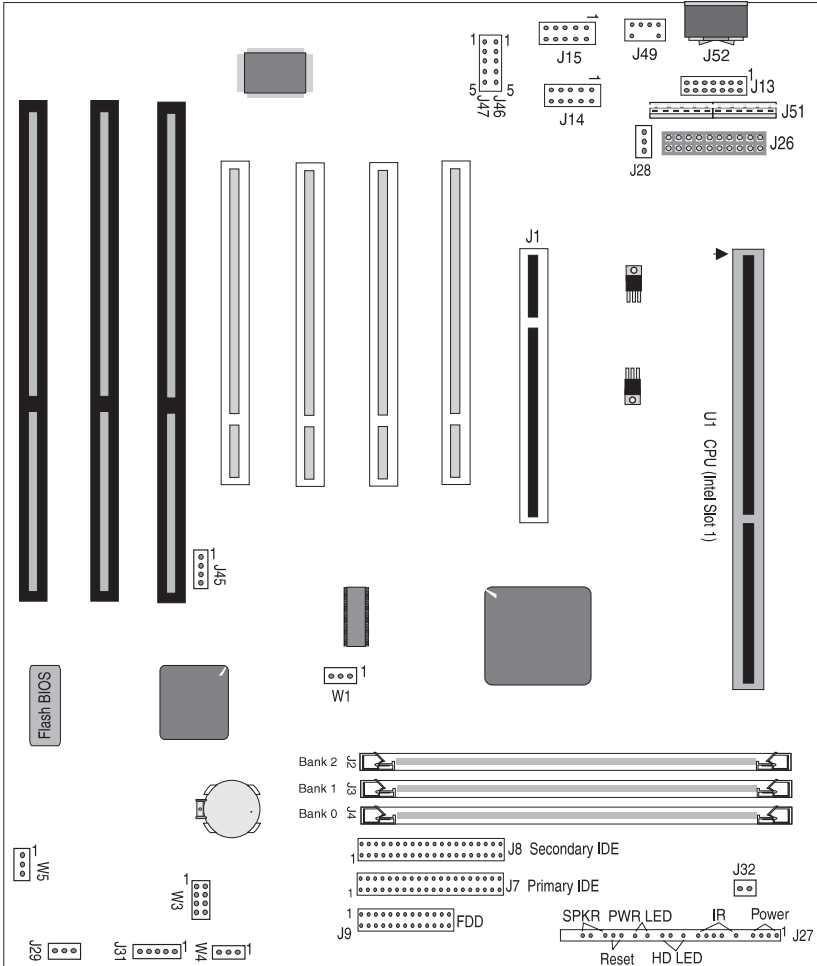


Figure 2-1: Twister LX System Board Diagram

# Jumper Settings

This section provides the jumper settings for the Twister LX system board.

Table 2-1 lists the jumper settings to select the system speed settings.

| System Speed (Intel Processors) | Jumper | | | |
|---|---|---|---|---|
| | W3 | W3 | W3 | W3 |
| | 1-2 | 3-4 | 5-6 | 7-8 |
| 233 MHz External, 66 MHz Internal* | Close | Close | Open | Open |
| 266 MHz External, 66 MHz Internal | Close | Open | Close | Close |
| 300 MHz External, 66 MHz Internal | Close | Open | Close | Open |
| 333 MHz External, 66 MHz Internal | Close | Open | Open | Close |

Table 2-1: System Speed Selection

*Default Setting*

Table 2-2 lists the settings to clear the CMOS. With your computer's power off, close pins 2-3, wait ten seconds and place the jumper back on pins 1-2. (The jumper must be placed back on pins 1-2 for the system to function properly.)

*NOTE: This will reset all BIOS default settings. Any changes you have made will be lost.*

| Jumper | Function | Settings |
|---|---|---|
| W5 | Normal (default)<br>Clear CMOS | 1-2<br>2-3 |

Table 2-2: Clear CMOS Settings

Table 2-3 lists the connector and peripheral connections.

| Connector | Function | Notes |
|---|---|---|
| J1 | AGP Bus Expansion Slot | 62 x 2-pin connector |
| J2-J4 | DRAM (168-pin DIMM Sockets) | 3.3 volt, unbuffered EDO and SDRAM DIMMs |
| J7, J8 | Primary and Secondary IDE Port Connectors | Both support up to two IDE devices |
| J9 | Floppy Drive Connector | Supports up to two floppy drives |
| J13 | Parallel Port Connector | |
| J14, J15 | Serial Ports | COM 1 & COM 2 |
| J16-J19 | PCI Bus Expansion Slots | |
| J26 | ATX Power Supply Connector | |
| J27 | Front Panel Connector | |
| " | System Power On/Off | 1 - Power;  2 - Ground (for ATX power supply) |
| " | Infrared Port | 6 - +5V DC; 7 - No Connect; 8 - Receive Data; 9 - Ground; 10 - Transmit Data; No Connect |
| " | Drive Activity LED Note: IDE, SCSI Channels A/B and Add-In Drive Controller share the same LED | 13 or 16 - Positive; 15 - Negative |
| " | Power-On LED | 18 - Ground; 20 - Positive |
| " | System Reset Switch | 22 - Ground; 23 - Reset |
| " | External PC Speaker | 24 - Positive; 27 - Speaker Output |

Table 2-3: Connector and Peripheral Connections

| Connector | Function | Notes |
|-----------|----------|-------|
| J28 | CPU Fan | 1 - Ground; 2 - +12V Power; 3 - Fan Speed Monitor |
| J29 | Chassis Fan | 1 - Ground; 2 - 12+V Power; 3 - Status (Running or Stopped) |
| J31 | External Temperature Sensor Connector | 1 - SMDATA; 2 - Ground; 3 - SMCLOCK; 4 - VCC; 5 - Board temperature interrupt |
| J32 | Chassis Intrusion Sensor Connector | 1 - Battery Power (approx +3V); 2 - Trigger Input (pull to pin 1 voltage to indicate intrusion) |
| J43-J44 | ISA Bus Expansion Slots | |
| J45 | SCSI LED | 1,4 - No Connect; 2,3 - SCSI Device LED Signal Input |
| J46 | USB Connector | Lower Level: USB Port 0 |
| J47 | USB Connector | Upper Level: USB Port 1 |
| J49 | PS/2 Mouse Header | |
| J51 | AT Power Supply Connector | |
| J52 | AT Keyboard Connector | |
| U1 | Pentium II CPU | Slot 1 |

Table 2-3a: Connector and Peripheral Connections

**Chapter**

# 3

# *Installing the Twister LX*

## Introduction

This chapter explains how to install the Twister LX system board, memory, CPU and peripherals.

*WARNING: Before installing or removing any peripherals or components, make sure you have a clear work space and that you adhere to all anti-static precautions described in Chapter 1. Micronics recommends that only trained technicians install and configure 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 dealer where you purchased the peripheral or Micronics' Technical Support Department.*

## System Memory Support

The flexibility of the Twister LX is augmented by its support for EDO and SDRAM memory. The Twister LX supports ECC (with 72-bit DIMMs) via the chipset.

SDRAM speed and synchronous operation have enabled the breakthrough in memory-systems design needed to meet the demands of fast high-performance processors. SDRAM improves bandwidth to main memory because all address, data and control signals are synchronized with a system clock. With all operations synchronized, system wait states are eliminated, thus providing increased performance over conventional DRAM.

# Installing the Twister LX

Installation of the Twister LX system board depends on the type of case you use. The Twister LX is designed for the Baby AT form factor and may be installed into most cases. Install the system board into the chassis using the tools and equipment required and make all necessary case connections.

*NOTE: If you are unfamiliar with installing a system board, Micronics highly recommends that 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 Twister LX:

❏   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 Twister LX for a typical configuration:

❏   AT chassis with standard hardware.

❏   A high-quality AT/ATX power supply capable of providing continuous power within a 5 volt range. A power filter may be used with a noisy AC power source.

❏   AT style keyboard and mouse and PS/2 mouse connector via cable.

❏   Eight ohm speaker.

❏   Standard ribbon cables for internal connections.

❏   Standard power cord (grounded).

# System Memory

System memory is necessary to operate the Twister LX system board. The Twister LX has three 3.3V unbuffered 64/72-bit, 168-pin DIMM sockets for a maximum of 768MB of EDO memory and 384MB of SDRAM memory. This section list the rules for adding memory to the Twister LX, give some examples of common memory configurations and show how to physically install the memory.

NOTE: One of the numerous features of Twister LX allows support for SDRAM with and without SPD (Serial Presence Detect) support.

### Adding Memory

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

The following is a list of rules to follow when installing DIMMs. If you follow these rules, your upgrade should be trouble-free:

❏ Use 10ns or faster SDRAM or 60ns or faster EDO DIMMs.

❏ DIMM memory modules support EDO and SDRAM (unbuffered) memory types.

❏ Singled-sided and double-sided memory modules are supported.

❏ Different memory types and sizes in separate banks will cause the performance of the memory to run at the speed of the slowest RAM installed, and/or cause operating system stability problems.



168-Pin DIMM

# Memory Configurations

DIMM memory configuration is auto-banking and therefore does not need to be installed in any particular order. The following tables list the most common memory configurations.

| Memory | Bank 0 | Bank 1 | Bank 2 |
|--------|--------|--------|--------|
| 8MB | 1Mx64 | | |
| 16MB | 2Mx64 | | |
| 16MB | 1Mx64 | 1Mx64 | |
| 24MB | 2Mx64 | 1Mx64 | |
| 24MB | 1Mx64 | 1Mx64 | 1Mx64 |
| 32MB | 2Mx64 | 2Mx64 | |
| 32MB | 4Mx64 | | |
| 40MB | 2Mx64 | 2Mx64 | 1Mx64 |
| 40MB | 4Mx64 | 1Mx64 | |
| 48MB | 2Mx64 | 2Mx64 | 2Mx64 |
| 48MB | 4Mx64 | 1Mx64 | 1Mx64 |
| 48MB | 4Mx64 | 2Mx64 | |
| 56MB | 4Mx64 | 2Mx64 | 1Mx64 |
| 64MB | 4Mx64 | 4Mx64 | |
| 64MB | 8Mx64 | | |
| 80MB | 8Mx64 | 2Mx64 | |
| 80MB | 8Mx64 | 1Mx64 | 1Mx64 |

Table 3-1: Memory Configurations

| Memory | Bank 0 | Bank 1 | Bank 2 |
|--------|--------|--------|--------|
| 96MB | 4Mx64 | 4Mx64 | 4Mx64 |
| 112MB | 8Mx64 | 4Mx64 | 2Mx64 |
| 128MB | 16Mx64 | | |
| 128MB | 8Mx64 | 4Mx64 | 4Mx64 |
| 128MB | 8Mx64 | 8Mx64 | |
| 160MB | 16Mx64 | 4Mx64 | |
| 160MB | 16Mx64 | 2Mx64 | 2Mx64 |
| 192MB | 8Mx64 | 8Mx64 | 8Mx64 |
| 192MB | 16Mx64 | 4Mx64 | 4Mx64 |
| 192MB | 16Mx64 | 8Mx64 | |
| 224MB | 16Mx64 | 8Mx64 | 4Mx64 |
| 256MB | 16Mx64 | 16Mx64 | |
| 256MB | 16Mx64 | 8Mx64 | 8Mx64 |
| 320MB | 16Mx64 | 16Mx64 | 8Mx64 |
| 384MB | 16Mx64 | 16Mx64 | 16Mx64 |
| 384MB | 32Mx64 | 16Mx64 | |
| 384MB | 32Mx64 | 8Mx64 | 8Mx64 |
| 448MB | 32Mx64 | 16Mx64 | 8Mx64 |
| 512MB | 32Mx64 | 32Mx64 | |
| 512MB | 32Mx64 | 16Mx64 | 16Mx64 |
| 768MB | 32Mx64 | 32Mx64 | 32Mx64 |

Table 3-1a: Memory Configurations

# CPU Installation

The Twister LX is designed to support single Pentium II processors. The Pentium II processor comes installed in a Single Edge Contact (SEC) cartridge that connects into "Slot 1" on the system board.

A Retention Mechanism is supplied to anchor the processor to the system board. Attach the Retention Mechanism before inserting the processor.

## Installing the CPU Retention Mechanism

Before you begin, verify that your Retention Mechanism Kit contains the following items:

❏   Retention Base (black plastic module)

❏   Support Bridges with Studs (plastic mounts).



Retention Base

Support Bridge with Studs
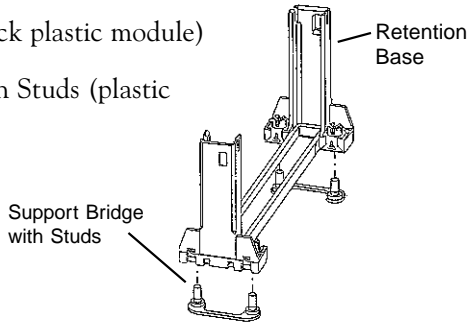
Follow the steps below to install the kit:

1.   Locate the four Retention Base holes (near each end of the Slot 1 socket). Insert the two Support Bridges with studs (plastic mounts) from the bottom side of the Twister LX toward the component side until they snap into place.



(Orient the loops toward the outer edges of the system board)
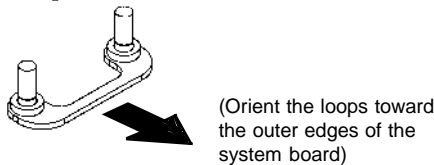
2.  Place the Retention Base over the Slot 1 connector and insert it down into the Support Bridges with studs. Note the "Keyed" location of both Slot 1 and the Retention Base.



Keyed
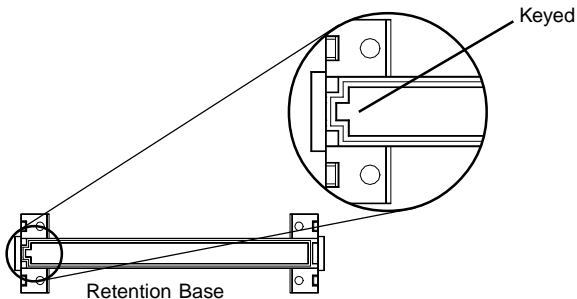
Retention Base

3.  Using a screwdriver, tighten all four sides of the Retention Base.
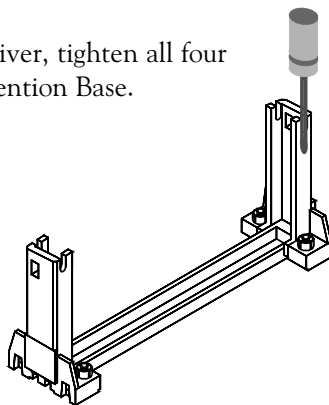


## Installing a CPU

Follow the steps below to install the Pentium II processor:

1.  Locate the Slot 1 connector (refer to Figure 2-1).

2.  If you are installing the boxed version of the Pentium II processor, follow the instructions in the section "CPU Installation (Boxed version)."

3.  If you are installing the *optional* Heat Sink Support, continue to step 4; if not, go to step 5.

4. The Heatsink components consist of a top bar, base and two pins. Gently insert the Heatsink base into the holes next to the Slot 1 socket. Push down until the base snaps into place.
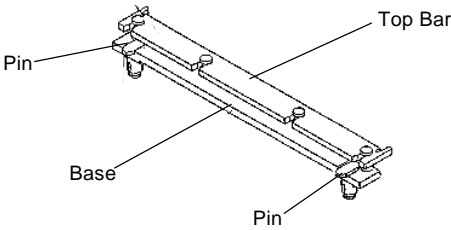


5. Gently insert the processor cartridge down into the Retention Module, making sure the connector on the processor cartridge and the Slot 1 connector are aligned (refer to the keyed location on the previous page).

6. Push the processor cartridge down until it snaps into place.

7. Lock the processor cartridge into place by pushing outward on the tabs located on both sides of the processor cartridge. The processor cartridge is locked when the tabs snap into the holes on the side of the Retention Mechanism.

8. After the processor cartridge is locked into place, connect the Heatsink's top bar to the base.

9. Lock the base into place by inserting a pin down into the base on both sides.

10. Make sure the speed selection jumpers are set correctly (refer to Chapter 2 - Jumper Settings).

# CPU Installation Overview

**CPU Installation Overview**

1. Mount the Retention Mechanism for the CPU.

2. Mount the (optional) heatsink support base onto the system board.

3. Slide the CPU into the Retention Mechanism.

4. Lock the CPU into the Retention mechanism using the tabs.

5. Slide in the Heat Sink Top Bar, then insert the pins to lock it in place.
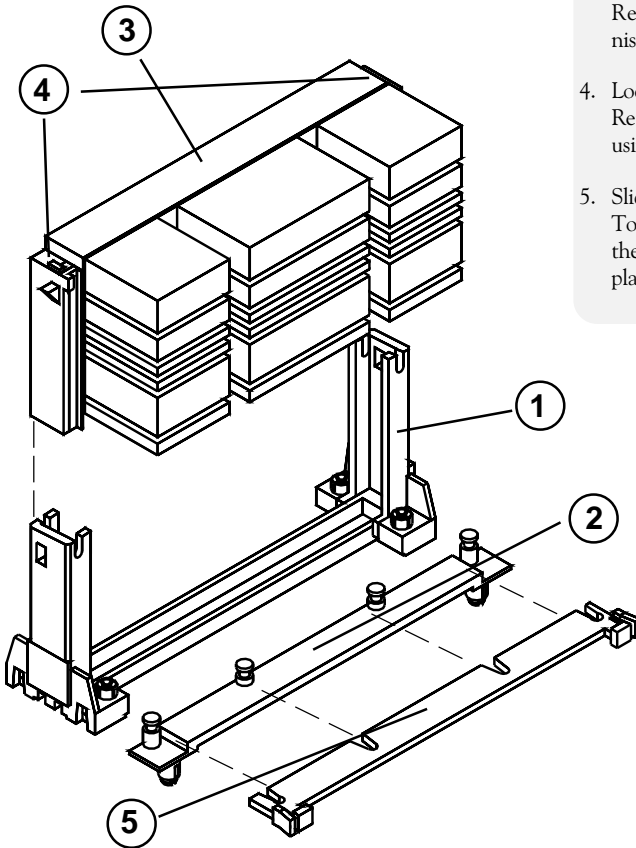


Figure 3-1: Installing a CPU

# CPU Installation (Boxed version)

A boxed version of the CPU is offered through Intel. This packaging uses an active cooling fan. The mounting hardware is described below. For detailed instructions, please refer to the documentation that is supplied with your CPU.

NOTE: Make sure the speed selection jumpers are set correctly (refer to Chapter 2 - Jumper Settings).



Install to system board
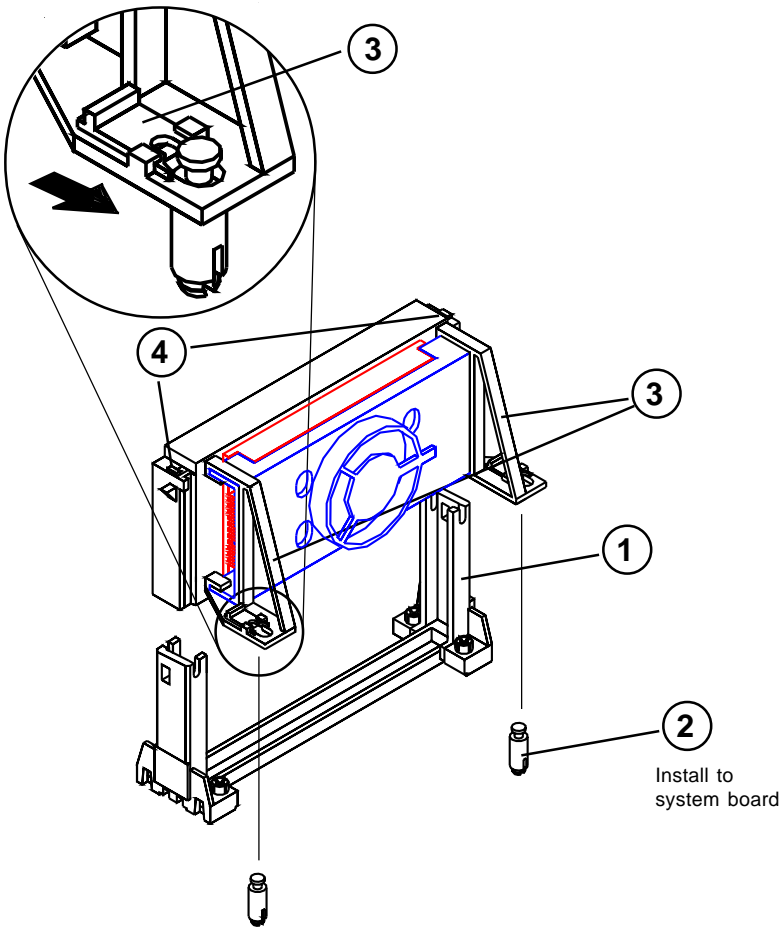
Figure 3-2: Installing a CPU (Boxed version)

# Installing DIMMs

To install the DIMMs, locate the memory banks on the system board and perform the following steps:

1.  Hold the DIMM so that the notched edge is aligned with the notch on the DIMM socket (Figure 3-1).

2.  Insert the DIMM at a 90 degree angle.

3.  Gently push the DIMM straight down until it locks into place (past the release tabs).
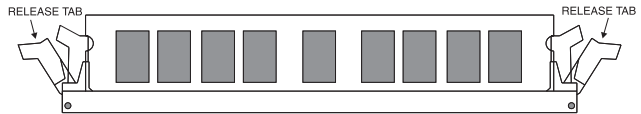


Figure 3-3: Installing a 168-Pin DIMM

## Removing DIMMs

To remove DIMMs, follow the steps below:

1.  With both thumbs (or fingers), press the release tabs away from the socket.

2.  With the DIMM free from the release tabs, lift the module up and place in an anti-static bag or package.

# Installing a PCI Peripheral Card

Micronics PCI slots accommodate all PCI peripherals that meet the PCI 2.1 specifications. Follow the steps below 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 in place.

6.  Replace the computer cover.

7.  Refer to the PCI card's documentation additional instructions regarding installation and software drivers.
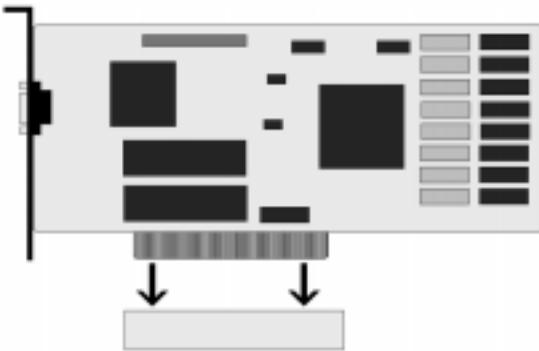
Figure 3-4: Installing a PCI Card

# Installing an ISA Peripheral Card

Micronics ISA slots accommodate all standard ISA peripherals. Follow the steps below to install an ISA card:

1.  Turn the computer system off and remove its cover.

2.  Choose an unused ISA slot and remove the slot cover.

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

4.  Carefully push the card straight down, making sure the card is fully inserted.

5.  Replace the screw that holds the card in place.

6.  Replace the computer cover.

7.  Refer to the ISA card's documentation for additional instructions regarding installation and software drivers.
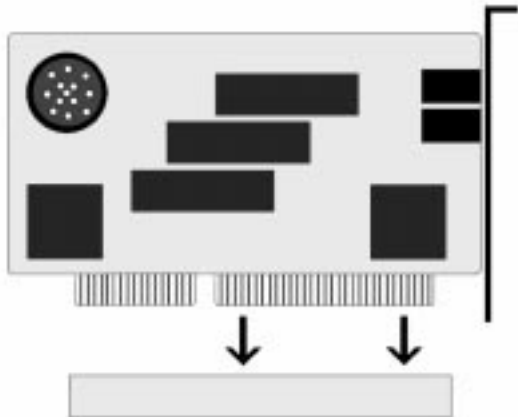
Figure 3-5: Installing an ISA Peripheral Card

# Installing an AGP Peripheral Card

Micronics AGP slot can accommodate all AGP peripherals that meet the Intel AGP bus specifications. Follow the steps below to install an AGP card:

1.  Turn the computer system off and remove its cover.

2.  Locate the AGP slot (J1) 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 in place.

6.  Replace the computer cover.

7.  Refer to the AGP card's documentation for additional instructions regarding installation and software drivers.
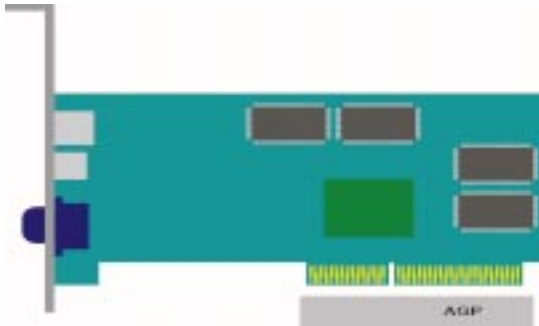
Figure 3-6: Installing an AGP Peripheral Card

**Chapter**

# 4

# *The BIOS Setup Utility*

## Configuration

After the Twister LX 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.

We recommend that you keep the computer cover off the first time you boot the system. This makes it faster and easier to correct any difficulties that might arise.

## Initial Boot Up

Power up the Twister LX. If the system does not properly boot, check all your cables and peripherals for bad connections. You may also get beep codes or error messages. If this occurs, consult Appendix B for a guide to possible solutions.

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

## Setup

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

When the system is turned on, it performs a memory test, and a BIOS identification and system information screen is displayed on your monitor, as shown in Figure 4-1.

```
Award Modular BIOS v4.51PG,  An Energy Star Ally
Copyright (C) 1984-98 Award Software, Inc.

Micronics Computers, Inc.            Twister LX -xx

PENTIUM-II MMX CPU at 300MHz
Memory Test: 32000K OK

Award Plug and Play BIOS Extension v1.0A
Copyright (C) 1998, Award Software, Inc.




Press DEL to enter SETUP
```
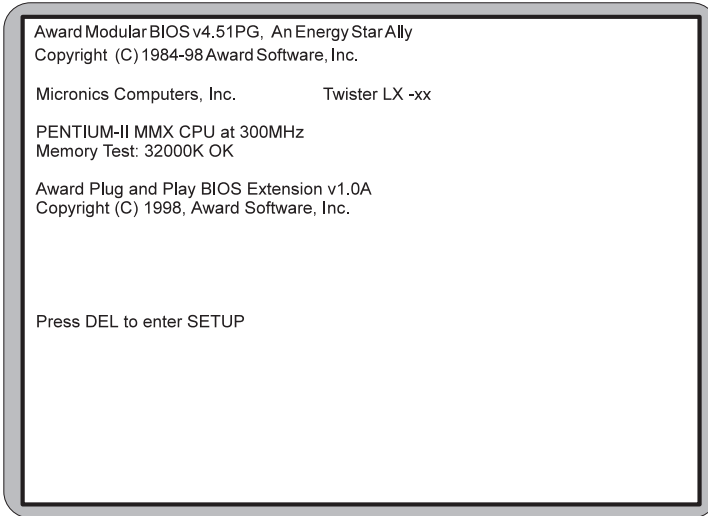
Figure 4-1: Power-Up Screen

When "Press DEL to enter Setup" appears at the bottom of the screen, press the <DEL> key to start the Setup program.  The main CMOS Setup utility screen (Figure 4-2) appears.  Note that the Setup program can only be activated during the boot sequence.

# Running the Setup Program

The Twister LX system board has six primary CMOS configuration screens: main setup menu, Standard CMOS Setup, BIOS Features Setup, Chipset Features Setup, PNP/PCI Configuration and Integrated Peripherals screen.

In addition, there are four screens containing options that do not have to be set unless you want to: the Power Management Setup screen, the Supervisor Password, the User Password and the IDE HDD Auto Detection screen. The main menu screen also contains the following options: Load BIOS Defaults, Load Setup Defaults, HDD Low Level Format, Save & Exit Setup and the Exit Without Saving.

To select any of these screens or options, use the arrow keys (<↑←↓→>) to move the highlight to the desired item and press <Enter>. *NOTE: A brief description of each highlighted selection appears at the bottom of the screen.*

```
                    ROM PCI/ISA BIOS (2A69JS2A)
                        CMOS SETUP UTILITY
                  AWARD SOFTWARE, INTERNATIONAL INC.

   STANDARD CMOS SETUP              INTEGRATED PERIPHERALS
   BIOS FEATURES SETUP              SUPERVISOR PASSWORD
   CHIPSET FEATURES SETUP           USER PASSWORD
   POWER MANAGEMENT SETUP           IDE HDD AUTO DETECTION
   PNP/PCI CONFIGURATION SETUP      HDD LOW LEVEL FORMAT
   LOAD BIOS DEFAULTS               SAVE AND EXIT SETUP
   LOAD SETUP DEFAULTS              EXIT WITHOUT SAVING


   Esc : Quit                       ↑↓→← : Select Item
   F10 : Save & Exit Setup
                                    (Shift) F2 : Change Color

                Time, Date, Hard Disk Type…
```

Figure 4-2: CMOS Main Screen

# Standard CMOS Setup

The STANDARD CMOS SETUP allows checking or modification of general configuration information. To access the STANDARD CMOS SETUP screen, highlight this option on the main menu screen and press <Enter>.

```
                    ROM PCI/ISA BIOS (2A69JS2A)
                       STANDARD CMOS SETUP
                       AWARD SOFTWARE, INC.

  Date (mm:dd:yy) : Tue, Jan 13 1998
  Time (hh:mm:ss) : 15 : 5 : 29

  HARD DISKS      TYPE  SIZE  CYLS  HEAD  PRECOMP  LANDZ  SECTOR  MODE

  Primary Master    Auto    0     0     0        0      0       0   Auto
  Primary Slave     Auto    0     0     0        0      0       0   Auto
  Secondary Master  Auto    0     0     0        0      0       0   Auto
  Secondary Slave   Auto    0     0     0        0      0       0   Auto


  Drive A  : 1.44MB 3.5 in
  Drive B  : None                   Base Memory :     640K
                              Extended Memory : 31744K
  Video    : EGA/VGA              Other Memory :     384K
  Halt On  : All Errors
                                  Total Memory : 32768K

  Esc : Quit              ↑↓→← : Select Item     PU/PD/+/- : Modify
  F1  : Help              (Shift) F2 : Change Color
```

Figure 4-3. Standard CMOS Setup Screen

## Date and Time

To set the date, use <→/←↑/↓> arrow keys to highlight the date and follow the same procedure to set the time.

## Hard Disks Setup

The BIOS supports up to four IDE drives. You can specify the physical and electronic properties of the disk drives installed. Relevant specifications include the type, number of cylinders (CYLS), heads (HEAD), write precompensation time (PRECOMP), read/write head land-

ing zone (LANDZ), number of sectors per track (SEC-TOR), and HDD mode (MODE). *NOTE: We recommend that you select type Auto for all drives.*

### Diskette A or B

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

### Video

Select the type of video card installed into your system. The default setting is EGA/VGA.

### Halt On

During the Power-On Self-Test (POST), the system stops if the BIOS detects a hardware error. The default setting is All Errors.

### Base/Extended/Other Memory

A small section in the lower right corner of the screen displays important information about your system that includes the base, extended and other memory sizes. They are updated automatically by the Setup program according to the status detected by the BIOS self-test.

# BIOS Features Setup

This feature allows you to set the Award enhanced BIOS options of your choice. To access the BIOS FEATURES SETUP screen, highlight this option on the main menu screen and press <Enter>.

```
                ROM PCI/ISA BIOS (2A69JS2A)
                   BIOS FEATURES SETUP
                   AWARD SOFTWARE, INC.

 Virus Warning              Disabled    Video BIOS Shadow       Enabled
 CPU Internal Cache         Enabled     C8000-CBFFF Shadow      Disabled
 External Cache             Enabled     CC000-CFFFF Shadow      Disabled
 Quick Power On Self Test   Enabled     D0000-D3FFF Shadow      Disabled
 Boot Sequence              A, C, SCSI  D4000-D7FFF Shadow      Disabled
 Swap Floppy Drive          Disabled    D8000-DBFFF Shadow      Disabled
 Boot Up Floppy Seek        Enabled     DC000-DFFFF Shadow      Disabled
 Boot Up Numlock Status     On
 Boot Up System Speed       High
 Gate A20 Option            Fast
 Typematic Rate Setting     Disabled
 Typematic Rate (Char/Sec)  6
 Typematic Delay (Msec)     250
 Security Option            Setup
 PCI/VGA Palette Snoop      Disabled
 OS Select for DRAM > 64MB  Non-OS2

                                   ESC  :   Quit        ↑↓→← : Select Item
                                   F1   :   Help        PU/PD/+/- : Modify
                                   F5   :   Old Values   (Shift)F2  :  Color
                                   F6   :   Load BIOS Defaults
                                   F7   :   Load SETUP Defaults
```

Figure 4-4: BIOS Features Setup Screen

## Virus Warning

When enabled, the system BIOS will report a warning message if a program attempts to write to the boot sector or partition table of the hard disk drive.

## CPU Internal Cache

This selection enables the internal CPU. The default setting is Enabled.

## External Cache

The External Cache selection enables or disables the external (L2) cache and the onboard secondary cache. The default setting is Enabled.

### Quick Power-On Self-Test

When enabled, this selection will reduce the amount of time required to run the Power-On Self-Test (POST). A quick POST skips certain steps. We recommend that you disable quick POST. The default setting is Enabled.

### Boot Sequence

Boot Sequence selects the order in which the system searches for a boot disk. The default setting is A, C, SCSI.

### Swap Floppy Drive

This selection can be set to remap the floppy drives. When set to Enabled, drive A: becomes drive B: and drive B: becomes drive A:.

### Boot Up Floppy Seek

When set to Enabled (default), the BIOS tests (seeks) floppy drives to determine whether they have 40 or 80 tracks. Drives with 720KB, 1.2MB and 1.44MB capacity all have 80 tracks.

### Boot Up Numlock Status

Toggle between On and Off to control the state of the NumLock key when the system boots. When toggled On, the numeric keypad generates numbers instead of controlling cursor operations. The default setting is On.

### Boot Up System Speed

Select the system boot up speed. The default setting is High.

## Gate A20 Option

Gate A20 refers to the way the system addresses memory above 1MB (extended memory). When set to Fast (default), the system chipset controls Gate A20. When set to Normal, a pin in the keyboard controller controls Gate A20. Setting Gate A20 to Fast improves system speed, particularly with OS/2 and Windows.

## Typematic Rate Setting

This selection enables or disables the Type Rate and Typematic Delay options that control the speed at which a keystroke is repeated.

## Typematic Rate/Typematic Delay

Typematic Rate selects the typematic rate at which characters repeat when a key is held down. The default setting is 6 (Chars/Sec). Typematic Delay controls the gap between key compression and appearance of the characters on the screen. The default setting is 250 (Msec).

## Security Option

This selection determines whether the password will be asked for in every system boot or only when entering into the Setup (default) program.

## PCI/VGA Palette Snoop

Alters the VGA palette setting while graphic signals pass through the feature connector of the VGA card and are processed by the MPEG card. Enable this option only if you have MPEG connections through the VGA feature connector; this means you can adjust PCI/VGA palettes. The default setting is Disabled.

## OS Select for DRAM>64MB

This selection allows you to select the amount of memory installed for your operating system. The default setting is Non-OS2. Select OS2 only when running OS/2 operating systems with greater than 64MB of system memory.

## Video BIOS Shadow

Enabling this selection allows you to shadow the BIOS on the video card for faster video performance. Some video cards do not support video BIOS shadowing. Disable this option if problems occur.

# Chipset Features Setup

The Chipset Features Setup allows you to program the Intel 430TX PCI chipset features. To access the CHIPSET FEATURES SETUP screen, highlight this option on the main menu screen and press <Enter>.

```
                ROM PCI/ISA BIOS (2A69JS2A)
                  CHIPSET FEATURES SETUP
                   AWARD SOFTWARE, INC.

Auto Configuration        :Enabled    SDRAM CAS Latency Time  :3
DRAM Timing               :70ns
MA Wait State             :Slow
EDO RAS# To CAS# Time     :3          Current System Temp.     :31 C/87 F
EDO RAS# Precharge Time   :3          Current CPU FAN1 Speed   :7417 RPM
EDO DRAM Read Burst       :x333
EDO DRAM Write Burst      :x333
DRAM Data Integrity Mode  :Non-ECC    IN0(V)  :   4.98V   IN1(V)  :2.48V
CPU-To-PCI IDE Posting    :Enabled    IN2(V)  :   3.28V   IN3(V)  :5.16V
System BIOS Cacheable     :Disabled   IN4(V)  :  12.40V   IN5(V)  :-12.65V
Video BIOS Cacheable      :Disabled   IN6(V)  :  -4.80V
Video RAM Cacheable       :Disabled
8 bit I/O Recovery Time   :NA
16 Bit I/O Recovery Time  :NA
Memory Hole at 15M-16M    :Disabled
Passive Release           :Enabled
Delay Transaction         :Disabled   ESC :   Quit          ↑↓→← : Select Item
AGP Aperture Size (MB)    :64         F1  :   Help         UP/DN/+/- : Modify
SDRAM RAS-to-CAS Delay    :Slow       F5  :   Old Values   (Shift) F2  : Color
SDRAM RAS Precharge Time  :Slow       F6  :   Load BIOS Defaults
                                      F7  :   Load SETUP Defaults
```

Figure 4-5: Chipset Features Setup Screen

## Auto Configuration

Auto Configuration selects predetermined optimal values of the chipset parameters. When disabled, chipset parameters revert to setup information stored in CMOS. Many fields in this screen are not available when Auto Configuration is enabled.

## DRAM Timing

This selection configures the DRAM read/write timing for maximum performance. The options are 60ns (default) and 50ns. NOTE: Before changing this selection, verify the speed of the DRAM currently installed.

*An incorrect DRAM Timing setting could cause the system to lock up. Clear the CMOS and run the Setup program again.*

### MA Wait State

Select the wait state before the beginning of a memory read. The default settings is Slow.

### EDO RAS# To CAS# Time

This field applies only if EDO DRAM is installed in the system. It lets you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. The default setting is 3.

### EDO RAS# Precharge Time

The precharge time is the number of cycles it takes for the RAS to accumulate its charge before DRAM refresh. If insufficient time is allowed, refresh may be incomplete and the DRAM may fail to retain data. This field applies only if EDO DRAM is installed in the system. The default setting is 3.

### EDO DRAM Read Burst

Set the timing for burst-mode reads from DRAM. The lower the timing numbers, the faster the system addresses memory. This field applies only if EDO DRAM is installed in the system.

### EDO DRAM Write Burst

Set the timing for burst-mode writes from DRAM. The lower the timing numbers, the faster the system addresses memory. This field applies only if EDO DRAM is installed in the system.

### DRAM Data Integrity Mode

Select Parity or ECC (error-correcting code), according to the type of installed DRAM.

## CPU-To-PCI IDE Posting

Select Enabled to post write cycles from the CPU to the PCI IDE interface. IDE accesses are posted in the CPU to PCI buffers, for cycle optimization.

## System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

## Video BIOS Cacheable

Selecting Enabled allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

## Video RAM Cacheable

Enable or disable the caching of the video RAM. The default settings is Disabled.

## 8-Bit/16-Bit I/O Recovery Time

The I/O recovery mechanism adds bus clock cycles between PCI-originated I/O cycles to the ISA bus. This delay takes place because the PCI bus is so much faster than the ISA bus. These two fields let you add recovery time (in bus clock cycles) for 16-bit and 8-bit I/O.

## Memory Hole at 15M-16M

You can reserve this area of system memory for the ISA adapter ROM. When this area is reserved, it cannot be cached.

### Passive Release

When enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

### Delay Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transaction cycles. Select Enabled to support compliance with PCI specification version 2.1.

### AGP Aperture Size (MB)

Select the size of the Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation.

### SDRAM RAS-to-CAS Delay

This field lets you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. Fast gives faster performance and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.

### SDRAM RAS Precharge Time

If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. This field applies only when synchronous DRAM is installed in the system.

### SDRAM CAS Latency Time

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. Do not reset this field from the default value specified.

# Power Management Setup

The Power Management Setup option controls the power management functions of the system. To access the POWER MANAGEMENT SETUP screen, highlight this option on the main menu screen and press <Enter>.

```
                    ROM PCI/ISA BIOS (2A69JS2A)
                    POWER MANAGEMENT SETUP
                       AWARD SOFTWARE, INC.

   Power Management      : Max Savings      ** Reload Global Timer Events **
   PM Control by APM     :Yes               IRQ (3-7, 9-15), NMI     :Enabled
   Video Off Method      : V/H Sync+Blank   Primary IDE 0            :Disabled
   Video Off After       :Standby           Primary IDE 1            :Disabled
   Modem Use IRQ         :3                 Secondary IDE 0          :Disabled
   Doze Mode             :1 Min             Secondary IDE 1          :Disabled
   Standby Mode          :1 Min             Floppy Disk              :Disabled
   Suspend Mode          :1 Min             Serial Port              :Enabled
   HDD Power Down        :1 Min             Parallel Port            :Disabled
   Throttle Duty Cycle   :62.5%
   ZZ Active in Suspend  :Disabled
   VGA Active Monitor    :Enabled
   Resume by Ring        :Enabled
   IRQ 8 Clock Event     :Disabled

                          ESC  :   Quit            ↑↓→←  : Select Item
                          F1   :   Help        UP/DN/+/- : Modify
                          F5   :   Old Values   (Shift) F2  : Color
                          F6   :   Load BIOS Defaults
                          F7   :   Load SETUP Defaults
```

Figure 4-6: Power Management Screen

## Power Management

This selection allows you to select the type (or degree) of power saving for Sleep, Standby and Suspend modes. The options are: Maximum Power Savings, User Defined and Minimum Power Savings.

| | |
|---|---|
| Max Saving | Maximum power savings. Inactivity period is 1 minute in each mode. |
| User Define | Set each mode individually. Select time-out periods in the PM Timers section. |
| Min Saving | Minimum power savings. Inactivity period is 1 hour in each mode (except the hard drive). |

### PM Control By APM

When enabled, power management is controlled by the Advanced Power Management (APM) feature, which gives better power savings. The default setting is YES.

### Video OFF Method

This selection defines the video off method in standby mode. The following table describes each option:

| | |
|---|---|
| SYNC+Blank | System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer. |
| DPMS Support | Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values. |
| Blank Screen | System only writes blanks to the video buffer. |

### Video OFF After

Select the mode in which you want the monitor to blank. The default setting is Standby.

### Modem Use IRQ

Select an IRQ setting to be used by the modem if Resume by Ring is enabled.

### Doze Mode

After the selected period of system inactivity (1 minute to 1 hour), the CPU clock runs at slower speed while all other devices still operate at full speed.

## Standby Mode

After the selected period of system inactivity (1 minute to 1 hour), the fixed disk drive and the video shut off while all other devices still operate at full speed.

## Suspend Mode

After the selected period of system inactivity (1 minute to 1 hour), all devices except the CPU shut off.

## HDD Power Down

After the selected period of drive inactivity (1 to 15 minutes), the hard disk drive powers down while all other devices remain active.

## Throttle Duty Cycle

This option allows you to select the percentage of time that the CPU clock runs when the system enters Doze Mode.

## ZZ Active in Suspend

When enabled, the ZZ signal is active during Suspend mode.

## VGA Active Monitor

Select whether or not video activity restarts the global timer for Standby Mode.

## Resume By Ring

When this feature is turned on, the system will wake up when an incoming call is detected on your modem. You must set up the Mode Use IRQ selection.

### IRQ 8 Clock Event

Sets the monitoring of IRQ8 (Real Time Clock) so that it does not awaken the system from Suspend Mode.

### Reload Global Timer Events

You can disable monitoring of common interrupt requests so they do not awaken the system from, or reset activity timers for Standby mode.

# PnP/PCI Configuration Setup

The PnP/PCI Configuration Setup option sets the various system functions and internal addresses of PnP and PCI devices and onboard PCI IDE controller. To access the PnP/PCI CONFIGURATION SETUP screen, highlight this option on the main menu screen and press <Enter>.
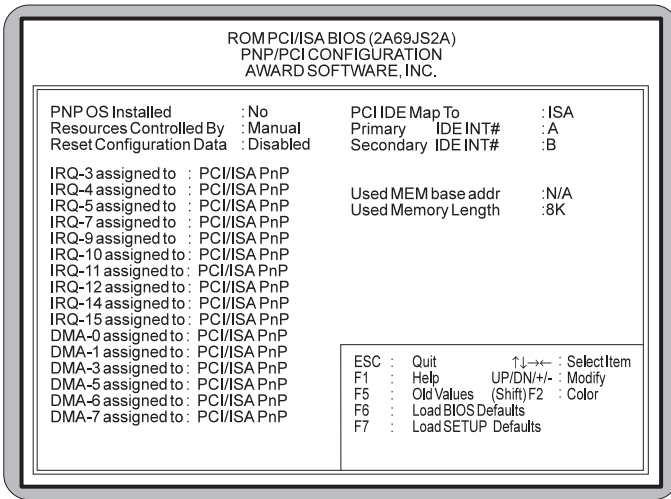
```
                  ROM PCI/ISA BIOS (2A69JS2A)
                      PNP/PCI CONFIGURATION
                       AWARD SOFTWARE, INC.

   PNP OS Installed        : No        PCI IDE Map To          : ISA
   Resources Controlled By : Manual    Primary     IDE INT#    : A
   Reset Configuration Data : Disabled Secondary  IDE INT#     : B

   IRQ-3 assigned to  : PCI/ISA PnP
   IRQ-4 assigned to  : PCI/ISA PnP
   IRQ-5 assigned to  : PCI/ISA PnP    Used MEM base addr      : N/A
   IRQ-7 assigned to  : PCI/ISA PnP    Used Memory Length      : 8K
   IRQ-9 assigned to  : PCI/ISA PnP
   IRQ-10 assigned to : PCI/ISA PnP
   IRQ-11 assigned to : PCI/ISA PnP
   IRQ-12 assigned to : PCI/ISA PnP
   IRQ-14 assigned to : PCI/ISA PnP
   IRQ-15 assigned to : PCI/ISA PnP
   DMA-0 assigned to  : PCI/ISA PnP
   DMA-1 assigned to  : PCI/ISA PnP    ┌──────────────────────────────────────┐
   DMA-3 assigned to  : PCI/ISA PnP    ESC :  Quit         ↑↓→← : Select Item
   DMA-5 assigned to  : PCI/ISA PnP    F1  :  Help       UP/DN/+/- : Modify
   DMA-6 assigned to  : PCI/ISA PnP    F5  :  Old Values  (Shift)F2 : Color
   DMA-7 assigned to  : PCI/ISA PnP    F6  :  Load BIOS Defaults
                                       F7  :  Load SETUP Defaults
```

Figure 4-7: PnP/PCI Configuration Screen

## PnP OS Installed

When set to Yes, this selection allows the system to work with a Plug and Play (PnP) operating system such as Windows 95. The PnP BIOS will configure only PCI and ISA Plug and Play cards needed to boot the system, and allow the operating system or device drivers to configure the remaining cards. The default setting is No.

## Resources Controlled By

The Twister LX's Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible

devices. If you select Auto all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them.

## Reset Configuration Data

Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup. This selection allows the PnP BIOS to detect your PCI and ISA PnP devices and reallocate resources to them. The default setting is Disabled.

## IRQ *n* Assigned To

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

*Legacy ISA*    Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for COM 1) or older ISA cards that use jumpers to adjust resources.

*PCI/ISA PnP*   Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

## DMA *n* Assigned To

When resources are controlled manually, assign each system DMA channel as one of the following types, depending on the type of device using the interrupt:

*Legacy ISA*    Devices compliant with the original PC AT bus specification, requiring a specific DMA channel or older ISA cards that use jumpers to adjust resources.

*PCI/ISA PnP*   Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

### PCI IDE Map To

Select PCI IDE IRQ mapping or PC AT (ISA) interrupts.

### Used Memory Base Address

Select a base address for the memory area used by any peripheral that requires high memory.

### Used Memory Length

Select a length of memory area specified by any peripheral that requires high memory. NOTE: This option is available only if Used Memory Base Address is not set at N/A.

# Load BIOS Defaults

This selection loads the BIOS default values that would allow safe booting of the system in the event of a BIOS configuration memory loss. To select LOAD BIOS DEFAULTS, highlight this option on the main menu screen and press <Enter>. Press <Y> or <N> when the program prompts you with the Load BIOS Defaults question.

# Load Setup Defaults

This selection allows automatic configuration of all the options in the Standard CMOS Setup, BIOS Features Setup and Chipset Features Setup with the setup defaults. If problems are encountered after loading the setup defaults, reboot the system and load the BIOS defaults. To select LOAD SETUP DEFAULTS, highlight this option on the main menu screen and press <Enter>. Press <Y> or <N> when the program prompts you with the Load Setup Defaults question.

# Integrated Peripherals

This option sets the addresses of I/O subsystems that depend on the integrated peripherals controller in your system. To access the INTEGRATED PERIPHERALS screen, highlight this option on the main menu screen and press <Enter>.
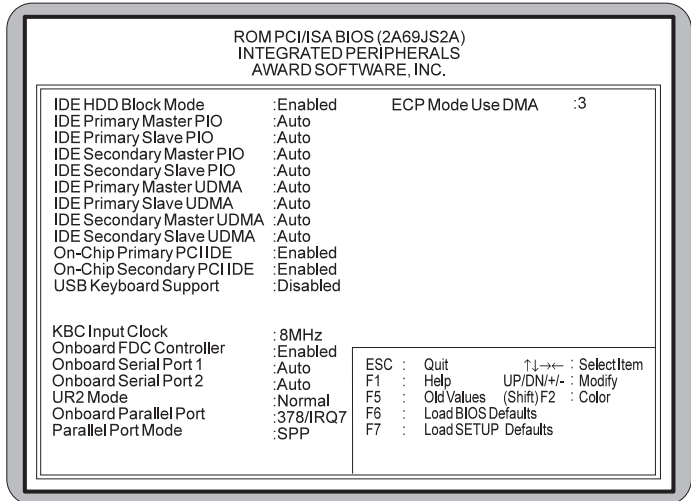
```
                    ROM PCI/ISA BIOS (2A69JS2A)
                     INTEGRATED PERIPHERALS
                       AWARD SOFTWARE, INC.

 IDE HDD Block Mode          :Enabled    ECP Mode Use DMA      :3
 IDE Primary Master PIO      :Auto
 IDE Primary Slave PIO       :Auto
 IDE Secondary Master PIO    :Auto
 IDE Secondary Slave PIO     :Auto
 IDE Primary Master UDMA     :Auto
 IDE Primary Slave UDMA      :Auto
 IDE Secondary Master UDMA   :Auto
 IDE Secondary Slave UDMA    :Auto
 On-Chip Primary PCI IDE     :Enabled
 On-Chip Secondary PCI IDE   :Enabled
 USB Keyboard Support        :Disabled

 KBC Input Clock             : 8MHz
 Onboard FDC Controller      :Enabled
 Onboard Serial Port 1       :Auto       ESC :  Quit         ↑↓→← : Select Item
 Onboard Serial Port 2       :Auto       F1  :  Help       UP/DN/+/- : Modify
 UR2 Mode                    :Normal     F5  :  Old Values  (Shift)F2 : Color
 Onboard Parallel Port       :378/IRQ7   F6  :  Load BIOS Defaults
 Parallel Port Mode          :SPP        F7  :  Load SETUP  Defaults
```

Figure 4-8: Integrated Peripherals Configuration Screen

## IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled (default) for automatic detection of the optimal number of block read/writes per sector the drive can support.

## IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields allow you to set a PIO mode (0-4) for each of the four IDE

devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto (default) mode, the system automatically determines the best mode for each device.

### IDE Primary/Secondary Master/Slave UDMA

Set the UDMA (Ultra DMA/33) mode for the specified onboard IDE interface. Ultra DMA/33 is a hard drive interface protocol that increases the burst data transfer rate to 33MBytes per second. NOTE: Your hard drive and operating environment must both support the UDMA mode.

### On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

### USB Keyboard Support

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have USB keyboard.

### KBC Input Clock

This selection allows you to set the clock speed for the keyboard controller. The default setting is 8MHz.

### Onboard FDC Controller

Select Enabled (default) to use the floppy disk controller installed on the system board. If you install an add-in controller or the system has no floppy drive, select Disabled.

### Onboard Serial Port 1 and Serial Port 2

Select a logical COM port name and matching address for the first and second serial ports.

### UR2 Mode

The second serial port offers the following Infrared interface modes: Standard, HPSIR: IrDA-compliant serial infrared port, and ASK-IR: Amplitude shift keyed infrared port. Standard mode is the default.

### Onboard Parallel Port

Select an address and interrupt for the physical parallel (printer) port.

### Parallel Port Mode

Select an operating mode for the onboard parallel (printer) port. Select SPP (default) unless your hardware and software require one of the other modes offered in this field.

### ECP Mode Use DMA

Select a DMA channel for the port. The default setting is channel 3.

# Supervisor Password

The Supervisor Password utility allows you to setup, change or disable the password stored in the BIOS. The Supervisor Password allows access to the system Setup. To setup or change a password, highlight the SUPERVISOR PASSWORD option on the main menu screen and press <Enter>.

The password can be no more than eight characters long. The program will prompt you to confirm the new password before exiting and enabling the utility. To disable the password, press <Enter> when the program prompts you to enter the new password.

*WARNING: If you forget the Supervisor Password, it cannot be disabled without resetting the CMOS.*

# User Password

The User Password utility allows you to setup, change or disable the password stored in the BIOS. Follow the same procedure used to setup the Supervisor Password. The User Password allows power-on access to the system, but will not allow you to modify the CMOS settings.

NOTE: The User Password can only be set after setting the Supervisor password.

# IDE HDD Auto Detection

The IDE HDD Auto Detection option provides auto configuration of the hard drive installed in your system. To access the IDE HDD Auto Detection screen, highlight this option on the main menu screen and press <Enter>.
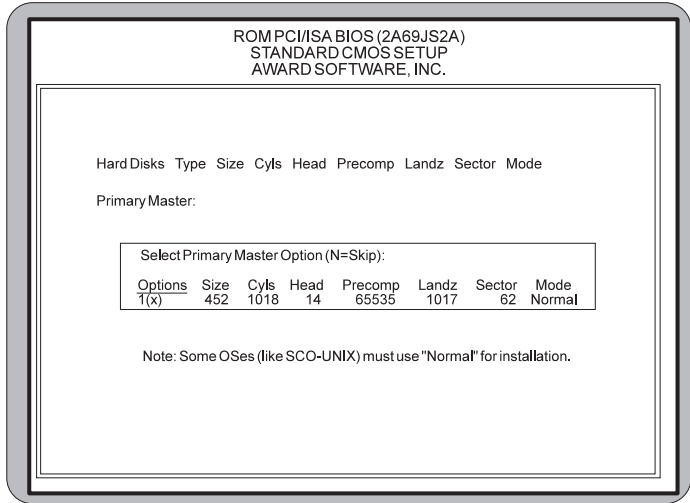
```
                ROM PCI/ISA BIOS (2A69JS2A)
                   STANDARD CMOS SETUP
                   AWARD SOFTWARE, INC.


   Hard Disks  Type  Size  Cyls  Head  Precomp  Landz  Sector  Mode

   Primary Master:


     Select Primary Master Option (N=Skip):

     Options   Size   Cyls   Head   Precomp   Landz   Sector   Mode
     1(x)       452   1018    14     65535     1017      62    Normal


   Note: Some OSes (like SCO-UNIX) must use "Normal" for installation.
```

Figure 4-9: IDE HDD Auto Detection Screen

The IDE HDD Auto Detection option provides auto configuration of the hard drive installed in your system. It supports LBA, Large and Normal modes.

If your hard disk drive's capacity is under 528MB, select Normal mode. NOTE: It is recommended that you select Normal mode for your hard disk drive if you will be using UNIX. If the system's hard disk drive has a capacity of over 528MB and supports LBA functions, you may enable either the LBA mode or the Large Mode.

# HDD Low Level Format

*Micronics recommends that only trained technicians use this utility.* This selection allows you to perform a low level format of your hard disk drive. To select the HDD LOW LEVEL FORMAT option, highlight this option on the main menu screen and press <Enter>.
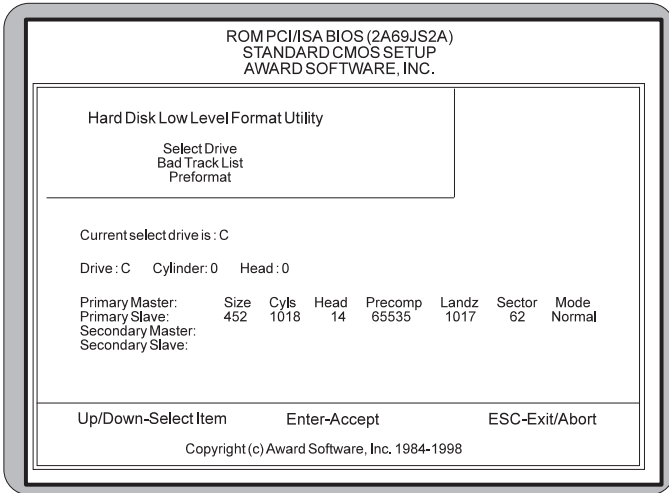


Figure 4:10: HDD Low Level Format Screen

The selections available are: Low Level Format Utility, Select Drive Bad Track List and Preformat.

*WARNING: This utility should not be run on an IDE or EIDE hard drive unless the manufacturer of the hard drive instructs you to do so.*

# Save and Exit Setup

This selection saves the changes you have made in the setup program, then exits and reboots the system. After making all modifications in the setup program, exit to the main menu screen. Highlight the SAVE AND EXIT SETUP option and press <Enter>. Press <Y> to confirm the changes made and <N> or <ESC> if additional modifications are needed before exiting the setup program.

# Exit Without Saving

This selection abandons all previous settings, then exits and reboots the system. From the main menu screen highlight the EXIT WITHOUT SAVING option and press <Enter>. Press <Y> and the system will exit the setup program, then reboot without saving any of the changes made.

**Chapter**

**5**

## *Special Features*

The Twister LX achieves high reliability and high performance with numerous features.

### Accelerated Graphics Port (AGP)

With the introduction of the Pentium II and the 440LX AGPset, graphics took the next step onto the AGP freeway. The AGP bus is faster than the current 33MHz PCI bus. It provides a *direct* connection between the graphics subsystem and system memory. AGP, with dual 528MB/s data path, surpasses PCI's 132MB bottleneck.
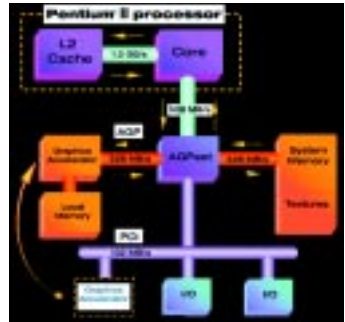
### LM79

A highly integrated Data Acquisition system for hardware monitoring of servers, Personal Computers, or virtually any microprocessor based system. In a PC, the LM79 can be used to monitor power supply voltages, temperatures, and fan speeds. It provides the hardware support for remote management software, (e.g., Intel's LANDesk) to keep maintenance costs to a minimum while providing real time remote management.

## Ultra DMA/33 IDE

A hard drive interface protocol that
increases the burst data transfer rate
to 33MBytes per second. Prior to this
protocol, Mode-4 protocol has been
the fastest at 16.6MB per second. This new protocol is
supported by Intel's 430TX and 440LX PCIsets.

## Universal Serial Bus (USB)

The simple and flexible way to connect devices to your
desktop or notebook PC. USB allows virtually unlimited
PC expansion with
no more hassles over
add-in cards, dip
switches, jumper
cables, software
drivers, IRQ set-
tings, DMA chan-
nels and I/O addresses. With USB, you can attach and
detach peripherals without opening the computer or
even shutting it down.

**Appendix**

# A

## *Specifications*

Part Number:     09-00338-xx

Processor:     Single Intel Slot 1® for
Intel Pentium II® 233, 266, 300,
333MHz.
Integrated VRM

CPU Clock Select:  Support for 66 MHz CPU bus

Chipset:     Intel 440LX AGPset
Intel PIIX 4
National PC87309 Enhanced Super
I/O chip.

Form Factor:     Baby AT footprint (10.8" x 8.6")
Four layer board
20-pin ATX power connector
12-pin AT power connector

Expansion:     Three 16-bit ISA slots
Four 32-bit PCI slots
(One is a shared PCI/ISA slot)
One AGP slot

BIOS:     Award BIOS on 2MB Flash
APM 1.2
PCI auto configuration
Auto detection of memory size
Auto detection and display of EDO
and SDRAM memory.
Auto detection of IDE hard disk types
Soft Power Down (for ATX power
supply)
Instant On and Quick Boot
Multi-boot II
DMI 2.0/SMI/ACPI

Keyboard/Mouse: AT keyboard connector
PS/2 mouse 8-pin header via cable connector

Memory Capacity: Three 3.3V unbuffered 64-bit DIMM sockets
Maximum memory - 768MB for EDO
Maximum memory - 384MB for SDRAM
Supports EDO and SDRAM simultaneously
ECC supported via chipset when using parity

Hardware
Management:
LM79 Microprocessor System Hardware Monitor
CPU Temperature Sensor
CPU Fan Speed Monitoring (3-pin header)
Chassis Intrusion (2-pin header)
Chassis Fan Speed Monitoring (3-pin header)

I/O Ports: Two high speed serial ports (16550 compatible)
One 25-pin Parallel Port (ECP and EPP)
IrDA compliant IR header
Two USB headers (optional USB cable w/bracket)

Floppy Port: Supports 360K - 2.88MB formats
Auto detection of add-in floppy controllers

PCI IDE Ports: Ultra DMA/33 IDE
Two 40-pin IDE connectors
(Primary and Secondary IDE).
Multiple sector transfer support
Auto detection of add-in IDE board
Supports all ATAPI devices

# Environmental Specifications

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

## Temperature Range

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

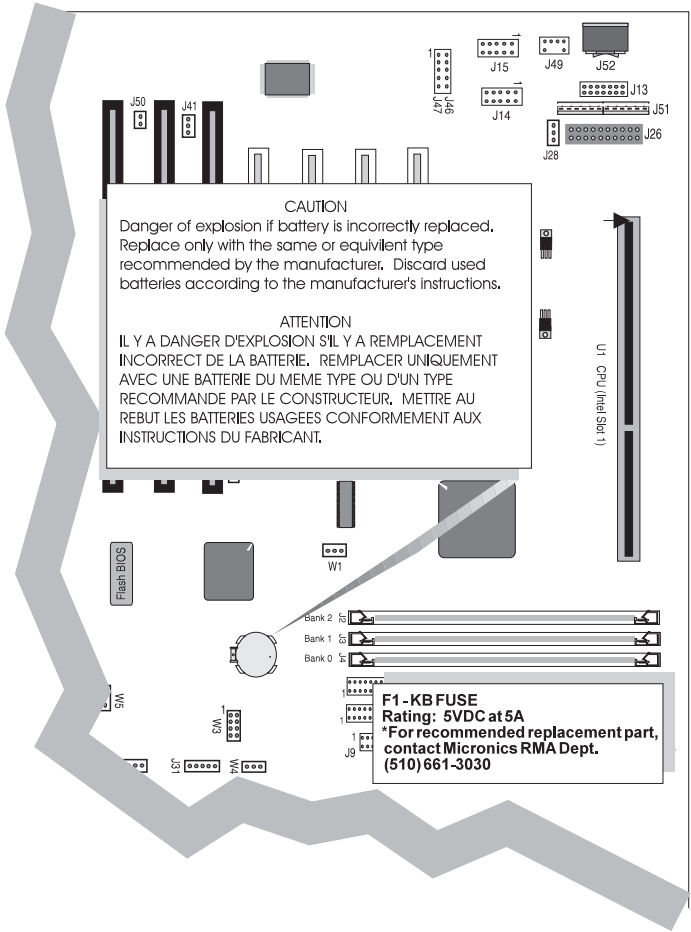Non -Operating: 50 to 140 degrees Fahrenheit (10 to 60 degrees Celsius).

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

## Relative Humidity

Operating:  20% to 80%.
Non-Operating:  5% to 90%.

# Battery Disposal



Within the diagram:

J50  J41  J15  J49  J52

J46
J47  J14  J13  J51

J28  J26

CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivilent type
recommended by the manufacturer. Discard used
batteries according to the manufacturer's instructions.

ATTENTION
IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT
INCORRECT DE LA BATTERIE. REMPLACER UNIQUEMENT
AVEC UNE BATTERIE DU MEME TYPE OU D'UN TYPE
RECOMMANDE PAR LE CONSTRUCTEUR. METTRE AU
REBUT LES BATTERIES USAGEES CONFORMEMENT AUX
INSTRUCTIONS DU FABRICANT.

U1  CPU (Intel Slot 1)

Flash BIOS

W1

Bank 2  J2
Bank 1  J3
Bank 0  J4

**F1 - KB FUSE**
**Rating: 5VDC at 5A**
**\*For recommended replacement part,**
**contact Micronics RMA Dept.**
**(510) 661-3030**

W5  W3  J9  J31  W4

### WARNING:

*Please do not open battery, dispose of in fire, recharge, put in backwards or mix with used or other battery types. The battery may explode or leak and cause personal injury.*

# Support and Information Services

Micronics offers a variety of support and information services to help you get the most from your product. The following services are available:

▲ Technical Support

▲ Electronic Bulletin Board Service (BBS)

▲ Return Materials Authorization (RMA)

▲ Fax-On-Demand

▲ World Wide Web

▲ Customer Service

Refer to Table A-1 for details on these services.

## Technical Support

If you need technical assistance, our Technical Support Engineers will be glad to help you. You can contact us via telephone, fax or BBS. Before calling Technical Support please have the following information ready:

❏ The model name, 09 part number and serial number of your Micronics product, which is silk screened on the face of the Twister LX system board.

❏ Your computer information such as CPU type, operating system, amount of installed memory and other peripherals installed in your computer.

❏ Try to call from the location of your computer.

NOTE: For Return Material Authorization purposes, please keep a copy of your product receipt.

| Service | Hours | Country | Telephone Number |
|---------|-------|---------|------------------|
| Technical Support - Live phone help from Technical Support Engineers | M-F: 7:00am to 5:00pm (PST) | USA<br><br>UK | (510) 661-3000<br>(510) 651-6982 (Fax)<br>+44 (1256) 844899<br>+44 (1256) 364222 (Fax) |
| Electronic Bulletin Board Service (BBS) - Information on software upgrades, new releases and other helpful information | 24 hours a day 7 days a week<br><br>" | USA<br><br><br><br><br><br>UK | (510) 651-6837<br>14400 baud rate, Parity=N, Data Bits=8, Stop Bits=1<br>YMODEM and ZMODEM (recommended file transfer protocols)<br>+44 (1256) 363373 |
| RMA (Return Materials Authorization) - Return products for repair | M-F: 8:00am to 4:45pm (PST) | USA | (510) 661-3030<br>(510) 683-0543 (Fax) |
| Fax-On-Demand - Automated system for product literature, technical bulletins and other helpful information | 24 hours a day 7 days a week | USA | (510) 661-3199 |
| World Wide Web - Product information, technical support, press releases and other helpful information | 24 hours a day 7 days a week " | USA Europe | http://www.micronics.com |
| Customer Service - Order Micronics and Orchid products | M-F: 8:00am to 5:00pm | USA<br><br>UK<br><br>Taiwan | (800) 577-0977<br>(510) 651-3666 (Fax)<br>+44 (1256) 479 898<br>+44 (1256) 364222 (Fax)<br>+886 2 918 5005<br>+886 2 911 5472 (Fax) |

Table A-1: Support and Information Services

**Appendix**

# *POST Messages*

# B

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

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

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

# C

# *Beep and POST Codes*

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

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

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

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

The following tables list all beep codes and POST routines.

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

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

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

Appendix

# *Updating the System BIOS*

**D**

The Micronics system boards are designed so that the BIOS can be reprogrammed using a BIOS file. You can easily FLASH a BIOS by following the steps below:

1.  After downloading the appropriate BIOS file from our BBS or Website, extract it to a bootable MS-DOS 6.X diskette.

2.  Reboot your system with the MS-DOS 6.X diskette in the A: drive. To make sure a clean DOS environment is loaded, press the F5 key while "Starting MS-DOS" is displayed. After the system has rebooted, the cursor will appear at the A:> prompt.

3.  Now you can run the FLASH utility from the bootable floppy disk. Refer to the README.TXT file included with the BIOS update for detailed instructions.

*If you encounter any problems during this process, or if you have questions about the procedure, please call Technical Support.*

4.  After the update process has completed and the system reboots, verify that the new BIOS version appears on-screen. If you have problems during this process, or if you have questions about the procedure, please call Technical Support.

NOTE: If you prefer to send your system board in for the upgrade, the RMA department offers this service free of charge if your system board is under warranty.

# *Limited Warranty*

**E**

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) 661-3030. The RMA department is open between 8:30 A.M. and 4:45P.M. Pacific Standard Time.

# FCC 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. You are 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 are required.

*NOTE: Changes or modifications not expressly approved by Micronics could void your authority to operate the equipment.*

# Glossary

**16550 UART** - A high speed chip for controlling serial ports. Although unnecessary for a mouse, it is required for modems that are 14,400 baud or faster.

**AGP** - Accelerated Graphics Port. A faster bus than the current 33MHz PCI bus, which will connect the graphics controller to system memory through the chipset.

**Asynchronous** - Operations that do not require the clocks of communicating devices to be coordinated. See Synchronous.

**Baby AT** - A system board size measuring approximately 10.8" x 8.6".

**Bidirectional Parallel Port** - A type of parallel port that can send and receive information.

**BIOS** - An Acronym for Basic Input/ Output System. Configures the system board and provides hardware information to the operating system.

**Bit** - A contraction of Binary digit. The smallest unit of information in a binary number system. A bit represents a choice between either zero or one.

**Boot** - To start up the computer and load the operating system software. See cold boot and warm boot.

**Buffered DIMMs** - The 168-pin buffered DIMM modules use buffer logic chips on their control lines to reduce loading on the system board. This buffering action increases the maximum number of modules on the same system board. The buffered DIMMs come with standard DRAM chips for either 5V or 3.3V operation.

**Bus** - A group of electronic paths used to send data between parts of the system. On a system board, the bus connects the peripheral cards with the microprocessor via the expansion slots.

**Bus Mastering** - The ability of a peripheral card to control the bus without requiring intervention of the CPU.

**Byte** - A group of adjacent bits treated as a unit. Eight bits are typically considered one byte. Also called a character.

**Cache** - A process where information is copied from the slower memory (DRAM) to the faster memory (SRAM). Information that is likely to be read or edited is stored in the cache providing significant performance increases.

**Cache Hit** - The percentage of request for data from memory that can be served from the cache.

**Cache Miss** - A memory access which cannot be supplied from cache.

**Cold Boot** - Starting the computer by turning on the power or pressing the RESET button. A cold boot makes the processor execute all of the diagnostics. See boot and warm boot.

**CPU** - An acronym for Central Processing Unit. A CPU performs arithmetic calculations, makes logical decisions, and directs the operation of the computer in conjunction with the operating system.

**DIMM** - An acronym for Dual Inline Memory Module. A small printed circuit board containing memory chips.

**Disk Drive** - A hardware device which provides for the storage of data on diskettes or hard metal disks that have a magnetic coating. A disk drive functions by spinning at high speed while moving a device called the read/write head across the disk's surface in order to read or write data in magnetic code.

**DRAM** - An acronym for Dynamic Random Access Memory. A type of memory chip that only keeps its memory if supplied with regular clock pulses and a chance to regularly refresh its data. It is slower and more cost effective than SRAM. See SRAM.

**ECC** - An acronym for Error Checking and Correction. ECC is logic designed to correct memory errors. The number of errors that can be corrected depends upon the algorithms used, and the number of error correction bits (non-data bits) present.

**ECP** - An acronym for Expanded Capabilities Port. A standard set by Hewlett Packard and Microsoft Corporation to expand the capabilities of the parallel port.

**EDO Memory** - An acronym for Extended Data Out. A DRAM performance feature that permits multiple bit of data in a single row to be accessed quickly.

**EPP** - An acronym for Enhanced Parallel Port. A standard which increases the capabilities of the parallel port.

**EPROM** - Acronym for Erasable Programmable Read Only Memory. A type of ROM chip that can be programmed with relatively simple tools that will retain its data until erased. It can only be erased by exposing the circuitry in the chip to ultraviolet light. See also Flash ROM.

**Flash ROM** - A type of ROM chip that will retain its data until erased. It can be erased or reprogrammed by supplying it with +12V of voltage. See ROM and EPROM.

**Gigabyte** - A disk storage capacity measurement. Approximately one thousand megabytes or 1,073,741,824 bytes.

**IDE** - An acronym for Integrated Device Electronics. A standard for communicating between a hard drive and a computer.

**Internal Cache** - Cache which is built into the CPU. See Cache.

**ISA** - An acronym for Industry Standard Architecture. A well-established bus standard that originated with the IBM AT. See *PCI and VESA Local Bus.*

**LM75** - The LM75 is a temperature sensor. The host can query the LM75 at any time to read the temperature. Its 3.0V to 5.5V supply voltage range, low supply current and I²C interface, make it ideal for a wide range of applications.

**LM79** - The LM79 is a highly integrated Data Acquisition system for hardware monitoring of servers, personal computers or virtually any microprocessor based system. In a PC, the LM79 can be used to monitor temperatures, power supply voltages and fan speeds.

**NS** - An acronym for Nanosecond. One billionth of a second. Measure of the access time of RAM.

**Parallel** - A form of data transmission in which the data is sent one byte at a time over several wires that each carry one byte. In parallel transmission, all the bytes arrive simultaneously, as opposed to serial transmission in which bits arrive one by one.

**Parallel Port** - A connection for a printer or similar peripheral. Generally, parallel ports are output only. See Bidirectional Parallel Port and ECP.

**Parity** - Logic that detects the presence of an error in memory. Generally, a single parity bit is used for each byte (8 bits) of data. The most commonly used forms of parity are even parity, odd parity and checksums.

**PCI** - An acronym for Peripheral Component Interconnect. A high performance 32-bit or 64-bit bus developed by Intel Corporation. PCI is designed to be independent of the hardware architecture to ensure compatibility with future computer systems. See *VESA Local Bus and ISA.*

**Pentium** - A high performance 64-bit CISC processor designed and manufactured by Intel Corporation.

**Pipeline** - In DRAMs and SRAMs, a method for increasing the performance using multistage circuitry to stack or save data while new data is being accessed.

**Plug and Play** - A standard developed to ensure easy installation of peripherals. Theoretically, a newly installed card will automatically configure itself and work properly without requiring jumper configuration or device drivers.

**POST** - An acronym for Power On Self Test. A diagnostic program that is run whenever the system is cold booted.

**RAM** - An acronym for Random Access Memory. A type of memory that is used as the "working memory" of a computer system. See DRAM and SRAM.

**ROM** - An acronym for Read Only Memory. A type of memory that retains its data without requiring power. Once written, it cannot be modified. See EPROM and Flash ROM.

**Serial Port** - A communications port used to connect peripherals such as modems and mice.

**Serial Presence Detect** - Some SDRAM modules have an onboard EEPROM which contains critical configuration information about the module. This feature, known as Serial Presence Detect (SPD), allows the platform's chipset and BIOS to quickly determine the type of memory installed in the system, resulting in optimal system performance.

**Setup** - A program that allows you to make changes to the system configuration.

**Shadow RAM** - A technique used to load a duplicate copy of BIOS from slower ROM into faster RAM. This enhances system performance because it provides higher access speed to the BIOS.

**SIMM** - An acronym for Standard Inline Memory Module. A small printed circuit board containing memory chips.

**SDRAM** - An acronym for Synchronous Dynamic Random Access Memory or Synchronous DRAM. A DRAM designed to deliver bursts of data at very high speed using automatic addressing, multiple page interleaving and a synchronous (or clocked) interface.

**Synchronous Cache** - A type of cache that uses a clock signal to latch the inputs and the data output. This structure spreads the cache access across two or three cycles while maintaining a bandwidth of one access per cycle. Improves performance by 5-10%.

**Unbuffered DIMMs** - The unbuffered DIMM modules do not use any buffer logic chips, thus achieving faster operation due to the elimination of the propagation delay of the logic buffer. This increase in speed comes at the cost of reducing the maximum number of modules on the same system board.

**USB** - An acronym for Universal Serial Bus. The simple and flexible way to connect devices to your desktop or notebook PC. USB allows virtually unlimited PC expansion with no more hassles over add-in cards, dip switches, jumper cables, software drivers, IRQ settings, DMA channels and I/O addresses. With USB, you can attach and detach peripherals without opening the computer or even shutting it down.

**VESA** - An acronym for Video Electronics and Standards Association.

**VESA Local Bus (VL-Bus)** - A high performance bus designed by VESA. A 32-bit version of the ISA bus which operates at the speed of the computer's CPU.  See *PCI and ISA*.

**Warm Boot** - Restarting the system by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys.

**Write-Back Cache** - Upon a cache hit, the cache is updated and the main memory is not affected. Upon a cache miss, only the main memory is updated.

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