

# **POWERLEAP™ PL/586-133**

## **Processor Upgrade**

*--for--*

**486DX4, 486DX2, 486DX, 486SX2 and 486SX Systems**

**Installation Guide**

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## Introduction

Your PowerLeap™ PL/586-133 is a clock- tripled/quadrupled processor upgrade for 80486SX/SX2, 80486DX/DX2, and 80486DX4 computers. The PowerLeap™ processor upgrade uses the AMD X5-133 CPU (Am5x86-P75 CPU). PowerLeap™ installs directly into your computer's existing CPU socket or, if you cannot remove the original CPU, into an Intel Overdrive or 80487SX socket. Please contact your dealer for more information about the CPU.

**Before installing the PowerLeap™ processor upgrade, we recommend setting your motherboard's onboard clock frequency to 33MHz for the BEST Performance. For more information, refer to your motherboard's documentation or contact your system vendor.**

The following table shows the original CPU speed, the processor upgrade speed, and the type of CPU required.

Original CPU & Speed	Upgrade Speed	CPU Type
80486DX4-100***	133MHz (33x4)	<b>AMD X5-133 (Am5x86™-P75)</b>
80486DX4-75***	100MHz (25x4)	
80486DX2-80***	120MHz* (40x3)	
80486DX2-66**	133MHz (33x4)	
80486DX2-50	100MHz (25x4)	
80486DX-50	****	
80486DX-40	120MHz* (40x3)	
80486SX/DX-33	133MHz (33x4)	
80486SX/DX-25	100MHz (25x4)	

- \* You must set the SW1 DIP switch to run the CPU at triple or quadruple speed. For details, see the section “Setting the SW1 DIP Switch” later in this guide.
- \*\* There are two versions of the 486DX2-66 CPU: 5V and 3.3V/3.45V. You can use the JP1 jumper switch on the Power Leap™ upgrade to select the correct voltage. For more information, see the section “Setting the JP1 Jumper Switch” later in this manual.
- \*\*\* You must use the JP1 jumper switch on the PowerLeap™ upgrade to select the 3.3V/3.45V CPU voltage setting. For more information, please see the section “Setting the JP1 Jumper Switch” later in this manual.
- \*\*\*\* Please change the motherboard’s onboard clock frequency to 33MHz.

**For 80486-20 systems, the PowerLeap™ upgrade will by default operate at 60MHz (clock-tripled mode) or 80MHz (clock-quadrupled mode). To change the system to 100/133MHz performance, you must modify the onboard clock frequency (for information, refer to your mainboard’s documentation or contact your system vendor).**

## Special Features

PowerLeap™ PL/586-133 offers the following advanced features:

- Clock- tripled/quadrupled 5x86 CPU running at 100MHz or 133MHz
- Supports AMD CPU with 32-bit internal and external processing
- Supports AMD CPU with 16KB internal cache
- Quick and easy installation, with no software drivers to install
- Installs directly into your computer’s existing CPU socket, Intel Overdrive socket, or 80487SX socket
- Includes the Landmark System Speed Test® for testing the performance of your computer before and after PowerLeap™ installation

## What You Have

In addition to this *Installation Guide*, your Power Leap™ package includes:

- PowerLeap™ PL/586-133 processor upgrade
- Heat sink and cooling fan
- Software distribution floppy disk including the Write Back Cache Driver and the Landmark System Speed Test®

If any of these items is missing or damaged, contact the dealer from whom you purchased PowerLeap™. Save the packing materials for future use.

**Leave the PowerLeap™ processor upgrade in its original packing until you are ready to install it.**

## Electrostatic Discharge Precautions

Follow these precautions to protect your investment from electrostatic discharge:

- **Before handling the processor upgrade, discharge any static electricity in your body by touching a metal surface on the computer's case, expansion slot covers or any other unpainted portion of the computer chassis. This will discharge any static charge from your body.**
- Remove the processor upgrade from its anti-static packaging only when you are ready to install it in your computer.
- Handle the processor upgrade or the CPU by the edges and avoid touching its pins.



## Installing PowerLeap™ PL/586-133

The PowerLeap™ PL/586-133 processor upgrade can be installed in a wide variety of 486SX/SX2, 486DX/DX2, and 486DX4 computers. The installation process will depend on your computer's CPU configuration.

### Getting Started

To compare the performance increase provided by PowerLeap™, we suggest running the Landmark System Speed Test both before and after installation. For details, see “Running the Landmark System Speed Test” later in this guide.

Before beginning the installation, you need to:

- a) locate pin 1 on the PowerLeap™ processor upgrade and the motherboard's processor socket;
- b) identify your computer's CPU configuration;
- c) choose an installation option;
- d) set the SW1 DIP switch; and
- e) set the JP1 jumper switch for 3.3V/3.45V operation for 486DX4-75/100, 486DX2-80 and 486DX2-66 (3.3V/3.45V CPUs only)

Please take a moment to read the descriptions below.

**If you are not familiar with computer architecture, we recommend asking an experienced technician or advisor to help install the PowerLeap™ PL/586-133.**

## Locating Pin 1

When you install the processor upgrade, pin 1 must be installed in the pin 1 hole of the motherboard's CPU socket. The pin 1 corner of the processor upgrade is indicated by a triangular tab.

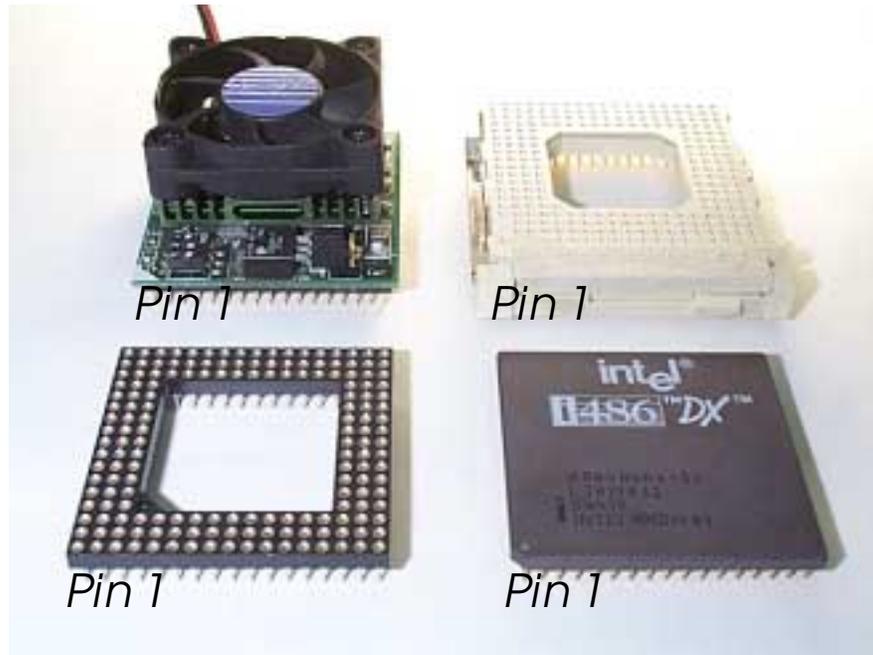


Figure 1. Locating pin 1

## Identifying the CPU Configuration & Choosing an Installation Option

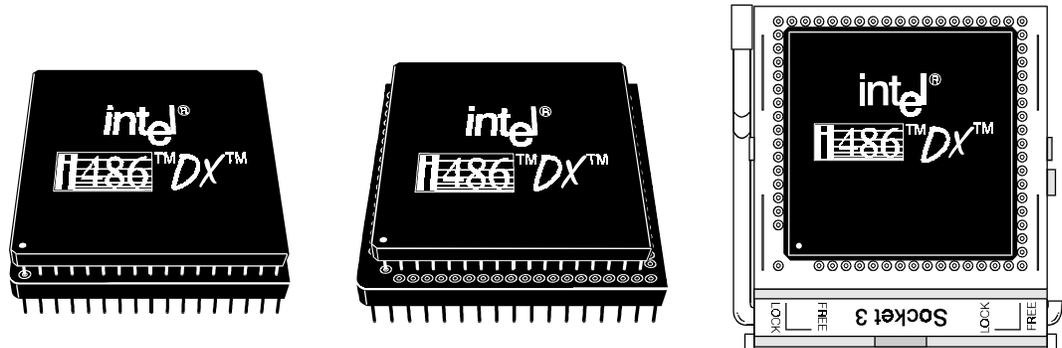
Before continuing, determine your computer's CPU configuration:

- *Surface-mounted*: the CPU is soldered directly to the motherboard
- *Socketed*: the CPU is inserted in either a standard or ZIF socket

The PowerLeap™ offers several installation options to match your computer's CPU configuration. For socketed configurations, you can remove the computer's original CPU and install the processor upgrade in the CPU socket. If the CPU is surface-mounted, you will not be able to remove it from the motherboard. In this case, you can install the processor upgrade in the board's Overdrive or 80487SX socket.

### Option #1: Socketed CPU

For this option, remove the computer's original CPU and install the PowerLeap™ processor upgrade in the computer's original CPU socket.



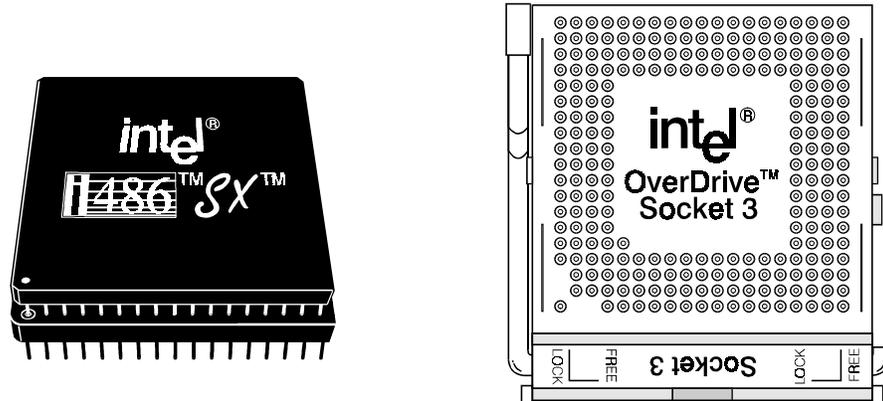
**Figure 2. Socketed CPU**

Before installing the PowerLeap™ processor upgrade, make sure that position 1 of SW1 is OFF.



## Option #2: Socketed CPU with Overdrive Socket

For this option, remove the computer's original CPU and install the PowerLeap™ processor upgrade in the computer's original socket (refer to the figure below). The Overdrive socket is not used.



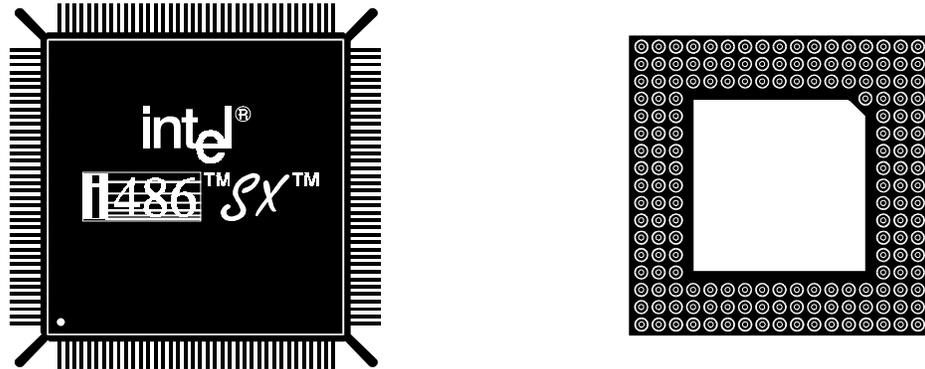
**Figure 3. Socketed CPU with Overdrive socket**

Before installing the PowerLeap™ processor upgrade, make sure that position 1 of SW1 is OFF.



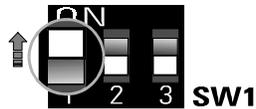
### Option #3: Surface-Mounted 80486SX CPU with 80487SX Socket

For this option, install the PowerLeap™ processor upgrade in the computer's 80487SX socket (refer to the figure below). You will not be able to remove the surface-mounted 80486SX CPU from the motherboard.



**Figure 4. Surface-mounted 80486SX CPU with 80487SX socket**

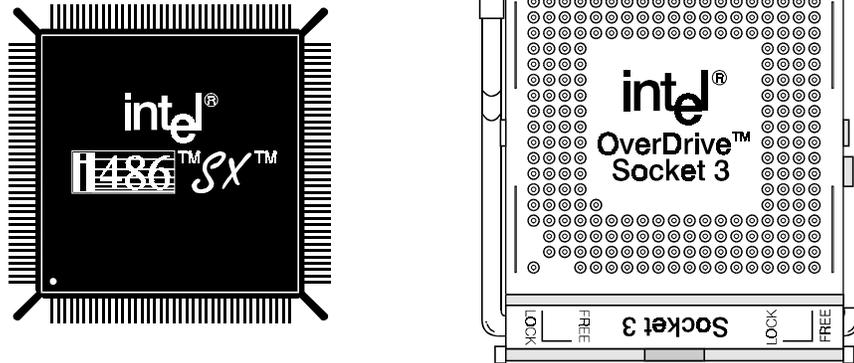
Before installing the PowerLeap™ processor upgrade, make sure that position 1 of SW1 is ON.



When you install the PowerLeap™ in the 80487SX socket, you may have to set jumper switches for the socket on the motherboard (see the documentation that came with the board).

### Option #4: Surface-Mounted CPU with Overdrive Socket

For this option, install the PowerLeap™ processor upgrade in the computer's Overdrive socket (refer to the figure below). You will not be able to remove the surface-mounted CPU from the motherboard.



**Figure 5. Surface-mounted CPU with Overdrive socket**

Before installing the PowerLeap™ processor upgrade, make sure that position 1 of SW1 is ON.



When you install the PowerLeap™ in the Overdrive socket, you may have to set jumper switches for the socket on the motherboard (see the documentation that came with the board).

## Opening Your Computer & Locating the CPU

- 1** Turn the computer off and disconnect all power cables from the computer.
- 2** Remove the cover from the computer (as described in the computer's documentation).
- 3** Locate the CPU on the computer's motherboard. The CPU will be clearly labeled with the manufacturer's name (such as "Intel"), and markings identifying the CPU model and speed (such as 80486DX2-66).

**Static electricity can damage the electronic components of the computer or optional equipment. Before the following procedures, ensure that you are already discharged of static electricity.**

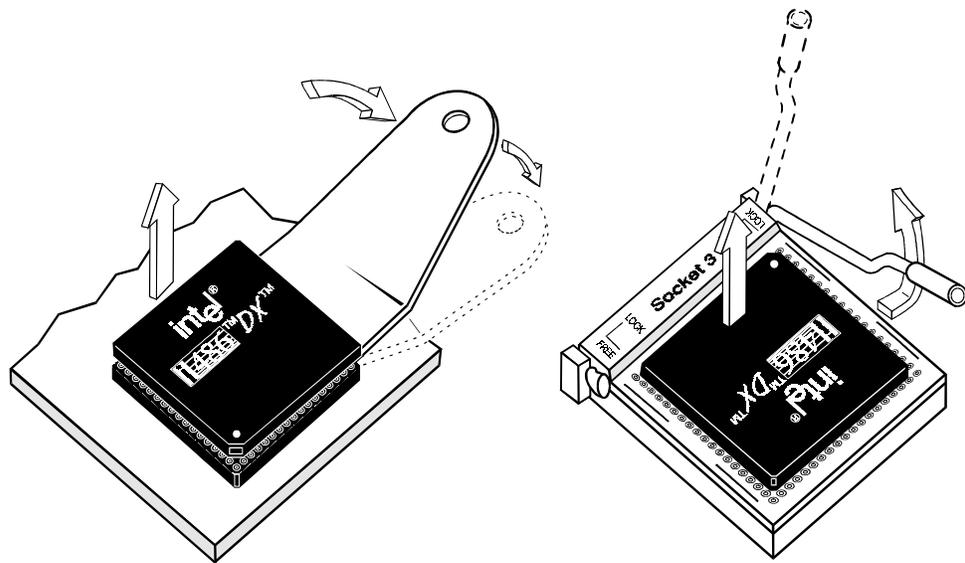
## Removing the CPU

If your computer's CPU is *socketed* (see the earlier section of this chapter), remove it as described below.

- 1** Make sure that the motherboard's CPU socket is readily accessible. If the socket is located under an expansion card or disk drive, you may have to remove the card or drive.
- 2** Note the orientation of the pin 1 hole on the CPU socket. This hole will typically be identified by a dot, beveled edge, or other marking.

### 3 Remove the CPU:

- If the CPU is installed in a standard socket, carefully insert a flat-bladed screwdriver **between the CPU and the socket**. Gently lever one side of the CPU up slightly (refer to the figure below). Do not attempt to pry the CPU out of the socket. Repeat for each side of the CPU, working around the CPU until the pins are sufficiently exposed to allow you to lift the CPU out of the socket. *Be careful not to break the pins.*
- If the CPU is installed in a ZIF socket, unlatch the sidebar lever, retaining screw, or overhead bar. When the CPU is loosened, lift it out of the socket with your fingers.

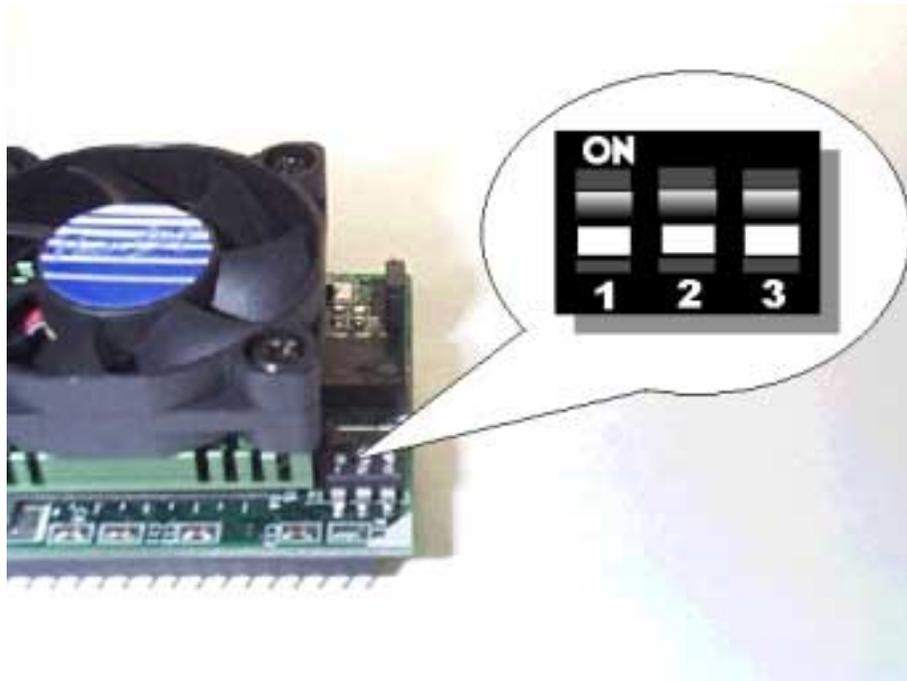


**Figure 6. Removing the CPU (standard and ZIF sockets)**

After removing the CPU, store it in the PowerLeap™ packaging.

## Setting the SW1 DIP Switch

Before installing the processor upgrade, you must set the SW1 DIP switch on the PowerLeap™. You can find SW1 on the top of the Power Leap™ PL/586-133. The SW1 DIP switch is shown in the following figure and described below.

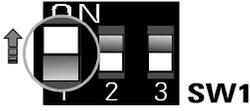


**Figure 7. The PowerLeap™ PL/586-133 SW1 DIP switch**

- Position 1 : allows you to choose an installation option (see descriptions earlier in this chapter).
- Position 2 : lets you select write-through (WT)/write-back (WB) for the AMD X5-133 CPU.
- Position 3 : lets you change the clock multiplier for the AMD-X5-133 CPU.

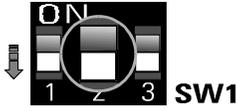
## SW1 Position 1: CPU Socket Type Selection

The PowerLeap™ offers several installation options to match your computer's CPU configuration. Before installing the processor upgrade, you must specify the selected socket type by setting position 1 of the SW1 DIP switch. This position is set to OFF by default.

Socket Type	Position 1 Setting
486SX/SX2/DX/DX2/DX4 ZIF or PGA socket	
Overdrive or 80487SX socket	

## SW1 Position 2: WB/WT Selection

The SW1 position 2 is set to OFF by default.

WB/WT Select	Position 2 Setting
Write-back*	
Write-through	

\* Some older motherboard designs do not support write-back CPUs (only boards that have the socket 3 CPU socket support the WB CPU). If your board does not offer this support, the Power Leap™ performance may be unstable in write-back mode. Set the processor upgrade to write-through mode instead.

If your system board doesn't support the WB function (without the socket 3 CPU socket), the system BIOS will automatically set the CPU to run in WT mode.

### SW1 Position 3: Clock Multiplier for AMD X5-133 CPU

The PowerLeap™ is a clock- tripled/quadrupled processor upgrade for 80486SX/SX2, 80486DX/DX2, and 80486DX4 computers. By default, the processor upgrade is set to clock-quadrupled mode.

Clock Multiplier	Position 3 Setting
4x (clock-quadrupled)*	
3x (clock-tripled)	

\* Clock-quadrupled for AMD X5-133.

The following table shows the recommended SW1 settings for available PowerLeap™ upgrades.

Position 3	Original CPU & speed	Upgrade speed
 SW1	80486DX2-80 80486DX-40	120MHz (3x)
 SW1	80486SX/DX-33 80486DX2-66 80486DX4-100	133MHz (4x)
 SW1	80486SX/DX-25 80486DX2-50 80486DX4-75	100MHz (4x)

## Setting the JP1 Jumper Switch

Use the JP1 jumper switch on the PowerLeap™ upgrade to select the correct CPU voltage. For the 80486DX4-100, 80486DX4-75, and 80486DX2-80 CPUs, you must set JP1 to the 3.3V/3.45V setting. **Note that there are two versions of the 486DX2-66 CPU: 5V and 3.3V/3.45V.**

Original CPU Voltage	JP1 Setting
3.3V/3.45V	
5V	

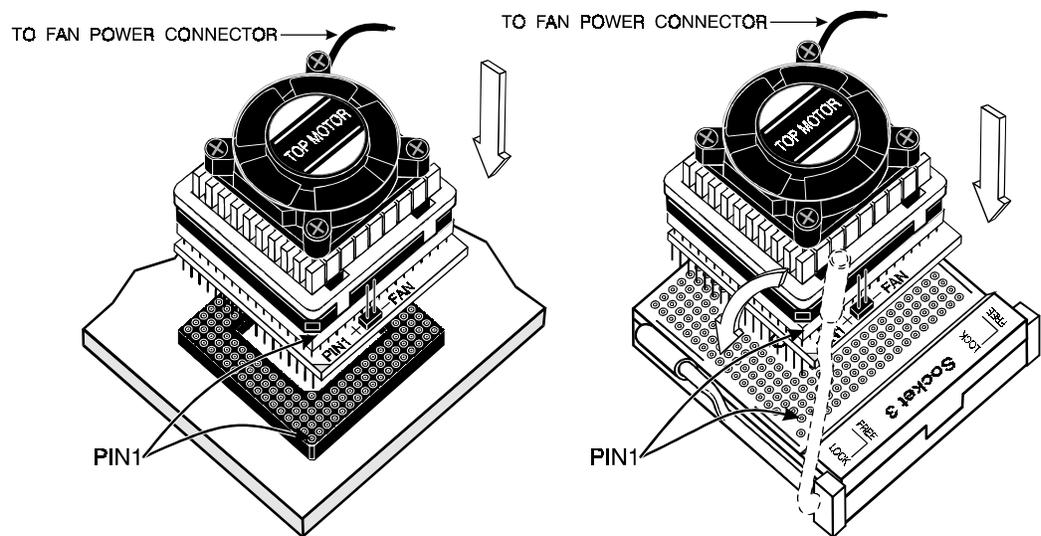
## Orienting & Inserting PowerLeap™

Before starting installation, locate pin 1 on the PowerLeap™ processor upgrade and the pin 1 hole on the motherboard CPU socket (see the figure below). When you install the processor upgrade, pin 1 of the processor upgrade must be installed in the pin 1 hole of the motherboard CPU socket. The pin 1 corner of the processor upgrade is indicated by a triangular tab.

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**CAUTION:** Pin 1 of the processor upgrade must match the pin 1 hole of the CPU socket. If the processor upgrade is installed incorrectly, the processor upgrade and/or the computer may be damaged.

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**Figure 8. Orienting and inserting the processor upgrade  
(standard and ZIF sockets)**

## Inserting PowerLeap™ in a Standard or 80487SX Socket

- 1 Align the pins of the processor upgrade with the holes of the socket.

**If you are installing the processor upgrade in a 238-pin socket (socket 3), make sure that the processor is positioned in the center of the socket. When aligned correctly, one row of empty pin holes will show on each side.**

- 2 Gently push the processor upgrade into the socket, making sure to apply even pressure.
- 3 When the processor upgrade is fully inserted in the socket, make sure the connection is good by pushing down firmly on each corner.

**If you are having difficulty inserting the processor upgrade in the socket, check the alignment of the pins with the socket holes or check to see if any pins are bent. If the alignment is not correct or some pins are bent, remove the processor upgrade, carefully straighten the pins, and start again.**

## Inserting PowerLeap™ in a ZIF Socket

For a ZIF socket that has a sidebar lever or a retaining screw, insert the processor upgrade as follows.

- 1 Open the ZIF socket by raising the sidebar level or loosening the retaining screw.
- 2 Align the pins of the processor upgrade with the holes of the ZIF socket, then place the processor upgrade into the socket. It should not be necessary to use pressure.

- 3 Close the ZIF socket by gently pushing the sidebar lever down until it locks into place.

**Make sure that the processor upgrade is positioned in the center of the socket. When aligned correctly, one row of empty pin holes will show on each side.**

## **Connecting the Cooling Fan to a Power Source**

After installing the processor upgrade, connect the optional cooling fan to your computer's power supply.

## **Completing Installation**

To complete the installation, replace the cover of your computer, reconnect the cables, and turn on the computer. If the computer does not boot, refer to the "Troubleshooting" section later in this guide.

Because PowerLeap™ does not require any software drivers, there is no software installation to perform. However, we recommend that you run the Landmark System Speed Test to compare the performance increase provided by PowerLeap™. For details, see "Running the Landmark System Speed Test" later in this guide.

## Troubleshooting

This section provides suggestions for solving problems that you may encounter with PowerLeap™.

Problem	Possible Cause	Suggested Solution
The computer doesn't start.	<ul style="list-style-type: none"> <li>The computer isn't receiving power.</li> </ul>	<ul style="list-style-type: none"> <li>Make sure that the power cord is connected to both the computer and the monitor.</li> </ul>
	<ul style="list-style-type: none"> <li>The processor upgrade is installed incorrectly.</li> </ul>	<ul style="list-style-type: none"> <li>Check the seating and pin orientation of the processor upgrade. Try reinstalling the processor upgrade.</li> </ul>
	<ul style="list-style-type: none"> <li>The processor upgrade is incompatible with your computer.</li> </ul>	<ul style="list-style-type: none"> <li>Remove the processor upgrade and reinstall the original CPU. If the CPU functions properly, the processor upgrade may be incompatible with the computer.</li> </ul>
	<ul style="list-style-type: none"> <li>The SW1 DIP switch on the PowerLeap™ is not set correctly.</li> </ul>	<ul style="list-style-type: none"> <li>Use SW1 to select the correct CPU socket type (refer to the section "Identifying the CPU Configuration &amp; Choosing an Installation Option").</li> </ul>

Problem	Possible Cause	Suggested Solution
After installing the PowerLeap™, the screen still shows the original CPU version and speed.	<ul style="list-style-type: none"> <li>The computer's old BIOS cannot recognize the processor upgrade type and speed.</li> </ul>	<ul style="list-style-type: none"> <li>Ignore the CPU version and speed shown on the screen. Instead, run the Landmark System Speed Test® to verify the improved performance.</li> </ul>
There is a problem with the computer's numeric coprocessor.	<ul style="list-style-type: none"> <li>The motherboard's jumper switches are not set correctly.</li> </ul>	<ul style="list-style-type: none"> <li>When you upgrade your system from a 486SX CPU to the PowerLeap™, set the CPU type jumper switch to change the CPU type from SX to DX. For details, refer to the documentation that came with your computer.</li> </ul>
The computer's performance is unstable.	<ul style="list-style-type: none"> <li>The computer's SRAM or DRAM is too slow for the faster CPU clock of the processor upgrade.</li> </ul>	<ul style="list-style-type: none"> <li>Run the CMOS Setup program to make the SRAM/DRAM access time slower. For example, change the "DRAM Write Wait State" from 0 WS to 1 WS.</li> </ul>
The computer's performance is too slow.	<ul style="list-style-type: none"> <li>The SW1 DIP switch setting is incorrect. For example, the clock multiplier should be set to 3x, but it is incorrectly set to 2x instead.</li> </ul>	<ul style="list-style-type: none"> <li>Change the SW1 setting (refer to the section "Setting the SW1 DIP Switch").</li> </ul>

Problem	Possible Cause	Suggested Solution
<p>The system hangs after the RAM test. But if the external cache is disabled in the BIOS setup, the computer works properly.</p>	<ul style="list-style-type: none"> <li>The board's BIOS doesn't support the (Cyril) 5X86 CPU's 16KB write-back design or the external cache architecture conflicts with the CPU's internal cache.</li> </ul>	<ul style="list-style-type: none"> <li>Depending on the computer's cache size (see the documentation that came with the board), change the external cache from 256KB to 128KB or from 64KB to 32KB. Because the (Cyril) 5X86 CPU's 16KB on-chip cache is a four-way set associative write-back design, your system performance will still be better than a traditional cache design, even after reducing the on-board cache size.</li> </ul>



## Running the Landmark System Speed Test

To compare the performance increase provided by PowerLeap™, we suggest running the Landmark System Speed Test® both before and after installation of the processor upgrade. The Landmark System Speed Test® is provided on the software distribution floppy disk.

The Landmark rating measures the speed of the processor at performing calculation tasks. Run the Landmark System Speed Test® as follows:

- 1** Insert the software distribution floppy disk into drive A.
- 2** At the DOS prompt, type *SPEED200* [*switches*] and then press <Enter>. The optional switches are described below.

**Running the Landmark System Speed Test® from within Microsoft Windows or OS/2 may yield unreliable results. For best results, run the test program from the DOS prompt. Do not run the test program from a DOS task within Microsoft Windows or OS/2.**

### Test Switches

You can run the Landmark System Speed Test® with the following optional switches:

Switch	Description
/b	Bypass the initial menu screen.
/nv	Do not run the video test.
/q	Run in quiet mode (no sound). <b>Note:</b> You can also turn the sound off while the test is running by pressing <F10>.
/xx	Perform the test for xx seconds, then quit.

The following table shows the approximate Landmark System Speed Test® results for the PowerLeap™ and other 80486 CPUs. Note that the results may vary slightly for different systems.

