

POWERLEAP™ PL-PROMMX PLUS

Pentium® CPU Upgrade Kit

--for--

- Intel Pentium (P54C) and Pentium w/MMX Technology (P55C)
 - AMD K6 and K6-2
- Cyrix/IBM 6X86, 6X86L, 6X86MX, and MII
 - IDT C6

Ver 3.xx

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Introduction

Your PowerLeap™ PL-ProMMX Plus CPU upgrade board allows Pentium socket 5 and socket 7 systems to take advantage of the latest MMX CPU technology from Intel, AMD, Cyrix, and IDT.

The CPU upgrade board employs patent pending technology *to adapt socket 5 and socket 7 systems* to the voltage and pinout requirements of this new generation of processors. By providing an upgrade solution that would otherwise require the replacement of the motherboard, PowerLeap™ lets you enjoy the most cost-effective MMX CPU upgrade solution.

About the MMX™ Technology

Intel's MMX technology extends the performance of Pentium processors with 57 new instructions, a 32K L1 cache, four new 64-bit data types, and more. For multimedia and communications applications, MMX can significantly enhance audio/video playback and image processing. MMX technology is compatible with a wide range of existing operating systems (including MS-DOS, Windows, OS/2, and UNIX) and 16/32-bit applications.

About the 3DNow!™ Technology

AMD's 3DNow! technology is an innovative group of 21 new instructions for the x86 architecture that bring powerful performance enhancements for multimedia and floating-point-intensive applications. With 3DNow! technology, applications can achieve more detailed 3D imaging, faster frame rates for video playback, and dramatic improvements in audio. 3DNow! technology appears in the AMD K6-2 processor and works with all existing operating systems and x86 applications.

Some Commonly Used Abbreviations

This manual uses the following abbreviations and acronyms.

- MMX:** Multimedia Extension
- P54C:** Intel Pentium CPU
- P55C:** Intel Pentium with MMX CPU

Special Features

Your PowerLeap™ PL-ProMMX Plus offers the following advanced features:

- Supports Clock-Multiplier 1.5x/2.0x/2.5x/3.0x/3.5x/4.0x/4.5x/5.0x/ 5.5x
- Supports voltage 3.5V~3.3V (Intel P54C/Cyrix 6x86/IDT C6), 3.2V (AMD K6-233), 2.9V (AMD K6-166/200/Cyrix 6x86MX/Cyrix M-II), 2.8V (Intel P55C-MMX/Cyrix 6x86L) and 2.2V(AMD K6-266/300 & K6-2).
- Provides MMX-enabled CPU upgrades for both Socket 5 & Socket 7 Pentium systems.
- Employs patented IPS (Independent Power Source) technology, providing pure, abundant, & durable power to the V/Core of split-voltage CPUs.
- Offers a unique **Redundant (2 phase) CPU overheat protection** function.
- Includes switching VRM (Voltage Regulating Module) circuitry.
- Supports 1.6V~3.5V (ascending by 0.1V), 20 sets voltage settings for V/Core.
- Quick and easy installation, with no software drivers to install.
- Includes the PowerLeap CPU Control Panel® for enhance the performance of your computer before and after PowerLeap™ installation.

What You Have

Your PowerLeap™ PL-ProMMX Plus upgrade board includes the following items:

- The PowerLeap™ PL-ProMMX Plus upgrade board
- Power connector cord
- PowerLeap™ Utility Diskette
- CPU cooling fan & heatsink

Configuring the PowerLeap™ PL-ProMMX Plus

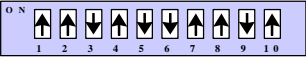
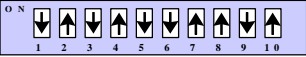

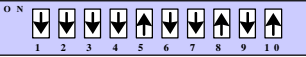

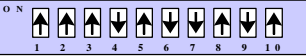
This chapter describes setting the clock multiplier and voltages for your PowerLeap™ PL-ProMMX Plus CPU upgrade board. It also discusses enabling and disabling the *CPU overheating protection* function.

Quick Start: CPU Settings



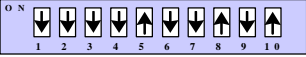

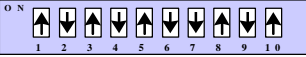
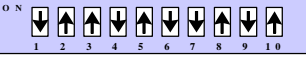
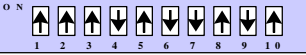
This section shows how to use the SW1 DIP switches to choose the correct clock multiplier and voltages for your new Intel, AMD, Cyrix/IBM, or IDT processor. For information about calculating the CPU upgrade board's clock multiplier, refer to the chapter "Technical Reference" later in this manual.

Intel CPU	SW1 Settings
Pentium-200 (66/3.0x)	
Pentium w/MMX-166 (66/2.5x)	
Pentium w/MMX-200 (66/3.0x)	
Pentium w/MMX-233 (66/3.5x)	

For Dual CPU system's upgrade, please stick with Intel CPUs; AMD, Cyrix & IDT CPU won't support SMP systems.

AMD K6 CPU	SW1 Settings
K6-166 (66/2.5x)	
K6 -200 (66/3.0x)	
*K6 -233 (66/3.5x) 3.2V	
*K6 -233 (66/3.5x) 2.2V	
K6 -266 (66/4.0x)	
K6 -300 (66/4.5x)	

* Note the actual voltage printed on the CPU label.

AMD K6-2 CPU	SW1 Settings
K6-2/233 (66/3.5x)	
K6-2/266 (66/4.0x)	
#K6-2/266 (75/3.5x)	
K6-2/300 (66/4.5x)	
#K6-2/300 (75/4.0x)	
K6-2/333 (66/5.0x)	
#K6-2/333 (75/4.5x)	

K6-2/366 (66/5.5x)	
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For systems with an external clock speed faster than 66MHz.

Cyrix/IBM 6x86L CPU	SW1 Settings
6x86L-P166+ (66/2.0x)	
#6x86L-P200+ (75/2.0x)	

For systems with an external clock speed faster than 66MHz.

Cyrix/IBM 6x86MX CPU	SW1 Setting
6x86MX-PR166GP (60/2.5x)	
6x86MX-PR200GP (66/2.5x)	
#6x86MX-PR200GP (75/2.0x)	
6x86MX-PR233GP (66/3.0x)	
#6x86MX-PR233GP (75/2.5x)	
#6x86MX-PR266GP (83/2.5x)	

For systems with an external clock speed faster than 66MHz.

Cyrix/IBM M-II CPU	SW1 Settings
M-II-300GP (66/3.5x)	

Cyrix/IBM M-II CPU	SW1 Settings
#M-II-300GP (75/3.0x)	
#M-II-333GP (75/3.5x)	

For systems with an external clock speed faster than 66MHz.

IDT CPU	SW1 Settings
C6 MMX-180 (60/3.0x)	
C6 MMX-200 (66/3.0x)	
C6 MMX-225 (75/3.0x)	
C6 MMX-240 (60/4.0x)	

For systems with an external clock speed faster than 66MHz.

SW1 Settings: Clock Multiplier, CPU Voltage and CPU Overheating Protection

SW1 Pins 1-3: Clock Multiplier

Clock Multiplier for P54C, P55C, K6, K6-2, 6X86MX, M-II, and C6								
CLKMUL	5.5x	5x	4.5x	4x	3.5x	3x	2.5x	2x
SW1: Pin 1	OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW1: Pin 2	OFF	ON	ON	OFF	OFF	ON	ON	OFF
SW1: Pin 3	ON	ON	ON	ON	OFF	OFF	OFF	OFF

Clock Multiplier for Cynix/IBM 6X86 and 6X86L	
CLKMUL	2x
SW1: Pin 1	ON
SW1: Pin 2	OFF
SW1: Pin 3	OFF

For systems with an external clock speed of less than 66MHz (50MHz or 60MHz), there may be a slight performance sacrifice for your new CPU. For example, changing to a K6-166 from a Pentium-75 will result in a system upgrade speed of 150MHz (not 166MHz). In this case, you can get improved performance by adjusting the external clock speed to 66MHz.

SW1 Pins 4-8: CPU Core Voltage

Core Voltage	3.5V	3.3V	3.2V	2.9V	2.8V	2.2V
CPU Type	C6	P54C	K6-233	K6-166 K6-200 6X86MX	P55C 6X86L	K6-266 K6-300 K6-2
SW1: Pin 4	ON	ON	OFF	ON	OFF	OFF
SW1: Pin 5	ON	OFF	OFF	OFF	OFF	ON
SW1: Pin 6	ON	ON	ON	OFF	OFF	OFF
SW1: Pin 7	ON	ON	ON	ON	ON	OFF
SW1: Pin 8	ON	ON	ON	ON	ON	ON

For a complete listing of core voltage settings 1.6V~3.5V, refer to the chapter “Technical Reference” P.21.

SW1 Pins 10: CPU Overheating Protection

The CPU upgrade board offers a unique **2 phase CPU overheating protection** function– when enabled, the CPU speed will automatically drop 55% if the CPU temperature reaches 70°C. when the CPU temperature reaches 76°C, the CPU speed will automatically drop 85% . This prevents the CPU from overheating.

CPU Overheating Protection	
SW1: Pins 10	CPU Overheating Protection
ON	Enabled
OFF	Disabled

Installing the CPU Upgrade Board

This chapter describes installing your PowerLeap™ PL-ProMMX Plus CPU upgrade board.

Before Installation

Prior to starting installation, take your CPU upgrade board from its packing and remove the protective foam pad, taking care not to damage the pins. If the package includes a CPU cooling fan & heatsink, remove it too.

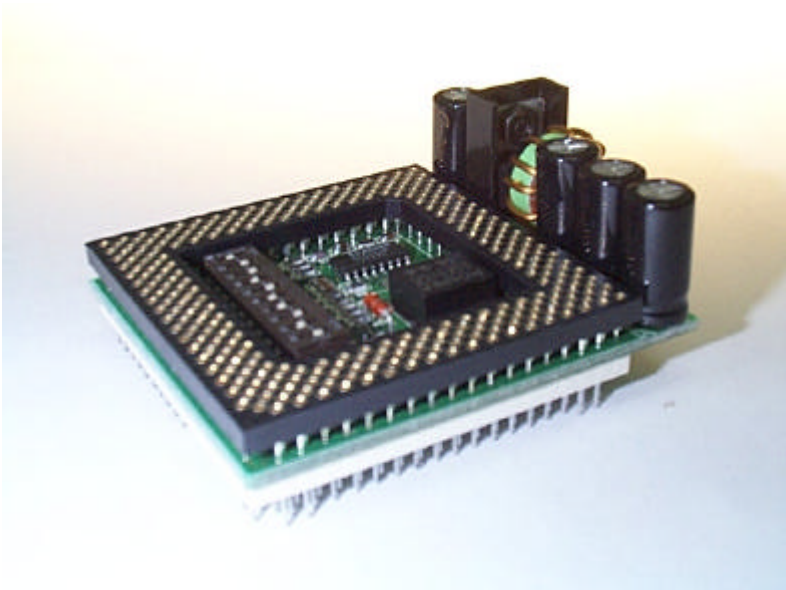


Figure 1. PowerLeap™ PL-ProMMX Plus (SVRM)

To compare the performance increase provided by the PowerLeap™ PL-ProMMX Plus CPU upgrade board, we suggest running the PowerLeap CPU Control Panel® both before and after installation. If you are uncertain about the speed of your existing CPU, you can determine the speed by running the PowerLeap CPU Control Panel®.

Installation

If your package came with a CPU cooling fan & heatsink, install the CPU upgrade board as follows.

- ➔ To install the CPU upgrade board:
 1. Place your computer where you will have plenty of space to work.
 - 2. Turn the computer off and disconnect all power cords and cables from the rear of the computer.**
 3. Remove the cover from the computer (as described in the computer documentation).
 4. Locate your existing 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 Pentium-75).
 5. Remove the existing CPU cooling fan.
 6. Remove the existing CPU from the ZIF socket.

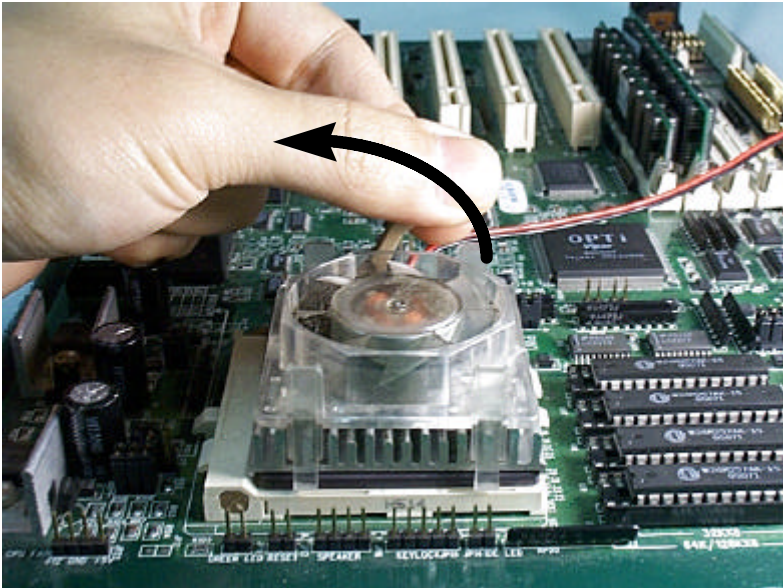


Figure 2. Removing the existing CPU and CPU cooling fan

7. Hold the provided CPU cooling fan & heatsink so that the CPU plate faces upward.
8. Loosen the hex nuts at each corner of the CPU cooling fan. You should be able to freely move the CPU plate up and down.

9. Turn your new CPU over (so that the pins are facing upward) and slide it under the grooves at the sides of the CPU plate.

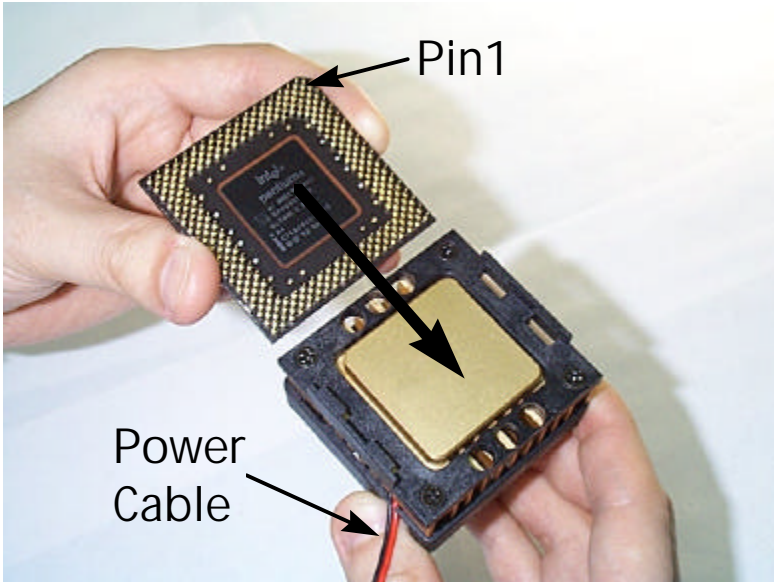


Figure 3. Sliding the CPU onto the CPU plate

Pin 1 of the CPU must occupy the corner diagonally opposite the fan's power cable. If necessary, remove the CPU from the CPU plate and insert it again, with pin 1 in the correct position.

10. Tighten the hex nuts. The CPU should be firmly attached to the CPU plate.

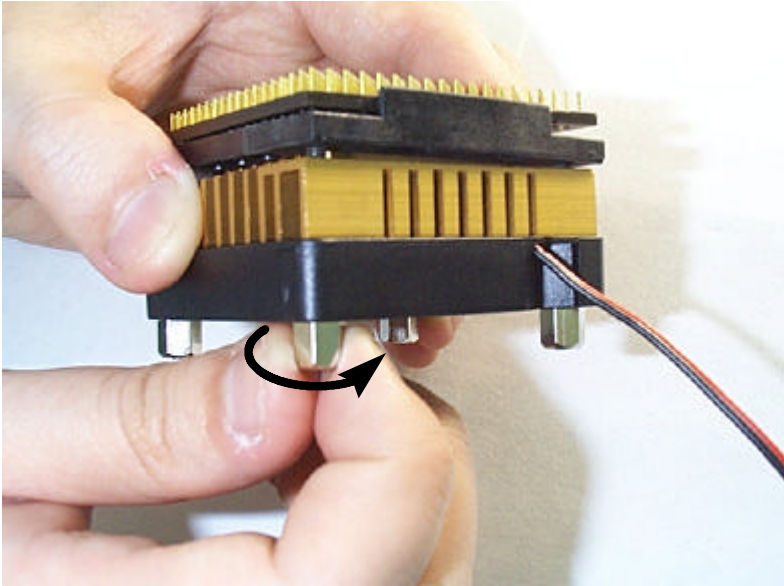


Figure 4. Tightening the hex nuts

11. Make sure that the upgrade board's SW1 settings are correct (refer to the previous chapter). These switches let you set the correct external clock frequency, clock multiplier, and voltage for the upgrade board.

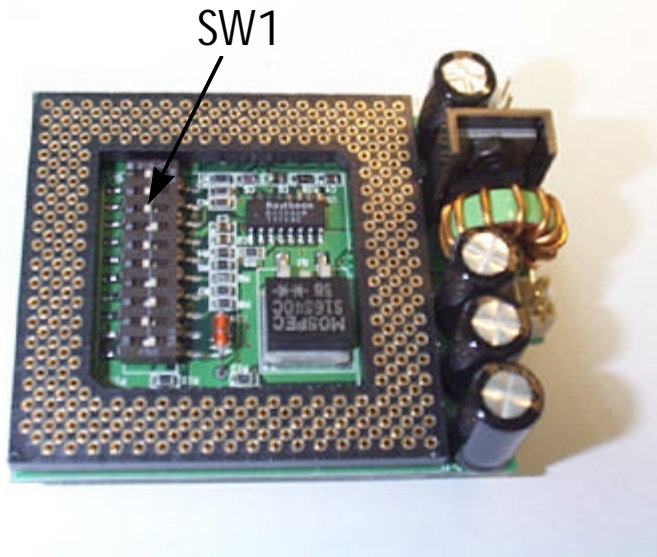


Figure 5. The SW1 DIP switches

12. Turn the CPU cooling fan & heatsink over and insert the CPU into the upgrade board, **making sure that pin 1 of the CPU corresponds to pin 1 of the upgrade board.** Be sure the CPU is firmly seated in the board.

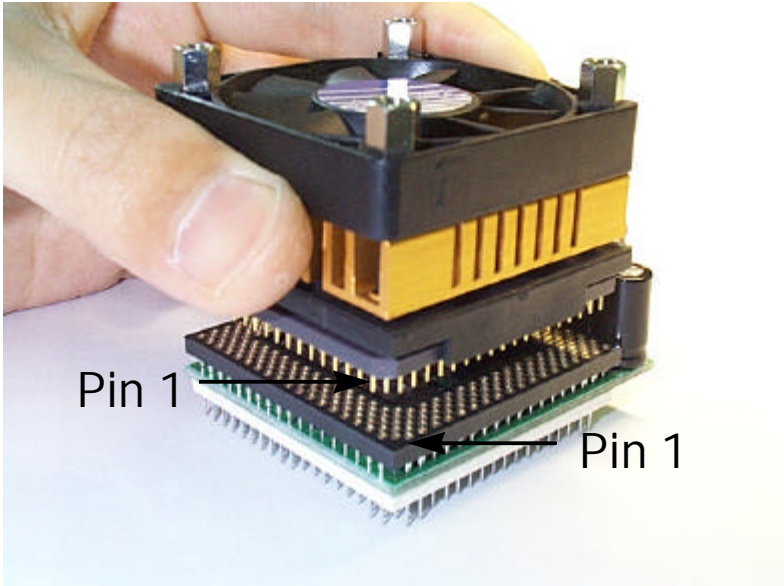


Figure 6. Inserting the CPU into the upgrade board

13. Install the CPU upgrade board into your computer's ZIF socket, **making sure that pin 1 of the upgrade board is installed in pin 1 of the ZIF socket.**

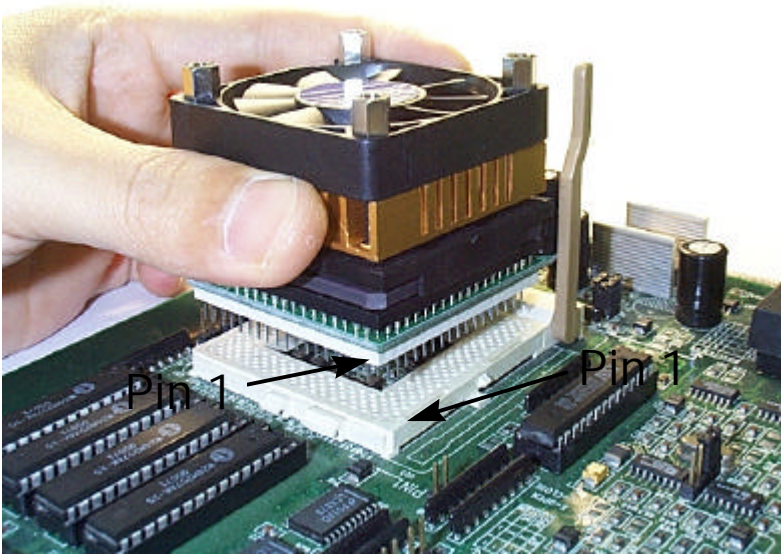


Figure 7. Installing the CPU upgrade board into the ZIF socket

Pin 1 of the CPU upgrade board must match the pin 1 hole of the ZIF socket. If the upgrade board is installed incorrectly, it may be damaged.

14. Lock the CPU upgrade board into the ZIF socket by pressing the socket arm down.

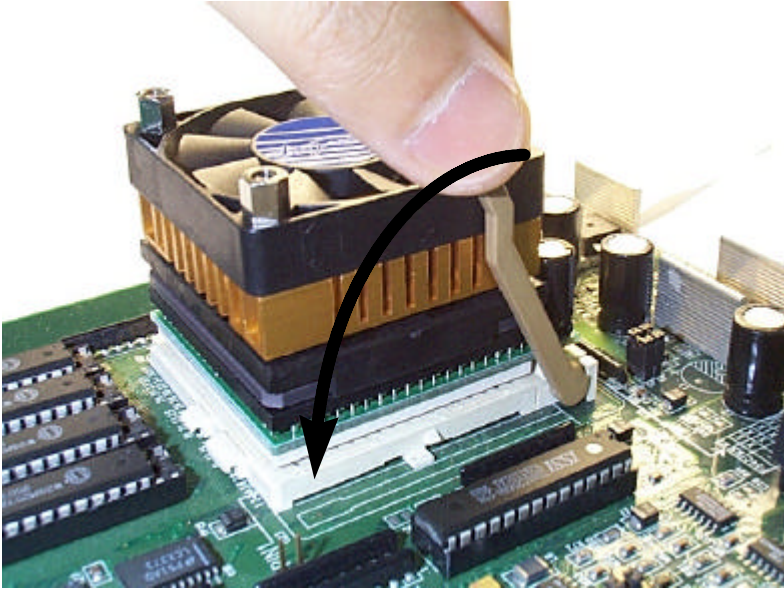


Figure 8. Locking the CPU upgrade board into the ZIF socket

15. Plug the PL-ProMMX Plus's power cable and fan's power cable into the power connector and fan connector on the CPU upgrade board.

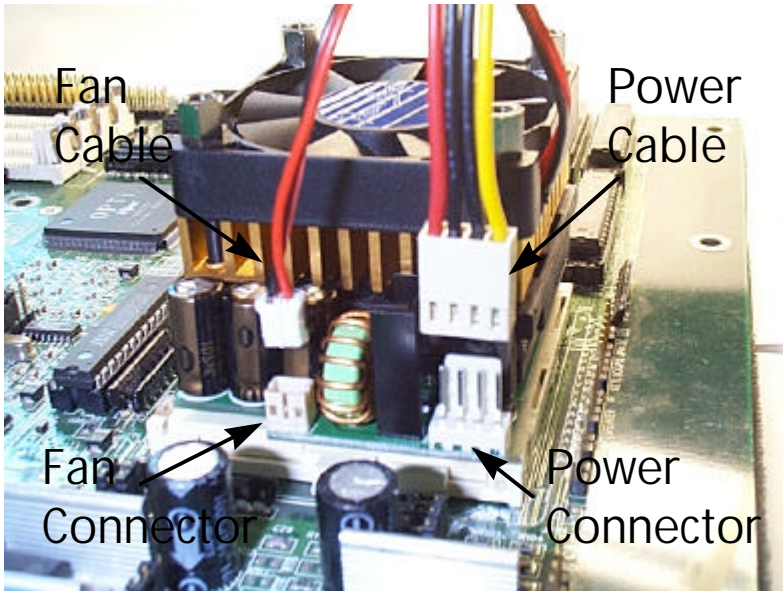


Figure 9. Connecting the power cable and fan cable

The upgrade board must have an independent (external) power supply in order to operate. Without a connection to an external power supply, the CPU upgrade will not work.

For maximum reliability, do not use the unused connector on the power connector cord to supply power to a hard disk drive or other device. In other words, use the power connector cord to connect only the upgrade board to the power supply.

Technical Reference

This chapter presents information for calculating the system upgrade speed. It also lists all CPU core voltage settings.

Calculating the System Upgrade Speed

You can achieve the best CPU performance by adjusting the system board's external clock speed according to the tables below. Or use the formula below to calculate the CPU upgrade board's clock multiplier.

System Upgrade Speed = External Clock Speed x Upgrade Board Clock Multiplier

Intel CPU	External Clock Speed	Upgrade Board Clock Multiplier	Internal Clock Speed
Pentium - 75	50 MHz	1.5x	75 MHz
Pentium - 90	60 MHz	1.5x	90 MHz
Pentium - 100	66 MHz	1.5x	100 MHz
Pentium - 120	60 MHz	2.0x	120 MHz
Pentium - 133	66 MHz	2.0x	133 MHz
Pentium - 150	60 MHz	2.5x	150 MHz
Pentium -166	66 MHz	2.5x	166 MHz
Pentium - 200	66 MHz	3.0x	200 MHz
P55C MMX - 166	66 MHz	2.5x	166 MHz
P55C MMX - 200	66 MHz	3.0x	200 MHz
P55C MMX - 233	66 MHz	3.5x	233 MHz

AMD CPU	External Clock Speed	Upgrade Board Clock Multiplier	Internal Clock Speed
K6-166	66 MHz	2.5x	166 MHz
K6-200	66 MHz	3.0x	200 MHz
K6-233	66 MHz	3.5x	233 MHz
K6-266	66 MHz	4.0x	266 MHz
K6-300	66 MHz	4.5x	300 MHz
K6-2 /233	66 MHz	3.5x	233 MHz
K6-2 /233	75 MHz	3.0x	225 MHz
K6-2 /266	66 MHz	4.0x	266 MHz
K6-2 /266	75 MHz	3.5x	266 MHz
K6-2 /300	66 MHz	4.5x	300 MHz
K6-2 /300	75 MHz	4.0x	300 MHz
K6-2 /333	66 MHz	5.0x	333 MHz
K6-2 /333	75 MHz	4.5x	337 MHz
K6-2 /366	66 MHz	5.5x	366 MHz

IDT CPU	External Clock Speed	Upgrade Board Clock Multiplier	Internal Clock Speed
C6-180	60 MHz	3.0x	180 MHz
C6-200	66 MHz	3.0x	200 MHz
C6-225	75 MHz	3.5x	225 MHz
C6-240	60 MHz	4.0x	240 MHz

Cyrix/IBM CPU	External Clock Speed	Upgrade Board Clock Multiplier	Internal Clock Speed
6x86 - P150+	60 MHz	2.0x	120 MHz
6x86 - P166+	66 MHz	2.0x	133 MHz
6x86 - P200+	75 MHz	2.0x	150 MHz
6x86L - P120+	50 MHz	2.0x	100 MHz
6x86L - P133+	55 MHz	2.0x	110 MHz
6x86L - P150+	60 MHz	2.0x	120 MHz
6x86L - P166+	66 MHz	2.0x	133 MHz
6x86L - P200+	75 MHz	2.0x	150 MHz
6x86MX - PR166	60 MHz	2.5x	150 MHz
6x86MX - PR200	66 MHz	2.5x	166 MHz
6x86MX - PR200	75 MHz	2.5x	150 MHz
6x86MX - PR233	66 MHz	2.0 x	200 MHz
6x86MX - PR233	75 MHz	3.0x	188 MHz
6x86MX - PR266	83 MHz	2.5x	207 MHz
MII-300GP	66 MHz	3.5x	233 MHz
MII-300GP	75 MHz	3.0x	225 MHz
MII-333GP	75 MHz	3.5x	263 MHz

For systems with an external clock speed slower than 50MHz, there may be a slight performance sacrifice for your new CPU. For example, changing to a K6-166 from a Pentium-75 will result in a system upgrade speed of 150MHz (not 166MHz).

SW1: Core Voltage Settings

Core Voltage	Pins 4	Pins 5	Pins 6	Pins 7	Pins 8
3.5V	ON	ON	ON	ON	ON
3.4V	OFF	ON	ON	ON	ON
3.3V	ON	OFF	ON	ON	ON
3.2V	OFF	OFF	ON	ON	ON
3.1V	ON	ON	OFF	ON	ON
3.0V	OFF	ON	OFF	ON	ON
2.9V	ON	OFF	OFF	ON	ON
2.8V	OFF	OFF	OFF	ON	ON
2.7V	ON	ON	ON	OFF	ON
2.6V	OFF	ON	ON	OFF	ON
2.5V	ON	OFF	ON	OFF	ON
2.4V	OFF	OFF	ON	OFF	ON
2.3V	ON	ON	OFF	OFF	ON
2.2V	OFF	ON	OFF	OFF	ON
2.1V	ON	OFF	OFF	OFF	ON
2.0V	OFF	OFF	OFF	OFF	ON
1.9V	OFF	OFF	ON	OFF	OFF
1.8V	ON	ON	OFF	OFF	OFF
1.7V	OFF	ON	OFF	OFF	OFF
1.6V	ON	OFF	OFF	OFF	OFF

Downloading PowerLeap Software

The PowerLeap web site (<http://www.powerleap.com/download.htm>) contains links to files available for FTP download, including:

- PowerLeap CPU Control Panel and the PL/586 Write-back Cache Driver for Windows 95. This is the contents of the distribution diskette that is include with the PL/586-133, PL/54C, PL/OD54C, and PL/ProMMX products.
- PL/586 Installation Software for DOS/Windows 3.x.
- PL/386 Installation Software for DOS/Windows 3.x.
- WinTune 97 Benchmark. *Windows Magazine's* latest version of the WinTune benchmark, which is handy for before-after comparisons. Requires Windows 95.

