

POWERLEAP™ PL-PRO/II

Intel Celeron CPU Upgrade Kit

--for--

Pentium Pro Systems

Installation Guide

Copyright © 1999-2000 PowerLeap Products, Inc.

All Rights Reserved.

v1.0, August 1999

v2.0, February 2000

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

PowerLeap is a registered trademark of PowerLeap Products Inc. PL-Pro/II, PL-PII, PL-ProMMX, IPS, PL-54C/MMX, PL-C6/200, PL-OD54C, PL-386, and PL-586 are trademarks of PowerLeap Products Inc. Intel, Celeron, MMX, and Pentium are registered trademarks of Intel Corporation. Microsoft, Windows, Windows NT, and MS-DOS are either trademarks or registered trademarks of Microsoft Corporation. IBM, EGA, VGA, XT/AT, OS/2, and PS/2 are registered trademarks of International Business Machines Corporation. Other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Visit our Web sites at:

<http://www.powerleap.com>

<http://www.friendtech.com>

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

Table of Contents

Introduction	1
About the Intel Celeron Processors _____	2
PL-Pro/II Special Features _____	3
What You Have _____	4
What You Need to Know _____	4
Installing the PL-Pro/II	5
Using the PL-Pro/II Utility Software	13
Getting to Know the CPU Control Panel Utility Software _____	13
Enabling the L2 Cache _____	15
Increasing the L2 Cache Latency _____	15
Using the PL-Pro/II with Dual-CPU Systems _____	16
Frequently Asked Questions	17
PL-Pro/II _____	17
CPU Control Panel _____	18

Table of Figures

Figure 1. The PowerLeap PL-Pro/II _____	1
Figure 2. Tightening the hex nuts _____	6
Figure 3. Removing the Pentium Pro CPU _____	8
Figure 4. Installing the upgrade adapter into the ZIF socket _____	9
Figure 5. Locking the upgrade adapter into the ZIF socket _____	10
Figure 6. Connecting the power cable _____	11

Introduction

Your PowerLeap™ PL-Pro/II CPU upgrade kit employs patent-pending technology to adapt Pentium Pro (Socket 8) systems to the voltage and pinout requirements of the Intel Pentium II Celeron™ processors. PowerLeap lets you enjoy a cost-effective Celeron CPU upgrade solution (including MMX technology and more)--without requiring replacement of the computer's motherboard.

This manual provides everything you need to know to install and configure the PowerLeap™ PL-Pro/II for maximum performance.



Figure 1. The PowerLeap PL-Pro/II

The PowerLeap™ PL-Pro/II supports the PPGA (Plastic Pin Grid Array) form factor. This form factor provides a 370-pin socket (PGA370), for the 533MHz, 500MHz, and 466MHz Celeron processors.

The PGA370 socket is not compatible with Socket 7 or Super Socket 7, although they have a similar appearance.

About the Intel Celeron Processors

Intel's Celeron processor extends the performance of Pentium Pro processors with MMX technology, a high-performance 128KB level-two cache, and a 32KB level-one cache (consisting of separate 16KB instruction and 16KB data caches). Because the Celeron's 128KB cache is built into the processor die, it runs at full processor speed (in other words, at 500MHz for a Celeron-500).

The Intel Celeron processors provide excellent performance for applications running on advanced operating systems such as Windows 95/98, Windows NT, and Linux. For multimedia and communications applications, the processors provide the capabilities of MMX media enhancement technology. *The Celeron processors also benefit from the same P6 microarchitecture core as the Pentium® II and Pentium® III processors.*

MMX™ Technology

Intel's MMX technology extends the performance of Pentium processors with 57 new instructions, a 32K level-one 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 95/98/NT, OS/2, and Linux) and 16/32-bit applications.

PL-Pro/II Special Features

PowerLeap PL-Pro/II offers the following advanced features:

- Delivers the most cost-effective CPU upgrade solution for Pentium Pro (Socket 8) systems.
- Supports the Intel Celeron 533MHz, 500MHz, and 466MHz processors (PPGA form factor).
- Offers chip-for-chip replacement.
- Includes PowerLeap CPU Control Panel software utility for improved L2 cache performance.
- Offers a unique CPU overheating protection function.
- Includes Autodetect VRM (Voltage Regulating Module) circuitry.
- Supports 1.8V~3.5V (ascending by 0.05V and 0.1V), with 21 voltage settings for V/Core.
- Provides dual-CPU support.

To use the PL-Pro/II with a dual-CPU system, make sure that you have SMP-capable Celeron CPUs. If the CPU packaging includes wording such as “Uniprocessor Only,” the CPUs will not support dual-CPU operation.

What You Have

Your PowerLeap™ PL-Pro/II CPU upgrade kit includes the following items:

- The PowerLeap™ PL-Pro/II CPU upgrade adapter
- Heatsink and cooling fan
- PowerLeap CPU Control Panel utility software
- Power cable

What You Need to Know

The PowerLeap™ PL-Pro/II CPU upgrade adapter installs in a ZIF socket on the motherboard of your computer. If you are not comfortable with opening your computer, please have an authorized service center install the PowerLeap™ PL-Pro/II CPU upgrade adapter.

We recommend using a grounding strap or touching the power supply of the computer before installation to release any static electricity build-up. In addition, you should work in a clean and static-free area.

IMPORTANT: Your PowerLeap™ PL-Pro/II CPU upgrade adapter is a static-sensitive device. It is susceptible to damage if not protected during installation. Do not remove the product from its anti-static bag until you are ready to install it.

Installing the PL-Pro/II

This section describes installing the PowerLeap™ PL-Pro/II CPU upgrade adapter in your computer. There are no configuration switches on the adapter, so installation is easy.

To compare the performance increase provided by the PL-Pro/II upgrade adapter, we suggest running the PowerLeap CPU Control Panel® utility software both before and after installation. If you are uncertain about the speed of your existing processor, you can determine the speed by running the PowerLeap CPU Control Panel® software.

The PowerLeap web site (<http://www.powerleap.com>) contains links to files available for downloading, including the PowerLeap CPU Control Panel® software.

➤ **To install a CPU in the PL-Pro/II upgrade adapter:**

1. Loosen the hex nuts at each corner of the provided CPU cooling fan/heatsink. You should be able to freely move the heatsink up and down.
2. Turn the CPU cooling fan/heatsink over, so that the heatsink's CPU plate faces upward.
3. Turn your new CPU over (so that the pins are facing upward) and slide it under the grooves at the sides of the CPU cooling fan/heatsink. (We recommend inserting the CPU so that its pin 1 corner corresponds to the corner with the fan's power cable. In this way, the power cable will easily reach the fan connector when the CPU is installed on the CPU upgrade adapter.)

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



Figure 2. Tightening the hex nuts

5. Turn the assembled CPU cooling fan/heatsink and CPU over and insert the CPU into the socket on the upgrade adapter, **making sure that pin 1 of the CPU corresponds to pin 1 of the socket.** Be sure the CPU is firmly seated in the socket.
6. Plug the cooling fan's power cable into the fan connector on the CPU upgrade adapter.

➔ **To install the PL-Pro/II upgrade adapter in your computer:**

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 the CPU ZIF socket on the computer's motherboard. The CPU itself may be concealed underneath a CPU cooling fan and/or heatsink.
5. If your computer has a CPU cooling fan/heatsink, remove it.

6. Lift the ZIF socket arm and remove the CPU from the ZIF socket.



Figure 3. Removing the Pentium Pro CPU

7. Align the pins of the upgrade adapter with the holes of your computer's ZIF socket, and gently insert the adapter into the ZIF socket.

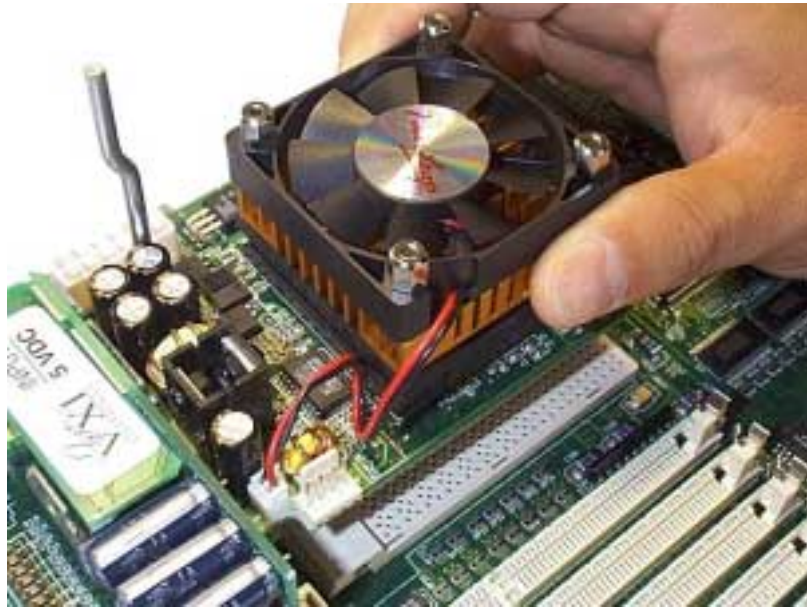


Figure 4. Installing the upgrade adapter into the ZIF socket

There is only one possible alignment for the adapter pins in the ZIF socket.

8. Lock the upgrade adapter into the ZIF socket by pressing the socket arm down.



Figure 5. Locking the upgrade adapter into the ZIF socket

9. Plug the provided power cable into the connector on the upgrade adapter and one of the connectors from your computer's power supply.



Figure 6. Connecting the power cable

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

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

10. Reconnect your computer's power cords and cables and start your computer.

Happy Powerleaping!

➤ **To remove the CPU from the PL-Pro/II upgrade adapter:**

1. Remove the upgrade adapter from your computer's ZIF socket.
2. Insert a flat-bladed screwdriver under one edge of the CPU and gently pry upward until there is a slight gap between the CPU and the socket. Repeat on the opposite side of the CPU, and lift the CPU out of the socket.
3. Loosen the hex nuts on the cooling fan/heatsink and slide the CPU out.

Using the PL-Pro/II Utility Software

This chapter briefly describes using the PowerLeap CPU Control Panel and other utility software. You can download the latest versions of the software utilities from the PowerLeap PL-Pro/II web site

(<http://www.powerleap.com/PL-ProII/index.html>).

Getting to Know the CPU Control Panel Utility Software

The PowerLeap CPU Control Panel is a Windows 95/98/NT/2000 software utility that lets you view information about your CPU and configure CPU settings. In addition to displaying a variety of CPU information, the utility provides settings for different CPU types and more. It also includes innovative CPU temperature reduction technology.



The latest version of the PowerLeap CPU Control Panel includes all the features of version 3.0, and offers a number of new and improved features, including:

- Enables L2 cache when run with a PL-Pro/II upgrade adapter.
- For the PL-Pro/II upgrade adapter, identifies the Celeron CPU and core frequency.
- Displays the BIOS version and date on the "CPU Information" tab. This data is useful in cases where the BIOS needs to be upgraded and the vendor needs to know this information.
- Improves CPU core speed detection accuracy.
- Includes new "Automatically start at startup" option on the "Configuration Tab", which allows you to set up (with one click of the mouse) the CPU Control Panel to run automatically each time Windows is booted up.
- Includes improved CPU temperature reduction technology, replacing "RAIN". Now this function is built in, and it does an even better job at keeping the CPU as cool as possible. It takes up less memory, too.
- Corrects "Blue Screen of Death" system crash problem in Windows NT, and other known version 3.0 bugs.

Enabling the L2 Cache

The latest version of the PowerLeap CPU Control Panel enables the Celeron's L2 cache when run with a PL-Pro/II CPU upgrade. The PL-Pro/II requires the CPU Control Panel to configure and enable the Celeron's L2 cache, which most Pentium Pro system BIOSes can't do by themselves.

For Japanese NEC-98 systems, there are additional useful utilities to do the job (under Windows 95/98 and Windows NT v.4.0):

- **For Windows 95/98:**
<http://www.freepage.total.co.jp/GP03DBM/index.htm>
- **For Windows NT v.4.0 and higher:**
<http://homepage1.nifty.com/marimono/>

Increasing the L2 Cache Latency

The WCPUL2 utility allows you to increase the L2 cache latency, which may help in cases where the system becomes unstable with the PL-Pro/II installed. This utility runs on Windows 95/98 and Windows NT 4.0/5.0 in both Japanese and English languages.

Use this utility to increase the L2 cache latency if your system becomes unstable with the PL-Pro/II. The default value in the current version is "L2-Cache Latency = 5". To improve system stability, try increasing the L2 latency (for example, to 10).

This software utility is intended for advanced users. It's not a good idea to use this program if you don't have a firm knowledge of editing the Windows registry.

Using the PL-Pro/II with Dual-CPU Systems

The WCPUID utility allows dual-CPU systems to identify both primary and secondary processors. Since the PowerLeap CPU Control Panel at present can only give information about the primary processor, this freeware utility is useful for dual-CPU systems because it correctly identifies both CPUs. This utility runs on Windows 95/98 and Windows NT 4.0/5.0 in both Japanese and English languages.

To use the PL-Pro/II with a dual-CPU system, make sure that you have SMP-capable Celeron CPUs. If the CPU packaging includes wording such as “Uniprocessor Only,” the CPUs will not support dual-CPU operation.

Frequently Asked Questions

This chapter attempts to answer some common questions regarding the PL-Pro/II and the PowerLeap CPU Control Panel.

PL-Pro/II

- **Can I use the PL-Pro/II on a dual-CPU motherboard?**

If you have a dual-Pentium Pro motherboard, you can remove your old CPUs and install two PL-Pro/II's with SMP-compliant Celerons. (Please note that not all Celerons are SMP-compliant.)

- **What is SMP?**

SMP (Symmetric Multi-Processing) is a method for building a computer that can use more than one CPU. SMP technology has been employed in advanced workstations, mini computers, and mainframe computers for some time. Recently high-performance PC-based servers have also used SMP.

- **Can I benefit from SMP?**

To take advantage of the extra processor, you must have an operating system that supports dual CPUs (Windows NT 4.0 does; Windows 95/98 don't), and applications that can use the extra processor. Currently, relatively few end-user applications can benefit from dual CPUs. In fact, most dual-processor systems are employed as file servers.

- **Using the PL-Pro/II to upgrade to the Celeron CPU: Are there any restrictions on the maximum speed of the Celeron, or can it just take the fastest I wish to install (say the Celeron 533MHz)?**

You can use any available Celeron, including the 533MHz.

- **How about using two connectors on the same power line for a dual-CPU machine?**

Since the Celeron CPU draws much less current than the AMD K6-III, it's possible to use the Y-type power cable to connect two Celerons to the same power line. But for the greatest stability for an SMP system (especially servers or high-end workstations), you'd better use a dedicated power connector for each CPU.

- **With the PL-Pro/II, why do I need the CPU Control Panel to enable the Celeron's L2 cache?**

Because your computer's BIOS will not recognize the Celeron's CPU ID, it will fail to initialize the CPU's L2 cache. The PowerLeap CPU Control Panel can enable the L2 cache.

CPU Control Panel

- **What is the PowerLeap CPU Control Panel?**

The CPU Control Panel is a companion utility that works with most PowerLeap CPU upgrades. It provides support for new CPUs that the original system's BIOS may not support. The Control Panel also works with the CPU Temperature Monitor, providing a robust way to react to fan failure or other overheating condition.

- **I noticed that in the CPU Control Panel under the Thermostat tab, when I click the Test button in the CPU Temperature section this message appears: "Your CPU has slowed down, it may be due to overheating, please check your system." What is happening?**

This is just a test message to show you what you will see if your CPU really overheats.

- **Is there a version of the PowerLeap CPU Control Panel for Linux?**

No, the PowerLeap CPU Control Panel currently runs only under Windows 95/98 and Windows NT. However, you can use our Linux driver (posted on the PowerLeap PL-Pro/II News site) to enable the L2 cache on the PL-Pro/II.

- **Does the CPU Control Panel have to be running in order for the CPU temperature monitor to work?**

Yes. Although the hardware overheating protection is still working, the CPU Control Panel's CPU Temperature Monitor only works when the CPU Control Panel is running, either on the desktop or docked to the taskbar.

- **Does the CPU Control Panel have to be running in order for the CPU settings to remain in effect?**

No. You can opt for the CPU Control Panel not to dock to the Taskbar, and the CPU settings will still be in effect until the system is shut down or reset.

- **What if my system locks up or crashes with the options I choose?**

Restart your system, and when the CPU Control Panel comes up, immediately click anywhere on the program's display. This will stop the settings from being programmed into the CPU. Then go to the "Settings" panel and undo whatever you did before the crash. Check the documentation for information on the options available on the "Settings" panel, and please take special note of any warnings.

- **The temperature alarm is going off! What should I do?**

First of all, if it goes off when you hit the "Test" button in the Control Panel, that's not a problem--it's supposed to do that. The "Test" button trips the alarm even when the CPU hasn't overheated: this is a way to see if the options selected are working the way you expect them to. If the alarm really goes off by itself, immediately shut down the system and open the case. With the case open, turn on the system again and note whether or not the cooling fan on the CPU upgrade is working. If it seems slow or is

making excessive or unusual noise, contact our Service Department for a replacement fan. In the meantime, enable "Rain" on the "Configuration Panel".

- **In the CPU Control Panel, what does the "Active CPU Cooling" function do?**

The "Active CPU Cooling" feature does the same thing as other temperature-reducing utilities, such as "Waterfall" and "Rain": it issues the HALT instruction over and over again, which turns the CPU "OFF" when the CPU is idle (any interrupt, such as a keystroke, mouse movement, or program execution starts the CPU up again). This feature is built into the Windows NT kernel, so it only shows up in the CPU Control Panel as an option when the OS is Windows 9x.

For updated Frequently Asked Questions, visit the PowerLeap (<http://www.powerleap.com>) and FriendTech web sites (<http://www.friendtech.com>).