

POWERLEAP™ CPU CONTROL PANEL

CPU Software Utility Tool

--for use with --

- AMD, Intel, IDT, and Cyrix/IBM CPUs

User's Guide

Copyright © 2000 PowerLeap Products, Inc.

All Rights Reserved.

Manual edition 1.0, April 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. IBM, EGA, VGA, XT/AT, OS/2, and PS/2 are registered trademarks of International Business Machines Corporation. Intel and Pentium are registered trademarks of Intel Corporation. Microsoft, Windows, Windows NT, and MS-DOS are either trademarks or registered trademarks of Microsoft Corporation. VIA is a registered trademark of VIA Technologies, Inc. Other product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

IBM, PowerPC, and PowerPC 750 are trademarks of IBM Corp. Apple, Macintosh, and Power Macintosh are trademarks of Apple Computer, Inc. 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:

www.powerleap.com

www.friendtech.com

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

Contents

Introduction	1
Features at a Glance _____	1
Installing the CPU Control Panel _____	2
Getting to Know the CPU Control Panel _____	3
Working With the CPU Control Panel	5
Displaying CPU Information _____	5
Calculating the CPU Speed	6
Setting CPU Options _____	6
Intel CPU Users	6
AMD CPU Users	7
IDT CPU Users	9
Cyrix/IBM Users	10
Configuring the CPU Control Panel _____	10
Docking the CPU Control Panel to the Taskbar	10
Enabling CPU Cooling Technology	11
Launching the CPU Control Panel Automatically at Startup	12
Using the CPU Control Panel Thermostat _____	12
Selecting the CPU Temperature Monitor Sensitivity Level	13
Setting Thermostat Overheating Actions	13
Testing the CPU Temperature Monitor	15
Frequently Asked Questions	17

Introduction

The PowerLeap CPU Control Panel is a companion software utility that lets you configure CPU settings and view information about your CPU, L1 Cache, RAM, BIOS, and more. The utility also provides settings for different CPU types, including L1 Cache State, Write Allocation (AMD CPUs), Write Cacheability Detection (AMD CPUs), and more. In addition, the panel's CPU Temperature Monitor provides a robust way to react to fan failure or other overheating conditions. The CPU Control Panel runs on Windows 95, 98, Windows NT (4.0 and up), and 2000.

Features at a Glance

This section describes the special features of the PowerLeap CPU Control Panel.

- CPU software utility that runs on Windows 95, 98, Windows NT (4.0 and up), and 2000.
- Displays detailed system information including: CPU (manufacturer, type, model, stepping, features, and speed), L1 Cache size, BIOS (manufacturer, and date), and amount of RAM.
- Provides accurate CPU core speed detection.
- Allows AMD K6-2 "write allocate" optimization to be enabled/disabled on all K6-2 models/steppings.
- Removes need to run the "K6-2 Optimizer" supplement when using the PowerLeap PL-ProMMX-333 and PL-ProMMX-400 K6-2 processor upgrades.
- Features patented CPU cooling technology.
- Allows you to enable/disable L2 cache for certain CPUs.

- Provides a CPU Temperature Monitor with variable temperature sensitivity levels that lets you configure overheating actions.

Note: Support for the PL-586 upgrade has been removed from this release. For the PL-586 upgrade, use CPU Control Panel version 3.0 or earlier.

- Works with Evergreen Spectra upgrades (all speeds), Kingston Turbochip 233/333/366/400, and PNY QuickChip 200/233/266.

Installing the CPU Control Panel

The following step-by-step instructions guide you through installing the PowerLeap CPU Control Panel.

You can find the latest version of the CPU Control Panel on the PowerLeap website at www.powerleap.com.

Before installing the latest version of the CPU Control Panel, you must make sure there are no previous versions running.

➔ To install the CPU Control Panel:

1. Close any previous version of the CPU Control Panel that may be currently running. The installation of the new version can only run properly if no other copy of the CPU Control Panel is running.
2. Place the CPU Control Panel floppy disk into your computer's floppy disk drive.
3. On your desktop, double-click the My Computer icon.
4. Double-click the 3½ Floppy (A:) icon.
5. Double-click the ccp4xxx.exe file. The setup dialog box appears.

6. Follow the setup instructions that appear. Choose the default options wherever possible. After the installation finishes, the CPU Control Panel icon appears on your desktop.

Getting to Know the CPU Control Panel

The PowerLeap CPU Control Panel lets you instantly view information about your CPU. In addition to displaying CPU information, the utility also provides CPU-specific settings, for example: L1 Cache State, Write Allocation (AMD CPUs), Write Cacheability Detection (AMD CPUs), and more.

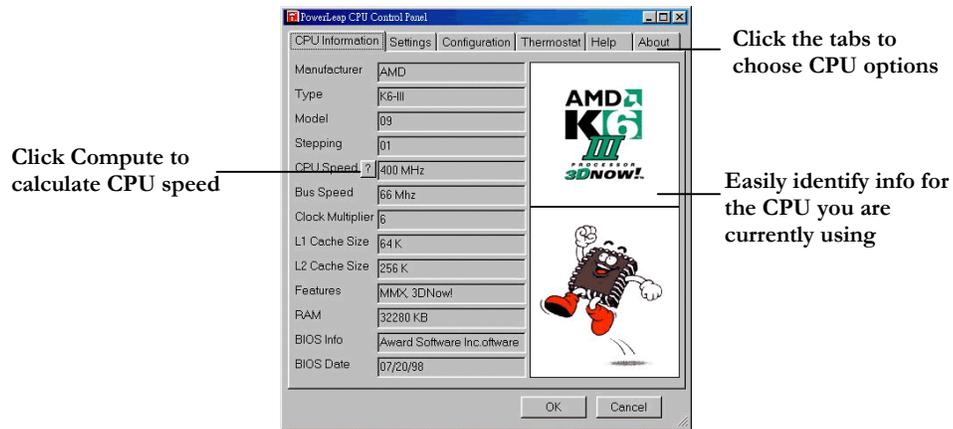
➤ To open the CPU Control Panel:

1. To run the CPU Control Panel, double-click the icon. The CPU Control Panel briefly appears and then docks to the taskbar. When the panel appears, let the CPU Control Panel dock to the taskbar before trying to configure it. Do not click a tab before the CPU Control Panel docks or the following error message appears:



If this occurs, close the CPU Control Panel and re-open it.

2. In the taskbar, double-click the CPU Control Panel icon. The CPU Control Panel appears.



Depending on the type of CPU you are using, the CPU Control Panel offers different CPU Settings options. For example, if you are using an AMD processor your Settings options are different than if you are using an Intel or WinChip CPU.

Working With the CPU Control Panel

The PowerLeap CPU Control Panel's graphical user interface lets you quickly configure your CPU. Informative and easy to use, the PowerLeap CPU Control Panel allows you to configure and protect your new CPU with a few clicks of your mouse.

No matter what type of CPU you are using, the CPU Control Panel's innovative CPU Cooling technology helps prevent your CPU from overheating.

Displaying CPU Information

You can use the CPU Control Panel to display information about the features your CPU supports including MMX and 3DNow! technologies. In addition, you can see other CPU information including: L1 Cache, RAM, BIOS, and more.

With the CPU Control Panel, you can display the following CPU information:

- Manufacturer
- Type
- Model
- Stepping
- CPU Speed
- Bus Speed (*)
- Clock Multiplier (*)
- L1 Cache Size
- L2 Cache Size (*)
- Features
- RAM
- BIOS Info
- BIOS Date

*** Not all CPU types list this information.**

➤ To display CPU information:

1. Open the CPU Control Panel.
2. Click the CPU Information tab.
3. View the info and click OK when you are finished.

Calculating the CPU Speed

You can quickly calculate the speed of your CPU. Use this feature to compare your CPU speed before and after your CPU upgrade.

➤ To calculate CPU speed:

1. Open the CPU Control Panel and make sure the CPU Information tab is displayed.
2. Click Compute . The CPU Control Panel calculates the speed and displays it in the CPU Speed column.
3. Click OK.

Setting CPU Options

The PowerLeap CPU Control Panel supports many types of CPUs. Depending on the type of CPU you have installed, you can specify CPU-related settings. After you have set your CPU options, the settings remain in effect until the system is shut down or reset.

Intel CPU Users

The CPU Control Panels let you enable or disable the L1 cache for Intel Pentium CPUs. Unless you have a strong reason for disabling the L1 cache, we recommend you keep the L1 cache enabled.

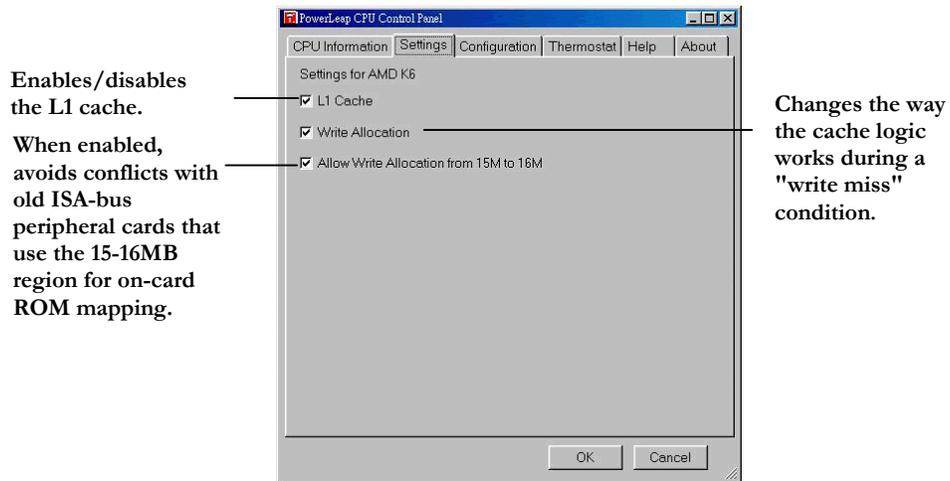
➤ To set Intel CPU options:

1. Open the CPU Control Panel.
2. Click the Settings tab.
3. From the list, select Enabled (strongly recommended).
4. Click OK.

AMD CPU Users

The CPU Control Panel supports the AMD K5, K6, K6-2, and K6-III CPUs. If you are using an AMD CPU, you can specify the following settings:

- L1 Cache
- Write Allocation
- Allow Write Allocation for 15M to 16M



L1 Cache

Level 1 cache is a type of small, fast cache memory located on the CPU die. Because L1 cache is located on the CPU die, it is the fastest cache available to the CPU. Enable this setting to let the CPU access this cache before attempting to access other types of cache. We recommend you enable the L1 cache.

Write Allocation

Write Allocation changes the way the cache logic works during a "write miss" condition (when the CPU has to write out some data, and that address is not in the cache). If Write Allocation is disabled, the "write miss" condition results in data being written out directly to RAM. This is okay for an occasional write, but when there are lots of them, it slows things down.

When Write Allocation is enabled, the system does a burst write of the data from RAM into the cache instead of writing the data to RAM. It then performs the write operation on the data in the cache. This takes more overhead the first time, but if subsequent writes occur in the same or nearby address range (which is now cached), they occur with much less overhead than direct writes to RAM.

Allow Write Allocation from 15M to 16M

Some old ISA-bus peripheral cards (such as ISA-bus-based Token-Ring LAN cards) use the 15-16MB region for on-card ROM mapping. If your computer uses old ISA-bus peripheral cards, you should select this option or conflicts could occur.

➤ To set AMD CPU options:

1. Open the CPU Control Panel.
2. Click the Settings tab.

3. Set any of the following options for an AMD CPU:
 - To enable the L1 cache, select the L1 Cache check box (recommended).
 - To turn on Write Allocation, select the Write Allocation check box (recommended).
 - To turn on Allow Write Allocation from 15M to 16M, select the “Allow Write Allocation from 15M to 16M” check box (recommended for computers with old ISA-bus peripheral cards).
4. Click OK.

IDT CPU Users

If you have a Winchip, Winchip-2, Winchip-3, or Winchip-4 CPU, you can use the CPU Control Panel. To set the following additional settings:

1. Enable L1 Cache
2. Write Gathering
3. Allow Write Gathering from 15M to 16M
4. Enable RAM Write Enhancement
5. Enable Linear Burst Mode
6. Disable Strict Cache Coherency
7. Disable Dynamic CPU Power Management
8. Disable Strict Data Cache Flush Logic
9. Disguise as Intel Pentium

Detailed information about the WinChip CPU-specific settings is to be determined at a later date.

Cyrix/IBM Users

For those of you that use a Cyrix/IBM CPU (6x86MX, MII, 6x86L, 6x86, or Rise P6), you can also take advantage of the CPU Control Panel.

Detailed information about the Cyrix CPU-specific settings is to be determined at a later date.

Configuring the CPU Control Panel

The CPU Control Panel must be running on the desktop or docked to the taskbar in order to work. You can set the CPU Control Panel to automatically start whenever you boot Windows and have it dock to your taskbar. In addition, to prevent your CPU from overheating you can enable PowerLeap's patented CPU Cooling technology.

Docking the CPU Control Panel to the Taskbar

You can dock the CPU Control Panel to the taskbar. This keeps the CPU Control Panel running in the background and lets you easily open it when you want to make changes to the CPU settings.

Note: **The CPU Control must be running either on the desktop or docked to the taskbar for the CPU Temperature Monitor to work. However, even if the CPU Control Panel is not docked to the taskbar, the hardware overheating protection still works.**

If you decide not to dock the CPU Control Panel to the taskbar and close the CPU Control Panel, your settings remain in effect until you shutdown or restart your computer.

➤ To dock the CPU Control Panel to the taskbar:

1. Open the CPU Control Panel.
2. Click the Configuration tab.
3. Select the Dock to Taskbar check box.
4. Click OK.

Enabling CPU Cooling Technology

PowerLeap's CPU Cooling technology helps prevent your CPU from overheating. Similar to other temperature-reducing utilities (such as "Waterfall" and "Rain"), it continually issues the HALT instruction. This turns the CPU "OFF" when the CPU is idle.

Note: Once you select the "Enable CPU Cooling technology" option, it runs continuously. This setting overrides the "Activate CPU Cooling technology" option on the Thermostat tab.

➤ To enable CPU Cooling technology:

1. Open the CPU Control Panel.
2. Click the Configuration tab.
3. Select the "Enable CPU Cooling technology" check box.
4. Click OK.

Launching the CPU Control Panel Automatically at Startup

Select the “Automatically Start at Startup” check box on the Configuration tab and every time Windows starts, the CPU Control Panel runs automatically. We recommend you use this option because the CPU Control Panel's Temperature Monitor only works when the CPU Control Panel is running, either on the desktop or docked to the taskbar.

➤ **To automatically launch the CPU Control Panel at startup:**

1. Open the CPU Control Panel.
2. Click the Configuration tab.
3. Select the “Automatically Start at Startup” check box.
4. Click OK.

Using the CPU Control Panel Thermostat

With the CPU Control Panel you can set how quickly the CPU Control Panel reacts to changes in the CPU core temperature. You can specify the CPU Control Panel to trigger certain overheating actions if the CPU's temperature exceeds the Temperature Monitor sensitivity level. For example, you could set the CPU to activate CPU Cooling technology that helps keep your CPU cool and reduces power consumption.

You can perform a test to see the way the CPU Control Panel reacts if the CPU begins to overheat. This will let you confirm whether the CPU Control Panel reacts the way you expect it to if you have set overheating actions.

Selecting the CPU Temperature Monitor Sensitivity Level

The CPU Control Panel monitors the CPU to see if an overheating condition occurs, for example if a cooling fan fails. How quickly the CPU Control Panel triggers overheating actions depends on the sensitivity level you set for the Temperature Monitor.

You can select different temperature sensitivity levels including: Extreme (most sensitive), High, Medium, Low, and Off.

➤ To select the Temperature Monitor sensitivity level:

1. Open the CPU Control Panel.
2. Click the Thermostat tab.
3. From the Sensitivity list, select a sensitivity level.
4. Click OK.

Setting Thermostat Overheating Actions

Using the CPU Control Panel, you can set different overheating actions to occur if your CPU begins to overheat. You can customize the CPU Control Panel settings to perform either one or more actions together if overheating occurs. For example, if your CPU runs too hot your computer could:

- Display a message
- Make a phone call
- Play a sound (.wav) file
- Activate CPU Cooling technology
- Execute a program

PowerLeap's CPU Cooling technology offers similar functions 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--restarts the CPU.

Notes:

- *This feature is built into the Windows NT and Windows 2000 kernel, so it only appears in the CPU Control Panel as an option when the operating system is Windows 9x.*
- *If you select the "Activate CPU Cooling technology" feature on the Thermostat tab, the CPU Cooling technology activates as a response to overheating. The "Enable CPU Cooling technology" option runs continuously.*

➤ **To set Thermostat overheating actions:**

1. Open the CPU Control Panel.
2. Click the Thermostat tab.
3. Set any of the following actions to occur if your CPU begins to overheat:
 - To display a message, select the "Display A Message" check box.
 - To make the computer dial a number, select the "Make A Phone Call" check box and enter a phone number in the text box.
 - To play a Wave file, select the "Play Wave File" check box. Click Browse to navigate to the Wave file that you want to play. Select the Play Continuously check box to make the Wave file remain playing.
 - To activate CPU Cooling technology, select the "Activate CPU Cooling technology" check box.
 - To run a program, select the Run Program check box. Click Browse to navigate to the executable file you want to run.

4. Click OK.

Testing the CPU Temperature Monitor

You can test the overheating actions you have set by clicking the Test! button; this triggers any actions you have set. You should test the Temperature Monitor to confirm the overheating actions you set, work the way you expect them to.

➤ **To test the CPU Temperature Monitor:**

1. Open the CPU Control Panel.
2. Click the Thermostat tab.
3. Make sure you have set the overheating actions you want to occur (see “Setting Thermostat Overheating Actions”) and click Test!. The actions you set are triggered.
4. Click OK.

Important: If the alarm really goes off by itself, immediately shut down the system and open your computer case. With the case open, turn on the system again and note whether or not the cooling fan on the CPU upgrade is working properly. If the fan seems slow or is making excessive or unusual noise, contact the dealer from whom you purchased it. We also recommend cleaning off any dust inside the CPU fan; this helps prevent overheating. Please also make sure nothing is blocking the air flow path inside the computer chassis.

Frequently Asked Questions

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

The PowerLeap CPU Control Panel is a 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, including L1 Cache State, Write Allocation (AMD CPUs), Write Cacheability Detection (AMD CPUs), and more. It also includes innovative CPU temperature reduction technology. The CPU Control Panel runs on Windows 95, 98, NT (4.0 and up), and 2000.

- **After installing my CPU upgrade, the CPU Control Panel indicates that the upgrade is running at less than expected [in this case, 175MHz instead of 233MHz]. Why is this? How do I boost the speed?**

The upgrade is running at 175MHz because the system bus (or "frontside bus") on the motherboard is set to 50MHz. The way the CPU sets its internal clock rate is by multiplying this system bus clock by a certain factor--in the case of the Intel 233MHz Pentium, the factor is 3.5x. So, $3.5 \times 50\text{MHz} = 175\text{MHz}$. In order to reach a 233MHz core speed, the system bus clock has to be set to run at 66MHz ($3.5 \times 66.6\text{MHz} = 233\text{MHz}$). There should be a jumper on the motherboard that you can use to change the system bus clock speed. It may be labeled "50/60/66" (choose 66), or it may be some combined setting for the CPU speed in use ("75MHz/90MHz/100MHz"), in which case you should set the jumpers for the 100MHz CPU, which will make the system bus run at 66.6MHz.

- **I noticed that in the PowerLeap 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?**

The PowerLeap CPU Control Panel currently runs on Windows 95, 98, NT (4.0 and up), and 2000. 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. You can also use [PowerTweak's](#) Linux version to enhance the PL-K6-III's performance under Linux.

- **Can I run the PowerLeap CPU Control Panel and PowerTweak at the same time?**

We don't recommend this. If your purpose in using one of these programs is only to turn CPU registers on/off, you can use it and then uninstall it after switching registers on/off. (Once "on/off", the registers will stay "on/off" until changed.) Note that in order to use the PowerLeap CPU Control Panel's Temperature Monitoring feature, the program must be running or docked to the taskbar.

- **In the PowerLeap CPU Control Panel I can enable write allocation. But when I use setk6.exe, it says that it is disabled and I am unable to enable it using setk6.exe. Could this be a BIOS issue?**

It's not the BIOS, it's a software conflict. This problem occurs because both programs are trying to address the same registers. You can use either SetK6 or the PowerLeap CPU Control Panel, but not both.

- **What about Cyrix CPUs? Does the CPU Control Panel support them?**

Yes. We just don't document much of it because we don't sell Cyrix-based upgrades. However, if you have a Cyrix or IBM 6x86MX or MII processor, a custom "Settings" panel will give you access to the numerous internal performance registers of these processors.

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

Yes. Although the hardware redundant 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. Therefore, any overheating actions you have set under the Thermostat tab will not trigger unless the CPU Control Panel is running.

- **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 click the "Test!" button in the CPU 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 the fan seems slow or is making excessive or unusual noise, contact the dealer from whom you purchased it. We also recommend cleaning any dust inside the CPU fan. Dust build-up can restrict the flow of air, so a clean fan prevents overheating. Please also make sure nothing is blocking the air flow path inside the computer chassis.

- **What does Write Allocation do?**

Write Allocation changes the way the cache logic works during a "write miss" condition (that is, when the CPU has to write out some data, and that address is not in the cache). Normally, without Write Allocation enabled, the "write miss" condition results in the data being written out directly to RAM. That's OK for an occasional write, but when there are a lot of them, it slows things down. With Write Allocation enabled, instead of writing the data to RAM, the system does a burst read of the data from RAM into the cache, and then it does the write operation on the data in the cache. This takes more overhead the first time, but if subsequent writes occur in the same or nearby address range (which is now cached), they occur with much less overhead than direct writes to RAM.

- **There is an option in the PowerLeap CPU Control Panel to "Allow write allocation from 15M to 16M". What does this do? How does it improve performance?**

Some old ISA-bus peripheral cards (such as the ISA-bus-based Token-Ring LAN card) use the 15-16MB region for on-card ROM mapping. Without this option, there'll be a conflict.

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

The "Enable CPU Cooling technology" function offers similar functions 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 and Windows 2000 kernel, so it only shows up in the CPU Control Panel as an option when the OS is Windows 9x.

- **What do the Write Allocation and Write Combining BIOS settings do for AMD CPUs?**

When enabled, Write Allocation optimizes memory I/O performance dramatically. Some BIOSes will turn on Write Allocation automatically for some older K6-2 CPUs, but usually not for the newer ones with the "CTX" core (AMD moved the registers to a different address). This includes all K6-III CPUs. In addition, the "CTX" core chips have the capability for Write Combining, which can make the PCI video performance better by improving the efficiency of the bus traffic. Write Combining requires some setting up based upon RAM allocation, and the significant memory addresses used by the video card.

- **When I try to configure the CPU Control Panel, why does the message "CPU settings will not be loaded from File!" appear?**

When you open the CPU Control Panel, it briefly appears before docking to the taskbar. The message appears because you are trying to configure the CPU Control Panel before it docks to the taskbar. Let the panel first dock to the taskbar, and then in the taskbar double-click the CPU Control Panel icon.

- **In my version of the CPU Control Panel, under the Thermostat tab, it says those settings are only for PL-ProMMX Plus!. Why can't owners of other PowerLeap products also use those settings?**

In fact, now many of PowerLeap products have built-in ROP (Redundant Overheating Protection) therefore this message is no longer true. This message is changed in future versions.

- **I have Windows 9x and after opening the CPU Control Panel the System Monitor shows Kernel: Processor Usage (%) at 99-100%. It remains this high until I close the CPU Control Panel. Please explain what's happening and what I can to correct it?**

This is related to the way the performance and processor usage algorithms perform their measurements, and the way the "Activate CPU Cooling technology" feature works in the CPU Control Panel. When the CPU is idle, the CPU Control Panel issues a command to the CPU to make it power-down. This is, of course, interrupted as soon as the CPU starts doing something again. However, over the course of normal usage, having the CPU power-down can save a lot of power and heat.

The CPU usage monitors misinterpret the powered-down state as an indication that the CPU is busy. So, with the cooling feature enabled, the CPU always "looks" busy, when in reality it's no busier than with the cooling feature disabled.