POWERTWEAK 2.0

User's Manual

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About this manual

Typing conventions

Simultaneous Key press : <Alt>+<Ctrl>+<F1> means you need press all keys indicated between brackets ("<" and ">") simultaneously.

Menu commands : *File* > *Options* means you need to select the "file" menu in the menu bar first, and then the "Options" menu in the submenu.

Terms definitions : Some technical terms will be used along this manual. Most of them are defined in the "Glossary". If this is the case, they have a small mark ("•") next to them.

Overview

Powertweak is composed of three modules : The *Control Center*, which is at the top of the hierarchy, the *System Monitor* and the *Optimizer*.

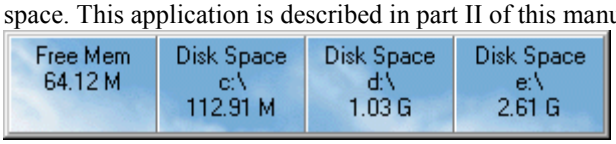
The Control Center

The control center is the application which will give you access to the two other modules. It will place a little icon in the taskbar :

This application is described in part I.

The System Monitor

This application displays information on the current state of the system, such as free memory space or disk space. This application is described in part II of this manual.



The Optimizer

The most complex of the three applications. It optimizes the processor and chipset in order to increase the system speed. This application is described in part III of this manual.

Uninstallation

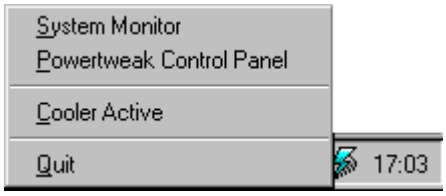
To remove Powertweak, open the “Add/Remove” control panel applet, click on “Powertweak” in the application list, and click on “Add/Remove…”.

Part I – The Powertweak Control Center

The Powertweak Control Center is loaded at boot time. It displays a small icon in the taskbar.

This icon is used to start the two other applications, the System Monitor (see Part II) and the Optimizer (see Part III).

Clicking with the right button on the icon will display a popup menu:



Choosing *System Monitor* will start the System Monitor Application.
Choosing *Powertweak* Control Panel will start the Optimizer.

The *Cooler Active* option toggles the cooling function. This function decreases the CPU temperature by executing a specific instruction which halts the processor when it is not in use (approximately 95% of the time in office use), see below.

Finally, clicking on *Quit* will remove the icon from the taskbar, and close the monitor if it is open.

The Cooling Function

This is an extremely useful function of Powertweak. In normal use, your computer is idle 95% of the time. The idea behind this function is to halt the processor during this idle time in order to save power and decrease the temperature.

This will reduce your power consumption and increase your processor life span. To illustrate this, decreasing the processor temperature by ten degrees Celsius doubles its lifetime.

This function should be disabled under Windows NT because this operating system has its own internal cooling feature.
You may also need to disable it when playing games, since it slightly decreases the performances (< 2% decrease).

Part II – The System Monitor

This application displays real-time information about the state of the system.
It can display up to 32 monitors at the same time, each being updated every 10^{th} of second.

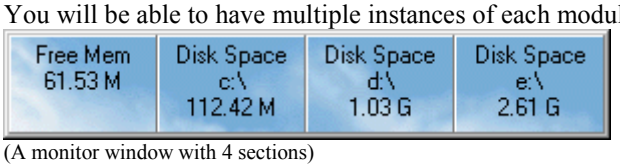
When the application is started, you will notice a little window with two monitors installed by default, the first measuring the free memory and the second measuring the free disk space of the c: hard drive.

This window can be placed anywhere on the screen, it can be resized dynamically and will conserve its position and size next time you start it. It can be placed above all the other windows so that you can watch it anytime without having to call it.

1. First glance at the monitor

Several monitoring modules are available : disk space, memory space.
Each has multiple function. For instance, the memory space module can monitor the available physical memory, virtual memory, paging file memory…

You will be able to have multiple instances of each module, corresponding to one section of the monitor window



(A monitor window with 4 sections)

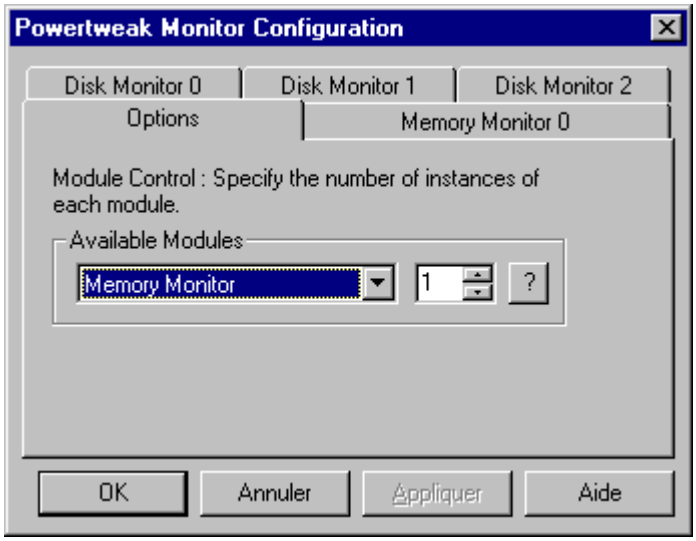
Here we have one instance of the memory monitor, watching the free physical memory, and three instances of the disk monitor watching the free disk space of the c, d and e hard drives.
You might want to start another instance of the memory module or simply change its function.

We'll see first how to add or remove an instance of a module.

2. Adding, removing and changing monitors

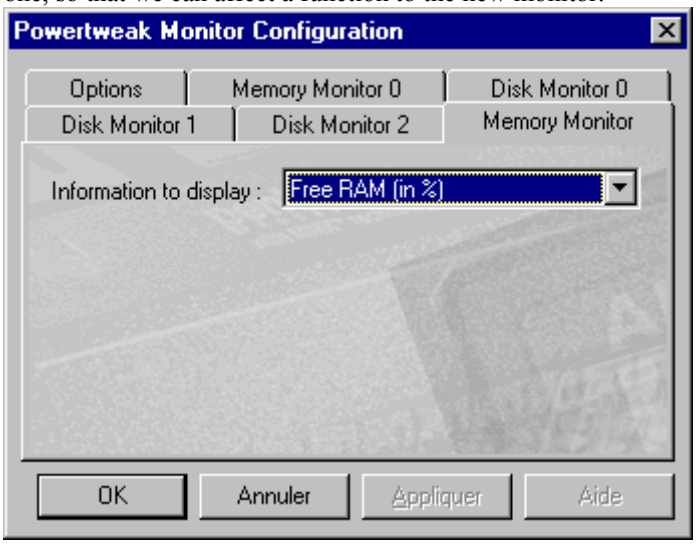
Click on the monitor window with the right button and select "configuration" in the popup menu. This will display a property sheet. One of the pages is entitled "Options", select it.

There you have a drop down box, containing a list of the available modules. Select one of them. The instance counter at the right side of the drop down box will be updated. If you want to add an instance of the module, click on the up arrow, if you want to remove one, click on the down arrow.



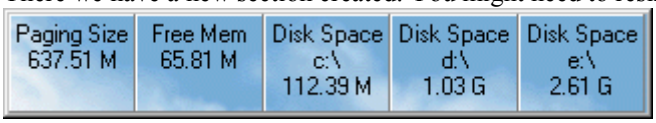
N.B. : The deleted module is always the last one.

As you change the number of instances, the number of property pages will change. Click on the newly added one, so that we can affect a function to the new monitor.



The contents of the property page will vary with the type of module you select. Here it is quite simple, only one drop down list is available. Let's select "Paging File Size" for instance.

There we have a new section created. You might need to resize the monitor window to display it correctly.



You have now learnt how to use the monitor.

3. Other functions

You can place the window above all the others in order to be able to watch it anytime.
This is done easily.

If the monitor window is not visible, bring it to the top by right-clicking on the Powertweak icon in the taskbar and selecting "System Monitor".

Now click on the monitor window with the right button, and select "Always On Top". This will toggle the "topmost" mode. Doing this again will disable the "topmost" mode.

The little check mark next to the menu item will indicate whether this function is activated or not.

Introduction

This chapter contains the following paragraphs :

Presentation of Powertweak
Powertweak Functions
Before starting Powertweak
Components Supported by Powertweak

Presentation of Powertweak

Powertweak is a unique hardware tuning and optimization software. Let us take an example in everyday life, you have ordered a new car. You may either use it "as is", or try to get an extra performance boost, or reduce its gas consumption by fine-tuning the different parts. With a computer, we are in the same situation. The whole system is constituted with small individual parts which can be tuned in a more efficient way than the default. The problem is that it would increase the manufacturer production costs to tune the components individually. This is where Powertweak is useful, the manufacturer provides the information required to tune its components, and Powertweak fine-tunes your components according to these recommendations.

Thus, the processors and chipsets• can be configured for your own system, according to parameters which can only be determined at run time, this is why these features are not correctly configured or enabled by default.

Powertweak gathers all the required system information, and configures the low-level registers of your processor and chipset.

Substantial performance increases can be obtained with the use of Powertweak. Performance increase vary in a range of +5% to +40%, depending on the system, on the software used to test the system performance, and on the subsystems it tests.

Powertweak Functions

Powertweak automatically detects the processor(s) and PCI/AGP devices present in your system. If a device can be configured by Powertweak, it will allow you to access its most significant settings, in terms of performance and system functionality.

Let us take an example: writes to the video memory. This is what changes the display on your screen.
In normal use, writes to the memory area are directly transmitted across the PCI• or AGP• bus. As there is a high latency, because PCI/AGP transfers are very slow compared to the processor to memory transfer rate, the processor has to wait for all writes to be issued one by one.

However, it is possible to enable what is called “Write Combining” or “Write Gathering”. The processor has an internal buffer which will store writes to a specified memory area, and instead of sending them one by one, will gather (combine) them, so that only one transfer across the PCI/AGP bus will be issued for multiple writes.

The Intel® Pentium Pro, Celeron, Pentium® II and Pentium® III have a 32-bytes buffer, which means that in an 8-bit color mode, it will be able to gather 32 write operations and send them all at once.
This is an example of something that can only be done at runtime, Powertweak first locates the video memory area physical location and size, and sets a special memory area in the processor Memory Type Range Registers (MTRR).

This, according to the Intel® guides, can improve throughput transfer rate by 100%.

This is only an example among the numerous features offered by Powertweak.

Before starting Powertweak

You have to be conscious that, as Powertweak works with low-level hardware, some risks exist with the use of Powertweak. But please do not worry, Powertweak has been thoroughly tested on a wide variety of system configurations.

Another safety measure is provided by the hardware which Powertweak works on itself : it's configuration is reset to default state each time the computer is restarted, therefore there is absolutely no risk to permanently alter your system.

As a general rule, it is better to close all your applications and save your work before starting *Powertweak* for the few first times. Once you are sure it works correctly, you can use it like any other application.

Components Supported by Powertweak

Most recent components are supported by Powertweak. Please note that if a processor or chipset is not supported by Powertweak, though Powertweak will not optimize it, it will not prevent it from running on your system.

Supported Processors

Advanced Micro Devices, Inc. (A.M.D.™) :
K6, K6-2, K6-III, Athlon™
Cyrix™ Corporation :
5x86™, 6x86™, 6x86MX™ and MII™
Intel® Corporation :
Pentium® Pro, Pentium® II, Pentium® II Xeon™, Celeron™, Pentium® III, Pentium® III Xeon™.
I.D.T.
Winchip™ C6, Winchip™ 2.

Supported Chipsets

Acer Labs Inc. (ALi)
Aladdin V (M1541), Aladdin IV (M1531)

Intel® Corporation :
430VX, 430HX, 430FX, 430HX, 440FX, 440LX, 440EX, 440BX, 440GX, 440MX.

VIA Technologies, Inc. :
Apollo VP, VPX, VPX/97, VP2, VP2/97, VP3, MVP3, MVP4, Apollo Pro, Apollo Pro +, Apollo Pro133.

Supported Operating Systems

Powertweak will be able to operate under the following Operating Systems (O.S.):

Microsoft® Windows® 95
Microsoft® Windows® 98
Microsoft® Windows NT® 4.0
Microsoft® Windows® 2000

Chapter 1

Using Powertweak

This chapter contains the following paragraphs :

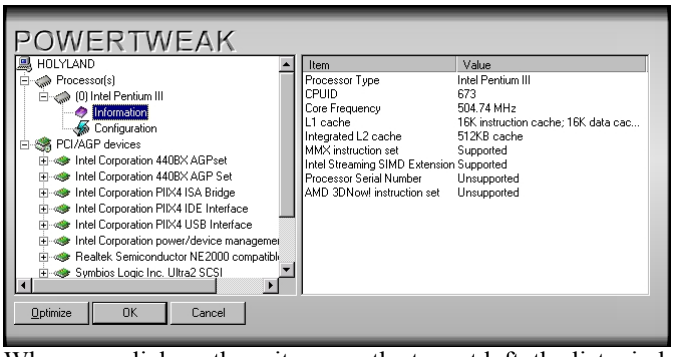
Starting Powertweak

To start Powertweak :
Click on Start > Programs > Powertweak 2.0 > Powertweak 2.0.

Powertweak Main Window – Presentation

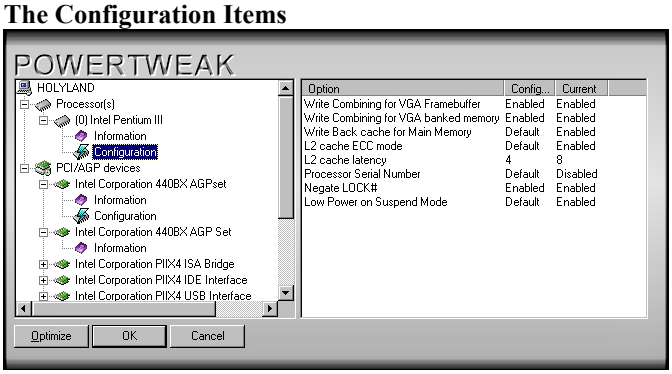
The main window is composed of a tree on the left side, containing the detected processors under the processor section, and the PCI/AGP detected devices.
Each processor or PCI device item has subitems :

a. The Information Items



When you click on these items on the tree at left, the list window on the right side is filled with information about the selected component. This is strictly informative and you cannot modify these items.

b. The Configuration Items



The configuration items will be present for devices explicitly supported by *Powertweak* only. Clicking on these items will display settings which you can change. Three columns are displayed: option name, selected state and current state.
Option name : briefly describes what this option is for.
Selected State : this is the desired state for this option, which can be changed.
Current State : this is how the system is currently configured.

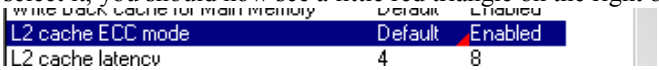
c. The buttons at the bottom

Three buttons are available : “Ok”, “Optimize” and “Cancel”
Ok : optimizes the computer and shuts down Powertweak.
Optimize : optimizes the computer and keeps Powertweak open.
Cancel : shuts down Powertweak and does not configure the system.
When clicking either *ok* or *optimize,* the changes made in the selected configuration will be reflected on the system. As long as you make changes in the configuration, the actual hardware configuration does not change.

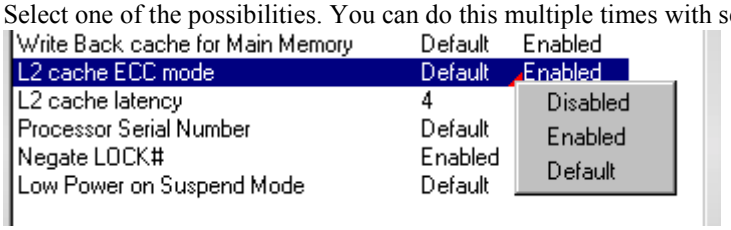
Changing the system configuration

a. **Select a component**
Choose one of the processors or PCI devices you want to configure, and then select its configuration subitem. If there is no configuration subitem, then you cannot configure this component. The list on the left side has been filled with options which you can change.

b. **Select an option to change**
There are usually several options available for a given component. Click on one of the list items to select it, you should now see a little red triangle on the right of the "Selected State" column.



c. **Select the new state**
Click on the little triangle to display a pop up menu which contains the available options. Select one of the possibilities. You can do this multiple times with several different options.



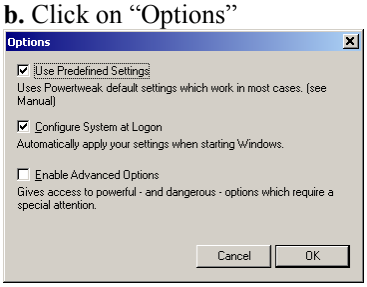
d. **Apply changes**
Now that you have changed the configuration, you will need it to be reflected in the actual hardware registers. To do this, you will need to click on either "Ok" or "Optimize".

Making system optimization automatic

You need to have Powertweak configure your system each time you start the computer, because the settings are lost when the computer is powered off or reset. In order to make this easy and transparent for you, Powertweak can automatically configure the system when Windows is starting.

Here is how to activate this feature:

a. Open Powertweak
b. Click on "Options"



c. Switch the "Configure System at Logon" option on
d. Click on OK.

You will notice Powertweak has started with the Powertweak splash screen appearing at logon.

Note: You should only activate this feature once you are sure the system is working correctly with the selected configuration.

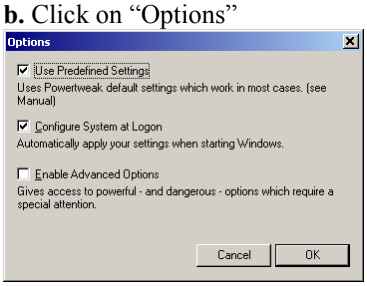
Using Predefined Settings

One of the great features of Powertweak 1.0 was the ability to use predefined settings : these settings represent the configuration which provides the best possible optimization without any failure risk.

Here is how to activate this feature:

a. Open Powertweak

b. Click on “Options”



c. Switch the “Use Predefined Settings” option on

d. Click on OK.

Now the predefined configuration will be applied to your system each time you click on *OK* or *Apply*, or when the system is configured at logon, if this feature is enabled.

Tip for Expert Users : disabling this feature allows you to enable extra feature which are not enabled by default. These feature may cause system crashes, so be careful though.

Chapter 2

Troubleshooting

This chapter contains the following paragraphs :

Finding out The Origin of a Problem

There are several ways to detect the origin of a problem, which are all very logical.

a. The Log File

This method applies in cases where the computer immediately locks up after pressing "OK" or "Optimize" from the Powertweak window.

The first thing to do is to check out what is called the "log file": it records everything Powertweak does. In particular, the last line in this file may indicate the origin of the failure most of the time: to open the log file:

Open the Windows Notepad. We will assume you have installed Powertweak in "C:\Program Files\Powertweak 2.0", but this also applies to any directory in which you have installed Powertweak. Click on *File > Open…*and select the (C:) hard disk drive, then double click on *"Program Files"* and *"Powertweak 2.0"* in the folders list, and finally, double click on *"pwtlog.txt*". Lines with the format DATE-TIME-COMMAND will appear.

Now, look at the end of the file, the last executed command is displayed last. Its name corresponds to options available in Powertweak. For example, let's say the last line is

```
09/18/99,14:20:40-AGP Side Band Addressing
```

To know to what hardware component it belongs, you will need to look a few lines before and fine the first occurrence of "Enter: " followed by the name of the component. Here we would find :

```
09/18/99,14:20:40-Enter: Intel 440BX Configuration
```

which means this options is one of the options available in the Intel 440BX chipset configuration.

Here is how to proceed to solve the problem:
Open Powertweak, select the component located using the method described over, select the option you have found out in the last line, and change its state to "Default" as described in Chapter 1 of this manual.
Clicking on "Optimize" or "OK" now should not reproduce the problem anymore.

b. Other problems

Problems you may encounter are separated into several different categories:

1 – Immediate lockups
2 – Non-immediate lockups
3 – Weird system behavior

1 – Immediate lockups

Here again, this problem should be separated into several categories:

A – The screen is frozen in the Windows environment.

This is usually an error in the chipset configuration. Make sure you are not in "Advanced Mode", the options available in this mode are likely to create this kind of problem if wrong settings are used. If you were in Advanced Mode, you may try to debug the configuration with the use of the Log File method described before. It is usually preferred to stay in Normal Mode.

B – You get a blue screen (commonly called Blue Screen Of Death, BSOD) with an error message.

This is usually caused by errors in the processor configuration. Try to set the options like "Enable Write Combining for Linear Framebuffer" or "Enable Write Combining for VGA Framebuffer" in the processor configuration to "Default" state, if they are available.
If this does not work, try the log file method describing before. If this still does not work, please contact the technical support.

2 – Non-immediate lockups

These problems happen rarely. There is no general rule concerning their origin, and they are particularly difficult to locate, because the log file is of no use here.

3 – Weird system behavior

See common problems.

Common Problems and Answers

Scrambled Display : some parts of the screen are not correctly displayed. In this case, try to set the options like “Enable Write Combining for Linear Framebuffer” or “Enable Write Combining for VGA Framebuffer” in the processor configuration to “Default” state, if they are available.

Scrambled Sound : this is usually caused by the chipset configuration with a PCI sound card. In particular, VIA chipset often exhibit this problem. To solve the problem, disable the “CPU to PCI write posting” and “PCI Master Write Merge” option. If this is not enough, disable options which names contain the “Merge” word. Indeed, merging write operations may cause problems with 16-bit sound.