

CPUCool Help Index

CPUCool is a multifunctional utility:

- 1) Cooling the CPU under Windows 95 / 98
- 2) Changing the FrontSideBus (changing the clock frequency of CPU)
- 3) Shutdown Windows by keystroke
- 4) Scans the System Management Bus for EPROMS located on SDRAM modules.
- 5) Display's the temperatures, voltages and fan speed of your motherboard
- 6) Optimization of memory
- 7) Optimization of CPU for AMD Cyrix and Intel processors

Please visit my home page at

<http://www.podien.de>

for updates of my software and to see my other programs!

You can access CPUCool's powerful options quickly via the [right mousebutton menu](#) located in the tray.

To see the values continuously you can select the small [display](#) which stays on top of the screen

If optimization of CPU fails press the right mouse button during initialization, this will stop the optimization process. Or run the RESET.EXE file that comes with the distribution

There are the following menu items:

[File](#)
[SD-RAM](#)
[Updaterate](#)
[Optimizations](#)
[Display Options](#)
[Options](#)
[Register](#)
[Help](#)

You can register this program by filling out the [Shareware Registration Form](#)

Please be fair and register. It will help future development of this little program. Remember it costs a lot to buy the latest motherboards.

Dear Hackers!

I am aware of you, so I decided to make an easy registration number, not to mention. I sell my programs inexpensively. If you make cracks of my program or make a public registered version you might cause me to have to stop developing future versions, and that would not be good for that hardware depending on this program. Remember it costs a lot of money to have the latest hardware supported. As a matter of fact I have not made any money with that program, all the money I get goes to new hardware. As you know there are not that many interesting programs as cost effective as this one, so if you can restrain yourselves from cracking an easy registration number, it will ensure the production future of this and other programs to come.

File

Save settings

In the File dialog you can save the settings you have made. Normally CPUCool saves the settings at the end of each session. But if you shutdown Windows without closing CPUCool first, the settings are not saved. Please use the option to save the settings before you shutdown Windows if you choose not to close CPUCool first. If CPUCool shuts Windows down itself, the settings will be saved.

You can configure the log file with the next four options. If you have chosen a file name logging starts automatically.

Quit CPUCool

With “Minimize” you will leave the dialog mode and go to the tray.

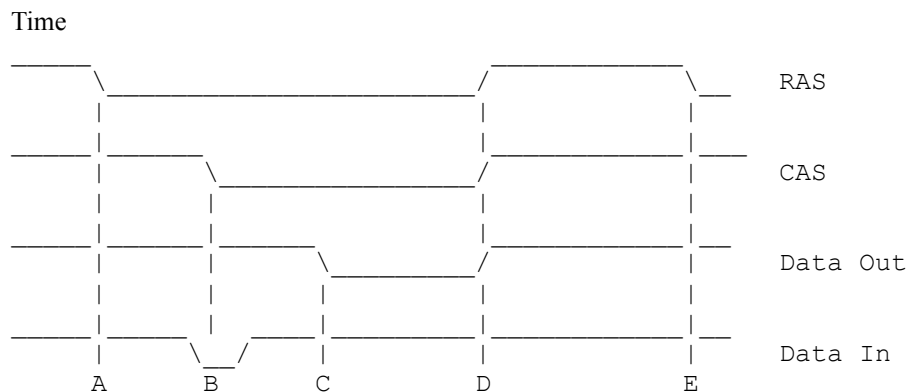
With “Abort” you will be in the dialog mode again

With Exit you will close CPUCool.

SD RAM

All SD RAM modules that hold an EPROM can be displayed. Not all values are seen in the shareware version. In the registered version there are **two** displays which show you every bit when the SDRAM is decoded. There will be no translation for this menu in the language specific versions of CPUCool. I think that everybody who is able to decode these values is good at English.

Since the beginning of dynamic RAM production there had to be two things solved: to reduce the number of pins on the package and to have a field of RAM cells organized in the best way. So the manufacturers put the RAM cells into an array with two dimensions. So you have rows and columns. For example if you have a 30 bit memory you can organize it in two ways, one with 5 rows and 6 columns the other with 6 rows and 5 columns. To access this you first put into the SDRAM the row address with the RAS pulse and then you access the column which the CAS pulse. After a period of time you get the information.



This is the simplified model of RAM access. First of all you put the row addresses on the address bus. That is done immediately before state A in the timing diagram. Then you have to decide whether you want to get data out of the RAM or put it into the RAM. If you want to read data, you must put the data together with the address on the bus. Then comes the CAS signal that latches the data to the ram (timing diagram state B). Then you have to wait for a moment and you can take back the RAS and CAS signals (timing diagram state D). The next cycle starts at E.

If you want to get data you must put only the column address on the bus. Then make the CAS signal active (timing diagram state b). After a short time you will get the data at C. Then you take back the RAS and CAS impulse. You have to wait a while till you can start the next cycle (timing diagram state E).

1 Page

Checksum	If the checksum is ok the contents of the EPROM is read out correctly. Checksum error might occur if less values are programmed in EPROM than necessary
Number of bytes	The number of bytes show the amount of bytes being programmed by the manufacturer of the SDRAM. Mostly the manufacturer only programs less values than this number.
Total SPD memory size	This field describes the length of the memory that holds the SDP data
Memory type	Should be SDRAM. EDO is possible too
Number of row address bits	You can see the number of row addresses. $2^{\text{power (number of rows + number of columns)}} * \text{number of rows} * \text{number of banks} * \text{Module data width} / 8 = \text{size of module in bytes}$
Number of column address bits	You can see the number of column addresses. $2^{\text{power (number of rows + number of columns)}} * \text{number of rows} * \text{number of banks} * \text{Module data width} / 8 = \text{size of module in bytes}$
Number of rows	You can see the rows of the SDRAM. $2^{\text{power (number of rows + number of columns)}} * \text{number of rows} * \text{number of banks} * \text{Module data width} / 8 = \text{size of module in bytes}$
Module data width	You can see the data width of the SDRAM module. Normally it is 64 Bit. $2^{\text{power (number of rows + number of columns)}} * \text{number of rows} * \text{number of banks} * \text{Module data width} / 8 = \text{size of module in bytes}$

	data width / 8 = size of module in bytes
Module interface signal Levels	You can see the SDRAM module signal voltage interface. Normally it is LVTTTL = 3.3 Volt operating voltage
SDRAM cycle time	You can see the total minimum cycle time (clock period) for the SDRAM. In SDRAM mode.
SDRAM access time from clock	You can see the maximum clock to data out time for the SDRAM
Module configuration type	You can see the module's error detection and correction scheme. Mostly it is none as these modules are not so expensive.
Refresh rate / type	You can see the refresh rate and type of the module. Normal refresh period is 15.625 microseconds. If you see a multiplier you must multiply the normal refresh period by that multiplier.
SDRAM width	You can see the data width of the primary SDRAM component uses on the module
Error checking SDRAM width	If the module incorporates error checking then the number of bits used for error checking is expressed here
Min clock delay	You can see the minimal clock delay for back to back random column addresses. Mostly it is 1
Burst length supported	You can see the length of burst accesses for the SDRAM
Number of banks on SDRAM device	You can see the number of banks internal to the SDRAM device for each row of the DIMM. $2^{\text{power}} (\text{number of rows} + \text{number of columns}) * \text{number of rows} * \text{number of banks} * \text{Module data width} / 8 = \text{size of module}$
CAS latency	You can see which CAS latencies are supported.
CS latency	You can see which CS (chipselct) latencies are acceptable for the SDRAM.
WE latency	You can see which WE (write enable) latencies are acceptable for the SDRAM.
Redundant row addr	If you have mixed size of RAM's on the module you can have a different number of RAS and CAS rows.
Differential clock input	You can see whether you have a differential clock input. So you have 2 clock signals one being the inverse of the other.
Registered DQMB inputs	You can see whether you have a registered data inputs
Buffered DQMB inputs	You can see whether you have buffered data inputs
On card PLL	You can see whether you have the module has ist own PLL on chip.
Registered address / control inputs	You can see whether you have registered address and control (RAS,CAS,WE,CKE,S) inputs
Buffered address / control inputs	You can see whether you have buffered address and control inputs.

2 Page

Support early RAS # precharge	You can see whether the SDRAM supports early RAS precharge.
Support auto precharge	You can see whether the SDRAM supports auto precharge
Support precharge all	You can see whether the SDRAM supports early all types of precharge
Support write 1 / read burst	You can see whether the SDRAM supports write 1 / read burst
Low VCC tolerance	You can see the low voltage tolerance needed for that SDRAM. Normally it is 10% which is 3.0 volt at 3.3 voltage level
Upper VCC tolerance	You can see the upper voltage tolerance needed for that SDRAM. Normally it is 10% which is 3.6 volt at 3.3 voltage level
SDRAM cycle time 2nd highest CAS latency	If you use the SDRAM in CAS latency mode 2 that is the minimum cycle time
SDRAM Access from Clock 2nd highest CAS latency	If you use the SDRAM in CAS latency mode 2 that is the maximum time data is available from the rising edge of the CAS signal
SDRAM cycle time 3rd highest CAS latency	If you use the SDRAM in CAS latency mode 3 that is the minimum cycle time

Minimum row precharge time	If you use the SDRAM in CAS latency mode 3 that is the maximum time data is available from the rising edge of the CAS signal
Row active to row active min	You can see the minimum time between two rows active
RAS to CAS delay min	You can see the minimum time between RAS and CAS (timing diagram A - timing diagram B)
Minimum RAS pulse width	You can see the minimum RAS pulse width (timing diagram A - timing diagram D)
Density of Each row on module	You can see the memory capacity of each physical row on the DIMM module. Multiply it with the number of rows and you will have the capacity of the SDRAM
Command and address signal input setup time	You can see the minimum time the command and address signals could have before clock
Command and address signal input hold time	You can see the minimum time the command and address signals must hold before clock
Data signal input setup time	You can see the minimum time the input data signals could have before clock
Data signal input hold time	You can see the minimum time the input data signals could have before clock
SPD data revision code	18 = November 97 which is release 1.2 (hex 12!)
Manufacturer	optional values
Manufacturer location	optional values
Part number	optional values
Revision code	optional values
Manufacturing date	optional values
Assembly number	optional values
Specification for frequency	You can see whether the SDRAM is PC100 or PC66 compatible

Updaterate

You can switch the update rate to the following values:

- 1 sec
- 2 sec
- 5 sec
- 10 sec
- 20 sec
- 30 sec

Shareware

License Agreement

You should carefully read the following terms and conditions before using this software. Unless you have a different license agreement signed by Wolfram Podien, your use of this software indicates your acceptance of this license agreement and warranty.

Evaluation and Registration

This is not free software. Subject to the terms below, you are hereby licensed to use this software for evaluation purposes without charge for a period of 21 days. If you use this software after the 21 day evaluation period a registration fee is required (See [Registration](#)). Payments must be in US dollars or Euro drawn on a German bank, and should be sent to the AUTHOR

Wolfram Podien
Rohöfe 3
28832 Achim
Germany.

When payment is received you will be sent a registration key for the last version of this program.

Governing Law

This agreement shall be governed by the laws of the Germany.

Disclaimer of Warranty

THIS SOFTWARE AND THE ACCOMPANYING FILES ARE SOLD "AS IS" AND WITHOUT WARRANTIES AS TO PERFORMANCE OR MERCHANTABILITY OR ANY OTHER WARRANTIES WHETHER EXPRESSED OR IMPLIED.

Provided that you verify that you are distributing the evaluation version you are hereby licensed to make as many copies of the evaluation version of this software and documentation as you wish for private purpose; give exact copies of the original evaluation version to anyone. There is no charge for any form of a copy.

You are specifically prohibited from charging, or requesting donations, for any such copies, however made.

SPECIAL TERMS AND CONDITIONS

- **Distribution by BBS, on-line Services, FTP, FSP, News, WWW, Satellite, Other File Transfer Protocols:** The SOFTWARE and associated files may be copied, used and posted without charge and permission as long as the "Licence Agreement" set forth above are complied with.
- **Distribution on Floppy Disk / CD-ROM / DVD / Other Disk Types in a non-retail environment:** The SOFTWARE and associated files may be copied, and used and posted without charge and permission as long as the "Licence Agreement" set forth above are complied with.
- **Distribution on Floppy Disk / CD-ROM / DVD / Other Disk Types by Anonymous access FTP/WWW Shareware Archives:** (e.g., WinSite, SimTel, Windows95, etc.) The SOFTWARE and associated files may be copied, used and posted without charge and permission as long as the "Licence Agreement" set forth above are complied with.
- **Distribution on Magazine Companion Disk / CD-ROM / Other Disk Types:** The program and associated files may be copied, used and posted without charge and permission as long as the "Licence Agreement" set forth above are complied with. I would greatly appreciate if you would inform me about any review(s) you write about the SOFTWARE. Thanks.
- **Distribution in a Retail Environment, Book Companion Disk / CD-ROM / Other Disk Types (Book):** You may not distribute the program without obtaining explicit permission from AUTHOR. I would greatly appreciate if you would inform me about any CD-ROM on which you put the SOFTWARE. Thanks.
- **Other (e.g. Retail not covered above) CD-ROM Shareware Distribution:** You may not distribute the

program without obtaining explicit permission from AUTHOR. I would greatly appreciate if you would inform me about any Shareware Distribution on which you put the SOFTWARE. Thanks.

- **Internet Providers Disk / CD-ROM / Demo Disks / Connection Kits / etc.:** You may distribute this SOFTWARE on your disk/CD only as bundled shareware with other programs without charge and permission as long as the "General Terms and Conditions" set forth above are complied with. If you intent to provide the program for your own diagnostic purposes then you may not distribute the program without obtaining explicit permission from the AUTHOR.
- **Software/Hardware Manufacturers & Suppliers:** You may not distribute the program pre-installed or otherwise on the machines you manufacture/distribute/etc. or bundled with your own products without obtaining explicit permission from AUTHOR.
- **Other Type of Distribution:** Please contact AUTHOR for details.

BY DISTRIBUTING THE SOFTWARE YOU ACKNOWLEDGE THAT YOU HAVE READ AND UNDERSTOOD THIS AGREEMENT AND YOU AGREE TO BE BOUND BY THIS AGREEMENT'S TERMS AND CONDITIONS. YOU ALSO AGREE THAT THIS AGREEMENT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE RIGHTS AND LIABILITIES OF THE PARTIES AND SUPERSEDES ALL PROPOSALS OR PRIOR AGREEMENTS, ORAL OR WRITTEN AND ANY OTHER COMMUNICATION BETWEEN THE PARTIES RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT.

Copyright: Wolfram Podien

Options

Cooling mode

Windows shutdown by keyboard

Limits of temperature voltages fanspeed

Startup of CPUCool

Celsius - Fahrenheit

Temperature Offset

Language

Priority

Winbond Temperature

Configure Tray game item

Mainboard Choice

Cooling Mode

You can switch the cooling on and off with this display

Additionally you can do forced cooling when one of the sensors is above a certain level. It will raise the priority of the cooling task and will slow down the systems performance dramatically. So choose a high level which is slightly below the limits of the CPU. It is wise to let CPUCooL alert you by sound so you know the situation. You will hear three sounds out of the main computer speaker. Forced cooling will be switched on till the temperature is 2° Celsius or 4 Fahrenheit below the switch on temperature.

Alternatively you can shutdown Windows. A message box is displayed before the actual shutdown takes place. Alternatively you can reduce the speed of the FrontSideBus. So the CPU will reduce the clock frequency and produce less heat. It will than be cooler.

You can also switch off the cooling function while playing a game. If the load is above a certain level for a longer time, CPUCooL can switch off the cooling function. It will be switched on immediately after the load goes below this level.

CPUCooL Cooling Mode

Under many operating systems like Windows NT and Linux the CPU issues a HALT operation when there is nothing to do. That enables the built-in CPU function to reduce the power consumption, which keeps the CPU cool and saves money. If you overclock the CPU it is advisable to use a cooling program because the CPU gets hotter then specified.

Unfortunately there is no HALT operation under Windows 95 / 98. The CPU permanently checks whether there is something to do or not. Many other programs like CPUCooL put in a task at low priority which issues a HALT instruction. But it costs time to make the new program run. You can see these programs work with the Microsoft WinTop Monitor. It shows 100 % activity although there is nothing to be done by the CPU.

CPUCooL has an other technique to solve this problem. Look at WinTop and you will see the difference. Wintop shows the normal idle time as before. CPUCooL integrates the HALT operation directly into Windows 95 / 98.

The other advantage is that you can only **switch off** this cooling function by CPUCooL. There is no other way. Even if CPUCooL is terminated the cooling function is still active!

For Windows NT/2000 systems the cooling is implemented as well. In several systems you can reduce the CPU temperature also, especially if there are huge amounts of background activity.

Startup

You can choose between several startup modes. They configure whether CPUCool should go to the tray or make up a dialog.

In the autostart folder CPUCool has the parameter 1. That parameter tells CPUCool that it is called from the autostart folder. If the autostart option is on it will go to the tray. Otherwise it will start up a dialog.

Celsius Fahrenheit

This button switches the temperature display from Celsius to Fahrenheit or vice versa. The temperature offsets are not recalculated. They are interpreted as Fahrenheit values. The limits are recalculated. This switch is system wide. Every temperature will be interpreted that way.

Help

This Help system

There is an AboutBox to show the version number and other information

About

There is an about screen which gives the version number and there is a screen for this help menu. There are some additional outputs which show the I2C Bus and the CPU Version. With the button “write info to file” all these information is written to a file called **CPUCool.Info**. Then you can fax or mail me the information.

Registration

Payment : 30 DM or 15 EUR or US\$13

to

Wolfram Podien

Rohöfe 3

28832 Achim

Germany

Kto 1368364 at Bank 24 BLZ 38070724

You can get the current version at <http://www.podien.de>

Support at support@podien.de

Please send this form per e-mail or letter:

Operating system :

Mainboard manufacturer and type

Graphic card manufacturer and type

Please insert the Info you get from HELP ->CPUCool Info and the button Write to File

How did you become acquainted with CPUCoolL:

Anything ideas for improvement:

Any suggestions:

Put a personal check or a note into an envelope or send/wire the money directly to my bank. Every payment is welcomed and will help me to continue with this project.

Set Limits

You can change the limits which the program should check while it is running. For every motherboard value (temperature, fan and voltages) there maybe a defined limit. If the value is above the limits there is an alarm message issued. Under this menu item are two displays. The first one asks for the value to check, the next menu item asks for the upper and lower limit for that item. You can assign a value to every menu item that is read /write. If that special value should be checked it must be activated by the active button in the second menu. If the program should not care about the limit do not check the active button.

Priority

You can change the priority of the program with this menu. The priority tells the operating system which jobs are urgent. The highest priority is real-time. The program itself has a normal priority class. You can lower the value in that class by taking a value that is above the normal check button (above idle). It is advisable to do it as the program will give more process time to the job in the foreground.

Normally the program takes under 3 per cent time. All ic's that are only connected via smbus (GL518, GL520, Win83783, LM80,..) are a little bit more complicated to access, which take about 0.5 per cent.

If you take the first priority value it would not cost you anything as the time is taken from the idle time. This time is not needed by other processes.

For SIS5595 (old version) and VIA Chip (you can see that by menu Help->CPUCool Info) sets it is advisable to take the option to raise the priority only while accessing the I2C bus. Then the timing of the I2C bus is not disturbed by task switching.

Optimizations

There are some optimizations for

Cyrix Processors

Intel Processors.

AMD Processor(processor defendant)

Memory Optimization for Windows start here

To speed up your CPU you can use the

FrontSideBusoption.

It is on your own risk!

Optimizations for Cyrix CPU's

Write Allocation	To optimize the cache strategy of L2 cache.
Write Back Cache	Set strategy for second level cache
IO Recovery Time	Set IO recovery time to 0 or to max.
Linear Burst	chip set must support it. Be careful
Cached Directory	for old Cyrix processors only
CPU ID	CPU ID switch on
Negate Lock	Do not wait for floating point unit
Suspend on Halt	To enable power saving switch it on. This item is necessary for CPUCool to enable cooling function.
Framebuffer	Sets the CPU cache buffer to the framebuffer of graphics card

Optimizations for Intel CPU's

For Intel CPU's

- Low Power For Intel Pentium processor to enable low power mode (default off)
- Low Power MMX For Intel Pentium II processors to enable low power mode (default)
- L2 Cache Latency Number of clock cycles between two accesses to the L2 cache.
Could be 0 to 15. Dangerous. Your hardware could freeze. Unplug AC and try to restart your computer

Optimizations for AMD CPU's

For AMD K6 2/3 CPU's

Write Allocation	To optimize the cache strategy of L2 cache.
Data Prefetch	If enabled, cache misses initiated by a memory read within a 32 byte cache line are conditionally followed by cache-line fetches of the other line in the 64 byte sector
Write Combining	To enable to combine up to four byte accesses to a long word access. There are two possibilities: Global: It enables the CPU to write to any memory without write ordering. Speculative: is a restriction of global. Write ordering is done in any memory except the memory of the frame buffers and an external EWBE signal
EWBE Enhance	Out of order writing to the L1 Cache.
Frame Buffer	To optimize the access of the frame buffer in the graphics card. There are two frame buffers which could be optimized separately

Optimizations for Athlon look [here](#)

Optimizations for Windows

Windows especially Windows 95/98 does not give allocated memory back to the user. So memory decreases till nothing is left. If more memory is needed then the operating system frees memory. The disadvantage is that if you start an application, most times there is no more memory left at the beginning. Then Windows starts his deallocation algorithm taking the time needed to start the application. With this menu you could choose a strategy to free the memory before starting the application at a time windows has to do nothing else.

Good values are for 64 M Byte to free 16 M Byte if there are only 2 M Byte left after a time of 10 sec. It is not useful to free more than half of memory.

You can do it periodically every e.g. 30 minutes as well.

Initially this option is switched off because CPUCool could not detect, whether there is a CD-ROM is working or not. If a CD ROM burner is working in 486 systems you should switch off this option because it might delay the data output from the CPU a little bit on slow systems.

Before starting a game it is a good thing to tell CPUCool with the right mouse button in the tray menu that a game is going to start. Then CPUCool frees the memory, suspends cooling, and cancels all his own periodical tasks. So you will get a higher frame rate than ever.

Display Options

You can choose with value you want to see in

General

Tray Value

This display

Small Display

Configure graphics display

Beside the normal temperature voltage and fan values there are several normal monitor values to display. These values are as follows:

% CPU Time	is the working time of the CPU. If this value is 0 the CPU has nothing to do.
Dial rec	is the value in kB/s received by a dial up network. Not included are the K Bytes, which are directly read from a COM Port
Dial trans	is the value in kB/s transmitted by a dial up modem in a second. Not included are the K Bytes, which are directly send to a COM Port
Dial crc	are the CRC Errors of the dial up modem. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on. If this value raises you must check the connection to the modem
Dial tot rec	are the number of bytes received from the remote host. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on.
Dial tot trans	are the number of bytes transmitted to the remote host. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on.
Mem avail	displays the physical memory available in the system for jobs not yet running
Mem page	displays the number of bytes in a page file
Disk read	the total number of bytes read from the local file system / sec. There are some problems to detect that value in NT. So it is the system i/o read access on NT based systems.
Disk write	the total number of bytes written to the local file system / sec. There are some problems to detect that value in NT.
Server total	number of bytes received and transmitted by the local CPU via network in server mode / sec. There bytes are ordered from another compter.
Client total	number of bytes received and transmitted by the local CPU via network as a client computer / sec. These bytes are used in the local computer
Pager page	number of pages send by the CPU to a page file.

Tray Value

If there is more than one temperature value you can select the values that should go to the tray. Only five values could be displayed in the tray. It could be a temperature or the CPU Load time or the free memory or the dial up receive/transmit values if they are available.

Keep in mind that it costs time to display the values in tray

Windows NT There is no colored display from bar graphs.

Celsius Fahrenheit

You can select whether you want to see the Celsius values or the Fahrenheit values. It is for both the tray and the display at the same time. It is for the temperature offset as well.

Temperature Offset

There is an offset between the correct temperature of the CPU and the displayed temperature. To minimize this offset you can put in a value to be added to the temperature. Only the sum will be displayed.

Display

You can hide some options that are supported by the chip set manufacturer but are not connected on the main board. The result are silly values. If you do not want to see them you can hide these values by unchecking the button.

Besides fan speeds and voltages there are temperatures to be seen. If these temperatures are from the main monitoring IC they are called Temp. If these temperatures are generated by an additional monitoring IC on the motherboard, they are called Temp Sens. You can see the main monitoring IC under Help ->CPUCooL Info. The main monitoring IC comes second (First is the chipset). The additional temperature only detecting device come third, called sensor.

On some motherboards the voltage readout is not correct. Then the motherboard manufacturer has not taken the pinning of the IC manufacturer.

% CPU Time	is the working time of the CPU. If this value is 0 the CPU has nothing to do.
Dial rec	is the value in kB/s received by a dial up network. Not included are the K Bytes, which are directly read from a COM Port
Dial trans	is the value in kB/s transmitted by a dial up modem in a second. Not included are the K Bytes, which are directly send to a COM Port
Dial crc	are the CRC Errors of the dial up modem. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on. If this value raises you must check the connection to the modem
Dial tot rec	are the number of bytes received from the remote host. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on.
Dial tot trans	are the number of bytes transmitted to the remote host. In Windows NT it is for a session, in Windows 95/98 it is for all sessions since the power is switched on.
Mem avail	displays the physical memory available in the system for jobs not yet running
Mem page	displays the number of bytes in a page file
Disk read	the total number of bytes read from the local file system / sec. There are some problems to detect that value in NT. So it is the system i/o read access on NT based systems.
Disk write	the total number of bytes written to the local file system / sec. There are some problems to detect that value in NT.
Server total	number of bytes received and transmitted by the local CPU via network in server mode / sec. There bytes are ordered from another computer.
Client total	number of bytes received and transmitted by the local CPU via network as a client computer / sec. These bytes are used in the local computer
Pager page	number of pages send by the CPU to a page file.

General Display Options

In this menu you can select the actions of the timer routine. This routine is called periodically with the Updaterate . There are four options:

Nothing	Nothing is done. No timer routine is set up.
Tray Only	Only the values that are needed to display the tray value are gathered from the system. No check is done. No alarm is checked. No forced cooling.
Motherboard and tray values	All values except those from the operating system are gathered. Alarm function is enabled together with the cooling options.
Full Display	All values are gathered. All alarms could happen, forced cooling enabled.

Right mouse button display

You can select between these options (some of them are displayed only if necessary):

Exit CPUCool	Exit CPUCool. The exit display is popped up
Open main display	The main display is opened
Free memory	The memory is freed with the amount of memory configure in the <u>Free Memory Display</u> is configured
Cooling on/off	Windows 95/98 only. Switches on / off cooling directly.
Alarm on/off	If an alarm from temperatures, voltages or fans is active you can switch it off by clicking this item.
Forced cooling off	You can switch off the forced cooling if it is enabled in the <u>Cooling mode Display</u>
Start/Stop game	Start game is free memory and switch off any collection of data (neither from the motherboard nor from the operating system). The Tray value stays as it is. It is the same as the Nothing option in <u>Display Options</u> Stop game frees the memory again. It restores the <u>Display Options</u> . Cooling is switched on.
Close tray menu	Closes the right button display

Small Displays

Small displays are used to observe the computer continuously. They could be configured via a menu. There are four options:

- 1) Options
- 2) Numeric display
- 3) Graphical display
- 4) Bargraph display

The options part of the menu is generally used for configuring the display. You can choose the position of the display. What is most common, is to put it in the lower right corner as there is often free space available. The size of the display could be changed in the next box. Values between 0.4 and 3.0 are available. You should check the next box if you like the display so that it should always be displayed. As time goes on you will see every value you have chosen displayed in real time quotes. Also you clear the names by unchecking the next checkbox. You can choose a black and white display or a colored display with the last checkbox.

Choose the options 2 to 4 to configure the values you want to see.

With item 2 you can get a numeric display of the values you want to see.

Item 3 gives you a graphical curve. These are only relative values that you will be viewing, you can see small differences exactly. But you will not see an absolute value.

The last option you can see bargraphs. The length of the graph changes with the value it should display.

Language Choice

You can choose the language in which the messages and the menu system will be displayed. Today you can only choose between German, English and French. But I hope to present you other languages as soon as possible.

SDRam 2. Display

The second half of the values stored in the SDRam could be read out here. The most interesting point is the Specification for frequency. It shows whether the SDRam is PC 100 compliant or not.

Set Limits

Here you can enter the limits you want to have. Please use the arrows. There is no possibility to enter the values directly.

Values to be checked must be activated by the active button. Otherwise they will not make any alarm

Left Button double click

This menu is a combination of the exit menu and the configuration menu. The configuration menu is described [here](#).

Register

Tips to register CPUCool are [here](#).

Small Displays Options

The options for small displays are described [here](#).

Winbond Temperature Dialog

This display is only seen on computers with Winbond monitoring chips. In these chips there is a option which optimizes the display of the temperatures. If you are directly connected to a PII compatible temperature measuring diode, you should take that option for this sensor. You can see that especially if you look at the temperatures. If they change quickly with the load of the CPU you might have a direct connection to the silicon die (quickly is about 10 ° C difference in 10 sec). Then you should take that option

Fan Speed Control

In this menu there are two temperatures defined with their fan values. If the temperature is below the first value, the fan speed of the first value is taken. If the temperature is above the second value, the fan speed of the second value is taken. Between these two temperatures there is a linear function in between. So if the temperature increases the fan speed increases also.

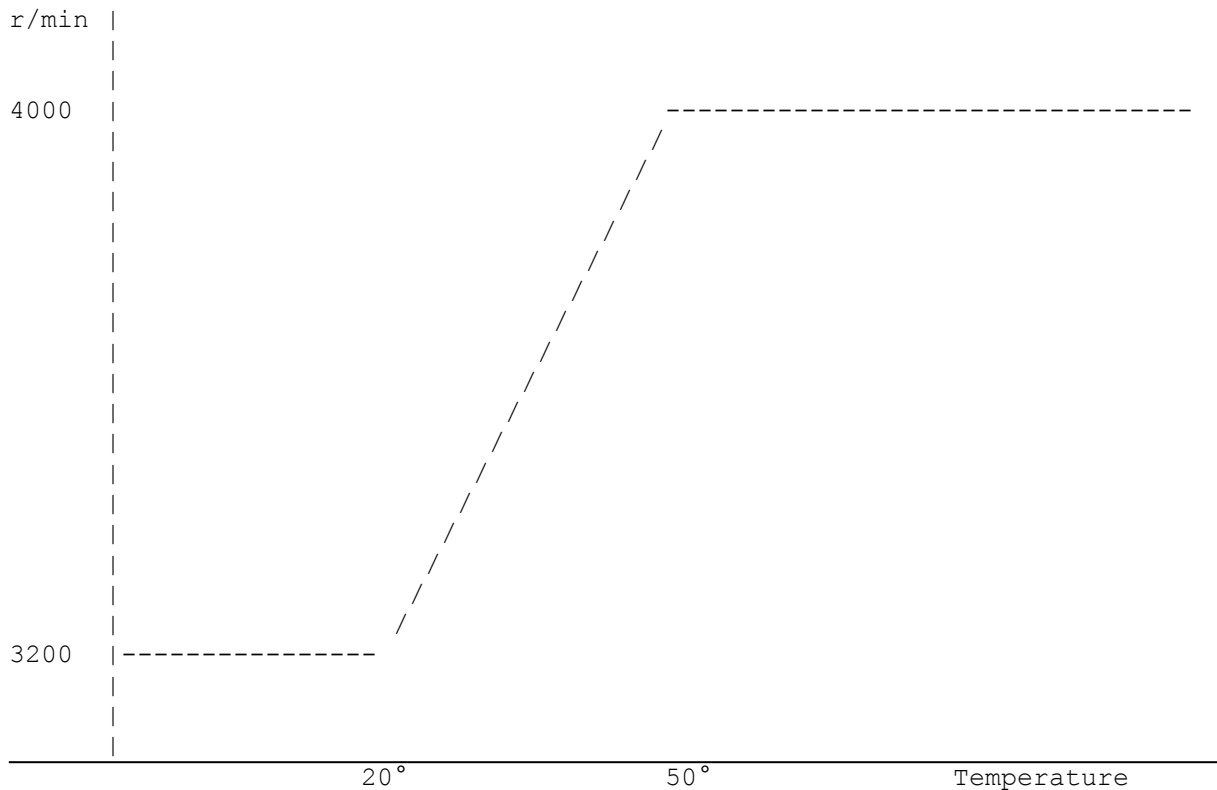
The fan speed is defined relatively. 100 means the fan is at full speed. At 0 there is no fan rotation. At 80 there is 80 % of the nominal speed reached.

Example:

Normal fan speed 4000 rotations/ min

80 % is 3200 rotations/min

There is a diagram for that example



This is the diagram for the fan speed over the temperature with the following values:

lower limit 20° and 3200 rotations / minute

upper limit 50° and 4000 rotations /minute.

If you have chosen Fahrenheit as measuring unit than 20 means 20 Fahrenheit and 50 means 50 Fahrenheit. The values are calculated to Celsius internally.

Front Side Bus

What is the FrontSideBus?

The FrontSideBus is the main CPU bus. All data to and from the memory and the input/output devices is transferred by this bus. To speed up your system you must only increase the frequency of this bus. But there are limits set by the CPU manufacturer. If you come near that limit your system crashes.

To increase the FrontSideBus frequency you must know the PLL IC of the mainboard. But which IC is it? Mostly it is near by a crystal which has the frequency of 14.3... MHz. Look at you mainboard and you will find a silver part that is about 1 cm long (it looks like a metal stick) and has the numbers 14.318 on top of the case. Nearby this crystal there is the PLL (Phase Locked Loop) that generates all frequencies of the mainboard. There are only six manufacturers of PLL IC's:

CMedia



Cypress



IC Works



ICS



IMI



PLL



Winbond



If you have found the IC you may see some parts of the graphics above on the top of the IC. Then you choose the manufacturer, and all PLL's of that manufacturer are displayed here. If your numbers match this means you have chosen the correct PLL.

It is dangerous to change this frequency. It will be done at your own risk!

You can choose that PLL. Then it is advisable to take the frontbusspeed you have switched with jumpers and set this frequency first. If you succeed, you can try other frequencies as well. If you fail, your computer has to be powered off to recover. After some tries you will find the frequencies your hardware will work with.

Sometimes there are two or more versions of the same PLL listed with the same name but with an 'A' or 'B' next to it. This is for write only PLL's. They could not be read out before setting the frequency. So since it was necessary to suggest the contents of the PLL I switched on every output. Also on some PLL's I was not sure whether the frequency was 24 MHz or 48 MHz. or if the spectrum of the PLL was switched on or not, so I had to program different versions to choose from.

You can easily switch the frequencies by clicking on the tray symbol. If you have defined some values for the tray it is easy to switch the frequencies without entering the main dialog. It is better to take only tested frequencies for the tray display

The actual frequency is shown in a small box. It is not very accurate (about .5%). But it will change if you are successful with changing the frequency.

You can read out the parameters of some read/write PLL's. That is good for finding the values programmed in that PLL. Send me these values and you will get a version of CPUCool in return that has the unknown PLL. If you have a write only PLL on the mainboard, your computer could crash.

There is a list of implemented PLL's in the internet. And there is a table with mainboards and PLL's as well. Check if you find your mainboard there. It will speed up the process of finding the correct PLL.

Please give me an e-mail with your mainboard and your PLL and I will add it as soon as possible.

Windows Shutdown

You can choose the keystroke combination to shutdown windows. You always have to take the Control and Alt keys. These keystrokes prevent you from shutting down windows occasionally The additional keystroke is chosen between the letters, numbers and function keys.

There are five ways to shutdown windows:

- 1) shutdown windows normally with power switch off
- 2) shutdown windows forced with power switch off
- 3) shutdown windows normally with reboot
- 4) shutdown windows forced with reboot
- 5) Log off the current user

When you take the forced option not all programs are asked to shutdown. So you can lose data if it is not saved before. But if windows hangs it is sometimes the only way to shutdown windows if you take the forced option.

Log File

You can create a log file with all the data output of CPUCool. Here are the following options in the menu log file configuration::

- 1) Start the logging at the beginning of CPUCool. Then every time you start CPUCool the log file would be written to.
- 2) Append the new data to an existing log file. If there is no log file a new log file will be created without an error message. But the log file will grow. If that box is not checked, a new file will be created and the old one will be destroyed.
- 3) If you check the third box every values will be written with its name in front of its value.
- 4) In the last check box you can choose whether you only want to log the mainboard values or all values CPUCool gathers.

If you choose a filename then logging will start immediately. If you do not choose a name, the name you took the last time will be taken again. If there is no last name, CPUCool will take the name "CPUCoolLOG.LOG".

You can stop logging at any time you want.

Configure Graphics Display

You can set the limits for the graphics. This menu item is for all four graphics:

- n the graphics of the big display
- n the graphics of the small displays
- n the bar graph of the small displays
- n the bar graph of the tray icon

You can choose the maximum value the display should display correctly. If for example you configure the maximum of the dial rec limit to 13 K byte every value from 0 to 13 K byte will be displayed correctly. 13 K is the top of the display. If you choose 130K byte Limit 10 K byte will be on the line 1. If you choose 13K byte limit the 10 K byte will be on the line 10.

You could set the limits for

Dial rec - dial receive

Dial trans - dial transmit

Mem avail - memory available

Mem page - memory paging

Disk read - disk read

Disk write - disk write

Server total - transferred via network in server mode

Client total - transferred via network in client mode

Pager page - pages the pager transfers to disk.

In addition you can leave the horizontal and vertical lines from the big display. So you can see the graph a little bit better.

The next thing CPUcooL has to solve is the problem of displaying temperatures in graphs. The main problem is that 130F is equal to 54,4 ° Celsius. That is a normal operating temperature for a processor. But that is the limit for the graphics. So now you can decide if you want to see a good graphic curves only the curves are displayed in ° Celsius but the numerical display is still in Fahrenheit. You get a good graphic curve. On the other hand you can choose to display all graphics in Fahrenheit and the maximum value is 1300 F. So you get the correct values but the scale is very rough.

SDRAM Overview

With the SDRAM display you get a quick overview of the technical data from the SDRAM's in your system. You can get an extended overview if you press the extended output button. The output of these displays is for experts only.

Signal name	Meaning
checksum	Checksum calculated by the addition of the first 64 bytes in EEPROM
number of bytes in EEPROM	number of bytes in EEPROM
CAS Latency	Number of clock cycles before to wait until the data is accessible
RAS to CAS Delay	delay time between RAS and CAS signal. 15ns = 66 MHz 10 ns = 100MHz 7,5 ns = 133 MHz
RAS precharge time	Wait time until the next data could be accessed
SDRAM cycle time	Cycle time for a complete data access
SDRAM access time	Time from setting the RAM address to data output
SDRAM 2nd cycle time	If you are in the second best CAS latency mode this is the time for a complete data access
SDRAM 2nd access time	If you are in the second best CAS latency mode this is the time from all addresses correct until data is present
PC 100 spec	Shows whether the module is PC66 or PC100/133 compatible

Main Configuration Menu

This is the main configuration menu. From here you can choose the other menus.

Display Configuration Menu

This is the display configuration menu. You can choose the other menus.

Mainboard Choice

The mainboards listed in this menu have problems with reading the Front Side Bus and the EEPROMs on the SDRAM. It is necessary to switch the SMBus, as there are additional bus drivers in the SMBus. These bus drivers have to be switched in every read cycle.

Reading the temperature, the voltages and the fan speeds is independent of this feature.

Additionally there is a list of known mainboards put into CPUCool. So you can easily choose the mainboard and you get the PLL. Please give me an e-mail if you have a mainboard not listed here with the mainboard manufacturer, mainboard type and PLL.

Configure tray game item

With this button you could change several options of CPUCooL in one go. Simply by clicking the right mouse button on the tray icon. This is normally done for getting the best performance out of your hardware. Normally you only need it for games. You could

- 1) Switch off cooling. Normally the CPU usage if you play games is 100%. Then there is no time for cooling anyway.
- 2) You could switch off periodical activities. So there will be no values taken from the mainboard (temperature, fan speed and voltages) and from the system.
- 3) The output window of CPUCooL will be minimized. If you play games you do not want to see anything but the game
- 4) The front side bus is set to a higher speed.

Everything could be taken back with a single click with the right mouse button on the tray icon of CPUCooL.

Athlon Optimizations

In this menu there are the optimizations known for K6 AMD processors. They are checked for the Athlon system.

Additionally the cache divisor is made switchable. The Cache divisor is the ratio between the system clock and the clock of the L2 Processor. With this option you can change the caches speed independent of the system speed. There is a detection for Motorola and NEC caches. Normally up to 700 MHz use $\frac{1}{2}$ from 750 to 850 use $\frac{2}{5}$ and from 900 to 1000MHz use $\frac{1}{3}$.

