NoteBook FanControl
User Manual

Table of Contents

1. General Information & Instructions

NoteBook FanControl (further named NBFC) is an application that gives you full control over your notebook's fan.
NBFC is capable of controlling the fan on many different notebooks, as long as a settings file for the notebook model exists.
This means you may not expect NBFC to work out of the box, but you have to find a working config for your notebook model or create your own.

On the first start NBFC will try to find a config that works for your notebook model and prompt you to select one of the existing configs or create your own, if it was not able to automatically determine which one will work for you.
You may try to select an existing config for a notebook model that is similar to yours (e.g. same manufacturer, same series and similar hardware). The chance is high, that it will work for your notebook as well.

If you decide to create your own config, please be aware of the threat of damaging your hardware if you set up your config with the wrong parameters. First read the instructions of how to create a config file and then decide if you want to take the risk.
If something goes wrong or if you recognize weird behaviour of the fan, shutdown your notebook and pull the battery to make sure the fan control is completely reset.
If you somehow damage your hardware, software, or loose important data it is completely your fault.

Additionally on some notebooks there is a BIOS option named "fan always on while on AC power" (or similar).
You have to deactivate this option in order to give NBFC the opportunity to completely deactivate the fan.

2. Requirements & Installation

NBFC requires at least Microsoft .NET Framework 4.0 Client Profile in order to work properly. If it is not yet installed, you can download the .NET Framework web installer here.

NBFC itself does not require an installation. Just copy the extracted folder wherever you want and run the executable.

NBFC was tested on Windows XP, Windows Vista and Windows 7.
It should work on 32bit machines as well as on 64bit machines.
Maybe it works on other Microsoft operating systems as well. Give it a try if you like to.

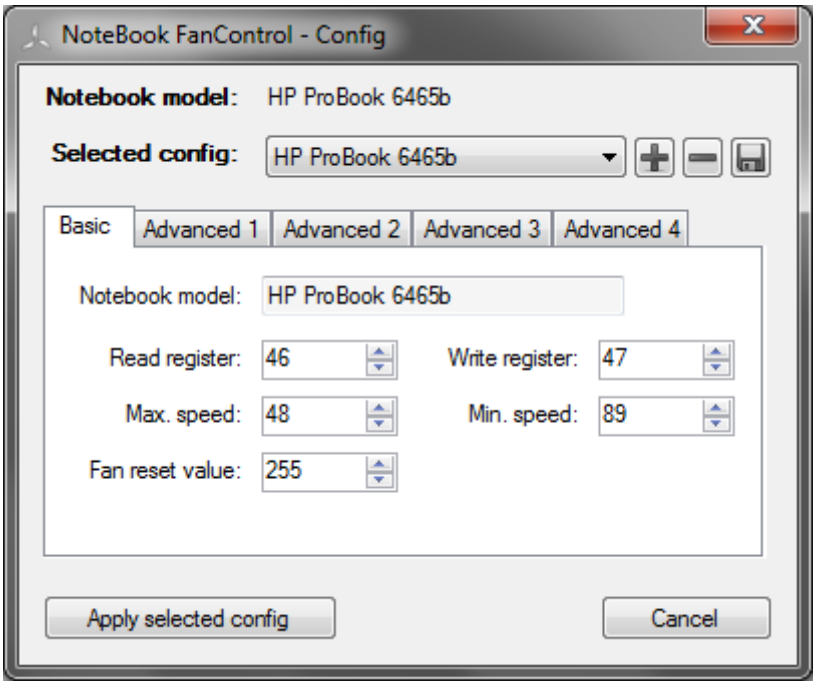
3. Creating a Config File

Config files are a very important part of NBFC. Config files define individually for each notebook model how NBFC should interact with the embedded controller (EC) which is responsible for controlling the fan.
In order to create a working config for your notebook, you have to find out how the EC works and how you can manipulate it.
In the following chapter will be explained step by step, how to create a config that enables NBFC to control the fan.

If you managed to create a working config for your notebook, please send it to NotebookFanControl@t-online.de to make it available for every NBFC user.

3.1. Basic Config Editing

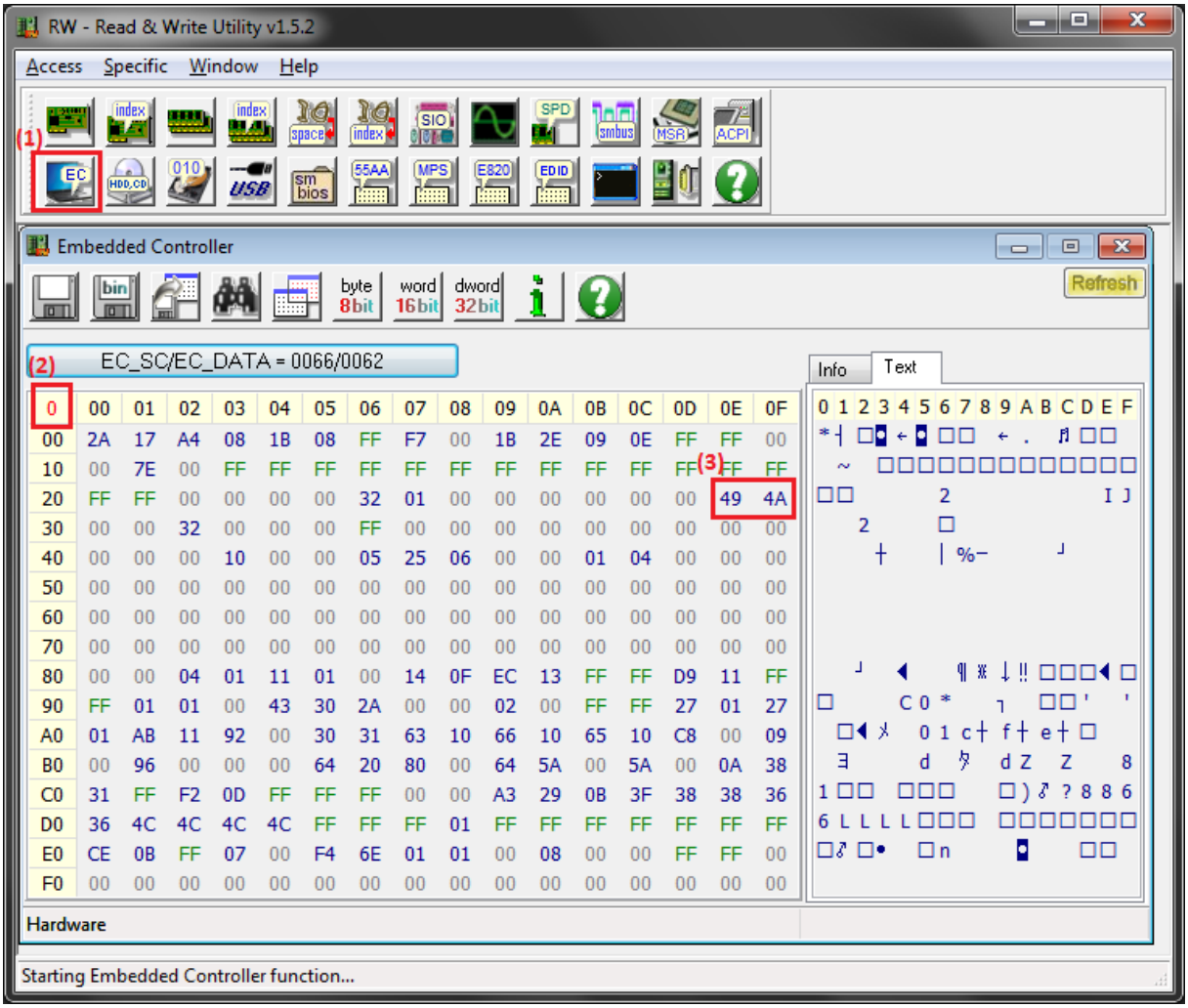
To create a basic config, first open the config window:



To create a new config, press the plus button and enter a name.
NBFC will create a new config file in the Configs folder.
Now you have to edit the 5 values of your config, so that they meet the requirements of the EC of your notebook.
To do so you have to understand the structure of the EC and the meaning of each of these 5 values.
The EC has a set of registers, which can be read to determine e.g. current fan speed or the temperature reading of a connected temperature diode.

Most of these registers are read-only, but some of them allow write access.

If you write in one of those registers, the EC will react to the changes you made and thus change its behaviour.
So, if you knew the function of every register, you could force the EC to do anything you want.
The big problem is, that you probably don't know anything of the EC and that also publicly available datasheets for certain ECs are very rare.
To face the problem, in the following part will be explained how to educe the information you need from the EC.
First you have to make sure you have the right tools to investigate the EC structure.
To obtain direct access to the EC, you can use a nice tool called [Read & Write].
Further you need a tool to stress your CPU e.g. Prime95.
Open RW and press the EC button (1).
What you see there is a table with all the values stored in EC's registers.



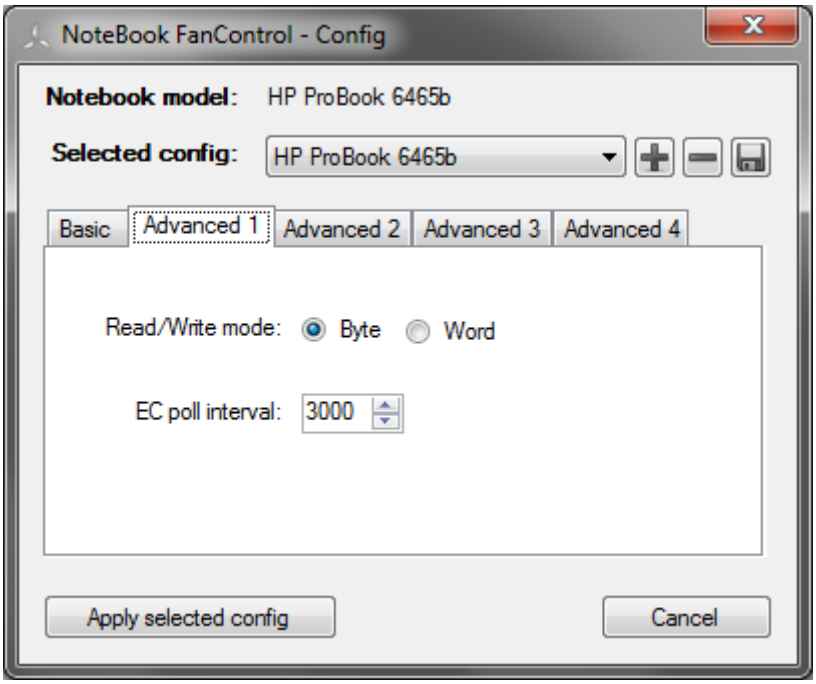
You maybe have already recognized that all values are hexadecimal values.
NBFC only accepts decimal values, so you have to convert them first.
Remember that when creating your own config.

The first thing you have to look for are the *read register* and the *write register.*
Read register means the offset of the register where the current fan speed is stored - which can be read by NBFC.
Write register means the offset of the register where NBFC writes the target fan speed and the EC will react correspondingly.
To get the offset of a register, just single-click on it and the red value in the upper left corner (2) will show you the offset in decimal format (no need of conversion here).
To find the right registers, stress your CPU so that it heats up.
Then listen to your fan. If it speeds up, look for values that changed.
It should be two relatively similar values.
For HP ProBook 6465b *read register* is set to 0x49 whereas *write register* is set to 0x4A as you can see on the example screenshot (3).
To verify that you found the right register, try writing a value to the *write register* (double-click on a value) and see if the fan speed and also the value in the *read register* changes.
When you successfully wrote a value to the *write register* the fan will stay at this speed and won't change, so it is very important to find the *fan reset value*.
To do this write either 0xFF or 0x00 to the *write register*. Most likely one of those two values will be the right one and restore the automatic fan control function of the EC.
The last thing you have to do is finding *max.* and *min. speed value*.
This is pretty easy, since you just have to write some values to the *write register* and see if the fan is slows down/speeds up and the value stored in the *read register* changes.
Don't be irritated if *max. speed value is* lower than *min. speed value*.
If you completed all those steps, write down all the values you've found, convert them to decimal format if required, create a new config, input your values, save, and then test if it works properly.
If you did everything right, NBFC should now be able to control your fan.

Maybe on some notebook models further actions are required to get everything working.
Therefore NBFC provides some additional config options, which are explained in detail in the next chapter.

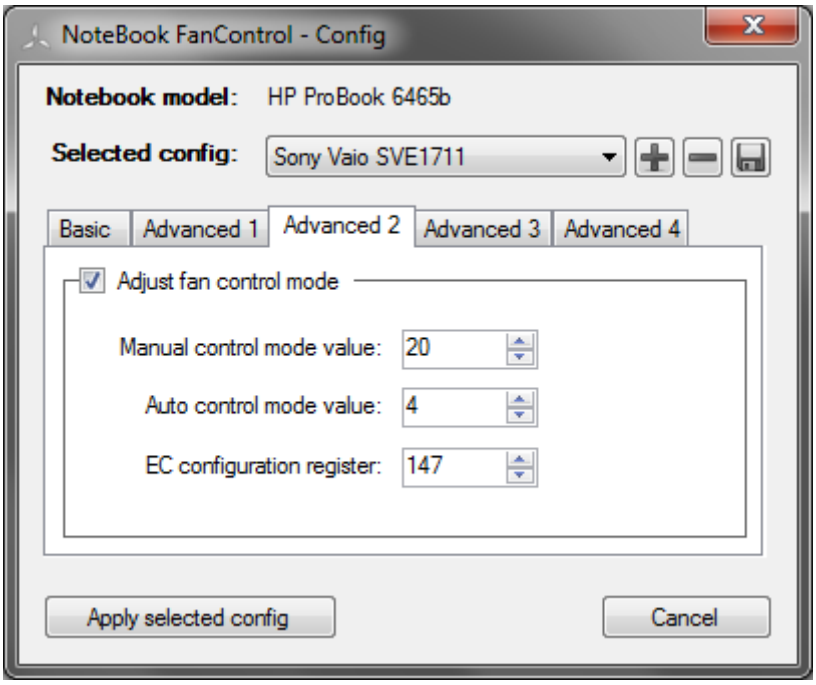
3.2. Advanced Config Editing

In addition to the basic options which must be set correctly to get NBFC to work with your notebook, there are some advanced options which may help to get NBFC to work correctly if the basic options don't do the trick.
Below will be explained, what all the different options mean.
To find the right values you may try *Read & Write* or you may have a look at the DSDT of your notebook.
You can view the *DSDT* via *Read & Write* → *ACPI Tables*.

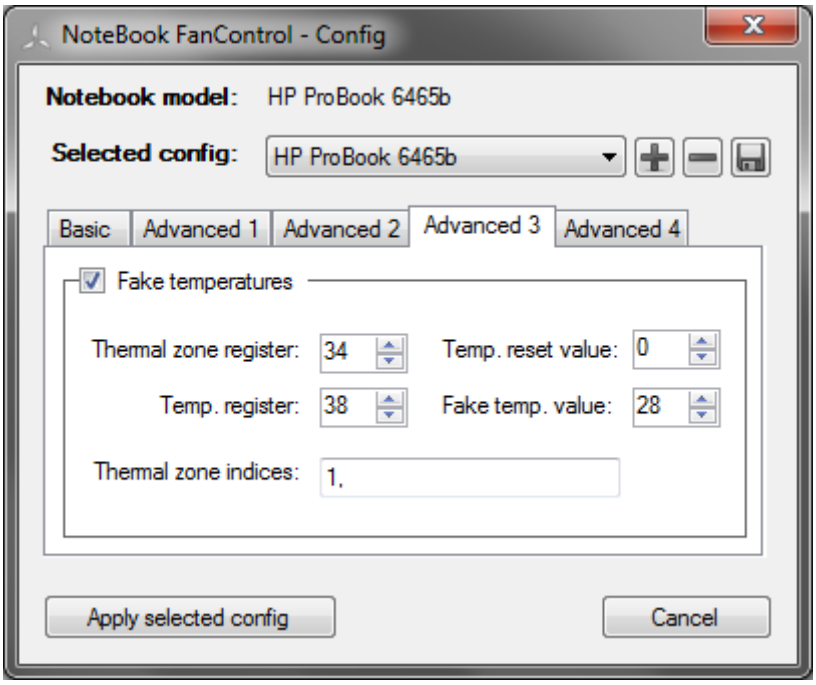


Read/Write mode → This defines the way NBFC read and writes values to the EC's registers.
Usually Byte should be good, but some EC's use Words (2 bytes).
E.g. if you set *read register* to 46 and *Read/Write mode* to Word, NBFC will read not only from register 46 but also from register 47 and combine the both readings to one.

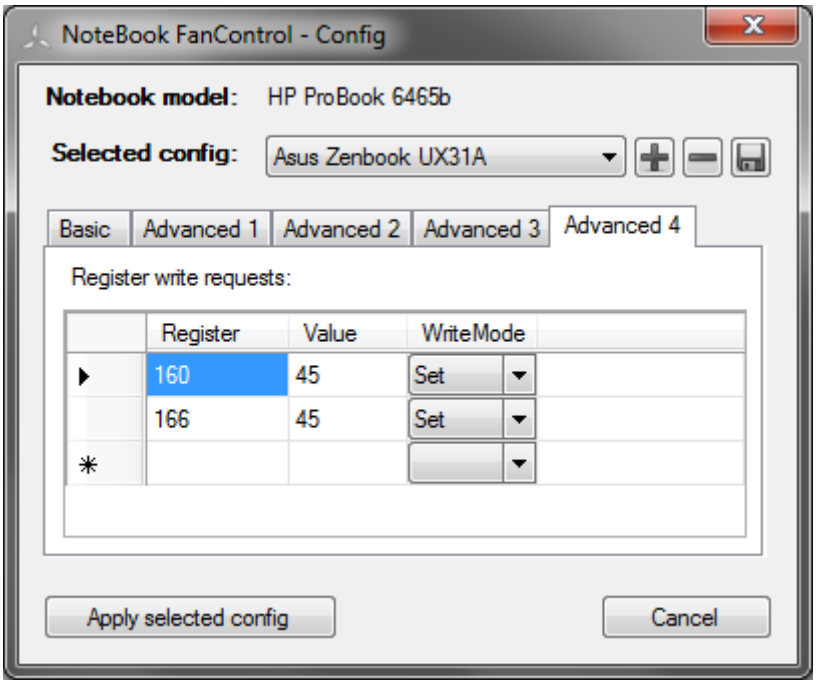
EC poll interval → This defines the interval in which NBFC accesses the EC in milliseconds. The default value is 3000. You may decrease that value, but be aware that the lower this values is, the more your will your CPU be stressed.



Adjust fan control mode	→	You may check this option, if you know which register is used to define the control mode of the EC. On some notebooks it may be required to set the control mode to manual first before you can change the fan speed.
Manual control mode value	→	The value that turns the EC into manual control mode.
Auto control mode value	→	The value that turns the EC into auto control mode.
EC configuration register	→	The register where the values will be written to, in order to set the control mode.



Fake temperatures	→	If this option is checked, NBFC tries to fake all the temperatures of the thermal zones you specified in order to trick the EC, so that it "thinks" the temperature is low enough to turn off the fan.
Thermal zone register	→	The register where the thermal zone indices will be written to. This register allows to select a thermal zone which then can be accessed via *temp. register*.
Temp. reset value	→	The value that will be written to *temp. register* in order to restore the real temperature for a thermal zone, if it was faked.
Temp. register	→	The register where the faked temperature will be written to. This register allows to change thermal zone temperatures.
Fake temp. value	→	The value that will be written to *temp. register* in order to trick the EC. This value must be small enough so that the EC's fan control algorithm turns the fan off.
Thermal zone indices	→	The indices of all the thermal zones of which the temperature should be faked. (e.g. for ProBook 6465b an index of 1 means CPUZ, and index of 2 means GPUZ). The indices should be comma-separated.



This page allows you to set any register to any value.
The values will be set everytime after NBFC has written a value to the *write register*.

Register → The register which should be written to.

Value → The value which should be written.

Mode → The way NBFC writes the value.
There are 3 different write modes you can choose from:

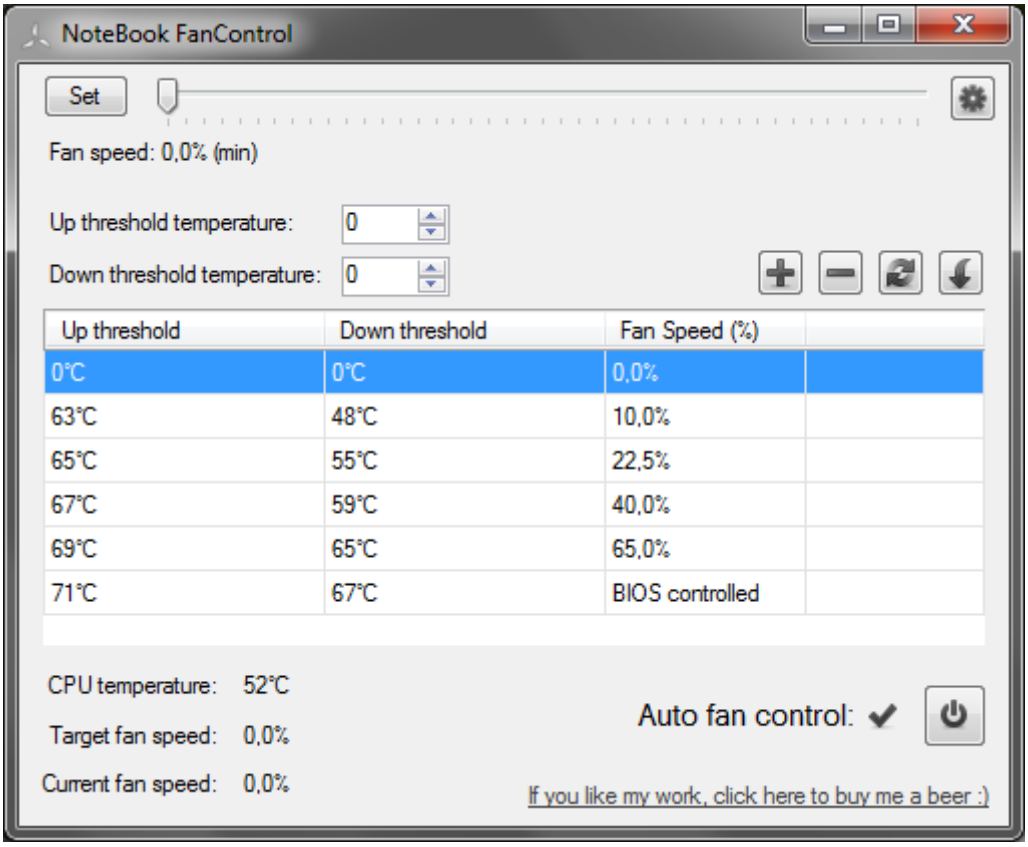
1. *Set*: writes the value
   (register = value)

2. *And*: performs a logical AND operation on the register
   (register = register & value)

3. *Or*: performs a logical OR operation on the register
   (register = register | value)

4. Setting Up Auto Fan Control

To set up *auto fan control*, you just have to define some thresholds and hit the *enable* button.
Thresholds can be defined by choosing both, an *up threshold temperature* and a *down threshold temperature,* dragging the slider to the desired fan speed percentage (no need to click the set button) and clicking the add button (plus).
To update an existing threshold, just select the item in the list, change whatever you want, and then click the refresh button.
If the currently selected config contains default thresholds, they will be loaded upon first start.
You can load the default thresholds at any time via *load default thresholds button*.
If you want to overwrite the default thresholds in the config file with your own thresholds, just open the config window and save your current config.

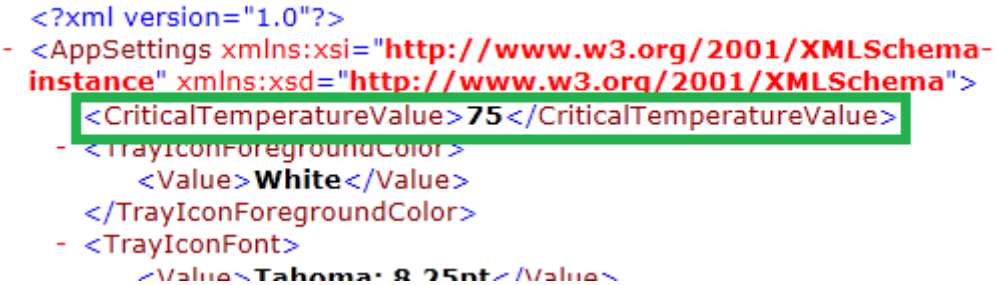


If *auto fan control* is enabled, NBFC will compare the *up threshold temperature* to the current CPU temperature and speed the fan up to the specified fan speed of the item that fits best.
If the temperature drops below the *down threshold temperature*, NBFC will select the next lower item in the list.
If the temperature rises above the next higher *up threshold temperature* in the list, NBFC will set the fan speed corresponding to the next item.
You have to find out yourself which thresholds work best for your notebook. Do not just copy the values in the screenshot, since they might not be appropriate for your notebook model.

5. Critical Mode

To prevent your hardware from taking damage due to overheating, NBFC will activate critical mode if the CPU temperature exceeds a certain threshold.
In Critical Mode NBFC will set the fan to maximum speed and refuse to accept any changes until the temperature drops below *CriticalTemperatureValue - 15*.

By default this critical temperature threshold is at 75°C, but you may change it according to your needs. To achieve this, open the *NoteBookFanControl.settings* file (which is located in the NoteBook FanControl folder after the first start of NBFC) in a text/XML Editor of your choice and change the *CriticalTemperatureValue.*



Only change that value if you know what you're doing!

6. Command Line Parameters

NBFC accepts two different command line parameters.
They are intended to be used to control the startup behaviour of NBFC.

/tray → NBFC will not display any window, but start minimized to the system tray

/auto → NBFC will start with *auto fan control* enabled

7. Autostart

NBFC needs administrative privileges to work properly. Because of this it is not practicable to just put a shortcut to the autostart folder unless you do want to confirm an UAC dialog on each startup.
Because of this, NBFC has the option to create a scheduled task for you.
Just click on "Start with Windows" in the tray menu.

If "Start with Windows" is enabled, NBFC will check for the scheduled task and rewrite it at each start in order to make sure the path points to the right executable.
So if you want to change the start parameters or the settings of the scheduled task, you have to create your own - with a different name to make sure your settings stay and are not overridden by NBFC.

8. Disclaimer

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