

How to Overclock the ASUS Eee PC (XP/Vista)

The Eee is a great little device, but why not make it that little bit better? How's 1GHz sound for a speed boost?

Overclocking the Eee is the best way to improve its performance. Many people add extra RAM, faster RAM (which is a waste of time, more on this later), and cut down their OSs (see [here](#)) in order to squeeze every last bit of processing power available.

What is overclocking?

Overclocking is the process of increasing component clock speeds above stock.

Theory behind overclocking

Overclocking is not a difficult concept, but it does require some background knowledge. Due to the identical processing hardware in each Eee PC, knowing the theory isn't essential for this guide, but if you're interested, read this tutorial on the subject [here](#).

Risks and Warranty

Overclocking can cause hardware damage and software corruption on rare occasions. Overclocking the Eee may void its warranty, so do so at your own risk. I am not liable for any damage caused by following this tutorial.

Overclocking the Eee PC

There are three methods of overclocking the Eee PC running XP or Vista. These overclocking methods include:

- EeeCtl software
- Unofficial BIOS
- SetFSB software

The BIOS method is generic and will work on all 4G Eee PCs. The SetFSB and EeeCtl methods will only work while Windows XP/Vista is running, and only on the non-2G models.

EeeCtl

EeeCtl is great for its modifiable configuration and Eee PC speciality. It features manual fan control with optional user-defined rules (based on temperature), PCI-e bus alteration, extra brightness increase, voltage adjustment, and most importantly, FSB adjustment. EeeCtl features the greatest success with overclocking, with some people breaking the 1GHz barrier.

BIOS

The BIOS method is best if you want the overclock to be active before Windows boots; this is something the other methods lack. The BIOS method is restricted to the options 630MHz and 900MHz, but can be used in conjunction with either of the other two methods. Some BIOSs unlock features such as extra screen brightness, but the BIOS itself usually has flaws.

SetFSB

SetFSB is not recommended as it isn't as flexible as EeeCtl. I have added this method as an alternative in the event that EeeCtl doesn't work. This program features FSB and PCI-e control, and it not restricted to the Eee PC platform.

Which method should I choose?

The safest and most effective method is EeeCtl. EeeCtl being a software solution can be turned off if problems occur. SetFSB is similar but should only be used if EeeCtl isn't working due to its lack of features. The BIOS method is for people who want a speed boost as soon as the Eee is turned on instead of waiting for XP or Vista to boot. The only issue is that BIOSs that support overclocking tend to be buggy, which is never a good thing.

My recommendation is EeeCtl.

How to overclock the Eee PC

Quick overclocking theory lesson

You probably thought I'd skip this part, but it's handy to know, and may even save you money.

CPU Clock

CPU clocks are found by '*CPU Multiplier x FSB*'

All three methods alter the FSB (Front Side Bus) to increase the speed of the Eee PC. The first generation Eee PCs run a Celeron CPU which uses a '9x' multiplier. So, if you were to set the FSB to 100Mhz:

$$9 \text{ (Multiplier)} \times 100 \text{ (FSB)} = 900\text{MHz (CPU Clock)}$$

So basically, all we have to do is increase the FSB to overclock the device.

It's a not so well known fact that increasing the PCI-e bus on the Eee allows greater overlocks. This is because of bottleneck issues, since the internal GPU (Graphics Processing Unit), RAM and CPU all share the same bus. The default PCI-e bus clock is 100MHz, but an increase to 110MHz should allow us to hit 1GHz.

RAM Speed

The Eee PC uses DDR2 RAM. All DDR (Double Data Rate) RAM runs at twice the speed of the FSB, hence the term 'double'. The Eee PC comes with a 533MHz DDR2 RAM module (from my experience). Most people buy high speed RAM for their Eee PCs. This is **not** essential. Why? Because:

$$\text{DDR} = \text{FSB} \times 2$$

Therefore, an Eee PC running at 1.8GHz (which is probably impossible) would have a FSB of 200Mhz (remember, $9 \times 200 = 1.8\text{Ghz}$). At this enormous speed, the RAM would run at:

$$200 \times 9 = 400\text{MHz}$$

Essentially, the stock 533MHz RAM speed is more than enough. Most people will hit a maximum of 115MHz on the FSB, which results in a 230MHz RAM speed.

Core Voltage

CPUs can be overclocked further by increasing the voltage. The Eee PC has two voltage values, 'normal' and 'high'. Most people need the 'high' setting to overclock to 900MHz and beyond. The only drawback with increasing the voltage is that the heat increases too. CPU temperatures over 65°C are not recommended. EeeCtl has an inbuilt temperature display.

Stability

It is important to ensure that the Eee is stable after an overclock. Increasing the voltage improves stability, as well as setting the PCI-e bus to 110MHz. Instability has symptoms such as system freezing, artifacting display (random patterns and colours across the screen) and constant program crashing. Programs such as OCCT stress the system to determine whether it is stable. OCCT is freeware and can be found [here](#). If 'high' voltage and a 110MHz PCI-e bus doesn't fix instability, you will have to set the overclock to a lower level.

That's all you need to know to be proficient at overclocking the Eee PC. Now let's get on to the fun stuff.

Overclocking - EeeCtl Method

EeeCtl is a tiny utility (~21KB) which makes overclocking very easy. It's freeware and can be downloaded [here](#). These steps are based on the latest release at the time of writing, in this case, version 0.23. Please check that your model Eee PC is supported, there are currently issues with 2G Eee PCs. The following steps will guide you through the process of setting up EeeCtl with different speed profiles, including 1GHz.

1. Download and extract EeeCtl to the 'C:/' (or any other permanent location).
2. There will be three files, eeectl.exe, eeectl.ini and eeectl.txt. If you want EeeCtl to run at startup (recommended), then place a shortcut to it in the 'Startup' folder. On XP, this folder is located at 'Start' > 'Program Files' > 'Startup'. On Vista, 'Start/orb' > 'All Programs' > 'Startup'
3. Open eeectl.ini. This is where all the configuration takes place. It looks daunting, but rest assured it's much easier than it looks.
4. Scroll down until you find '[Settings]'. Below it will show 'Core.Save = Fan; Speed;'. This means that when you set the fan or the FSB speed, EeeCtl will remember it the next time you run it. This option may be unsuitable if you set the FSB too high, and then EeeCtl remembers this setting later. Delete 'Speed;' to disable saving of the FSB value, and 'Fan;' if you don't want that saved either.
5. Locate 'Speed.Profiles'. These are the profiles that are found in the menu here:



The first profile is '70,99,0,Suspend;'. The first number (70) represents the FSB clock, the second (99) is the PCI-e clock, the third (0) is the voltage ('0' = stock/normal, '1' = high), and the last is the name of the profile (this appears as an option in the menu). If you leave the name out of profiles, they do not appear as a menu option, but instead act as intermediate steps between the other profiles. For example, the '75,100;' profile entry. This means that selecting the 'Medium' profile will run at a 75MHz FSB, then a 80MHz FSB ('80,100;') before it finally sets the 'Medium' profile of the 85MHz FSB '85,100,1,Medium;'. Why do we put these steps

there? It's because sudden large clock changes can crash the Eee PC, so it's a prevention technique. Going back to the 'Stock' profile would do the same, but backwards.

6. As described in the overclocking theory, we must increase the FSB and PCI-e bus in order to overclock the Eee PC to a high speed. It's a good idea to set intermediate steps as described above. If you are having trouble, you can cheat and download my custom .ini file [here](#). I however recommend that you attempt to understand how it all works, so that you can add your own options and profiles. Here are the profiles I used for my Eee PC:

Set the voltage to '1' before hitting a 90MHz FSB to ensure stability. Also, slowly set the PCI-e bus to 110MHz, in 2-3MHz steps.

7. Now that you have your profiles set, you can change the speed in which these settings are performed. Navigate to 'Speed.StepDelay' and change the value to 300. This value is in ms (milliseconds) and can be set to as low as 200. I find that 300 is a good speed without compromising stability, but experiment for yourself.
8. EeeCtl runs in the taskbar and as a result has an associated icon. This icon is configured to display clock speed and temperature status. You can change the speed in which each status is shown with the 'Core.IconDelay' setting. This setting is in ms (milliseconds) and is the time between each readout alternating on the icon. I prefer 1000ms (1 sec) because it allows me to quickly see each readout. By default, the clock speed shown on the icon is the FSB speed. To make it show the CPU clock, locate the 'Speed.FSBIconMul' setting and change the value from '1' to '9'. This works because 9 x the FSB is the clock speed (as mentioned earlier).
9. Other profiles which can be adjusted include shortcut keys, fan speed, and backlight brightness. By default these settings are great, but you can customise them if you wish. The fan profiles are under 'Fan.Profiles', the backlight profiles are under 'Backlight.Profiles' and the shortcut key profiles are under 'Core.Keys'. The .ini file has instructions if you wish to alter these settings. It is not necessary to alter these for overclocking.
10. When done, save eeectl.ini and run eeectl.exe. The program will open in the taskbar as a little IC icon. Right-clicking the icon will show you your speed profiles, click them to activate them. Other options include the fan and backlight settings. If you set a profile with a 111MHz FSB, this is essentially a 1GHz clock speed (anything above a 111MHz FSB is usually unstable). Activate it and run OCCT for 30mins. If everything runs fine, you're one of a few with a 1GHz Eee PC, congrats! If artifacts or instability occurs, turn it off and try again with a lower speed. You might need to remove the battery/AC power to turn it off in this situation.

Overclocking - BIOS Method

There are two known Eee PC BIOSs that support overclocking to 900MHz. These are the 8804 and 0511 BIOSs. Only the 4G Eee PCs (including the Surf version) are capable of using these BIOSs. The 0511 BIOS is my recommendation of the two due to its backlight options and less bugs. Follow these steps to install either BIOS:

1. Download 'BIOS Update Tools' [here](#).
2. Extract the archive and insert an empty USB drive into the PC. Run 'MakeBoot' and follow the steps to create a bootable BIOS drive.
3. Boot off the USB drive and follow the prompts to install the 0511 BIOS. You should be on mains power with the battery charged and inserted, this will minimise the risk of power failure during the BIOS update. Restart the Eee PC when done.

4. To overclock the Eee PC, enter the BIOS by pressing [F2] during POST (Power On Self Test) or in layman's terms, the BIOS boot screen. Change the settings to 'High Performance', this is 900MHz. Press [F10] to save and exit.

Overclocking - SetFSB Method

SetFSB does exactly what it implies, it sets the FSB. SetFSB has several PLL settings for many different PC platforms. For reference, the ASUS Eee 'Clock Generator' is 'ICS9LPR426AGLF'.

1. Download and extract SetFSB from [here](#).
2. Open SetFSB and select the 'ICS9LPR426AGLF' Clock Generator from the list.
3. Increase the PCI-e bus to 110MHz, and then hit the 'Set FSB' button. Now increase the FSB to 80MHz and set it, then 90MHz, 100MHz, 105MHz and so forth until 111MHz (1GHz CPU clock). Do it in small steps like this to avoid instability.
4. Run OCCT for 30mins to check for instability. If unstable, reduce the overclock.

Need help?

This process may be difficult for some, but help will always be available at my [forum](#).

For those who want a pre-configured eeectl.ini file, feel free to use mine [here](#).

Final Word

I hope you've enjoyed the tutorial. I'm sure you'll reap great benefits from having a faster Eee PC, the performance boost is a welcome addition to such a nifty little device. I'll be updating this tutorial as new methods and Eee versions appear. :) - *Vito Cassisi*