Gigabyte Sandy Bridge Overclocking Guide

Overclocking Sandy Bridge

Intro and disclaimer

So, starting Monday 10th the Sandy Bridge processors are available for purchase. There is much controversy about the new architecture, and Intel alledgedly "killing" overclocking, but the truth is that overclocking on Sandy bridge is great fun and gives some fantastic results! This tutorial will show you how to get in on the action, and give a quick demonstration of the different styles of overclocking that can be done on this platform.

First of all though, a few disclaimers are needed.

- If you overclock your system, the warranty on those parts becomes void. Any damage caused by overclocking (even when done correctly and carefully), hardware or data loss, is NOT under guarantee. We wholeheartedly support overclocking here at Gigabyte, but by definition, if you overclock, you are running your hardware above specification, meaning that you yourself are responsible for the results.
- In overclocking the rule is always: YMMV (Your Mileage May Vary). In clearer words, this means that every individual chip, every individual board, every individual RAM module and every individual power supply has slightly different electrical characteristics, and they ALL can influence the overclocking results, good or bad. If you get bad results, it can simply be bad luck. Therefore, we cannot guarantee ANY results at all.
- For readability and briefness, this guide is written assuming you have at least a basic understanding of overclocking on P55, X58 or AM3 platforms, and the risks involved. If you do not, please read any of the basic overclocking tutorials available on the web before returning here.
- ALL values you see in the screenshots are done using our particular setup, and your computer is different. Do not blindly copy these values and expect it to work. Overclocking (especially in stage 2 and 3) is a process that requires your personal touch and input. So, with that in mind, you should treat all the values, settings and results (basically anything expressed with a number) as an **example, not as a recommendation.**

With that out of the way, lets get going!

Summary

- What you need
  - hardware
  - software
- Designing your overclock
- A look at the new BIOS
- Preparation
- Stage 1: A conservative, dynamic overclock
- Stage 2: A static high-performance overclock
- Stage 3: A benchmarking overclock

What you need to Overclock Sandy Bridge

Hardware

To get overclocking on Sandy Bridge you need:

- An Intel Sandy Bridge "K-model" CPU. At the time of writing, only two suitable models are available: the i5-2500K and the i7-2600K
- A Gigabyte P67 Motherboard. The screenshots are all taken on a P67A-UD7, but the basic functionality is the same for all P67 boards.
  ATTENTION: You cannot overclock on an H67 board!
- A good cooler to keep your CPU cool. Preferably a tower cooler with 12cm fan, or watercooling for the highest overclocks.
- Of course, a good power supply also helps a stable overclock.

Software

You need the following software to follow this tutorial:

- OS: We used Windows 7 64bit for our testing, but any windows version can follow this guide.
- Temperature monitoring: You need to make sure your CPU is not overheating. We used CoreTemp, but there are many other good alternatives.
- Frequency analysis: To monitor the processor's frequency, use CPU-Z
- Benchmarking: To measure how much performance is gained from overclocking, there are many tools out there. We have limited ourselves to a few popular benchmarks: wPrime 1.55, SuperPi mod 1.5, Cinebench 11.5
- Stability testing: To make sure that the CPU is still stable after overclocking it, and to test if it will not overheat even in extreme conditions, we use Prime95 to put 100% load on all CPU cores.

Designing your overclock

When you start overclocking, it's important that you first think about what you want to accomplish. Different users want different things, and this means you will make different choices and demands for your overclock. This guide gives you three examples, but you may of course design your own set of expectations and demands based on your own preference.

Stage 1: Conservative Dynamic overclocking

The easiest to achieve, and most power-efficient way to do overclocking, the dynamic clock will be the best way to do it for most users. We leave all the power saving features on (EIST, C1E, C-states), and don't change the voltage. If the PC is idle, the CPU will clock itself down and use a lower voltage. This Overclock is simply a faster version of the stock processor, with ALL features turned on.

Stage 2: Static High-performance

Taking things one step further, we turn off the power saving features for the static overclock. The CPU is now always in it's fastest state, but uses more power and will produce more heat. We also raise the voltage to reach the highest possible speed, while still keeping stability to make the PC usable in a day-to-day situation.

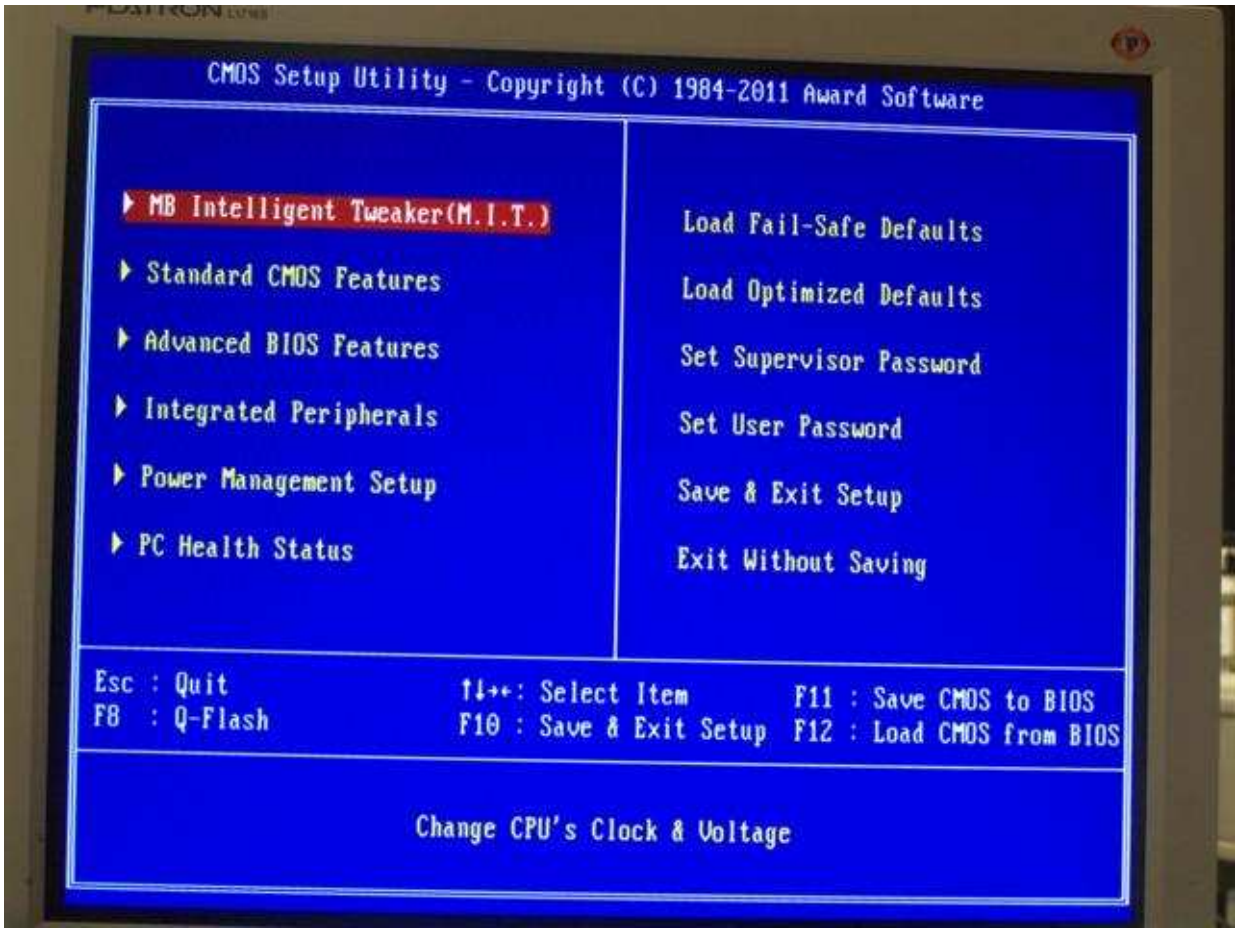
Stage 3: Benchmarking

Pulling all the stops, we overclock the system to it's very limit. This kind of overclocking is fun to do, and can get very addictive and competitive, but the resulting system will not be stable or usable in real-life situation. At this point, we are purely doing it for the fun and the sport!

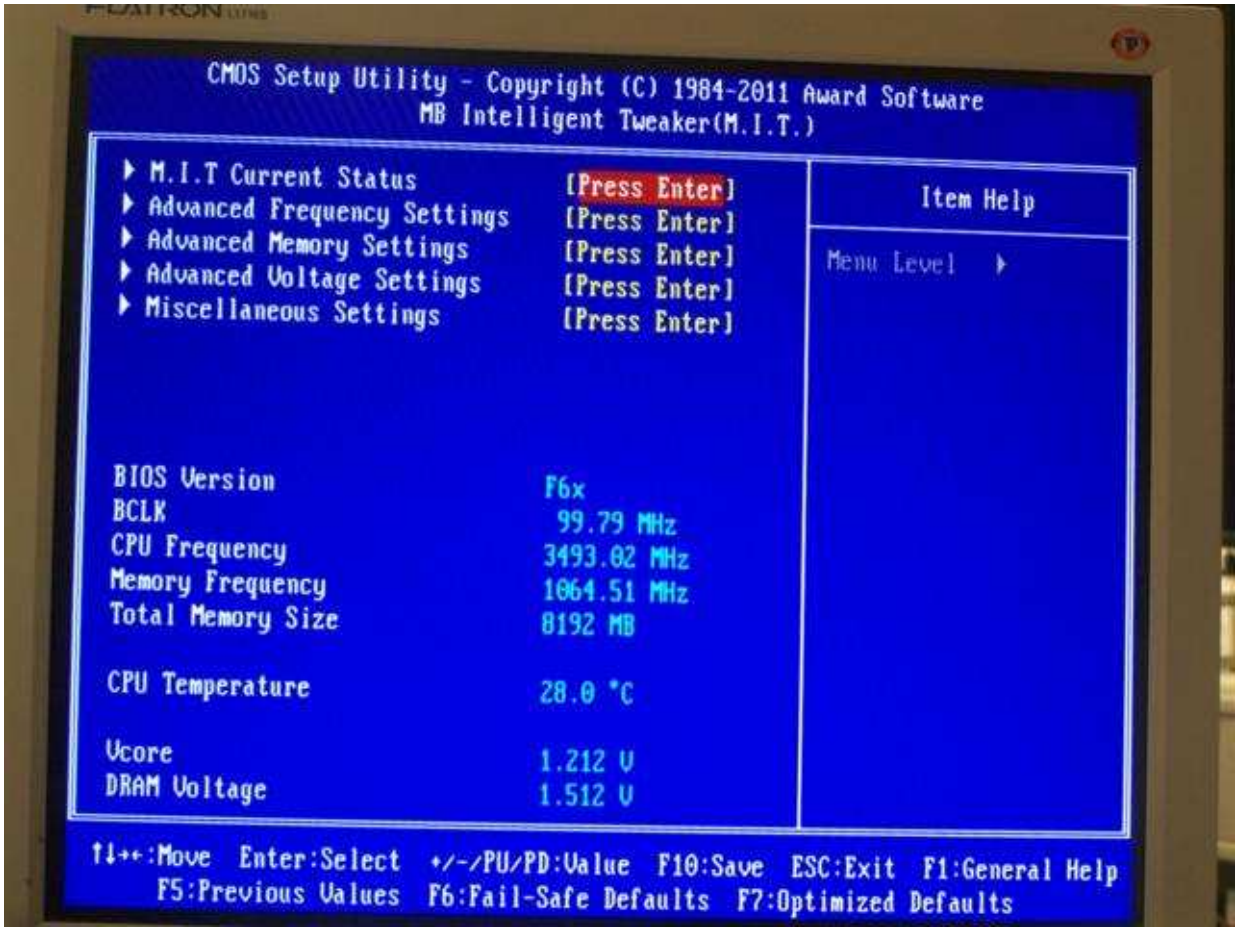
A look at the new BIOS

While the differences between previous platforms and P67 are huge, the Gigabyte BIOS still has the same well-known layout and functionality, so you will feel immediately at home if you've ever had the pleasure of working with one before. Still, let's look at each page in detail before we start changing anything. These photo's are taken with F6x, which is a particular overclocking BIOS, but all the features should be the same as on all BIOSes on the website.

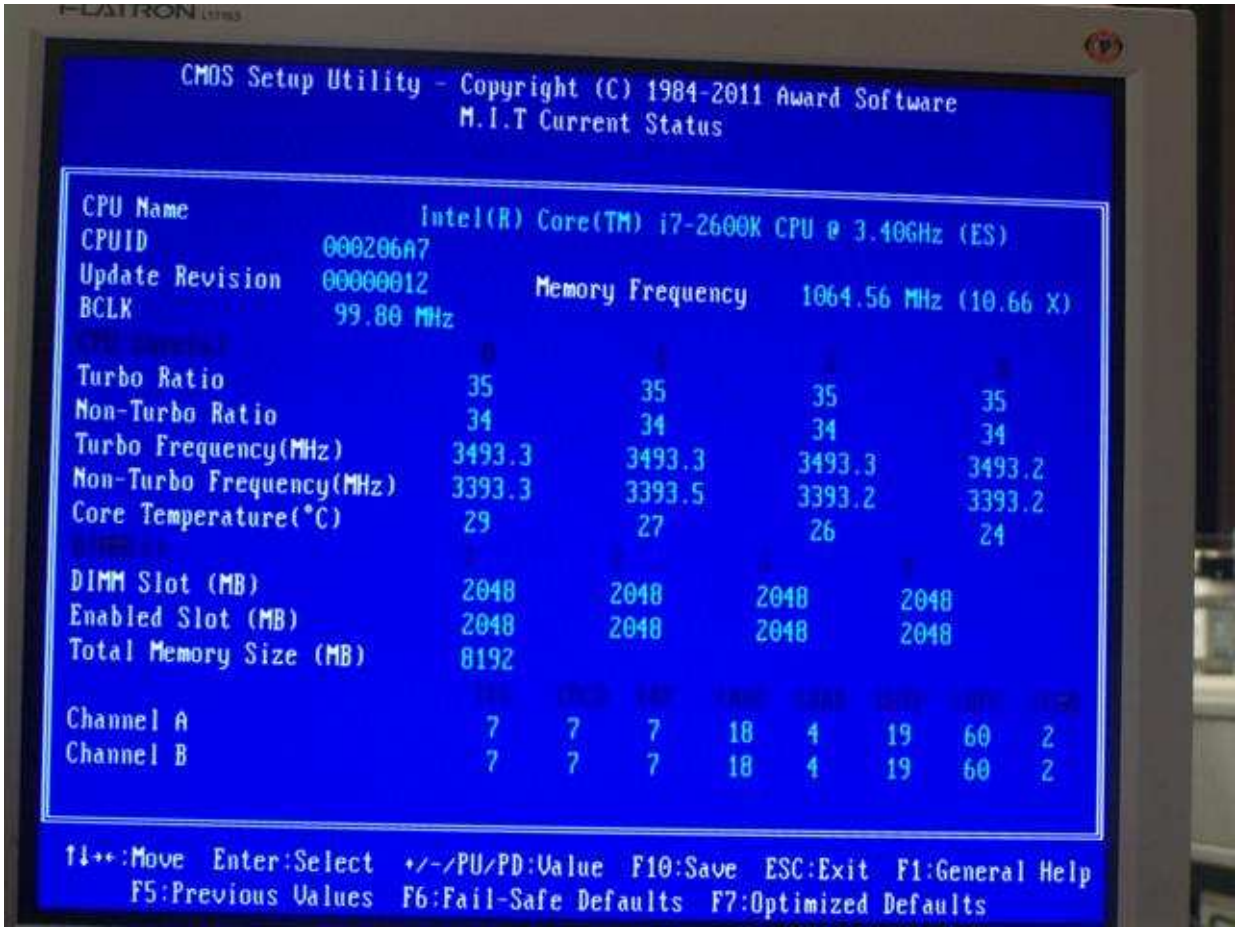
First, the familiar start screen. Nothing special here, everything is just like we all know!



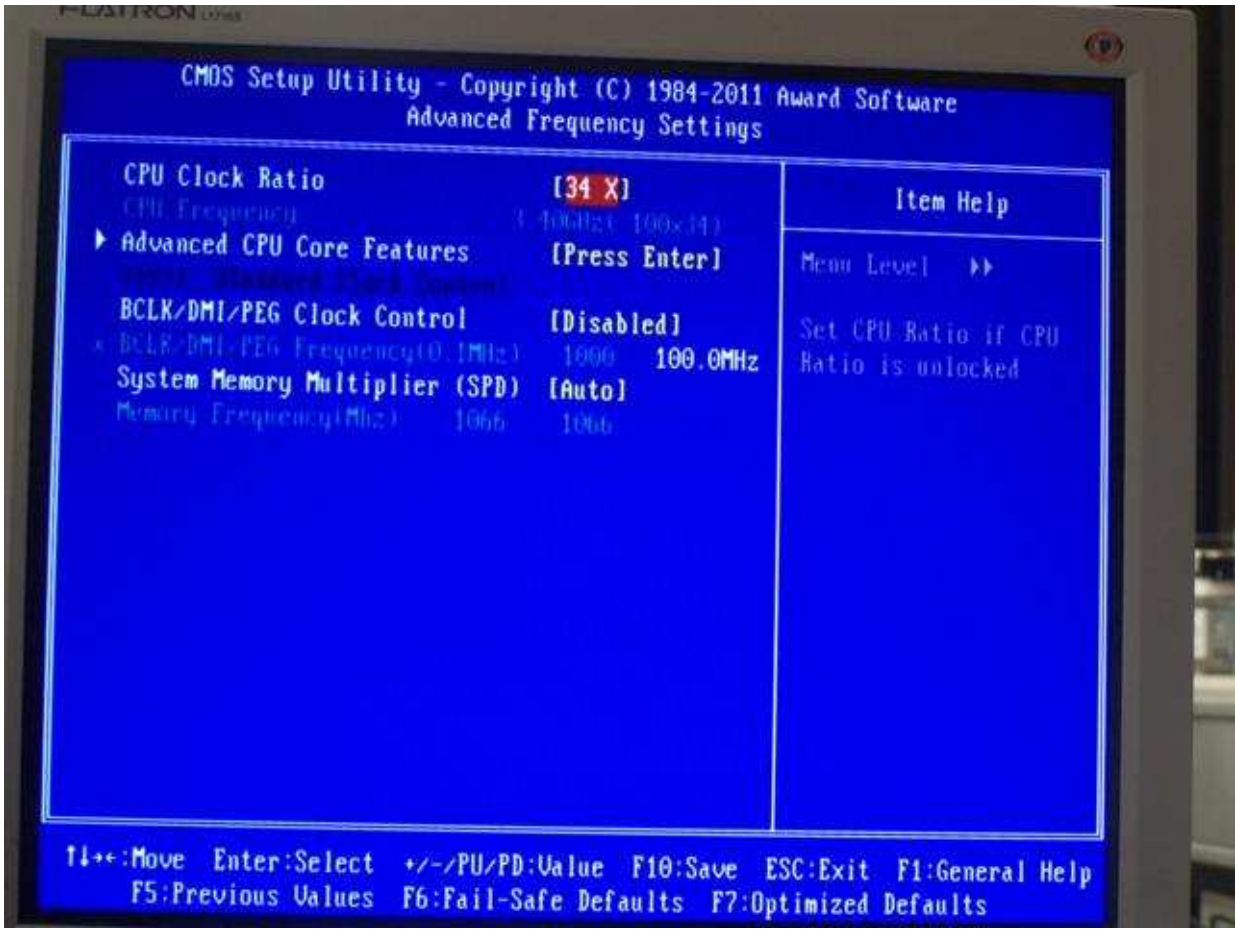
Going into the MIT menu we see the familiar interface. The 5 submenus, and the status information of your system.



This is the MIT current status screen. It's a great resource for information, especially if you are trying to solve memory problems. We don't have any memory problems at the moment, so let's move on!



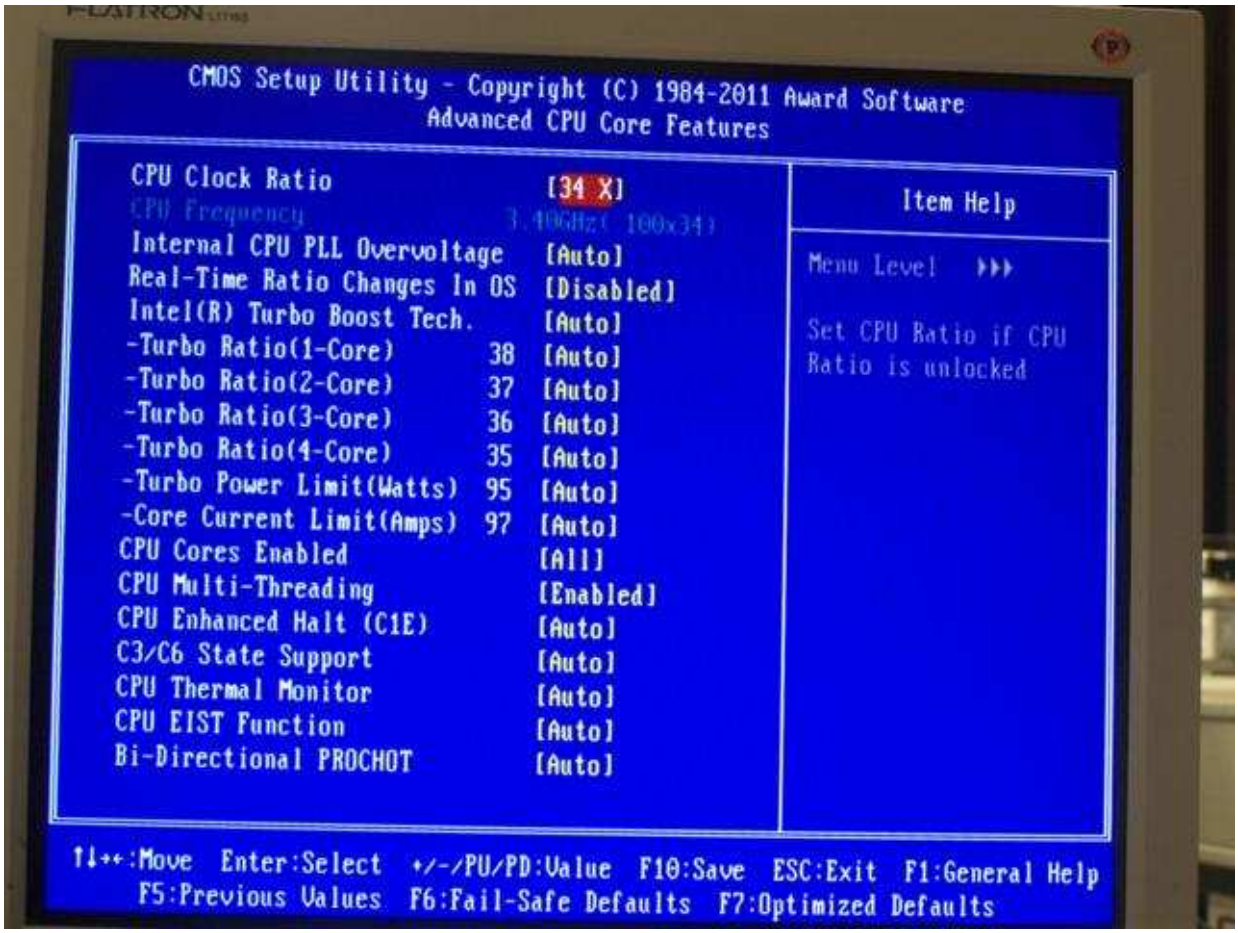
Advanced Frequency Settings. Here things get really interesting. We see the main multiplier (CPU clock Ratio), a link to even more advanced CPU features (next picture), and here we can also change the BCLK and the memory multiplier. Because on Sandy Bridge the BCLK is not flexible like on other platforms, we will do the overclocking by raising the Multiplier, and leave the BCLK alone until we start finetuning it for the ultimate performance in the benchmarking Stage. Because we will not change the BCLK, memory is not affected by CPU overclocking, so we will leave it out of this guide.



And now we arrive at the real heart of the overclocking settings. Here we will find the Turbo mode with all it's settings, as well as the power saving features and the multiplier again.

For the first stage, we will use the turbo mode, for the second and third stages we will raise the stakes and turn off all the features here.

Also worth noting is the Internal CPU PLL Overvoltage. This is a setting that allows extra performance in the third stage, and is presently only available in this F6x version BIOS. It will also feature in later BIOSes.



Next up is the other very important screen for overclockers: voltage control. This screen is a bit simpler then it is on other platforms, but there are some new terms.

Stage 1 will leave this screen untouched, but for stages 2 and 3 we will spend some time in here.

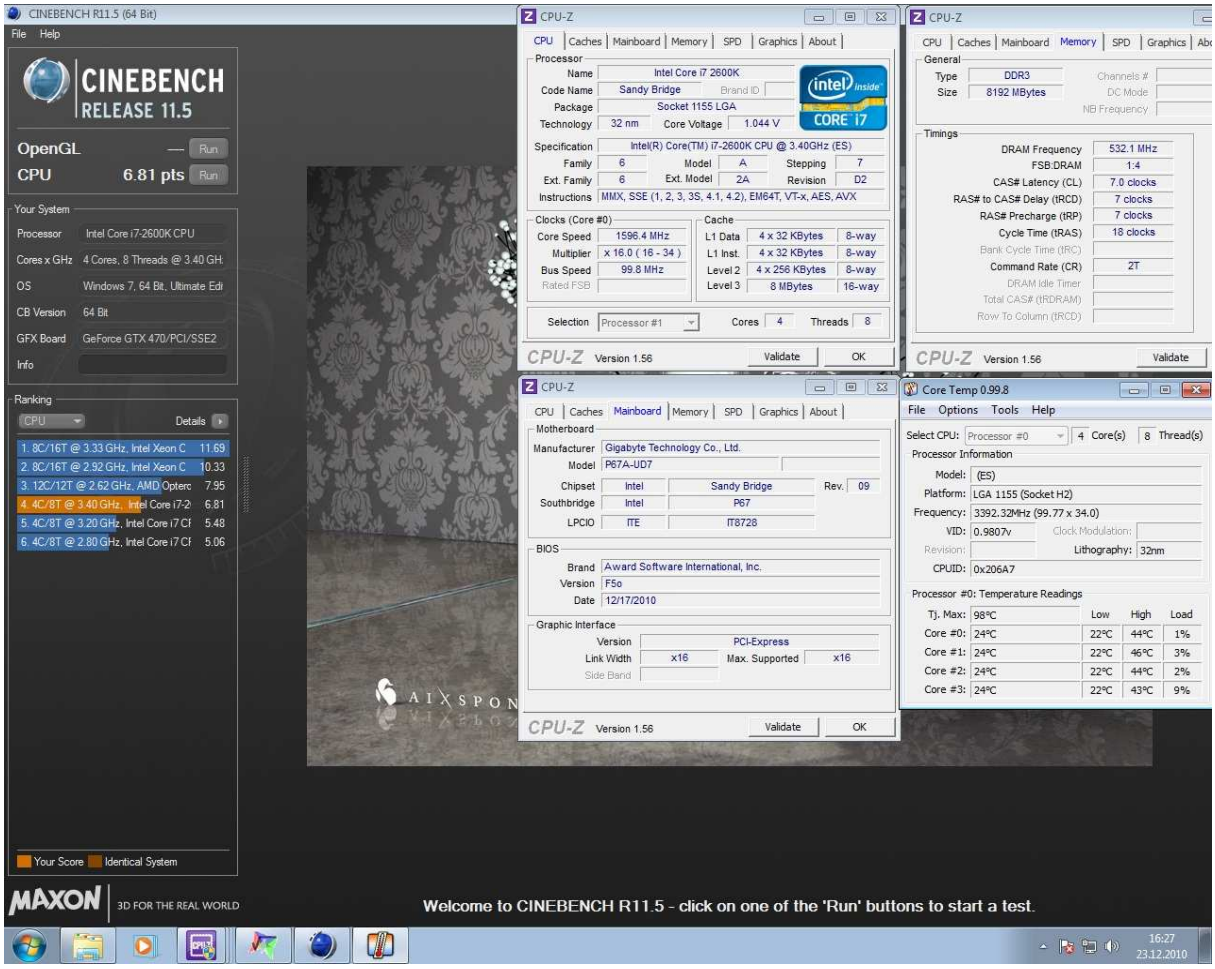
And that's all the screens we need for overclocking! Let's work!

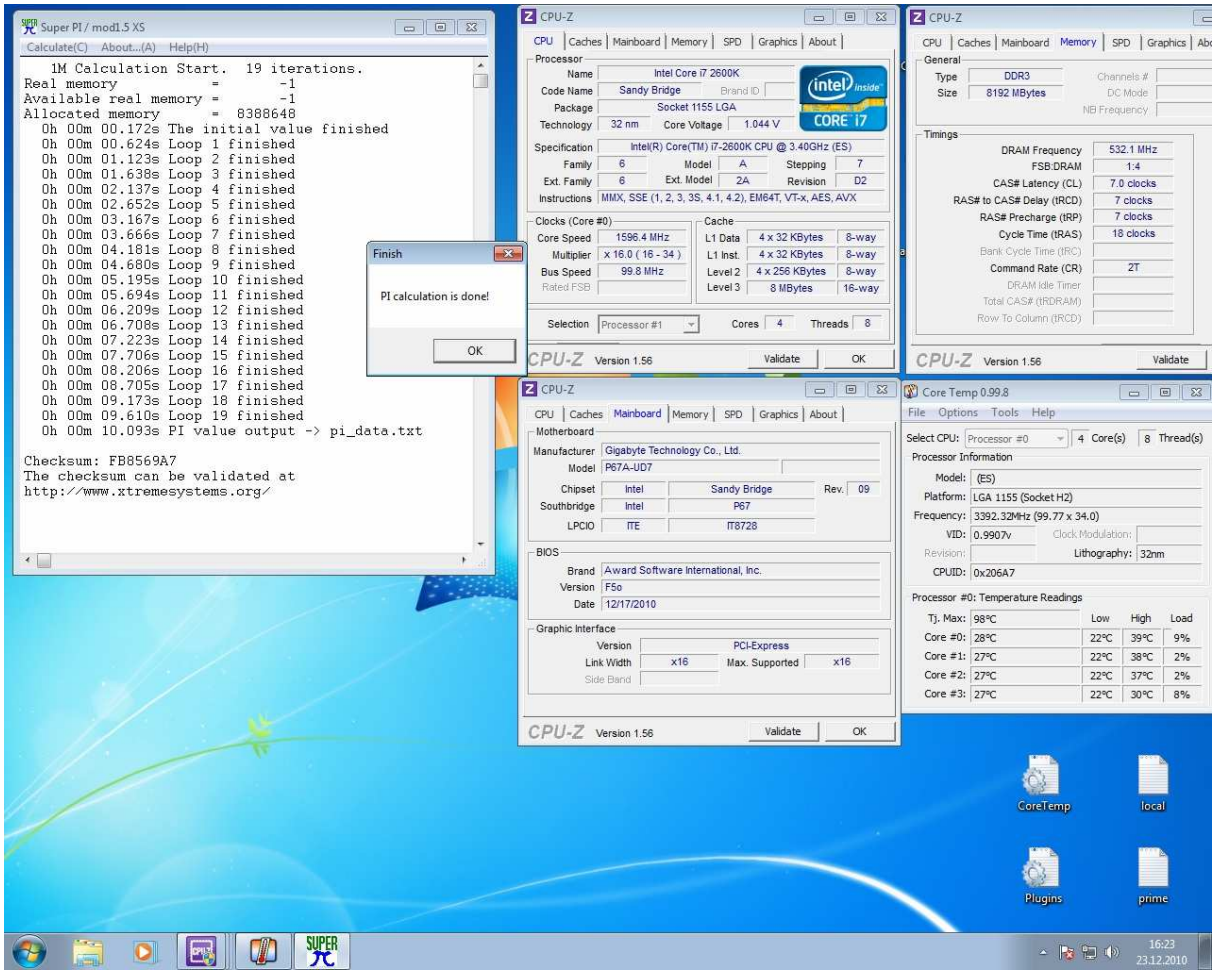
Preparation

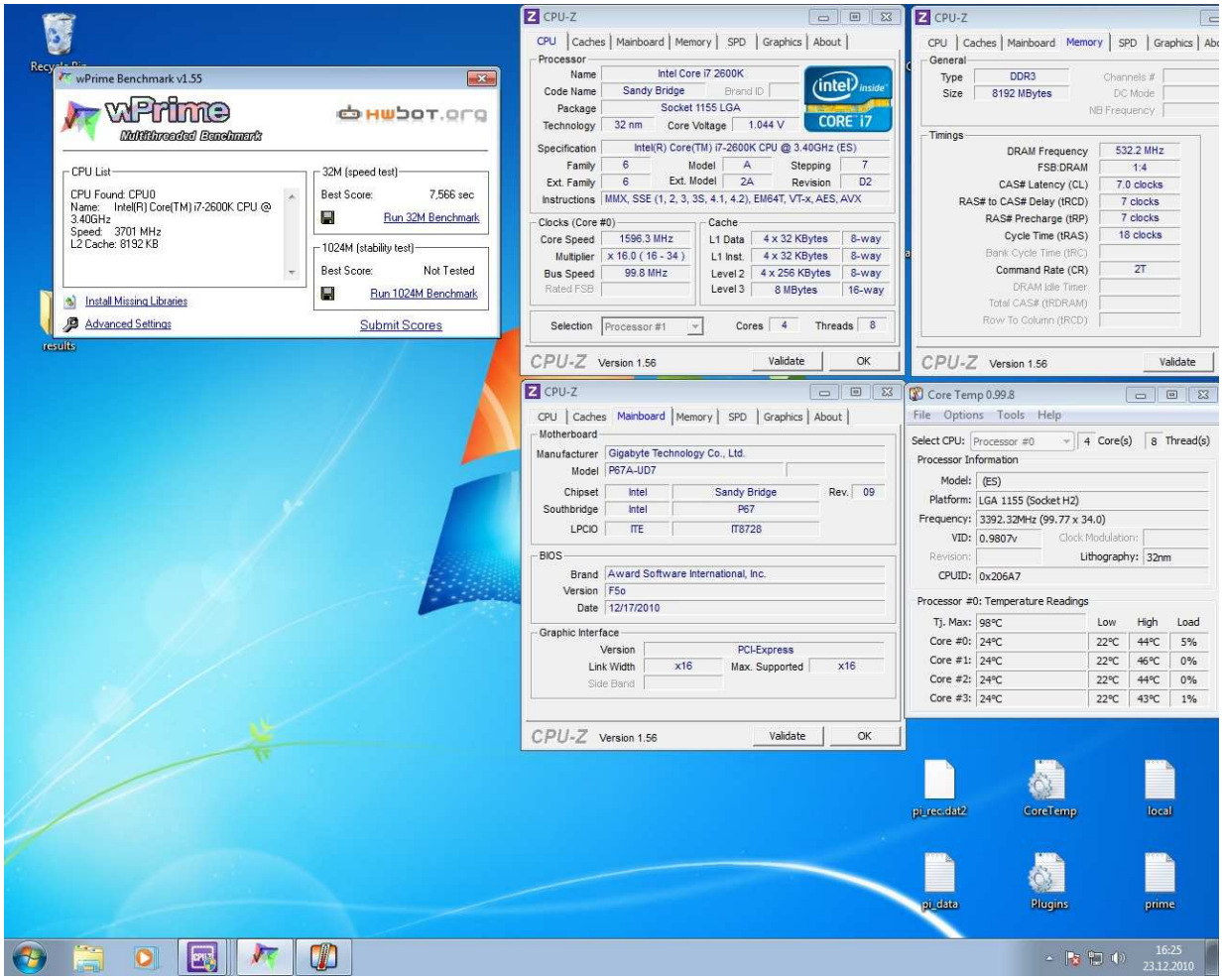
There are some things that need to be done before we can start overclocing. It's the same for overclocking on all platforms, so I'll just put a quick checklist here for your reference. Make sure you tick off the whole list before you start overclocking! It may take some time, but if you run into problems later, it's always good to be sure it's because of your overclock, and not one of the factors below.

- Install the PC and components
- Install all the software you want to use
- Virus check
- Do stability test
- Check temperatures and make sure the cooling is ok. You need a lot of headroom at this point, in later stages the temperature will go up very quickly!
- Perform all the benchmarks of your choice to set a baseline performance, so you know how much you have gained when you are done.

So, here is our baseline performance:




Super PI / mod1.5 XS
Calculate(C) About...(A) Help(H)
1M Calculation Start. 19 iterations.
Real memory = -1
Available real memory = -1
Allocated memory = 8388648
0h 00m 00.172s The initial value finished
0h 00m 00.624s Loop 1 finished
0h 00m 01.123s Loop 2 finished
0h 00m 01.638s Loop 3 finished
0h 00m 02.137s Loop 4 finished
0h 00m 02.652s Loop 5 finished
0h 00m 03.167s Loop 6 finished
0h 00m 03.666s Loop 7 finished
0h 00m 04.181s Loop 8 finished
0h 00m 04.680s Loop 9 finished
0h 00m 05.195s Loop 10 finished
0h 00m 05.694s Loop 11 finished
0h 00m 06.209s Loop 12 finished
0h 00m 06.708s Loop 13 finished
0h 00m 07.223s Loop 14 finished
0h 00m 07.706s Loop 15 finished
0h 00m 08.206s Loop 16 finished
0h 00m 08.705s Loop 17 finished
0h 00m 09.173s Loop 18 finished
0h 00m 09.610s Loop 19 finished
0h 00m 10.093s PI value output -> pi_data.txt
Checksum: FB8569A7
The checksum can be validated at
http://www.xtremesystems.org/
Finish
PI calculation is done!
OK
CPU-Z
CPU Caches Mainboard Memory SPD Graphics About
Processor
Name Intel Core i7 2600K
Code Name Sandy Bridge Brand ID
Package Socket 1155 LGA
Technology 32 nm Core Voltage 1.044 V
Specification Intel(R) Core(TM) i7-2600K CPU @ 3.40GHz (ES)
Family 6 Model A Stepping 7
Ext. Family 6 Ext. Model 2A Revision D2
Instructions MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES, AVX
Clocks (Core #0)
Core Speed 1596.4 MHz
Multiplier x 16.0 (16 - 34)
Bus Speed 99.8 MHz
Rated FSB
Cache
L1 Data 4 x 32 KBytes 8-way
L1 Inst. 4 x 32 KBytes 8-way
Level 2 4 x 256 KBytes 8-way
Level 3 8 MBytes 16-way
Selection Processor #1 Cores 4 Threads 8
CPU-Z Version 1.56 Validate OK
CPU-Z
CPU Caches Mainboard Memory SPD Graphics About
General
Type DDR3 Channels #
Size 8192 MBytes DC Mode
NB Frequency
Timings
DRAM Frequency 532.1 MHz
FSB:DRAM 1:4
CAS# Latency (CL) 7.0 clocks
RAS# to CAS# Delay (tRCD) 7 clocks
RAS# Precharge (tRP) 7 clocks
Cycle Time (tRAS) 18 clocks
Bank Cycle Time (tRC)
Command Rate (CR) 2T
DRAM Idle Timer
Total CAS# (tRDRAM)
Row To Column (tRCD)
CPU-Z Version 1.56 Validate
CPU-Z
CPU Caches Mainboard Memory SPD Graphics About
Motherboard
Manufacturer Gigabyte Technology Co., Ltd.
Model P67A-UD7
Chipset Intel Sandy Bridge Rev. 09
Southbridge Intel P67
LPCIO ITE IT8728
BIOS
Brand Award Software International, Inc.
Version F5o
Date 12/17/2010
Graphic Interface
Version PCI-Express
Link Width x16 Max. Supported x16
Side Band
CPU-Z Version 1.56 Validate OK
Core Temp 0.99.8
File Options Tools Help
Select CPU: Processor #0 4 Core(s) 8 Thread(s)
Processor Information
Model: (ES)
Platform: LGA 1155 (Socket H2)
Frequency: 3392.32MHz (99.77 x 34.0)
VID: 0.9907v Clock Modulation:
Revision: Lithography: 32nm
CPUID: 0x206A7
Processor #0: Temperature Readings
Tj. Max: 98°C Low High Load
Core #0: 28°C 22°C 39°C 9%
Core #1: 27°C 22°C 38°C 2%
Core #2: 27°C 22°C 37°C 2%
Core #3: 27°C 22°C 30°C 8%
CoreTemp
local
Plugins
prime
16:23
23.12.2010

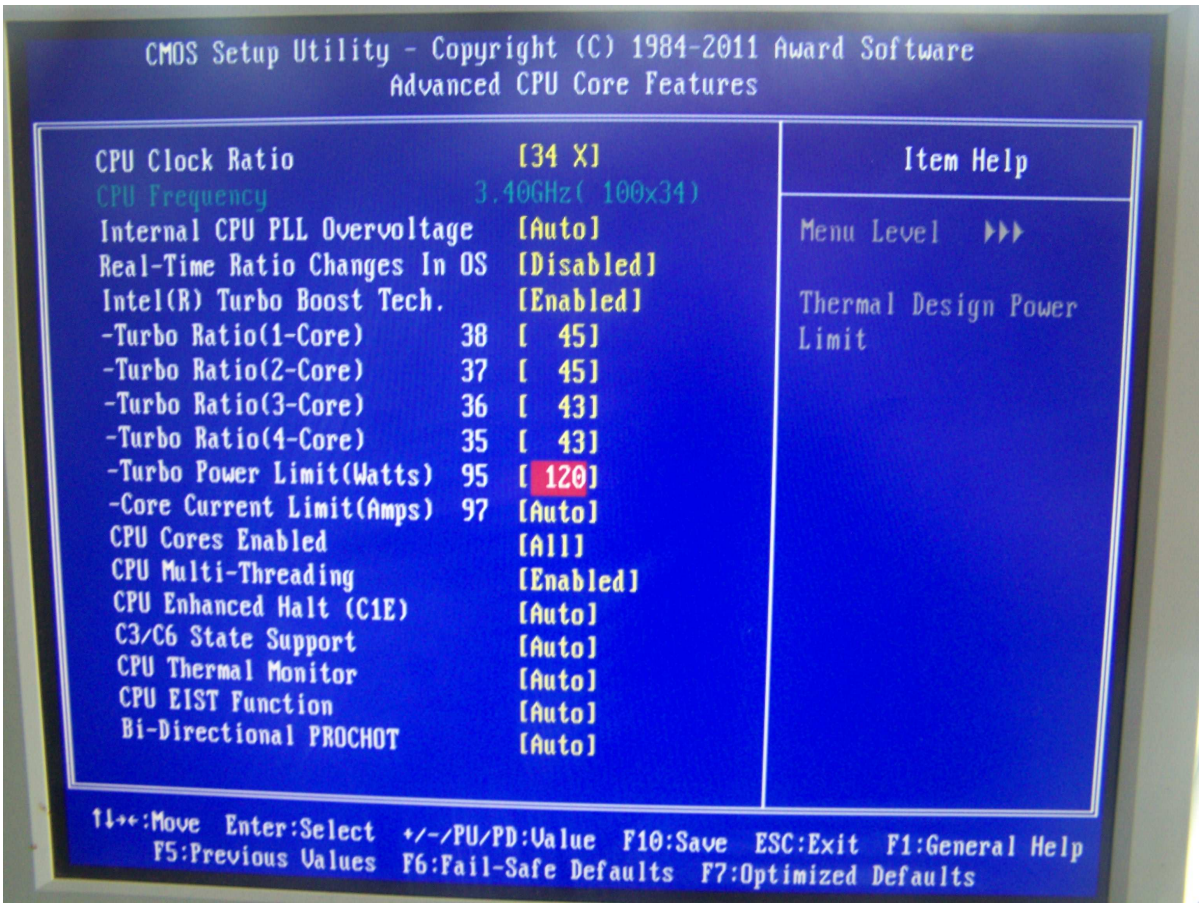


Stage 1: Conservative Dynamic overclocking

So, we have everything ready, here we go!

At first, we will keep things conservative, we aren't changing much. For this overclock, we will use the great new implementation of Turbo Boost Technology.

Simply go to the advanced CPU core features screen, and change the following values:

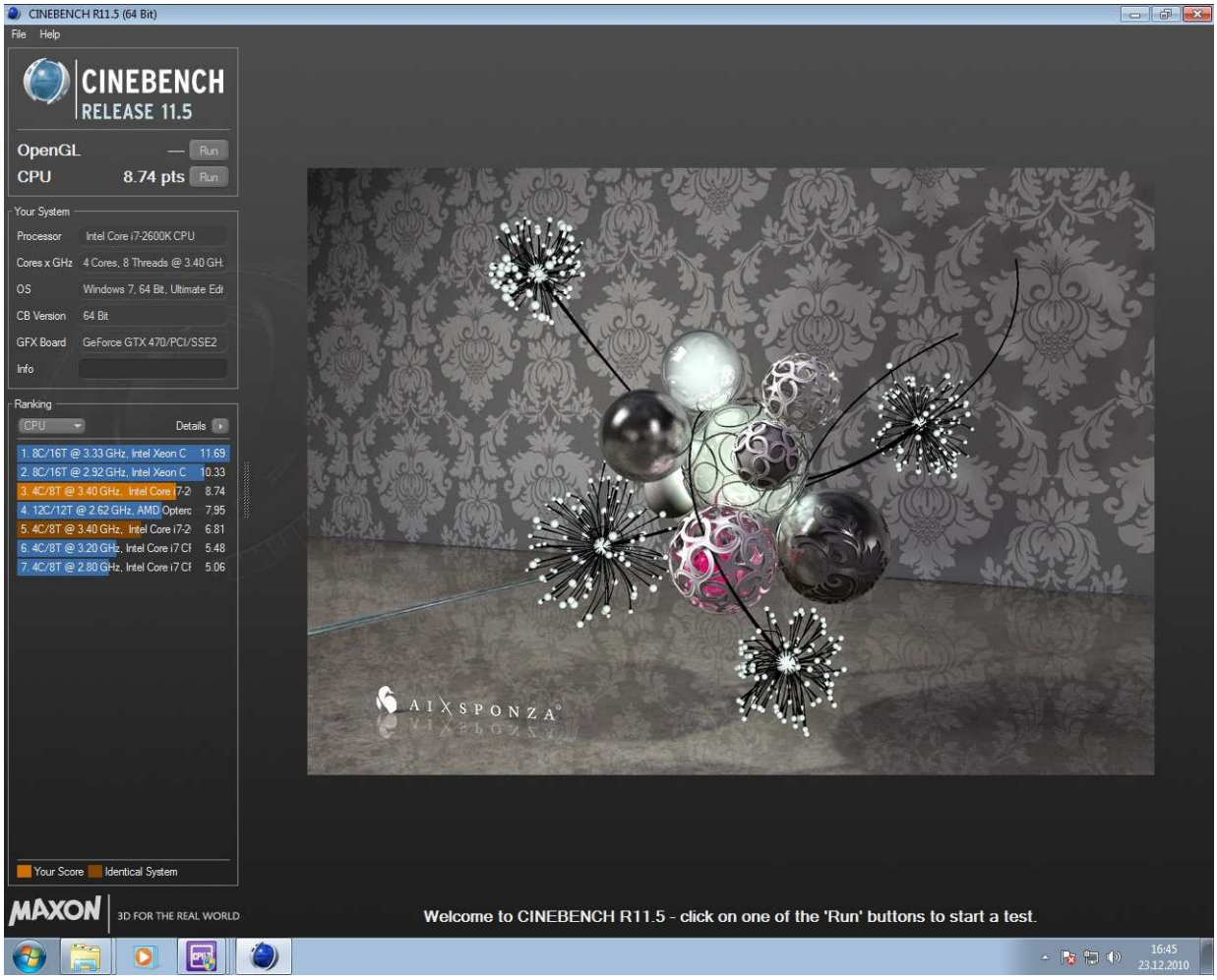


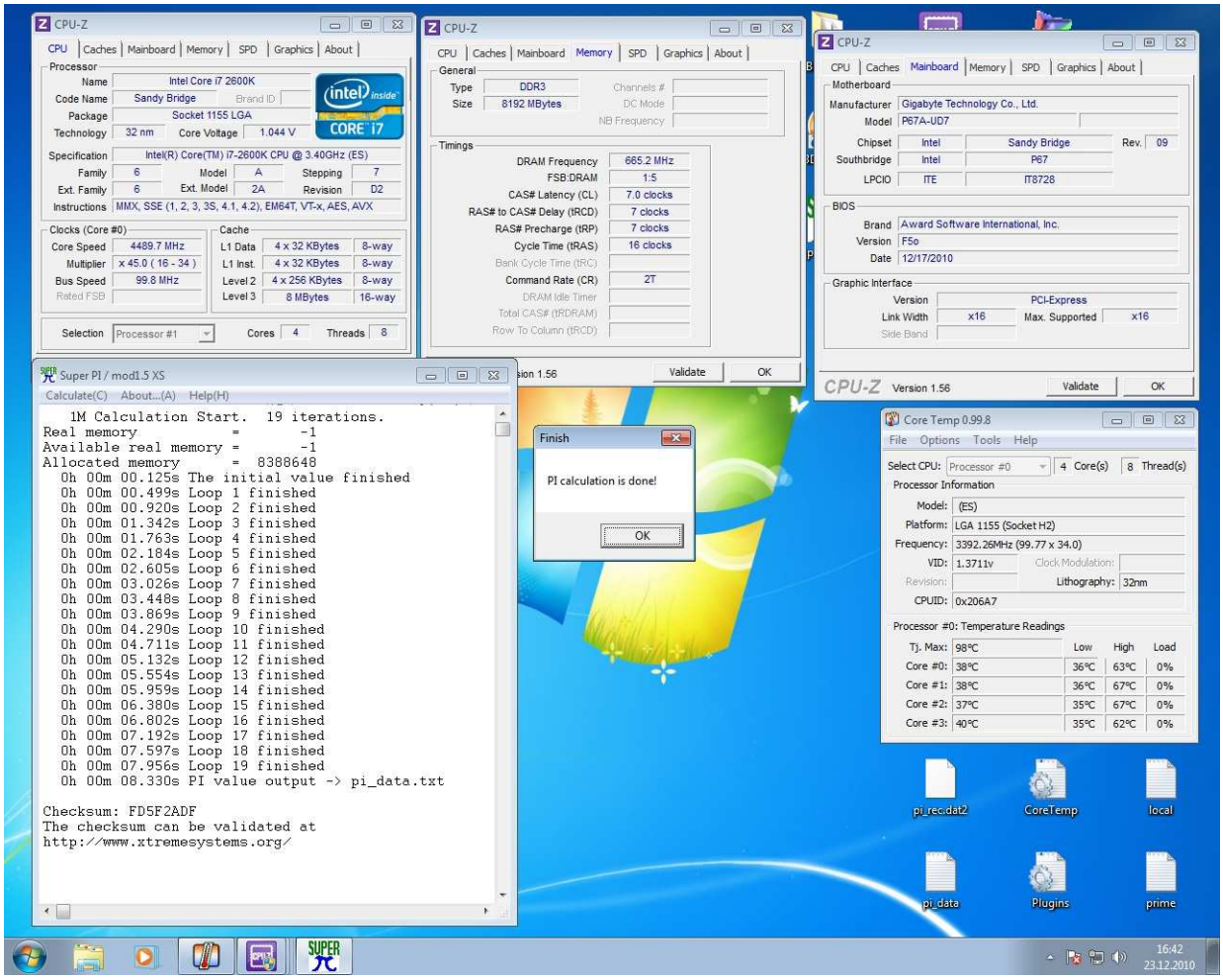
Ok, let's look at it in some more detail.
We have changed the Turbo Boost jump, but not any of the standard settings of this processor. That means everything works as normal, even power saving features, but when there is workload and enough power available, the CPU will jump into turbo mode and go to 45 multiplier for single- and dual-threaded workloads, and to 43 if more then two cores are put to work. This will give us clockspeeds of 4,5GHz and 4,3GHz respectively. 4,5 GHz? Is that conservative? Yes, on Sandy Bridge it is! As you will see in stage 2 or 3, the actual limit is much higher.

Now, of course all this extra performance does use some extra power. That's why we raised the Turbo Power limit to 120W, so there is extra power available when the CPU needs it. Don't be too afraid of this value, the CPU will now use a it's absolute maximum the same amount of power as a core i7-920 at stock settings. Any decent air cooler will be able to deal with this heat.

Now, go into windows and start checking performance, stability and heat. If you think you can go a little further based on your measurements, adjust the numbers to your liking. Remember, these values I am posting here are examples, not recommendations!

Here are our results, you can see great improvements in all categories!




CPU-Z
CPU | Caches | Mainboard | Memory | SPD | Graphics | About
Processor
Name Intel Core i7 2600K
Code Name Sandy Bridge
Package Socket 1155 LGA
Technology 32 nm
Core Voltage 1.044 V
Specification Intel(R) Core(TM) i7-2600K CPU @ 3.40GHz (ES)
Family 6
Model A
Stepping 7
Ext. Family 6
Ext. Model 2A
Revision D2
Instructions MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES, AVX
Clocks (Core #0)
Core Speed 4489.7 MHz
Multiplier x 45.0 (16 - 34)
Bus Speed 99.8 MHz
Rated FSB
Cache
L1 Data 4 x 32 KBytes 8-way
L1 Inst. 4 x 32 KBytes 8-way
Level 2 4 x 256 KBytes 8-way
Level 3 8 MBytes 16-way
Selection Processor #1
Cores 4
Threads 8
CPU-Z
CPU | Caches | Mainboard | Memory | SPD | Graphics | About
General
Type DDR3
Size 8192 MBytes
Channels #
DC Mode
NB Frequency
Timings
DRAM Frequency 665.2 MHz
FSB:DRAM 1:5
CAS# Latency (CL) 7.0 clocks
RAS# to CAS# Delay (tRCD) 7 clocks
RAS# Precharge (tRP) 7 clocks
Cycle Time (tRAS) 16 clocks
Bank Cycle Time (tRC)
Command Rate (CR) 2T
DRAM Idle Timer
Total CAS# (tRDRAM)
Row To Column (tRCD)
Validate
OK
CPU-Z
CPU | Caches | Mainboard | Memory | SPD | Graphics | About
Motherboard
Manufacturer Gigabyte Technology Co., Ltd.
Model P67A-UD7
Chipset Intel Sandy Bridge Rev. 09
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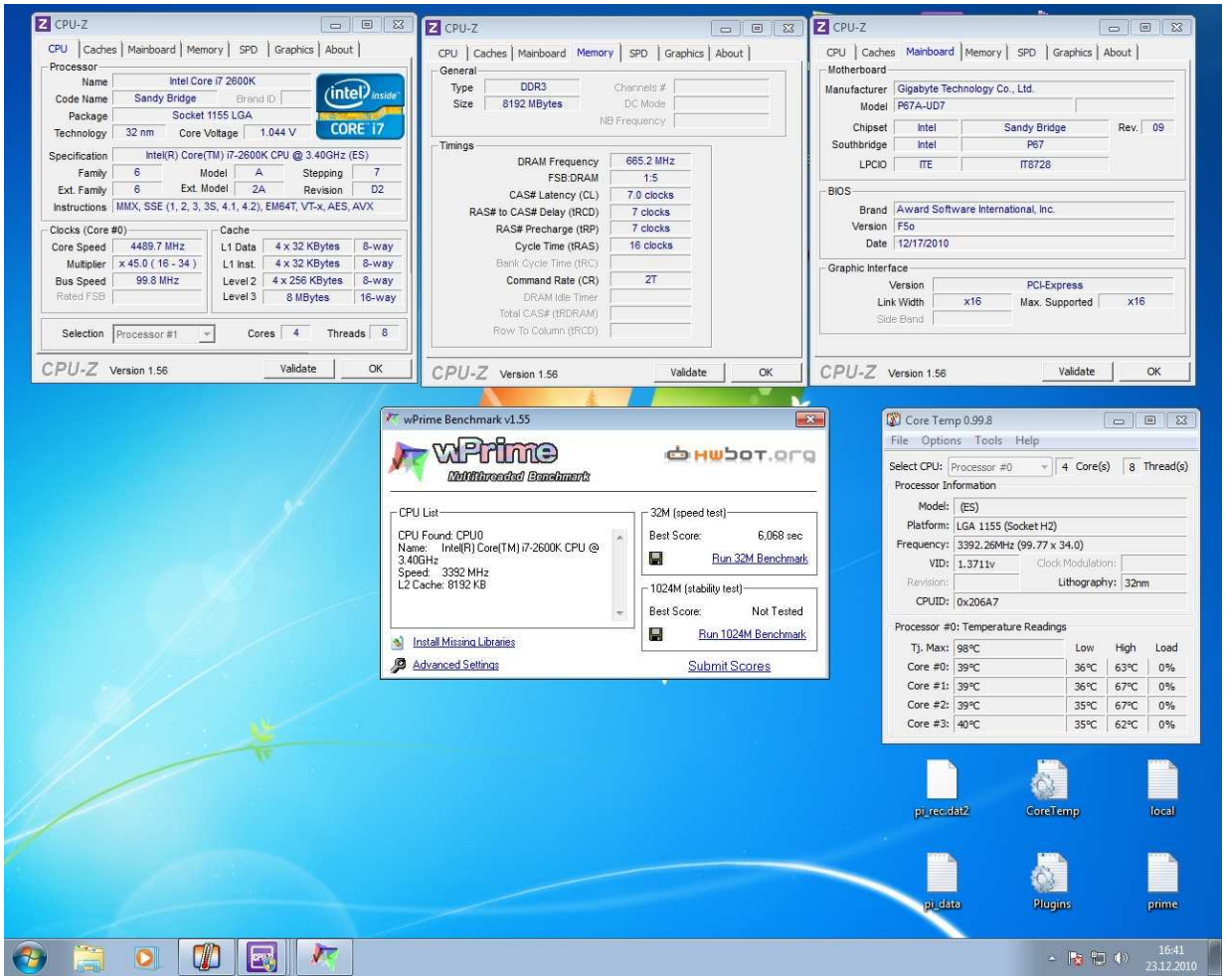
BIOS
Brand Award Software International, Inc.
Version F5o
Date 12/17/2010
Graphic Interface
Version PCI-Express
Link Width x16
Max. Supported x16
Side Band
CPU-Z Version 1.56
Validate
OK
Super PI / mod1.5 XS
Calculate(C) About...(A) Help(H)
1M Calculation Start. 19 iterations.
Real memory = -1
Available real memory = -1
Allocated memory = 8388648
0h 00m 00.125s The initial value finished
0h 00m 00.499s Loop 1 finished
0h 00m 00.920s Loop 2 finished
0h 00m 01.342s Loop 3 finished
0h 00m 01.763s Loop 4 finished
0h 00m 02.184s Loop 5 finished
0h 00m 02.605s Loop 6 finished
0h 00m 03.026s Loop 7 finished
0h 00m 03.448s Loop 8 finished
0h 00m 03.869s Loop 9 finished
0h 00m 04.290s Loop 10 finished
0h 00m 04.711s Loop 11 finished
0h 00m 05.132s Loop 12 finished
0h 00m 05.554s Loop 13 finished
0h 00m 05.959s Loop 14 finished
0h 00m 06.380s Loop 15 finished
0h 00m 06.802s Loop 16 finished
0h 00m 07.192s Loop 17 finished
0h 00m 07.597s Loop 18 finished
0h 00m 07.956s Loop 19 finished
0h 00m 08.330s PI value output -> pi_data.txt
Checksum: FD5F2ADF
The checksum can be validated at
http://www.xtremesystems.org/
Finish
PI calculation is done!
OK
Core Temp 0.99.8
File Options Tools Help
Select CPU: Processor #0 4 Core(s) 8 Thread(s)
Processor Information
Model: (ES)
Platform: LGA 1155 (Socket H2)
Frequency: 3392.26MHz (99.77 x 34.0)
VID: 1.3711v
Clock Modulation:
Revision:
Lithography: 32nm
CPUID: 0x206A7
Processor #0: Temperature Readings
Tj. Max: 98°C
Low High Load
Core #0: 38°C 36°C 63°C 0%
Core #1: 38°C 36°C 67°C 0%
Core #2: 37°C 35°C 67°C 0%
Core #3: 40°C 35°C 62°C 0%
pi_rec.dat2
CoreTemp
local
pi_data
Plugins
prime
16:42
23.12.2010

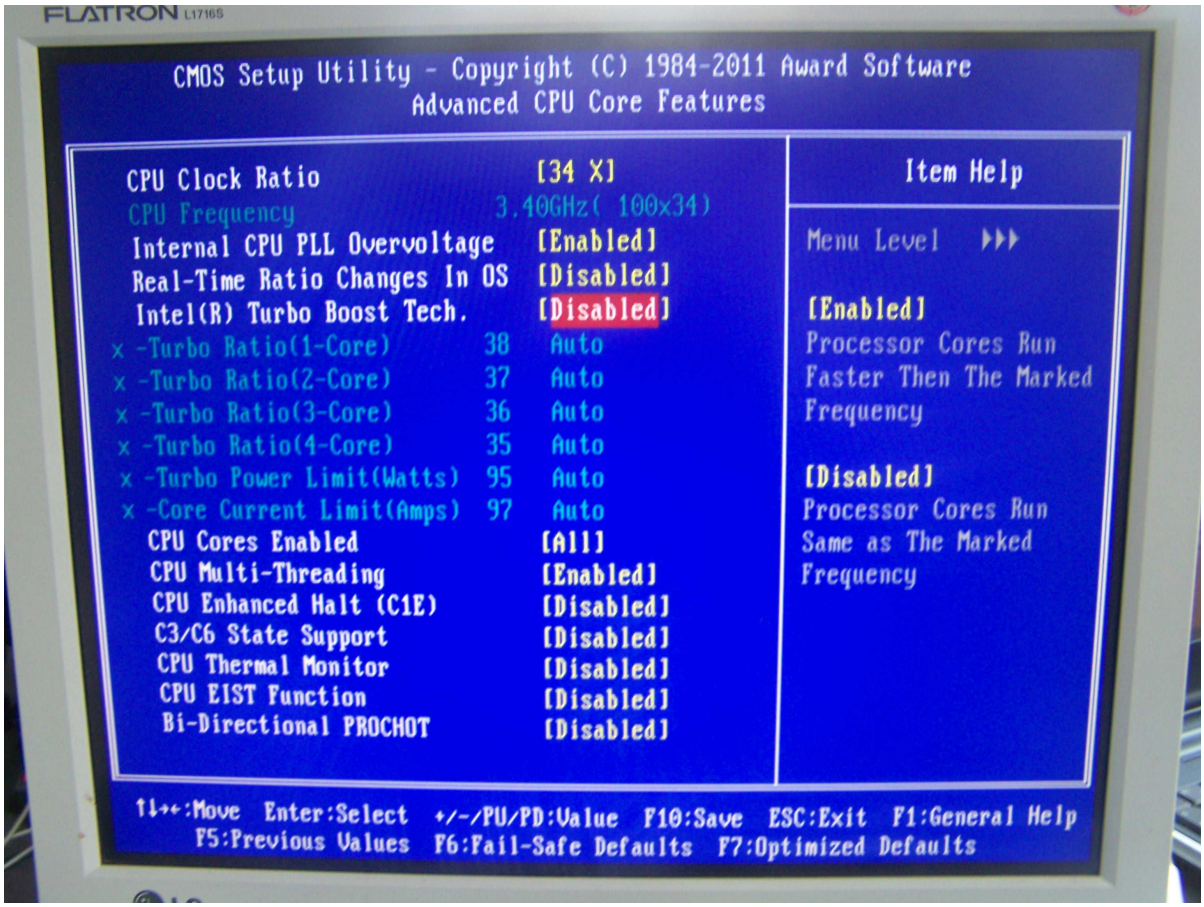


Stage 2: Static High-Performance

Ok, so you have gotten the taste of all that performance, and now you want more! Time to take the gloves off! Of course I should warn you again: if you enter this stage you need to keep a constant eye on your CPU temperature and stability, and have good upgraded cooling.

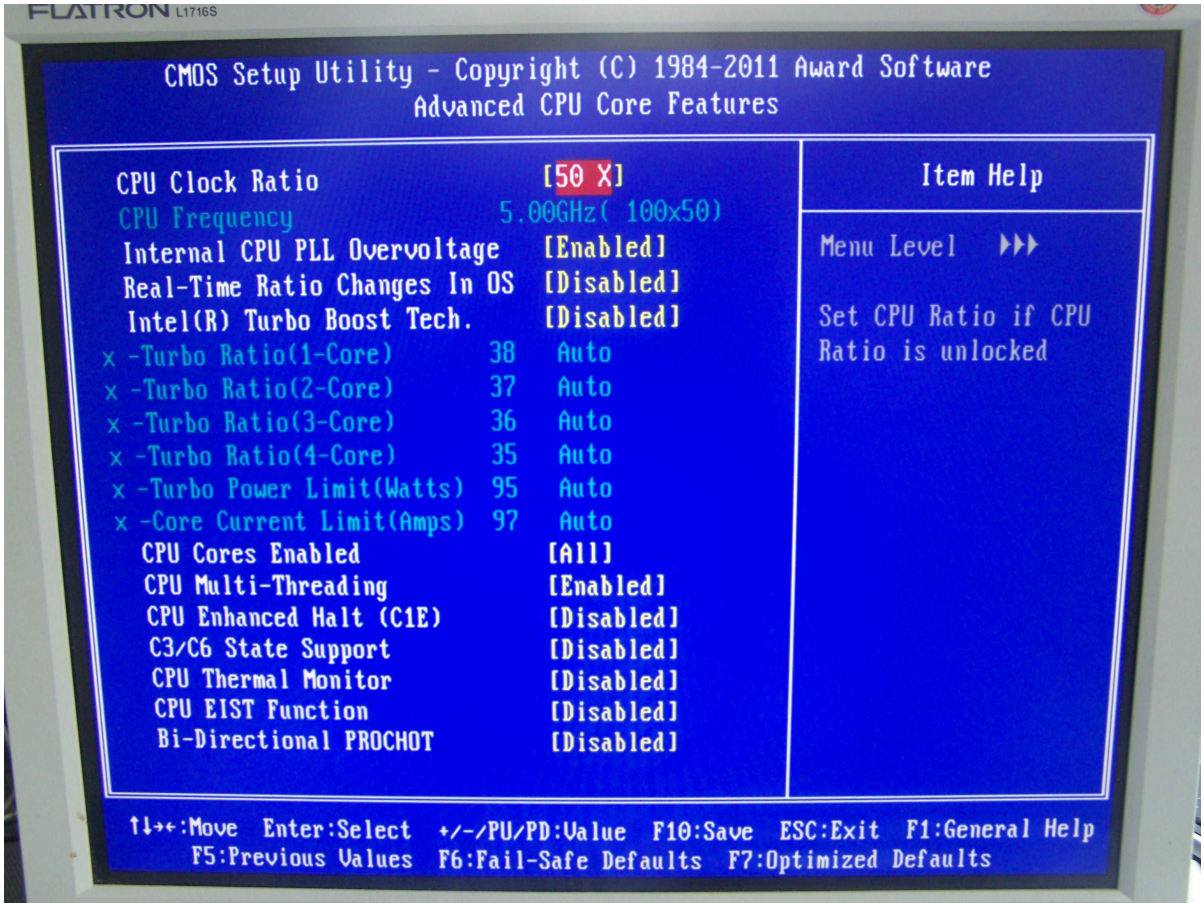
First, we go back to the Advanced Features screen, and turn everything off. We also enable the Internal CPU PLL overvoltage option.

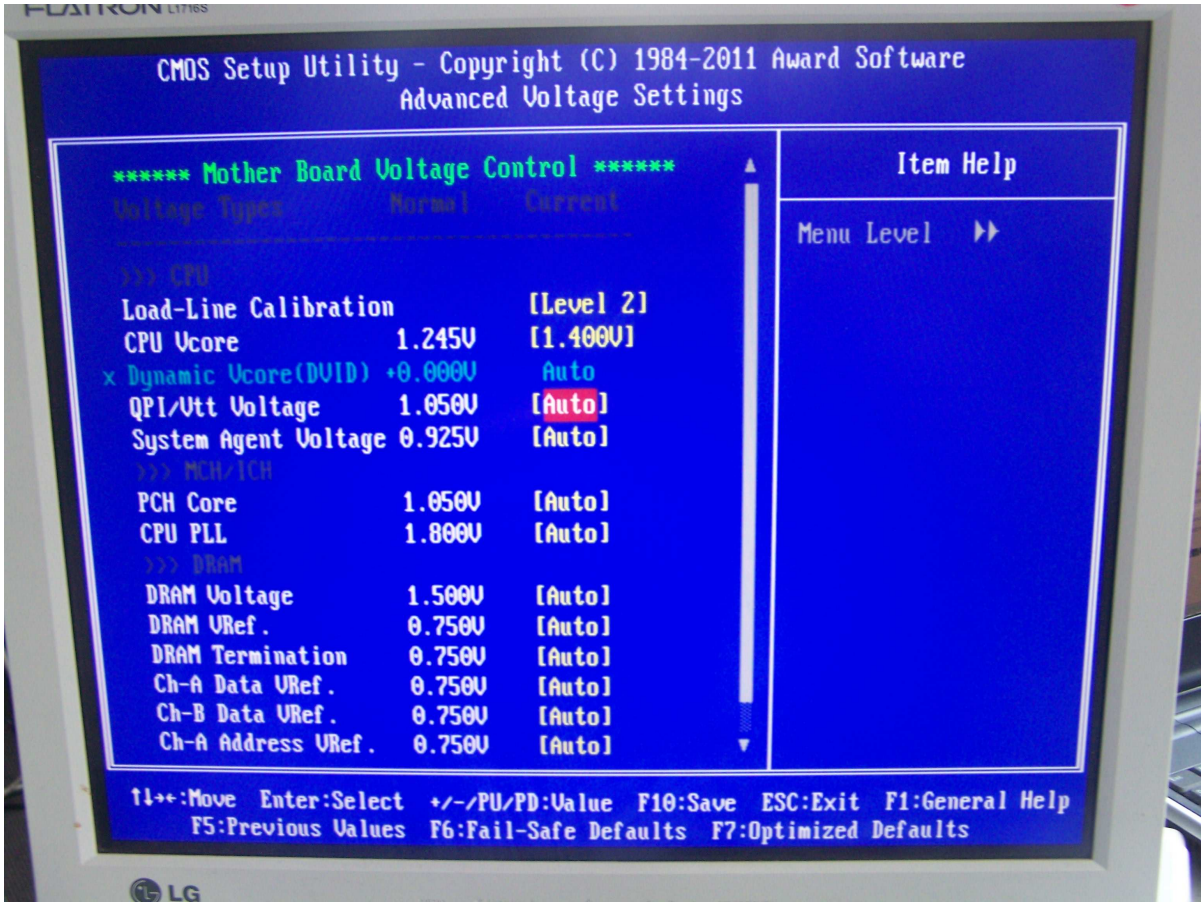
This time, we are not letting windows control how fast the CPU is going, we are doing it ourselves. After you have turned everything off, it should look like this:



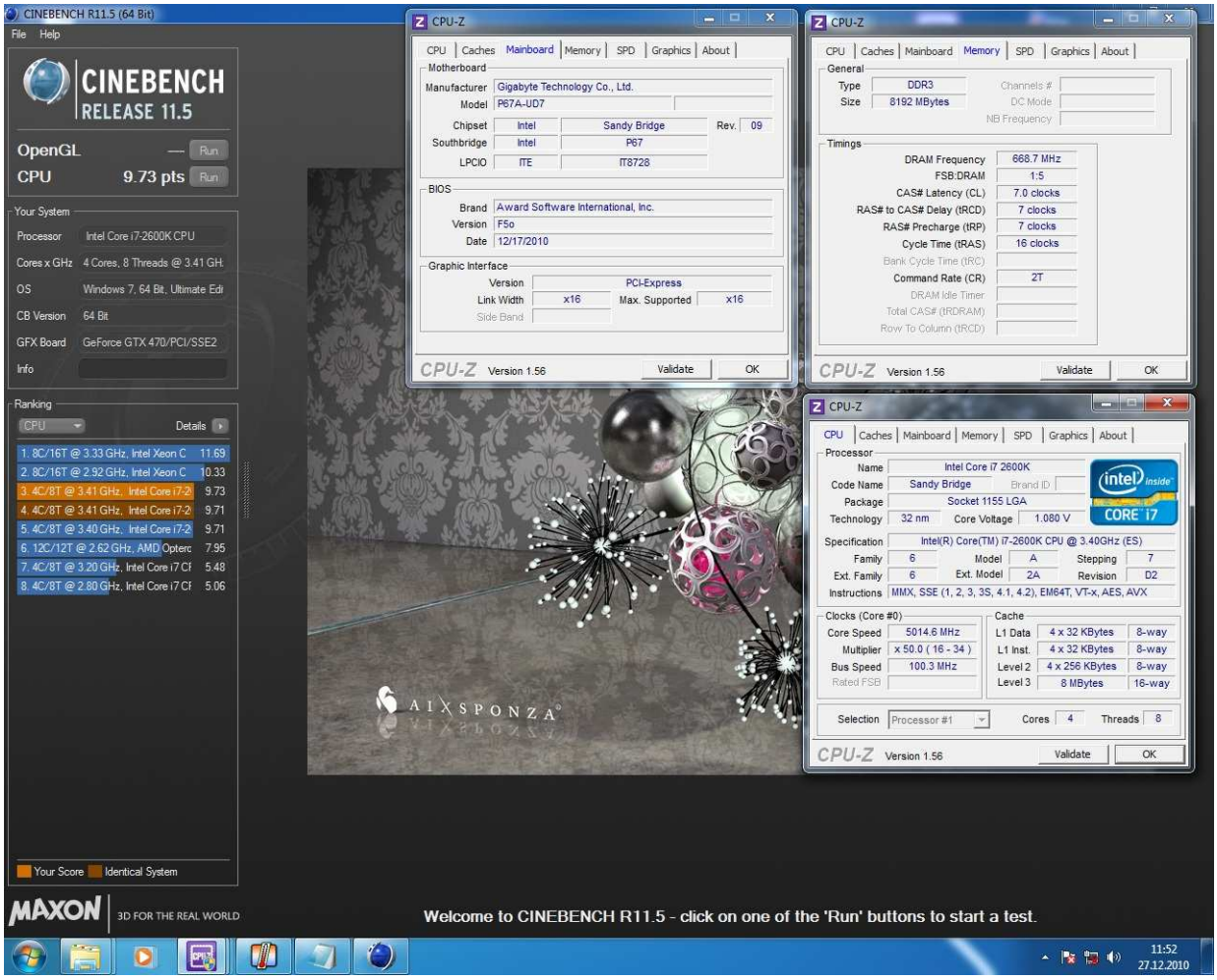
Now we start raising the clock speed by lifting that multiplier higher and higher. Take small steps to be sure, and test each time to make sure you have no stability or heat issues. If the CPU is unstable but not too hot, you can go to the voltage screen and raise the voltage a bit. We also turn on Load Line Calibration to level 2, so the voltage will stay stable, even when the CPU is under stress. Again, baby steps, keep testing, and be patient.

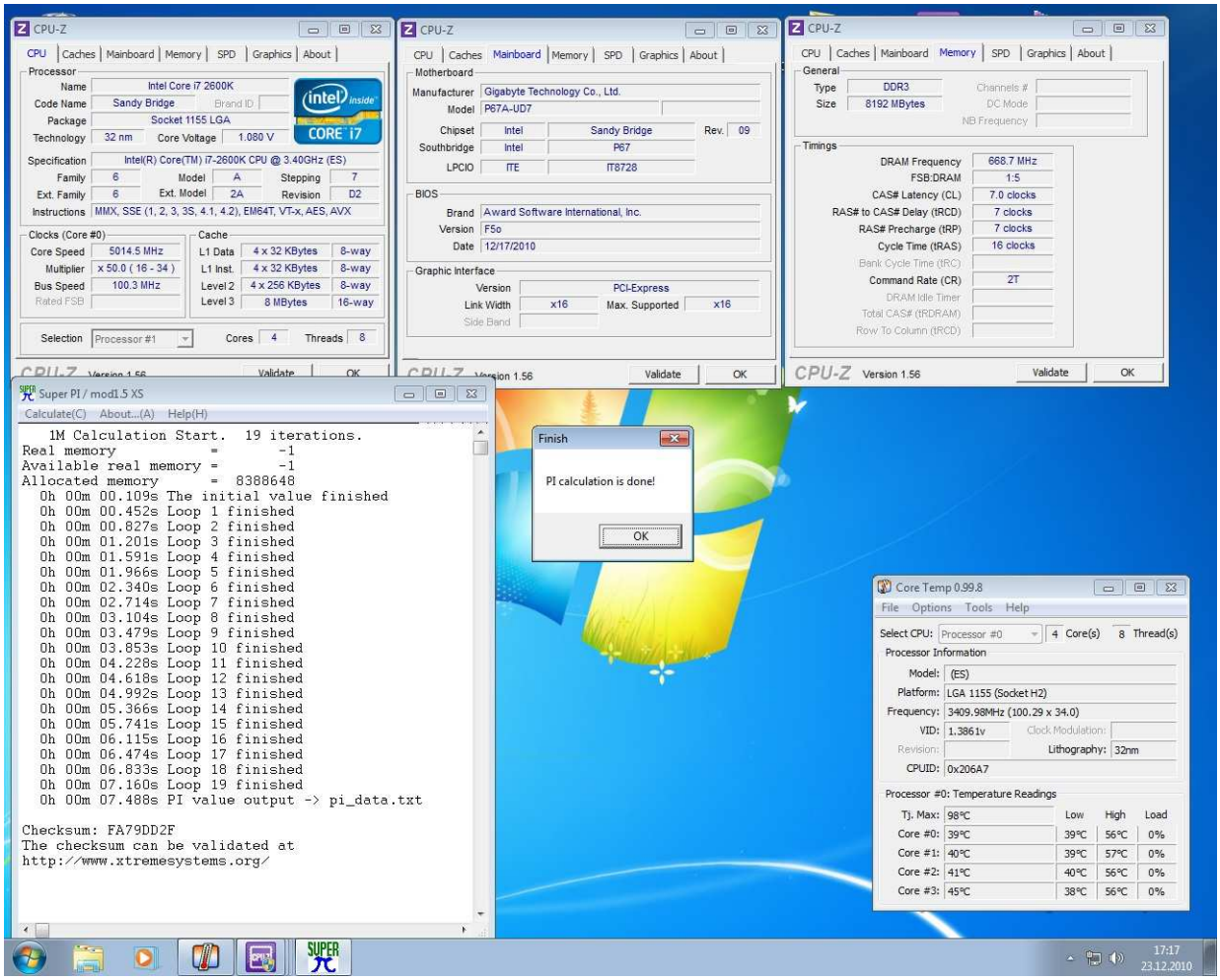
After a while, you will find the personal maximum of your setup. In my case, I ended up on 5.0GHz, with 1,4V on the vCore and everything else on automatic:

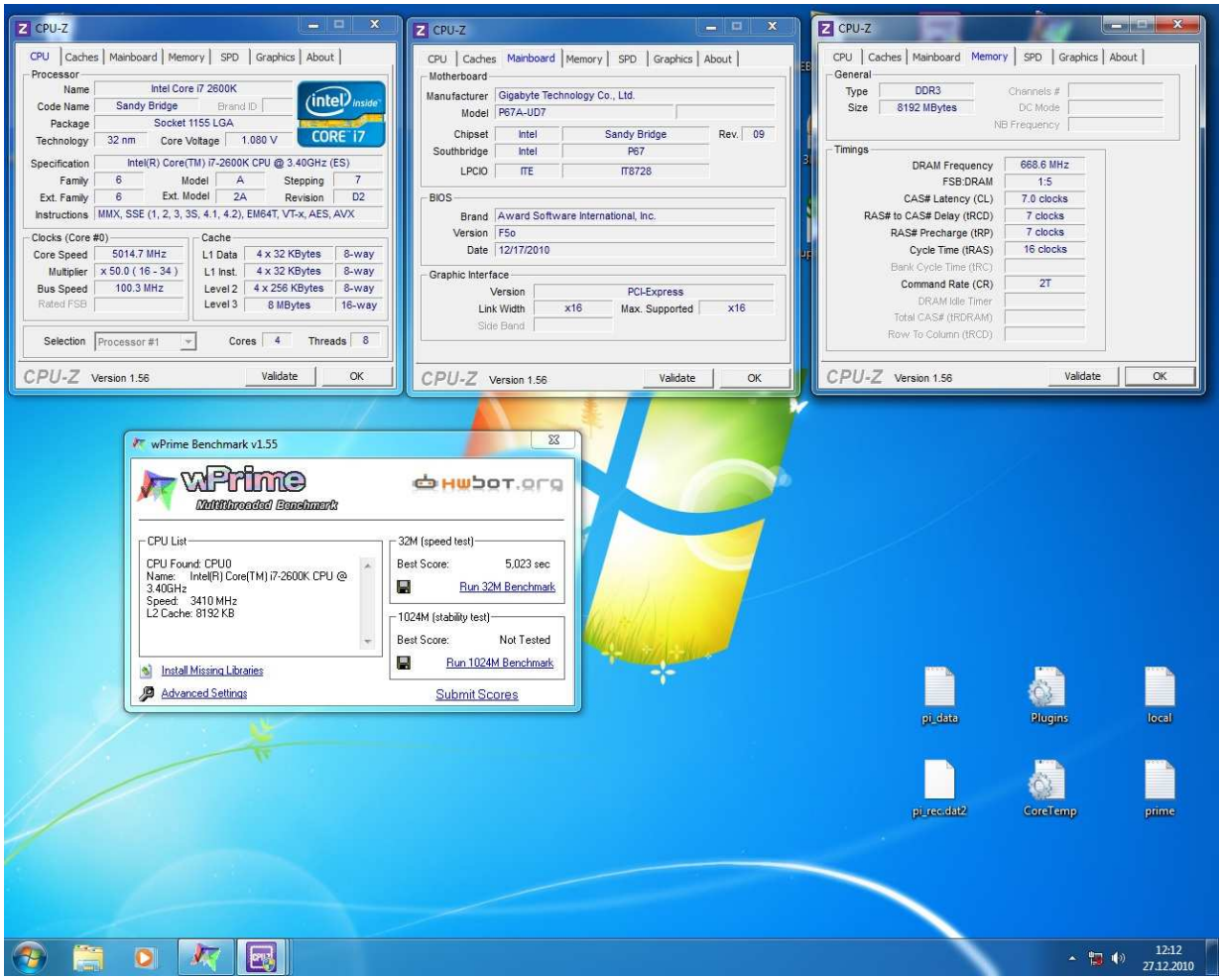



CMOS Setup Utility - Copyright (C) 1984-2011 Award Software
Advanced Voltage Settings
****** Mother Board Voltage Control ******
Voltage Types Normal Current
>>> CPU
Load-Line Calibration [Level 2]
CPU Vcore 1.245V [1.400V]
x Dynamic Vcore(DVID) +0.000V Auto
QPI/Vtt Voltage 1.050V [Auto]
System Agent Voltage 0.925V [Auto]
>>> MCH/ICH
PCH Core 1.050V [Auto]
CPU PLL 1.800V [Auto]
>>> DRAM
DRAM Voltage 1.500V [Auto]
DRAM VRef. 0.750V [Auto]
DRAM Termination 0.750V [Auto]
Ch-A Data VRef. 0.750V [Auto]
Ch-B Data VRef. 0.750V [Auto]
Ch-A Address VRef. 0.750V [Auto]
Item Help
Menu Level
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults
LG

Going back to windows, the results were great to see!




CPU-Z
CPU | Caches | Mainboard | Memory | SPD | Graphics | About
Processor
Name Intel Core i7 2600K
Code Name Sandy Bridge
Package Socket 1155 LGA
Technology 32 nm
Core Voltage 1.080 V
Specification Intel(R) Core(TM) i7-2600K CPU @ 3.40GHz (ES)
Family 6
Model A
Stepping 7
Ext. Family 6
Ext. Model 2A
Revision D2
Instructions MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES, AVX
Clocks (Core #0)
Core Speed 5014.5 MHz
Multiplier x 50.0 (16 - 34)
Bus Speed 100.3 MHz
Rated FSB
Cache
L1 Data 4 x 32 KBytes 8-way
L1 Inst. 4 x 32 KBytes 8-way
Level 2 4 x 256 KBytes 8-way
Level 3 8 MBytes 16-way
Selection Processor #1
Cores 4
Threads 8
Validate
OK
Motherboard
Manufacturer Gigabyte Technology Co., Ltd.
Model P67A-UD7
Chipset Intel Sandy Bridge Rev. 09
Southbridge Intel P67
LPCIO ITE IT8728
BIOS
Brand Award Software International, Inc.
Version F5o
Date 12/17/2010
Graphic Interface
Version PCI-Express
Link Width x16
Max. Supported x16
Side Band
CPU-Z Version 1.56
General
Type DDR3
Size 8192 MBytes
Channels #
DC Mode
NB Frequency
Timings
DRAM Frequency 668.7 MHz
FSB:DRAM 1:5
CAS# Latency (CL) 7.0 clocks
RAS# to CAS# Delay (tRCD) 7 clocks
RAS# Precharge (tRP) 7 clocks
Cycle Time (tRAS) 16 clocks
Bank Cycle Time (tRC)
Command Rate (CR) 2T
DRAM Idle Timer
Total CAS# (tRDRAM)
Row To Column (tRCD)
Super PI / mod1.5 XS
Calculate(C) About...(A) Help(H)
1M Calculation Start. 19 iterations.
Real memory = -1
Available real memory = -1
Allocated memory = 8388648
0h 00m 00.109s The initial value finished
0h 00m 00.452s Loop 1 finished
0h 00m 00.827s Loop 2 finished
0h 00m 01.201s Loop 3 finished
0h 00m 01.591s Loop 4 finished
0h 00m 01.966s Loop 5 finished
0h 00m 02.340s Loop 6 finished
0h 00m 02.714s Loop 7 finished
0h 00m 03.104s Loop 8 finished
0h 00m 03.479s Loop 9 finished
0h 00m 03.853s Loop 10 finished
0h 00m 04.228s Loop 11 finished
0h 00m 04.618s Loop 12 finished
0h 00m 04.992s Loop 13 finished
0h 00m 05.366s Loop 14 finished
0h 00m 05.741s Loop 15 finished
0h 00m 06.115s Loop 16 finished
0h 00m 06.474s Loop 17 finished
0h 00m 06.833s Loop 18 finished
0h 00m 07.160s Loop 19 finished
0h 00m 07.488s PI value output -> pi_data.txt
Checksum: FA79DD2F
The checksum can be validated at
http://www.xtremesystems.org/
Finish
PI calculation is done!
OK
Core Temp 0.99.8
File Options Tools Help
Select CPU: Processor #0
4 Core(s) 8 Thread(s)
Processor Information
Model: (ES)
Platform: LGA 1155 (Socket H2)
Frequency: 3409.98MHz (100.29 x 34.0)
VID: 1.3861v
Clock Modulation:
Revision:
Lithography: 32nm
CPUID: 0x206A7
Processor #0: Temperature Readings
Tj. Max: 98°C
Low High Load
Core #0: 39°C 39°C 56°C 0%
Core #1: 40°C 39°C 57°C 0%
Core #2: 41°C 40°C 56°C 0%
Core #3: 45°C 38°C 56°C 0%
17:17
23.12.2010

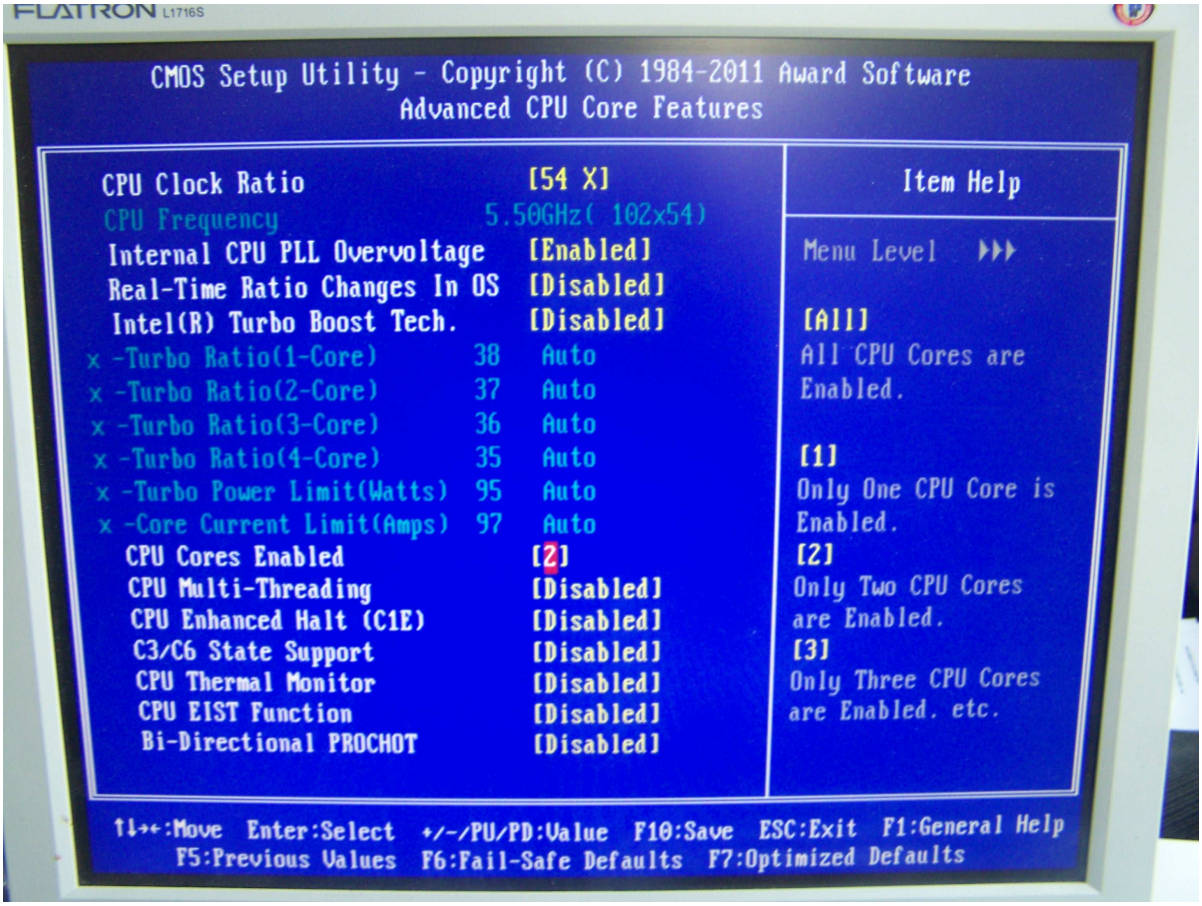


Stage 3: Benchmarking

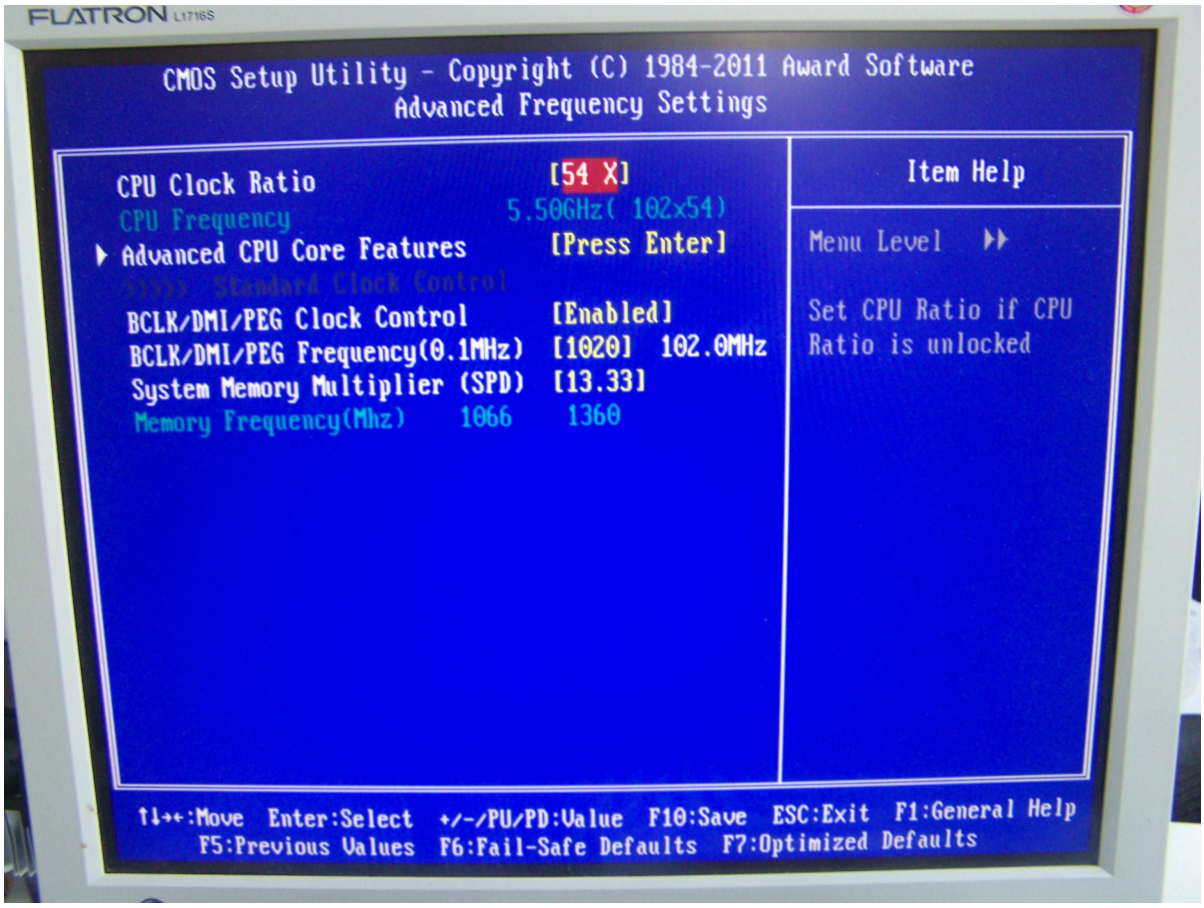
If you are like many others, you have now caught the overclocking bug: you want to see how high it is possible to go with this CPU! This stage is not for the weakhearted, because there is a very real chance that your CPU will be burned. Let me repeat that just to make sure: there is a very real chance that you will break your CPU if you push it to the speeds of stage 3. Make sure you have VERY good cooling, keep watching the temperatures, and don't go too high with any of the voltages. Baby steps, keep testing and read the different online forums where others have made similar attempts. This part of the guide is not to advise you to do this, only to show you that IF you want to do it, our boards can handle it and will help you get the best possible results!

Because of limited time, I could only focus on one benchmark: SuperPi

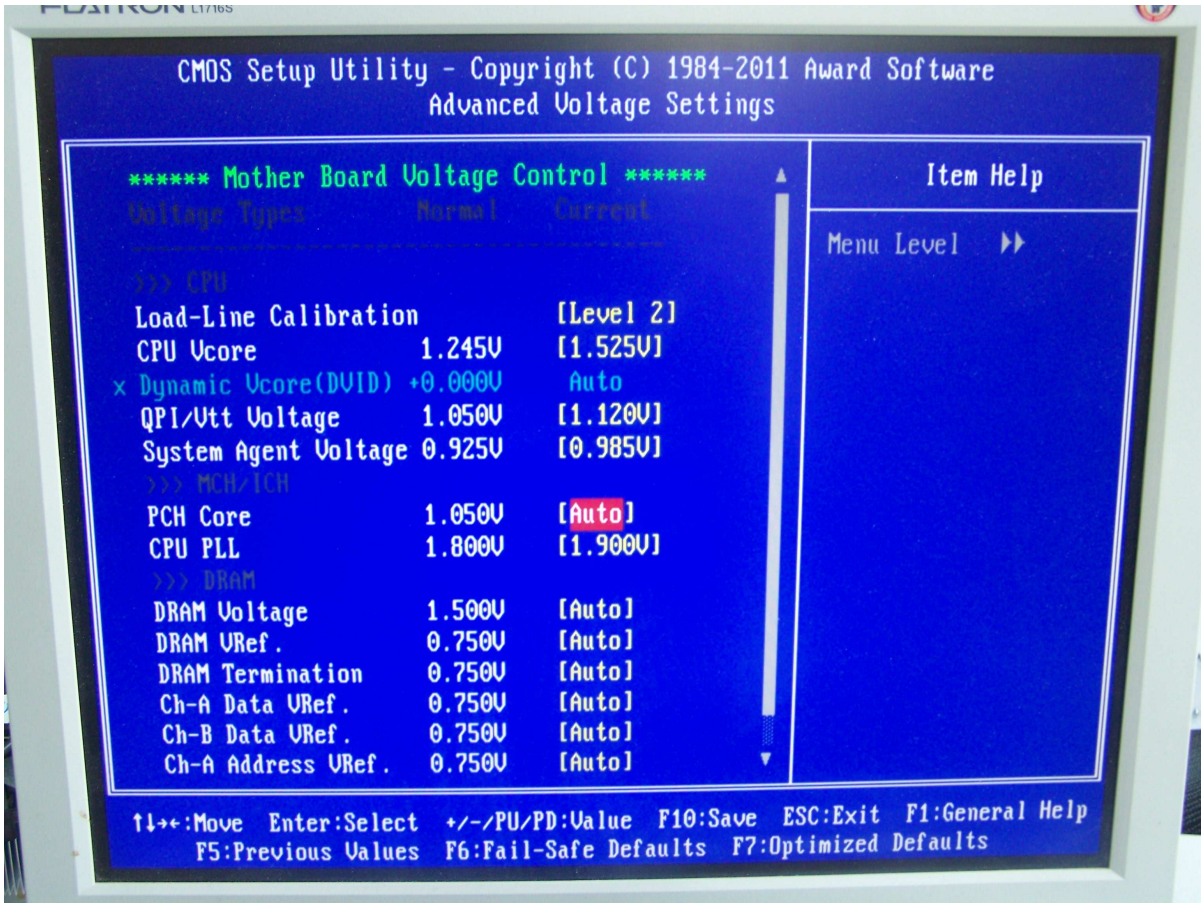
Because this benchmark only uses one core, Hyperthreading and 2 cores were turned off. The CPU now uses it's two best cores, and turns the other two off.



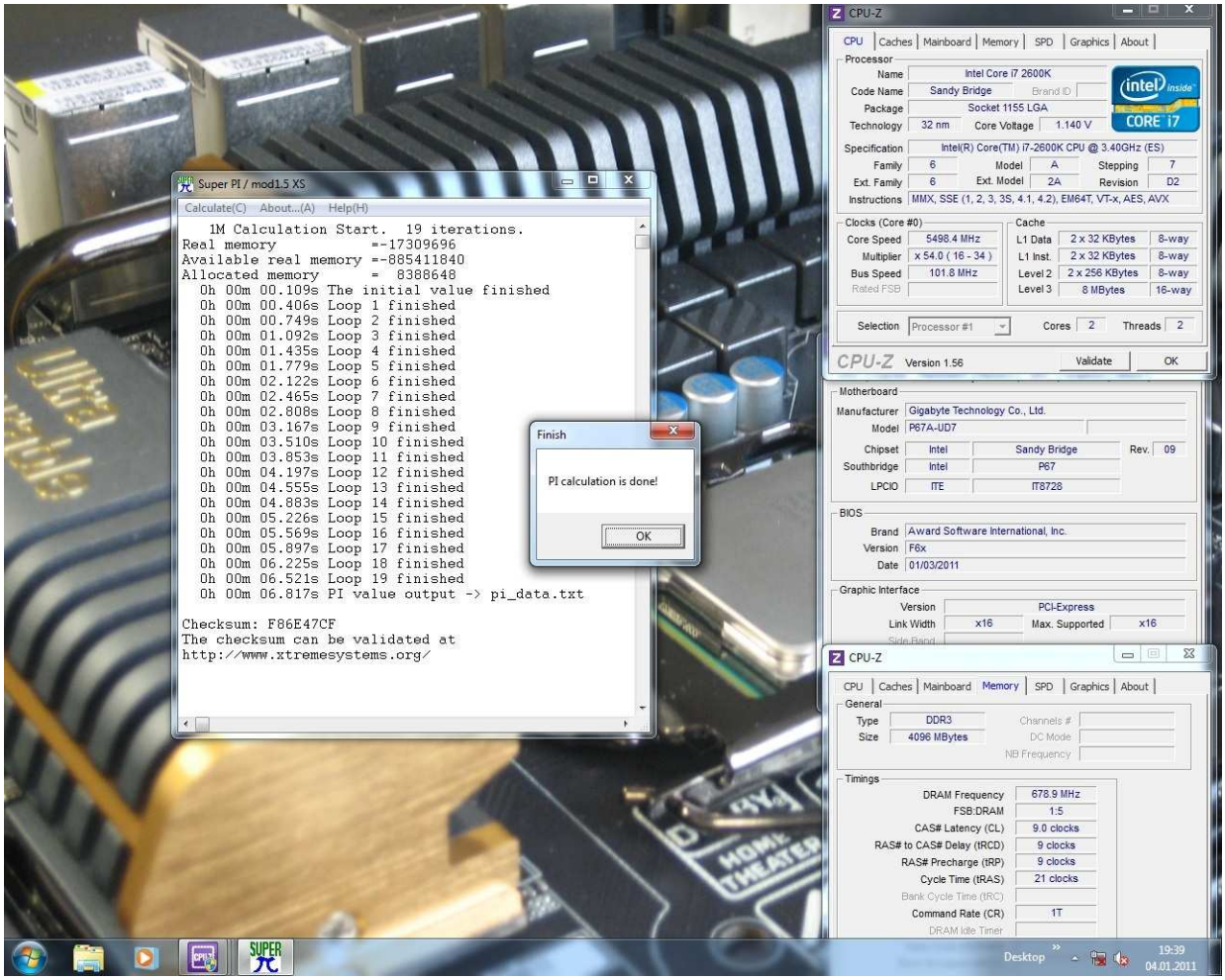
We changed the BCLK to 102MHz for that last little bit of speed, giving a fantastic 5,5GHz clockspeed.



To reach these lofty heights, we needed a lot of voltage!



All the invested time and the risk was worth it though. We were able do a full run of SuperPi and save the screenshot for prosperity. The “under 7 seconds club” used to be a very small group, but I suspect a lot more people will join soon! Can you beat our score?


Super PI / mod1.5 XS
Calculate(C) About...(A) Help(H)
1M Calculation Start. 19 iterations.
Real memory =-17309696
Available real memory =-885411840
Allocated memory = 8388648
0h 00m 00.109s The initial value finished
0h 00m 00.406s Loop 1 finished
0h 00m 00.749s Loop 2 finished
0h 00m 01.092s Loop 3 finished
0h 00m 01.435s Loop 4 finished
0h 00m 01.779s Loop 5 finished
0h 00m 02.122s Loop 6 finished
0h 00m 02.465s Loop 7 finished
0h 00m 02.808s Loop 8 finished
0h 00m 03.167s Loop 9 finished
0h 00m 03.510s Loop 10 finished
0h 00m 03.853s Loop 11 finished
0h 00m 04.197s Loop 12 finished
0h 00m 04.555s Loop 13 finished
0h 00m 04.883s Loop 14 finished
0h 00m 05.226s Loop 15 finished
0h 00m 05.569s Loop 16 finished
0h 00m 05.897s Loop 17 finished
0h 00m 06.225s Loop 18 finished
0h 00m 06.521s Loop 19 finished
0h 00m 06.817s PI value output -> pi_data.txt
Checksum: F86E47CF
The checksum can be validated at
http://www.xtremesystems.org/
Finish
PI calculation is done!
OK
CPU-Z
CPU Caches Mainboard Memory SPD Graphics About
Processor
Name Intel Core i7 2600K
Code Name Sandy Bridge Brand ID
Package Socket 1155 LGA
Technology 32 nm Core Voltage 1.140 V
Specification Intel(R) Core(TM) i7-2600K CPU @ 3.40GHz (ES)
Family 6 Model A Stepping 7
Ext. Family 6 Ext. Model 2A Revision D2
Instructions MMX, SSE (1, 2, 3, 3S, 4.1, 4.2), EM64T, VT-x, AES, AVX
Clocks (Core #0)
Core Speed 5498.4 MHz
Multiplier x 54.0 (16 - 34)
Bus Speed 101.8 MHz
Rated FSB
Cache
L1 Data 2 x 32 KBytes 8-way
L1 Inst. 2 x 32 KBytes 8-way
Level 2 2 x 256 KBytes 8-way
Level 3 8 MBytes 16-way
Selection Processor #1 Cores 2 Threads 2
CPU-Z Version 1.56 Validate OK
Motherboard
Manufacturer Gigabyte Technology Co., Ltd.
Model P67A-UD7
Chipset Intel Sandy Bridge Rev. 09
Southbridge Intel P67
LPCIO ITE IT8728
BIOS
Brand Award Software International, Inc.
Version F6x
Date 01/03/2011
Graphic Interface
Version PCI-Express
Link Width x16 Max. Supported x16
CPU-Z
CPU Caches Mainboard Memory SPD Graphics About
General
Type DDR3 Channels #
Size 4096 MBytes DC Mode
NB Frequency
Timings
DRAM Frequency 678.9 MHz
FSB:DRAM 1:5
CAS# Latency (CL) 9.0 clocks
RAS# to CAS# Delay (tRCD) 9 clocks
RAS# Precharge (tRP) 9 clocks
Cycle Time (tRAS) 21 clocks
Bank Cycle Time (tRC)
Command Rate (CR) 1T
DRAM Idle Timer
Desktop
19:39
04.01.2011