After Intel launched the Series 50 chipsets and Lynnfield and Clarkdale processors for desktops in 2009, platforms for LGA1156 processors have since become the focus of worldwide power users. After another year pf further research, Intel revolutionized again the desktop platforms by launching the brand new platform code-named Sandy Bridge, which included both the Series 60 chipsets and core processors. MSI thus launched the next-gen Intel mainboards for consumers to experience these new desktop products from Intel.

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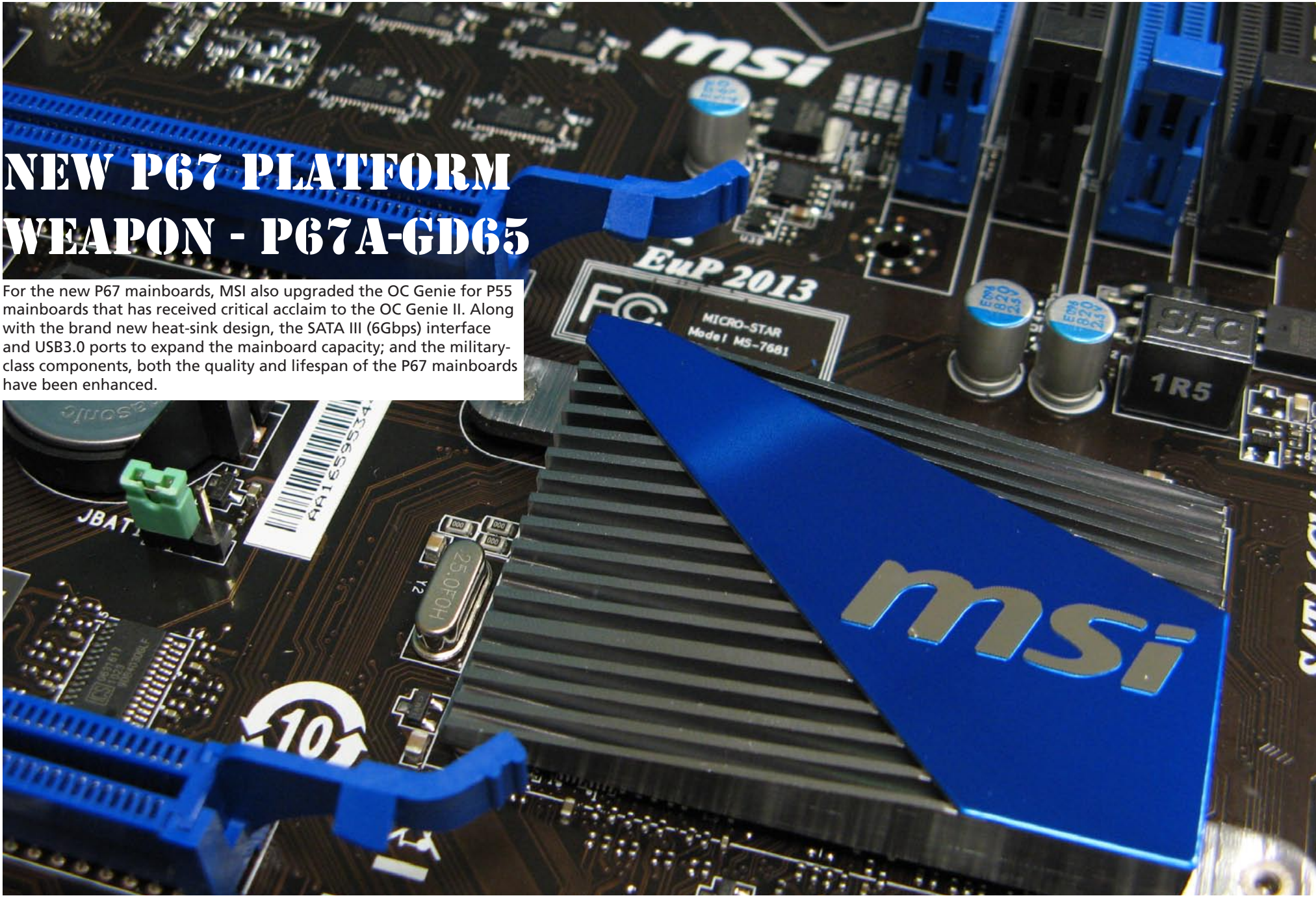
NOTE
The function, specification, data and pictures provided by this guidebook is only for reference. Please refer to the actual content through the official launched product.

NEW P67 PLATFORM WEAPON - P67A-GD65

For the new P67 mainboards, MSI also upgraded the OC Genie for P55 mainboards that has received critical acclaim to the OC Genie II. Along with the brand new heat-sink design, the SATA III (6Gbps) interface and USB3.0 ports to expand the mainboard capacity; and the military-class components, both the quality and lifespan of the P67 mainboards have been enhanced.



SOME OC INFO ABOUT NEW P67 PLATFORM

Despite design and architectural similarities between the Intel Series 60 chipsets for the brand new LGA1155 processors and the previous Series 50 chipsets for LGA1156 processors, none of them are compatible. In addition to the integrated GPU, the Sandy Bridge is equipped with more demanding OC restrictions. That is to say, it is less flexible than any LGA1156 processors.

OC ? You need K SKU CPU

First, Intel has restricted base clock OC of Sandy Bridge processors, and the average BCLK OC range is about 10%. Given that the default BCLK of the Sandy Bridge is 100MHz, the OC range will fall within 110MHz. When compared with the processors of previous versions, the range is far less. In other words, we can only adjust the CPU ratio (multiplier) to run OC on the Sandy Bridge processors, and the K series processors without ratio block will surely be the primary choice for OC power users.

Sandy Bridge CPU OC Ability Comparison				
	K SKU	i7	i5	i3
Base Clock	△	△	△	△
CPU Ratio	○	△	△	×
GPU Clock	○	○	○	○

△=Adjustable at a limited range.

Chipsets OC Limited

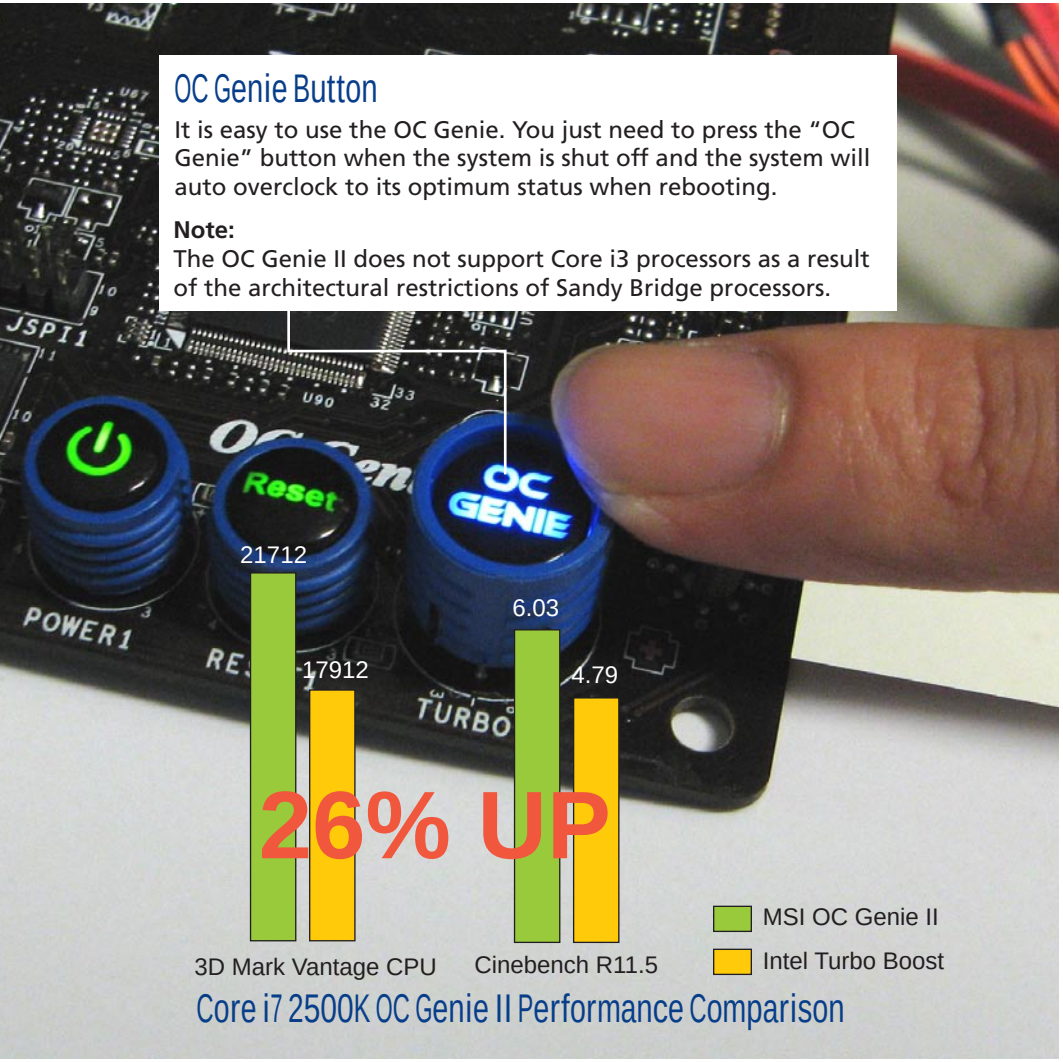
Apart from the range limit of processors, the design of the Series 60 chipsets also differs. Although the OC features of the P55 and H55 chipsets are similar (depending on the mainboard design), it is necessary for consumers to carefully select the Series 60 chipsets in order to run OC on their systems. Despite the fact that the GPU is integrated with all Sandy Bridge processors, users are advised to choose the K-series processors and P67 mainbaords in order to exert the power of OC. However, when one wants to run OC on the GPU integrated with the processors, the H67 platforms will be the only choice. Simply speaking, it is impossible to run GPU OC on the P67 platforms or CPU OC on the H67 platforms.

Sandy Bridge Platform OC Ability Comparison		
	P67	H67
Base Clock	△	×
CPU Ratio	○	×
GPU Clock	×	○

△=Adjustable at a limited range.

NEXT GENERATION - OC GENIE II

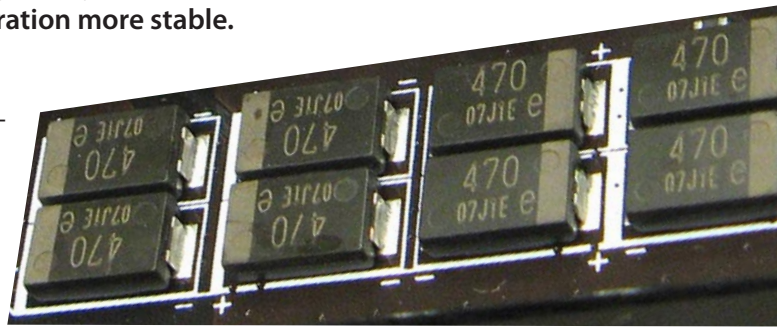
Although Intel has imposed various OC restrictions on the Sandy Bridge platform, the OC Genie button is still equipped on the mainboards for this platform. In fact, it is the new-gen OC Genie II from MSI. Also equipped with the auto optimization and quick hardware OC features, the OC Genie II can automatically optimize the CPU Multiplier, CPU VCore, Memory Ratio and Memory Voltage of Core i7/i5 processors for beginners to enjoy the greater performance delivered by the Intel Turbo Boost in the simplest and fastest manner.



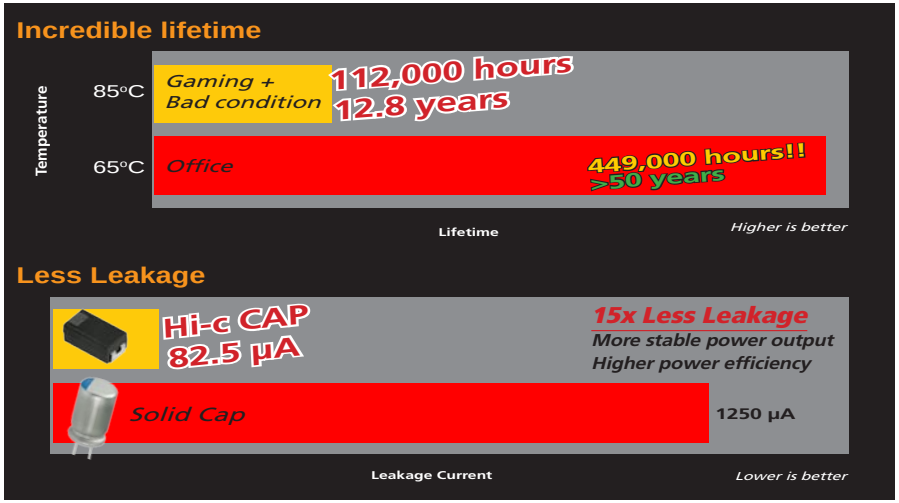
MILITARY CLASS MATERIALS

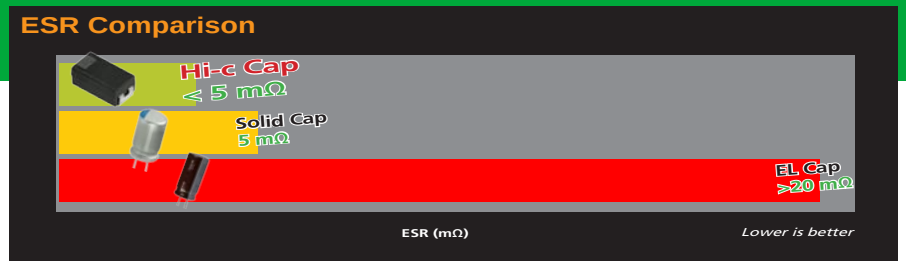
Continuing the premium-quality material design tradition, apart from delivering a longer lifespan, the MSI P67A-GD65 mainboard makes OC operation more stable.

Hi-C CAP



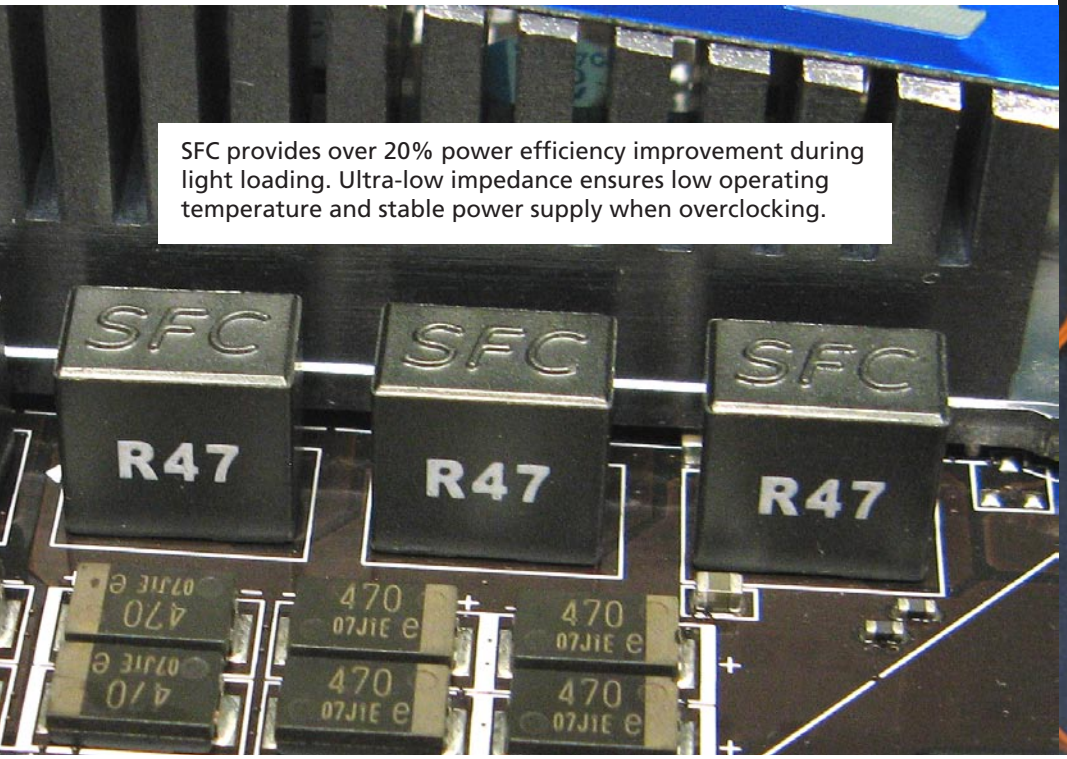
Hi-C CAP, Highly-Conductive Polymerized Capacitor, uses high electric conduction polymer as internal electrolyte, featuring the small size and high capacity, which are commonly used in many electronic products such as laptop computers, satellites and so on.
The main reason Hi-C CAP can be applied in high tech and precise machine is that the special Core brings low ESR (Equivalent Series Resistance), low electric leaks (Leakage Current) and larger adaptation range of ambient temperature scope. High ESR and Leakage current cause not only unstable system but also the life cycle reduction of spare part. The Hi-C CAP performance in ESR and Leakage current both surpass the present mainstream Solid CAP, not to say the obsolete EL CAP. Being as for the whole, Hi-C CAP stables the motherboard power output, enhances the power transference efficiency and has the adjustment function when Inrush Current (burst electric current) occurs. Naturally, the power loss is extremely low, brings the greatest superiority either in overclocking operation or life cycle.





SFC

To reach the lower power consumption, P67A-GD65's PWM adopt Green Choke design, SFC (Super Ferrite Choke), utilizing the latest material technology - iron core. The material's exclusive physical character allows SFC automatically to adjust the inductance value for optimal power efficiency based on the system's loading. During light loading such as surfing the net or running 2D operations, SFC can help provide up to a 20% improvement in power efficiency compared to a normal ferrite choke. For heavier loading such as playing 3D games, SFC's ultra-low impedance still helps to maintain a low operating temperature. Even when overclocking to the max, Super Ferrite Choke offers an incredibly stable supply of power. Clearly, SFC can satisfy every possible power demand and usage scenario.

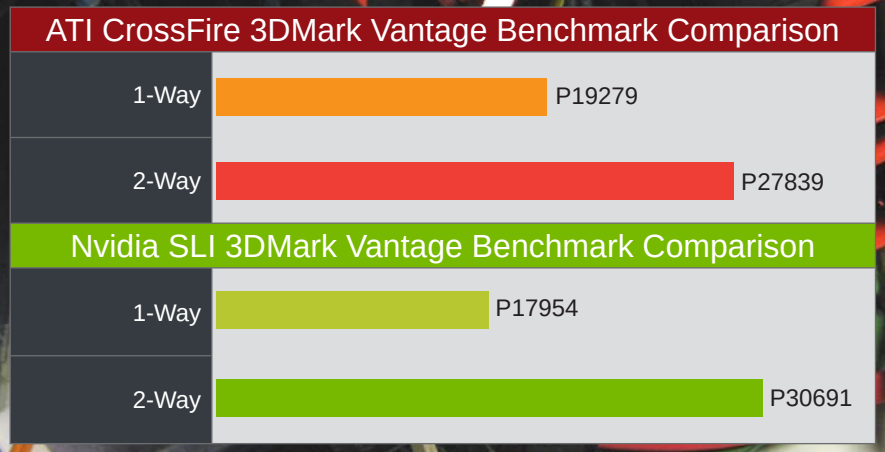


SFC provides over 20% power efficiency improvement during light loading. Ultra-low impedance ensures low operating temperature and stable power supply when overclocking.

MULTI-GRAPHICS CARDS GAMING DESIGN

The P67A-GD65 mainboard has two PCI-E X16 slots; except it may be installed the full two graphics cards for formidable multi-screen output, it also supports the amazing Nvidia SLI and AMD CrossFireX computing.

Multi-VGA cards system configuration	
Mainboard	P67A-GD65
BIOS	10H
CPU	Core i7 2600K D2
Memory	Corsair CMGTX3 DDR3-2400
Graphics Card	Nvidia GeForce GTX470, ATI Radeon HD5870
HDD	Intel SSDSA2MH080G2GN
PSU	XIGMATEK NRP-HC1001 1000W
OS	Windows 7 64bit RTM7600



OC NOTICE: COOLER CONFIGURATION

Well-controlled temperature is sure to enhance overclocking capability. The higher the CPU temperature rises, the higher risks of system instability and overclocking failure may cause. According to our clinical test, temperature of the boxed CPU fan of Intel may exceed 50 easily during OC usage due to its small-scale cooling design. That is why changing a high-efficiency CPU fan with better heat dissipation is recommend, radiation fan for instance, seems to be a better solution for both of CPU and PWM. Furthermore, if you intend to push your hardware to the limit, then CPU-LN2 would be the best choice of all so far.

Intel official boxed CPU fan
This is the original boxed LGA1155 CPU fan, and it's not suitable for overclocking due to its small-scale cooling design.

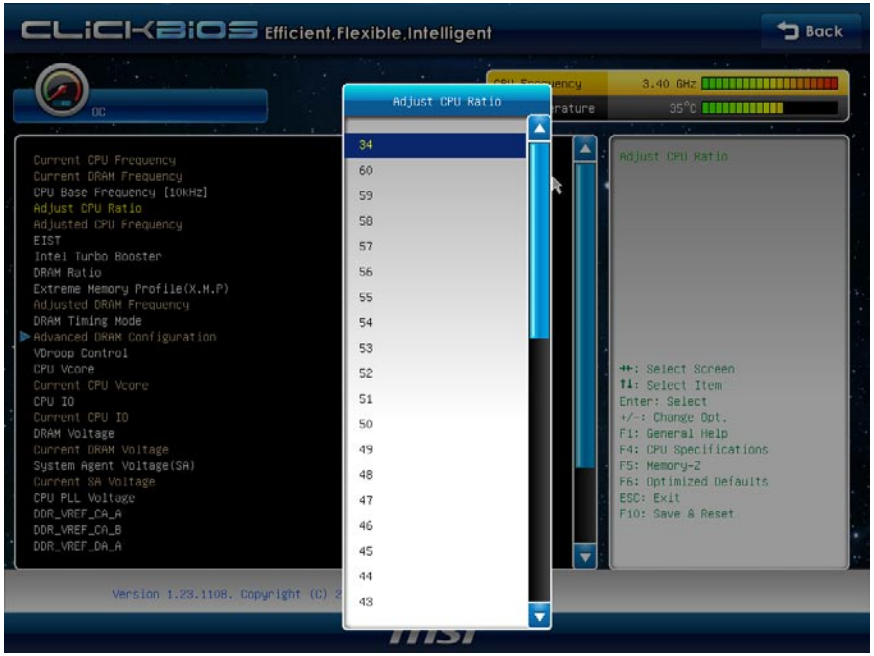
Better to use enhanced cooler set
The dissipation effect of the enhanced cooler set is better than that of the original factory fan.

The special design cooler set of overclocking
It takes the illustrated proprietary design cooler set to lower temperature and avoid system instability.

MANUAL OC OVERVIEW

All MSI Sandy Bridge mainboards are equipped with the latest UEFI BIOS technology, and the OC setup items are mostly found in the OC option in the main menu. Regardless of the differences in the user interface, both the name of options and the setup procedure of these options are similar to those of the previous MSI mainboards. Therefore, it is very easy for users to adapt to them.

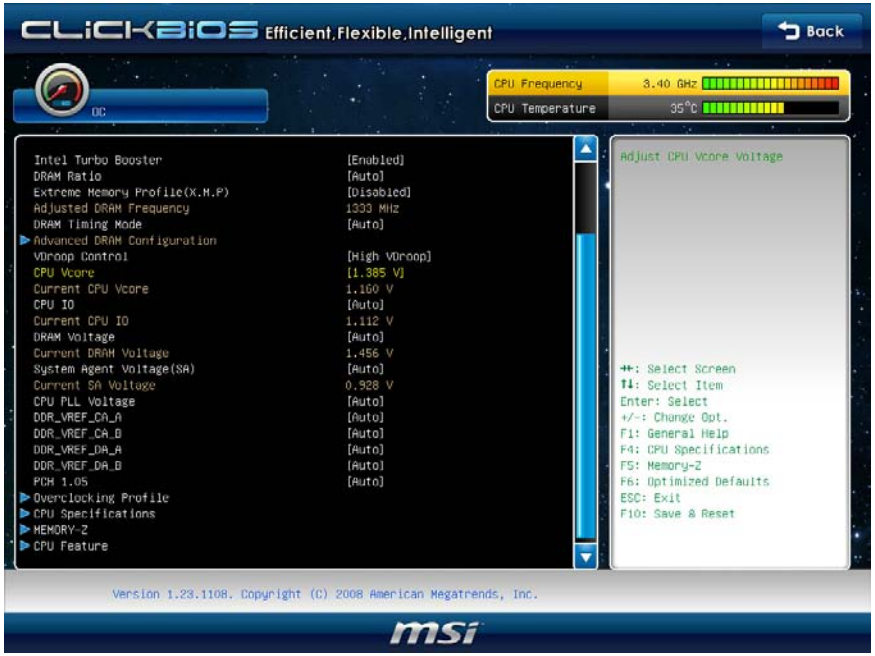
Frequency Setting



Due to the Base Frequency restrictions of the Sandy Bridge processors, users are advised to adjust the CPU Ratio while running frequency-related OC operations, while CPU Base Frequency is supportive. For example, when running memory OC, users can fine-tune the memory from DRAM Ratio. It is noteworthy that the unit for the Base Frequency is 10KHz.

Also, users were advised to shut down the Intel Turbo Boost when running OC manually. On the Sandy Bridge processors, however, users are advised to turn the Intel Turbo Boost in order to obtain the unexpectedly great OC effect.

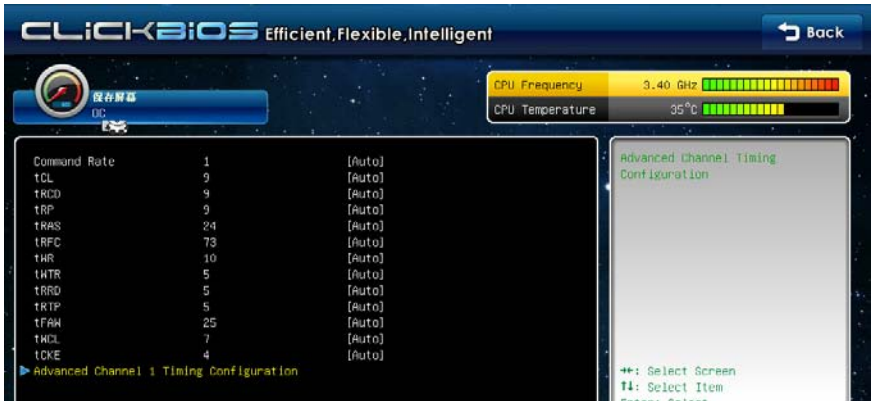
Voltage Setting



In overvoltage operations, the OC Genie II provides comprehensive items as in the previous generation for users to adjust. These items include: CPU Voltage, CPU IO Voltage (VTT), DRAM Voltage and System Agent Voltage. The CPU Voltage and IO Voltage are the two items related to CPU OC, and the DRAM Voltage and IO Voltage are the two associated with memory OC. When increasing voltage to enhance OC capability, it means the system will produce more heat and consume more energy. Therefore, users should pay attention to the thermal condition of various devices, and even replace the heat-sinks on the mainboard. When the CPU consumes more power, this will activate the protective mechanism built in the CPU to reduce CPU Ratio when system loading.

The VDroop Control option helps to correct the voltage drop while the CPU is under high-load operation. The VDroop setting does not affect the over-clocking capability of the CPU but indeed interferes with other overclocking settings. As a solution, users may need to adjust the voltage settings after tuning the VDroop. Given the high cooling efficiency of the cooler/heat sink, users are suggested to set the VDroop to"Low VDroop"to enhance system stability during heavy loading.

Advanced Memory Timing Setting



Users can assign different settings for particular channels of memory. This has the advantage of individual memory parameter optimization, even using the different memory specifications. When you set the detailed parameters, and don't know where to start with values, you can refer to the bottom of the Current memory values list in the gray font block to set the appropriate parameters for overclocking and not too far off the mark.

CPU Feature

Settings of devices built in the CPU are adjustable from the options in the CPU Features. With these options, users can set the Execute Disable Bit, Virtualization Tech, Power Technology and C State. The Long/Short Duration Power Limit is designed for users to adjust the CPU TDP wattage limit. These two settings are the key to control of the CPU Ratio when running OC in heavy loading.

OC ABILITY REFERENCE

Now, taking the P67A-GD65 mainboard with the Intel's latest Core i7 2600K CPU as an example, we will set Core Speed and Memory Frequency as over-clocking items to introduce some points and notices to users for reference.

Demo system configuration	
Motherboard	P67A-GD65
BIOS	V1.0H
CPU	Core i7 2600K D1
Memory	Corsair CMGTX3 DDR3-2400
Graphics Card	MSI Nvidia GeForce GTX470
HDD	Intel SSDSA2MH080G2GC
PSU	XIGMATEK NRP-HC1001 1000W
OS	Windows 7 64-bit Ultimate RTM 7600

Note: Although the BIOS is the V1.0H Beta edition, but the function will be added into the official edition.

Max CPU Core Speed

Learned from the LGA1156 platform experience, the Core i7 CPU's Core Speed can be overclocked to 4GHz approximately in air cooling condition. But by the promotion of the 32nm manufacture process, even the Core i7 2600K CPU has four built-in cores, it can reach 5GHz merely in air cooling condition; thus, attracting many overclockers.The key of the Core i7 2600K CPU is CPU Ratio.

Because it is the CPU Ratio unlocked K version, you can direct tune the CPU Ratio to raise the Core Speed despite the Base Clock and Dram Frequency. CPU Voltage and CPU IO Voltage are two major factors for voltage adjustment; certainly do not set them to excessively high values to avoid burning down the CPU or the motherboard.

Reference setting ~ 5000MHz

- CPU Voltage:1.375V
- CPU IO:Auto
- Base Clock:100MHz
- CPU Ratio:50×

Max Memory Frequency

Due to the limited BCLK OC range of the Sandy Bridge processors and the restrictions on memory ratio; e.g. the maximum ratio for 2600K is only 8 times. Therefore, the maximum range for memory OC will be around DDR3-2133; except with the support of Base Clock OC.

Thanks to the quality of DDR3 modules nowadays, as long as users buy better DDR3 modules, it will not be difficult to boost the memory frequency to DDR3-2133. Resembling the LGA1156 platform, the DRAM Voltage is the main item for adjusting CPU IO voltage. After changing the Base Frequency, it may be necessary to adjust the CPU Vcore and CPU IO Voltage.

Reference setting ~ DDR3-2133

- CPU IO Voltage:Auto
- RAM Voltage:1.652V
- RAM Ratio:8×

P67A-GD65 OC SETTING REFERENCE TABLE

Tuning Item	Default	Increment	Easy	Normal	Fun	Danger	Not Recommend
CPU Ratio	34	1	34~40	40~45	45~50	50~52	>52
CPU Vcore (V)	1.160	0.005	~1.3	1.3~1.4	1.4~1.5	1.5~1.6	>1.6
CPU IO Voltage (V)	1.112	0.0265	~1.2	1.25~1.3	1.3~1.45	1.45~1.5	>1.5
Memory Frequency (MHz)	DDR3-1333	Depends on DRAM Ratio	DDR3-1333~1600	DDR3-1600~2000	DDR3-2000~2133	>DDR3-2133	> DDR3-2300
RAM Voltage (V)	1.472	0.007	1.5~1.6	1.6~1.65	1.65~1.8	>1.8	>1.9

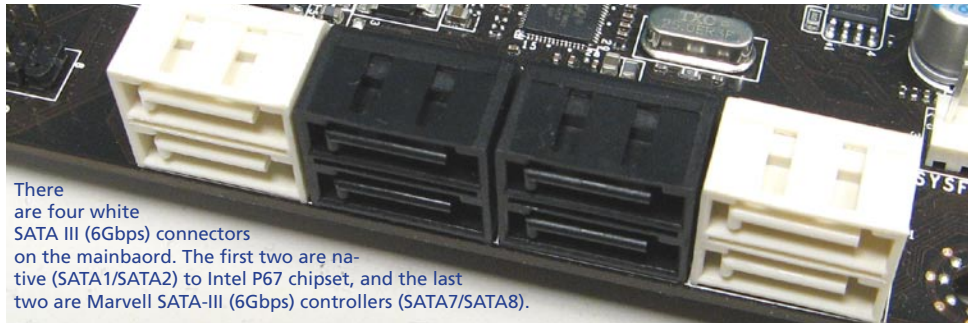
Note:

1. The reference value above is for Core i7 2600K D2 ver. Processor.
2. The condition is based on air cooling.
3. Increasing voltage may raise the success rate of overclocking as the risk of damage the CPU; thus,we suggest use the special design CPU cooler set to prevent the CPU from overheating.
4. Below voltage value would cause the damage of component while under air cooling.
   - CPU Voltage:1.6V
   - CPU I0 Voltage:1.5V
   - DRAM Voltage:1.9V

We suggest disable some item in BIOS,such as Green Power Phase Contral and OverSpeed Protection.

BUILD UP HIGHER BANDWIDTH WITH SATA 6Gb/s

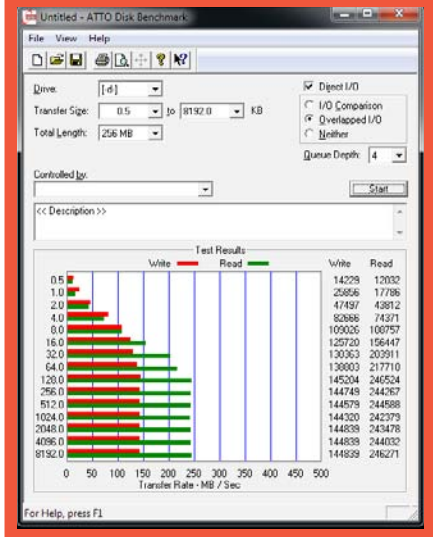
Considering user's requirement for massive data transmission, high data bandwidth has become an essential for the development of motherboard, and SATA 6Gb/s is probably the best solution for insufficient bandwidth at the present time.P67A-GD65 contains four SATA 6Gb/s ports that maximize data transmission bandwidth through the Intel P67 and Marvell SATA 6Gb/s controller chip. In terms of data transmission cable, SATA 6Gb/s hard disk and the previous generation, SATA 3Gb/s, share the same data cable, as well as the SATA power cable.



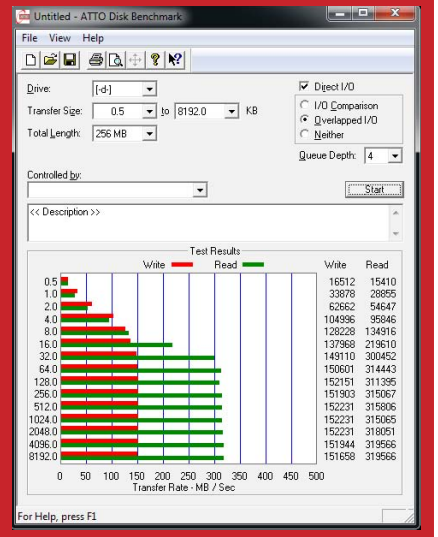
There are four white SATA III (6Gbps) connectors on the mainbaord. The first two are native (SATA1/SATA2) to Intel P67 chipset, and the last two are Marvell SATA-III (6Gbps) controllers (SATA7/SATA8).

SATA Performance Comparison

SATA 3Gb/s



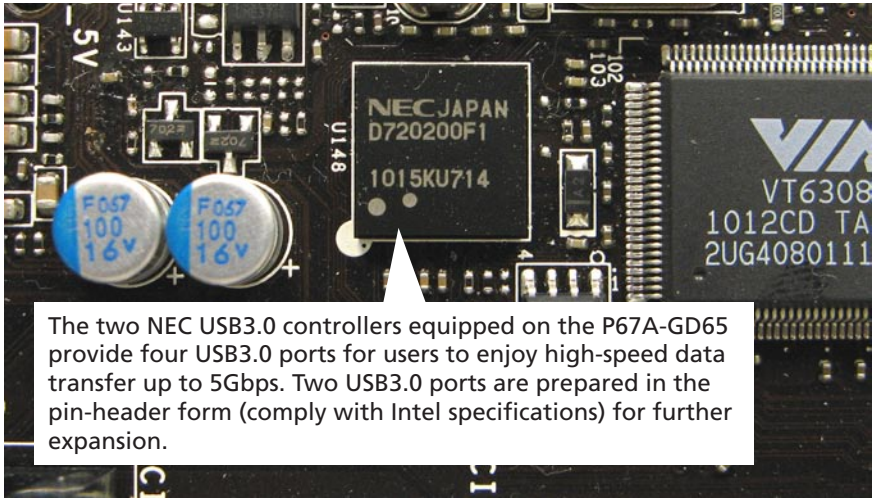
SATA 6Gb/s



To ensure the hard disk transmission rate is optimized, it is strongly recommended to use SATA 6Gb/s SSD. Even create a RAID 0 disk system with two hard disks that support SATA 6Gb/s.

SUPER SPEED USB

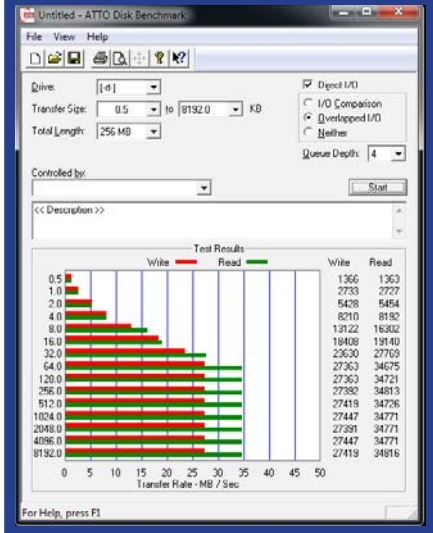
Although Intel did not include USB3.0 in the Sandy Bridge processors, it is equipped on the P67A-GD65 to provide high-speed data transfer up to 5Gbps. With two NEC controllers, the P67A-GD65 provides four USB3.0 ports, including two on the rear panel and two in the pin-header form for users to connect to either on the front panel or the add-on USB on the rear panel.



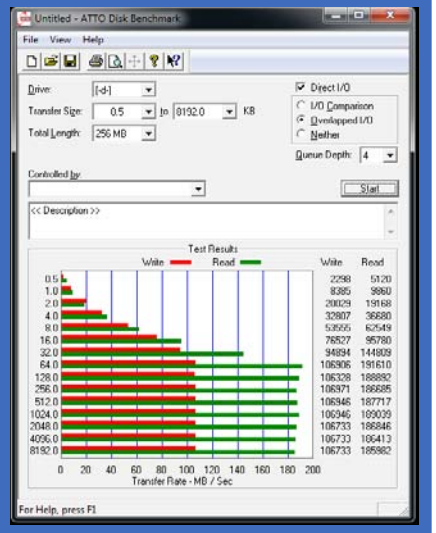
The two NEC USB3.0 controllers equipped on the P67A-GD65 provide four USB3.0 ports for users to enjoy high-speed data transfer up to 5Gbps. Two USB3.0 ports are prepared in the pin-header form (comply with Intel specifications) for further expansion.

USB Performance Comparison

USB2.0



USB3.0

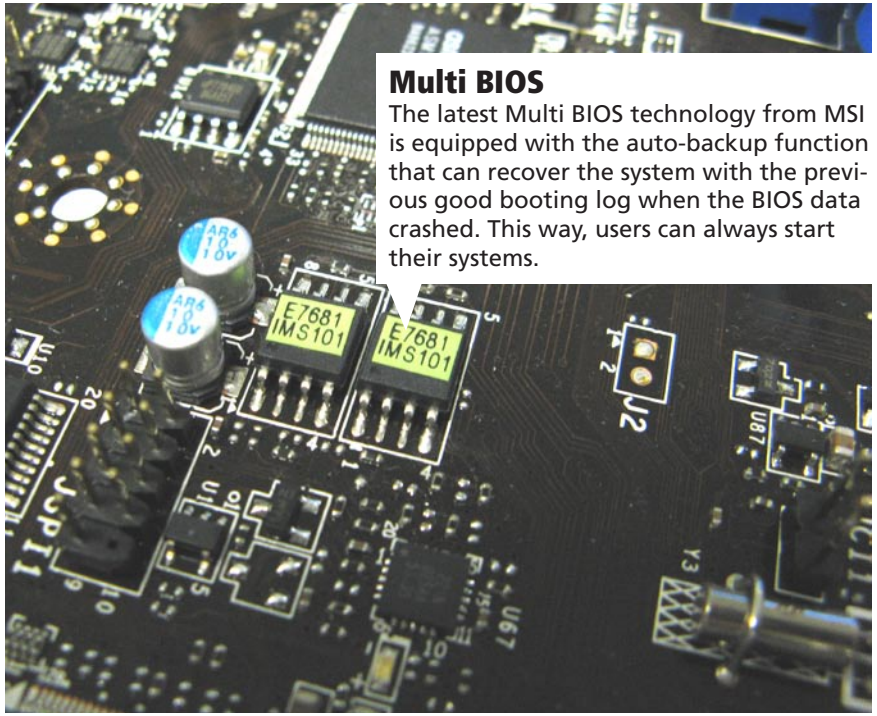


To ensure the hard disk transmission rate is optimized, it is strongly recommended to use USB3.0 SSD.

OTHER FEATURES ON P67A-GD65

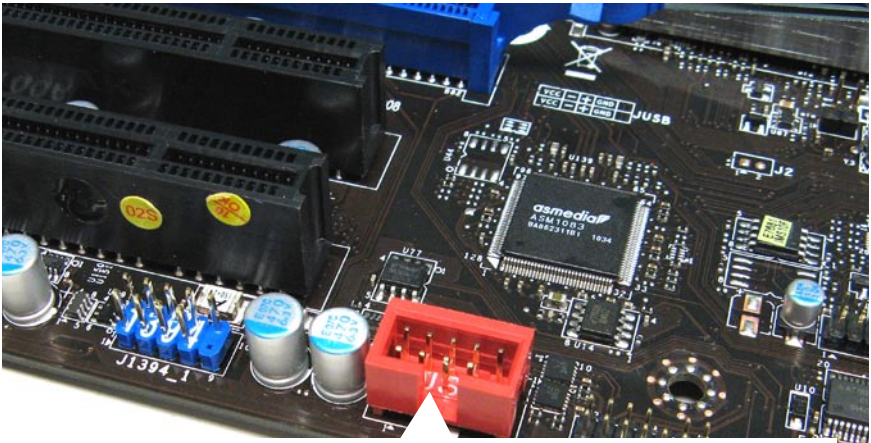
ClickBIOS

The GUI of UEFI BIOS technology makes BIOS setup a piece of cake and adds additional gaming and entertainment functions. Users can even change settings with a mouse.



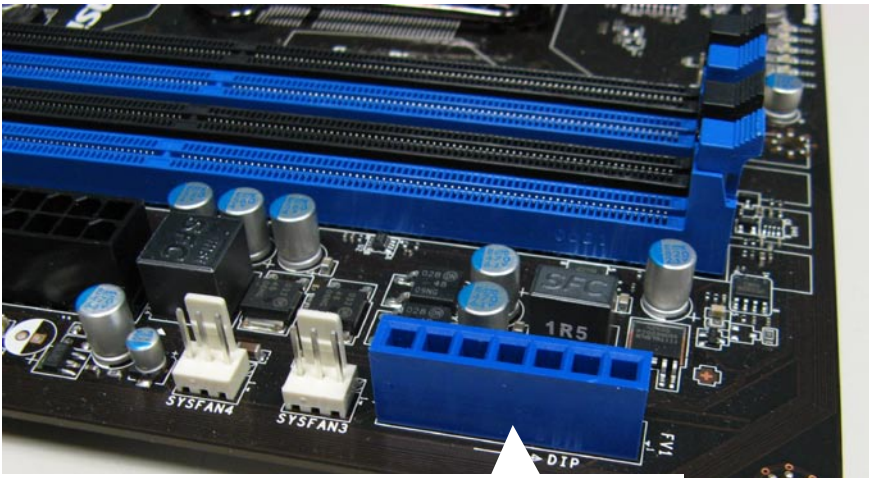
Multi BIOS

The latest Multi BIOS technology from MSI is equipped with the auto-backup function that can recover the system with the previous good booting log when the BIOS data crashed. This way, users can always start their systems.



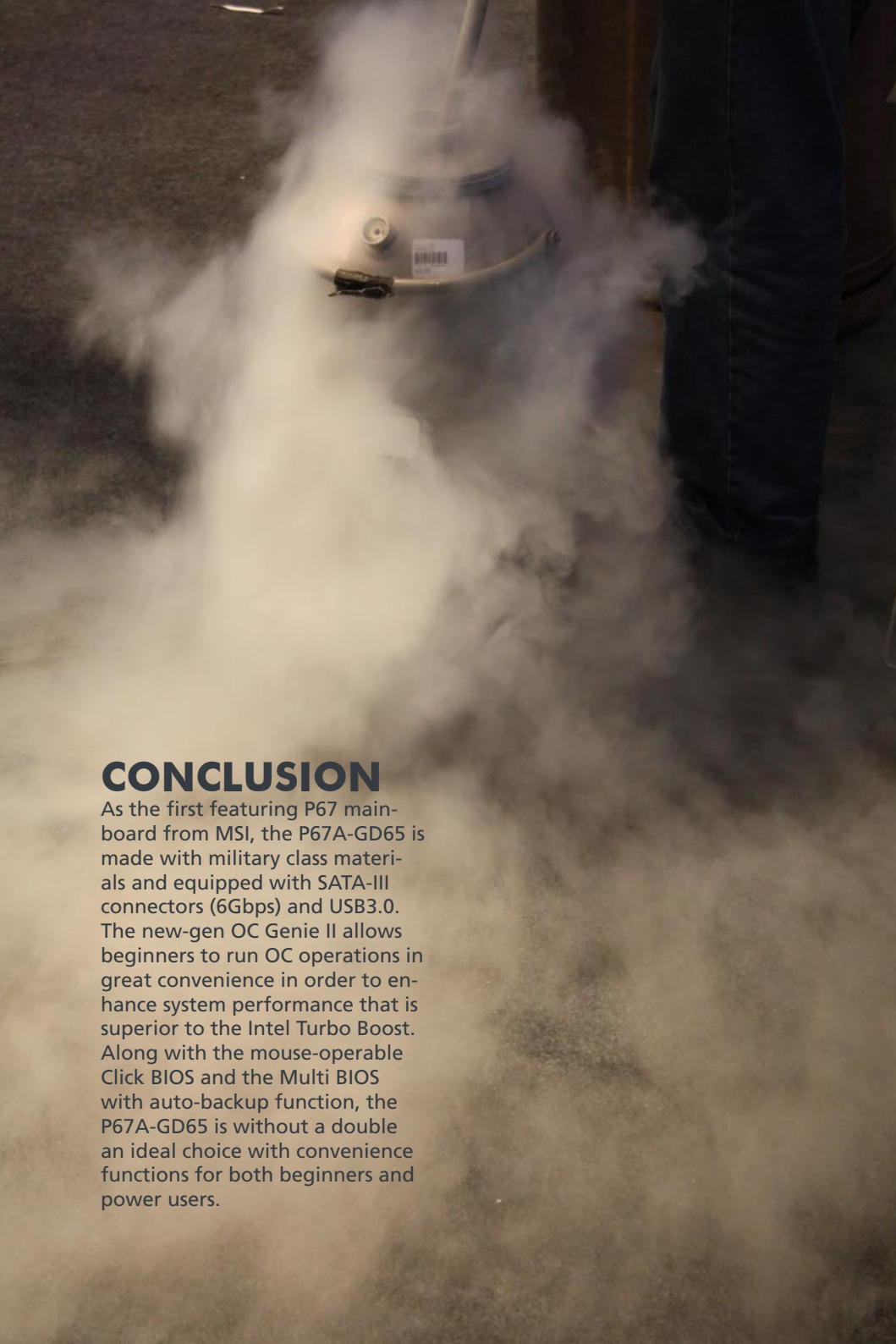
Super Charger

The first USB pin header on the P67A-GD65 supports the latest Super Charger which supplies high voltage for charging iPad or iPhone by automatically identifying the voltage requirements of the device connected to the port. Other ports are also equipped with the previous iCharger function. Therefore, it can be considered as an improved version of the iCharger (must be used along with the corresponding software).



V-Check Points

"V-Check Points" detects voltage for core components during overclocking activities. There are five measure points at the edge of this mainboard, allowing enthusiasts to check relevant voltage values through a multimeter.



CONCLUSION

As the first featuring P67 mainboard from MSI, the P67A-GD65 is made with military class materials and equipped with SATA-III connectors (6Gbps) and USB3.0. The new-gen OC Genie II allows beginners to run OC operations in great convenience in order to enhance system performance that is superior to the Intel Turbo Boost. Along with the mouse-operable Click BIOS and the Multi BIOS with auto-backup function, the P67A-GD65 is without a double an ideal choice with convenience functions for both beginners and power users.