

Quelle: <http://www.techspot.com/review/395-asrock-z68-extreme4/>

## Asrock Z68 Extreme4 (Intel Z68) Motherboard Review

By [Steven Walton](#) on May 17, 2011 - Editor: [Matthew DeCarlo](#)

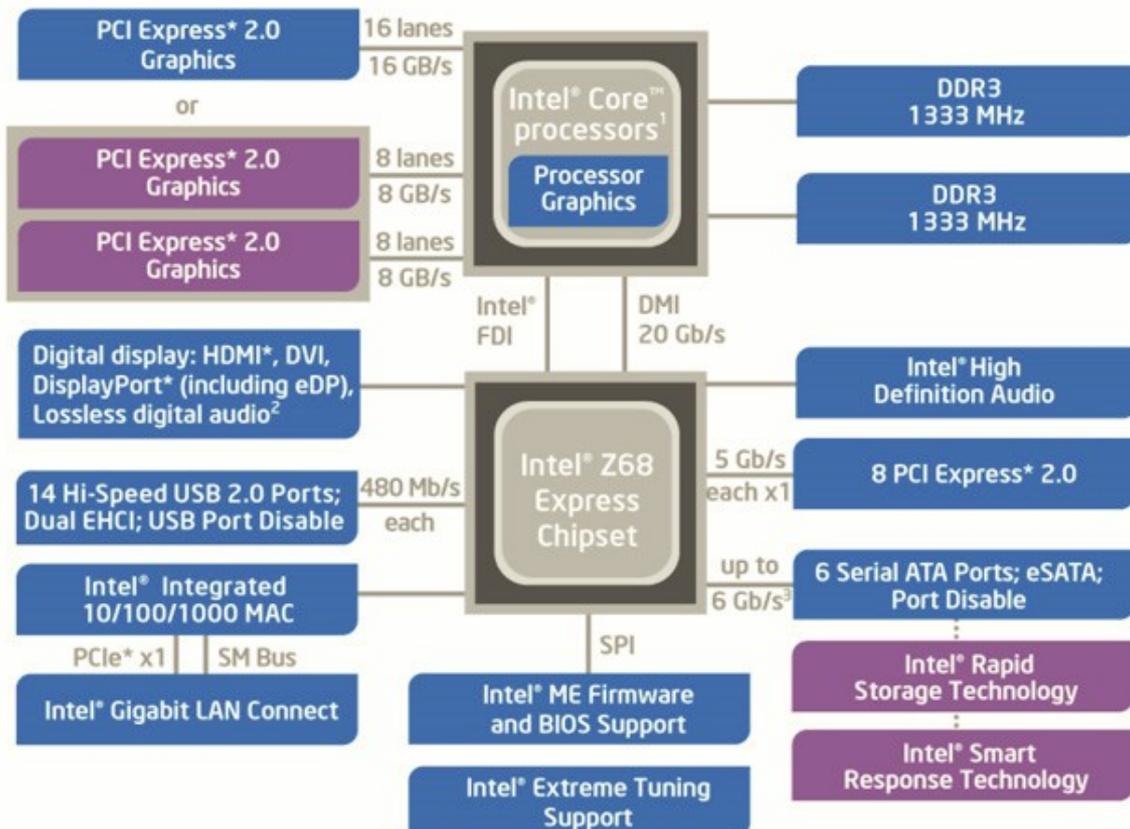


Launched at the beginning of the year, [Intel's 32nm Sandy Bridge processors](#) arrived alongside the new socket LGA1155 and two accompanying 6-series chipsets, the [P67](#) and [H67](#). Each platform presented a different value perspective: the pricier P67 supported Intel's unlocked "K" series enthusiast processors with advanced overclocking options, while the cheaper H67 had access to Sandy Bridge's built-in graphics.

Neither chipset offered both features, ultimately forcing

users to assess their priorities. However this hasn't been a major deal for the average system builder because someone who wants to overclock heavily probably has a discrete graphics card, while someone who's using Sandy Bridge's integrated graphics chip likely wouldn't want to be bothered with overclocking -- note the word "likely."

There exists a third, smaller group of individuals who want squeeze extra performance out of their processor and memory, but don't require the graphical muscle of a full-blown video card. To fill that void, Intel has released the Z68 chipset, which is somewhat of a hybrid of the P67 and H67: it allows you to overclock while simultaneously using the baked-in graphics engine. But there's more to it...



Along with combining the functionality of its previous chipsets, Intel has infused the Z68 with some impressive new features that should make it more appealing to a broader demographic. By cramming more features into the Z68, the company has effectively created a new enthusiast-grade chipset, while the P67 has been demoted to somewhat of a mid-range offering.

Intel's [Smart Response Technology \(SRT\)](#) is one of the more noteworthy additions as it boosts system performance by using a small solid state drive for caching purposes. SRT is to an extent similar to what the Seagate Momentus XT hybrid hard drives offer, except it's considerably more flexible. This is an attractive feature among hardware buffs, as full-fledged SSDs are still too expensive for widespread adoption. We'll be fully testing this capability on this review.

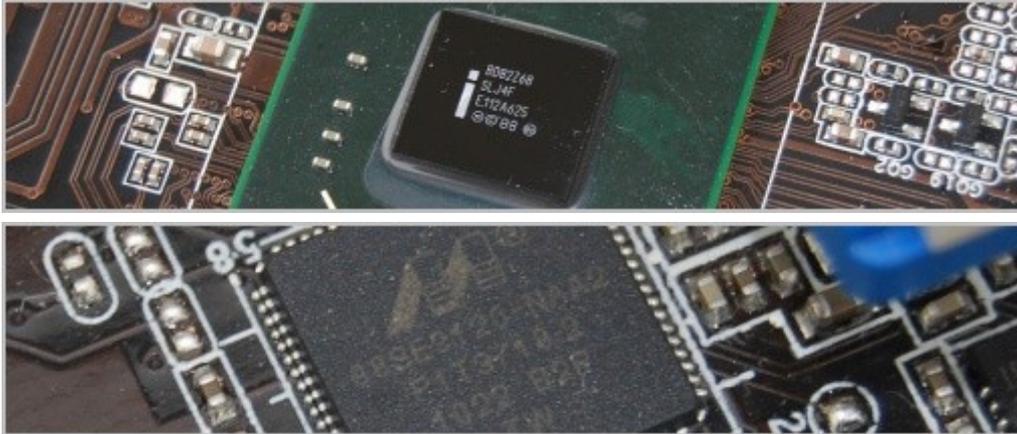
Intel is also shipping the Z68 with [LucidLogix Virtu GPU virtualization](#) software, which offers power savings by allowing your system to toggle between a discrete video card or Sandy Bridge's built-in graphics engine for a specific task -- think of Nvidia's Optimus technology on the desktop. Needless to say, we're eager to examine both features courtesy of [Asrock's latest Z68 Extreme4](#) motherboard, so let's get this show on the road.

## Asrock Z68 Extreme4

For testing Intel's latest chipset Asrock provided us with their Z68 Extreme4 motherboard, which is currently retailing for \$200, making it slightly more affordable than the P67 Extreme6 we tested in our recent P67 motherboard roundup. In fact, we considered the Extreme6 to be the best all-around value for enthusiast shoppers.



Besides the inclusion of Z68's new features, the Extreme4 appears to offer many of the same great features seen on the P67 Extreme6. The spec sheet includes 64Mb AMI UEFI Legal BIOS with GUI support, four USB 3.0 ports, four SATA 6Gb/s connectors, 8-channel audio, eSATA 6Gb/s and Gigabit LAN.



Asrock has added quite a bit of functionality to the stock Z68 chipset. Whereas all Z68 motherboards have six SATA 3Gb/s ports (two can work at 6Gb/s speeds) Asrock has expanded the storage capabilities of their Z68 Extreme4 by including the Marvell 88SE9120 controller, which supports a pair of 6Gb/s SATA ports each using a [PCI Express](#) 2.0 x1 (5.0Gb/s) lane.

While the Marvell chip doesn't offer any RAID functionality, it does support NCQ (Native Command Queuing) and it provides the Asrock Z68 Extreme4 with a grand total of SATA ports. Networking is covered by a Broadcom BCM57781 [Gigabit Ethernet](#) controller which supports Wake-On-LAN and Energy Efficient Ethernet 802.3az.



Etron EJ168A controllers also occupy one PCI Express 2.0 x1 (5.0Gb/s) lane each to provide a combined four USB 3.0 ports. One controller powers two rear USB 3.0 ports while the other feeds a pair of front mounted ports using the supplied onboard header.



Asrock has added quite a few PCI Express devices and that presents a problem as the Z68 features just eight PCIe 2.0 (5.0Gb/s) lanes. As a workaround, Asrock employs the PLX PEX 8608 switch to deliver eight more flexible ports -- though we suspect many have been used to connect the PLX switch to the Z68. This isn't an ideal solution, but it's the only way Asrock could strap on so much extra hardware.

We found that the 8-channel audio is delivered by a rather traditional choice in the Realtek ALC892 codec which supports THX TruStudio Pro. Despite seeing this chipset on numerous Asrock boards before, we were unable to dig up any real info on it. The Realtek website only lists 8-channel codecs from the ALC861 to the ALC889.

## Intel Smart Response Technology

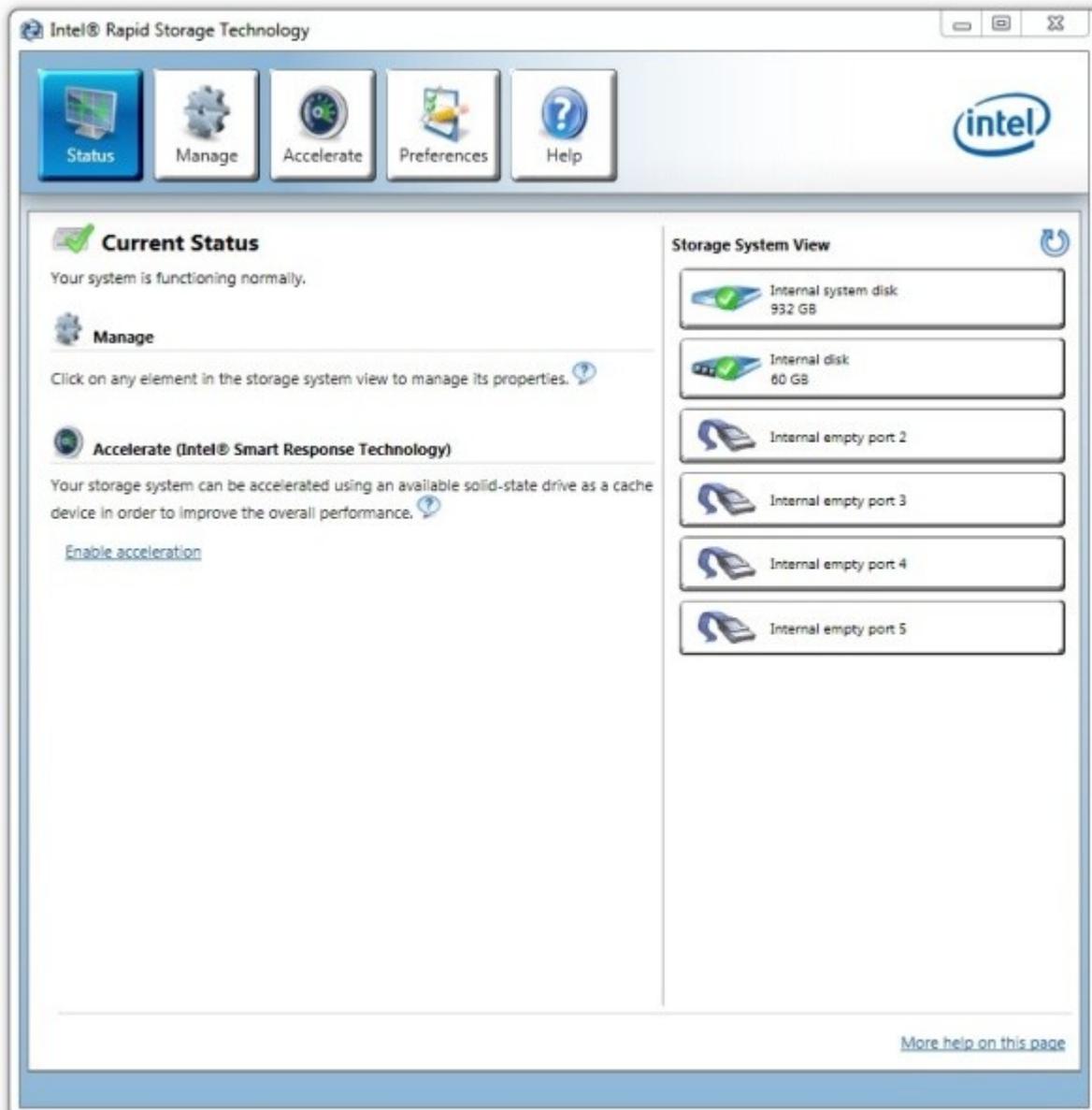
Flash-based storage represents a massive leap forward in performance when compared to traditional hard drives, largely due to its zero millisecond access time. Unfortunately, that speed still comes at an exorbitant premium, with most mainstream SSDs costing around \$2.00 per gigabyte while conventional HDD technology costs roughly five cents per gigabyte.

While most of us can't afford to transition entirely to flash storage, it's increasingly common for enthusiasts to house their operating system and certain programs on a relatively inexpensive low-

capacity SSD. The obvious drawback is that you're still forced to rely on an HDD for large applications and media, which won't enjoy the same performance benefits.

Seagate first demonstrated SSD caching technology with their Seagate Momentus XT series. The hybrid drives utilize "Adaptive Memory" to automatically move frequently accessed data to a 4GB NAND flash module. The performance and price of these drives make them a reasonable compromise for pricey full-sized SSDs, but they do leave quite a bit to be desired.

Intel has developed its own solution called "Smart Response Technology," which takes a slightly different approach. Instead of having a small NAND flash buffer on your hard drive, SRT lets you separate both storage mediums, creating a more flexible solution -- and a potentially faster one at that.

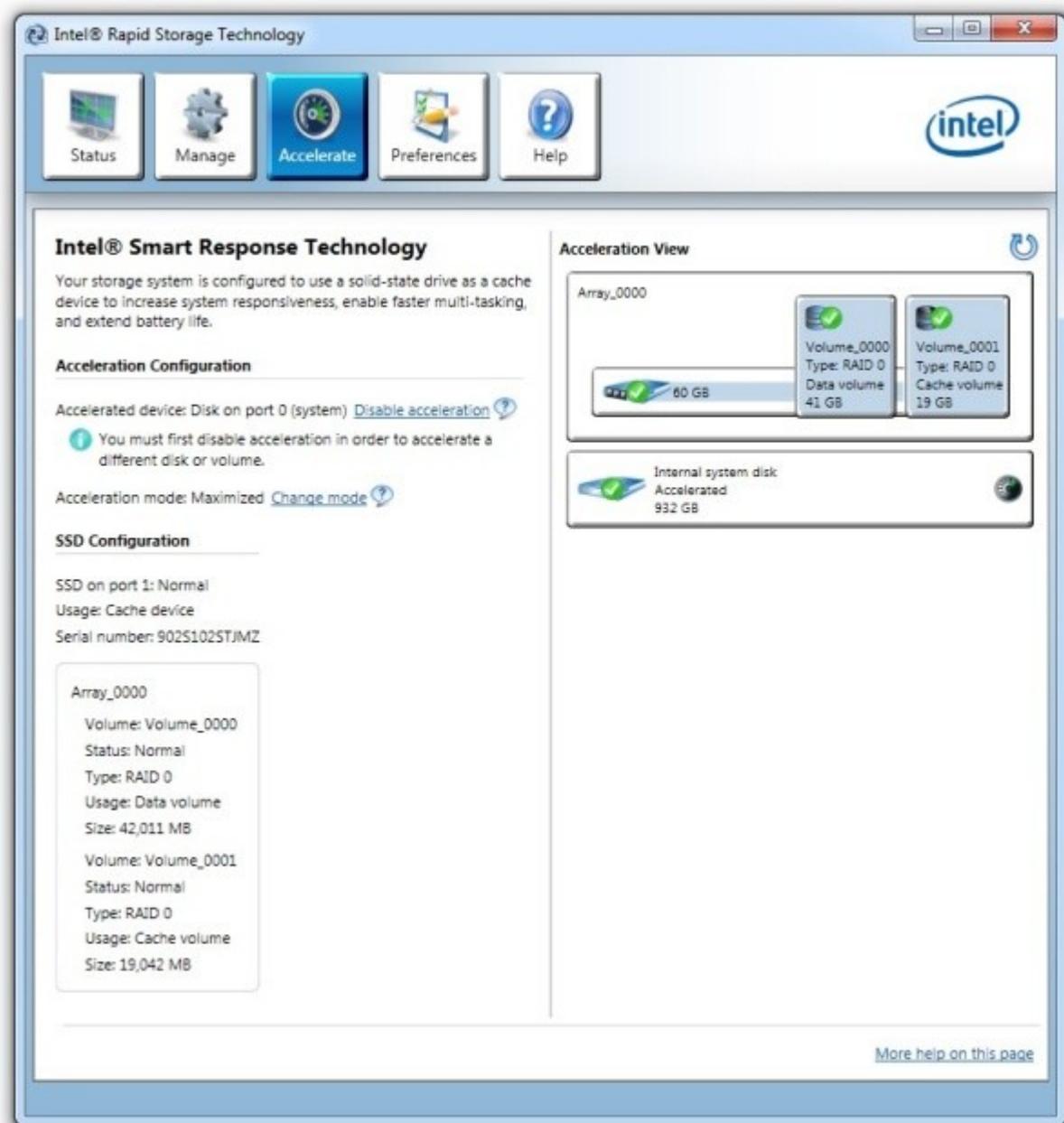


You can select any SSD as long as it is at least 20GB in capacity and pair it with any HDD. The SSD is used as a cache for commonly used data blocks while the Z68 chipset monitors the HDDs usage patterns and transfers the most frequently accessed bits of data from the HDD to the SSD.



Data stored on the HDD must be accessed multiple times before it's transferred to the SSD, so data that is infrequently accessed or new will not take advantage of the speed bump provided by the SSD. In other words, you are unlikely to witness an immediate performance boost in freshly installed programs or while transferring large files.

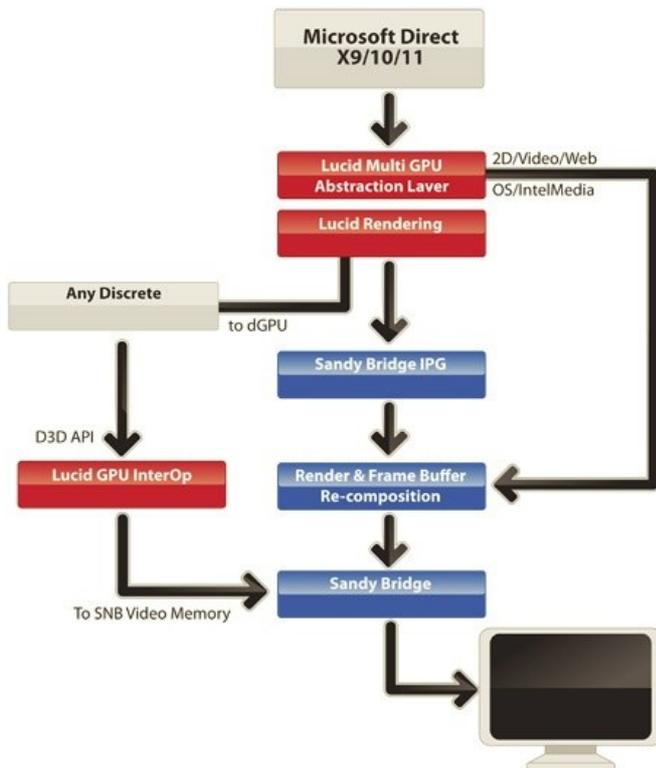
Where SRT really surpasses the Seagate Momentus XT is in its ability to utilize much larger SSDs. You can dedicate just 18.4GB of an SSD for caching purposes or you can use the entire drive -- though limiting the use to just 20GB makes more sense as larger 64GB+ drives would probably work better if they were used solely as the boot drive.



Intel plans to launch a drive specifically for use with SRT. We expect the upcoming 20GB Larsen Creek SSD to cost around \$50 and it should present a fantastic value when paired with a 2TB HDD. Although we don't have a 20GB Larsen Creek SSD yet, we used the Kingston SSDNow V+ 180 64GB for testing purposes which should provide similar performance.

## Lucid Virtu GPU virtualization

Lucid's Virtu software GPU virtualization technology supports dynamic switching between a dedicated video card and Sandy Bridge's integrated graphics. The switch doesn't require a reboot and it occurs based on which application is using the graphics subsystem at the same time. It's designed to work with all second-generation i3/i5/i7 processors and automatically picks one of the GPUs for a specific job.



The software can assign tasks in real time to the best available graphics resource based on power, performance and features, with no need for additional hardware. If it detects that you're trying to run a demanding DirectX 11 game, it'll whip out the big guns. If it thinks you can get by with the integrated graphics, your discrete GPU automatically idles, decreasing noise, heat and power levels.

You might recall that we reviewed the Asus Crosshair IV Extreme motherboard with Lucid's HydraLogix technology, which is designed to let you mix and match graphics cards from both AMD and Nvidia, including cards from entirely different graphics generations. While we appreciated the concept behind HydraLogix -- and still do -- we discovered that it simply didn't work as advertised.



We're pleased to report that Virtu is a hell of a lot more straightforward than HydraLogix and it seems to work pretty well, smoothly switching between our Radeon HD 6970 and Sandy Bridge's graphics.

The software has two settings: i-Mode and d-Mode. The former requires your monitor to be wired to the motherboard (the Sandy Bridge graphics engine) and offers nearly zero overhead.

Conversely, Virtu's d-Mode lets you connect your display directly to a graphics card, but the Sandy Bridge graphics engine is always powered on, whereas it can be powered off in the i-Mode. That sacrifice will be worthwhile for some enthusiasts, as d-Mode's main advantage is that it allows you to use multi-GPU technology such as CrossfireX and SLI, while this isn't possible with the i-Mode.

## Test System Specs & Memory Performance

### Core i7 Test System Specs

- Intel Core i7 2600K
- x4 2GB G.Skill DDR3 PC3-12800 (CAS 8-8-8-20)
- Asrock Z68 Extreme4
- Asrock P67 Extreme6
- OCZ ZX Series 1250w
- Hitachi Deskstar 7K1000.C 1TB (SATA 3Gb/s)
- Kingston SSDNow V+ 180 64GB (SATA 3Gb/s)
- GeForce GTX 580 (1536MB)
- [Microsoft Windows 7 Ultimate](#) 64-bit
- Nvidia Forceware 270.61

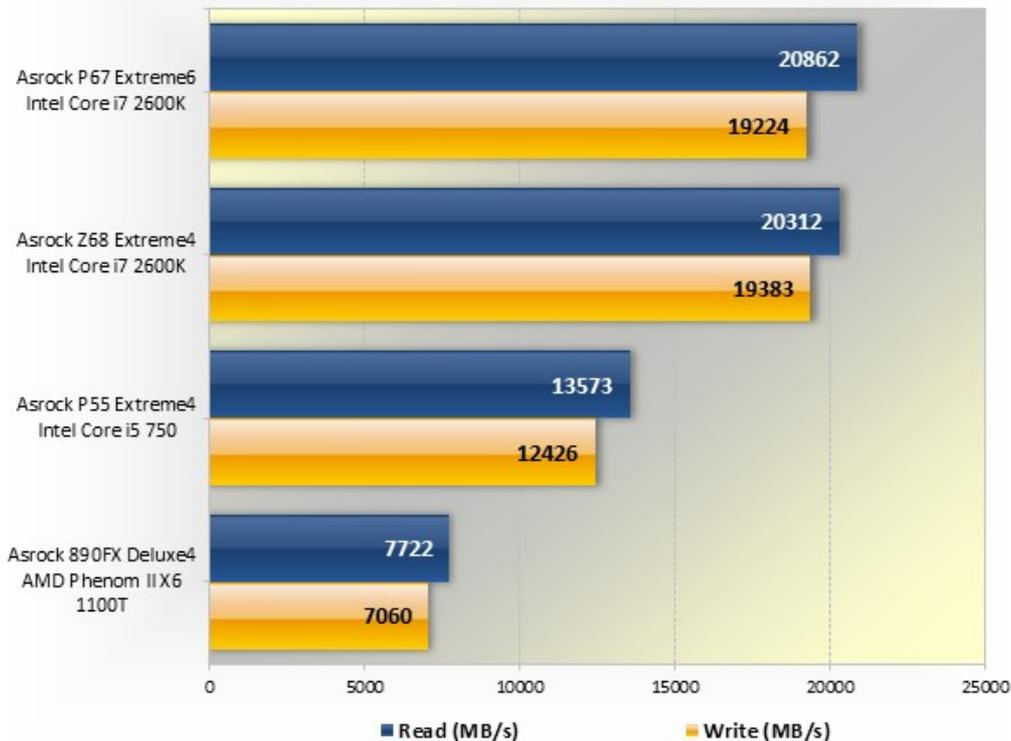
### AMD Phenom II X6 Test System Specs

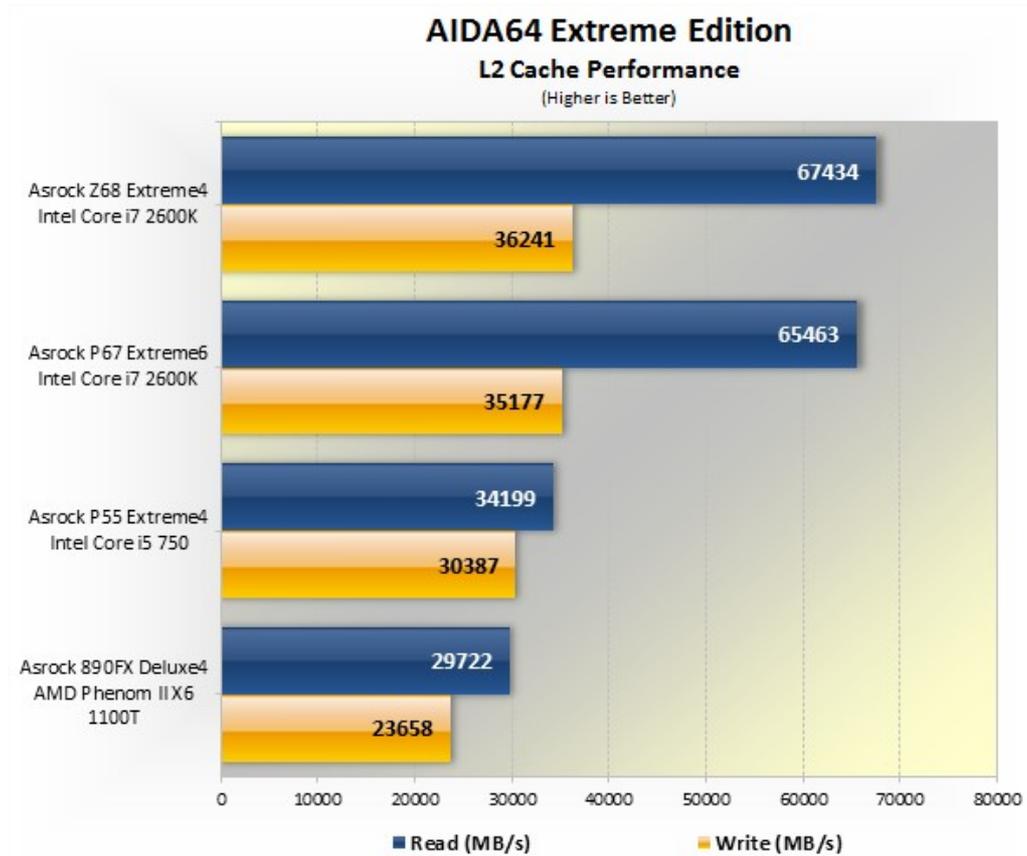
- AMD Phenom II X6 1100T (3.30GHz)
- x4 2GB G.Skill DDR3 PC3-12800 (CAS 8-8-8-20)
- Asus Crosshair IV (AMD 890FX)
- GeForce GTX 580 (1536MB)
- OCZ ZX Series 1250w
- Seagate 500GB 7200-RPM (Serial ATA300)
- Software**
- Microsoft Windows 7 Ultimate 64-bit

### Core i5 Test System Specs

- Intel Core i5 750 (2.66GHz)
- x4 2GB G.Skill DDR3 PC3-12800 (CAS 8-8-8-20)
- Asus P7P55D-E Premium (Intel P55)
- GeForce GTX 580 (1536MB)
- OCZ ZX Series 1250w
- Seagate 500GB 7200-RPM (Serial ATA300)
- Software**
- Microsoft Windows 7 Ultimate 64-bit
- Nvidia Forceware 270.61

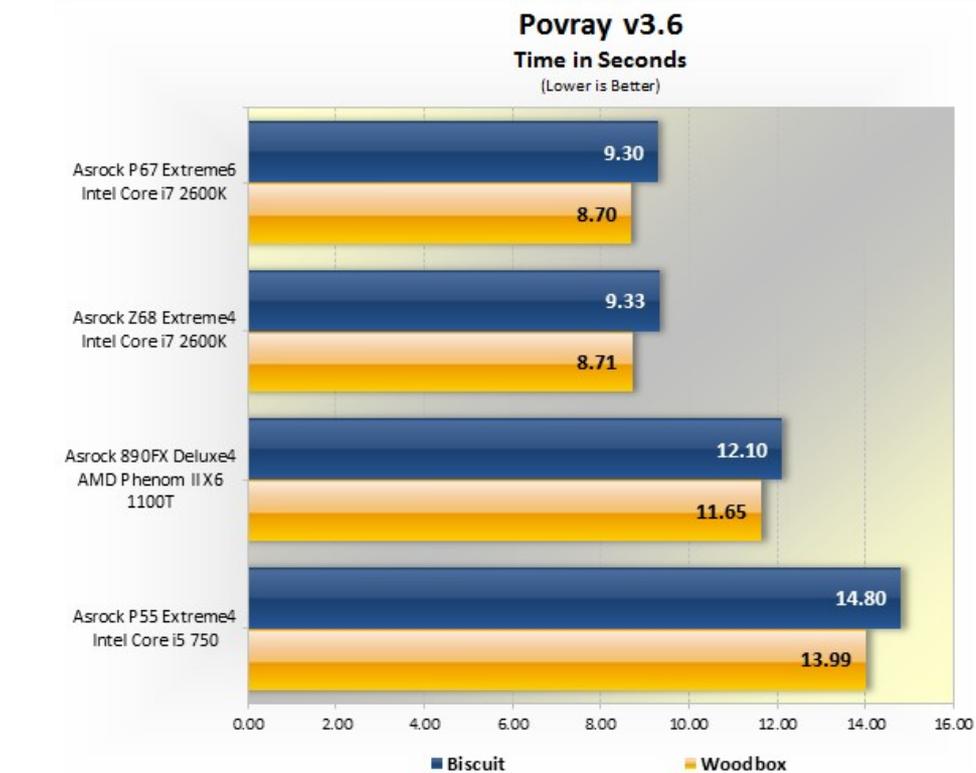
**AIDA64 Extreme Edition**  
**Memory Bandwidth Performance**  
 (Higher is Better)



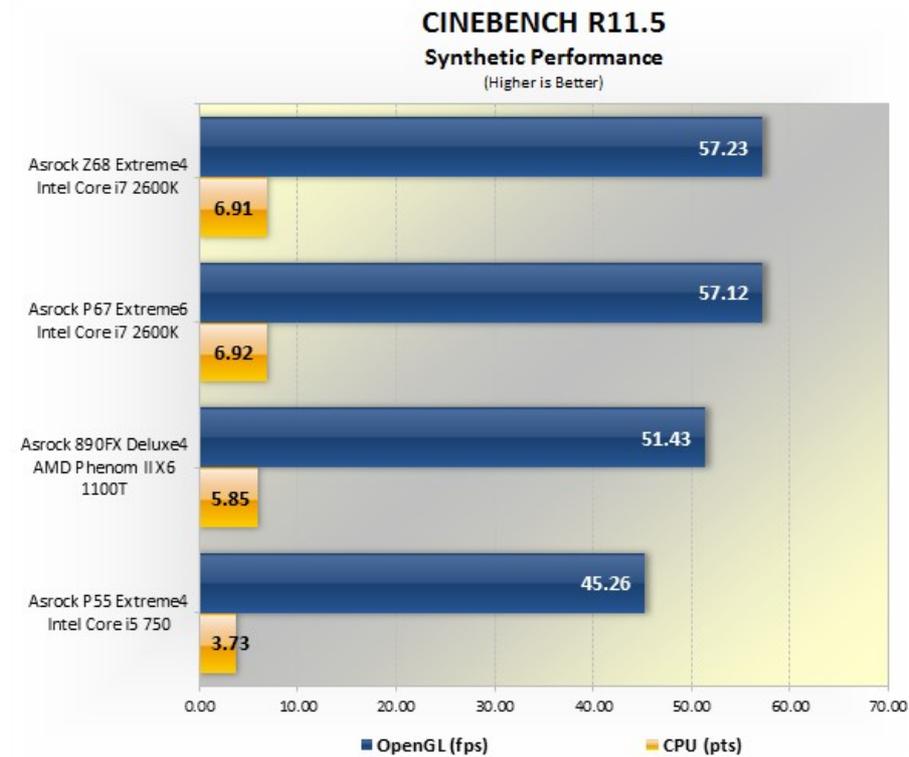


The Asrock Z68 Extreme4's memory bandwidth performance matches the P67 motherboard, but this was expected considering the memory controller is located on the processor and not the chipset.

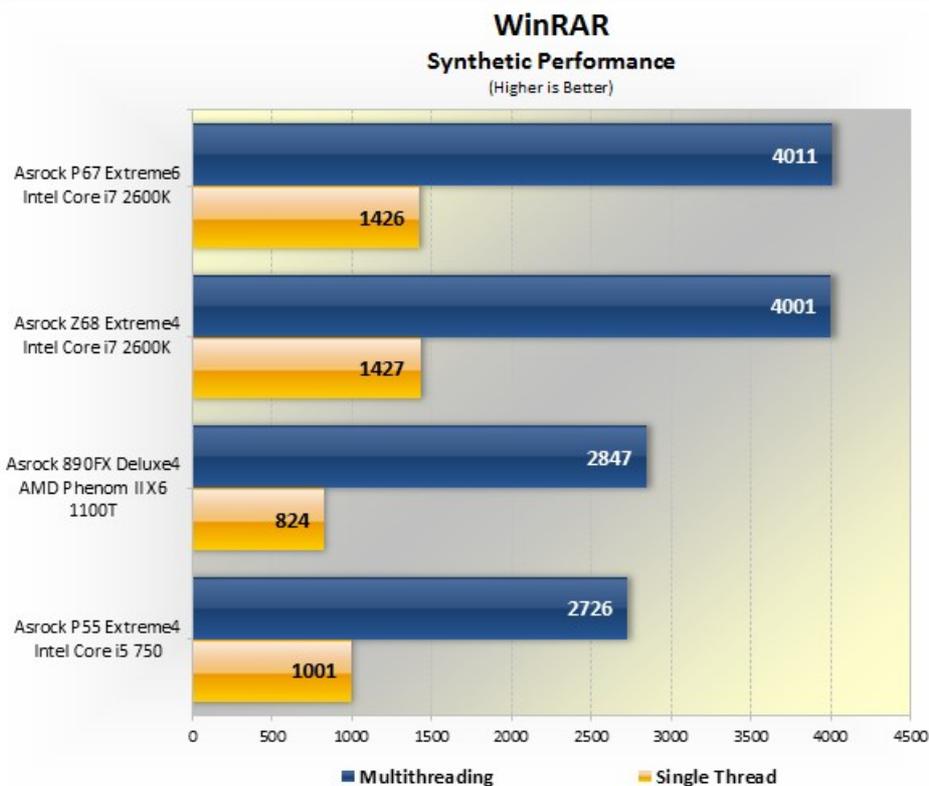
## Synthetic Application Performance



The Z68 Extreme4's performance in Povray v3.6 was comparable to that of the P67 Extreme6.



The CINEBENCH R11.5 results were also very similar between both boards, though you will notice that the Core i7 2600K provides considerably better GPU performance in this test than the Phenom II X6 1100T and Core i5 750.



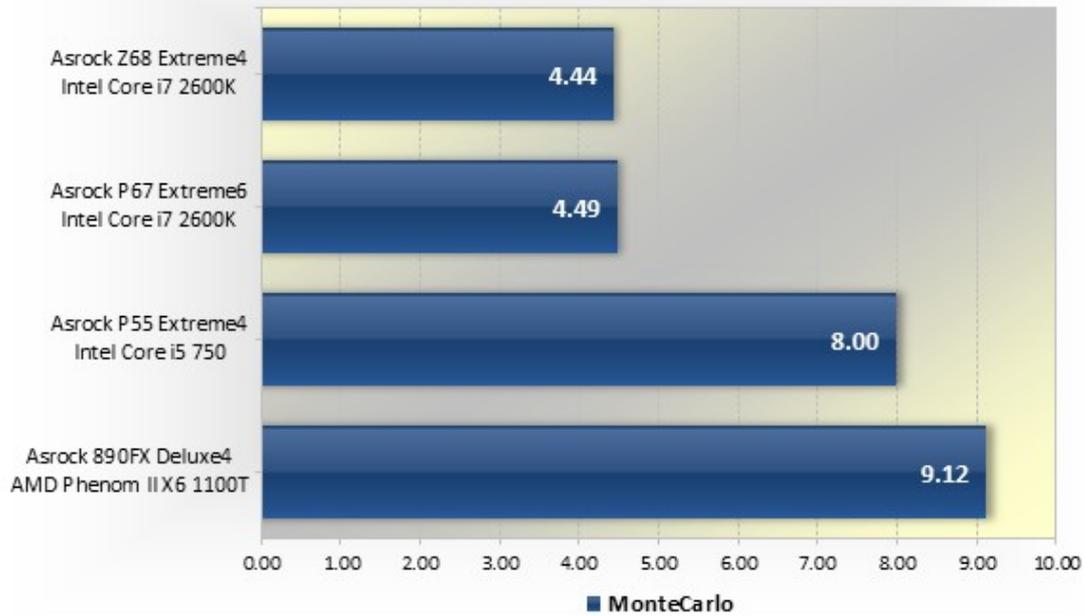
Again, we saw little to no performance different between the Z68 and P67 chipsets in WinRAR.

## Application Performance

### Microsoft Excel 2010 (64-bit)

Time in Seconds

(Lower is Better)

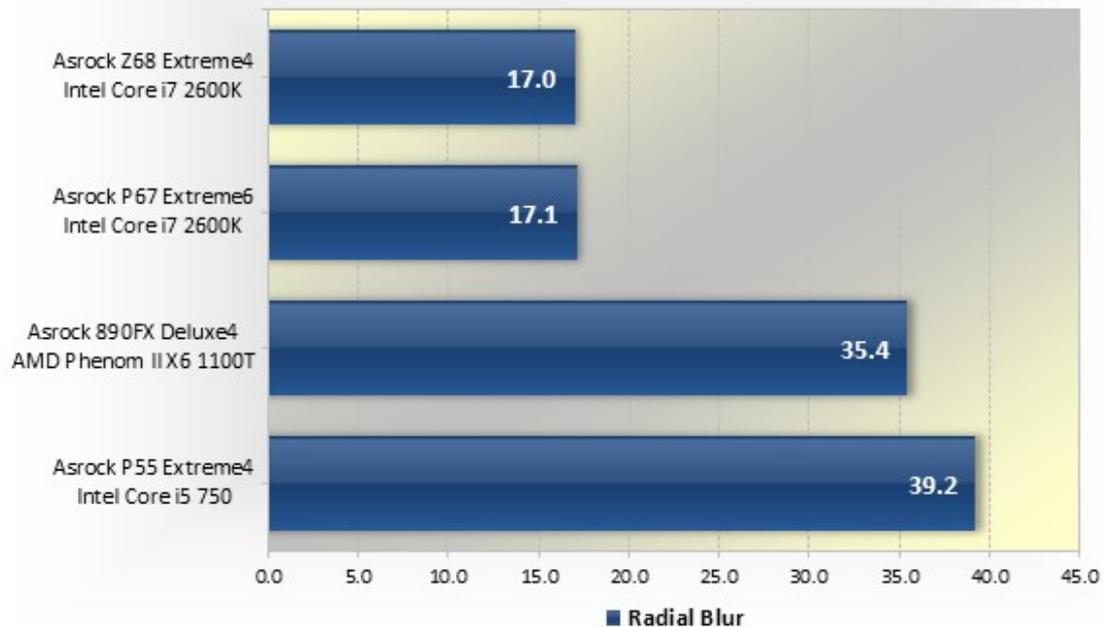


The Core i7 2600K powered through our Excel 2010 test nearly twice as fast as the Core i5 750, but the Z68 and P67 chipsets were only separated by a mere 0.05-second gap.

### Adobe Photoshop CS5

Time in Seconds

(Lower is Better)

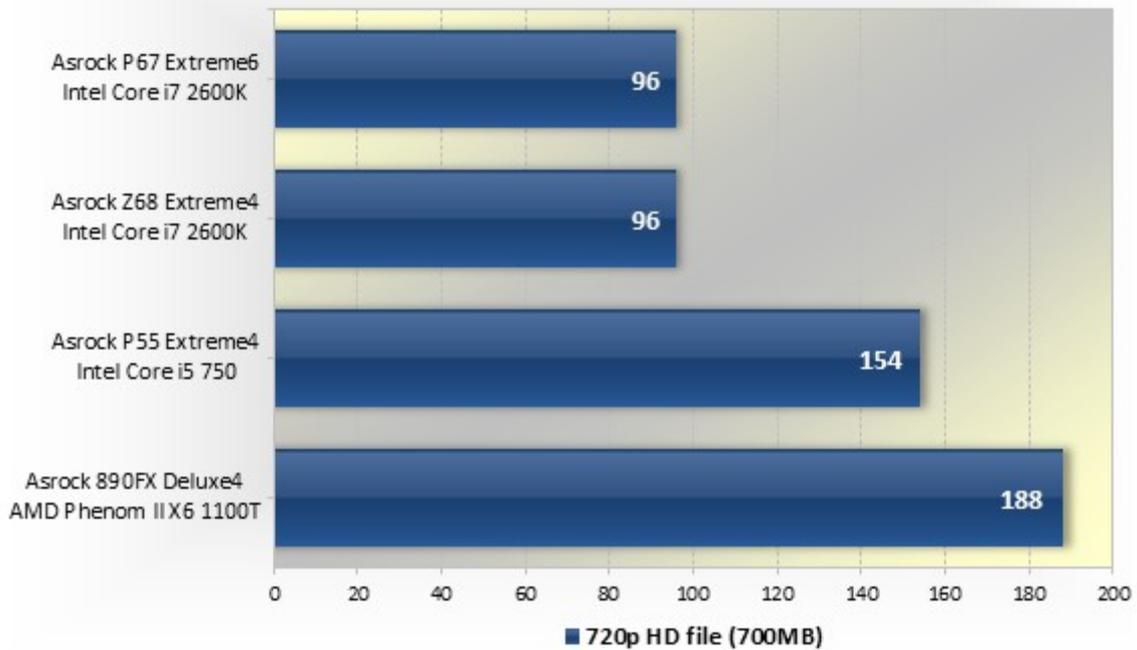


That trend continued in Photoshop CS5: the Core i7 2600K blasted the i5 750 and Phenom II X6 1100T, but the Z68 and P67 delivered nearly indistinguishable results.

## WinRAR Compression

Time in Seconds

(Lower is Better)



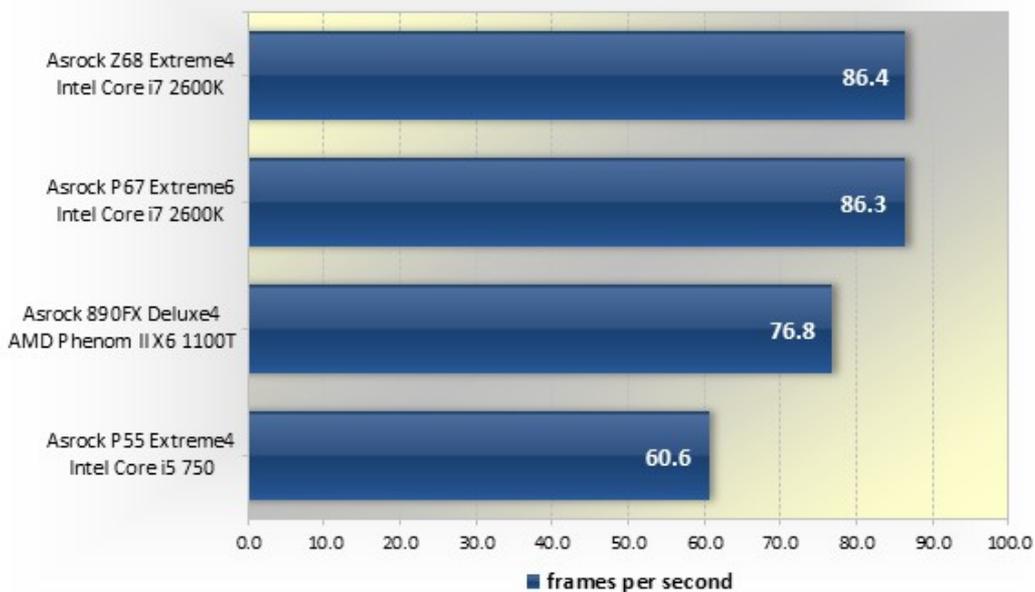
It took the Core i7 2600K just 96 seconds to compress a 720p HD audio/video file with WinRAR on both platforms.

## Encoding Performance

### HandBrake

Frames per second

(Higher is Better)

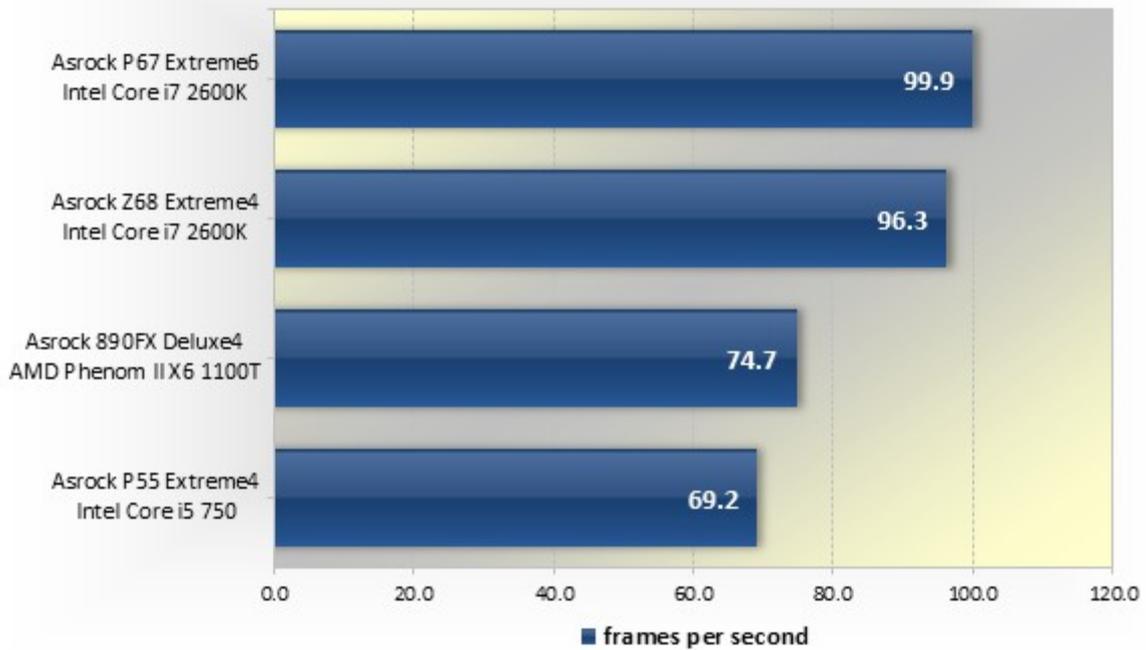


The Asrock Z68 Extreme4 provided the same level of performance as its P67 counterpart in handbrake, with both platforms achieving 86fps.

## x264 HD Benchmark 3.0

### 2-pass 1280x720 encode

(Higher is Better)

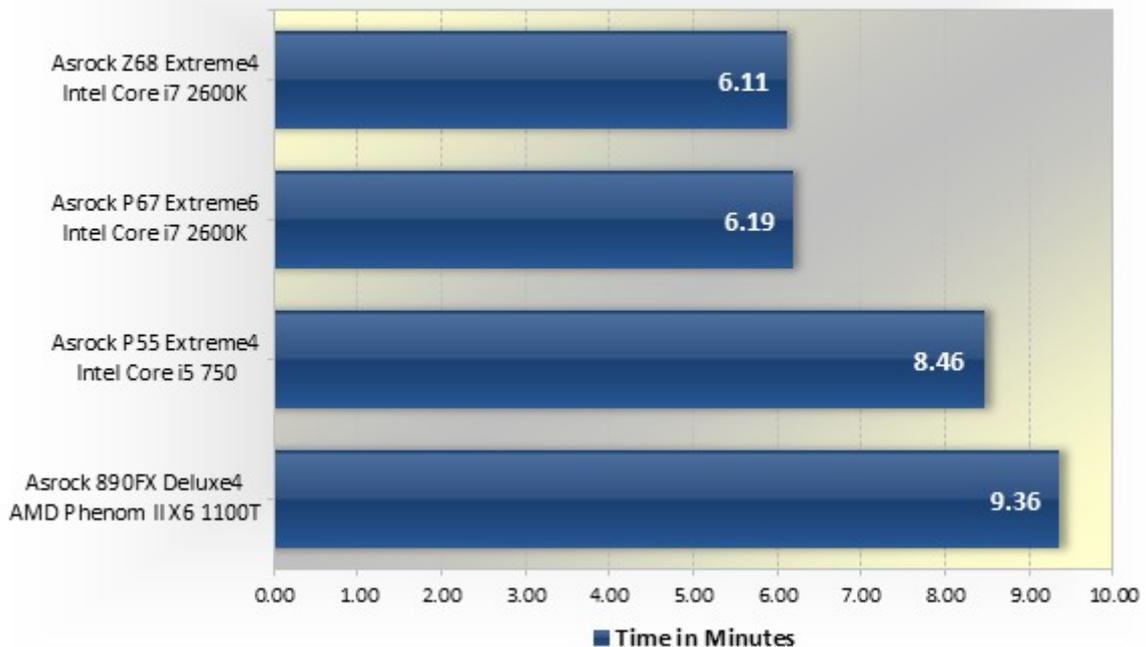


Interestingly, we witnessed the first true deviation between the two chipsets in x264 HD Benchmark 3.0, with the Z68 being 3fps slower.

## TMPGEnc 4.0 XPress

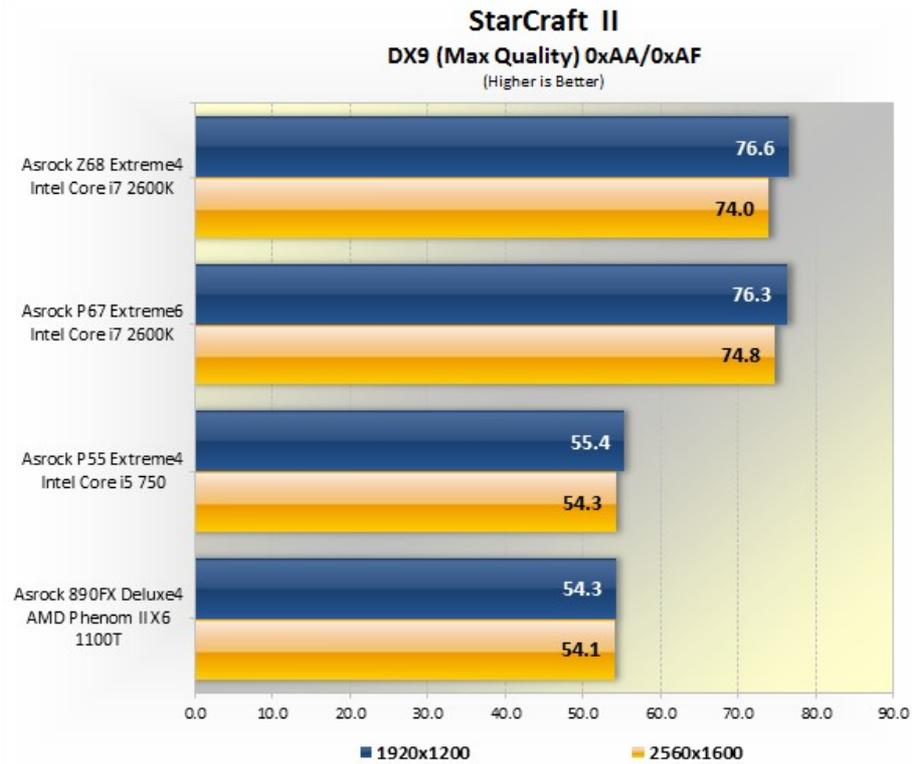
### AVI to MPG Conversion

(Lower is Better)

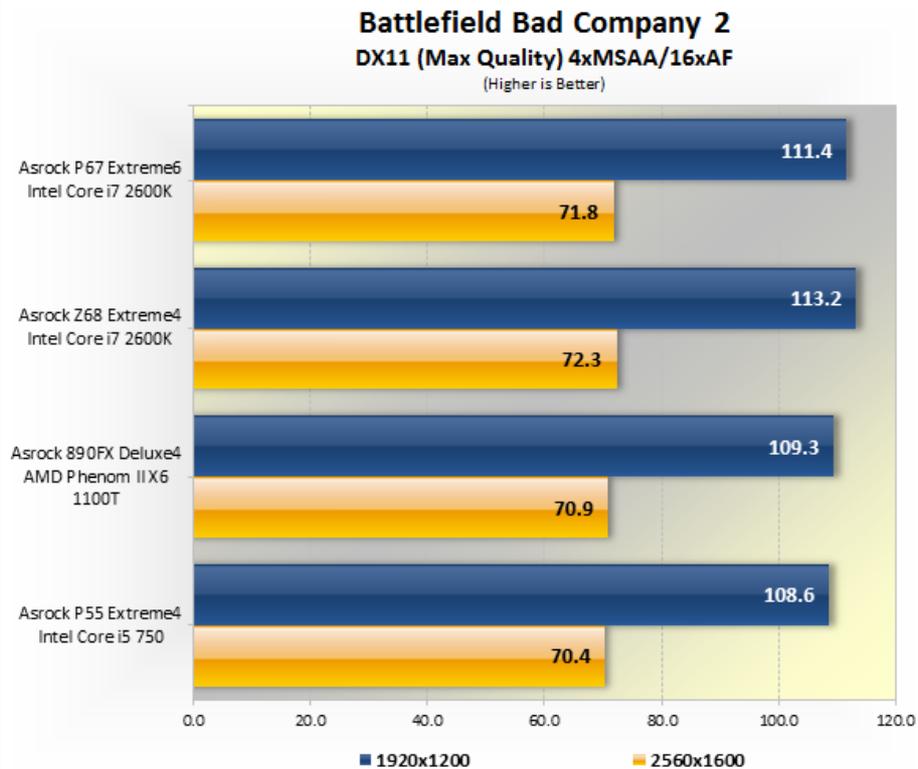


Things returned to normal when testing with TMPGEnc 4.0 XPress, where Intel's Sandy Bridge platforms completed the test in just over six seconds.

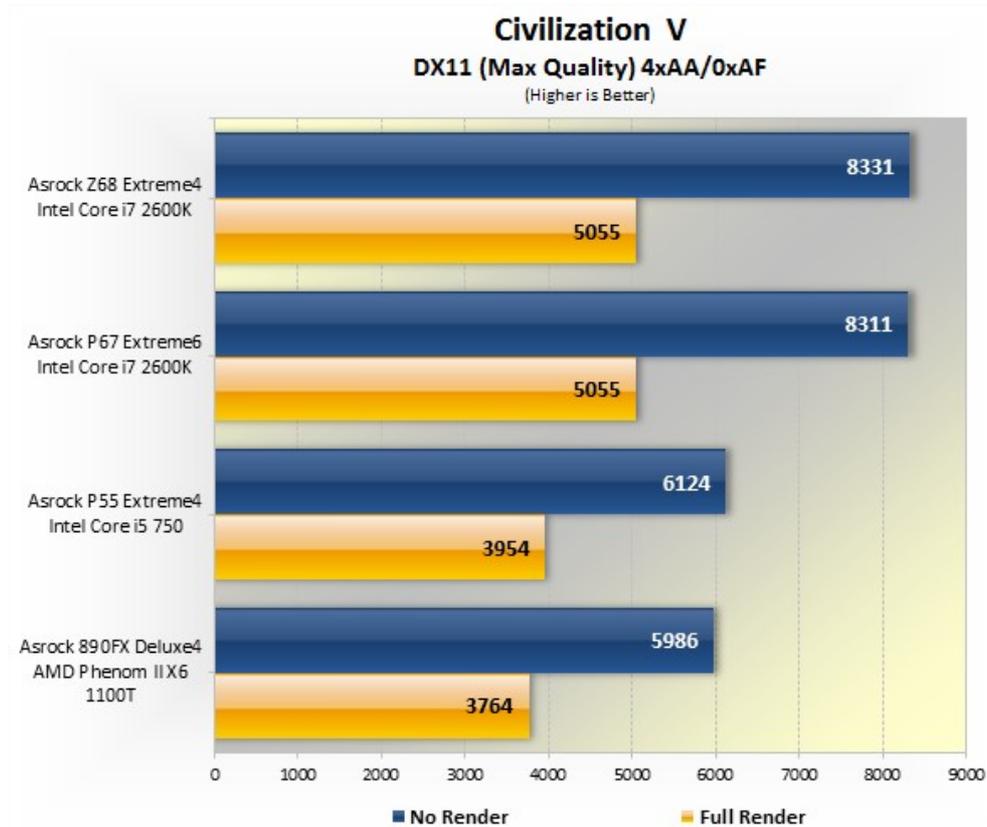
## Gaming Performance



We used Fraps to measure StarCraft II's frame rates, recording five minutes of gameplay and using a replay of an 8-player online battle.



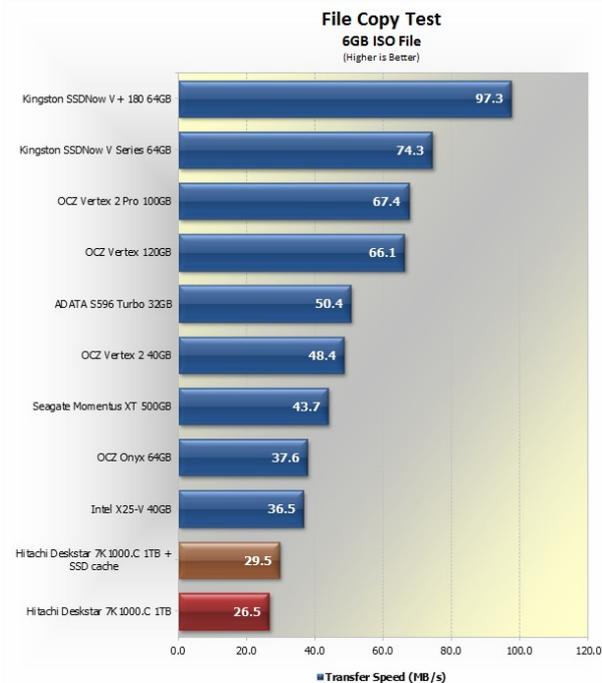
Battlefield: Bad Company 2 was tested using Fraps to record 60 seconds of gameplay from the level "Cold War" with the best quality settings and 4xAA/16xAF enabled.



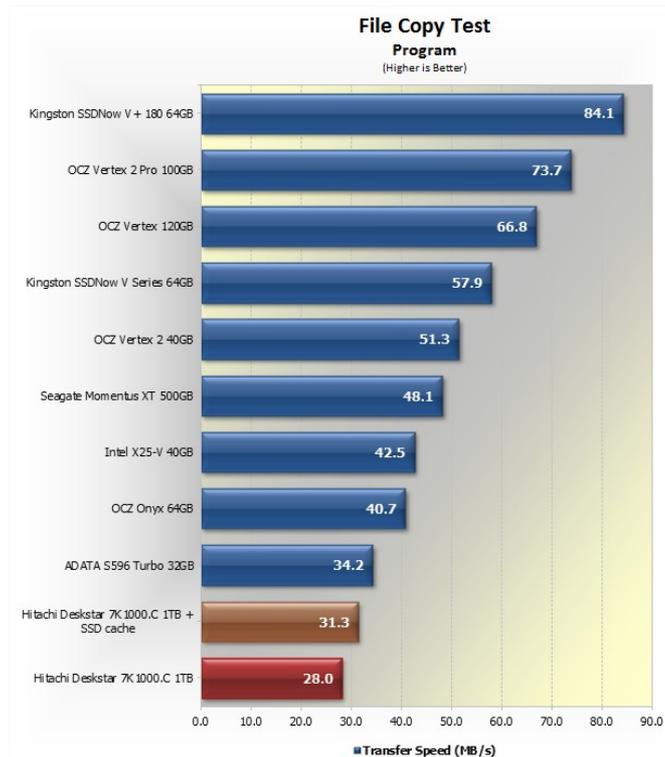
We tested Civ V with a saved file that's more 300 turns into a game, offering a good representation of gameplay. Using Fraps, we measured the performance at various zoom levels while scrolling around the map.

Unsurprisingly, we didn't record any noteworthy fps discrepancies between the Z68 and P67.

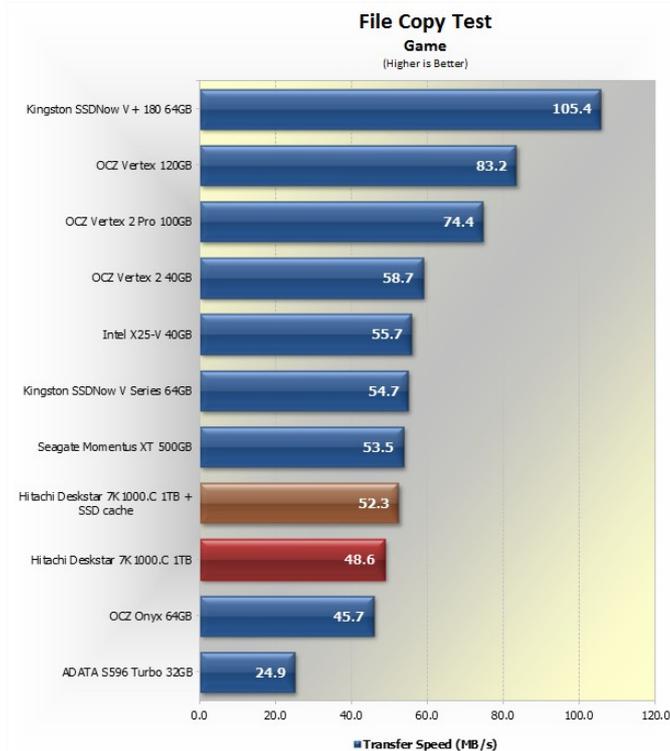
## Intel SRT - File Copy Test



As we mentioned earlier, Intel's Smart Response Technology provides no real performance boost when working with large files. When paired with an SSD and SRT, our test HDD improved by 3MB/s, or a mere 11%.



We witnessed the same exact gain in our program file copy test: the SSD/HDD duo was 12% faster.



That speed advantage dipped down to only 8% in our game copy test, which worked out to just under 4MB/s. ( <http://www.techspot.com/review/395-asrock-z68-extreme4/page10.html> )

## Intel SRT - Application Performance

Siehe diese Seite: <http://www.techspot.com/review/395-asrock-z68-extreme4/page11.html>

## Intel SRT - CrystalDiskMark 3.0

Siehe diese Seite: <http://www.techspot.com/review/395-asrock-z68-extreme4/page12.html>

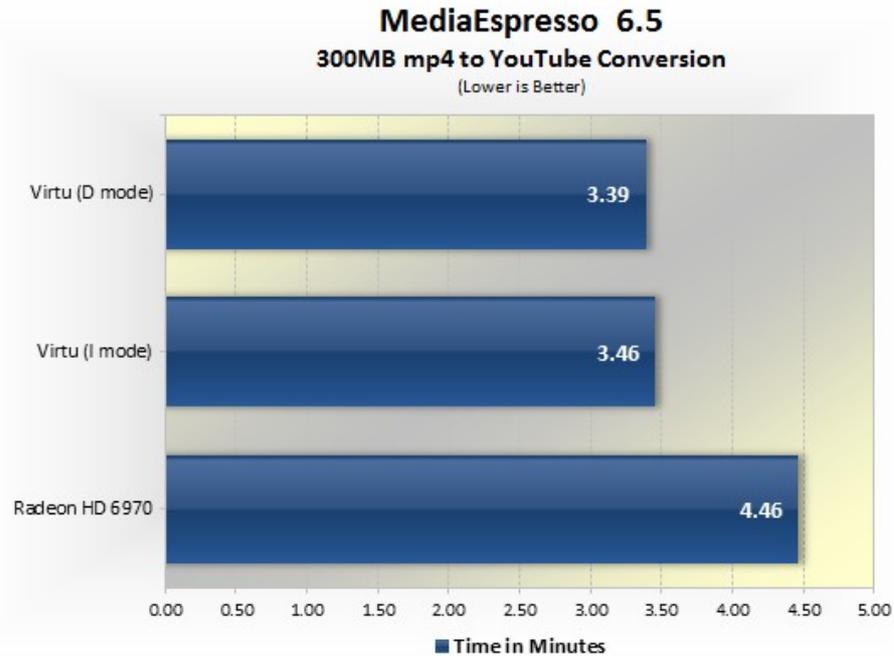
## Intel SRT - AS SSD Benchmark

Siehe diese Seite: <http://www.techspot.com/review/395-asrock-z68-extreme4/page13.html>

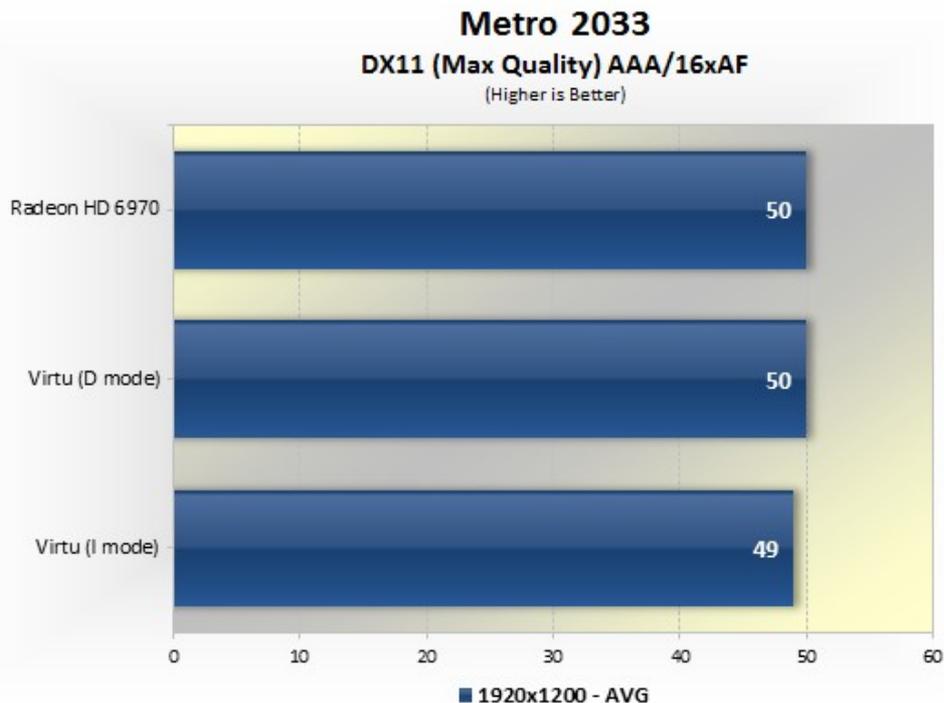
## Intel SRT - Atto Disk Benchmark

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## Lucid Virtu Performance

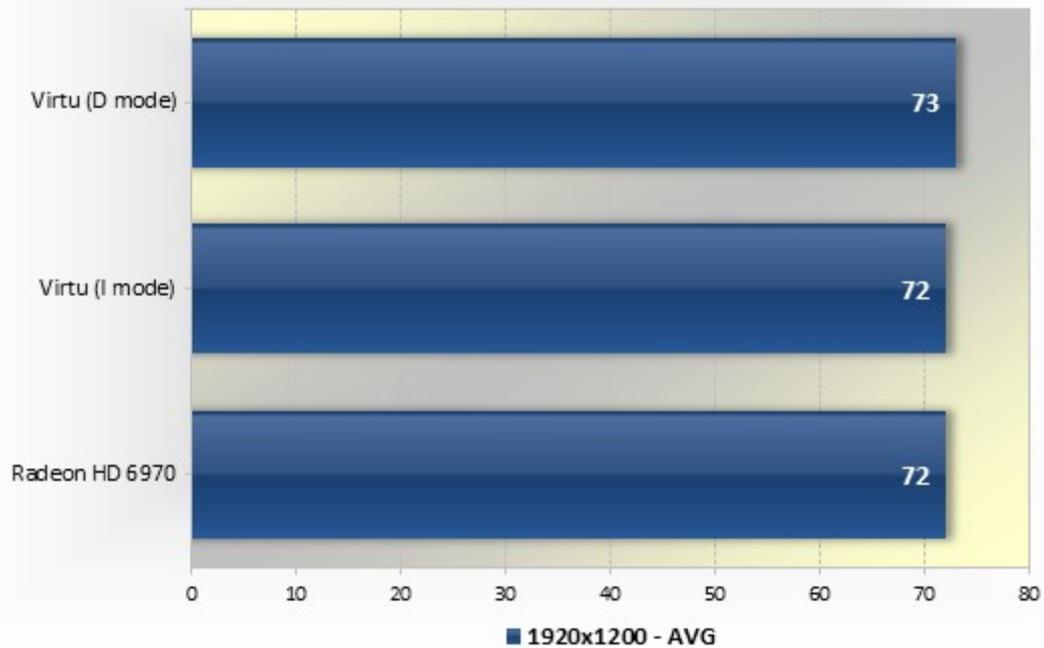


We used MediaEspresso 6.5 to convert a 300MB mp4 video to YouTube format using both the Radeon HD 6970 and the Core i7 2600K. The Radeon HD 6970 completed this task in 4:46 minutes while the i7 2600K's graphics engine was 25% faster at 3:39 minutes when using the Virtu (D-mode).



Virtu had no impact on Metro 2033 performance as we received the same performance with just the Radeon HD 6970 as we did when using both D and I modes.

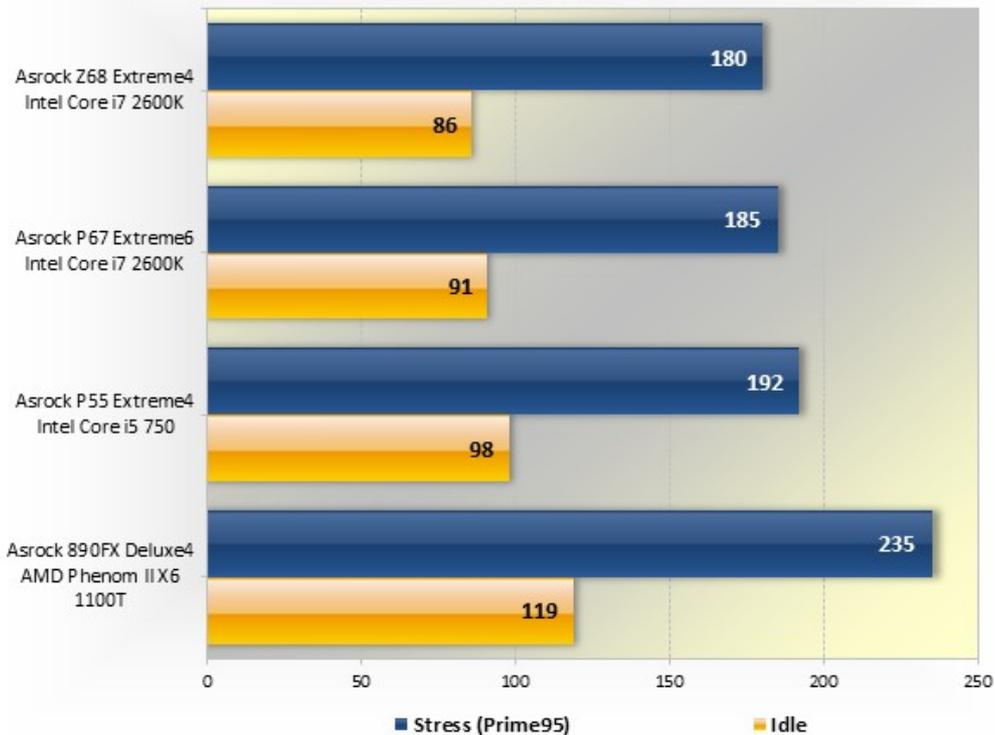
### Civilization V DX11 (Max Quality) 4xAA/0xAF (Higher is Better)



We experienced the same results when testing other games such as Civilization V: Virtu neither aided nor hindered the results.

## Power Consumption

### Power Consumption Measured in Watts (Lower is Better)



While we found the Z68 Extreme4 to consume about 5 watts less than the P67 Extreme6, we believe this is largely attributable to the P67's extra hardware, not a difference in chipset efficiency.

## Final Thoughts

We don't think anyone expected to see a performance difference between the Z68 and P67 chipsets when using a near identical configuration and unsurprisingly there isn't any. While some users will undoubtedly appreciate the combined overclocking and graphics functionality of the H67 and P67, the Z68's primary attraction is Intel's [Smart Response Technology](#) and [Lucid's Virtu software](#), thus our focus on those new features.

Although Virtu worked as intended, it [didn't exactly "wow" us](#) like SRT did. We don't believe Virtu will be limited to the Z68, let alone Intel chipsets for that matter. In other words, while we see potential for the software, we don't think it's a key selling point for the Z68. Conversely, SRT is the best example of hybrid storage technology we've seen to date and it should help broaden SSD adoption.



By now we've become quite fond of Smart Response, though it certainly has its pros and cons. First and foremost, you still need to buy an SSD -- albeit a much smaller, cheaper SSD than you would need for a typical boot drive, but even at \$50 the 20GB Larsen Creek SSD isn't free. Second, although SRT demonstrated some [impressive speed gains](#) over a standalone hard drive, it's not nearly as fast as a dedicated full-size SSD.

Pricing and performance aside, there's also the unfortunate requirement that most users will have to reinstall Windows unless they are willing to manually edit the system registry. Intel's SRT requires you to enable RAID mode, which will force AHCI or IDE installations to blue screen upon loading an existing copy of your operating system. We believe the performance boost is worth the inconvenience, but it's worth noting that this isn't as easy as upgrading your graphics card or RAM.

Cash-strapped performance junkies have the obvious alternative of buying a small 64, 80 or 128GB SSD to house their operating system and key applications, but that has its own drawbacks. For instance, you'll have to manually decide what data is worthy enough to be housed on your speedy flash drive. The remaining bits, of course, are forced to take refuge on an archaic disk drive without the luxury of the SSD cache.

### Outstanding product: Asrock Z68 Extreme4 Motherboard (Intel Z68)

Along with Asrock all key players in introduced Z68-based products, all of whom were featured in April's Asrock's Z68 Extreme4 is priced P67 Extreme4 and \$10 less than the you can spare for a motherboard, [\\$125](#). Either way you'll be getting a



the motherboard market have including Asus, Gigabyte and MSI -- [five-way P67 shootout](#). At [\\$200](#), pretty sensibly at \$40 more than the P67 Extreme6. If that's more than Asrock offers Z68 Pro3-M for [just](#) solid motherboard into your hands.