

Building a Gaming PC On a \$1000 Budget



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Build Overview

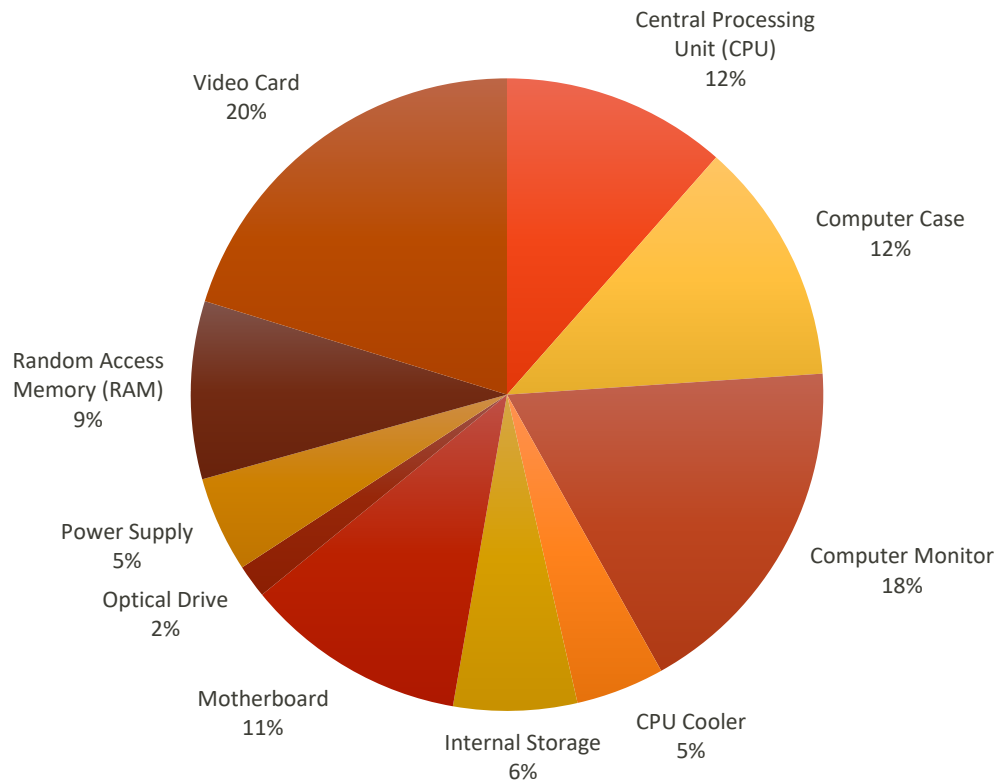
The case study scenario for this assignment is to build the best possible gaming computer with a budget of \$1000, which was to include everything required for the build except software. I also assumed that the customer had their own gaming mouse, keyboard and a quality set of headphones to plug into the audio jack. Although the monitor selected in this build does have built-in speakers, the sound quality will be poor compared to good headphones.

The final system, including tax, came to \$994.54. The \$1000 limit on the budget, which included a monitor, was a severely inhibiting factor, so this gaming system has many compromises. As required, however, it is capable of being overclocked, as the AMD CPU selected is unlocked and the medium-quality CPU cooler should allow a reasonable overclocking performance increase. The actual amount of performance increase will be subject to experimentation.

If this build were to be implemented in real life, it is unlikely I would select the suggested configuration. Rather, I would council my client to not compromise on the key components of the system, instead it would make sense to purchase a second-hand monitor and not include an optical drive. The compromises that occurred in this configuration to keep the build under \$1000, such as the CPU, the motherboard and the RAM selections, reduce future upgradeability. It seems more practical to compromise less on these key components and keep future upgradability a more viable option.

Build Cost Breakdown

The cost breakdown can be visualized in the following diagram:



In a tabular format, the cost breakdown would be:

Component Name	Model	Pre-Tax Price	With Tax Price
Central Processing Unit	AMD Phenom 2 560 Black Edition 3.3GHZ	\$101.20	\$114.36
Motherboard	GigaByte 970A-D3P	\$99.99	\$112.99
Random Access Memory	G.SKILL Ripjaws Series 8GB	\$79.99	\$90.39
Video Card	Sapphire Nitro Radeon RX 460	\$177.99	\$201.13
Internal Storage	Patriot 120GB 2.5" Solid State Drive	\$55.61	\$62.84
Computer Case	NZXT Source 530 Full Tower	\$109.50	\$123.74
CPU Cooler	Cooler Master Hyper 212 EVO	\$39.85	\$45.03
Power Supply	CoolMax CL Series 600 Watt	\$43.00	\$48.59
Optical Drive	Lite-On iHAS124-14 DVD/CD Writer	\$14.99	\$16.94
Computer Monitor	Asus VE208T Black 20"	\$158.00	\$178.54
		\$880.12	\$994.54

Components

Central Processing Unit (CPU)

AMD Phenom II 2 560 Black Edition 3.3GHz

AMD was selected for the CPU because it offers significantly higher return on investment in a budget build than Intel. This particular processor is nearing the end of its marketing life, but it offers very fast processing and the ability to overclock. Further, this CPU uses the AM3 Socket, which is the modern AMD standard. This will allow upgrading of the CPU at a later date without having to change the motherboard.



This CPU costs \$101 before tax. It is available through several online retailers, but for this build I would order it through Amazon.ca:

<https://www.amazon.ca/dp/B003YV21KY/?tag=pcp0f-20>.

Motherboard

GigaByte 970A-D3P

This motherboard is also nearing the end of its marketing life, but is still a powerful motherboard. It offers all of the modern amenities (SATA ports, support for DDR3 RAM, etc). It has an AM3/AM3+ socket, so is a good match for the CPU.

This motherboard costs \$99 before tax. It is also available through multiple online retailers. For this build, I selected NCIX.com: <http://www.ncix.com/detail/gigabyte-970a-d3p-amd970-atx-am3-b2-88184.htm?affiliateid=7474144&promoid=1903>.



Random Access Memory (RAM)

G.SKILL Ripjaws Series 8GB

This DDR3 RAM offers a clock speed of 1600MHz, which is fast enough for gaming, but is not the fastest on the market currently. 8GB should suffice for most gaming. DDR4 RAM would have been preferable, however, this is a budget-based compromise.

This RAM costs \$79 for 8GB before tax, a very budget-friendly price point. I would order this RAM from NewEgg Canada:

https://www.newegg.ca/Product/Product.aspx?Item=N82E16820231314&nm_mc=AFC-C8JunctionCA&cm_mmc=AFC-C8JunctionCA--na-na-na&AID=10592396&PID=3938566&utm_medium=affiliates&utm_source=afc-%25zn.



Video Card

Sapphire Nitro Radeon RX 460

Like the other components of this build, this video card is nearing the end of its marketing cycle, but is still an excellent choice for a gaming computer. It uses a PCIe 3.0 x 16 slot and features a RX 460 chipset. Although not the best on the market, it certainly will keep most gamers happy and is capable of rendering high-quality graphics for most modern games.



This video card costs \$177 before tax, which considering that the working budget is \$1000 (which some new video cards costs all on their own), this provides excellent performance which doesn't obliterate the budget. This video card would be ordered from PC Canada: http://www.pc-canada.com/item/11257-02-20G.html?utm_source=pcpartpicker&utm_medium=affiliate&utm_campaign=pcpartpicker.

CPU Cooler

Cooler Master Hyper 212 EVO

Overclocking an air-cooled CPU is highly dependent on maximizing air flow. The more air flow, the lower the CPU temperature stays, allowing faster CPU tuning. Liquid cooling is also a viable option for this setup, however to keep costs at a minimum I chose to go with a traditional air-cooled system.



This CPU cooler costs \$39.85 before tax, which is money well spent in for the amount of cooling it provides. It is available at: <http://www.vuugo.com/computer-hardware/computer-parts/computer-cooling/cpu-cooling/cooler-master-cpu-cooler-RR-212E-20PK-R2.html?tracking=5108053939762>.

Internal Storage

Patriot 120GB 2.5" Solid State Drive

In an effort to improve speed, I decided to only install a very small SSD in this computer. This will greatly improve performance, as SSDs access files much faster than traditional hard drives. Currently, however, they are also much more expensive. While this SSD is small and may require an occasional uninstallation of an old game to make room for a new game, the boot time will be much faster and the actual game play will be smoother.



Traditional hard drives (magnetic spin-drives) are very inexpensive and I would council the client to add one for improved storage capacity (perhaps at a later date). However, this SSD will give a premium gaming experience.

This SSD costs \$55 before tax, and is very budget-friendly. I would purchase it from Direct Canada: <http://www.directcanada.com/products/?sku=13411112712>.

Computer Case

NZXT Source 530 Full Tower

A full tower case was selected for this build, with three built in fans for excellent air movement. As this build explicitly requires the ability to overclock, the more air that moves across the CPU and video card, the more overclocking that can safely be performed.

This computer case is costly, at \$109 before tax, but will be useful for the life of this computer and almost certainly its replacement. This computer case can be purchased from Vuugo.com: <http://www.vuugo.com/computer-hardware/computer-parts/computer-cases/nzxt-pc-cases-CA-SO530-M1.html?tracking=5108053939762#!prettyPhoto>.



Computer Power Supply

CoolMax CL Series 600 Watt

An undersized power supply is a common custom-build computer problem. Often customizers will add a video card, only to find other problems such as random shut-downs occur. An underpowered supply is often the cause. The selected power supply offers 600 watts, while the system should not draw more than 400 watts (the actual calculation is just under 300 watts, but adding a margin for error is a good idea!).

This power supply costs \$43 before tax, and is available from ShopRBC.com: http://www.shoprbc.com/ca/shop/product_details.php?pid=88851.



Optical Drive

Lite-On iHAS124-14 DVD/CD Writer

Certainly considered an optional part of most modern builds, the client in this scenario has requested an optical drive be included in the \$1000 budget. This optical drive has the ability to read and write CDs and DVDs. Optical drives are useful, but most software is downloaded today (or loaded via external drives and/or USB flash drives).

This optical drive costs \$14.99 before tax and is available at: https://www.newegg.ca/Product/Product.aspx?Item=N82E16827106393&nm_mc=AFC-C8JunctionCA&cm_mmc=AFC-C8JunctionCA--na-na-na&AID=10592396&PID=3938566&utm_medium=affiliates&utm_source=afc-%25zn.



Computer Monitor

Asus VE208T Black 20"

Similar to a computer case, a good computer monitor can last several generations of custom computer builds. However, a good monitor is a very expensive proposition (relative to a \$1000 budget). Rather than spend a high percentage of the budget on a high-quality monitor, I selected a 20-inch model from Asus that will perform at an adequate level without any extras. This particular monitor was selected as it does have built-in speakers, although these will only suffice for basic applications. Headphones or a full sound system would provide a more immersive gaming experience.



This monitor costs \$158 before taxes (18% of the total budget) and is available from Walmart:

<https://www.walmart.ca/en/ip/asus-ve208t-black-20-1600x900-5ms-led-backlight-widescreen-lcd-monitor-wspeakers/6000005390803>.