

Building a RIG 101 (Feb 20th 2008)

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Top mid-range (Intel)

Introduction

Many people believe that a fast, powerful computer is one which runs into the 5 digit cost bracket. These people are generally right, however, there are certain factors that make this assumption true.

Firstly, most local computer sales and service centers market machines that will generally fall into the “midrange” category as high end systems. While such systems are above average in terms of specifications, they are by no means the latest and greatest. For example, an advertisement reading “High end gaming PC for sale” does not necessarily mean it is the best that money can buy.

This, however, does not mean that the PC is inadequate. In fact, it may prove to execute all the users’ requirements quickly and efficiently. In most cases, an ultra high end PC would go underutilized because the user does not perform tasks to fully take advantage of its resources. This scenario can be likened to a 70 year old lady purchasing a Bugatti Veyron for the sole purpose of picking up her groceries and driving to the pharmacy to pick up her arthritis medication when all she really needs is a March. In much the same way, the majority of PC users wishing to carry out even resource intensive tasks such as video editing and gaming need not look beyond a good mid-range system to meet their needs.

This article is designed to help technically minded individuals of all experience levels to choose components to build a top mid-range system. The majority of the components listed in this article would not be available in Trinidad and Tobago’s retail stores (if at all), therefore, they are sourced from online foreign retailers, the likes of which include Newegg.com, Amazon.com and Zipzoomfly.com, all of which are reputable e-tailers. Each component recommendation is represented as an individual category.

CPU (Processor)

Since the introduction of the “Core” micro architecture by Intel, they have pretty much dominated the market in terms of performance on the consumer and enterprise level. The dual core beasts quickly chew into the competition, making it the choice of enthusiasts and mainstream consumers worldwide. Since then, they have released their quad-core models, effectively managing to pack four CPU’s into one package. Sounds expensive, right? Yes, they are more expensive than their dual core brethren, however, quite cost-effective models can be found. One such model is the **Q6600 Kentsfield**.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16819115017>

Cost:

\$1700 - \$1800tt

Comments

Its four cores certainly provide a significant boost in multi threaded applications over its dual core counterparts. Having personal experience using one of these units, I can confirm that this CPU lives up to hype.

CPU Cooling

In order to protect your investment and to ensure your CPU runs as cool and stable as possible, adequate cooling is very important. There are two general categories of CPU cooling which are Air and Water. Water cooling is usually much more effective than air, however comes at a price premium that may be out of financial reach for the ordinary user. Air solutions, while not as effective are significantly cheaper and represents the best “bang for buck” category. Almost all retail CPU’s come with a heat sink/fan combination. These solutions are usually good enough for running CPU’s at their stock speeds. However, if you have the desire to over clock, an aftermarket solution is required to maintain a safe operating temperature. There are many different products available. Unfortunately, the effectiveness of a particular solution cannot be determined from observing its appearance. Research must be done to identify effective coolers. One such cooler is the **Zerotherm Nirvana NV120**.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16835887011>

Cost:

\$250 - \$300tt

RAM (Memory)

There are many different types of memory, so much so, a description of each type and specifications would require a separate article. Basically, the choice of system memory comes down to either DDR2 or DDR3. DDR3 is the latest and greatest in memory technology, boasting blazingly fast speeds and read/write capabilities. Unfortunately, with this great speed comes great cost, with 2GB of quality DDR3 easily costing as much as \$3,500tt. That's right. That's the cost of the memory alone. Obviously, for the purposes of a mid-range system, this type of memory is totally out of the question.

On the other hand, the release of DDR3 has resulted in massive reductions in the cost of DDR2, a bit of very welcomed news for the new budget-minded system builder. My recommendation in this category is Ballistix 2 X 1GB DDR 1066 memory from Crucial Technology. This kit is capable of running at speeds of 1,066 MHz with CAS latency of 5-5-5-15 making it an excellent choice for the gamer on a budget.

Note: Some users may prefer to run 4gb of memory instead of "just" , because, well, the more the merrier, however, due to restrictions of 32bit Operating Systems, 4gb of memory cannot be addressed, therefore about 1GB of that memory would go unrecognized by the system. The solution to this problem is to switch to a 64bit Operating System, where as much as 16 terabytes can be supported, however, lack of 64bit driver support greatly reduces the attractiveness of this option.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16820148069>

Cost:

\$600 - \$700tt

Comments

As mentioned above, most users may prefer to buy 4 GB of memory, however, the inability of 32bit Operating Systems to address that much memory must be taken into account. That said, 2GB of memory would prove to be more than adequate to run Windows XP and Windows Vista quite well.

Motherboard

Choosing a good motherboard is one of the most difficult tasks in building a new system. Several factors have to be taken into consideration including CPU to be used, chipset, multi-graphic capability and memory capability. Since we already chose our CPU, the criteria for choosing a motherboard can be defined in more detail. We need a board that supports 65nm quad core CPU's as well as DDR2. One major variable that exists is the choice of a multi-GPU configuration. To this end, a Crossfire, SLI or single GPU board can be selected. IN order to be flexible and cater for all three of these options, three different motherboards meeting the respective criteria will be selected.

SLI board.

Some users may want to take advantage SLI technology right away in their build or just have the option available to them in the future. For this option, I recommend the EVGA nForce 780i SLI motherboard. This chipset is currently Nvidia's flagship and boasts many features and over clocking options. The main

reason for choosing this board with this chipset is because of its ability to support the newer 45nm Intel chips and the PCI-E 2.0 standard, which will make upgrading to the new batch of CPU's to be released in Q1 2008 easy and provide the recommended platform for all current and next-gen model video cards. Three way SLI is also supported.

Link:

<http://www.newegg.com/Product/Product.aspx?Item=N82E16813188024&Tpk=EVGA%2bnForce%2b780i%2bSLI>

Cost:

\$1700 - \$1800tt

Crossfire board

For the ATI Crossfire fans out there, the ASUS P5E is a good choice. It features an X38 chipset which supports DDR2 1200, 45nm Intel CPU's and also the PCI-E 2.0 standard. This is also an excellent choice for over clocking.

<http://www.newegg.com/Product/Product.aspx?Item=N82E16813131219>

Cost:

\$1450 - \$1550tt

Single GPU board

For those of you who have no burning desire to run a multi-GPU configuration, the **Abit IP35 Pro** is an excellent choice. It Supports 45nm CPU's, and boasts a stable chipset with great over clocking capabilities. This main board carries 2 PCI-E X 16 slots, however, the second works only at 4x speed therefore making it unsuitable for optimal multi-GPU performance. The price of this unit also makes it an attractive option for a mid-range system.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16813127030&Tpk=ip35%2bpro>

Cost:

\$1120-\$1200tt

Video

Prior to October 2007, the graphic card industry remained relatively dormant with only a handful of new products being released. That all changed, however, with the release of the **8800GT by Nvidia** where a flurry of new parts have been released as well as announcements of those to come. Despite this fact, it has remained one of the most popular choices among new system builders because of its price/performance ratio. This product was originally intended to be a midrange part, however, it was discovered that it rivaled high end parts in terms of performance for a fraction of the cost. Since its release, availability has increased dramatically. An EVGA 8800GT can be had for \$1680tt, cheaper than the 8800GTS it replaced while boasting increased performance. A single 8800GT is quite capable of running most games released to date (with the obvious exception of Crysis) at maximum quality settings and sufficiently adequate frame rates. If you feel the need to bump up the settings in this game, however, be prepared to sustain a significant performance hit. Perhaps, in this case, a second card in SLI may just be what the doctor ordered.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16814130318>

Cost:

\$1550 - \$1650tt

Hard Drives

Hard drives have certainly come a long way over the years. Just a few short years ago, a 30GB model was top of the line and many (including me) wondered how they would ever fill such a vast amount of space. Fast forward to today where capacities such as 320 and 500gb are the order of the day and can be easily obtained without breaking the bank. For as little as \$760, a **500 Gig Seagate Barracuda drive with 32 Mb of cache** can be had. Not only is this drive spacious, but its 32mb cache will go a long way into speeding up sustained data transfer rates.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16822148288>

Cost:

\$750-\$850tt

Power Supply

A power supply unit (PSU) is a very important component your rig and is often overlooked and cheap models purchased to cut costs. This however is a very dangerous practice since this part is responsible for supplying a clean, adequate and reliable power source for each component within the system. The higher quality models carry a feature known as active PFC provides protection against voltage spikes and other abnormalities. Such a unit is the **PC Power and**

Cooling 750 Quad 750Watt unit. It has an abundance of power connectors and is powerful enough to run 2 8800GTX video cards in SLI.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16817703009>

Cost:

\$1050 - \$1150tt

Sound

Sound hardware has evolved significantly over the years. Gone are the days when users had no choice but to purchase an add-on card to get an acceptable sound output from their machines. These days, the quality of on board sound has increased to the point where there is 7 channel support and even optical outputs that produce superb sound quality, therefore most users opt to forego the cost of purchasing a separate card and used the supplied audio.

There are those audiophiles and enthusiasts, however, that would prefer the higher quality of an additional sound card. The **Creative Sound Blaster X-Fi XtremeGamer 7.1 is an excellent choice**. It sports features such as 7.1 channel sound, 24bit, SPDIF in and out among others.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16829102006>

Cost:

\$470 - \$570tt

Monitor

The monitor is perhaps the most important output device in one's computer. It is the one device that must always be looked at while the computer is in use. Most people, however, take it for granted. Monitor technology has changed significantly over the years, coming from the large, power hungry CRT's of yesteryear to the smaller, lighter more efficient LCD technology. When they were first introduced, the cost of LCD's were prohibitive to most people and reproduced colours that were not up to the quality of their CRT brethren. The technology has since matured to a point where color quality rivals that of a CRT's and prices have been drastically reduced. Panel sizes have also moved away from the norm with LCD monitor sizes ranging up to 30 inches.

The sweet spot for price vs size lies in the 22" LCD monitor. One such monitor that has stood out from the rest in terms of performance and value is the **Acer AL2216W**. I currently own one of these monitors therefore I can attest to its quality and longevity. It is a barebones monitor that does not come with any USB ports. Also, its stand does not allow for much adjustment (only tilt), however, these disadvantages are negated by its low price and the quality of the monitor itself.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16824009094>

Cost:

\$1380 - \$1500tt

DVD-RW

Optical media has come a long way since the introduction of compact discs in the 1980's with capacities starting from 700mb to up to 50Gb in Blu-Ray discs of today. While Blu Ray and HD-DVD discs boast a much larger capacity than DVD's, Blu Ray is still a relatively new technology and comes at a price premium for RW drives, however, DVD's are already mature and prices are very low. The unit I would recommend is the **LITE-ON LH-20A1L-05**. This drive is capable of writing DVD's at a speed of up to 20X. It also performs read functions for DVD's as well as read and write functions for CD's. It also comes with the newer SATA interface which utilizes a much smaller data cable than conventional drives which allows for better aesthetics and greater air flow within the case.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16827106073>

Cost:

\$200 - \$300tt

Case

Computer cases are usually the most overlooked component by system builders. I fall into that category. When building a personal system, I leave the case as the last thing I select, but always run out of money before that stage is reached so as a result, I use a case that's almost as old as I am. Cases are very important, however, because it houses, protects and aids in cooling all the components within it. While an ordinary case bought at the local computer store may be sufficient for most applications, some users may desire a product of higher quality. To those users, I recommend the **Thermaltake Armor VA8000BWS**. This case is of high quality craftsmanship and is able to comfortably fit any imaginable configuration with ease. It also comes with server cooling fans placed at strategic locations to ensure healthy airflow and ventilation inside.

Link: <http://www.newegg.com/Product/Product.aspx?Item=N82E16811133154>

Cost:

\$800 - \$1000tt

Summary

For the majority of potential PC buyers, the prospect of buying parts and putting together a machine is not an option, however the more experienced PC users and enthusiasts have a proclivity towards obtaining a pc consisting of more powerful, high end parts capable of better performance than ordinary store bought machines. The purpose of this article is to guide those on a budget who are interested in assembling their own better than average PC but are unsure of what components should be used and where they can be sourced.

System cost estimation:

System	Estimated cost
Single GPU	\$9,500
SLI	\$12,000
Crossfire	\$11,500

Note: Crossfire estimation is based upon the HD3870 GPU by ATI (<http://www.newegg.com/Product/Product.aspx?Item=N82E16814103050>) with an estimated price range between \$1300 and \$1400tt per unit.

All prices are listed in TTD and include estimated cost to ship from online retailer to your door.