Building Your Own Computer
By Ron Mettler August 2007

Building a computer from components can be a fun, rewarding experience. Why build it from scratch instead of purchasing an off-the-shelf computer?

Faster computer and more bang for the buck
By selecting individual components to meet your criteria for a faster or better computer, you can assemble a system that is better than what you can purchase at a big box store. If you want a gaming computer, a fast family computer or a high-end super box, picking the individual components can achieve that goal.

Learning more about your system will help troubleshoot future problems
It takes research and an acquired level of knowledge to understand the relationship of the components to the overall system. You can learn new concepts about the way a computer functions and gain from the new knowledge. It can be a lot of fun as it was for me. Getting a new version of an operating system to work on the first try is rewarding.

Get only what you need or want
Selecting your components based on your anticipated use avoids getting components that you do not need. Do you need the extra floppy drive, the IDE drive instead of a SATA drive, the memory card reader or other items that may be included in store bought computers? Would you rather have a different monitor than what is offered as part of a package deal from a store?

Avoid bloat-ware that is installed on many store-bought computers
A store bought computer is often crippled as soon as you start it up. Many have the full array of AOL programs, trial versions of office suites, anti-virus programs and other software packages that you do not want or should not want. Uninstalling those programs can be a long process and may not remove them entirely. If you plan to install OpenOffice or Microsoft Office 2003 instead of Microsoft Office 2007, removing all traces of a trial version of Office 2007 can create problems. Do you really want to use that Symantec 90 day trial of a suite that contains anti-virus, antispyware, email scanning, online identity protection, web site authentication, firewall protection, antiphishing, automatic backup and restore, pc performance tuneup, automatic updates and embedded support? A trial version of Norton 360 gets all of that, but the computer may be slower than an old 486 system.

Build a nice looking system that you can show off
Pick the style of case, the color, the size and add lots of bells and whistles if you so desire. Some cases are black polished metal, some have clear sides or are entirely clear, and some have flashing LED lights. A lot of components can be purchased with different colored LED lights so if you have a case with clear sides, your room will be lit like a gaming center.

The downside of DIY computer

Unless you purchase extended warranties, you may have unacceptable time limitations on warranties for some components. On the other hand, it is possible to have better warranties than what you get at a store. My ASUS motherboard includes a 3-year warranty at no extra cost. Some items have no-questions asked 30 day return policies. Check the details of each item that you intend to purchase. If you break a component while installing it, you may be out of luck in getting a free replacement.

What does it take in the way of components to get a computer up and running?

Motherboard (Mobo to some system builders) – the main circuit board that all components connect to.

Processor – the CPU or Central Processing Unit. Currently Intel and AMD are the two manufacturers of consumer level processors.

Memory (RAM) – the chip modules that plug into the motherboard that are used to store and execute various functions in conjunction with the CPU.

Case – the box that the components are mounted in.

Cooling Fans or other devices – Many cases include one or more fans, most newer CPU's require fans, some video cards include fans, and some systems even utilize circulating water cooling systems.

Power Supply – converts the 120 volt alternating current from your wall outlet to the various electrical supply voltages needed for the components. Power plugs and cables are included with power supplies to connect to the motherboard and components.

Hard drive – the device that programs and data files or stored on. A typical hard drive has one or more rotating platters that have magnetic properties such that data can be written and read repeatedly.

DVD/CD drive – The device that a DVD or CD can be read or in the case of writable DVD's and CD's, can be written to.

Floppy Drive – I forgot what that is but you may want one anyway,

Video Card – The device that connects to the monitor and manipulates graphics and text information for display.

Keyboard and Mouse – No further details needed

Monitor – LCD, CRT, as desired.

Operating System – Windows or Linux? Vista or XP?

Other Software – as desired, no more or less than you need. Decide on purchase options, shareware, freeware or open source as desired. Take care in reviewing system requirements, compatibility with the operating system, memory requirements, and look at user reviews.

Which components were my choices?
The following list details the items that I purchased**.** The list is a PDF file converted from "My Wish List" created on the Newegg.com web site. Newegg is a supplier of electronics including computer components. The Wish List feature allows a person to add and subtract items and to store the list until such time a decision is made to actually place an order. I am impressed with the feature and with Newegg although there are other suppliers that may have similar on-line features. The Newegg site also has extensive forums dealing with computer builds and reviews for most items. Note that I did not purchase a new monitor as I am using my old 19" LCD and a 19" CRT monitor in a dual monitor configuration.

1, Antec P182 Gun Metal Black 0.8mm cold rolled steel ATX Mid Tower Computer Case, Return Policy: Standard Return Policy
$169.99

1, ASUS P5W DH DELUXE/WIFI-AP LGA 775 Intel 975X ATX Intel Motherboard
Return Policy: Limited 30-Day Return Policy,
For Asus Tech Support, Please Call 502-995-0883 or http://helpdesk.asus.com/
$199.99

1, EVGA 256-P2-7624-AR GeForce 7900GS 256MB GDDR3 PCI Express x16 KO Video Card - Retail
Return Policy: Limited 30-Day Return Policy
For Tech Support 888/881-EVGA (3842)
$124.99

2, Western Digital Caviar SE16 WD4000AAKS 400GB 7200 RPM SATA 3.0Gb/s Hard Drive – OEM, Return Policy: Limited 30-Day Return Policy
$189.98

1, Western Digital Caviar SE16 WD7500AAKS 750GB 7200 RPM SATA 3.0Gb/s Hard Drive – OEM, Return Policy: Limited 30-Day Return Policy
This item is serviced by the Western Digital. Please call 800 832 4778 for service.
$209.99

1, Intel Core 2 Duo E6600 Conroe 2.4GHz LGA 775 Processor Model BX80557E6600 - Retail, Return Policy: Processors (CPUs) Return Policy
Intel (800)-628-8686 Please Verify Processor matches order Prior to installation.
IMPORTA9T: Always pack you CPU well for return. We will refuse your RMA if we received it as DAMAGED!
$222.90

1, Microsoft Windows Vista 32-Bit Ultimate for System Builders Single Pack DVD - OEM, Return Policy: Software Return Policy
Please note CD keys are listed on the outside of the plastic wrap accompanying your product.

$187.99

1, Antec SmartPower 2.0 SP-500 ATX12V 500W Power Supply – Retail, Return Policy: Standard Return Policy
$69.99
1, Zalman 9700 110mm 2 Ball CPU Cooler – Retail, Return Policy: Standard Return Policy
$59.99

1, Logitech MX 5000 967558-0403 Black USB Bluetooth Wireless Standard Desktop Mouse Included – Retail, Return Policy: Standard Return Policy
$105.99

1, LITE-O7 20X DVD±R DVD Burner with LightScribe Black SATA Model LH-20A1L-05 – OEM, Return Policy: Standard Return Policy
$36.99

2, CORSAIR XMS2 DOMI7ATOR 2GB (2 x 1GB) 240-Pin DDR2 SDRAM DDR2 800 (PC2 6400) Dual Channel Kit Desktop Memory Model TWI72X2048-6400C4D – Retail, Return Policy: Memory (Modules, USB) Return Policy
$358.00

Subtotal: $1,936.79
Tax: $0.00
Shipping: $20.68
Amount Paid: $1,957.47

Steve Mokray recently purchased components for his new Vista computer as follows:

1) Case: Ultra X-Blaster Black ATX Mid Tower----------59.99
2) Case Fans: 2x 120M Case Fans ----------10.00
3) Power Supply: Ultra 500w V Series PSU----------34.80
4) Mother Board: Asus M2N-SLI Deluxe AM2----------139.99
5) CPU: AMD Athlon 64FX-62 / 280GHz----------239,99
6) CPU Fan: Ultra AMD2----------49.99
7) Memory: 1G x2 Corsair Twin 2x1024----------103.99
8) Video Board: GeForce 7600 Graphics----------99.99
9) DVD/CD Rom: Lite-On 20x DVDRW Lightscribe----------39.99

10)Card Reader: XTATIX 3.5inch Sata Media Reader----------24.99
11) Hard Drive: Seagate 320Gb----------79.99
12) Hard Drive: Western Digital 200Gb----------59.99
Total----------$883.71

Note that Steve ordered a new LCD monitor which is not included in the above list.

A friend recently purchased components from Newegg for his new dual boot Linux/Windows XP computer as follows:

1, COOLER MASTER Stacker 830 Evolution RC-830-KKN2-GP Black Aluminum ATX Full Tower Computer Case – Retail, Model #: RC-830-KKN2-GP
Return Policy: Standard Return Policy
Mail-in Rebate
$259.99

1, EVGA 122-CK-NF66-T1 LGA 775 NVIDIA nForce 650i Ultra ATX Intel Motherboard – Retail, Item #: N82E16813188017, *Return Policy: Standard Return Policy*, In Stock
$89.99

1, EVGA 768-P2-N831-AR GeForce 8800GTX 768MB GDDR3 PCI Express x16 HDCP Video Card – Retail, Model #: 768-P2-N831-AR
Return Policy: Limited Non-Refundable 30-Day Return Policy
$516.99

1, CORSAIR CMPSU-620HX ATX12V v2.2 and EPS12V 2.91 620W Power Supply - Retail, Model #: CMPSU-620HX, *Return Policy: Standard Return Policy*
$169.99

1, Intel Core 2 Duo E6550 Conroe 2.33GHz LGA 775 Processor Model BX80557E6550 - Retail, Model #: BX80557E6550, *Return Policy: Processors (CPUs) Return Policy*
$182.99

1, CORSAIR XMS2 2GB (2 x 1GB) 240-Pin DDR2 SDRAM DDR2 800 (PC2 6400) Dual Channel Kit Desktop Memory Model TWIN2X2048-6400C4 - Retail

Model #: TWIN2X2048-6400C4, *Return Policy: Memory (Modules) Return Policy*
$119.00

2, Seagate Barracuda 7200.10 ST380815AS 80GB 7200 RPM SATA 3.0Gb/s Hard Drive – OEM, Model #: ST380815AS, *Return Policy: Limited 30-Day Return Policy*
$42.99 each, $85.98

1, SAMSUNG 226BW Black 22" 2 ms (GTG) DVI Widescreen LCD Monitor - Retail
Model #: 226BW, *Return Policy: [LCD] Limited Non-Refundable 30-Day Return Policy*
$319.99

1, Sony NEC Optiarc 18X DVD±R DVD Burner, OEM Version Black SATA Model AWG170S-B2 – OEM, Model #: AWG170S-B2
$32.99

1, Creative Sound Blaster X-Fi Xtreme Audio 7.1 Channels PCI Interface Sound Card -
$65.99

1, Scythe S-FLEX SFF21E 120mm Case Fan – Retail, Model #: S-FLEX SFF21E
Return Policy: Standard Return Policy
$19.99

Total: $1,863.89

My System design criteria

The above examples indicate the varying opinions based on individual needs and desires and the flexibility offered by purchasing components. My criteria for selecting the components that I used were influenced by the following thoughts (valid or otherwise):

1. I wanted a fast computer, one that would allow me to change components and upgrade if need be in the future.
2. I was curious about the possibility of over-clocking the memory and CPU to achieve higher performance without having higher cost components.
3. I wanted the system to last me for the next 5 years while allowing me to run any operating system and other software that might be introduced during that time.
4. I did not have a desire for higher end gaming capabilities but I did want to be able to purchase and run the newest Microsoft Flight Simulator software and devices.
5. I had a mid-range budget constraint.

My Selection Process

1. I started with my selection for the CPU. Reviews at the time indicated that Intel Core 2 Duo processors were performing better than AMD processors. I selected the E6600 because it had overclocking capabilities, and seemed to be priced at the best performance/price ratio. I consulted reviews on the extremetech.com web site and on the Newegg.com web site. The Quad Core processors did not seem to be worth the much higher cost in terms of improved performance. I did not use the CPU cooling fan that Intel furnishes with the CPU but purchased a separate higher performance Zalman 9700 CPU cooler. I probably did not need the extra cooling and cost.
2. My selection of the ASUS P5W DH Deluxe motherboard was influenced by a strong recommendation from friend and by three articles on the extremetech.com web site. The three articles covered building your own computer and included that motherboard. The board includes a BIOS that allows individual tweaking of frequency, voltages and timing parameters for the CPU and memory chips. The tweaking provides control of overclocking.
3. The case was selected on the fact that it was designed for very low noise, it had lots of room for components, and it had received high reviews. The cosmetics of the nice shiny black case with a front cover was also a factor.
4. I selected the RAM chips to match the motherboard and CPU requirements. I paid extra for the added cooling heat sinks that were built onto the chip modules. I am not sure that I was justified in spending the extra money for the feature.
5. I had decided that I would like to speed up my hard drive performance and would also like to find out what Raid hard drive configurations were all about. I selected 2, 400 GB 7200 RPM Western Digital drives for their quite operating performance and their 16 MB cache. My research indicated that if I used the BIOS on the motherboard to configure the two drives as a Raid 0 configuration, I would get something like 2 times the read/write speed and the configuration would appear as one 800 GB hard drive. I am also a very strong supporter of a backing up my system so I added a third 750 GB drive for backup purposes. All three drives are SATA II drives. I purchased and installed Norton Ghost 12 backup software because I was not happy with the Vista Ultimate backup routines.
6. I selected an EVGA GeForce 7900GS 256MB GDDR3 PCI Express x16 Video card. I am not a gamer, but I did want smooth video performance and the possibility of outputting high definition video to a future higher level monitor. I selected a card at the lower end of the mid-range of cost cards.
7. My selection of the Antec 500 watt power supply was driven by the desire to find a modular cabled power supply where I only had to install the cables that I needed to supply the components that I was using. Non-modular power supplies have permanently connected cables so extra cables have to be tied back and add cooling restrictions to the system.
8. The DVD writer selection was just a hit and miss item. I liked the wireless keyboard and laser wireless mouse combination that Logitech offered with the MX 5000 system and it was cool looking.
9. I purchased an OEM version of Microsoft Vista Ultimate, as my preferred choice.

Summary

I started my Wish List on the Newegg.com site about 6 months before I placed the order. I took all six months to tweak my component selections while being influenced by reviews, friend's recommendations, my thoughts and other random factors. I was also constrained by my budget and did have to wait several months to save up the money. Again, the process taught me a lot and I am still learning. That was a big part of my goal.

Reference link items:

Pictures of my components
Another Wish List from a friend

The above wish list from a friend is based on his dream machine if he did not have a budget limitation.