



Build a Computer

Part 1 - Hardware Selection

by
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HOW TO BUILD A COMPUTER Part One Hardware Selection

There hasn't been much interest in this topic among club members in the past, but conditions are changing. While I can't argue with the reassurance provided by a manufacturer's warranty I like being able to choose the brand and quality of every component in my computer. In addition I am comfortable knowing that I can replace or upgrade any component in my system as time passes and more desirable components become available. For example, while I'm not ready to pay the current price for a blue-wave drive I am confident that my computer will support one when I decide the time has come. These same is true about a quad core processor. While you can buy one today, you are paying for something that really won't be of immediate use until software houses really take advantage of its power. Should that happen I am confident that I will be able to upgrade my system to use one.

Is it cheaper to build your own computer. I'd say yes if you are going to use high quality components that are near the state of the art. The following computer has only a duo-core CPU but it is a 3.0GHz processor (about 50-100% as fast as the ones in the cheap computers you see listed). If you go by the benchmarks alone you are buying the argument that a quad-core computer is 4 times as fast as a single core and twice as fast as a double core, but that is only true if true multitasking software is provided. The 64bit operating system is theoretically 2X as fast as the 32bit, but in reality it probable isn't much faster. My design has 4GB RAM, a 3.0GHz Duo core CPU and a 1TB hard disk drive. These specs are not commonly found in cheap computers.

What I bought:

<i>Item</i>	<i>Brief Description</i>	<i>Price</i>
Barebones Kit	includes case, power supply and motherboard	\$219.99
Operating System	Microsoft Home Premium Vista SP1 64-bit	\$99.99
4GB RAM Memory	Corsair XMS RAM - 2 strips of 2GB memory	\$44.99
CPU	Intel Core 2 Duo E8400 CPU	\$164.99
Optical Drive	Samsung DVD Burner Black SATA .	\$23.99
Cable	SATA Optical Drive Cable	3.99
Hard Disk Drive	1TB Hitachi 7200RPM, SATA 3.0-	87.99
Totals	A Very Small but Fast Computer	\$649.92

The "barebones kit" from Shuttle is their SG33G5B Intel Socket T (LGA775) Intel G33 2 x 240 Pin Intel GMA 3100 glamor small form factor black XPC Barebone with HDMI. This can be translated to: A very small case (8" x 7.5" cross section and a depth of 12"). Get out a ruler and check that out, its tiny! The case comes with a preinstalled power supply (250W), and motherboard. The motherboard is what ties all the parts together to make a machine. The motherboard is preinstalled in the case with the power connections in place and nearly all of the peripheral cables routed and tied down (with clever plastic ties that can be easily removed or adjusted).

The Shuttle motherboard includes the CPU socket, that's the Intel Socket T (LGA775) part of the above. This determines what CPUs can be installed. The LGA775 socket works with everything from the Intel Celeron 400, through the Pentium P4, the Core 2 Duo, and the Core 2 Quad. That's a lot of territory. The CPU is not included in the above barebone package. The next part of the spec tells us that the memory must be of the type DDR2 800/667 with the 800 being faster. There are only two memory card slots on the motherboard and memory must be added to both card slots in equal amounts of identical memory.

This motherboard includes all the necessary circuitry for a 5.1 audio system, a 10/100/1000 Mbps LAN (Internet) connection, and a video card. While the video card probably will not satisfy the needs of a true die hard gamer it will satisfy the requirements of Windows Vista Home Premium quite nicely.

This leaves a surprisingly small number of parts left to buy. The first of these should be the operating system because the size of the RAM memory depends on version of the operating system. I decided to go with the 64 bit version of Windows Vista Home Premium. When I tried the 64-bit version of XP three years ago I concluded it was not ready to support my needs. I have had better luck finding all my drives for my peripherals and this version, in part due to the fact I have updated some of the peripherals.

Because the motherboard in the Shuttle barebones case provides only two memory slots the choices are between two 1 GB memory strips for 2 GB of RAM Memory for the 32-bit version of the operating system or 2 x 2GB for 4GB of RAM Memory for the 64 bit version of the operating system. Most modern memory, the 240pin DDR2 in particular, is sold in pairs. I chose to add 2 x 2 GB of memory for a total of 4GB. Tonight Corsair XMS memory is selling for \$44.99 with \$20 mail-in rebate from that figure. When I bought my components this same memory was \$56 with a \$20 mail-in rebate.

The CPU choice is one of the more difficult ones you will have to make. You need to consult with the [benchmark rating pages](#) I have referred to earlier to determine the bang-for-the-buck for a variety of processors. This time I chose an Intel CPU with the one of the latest technologies available. The Intel Core 2 Duo E8400 Wolfdale 3.0 GHz LGA 75 65W Dual Core Processor Model BX80570E8400 is built on Intel's 45nm manufacturing to achieve a low power consumption of 65 watts, one of the lowest on the market. This is desirable in terms of the heat that can build up in a tiny case like I chose for this system.

This processor is a winner of a Customer Choice Award for Processor - Desktops. It's benchmark score is about 3 X my previous winner, an AMD 4800+, the last of its line in the 929 socket. Both are dual processor chips and I suspect that I have not used either at anywhere near its full potential. For what it is worth the latest machine cost about 1/2 what its predecessor did.

While it is growing less necessary, I still prefer systems to include a CD/DVD drive that can both read and write optical disks. However, I'm still not ready to pay \$200-\$400 for a blue ray drive when I can obtain an adequate conventional drive for \$20-\$30. I went with a Samsung DVD Burner Black SATA Model SH-S223F. This is an OEM drive that comes with no supporting cables or paper work.

I was disappointed to find that my Shuttle case did not include the data cable for a SATA optical drive but I found one in my collection of odds and ends. If I were to build another machine like this one I would include this cable in my parts list. NewEgg's - OKGEAR 24" SATA II Cable Model GC24AUGM12 - \$3.99.

Finally I topped my system off with a 1TB hard disk drive. I chose the Hitachi 0A380016 1TB 7200 RPM 16MB Cache SATA 3.0 Gb/s Hard Drive - OEM. Shuttle had provided and routed all of the cables necessary for the support of this drive.

A component that I have not listed, but is a significant part of my machine, is the TV Tuner card. Mine is a dual tuner type card but I'm currently using only one cable connection. The card is an analog card so is outdated now. I use it with my cable-TV converter box so it still works and provides 720 pixel quality with our Suddenlink converter. The picture quality is quite nice driving a 22" monitor. The computer has an HDMI output that varies from 540 to 720 pixels but does not support 1080 pixels. From anything I've read you really won't benefit much from 1080 with a 22" monitor.

Next month we will describe the assembly of his machine.