HOW TO BUILD A COMPUTER - II: CHOOSING COMPUTER COMPONENTS

Note: This is the second installment in an ongoing series that will detail how to build a computer starting with selecting the components and covering everything in between up to installing the OS and tweaking the BIOS.

We began our series on how to build a computer last week when we covered choosing the case, power supply, CD/DVD drives, and floppy drive. This week, we will continue by looking at how to select a motherboard, hard drive, and memory (RAM) for your computer system. The information provided here is of a basic nature for those new to computer building and selecting components. The hardware on the component list below in italics was covered in a previous installment of this series. Today, we will be covering the hardware in bold. Asterisks denote optional components.

• *Chassis/case*
• *Power supply*
• *CD drives*
• *DVD drives*
• *Floppy Drive**
• **Hard Drive(s)**
• **RAM** (random access memory)
• **Motherboard**
• CPU (central processing unit)
• CPU heat sink/fan
• Thermal paste
• Hard drive cable
• Floppy drive cable*
• CD/DVD drive cable
• Video card (graphics card)*
(optional if your motherboard has onboard graphics)
• Sound card* (optional if your motherboard has onboard sound)
• Monitor (display)
• Input – Keyboard/Mouse

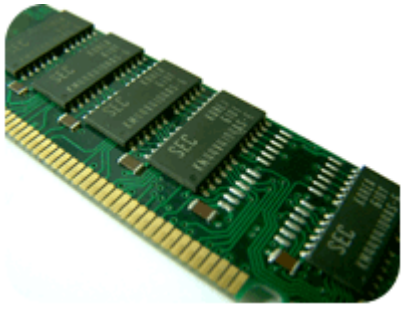
• Speakers*
• Operating system software

Hard Drive

There are a number of different hard drive manufacturers and hard drive types in a wide price range, but basically internal hard drives are available in two internal styles:IDE and SATA. SATA drives are newer, offer improved performance over IDE drives with regards to bandwidth and data transfer speeds, and use thinner serial cables versus the bulkier ribbon cables used by IDE drives. However, IDE drives are still available and every motherboard still has the required IDE headers (connectors) on them. The same can't be said for SATA drives; some of the older motherboards around don't have SATA ports on them. SATA drives also come in two speeds: SATA 3.0 GB/s and the standard (150 mb/second) SATA ports. You will want to check compatibility with your motherboard before you purchase your hard drive.

The capacity of the hard drive you buy is really a matter of personal choice. Currently, the largest capacity you can get on an internal single hard drive is 750GB. Obviously, the larger the capacity, the more the drive costs. I recommend you get the largest drive your budget can absorb.

RAM (Random Access Memory)



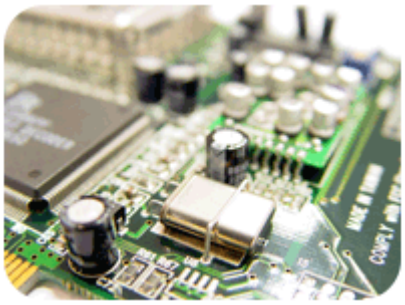
Much like hard drives, there are many choices available for RAM, depending on the manufacturer and speed of the product. You need to be sure that you are buying the appropriate RAM for your system. Some motherboards will accept DDR2 and some will only accept original DDR. All AMD motherboards accept only DDR memory, except the newest socket AM2 systems. Most all Intel systems that are currently on the market use DDR2, as do the new AMD AM2 platforms.

RAM [check out this Tech Tip on memory] is typically specified by both a gigahertz (GHz) speed as well as latency, such as OCZ PC5300 333MHz. If you are searching for gaming RAM, you will want to keep an eye on the latency of the RAM. Generic modules of RAM will likely not list the latencies, while high performance and gaming RAM will certainly list them. The lower the latency numbers, the better the performance you can expect from your modules.

Some systems, such as the AMD socket AM2 systems, benefit more from lower latencies than they do from higher clock speeds. You will want to do some research to determine what is better for your system: high memory speeds or lower latencies. Obviously, the best of both worlds would be RAM with both high clock speeds and low latencies.

The amount of RAM depends on both your budget, as well as what you intend the system to be used for when it's completed. If you are going to build a gaming computer system, I strongly recommend a minimum of 2GB of RAM. The way games are trending, 2GB of RAM is swiftly becoming the norm for high-end titles to perform at their best. Currently, I see no need for more than 2GB of RAM in standard gaming systems. RAM can be one of the most expensive components of your system. For a basic Windows XP system intended for simple web browsing, word processing, and maybe some simple games (ie., Solitaire), 1GB of RAM should be adequate.

Motherboard



One of the most difficult hardware choices for someone building their first system is the motherboard [check out this Tech Tip on motherboard basics]. Because the motherboard is the heart of the computer, it is critical that the motherboard and the CPU (Central Processing Unit) you purchase are compatible. To determine compatibility, look for the processor socket type - all CPUs will list their socket type in the description. As an example, the processor in my system is an AMD Athlon 64 X2 5000+ socket AM2. To buy a motherboard for this CPU, you simply look for one that has the socket AM2 built-in. The same goes for Intel processors - just get a motherboard that has the correct socket. There are several socket types currently in use by both AMD and Intel, so be sure to check compatibility with the motherboard before you buy either the motherboard or the CPU or you can buy a motherboard/processor combo such as this one.

You want to be sure that you choose the correct features for your desired system based on anticipated use. For instance, if you are building a moderate to low performance system for general computer work, look for a motherboard with on-board graphics. This will save you some money and time over buying and installing a separate graphics card. If you are building a high-end gaming system, stay away from any motherboard that has on-board graphics. Instead, look for a motherboard that has one or two PCI Express slots for high-end graphics cards. You can also still occasionally find motherboards that use AGP over PCI-E. There are very few high-

performance AGP graphics cards left on the market; gamers should go for PCI-E motherboards.

Gamers should also consider whether to run dual graphics cards with either nVidia SLI or ATi Crossfire setups. To be able to run either dual card method, you will need an appropriate motherboard with the correct chipset. If a motherboard is SLI or Crossfire capable, it will be listed. If you think at some future date you might want to use dual graphics cards, buy the motherboard now that supports your preferred vendor. That way, you can run either SLI and Crossfire graphic boards in a single card configuration and have an upgrade path for the future without having to buy a new motherboard.

If you intend to run multiple hard drives in a RAID array, you will also want to be sure that the motherboard you choose supports that function. However, if you find the perfect motherboard that lacks RAID functionality, you can buy good, inexpensive add-in RAID cards. That said, most current motherboards offer RAID functionality of some sort. For more information on RAID, check out this Tech Tip on RAID.

In summary, your choice of motherboard is going to be the basis for determining the performance of your PC going forward. Next week, we will pick up where we left off today, starting with CPUs, the most important part of the entire computer system. Knowing what you will be using your computer for will help you decide what direction to go when building it.