

**Chapter 1 : Internal Computer Hardware – Introduction to Information and Communication Technology**

*At its core, a computer system is nothing more than a combination of computer parts working together. The most essential parts are the CPU, motherboard, memory (RAM), power supply, and hard drive (or SSD).*

While previously one could use up to 4 graphic cards at one time, the limit is generally two now. The idea is that it will record and serve audio and video files for replay via your existing television and stereo. The current notion is that this computer should be built in a special case that makes it look more like a stereo component, the size of which can present a challenge when it comes to getting all the necessary parts fitted. For this system a mid-range processor will be fine, along with a generous amount of RAM. A fast Ethernet connection will facilitate sharing large files. Many of these also provide DVR digital video recorder functionality, often without the monthly subscription fees and DRM digital rights management restrictions required by companies like Tivo. A wireless keyboard and mouse provide for couch-based use and a separate monitor may be unnecessary as your TV will fill that role. For this application it makes sense to trade a little power for passively-cooled without fans parts. Following this logic, one may consider fan-less CPUs and mainboards.

**Workstation**[ edit ] A workstation was originally a single-user computer with more muscle than a PC intended to support a demanding technical application, like CAD or complicated array-based simulations of real world phenomena. One sector that still uses large workstation farms from Sun or Silicon Graphics is serious, Pixar-style animation. For any of the following uses, you will need the fastest processor and the most RAM you can manage. The 4th gigabyte will be partially absorbed by system overhead or remain partially unused due to the OS incapacity to address memory at that range. Video editing[ edit ] Big and fast hard drives are key. Audio interfaces allow anything from a single microphone or instrument on up to pro level systems that have 32 or more simultaneous inputs. These separate inputs will allow you to record each one as a separate track in your DAW. One piece of advice, if you have extra money, get better microphones - even if you have to trade the Bluesmobile. Spec the hardware to support the software - always a good idea but especially important here. Do I plan on overclocking my computer? If you are serious about overclocking your computer, you need to do extensive research into the components you select, as some parts respond to overclocking better than others. Processors that respond well to heavy overclocking are generally not very expensive though overclockable memory is , but the price of a component is by no means a guarantee of its overclocking potential. Overclocking usually voids your warranty and is risky you can destroy your entire computer , so be warned! You need to think hard about cooling the computer as overclocking generates heat. Anything from a few extra fans to a liquid-cooled system may be necessary depending on the nature of your system. Examples are iK, iK or iX. Some processors within the same model! For example, a good Haswell K chip can clock up to about 4. Do I plan on underclocking my computer? Can I use any of the parts from my old computer? On the other hand, if you are upgrading from a fairly new machine, you may be able to use many of the parts. All of this assumes the old computer will no longer be used. Special precautions must be taken to ensure that you are not giving away your sensitive or personal information. Lower-tech approaches include drilling a few holes in the drive or taking a blowtorch to it. Obviously, either prevents it from being used again Be planet friendly and try to avoid this. The same can go for keyboards, as well as mice, printers, scanners, and possibly speaker sets. On the inside, you may be able to take out the floppy drive, CD-ROM drive, and possibly the sound card and hard drive depending on how good they are, of course. Sometimes so much is used from the old computer, that the line between an upgrade and a new computer can become blurred. Reusing a hard drive is an easy way to keep data from your old computer. With most Windows operating systems moving a boot drive from one motherboard to another will entail a series of reboots and installation of new drivers. Back up your data before trying this, and note that Windows will usually ask you to reactivate. Keep the licence key ready. Where do I find the parts? A few hours of research can save you years of regret, so make sure that the computer you build will do what you need it to do. There are several places to buy parts: Internet retailers generally offer the best price for new parts. If a part needs to be returned, you may be stuck for the shipping; check return policies before you purchase. Auction sites like eBay and several others offer very good prices

for used parts. This is especially useful for parts which do not wear out. Returns can be problematic or impossible. Some auctions may not be legitimate. Always check the shipping cost before you bid. Local PC shops - Their prices are often higher, but they may make up for this by providing a lot of expertise. Big local retailers often lack technical expertise and charge higher prices, but can be useful because they usually handle returns quickly. Also good if you need something right away. Trade shows that occur from time to time also provide a good place to shop, as the prices are often significantly reduced, and the variety of prefabricated computers built towards specific computing needs tend to be higher. Also, your local town dump may have a special section for computers and monitors that others have got rid of. These can be more or less brand new computers with trivial problems such as a busted power supply or faulty cables. Of course if the dump does have such a section, you should ask permission of those in charge. Taking advantage of this can yield incredible finds, with a price tag of nothing or very little. Many hardware manufacturers will sell the same components in both OEM and Retail versions. Retail hardware is intended to be sold to the end-user through retail channels, and will come fully packaged with manuals, accessories, software, etc. OEM stands for "original equipment manufacturer"; items labeled as such are intended to be sold in bulk for use by firms which integrate the components into their own products. However, many online stores will offer OEM hardware at slightly cheaper prices than the corresponding retail versions. You will usually receive such an item by itself in an anti-static bag. It may or may not come with a manual or a CD containing drivers. Warranties on OEM parts may often be shorter or nonexistent, and sometimes require you to obtain support through your vendor, rather than the manufacturer. OEM components are also sometimes specified differently than their retail counterparts, parts may be clocked slower, and ports or features may be missing. Some of the support may be less as in the case of Microsoft. Again, do your research. Below are some things to consider. Often quality RAM that is not on the approved list but is of the proper type will work anyway, but the manufacturers list of processors should be rigidly adhered to. If you have any interest in running Linux, macOS or another operating system now or in the future, buy parts that are supported by that OS Operating System. It is also worth checking around the Internet to make sure there is no history of your chosen components clashing e. Ergonomics[ edit ] Ergonomics is the science of designing things so that they work with the human body. This is obviously important when choosing peripherals such as a keyboard or mouse but should also be considered when selecting a monitor, and especially when setting up the computer for your use. An ounce of prevention here can avert troublesome repetitive strain injuries. Learning to type without looking down at the keyboard is very useful for avoiding neck strain. Operating temperature[ edit ] Modern components, notably processors, GPUs, RAM, and some elements on the motherboard, are very small and draw a lot of power. A small area doing a lot of work with a lot of power leads to high temperatures. Various factors can cause electronic parts to break down over time and all of these factors are exacerbated by heat. Very high temperatures can burn out chips almost instantly, while running hot can shorten the useful life of a part, so the cooler we can make these parts, the better. If you are not going to overclock your system, stock air cooling, when paired with a good case with adequate fans, should be enough to keep your system cool. If you want a quiet computer then components designed for passive fan-less cooling can be paired with very low noise case fans or a well-vented case. In general, high-end parts will require more attention to cooling. To keep your system at a proper operating temperature, you can monitor vital components with software which usually comes with your motherboard. If you are seeing high temps, make sure the interior of your case is dust free, and remember that most cooling solutions can not reduce the temperature of your computer parts below room temperature. Of course, unless you happen to have your computer outdoors in a climate such as the Sahara, room temperature will be well within the thermal limits of any component on your computer. Which brings us to overclocking. An enthusiast seeking a major overclock might go with a water-cooling solution for the CPU and GPU and sometimes other chips. The real fanatics have been known to use liquid nitrogen or total immersion in pure water or oil. Price[ edit ] Today, there are a wide array of hardware components and peripherals tailored to fit every home computing need and budget. Shop around and remember to factor in shipping and handling, and taxes. Some places may be priced a bit higher, but offer perks such as free shipping, limited warranties, or hour tech support. So look for components that support the newest standards

and have room for future expansion, like a motherboard that will allow you to fit more memory than you are planning to use, or a case that has room for extra hard drives. If your current machine is maxed out the only possible upgrade is often a new machine. You may also find that by over-specifying in some areas you can save money on others, e. Performance[ edit ] If money is no object, this is an easy question; just buy the most powerful components you can find. Primary components[ edit ] These are the components that will be the core of your new computer. It is impractical to put together a PC compatible computer without these components and a bare set of peripherals.

**Chapter 2 : Computer Parts Stock Photos. Royalty Free Computer Parts Images**

*theinnatdunvilla.com offers 96 name all parts computer products. About 30% of these are computer cases & towers, 29% are memory, and 15% are desktops. A wide variety of name all parts computer options are available to you, such as desktop, full tower, and ddr3.*

The hardware of a computer is infrequently changed, while software and data are modified frequently. The term soft refers to readily created, modified, or erased. These are unlike the physical components within the computer which are hard. When you think of the term computer hardware you probably think of the guts inside your personal computer at home or the one in your classroom. However, computer hardware does not specifically refer to personal computers. Instead, it is all types of computer systems. Computer hardware is in embedded systems in automobiles, microwave ovens, CD players, DVD players, and many more devices. In , only 0. How many other things in your house or your classroom use computer hardware? It is the central circuit board making up a complex electronic system. A motherboard provides the electrical connections by which the other components of the system communicate. The mother board includes many components such as: It is sometimes referred to as the brain of the computer. The first step, fetch, involves retrieving an instruction from program memory. In the decode step, the instruction is broken up into parts that have significance to other portions of the CPU. During the execute step various portions of the CPU, such as the arithmetic logic unit ALU and the floating point unit FPU are connected so they can perform the desired operation. The final step, writeback, simply writes back the results of the execute step to some form of memory. RAM attaches directly to the motherboard, and is used to store programs that are currently running. RAM is a set of integrated circuits that allow the stored data to be accessed in any order why it is called random. There are many different types of RAM. Distinctions between these different types include: It is a computer program that is embedded in a hardware device, for example a microcontroller. As it name suggests, firmware is somewhere between hardware and software. Like software, it is a computer program which is executed by a microprocessor or a microcontroller. But it is also tightly linked to a piece of hardware, and has little meaning outside of it. Most devices attached to modern systems are special-purpose computers in their own right, running their own software. Its case holds a transformer, voltage control, and usually a cooling fan. The power supply converts about volts of AC power to low-voltage DC power for the internal components to use. The most common computer power supplies are built to conform with the ATX form factor. This enables different power supplies to be interchangeable with different components inside the computer. ATX power supplies also are designed to turn on and off using a signal from the motherboard, and provide support for modern functions such as standby mode. There are many different removable media devices. The most popular are probably CD and DVD drives which almost every computer these days has at least one of. There are some new disc drives such as Blu-ray which can hold a much larger amount of information then normal CDs or DVDs. One type of removable media which is becoming less popular is floppy disk. They are inexpensive but also have short life-span. There are a few different kinds of CDs. CD-ROM which stands for Compact Disc read-only memory are popularly used to distribute computer software although any type of data can be stored on them. CD-R is another variation which can only be written to once but can be read many times. CD-RW rewritable can be written to more than once as well as read more than once. The CD writer drive can read and write a CD. Both kinds of CD drives are called optical disc drives because the use a laser light or electromagnetic waves to read or write data to or from a CD. The main uses for DVDs are video and data storage. Most DVDs are of the same dimensions as compact discs. Just like CDs there are many different variations. Its main uses are high-definition video and data storage. Blu-ray discs have similar devices used to read them and write to them as CDs have. Floppy disks are read and written by a floppy disk drive. Floppy disks are a dying and being replaced by the optical and flash drives. Many new computers do not come with floppy drives anymore but there are a lot of older ones with floppy drives lying around. While floppy disks are very cheap the amount of storage on them compared to the amount of storage for the price of flash drives makes floppy disks unreasonable to use. There are a few different types of internal storage. Hard disks are the

most popular type of internal storage. Solid-state drives have grown in popularity slowly. A disk array controller is popular when you need more storage than a single hard disk can hold. Just about every new computer comes with a hard disk these days unless it comes with a new solid-state drive. An SSD emulates a hard disk drive, thus easily replacing it in any application. SSDs are currently more expensive per unit of capacity than HDDs which is why they have not caught on so quickly. It almost always implements hardware RAID. A disk array controller also provides additional disk cache.

## Chapter 3 : Motherboard Parts and Functions: Getting to Know Your Hardware

*The central processing unit (CPU) is the brain of your computer. It handles all the instructions you give your computer, and the faster it does this, the better.*

Transistor computer The design complexity of CPUs increased as various technologies facilitated building smaller and more reliable electronic devices. The first such improvement came with the advent of the transistor. Transistorized CPUs during the s and s no longer had to be built out of bulky, unreliable and fragile switching elements like vacuum tubes and relays. To facilitate this improvement, IBM used the concept of a microprogram often called "microcode" , which still sees widespread usage in modern CPUs. Aside from facilitating increased reliability and lower power consumption, transistors also allowed CPUs to operate at much higher speeds because of the short switching time of a transistor in comparison to a tube or relay. The integrated circuit IC allowed a large number of transistors to be manufactured on a single semiconductor-based die , or "chip". At first, only very basic non-specialized digital circuits such as NOR gates were miniaturized into ICs. To build an entire CPU out of SSI ICs required thousands of individual chips, but still consumed much less space and power than earlier discrete transistor designs. Large-scale integration CPUs[ edit ] Lee Boysel published influential articles, including a "manifesto", which described how to build the equivalent of a bit mainframe computer from a relatively small number of large-scale integration circuits LSI. However, some companies continued to build processors out of bipolar chips because bipolar junction transistors were so much faster than MOS chips; for example, Datapoint built processors out of transistorâ€™transistor logic TTL chips until the early s. Microprocessor Die of an Intel DX2 microprocessor actual size: Mainframe and minicomputer manufacturers of the time launched proprietary IC development programs to upgrade their older computer architectures , and eventually produced instruction set compatible microprocessors that were backward-compatible with their older hardware and software. Combined with the advent and eventual success of the ubiquitous personal computer , the term CPU is now applied almost exclusively [a] to microprocessors. Several CPUs denoted cores can be combined in a single processing chip. Additionally, the ability to construct exceedingly small transistors on an IC has increased the complexity and number of transistors in a single CPU many fold. Almost all common CPUs today can be very accurately described as von Neumann stored-program machines. Extreme miniaturization of electronic gates is causing the effects of phenomena like electromigration and subthreshold leakage to become much more significant. Operation[ edit ] The fundamental operation of most CPUs, regardless of the physical form they take, is to execute a sequence of stored instructions that is called a program. The instructions to be executed are kept in some kind of computer memory. Nearly all CPUs follow the fetch, decode and execute steps in their operation, which are collectively known as the instruction cycle. After the execution of an instruction, the entire process repeats, with the next instruction cycle normally fetching the next-in-sequence instruction because of the incremented value in the program counter. If a jump instruction was executed, the program counter will be modified to contain the address of the instruction that was jumped to and program execution continues normally. In more complex CPUs, multiple instructions can be fetched, decoded and executed simultaneously. This section describes what is generally referred to as the " classic RISC pipeline ", which is quite common among the simple CPUs used in many electronic devices often called microcontroller. It largely ignores the important role of CPU cache , and therefore the access stage of the pipeline. Some instructions manipulate the program counter rather than producing result data directly; such instructions are generally called "jumps" and facilitate program behavior like loops , conditional program execution through the use of a conditional jump , and existence of functions. These flags can be used to influence how a program behaves, since they often indicate the outcome of various operations. For example, in such processors a "compare" instruction evaluates two values and sets or clears bits in the flags register to indicate which one is greater or whether they are equal; one of these flags could then be used by a later jump instruction to determine program flow. Fetch[ edit ] The first step, fetch, involves retrieving an instruction which is represented by a number or sequence of numbers from program memory. After an instruction is fetched, the PC is incremented by the

length of the instruction so that it will contain the address of the next instruction in the sequence. This issue is largely addressed in modern processors by caches and pipeline architectures see below. In the decode step, performed by the circuitry known as the instruction decoder, the instruction is converted into signals that control other parts of the CPU. Those operands may be specified as a constant value called an immediate value , or as the location of a value that may be a processor register or a memory address, as determined by some addressing mode. In some CPU designs the instruction decoder is implemented as a hardwired, unchangeable circuit. In others, a microprogram is used to translate instructions into sets of CPU configuration signals that are applied sequentially over multiple clock pulses. In some cases the memory that stores the microprogram is rewritable, making it possible to change the way in which the CPU decodes instructions. Execute[ edit ] After the fetch and decode steps, the execute step is performed. Depending on the CPU architecture, this may consist of a single action or a sequence of actions. During each action, various parts of the CPU are electrically connected so they can perform all or part of the desired operation and then the action is completed, typically in response to a clock pulse. Very often the results are written to an internal CPU register for quick access by subsequent instructions. In other cases results may be written to slower, but less expensive and higher capacity main memory. For example, if an addition instruction is to be executed, the arithmetic logic unit ALU inputs are connected to a pair of operand sources numbers to be summed , the ALU is configured to perform an addition operation so that the sum of its operand inputs will appear at its output, and the ALU output is connected to storage e. When the clock pulse occurs, the sum will be transferred to storage and, if the resulting sum is too large i. Structure and implementation[ edit ] See also: Processor design Block diagram of a basic uniprocessor-CPU computer. Black lines indicate data flow, whereas red lines indicate control flow; arrows indicate flow directions. Such operations may involve, for example, adding or subtracting two numbers, comparing two numbers, or jumping to a different part of a program. Each basic operation is represented by a particular combination of bits , known as the machine language opcode ; while executing instructions in a machine language program, the CPU decides which operation to perform by "decoding" the opcode. A complete machine language instruction consists of an opcode and, in many cases, additional bits that specify arguments for the operation for example, the numbers to be summed in the case of an addition operation. Going up the complexity scale, a machine language program is a collection of machine language instructions that the CPU executes. In general, a CPU executes an instruction by fetching it from memory, using its ALU to perform an operation, and then storing the result to memory. Control unit The control unit of the CPU contains circuitry that uses electrical signals to direct the entire computer system to carry out stored program instructions. The control unit does not execute program instructions; rather, it directs other parts of the system to do so. The control unit communicates with both the ALU and memory. Arithmetic logic unit[ edit ] Main article: Arithmetic logic unit Symbolic representation of an ALU and its input and output signals The arithmetic logic unit ALU is a digital circuit within the processor that performs integer arithmetic and bitwise logic operations. The inputs to the ALU are the data words to be operated on called operands , status information from previous operations, and a code from the control unit indicating which operation to perform. Depending on the instruction being executed, the operands may come from internal CPU registers or external memory, or they may be constants generated by the ALU itself. The result consists of both a data word, which may be stored in a register or memory, and status information that is typically stored in a special, internal CPU register reserved for this purpose. Memory management unit MMU [ edit ].

**Chapter 4 : Understanding What is Inside Your Computer and How it Works – The 8 am Edition**

*Central Processing Unit Among the most crucial parts of the computer - or the most crucial - is the central processing unit, or CPU. Think of the CPU as the brain and central calculator of the computer.*

Minicomputer In the s and s, more and more departments started to use cheaper and dedicated systems for specific purposes like process control and laboratory automation. Supercomputer A supercomputer is superficially similar to a mainframe, but is instead intended for extremely demanding computational tasks. The term supercomputer does not refer to a specific technology. Rather it indicates the fastest computations available at any given time. Supercomputers are fast but extremely costly, so they are generally used by large organizations to execute computationally demanding tasks involving large data sets. Supercomputers typically run military and scientific applications. Although costly, they are also being used for commercial applications where huge amounts of data must be analyzed. For example, large banks employ supercomputers to calculate the risks and returns of various investment strategies, and healthcare organizations use them to analyze giant databases of patient data to determine optimal treatments for various diseases and problems incurring to the country. You can help by adding to it. October Hardware upgrade[ edit ] When using computer hardware, an upgrade means adding new hardware to a computer that improves its performance, adds capacity or new features. For example, a user could perform a hardware upgrade to replace the hard drive with a SSD to get a boost in performance or increase the amount of files that may be stored. Also, the user could increase the RAM so the computer may run more smoothly. The user could add a USB 3. Sales[ edit ] This section needs to be updated. Please update this article to reflect recent events or newly available information. September For the third consecutive year, U. The growth was the fastest sales increase since the end of the recession. Sales growth accelerated in the second half of the year peaking in fourth quarter with a 6. Computer recycling Because computer parts contain hazardous materials, there is a growing movement to recycle old and outdated parts. According to the EPA these e-wastes have a harmful effect on the environment unless they are disposed of properly. Making hardware requires energy, and recycling parts will reduce air pollution , water pollution, as well as greenhouse gas emissions. Legislation makes it mandatory to recycle computers through the government approved facilities. Recycling a computer can be made easier by taking out certain reusable parts. Toxic computer components[ edit ] The central processing unit contains many toxic materials. It contains lead and chromium in the metal plates. Resistors, semi-conductors, infrared detectors, stabilizers, cables, and wires contain cadmium. The circuit boards in a computer contain mercury, and chromium. When e-waste byproducts leach into ground water, are burned, or get mishandled during recycling, it causes harm. Health problems associated with such toxins include impaired mental development, cancer, and damage to the lungs, liver, and kidneys. Different companies have different techniques to recycle a wire. For example, first each of the parts are taken apart then all of the inner parts get separated and placed into its own bin. Both companies will take back the computer of their make or any other make. Otherwise a computer can be donated to Computer Aid International which is an organization that recycles and refurbishes old computers for hospitals, schools, universities, etc.

**Chapter 5 : Complete listing of computer hardware**

*Motherboard is nick name of the main circuit board of the computer that resides in the system unit. Motherboard is made of a hard plastic [ ] Old parts of computer.*

Let us find out about some more devices that can be connected to a computer. Devices that help us put data into the computer are called input devices. They help in giving instructions to the computer. Let us learn about a few input devices. The keyboard is used for entering data into the computer system. It can type words, numbers and symbols. The mouse is a pointing device. You can give input to the computer with the help of the mouse. More information of computer mouse Joystick: A joystick makes computer games a lot more fun. When it is moved, it passes information to the computer. A microphone is the mike that can be attached to a computer. It allows you to input sounds like speech and songs into the computer. You can record your voice with the help of a microphone. A web camera is used to take live photos videos. You can save them in the computer. A Scanner Copies pictures and pages, and turns them into images that can be saved on a computer. All the inputs are stored, sorted, arranged and changed by a computer. The device that helps a computer do so is called the processing device. The parts of a computer that help us to show the results of processing are called output devices. Let us learn about a few output devices. A monitor looks like a TV screen. It shows whatever you type on the keyboard or draw with the mouse. A printer prints the results of your work from the computer screen on a sheet of paper. The speakers are the output devices that produce different types of sounds processed by the computer. You can listen to songs or speeches stored in the computer with the help of speakers. You can listen to music or any sound from a computer with the help of headphones without disturbing others. The parts of a computer which are used for storing data are called storage devices. They help in storing any work done on a computer permanently. Let us learn about a few storage devices. Inside the CPU there is a hard disk. It is made up of one or more metallic disks. It stores a large amount of information. A floppy disk stores small amounts of information. It works when it is inserted into the floppy drive. The floppy drive is fixed in the CPU. A CD stores many times more information than a floppy disk. It works when it is inserted into the CD drive. Not handling the CD properly may result in loss of data stored. All computer parts Glossary: It stores information many times more than a floppy disk. The processing device in a computer. It is the information given to the computer. It is the machine that runs with the help of electricity. It stores a small amount of information. The device for listening to the recorded sounds without disturbing others. These help us put data into the computer. It is used for playing computer games. This is used to enter data into the computer system. It is used for recording sound. It is pointing device. These help us to show the results of processing. Helps to store, sort, arrange and change the inputs on a computer. It copies pictures and pages and turns into images that can be saved on a computer. These are used for listening to recorded sound. These are form the memory of the computer. It is used for taking live photos and videos.

## Chapter 6 : Names of computer parts in various languages

*CPU Mean - Central Processing Unit. It is the electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control and input/output (I/O) operations specified by the instructions.*

April 2, by Alex Barbos The motherboard is one of the most important parts of the PC, but as a tech enthusiast, you probably already know that. What you might not know, though, is the role played by each chip, port or slot present on a motherboard. **Motherboard Basics** A computer has many components, each with their own roles and functions. The role of the motherboard is to allow all these components to communicate with each other. Considering the fact that all the other components are installed on the motherboard or connected to it, it is safe to say that the motherboard is the central piece of a PC, the component that brings it all together. **Processor Socket** The processor socket is the central piece of a motherboard, usually being located near the center of the motherboard. **Power Connectors** No computer component can operate without power, and a motherboard is no exception. The power connector, commonly a 20 or pin connector, can be situated either near the right edge of the motherboard, or somewhere close to the processor socket on older motherboards. Newer motherboards have an additional 4-pin or 8-pin connector near the processor, used to supply additional power directly to the processor. The number of slots can vary, depending on motherboard, from 2, in low-end motherboards, all the way up to 8 memory slots, on high-end and gaming motherboards. It is important to pay close attention to the type of memory a motherboard supports, in order to buy the appropriate memory modules. Newer motherboards support DDR3 memory, the current industry standard memory architecture, but motherboards with DDR2 memory slots and even DDR1 memory slots are still present on the market. An interesting aspect is that there are some older motherboard models that supported different types of memory, and usually come with two DDR1 memory slots and 2 DDR2 memory slots, or two DDR2 slots and two DDR3 slots. These motherboards were great options for people that wanted to upgrade a motherboard without having to upgrade all the other components as well. The number of memory slots should be an important criterion to take into account when choosing a motherboard, as it will determine the maximum amount of memory you can install. Coming in the form of a PCI-Express slot on newer motherboards or AGP on older ones, the video card slot is situated right below the processor. At the opposite pole, high-end gaming motherboards come with multiple video card slots, allowing the installation of multiple video cards in a SLI or CrossFire configuration. **Expansion Slots** Expansions have the role of letting you install additional components to enhance or expand the functionality of your PC. You can install a TV tuner, a video capture card, a better soundcard, etc. These ports are located under the video card slot, and come in the form of PCI slots on older motherboards or a scaled-down version of PCI-Express slots on newer motherboards. Some motherboards come with both types of expansion slots. The number of slots is usually dependent on the format of the motherboard – larger motherboards full ATX have more, while smaller formats micro-ATX have fewer, if any. Considering the fact that most optical drives on the market come with a SATA connector, and these devices are not bandwidth-hungry, using a SATA2 port for an optical drive is perfectly acceptable. Since the BIOS code is stored on a memory chip that needs constant power to function, a battery is also present to keep the chip powered when the computer is unplugged. This metal component is actually a heatsink, and its role is to provide thermal protection for the Northbridge – one of the most important components of a motherboard. The northbridge is responsible for coordinating the data flow between the memory, the video card and the processor. A secondary chip, known as Southbridge, has a similar function, coordinating the data flow between the processor and peripherals such as sound cards or network cards. Power button, reset button, power led, audio connectors and USB connectors – they are all connected to the front panel or the corresponding headers. **Rear Connectors** These connectors are the bridge between the outside of your computer and the inside. The name is a bit misleading, as the connectors are actually located on the left edge of the motherboard; however, since these connectors are accessible from the outside, the name simply implies where they are accessible from – the rear of the PC case. External peripherals such as keyboard, mouse,

monitor, speakers and so on are all connected via these connectors. So there you have it, the parts of the motherboard and their functions, explained. Now that you know how to choose your motherboard and build your dream PC, you might want to check out this interesting blog post on choosing the right operating system for it. The article provides a detailed outline of two of the most popular operating systems, Linux and Windows, allowing you to determine which will suite your needs better. However, if you want to learn more about these operating systems before making a choice, check out this online course for an in-depth introduction to Linux or this online course if you want to master Windows 8.

## Chapter 7 : Computer Basics: Basic Parts of a Computer

*More Information About CPU Parts As the name implies, the arithmetic logic unit is primarily designed to manage all the math-based operations occurring in the CPU. The control unit has a more diverse set of responsibilities.*

Computers are abundant in the life we live now. Everyone uses computers but the average person does not understand how a computer functions or what exactly they are paying for, in terms of its specifications. If you can understand this, it is possible for you save money when purchasing or seeking repairs on your device. It is imperative to understand the name and function of each component in a computer in order to understand how it functions as a whole. Attempt to always remember that a computer is based off the human body and functions in the same way. You cannot expect to understand the human body without first understanding its organs and their functions. A computer is composed of components in the same way that the body is composed of organs that together work to make the body or computer function. These 7 components are the backbone of every healthy, functioning computer. Understanding this will make your knowledge of technology immensely powerful. The computer case is an enclosure that holds all the wires and components of the computer inside it. It is like the human skeletal system. Inside it are all the parts necessary for a computer to function. It keeps them safe and securely attached so that they do not shift freely and allows for air ventilation to prevent over heating. You will want to invest in something that is sturdy but it does not need to necessarily be extremely expensive, flashy or glamorous. As long as it holds the items together securely its role has been fulfilled. Its purpose is to connect all the parts of the computer together and make everything centralized using its printed circuit board. The central processing unit, hard drives, memory, graphic processing unit, printers, and other ports all connect to the computer directly or via special cables that attach on to the motherboard. When you plug in a USB or thumb drive to a computer you are actually plugging it directly into the computer! It is important that you pick a motherboard that has all the types of ports you may need in the future. In the past, it was important to purchase sound cards in charge of allowing your computer to play audio for all college parties we love but today they tend to be integrated into the motherboard already so you are actually saving money thanks to technological advances! If you are tight on a budget it is recommended that you do not cheap out on the motherboard since all your computer parts will run according to the specifications of the slots available on the motherboard. You want to spend your big bucks here to guarantee you receive a system circuit or nervous system that can perform for a prolonged period like the human body. Most computers today have two or more CPUs to help maximize potential and processing power. Generally, the more CPU cores you have, the faster your computer will be able to complete requests made by the user such as exporting a movie file. The two major corporations to produce this part are Intel and AMD. It is personal preference which company you choose but statistically speaking and from personal experience Intel processors outperform AMD so that is something to be aware of. The better brain you have, the more tasks you can take on and complete in shorter time duration. If you plan on doing heavily demanding things such as video editing, photo editing, gaming, or programming robust programs it is highly recommended to get the best CPU in the market or close to it. Power Supply Humans eat food to acquire important nutrients to maintain health and provide energy for the body. This energy is what enables us to do work and complete tasks. In the same way that we eat to acquire this energy a computer utilizes a power supply unit PSU , which is in charge of bringing electrical power to the computer. By purchasing a reliable PSU, you are ensuring that all your components are capable of working to max capacity at all times and also provides that extra boost of energy to help you get through your school work, intense gaming, or designing. It is known as permanent memory and is not volatile, meaning it does not get erased when the power is shut off. This type of memory is where all your documents, pictures, programs, videos and movies are stored and kept safely. As technology has grown to be more universal and cheaper to produce, the price of hard drives have dramatically decreased. The more sufficient space you have to save your files the better. RPM stand for rotation per minute and these relate to how fast the drive can read and write data. Of course RPM is what you want to aim for since we are a part of the instant glorification age. Memory Random Access Memory It starts

to get a little confusing here differentiating between hard drive memory and random access memory but there is a clear distinction which most people cannot identify until they are told. Have you ever wondered why when you try to buy a computer the sales associate insists you get more RAM Random Access Memory so that your computer is faster? Random Access memory, often referred to as RAM, is memory that can be accessed randomly. Likewise, when your brain can recall from memory quickly it is able to better react to situations or problems. This is special to computers because they can only manipulate data that is on the main memory. Therefore, every program you execute or every file you access must be moved from the hard drive into the memory. Imagine your brain capped off at a certain point in memory recall. This would be disastrous during a test because you would be unable to recall facts. In the same way you want to have enough RAM so you can easily run programs simultaneously and allow them all to run sufficiently. Essentially, RAM will allow you to execute multiple programs at once without suffering lag or long loading times. This is no miracle. The Graphics processing unit GPU often referred to as a graphics card is used primarily for 3D applications. This is the equivalent to how your eyes function and relate your beautiful visual sensory details to your brain. These calculations are extremely mathematically intensive tasks that would put fair amount of strain on the CPU. By allowing the GPU to take over these tasks it enable the CPU to tend to other non-visual related calculations that the computer needs to function. The GPU do not have a limit and are always being tested to find the next generation of technology that can duplicate the visuals we see as humans. Optical Drives The final part is an optical drive. We are all familiar with this and tend to use them often. These are used to read or write data from discs which can than be removed and carried. Not only are USBs easier to carry, but also so cheap that everyone has one on their key chains these days. By understanding these basic functions of each computer component you have enabled yourself to become a more educated consumer. You can now understand if a sales person is simply pressing your wallet for more sales revenue and commission or if they are truly helping you in your purchase. Technology has become so prevalent in our lives that this information will serve as the basis for you to expand your knowledge if you choose. If not, the basics allow you to understand what you are purchasing and how efficient it will be for your personal or business needs.

## Chapter 8 : Motherboard Components Labeled - Motherboard Parts and Functions

*This lesson will explain the various parts of the CPU of a desktop computer.*

Each part plays an important role whenever you use a computer. Watch the video below to learn about the basic parts of a desktop computer.

**Computer case** The computer case is the metal and plastic box that contains the main components of the computer, including the motherboard, central processing unit CPU, and power supply. Computer cases come in different shapes and sizes. A desktop case lies flat on a desk, and the monitor usually sits on top of it. A tower case is tall and sits next to the monitor or on the floor. All-in-one computers come with the internal components built into the monitor, which eliminates the need for a separate case.

**Monitor** The monitor works with a video card, located inside the computer case, to display images and text on the screen. These can be made very thin, and they are often called flat-panel displays. Older monitors use CRT cathode ray tube displays. CRT monitors are much larger and heavier, and they take up more desk space.

**Keyboard** The keyboard is one of the main ways to communicate with a computer. There are many different types of keyboards, but most are very similar and allow you to accomplish the same basic tasks. Click the buttons in the interactive below to learn about the different parts of the keyboard.

**The Print Screen key** takes a picture of your screen called a screenshot that you can edit or save using a graphics program.

**Escape Key** The Escape Esc key allows you to stop a function or action. For example, if a webpage is taking a long time to load, you can press the Escape key to stop loading it.

**Function Keys** The function keys are labeled F1 through F12. Some programs use these keys as shortcuts for common tasks. For example, in many programs, F1 opens the Help file.

**Tab Key** The Tab key is used to create indents in word processing programs. Also, if you are filling out a form online, you can use the Tab key to switch to the next field.

**Alphanumeric Keys** The main part of the keyboard includes the alphanumeric keys letters and numbers and the spacebar. Typically, you hold down Ctrl, Alt, or Shift and then type another key to perform a specific task.

**Arrow Keys** The arrow keys are used for many different purposes, including moving the cursor, scrolling a document, and controlling a game.

**Numeric Keypad** The numeric keypad resembles a calculator keypad. Many users find that it is easier to type numbers using this keypad. On some keyboards, these keys double as arrow keys.

**Backspace Key** The Backspace key erases the character to the left of the cursor.

**Enter** The Enter key executes commands. For example, while on the Internet, you can type a website address and then press Enter to go to the site. It is also used to start a new line in word processing programs.

**Home and End** These move the cursor to the beginning or end of the current line.

**Insert and Delete** Insert: This switches between insert mode which inserts new text without deleting anything and overwrite mode which deletes text after the cursor as you type. This erases the character to the right of the cursor.

**Page Up and Page Down** These scroll a document or webpage up or down.

If you want to learn how to type or improve your touch-typing skills, check out our free [Typing Tutorial](#).

**Mouse** The mouse is another important tool for communicating with computers. Commonly known as a pointing device, it lets you point to objects on the screen, click on them, and move them. There are two main mouse types: The optical mouse uses an electronic eye to detect movement and is easier to clean. The mechanical mouse uses a rolling ball to detect movement and requires regular cleaning to work properly. To learn the basics of using a mouse, check out our interactive [Mouse Tutorial](#).

**Mouse alternatives** There are other devices that can do the same thing as a mouse. Many people find them easier to use, and they also require less desk space than a traditional mouse. The most common mouse alternatives are below. A trackball has a ball that can rotate freely. Instead of moving the device like a mouse, you can roll the ball with your thumb to move the pointer. A touchpad—also called a trackpad—is a touch-sensitive pad that lets you control the pointer by making a drawing motion with your finger. Touchpads are common on laptop computers.

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*The basic parts of a desktop computer are the computer case, monitor, keyboard, mouse, and power cord. Each part plays an important role whenever you use a computer. Watch the video below to learn about the basic parts of a desktop computer.*

Understanding your motherboard components and functions is simple Join us as we explain the different parts of a motherboard with pictures. At the first glance, the components of a motherboard can appear complicated How are we supposed to figure out this big jumble of connectors, ports, slots, sockets and heat sinks? You simply need to be able to identify the different motherboard parts and understand their functions. Join us as we take you on a guided tour of the different motherboard components complete with photos and plain English descriptions: See image below for a close-up view. For details on the individual back panel ports, click here for our guide to computer cable connections. Peripheral Component Interconnect Slot for older expansion cards such as sound cards, network cards, connector cards. Have been largely replaced by PCI-Express x1 slots see motherboard parts 3 below. PCI Express x16 Slot Slot for discrete graphic cards and high bandwidth devices such as top-end solid state drives. Beginning from Intel Sandy Bridge in , this motherboard component is no longer present as it has been integrated within the CPU itself. Front Panel USB 2. See image above for a close-up view. For more details on the individual front panel ports, click here for our guide to installing a motherboard. IDE Connector Connects to older hard drive disks and optical drives for data transfer. Have been replaced over by SATA connectors see motherboard component 13 below. SATA Connectors Connects to modern hard disk drives, solid state drives and optical drives for data transfer. Front Panel USB 3. This motherboard component is more common among high end boards.