زانکۆی گەشەپێدانی مرۆیی
UNIVERSITY OF HUMAN DEVELOPMENT

# Computer Organization Laboratory

## Introduction to PC Component

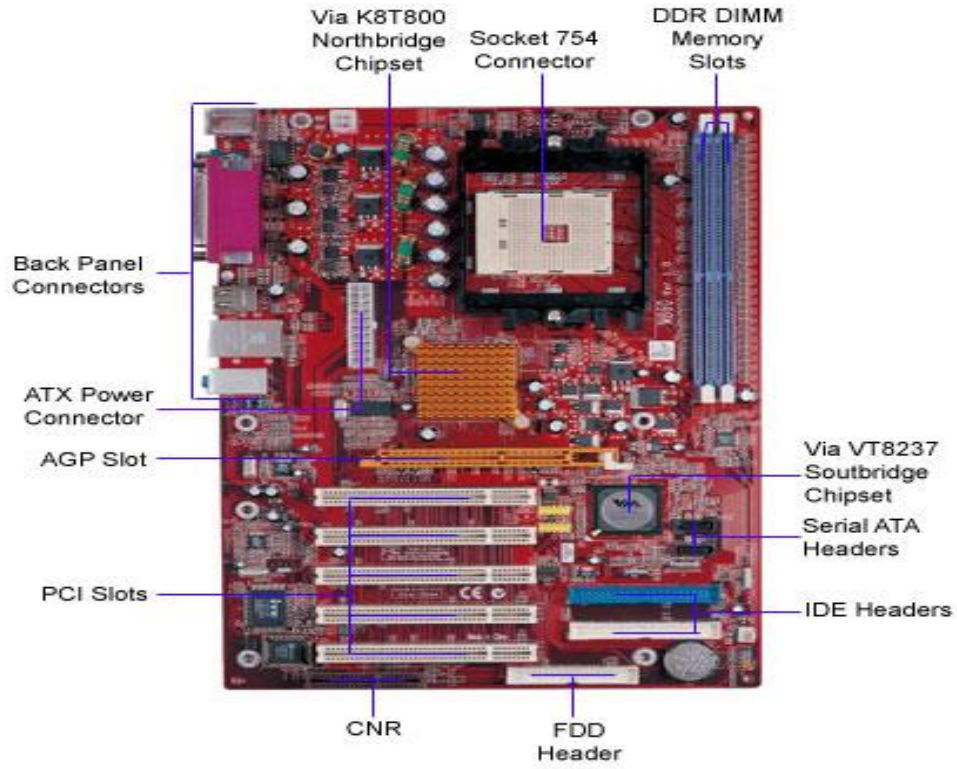
In this subject we are talking about computer hardware and its parts, Computer hardware is the physical part of the computer including the digital circuits inside the computer as opposed to the software that carry out the computing instructions. The hardware of a computer is unlikely to change frequently unless due to the crash or for upgrading them. The devices that is capable of storing, executing system instructions and controlling.

Hardware comprises all of the physical part of the computer such as

Monitor, CPU, motherboard, RAM, CD-ROM, Printer, Scanner, Hard disk, flash drive(AKA pen drive), processor, PCI buses, floppy disk, power supply, VGA card, sound card, network interface card, joystick, mouse, keyboard, computer fan, camera, head set and others.

On the other hard software is a logical part of computer and is used to carry out the instructions, storing executing and developing other software programs. A typical PC consists of a case or chassis in the desktop or tower case and these components.

## Mother board:-




- CPU.
- Computer fan.
- RAM.
- BIOS (VGA Video graphic array).
- Digital Circuit.
- PCI slots.

## PC Buses:-

- PCI.
- USB (universal serial bus).
- Hyper transport.
- AGP (accelerated graphic port).
- ISA (industry standard architecture).
- EISA (extended industry standard architecture).
- VLB (VESA local bus).

## Drives:-

- CD-ROM.
- DVD-ROM.
- HDD (hard disk drive).
- Joystick.

- BD-Rom drive.

## Other Peripheral Devices:-

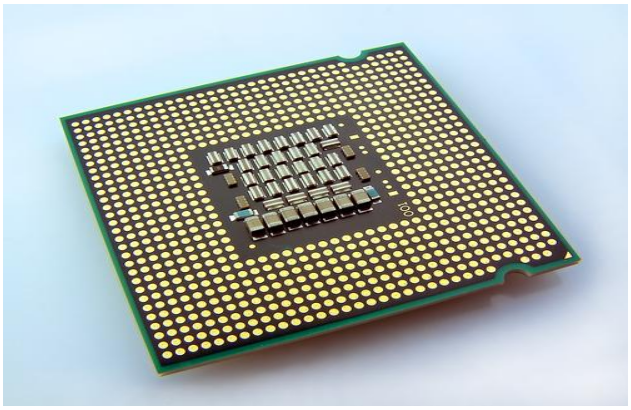
- Mouse.
- Modems.
- Digital camera.
- Sound, Video cards.
- Printer.

## Input, Output Devices:-

- Printer.
- Scanner.
- Monitor.
- Speakers.
- Video output devices.
- Touch.

## CPU (Central Processing Unit):-

CPU or central processing unit relates to a specific or processor. The performance of the computer is determined by the CPU chip (processor speed) and the other computer circuitry. Currently, the Pentium chip (processor) is the most popular even through there are other chips available in the market today such as AMD, Motorola and others. The clocks speed becomes most important factor in determining the performance of a computer.



The motherboard contains the hardware circuitry and connections that allow the different hardware components of the PC to interact and communicate with each other. Most computer software is being developed for the latest processors so it would be difficult to use the older systems.

## Hard Disk Drives:-

Disk drive is the mechanism to run the disks. All disks need a drive to get the information, read it and put it back to the disks.

Hard disk is used to store the data permanently. Often the terms disk and drive used to describe the same thing but it should be clear that a disk is a storage device.

## Modem:-

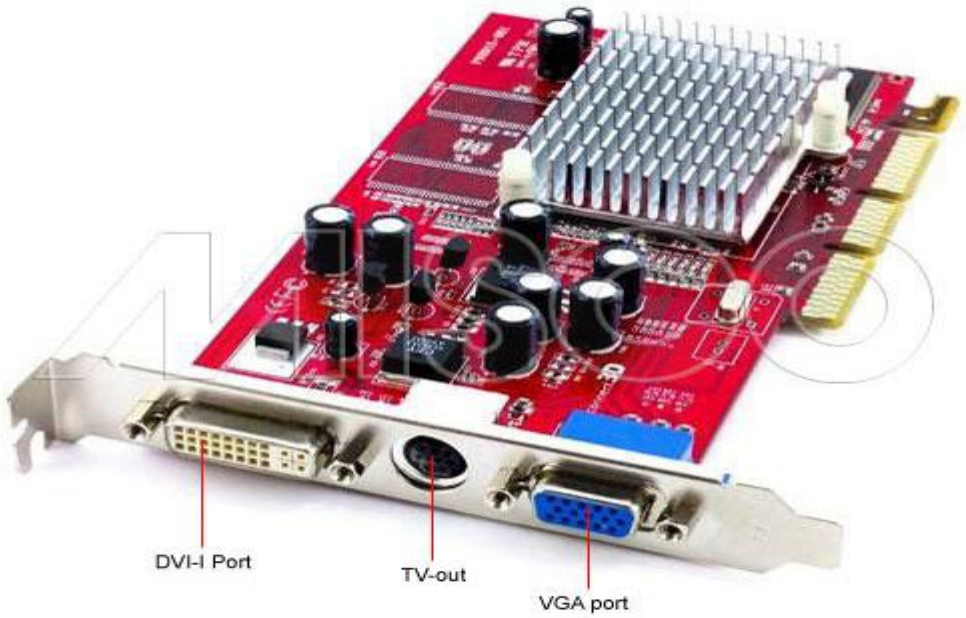
A modem is used for the modulation and demodulation of the data that is transferred through the modem and the telephone lines. Modem translates the data from digital to analog from analog to digital, because on the telephone lines data can travel in the form of the analog signals and in the computer data transmits in the form of digital signals. Modems are measured by the speed which is called baud rate. The typical baud rate is 56Kb.

## Keyboard:-

The keyboard is used to type something or input information to the computer. There are different designs and models of the keyboards in the market. The most common layout of the keyboard is QWERTY layout. A standard keyboard has 101 keys and embedded keys.

## Video cards:-

Video cards allow computer to display video, graphics and animation. Some video cards allow computers to display television. A video card with a digital video camera allows users to produce live video. A high speed broadband internet connection is required to watch the videos on net.




## Network cards:-

Network interface cards allow PCs to connect with each other and communicate. Every network computer is required to have a NIC card. NIC cards are required both in wired and wireless networking.

## Mouse:-

Every modern computer requires a mouse for faster operations. Generally a mouse has two buttons left and right to perform different functions. One type of mouse has a round ball under the bottom. Another type of mouse use optical system to track the movement of the mouse.

## Monitors:-

The monitor is used to display the information on the screen. All the activities of a computer, functions and tasks are seen on the computer screen and this is called outputting information. Monitors come in many size and shapes, monochrome or full colors. Today most computers use LCD screens. It is light weight and consumes less power as compared to the monitors.

# Lab.1

## Printers:-

The printer takes the information from the PC and transfers it to the paper of different sizes, which are placed in the printer device. There are three basic types of a printer such as dot matrix, inkjet and laser.

## Scanners:-

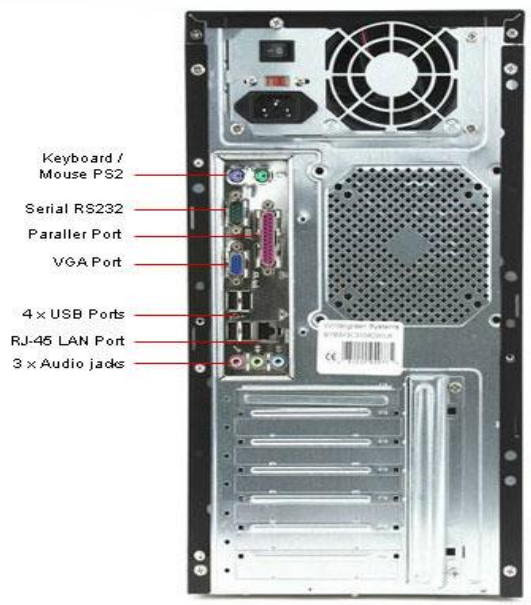
Scanners allow you to transfer pictures and photographs to your computer. A scanner is used to scan the images and pictures. You can then send the image to someone, modify it or take a print out of it. With optical character recognition software you can convert printed documents into the text that you can use in the word processor.

## Digital camera:-

You can take the digital photograph with the digital cameras. The images are stored on the memory chip of digital cameras and you can transfer them to your computer with the USB drive.

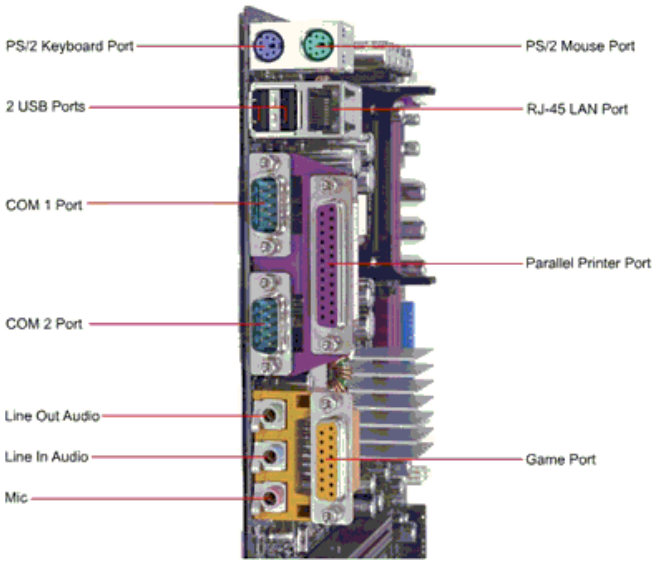
## Case:-

Case or casing covers the whole computer's circuitry. There are two types of casings desktop and tower casing. There is room inside the casing to add or remove components. Cases come in many size like desktop, mini, midi and tower. There are some additional empty slots inside the cases such as IDE, USB, ASI, PCI and fire wire slots.




## Cards:-

Cards are the hardware components that are added to the computer to increase their functionalities and capabilities.
Sound cards produce the sound like music and voice. The older cars were 8, 16 and then 32 bits.
Color cards allow computers to produce colors. Initially there were 2, 4 and then 16 bits. The main types of the graphic cards are EGA, VGA and SGA.
The 32 cards are the standard to display almost billions of the colors on the monitor.



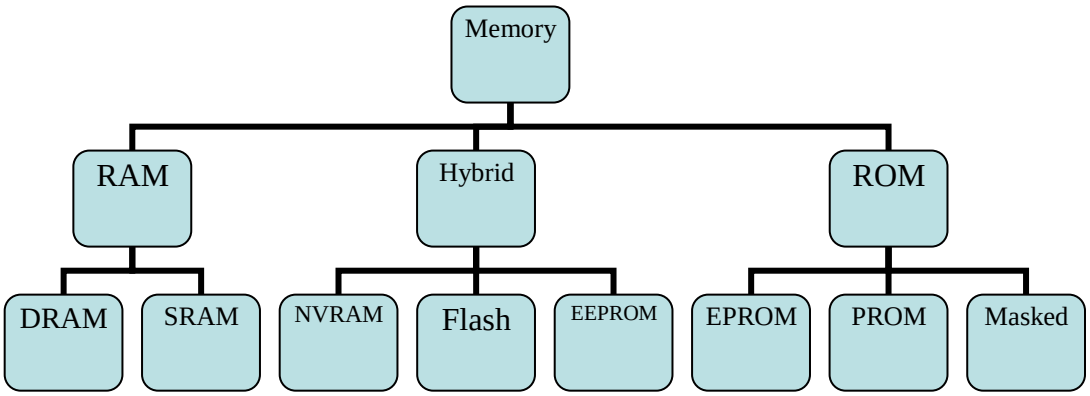

## Memory:-

Main store or computer memory is divided into ROM (Read Only Memory) and Ram (Random Access Memory).
ROM is memory that cannot be changed by a program or user, ROM retains its memory even after the computer is turned off. For example, ROM stores the instructions for the computer to start up when it is turned on again. The operating system is loaded from the hard disk and stored in RAM while the machine is being used.

Fast temporary type of memory in which programs and data are stored while the computer is switched on. For example, when you load a word processing program it is loaded into RAM. The contents of the computer's screen are also held in RAM. If the computer loses power, data stored in RAM is lost

Many types of memory devices are available for use in modern computer systems. As an embedded software engineer, you must be aware of the difference between them and understand how to use each type effectively.
In our discussion, we will approach these devices from the software developer's perspective. Keep in mind that the development of these devices took several decades and that their underlying hardware differs significantly. The names of the memory

types frequently reflect the historical nature of the development process and are often more confusing than insightful.



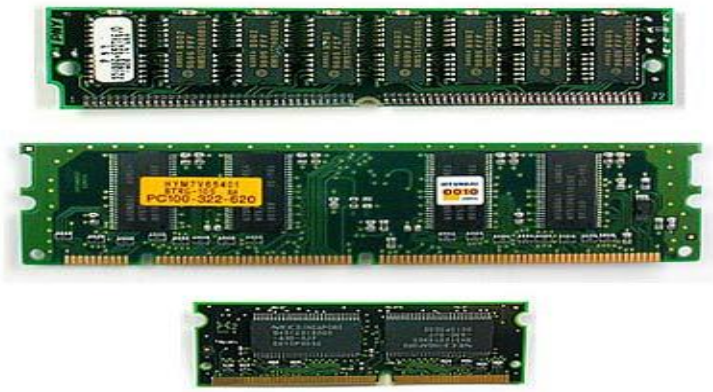

## Types of RAM:-

**SRAM:** Static Random Access Memory, use multiple transistors, typically four to six, for each memory cell but doesn't have capacitor in each cell. It is used primarily for cache.

**DRAM:** Dynamic Random Access Memory has memory cells with paired transistor and capacitor requiring constant refreshing.

**SDRAM:** Synchronous Dynamic Random Access Memory takes advantage of the burst mode concept to greatly improve performance. It does this by staying on the row containing the requested bit and moving rapidly through the columns, reading each bit as it goes. The idea is that most of time the data needed by the CPU will be in sequence. SDRAM is a bout five desktop today, maximum transfer rate to L2 cache is approximately 528 mbps.

**DDR SDRAM:** Double Data Rate Synchronous Dynamic RAM is just like SDRAM except that is has higher bandwidth, meaning greater speed. Maximum transfer rate to L2 cache is approximately 1.064 mbps (for DDR SDRAM 133 MHz).



**CMOS RAM:** is a term for small amount of memory used by your computer and some other devices to remember things like hard disk setting-see why does my computer need a battery?? For details, this memory uses a small battery to provide it with the power it needs maintain the memory contents.

## Types of ROM:-

Memories in the ROM family are distinguished by the methods used to write new data to them (usually called programming), and the number of times they can be written. This classification reflects the evolution of ROM devices from hardwired to programmable to erasable-and-programmable. A common feature of all these devices is their ability to retain data and programs forever, even during a power failure.

**PROM:** Programmable ROM, which is purchased in a programmed state. If you were to look at the contents of a programmed PROM, you would see that the data is made up entirely of 1's. The process of writing your data to the PROM involves a special piece of equipment called a device programmer. The device programmer writes data to the device one word at a time by applying an electrical charge to the input pins of the chip. Once a PROM has been programmed in this way, its contents can never be changed. If the code or data stored in the PROM must be changed, the current device must be discarded. As a result, PROM is also known as one-time programmable (OTP.) device

**EPROM:** Erasable Programmable ROM is programmed as the same manner as a PROM, however EPROM can be erased and reprogrammed repeatedly. To erase an EPROM you simply expose the device to a strong source of ultraviolet light. (A window in the top of the device allows the light to reach the silicon.) By doing this, you essentially reset the entire chip to its initial-programmed-state.

**Hybrids:** as memory technology has matured in recent years, the line between RAM and ROM has blurred. Now, several types of memory combine features of both. Hybrid memories can be read and written as desired, like RAM, but maintain their contents without electrical power, just like ROM. Two of the most widely used hybrid devices, EEPROM and Flash

**EEPROM:** Is Electrically Erasable Programmable ROM, internally they are similar to EPROM, but the erase operation is accomplished electrically, rather than by exposure to ultraviolet light. The primary tradeoff for this improved functionality is higher cost, though write cycles are also significantly longer than writes to a RAM, so we used an EEPROM in main memory.

**Flash:** combines the best features of the memory devices described thus far, flash memory devices are high density, low cost, nonvolatile, fast to read but not to write and electrically reprogrammable.

***Prepared by***
**Kanar R. Tariq**
**B.Sc. in Computer Engineering**