LAB CYCLE - 1

EXPERIMENT NO : 1

HARDWARE FAMILIARISATION

AIM: Introduction to Computer hardware: Physical identification of major components of a computer system such as mother board, RAM modules, daughter cards, bus slots, SMPS, internal storage devices, interfacing ports. Specifications of desktop and server class computers.

What is Computer Hardware?

Computer hardware is a hardware part of a computer system. In simple words, only those parts of the computer system which we can see or touch are called computer hardware. Hardware is an important part of our computer system without which the computer is incomplete. You cannot use a computer without hardware and without hardware, there cannot be a computer system or construction.

1.Motherboard

The motherboard is the backbone of our computer system. It's the central processing unit or CPU. It connects all the other components, like memory and graphics card, to the power supply. The motherboard is where all the wires are plugged in and it's also where you place your RAM, which is your computer's working memory. The motherboard is what makes one machine different from another. Motherboards are made up of tiny transistors that control the flow of electricity through copper tracks on their surface. These transistors are called Integrated Circuits or ICs for short.

2.RAM Module

A memory module is another name for a RAM chip. It is often used as a general term used to describe SIMM, DIMM, and SO-DIMM memory. While there are several different types of memory modules available, they all serve the same purpose, which is to store temporary data while the computer is running.

Memory modules come in different sizes and have several different pin configurations. For example, the original SIMMs had 30 pins (which are metal contacts that connect to the motherboard). However, newer SIMM chips have 72 pins. DIMMs commonly come in 168pin configurations, but some DIMMs have as many as 240 pins. SO-DIMMs have a smaller form factor than standard DIMM chips, and come in 72-pin, 144-pin, and 200-pin configurations.

3.Daughter cards

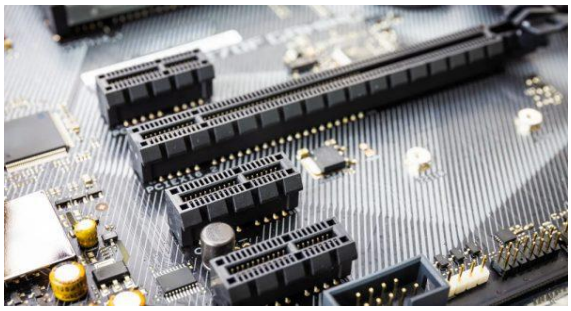
A daughterboard (or *daughter board* , *daughter card* , or *daughtercard*) is a circuit board that plugs into and extends the circuitry of another circuit board. The other circuit board may be the computer's main board (its motherboard) or it may be another board or card that is already in the computer, often a sound card. The term is commonly used by manufacturers of wavetable daughterboards that attach to existing sound cards.A mezzanine card is a kind of daughterboard that is installed in the same plane as but on a second level above the motherboard.

4.Expansion slots / Bus slots

Alternatively referred to as a **bus slot** or **expansion port**, an **expansion slot** is connection or port located inside a computer on the motherboard or riser board that allows a computer hardware expansion card to be connected. For example, if you wanted to install a new video card in the computer, you'd purchase a video expansion card and install that card into the compatible expansion slot.

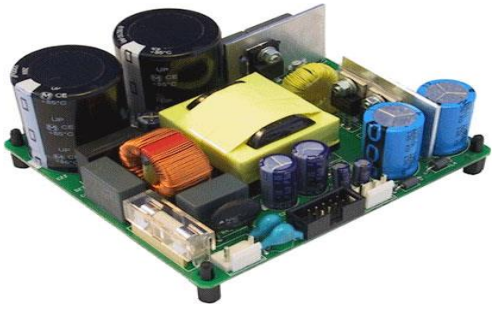
Many of the below expansion card slots are obsolete.You're most likely only going to encounter AGP, PCI, and PCI Express when working with computers today. In the picture below is an example of what expansion slots may look like on a motherboard. In this picture, there are three different types of expansion slots: **PCI Express**, **PCI**, and **AGP**.

- **PCI** – Network card, SCSI, Sound card, Video card
- **PCI Express** – Video card
- **AGP** – Video card
- **ISA** – Network card, Sound card, Video card
- **AMR** – Modem, Sound card
- **CNR** – Modem, Network card, Sound card
- **EISA** – SCSI, Network card, Video card
- **VESA** – Video card



5. SMPS (Switched Mode Power Supply)

A **switched-mode power supply (SMPS)** is an electronic circuit that converts power using switching devices that are turned on and off at high frequencies, and storage components such as inductors or capacitors to supply power when the switching device is in its non-conduction state. Switching power supplies have high efficiency and are widely used in a variety of electronic equipment, including computers and other sensitive equipment requiring stable and efficient power supply.A switched-mode power supply is also known as a switch-mode power supply or switching-mode power supply.



6. Internal storage device

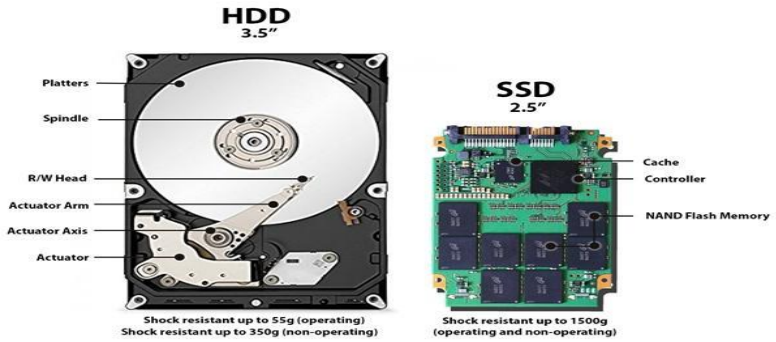
Internal storage devices are components of a computer system that provide non-volatile storage for files, applications, and the operating system. Internal storage devices are typically housed within the computer's chassis or connected directly to the motherboard.

Some common types of internal storage devices include:

- **Hard disk drives (HDDs)**: These are traditional storage devices that use spinning disks to store data. HDDs are known for their high storage capacities and relatively low cost per GB.
- **Solid-state drives (SSDs**): These are newer storage devices that use flash memory to store data. SSDs are known for their faster read and write speeds compared to HDDs, as well as their reliability and durability.
- **Hybrid drives**: These are storage devices that combine the advantages of HDDs and SSDs, with a small amount of solid-state memory used as a cache to improve read and write speeds.

Internal storage devices can be connected to the computer system using various interfaces, such as SATA (Serial ATA) or NVMe (Non-Volatile Memory Express) for SSDs, or SCSI (Small Computer System Interface) for tape drives.

Hybrid drives



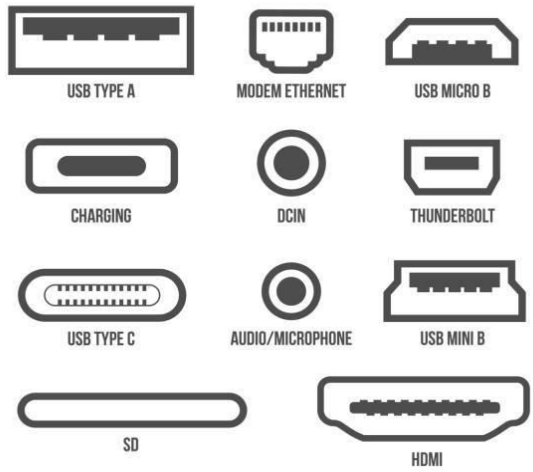
7. Interfacing ports

Interfacing ports are physical connectors on a computer system that allow data to be transferred between the computer and external devices. These ports can be used for a variety of purposes, such as connecting external storage devices, input/output (I/O) devices, or networking equipment.

Some common types of interfacing ports include:

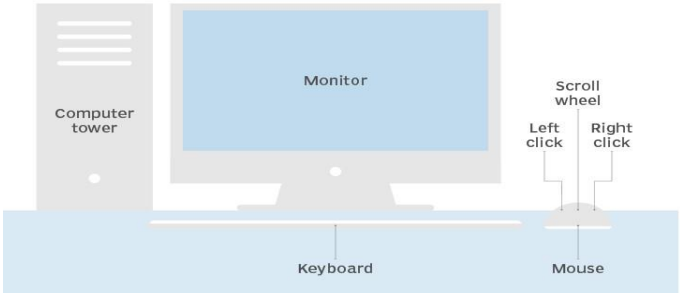
- USB (Universal Serial Bus) ports: These are the most common type of interfacing ports and are used to connect a wide variety of devices, including external hard drives, printers, keyboards, mice, and cameras.

- Ethernet ports: These are used to connect a computer to a wired network, such as a local area network (LAN) or the Internet.
- HDMI (High-Definition Multimedia Interface) ports: These are used to connect a computer to a high-definition display, such as a monitor or TV.
- DisplayPort: This is another type of port used to connect a computer to a highdefinition display.
- Audio ports: These are used to connect speakers, microphones, and other audio equipment to a computer system.
- Thunderbolt ports: These are used for high-speed data transfer and can be used to connect a wide range of devices, such as external hard drives, monitors, and docking stations.
- FireWire ports: These are similar to Thunderbolt ports and are used for high-speed data transfer. FireWire ports are not as common as they used to be.



8. <u>Specifications of desktop and server class</u>

computers Desktop Computer:



A desktop computer is a personal computing device designed to fit on top of a typical office desk. It houses the physical hardware that makes a computer run and connects to input

devices such as the monitor, keyboard and mouse users interact with. Desktop computers are commonly used in the enterprise, as well as in consumer use cases such as gaming. In the enterprise, they are important because they are the main means for many users to do their jobs.

The internal components of a desktop computer typically include:

1. Motherboard: This is the main circuit board that connects all the internal components of the computer together.
2. Processor: Also known as the central processing unit (CPU), this is the "brain" of the computer that performs most of the calculations and processes the data.
3. Memory: This is the temporary storage used by the computer to store data and instructions that are currently being used by the CPU.
4. Storage: This includes the hard drive or solid-state drive (SSD) that stores the operating system, software, and data.
5. Power supply: This provides power to the internal components of the computer.
6. Cooling system: This includes fans and/or heat sinks to keep the internal components from overheating.

Server Computer:

A server computer is a computer system designed specifically to perform server-related tasks, such as managing network resources, providing file and print services, hosting websites, running applications, and more.

Server computers typically have more powerful hardware than desktop computers, with multiple processors or processor cores, larger amounts of memory, and high-speed storage arrays. They also typically have redundant power supplies and cooling systems, as well as remote management tools to allow administrators to manage them from a remote location.

Server computers run specialized server operating systems, such as Windows Server, Linux, or Unix, which are optimized for server tasks and can handle large numbers of concurrent users or requests. They also typically run specialized server software applications, such as web servers, database management systems, email servers, and more, to provide specific services to clients on the network.