Experiment: 1 **Date: 06-02-2024**

AIM:

To identify the major components of a computer system such as motherboard, ram modules, daughter cards, SMPS, bus loads, internal storage devices and interfacing ports. Specification of desktop and server class computers. Installation of common operating system for desktop and server use.

COMPUTER HARDWARE

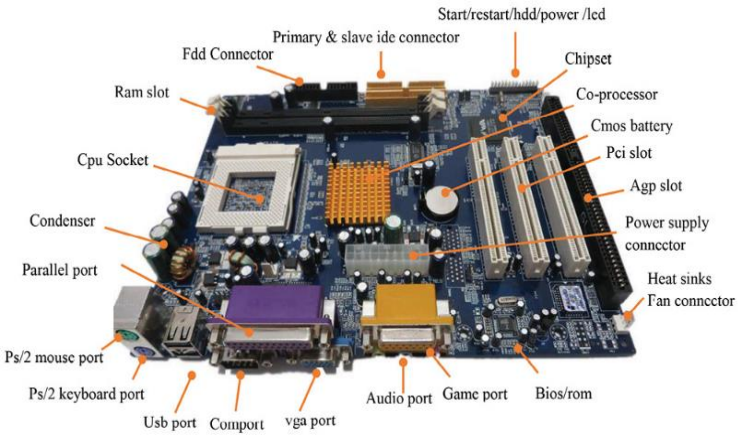
Computer hardware refers to the physical components that make up a computer system. These components work together to enable a computer to perform various tasks and functions. Key components include the central processing unit (CPU), which acts as the brain of the system, executing instructions and managing data

1. Central Processing Unit (CPU)
2. Memory (RAM)
3. Storage Devices (Hard Disk Drives, Solid State Drives, Flash Drives)
4. Motherboard
5. Graphics Processing Unit (GPU)
6. Power Supply Unit (PSU)
7. Input Devices (Keyboards, Mice, Touchscreens, Microphones)
8. Output Devices (Monitors, Printers, Speakers)
9. Expansion Cards (Sound Cards, Network Interface Cards, Graphics Cards)
10. Cooling Systems (Fans, Heat Sinks)

MOTHERBOARD

A motherboard, also known as a mainboard or system board, is the primary circuit board in a computer that connects and facilitates communication

between various hardware components. It serves as a central hub for the essential components of a computer system to work together. The motherboard provides the physical and electrical connections for the central processing unit (CPU), memory (RAM), storage devices, graphics cards, and other peripherals.



GRAPHICS PROCESSING UNIT (GPU)

The GPU is responsible for rendering graphics and images, handling tasks related to visual processing.

It accelerates image and video processing, 3D rendering, and gaming graphics.

GPUs can be integrated into the CPU (integrated graphics) or come as discrete graphics cards, offering higher performance for demanding tasks.

SMPS (SWITCHED-MODE POWER SUPPLY)

SMPS is an electronic power supply system that makes use of a switching regulator to transfer electrical power effectively. It is a PSU (POWER SUPPLY UNIT) and is usually used in computers to change the voltage to the appropriate range for the computer.

COMPLEMENTARY METAL-OXIDE-SEMICONDUCTOR (CMOS) BATTERY

The CMOS battery is a small, coin-shaped battery located on the computer's motherboard. It provides power to the complementary metal-oxide-semiconductor (CMOS) memory, a special type of volatile memory that stores system configuration settings such as date and time. The CMOS battery ensures that these settings are retained even when the computer is powered off. If the CMOS battery fails, the computer may lose its date and time settings, and the system may not operate properly.

HDMI (HIGH-DEFINITION MULTIMEDIA INTERFACE)

HDMI stands for High-Definition Multimedia Interface. It is a widely used interface for transmitting audio and video signals between devices, such as computers, gaming consoles, Blu-ray players, TVs, monitors, and audio-video receivers. HDMI is known for delivering high-quality digital audio and video in a single cable, simplifying connectivity and providing a superior multimedia experience.

RAM MODULES

In computing, a memory module or RAM (random access memory) stick is a printed circuit board on which memory integrated circuit are mounted. Memory modules permit easy installation and replacement in electronic systems, especially computers such as personal computers, word stations,

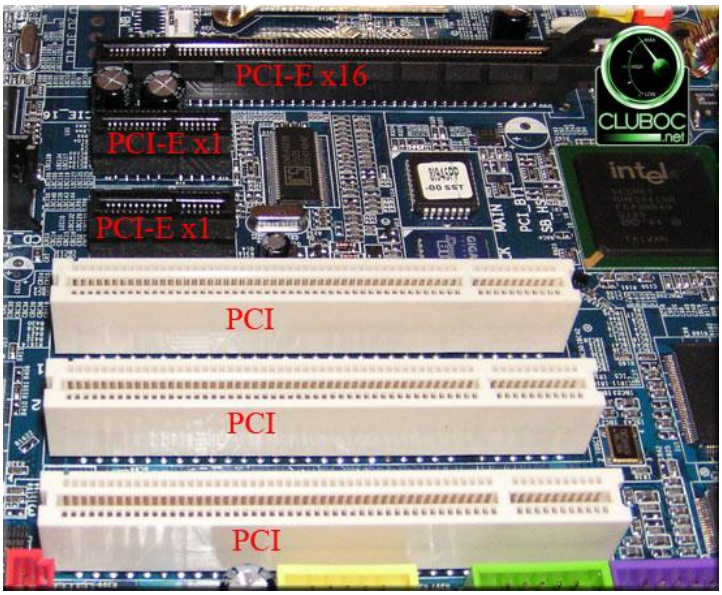
and servers. RAM modules refer to the physical hardware components that contain the RAM chips.

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 maybe 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.

BUS SLOT

Alternatively known as a bus slot or expansion port, an expansion slot is a connection or port inside a computer on the motherboard or riser card. It provides an installation point for a 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.



STORAGE DEVICES

Storage devices are hardware components or devices that store, retain, and retrieve digital data. They come in various types and serve different purposes, ranging from providing long-term storage for large amounts of data to offering fast, temporary storage for active processes.

1) HDD (HARD DISK DRIVE) - is an electro mechanical storage device, which is an abbreviation of hard disk drive. It uses magnetic storage for storing and retrieving the digital data. It is a non-volatile storage device. Hard disk is installed internally in our computer systems, which is connecter

directly to the disk controllers of the motherboard. HDD means data is retained when our computer system is shutdown.

2) <u>SSD (SOLID STATE DRIVE)</u> - SSD is non-volatile storage device, it stores the data on flash memory chips and maintains the data in a permanent state, even when the power is off. As compared to electromechanical drives, SSDs have lower latency and access quickly. These storage devices store the data in the semiconductor cells.

Following are several types of SSDs:

<u>SATA SSD:</u> SATA is the acronym for 'serial advanced

M.2 SATA SSD: Its newer. and its format is lighter and smaller than the SATA SSD.

mSATA SSD: Its mini version of SATA. It has a smaller form factor mainly used in ultra-compact computers, laptops, mobile devices with an mSATA slot, in which the installation of an extended size SATA SSD is impossible.

INPUT DEVICES/UNITS

Input devices or units are hardware components that allow users to interact with a computer or other electronic devices by providing data or commands. These devices convert physical actions or signals into digital information that can be processed by the computer.

1) KEYBOARD: The keyboard is one of the primary input devices, which helps in entering data and commands in a computer. A normal keyboard is usually has a variety of keys, such as alphabetic character keys, function keys, number keys, arrow keys, and control keys. The keyboard can be connected to a computer using USB or BLUETOOTH.

2) MOUSE: Mouse is the most common and very popular pointing device that helps interact with a common through a process called 'point and click'. This is mainly used to move a cursor on the computer's screen and click on the corresponding object using buttons (usually left, right, and middle key roller buttons).

3) SCANNER: Scanner is an input device, which works more like a photocopy machine. It used when some information is available on paper and it is to be transferred to the hard disk of the computer for further manipulation.

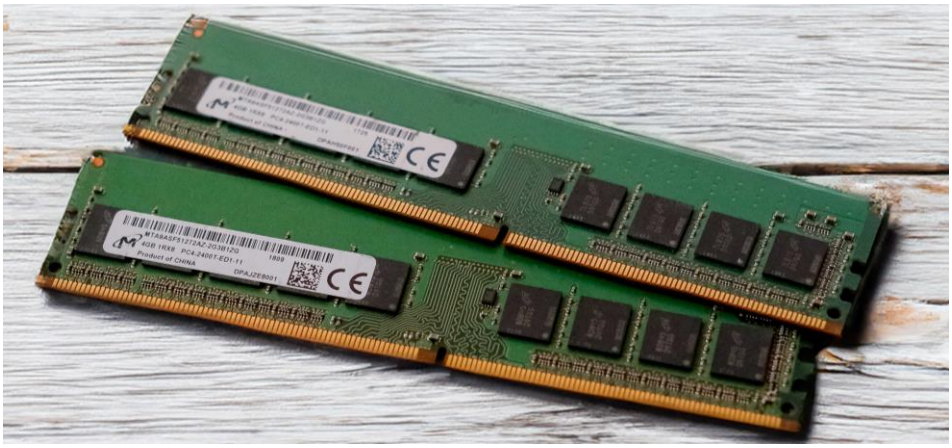
4) BARCODE SCANNER: A barcode scanner is an input device that captures and translates barcode information into digital data that a computer or other electronic system can process. Barcode scanners are widely used in various industries for tasks such as inventory management, point-of-sale transactions, and tracking items through supply chains.

PROCESSING UNIT

The part of a computer that performs logical and arithmetical operation on the data as specified in the instructions.

1) CPU (CENTRAL PROCESSING UNIT): A central processing unit is also called a processor, central processor, or microprocessor. The CPU, or Central Processing Unit, is a critical component of a computer system. It serves as the brain of the computer, executing instructions and performing calculations necessary for the operation of software and the overall functioning of the system.

2) <u>RAM (RANDOM ACCESS MEMORY):</u> Is a hardware device generally located on the motherboard of a computer of the CPU. RAM is a type of computer memory that is used to store data that is actively being used or processed by a computer. It is a volatile memory, meaning that it loses its content when the power is turned off. RAM is a crucial component for the smooth functioning of a computer, as it allows the system to quickly access and retrieve data that is in active use by the CPU.



OUTPUT DEVICES/UNITS

Output devices or units in computing are hardware components that present information from a computer to the user or to other systems. These devices convert electronic information into human-readable or machine-readable forms.

1) MONITOR: A monitor is a piece of computer hardware that accepts data from a computer and displays it on the system screen through the computers video card. Monitors have the ability to display information at much higher resolution. Additionally, these are much like televisions and also known as video screen, display, video display terminal, or video display unit.

2) SPEAKERS: The most common output devices, speakers accept sound data from a computer and play the sounds for users to hear.

3) PROJECTOR: Projector is an output device that accepts data from a computer and projects that data or information as a picture onto a wall or screen or any large surface.

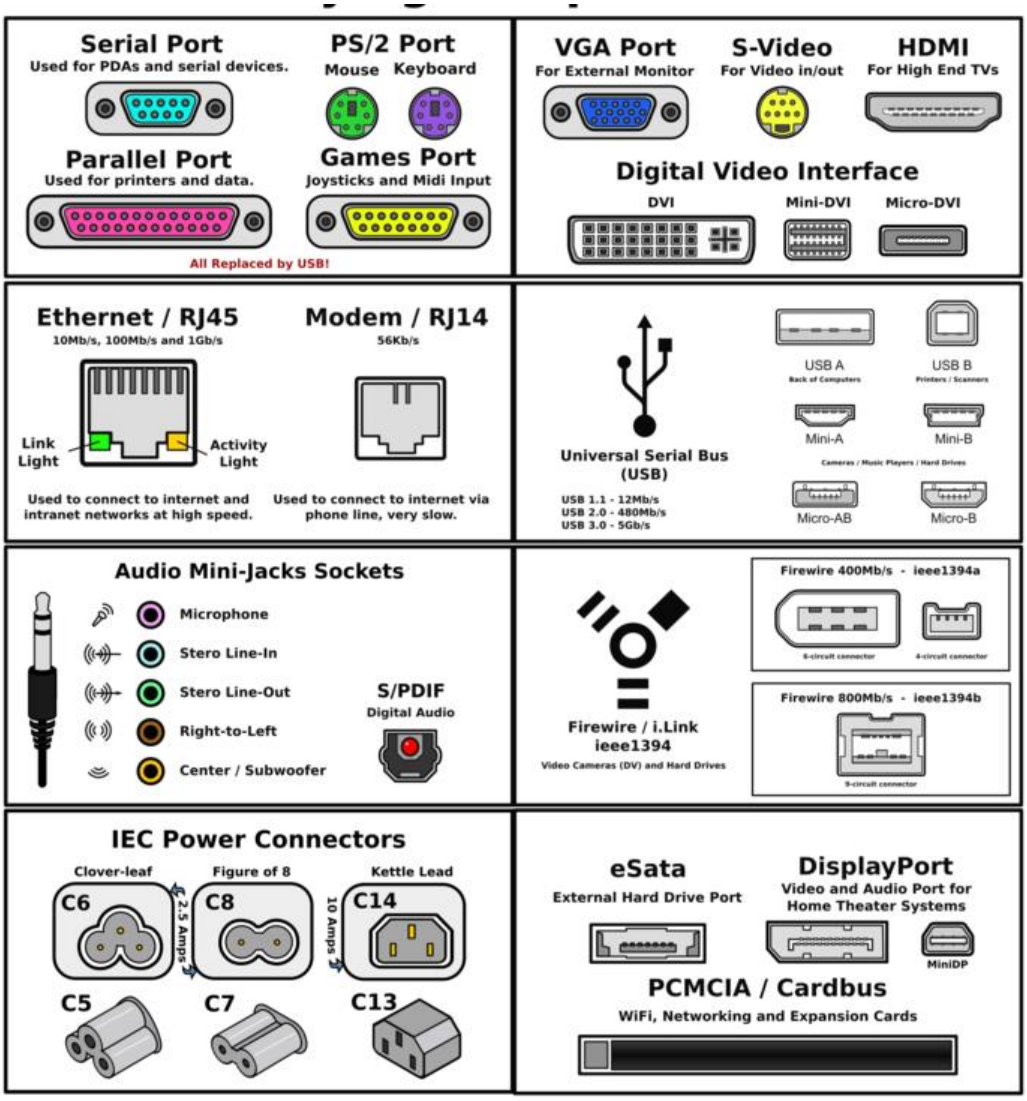
4) PLOTTERS: Specialized output devices used for printing large-scale engineering drawings, maps, or designs with high precision.

5) PRINTER: Produces hard copies of digital documents or images on paper. Types of printers include inkjet, laser, dot matrix, and 3D printers.

INTERFACING PORTS:

Interfacing ports, also known as input/output ports or simply I/O ports, are connectors on a computer or electronic device that allows communication with external peripherals or other devices. These ports facilitate the transfer of data, power, or signals between the computer and various external components.

A port is a physical docking point using which an external device can be connected to the computer. It can also be programmatic docking point through which information flows from a program to the computer or over the Internet.



1. **USB Ports (Universal Serial Bus):** USB ports are versatile and widely used for connecting a variety of peripherals, including keyboards, mice, printers, external hard drives, and more. Motherboards typically have multiple USB ports.

2. **Audio Ports:** These ports, often color-coded, include connections for headphones, microphones, and line-in/line-out audio devices. Commonly, motherboards have 3.5mm jacks for audio connections.
3. **Ethernet Port (RJ45):** This port enables a wired network connection, allowing the motherboard to connect to local area networks (LANs) or the internet.
4. **HDMI, DisplayPort, and VGA Ports:** These video output ports allow you to connect monitors or other display devices to the motherboard. The specific ports available depend on the motherboard model.
5. **PS/2 Ports:** These are legacy ports for connecting keyboards and mice. PS/2 ports are less common on modern motherboards but may still be found on some.
6. **PCI Express Slots:** PCIe slots are used for connecting expansion cards such as graphics cards, sound cards, network cards, and other high-performance peripherals.
7. **SATA Ports:** Serial ATA (SATA) ports are used to connect internal storage devices, such as hard drives and SSDs, to the motherboard.
8. **M.2 Slots:** M.2 slots support small form factor expansion cards, commonly used for connecting SSDs, Wi-Fi cards, and other high-speed components.
9. **Thunderbolt Ports:** Some motherboards feature Thunderbolt ports, providing high-speed data transfer and display connectivity.
10. **USB Type-C Port:** USB Type-C is a versatile and reversible connector that supports high-speed data transfer, power delivery, and display connectivity. It is becoming more common on modern motherboards.
11. **RGB Headers:** These headers allow you to connect RGB lighting strips or fans to the motherboard, enabling control and synchronization of lighting effects.
12. **Fan Headers:** Motherboards include headers for connecting case fans and CPU fans, allowing the motherboard to control fan speeds based on system temperature.

13. **CMOS Battery:** Not a traditional port, but an important component for maintaining the motherboard's BIOS settings.
14. **DVI (Digital Visual Interface):** Used for connecting computers to monitors or displays. It supports both analog and digital signals.
15. **VGA (Video Graphics Array):** An older video port standard used to connect computers to monitors or projectors. VGA transmits analog video signals.

Common Operating System Installation

For both desktop and server use, one of the most common operating systems is Linux. Here's a brief overview of how to install Linux on both types of computers:

Desktop Installation

Choose a Linux distribution (distro) tailored for desktop use, such as Ubuntu, Fedora, or Linux Mint. Download the installation ISO file from the distribution's website. Create a bootable USB drive using software like Rufus (Windows) or balenaEtcher (Windows, macOS, Linux). Boot from the USB drive and follow the on-screen instructions to install the Linux distribution. You'll typically need to partition your hard drive, select installation options, and create a user account.

Server Installation

Choose a server-oriented Linux distribution such as CentOS, Debian, or Ubuntu Server. Download the installation ISO file from the distribution's website. Create a bootable USB drive or mount the ISO file on the server. Boot from the USB drive or mount the ISO file and follow the on-screen instructions to install the Linux distribution. Server installations often offer options for configuring network settings, disk partitioning, and package selection. Once installed, you can manage the server remotely using SSH (Secure Shell) or a web-based control panel.

Additionally, Windows Server is another common operating system for server-class computers, especially in enterprise environments. Installation procedures for Windows Server are similar to those for desktop versions of Windows, with additional features and configuration options tailored for server use.