

# Computer Basics - Hardware components

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<https://yasirbhutta.github.io/computer-basics/docs/hardware.html>

## Computer Hardware

- The physical parts of a computer are called hardware.
- The user can see and touch hardware. computer is a collection of several different parts

### Desktop PC System



Image by [wikimedia.org](#)

#### Types of computer hardware:

- **Internal hardware:** Internal hardware is the hardware that is located inside the computer case. It includes the following components:
  - **Motherboard:** The motherboard is the main circuit board of a computer. It connects all of the other internal components together.
  - **CPU:** The CPU is the brain of the computer. It is responsible for processing instructions and performing calculations.
  - **Memory:** Memory is used to store data and programs that the CPU is currently using. There are two main types of memory: random access memory (RAM) and read-only memory (ROM).

- **Storage devices:** Storage devices are used to store data permanently. Common storage devices include hard disk drives (HDDs), solid-state drives (SSDs), and optical drives (such as CD-ROM and DVD drives).
- Expansion cards: Expansion cards are used to add new features to a computer, such as a graphics card, sound card, or network card.
- **External hardware:** External hardware is the hardware that is connected to the computer but is located outside of the computer case. It includes the following devices:
  - **Input devices:** Input devices are used to enter data into the computer. Common input devices include keyboards, mice, trackpads, touchscreens, and scanners.
  - **Output devices:** Output devices are used to display or print data from the computer. Common output devices include monitors, printers, and speakers.
  - **Networking hardware:** Networking hardware is used to connect a computer to a network. Common networking devices include routers, switches, and modems.

Other types of computer hardware include:

- Power supply unit (PSU): The PSU provides power to all of the other components in the computer.
- Cooling system: The cooling system keeps the computer from overheating.
- Case/System Unit: The case houses all of the internal components of the computer and protects them from damage.

#### See also:

- [Video: Computer Basics- Inside a Computer](#)
- [Video: What are internal components of CPU? Animated E learning Video](#)

## Input Devices

- A hardware component that is used to enter data and instruction into computer is called input device.
- Keyboards
- Pointing Devices
  - Mouse
  - Trackball
  - Touchpad
  - Touchscreen
  - Joystick
  - Pointing stick
  - Light pen
- Imaging and Video input devices
  - Webcam
  - Image scanner
  - Fingerprint scanner
  - Barcode Reader
- Audio input devices

- Microphone

## Keyboard

- keyboard is used to type text and numbers into a word processor, text editor or other program[3]. It contains alphabetic, numeric and other keys for entering different type of data.

## Mouse

- Mouse is a pointing device.
- It controls the pointer on the screen.
- Pointer on the screen is used to apply different commands.
- Mouse mostly have two buttons.

## Trackball

- A trackball is a pointing device consisting of a ball to move the cursor on the screen.

## Touchpad

- A touchpad or trackpad is a flat surface.
- The movement of the finger moves the cursor on the screen.
- A touch pad also has one or more buttons. These button work like mouse buttons.
- Most used in laptop/notebooks.

## Touchscreen

- Touch screen is video display screen that receives input from the touch of finger.

## Joystick

- A joystick consists of a base and a stick.
- The most common use of a joystick is for playing computer games.

## Pointing Stick

- Pointing stick is a pressure-sensitive device.
- It exists between keys on the keyboard.
- By moving pointing stick, pointer move on the screen.

## Light Pen

- A lightpen is a device similar to a touch screen, but uses a special light sensitive pen instead of the finger, which allows for more accurate screen input.

## Imaging and Video input devices

### Web Cams

- A webcam is a video capture device connected to a computer.
- It is used for video conferencing, video Calling, recording of video files or even still images.

### **Image Scanner**

- In computing, a scanner is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. [6]

### **Fingerprint Scanner**

- Fingerprint scanner is used to scan the fingerprint of human.
- Fingerprints are one of many forms of biometrics used to identify an individual and verify their identity.

### **Bar Code Scanner**

A barcode reader (or barcode scanner) is an electronic device for reading barcodes printed on various surfaces.

## **Audio Input Devices**

### **Microphone**

- A device that converts sound into electrical wave for the purpose of transmitting or recording.[7] Outut Devices

## **Output Devices**

- The hardware components that are used to receive information from the computer are called output devices.
- Output devices take information from the computer and convert it in a form that is understandable by the users.
- Output devices are hardware components that receive data from a computer and translate it into a format that can be understood by humans.

## **Hard Copy & Soft Copy**

**Hard Copy:** material printed by a computer on paper.

**Soft Copy:** technical information stored in a computer's memory or shown on a screen rather than printed on paper.

### **Monitor**

- A computer monitor is an electronic device that shows pictures.

There are several types of computer monitors:

#### **LCD (liquid crystal display) monitors**

- LCD monitors are the most common type of monitor available today.
- They are thin, lightweight, and energy-efficient.
- LCD monitors use liquid crystals to create images on the screen.

#### **LED (light-emitting diode) monitors**

- LED monitors are a type of LCD monitor that uses light-emitting diodes (LEDs) as the backlight instead of fluorescent lamps.
- LEDs are more energy-efficient and have a longer lifespan than fluorescent lamps.
- LED monitors also tend to have better image quality than LCD monitors, with higher contrast ratios and brighter colors.

The contrast ratio (CR) is a property of a display system, defined as the ratio of the luminance of the brightest shade (white) to that of the darkest shade (black) that the system is capable of producing. A high contrast ratio is a desired aspect of any display. [^3]

#### **CRT (cathode ray tube) monitors**

- CRT monitors are the oldest type of computer monitor.
- They are bulky and heavy, and they consume a lot of power.
- CRT monitors are also known for their excellent image quality and wide viewing angles.
- CRT monitors are no longer commonly used, but they are still available for some specialized applications.

#### **Printer**

- A printer is an output device that prints characters, symbols and graphics on paper. The Printed output is called hard copy.

Or

- Printers take the information from the CPU and print it on paper.

#### **Speakers**

- Output devices that receive signals from the computer's sound card to play music, narration, or sound effects.

#### **Headphone**

- A headphone is designed to hear the sound on a computer system.
- Headphones is a pair of small loudspeakers.

#### **Data Projector**

- A device that projects computer output onto a larger screen.
- Widely used in classrooms and auditoriums etc

#### **CPU or Processor**

- CPU stands for **Central Processing Unit**.
- It is the brain of the computer.
- It is also called processor.
- CPU continually receives instructions to execute. CPU performs all operations according to the given instructions. It executes instructions and tells other parts of computer what to do.

CPU consists of two main units:

- ALU ( Arithmetic and logic Unit)
- CU ( Control Unit)

### ALU (Arithmetic and Logic Unit)

- ALU is a part of CPU. Actual execution of the instructions takes place in this part.

It Consists Two units:

**Arithmetic Unit** : Arithmetic unit of the ALU performs basic arithmetic functions such as additions, subtraction, multiplications and division. **Logic Unit** : Logic unit of the ALU performs logical operations like comparing two data items to find which data item is greater than ,equal to or less than the other.

### Control Unit

- It controls all activities of computer system.
- It is also called the **supervisor** of the computer.

### Motherboard

- The motherboard is **main circuit board** of a computer, usually containing the central processing unit and main system memory as well as circuitry that controls the disk drives, keyboard, monitor, and other peripheral devices.
- It is also known as a mainboard, baseboard, system board.

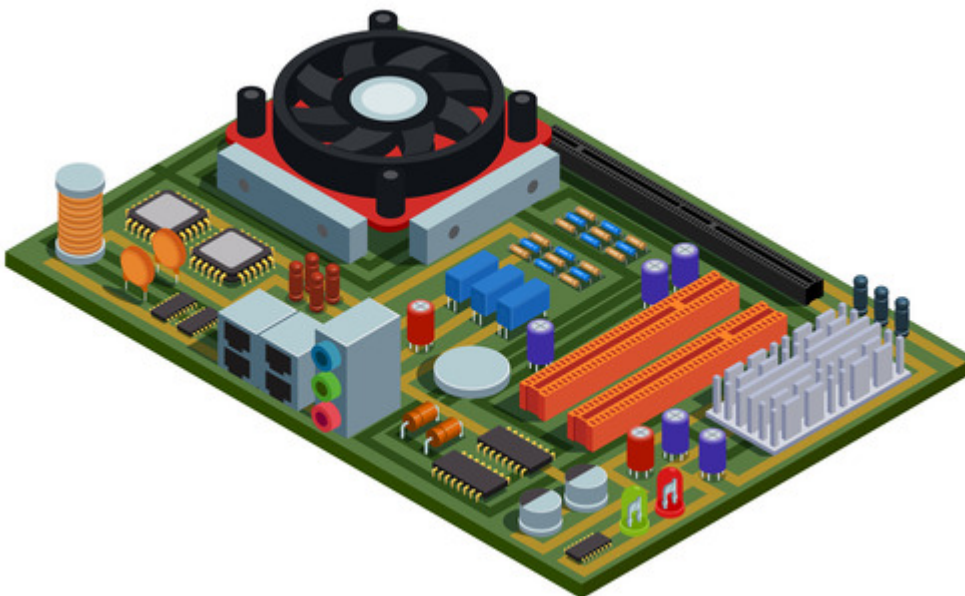


Image by [macrovector](#) on

Freepik

**Buses:** Buses on a motherboard are electrical pathways that allow different components on the motherboard to communicate with each other.

## Computer Peripherals

### System Unit

- System unit is a box that contains different components of computer system.
- It is also called casing.

Types of system units:

- Desktop model
- Tower model

### Sound Card

- A circuit board/Card that gives the computer the ability to accept audio input, play sound files, and produce audio output through speakers or headphones.

### Video Graphic Adapter

- A display screen must have a video display adapter attached with the computer to display graphics.
- It is also called video graphics card.

### Network Interface Card

- NIC is also called LAN Card.
- It is used to connect a device to a network.
- It manages the transmission of data, instructions and information to and from the computer with NIC.

### Power Supply

- Power supply is used to provide electric circuit to different computer hardware components. Like Motherboard, Hard disk, CD Rom.

### Uninterrupted Power Supply

- It is also called UPS.
- UPS is used to provide continuous power supply for computers and other devices during electricity break down.
- UPS has batteries to store electricity powers.

## Ports

- A port is an interface on a computer to which other devices are connected.
- It is used to connect peripheral devices with computer such as printers, keyboards or mouse.

### USB (Universal Serial Bus):

- USB is a type of port that is used to connect a wide variety of devices to a computer, including external hard drives, printers, scanners, and keyboards.
- There are several types of USB ports available, including USB-A (Type A), USB-B (Type B), and USB-C (Type C) but the most common type is the USB Type-A port. [^1] [^2]

**HDMI:**

- HDMI (High-Definition Multimedia Interface) is a type of port that is used to connect high-definition video and audio devices to a computer, such as monitors, televisions, and projectors.
- HDMI ports are capable of carrying both high-definition video and audio signals over a single cable.

**DisplayPort:**

DisplayPort is another type of port that is used to connect high-definition video and audio devices to a computer. DisplayPort ports are similar to HDMI ports, but they offer some additional features, such as the ability to support multiple monitors over a single cable.

**Ethernet:**

- Ethernet ports are used to connect computers to a network, such as a home network or a business network.
- Ethernet ports use a standard RJ-45 connector.

**VGA:**

- VGA (Video Graphics Array) ports are used to connect analog monitors to a computer.
- VGA ports are the oldest type of video port, but they are still commonly used on older computers and monitors.

**Audio ports:**

- Audio ports are used to connect speakers and microphones to a computer.

**True/False**

- A printer is an input device because it produces a physical copy of digital information.
- USB and HDMI are examples of common types of computer ports.
- Monitors are used to input data into the computer.
- Buses on a motherboard have no role in data transmission between the CPU and RAM.
- The motherboard is also known as the central processing unit (CPU).
- The CMOS battery on a motherboard is responsible for maintaining the system time and BIOS settings, even when the computer is turned off.
- The PSU (Power Supply Unit) in a computer converts alternating current (AC) to direct current (DC) to power the components.
- Input devices, such as keyboards and mice, are used to send data to the computer.
- The BIOS (Basic Input/Output System) is software that is permanently stored on a computer's motherboard.
- Network cards are used to connect computers to a network.
- Power supplies are used to cool the CPU and other components of the computer.
- Software is the physical components of a computer.



- Ports are used to connect input and output devices to a computer.
- The data bus is responsible for transmitting data between the CPU and RAM.
- Buses on a motherboard are responsible for connecting components within a computer, facilitating communication.
- A USB (Universal Serial Bus) port on a motherboard is considered a type of bus.

## Multiple Choice

Which of the following is NOT a hardware component?

1. ☒ Software
2. ☐ CPU
3. ☐ Motherboard
4. ☐ RAM

Which of the following is the brain of the computer?

1. ☒ CPU
2. ☐ Motherboard
3. ☐ RAM
4. ☐ Hard drive

What does CPU stand for?

1. ☒ Central Processing Unit
2. ☐ Computer Power Unit
3. ☐ Central Power Unit
4. ☐ Central Peripheral Unit

Which of the following is used to connect input and output devices to the computer?

1. ☐ Ports
2. ☐ Buses
3. ☐ Expansion cards
4. ☒ All of the above

- **Ports** are physical connectors on the computer that allow input and output devices to be connected. Examples of ports include USB, HDMI, and Ethernet ports.
- **Buses** are electrical pathways that allow data to be transferred between different components of the computer, including input and output devices. Examples of buses include the PCI Express bus and the USB bus.
- **Expansion cards** are circuit boards that can be installed in the computer to add new capabilities, such as support for new input and output devices. Examples of expansion cards include graphics cards and sound cards.

Which of the following is a type of input device?

1. ☐ Keyboard
2. ☐ Mouse
3. ☐ Scanner

4. ☒ All of the above

Which of the following is used to store data and programs that the CPU is currently using?

1. ☒ RAM
2. ☐ ROM
3. ☐ Hard drive
4. ☐ Optical drive

Which component supplies power to all the other components in a computer?

1. ☐ CPU
2. ☐ RAM
3. ☒ PSU (Power Supply Unit)
4. ☐ GPU

Which of the following is an example of an input device?

1. ☐ Monitor
2. ☒ Keyboard
3. ☐ Printer
4. ☐ Speaker

Which port is commonly used to connect a keyboard and mouse to a computer?

1. ☒ USB
2. ☐ HDMI
3. ☐ Ethernet
4. ☐ VGA

What is the purpose of a CPU heatsink and fan?

1. ☐ To increase CPU performance
2. ☒ To cool the motherboard
3. ☐ To prevent the CPU from overheating
4. ☐ To enhance graphics rendering

Which of the following is a type of output device?

1. ☐ Monitor
2. ☐ Printer
3. ☐ Speakers
4. ☒ All of the above

What is the primary function of a motherboard in a computer?

1. ☐ Storing data
2. ☐ Processing data
3. ☒ Connecting and coordinating hardware components
4. ☐ Displaying images on the screen

What is the main purpose of a power supply unit (PSU) in a computer?

1. ☐ Cooling the components
2. ☐ Providing electricity to the CPU
3. ☒ Supplying power to all computer components
4. ☐ Controlling the CPU speed

What is the purpose of an expansion slot on a motherboard?

1. ☐ To connect to the internet
2. ☐ To increase CPU speed
3. ☒ To add additional hardware components
4. ☐ To improve display quality

Which part of a computer is responsible for initializing the hardware and booting the operating system?

1. ☐ CPU
2. ☐ RAM
3. ☒ BIOS
4. ☐ GPU

Which of the following is not an example of a common input/output port on a computer?

1. ☐ USB
2. ☐ HDMI
3. ☒ WiFi
4. ☐ Ethernet

What is the purpose of a CMOS battery on a motherboard?

1. ☐ It powers the CPU.
2. ☒ It maintains the system time and BIOS settings.
3. ☐ It controls the GPU.
4. ☐ It stores application data.

What is a "driver" in the context of computer hardware?

1. ☐ A person who operates the computer
2. ☒ A piece of software that allows hardware to work with the operating system
3. ☐ A hardware component in a computer
4. ☐ A type of power supply unit

## Review Questions

- What is the difference between hardware and software?
- What are the different types of input and output devices?
- What is the motherboard and what is its function?
- What is the CPU and what does it do?

**Answer:**

A single-core CPU has only one processing unit, while a multi-core CPU has multiple processing units. In other words, a single-core CPU can only execute one instruction at a time, while a multi-core CPU can execute multiple instructions simultaneously. [read more...](#)

- What is the clock speed of a CPU?

#### Answer:

The clock speed of a processor refers to the number of cycles it can execute per second, essentially acting like its heartbeat. It's measured in hertz (Hz), with common units being:

**MHz (megahertz):** Millions of cycles per second. Used for older processors. **GHz (gigahertz):** Billions of cycles per second. Standard for modern processors, ranging from around 2 GHz to 4 GHz or even higher.

- What is the difference between a 32-bit and a 64-bit CPU?

#### Answer:

Data Handling:

- 32-bit CPU: Can process 32 bits of data at a time, which equals 4 bytes.
- 64-bit CPU: Can process 64 bits of data at a time, which equals 8 bytes. This allows them to handle much larger numbers and complex calculations more efficiently.

Memory Access:

- 32-bit CPU: Can address a maximum of 4GB of RAM (random access memory). This means they can only use up to 4GB of RAM at a time. 64-bit CPU: Can address a vast amount of RAM, theoretically up to 18 quintillion gigabytes. In practice, the actual limit depends on the specific CPU and operating system, but it's significantly higher than 32-bit CPUs.
- What is the cache memory of a CPU?
- What are some of the things to consider when choosing a CPU?
- What are the different types of monitors?
- What are the different types of printers?
- What is the power supply and what does it do?
- What is a graphics card and what does it do?
- What are the different types of ports on a computer?
- What is the purpose of a motherboard in a computer, and what components are typically connected to it?
- What is the purpose of the CMOS battery in a computer, and what happens if it fails?
- What is a network card (NIC), and how does it facilitate network connectivity in a computer?

## References

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- <http://en.wikipedia.org/wiki/Webcam>
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- [<sup>1</sup>] [What Is a USB Port? - LifeWire](#)
- [<sup>2</sup>] [USB Explained: All the Different Types \(and What They're Used for\)](#)
- [<sup>3</sup>] [Contrast ratio](#)
- [http://en.wikipedia.org/wiki/Pointing\\_device](http://en.wikipedia.org/wiki/Pointing_device)