Al-Mustaqbal University
College Of Engineering Technology
Department Of Cyber Security Techniques Engineering
Class: 1st
Subject: Computer Hardware Components
Lecturer: Dr. Zainab Abdullah Jasim
1st term – Lecture: 2- Introduction

Computer Hardware Components:-

Explore our essential guide to computer hardware components and their functions, perfect for enhancing your knowledge of PCs. Learn how each part, from the CPU to peripheral devices, plays a role in your computer's performance.

A computer is an integral part of both work and personal life. Understanding the components that make up your computer can enhance your ability to make informed decisions about hardware purchases, upgrade paths, and troubleshooting. This guide will navigate you through the essential hardware components of a computer system, explaining the role each part plays in the overall functionality. Whether you're a seasoned professional or a casual user, knowing the building blocks of your computer is important in optimising its performance and lifespan.

- **Key Takeaways**

Component	Function
CPU	Processes instructions and manages data flow within the computer.
Motherboard	Connects all hardware components and allows communication between them.
RAM	Stores data temporarily for quick access and multitasking.
Storage (HDD/SSD)	Permanently stores data; SSDs are faster than HDDs.
PSU	Converts and supplies power to the computer's components.
GPU	Renders graphics and images for display.
Cooling Systems	Maintains optimal operating temperatures.
Peripheral Devices	Facilitate user interaction and additional functionalities.

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Component	Function
Networking Components	Connect the computer to the internet and other networks.
Sound Card	Processes audio data and provides sound output.

Figure 1 represent Computer Hardware Components

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➢ The Central Processing Unit (CPU)

The Central Processing Unit, or CPU, is the primary component of a computer that performs most of the processing inside a computer. To understand it better, let's look at its main functions.

The Role of the CPU

- **Execution of Programs:** The CPU executes instructions from software applications, ranging from complex video games to simple text editors.
- **Processing Data:** It processes the data it receives from various programs or devices.
- **Performance:** The CPU's speed, measured in GHz, directly impacts the overall computer's performance.

Key Factors Affecting CPU Performance

- **Clock Speed:** The speed at which a CPU can execute instructions.
- **Core Count:** More cores can handle multiple tasks at once.
- **Cache Size:** A larger cache provides the CPU with quicker access to data.

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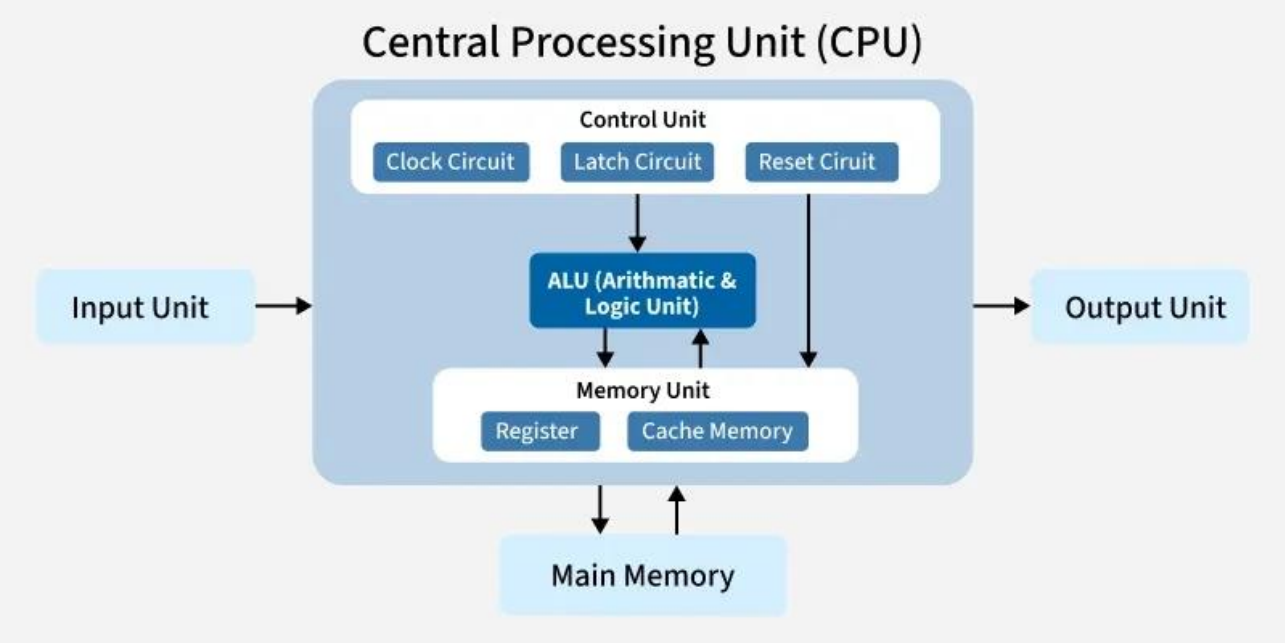

Figure 2 represent Central Processing Unit

CPU Architectures and Brands

- **Intel and AMD:** The two main CPU manufacturers, each offering a range of processors for different needs.
- **ARM:** Used in most smartphones, it's known for energy efficiency.

> The Motherboard

The Foundation of Functionality

The motherboard is suitable named for its role: it is the central hub that connects all other components of a computer, much like a mother's central role in a family. It's a critical piece of the hardware , hosting the CPU, memory, and expansion slots for other hardware.

Main Functions of the Motherboard

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- **Interconnectivity:** It provides the pathways for data to travel between components.
- **Expansion:** It offers slots for additional components like GPUs and sound cards.
- **Power Distribution:** It distributes power from the PSU to various components.

Motherboard Components include:

- **Chipset:** This acts as the traffic controller, managing data flows.
- **Slots and Connectors** Including

  1-RAM slots (Used to install RAM modules for system memory),

  2-PCI slots **(Interfaces for adding expansion cards like graphics or network cards)**, and

  3-SATA ports(**Connectors**)for storage(ports for connecting hard drives, SSDs, and optical drives)

- **BIOS/UEFI Firmware:** The basic input/output system or unified extensible firmware interface controls the basic functions of the hardware.
- **Processor Socket**: The physical electrical interface between the CPU and the motherboard.

Northbridge/Southbridge: Chipsets that manage communication between the CPU, memory, and peripheral devices.

Expansion Slots (PCI/AGP): Interfaces for adding expansion cards like graphics or network cards.

Choosing the Right Motherboard

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- **Form Factor:** Size of the motherboard, like ATX or microATX, which determines the size of the case you can use.
- **Socket Type:** It must match the CPU's socket type.
- **Features:** Such as built-in Wi-Fi, number of USB ports, and quality of on-board audio.

The motherboard is a component that often gets less attention but is just as crucial as the CPU or RAM. It's the foundation upon which a reliable and high-functioning computer is built. Figure 3 show the motherboard components.

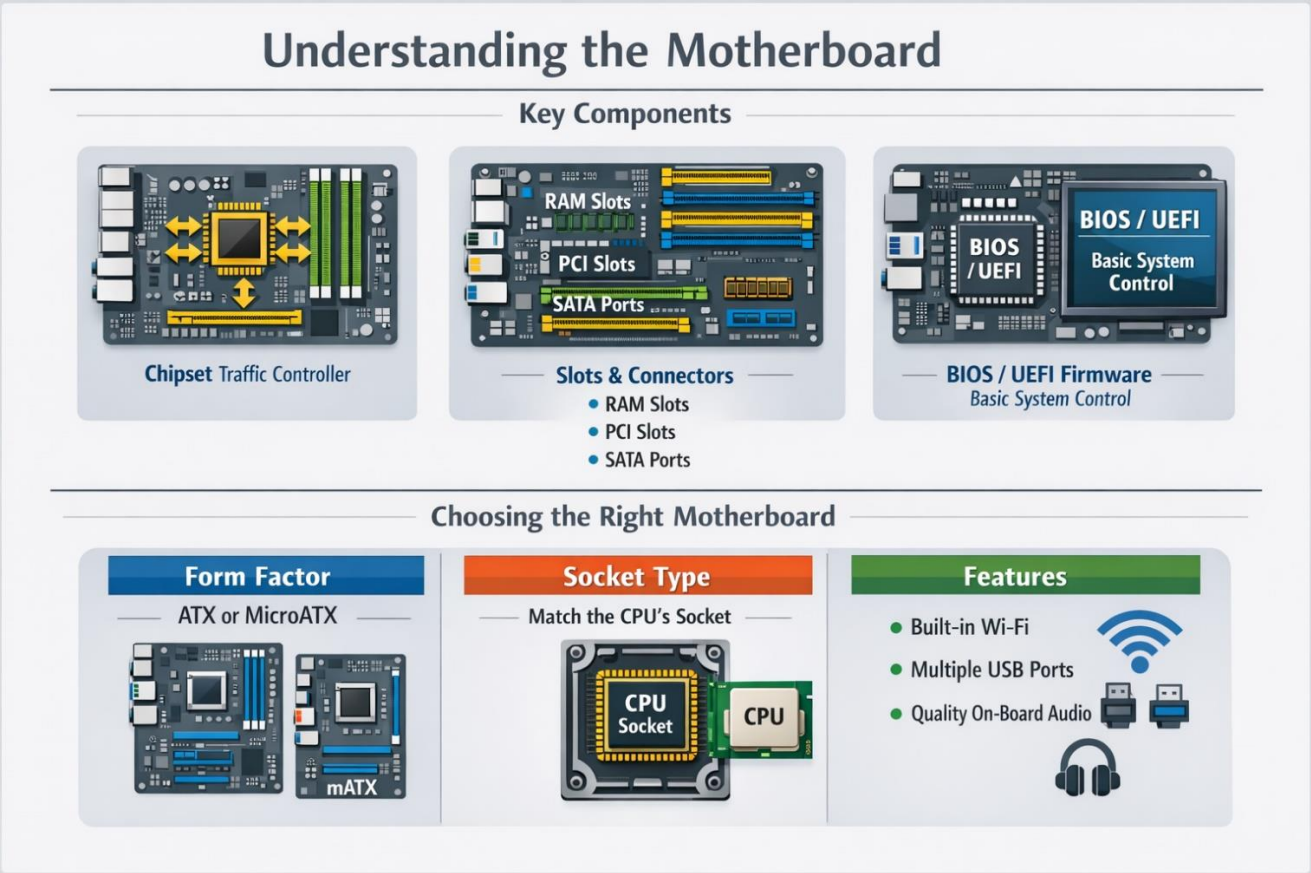

Figure 3 the motherboard components