**Important Notes:**

**System Clock:** Motherboard component that keeps everything **synchronised**.

**System Clock Speed:** Measured in **MHz** or **GHz**.

**Intel CPUs**: **LGA** (Pins on Motherboard)

**AMD CPUs**: **PGA** (Pins on CPU)

**Chipset**: The main component that is responsible for data transfer between CPU and all the components. **Integrated** into motherboard and can’t be removed.

**Northbridge**: Handles communication between CPU and **high** **speed** **memory** locations like RAMs and high speed graphics card.

**Southbridge**: Handles communication between CPU and other low speed memory devices like PCI slots.

**SATA Ports:** Often used to connect storage devices like **HDDs** and **SSDs**. Also **for tape drives** and **optical drives.**

**M.2 Interface:** While **SATA ports** supports **6Gbps**, **M.2 slot** support **64 Gbps** speed. It is small and doesnot need power supply like SATA. Lengths: **42mm, 60mm, 60mm, or 110mm. Remember,** it is an empty space where we can install the SSDs. It is not the device itself. So we can say it as **Form Factor for high speed storage devices.**

**External SATA:** **2m** long. We cannot use Internal SATA as external SATA. Power is not supplied in SATA technology. We need to carry an external power. For larger external storage devices (**3.5 inches**) where power port is there, it is not a problem but for smaller portable storage devices of **size 2.5 inch,** it can be problem sometime.

**PCIe:** **Point-to-point connection Serial**. More lanes = faster performance. Sizes: **x1, x4, x8, x16.** The one which is closest to CPU is x16 and after that it continues like x8, x4, x1. A **x16** slot has **16** lanes whereas **x1** has **one** lane.

**Backward Compatibility** of PCI slots: A **PCIe** **2** slot can work on **PCIe** **4** slot but run on 2th version.

**Power for PCIe slot:** **75watt**. And extra **75watt** can be attached from another PCIe power connector. A normal PCIe version2 **x16** slot has speed of **8 GB/s**.

**PCI Slots:** **5V** power. Uses **parallel** communication which means data is sent across multiple wires at the same time. Speed: **133Mbps** which is way slower than PCIe which is in **8** **Gb/ps.**

**Motherboard Form Factors:** **ATX** for (standard PCs) and **ITX** for small devices.

**ATX: Size –** **12x9.6inches (305mm x 244mm).** Can support upto **7** expansion slots.

**MicroATX:** Square shaped **9.6inches** all sides. **(244mm x 244mm).** Can be mounted to ATX cases also.

**ITX: Mini-ITX: 6.7x6.7 inches (170mm x170mm).** Can be mounted to ATX cases. Usually support **1** expansion slot.

**Headers in Motherboard:** There are multiple headers like Power Button Header, Drive HDD Activity Lights, Audio Ports Header, and USB Ports Header.

**USB Port Header:** There is 2 USB headers. One is USB 2.0 with 9 pins and USB 3.0 with 20 pins.

**Power Connectors**: Main power connector **24** pins.

**Fans:** **3pin** fans and **4 pins fan**. (**Red-power**, **black**-**ground**, and yellow-monitoring the fan speed). 4 pin has one more pin that is blue in color and helps in **pulse-width modulation.**

**Video Cards and Interfaces:**

Remember, whenever we talk about Video Cards and Interfaces, we talk about its GPU speed.

Graphics Processing Unit (GPUs): Performance is measured by Frame Rate. Uses GDDR RAM (Graphics Double Data Rate RAM) for faster processing of 3D effects. Max is 12 GB GDDR RAM.