

## **Practical 2: Study of Different Slots on the Motherboard & Use of Front & Back Panel Connections**

The motherboard is the main circuit board of a computer that connects all hardware components. It contains different slots, sockets, ports, and connectors that allow devices like RAM, CPU, graphics card, and external peripherals to communicate properly.

This practical explains the major motherboard slots, their working, and the purpose of front and back panel connections.

### **Motherboard Slots and Their Working**

#### **(A) CPU Socket**

- This is the slot where the processor (CPU) is installed.
- It provides electrical connection between the processor and motherboard.
- CPU sockets have different types (LGA, PGA, BGA).
- Ensure the CPU receives power, data transfer pathways, and communication with RAM & chipset.

#### **(B) RAM Slots (Memory Slots)**

- Called **DIMM slots**.
- Used to install RAM modules.
- Usually 2 to 4 slots are present.
- RAM stores temporary data for processing.
- Slot color coding shows dual-channel memory support.

### **Working:**

RAM communicates directly with the CPU to store and fetch temporary data quickly.

### **(C) PCI Express (PCIe) Slots**

PCIe slots are used to attach high-speed expansion cards.

#### **Types:**

- **PCIe x16** → Used for graphics cards
- **PCIe x8 / x4** → RAID or network cards
- **PCIe x1** → Sound card, WiFi card, USB expansion card

### **Working:**

These slots provide a fast communication link between the motherboard and installed cards.

### **(D) M.2 Slot**

- Used for M.2 SSDs (SATA or NVMe).
- NVMe SSDs use PCIe lanes for ultra-fast speed.
- Compact size and mounted flat on the motherboard.

### **(E) SATA Slots (Serial ATA)**

- Used to connect storage devices like HDDs, SSDs, and DVD drives.
- Provide a speed between 6 Gb/s depending on SATA version.

### **Working:**

Transfers data between the storage devices and motherboard chipset.

### **(F) Chipset**

- Combination of **Northbridge** and **Southbridge** functions.
- Controls communication between CPU, RAM, storage, and I/O devices.

### **(G) CMOS Battery Slot**

- Holds the CMOS battery (3V).
- Saves date, time, and BIOS settings even when the power is off.

### **(H) BIOS/UEFI Chip**

- Holds system startup instructions.
- Helps in booting the operating system.

### **(I) Power Connectors**

- **24-pin ATX power connector** → Main power to motherboard
- **4/8-pin CPU power connector** → Power to processor
- Provide voltage regulation and stable supply to all components.

## **Front Panel Connections of a Computer**

These connectors are available at the front side of the CPU cabinet for easy access.

### **(A) USB Ports (Front USB)**

- Used to connect pendrives, keyboard, mouse, mobile charging, and external storage.
- Usually USB 2.0, USB 3.0, or USB-C ports.

## **(B) Audio Jacks**

- **Headphone-out**
  
- **Microphone-in**  
Used for voice recording, headphones, earphones.

## **(C) Power Button**

- Connects to Power SW pins on the motherboard.
  
- Used to turn the system ON/OFF.

## **(D) Reset Button**

- Connects to Reset SW pins.
  
- Restarts the computer instantly.

## **(E) LED Indicators**

- **Power LED** → shows power status
  
- **HDD LED** → blinks during storage activity
  
- Connected to front panel headers on motherboard.

## **Front Panel Header Pins on Motherboard (F\_PANEL)**

These include:

- Power SW
  
- Reset SW
  
- Power LED

- HDD LED
- Front USB header
- Front audio header

## **Back Panel Connections of a Computer (I/O Panel)**

The back side of the motherboard contains ports for external devices.

### **(A) USB Ports**

- Used for mouse, keyboard, webcam, external HDD, printers, etc.
- Available in USB 2.0, USB 3.0, USB 3.2, USB-C formats.

### **(B) HDMI / VGA / DisplayPort**

- For connecting monitor or projector.
- HDMI/DP supports high-resolution video and audio.

### **(C) Ethernet (LAN) Port**

- For network connection or internet.
- Connects a LAN cable (RJ-45 connector).

### **(D) PS/2 Ports**

- Older style ports for keyboard and mouse.
- Green = mouse, Purple = keyboard.

### **(E) Audio Ports (3.5mm RGB)**

- Pink → Microphone
- Green → Speaker / Headphone
- Blue → Line-in

Used for sound input and output.

#### **(F) WiFi Antenna Connectors (if available)**

- Present in advanced motherboards.
- Used for improved wireless connectivity.

#### **(G) Power Supply Port (Only for PSU)**

- Power cable connects to the PSU at the back of cabinet.