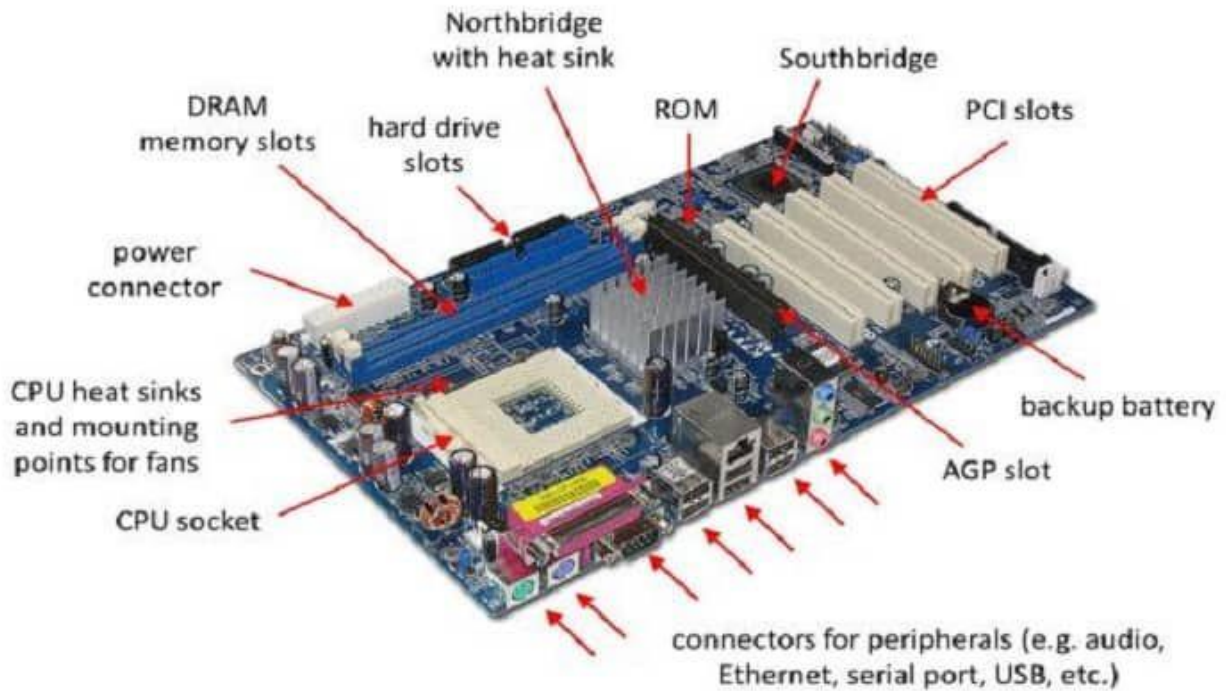


## Module-6

# PC Hardware

### Introduction:

The motherboard, also known as the mainboard or system board, is a critical component in a computer that connects various hardware components to work together.

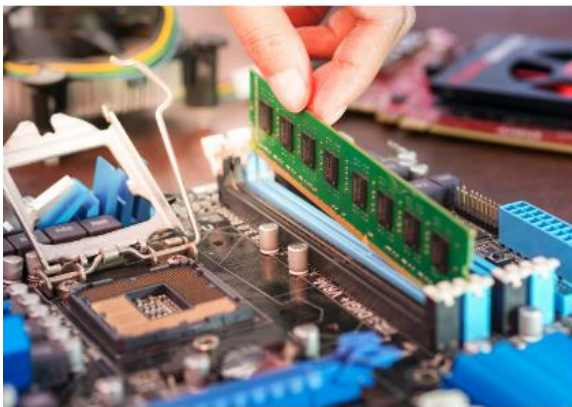


## **Main components found on a motherboard:**

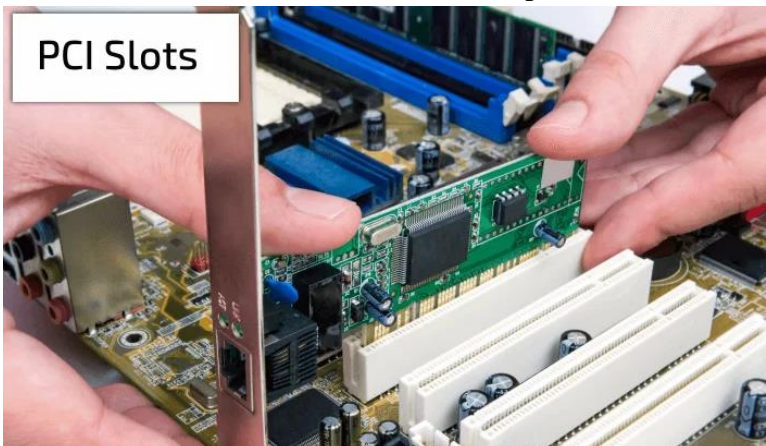
1. **CPU Socket (Central Processing Unit):** This is where the processor (CPU) is installed. The CPU is often considered as the brain of the computer. It controls overall components of the system.



2. **RAM Slots (Random Access Memory):** These slots hold the system memory (RAM), which is used by the CPU to store and quickly retrieve data that is actively being used or processed.

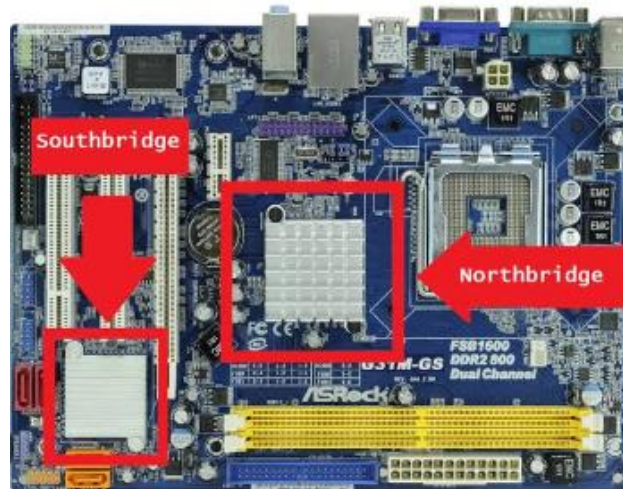


3. **Expansion Slots (PCIe, PCI, etc.):** PCI Stands for Peripheral Component Interconnect. These slots allow for the installation of additional components such as graphics cards, sound cards, network cards, and other expansion cards.

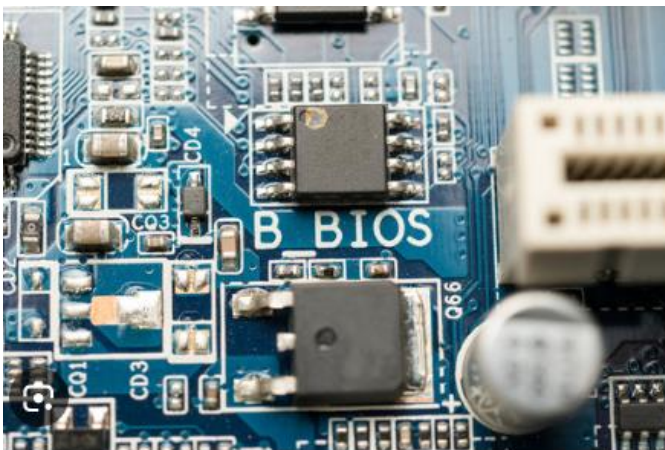


4. **Chipset:** The chipset is a set of chips on the motherboard that controls the flow of data between the CPU, memory, peripherals, and other components. It includes the Northbridge and Southbridge (or their modern equivalents).

- **Northbridge:** Manages communication between the CPU, RAM, and the graphics card (if integrated).
- **Southbridge:** Manages communication between the CPU, storage devices, USB ports, I/O (Input/Output) interface, network interface and other peripherals.



5. **BIOS/UEFI Chip:** This is a chip that stores the Basic Input/Output System (BIOS) or the Unified Extensible Firmware Interface (UEFI), which is essential for the system to boot and initialize hardware.



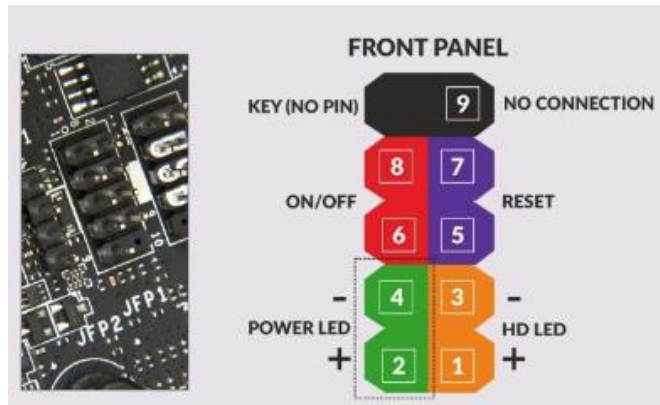
6. **Power Connectors:** These connectors provide power to the motherboard. Common ones include the main ATX power connector and additional power connectors for CPU and graphics cards.



7. **Storage Connectors:** SATA (Serial ATA) and/or NVMe connectors for connecting hard drives, solid-state drives, and other storage devices.



8. **Front Panel Connectors:** These connectors include power buttons, reset buttons, front panel audio jacks, and indicator LEDs.

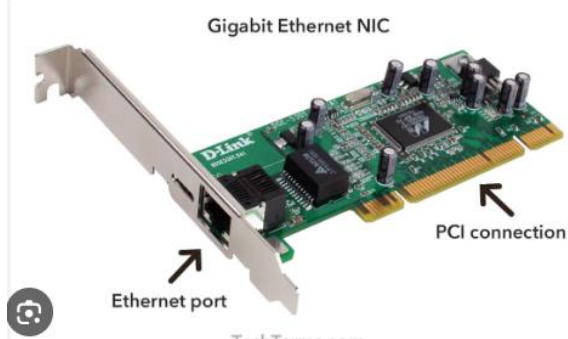




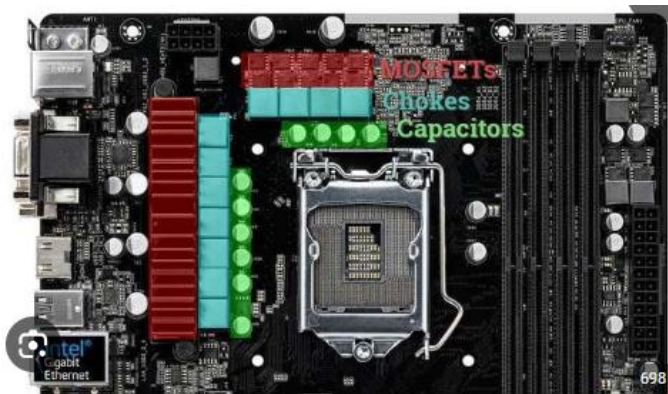
- 9. Back I/O Ports:** These are the ports on the back of the motherboard that allow for connection to external devices. Common ports include USB, HDMI, Ethernet, audio jacks, and more.



- 10. Network Interface Controller (NIC):** This is the component responsible for network connectivity. It can be integrated into the motherboard or provided as a separate expansion card.



- 11. Voltage Regulators/VRMs:** These components regulate and distribute power to the CPU and other critical components.



- 12. SMPS:** The SMPS (Switched-Mode Power Supply) in the context of a computer refers to the power supply unit that converts electrical power from an external source (such as a wall outlet) into the appropriate voltages needed to power the components on the motherboard and other parts of the computer.



- 13. CMOS:** A complementary metal-oxide semiconductor (CMOS) is the semiconductor technology used in most of today's integrated circuits (ICs), also known as chips or microchips. The main purpose of CMOS in computers is to store important system settings and configurations such as the date and time, boot order, hardware settings, and password information.



## Sub-Module: 6.2 Systems and Application Installation

### **BIOS (Basic Input/Output System)**

- BIOS is a firmware that is built into the motherboard of a computer. It is responsible for initializing and providing the communication between various hardware components of the system, such as the CPU, memory, and storage devices, during the boot process.
- Traditional BIOS has been used for a long time, but it has some limitations, such as the 2.2 TB limit on disk size and a lack of support for modern technologies.

### **UEFI (Unified Extensible Firmware Interface)**

- UEFI is a more modern and versatile firmware interface that has largely replaced traditional BIOS in newer computers.
- UEFI provides a standardized interface between the operating system and the firmware, allowing for more advanced features and capabilities during the boot process.
- Some advantages of UEFI over BIOS include faster boot times, support for larger disk sizes, a graphical user interface (GUI), and the ability to use mouse input.

### **Difference between BIOS and UEFI:**

S.N	BIOS	UEFI
1.	Older/Legacy Technology.	Modern Technology
2.	Operates in 16 bit real mode.	Operates in 32 bit or 64 bit real mode.
3.	Uses MBR (Master Boot Record) Partitioning.	Uses GPT (GUID Partition Table) Partitioning.
4.	Limitation on disk size i.e. 2.2 TB	No limitation on disk sizes.
5.	Text based interface.	Offers a graphical interface.
6.	Limited hardware supports.	Advance hardware support.
7.	Less secure.	High secure.
8.	Doesn't support secure boot.	Support secure boot.
9.	Slower speed	Faster speed
10	Low performance	High performance

## **Conversion from MBR to GPT or GPT to MBR**

Converting a disk from MBR (Master Boot Record) to GPT (GUID Partition Table) involves several steps, and it's important to note that this process will result in data loss. Therefore, make sure to back up any important data on the disk before proceeding. The following steps provide a general guide for converting MBR to GPT using the Windows built-in tools:

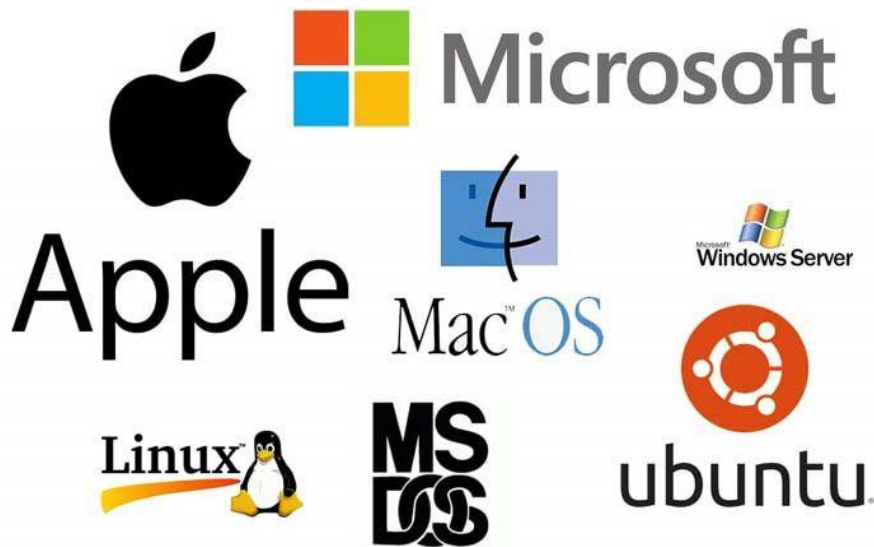
### **Using Disk Management:**

- i. **Open Disk Management:** Press Win + X and choose "Disk Management."
- ii. **Identify the Disk:** Identify the disk you want to convert from MBR to GPT. Make a note of the disk number.
- iii. **Backup Data:** Ensure that you have a backup of all data on the disk, as the conversion process will erase the existing partitions.
- iv. **Open Command Prompt as Administrator:** Press Win + X and select "Command Prompt (Admin)" or "Windows PowerShell (Admin)."
- v. **Run Diskpart:** In the Command Prompt, type **diskpart** and press Enter.
- vi. **List Disk:** Type **list disk** to display all connected disks.
- vii. **Select Disk:** Type **select disk X** (replace X with the disk number you noted earlier).
- viii. **Clean the Disk:** Type **clean** to remove all partitions and data from the disk.
- ix. **Convert to GPT:** Type **convert gpt** to convert the disk to the GPT format.
- x. **Exit Diskpart:** Type **exit** to exit the Diskpart utility.
- xi. **Initialize the Disk:** Go back to Disk Management, right-click on the disk that was just converted, and choose "Initialize Disk." Select GPT as the partition style.
- xii. **Create New Partitions:** Right-click on the unallocated space on the disk and create new partitions as needed.



## Operating System

- An operating system (OS) is system software that serves as an intermediary (मध्यस्थ) between computer hardware and the computer user. It manages and controls computer hardware, provides services for computer programs, and allows users to interact with the computer
- Common examples of operating systems include **Microsoft Windows, macOS, Linux, and UNIX**. Each type of OS has its strengths, features, and use cases, catering to the needs of different users and computing environments.



## Operating System (OS) installation process

The process of installing an operating system can vary depending on the specific OS and the type of installation method you choose. Below is a generalized overview of the steps involved in installing an operating system:

### 1. Preparation:

**Backup:** Before installation, ensure you have a backup of important data in case anything goes wrong during the installation process.

**System Requirements:** Verify that your hardware meets the minimum requirements for the chosen operating system.

### 2. Choose Installation Media:

**Installation Disc/USB:** Create a bootable installation disc or USB drive containing the operating system.

### 3. BIOS/UEFI Settings:

**Access BIOS/UEFI:** Restart the computer and enter the BIOS or UEFI settings. You can usually do this by pressing a specific key during the boot process (common keys include F2, Del, Esc, F10, F12 or other).

**Boot Order:** Set the boot order to prioritize the installation media (disc or USB) so that the computer boots from it.

### 4. Boot from Installation Media:

**Insert Disc/USB:** Insert the installation disc or connect the USB drive.

**Restart Computer:** Restart the computer, and it should boot from the installation media.

### 5. Follow Installation Wizard:

**Language and Region:** Choose your preferred language, time zone, and region.

**Product Key:** Enter the product key if required.

**Partitioning:** Decide on the partitioning scheme for your hard drive. You might create new partitions or choose an existing one.

**Format and Install:** Format the chosen partition and initiate the installation process.

## **6. Configure Settings:**

**User Account:** Set up a user account with a password.

**Network Settings:** Configure network settings, if applicable.

**Customization:** Customize system settings and preferences.

## **7. Finalize Installation:**

**Install Drivers:** Some operating systems might require additional drivers for specific hardware. Install these if needed.

**Updates:** Check for and install system updates.

**Reboot:** Restart the computer to complete the installation.

## **8. Post-Installation:**

**Install Software:** Install additional software and applications as needed.

**Restore Data:** If you backed up data, restore it to the system.

## **9. Verification:**

**Verify Installation:** Ensure the operating system is functioning correctly, check for updates, and confirm that all drivers are working.

## **10. Security Measures:**

**Antivirus:** Install antivirus software for system security.

**Firewall:** Configure a firewall to control incoming and outgoing network traffic.

## **Steps for creating bootable USB drive:**

### **For Windows:**

1. **Using Rufus:**

**Download Rufus:** Go to the Rufus website and download the latest version of Rufus.

2. **Insert USB Drive:** Insert the USB flash drive into a USB port on your computer.

3. **Run Rufus:** Run the Rufus application.

4. **Select USB Drive:** In Rufus, select your USB drive under the "Device" dropdown.

5. **Select Bootable Image:** Click on the "Select" button next to "Boot selection" and choose the ISO file of the operating system you want to install.

6. **Configure Settings:** Adjust any necessary settings, like the partition scheme (usually MBR for BIOS or UEFI for GPT), file system, and cluster size.

7. **Start the Process:** Click "Start" and confirm any warnings about data loss on the USB drive.

8. **Wait for Completion:** Rufus will format the USB drive and copy the necessary files. Wait for the process to complete.

9. **Completion:** Once the process is finished, you will see "READY" in green. You can now close Rufus.

## **Device Driver:**

A device driver, often referred to simply as a "driver," is a specialized software component that allows an operating system to communicate with and control a specific hardware device. It acts as an intermediary between the hardware device and the operating system or applications, enabling them to interact seamlessly. For example: Printer Driver, Audio Driver, Network Driver .etc.

### Function of Driver:

- Makes different types of hardware devices (like printers, graphics cards, etc.) understandable to the computer.
- Helps get the hardware ready to work when you turn on your computer.
- Makes it easy for the computer to recognize and use new devices you plug in.
- Makes sure you can see graphics, print documents, and use different hardware features through your computer.

### Driver Installation:

- i. **Download Driver:** Visit the manufacturer's website and download the latest driver for your hardware.
- ii. **Run Installer:** Double-click on the downloaded file to run the installer.
- iii. **Follow Wizard:** Follow the on-screen instructions in the installation wizard.
- iv. **Restart:** Restart your computer if prompted.
- v. **Check Device Manager:** Open Device Manager to verify successful installation.



## **Application Software:**

Application software, commonly known as applications or apps, refers to computer programs designed to perform specific tasks or provide specific functions for end-users. Unlike system software, which manages and supports the computer infrastructure, application software is user-focused and aims to fulfill the needs and requirements of individuals or organizations. For example: Microsoft Office Package, Chrome, PDF Reader .etc.

### **Application Software Installation:**

- i. Download the installer from the official website.
- ii. Run the installer file.
- iii. Accept the license agreement.
- iv. Start the installation process.
- v. Wait for the installation to complete.
- vi. Finish the installation.
- vii. Optionally, launch the application.



## Antivirus

An antivirus (or anti-virus) is a type of software designed to detect, prevent, and remove malicious software from computer systems. It helps protect your system from harmful software called malware, which includes viruses and other bad stuff. The antivirus scans your computer, looks for signs of these threats, and removes or quarantines them to keep your computer safe. Example of antivirus software: eScan, K7, MSecurity .etc.

### **Antivirus Installation Process:**

- i. Choose antivirus software.
- ii. Download the installer from the official website.
- iii. Run the installer and follow the on-screen instructions.
- iv. Customize settings if needed.
- v. Wait for the installation to complete.
- vi. Register or activate the software if required.
- vii. Update the antivirus to get the latest protection.
- viii. Optionally, perform an initial scan.
- ix. Restart your computer if prompted.
- x. Look for the antivirus icon in the system tray to ensure it's running.

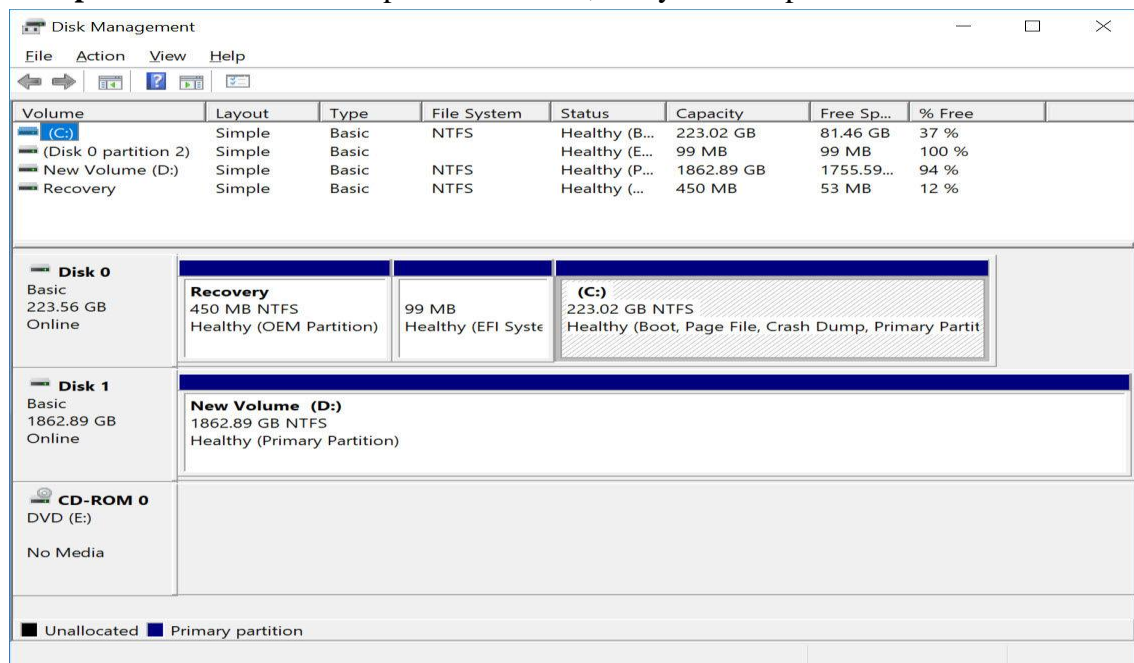


## Disk Partition:

Disk partitioning is like dividing your computer's storage into separate sections, each with its own specific job. It helps organize data, allows for different uses, and makes it easier to manage and protect your digital information.

Following steps are required to be followed for creating disk partition:

- i. **Open Disk Management:** Press Win + X and choose "Disk Management" from the menu.
- ii. **Locate the Disk:** In the Disk Management window, find the disk you want to partition. Be cautious to select the correct disk.
- iii. **Shrink Existing Partition:** Right-click on the existing partition and choose "Shrink Volume" and enter the amount of space you want to allocate for the new partition. This creates unallocated space.
- iv. **Create a New Partition:** Right-click on the unallocated space and select "New Simple Volume." Follow the wizard to set the size, assign a drive letter, and choose the file system (usually NTFS).
- v. **Complete the Wizard:** Complete the wizard, and your new partition is created.



## **Recovery disk**

A recovery disk is a bootable media or set of files designed to help troubleshoot, repair, and restore a computer's operating system in the event of system failures, errors, or other critical issues. It provides a means to recover the system to a functional state.

### **Steps for creating a Recovery Disk on Windows:**

- i. **Insert a USB Drive:** Insert a USB flash drive with sufficient storage capacity (at least 8GB) into your computer.
- ii. **Open Control Panel:** Open the Control Panel on your Windows computer.
- iii. **Navigate to "Backup and Restore (Windows 7)":** Go to "System and Security" > "Backup and Restore (Windows 7)."
- iv. **Create a System Repair Disk:** In the left pane, click on "Create a system repair disk."
- v. **Select USB Drive:** Choose your USB drive from the list and click "Create." This process will copy the necessary files to the USB drive, making it a bootable recovery disk.



## **Creating System Restore Point**

Creating a System Restore Point on Windows allows you to capture a snapshot of your system's settings and configuration at a specific point in time. If anything goes wrong later, you can use this restore point to revert your system to a previous state. Here are the steps to create a System Restore Point on Windows:

### **Using Windows 10:**

- i. **Open System Properties:** Right-click on the "Start" button and select "create restore point."
- ii. **Access System Protection:** In the System window, click on "System Protection" in the left sidebar.
- iii. **Create a Restore Point:** In the System Properties window, under the "System Protection" tab, click on the "Create" button.
- iv. **Name the Restore Point:** Provide a descriptive name for the restore point. This helps you identify it later.
- v. **Create:** Click "Create" and wait for the process to complete. It may take a few moments.
- vi. **Finish:** Once the restore point is created, you'll see a confirmation message. Click "Close" to finish.



## CD/DVD

Compact Discs (CDs) and Digital Versatile Discs (DVDs) are optical storage mediums that have been widely used for storing and distributing digital data, including music, videos, software, and other types of files. To create a bootable media using disc blank CD/DVD is required. There are different software that are used to burn disc such as PowerISO, Imgburn.

### Bootable CD/DVD

Steps to create a bootable CD/DVD using PowerISO:

- i. **Download and Install PowerISO:** Download and install PowerISO from the official website: PowerISO.
- ii. **Open PowerISO:** Launch PowerISO on your computer.
- iii. **Insert Blank DVD:** Insert a blank DVD into your computer's DVD writer.
- iv. **Choose "Burn to Disc":** In PowerISO, go to the "Tools" menu and select "Burn to Disc."
- v. **Select ISO File:** Select the ISO file you want to burn to the DVD.
- vi. **Configure Burning Settings:** Configure burning settings such as the burning speed..
- vii. **Start Burning:** Click on the "Burn" button to start the burning process.
- viii. **Wait for Completion:** Allow the burning process to complete. Once finished, PowerISO will notify you.



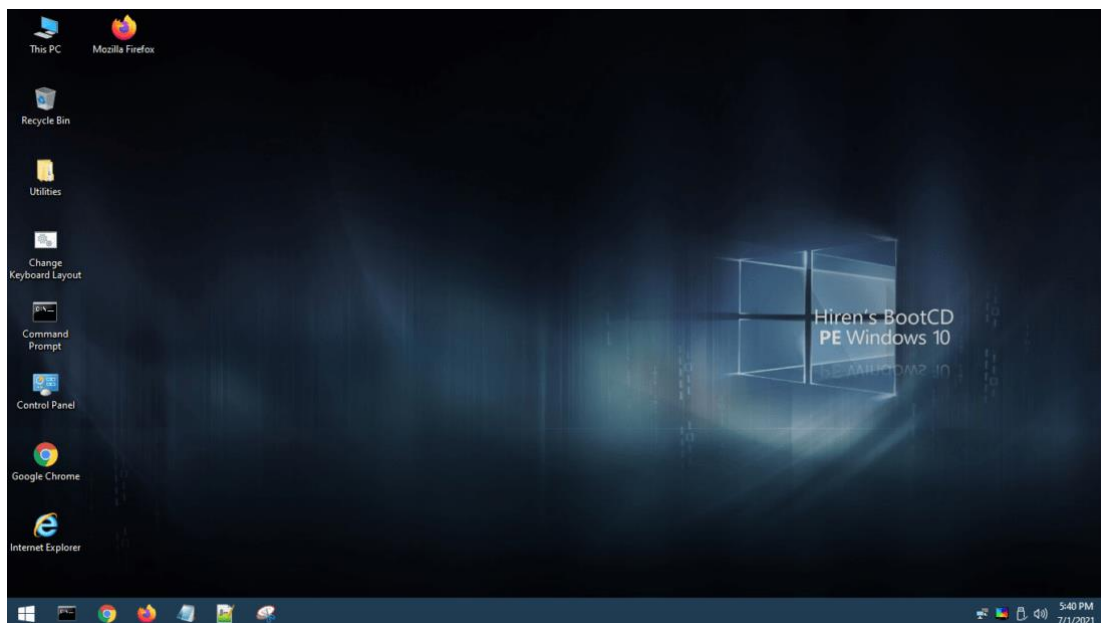
## UPS (Uninterruptible Power Supply)

In a computer system, a UPS (Uninterruptible Power Supply) is a critical component that provides power backup and protection to connected devices, such as computers, monitors, and network equipment in case of electrical outages(विद्युत कटौती) or fluctuations(उतार चढ़ाव).



## Utility tools (Hiren's boot CD)

Hiren's boot CD can fix issues like hard drive failure and virus infections, perform password & data recovery, and execute other operations on your PC. It's commonly used by technicians, IT professionals, and individuals for troubleshooting and fixing issues with computer systems.



## **Sub-module: 6.4 Hardware Upgrading**

### **1. Motherboard Upgrade**

Steps involved in motherboard upgrading:

- i. Screw Driver ले Casing खोलने ।
- ii. पुरानो Motherboard बाट Power Connectors, SATA/PATA/SSD Data Cable, front Panel Connectors, RAM र Processor सबै फिक्ने ।
- iii. Screw Driver ले Motherboard का सबै पेचहरु खोलने र Motherboard लाई Chasis बाट फिक्ने ।
- iv. Higher Model अथवा Higher Series को Motherboard लाई Chasis मा राख्ने र मिलाएर Screw Driver ले पेचहरु कस्ने ।
- v. Higher Model को नयाँ Motherboard मा Processor र RAM फिट गर्ने ।
- vi. Power Connectors, SATA/PATA/ SSD Data Cable, Front Panel Connectors हरू पनि जोड्ने ।
- vii. अब Computer ON गर्ने र नयाँ Motherboard का सम्पूर्ण Driver हरू Install गर्ने ।
- viii. Now system is ready to operate.

### **2. RAM Upgrade**

Steps involved in RAM upgrading:

- i. Screw Driver ले Casing खोलने ।
- ii. Motherboard बाट RAM झिक्ने ।
- iii. नयाँ RAM को Version Motherboard सँग Compatible भए नभएको check गर्ने
- iv. Compatible भएको खण्डमा बढी Space भएको नयाँ RAM लाई Motherboard को Slot मा Fit गर्ने ।
- v. दुवै नयाँ र पुरानो RAM हरू चलाउने हो भने नयाँ RAM लाई अर्को Slot मा Fit गर्ने ।
- vi. अब Computer ON गर्ने
- vii. Now system is ready to operate.

### **3. Hard Disk Upgrade**

Steps involved in Hard Disk Upgrading are listed below:

- i. Screw Driver ले Casing खोलने ।
- ii. बढि Space र RPM को Hard Disk लाई पुरानो Hard Disk को PATA Cable मै जोड्ने अथवा छुट्टै SATA/PATA/SSD Data Cable ले Motherboard सँग जोड्ने र Fit गर्ने ।
- iii. नयाँ र पुरानो दुवै Hard Disk हरू एउटै PATA Cable मा जोडिएको हो भने jumper Configuration गरि master र slave बनाउने ।
- iv. नयाँ Hard Disk एउटा मात्रै चलाउने हो भने पुरानो Hard Disk लाई पेच खोलेर data, Power Connector हरू छुटाएर फिक्ने र त्यसको ठाउँमा नयाँ Hard Disk Fit गर्ने ।
- v. नयाँ Hard Disk मा Data Cable र Power Connector जोड्ने ।
- vi. नयाँ Hard Disk लाई Format गर्ने र आवश्यकता अनुसार Operating System Install पनि गर्ने ।
- vii. Now system is ready to operate.

#### **4.. Processor Upgrade**

Steps involved in Processor Upgrading are listed below:

- i. Screw Driver ले Casing खोलने ।
- ii. Cooling Fan को Power Connector Motherboard बाट भिक्ने ।
- iii. Cooling Fan र Heat sink Processor Socket बाट भिक्ने ।
- iv. पुरानो Processor लाई Processor Socket बाट भिक्ने ।
- v. नयाँ high speed को Processor र Motherboard को Compatibility Check गर्ने ।
- vi. Compatible भएको खण्डमा नयाँ High Speed को Processor लाई Processor Socket मा राख्ने ।
- vii. नयाँ Processor माथि Cooling Paste लगाउने ।
- viii. अब Heat Sink र Cooling Fan पनि Processor Socket मा Fit गर्ने र Cooling Fan को Power Connector Motherboard मा जोड्ने ।
- ix. Now your system is ready to operate.

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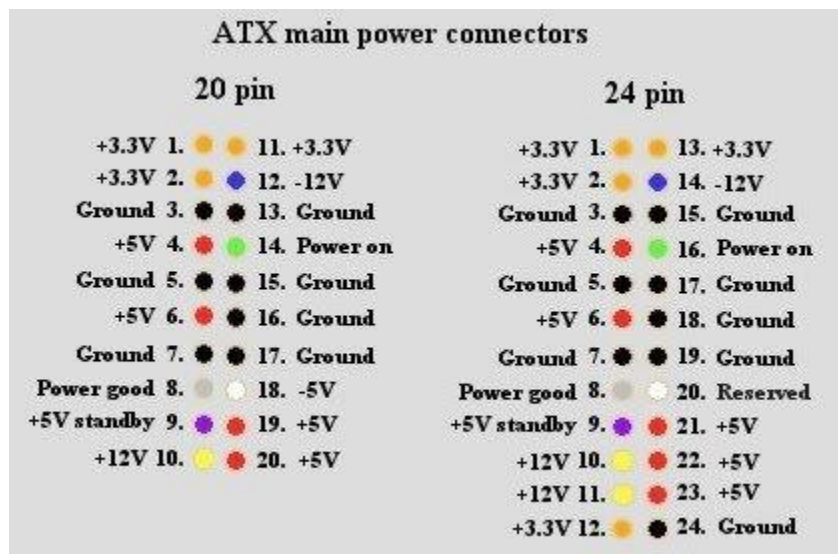
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## Sub-module 6.6: Set Death Case Hardware troubleshooting

### 1. Power Supply (SMPS) Troubleshoot

Troubleshooting issues with a Switched-Mode Power Supply (SMPS), commonly known as a power supply unit (PSU), involves identifying and addressing problems related to power delivery in a computer or electronic device. The amount of current that flow through each pin is shown in the given diagram:



Here are some steps you can take to troubleshoot issues with an SMPS:

- SMPS को P1 Power Connector को हरियो तारको प्वाल र कालो तारको प्वाललाई सानो तारले सट गर्ने र SMPS लाई Power दिने ।
- SMPS लाई Power दिई सकेपछि यसको Fan घुम्यो या घुमेन हेर्ने ।
- SMPS को Fan घुमेन र Power संचार भएन भने नयाँ SMPS ले Replace गर्ने ।
- SMPS को Fan घुमेन भने SMPS मा जोड्ने Power Cable Check गर्ने ।
- Power Cable बिर्गिएको खण्डमा Power Cable फेर्ने ।
- SMPS को Fan घुमेको छ भने P1 Power Connector का तारहरुमा आएको Voltage Multimeter ले जाँच गर्ने
- P1 Power Connector को रातो तारमा ५ भोल्ट, पहिलो तारमा १२ भोल्ट, सेतो तारमा -५ भोल्ट, निलो तारमा -१२ भोल्ट र सुन्तला रङ्गको तारमा -३ भोल्ट आएको छ छैन Multimeter ले Check गर्ने ।
- आवश्यक Voltage आएको छैन भने Screw Driver ले SMPS खोल्ने र Loose भएका तारहरु छान्ने भने Soldering Iron र Soldering Wire प्रयोग गरी ती तारहरुलाई Soldering गर्ने ।
- सोल्डरिङ गरे पछि तारहरुबाट नियमित आउनु पर्ने Voltage आएन भने नयाँ SMPS ले Replace गर्ने ।



## **2. Motherboard troubleshoot**

Here are the steps to troubleshoot common motherboard issues :

- i. Operating System Install गर्दा गर्दै Installation प्रक्रिया रोकिएर Monitor मा निलो Screen मा Message Display भयो भने Motherboard Replace गर्ने ।
- ii. Computer ON गर्दा Motherboard मा Power आएन र CPU Fan घुमेन भने Motherboard Replace गर्ने ।
- iii. Processor, RAM र Display Card ठिक भएर पनि Monitor मा Display आएन भने Motherboard Replace गर्ने ।
- iv. Motherboard मा जति नयाँ RAM Replace गर्दा पनि Memory समस्याको beep sound दियो भने Motherboard Replace गर्ने ।
- v. Motherboard का सबै expansion Card हरू भिकेर र सब SATA/PATA/SSD Cable भिकेर Motherboard लाई पनि Chasis बाट निकालेर बाहिरबाट Connect गर्दा पनि Power संचार भएन भने Motherboard Replace गर्ने ।
- vi. Motherboard को GMCH (Graphic memory controller hub) Chip Heat हुने समस्या ठिक भएन भने र Computer Hang मात्रै भयो भने Motherboard Replace गर्ने ।

## **3. Processor troubleshoot**

Here are the steps to troubleshoot Processor issues :

- i. Computer ON गर्दा System Loading भएन र Boot हुने Process अघि बढेन भने नयाँ Processor ले Replace गर्ने ।
- ii. Motherboard, RAM र display/VGA Card ठिक भएको खण्डमा यदि Monitor मा Display आएन भने नयाँ Processor ले Replace गर्ने ।
- iii. धेरै कार्य (Multitask) गर्दा अथवा ठूलाठूला साईजका Program हरू Load गर्दा Computer Hang भयो भने पुरानो Processor को भन्दा बढि Speed भएको Processor ले Replace गर्ने ।
- iv. Processor तातिएर Hang भएको हो भने Cooling Fan र Heat sink भिक्ने र Processor माथि Cooling Paste लगाएर Heat sink र Cooling Fan राम्ररी Fit गर्ने ।

## **4. RAM Troubleshooting**

Here are the steps to troubleshoot RAM issues :

- i. Computer ON गरेपछि तीन चोटी क्रमशः बिप sound आयो भने नयाँ RAM ले Replace गर्ने ।
- ii. Computer ON गर्दा यदि Monitor मा Display आएन भने RAM Check गर्ने ।
- iii. RAM लाई Slot बाट झिकने र अर्को Slot मा Fit गर्ने ।
- iv. पुन Display आएन भने फेरी RAM लाई झिकने र ब्रुसले RAM का Slot हरुलाई राम्ररी सफा गर्ने र RAM को Pin र Lock सफा गर्ने
- v. RAM Slot र RAM को सफाई गरेपछि अब RAM लाई Slot मा Fit गर्ने र Display Check गर्ने ।
- vi. यदि एउटा भन्दा बढी RAM छन् भने सबै RAM हरु झिकने र एउटा एउटा गरेर सबै RAM हरुलाई पालै पालो सबै Slot हरुमा Fit गरेर Check गर्ने ।
- vii. यदि यति गर्दा पनि Monitor मा Display आएन भने नयाँ RAM ले Replace गर्ने ।
- viii. यदि Computer ज्यादै ढिलो Boot भयो र Computerमा programहरु ढिलो Loading भए पुरानो RAM को भन्दा बढी Space को RAM ले Replace गर्ने ।

## **5. BIOS Troubleshooting**

Here are the steps to troubleshoot BIOS issues :

- i. Motherboard को Manual मा BIOS सम्बन्धि विवरण अध्ययन गर्ने ।
- ii. Motherboard को BIOS Setup Key/Configure Key नोट गर्ने ।
- iii. Computer ON गर्ने ।
- iv. Keyboard मा BIOS Setup Key/Configure Key लगातार थिच्ने र BIOS Setting लाई Default मा ल्याउने
- v. BIOS Setting लाई Default मा ल्याउन अर्को तरिका अपनाउने हो भने Motherboard को BIOS jumper लाई सार्ने र Computer ON गर्ने ।
- vi. Computer ON गरेर F2/Delete Key थिचेर BIOS मा जाने र Default Setting Load गर्ने र Computer OFF गर्ने ।
- vii. सारिएको jumper लाई पहिलेकै ठाउँमा / पहिलेकै अवस्थामा राखिदिने

## **6. CMOS Battery Troubleshoot**

Here are the key steps to troubleshoot CMOS Battery issues:

- i. Motherboard को Manual मा CMOS Battery सम्बन्धि विवरण अध्ययन गर्ने ।
- ii. Motherboard बाट CMOS Battery निकाल्ने ।
- iii. Multimeter ले BIOS Battery को Voltage ३ भोल्ट छ/छैन Check गर्ने ।
- iv. BIOS Battery को Voltage ३ भोल्ट छैन भने नयाँ BIOS Battery ले Replace गर्ने ।

## **Sub-module: 6.7 No Set Death Case Hardware Troubleshooting**

### **1. Hard Disk Troubleshooting**

Here are the key steps to troubleshoot Hard Disk issues:

- i. Computer ON गर्ने र DEL/F2 Key थिचेर BIOS मा जाने ।
- ii. BIOS मा Hard Drive detect भएको छ या छैन Check गर्ने ।
- iii. BIOS मा Hard Drive detect भएको छैन भने सुरुमा Drive को SATA/PATA/SSD Cable Replace गर्ने ।
- iv. Hard Disk मा जोडिएको Power Cable मा समस्या छ या छैन जाँच गरेर समस्या भए अर्को Power Connector लगाउने ।
- v. यसो गरेर पनि BIOS मा Hard Drive Detect भएन भने Motherboard मा Hard Drive को SATA/PATA/SSD Cable फिक्ने र अर्को IDE/SATA Port मा जोड्ने ।
- vi. समस्या समाधान भएन भने पुरानो Hard Drive फिक्ने र नयाँले Replace गर्ने ।
- vii. Computer Boot हुने बेलामा “Hard Disk Failure” भनेर Message आयो भने पनि सिधै नयाँ Hard Drive ले Replace गर्ने ।
- viii. Computer Boot हुने बेलामा 9700 Series को Error Code Message Display भयो भने पनि सिधै नयाँ Hard Drive ले Replace गर्ने ।
- ix. Hard Drive लाई Format गर्न खोज्दा यदि Format हुँदैन भने पनि सिधै नयाँ Hard Drive ले Replace गर्ने ।

### **2. Keyboard troubleshooting**

Here are key steps to troubleshoot Keyboard issues:

- i. Computer Start गर्दा Keyboard नचलेको खण्डमा Keyboard को Cable छुटाउने ।
- ii. Keyboard को PS/2 Connector को Pin हरू बाझिएका भए चिम्टाले सिधा पार्ने ।
- iii. USB Connector भएको Keyboard भए अर्को USB Port मा जोडेर जाँच गर्ने ।
- iv. माथिको कार्य गर्दा पनि Keyboard ले काम गरेन भने Screw Driver ले Keyboard खोल्ने र ब्रुसले पहिले सबै घुलो फाल्ने ।
- v. Keyboard को circuit board लाई र Key grid लाई IPA liquid प्रयोग गरी ब्रुसले राम्ररी Chemical Wash गर्ने ।
- vi. हलुका भिजेको कपडाले Key Pad र Key switch मा भएको मैलो सफा गर्ने ।
- vii. माथिको कार्य गर्दा पनि Keyboard ले काम गरेन भने Keyboard Replace गर्ने ।

### **3. Mouse Troubleshooting**

Here are key steps to troubleshoot Mouse issues:

- i. Computer Start गर्दा Mouse नचलेको खण्डमा Mouse को Cable छुटाउने ।
- ii. Mouse को PS/2 Connector को Pin हरु बाझिएका भए चिम्टाले सिधा पार्ने ।
- iii. USB Connector Mouse भए अर्को USB Port मा जोडेर जाँच गर्ने ।
- iv. माथिको कार्य गर्दा पनि Mouse ले काम गरेन भने Screw Driver ले Mouse खोल्ने र ब्रुसले पहिले सबै घुलो फाल्ने ।
- v. माथिको कार्य गर्दा पनि mouseले काम गरेन भने Mouse Replace गर्ने ।

### **4. Error Message Troubleshooting**

Here are key steps to troubleshoot error message issues:

- i. Computer Boot हुँदै गर्दा “Hard Disk Failure” भनेर Message आयो भने Hard Disk Replace गर्ने ।
- ii. यदि १७०० Series को Error Code Message आयो भने पनि Hard Disk Replace गर्ने ।
- iii. यदि १०० Series को Error Code Message आयो भने Motherboard Replace गर्ने ।
- iv. यदि ३०० Series को Error Code Message आयो भने Keyboard Replace गर्ने ।
- v. Computer Boot हुँदै गर्दा “Boot failure”, “Select Proper Boot Devices” भनेर Message आयो भने पहिला BIOS मा Boot Sequence मिलाउने र समस्या समाधान भएन भने Hard Disk को SATA/PATA/SSD Cable फेर्ने र नभए Hard Disk नै फेर्ने ।
- vi. Computer Boot गर्दा “NTDLR Missing/bootmgr missing” भनेर Message आयो भने recovery console चलाई missing file recover गर्ने अथवा Operating System ReInstall गर्ने ।
- vii. Computer Boot गर्दा “Set Date and Time” भनेर Message आयो भने CMOS Battery फेर्ने र BIOS मा गएर Date र Time Set गर्ने ।

## **5. Display Troubleshooting**

Here are key steps to troubleshoot display issues:

- i. Motherboard को CMOS Battery नजिकको CMOS clear गर्ने Jumper को स्थान ५ देखि १० मिनेट सम्म परिवर्तन गर्ने ।
- ii. स्थान परिवर्तन गरेको Jumper लाई पुरानै स्थान मा राख्ने ।
- iii. यो गरेमा CMOS Setting Clear भएर Display आउँछ तर यदि Display आएन भने अब CMOS Battery Check गर्ने ।
- iv. Multimeter ले CMOS Battery को Voltage ३ भोल्ट छ या छैन Check गर्ने र यदि ३ भोल्ट छैन भने CMOS Battery फेर्ने र Display Check गर्ने ।
- v. अझै भएन भने Motherboard मा सबै SATA/PATA/SSD Cable हरू र Expansion Card हरू छुटाउने र Display Check गर्ने ।
- vi. फेरि पनि Display नआएको खण्डमा Motherboard लाई Casing बाट भिक्ने र बाहिरबाट नै Computer ON गरेर Display Check गर्ने ।
- vii. अझै Display नआएको खण्डमा RAM लाई भिक्ने र अर्को Slot मा Fit गर्ने र Display Check गर्ने ।
- viii. अझै भएन भने अब पुरानो RAM लाई नयाँ RAM ले Replace गर्ने ।
- ix. भएन भने अब Motherboard को PCI Slot मा नयाँ VGA Card राखेर Display Check गर्ने ।
- x. RAM र VGA Card फेरेर पनि Display आएन भने अब नयाँ Motherboard ले Replace गर्ने ।
- xi. नयाँ Motherboard Replace गरेर पनि Display आएन भने अत्यमा CPU /Processor नै Replace गर्ने र Display Check गर्ने ।
- xii. Display आएको खण्डमा Motherboard Replace गरेको छ भने नयाँ Motherboard को सम्पूर्ण Driver हरू CD/DVD बाट Install गर्ने ।
- xiii. Monitor मा समस्या भएको खण्डमा वा Monitor बिग्रिएको अवस्थामा नयाँ Monitor ले Replace गर्ने ।

## **6. Software Troubleshooting**

Here are key steps to troubleshoot software issues:

- i. Software/program slow र hang भएमा RAM मा Load भएको सबै Software/program लाई Close गर्ने ।
- ii. Software/program लाई Re-open गर्न
- iii. Re-open गर्दा Software/program ले काम गरेन भने Computer लाई Restart गर्ने ।
- iv. Computer Restart गर्दा Software/ program चलेन भने Software/ program unInstall गर्ने ।
- v. फेरि Software/program Install गर्ने ।
- vi. Install गरिएको Software/program Files लाई Antivirus Software ले scan गर्ने ।
- vii. माथिका कार्यहरूबाट समस्या समाधान भएन भने Internet को प्रयोग गरी समस्याको समाधान खोज्ने ।



## **7. Internal DOS Command**

DOS (Disk Operating System) commands are text-based commands used to perform various tasks in the MS-DOS. An internal command is the MS-DOS command stored in system memory and loaded from command.com or cmd.exe. Here are some common internal DOS commands:

<b>Command</b>	<b>Description</b>	<b>Example</b>
<b>DIR</b>	Directory Listing	<b>DIR</b>
<b>CD</b>	Change Directory	<b>CD [directory_path]</b>
<b>MD</b>	Make Directory	<b>MD [directory_name]</b>
<b>RD</b>	Remove Directory	<b>RD [directory_name]</b>
<b>COPY</b>	Copy Files	<b>COPY [source] [destination]</b>
<b>DEL</b>	Delete Files	<b>DEL [file_name]</b>
<b>REN</b>	Rename Files	<b>REN [old_file_name] [new_file_name]</b>
<b>TYPE</b>	Display Content of Text File	<b>TYPE [file_name]</b>
<b>CLS</b>	Clear Screen	<b>CLS</b>
<b>EXIT</b>	Exit Command Prompt	<b>EXIT</b>
<b>VER</b>	Display Operating System Version	<b>VER</b>
<b>DATE</b>	Display or Set Date	<b>DATE</b>
<b>TIME</b>	Display or Set Time	<b>TIME</b>
<b>ECHO</b>	Display Messages	<b>ECHO [message]</b>
<b>MOVE</b>	Move Files	<b>MOVE [source] [destination]</b>
<b>VOL</b>	Volume Label	<b>VOL [drive_letter:]</b>
<b>COLOR</b>	Change Console Color	<b>COLOR [background][foreground]</b>
<b>COPY CON</b>	<ul style="list-style-type: none"><li><b>COPY CON MyFile.txt</b> - Create or edit a text file directly from the command line</li><li>Type text, then press Ctrl + Z and Enter to save</li></ul>	<b>COPY CON [filename]</b>
a) ? b) *	a) <b>DIR image?.jpg</b> - List files like "image1.jpg", "imageA.jpg", etc. b) <b>Dir file*</b> - List files starting with "file"	a) <b>DIR file? .jpg</b> b) <b>DIR file*</b>

## **8. External DOS Command**

External commands in MS-DOS and Windows Command Prompt are commands that are not built into the command interpreter. Instead, they are separate executable files (.exe) that perform specific tasks when called from the command prompt. Here are some common external commands:

Command	Description	Example
<b>FORMAT</b>	Format a disk	<b>FORMAT C: /FS:NTFS</b>
<b>CHKDSK</b>	Check and fix disk errors	<b>CHKDSK C: /F</b>
<b>DISKPART</b>	Manage disk partitions	<b>DISKPART</b>
<b>XCOPY</b>	Copy files and directories with extended options	<b>XCOPY C:\Source\*.* D:\Destination\ /E /C /H /R /Y</b> <b>where</b> /E: Copies directories and subdirectories, including empty ones. /C: Continues copying even if errors occur. /H: Copies hidden and system files. /R: Overwrites read-only files.
<b>PING</b>	Test network connection to a specific IP address	<b>PING www.example.com</b>
<b>IPCONFIG</b>	Display network configuration information	<b>IPCONFIG /all</b>
<b>NET</b>	Manage network resources	<b>NET USE Z: \\Server\Share</b>
<b>FIND</b>	Search for a specific string in files	<b>FIND "keyword" filename.txt</b>
<b>TREE</b>	Display directory structure of a drive or path	<b>TREE C:\</b>
<b>MORE</b>	Display contents of a text file one screen at a time	<b>MORE filename.txt</b>
<b>ATTRIB</b>	Display or change file attributes	<b>ATTRIB +R -H filename.txt</b>
<b>LABEL</b>	Display or set volume label of a disk	<b>LABEL C: MyDisk</b>
<b>SORT</b>	Sort lines of text file or command output	<b>SORT filename.txt</b>
<b>Notepad</b>	Open notepad	<b>notepad</b>

