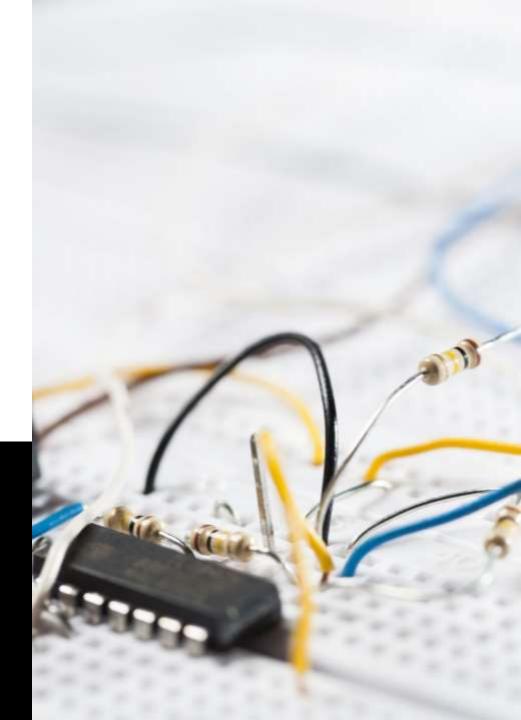
MODULE 3:

DIAGNOSING AND TROUBLESHOOTING HARDWARE ISSUES



Objectives:

- Identify the common hardware issues.
- Identify the diagnostic tools
- Learn how to troubleshoot power supply issues, faulty RAM, and hard drives

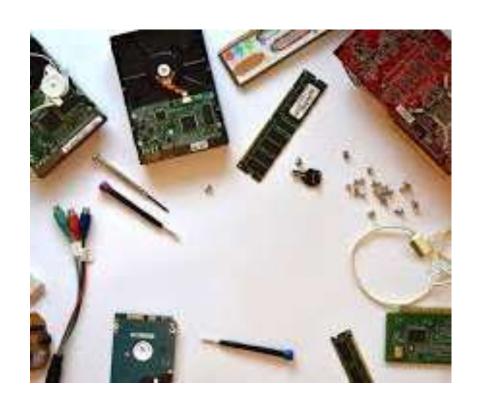


COMMON HARDWARE ISSUES

1. No Display

When a computer powers on but does not show anything on the monitor, it can be frustrating. This issue can arise from several factors:

- •Loose or Damaged Cables: The cable connecting the monitor to the computer may be loose or damaged, preventing the signal from reaching the display.
- •Faulty Monitor: The monitor itself might be malfunctioning. This could be due to internal failure or settings issues.
- •Graphics Card Issues: The graphics processing unit (GPU) may be improperly seated in its slot, disconnected, or failing.
- •Motherboard Problems: If the motherboard is faulty, it may not send signals to the GPU or monitor.
- •RAM Issues: Bad RAM can prevent the system from completing the POST (Power-On Self-Test), resulting in no display.



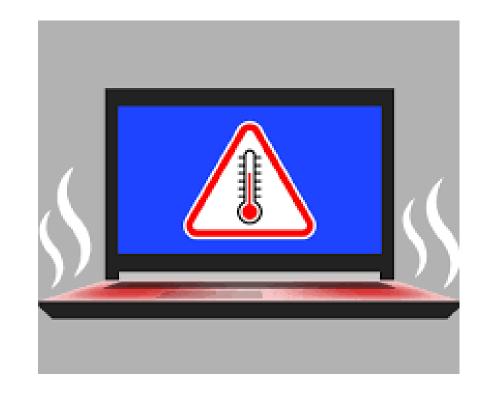
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2. Overheating

Explanation: Overheating can lead to performance degradation and hardware damage. Here are some common causes:

- •Dust Buildup: Dust can accumulate in fans, vents, and heatsinks, obstructing airflow and causing components to heat up.
- •Faulty Cooling Components: If fans are not working correctly or thermal paste is worn out, heat may not be dissipated efficiently.



- •Poor Airflow: If the computer case is cramped or poorly designed, hot air can become trapped inside, raising temperatures.
- •High Ambient Temperature: External environmental factors, such as high room temperature, can contribute to overheating.



3. Random Shutdowns

Explanation: Unexpected shutdowns can be alarming and may be due to various underlying issues:

- •Overheating: Many systems are designed to shut down automatically to prevent damage from excessive heat.
- •Power Supply Issues: A failing power supply may not provide stable power, leading to sudden shutdowns. Voltage fluctuations can also cause instability.



- •Faulty Hardware Components: Issues with RAM, the motherboard, or other critical components can lead to system crashes and shutdowns.
- •Software Conflicts: While less common, certain software issues or driver conflicts can also lead to system instability and shutdowns.



DIAGNOSTIC TOOLS

1. BIOS (Basic Input/Output System)

BIOS is the firmware that initializes hardware during the boot process before handing over control to the operating system. It provides an interface for hardware configuration.

Diagnostic Features:

- •Hardware Configuration: You can check if all components (CPU, RAM, storage, etc.) are detected correctly.
- •Settings Adjustment: You can modify settings such as boot order, fan speeds, and voltage levels.
- •System Monitoring: Many BIOS versions offer hardware monitoring features to check temperatures and voltages.

PC DIAGNOS1 TOOLS





2. POST (Power-On Self-Test)

POST is a diagnostic process that runs when you first power on your computer. It checks the hardware components to ensure they are functioning properly.

Diagnostic Features:

- •Component Checks: POST tests critical components like RAM, CPU, and storage devices.
- •Error Codes: If POST encounters issues, it may return error codes or fail to complete the boot process, indicating specific hardware problems.



3. Beep Codes

Overview: Beep codes are auditory signals emitted by the motherboard during POST to indicate hardware errors. The pattern of beeps corresponds to specific issues.

Common Beep Codes:

- One Short Beep: Indicates a successful POST.
- •Continuous Beeps: Often indicates a RAM issue.
- •Repeating Long and Short Beeps: Can indicate a video card problem or motherboard failure



HO TO TROUBLESHOOT POWER SUPPLY ISSUES



Steps:



Check Connections:

Ensure that all power cables (24-pin ATX, 4/8-pin CPU, and any GPU power connectors) are securely connected.



Inspect for Damage:

Look for visible signs of damage like burnt components, bulging capacitors, or frayed wires.



Test with a Multimeter:

If you have a multimeter, test the voltage output from the power supply. Compare readings against the standard voltage levels (e.g., +12V, +5V, +3.3V).



Use a Power Supply Tester:

A power supply tester can quickly check if the PSU is functioning properly.



Try a Different Power Supply:

If possible, swap in a known working power supply to see if the issue resolves.

2. TROUBLESHOOTING FAULTY RAM



Reseat RAM Modules:

 Turn off the computer and reseat the RAM sticks in their slots. Ensure they click into place. 2

Test One Stick at a Time:

 If you have multiple RAM sticks, remove all but one and boot the system. Rotate through each stick in different slots to identify a faulty module. 3

Run Memory Diagnostics:

 Use tools like Windows Memory Diagnostic or MemTest86 to check for errors. Let the test run multiple passes for thorough results.



Check for Compatibility:

• Ensure that the RAM is compatible with the motherboard (check speed, size, and type).

3. TROUBLESHOOTING HARD DRIVES

Steps:

Check Connections:

Ensure that the data (SATA) and power cables are securely connected to both the hard drive and the motherboard.

Listen for Noises:

If you hear unusual sounds from the hard drive, it may indicate mechanical failure. Use Diagnostic Tools:

Utilize tools like CrystalDiskInfo or manufacturerspecific utilities to check the drive's health and SMART status. Try a Different Port or Cable:

Swap the SATA cable or connect the hard drive to a different SATA port on the motherboard to rule out a faulty port or cable.

Run Check Disk (CHKDSK)

On Windows, run chkdsk /f from the command prompt to fix file system errors. Use chkdsk /r to check for bad sectors.

Backup Data:

If the drive is showing signs of failure, back up any important data immediately if you can access it.

Assessment:

(20 points)

Virtual troubleshooting exercises

Identify the issue simulated environment.

Thank you

