

JOB ROLE – INSTALLATION TECHNICIAN COMPUTING AND PERIPHERALS

Sector – Electronics
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UNIT 4: COMPUTER ASSEMBLY AND DISASSEMBLY

CHAPTER 11: TOOLS AND SAFETY

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Session Objectives

The students will be able to:

- Classification of Hardware Tools
- Discuss Cleaning Tools
- Identify Diagnostic Tools
- Explain Safety and Protecting Equipment
- Discuss proper Disposal to Protect Environment
- Summary

Introduction

Tools are an essential part of computer assembly and maintenance. It is important to handle the tools carefully and safely. The technician has to take care of the tools as well as personal safety. Safe working practice helps to prevent injury to people and damage to computer equipment. A safe workspace is clean, organised, and properly lit. It is necessary to understand and follow safety procedures.

Importance of memory in computers

Memory is one of the most essential components of a computer. The CPU is constantly using memory right from the startup to shut down of the computer.

When you turn on the computer, the computer loads data from read-only memory (ROM) and performs a power-on self-test (POST) to make sure that all the major components are functioning properly. Memory controller checks all the memory addresses with a quick read/write operation to ensure that there are no errors in the memory chips. Read/write means that data is written to a bit and then read from that bit.

Hardware Tools

A tool kit should contain all the tools necessary to complete hardware repairs. Hardware tools are grouped into four categories —

(i) ESD tools (ii) Hand tools

(iii) Cleaning tools (iv) Diagnostic tools

ESD tools : There are two ESD tools — the anti-static wrist strap and the anti-static mat.

The anti-static wrist strap protects computer equipment when grounded to a computer chassis. It is used to prevent ESD damage to computer equipment.

The anti-static mat protects computer equipment by preventing static electricity from accumulating on the hardware or on the technician.

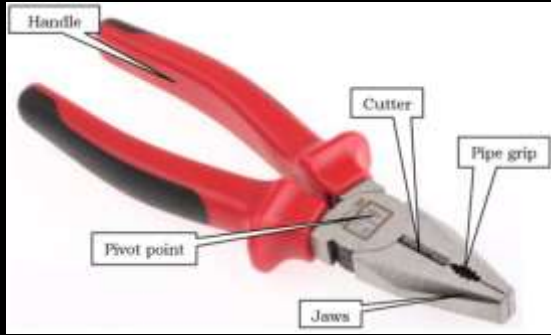
Hardware Tools

Hand Tools: Most tools used in the computer assembly process are small hand tools. Tool kits range widely in size, quality, and price.

- **Electronic cutter:** This belongs to the family of pliers and cutter. It is used in printed circuit board and to cut fine wire. It is sharp enough and hence cannot damage the other nearby wires.
- **Precise screwdriver :** Screwdriver is a hand held tool, commonly used for inserting and removing of screw.



Hardware Tools



- **Combination pliers:** Combination pliers, as the name suggests, perform various operations. It enables the user to perform the combined operation, that is, cutting and gripping.
- **Wire stripper:** It is a portable handheld tool used by workers, especially electricians, for removing the protective coating of an electric wire in order to replace or repair the wire.
- **Crimper:** This is used for the joining of stripped wire and special connector. Stripped wire is inserted through the correctly sized opening of the connector.
- **Tweezers:** These are used to manipulate small parts.
- **Punch down tool:** It is used to terminate a wire into termination blocks. Some cable connectors must be connected to cables using a punch down tool.



Cleaning Tools

Soft lint-free cloth: It used to clean different computer components without scratching or leaving debris.

- **Compressed air** : It used to blow away dust and debris from different computer parts without touching the components.
- **Cable ties** : They are used to bundle cables neatly inside and outside of a computer.

Diagnostic Tools

- **Digital multimeter:** It is used to test the integrity of circuits and the quality of electricity in computer components. A digital multimeter displays the information on an LCD or LED.
- **Loopback adapter :** It is also known as a loopback plug and is used to test the basic functionality of computer ports. The adapter is specific to the port that you want to test.
- **Toner probe :** It is a two-part tool. The toner part is connected to a cable at one end using specific adapters such as an RJ-45, coaxial, or metal clips. The toner generates a tone that travels the length of the cable.

Safety and Protecting Equipment

Safety: While installing computer and peripherals, you should follow the basic safety guidelines to prevent cuts, burns, electrical shock, and damage to eyesight. As a best practice, make sure that a fire extinguisher and first aid kits are available in case of fire or injury.

Basic safety guidelines:

- Remove your watch and jewellery.
- Turn off the power and unplug equipment before installation.
- Never open a power supply or a CRT monitor.
- Do not touch the computer and the printer's part that use high voltage.
- Know about the location of fire extinguisher and its use.
- Take necessary precautions when lifting heavy objects to avoid injury.
- Keep food and drinks out of your workspace.

Safety and Protecting Equipment

Electrical safety : Follow electrical safety guidelines to prevent electrical fires and injuries. Power supplies and CRT monitors contain high voltage.

Fire safety: Follow fire safety guidelines to protect yourself and equipment. To avoid an electrical shock and to prevent damage to the computer, turn off and unplug the computer before beginning installation.

Now Discuss Protecting Equipments:

Electrostatic discharge (ESD): Electrostatic discharge (ESD) and poor-quality sources of electricity can cause damage to computer equipment. Follow proper handling guidelines, be aware of environmental issues, and use equipment that stabilises power to prevent equipment damage and data loss.

Safety and Protecting Equipment

Electromagnetic interference : It is the intrusion of outside electromagnetic signals in a transmission media, such as copper cabling. In a network environment, EMI distorts the signals so that the receiving devices have difficulty interpreting them.

Climate: This affects the computer equipment in variety of ways:

- If the environment temperature is too high, equipment can overheat.
- If the humidity level is too low, the chance of ESD increases.
- If the humidity level is too high, equipment can suffer from moisture damage.

Power fluctuations: Voltage is a measure of work required to move a charge from one location to another. The movement of electrons is called current. Computer circuits need voltage and current to operate electronic components.

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Safety and Protecting Equipment

Power protection devices: To help shield against power fluctuation problems, use devices to protect the data and computer equipment:

- **Surge suppressor** — It diverts extra electrical voltage that is on the line to the ground. It helps to protect against damage from surges and spikes.
- **Uninterruptible power supply (UPS)** — It provides a consistent quality of power when power supply goes off. It helps to protect against potential electrical power problems by supplying a consistent level of electrical power to a computer or other device.

Proper Disposal to Protect Environment

To protect the environment it is essential to properly dispose or recycle the hazardous computer components.

- **Batteries:** They contain rare earth metals that can be harmful to the environment. Batteries from portable computer systems contain lead, cadmium, lithium, alkaline manganese, and mercury.
- **Monitors:** They contain glass, metal, plastics, lead, barium, and rare earth metals. They must be disposed off in compliance with environmental regulations.
- **Toner kits, cartridges, and developers:** Used printer toner kits and printer cartridges must be disposed of properly or recycled. Some toner cartridge suppliers and manufacturers take empty cartridges for refilling.
- **Chemical solvents and aerosol cans:** Contact the local sanitation company to learn how and where to dispose of the chemicals and solvents used to clean computers.

Summary

In this session, you have learnt about the Tools used for computer assembly and maintenance. Here we also mention handle the tools carefully and safely.

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