



Skilling India in Electronics

# Participant Handbook

Sector  
**Electronics**

Sub-Sector  
**IT Hardware**

Occupation  
**After Sales Support**

Reference ID - **ELE/Q7302, Version 1.0**  
**NSQF Level 3**



**Field Technician  
(Networking and  
Storage)**

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**Shri Narendra Modi**  
Prime Minister of India

“ Skilling is building a better India.  
If we have to move India towards  
development then Skill Development  
should be our mission. ”



## Certificate

**COMPLIANCE TO  
QUALIFICATION PACK - NATIONAL OCCUPATIONAL  
STANDARDS**

is hereby issued by the

**ELECTRONICS SECTOR SKILL COUNCIL OF INDIA**

for

**SKILLING CONTENT : PARTICIPANT HANDBOOK**

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **"Field Technician - Networking & Storage"** QP No. **"ELE/Q4606, NSQF Level 4"**

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'Valid up to' date mentioned above (whichever is earlier)

Authorised Signatory  
(Electronics Sector Skill Council)

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The need for having a standard curriculum for the Job Role based Qualification Packs under the National Skills Qualification Framework was felt necessary for achieving a uniform skill based training manual in the form of a participant handbook.

I would like to take the opportunity to thank everyone who contributed in developing this handbook for the QP Field Technician Networking and Storage.

The handbook is the result of tireless pursuit to develop an effective tool for imparting the Skill Based training in the most effective manner.

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CEO

Electronics Sector Skills Council of India

## About this Book

This Participant Handbook is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS.

- Describe the basics of computers
- Explain computer peripherals
- Explain what a network and types of network is
- Describe different types of networking devices
- Explain the fundamentals of electronics
- Define electronic circuits and components
- Define fundamentals of electricity
- Understand basic concept of networking
- Describe TCP/IP protocol and their layers
- Install the hardware
- Configure and set up peripherals
- Set up the software
- Install and configure networking devices
- Install and configure storage devices
- Troubleshoot storage and other devices
- Complete the repairs
- Identify customer's requirements
- Learn how to interact with customers
- Suggest resolutions to the problems of customers
- Explain company's policies
- Write reports and fill forms as needed for the role
- Interact with people

The symbols used in this book are described below

## Symbols Used



Key Learning Outcomes



Steps



Role Play



Tips



Notes



Unit Objectives



Activity



Practical

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# 1. Introduction to Computers and Networking



Unit 1.1 – Computer Fundamentals

Unit 1.2 – Networking Fundamentals

Unit 1.3 – Software Basics



ELE/N4612

## Key Learning Outcomes



**At the end of this module, you will be able to:**

1. Describe the basics of computers
2. Explain computer peripherals
3. Explain what a network and types of network is
4. Describe different types of networking devices
5. Describe software

## UNIT 1.1: Computer Fundamentals

### Unit Objectives

At the end of this unit, you will be able to:

1. Define computer and its types
2. Describe computer peripherals

### 1.1.1 Introduction to Computer

A computer is an electronic device which transforms data into meaningful information. The following image shows a computer:



Fig. 1.1.1: A computer

The basic functionality of computers, irrespective of their size or make, is shown in the following figure:

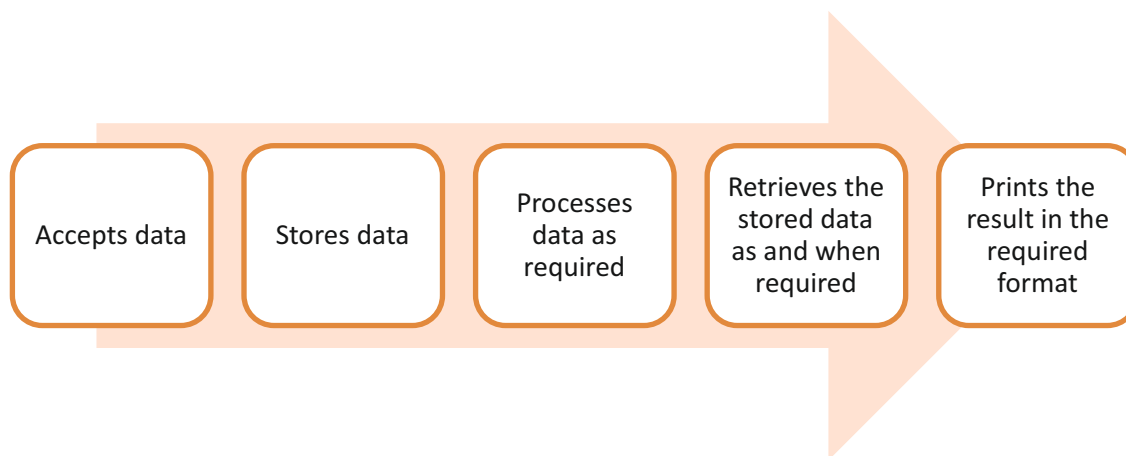


Fig. 1.1.2: The basic function of a computer

Some characteristics that have made usage of computers almost a necessity in life are they are fast, accurate, diligent, adaptable and have good storage capacity.

A computer consists of various units or parts that enables it to perform its functions.

The following figure shows a block diagram of the functional units of a computer:

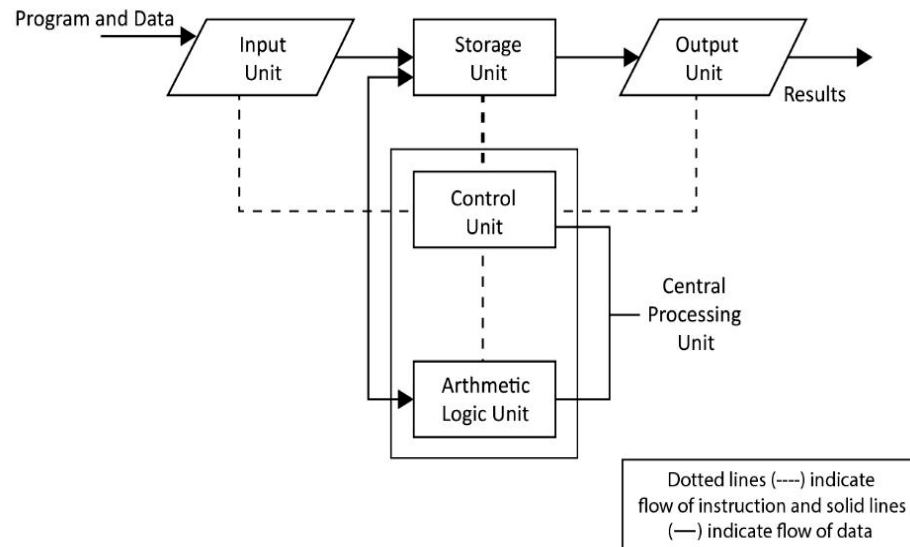


Fig. 1.1.3: Block diagram of functional units of a computer

The four main functional units of a computer is described in the following figure:

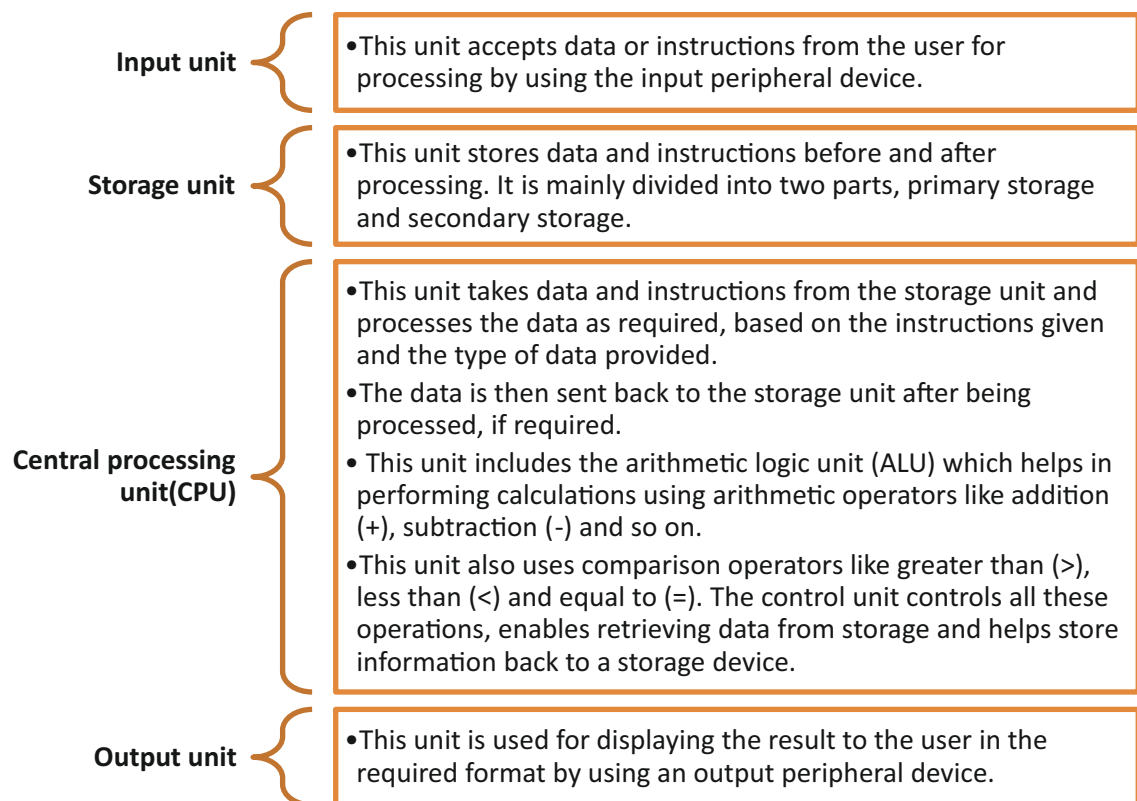





Fig. 1.1.4: Functional units of a computer

### Types of Computers

Computers can be classified according to their size, speed and computing power. The following table lists the different types of computers:

Type	Description	Image
Microcomputer	<p>It is a single user computer system with a single chip and moderately powerful microprocessor. The different types of microcomputers are:</p> <ul style="list-style-type: none"> <li>• Desktop Computer</li> <li>• Laptop Computer</li> <li>• Notebook</li> <li>• Tablet</li> </ul>	
Mini Computer	<p>It is a computer which can support hundreds of users simultaneously and has more powerful processors than a microcomputer. It is also called mid-range computer.</p>	
Main Frame	<p>It is a multi-user system, like a minicomputer but the technology is different than that of a minicomputer. It is used to handle and process large amount of data such as in banks and government offices.</p>	

**Super Computer**

It is the fastest and most expensive computer system. It is used for complex scientific computations and numerical calculations such as weather forecasting, nuclear simulations and astrophysics.



*Fig. 1.1.5: Types of computer*

Computers are commonly classified as:

- Laptop
- Desktop
- Server

**Laptop**

Laptop is a battery or alternate current (AC)-powered, portable, wireless personal computer (PC), generally smaller than the size of a briefcase. It is a small personal computer with a "clamshell" form factor, a thin Liquid Crystal Display (LCD) or Light Emitting Diode (LED) computer screen on the upper portion and a keyboard on the lower part of the "clamshell".

The following image shows a laptop and internal view of the laptop:



*Fig. 1.1.6: Exterior and interior of a laptop computer*

**Desktop**

A desktop is a PC that is made to be used on or near a desk or a table, and is not portable. A desktop PC has a mouse, a keyboard and a base unit which includes the computer's components. Some newer models have the base unit within the monitor to save space.

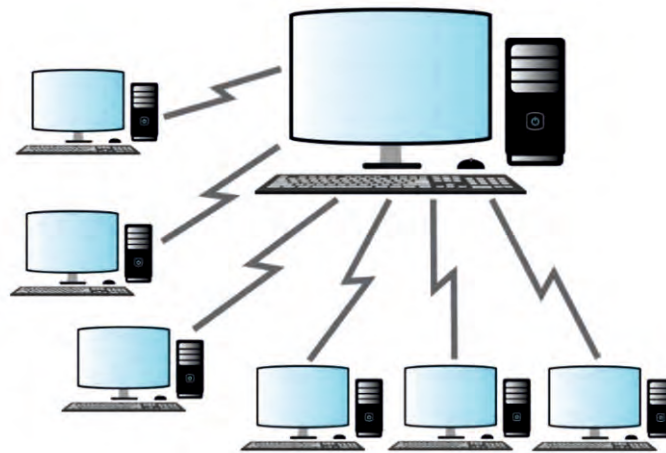
The following image shows a desktop computer along with its system unit or CPU and peripherals:



*Fig. 1.1.7: A desktop computer along with its CPU and peripherals*

### Server

A server computer is a central computer, which comprises of collection of data and programs. It is also known as a network server as it allows all the connected systems to share and store data and applications. File servers and application servers are the two main types of servers. The following image shows a server computer connected to various other computers:

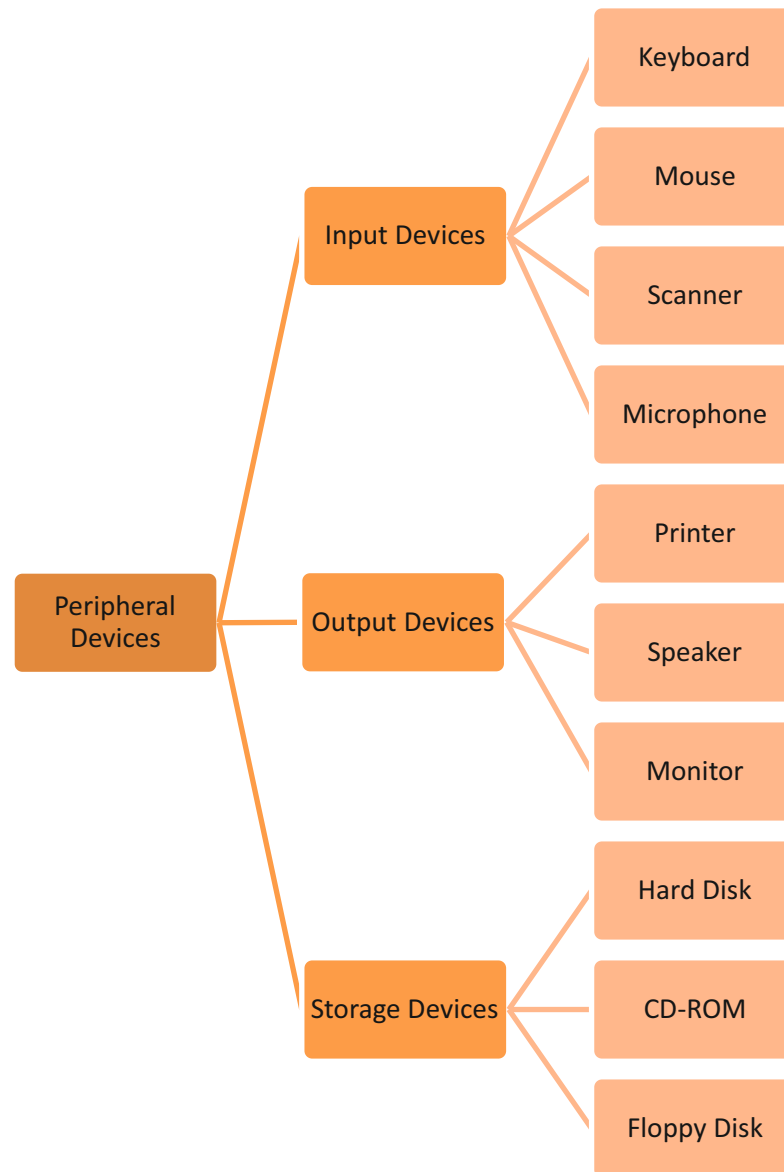


*Fig. 1.1.8: A server computer linked to other computers*

### 1.1.2 Types of Computer Peripherals

Peripheral devices are the input/output devices that are typically used to feed information and instructions into a computer for storage or processing, and to show an output.

The peripheral devices are categorized as shown in the following figure:



*Fig.1.1.9: Different types of peripheral devices*

### **Input Devices**

An input device is any device that provides input to a computer. There are many input devices such as a keyboard and mouse. Some input devices are explained as follows:

#### **Mouse**

The mouse is an input device, used to make selections and move objects on a computer screen. A mouse can be with a laser or a ball, wired or wireless.



Some different types of mouse are shown in the following image:



*Fig. 1.1.10: Different types of mouse*

Though the mouse is considered as a peripheral, it is a vital device and essential for using computers.

### Keyboard

A keyboard is one of the primary input devices and it looks similar to those found on electric typewriters. The following image shows a keyboard:



*Fig. 1.1.11: A keyboard*

Keyboards allow users to enter letters, numbers and other symbols into a computer that can serve as commands or be used to type text.

### Scanner

A scanner reads documents (text and photographs) and stores it in the computer to which it is connected. The physical document is converted to digital format after it gets scanned. The digital document can be viewed and modified on a computer. Earlier a software needs to be installed in the computer for scanners to work but now all the systems have inbuilt settings to detect the scanner automatically. Basic scanning software allows the user to import data from it.

Scanners with flat scanning surface are suitable for books, pages, photographs and so on. The following image shows a scanner:



*Fig. 1.1.12: A scanner*

### **Output Devices**

An output device receives information from the CPU and presents it to the user in the required format. The processed data, stored in the memory of the computer is sent to the output unit, which then converts it into a form that can be understood by the user. The output is typically presented either on a display device such as a monitor, or on paper (hard copy) with the help of a printer.

Some output devices are explained as follows:

### **Monitor**

The monitor is an output device, also called a visual display unit (VDU) that shows the graphical and textual information of the computer. The following image shows a LCD monitor:



*Fig. 1.1.13: A monitor*

### **Printer**

Printer is a peripheral device which is used to display graphics or text on paper. They are a great resource but they should be used in a controlled way. Their overuse puts unnecessary wear and tear on them and also uses up expensive ink and paper. There are three types of printers based on its usage:

- **Personal printers:** These printers are designed for personal use and may be connected to only a single computer. They are used for low-volume smaller printing, requiring minimal setup time to produce a hard copy of a given document.
- **Networked or shared printers:** These are typically used for high-volume and faster printing. They are shared by multiple users on a network.
- **Virtual printer:** It is a piece of software whose user interface resembles a printer driver but it is not connected to a computer printer. It is generally used for archival purposes or as an input for another software.

### Speakers

Speakers receive audio signals as input from the sound card of the computer and produce them in the form of sound waves as audio output. The following image shows speakers:



*Fig. 1.1.14: Speakers*

### Storage Devices

Storage devices, also called storage media, are hardware devices which are used to store data or information. It can store information temporarily or permanently. These devices can be added to computers externally or internally. Storage devices are of two types:

- **Magnetic storage:** Includes hard disk drive, magnetic tapes, floppy drive and so on.
- **Optical storage:** Includes CD-R, CD-RW, Blue ray disk, DVD, flash drive and so on. It uses laser ray or light to access data in it.

### Hard Disks

A hard disk is a device that stores data on a computer permanently. A hard drive is collection of one or more disks or platters shielded with magnetic material to which data is written with the help of a magnetic head. Hard disks are connected to the motherboard using special cables such as PATA (Parallel ATA), SATA (Serial ATA), USB or SAS (Serial attached SCSI) cables and they are powered by a power supply unit.

The following images shows hard disk drives:

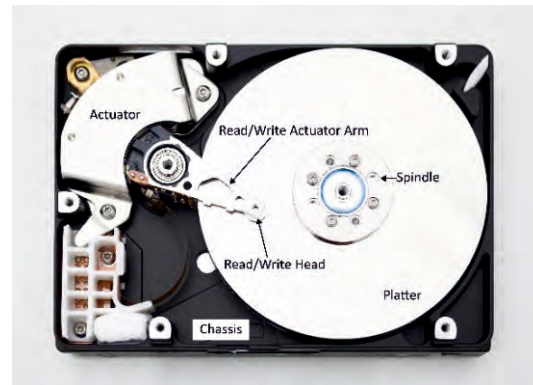


Fig. 1.1.15: Hard disk drives

In case of a laptop, the hardware components and devices that come along in the package are same as that of a desktop except a few changes; instead of mouse, laptops have touchpads or track pads and instead of external power source, laptops have an internal battery.

### CD/DVD

CD/DVDs are types of optical disk drives that use laser light or electromagnetic waves for reading and writing data. Different types of CD/DVDs are:

- CD/DVD-R where R stands for recordable. CD/DVD can be written once and read many times.
- CD/DVD-RW where RW stands for rewritable. CD/DVD-RW allows reading of data many times and also the data can be erased and written again.
- CD/DVD-ROM where ROM stands for read only memory. CD/DVD-ROM allows reading of data which is already present on the CD.

### Floppy Disk Drive

Floppy disk drive was a common storage device and can be still found in many old desktop computers. It can be read and written using a floppy disk drive. It is a disk of thin and flexible magnetic storage which is sealed in a rectangular plastic enclosure. Floppy disks are available in different sizes:

- 8-inch (200 mm)
- 5¼-inch (133 mm)
- 3½-inch (90 mm)