

PIMPRI CHINCHWAD EDUCATION TRUST'S
PIMPRI CHINCHWAD COLLEGE OF ENGINEERING



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Department of Computer Engineering

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Report On

**" Assembling and Disassembling of Computer Systems and Identifying Internal
Components "**

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Batch: J1

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Title:

Assembling and disassembling of computer systems and Identifying Internal Components such as motherboard, RAM, SMPS, Ports, I/O Peripherals and Processor etc.

Introduction:

Computer systems are complex devices that consist of various internal components. Assembling and disassembling these components is a crucial skill for computer technicians and enthusiasts. In this assignment, we will explore the process of assembling and disassembling computer systems and identify the internal components.

Background:

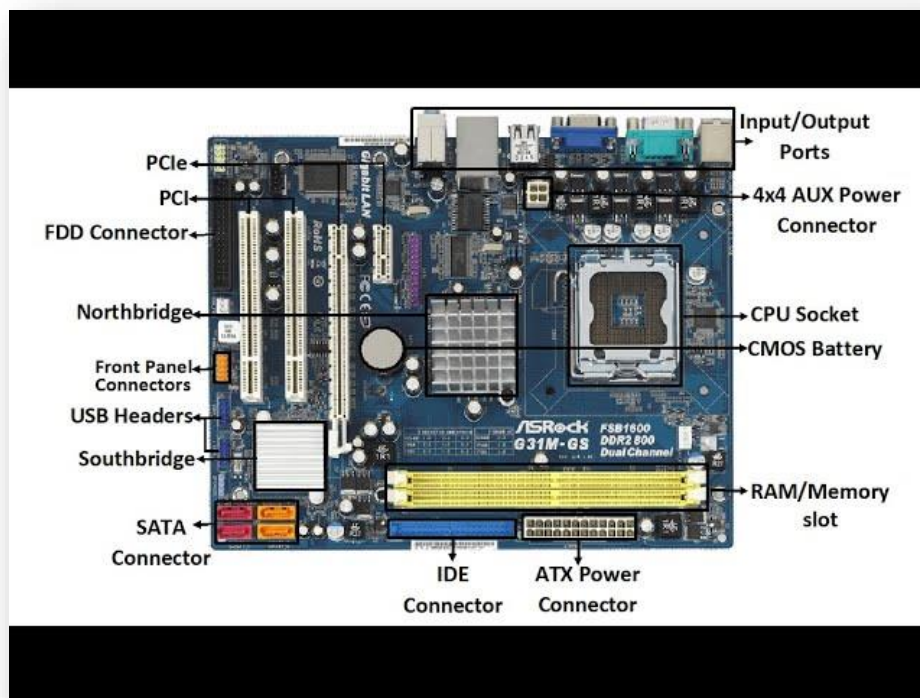
Computer systems have become an essential part of our daily lives. With the increasing demand for computers, the need for skilled technicians who can assemble and disassemble computer systems has also increased. Assembling and disassembling computer systems requires a thorough understanding of the internal components and their functions.

Objective:

1. Assemble and disassemble a computer system.
2. Identify the internal components of a computer system.
3. Understand the functions of each internal component.

Computer Assembly:

Computer assembly is a process in which all the internal components of the computer system are fitted to make the computer functional. There is a proper sequence of attachment of every component into the computer system. To establish proper connectivity, one must use the tools. Proper handling of tools is also required by the technician. The main component involves installing CPU, motherboard, drives, video, graphics card, sound card, modem and adapter, and connectors, and system panel connector.



As we know, computer assembly is a systematic process. First, arrange the computer parts. The sequence for assembly and working of the computer listed below is as:

- Open the case.
- Install the power supply.
- Attach the components to the motherboard.
- Install the motherboard.
- Install internal drives.
- Connect all internal cables.

- Install motherboard power connections
- Connect external cables to the computer.
- Boot the computer for the first time.

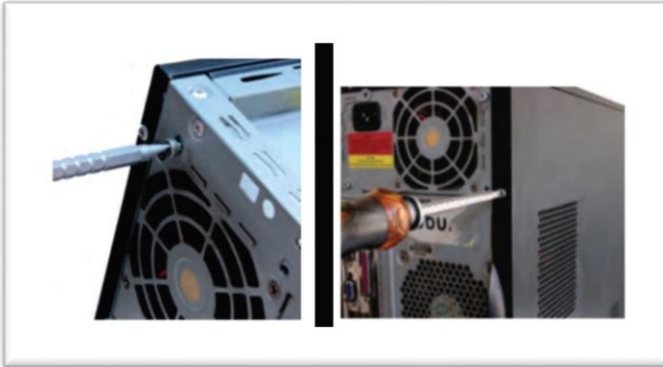
Material Required:

- Computer case, with power supply installed
- Motherboard
- CPU
- Heat sink/fan assembly
- Thermal compound
- RAM module(s)
- Motherboard standoffs and screws
- Anti-static wrist strap and antistatic mat
- Tool kit

Procedure:

Step 1: Open the case

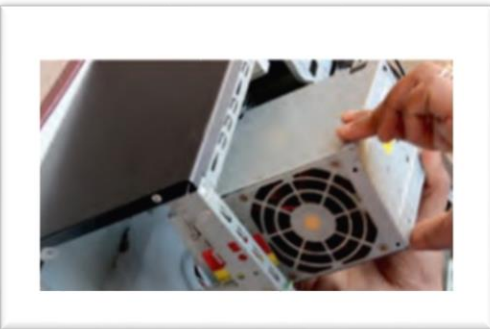
- The first step in assembling a computer is to open the computer case. There are different methods for opening cases.
- To open the case, first remove the screws of the left side cover and slide the side cover.



Step 2: Install the power supply

The next step is to install a power supply. There are usually four screws that attach the power supply to the case. Power supplies have fans that can vibrate and loosen screws that are not secured. Insert the power supply into the case.

- Align the holes in the power supply with the holes in the case.
- Secure the power supply to the case using the proper screws.



Step 3: Attach the components to motherboard

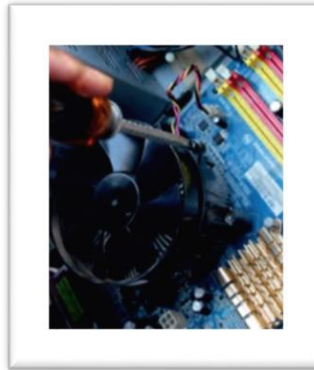
The motherboard has to be prepared before its installation. To prepare the motherboard, you first need to install the CPU, then the heat sink on the CPU and CPU fan.

Installation of RAM:

To install RAM, follow these steps.

- Press down the side locks of the memory slot. Align the notches on the RAM module to the keys in the slot and press down on both ends of RAM module until the side lock gets locked.

- Make sure that the side tabs have locked the RAM module.
- Repeat the above steps to install additional RAM modules.



Step 4: Install motherboard

After preparing the motherboard, you can install the computer case, as shown in Figure.

To install the motherboard, follow these steps:

- Lay the motherboard over the standoffs to mount it on the holes.
- Align the screw holes of the motherboard with the standoffs.
- Then screw the board using a standard screwdriver.
- Tighten all the motherboard screws.
- Connect the 4pin ATX power connector from the power supply to the motherboard.



Step 5: Install internal drives

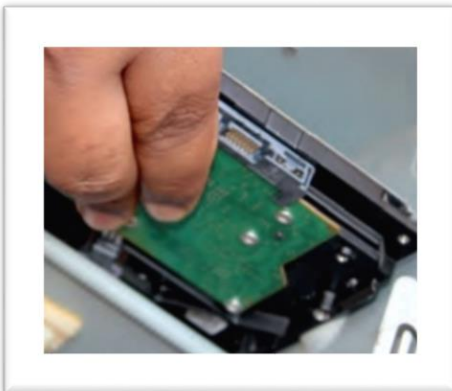
Drives that are installed in internal bays are called internal drives.

Hard drive

The hard drive is the device which stores all the data. It is 3.5 inch wide and needs to be mounted so that access to the cable connections on the back is gained.

Optical drive

- Insert the optical drive into the drive bay so that the optical drive screw holes align with the screw holes in the case.
- Connect the power cable coming from the SMPS to the power socket of optical drive.
- Connect SATA data cable from optical drive socket to the motherboard socket.



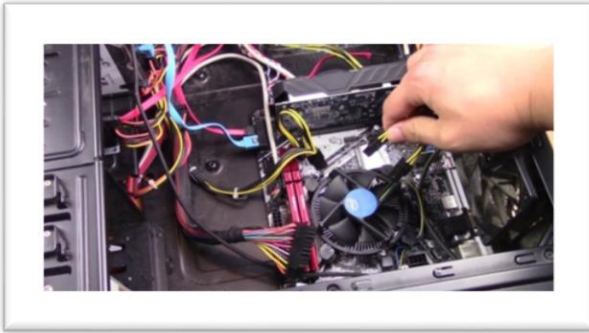
Hard Drive



Optical Drive

Step 6: Connect all internal cables

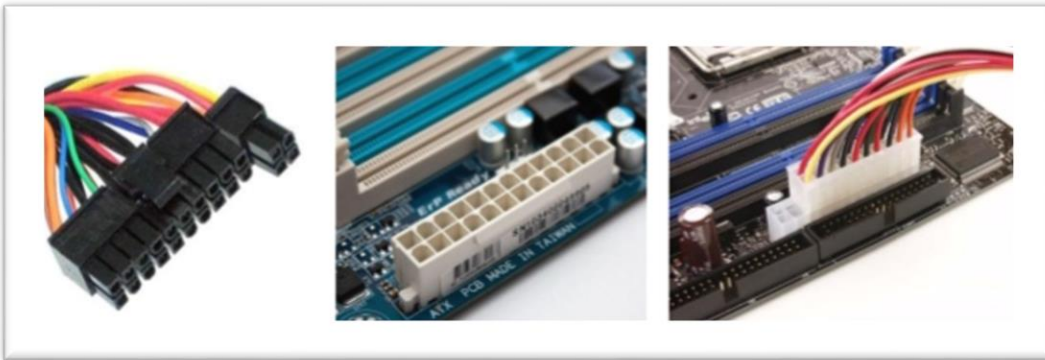
Power cables are used to distribute electricity from the power supply to the motherboard and other components. Data cables transmit data between the motherboard and storage devices, such as hard drives.



Step 7: Install motherboard power connections

The Advanced Technology Extended (ATX) Main Power Connector

Will Have Either 20 Or 24 Pins.



Step 8: Connect external cables to the computer

VGA cable or monitor cable:

The VGA cable is used to connect to monitor and another point on to the back side of the cabinet.



Connecting Keyboard

If It Uses A USB Connector, Plug It into Any of the USB Ports on The Back of The Computer.



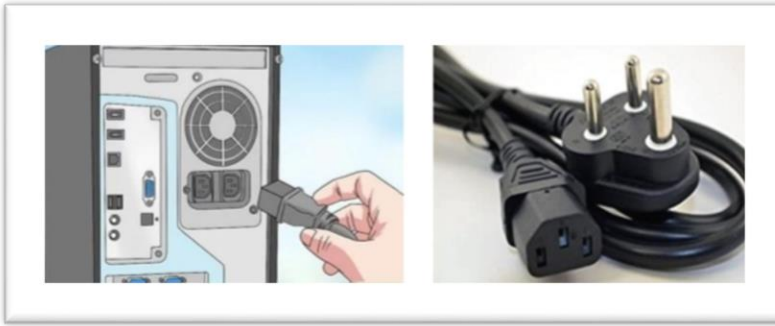
Connecting Headphones or Speakers, And Microphone

Connect The External Speakers or Headphones, to Computer's Audio Port (Either on The Front or Back of the Computer Case).



Connect The Computer to a Power Supply

Power Supply Cable Connect into The Back of the Computer Case.



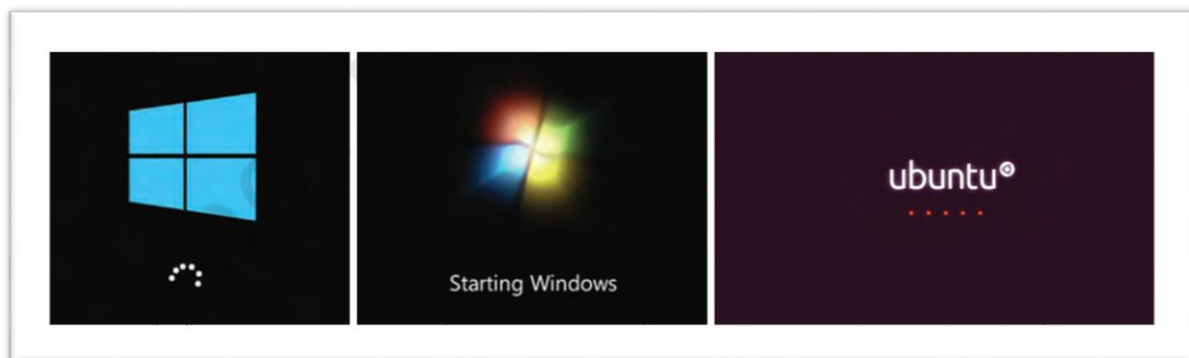
Connecting printer, scanner, webcam

To connect the peripherals such as printer, scanner, webcam, identify the respective connectors of the cable and port on the cabinet.



Step 9: Starting the computer

Always Remember That the First Step Is to Push Power Button of the CPU than the Monitor's. An Operating System Or System Software like Window or Linux Will Start Loading, Now Your Computer Is Ready to Use.



For windows 10

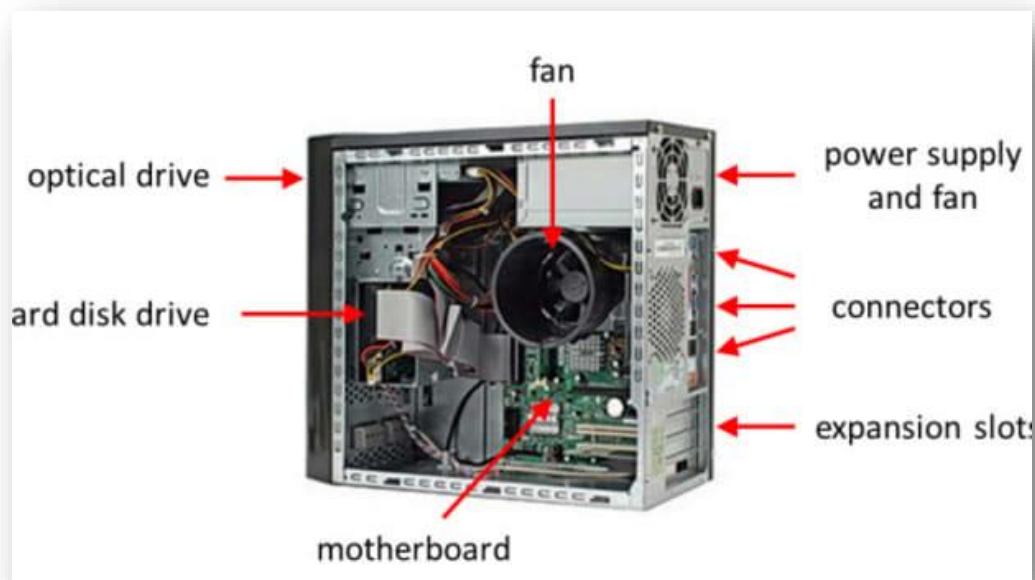
For windows 7

For ubuntu

Computer Disassembly:

Disassembly is the process of breaking down a device into separate parts. Disassembly of any device is required to determine a problem, to replace a part, or take the parts and use them in another device. A computer is also an electronic device which requires disassembly for such issues.

Just like computer assembly, the disassembly is a standard process. The process involves unplugging of all the cords and cables connecting a component to other components, then removing the part from the case or frame.



Material Required:

- One working PC
- An anti-static wrist strap
- An anti-static mat
- Antistatic bags of various sizes
- Technician's toolkit
- A plastic cup or box to organize screws, nuts, and bolts

Procedure:

The disassembly procedure of computer is demonstrated as below -

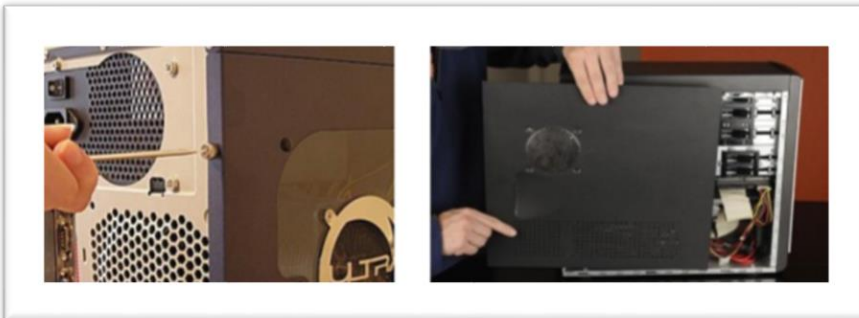
Step 1: Unplugging

- Unplug the power cord from the PC and from the wall socket
- Unplug all the peripherals attached to the computer, such as the keyboard, mouse, monitor, headphones, and any external drives.

Step 2: Open the case

The computer comes with various types of cabinets. The methods of opening the case are different based on the manufacturer.

- To open the case, first remove the screws of the left side cover and slide the side cover.
- Pull the latch to release the side panel. Then lift the side cover out from the chassis.



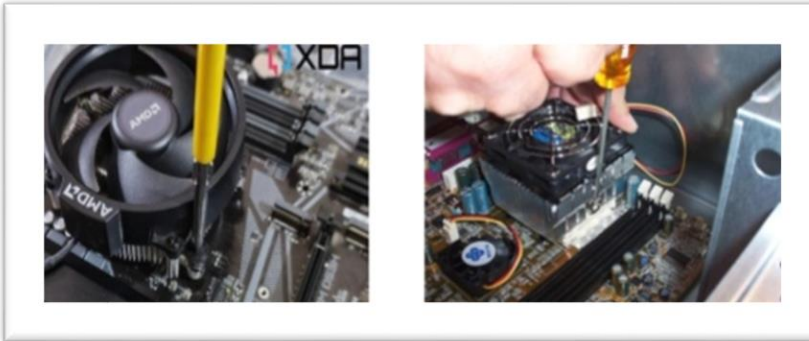
Step 3: Disconnect all the connectors

Disconnect all the connectors connected to the motherboard. These include SATA power cable and data cable of HDD as well as SATA cable of optical drive.



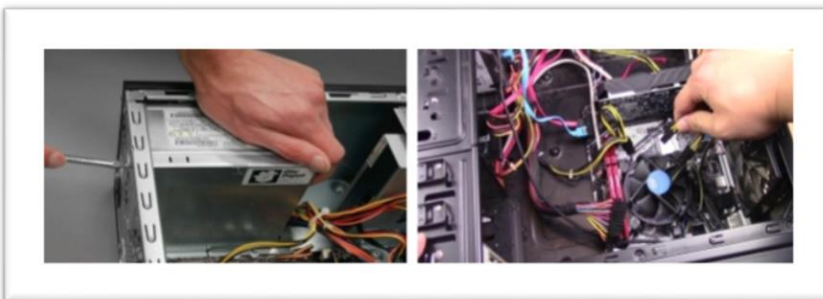
Step 4: Remove the fan

Remove the fan now. Most computers have two fans—the system fan and CPU fan. The system fan is located at the back side of the computer to blow air into the computer. The CPU fan is located on top of the CPU heat sink.



Step 5: Remove the power supply

The power supply is connected to the motherboard by a 20pin connector and 4pin connector. It is also connected to hard disk drive and the optical drive. Firstly, disconnect hard disk drive and the optical drive connectors from the motherboard.



Step 6: Removing HDD and optical drive

- Remove the SATA cable connecting to the HDD and motherboard.
- Then Unscrew the SMPS and remove it from cabinet Then unscrew the four screws securing it in place and pull out the HDD.



Step 7: Remove RAM (random access memory) modules

RAM allows for the transfer of information to and from the CPU. Computer runs fast with more RAM. To remove the RAM, push down on both tabs holding the RAM in place, which are located at both ends of the RAM. It will cause the module to pop up for easy removal.



Step 8: Remove expansion cards

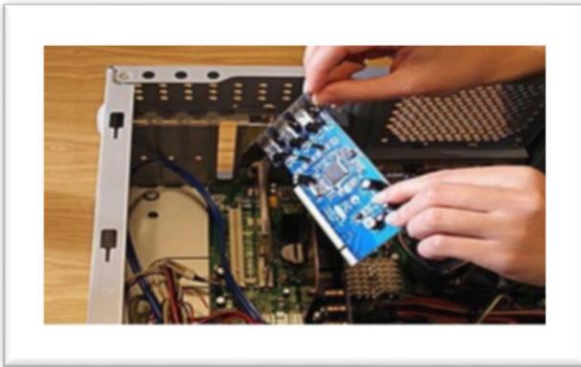
The modern motherboards are integrated with the audio, video and network cards.

- To remove the expansion cards, disconnect the cables attached to it.
- Remove the screws securing the card in the slot.
- Carefully take out the card from the slot.

Step 9: Remove motherboard

Every part of the computer is attached to the motherboard. The CPU, RAM, and expansion cards are directly attached to the motherboard. To remove the motherboard, disconnect all the cables

from the motherboard. It has seven screws holding it to the frame. Remove these screws and then lift the motherboard out of the frame.



Step 10: Reassemble the components

- Identify every component and take its photograph.
- After identification of each component, put all the components back in their place and ensure that all cables and wires are connected at the right place to avoid further troubleshooting.
- Close the case and put the screws back in their place.
- Lastly, connect every external device such as the keyboard, mouse, monitor, etc., and turn on the computer to see everything is working fine after assembled.



Internal Components:

1. Components of CPU:

The CPU and motherboard are sensitive to electrostatic discharge. So, place them on a grounded antistatic mat and wear an antistatic wrist strap while handling the CPU. When handling a CPU, do not touch the CPU contacts at any point. The CPU is secured to the socket on the motherboard with a locking assembly.

- **Control Unit (CU):** The control unit retrieves instructions from memory, decodes them, and manages the flow of data between different parts of the CPU. It acts as the "manager" of the CPU.
- **Arithmetic Logic Unit (ALU):** The ALU performs mathematical and logical operations, such as addition, subtraction, multiplication, and division. It's responsible for executing the instructions decoded by the control unit.
- **Registers:** Registers are small amounts of on-chip memory that store data temporarily while it's being processed. They provide quick access to data, reducing the time it takes to execute instructions.
- **Cache Memory:** Cache memory is a small, fast memory that stores frequently-used data or instructions. It acts as a buffer between the CPU and main memory, reducing the time it takes to access data.
- **Bus Interface Unit (BIU):** The BIU manages data transfer between the CPU and other components, such as memory and input/output devices. It acts as an interface between the CPU and the rest of the
- system.

2. **Motherboard:**

The Motherboard is the main circuit board of the computer, connecting all the hardware components together. It's the backbone of the system, allowing different components to communicate with each other. The Motherboard plays a crucial role in the functioning of a computer, enabling communication and data transfer between different components.

3. **RAM & Its Types:**

- Another name for random access memory is read-write memory. While executing a function, the program and the data which is required are stored in RAM. As soon as the power is disconnected the data on this memory is lost, that is the reason behind considering it a volatile memory.

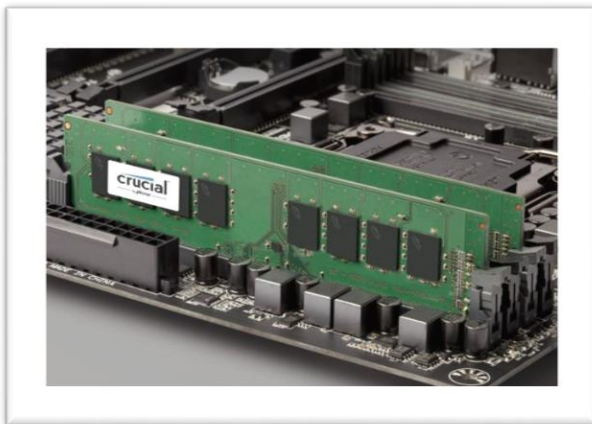
Types of Random Access Memory (RAM)

1. Static RAM:

SRAM stands for Static Random Access Memory. It is a type of semiconductor which is widely used in computing devices and microprocessors.

2. Dynamic RAM:

DRAM stands for Dynamic Random Access Memory. It is made of Capacitors and has smaller data life span than Static RAM.



4. ROM & Its Types:

Read Only Memory (ROM) is a type of computer memory that is used to permanently store data that does not need to be modified. ROM is non-volatile memory, which means that the data stored in it is retained even when the power is turned off. ROM is typically used to store the computer's BIOS (basic input/output system), which contains the instructions for booting the computer, as well as firmware for other hardware devices.

Types of Read-Only Memory (ROM):

1. PROM (Programmable read-only memory):

It can be programmed by the user. Once programmed, the data and instructions in it cannot be changed.

2. EPROM (Erasable Programmable read-only memory):

It can be reprogrammed. To erase data from it, expose it to ultraviolet light. To reprogram it, erase all the previous data.

3. EEPROM (Electrically erasable programmable read-only memory):

The data can be erased by applying an electric field, with no need for ultraviolet light. We can erase only portions of the chip.

4. MROM (Mask ROM):

Mask ROM is a kind of read-only memory, that is masked off at the time of production. Like other types of ROM, mask ROM cannot enable the user to change the data stored in it. If it can, the process would be difficult or slow.



5. Input and Output Peripherals:

1. Input Devices:

The input device is defined as it converts incoming data and instructions into a pattern of electrical signals in binary code that are comprehensible to a digital computer.

2. Output Devices:

An output device is generally the reverse of the input process and generally translates the digitized signals into a form intelligible to the user. The output device is also performed for sending data from one computer system to another. For some time, punched card and paper tape readers were extensively used for input, but these have now been supplanted by more efficient devices.

6. Storage Devices:

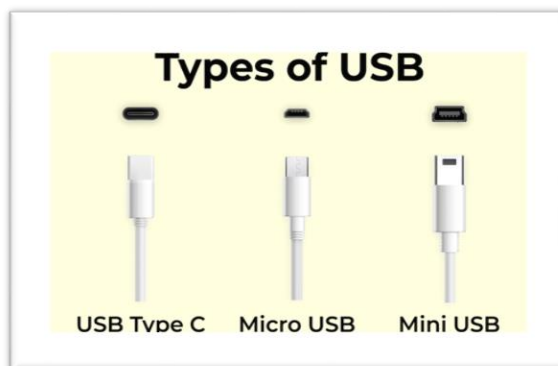
Storage devices are used to store data, programs, and operating systems in a computer or other electronic device. Here are some examples of storage devices:

Primary Storage Devices:

- RAM (Random Access Memory): temporary storage for data and programs.
- ROM (Read-Only Memory): permanent storage for firmware and software.

Secondary Storage Devices:

- Hard Disk Drive (HDD): stores large amounts of data on a magnetic disk
- Solid-State Drive (SSD): stores data on interconnected flash memory chips
- Flash Drive: portable storage device that uses flash memory
- CD (Compact Disc): stores data, music, and videos on an optical disc
- USB Drive: portable storage device that uses flash memory



- Memory Card: small storage device used in cameras, phones, and other devices

7. Ports and its types:

Ports are interfaces on a computer or other electronic device that allow it to connect to other devices, peripherals, or networks. Here are some common types of ports:

Hardware Ports:

- USB (Universal Serial Bus) Port: connects peripherals like keyboards, mice, and flash drives
- PS/2 Port: connects older keyboards and mice
- Serial Port: connects devices like modems and printers
- Parallel Port: connects devices like printers and scanners
- Ethernet Port: connects to a network using a cable

- VGA (Video Graphics Array) Port: connects a monitor or projector
- HDMI (High-Definition Multimedia Interface) Port: connects a monitor, projector, or TV.

Network Ports:

- HTTP (Hypertext Transfer Protocol) Port: used for web traffic (default port 80).
- FTP (File Transfer Protocol) Port: used for file transfers (default port 21).

8. SMPS:

It stands for Switch-Mode Power Supply. It's a type of power supply that uses switching electronics to convert electrical energy from one form to another.

9. Processor:

The processor, also known as the central processing unit (CPU), is the brain of a computer. It executes instructions and performs calculations that allow a computer to perform tasks.

10. VGA cables and VGA connectors:

VGA (Video Graphics Array) cables and connectors are used to connect a computer's video output to a monitor or other display device.

- A VGA connector is a type of connector that is used to connect a VGA cable to a computer or monitor.
- It is typically a 15-pin D-subminiature connector.
- The VGA connector has three rows of pins, with five pins in each row.

11. Connector:

A connector is a device that allows two or more electronic components to be connected together. Connectors are used to transmit signals, power, or data between devices, and they come in a wide range of shapes, sizes, and types.

Types of Connectors:

- D-subminiature (D-sub) connectors: These are commonly used for computer peripherals, such as keyboards and mice.
- RJ-45 connectors: These are used for Ethernet connections and are commonly found on network cables.
- USB connectors: These are used for connecting devices such as flash drives, keyboards, and mice to computers.
- HDMI connectors: These are used for connecting high-definition devices, such as TVs and projectors, to computers and other devices.

- BNC connectors: These are used for connecting coaxial cables to devices such as TVs and radios.
- Audio connectors: These are used for connecting audio devices, such as speakers and headphones, to computers and other devices.

12. Ethernet:

Ethernet is a type of local area network (LAN) technology used for connecting devices to a network. It was invented in the 1970s by Robert Metcalfe and David Boggs.

Types of Ethernets:

- Fast Ethernet: Supports data transfer rates of up to 100 Mbps.
- Gigabit Ethernet: Supports data transfer rates of up to 1 Gbps.
- 10-Gigabit Ethernet: Supports data transfer rates of up to 10 Gbps.

Computer Bus:

A computer bus is a communication system within a computer or between computers that transfers data between different components. The purpose of buses is to reduce the number of "pathways" needed for communication between the components

Types of Computer Bus:

1. Address Bus
2. Data Bus
3. Control Bus

1. Address Bus

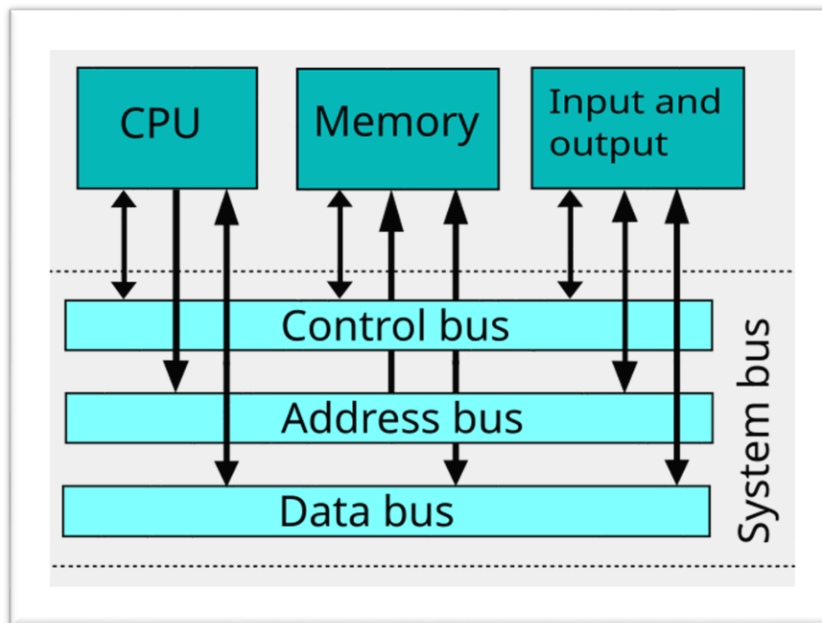
- A collection of wires used to identify particular location in main memory is called Address Bus. Or in other words, the information used to describe the memory locations travels along the address bus.
- The address bus transports memory addresses which the processor wants to access in order to read or write data.
- The address bus is unidirectional.

2. Data Bus

- A collection of wires through which data is transmitted from one part of a computer to another is called Data Bus.
- Data Bus can be thought of as a highway on which data travels within a computer.
- The main objective of data bus is transfer of the data between microprocessor to input/output devices or memory.

3. Control Bus

- The connections that carry control information between the CPU and other devices within the computer is called Control Bus.
- The main objective of control bus is all signals controller carried from processor to other hardware device.
- The control bus transports orders and synchronization signal coming from the control unit and travelling to all other hardware components.



Result:

After completing this assignment, we will be able to:

1. Assemble and disassemble a computer system safely and efficiently.
2. Identify and explain the functions of each internal component.

Conclusion:

Assembling and disassembling computer systems and identifying internal components are essential skills for computer technicians and enthusiasts. By understanding the internal components and their functions, individuals can troubleshoot common problems and upgrade or repair computer systems safely and efficiently. This assignment has provided a comprehensive

overview of the process of assembling and disassembling computer systems and identifying internal components.

Reference:

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- <https://bskillforum.bharatskills.gov.in/DashBoardUpload/Others-EBOOK-28Oct2022131021.pdf>
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