# EXPERIMENT: 1

**AIM: COMPUTER ANATOMY: MEMORY, PORTS, MOTHERBOARD AND ADD ON CARDS.**

**PROCEDURE:**

**MEMORY**

Computer memory is just like the human brain. It is used to store data/information and instructions. It is a data storage unit or a data storage device where data is to be processed and instructions required for processing are stored. It can store both the input and output can be stored here.

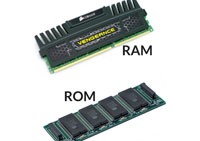


**In general, memory is of three types:**

* Primary memory
* Secondary memory
* Cache memory

**1. Primary Memory:** It is also known as the main memory of the computersystem. It is used to store data and programs or instructions during computer operations. It uses semiconductor technology and hence is commonly called semiconductor memory.

Primary memory is of two types:

1. **RAM (Random Access Memory):** It is a volatile memory. Volatile memory stores information based on the power supply. If the power supply fails/ interrupted/stopped, all the data & information on this memory will be lost. RAM is used for booting up or start the computer. It temporarily stores programs/ data which has to be executed by the processor. RAM is of two types:
   * **S RAM (Static RAM):** It uses transistors and the circuits of this memory are capable of retaining their state as long as the power is applied. This memory consists of the number of flip flops with each flip flop storing 1 bit. It has less access time and hence, it is faster.
   * **D RAM (Dynamic RAM):** It uses capacitors and transistors and stores the data as a charge on the capacitors. They contain thousands of memory cells. It needs refreshing of charge on capacitor after a few milliseconds. This memory is slower than S RAM.
2. **ROM (Read Only Memory):** It is a non-volatile memory. Non-volatile memory stores information even when there is a power supply failed/ interrupted/stopped. ROM is used to store information that is used to operate the system. As its name refers to read-only memory, we can only read the programs and data that is stored on it. It contains some electronic fuses that can be programmed for a piece of specific information. The information stored in the ROM in binary format. It is also known as permanent memory. ROM is of four types:
   * **MROM(Masked ROM):** Hard-wired devices with a pre-programmed collection of data or instructions were the first ROMs. Masked ROMs are a type of low-cost ROM that works in this way.
   * **PROM (Programmable Read Only Memory):** This read-only memory is modifiable once by the user. The user purchases a blank PROM and uses a PROM program to put the required contents into the PROM. Its content can’t be erased once written.
   * **EPROM (Erasable Programmable Read Only Memory):** It is an extension to PROM where you can erase the content of ROM by exposing it to Ultraviolet rays for nearly 40 minutes.
   * **EEPROM (Electrically Erasable Programmable Read Only Memory):** Here the written contents can be erased electrically. You can delete and reprogramme EEPROM up to 10,000 times. Erasing and programming take very little time, i.e., nearly 4 -10 ms(milliseconds). Any area in an EEPROM can be wiped and programmed selectively.

**2.Secondary Memory:** It is also known as auxiliary memory and backup memory. It is a non-volatile memory and used to store a large amount of data or information. The data or information stored in secondary memory is permanent, and it is slower than primary memory. A CPU cannot access secondary memory directly. The data/information from the auxiliary memory is first transferred to the main memory, and then the CPU can access it.

**Types of secondary memory:**

1. **Magnetic Tapes:** Magnetic tape is a long, narrow strip ofplastic film with a thin, magnetic coating on it that is used for magnetic recording. Bits are recorded on tape as magnetic patches called

RECORDS that run along many tracks. Typically, 7 or 9 bits arerecorded concurrently. Each track has one read/write head, which allows data to be recorded and read as a sequence of characters. It can be stopped, started moving forward or backward, or rewound.

1. **Magnetic Disks:** A magnetic disc is a circular metal or a plastic plate and these plates are coated with magnetic material. The disc is used on both sides. Bits are stored in magnetized surfaces in locations called tracks that run in concentric rings. Sectors are typically used to break tracks into pieces.

Hard discs are discs that are permanently attached and cannot be removed by a single user.

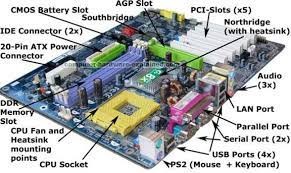
1. **Optical Disks:** It’s a laser-based storage medium that can be written to and read. It is reasonably priced and has a long lifespan. The optical disc can be taken out of the computer by occasional users. Types of Optical Disks :



**3. Cache Memory:** It is a type of high-speed semiconductor memory that can help the CPU run faster. Between the CPU and the main memory, it serves as a buffer. It is used to store the data and programs that the CPU uses the most frequently.

**MOTHERBOARD**

A motherboard is one of the most essential parts of a computer system. It holds together many of the crucial components of a computer, including the central processing unit (CPU), memory and connectors for input and output devices. The base of a motherboard consists of a very firm sheet of non-conductive material, typically some sort of rigid plastic. Thin layers of copper or aluminum foil, referred to as *traces*, are printed onto this sheet. These traces are very narrow and form the circuits between the various components. In addition to circuits, a motherboard contains a number of sockets and slots to connect the other components.



**Parts of a Motherboard**

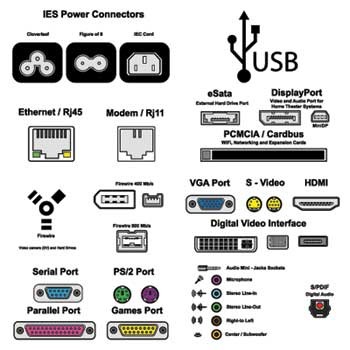
1. **Mouse & keyboard:** Keyboard Connectors are two types basically. All PCs have a Key board port connected directly to the motherboard. The oldest, but still quite common type, is a special DIN, and most PCs until recently retained this style connector. The AT-style keyboard connector is quickly disappearing, being replaced by the smaller mini DIN PS/2-style keyboard connector.
2. **USB (Universal serial bus):**  USB is the General-purpose connection for PC. You can find USB versions of many different devices, such as mice, keyboards, scanners, cameras, and even printers.

USB has a number of features that makes it particularly popular on PCs. First, USB devices are hot swappable. You can insert or remove them without restarting your system.

1. **Parallel port:** Most printers use a special connector called a parallel port. Parallel port carry data on more than one wire, as opposed to the serial port, which uses only one wire. Parallel ports use a 25-pin female DB connector. Parallel ports are directly supported by the motherboard through a direct connection or through a dangle.
2. **CPU Chip :** The *central processing unit,* also called the *microprocessor* performs all the calculations that take place inside a pc. Modern CPUs generate a lot of heat and thus require a cooling fan or heat sink. The cooling device (such as a cooling fan) is removable, although some CPU manufactures sell the CPU with a fan permanently attached.
3. **RAM slots:** Random-Access Memory (RAM) stores programs and data currently being used by the CPU. RAM is measured in units called bytes. RAM has been packaged in many different ways. The most current package is called a 168-pin DIMM (Dual Inline Memory module).
4. **Floppy controller:** The floppy drive connects to the computer via a 34-pin *ribbon cable,* which in turn connects to the motherboard. A *floppy controller* is one that is used to control the floppy drive.
5. **IDE controller:** Industry standards define two common types of hard drives: EIDE and SCSI. Majority of the PCs use EIDE drives. SCSI drives show up in high end PCs such as network servers or graphical workstations. The EIDE drive connects to the hard drive via a 2-inch-wide, 40-pin ribbon cable, which in turn connects to the motherboard. *IDE controller* is responsible for controlling the hard drive.
6. **PCI slot:** Intel introduced the *Peripheral component interconnect* bus protocol. The PCI bus is used to connect I/O devices (such as NIC or RAID controllers) to the main logic of the computer. PCI bus has replaced the ISA bus.
7. **ISA slot:**  (Industry Standard Architecture) It is the standard architecture of the Expansion bus. Motherboard may contain some slots to connect ISA compatible cards.
8. **CMOS Battery:** To provide CMOS with the power when the computer is turned off all motherboards comes with a battery. These batteries mount on the motherboard in one of three ways: the obsolete external battery, the most common onboard battery, and built-in battery.
9. **AGP slot:**  If you have a modern motherboard, you will almost certainly notice a single connector that looks like a PCI slot, but is slightly shorter and usually brown. You also probably have a video card inserted into this slot. This is an *Advanced Graphics Port (AGP)* slot.
10. **CPU slot:** To install the CPU, just slide it straight down into the slot. Special notches in the slot make it impossible to install them incorrectly. So remember if it does not go easily, it is probably not correct. Be sure to plug in the CPU fan's power.
11. **Power supply plug in:** The Power supply, as its name implies, provides the necessary electrical power to make the pc operate. the power supply takes standard 110-V AC power and converts into 12-Volt, 5-Volt, and 3.3-Volt DC power.

A port is a physical docking point using which an external device can be connected to the computer. It can also be programmatic docking point through which information flows from a program to the computer or over the Internet.

**Serial Port**

* Used for external modems and older computer mouse
* Two versions: 9 pin, 25 pin model
* Data travels at 115 kilobits per second

**Parallel Port**

* Used for scanners and printers
* Also called printer port
* 25 pin model
* IEEE 1284-compliant Centronics port

**PS/2 Port**

* Used for old computer keyboard and mouse
* Also called mouse port
* Most of the old computers provide two PS/2 port, each for the mouse and keyboard
* IEEE 1284-compliant Centronics port

**Universal Serial Bus (or USB) Port**

* It can connect all kinds of external USB devices such as external hard disk, printer, scanner, mouse, keyboard, etc.
* It was introduced in 1997.
* Most of the computers provide two USB ports as minimum.
* Data travels at 12 megabits per seconds.
* USB compliant devices can get power from a USB port.

**VGA Port**

* Connects monitor to a computer's video card.
* It has 15 holes.
* Similar to the serial port connector. However, serial port connector has pins, VGA port has holes.

**Power Connector**

* Three-pronged plug.
* Connects to the computer's power cable that plugs into a power bar or wall socket.

**Firewire Port**

* Transfers large amount of data at very fast speed.
* Connects camcorders and video equipment to the computer.
* Data travels at 400 to 800 megabits per seconds.
* Invented by Apple.
* It has three variants: 4-Pin FireWire 400 connector, 6-Pin FireWire 400 connector, and 9-Pin FireWire 800 connector.

**Modem Port**

* Connects a PC's modem to the telephone network.

**Ethernet Port**

* Connects to a network and high speed Internet.
* Connects the network cable to a computer.
* This port resides on an Ethernet Card.
* Data travels at 10 megabits to 1000 megabits per seconds depending upon the network bandwidth.

**Game Port**

* Connect a joystick to a PC
* Now replaced by USB

**Digital Video Interface, DVI port**

* Connects Flat panel LCD monitor to the computer's high-end video graphic cards.  Very popular among video card manufacturers.

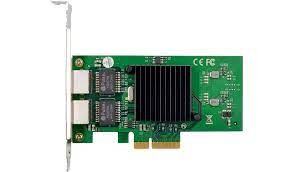
**Sockets**

* Sockets connect the microphone and speakers to the sound card of the computer.

**ADD-IN CARD**

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| --- | --- |
| [expansion slot](https://www.encyclopedia.com/computing/dictionaries-thesauruses-pictures-and-press-releases/expansion-slot) | in a |
| [,](https://www.encyclopedia.com/science-and-technology/technology/technology-terms-and-concepts/bus#1O11bus) and the type of connector and | |

**add-in card (add-on card, expansion card)** A [printed circuit](https://www.encyclopedia.com/science-and-technology/computers-and-electrical-engineering/electrical-engineering/printed-circuit) board that plugs into an computer to provide some extra facility. The sockets normally connect to a [bus](https://www.encyclopedia.com/science-and-technology/technology/technology-terms-and-concepts/bus#1O11bus) the use to which each contact is put are strictly defined to ensure compatibility between the card and the computer. Cards are available that provide extra memory, communications interfaces, sound I/O capabilities, device interfaces to extra disks or tape backup devices, for instance, or perhaps extra processors in multiprocessor systems. See also [PCMCIA](https://www.encyclopedia.com/science-and-technology/computers-and-electrical-engineering/computers-and-computing/pcmcia#1O11PCMCIA)



**Types of expansion cards.**

**Sound cards.**

Sound cards expand the sound capabilities of a PC. They are popular with gamers and those who watch videos, and/or television, on their PCs. With a sound card, a system can go from mono sound, to stereo sound, to surround sound.

**Video cards.**

Video cards can increase the overall performance of a system, depending upon the card that is installed. They can also allow the addition of multiple monitors. One of the ways that they increase performance is by taking the workload off of the CPU and transferring it to the video card. A good video card is a wise investment.

**Network cards.**

Most motherboards have built in network cards; however, they can fail or they might not connect to the right type of network in your situation. Additionally, you might need to connect with another or different type of network or make multiple network connections. Those are a few examples of situations where a network expansion card could prove useful.

**Serial and parallel cards.**

Another reason to add expansion cards would be the need to expand the life of legacy applications. Most systems nowadays do not come with a serial or parallel port; however, some applications and situations still call for those types of connections. You can add an expansion card that has a serial and/or parallel port in your system.

**USB cards.**

An expansion card will allow you to add more USB ports to a system. You can also add newer versions of USB by using an expansion card.

**FireWire cards.**

You can also add more FireWire ports to your system. If you don’t have FireWire, you can use an expansion card to add it, and, by installing an expansion card, you can update your system.

**Storage cards.**

A variety of storage solutions are available through the use of expansion cards. If you need to add a SCSI tape array, you can add an expansion card that allows you to connect to SCSI devices. There are also expansion cards that are solid-state drives in their own right. They are an extremely unique solution for storage and they are very fast; however, they tend to be fairly expensive.

**Modem cards**.

Most systems no longer come with built-in modems. However, some virtual private networks require the client to dial-in in order to connect and a modem is needed to do so. An expansion card that has a modem built into it will resolve this problem.

**Wireless/Cellular cards.**

Wireless and cellular network cards allow you to take advantage of wireless networks and a cellular card can take advantage of LTE or 4G networks. Caution: additional data charges may apply.

**TV tuner cards.**

A TV tuner card allows a PC to make a cable television connection. This is a popular option for a home theater PC. Cable television can be routed through, or watched, on the PC.

**Video capture cards.**

Video capture cards are used to capture video images. Specialized cards are used to capture video and/or still images that cross through the PC and they may be combined with a TV tuner card.

**Riser cards.**

The riser card is used as an adapter for other cards. They are plugged in and offer the ability to install another card at a 90-degree angle. They are used when space is tight.

