

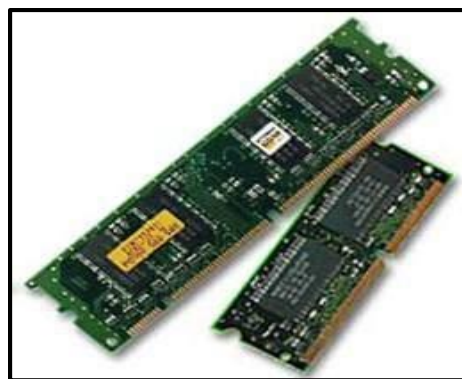
2.2.3. Memory and Storage:

Storing data is an important part of a computer system. The main concern of all computer designers is to create fast and efficient storage devices. As is commonly known, the primary memory inside the computer (Random Access Memory or RAM) is volatile i.e. whatever is stored in RAM is lost as soon as the computer is switched off. So if there is a need to save data from getting lost, it can be put on a storage device like floppy disk, hard disks and CD-ROMS before switching off the Computer.

1. Types of Main Memory

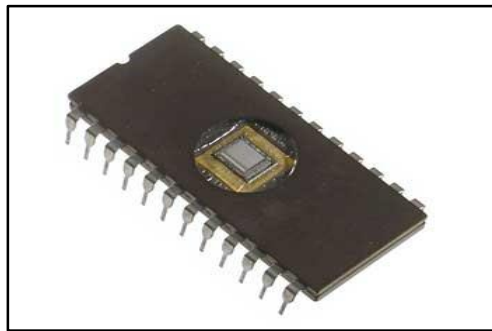
- a. RAM (Random Access Memory):** is the internal memory of the CPU for storing data, program and program result. It is read/write memory which stores data until the machine is working. As soon as the machine is switched off, data is erased.

RAM is **volatile**, i.e. data stored in it is lost when we switch off the computer or if there is a power failure. Hence a backup uninterruptible power system (UPS) is often used with computers. RAM is small, both in terms of its physical size and in the amount of data it can hold.



b.ROM stands for Read Only Memory

ROM stands for Read Only Memory. The memory from which we can only read but cannot write on it. This type of memory is **non-volatile**. The information is stored permanently in such memories during manufacture. A ROM, stores such instructions that are required to start a computer. This operation is referred to as bootstrap. ROM chips are not only used in the computer but also in other electronic items like washing machine and microwave oven.



Advantages of ROM

The advantages of ROM are as follows:

- Non-volatile in nature
- These cannot be accidentally changed
- Cheaper than RAMs
- Easy to test
- More reliable than RAMs
- These are static and do not require refreshing
- Its contents are always known and can be verified.

❖ Difference between RAM and ROM

	RAM	ROM
Definition	Random Access Memory or RAM is a form of data storage that can be accessed randomly at any time, in any order and from any physical location. Allowing quick access and manipulation.	Read-only memory or ROM is also a form of data storage that cannot be easily altered or reprogrammed. Stores instructions that are not necessary for re-booting up to make the computer operate when it is switched off. They are hardwired.
Stands for	Random Access Memory	Read-only memory
Use	RAM allows the computer to read data quickly to run applications. It allows reading and writing.	ROM stores the program required to initially boot the computer. It only allows reading.
Volatility	RAM is volatile i.e. its contents are lost when the device is powered off .	It is non-volatile i.e. its contents are retained even when the device is powered off.
Types	The two main types of RAM are static RAM and dynamic RAM.	The types of ROM include PROM, EPROM and EEPROM.

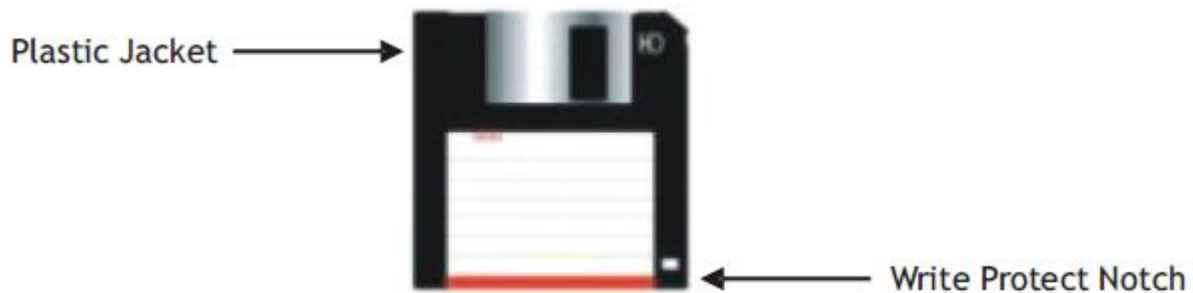
2. Secondary storage Devices:

Storing data is an important part of a computer system. The main concern of all computer designers is to create fast and efficient storage devices. As is commonly known, the primary memory inside the computer (Random Access Memory or RAM) is volatile i.e. whatever is stored in RAM is lost as soon as the computer is switched off. So if there is a need to save data from getting lost, it can be put on a storage device like floppy disk, hard disks and CD-ROMS before switching off the Computer.

a. Floppy Disk

These are small removable disks that are plastic coated with magnetic recording material. Floppy disks are typically 3.5" in size (diameter) and can hold 1.44 MB of data. This portable storage device is a rewritable media and can be reused a number of times.

Floppy disks are commonly used to move files between different computers. The main disadvantage of floppy disks is that they can be damaged easily and, therefore, are not very reliable. The following figure shows an example of the floppy disk.



b. Hard Disk Drive

It is a storage device with very large capacity, which ranges from 1GB to Terabytes in the modern scenario. It is placed inside the cabinet of CPU (Although external hard drives are also available these days). It is not a removable drive in normal circumstances. A hard disk has a much larger storage capacity than a floppy disk. It is fitted inside the computer and cannot be seen by us. There can be one or more hard disk in the system unit of a computer. They were originally called "fixed disks" or "Winchesters".

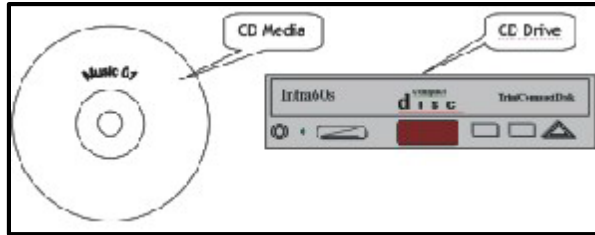


c. CD (Compact Disk):

Compact Disk (CD) is portable disk having data storage capacity between 650-700 MB. It can hold large amount of information such as music, full-motion videos, and text etc. It contains digital information that can be read, but cannot be rewritten. Separate drives exist for reading and writing CDs. Since it is a very reliable storage media, it is very often used as a medium for distributing large amount of information to large number of users. In fact today most of the software is distributed through CDs.

Their Types:

- **CD-ROM (read only):** The data stored on CD-ROM are **read only** as the name indicates, that is, the data on CD-ROM cannot be modified.
- **CD-R: (record) to a CD:** This is Compact Disk -**Recordable**. It can be used to write data on it once. The data on it can be retrieved as and when needed.
- **CD-RW:** Compact Disk **Re-writable** (CD-RW) is an optical disk that can be rewritten many times. The data stored on it can be read, erased and re-written as frequently as needed.



d. DVD (Digital Versatile Disk):

Digital Versatile Disk (DVD) is similar to a CD but has larger storage capacity and enormous clarity. Depending upon the disk type it can store several Gigabytes of data (as opposed to around 650MB of a CD). DVDs are primarily used to store music or movies and can be played back on your television or the computer too. They are not rewritable media. It's also termed DVD (Digital Video Disk)

DVD-ROM

- Over 4 GB storage (varies with format)
- DVD- ROM (read only)
- Many recordable formats (e.g., DVD-R, DVD-RW; ..)
- Are more highly compact than a CD.
- Special laser is needed to read them.

e. Pen Drive

This is a type of flash memory storage device of the size of a thumb and can plug into the USB port of the computer. USB flash drives are more compact, generally faster, hold more data, and are more reliable than disk storage. Most flash drives use a standard USB connector, which is connected directly to the USB port on a personal computer. Flash drive is nearly free from scratch and dust problems that



exist in the other storage media, such as floppy disks and compact discs. This makes it ideal for transporting data or work files from one location to another, such as from home to school or office or work places.