Storage Devices

Floppy Disk

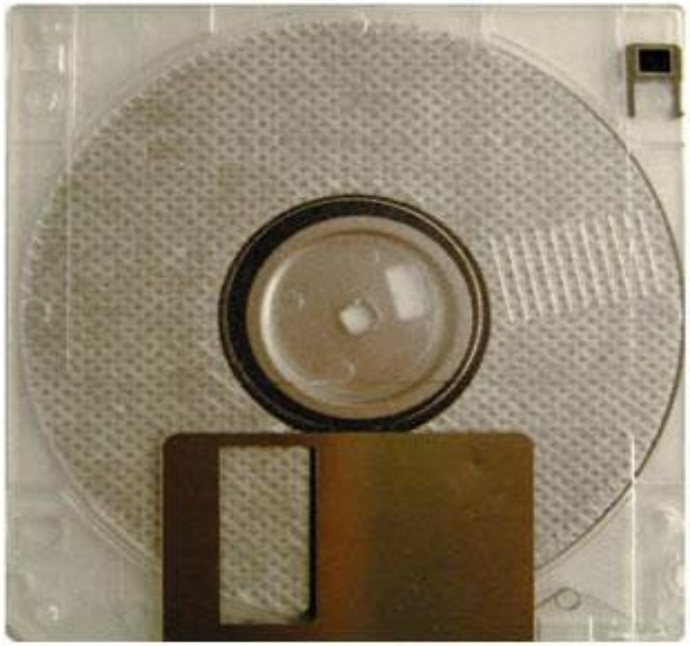
A floppy disk or floppy diskette (sometimes casually referred to as a floppy or diskette) is a type of disk storage composed of a thin and flexible disk of a magnetic storage medium in a square or nearly square plastic enclosure lined with a fabric that removes dust particles from the spinning disk. Floppy disks are read from and written to by a floppy disk drive (FDD).

Alternatively referred to as a floppy or floppy disk, a floppy diskette is a type of storage media capable of storing electronic data, like a computer file. The floppy diskette was first created in 1967 by IBM as an alternative to buying hard drives, which were extremely expensive at the time.

Floppy Disk…

The picture shown on this page is an example of a 3.5" floppy diskette, one of the most commonly used floppy diskettes, capable of storing 1.44 MB of data. To read and write to this diskette it would be inserted into a floppy drive.

Floppy Diskette



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Floppy Disk…

Figure: 8-inch, 5 1⁄4-inch, and 3 1⁄2-inch floppy disks

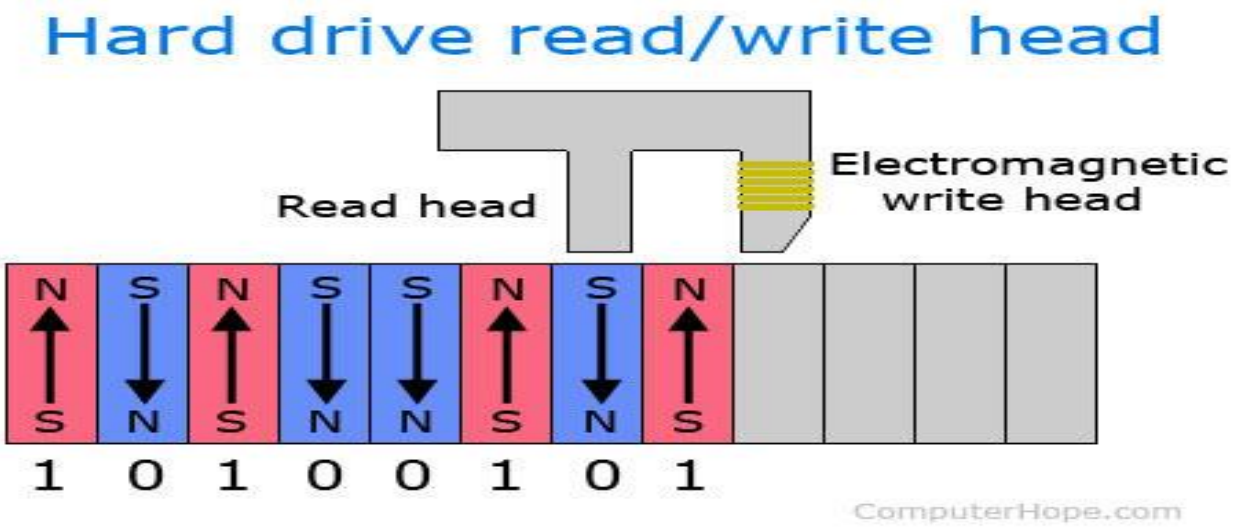
How were Floppy Disk used?

Early computers did not have CD-ROM drives or USB, and floppy disks were the only way to install a new program onto a computer or backup your information. If the program was small (less than 1.44 MB for the 3.5" floppy disk), the program could be installed from one floppy disk. However, since most programs were larger than 1.44 MB, most programs required multiple floppy diskettes. For example, the diskette version of Windows 95 came on 13 DMF diskettes and had to be installed one disk at a time.

Floppy disks were also a common place for users to store and backup their files. For example, a word processing file could be copied to a floppy disk and opened on another computer or stored as a backup.

How were Floppy Disk used?

A floppy disk is a magnetic media and stores and reads data on the floppy disk using a read head. When a 3.5" floppy diskette is inserted into the drive, the metal slide door is opened and exposes the magnetic disk in the floppy diskette. The read/write head uses a magnetic polarity of 0 or 1. Reading this as binary data, the computer can understand what the data is on the platter. For the computer to write information to the platter, the read/write head aligns the magnetic polarities, writing 0's and 1's that can be read later.



Floppy Disk Controller(IC 8272)

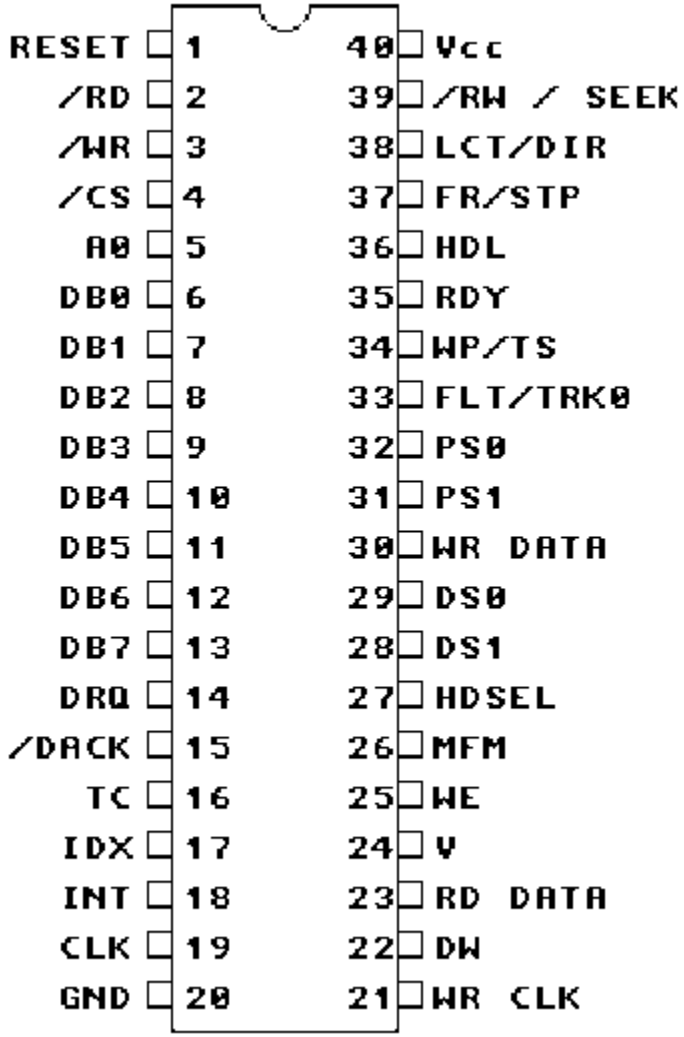
A floppy-disk controller (FDC) is a special-purpose chip and associated disk controller circuitry that directs and controls reading from and writing to a computer's floppy disk drive (FDD).

The 8272 is a LSI Floppy Disk Controller (FDC) Chip, which contains the circuitry and control functions for interfacing a processor to 4 Floppy Disk Drives. It is capable of supporting either IBM 3740 single density format (FM), or IBM System 34 Double Density format (MFM) including double sided recording. The 8272 provides control signals which simplify the design of an external phase locked loop, and write pre-compensation circuitry. The FDC simplifies and handles most of the burdens associated with implementing a Floppy Disk Drive Interface.

Floppy Disk Controller(IC 8272)…

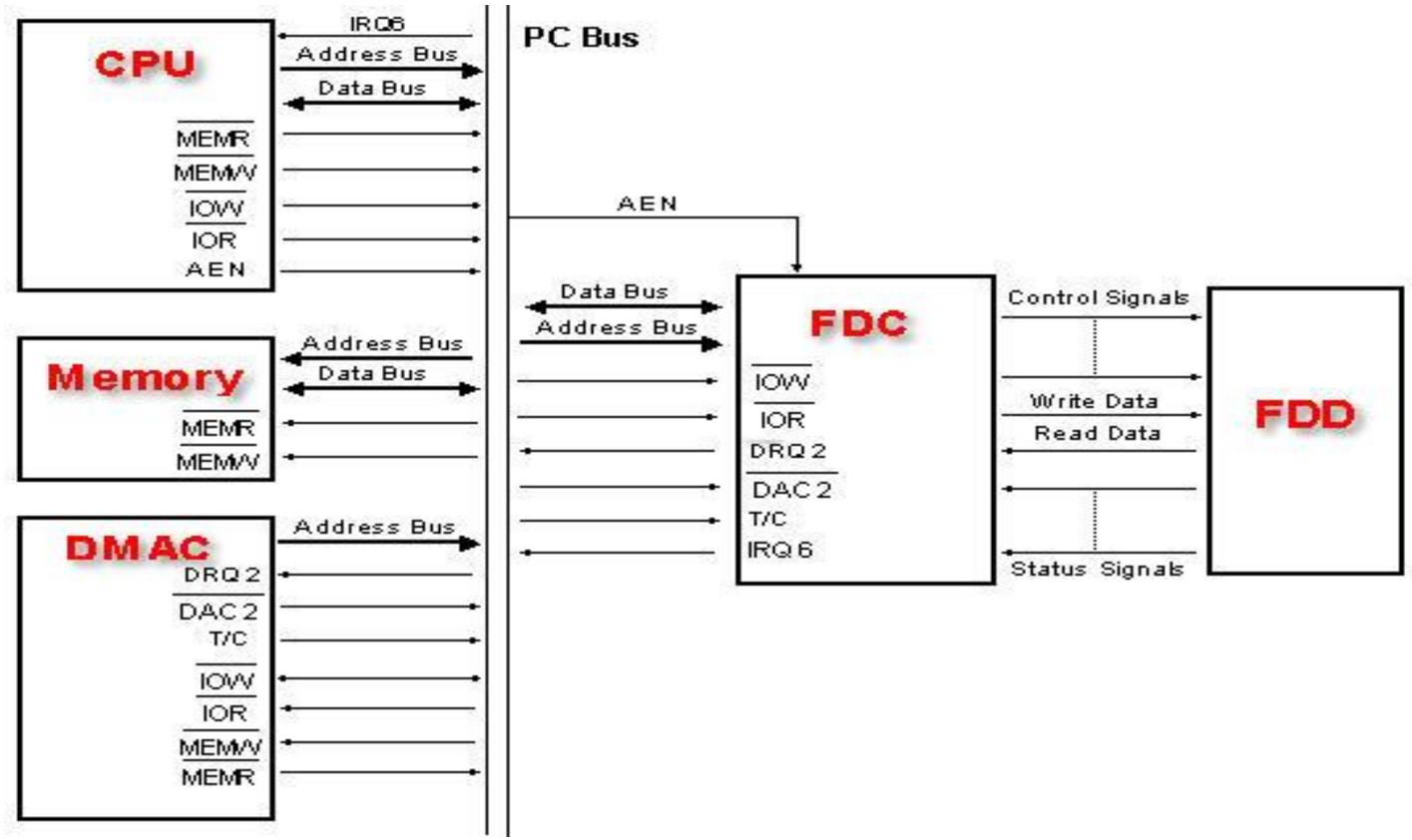
Floppy Disk Controller(IC 8272)…

PIN CONFIGURATION



Floppy Disk Controller(IC 8272)…

Block diagram showing FDC communication with the CPU and the FDD.



Magnetic Hard Disk

A magnetic disk is a storage device that uses a magnetization process to write, rewrite and access data. It is covered with a magnetic coating and stores data in the form of tracks, spots and sectors. Hard disks, zip disks and floppy disks are common examples of magnetic disks.

Magnetic storage or magnetic recording is the storage of data on a magnetized medium. Magnetic storage uses different patterns of magnetization in a magnetizable material to store data and is a form of non-volatile memory. The information is accessed using one or more read/write heads.

Magnetic Hard Disk…

Magnetic Hard Disk…

Magnetic storage media, primarily hard disks, are widely used to store computer data as well as audio and video signals. In the field of computing, the term magnetic storage is preferred and in the field of audio and video production, the term magnetic recording is more commonly used. The distinction is less technical and more a matter of preference. Other examples of magnetic storage media include floppy disks, magnetic recording tape, and magnetic stripes on credit cards.

Magnetic Hard Disk Controller

A hard disk controller (HDC) is an electrical component within a computer hard disk that enables the processor or CPU to access, read, write, delete and modify data to and from the hard disk. Essentially, an HDC allows the computer or its processor to control the hard disk.

A hard disk controller's primary function is to translate the instructions received from the computer into something that can be understood by the hard disk and vice versa. It consists of an expansion board and its related circuitry, which is usually attached directly to the backside of the hard disk.

Magnetic Hard Disk Controller

The instructions from a computer flow through the hard disk adapter, into the hard disk interface and then onto the HDC, which sends commands to the hard disk for performing that particular operation.

Typically, the type and functions of a hard disk controller depend on the type of interface being used by the computer to access the hard disk. For example, an IDE hard disk controller is used for IDE interface based hard disks.

Compact Disk

Compact disc (CD) is a digital optical disc data storage format that was co-developed by Philips and Sony and released in 1982. The format was originally developed to store and play only digital audio recordings (CD-DA) but was later adapted for storage of data (CD-ROM). Several other formats were further derived from these, including write-once audio and data storage (CD-R), rewritable media (CD-RW), Video CD (VCD), Super Video CD (SVCD), Photo CD, Picture CD, Compact Disc-Interactive (CD-i), and Enhanced Music CD. The first commercially available audio CD player, the Sony CDP-101, was released October 1982 in Japan.

Compact Disk

Compact Disk Layers

CD has normally 5 layers. They are stated below-

- A polycarbonate disc layer has the data encoded by using bumps.
- A shiny layer reflects the laser.
- A layer of lacquer protects the shiny layer.
- Artwork is screen printed on the top of the disc.
- A laser beam reads the CD and is reflected to a sensor, which converts it into electronic data

Compact Disk Layers

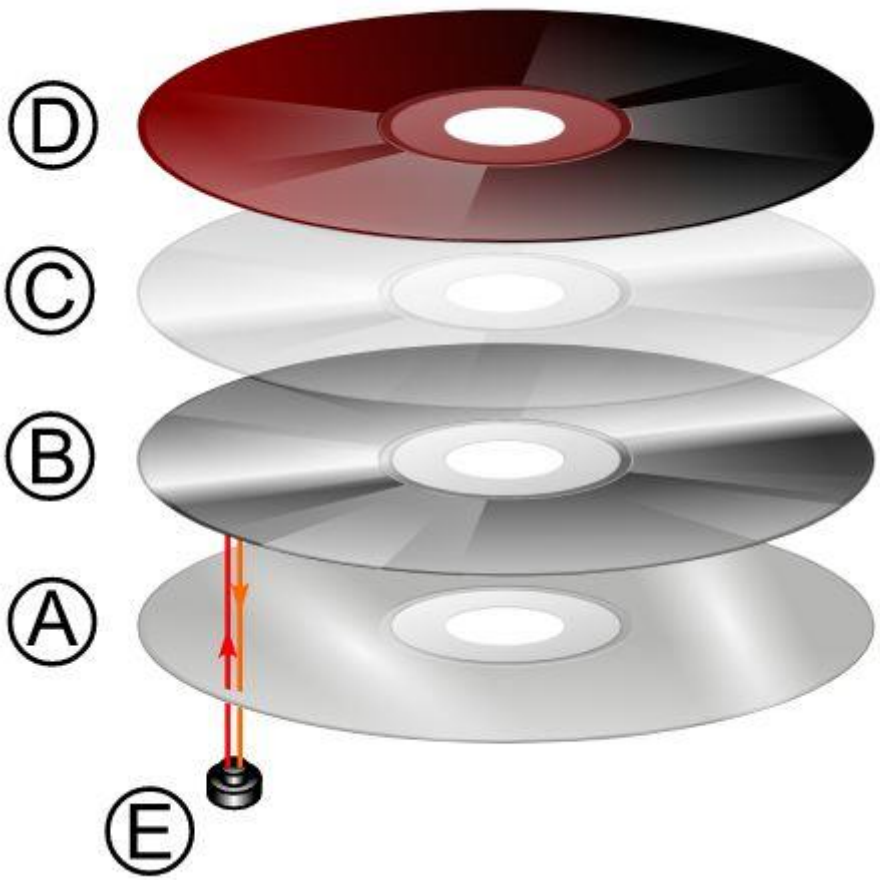


Figure: Diagram of CD layers

Compact Disk

What is a CD used for in a computer?

As we mentioned above, compact discs store data to be retrieved or executed at a later date. CDs can store software programs to install onto your computer. They save files for backup or transfer to another computer, and hold music to play in a CD player.

How much data does a CD hold?

The standard CD is capable of holding 72 minutes of music or 650 MB of data. An 80 minute CD is capable of holding 700 MB of data.

Compact Disk

What came before a CD?

There were several types of storage media released before a CD. However, the most common storage media used before the introduction of the CD was the 3.5" floppy diskette.

What came after a CD?

Several years after the CD was first introduced in the 1980s there were other methods of storing and retrieving data. However, the most common replacement for the CD today is DVD and Blu-ray discs. For larger storage, jump drives are also a popular replacement to the CD.

Magnetic Tape Data Storage

Magnetic tape data storage is a system for storing digital information on magnetic tape using digital recording.

Tape was an important medium for primary data storage in early computers, typically using large open reels of 9-Track tape. Modern magnetic tape is most commonly packaged in cartridges and cassettes, such as the widely supported Linear Tape-Open (LTO) and IBM 3592 series. The device that performs the writing or reading of data is called a tape drive. Autoloaders and tape libraries are often used to automate cartridge handling and exchange.

Magnetic Tape Data Storage

Tape data storage is now used more for system backup, data archive and data exchange. The low cost of tape has kept it viable for long-term storage and archive.

Magnetic Tape Data Storage

While tape can't compete with other storage media in terms of random access, there are still industries in which magnetic tape storage is a valuable storage technology.

- Many motion picture production companies record their footage on tape after experiencing costly failures with both hard disk and flash.
- Scientific experiments that produce mass quantities of data in a few microseconds leverage tape's capacity and write speeds.

Magnetic Tape Data Storage

The oil and gas industry has used tape for years to capture, transport and store valuable data. Because oil exploration occurs outside the data center, tape is a good medium to transport data back from the field.

Tape is often paired with object storage to address the need for lower-latency file access. Sometimes, it is entirely replaced by object storage.

Magnetic Tape Data Storage

Figure: An LTO-8 tape drive and LTO-8 tape media

Thank you