

OPTICAL STORAGE II



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

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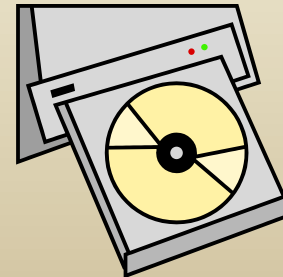
Optical discs can store data at much higher densities than magnetic disks. They are therefore ideal for multimedia applications where images, animation and sound occupy a lot of disc space. Optical discs are not affected by magnetic fields, meaning that they are secure and stable and can be transported through airport metal detectors without damaging the data. However, optical drives are slower than hard drives.



CDs and DVDs



At first sight, a DVD is similar to a CD. Both discs are 120 mm in diameter and 1,2 mm thick. They also both use a laser beam to read data. However, they are very different in internal structure and data capacity. In a DVD, the tracks are very close together, thus allowing more tracks. The pits in which data is stored are also smaller, so there are more pits per track. As a result, a CD can hold 650 – 700 MB, whereas a basic DVD can hold 4,7 GB. A DVD can be double-sided and dual layer, with a capacity of 17 GB.

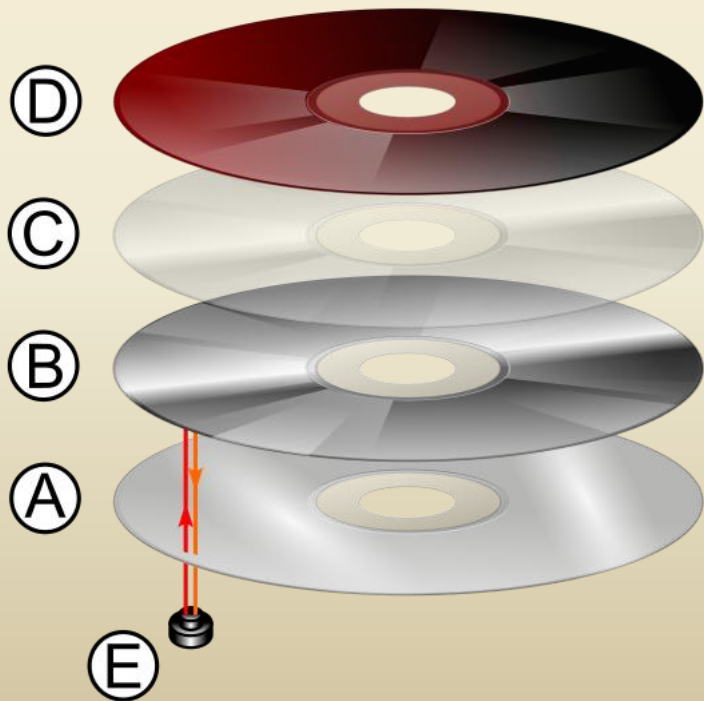


Different formats of CDs

- **CD-ROMs** (read only memory) are read-only units, meaning you cannot change the data stored on them (for example, a dictionary or a game).
- **CD-R** (recordable) discs are write-once devices which let you duplicate music CDs and other data CDs.
- **CD-RW** (rewritable) discs enable you to write onto them many times, just like a hard disk.

A Compact Disc

A CD is made from 1.2 mm thick, almost-pure polycarbonate plastic and weighs 15 – 20 grams. A thin layer of aluminium, or more rarely, gold is applied to the surface making it reflective. The metal is protected by a film of lacquer, the label is printed on the lacquer layer.



A. A polycarbonate disc layer has the data encoded by using bumps.

B. A shiny layer reflects the laser.

C. A layer of lacquer helps keep the shiny layer shiny.

D. Artwork is screen printed on the top of the disc.

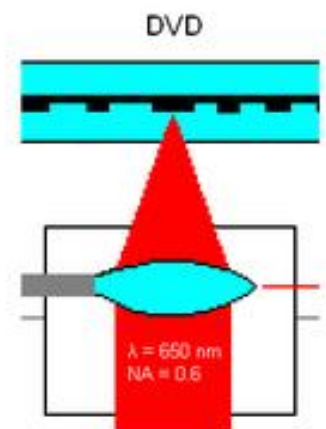
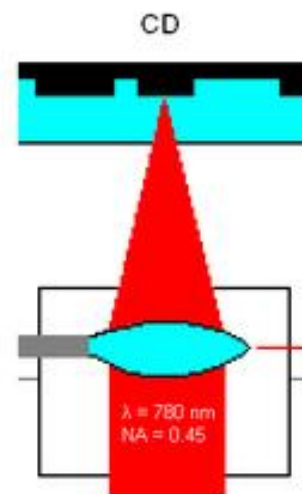
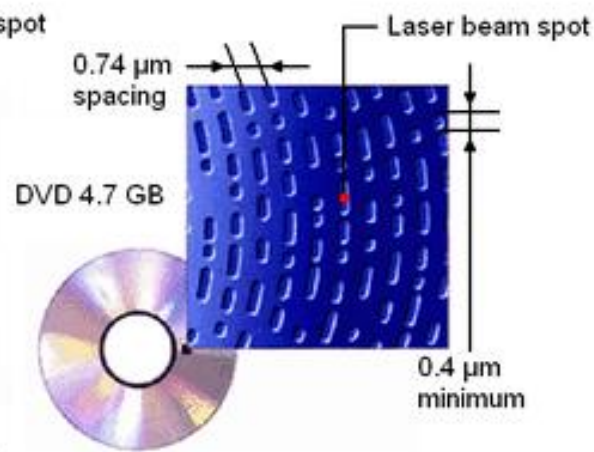
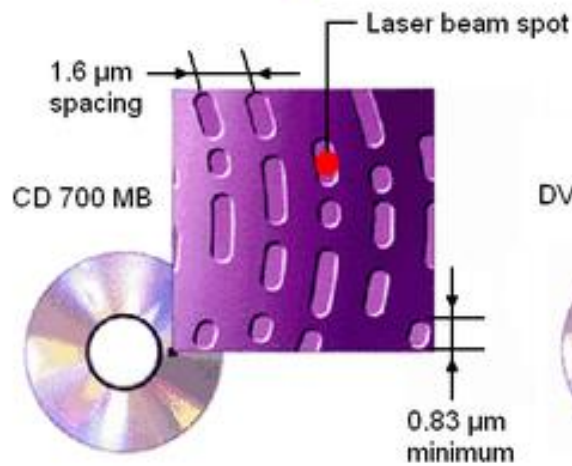
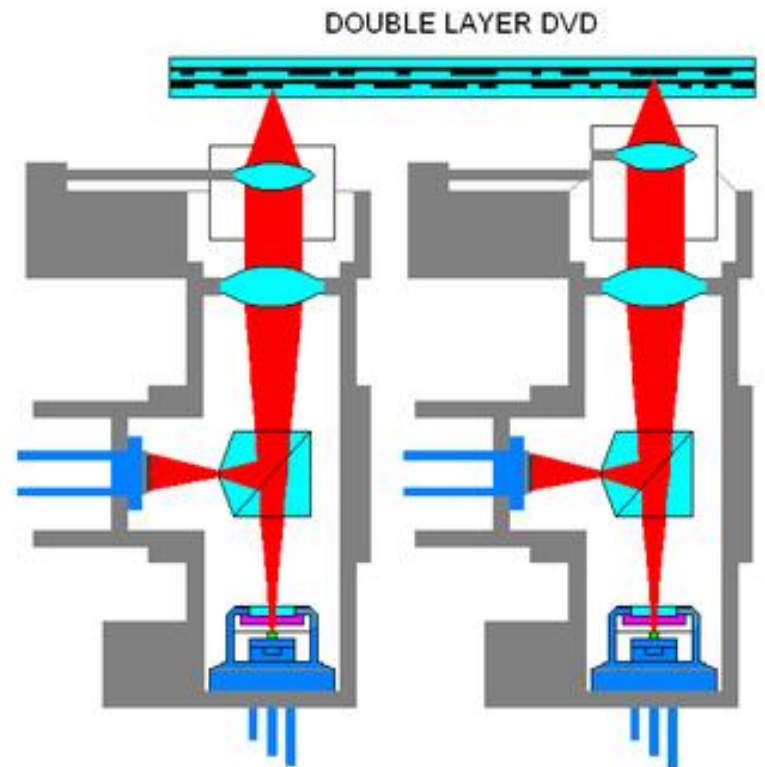
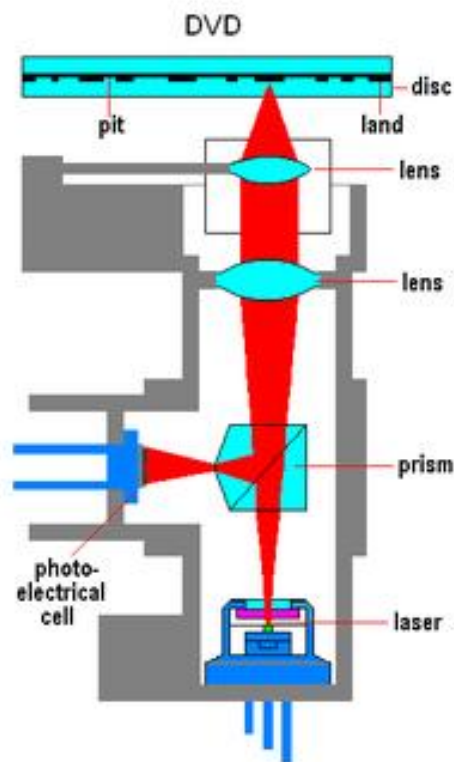
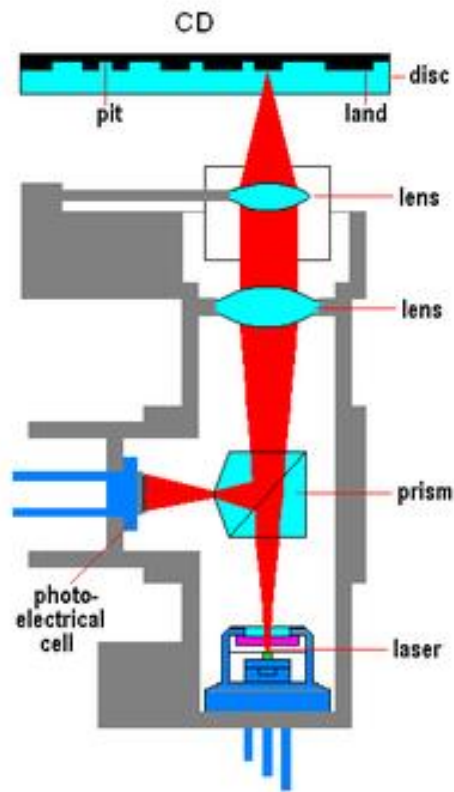
E. A laser beam reads the CD and is reflected back to a sensor, which converts it into electronic data

- CD data are stored as a series of tiny indentations known as pits, encoded in a spiral track molded into the top of the polycarbonate layer. The areas between pits are known as lands. A CD is read by focusing a 780 nm wavelength semiconductor laser through the bottom of the polycarbonate layer. The change in height between pits and lands results in a difference in intensity in the light reflected. By measuring the intensity change with a photodiode, the data can be read from the disc.
- The pits and lands themselves do not directly represent the zeros and ones of binary data. Instead, a change from pit to land or land to pit indicates a one, while no change indicates a series of zeros.

DVD FORMATS

- **DVD-ROMs** are used in DVD computer drives. They allow for data archiving as well as interactive content, for example, an encyclopaedia or a movie.
- **DVD-R** or **DVD+R** can only be recorded on once
- **DVD-RW** or **DVD+RW** discs can be erased and reused many times. They are used to back up data files and to record audio and video.

- The DVD drive used in computers is also called a DVD burner because it records information by burning via a laser to a blank DVD disc. However a DVD recorder typically refers to a standalone unit which resembles a video cassette recorder. New DVD recorders can play all CD and DVD formats.
- There are also portable DVD players – handheld devices which let you watch movies or TV, play games and listen to music, wherever you are. They come with a built-in DVD drive and wide screen LCD display (16:9 format). They usually support multi-format playback – that is, they can play many file formats, including DVD-video, DivX, CD audio discs, MP3 music and JPEG images.



HD-DVD (high definition DVD), Blu-ray discs

- These two formats used to be competitors, however Blu-ray format is used much more nowadays. A Blu-ray disc has a capacity of 25GB (single layer), 50 GB (dual layer) and 100 GB (four layer). Unlike DVDs, which used a red laser to read and write data, Blu-ray uses a blue-violet laser, hence its name. Blu-ray discs can record and play back high-definition television and digital audio, as well as computer data.

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