

1. How It Works: The "Pit and Land" System

The surface of an optical disk is a long, spiral track (similar to a vinyl record but much tighter).³ Data is stored in binary (**0s and 1s**) using physical or chemical marks.⁴

- **Pits:** Microscopic bumps or indentations on the disk surface.⁵
- **Lands:** The flat areas between the pits.⁶
- **Reading:** A low-power laser shines on the spinning disk.⁷ When it hits a **Land**, the light reflects perfectly back to a sensor (interpreted as a **0**). When it hits a **Pit**, the light scatters or reflects differently (interpreted as a **1**).⁸

2. The Three Main Types

Optical disks are categorized by their storage capacity and the type of laser they use.

Type	Capacity (Single Layer)	Laser Color	Primary Use
CD (Compact Disc)	~700 MB	Infrared (Invisible)	Music, small software.
DVD (Digital Versatile Disc)	4.7 GB	Red	Standard movies, larger software.
Blu-ray ⁹	25 GB ¹⁰	Blue-Violet ¹¹	HD/4K Movies, modern video games. ¹²

Why does "Blue" store more?

A blue laser has a shorter wavelength than a red laser.¹³ Think of it like a sharper pencil—because the laser "point" is smaller, it can write much smaller pits closer together, allowing more data to fit on the same size disk.

3. Recording Formats

When buying blank disks, you will see suffixes like **-ROM**, **-R**, and **-RW**.¹⁴ These tell you how the data can be handled:

- **-ROM (Read-Only Memory):** These are "pressed" at a factory (like a movie or game you buy).¹⁵ You cannot change or delete the data on them.¹⁶
 - **-R (Recordable):** These are "Write Once" disks.¹⁷ You can "burn" data onto them once using your own computer, but you can never erase it.¹⁸
 - **-RW / -RE (Rewritable / Recordable Erasable):** These can be written to, erased, and rewritten many times (usually up to 1,000 times).¹⁹
-

4. Pros and Cons

Pros:

- **Durability:** Unlike magnetic tapes, they aren't affected by magnets.
- **Portability:** They are thin, light, and easy to mail.
- **Shelf Life:** High-quality disks can last decades if stored properly.

Cons:

- **Fragility:** They are very prone to scratches, which can block the laser from reading data.

- **Speed:** They are much slower than modern SSDs or USB flash drives.²⁰
- **Obsolescence:** Many modern laptops no longer include a disk drive.