Optical Drives
Digital Versatile Disc
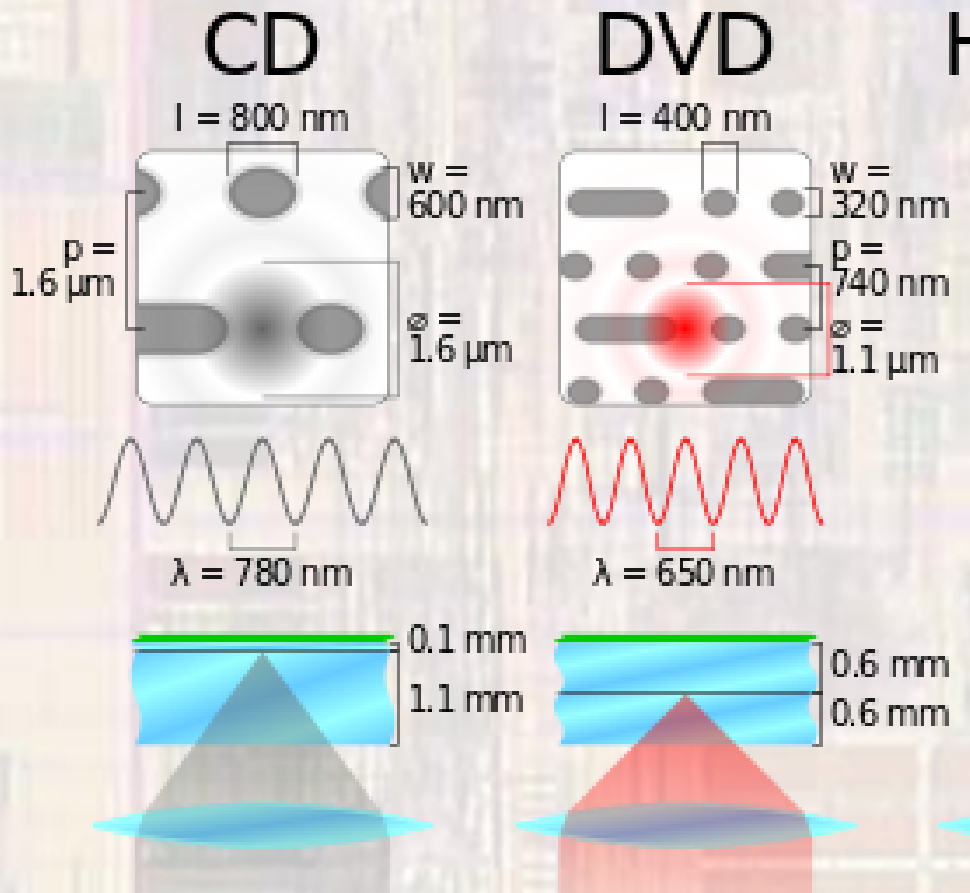
Last updated 2/15/24

Optical Disks - DVD

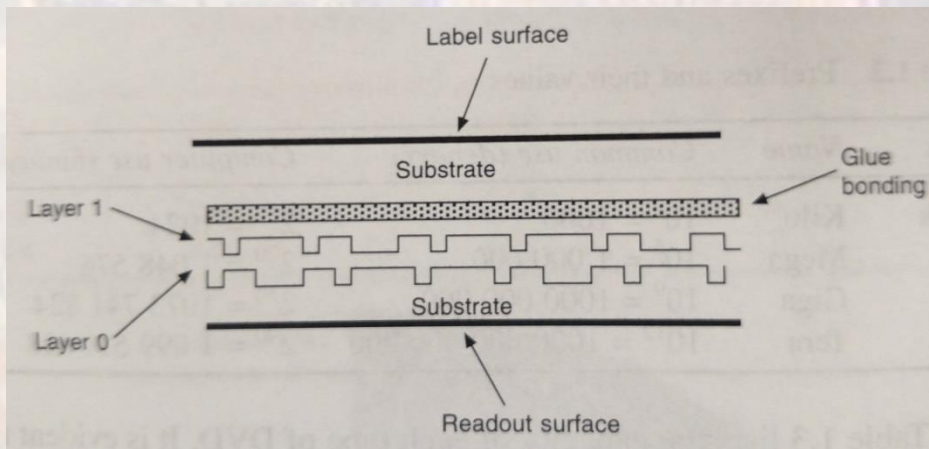- Overview

  - Digital Versatile Disk
  - Digital Video Disk
    - Similar to CD
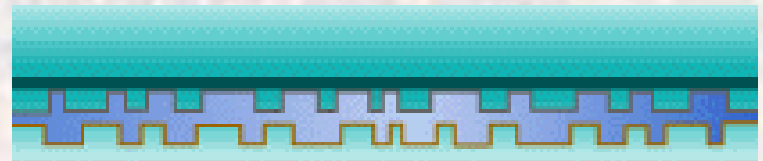   - Smaller Pit/Land, Pitch
    - 650nM Laser

Optical Disks - DVD

- Mechanical

  - Sandwich Construction
    - 2 thin disks bonded together
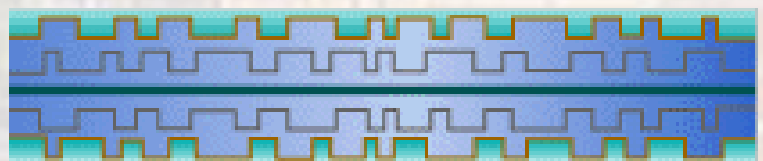   - Can have 2 layers / side

    - Outer layer must be transparent

Single-sided, single layer (4.7GB)

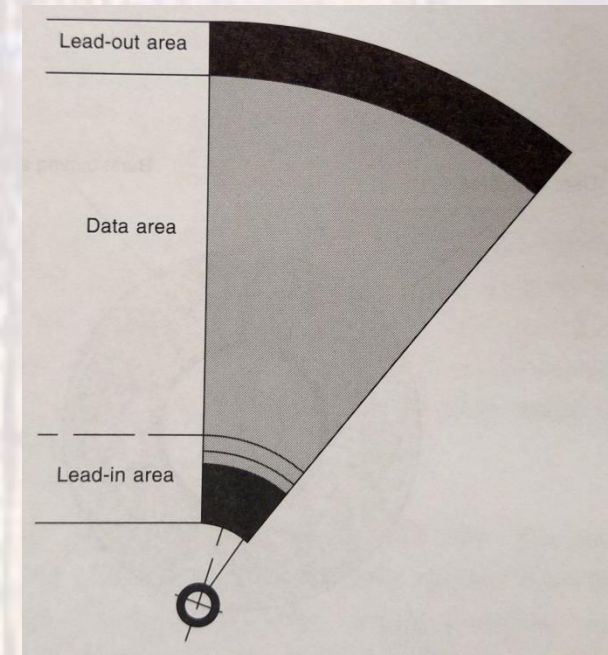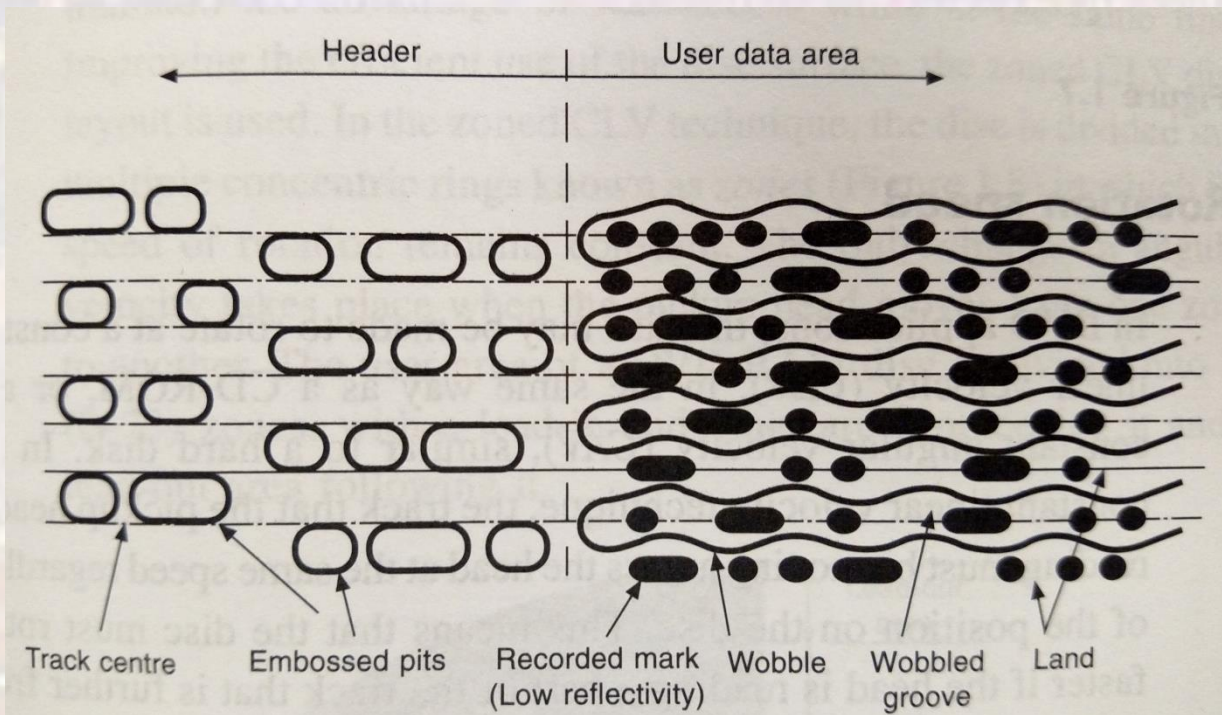**Single-sided, double layer (8.5GB)**

Double-sided, double layer (17GB)

©2000 How Stuff Works

Label surface

Substrate

Glue bonding

Layer 1

Substrate

Layer 0

Readout surface

Optical Disks - DVD

- Mechanical

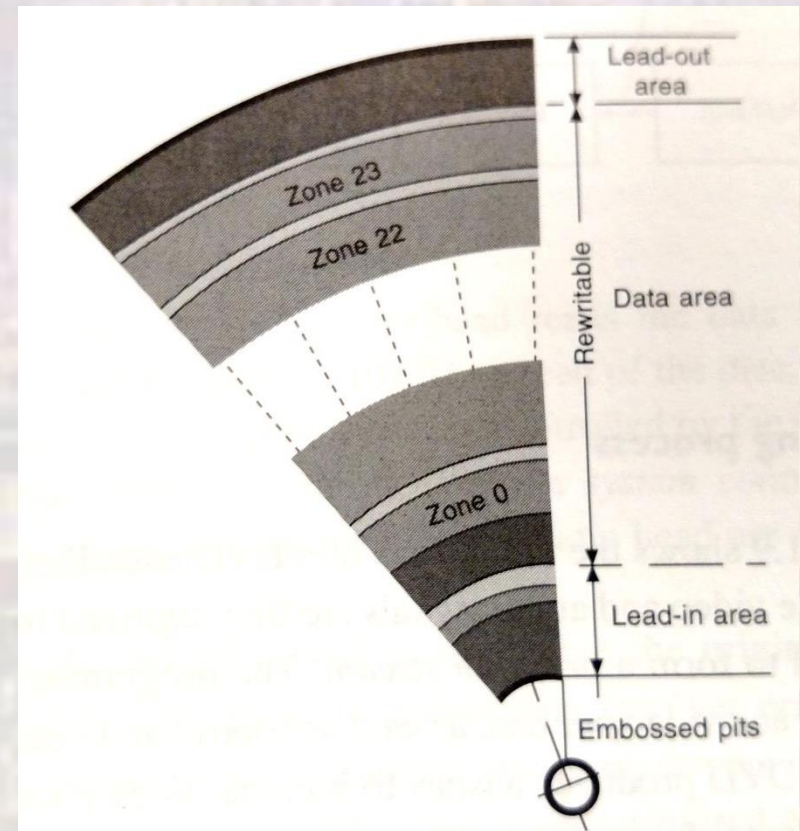 - Disk Construction

Optical Disks - DVD

- Mechanical

  - Rotation
    - CLV Constant linear Velocity
      - Sequential data – Movies
    - CAV Constant Angular Velocity
      - Fast access
      - Inefficient
    - Zoned CLV
      - CLV within zones

Optical Disks - DVD

- Data Framing

  - DVD Video
    - Video Stream
    - 8 types of Audio Streams
    - 32 types of Sub Picture Streams
    - PCI (Presentation Control Information) Stream
    - DSI (Data Search Information) Stream

    - 2K Byte data chunks in each stream (2048B)

    - Header and ECC added to make 2064 Bytes (PES packet)
      - Header includes location information

Optical Disks - DVD

- Data Framing

  - Forward Error Correction

    - Very powerful error detection and correction

    - Can correct a burst of up to 2800 Bytes (6mm linear damage)

    - Leads to a 2418 Byte Sector

Optical Disks - DVD

- Data Framing

  - NRZI and 8 to 16 encoding

    - EFM + (8-14 → 8-16)

    - Doubles the size of the sector

    - 4836 Bytes (Data Channel)

Optical Disks - DVD

- Data Framing

    - UDF – Universal Disk Format

        - Defines **data structures** such as volumes, file blocks, sectors, CRC's, paths, records, allocation tables, partitions, and character sets, as well as methods for recording, writing, and other applications.

Optical Disks - DVD

- R/RW

  - Same approach as CD-R/RW