Lecture 12

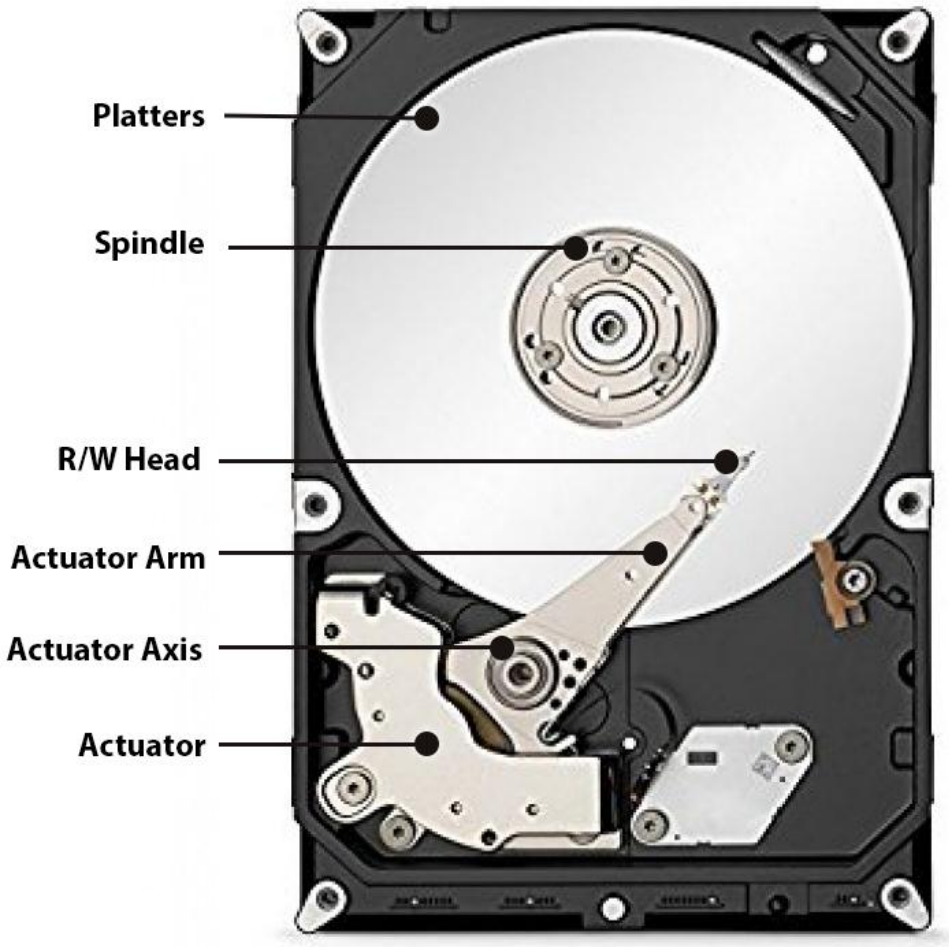
Computer and Information Technology

Part 2

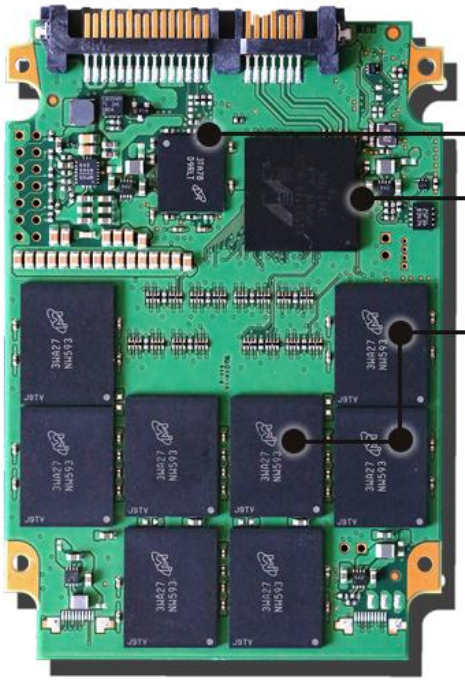
- Secondary Memory

Solid State Memory: Solid State Drive

HDD
3.5″



SSD
2.5″



Solid State Memory: Solid State Drive

Instead of magnetic coating disk or optical disk, Solid State Drive or just SSD are made from semiconductor IC (Integrated Circuit). Either NAND or NOR gate flash memory chips are used to store data bits and this technology is the result of chronological improvement of EEPROM technology.

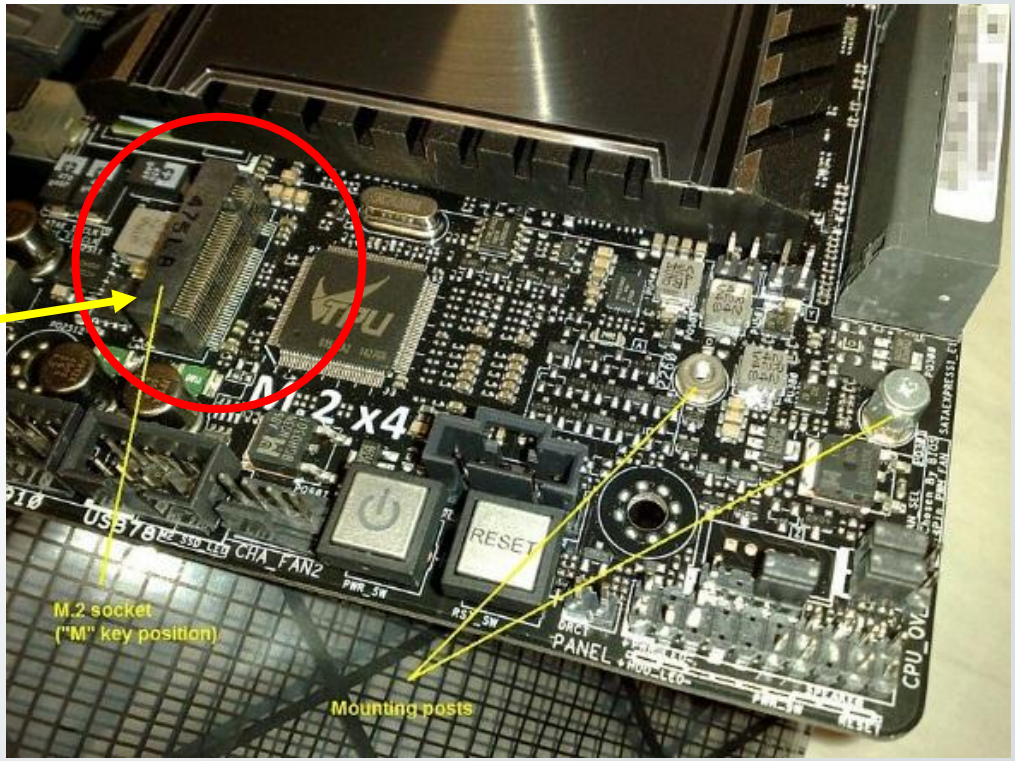
Features of SSD

- Comes in both 3.5” and 2.5” form factor and can replace regular HDD.
- Drop and shock proof.
- Requires no magnetic shielding.
- Low packing density and higher price compared to HDD.
- Faster read/write speed.
- Starts to lose data after prolonged inactivity.

Solid State Memory: Solid State Drive

M key NVMe M.2 SSD uses PCIe bus and can support upto 3.5GBps transfer speed

For past couple of years desktop and laptop computers are coming with a dedicated slot for M.2 SSDs. Without this slot, one has to use a PCIe adapter for installing M.2 SSD



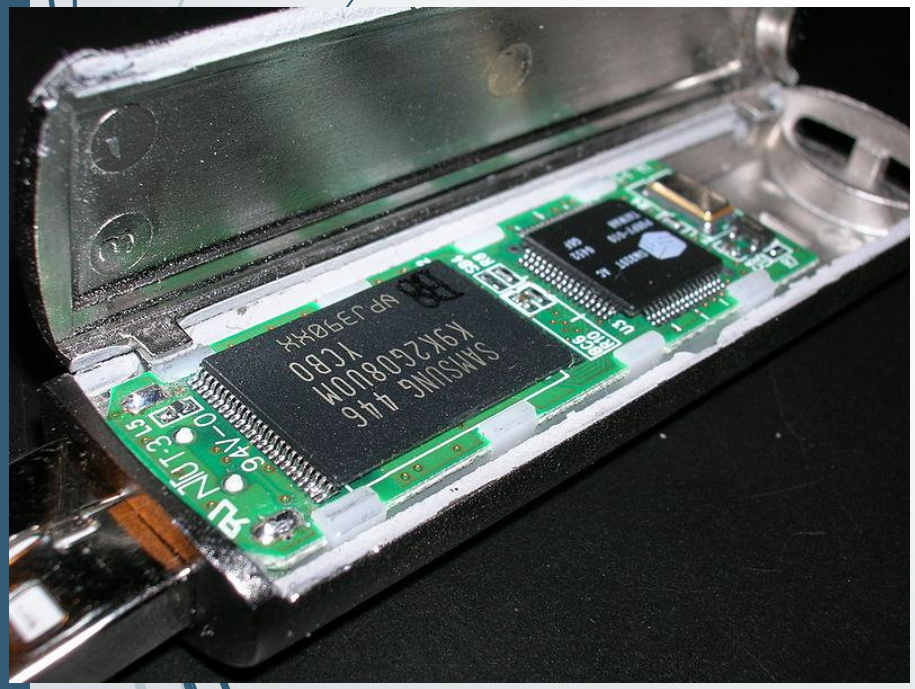
Solid State Memory: Memory Cards

Memory cards are mainly intended for portable devices like mobile phones, tabs, digital cameras, digital video recorders, voice recorders, TV, gaming consoles and electronic keyboards. Because of its lucrative price, very low power consumption and high packing density- memory cards are very popular now a days.

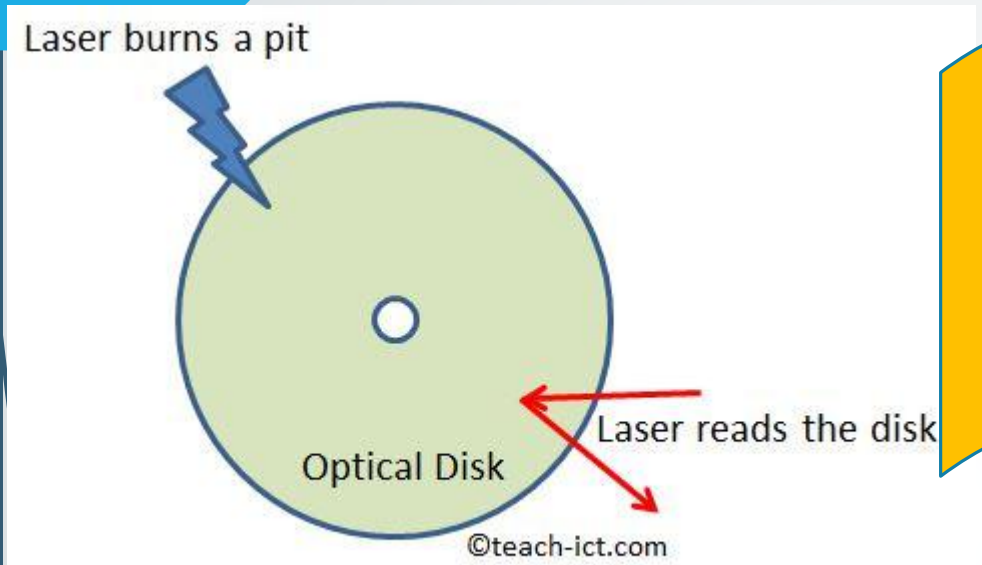
Memory Sticks are proprietary format of **SONY** and now almost obsolete

Solid State Memory: Pen/Thumb Drive

Pen drive or Thumb drive whatever we wish to call it is actually known as USB flash drive as it comes with a male USB port and flash memory chips. The USB male can be of USB-A shape for directly plugging it into a desktop or laptop computers. However, drives with micro USB-B ports can be plugged into portable devices (phones, cameras, etc.) that supports OTG (On the go) to transfer and store data.



Optical Disk: CD/DVD



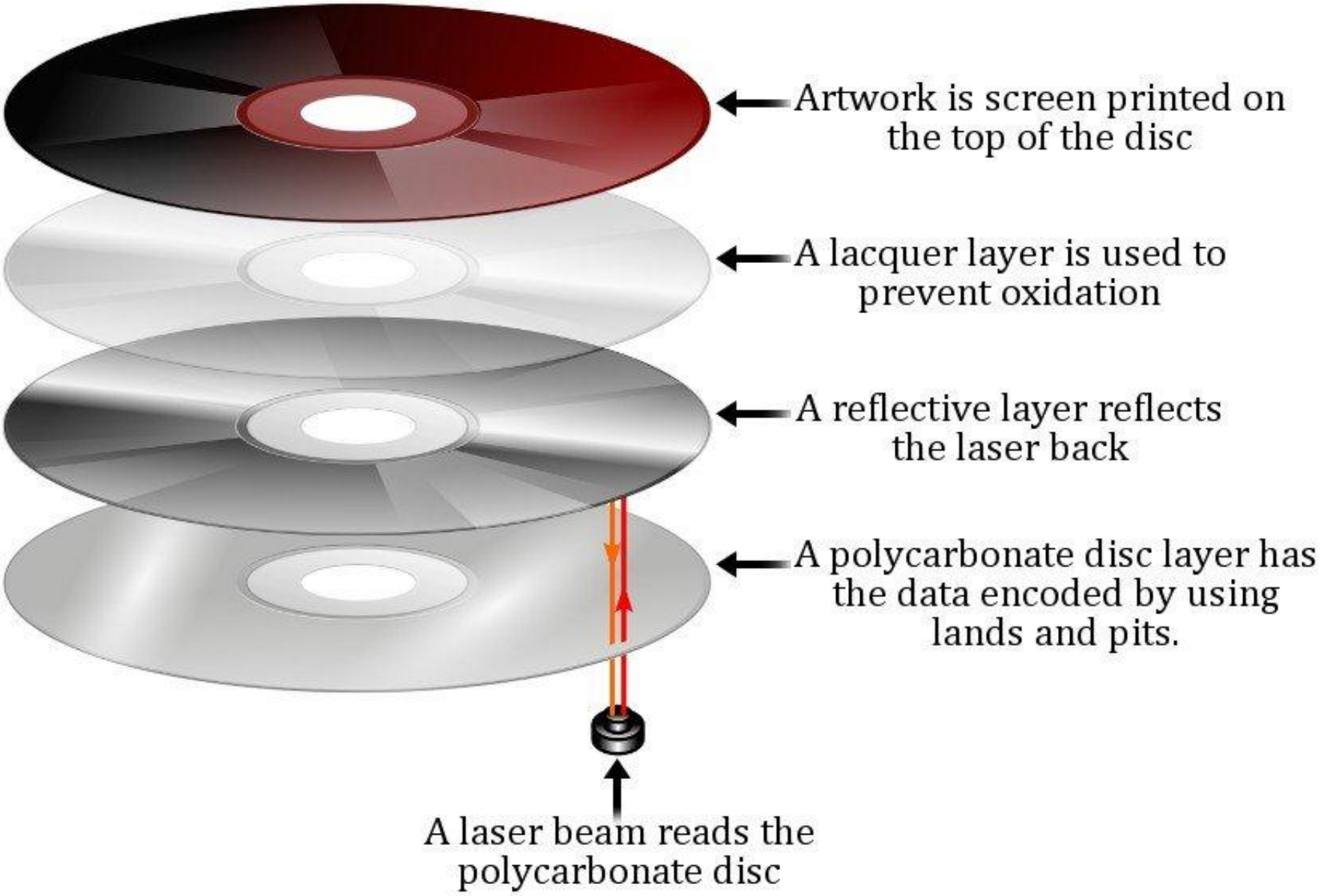
A high power LASER is used to write data on a CD/DVD but during read operation a low power LASER is used and sensor catches the reflection

CD (Compact Disk) and DVD (Digital Versatile Disk) are the two most popular disk type storage that uses optical technique to store and read digital data from a 120mm plastic disk.

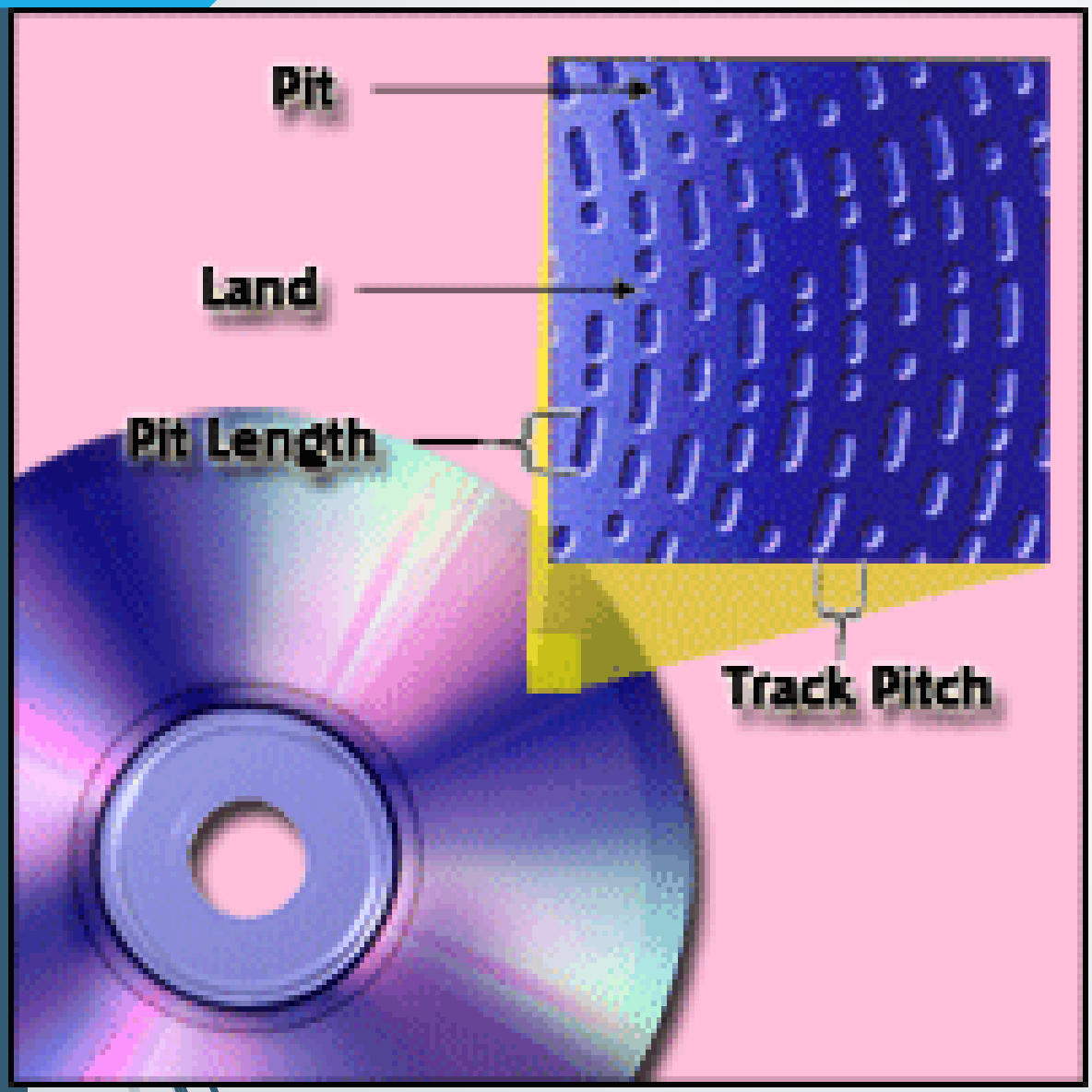
CDs can store up to 702MB whereas a double layer DVD can store up to 9.4GB data.

Their low cost nature make them suitable for the distribution of music, movies, application programs, device driver, etc.

Optical Disk: CD/DVD

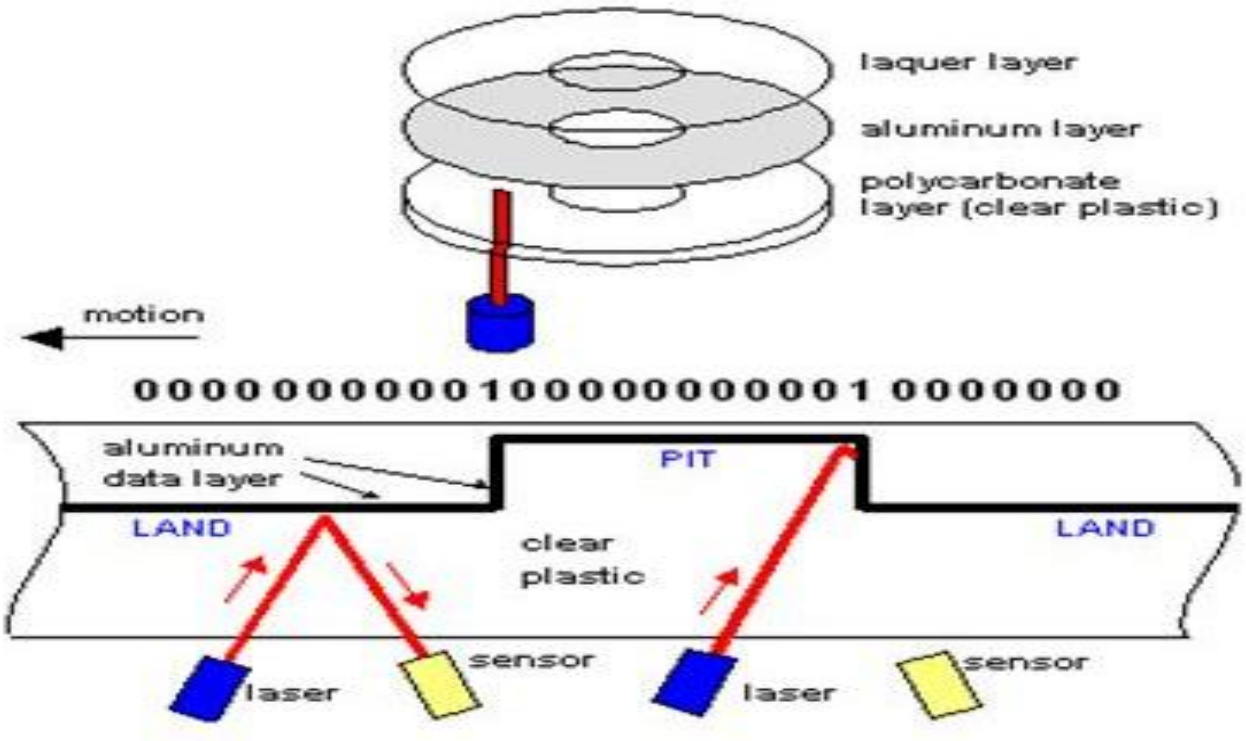


Optical Disk: CD/DVD



Only CD/DVD writer comes with the high power LASER that can create pits on the recording surface of an optical disk.
One time use CDs or DVDs are known as CD-ROM and DVD-ROM and only re-writable disks can be reused for very limited re-write cycles.

Optical Disk: CD/DVD



Reflection from lands & pits are translated to binary 1s & 0s

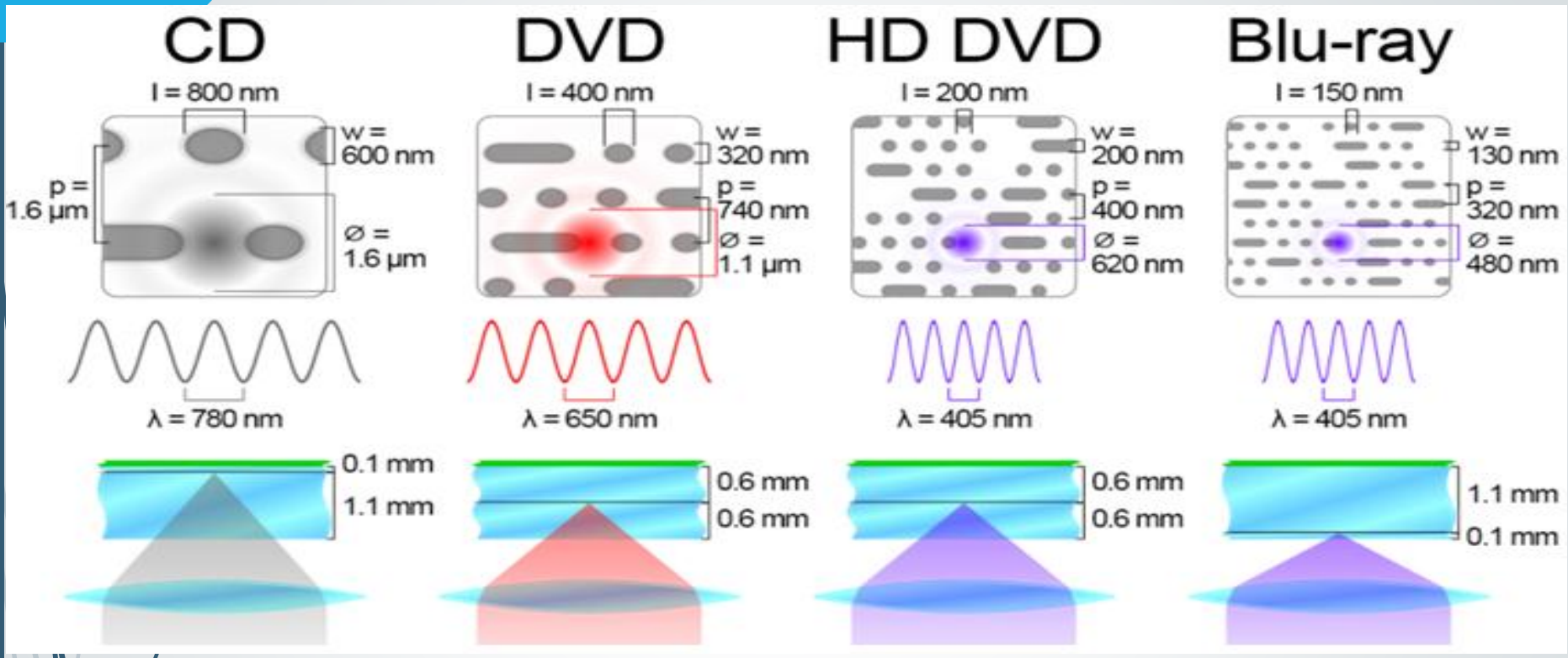
During read operation a LASER beam is projected on the disk and its reflection is detested in a sensor. Sensor detects reflection interrupts:

1. When the LASER falls into a pit from land &
2. When the LASER rises from a pit to land

These interrupts are encoded into 1s and rests are 0s.

Low quality flimsy optical disk is broken due high RPM of disk drive ruining both the disk and the drive.

Optical Disk: CD/DVD



Smaller pits and lands and narrower track pitch will allow us to write more 0s and 1s on an optical disk surface. But to detect narrower pitch, pits and land we will require shorter wave length. This is why a Blu-ray disk drive can read from any CD or DVD but a CD drive can't read from a DVD or Blu-ray disk.

Future of Secondary Storage

Punched Card

Stay Home, Stay Safe

Always put on a mask when you are in public!