Lecture 03

Introduction to the Personal computer- PIII

CT4005NI - Computer Hardware and Software Architectures

Lecture 03's Objectives

- Describe internal components.
- Describe the concept of RAID and its type.
- Concept of Secondary Storage Devices.
- Ports and cables
- Input & Output Devices

3.1 Internal Components : Storage Drives

RAID (Redundant Array of Independent Disk)

- RAID provides a way to store data across multiple hard disks for redundancy.
- To the operating system, RAID appears as one logical disk.
- Types: RAID (0-6), RAID 0/1.

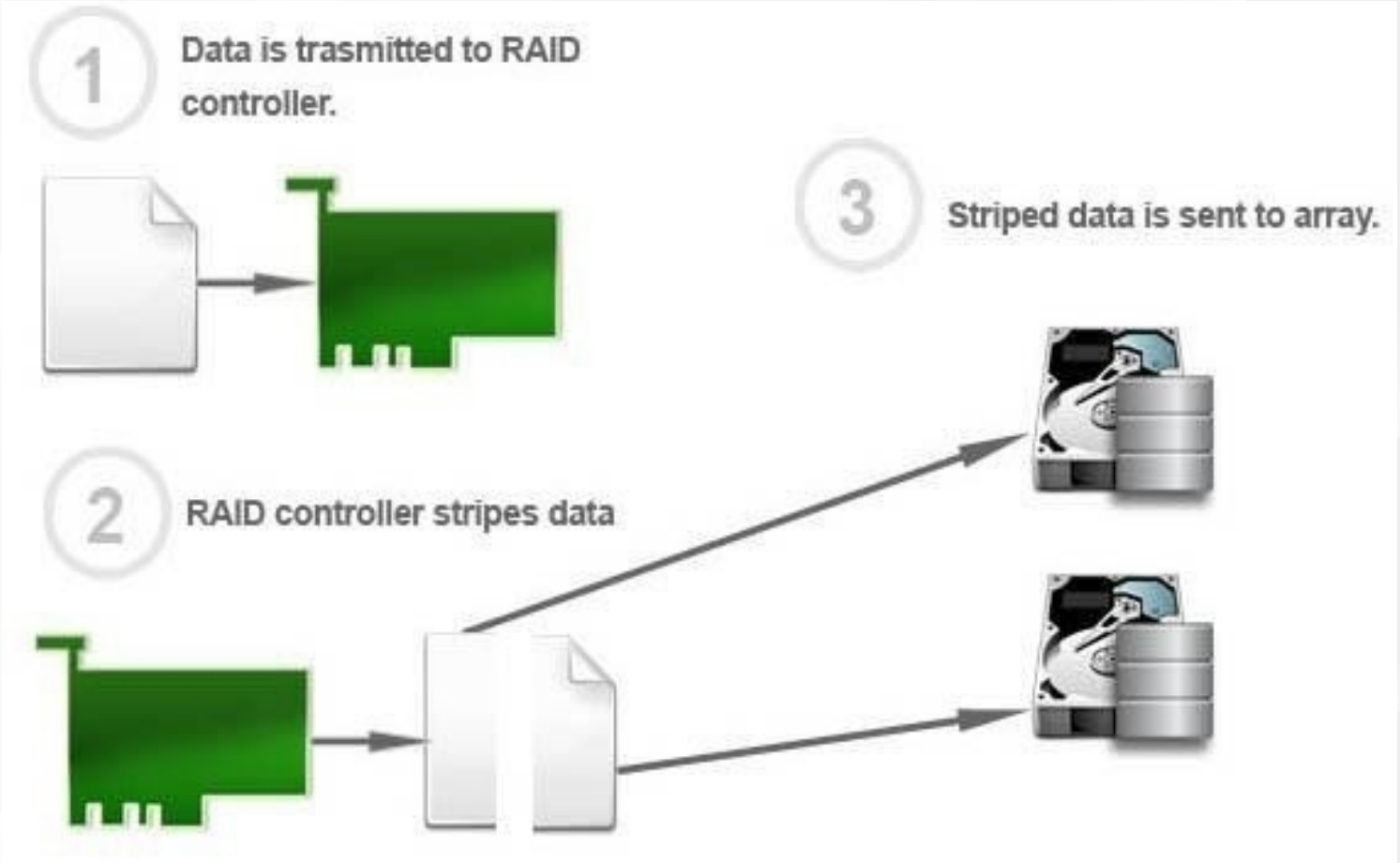
Terms Used in RAID

Striping - A method used to write data across multiple drives.

Mirroring - A method of storing duplicate data to a second drive.

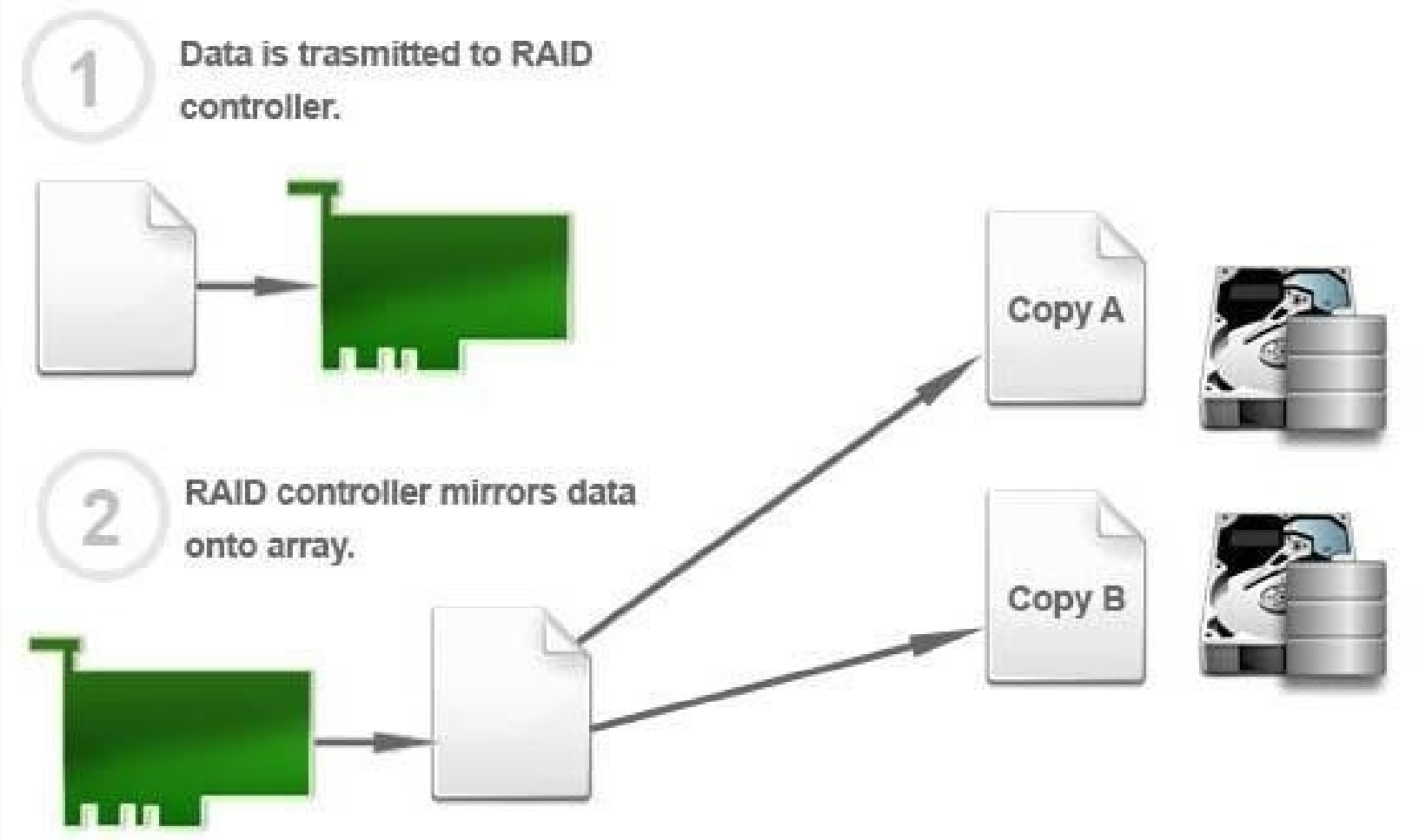
3.1 Storage drives : RAID 0

RAID 0 Array



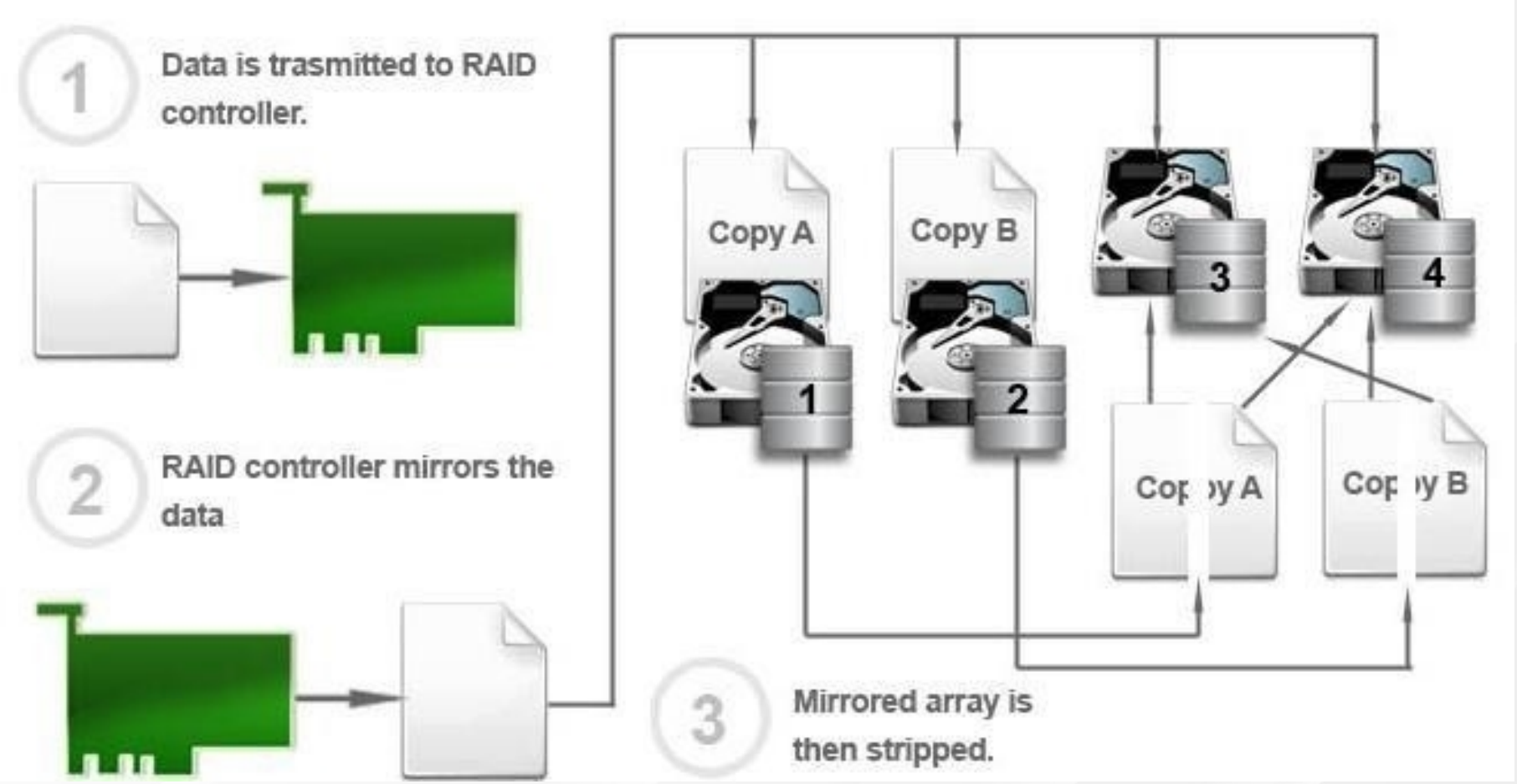
3.1 Storage drives : RAID 1

RAID 1
Array



3.1 Storage drives : RAID 10

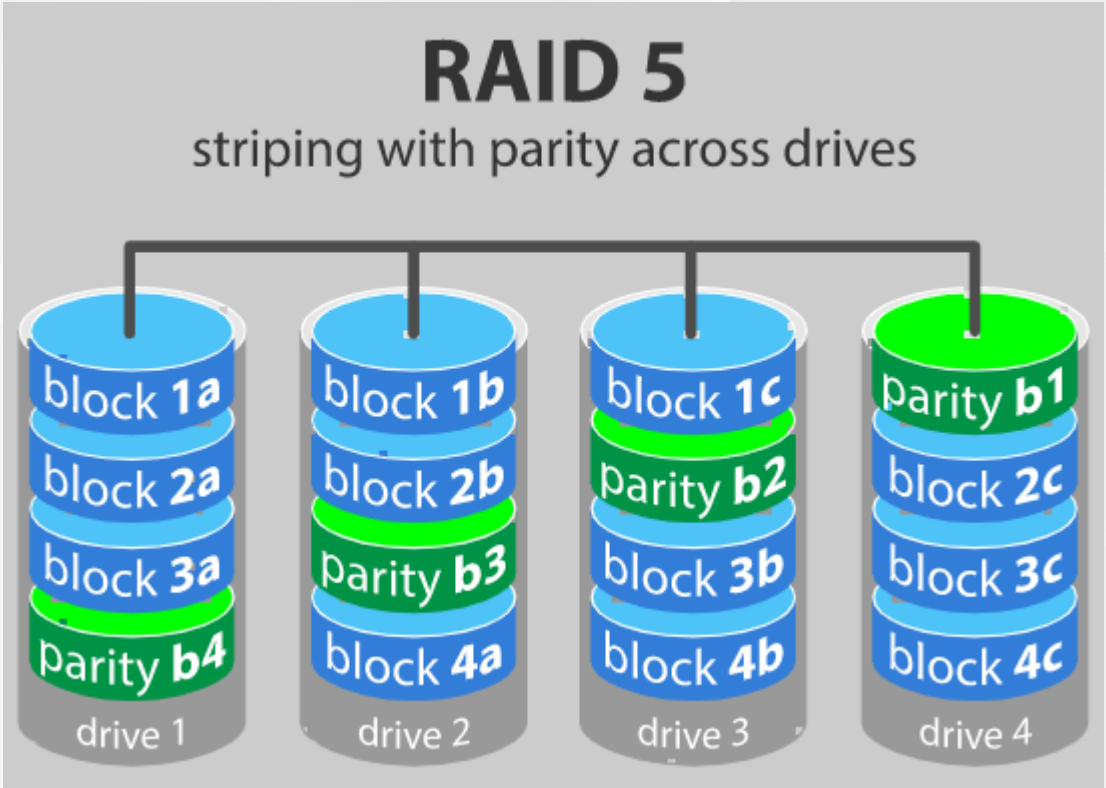
RAID 10 Array



3.1 Storage drives : RAID level 5 – Striping with parity

RAID 5 Array

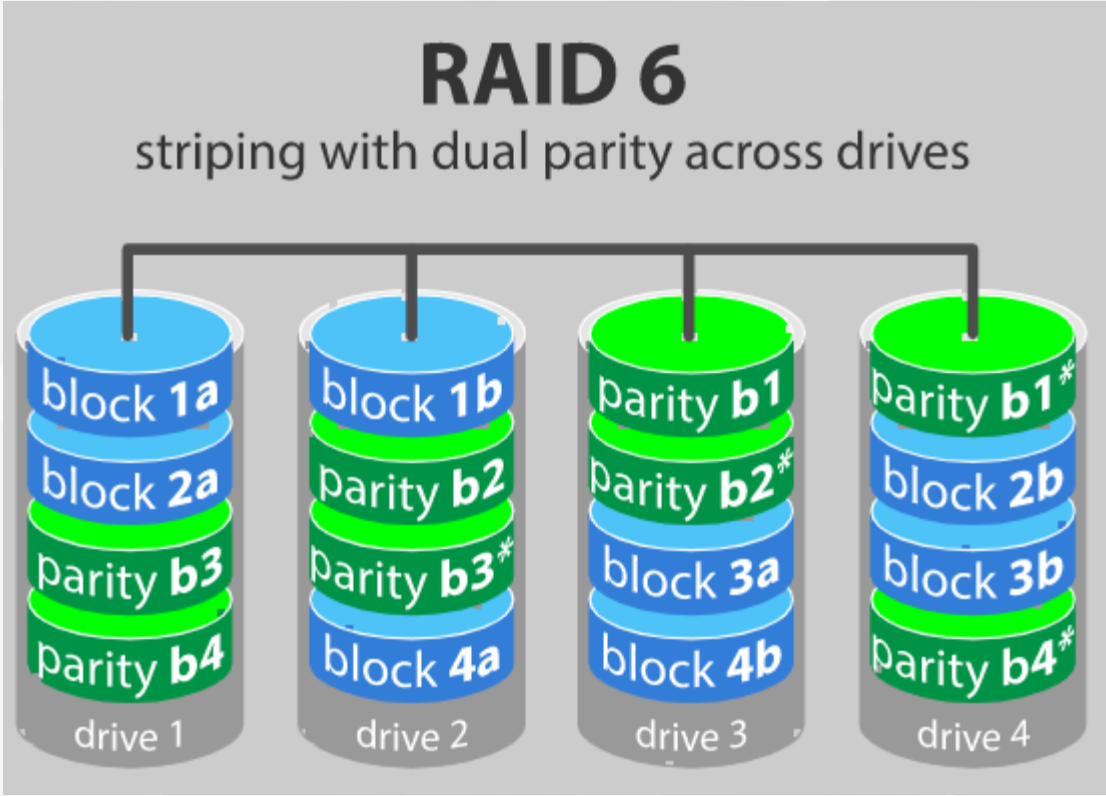
- Requires at least 3 drives but can work with up to 16
- Data blocks are striped across the drives
- Parity data: computer can recalculate the data of one of the other data blocks, should those data no longer be available
- Withstand a single drive failure without losing data or access to data



3.1 Storage drives : RAID level 6 - Striping with double parity

RAID 6 Array

- Like RAID 5, but the parity data are written to two drives
- Requires at least 4 drives and can withstand 2 drive's failure simultaneously



3.2 Storage drives : Optical Drive

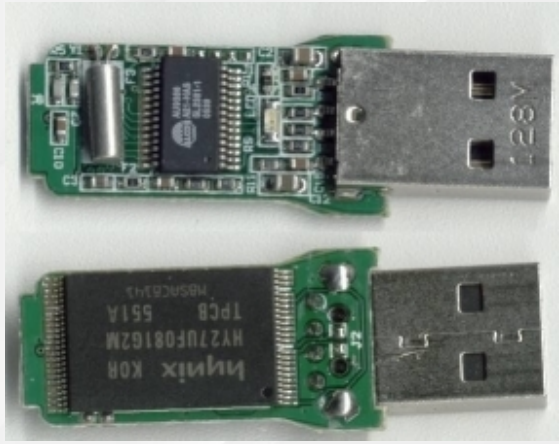
- An optical drive is a storage device that uses lasers to read data on the optical media.
- Types: CD (Compact Disc) (700 MB), DVD (Digital versatile Disc) (4.3 OR 8.5 GB), BD(Blu-ray Disc) (25 OR 50 GB).
- CD, DVD, and BD media can be pre-recorded (read-only), recordable (write once), or re- recordable (read and write multiple times).

Optical Media: DVD-ROM, DVD+/-R, DVD+/-RW (likewise for CD and BD)

3.3 Storage drives : External Flash Drive

- An external flash drive, also known as a thumb drive, is a removable storage device that connects to a USB port.

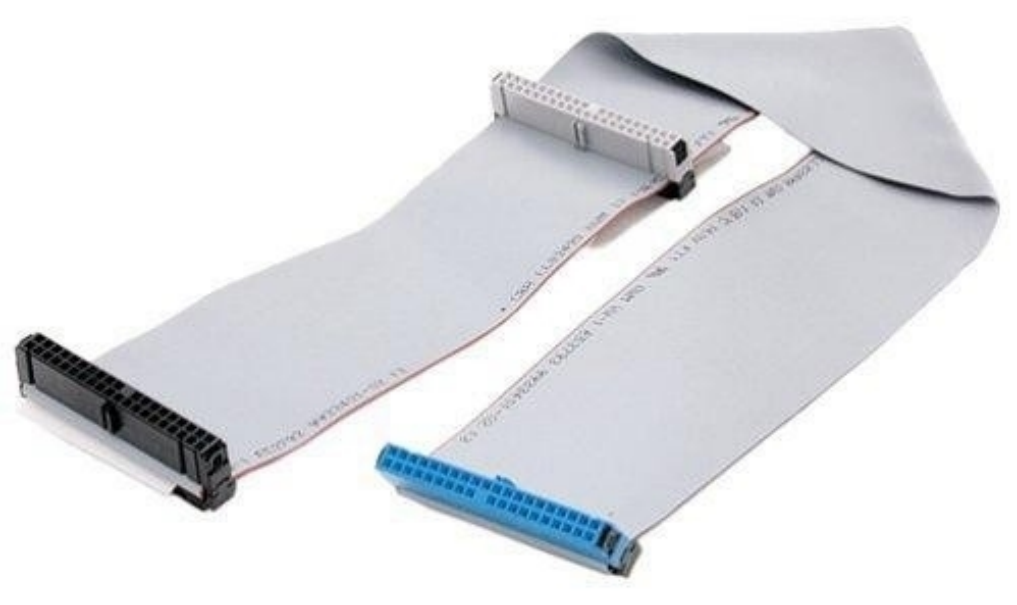
- It uses the same type of non-volatile memory chips as solid state drives and does not require power to maintain the data.



3.4 Internal Components : Drive Interfaces & Cables

3.4.1 Types of Drive Interfaces

- Used to interface storage devices to the motherboard.



IDE or PATA drive interface:

- 40 pins with 40 wires or 80 wires
- Speeds: 16MBps, 33MBps, 66MBps up to 133MBps
- Master and Slave configuration

3.4 Internal Components : Drive Interfaces & Cables

SATA drive interface:

- 7 pin data cable, 15 pin power cable
- Distinctive L shaped interface
- They are hot pluggable
- Speeds: 1.5Gbps, 3Gbps, 6Gbps and 16Gbps
- No master and slave configuration

SATA Data Cable

SATA Power Cable

3.5 Ports & Cables

- Input/output (I/O) ports on a computer connect peripheral devices, such as printers, scanners, and portable drives.

Serial (DB-9)

- Used to connect a serial device such as a modem and older peripheral devices.

Modem Ports (RJ11)

- In addition to the serial cable used to connect an external modem to a computer, a telephone cable is used to connect a modem to a telephone outlet. This cable uses an RJ-11 connector.

3.5 Ports & Cables

USB Ports and Cables

- The Universal Serial Bus (USB) is a standard interface that connects peripheral devices to a computer.
- It was originally designed to replace serial and parallel connections.

3.5 Ports & Cables

FireWire (IEEE 1394) Ports and Cables

- FireWire is a high-speed, hot-swappable interface that connects peripheral devices to a computer.

- Data rates can be supported up to supported up to 3.2 Gbps over a 100m distance.

3.5 Ports & Cables

Parallel Ports and Cables (DB-25)

- Parallel ports can transmit 8 bits of data at one time and is used to connect parallel device like printer.

DB-25 Male Connector

DB-25 Female Connector

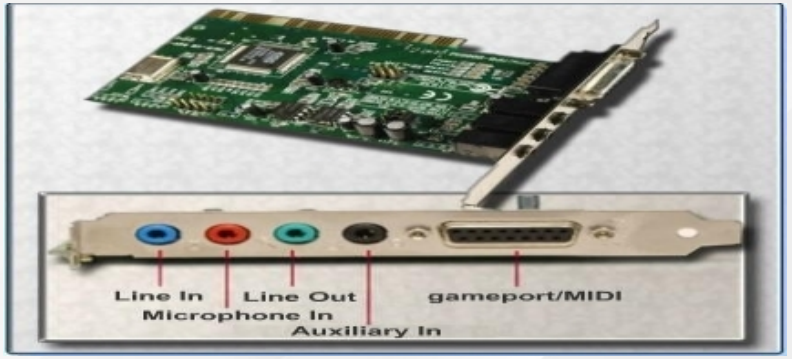
Network Ports and Cables (RJ45)

- A network port, also known as an RJ-45 port, connects a computer to a network.
- **Types:** Ethernet-10Mbps, Fast Ethernet- 100Mbps and Gigabit Ethernet-1000Mbps.

3.5 Ports & Cables

PS/2 Ports

- A PS/2 port connects a keyboard or a mouse to a computer.

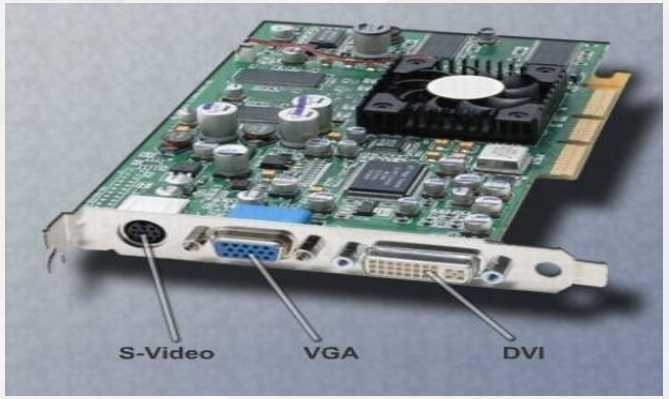


Audio Ports

- An audio port connects audio devices to the computer.

Video Ports and Connectors

- A vide port connects monitor cable to a computer.



3.6 Input Devices

- An input device is used to enter data or instructions into a computer.

Types:

- Mouse and keyboard
- Digital camera and digital video camera
- Biometric authentication device
- Touch screen
- Scanner

- A keyboard, video, mouse **(KVM) switch** is a hardware device that can be used to control more than one computer using a single keyboard, monitor, and mouse.

3.7 Output devices

- An output device is used to present information to the user from a computer.

Types:

- Monitors
- Projectors
- Scanners
- Printers
- Speakers

3.6 Output Device: Monitor

- Electronic device that outputs information in pictorial form.

Types:

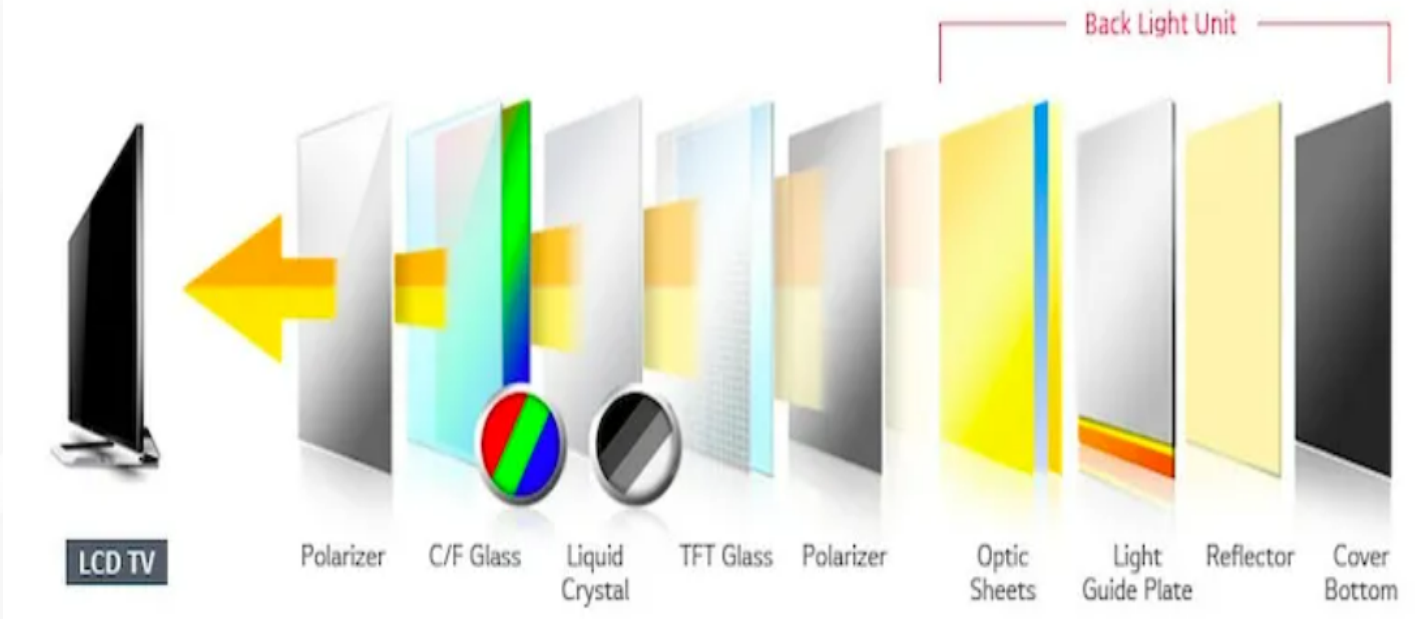
- Cathode-Ray Tube (CRT)
- Liquid Crystal Display (LCD)
- Light Emitting Diode (LED)

3.6.1 Monitor: Cathode-Ray Tube (CRT)

- Vacuum tube comprised of an electron gun at one end and a fluorescent screen at another end
- Capable of producing thousands of different colors and a resolution of up to 2048 x 1536 pixels, low refresh rates (approximated 60 Hz)
- They emit a very small amount of X-ray radiation
- Their illumination levels can strain the eyes and reduce visual acuity

3.6.2 Monitor: Liquid Crystal Display (LCD)

- LCD surpassed the picture quality of CRTs
- LCD uses the light-modulating characteristics of liquid crystals
- They cannot produce light on their own: liquid crystals use a reflector or backlight to generate images in monochrome or color
- Low response time and loss of contrast in low and high-temperature environments



3.6.3 Monitor: Light Emitting Diode (LED)

- Latest type of monitors in the market today,
- LED display uses light-emitting diodes for backlighting
- A light-emitting diode is capable of producing light from electricity
- It lasts longer and produces several different colors
- Most modern digital displays use organic light-emitting diode (OLED)
- OLED consists of an organic compound film that emits light in response to an electric current.

End of Lecture for week 03

Any question ?