INPUT AND OUTPUT DEVICES

- *Electromechanical device to feed input data and control signals to the computer.*
- Connected through cables or it maybe wireless.
- Input data – text, image, audio, video etc.
- The input device accepts input data from the user and converts into an understandable form using the **input interface**

  - **Keyboard**
  - **mouse**
  - **scanner**


Esc
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
Print Screen
Sys Rq
Scroll Lock
Pause
Break
Num Lock
Caps Lock
Scroll Lock
Insert
Home
Page Up
Delete
End
Page Down
Caps Lock
Ctrl
Alt
Alt Gr
Ctrl
Enter
Num Lock
Home
Pg Up
End
Pg Dn
Ins
Del

Keyboard

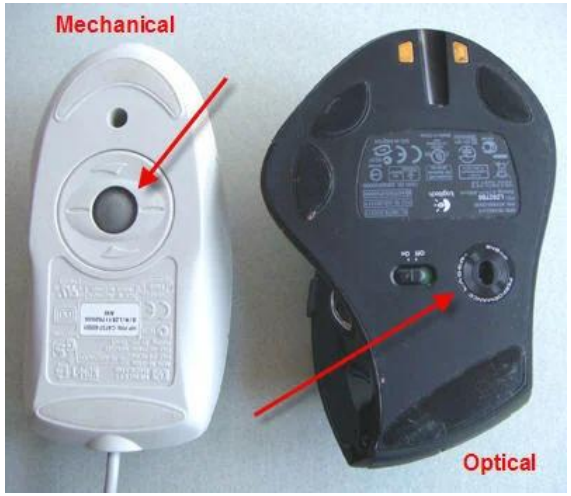
- Rectangular board – 101-104 keys
- Entering text data
- Computer recognizes the electrical signals coming from specific keys and processes the data accordingly.
- QWERTY – modern keyboard
- Specific function for each key
- 1. Typewriter key - letter, numbers, punctuation symbols
- 2. Function key - F1-F12 (different software functions)
- 3. Cursor control keys- 8 (left, right, up, down arrow, Pg Up, PgDn, Home and End)
- 4. Numeric key pad – calculator keys – right hand side
- 5. Caps Lock key – capital or lower letters

- 6. Shift key - +letter key = upper case
- two symbols in a key – upper symbol
- 7. Ctrl and Alt keys – to change the command
- Ctrl+alt+del = restart
- 8. Enter/Return key – new paragraph
- 9. Tab key - cursor moves to the next tab stop.
- 10. Esc key - cancel an entry or command
- 11. Delete key – erase right side of the cursor
- 12. Backspace key - erase left side of the cursor
- 13. Print screen key – captures the image of entire screen and then paste the image into a document.

Mouse

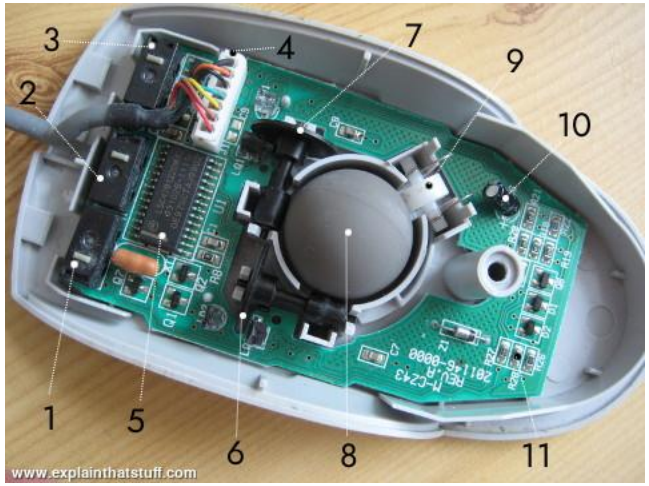
- Hand- held pointing device – move the cursor on the screen.
- Input device
- Control easily by the mouse without using the keyboard.
- Easier and faster than cursor control keys of keyboard.

- Two types
- Physical mouse
- Optical mouse



Physical mouse

- Rubber ball at the bottom side
- Two buttons, wheel at the top and rubber ball at the bottom.
- Left button – select an element on the screen
- Right – instruct the computer – special options to be selected.
- Wheel – scroll up or down
- Rubber ball – move the cursor



Optical mouse

- Light emitting Diode and a sensor in stead of rubber ball.
- Two button and a wheel
- Left button – select an element on the screen
- Right – instruct the computer – special options to be selected.
- Wheel – scroll up or down

Scanner

- *Optical device that converts texts and pictures into digital images understandable by the computer.*
- Input device
- Transfer letters or pictures to the computer.
- Works on the principle of Xerox machine. But it stores the captured image
- Digital image is formed of a collection of dots in different proportions of red, green and blue dots give colour to the image
- Hand held and flat bed type.

Output unit

- **Electromechanical** device
- **Display the results** of the processed data
- Text, audio, video or graphics
- It receive as **machine readable form**
- Human readable form – output interface
- Soft copy - electronic version
- Hard copy - physical form – paper

Output devices

01 MONITOR

02 PRINTER

03 SPEAKER

04 PLOTTER

05 MICRO FILE RECORDER

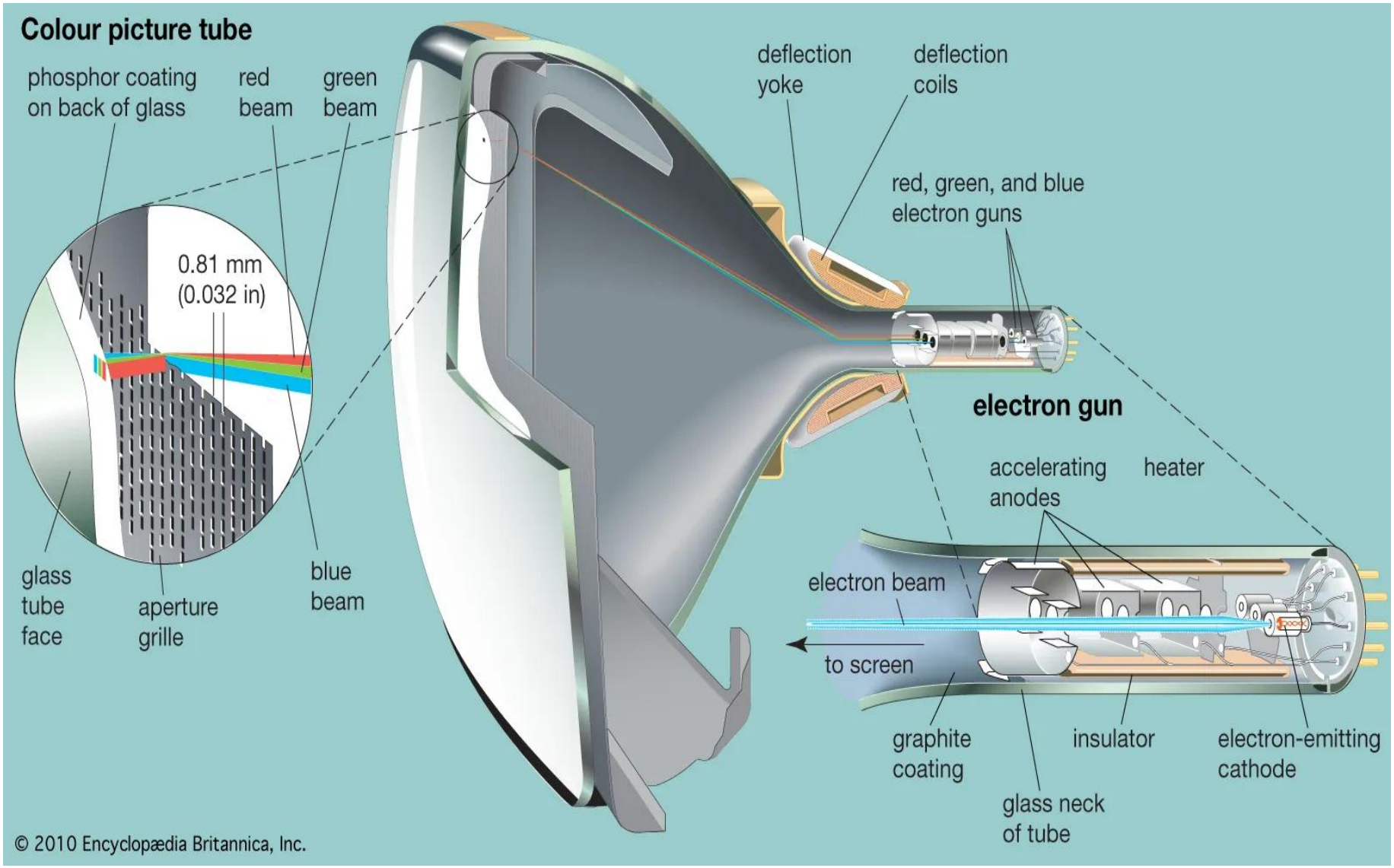
Output devices

Monitor

- *Monitor is the screen on which text, images and graphics can be seen as output.*
- Display screen
- Size and resolution
- Size- diagonally
- Images are represented as small dot – pixels
- Pixel density – clarity or resolution
- The number of pixels per unit area of the screen - resolution
- **Types**
  - Cathode ray tube monitor
  - Liquid crystal display monitor

CRT monitor

- Large, quality - low
- **vacuum tube** used as a display screen
- Screen – thousands of rows and columns – **million of cells**. Each cell – **pixe**l.
- Coated – **phosphorus**
- Vacuum tube – negatively charged **cathode** – shoots electrons
- Screen- positively charged
- Back of the screen – pixel will glow
  - Monochrome monitor – 2 colours
  - Colour monitor – 256 colours


Colour picture tube
phosphor coating on back of glass
red beam
green beam
0.81 mm (0.032 in)
glass tube face
aperture grille
blue beam
deflection yoke
deflection coils
red, green, and blue electron guns
electron gun
accelerating anodes
heater
electron beam
to screen
graphite coating
insulator
electron-emitting cathode
glass neck of tube
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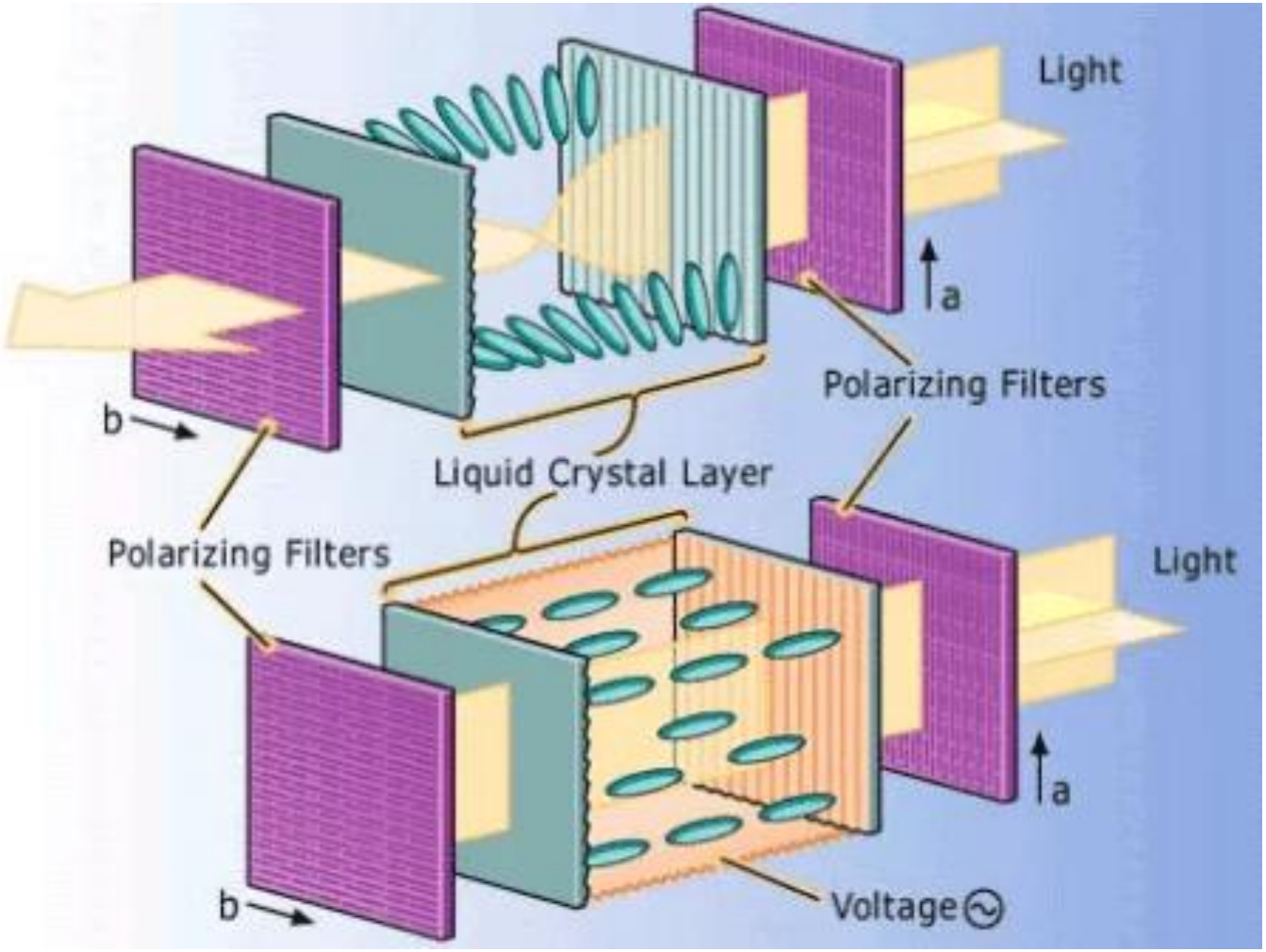
LCD monitor

- *Displays images on the screen by reflecting electron beams with molecular crystals -**Liquid Crystal Display monitor***
- Produce image by aligning molecular crystals.
- Twisted crystals – when varying voltages applied, these crystals untwist
- The back screen reflects light towards the front screen. The light get deviated by these molecules.
- Small, flat, occupies less space
- Expensive
- Small amount of electric power
- Digital watch

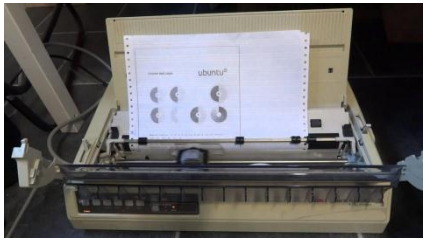

Light
a
Polarizing Filters
b
Liquid Crystal Layer
Polarizing Filters
Light
a
b
Voltage

Printer

- Hard copy – paper
- External device
- Cable
- Printer driver software- convert the printing document – understandable by the printer.
- Speed- pages per minute (ppm)
- Greater the ppm, higher efficiency
- Resolution – dots per inch

Types

- **Impact Printer**
- *the impact printer produces characters and graphics on a piece of paper by striking mechanism using ink ribbon.*
- eg. Dot matrix – less expensive, low quality, high volume printouts, low speed.



- **Non-impact printer**
- eg. Ink jet printer, Laser printer and plotters– uses laser technology, high quality, most expensive, speed: ppm (pages per minute)

Speaker

- Convert electric signals into sound waves
- Audio drivers need to be installed to produce audio output
- Output – music, spoken words
- High quality sounds.

Plotter

- Large paper drawing based on commands from a computer

Types

- **Flex printer**
- **Building plan printer**

- Produce **high quality graphics** in a variety of colours.
- It draws pictures on a paper using a pen.

Types of plotter

- **Drum plotter -** is a pen plotter that wraps the paper around a drum with a pin feed attachment
- **Flat bed plotter -** is a mechanical drafting device used for many CAD (computer aided design) programs for designers.
- **Ink jet plotter –** it creates image by spraying small droplets of ink on the paper. - banners
- **Cutting plotter -** is a large scale cutting device that produces ready cut graphics.

Microfilm recorder

- It records the **image** on the film
- Film reel in cine field
- It stores images on **a roll of plastic films**.
- The stored images are **so small** that you read them only with a **microfilm recorder**.