COMPUTER SCIENCES
KNOWING YOUR COMPUTER III
(COMPONENTS: POWER, MONITOR, DVD/BD)

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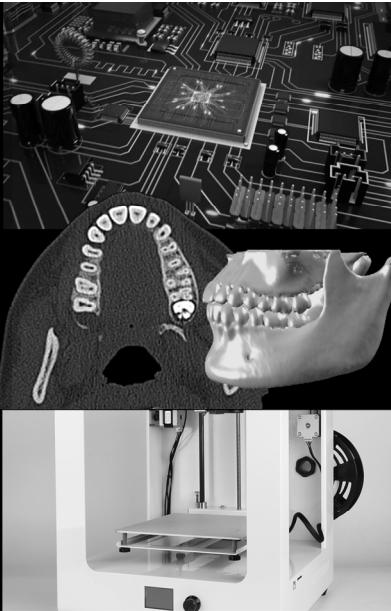
COMPUTER COMPONENTS

Desktop computer

- CPU/fan
- Memory modules
- Graphics card
- Motherboard
- Power supply
- Optical Drive
- Hard Drive
- Casing

COMPUTER COMPONENTS III

- Power Supply 電源供應器
- Monitor 顯示器/螢幕
- Optical Drive 光碟機

➢ Power supply for all components
➢ Screen display and 3D vision
➢ Data reading and writing

Please download handouts from (Week 5)
http://cflu.lab.nycu.edu.tw/CFLu_course_CompSci.html

POWER SUPPLY

- Full name: Switching Power Supply (SPS)
- Unstable power supply may cause damage to motherboard, hard disk and other components

- Cooling fan
- power output connectors
- Power supply
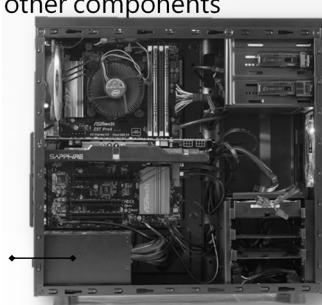
Features of Power Supply

- Max. DC output
- 80 PLUS efficiency
- Cables & connectors
- Modular cable design
- Safety protection
- Warranty

Max. DC Output

- Conversion of AC input to DC output power (in Watt, W)
- The more computer components are installed, the higher the power required.

Max. DC Output

- Evaluating the power consumption of the computer
  - Motherboard   50W
  - CPU   50~260W
  - SSD   <5W
  - HDD   20W
  - Graphics card   75~1000W

  - Basic requirement: >350W
  - Capacity for upgrade: >500W
  - Multi-GPU or high-end GPU: >650W

  350W~1300W specifications are available

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80 PLUS Energy Efficiency

The higher the efficiency, the lower the heat production.

Efficiency Level Certificates		80 PLUS	80 PLUS BRONZE	80 PLUS SILVER	80 PLUS GOLD	80 PLUS PLATINUM	80 PLUS TITANIUM
	20% load	80%	82%	85%	87%	90%	92%
115V	50% load	80%	85%	88%	90%	92%	94%
	100% load	80%	82%	85%	87%	89%	90%
	20% load	--	81%	85%	88%	90%	94%
230V	50% load	--	85%	89%	92%	94%	96%
	100% load	--	81%	85%	88%	91%	91%

Cable & Connector Types

Terminology: 雙8、參8

線材規格	24(20+4)Pin 主板接口	8(4+4)P CPU接口	小4Pin 軟驅接口	大4Pin 供電接口	Serial ATA 硬碟接口	PCI-E 顯卡接口
	Motherboard	CPU	Floppy drive	Fan or old HDD/ CD-ROM drive	SATA HDD/ CD-ROM drive	Graphics card
Model	Main Connector	CPU Connector	Floppy Connector	Peripheral Connector	S-ATA Connector	PCI-E Connector
HEC-650W	1	1	1	3	6	2

Be sure to know the required power supply connectors and quantity for computer components!

Modular Cable Design

Before

Connect the power output cable only when it is needed. Significantly saving space in the case!

MONITOR

- Image display allows users to interact with the computer.
- **LED-backlit LCD monitors** are the mainstream.

Backlighting

Traditional CRT monitor (Cathode ray tube)

LCD (Liquid Crystal Display)

CCFL (cold cathode fluorescent)

LED diodes

LCD Monitors

- Space saving
  - Without cathode ray tube

The LED-backlit LCD monitor achieves **slimmer, lower power consumption, higher brightness, lower heat generation,** and **longer life.**

- Low power consumption
  - environmentally friendly and low heat generation

- Low radiation:
  - LCD display is almost radiation-free, which is less likely to cause eye discomfort.

- Flat design
  - No distortion of the picture.

Features of Monitor

- Maximum size of viewable area
- Aspect ratio
- Best resolution
- Color Space
- Brightness & contrast ratio
- Response time
- Curvature

- Viewing angle (170~178º)
- Input interface/connector
- Panel type (IPS,PLS,VA,TN,…)
- Multimedia Interface
- 3D vision
- Multi-touch (for touchscreen)

Monitor Size & Ratio

24"

- The diagonal size of the actual display area
  - without considering the border!

4:3   **16:10**   (Widescreen) **16:9**   **21:9**
32:9

Best Resolution   **XGA: eXtended Graphics Array**

- The maximum number of dots (pixels) that can be displayed in the viewable area of the screen.
- 4:3 ratio: 1280 x 1024 (SXGA), 1600 x 1200 (UXGA)
- 16:9 ratio: 1366 x 768 (WXGA), 1600 x 900 (WXGA++), 1920 x 1080 (Full HD), 2560 x 1440, 3840 x 2160 (QFHD)
- 16:10 ratio: 1440 x 900 (WXGA+), 1680 x 1050 (WSXGA+), 1920 x 1200 (WUXGA), 2560 x 1600 (WQXGA), 4096 x 2160 (4K Ultra HD)
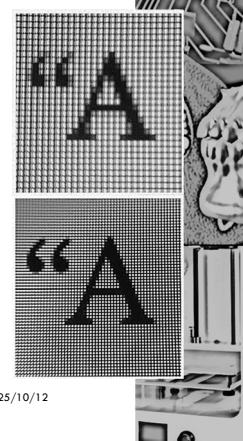

Brightness & Contrast Ratio

- **Brightness**
  - The brightness is measured in cd/m^2 (candlelight per square meter) by selecting 9 scattered liquid crystal dots and averaging them or taking the maximum value when the screen is completely white.
  - The higher the brightness, the brighter and clearer the picture can be maintained in bright environments ($250\ cd/m^2$ or more is preferred).
- **Contrast Ratio**
  - The ratio of the brightness of the screen in the "all white" and "all black" states is measured separately.
  - The higher the ratio, the more vivid the color gradation (from full black to full white) of the screen will be.

Response Time

- The total time required to reach the light and return to the dark (in ms).

- If the response time is too long, it will cause the afterimage/ ghost and the discontinuous images.

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Ghosting
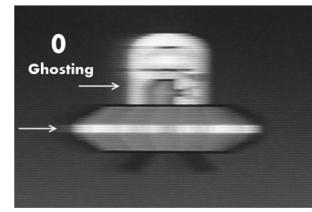
Input Interface

- D-Sub (VGA)
- DVI
- HDMI
- DisplayPort (DP)
- S-video(S端子)、CVBS(AV端子)、

  3RCA(色差端子)
- USB 3.1 Type-C

Audio in/out · DP · DVI · D-Sub

HDMI

DVI-D · D-SUB · HDMI

It should match the output connector of the graphics card!
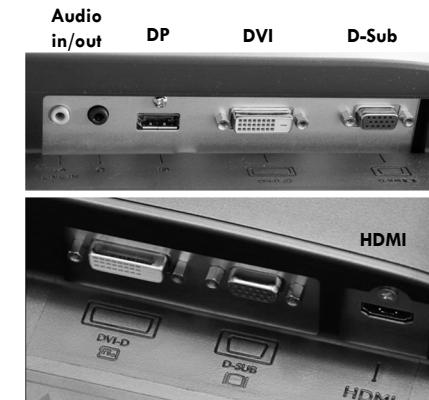
OPTICAL DRIVE

- A recorder (burner) can write data into optical discs.

- A player can only read data from optical discs.

- Two mainstreams:
 - DVD (digital versatile disc)、BD (Blue-ray disc)
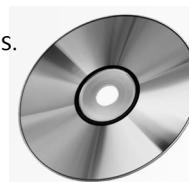
BD recorder

DVD recorder

DVD VS. BD

SD: Standard Definition   HD: High Definition

https://www.tipard.com/resource/blu-ray-vs-dvd.html
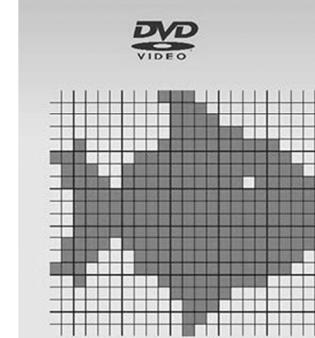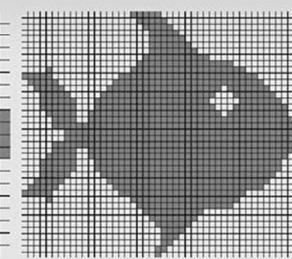
DVD VS. BD

- DVD
  - Capacity: 4.7 GB (single layer)
    8.7 GB (double layer)
  - Laser wavelength: 650 nm
  - Video resolution: 720 x 480
- BD
  - Capacity: 25 GB (single layer)
    50 GB (double layer)
  - Laser wavelength: 405 nm
  - Video resolution: 1920 x 1080P

CD : 0.7 GB — Beam Spot — 1.2 mm Substrate — λ=780 nm NA=0.45

DVD : 4.7 GB — Beam Spot — 0.6 mm Substrate — λ=650 nm NA=0.6

BD : 25 GB — Beam Spot — 0.1 mm Cover Layer — λ=405 nm NA=0.85

Features of Recorder

- Max. writing speed
- Connection interface
  - Internal connection: SATA, external connection: USB 3.0/3.1
- Double-layer (DL) recorder
  - Multi-layer technology to enhance the capacity
- LightScribe/Labelflash
  - Laser engraving of disc covers
- SecurDisc
  - Encrypted disc data

16X

HOW LONG WILL YOUR FILES LAST?

UP TO 5 YRS — HARD DRIVE
UP TO 7 YRS — DVD
UP TO 8 YRS — FLASH DRIVE
UP TO 1000 YRS — M-DISC
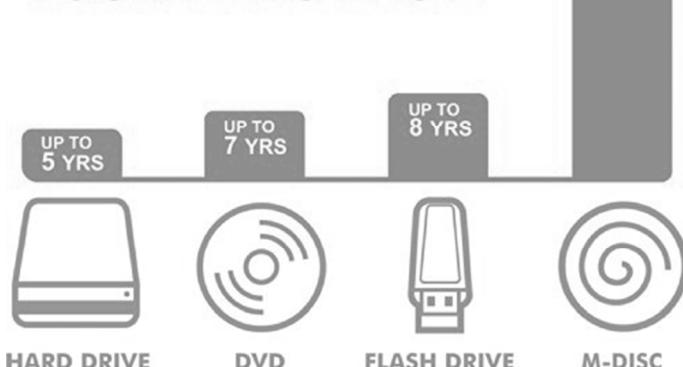
M-Disc is made of inorganic carbon compound, which can preserve data forever, called Millennium Disc.

THE END

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