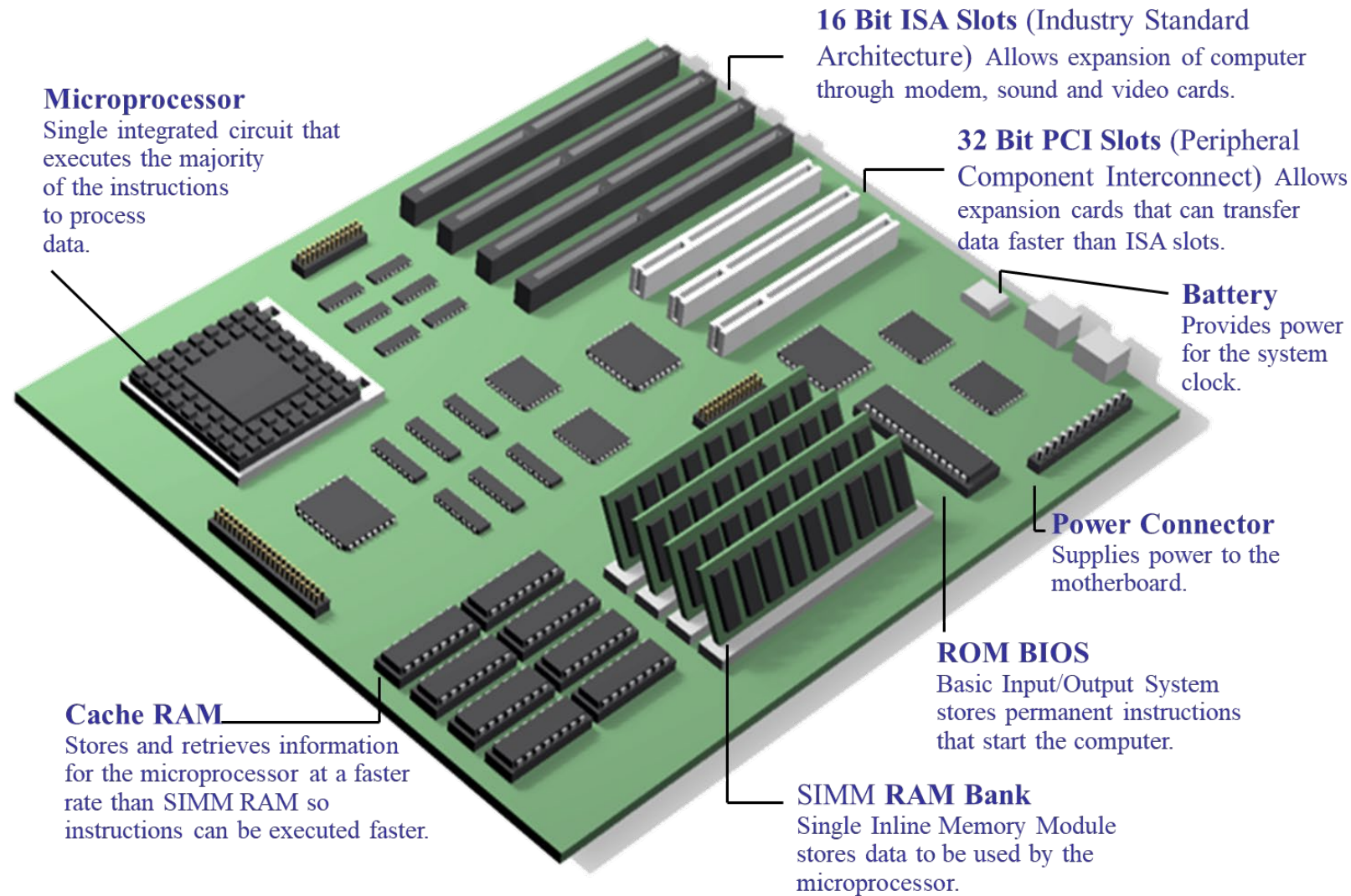


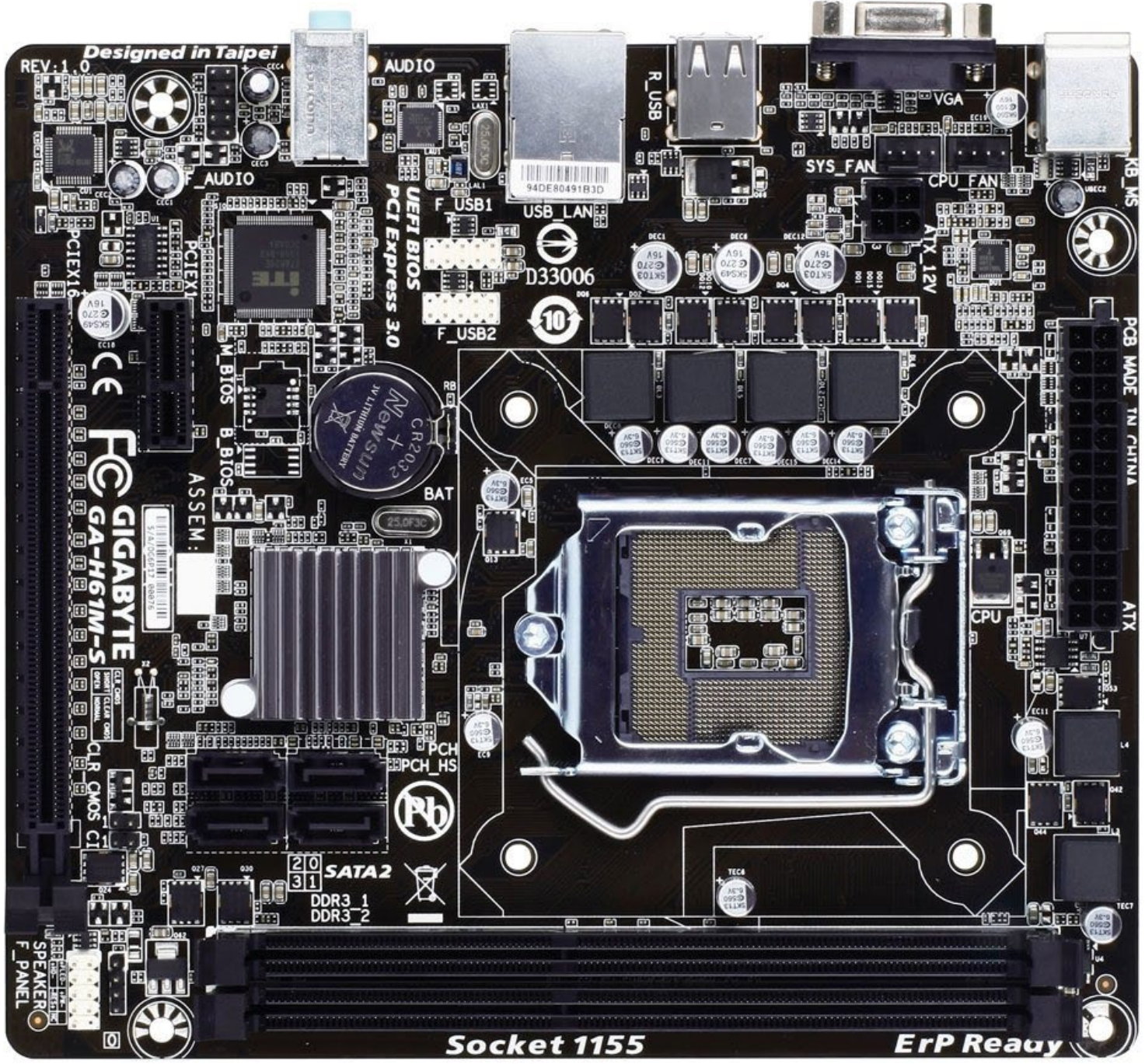
MSc III Sem – Life Sciences

Course – Bioinformatics

Components of Computer Systems

Major Components of a Motherboard





REV: 1.0
Designed in Taipei

CE
FC
GIGABYTE
GA-H61M-S

SPK
F_PANEL

ASSEM:

PCH_HS
PCH

SATA2
20
31
DDR3 1
DDR3 2

CR2032
3V LITHIUM BATTERY
NEWSUN

UEFI BIOS
PCI Express 3.0

Pb

USB LAN
D33006
10

Socket 1155

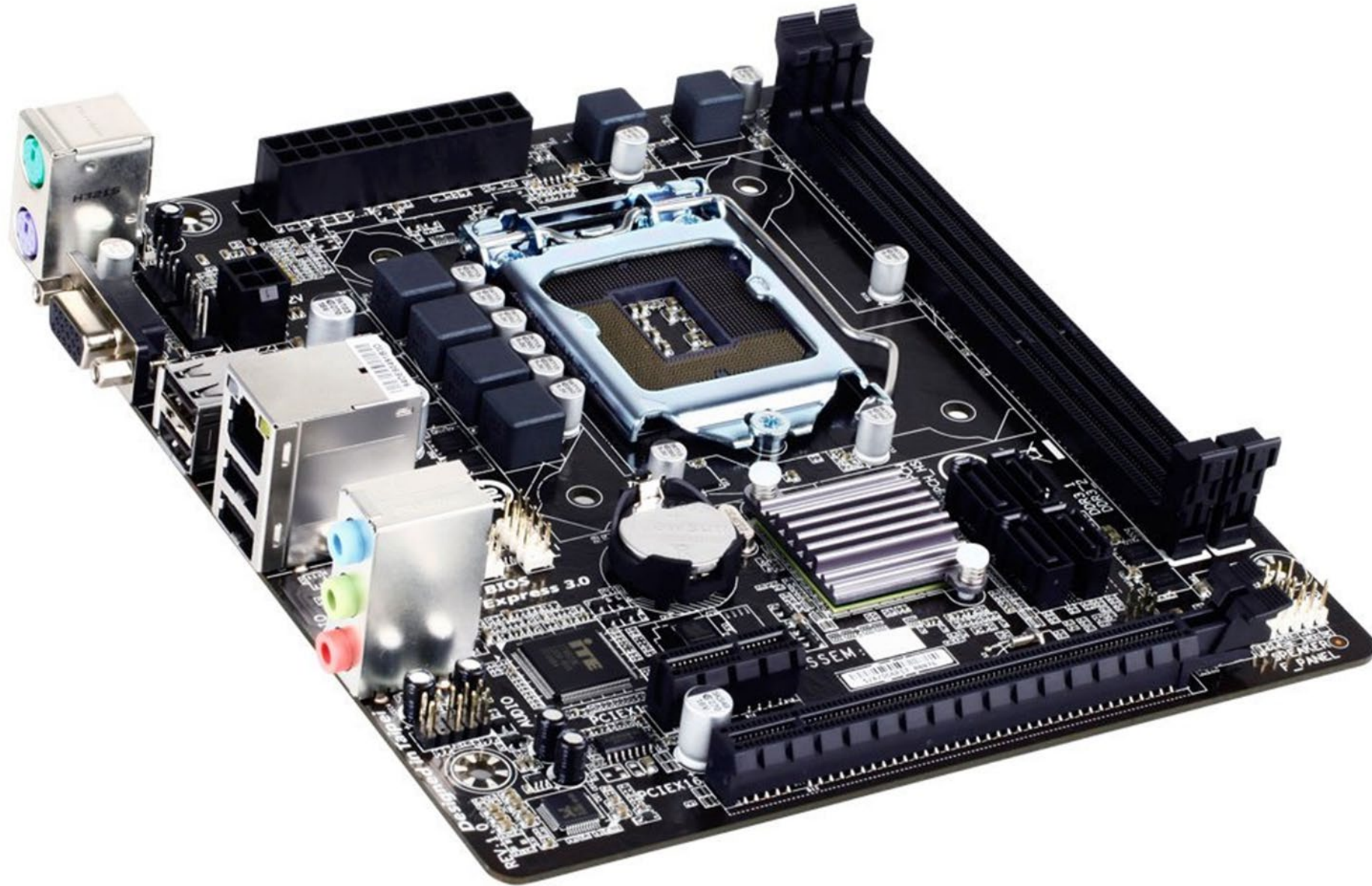
SYS_FAN
CPU_FAN
ATX_12V

ErP Ready

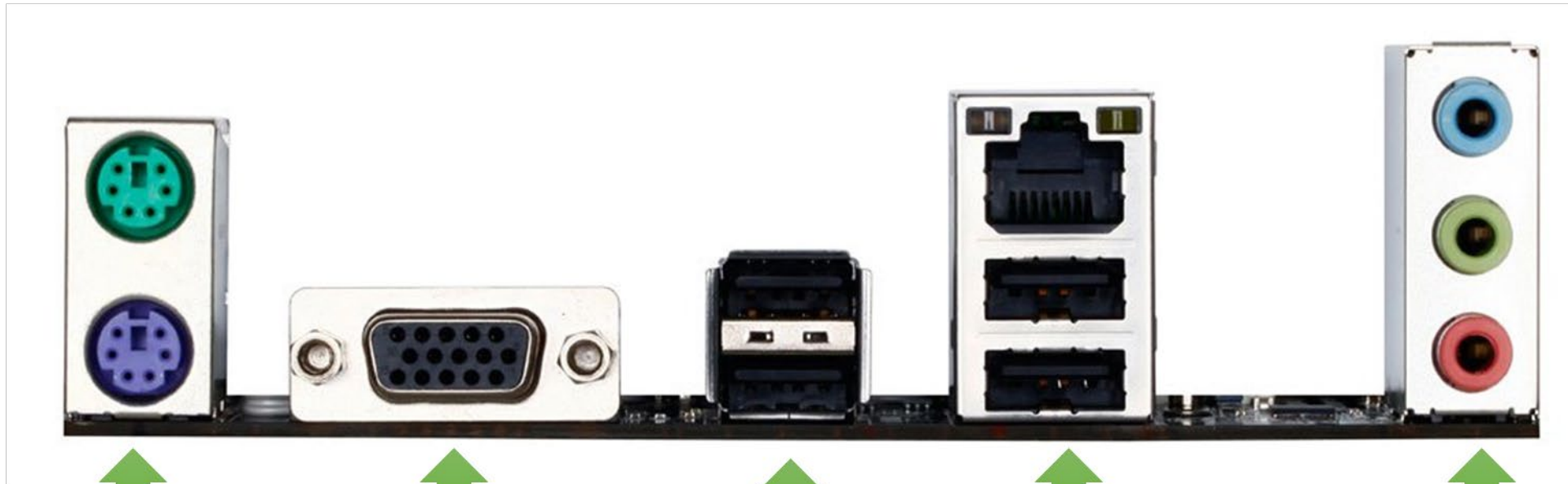
PCB MADE IN CHINA

ATX

Major Components of a Motherboard



Peripheral Components of a Motherboard



**Mouse &
Keyboard**

**Monitor /
Projector /
Printer**

**USB drive
Now HDMI**

**LAN port &
USB drive**

**Audio
in/out**

USB: Universal Serial Bus

HDMI: High-Definition Multimedia Interface

Computer Configuration

System

Control Panel > System and Security > System

Control Panel Home


- Device Manager
- Remote settings
- System protection
- Advanced system settings

View basic information about your computer

Windows edition


Windows 10 Home Single Language ← **Operating System**

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System

Manufacturer:	ASUSTek Computer Inc.
Processor:	Intel(R) Core(TM) i7-7700HQ CPU @ 2.80GHz 2.80 GHz ← CPU core information
Installed memory (RAM):	8.00 GB (7.89 GB usable) ← RAM information
System type:	64-bit Operating System, x64-based processor ← Memory handling information
Pen and Touch:	No Pen or Touch Input is available for this Display



ASUSTek Computer Inc. support

Website:	Online support
----------	--------------------------------

Computer name, domain, and workgroup settings

Computer name:	DESKTOP-SPANBVN	Change settings
Full computer name:	DESKTOP-SPANBVN	
Computer description:		
Workgroup:	WORKGROUP	

Windows activation

Windows is activated [Read the Microsoft Software License Terms](#)

Product ID: 00327-35820-02814-AAOEM

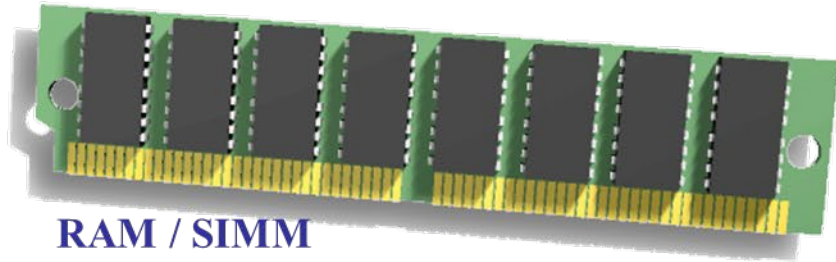
[Change product key](#)

See also
Security and Maintenance

Central Processing Unit (CPU)

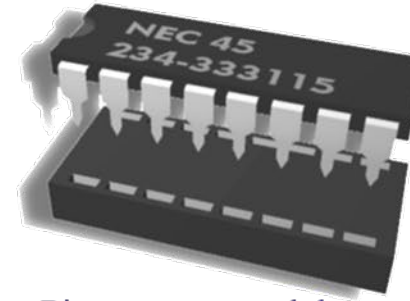
- Also called a central processor, main processor, computer core, or just processor, is the electronic circuitry within a computer that executes instructions that make up a computer program. The CPU performs basic arithmetic, logic, controlling, and input/output (I/O) operations specified by the instructions in the program.
- The computer industry used the term "central processing unit" as early as 1955.
- The term "CPU" refers to a processor, more specifically to its processing unit and control unit (CU), distinguishing these core elements of a computer from external components such as main memory and I/O circuitry.
- The form, design, and implementation of CPUs have changed over the course of their history, but their fundamental operation remains almost unchanged. Principal components of a CPU include the arithmetic logic unit (ALU) that performs arithmetic and logic operations, processor registers that supply operands to the ALU and store the results of ALU operations, and a control unit that orchestrates the fetching (from memory) and execution of instructions by directing the coordinated operations of the ALU, registers and other components.
- Most modern CPUs are microprocessors, where the CPU is contained on a single metal-oxide-semiconductor (MOS) integrated circuit (IC) chip. An IC that contains a CPU may also contain memory, peripheral interfaces, and other components of a computer; such integrated devices are variously called microcontrollers or systems on a chip (SoC).
- Some computers employ a multi-core processor, which is a single chip or "socket" containing two or more CPUs called "cores".
- Array processors or vector processors have multiple processors that operate in parallel, with no unit considered central.

Computer Memory



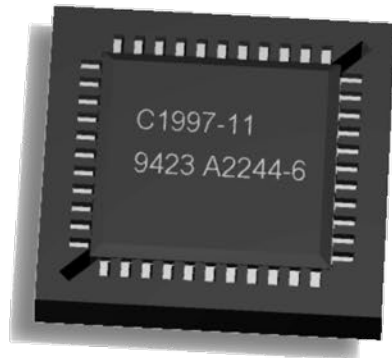
RAM / SIMM

Single Inline Memory Modules are the most popular memory module of present day computers. The small circuit board contains three to nine DIP chips. SIMMs range in size from 4MB to 32GB of memory.



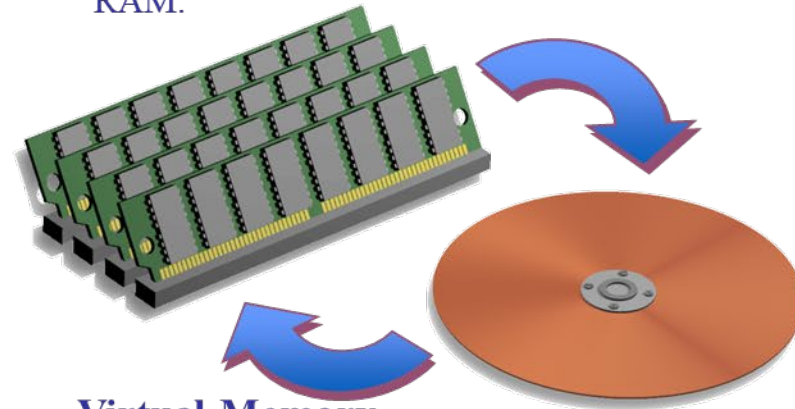
DIP

Dual Inline Pin memory modules were once used for main memory in older computer systems. Now they are used as components on SIMM chips and are also used in cache RAM.



ROM

A Read Only Memory storage device has instructions permanently embedded in its circuits. ROM chips contain programs that start the computer and perform system diagnostics.



Virtual Memory

When a computer runs out of real memory (storing information in RAM), it employs a software technique to generate virtual memory, storing and swapping information on the computer's hard drive.

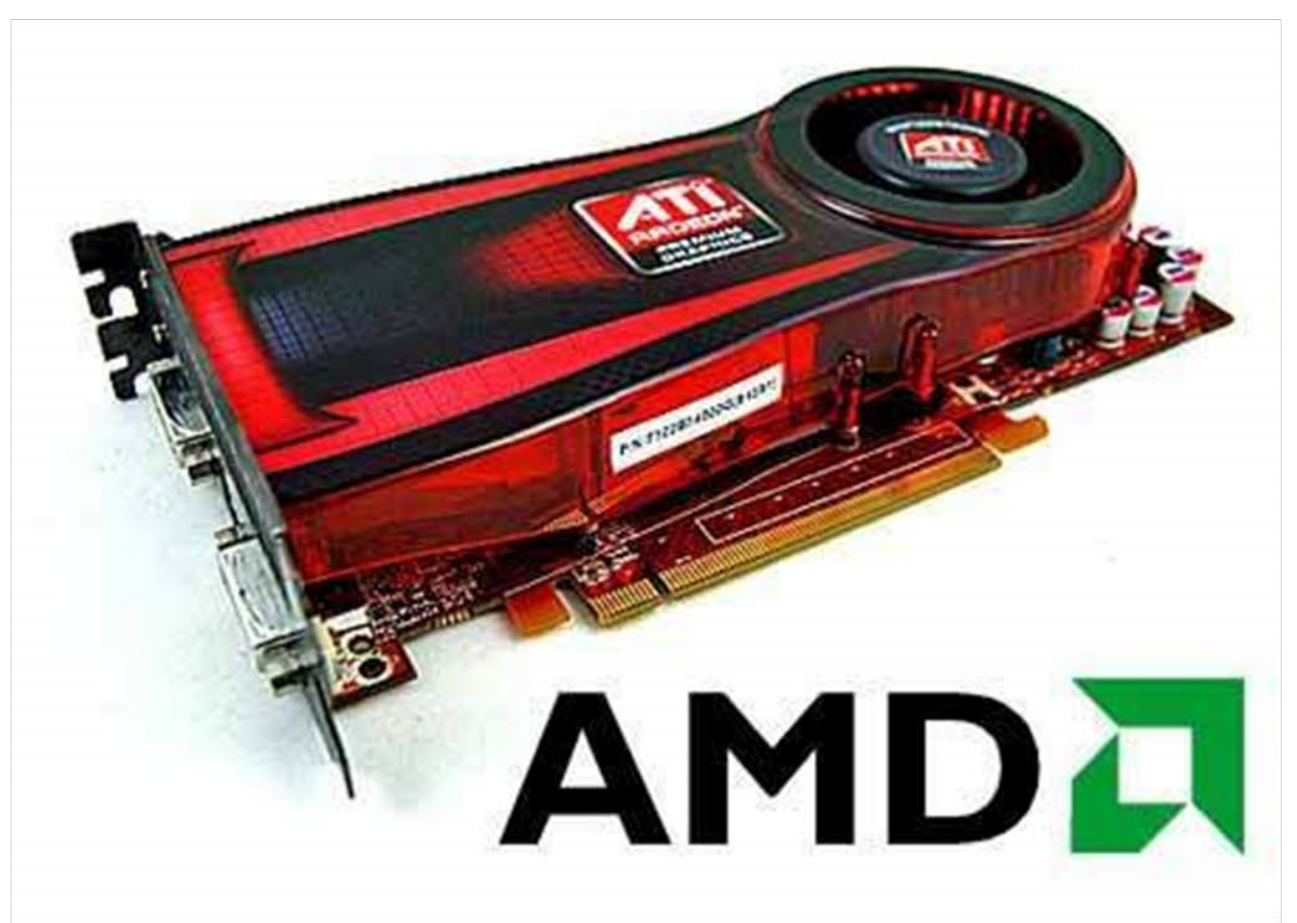
Random-Access Memory (RAM)

- RAM is a form of computer memory that can be read and changed in any order, typically used to store working data and machine code. RAM device allows data items to be read or written in almost the same amount of time irrespective of the physical location of data inside the memory.
- In contrast, with other direct-access data storage media such as hard disks, CD-RWs, DVD-RWs and the older magnetic tapes and drum memory, the time required to read and write data items varies significantly depending on their physical locations on the recording medium, due to mechanical limitations such as media rotation speeds and arm movement.
- RAM contains multiplexing and demultiplexing circuitry, to connect the data lines to the addressed storage for reading or writing the entry. Usually more than one bit of storage is accessed by the same address, and RAM devices often have multiple data lines and are said to be "8-bit" or "16-bit", etc. devices.
- In today's technology, random-access memory takes the form of integrated circuit (IC) chips with MOS (metal-oxide-semiconductor) memory cells. RAM is normally associated with volatile types of memory (such as dynamic random-access memory (DRAM) modules), where stored information is lost if power is removed, although non-volatile RAM has also been developed.
- The two main types of volatile random-access semiconductor memory are static random-access memory (SRAM) and dynamic random-access memory (DRAM).
- Commercial uses of semiconductor RAM date back to 1965, when IBM introduced the SP95 SRAM chip for their System/360 Model 95 computer, and Toshiba used DRAM memory cells for its Toscal BC-1411 electronic calculator, both based on bipolar transistors. Commercial MOS memory, based on MOS transistors, was developed in the late 1960s, and has since been the basis for all commercial semiconductor memory.
- The first commercial DRAM IC chip, the Intel 1103, was introduced in October 1970. Synchronous dynamic random-access memory (SDRAM) later debuted with the Samsung KM48SL2000 chip in 1992.

Graphic Processing Unit

(Graphic Card/Visual Memory)

- It is a processor optimized for 2D/3D graphics, video, visual computing, and display.
- It is highly parallel, highly multithreaded multiprocessor optimized for visual computing.
- It provide real-time visual interaction with computed objects via graphics images, and video.
- It serves as both a programmable graphics processor and a scalable parallel computing platform.
- Heterogeneous Systems: combine a GPU with a CPU
- GPU memory starts from 510MB to 16GB



- Applied for high end visual graphics work
- Gaming
- Bulk data processing
- High throughput imaging analysis

Hard Disk Storage

Sector

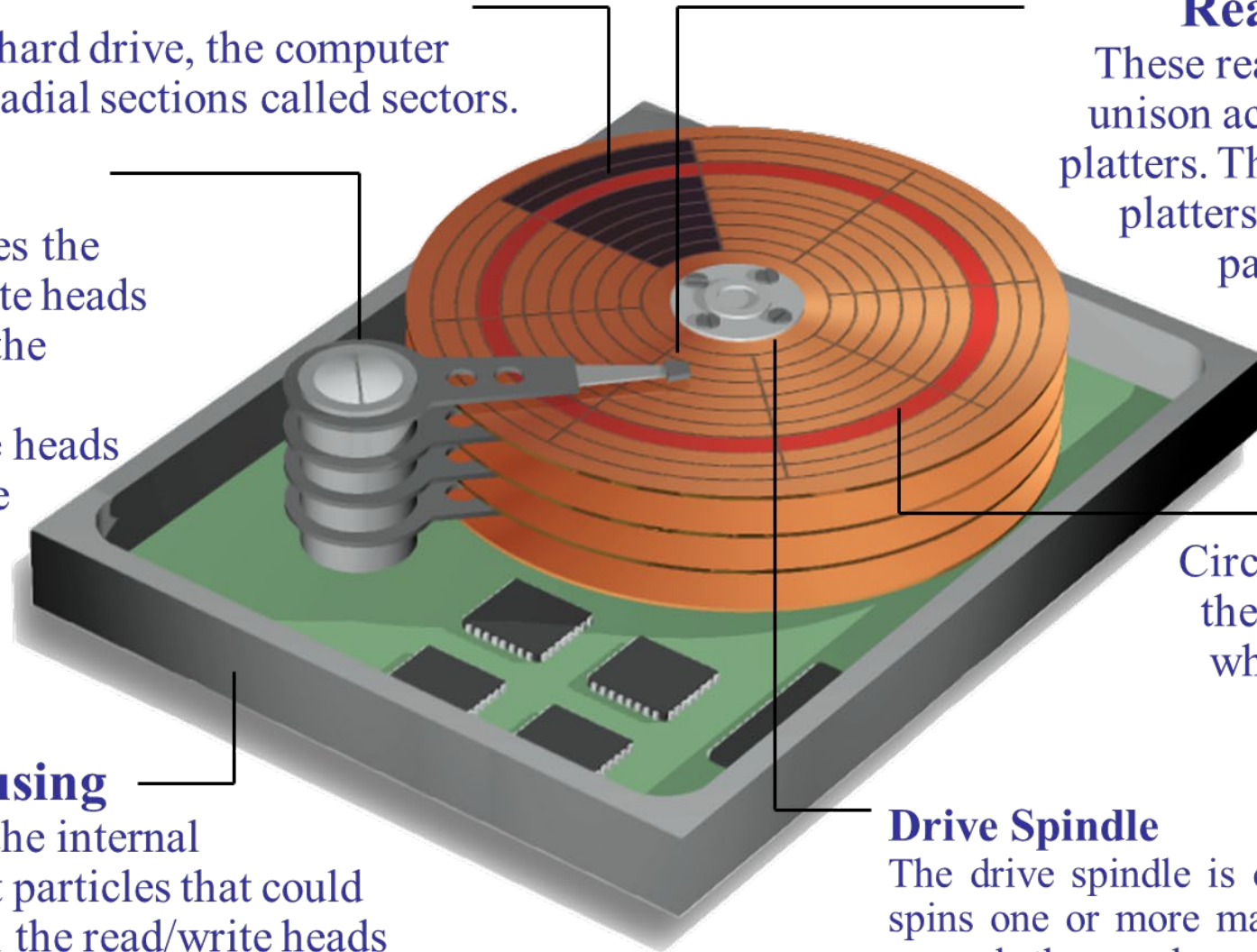
When formatting the hard drive, the computer divides the disk into radial sections called sectors.

Head Actuator

This component moves the collection of read/write heads across the surface of the platters with extreme accuracy. It aligns the heads with the tracks that lie in concentric circles on the platters.

Sealed Metal Housing

The housing protects the internal components from dust particles that could block the gap between the read/write heads and the platters, causing the hard drive to crash.



Read/Write Head

These read/write heads move in unison across the surfaces of the platters. The heads write data to the platters by aligning magnetic particles on the surface and read data by detecting the polarity of the particles.

Track

Circular and concentric paths the read/write heads follow when reading information from the disk.

Drive Spindle

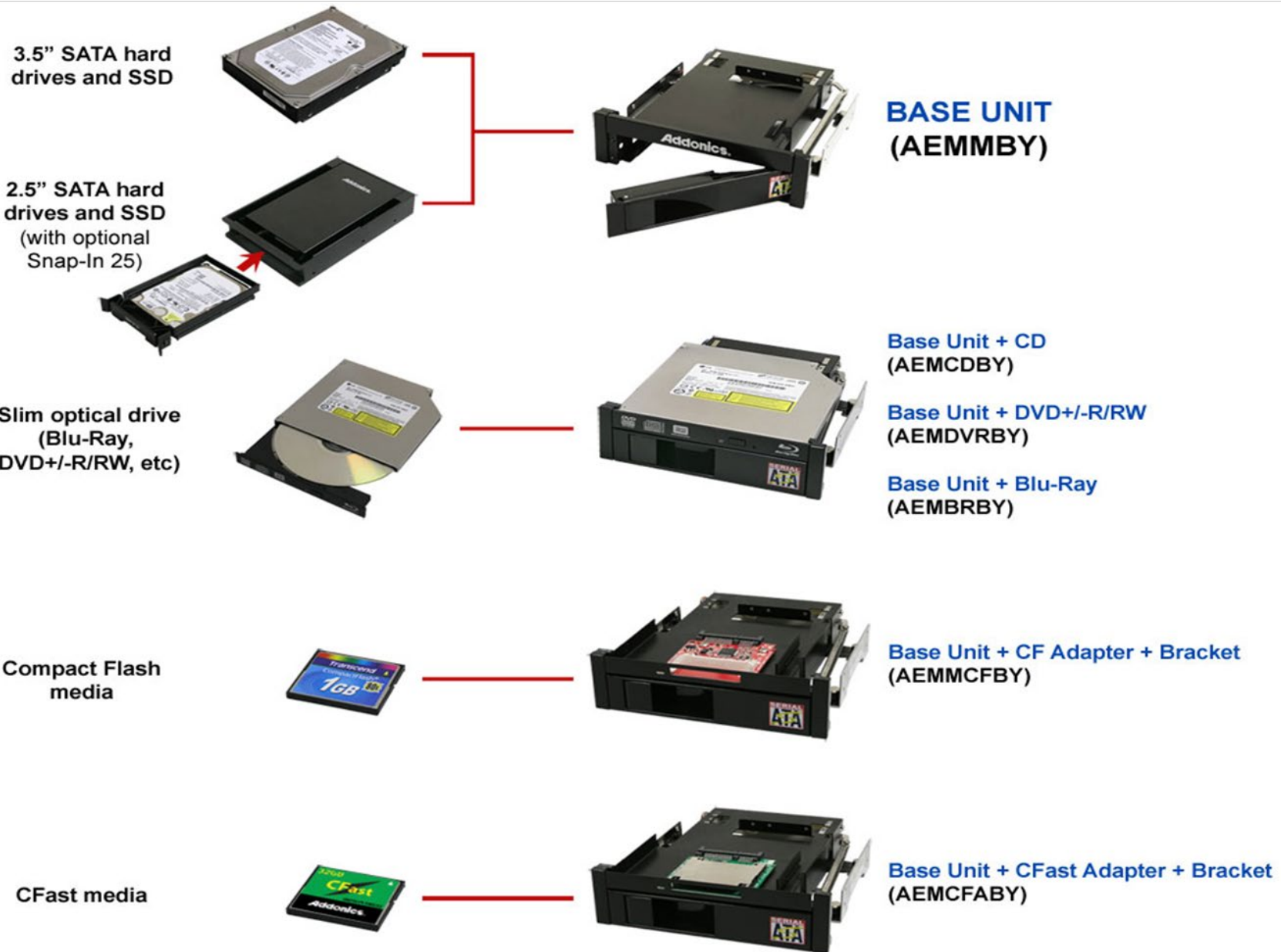
The drive spindle is connected to a motor which spins one or more magnetically coated platters at several thousand revolutions per minute. More platters mean greater disk storage capacity.

Types of Hard Disks



ATA: Advanced Technology Attachment

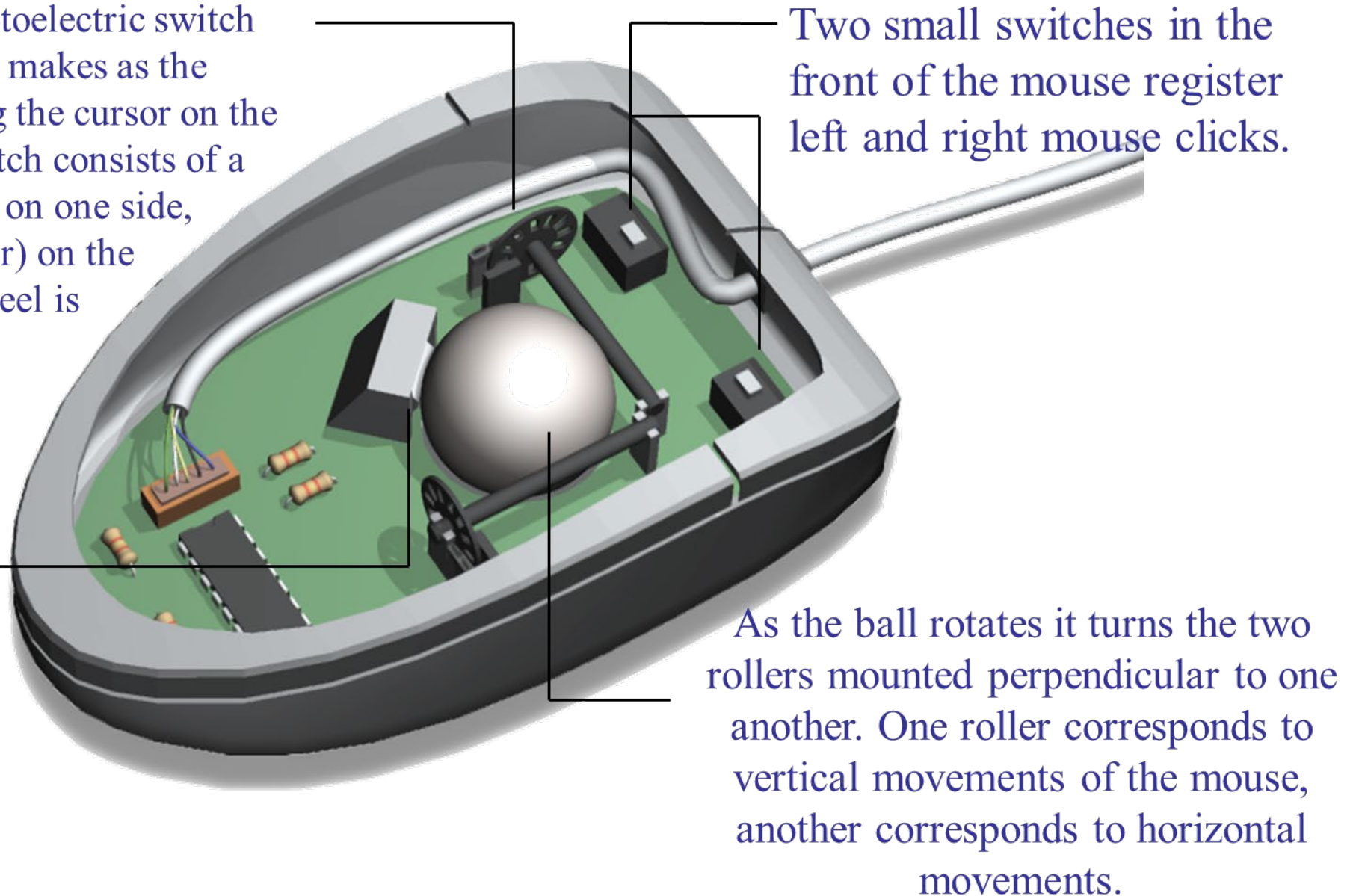
Types of Hard Disks



Mechanical Mouse

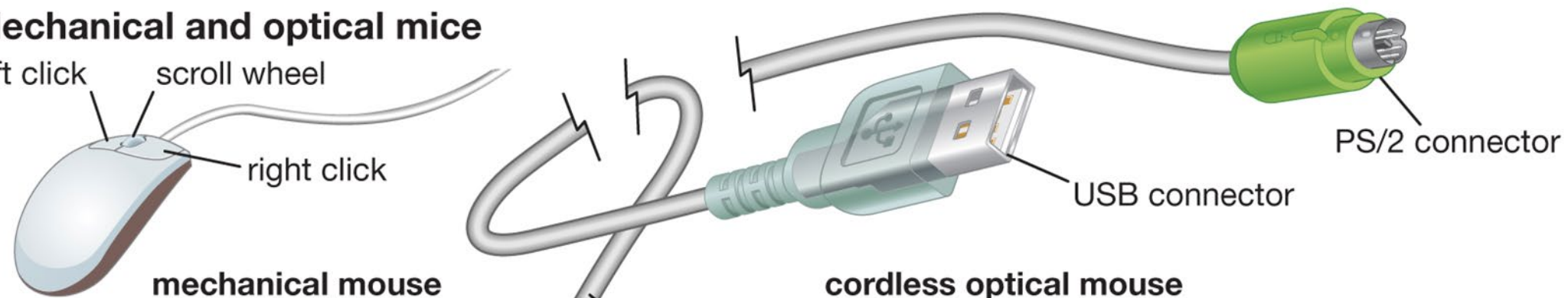
A perforated wheel and a photoelectric switch measure the rotations the ball makes as the mouse is moved, thus moving the cursor on the screen. The photoelectric switch consists of a light-emitting diode (emitter) on one side, and a phototransistor (receiver) on the other side. The perforated wheel is sandwiched between the two, turning the switch off and on as it rotates.

A third roller is used not for measurement, but instead to keep the ball in place as the user moves the mouse.



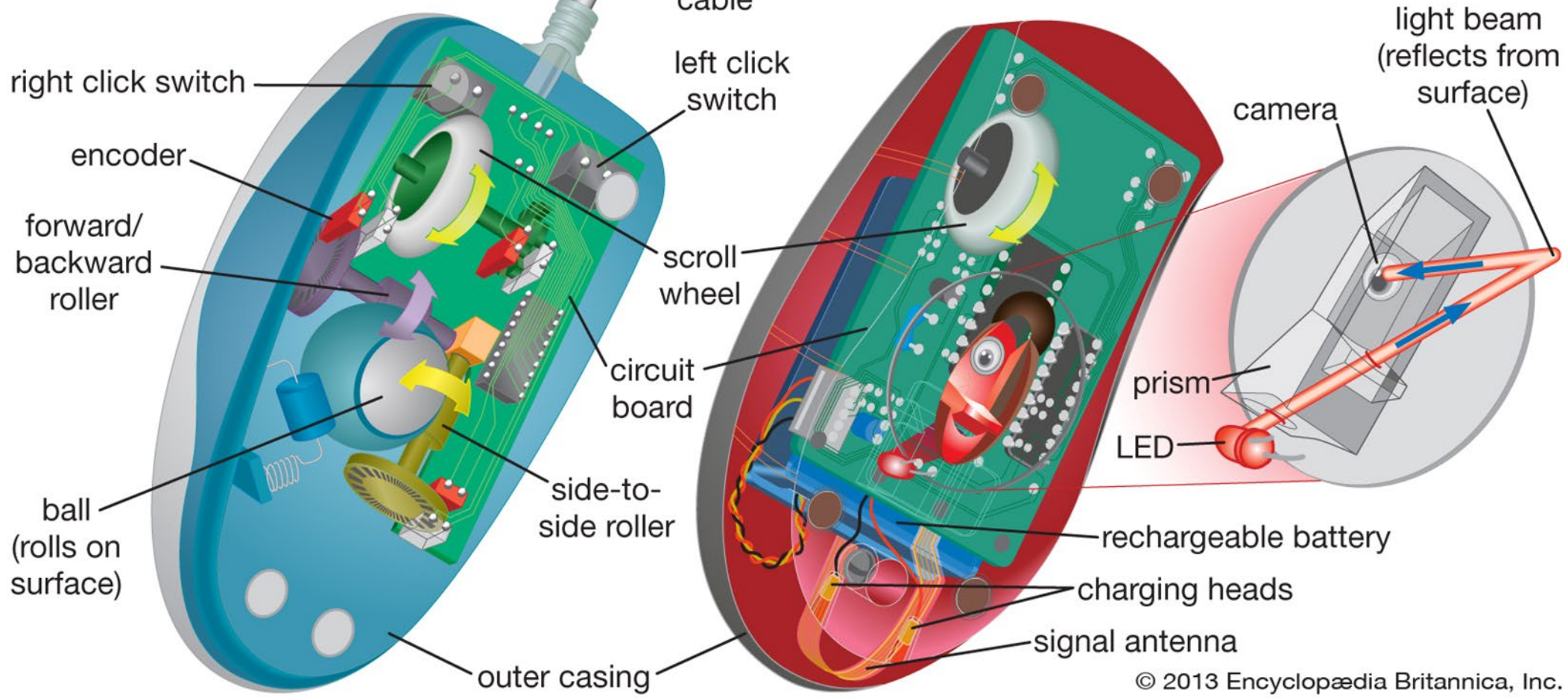
Mechanical and optical mice

left click
scroll wheel
right click



mechanical mouse
(bottom view)

cordless optical mouse
(bottom view)



Modems



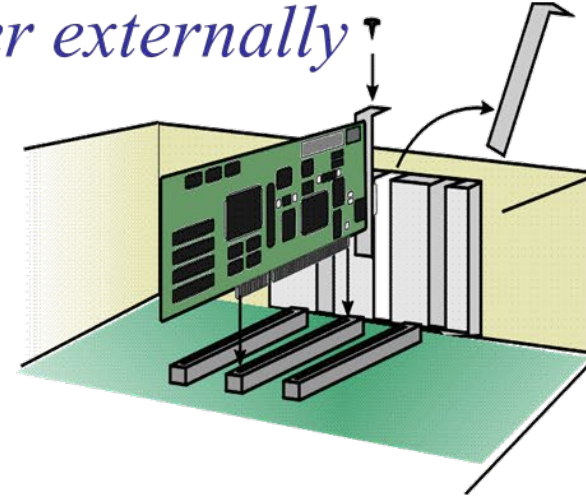
External Modem

Plugs into computer externally



Internal Modem

Fits inside computer



Modems can send data from one computer to another using telephone lines.

Modems are used in almost every aspect of work. Businesses use them to transfer files, data, and money. They are also used for teleconferencing, which allows people in various locations to communicate over vast distances; these are sometimes called virtual meetings. Schools use them to provide access to the Internet.

Modem

A modem – "modulator-demodulator" – is a hardware device that converts data from a digital format, intended for communication directly between devices with specialized wiring, into one suitable for a transmission medium such as telephone lines or radio. A modem modulates one or more carrier wave signals to encode digital information for transmission, and demodulates signals to decode the transmitted information. The goal is to produce a signal that can be transmitted easily and decoded reliably to reproduce the original digital data.

Modems can be used with almost any means of transmitting analog signals, from light-emitting diodes to radio. A common type of modem is one that turns the digital data of a computer into a modulated electrical signal for transmission over telephone lines, to be demodulated by another modem at the receiver side to recover the digital data.

Software Suites

Software suites are full- featured versions of several different programs packaged together.

Operating system

The basic software system that creates base for installing and operating programs.

Document processing software

- Word processor
- Database program
- Spreadsheet
- Presentation software
- Information management

Microsoft Office is one of the most popular software suites available for business, educational, and personal computer use.

What is Operating System



Red Hat



Fedora



CentOS



Debian



Ubuntu



Mint



OS X



Windows



Linux



Xen



SUSE



Sun



HP



IBM



VMWare



Apple



Oracle



FreeBSD



OpenBSD



NetBSD



DragonFly BSD



Darwin

Windows Operating Systems



1.0 (1985)



3.1 (1992)



95 (1995)



XP (2001)



VISTA (2006)



7 (2009)



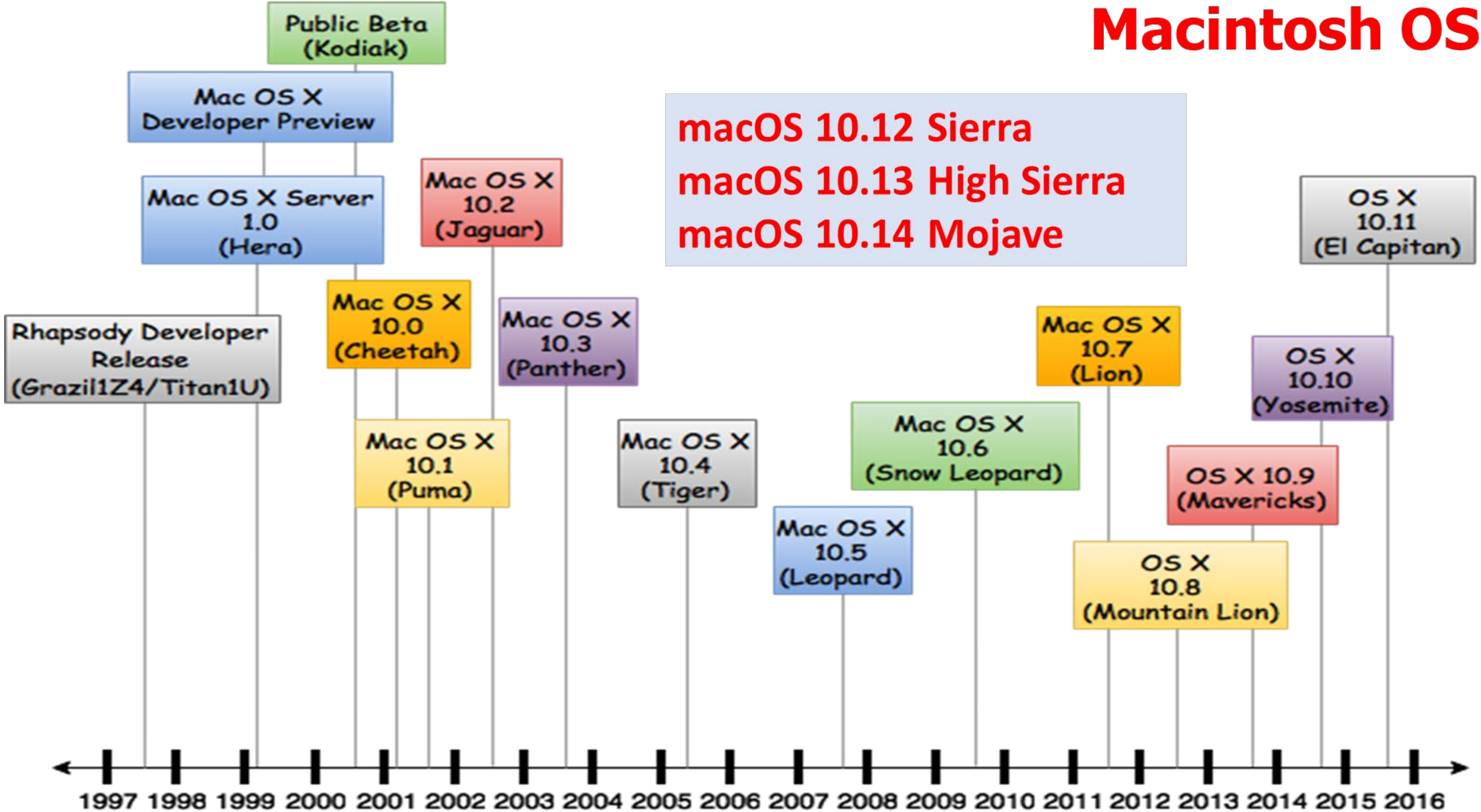
8 (2012)

 Windows 10

10 (2015)

Macintosh OS

macOS 10.12 Sierra
macOS 10.13 High Sierra
macOS 10.14 Mojave



Form Factor	Desktop / Laptop
Operating System	Windows 10 Home – 64bit
Screen Size and Resolution	15 inches, 1920 x 1080 pixels
Processor Brand	Intel
Processor Type	Core i7 – hexacore (6 cores)
Processor Speed	5 GHz
RAM Size	DDR4 - 8 GB
Maximum Memory Supported	32 GB
Memory Clock Speed	2933 MHz
Hard Drive Size	2 numbers
Hard Disk Description	Hybrid Drive
Hard Drive Interface mechanical	Serial ATA 5400 RPM or 7200 rpm – 1 TB
Hard Drive Interface flash	SSD – 512 GB
Graphics Coprocessor	NVIDIA GeForce GTX 1650Ti – DDR5 - 4 GB
Graphics Card Interface	PCI-E
Connectivity Type	Bluetooth, Wi-Fi
Wireless Type	Bluetooth, 802.11ax
Number of USB 2.0 and 3.0 Ports	1, 3
Number of HDMI Ports	1
Optical Drive Type	No Optical Drive
Peripherals	Keyboard, Mouse Pad

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