Computer hardware

Computer hardware is the physical part of a computer, including the digital circuitry, as distinguished from the computer software that executes within the hardware. The hardware of a computer is infrequently changed, in comparison with software and data, which are "soft" in the sense that they are readily created, modified or erased on the computer. Firmware is a special type of software that rarely, if ever, needs to be changed and so is stored on hardware devices such as read-only memory (ROM) where it is not readily changed (and is, therefore, "firm" rather than just "soft").

Most computer hardware is not seen by normal users. It is in embedded systems in automobiles, microwave ovens, electrocardiograph machines, compact disc players, and other devices. Personal computers, the computer hardware familiar to most people, form only a small minority of computers (about 0.2% of all new computers produced in 2003). See Market statistics.

Typical PC hardware

A typical Personal computer consists of a case or chassis in a tower shape (desktop) and the following parts:

Motherboard

The motherboard is the "heart" of the computer, through which all other components interface.

- Central processing unit (CPU) - Performs most of the calculations which enable a computer to function, sometimes referred to as the "brain" of the computer.
  - Computer fan - Used to lower the temperature of the computer; a fan is almost always attached to the CPU, and the computer case will generally have several fans to maintain a constant airflow. Liquid cooling can also be used to cool a computer, though it focuses more on individual parts rather than the overall temperature inside the chassis.
- Random Access Memory (RAM) - Fast-access memory that is cleared when the computer is powered-down. RAM attaches directly to the motherboard, and is used to store programs that are currently running.
- Firmware is loaded from the Read only memory ROM run from the Basic Input-Output System (BIOS) or in newer systems Extensible Firmware Interface (EFI) compliant
- Internal Buses - Connections to various internal components.
  - PCI (Peripheral component Interface)
  - PCI-E (PCI-Express)

- o USB (Universal serial Bus)
- o HyperTransport
- o CSI (Common system interface)
- External Bus Controllers - used to connect to external peripherals, such as printers and input devices. These ports may also be based upon expansion cards, attached to the internal buses.
  - o parallel port
  - o serial port
  - o USB
  - o firewire
  - o SCSI (On Servers and older machines)
  - o PS/2 (For mice and keyboards, being phased out and replaced by USB.)

Power supply

A case that holds a transformer, voltage control, and (usually) a cooling fan, and supplies power to run the rest of the computer.

Storage controllers

Controllers for hard disk, CD-ROM and other drives like internal Zip and Jaz conventionally for a PC are IDE/ATA; the controllers sit directly on the motherboard (on-board) or on expansion cards, such as a Disk array controller. IDE is usually integrated, unlike SCSI which is found in most servers. The floppy drive interface is a legacy MFM interface which is now slowly disappearing. All these interfaces are gradually being phased out to be replaced by SATA and SAS.

Video display controller

Produces the output for the computer display. This will either be built into the motherboard or attached in its own separate slot (PCI, PCI-E or AGP), in the form of a Graphics Card.

Removable media devices

- CD - the most common type of removable media, inexpensive but has a short life-span.
  - o CD-ROM Drive - a device used for reading data from a CD.
  - o CD Writer - a device used for both reading and writing data to and from a CD.
- DVD - a popular type of removable media that is the same dimensions as a CD but stores up to 6 times as much information. It is the most common way of transferring digital video.
  - o DVD-ROM Drive - a device used for reading data from a DVD.

- DVD Writer - a device used for both reading and writing data to and from a DVD.
  - DVD-RAM Drive - a device used for rapid writing and reading of data from a special type of DVD.
- Blu-ray - a high-density optical disc format for the storage of digital information, including high-definition video. Currently a rival of HD DVD.
  - BD-ROM Drive - a device used for reading data from a Blu-ray disc.
  - BD Writer - a device used for both reading and writing data to and from a Blu-ray disc.
- HD DVD - a high-density optical disc format and successor to the standard DVD. Currently a rival of Blu-ray
- Floppy disk - an outdated storage device consisting of a thin disk of a flexible magnetic storage medium.
- Zip drive - an outdated medium-capacity removable disk storage system, first introduced by Iomega in 1994.
- USB flash drive - a flash memory data storage device integrated with a USB interface, typically small, lightweight, removable and rewritable.
- Tape drive - a device that reads and writes data on a magnetic tape, usually used for long term storage.

Internal storage

Hardware that keeps data inside the computer for later use and remains persistent even when the computer has no power.

- Hard disk - for medium-term storage of data.
- Solid state drive - a device emulating a hard disk, but containing no moving parts.
- Disk array controller - a device to manage several hard disks, to achieve performance or reliability improvement.

Sound card

Enables the computer to output sound to audio devices, as well as accept input from a microphone. Most modern computers have sound cards built-in to the motherboard, though it is common for a user to install a separate sound card as an upgrade.

Networking

Connects the computer to the Internet and/or other computers.

- Modem - for dial-up connections
- Network card - for DSL/Cable internet, and/or connecting to other computers.

- Direct Cable Connection - Use of a null modem, connecting two computers together using their serial ports or a Laplink Cable, connecting two computers together with their parallel ports.

Input

- Text input devices
  - Keyboard - a device, to input text and characters by depressing buttons (referred to as keys), similar to a typewriter. The most common English-language key layout is the QWERTY layout.
- Pointing devices
  - Mouse - a pointing device that detects two dimensional motion relative to its supporting surface.
  - Trackball - a pointing device consisting of an exposed portruding ball housed in a socket that detects rotation about two axes.
- Gaming devices
  - Joystick - a general control device that consists of a handheld stick that pivots around one end, to detect angles in two or three dimensions.
  - Gamepad - a general game controller held in the hand that relies on the digits (especially thumbs) to provide input.
  - Game controller - a specific type of controller specialized for certain gaming purposes.
- Image, Video input devices
  - Image scanner - a device that provides input by analyzing images, printed text, handwriting, or an object.
  - Webcam - a low resolution video camera used to provide visual input that can be easily transferred over the internet.
- Audio input devices
  - Microphone - an acoustic sensor that provides input by converting sound into an electrical signal

Output

- Image, Video output devices
  - Printer - a peripheral device that produces a hard (usually paper) copy of a document.
  - Monitor - device that displays a video signal, similar to a television, to provide the user with information and an interface with which to interact.
- Audio output devices
  - Speakers - a device that converts analog audio signals into the equivalent air vibrations in order to make audible sound.
  - Headset - a device similar in functionality to computer speakers used mainly to not disturb others nearby.