

Additional hardware components

Motherboard

The motherboard is the main circuit board of a computer. The CPU and ROM will be mounted on the motherboard, which also provides RAM expansion slots, USB ports, PCI slots for expansion cards and controllers for devices such as the hard drive, DVD drive, keyboard, and mouse.

Graphics Processor Unit GPU

A GPU is a microprocessor that performs the calculations needed to produce graphic images on screen.

Initially the CPU performed these calculations, but as more complex applications were developed, such as 3D graphics and video quality animations, the GPU was introduced to offload those tasks from the CPU.

GPUs can be integrated within the circuitry of the motherboard, or provided on a dedicated graphics card.

Integrated GPU

An integrated GPU uses the computer's RAM. An integrated unit is cheaper than installing a dedicated GPU, it generates less heat and uses less power. They are perfect for general graphics processing such as watching or editing videos and word processing.

Dedicated GPU

A dedicated GPU has its own video memory. Dedicated cards provide the best visual experience and are used by people such as professional graphic designers and serious gamers, but they use more power and require a good cooling system.

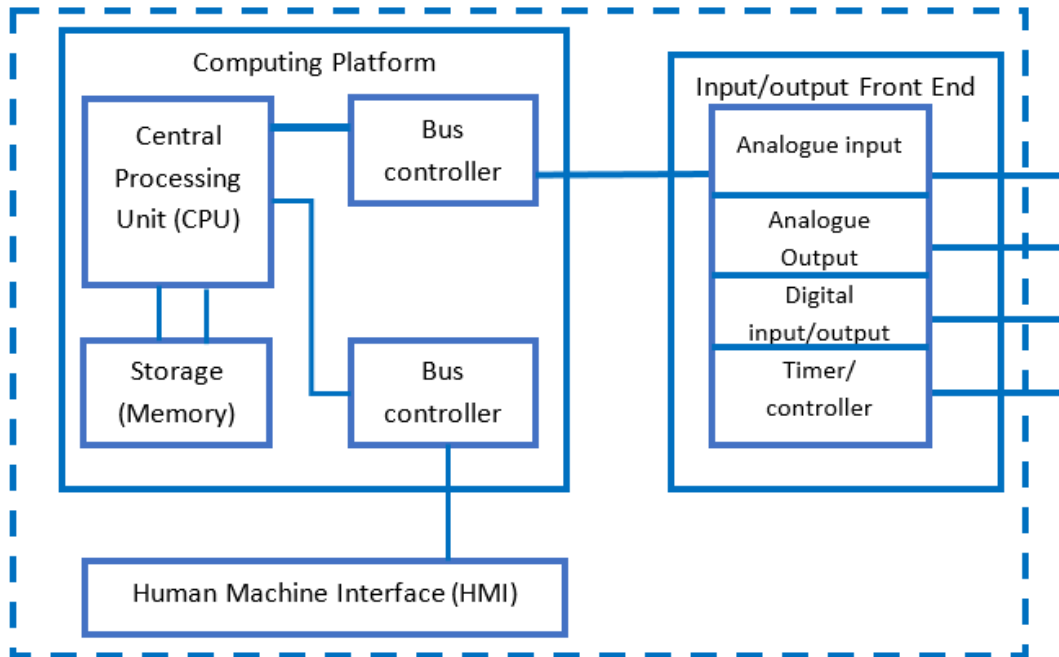
Sound cards

Sound cards may be on board (on the motherboard) or designed to fit a PCI slot. They enable the computer to output sound through speakers, to record sound from a microphone and to manipulate sound stored on a disk. Sound cards convert analogue input signals into digital data and reverse this process for audio output.

Embedded Systems

An embedded system is a combination of software and hardware that performs a specific task rather than a general-purpose computer that is designed to carry out multiple tasks.

Embedded systems are included as a part of a complete device often with hardware and mechanical parts. As the systems carry out specific tasks they can be designed to be small and have a low cost. Mass-production of embedded systems can save large amounts of money.



The software written for an embedded system is known as firmware. The instructions are stored in read-only memory or in Flash memory. The software runs with limited computer hardware resources, little memory and no peripherals.

Most embedded systems are reactive - they react to conditions such as temperature, weight, vibration and air quality. These systems detect external conditions and react to them by recording data, turning motors on or off, sounding an alarm or sending a message to another processor.

Reactive embedded systems often control real time events so must be completely reliable. For example, drivers rely on the anti-lock braking system of their car working correctly to avoid accidents on the road.

When an embedded system performs operations at high speed, and if it is very reliable, it can be used for real-time applications. If the size of the embedded system is very small and power consumption very low, then the system can be easily adapted for different situations.

INTERESTING FACT

98% of the microprocessors manufactured go into embedded systems.

Some examples of devices that incorporate embedded systems:

Electronics	Mobile phones, games consoles, printers, televisions, digital cameras
In the home	Washing machines, microwave ovens, refrigerators, dishwashers, air conditioners
Medical equipment	CT Scanners, Electrocardiogram (ECG), MRI Scanners, blood pressure monitors, heartbeat monitors
Cars	Electronic fuel injection systems, anti-lock braking systems, air-conditioner controls.

