


Week 3: Typical desktop system

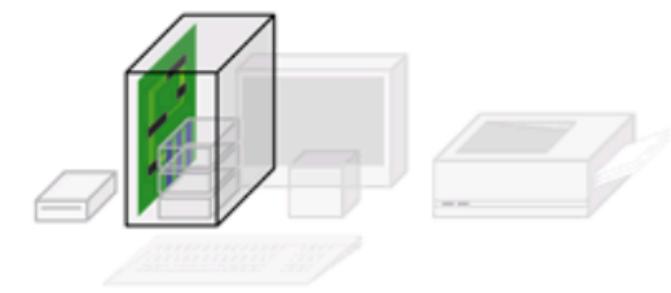
A complete computer system is made up of a number of individual components, both internally (chips and circuitboards performing specific core functions) and externally (peripherals that allow data to be stored, printed, presented, and so on).

Core components

The core components of the computer form its "backbone", so to speak. It provides the basic infrastructure that allows the computer to function, and for other peripherals to be connected to it.

These core components are usually grouped together on a circuit board known as the [motherboard](http://en.wikipedia.org/wiki/PC_motherboard)  (http://en.wikipedia.org/wiki/PC_motherboard).

- Motherboard
 - main printed circuit board (PCB)
 - houses CPU socket and slots for main memory
 - expansion slots
 - expansion card functions are increasingly being moved to the motherboard




Internal expansion

Attached directly to the motherboard are various *internal* (within the computer case) expansion devices. Components that are kept inside the computer are usually those critical to its function. This includes devices such as:

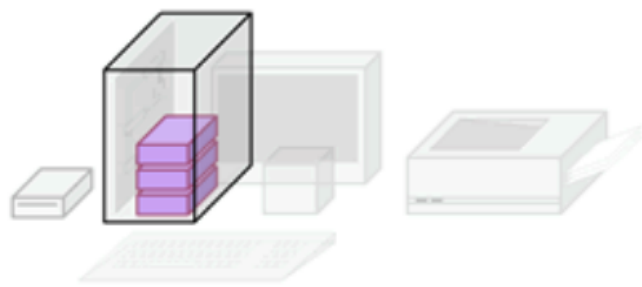
The CPU: the processor is usually mounted in a socket on the motherboard, enabling it to be removed and replaced with a faster or newer model.

Memory: electrical connectors allow the installation of *memory modules*, which can be added and removed to allow for memory capacity to be upgraded.

Expansion Cards  (http://en.wikipedia.org/wiki/Expansion_card): many motherboards include a set of electrical connectors known as *expansion slots*, into which cards can be inserted. Expansion cards can increase the functionality of a computer by giving it special features such as high-end audio and video capabilities, networking ability, and other connectivity options.

Internal Disks: computers have at least one internal hard disk for permanent storage of data. These disks are connected to the computer via connectors on the motherboard and mounted within the case drive bays.

- Internal Expansion
 - inside computer case
 - expansion cards such as network cards, graphics cards etc.
 - internal hard drives



External expansion


Ancillary devices that provide additional, non-core functionality are typically connected *externally* (i.e. in their own separate box, connected via cable to the computer system.)

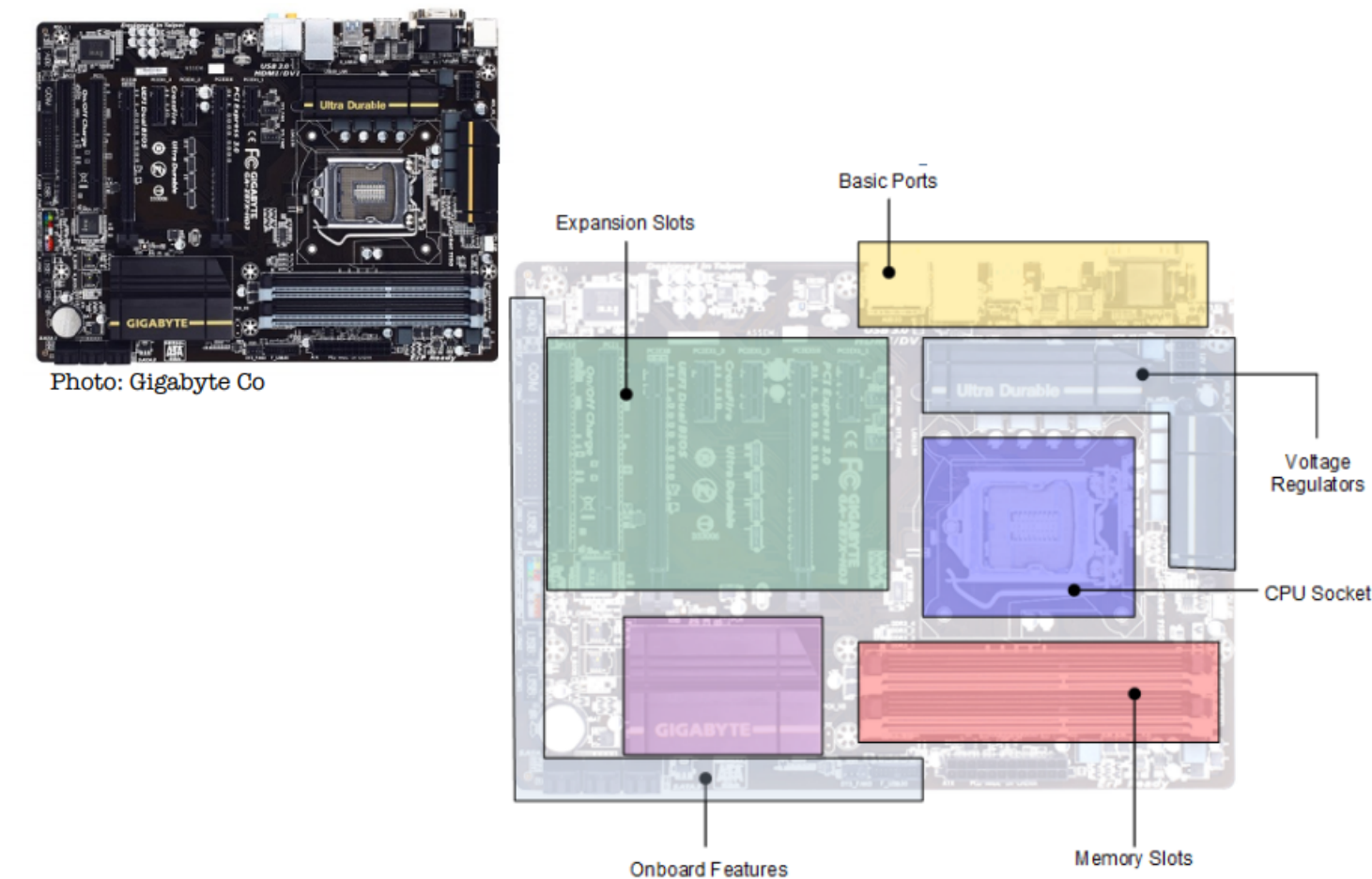
This includes peripherals such as keyboards, mice, printers, modems, and so on. There are a number of different connection methods for these devices, which will be covered in the next chapter.

- External Expansion
 - outside computer case
 - non-critical functions
 - peripherals such as keyboards, mice, printers etc.





System architecture

Regardless of the computing platform, there is a common design philosophy in how the internal components of a desktop computer are designed to work together. These core components are put together on a circuit board known as the [motherboard](http://en.wikipedia.org/wiki/PC_motherboard)  (http://en.wikipedia.org/wiki/PC_motherboard), (also known in some references as a *logic board* or *planar board*).



The motherboard

The motherboard (aka logic board) is the circuit board on which the core internals of the computer are placed. The picture below has been highlighted and annotated to show where each of the main components are, which we'll explain shortly.

Each motherboard is unique in its exact layout, however there are standards in their physical design (such as size, mounting holes, where ports will be) to ensure that motherboards consistently fit into computer cases. Two such standards exist for modern desktop PCs; [ATX](http://en.wikipedia.org/wiki/ATx)  (<http://en.wikipedia.org/wiki/ATx>) and [BTX](http://en.wikipedia.org/wiki/BTX_(computers))  ([http://en.wikipedia.org/wiki/BTX_\(computers\)](http://en.wikipedia.org/wiki/BTX_(computers))). "Small form factor" computers tend to have unique layout standards.

The [CPU](http://en.wikipedia.org/wiki/Central_processing_unit) ² (http://en.wikipedia.org/wiki/Central_processing_unit) is the processing core of the computer. As it needs to interact with a large number of different interfaces (computer memory, disk drives, displays, and so on) it requires a *supporting chipset* to be able to connect with these devices in a cohesive, efficient manner.