Universal Serial Bus

Universal Serial Bus or USB is a plug-and-play interface between the PC and the peripherals. **USB** is a standard port that helps to connect computer peripherals like scanner, printer, digital camera, flash drive and more to the Computer. The USB standard supports the data transfer at the rate of 12 Mbps. The advantage of USB is that the device can be plugged in or plugged out without the need of restarting the PC. Here explains the working of USB.


USB Specification

Two important aspects of USB are its **support capability** and **total bandwidth**. USB is capable of supporting **127 USB devices** and has a total **bandwidth of 12 Mbit per second** which is equal to 1.5 MB per second. Working of a 12 Mbit (full speed device) or a 1.5 Mbit (low speed devices) depends on the total bandwidth of the USB.

USB Connections

Each USB device uses the standard **A type USB** connector to the **USB host** or Hub through **A type receptacle**. The other end of the USB cable has series **B connector** which is used to plug into the **B type receptacle**
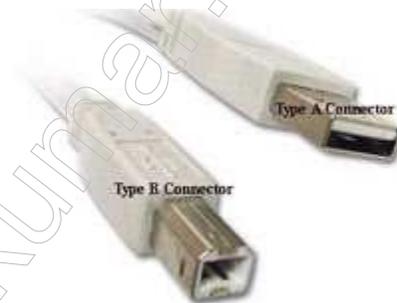
A connector is used for the upstream connection towards the host and **B connector** for the downward stream to the USB device. When the USB device is connected to the PC, it activates the host to recognize it. The PC detects the USB device and manages a control flow between the USB device and computer. PC also manages the data transfer between the USB device and PC. Once detected, the PC sends data to the USB system software to recognize it which then identify the device and assign an **address.** This address is used to detect the particular USB device. The software controls the input and output data between the PC and USB device. If the software fails to assign the address, PC will not detect the USB device.

Receptacles
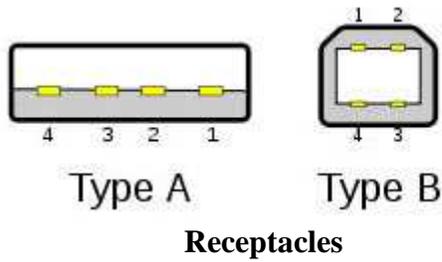
USB Cable

The **USB cable** provides four pathways- two **power conductors** and two twisted **signal conductors**. The USB device that uses full speed bandwidth devices must have a twisted pair D+ and D- conductors. The data is transferred through the D+ and D- connectors while Vbus and Gnd connectors provide power to the USB device.

Wiring connection

The **USB cable** has typically four wires to connect the A type connector

Red   + 5V   Pin 1
White   D+   Pin 2
Green   D-   Pin 3
Black   Gnd   Pin 4
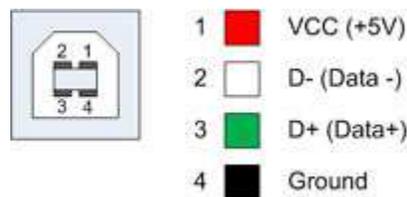
USB Hub

The **USB Hub** is used to connect many devices to the PC using a single USB connector. The USB Hub can detect the attachment or detachment of devices in each port of the Hub. The Hub also distributes power to all the devices connected to it. Hub also detects low speed and full speed devices.

The USB Hub has two components- A **Hub controller** and a **Hub repeater**. The Hub controller enables the Hub to communicate with the PC for configuration and control of devices attached to it. The Hub repeater has hardware support for reset, suspend and resume signals.

USB Flash Drive
The most commonly used USB device is the **Flash drive** the commonly called Pen drive. It is a mass storage device capable of functioning like a hard disk of computer