

BLUETOOTH

What is Bluetooth

Bluetooth is a low-speed, low-energy short-range wireless communication technology for transmitting fixed and mobile electronic device data over short distances. **Bluetooth** was introduced in 1994. The "Bluetooth" name is taken from a 10th-century Danish king named Harald Bluetooth, He was known to unite disparate, warring regional factions. **Bluetooth SIG industry** with Headquarters at Kirkland, WA 98033 USA controls Bluetooth's trademark.

Many of you may have heard about Bluetooth, especially with cell phones, speakers, headphones, printers, etc. This technology is used to connect Bluetooth enabled devices so that they can "talk, communicate" with each other, It creates a world, free from wire

Difference between Bluetooth and wifi

Wifi-It is also a wireless standard, but rather than being designed to communicate between devices, it serves to wirelessly connect devices to the internet. The main difference is that Bluetooth is primarily used to connect devices without using cables. Bluetooth range and transmission speeds are typically lower than Wi-F. Wi-Fi provides high-speed access to the internet

Bluetooth Technology

Bluetooth allows for data transfer from the source to the receipt when both are connected via Bluetooth. It acts much like an invisible cord between the two devices by creating a secure, wireless personal area network in which these devices can communicate. This technology is used to exchange data over short distances up to 10-meter (33-foot) radius wireless network, called a personal area network (PAN) or piconet. At present PAN can be created between two to eight devices. One Master device (Host Device) can connect to seven slave devices. Any slave device in the piconet can only be connected to a single master. Slaves are only allowed to transmit to and receive from their master. They can't talk to other slaves in the piconet.

You can enjoy music with your **Bluetooth Headphone** when your Bluetooth smartphone is in another room. In my mac, my keyboard and mouse are connected to mac through Bluetooth. It is so very convenient!!

Bluetooth Profiles

Profiles are definitions of possible applications and specify general behaviors that Bluetooth® enabled devices to use to communicate with other Bluetooth devices. Profiles build on the Bluetooth standard to more clearly define what kind of data a Bluetooth module is transmitting. The device's application determines which profiles it must support, from

hands-free capabilities to heart rate sensors to alerts and more. Bluetooth specifications define how the technology works, profiles define how it's used.

When embedding this technology in a device, a "Profile" is allocated to a device called Classic or Smart profile. These devices are called Bluetooth Smart or Bluetooth Classic devices. Bluetooth Smart devices is a low energy version and work on a different protocol than classic Bluetooth devices. Gadgets like smartphone, Headphone, laptop, printer, PDAs, Cameras are classic Bluetooth devices, Wearable, peripheral devices, as well as all other items that extend our smartphone's functionality like smartwatches are Bluetooth smart devices.

Connections of Master & Slave Bluetooth Devices

Bluetooth connection between two devices is a multi-step process involving three progressive states:

Inquiry — One Bluetooth device run an inquiry to try to discover the other. One device sends out the inquiry request, and other device respond with its address, name and other information.

Connecting — Each device understands the address of others and creates a connection

Connected — After a device has completed the connecting process, it enters the connection state. While connected, a device can either be actively participating or it can be put into a low power sleep mode.

Pairing and Bonding

There is a difference between pairing and bonding. Pairing is the exchange of security features between devices. Master send their features and slave confirms having those features. This is actually a compatibility test among Bluetooth devices. Once the pairing feature exchange is complete, a temporary security key is exchanged and the connection is encrypted, but only using the temporary key. So The devices are paired. Simultaneously the devices STORE and USE those keys for next time they connect. Keys can be exchanged using the bonding procedure. Thus common key creates bonding. Whenever such two devices are close together, they read the bonding key and automatically pair up. In the case of our car, the smartphone gets connects to the car's Bluetooth system. Headphone gets connected to the smartphone.

Bluetooth 5 (BT5)

Bluetooth 4.1,4.2 and 5 are various versions of Bluetooth technology. Every higher version has more and advanced feature. **Bluetooth 5** is the latest version of Bluetooth that has been released in December 2016. The special interest group (SIG) that controls the spec has opted to simply call it "Bluetooth 5" with no decimal point, Bluetooth 5 was designed specifically to provide lossless and secure communication as our gadgets

and gizmos become more and more technologically advanced. Bluetooth 5 is the fastest iteration. The main goal of Bluetooth 5 is to increase the overall quality of the connections and the interoperability of these connections. This means the higher the speed the more responsive high-performance devices will be. The increased broadcast message size also means more data can be transmitted. Cell and batteries can run for a longer time. Bluetooth 5 also enables a cool new feature that allows you to play audio on two connected devices at the same time. you could have two pairs of wireless headphones connected to your phone, and then streaming audio to both of them at once. Also, your headphone may be connected to two master devices. My Bose Headphones (the slave device) is connected to my MacBook Air and iPhone X (both Master Devices). I may be enjoying Music from MacBook, but when there is an incoming call, it gets disconnected from MacBook and takes the call from iPhone. The range of Bluetooth 5 is around 240 meters (800 feet).

Backward compatibility of Bluetooth 5

Bluetooth 5 hardware is fully backward compatible with prior versions of Bluetooth. Bluetooth 5 phone will have no problem at all working with all the lower version Bluetooth headphones, fitness trackers, printers, etc. However, the benefits of the new technology will not be available when connected with Bluetooth 4.0, 4.1, 4.2 devices. In such cases, you are limited to the older device's specifications. So, if you have a phone that supports Bluetooth 5.0 but a headset that supports Bluetooth 4.2, you'll be limited to the 10 meters (33 feet), a distance of Bluetooth 4.2.

Bluetooth Limitations

Drain on battery power although as the technology (and battery technology) has improved, this problem is less significant than it used to be.

The range is limited, usually up to 33 feet (10 meters), and obstacles such as walls, floors, or ceilings reduce this range further.

The pairing process may also be difficult, often depending on the devices involved, the manufacturers, and other factors that all can result in frustration when attempting to connect.

How Secure Is Bluetooth?

Bluetooth is considered a reasonably secure wireless technology. Connections are encrypted, preventing any interference from other devices nearby. Bluetooth devices also shift radio frequencies often while paired, which prevents easy invasion. Since secret keys are created for each pair, when using two different paired devices, they don't interfere with each other. However, hacking is always possible and attempts are made by hackers as on the internet.

Health effects of Bluetooth

Does the use of cellphones, laptops, or any portable device cause damage

to your health? People seem to worry about this question since wireless technology occurred. Recent scientific research published finds no correlation between cell phone use and brain cancer. A new Australian study of 30 years of data, shows no correlation whatsoever between **cellphone use and cases of cancer**. Bluetooth operates at the same frequency as of that mobile phones but sports less power, The radio frequency at which these devices work is between 2.4Hz to 2.485 GHz while Wi-Fi is at 2.4GHz.

In order of decreasing frequency (and increasing wavelength), the various regions of the electromagnetic spectrum are gamma rays, x-rays, ultraviolet, visible light, infrared, microwaves, and radio waves. The radio waves are at the lowest end and do not affect humans.