Bluetooth Enhancement in Data Transmission

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Abstract—Bluetooth is a small range wireless connectivity that is mostly used in many devices my vision is to increase the data transmission range and speed .This paper says a number of problems faced by the Bluetooth communication when transmitting data. The paper provides a brief overview of Bluetooth and describes some of the major issues that need to be said it is a wireless networking technology. Some important features that any solution must talked and encouraged to improve the technology. Some commonly faced problems in Bluetooth technology are data transmission rate, distance of transmission. The bluetooth technology supports devices that consist of Bluetooth. Bluetooth can penetrate through walls it is a portable device that can be used almost in many devices. It is designed for wireless communication between wide variety of devices. It is most consistent and prominent technology. My vision is to implement RF module into Bluetooth chip set to increase the performance of the Bluetooth machinery.

Keywords— *Wireless technology, transmission rate, portable, RF mod.*

1. Introduction

All the devices such as peripheral devices like Keyboard connected to the computer, also devices like,headphones,microphones,mobiles,laptops,mouse,spea kers,tabs,etc They are connected by cables. Cables have become the base of these devices this limits user interface by sitting at a particular area and operate the devices of many offices, homes etc. this is the reason why Bluetooth technology is introduced to replace the cables. One of the simplest recent developments in wireless technologies is the emergence of Wireless personal area networking (WPAN). [1]Developed in 1998, WPAN is based on a new technology called Bluetooth, which uses small-range radio frequencies to transfer both speech and data. This technology is wireless and transparent and synchronizes data across devices and creates access to networks and the Internet within a range of ten meters. The small-range networks Bluetooth enables are called Personal Area Networks (PANs) or piconets. Bluetooth is cleverer to move from frequencies to frequencies, making it better able to handle intervention than challenging protocols. Bluetooth machinery is the result of the joint achievements of nine leading companies such as 3comm, luecnt

technologies, International Business Machine, Intel, Microsoft corp, Motorola mobile comp, Nokia mobiles, Toshibha, Ericsson altogether known as the Blue Tooth Special Interest Group (SIG), which has well-known involvement by many companies. [1][2] In the beginning started by LM. Ericsson, it was designed as a small-range communications medium for wireless headsets to communicate with Mobile phones.

2. Bluetooth Technology Advantages

It splits the frequency group into steps. This extent spectrum is used to step from one piconet to another, which adds a robust level of safekeeping. Signals can be communicated through walls and carry cases, thus eradicating the need for line-of-sight. Devices dont need to be jagged at each other, it is not like infrared as signals are uni-directional one process at a time either send are receive. The both synchronous and asynchronous applications are reinforced, making it easy to implement on a variety of devices and for a variety of services, such as speech and Internet. Administrations worldwide normalize it, so it is possible to utilize the same standard wherever one travels. The Aim of "Bluetooth" has been set somewhat high. It is to come to at a requirement for a technology that optimizes the usage model of all mobile computing and communications devices, and providing Global usage, Voice and data handling. The ability to establish ad-hoc connections are specified below.

3. Bluetooth specification

Bluetooth is a global specification for a lesser form-issue, little-cost radio solution providing associations between mobile computers, mobile phones, and other movable hand seized devices, as well as connections to the Internet. The Institution of Electrical & Electronics Engineers (IEEE) has given the IEEE 802.15 standard. A Time-Division Duplex (TDD) scheme is used for full-duplex communication. Its main strong point is its capability to instantaneously handle both data and voice communications. A portable computer well-found with Bluetooth machinery, for example, could bond to a similarly well-appointed mobile phone to connect to the Internet. Numerous Bluetooth entities practice a Wireless Personal Region Linkage, called and up to seven client devices.

A Bluetooth WPAN is accomplished of supporting an asynchronous data link with every clients and synchronous speech associations with up to three client devices. It provides a range of up to 10mat a transmit power of 1 mwatt. Bluetooth piece, which will then stretch the evidence established to the workstation, mobile phone whatsoever. Bluetooth proposed the most economical solution for low-to-medium-speed device connectivity. It targets at small power drinking and delivers security for both stationary and mobile devices. The simple task is to deliver a standard wireless technology to replace the multitude of propriety cables currently linking computing devices. Technical standards and performance levels Bluetooth is established upon minor, high enactment incorporated radio transmitters & receivers, every of which is assigned a unique 48-bit address derived from the IEEE 802 standards. It operates in the unobstructed 2.45 GHz ISM permitted band, that is obtainable worldwide, even though minor deviation of location and width of band apply. The range is set at 10 meters to optimize for target market of mobile and business user. [4]The range can, however, be increased. Gross data rate is 1Mbit/s, with second generation plans to growth to 2 Mbit/s. One-on-one acquaintances permit supreme data transfer rate of 721 Kbits (corresponding to 3 voice channels).

Bluetooth uses a packet transferring protocol, centered on a rate of recurrence step scheme with 1600 hops/sek. to empower great enactment in piercing radio surroundings. The complete accessible frequency band is used with 79 hops of 1 MHz bandwidth, analogous to the IEEE 802.11 standard. It has low power consumption, portrayal only 0.3 mA in stand-in manner. This permits supreme enactment prolonged existence for battery power-driven devices. Throughout data transmission the supreme current gutter is 30 mA. Nevertheless, during suspensions or at minor data rates the drain would be lower.

4. The Bluetooth network topology

There are 3 types of connections in Bluetooth, as Single-slave or Multi-slave (up to 7 "slaves" on one master) or Scatter net. Multiple Bluetooth units form a Wireless Personal Area Network, called a piconet. A piconets comprises of one hub device and up to seven client devices. It is thinkable to backing more devices in a piconet by placing one or more of the clients into what is referred to as common mode. In command to interchange information with the allocated client, the hub must gross it out of allocated mode and return it to energetic mode. Merely seven clients can be in lively mode at any given time. When two piconets are in nearby contiguity, they have overlapping coverage areas - a scenario referred to as a scatter net Clients in one piconet can participate in another piconet as either a hub or client. This is accomplished through time division on multiplexing. In a scatter net, the two(or more) piconets are not synchronized in either time or frequency. Each of the piconets operates in its own frequency-hopping channel, while any devices in multiple piconets participate at the appropriate time via time division multiplexing. A piconet can be created in one of 4 ways A page (used by Master to connect to Slave) or A page scan (a unit listens for its´ device access code) or A Master – Slave switch is made or An "Unpark" of a unit is made (provided there are no active slaves).

5. Personal Networking Hardware and the Protocol Stack Layers

Bluetooth radio modules use Gaussian Frequency Shift Keying (GFSK) for variation. The data is transmitted at a data rate of 1 Mb/second. The Bluetooth Baseband Level: The baseband layer performs occupations like Bluetooth packet assembly, Forward Error Correction (FEC), automatic repeat request (ARQ), data whitening, Bluetooth watch synchronization, and frequency leaping control. The Bluetooth Link Manager Layer: The Link Manager forms the piconet by inquiring what other Bluetooth radios are in the area, establishing connection and maintaining the piconet. The Link Manager also handles security issues like authentication and encryption**.**

6.1 Radio

The Radio layer defines the requirements for a Bluetooth transceiver operating in the 2.4 GHz ISM band.

6.2 Base band

This layer describes the specification of the Bluetooth Link Controller (LC) which carries out the baseband protocols and other low-level link routines. The Link Manager Protocol (LMP) is used by the Link Managers (on either side) for link set-up and control. The Host Controller Interface (HCI) provides a command interface to the Baseband Link Controller and Link Manager, and access to hardware status and control registers. Logical Link Control and Adaptation Protocol (L2CAP) supports higher level protocol multiplexing, packet segmentation and reassembly, and the conveying of quality of service information.L2CAP, which adapts upper layer protocols over the Baseband, provides data services to the high level protocols with group abstractions.
[7] The RFCOMM protocol provides emulation of serial ports over the L2CAP protocol. The protocol is based on the ETSI standard TS 07.10. The Service Discovery Protocol (SDP) provides a means for applications to determine which services are delivered by or available through a Bluetooth device. Device information, services and the appearances of the services can be queried using the SDP.

6.   The Power Method

Bluetooth provides for three low power modes to conserve battery life they are sniff mode, hold mode, and park mode. While in the snuffle mode, a device listens to the piconet at a reduced rate. The snuffle interval is programmable, providing elasticity for different applications. In hold mode, only an internal timer is running and data transfer restarts when units transition out of the catch method. Park mode is used to handle more than seven clients - since only seven clients can be "active" at any time, one client can be "parked" and another one activated. This is because small packages and fast leaping limit the impact of microwave ovens and other sources of turbulences. Use of Forward Error Correction (FEC) limits the impact of random noise on long distance associations. Bluetooth can support an asynchronous data channel, or up to 3 simultaneous synchronous voice channels, or a channel which instantaneously supports asynchronous data and synchronous voice data. The replacement in RF module will surely increase the data transmission faster and quicker.
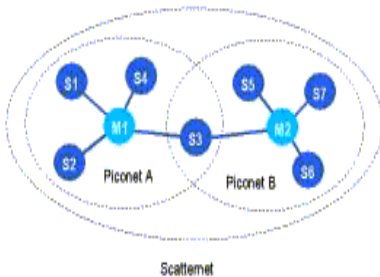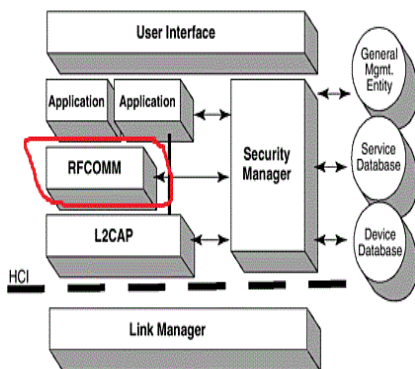

Fig.1: Scatter net

Fig.2: Bluetooth architecture

7.   Methodology

Bluetooth has a protocol architecture that is keep on changing from versions to versions It has antennas receivers transmitters amplifiers etc. these are changed from one Bluetooth version to another Bluetooth versions. Changing the RF module present in Bluetooth chip may help in acquiring the desired result of long range connectivity and quick data transmission. It is simple that previous versions of Bluetooth machineries were changed according to clients requirement Bluetooth versions from 1.0-4.0 have drastic change in transferring data and improved a lot in security measures it provides a security key to handle data transmission between devices the user can select the device that he wants to transfer his data with the user he wants to share with Bluetooth is a well populous technology that is used in many devices because it is portable and less power consuming it cannot transmit data to a long range but if the hardware part is changed such as RF module the rf module in the Bluetooth chip was very small it can transmit signal for some distance circle if the device exceeds the distance the connection will be lost and it can transfer data at 1mb/s if the new RF module is introduced it will increase the size of the Bluetooth chip millimeters to centimeters that can transfer data to fair distance up to 100mtrs but the size of the device will be transformed to new dimension so it may be hard to implement in devices like before as the size increases so the Bluetooth devices can be transformed and it has to be framed a new protocol architecture. The protocol architecture of Bluetooth are changing and differs from versions to versions so it is not restricted that the Bluetooth architecture should not be changed so it is always permissible chat it can be modified according to the user satisfaction to obtain best performance .

8.   Conclusion

Bluetooth devices are very small devices they cannot transmit for long range security can be breached easily every Bluetooth chip is 9mm*9mm chip it cannot transfer for long range because the rf *(radio frequency)module i.e, the receiver and transmitter in the chip is very small if it is replaced by 100 mtrs rf module frequency that is highly enough for the devices to transmit data for long range and receive data quickly.

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