Lifi wireless communication

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Abstract

Li-Fi stands for Light-fidelity. The technology was very new and proposed by the German Physicist Harald Hass in 2011. Li-Fi basically aims to replace Wi-Fi by using light to transmit internet signals. It works on the principle of visible light communication I.e .use of visible light for communication. Though Li-Fi is a system that is capable of transmitting data at high speeds over the visible light, ultraviolet and infrared spectrum but in its present state only LED lambs can be used. It consists of a light bulb which is used as an emitter and a photo diode as a receiver. Li-Fi provides transmission of data through an LED light bulb that varies in intensity faster than human eye can follow .It is ideal for high density wireless data coverage in confined area where there is no obstacle. It provides better bandwidth efficiency, availability& security than wifi. The technology is actively being developed by several organizations across the globe. In this project we tried to show a basic prototype of wireless data transmission using LiFi and what future it holds within itself for the new generation needs

Keywords: *Transmission , Microcontroller, Hyperterminal, Spectrum, Efficiency*

1. Introduction

Now we Can Connect Small Application of Microcontroller like LED or DC Motor I found Beautiful concept to communicate two PC or Laptop with some RS-232 Communication simulator or software like Hyperterminal by VLC (Visible Light Communication) , technique LI-fi we are making use of this technology in order to transmit data using this Lifi . Here are the components that we are using

- Components In Lifi Transreceiver :- U3 Voltage Regulator:- 7805 B1 Battery :- 9V Photo transistor L14G1 OP505A Schmitt-Trigger IC 7414 Hex Inverter U2:A U2:B U2:C U2:F Preset/ Variable resistor RV1 10k or 20k LED D1 White Transistor Q1 BC-548 Diode D2 D3 1N4001-1N4007 IC U1 Max 232 Capacitor C1,C2, C3, C4, C5 - (0.1uf) Resistance R1- 1k, R2-10k DB9 Connector for PC communication
- In microcontroller Circuit :- Microcontroller U1=At89s52, Crystal Oscillator x1=11.0592 Capacitor C3=10uf, c1,c2 = 33Pf Network Resistance Rn1= 10k Resistance R1= 10K Micro Switch With C3 Capacitor LED array or 2 LED U2 Note :- In Circuit you Don't Need Network resistance , It is only require when you plan to read from microcontroller from port 0

2. Working

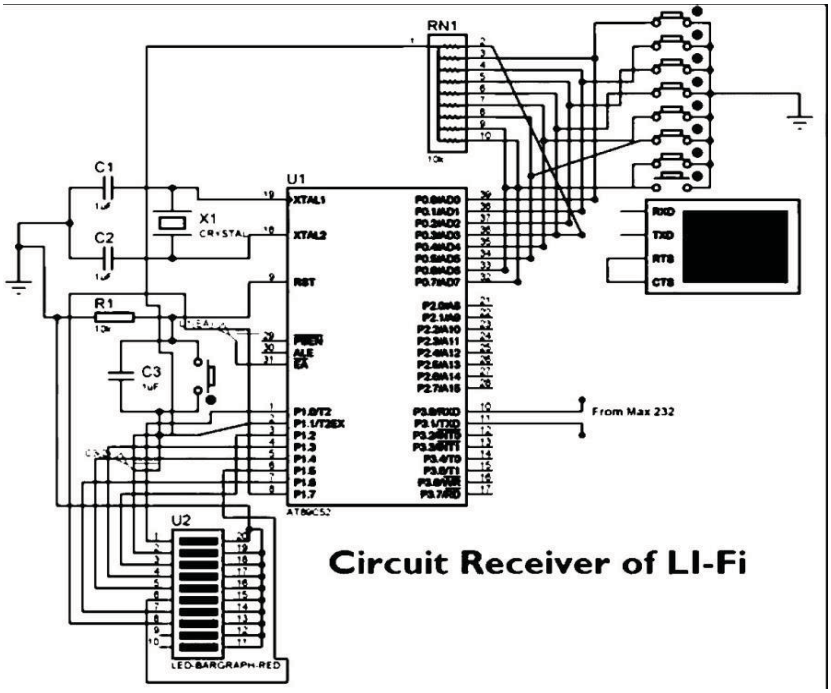
2.1 Receiving

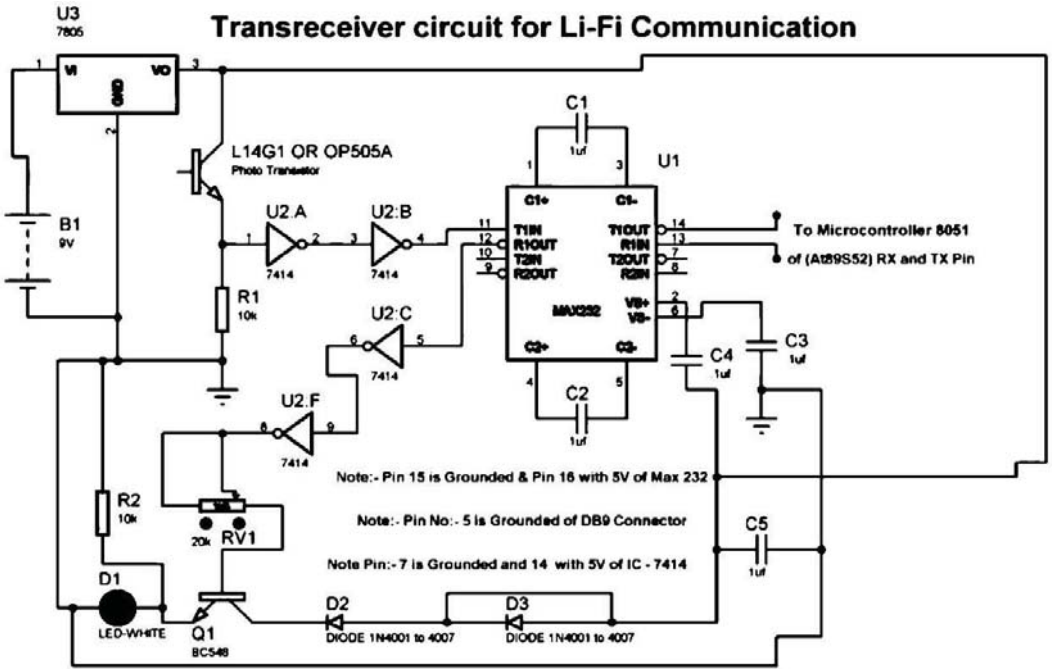
Likely in above circuit through Photo transistor LED feed in there is fluctuations or I can say through Rs-232 communication protocol relevant signal are coming where Light switch on and off in higher speed where human eye can't detect there switching , these data switch/trigger Schmitt-Trigger. We are doing this to amplify signal to first stage Pin2 and make amplified signals with reduced noise original signal to pin 4 then signal goes to pin 11 of max-232 IC where high voltage / uneven signals processed to TTL level of 5V processed and out to pin 14 of max-232 IC. Now these signal are ready to process by application or simulators like Hyperterminal which is set by 2400 baud rate or high/low in both computers or Microcontroller. Like in circuit Microcontroller are set in receive mode where LED is connected at Pin 21, 22 or P2.0, P2.1, Whenever from Computer , Signal is transmitted to microcontroller Selection of LED is Processed through LED's

2.2 Transmit

Through DB9 pin no. 3 output data in Low current -15 to +15V (by computer original not USB to serial converter) or by USB to Serial converter 5v to Max-232 IC pin 13 where signal convert to TTL level 5V to further required.. through pin 12 we get TTL output and feed to buffer noise free output at pin 8 of 7414 where it is connected to base of transistor for very high current and voltage amplification which can drive LED .You can take high voltage/current supply to drive hundreds of LED to transmit a data as well, Now Circuit is Ready to transmit

Then after our both circuits are ready we have to install Hyperterminal in order to give commands to communicate .It will work as follows like if we give command 0, one right side LED will glow. If we enter 1, the Left side LED will glow and if we command 2 then both led will get turned off and all this data transmission is taking place through light. Thus we are successful in our approach towards data.





3. Applications of LiFi

1. Imagine when you traveling and road lights gives you position on your mobile and computer display in car what is nearby.

2. Two cars can communicate with each other and can give you traffic density further ahead on road

3. In museum for scholars they can go to LiFi audio / Data region to collect information about monument or object at spot of light

4. In day and Night through Infrared and Visible light you can work without interruption ie. light is on or off

5. Give your garage gate to open or close instruction with your car head light encrypted data instruction to open

6. Imagine you are sitting in park, malls, railway station, airport, Public Places and doing internet playing games , communicating neighbours , finding in malls every gate what they have in there visible light regions

7. Charging your phone with light through solar modules and at same time working uninterrupted with power supply all time.

8. Under Water in Submarines, water divers can communicate in line of site, instead of gestures

4. Conclusion

We can clearly see that LiFi has so many advantages like high speed factor, no electromagnetic radiations and also transmission is effective in terms of transmitting capabilities .But there holds certain cons which needs to be improve in order to use it on a large scale like transmitting it long distances without loss in data and the efficiency factor must be comparable with the WiFi as well as the cost of setup must also be considerable so that it can be used as a general technology. Thus today we can't say LiFi is the substitute of

WiFi rather we can see them both working parallel and the technology evolves LiFi holds large variety within itself.

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