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# **Advanced Li-Fi Technology for Data and Voice Transmission with Device Control**

Harisha A M<sup>1</sup>, Chetana R<sup>2</sup>

<sup>1</sup>PG Student, VLSI and Embedded Systems, Department of ECE, SJB Institute of Technology, Bengaluru, India

<sup>2</sup>Associate professor, Department of ECE, SJB Institute of Technology, Bengaluru, India

**Abstract:** *Now a days, Data transmission without using any network is very tedious job to do. In this paper, data and audio is transmitted and gotten through visible lights and control the devices. The data is generated by PC1 then transmitted through LED, these data can be received by photo detector and displayed on PC2. It is an advanced technology and the accuracy is more. In this paper data communication, controlling the devices and as well as transmission of audio through visible light is achieved. Now a day, Wi-Fi is commonly used technology but the radiations are hazardous for human health so Li-Fi is the one which eliminated the wireless technology like Wi-Fi and transmits the data by using light. The security of transmitting the data is more compare to other technology. In industries, for file transmission and data transmission this technology is very useful because without using any networks one can easily transmit the data through existing light. It is user friendly and is cost effective. This technology is also used to control the devices like bulb, fan etc through visible light so that we can avoid the wastage of electricity. The data rate in this technology is faster than 10Mbps.*

**Keywords:** *Li-Fi, 8051 Microcontroller, Relay, LED, Photo detector, Data Transmission.*

## **I. INTRODUCTION**

Li-Fi is abbreviated as "Light Fidelity" is recent advancement used for many applications like street light control, data communication, navigation for blind people and audio transmission etc. in this paper, an attempt is achieved to transmit audio, data and controlling the devices. In this paper, by using the visible light, pc to pc communication is achieved and controls the devices as well as audio transmission like music player to play the song is done. The father of Li-Fi is "Harald Hass". He innovates the idea of Li-Fi in 21<sup>st</sup> century and he says that the main thing of this innovation is present in power and capacity of LEDs.

Through the light we can control the devices like home apparatuses, any electronic devices can be ON and OFF by utilizing the switches. As an ever increasing number of devices coming up step by step however the Li-Fi is more effective and profoundly secured and consistently transmit sound, voice in simple light force. It works in street to-vehicle communication in outside application so it is designed in such a way that it has to transmit the data same as Wi-Fi but security and speed must be more than Wi-Fi.

Li-Fi also controls the devices and spare the vitality utilizations and sitting in one place to control every devices in home. So this technology is also used in home automation applications. The data communication without network is little complicated so this Li-Fi transmits the data without any extra networks. In airplanes, such a large number of lights are used and Wi-Fi can't be adequately utilized so to overcome this issue Li-Fi can be used. The main advantage of Li-Fi is it is ok for people since light, not at all like radio frequency, can't enter human body. Thus worries of cell change are relieved.

## **II. BACK GROUND**

Li-Fi has been around 1990s. But the true work carried out by Harald Hass started in 2000s. He introduces the Li-Fi technology through which we can transmit the data using lights. He called those lights as D- lights. After this many works has been undergone but they had some disadvantages like some of them uses wireless technologies to transmit the data and some of them used optical fiber cable to transmit the audio. But in this paper, Li-Fi is used and 8051 is the main component used which controls the whole system. And is more secured than other wireless technologies because it uses photo detectors to receive the data and audio etc. but in other achievements, they use different cables and all for communication. And this technology is also termed as special modulation

## **III. METHODOLOGY**

The main objectives of this paper is to transmit data and voice over the visible light and to control the devices in home appliances,

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and to eliminate the network dependent communications so the Li-Fi is develop which is existed system[3] and it is cost effective. The overview of data transmission is shown in Fig 1. An 8051 Microcontroller is the heart of the system, it is a 8-bit CPU and it supports 64k of data memory. Then generated data is transmitted through LED and data will be generated by keypad and control the devices by using the switches so that the data can be encoded and transmitted through LED, basically it is a wireless communication and receiver side photo detector receives data then data will decoded from the microcontroller, original data can be displayed on the screen of PC 2 and LCD displa.

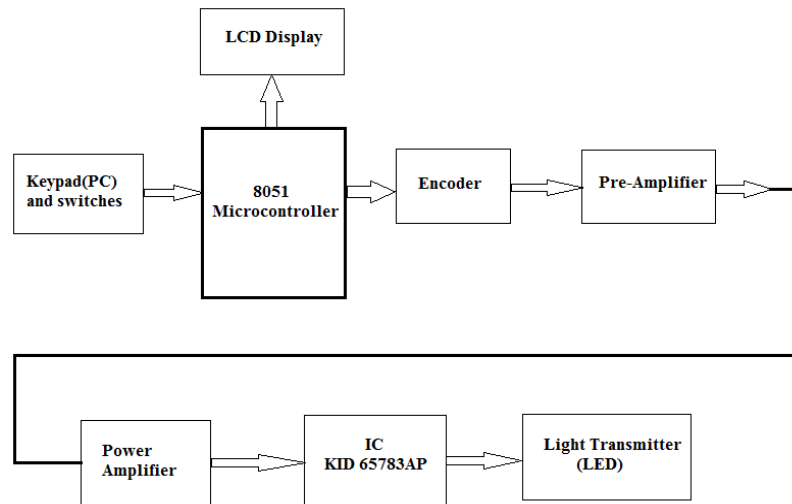


Fig 1: Data transmitter and device switching

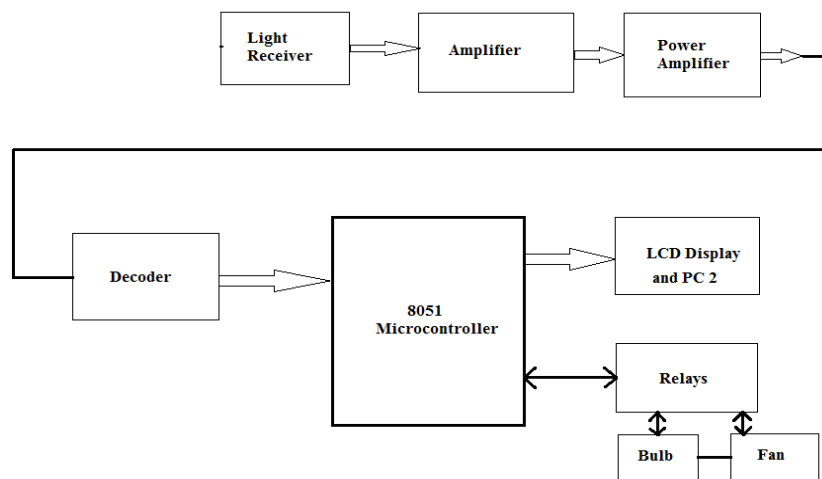


Fig 2: Data receiver

### A. Data transmission and device Switching:

Li-Fi is an advanced technology. In this paper, data will be transmitted starting with one PC then onto the next through visible light and an endeavor is made to control the devices like fan and bulb as shown in figure(1) & (2). This can be utilized as a part of home computerization too.

A 8051 Microcontroller is the heart of the framework. The input data will be generated by keyboard of PC1 and is send to Microcontroller. The data is encoded by encoder and is passed to preamplifier where it converts weak signal to strong signal. The amplified signal is send to IC KID65783, which produces the analog light intensity data at 4800 Mbps baud rate. At that point this information is transmitted through LED.

At the receiver unit, photo detector receives the signal from transmitter and is decoded by decoder. The decoded data is transmitted to microcontroller and the original data will be displayed on PC2. For device switching, the switch would have been selected at

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transmitter input block then at receiver the corresponding devices are controlled.

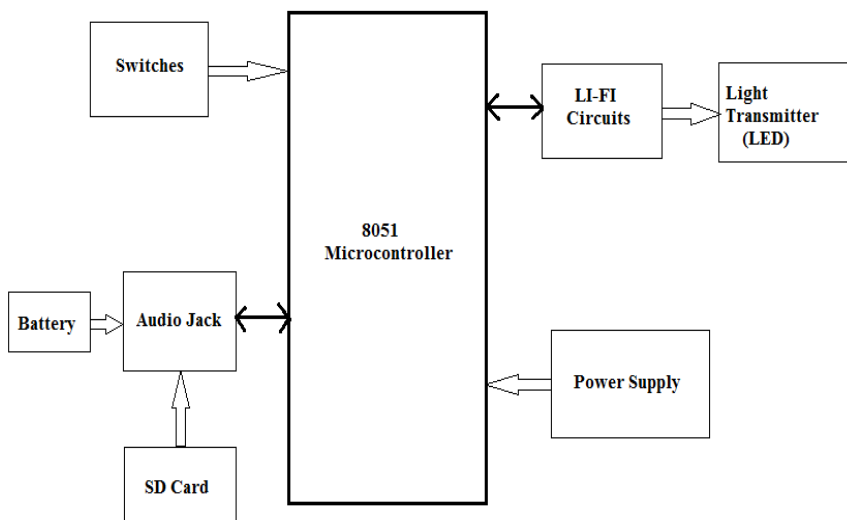


Fig 3: Audio transmitter

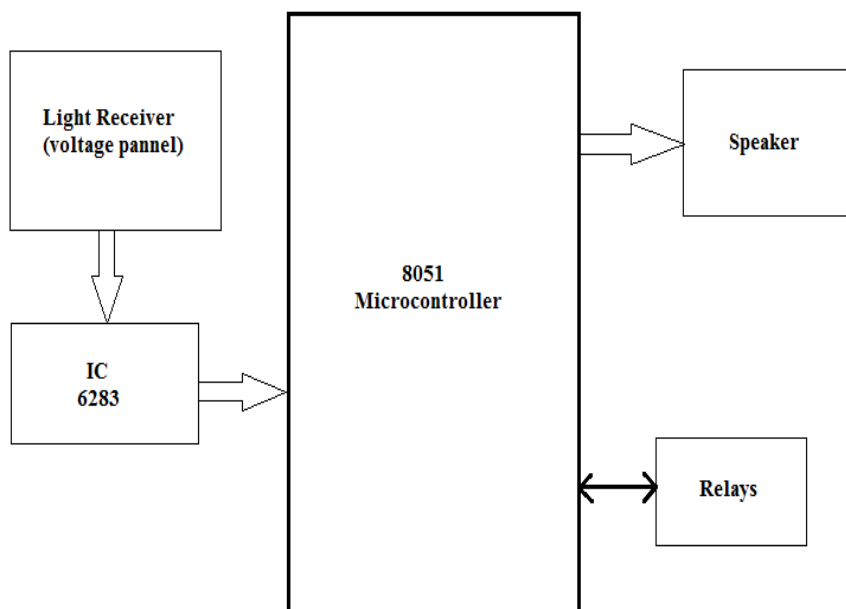


Fig 4: Audio Receiver

### B. Audio transmission

Another application of Li-Fi is audio transmission as shown in fig 3 and 4. The songs are preloaded to memory card and it is inserted into audio jack. When the switch 1 is pressed, the corresponding song is selected and is send to controller and through LED it is send to receiver. At the receiver, voltage panel receives the song and then IC6283 amplifies the signal because it is good stereo amplifier and produces good sound. Then the microcontroller sends the original song to speaker. Through speaker the song will be played. If switch 2 is pressed, the song is paused. Then again switch 2 is pressed the audio song will play. and other option of selecting the song is to press switch 3, it play the next song stored in the SD card. So relay is used to acts as a switch in this paper, The audio strength is good because we are using IC6283 amplifier. It mainly useful for blind people's navigation systems in indoor applications. In short distance, the audio sound will be more.

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## IV.FLOW CHART

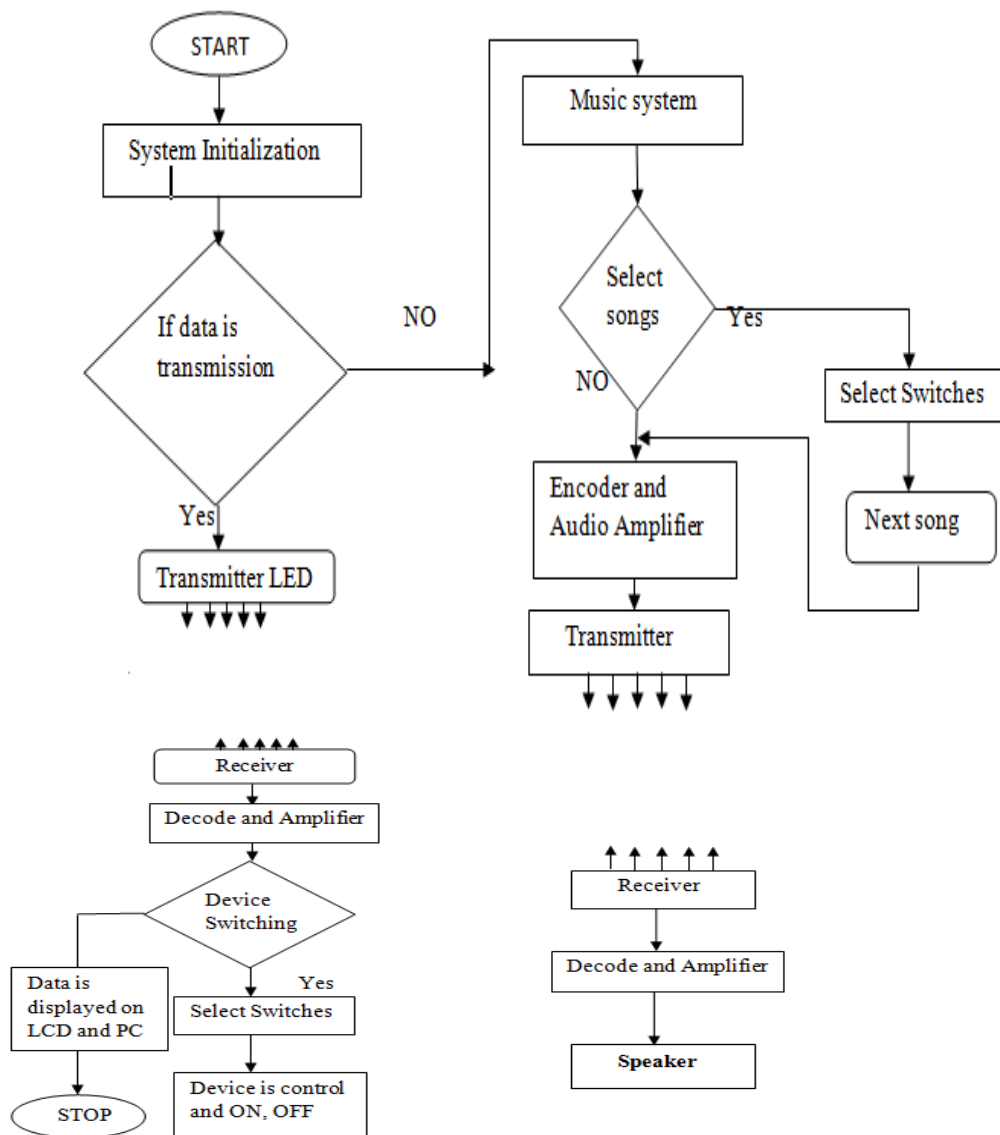


Figure 5: Flow Chart

## V. RESULTS

The data can be generated by keypad of PC 1, that is input of the data and output will be displayed on the screen of PC 2. Take one input has "WELCOME TO LI FI TECHNOLOGY" these data can be displayed on the PC 2.

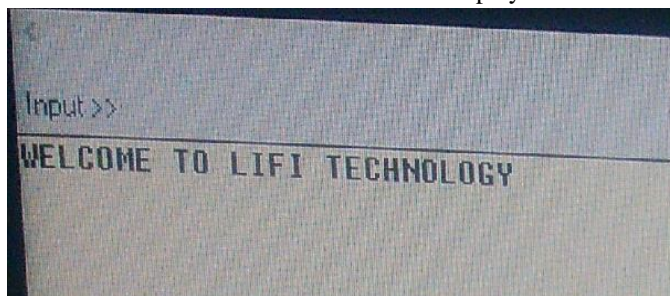


Fig 6: Input of the PC 1



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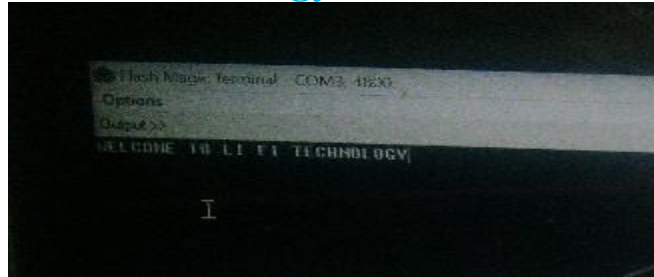


Fig 7: Output displayed on PC 2

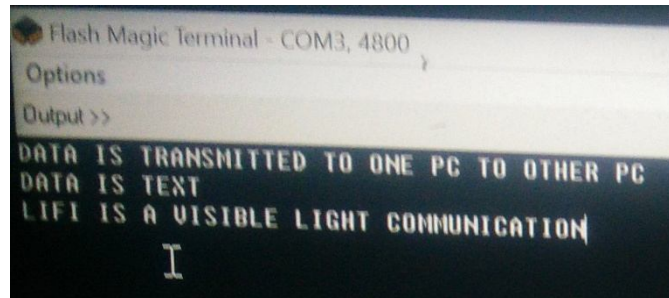


Fig 8: Any data can be displayed on the Output PC 2

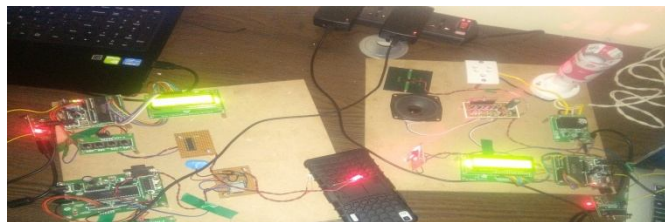


Fig 9: Both TX and RX connection

### VI.CONCLUSION

Li-Fi is advanced and growing technology. Now a day light is present everywhere so in this paper, visible light is used as source for communication and device control as well as audio transmission application. This paper provides pc to pc communication without using any Wi-Fi. This technology gives very tough competition for other technologies in future. It can also be used for medical fields and education fields etc. It is very advantageous than wireless advancements because speed, accuracy and data rates are more.

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45.98



IMPACT FACTOR:  
7.129



IMPACT FACTOR:  
7.429



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