

# “Under Water Communication using Visible Light”

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**Abstract:** Future electric lights will be comprised of visible LEDs (light emitting diode). Visible LED's with high power output are expected to serve in the next generation of lamps. An indoor visible data transmission system utilizing visible led lights is proposed. In the system, these devices are used not only for illuminating rooms but also for an optical wireless communication system. This system is suitable for private networks such as consumer communication networks. However it remains necessary to investigate the properties of visible LED's when they are used as optical transmitters. Based on numerical analyses and computer simulations it can be used for indoor optical transmission. Infrared light is already used for communication, such as wireless remote control, IrDA, Infrared wireless LAN, and infrared inter-building communication. However, visible light LEDs are beginning to be used in every home and office, which makes visible light LEDs ideal for ubiquitous data transmitter.

## I. INTRODUCTION

Data transmission using optical wireless has been identified as a technology that can be utilized for communications in critical environments, such as aircrafts or hospitals, where radio frequency (RF)-based transmissions are usually prohibited or refrained to avoid interference with critical systems. Moreover, a huge amount of unregulated bandwidth is available at infra- red and visible light frequencies. Researchers around the world are fine-tuning technologies that use standard lighting equipment to cheaply transmit high-speed data streams wirelessly, even while the equipment appears to be producing nothing more than normal illumination. Generally, the technologies rapidly and subtly fluctuate the intensity of light-emitting diodes, or LEDs, in a way that is imperceptible to the human eye. The idea of using light to send information, a field now known as visible light communications, has been around for well over a century. In fact, Alexander Graham Bell sent a wireless phone message in 1880 using his invention known as the Photo phone. But academic and commercial interest in visible light communication has accelerated in recent years. The increasing popularity of LED lights, which can be more finely controlled than traditional incandescent bulbs, makes light-based technology more practical and economical. Also, the exponentially growing demand of wireless communication devices has taxed radio spectrum, resulting in a need to find alternatives.

## II. METHODOLOGY

### A. Flow Chart

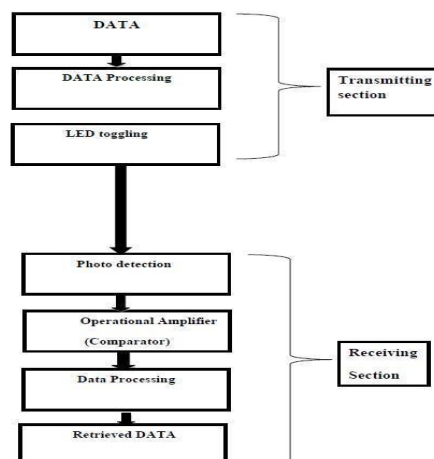
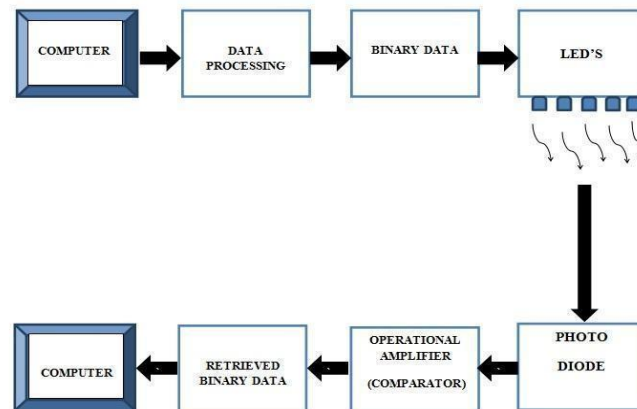


Figure 3.1: Flow chart

**B. Block Diagram**



**DATA** In this paper data transmission is done via visible light. The data is to be transmitted is an image, text and file.

**DATA PROCESSING** The data to be transmitted needs to be processed. Data processing here is done in VISUAL BASIC. The whole data is converted into binary format and is sent bit by bit to the receiver. The binary data which is passed to the LED makes the LED toggle and hence transmitting data to the receiver.

**LED TOGGLING** The converted binary codes are transmitted over to receiver taking visible light as its medium with the help of LED's. These LED's toggled in accordance with the binary codes received from the programme.

**PHOTO DETECTION** On the receiver side we have photodiode which detects the light incident on it. The analog voltage generated at the output of this detector is then given to the comparator.

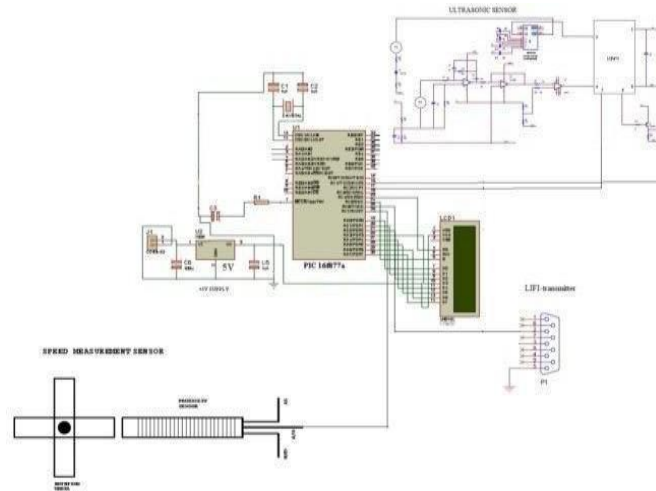
**RETRIEVEING DATA** The output of the photodiode is sent to the comparator along with the reference voltage and the appropriate result of each comparison is computed to retrieve the final data.

**III.SOFTWARE DESCRIPTION**

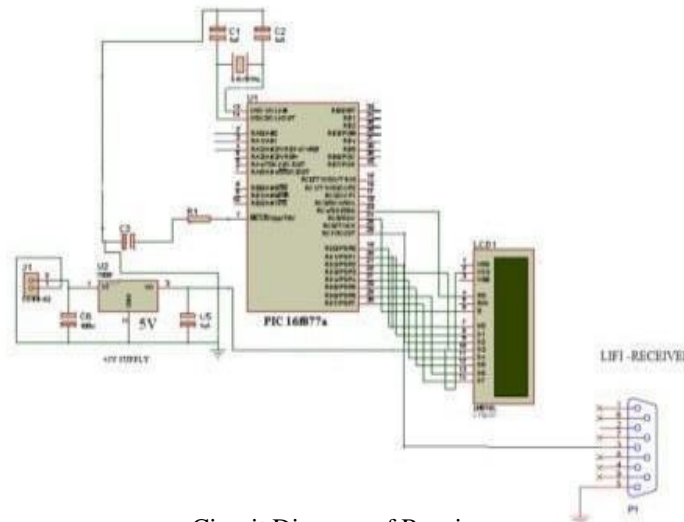
What Is Visual Basic? Programmers have undergone a major change in many years of programming various machines. For example what could be created in minutes with Visual Basic could take days in other languages such: as "C" or "Pascal". Visual Basic provides many interesting sets of tools to aid you in building exciting applications. Visual Basic provides these tools to make your life far easier because all the real hard code is already written. With controls like these you can create many applications which use certain parts of windows. For example, one of the controls could be a button, which we have demonstrated in the "Hello World" program below. First create the control on the screen, then write the code which would be executed once the control button is pressed. With this sort of operation in mind, simple programs would take very little code. Why do it like the poor old "C" programmer who would have to write code to even display a window on the screen, when Visual Basic already has this part written for you. Even though people tend to say Visual Basic's compiler is far behind the compilers of Pascal and C, it has earned itself the status of a professional programming language, and has almost freed BASIC of the reputation of a children's language. Overall you would class Visual Basic as a Graphics User Interface (GUI). Because as you draw, you write for the program. This must always be remembered in any kind of creation of a Visual Basic program. All in all, VB is the preferred language of many future programmers. With VB 6, you can create any program depending on your objective. For example, if you are a college or university lecturer, you can create educational programs to teach business, economics, engineering, computer science, accountancy, financial management, information system and more to make teaching more effective and interesting.

If you are in business, you can also create business programs such as inventory management system, point-of-sale system, payroll system, financial program as well as accounting program to help manage your business and increase productivity. For those of you who like games and working as games programmer, you can create those programs as well. Indeed, there is no limit to what program you can create! There are many such programs in this tutorial, so you must spend more time on the tutorial in order to learn how to create those programs.

### IV.RESULT



Circuit Diagram of Transmitter



Circuit Diagram of Receiver

### V.CONCLUSION

It has been shown that even though most existing efforts are still in a very early stage, VLC is a promising technology with a wide held of prospective applications. An ever- growing interest in VLC throughout the world can be expected to lead to real-world applications in the future. In some fields of application it poses a favourable alternative to conventional solutions (infrared, WLAN etc.).The transmission is based on the assumptions of direct LOS (line-of-sight) channels and simplex channel conditions. The encoding and decoding is used in the transmitter part and receiver part to reduce the error in transmission. In addition, the data transmission rate could be enhanced by using fast switching multiple LEDs. The driving speed of the circuit could also be enhanced if fast switching transistors were used. It was demonstrated that the blue LED based visible light data transmission system is indeed technically feasible. The tests were carried out under moderate indoor ambient light conditions. It is envisaged larger coverage can be obtained by using LED arrays. Finally, the wireless communication technology could be embedded into the visible light source which is the ultimate goal of the project.

### REFERENCES

- [1] Harald Haas, L. Yin, Y. Wang, C. Chen, "What is LiFi?", *Journal of Light Wave Technology*, 2015.
- [2] S. Rajagopal, R. Roberts, S.-K. Lim, "IEEE 802.15.7 visible light communication: Modulation schemes and dimming support", *IEEE Communication Magazine*, vol. 50, no. 3, pp. 72-82, Mar. 2012.
- [3] Jay H.Bhut, Dharmrajinh N.Parmer, Khuhbu Mehta., "Li-Fi Technology-A Visible Light Communication", *International Journal of Engineering Development and Research papers* at, Jan-2014.