*Available online at http://www.advancedscientificjournal.com*
*http://www.krishmapublication.com*
*IJMASRI, Vol. 2, issue 1, pp. 394 -396, Jan. -2021*
**https://doi.org/10.53633/ijmasri.2022.2.1.002**

**INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY ADVANCED SCIENTIFIC RESEARCH AND INNOVATION (IJMASRI)**

**ISSN: 2582-9130** **IBI IMPACT FACTOR 1.5** **DOI: 10.53633/IJMASRI**

RESEARCH ARTICLE

# LIFI COMMUNICATION SYSTEM USING KEYPAD

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## Abstract

Over the years, the overdependence on Wireless Fidelity (Wi-Fi) for data transmission necessitated the need for an alternate and more reliable means of communication, hence, Light Fidelity (Li-Fi). It involves the use of Light Emitting Diode to transmit data by blinking (i.e. switching them on and off) at a speed not noticeable to the eye. This paper proposed the development of the Li-Fi system using off the shelf electronic components. This would make the system an indispensable means of communication in the nearest future. This data transmission system is different from those in existence because expensive components were not in the design, invariably reducing the overall cost of the implementation.

**Keywords:** Light Fidelity (Li-Fi), Wireless Fidelity (Wi-Fi) Optical communication, Telecommunication

## Introduction

Light Fidelity (Li-Fi) is a fast, remote correspondence utilizing visible light. It falls under the classification of optical remote communications. Information transmission happens through Light Emitting Diode (LED) bulbs whose intensity changes (varies). During this variation in light intensity, communication takes places digitally. This innovation has huge applications where the utilization of Wi Fi is restricted or prohibited. It likewise takes out the unfavourable wellbeing impacts of utilizing electromagnetic waves. Except light is seen, information can't be hacked; thus, data transmission is secure. The utilization of light as a way to transmit information has been authored Li-Fi. The high speed innovation is like Wi-Fi but is quicker, enabling you to send and get more data in less time. By swapping glowing bulbs with LEDs - which have electronic properties - Li-Fi could bring Internet access to more regions and could reform the media communications industry.

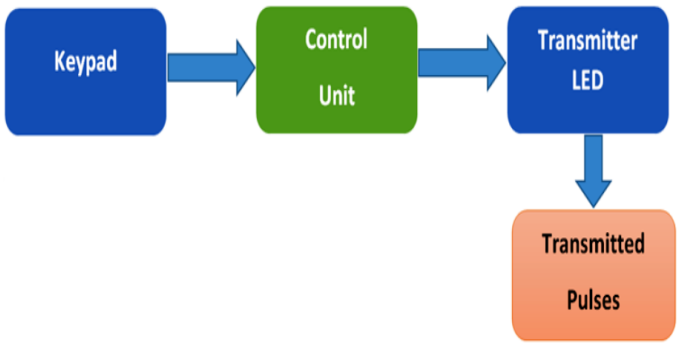
As of late, wireless innovation has blossomed, as it were such that, wireless technology requires huge amount of data to transmit each day. These days, wireless communications have turned out to be significant in the communication process. The fundamental methods for transmitting wireless information are by utilizing electromagnetic waves for example radio waves. In any case, radio waves can bolster less data transfer capacity (bandwidth) as a result of conservative spectrum accessibility and intrusion. The solution to this is data transmission using Visible Light Communication (VLC). Wi-Fi deals with wireless coverage within premises, whereas Li-Fi is perfect for high compactness wireless data coverage in a defined area and for mitigating radio interference issues. Li-Fi basically focuses on transmitting multimedia data between two terminals using LEDs.

Two fundamental functionalities: illumination and wireless data transmission are combined by fitting a small microchip to every potential illumination device. This relationship between these functionalities could solve the four essential problems namely, capacity, cost, efficiency, and security, that we face in wireless communication nowadays.

In this work, the issues with unpredictability, various contrary standards, and the subsequent costs in these current systems are tended to by providing a simplified Li-Fi data transmission system using off-the-shelf electronic components.

## Methodology

Li-Fi Transmitter Section using Arduino

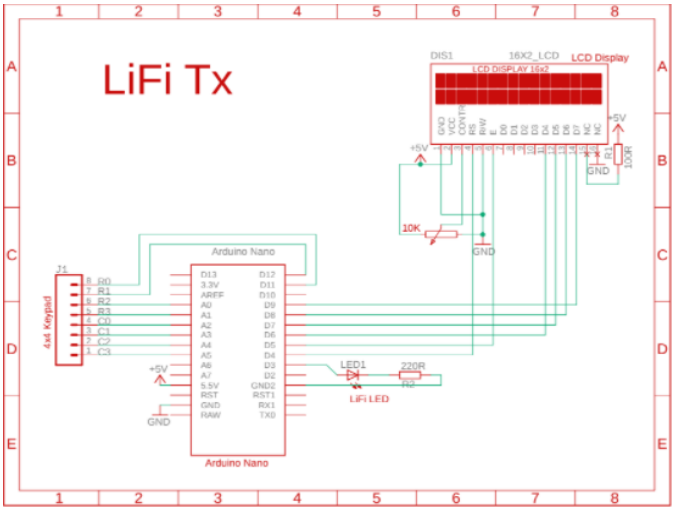


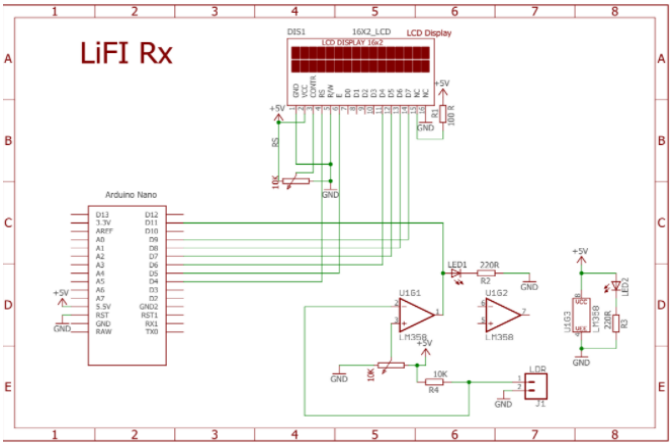

As shown in the figure above, in the transmitter part of Li-Fi communication, the keypad is used as input here. That means we'll be selecting the text to be transmitted using the keypad. Then the information is processed by the control unit which is nothing but Arduino in our case. Arduino converts the information into binary pulses which can be fed to an LED source for transmission. Then these data are fed to LED light which sends the visible light pulses to the receiver side.

Li-Fi Receiver Section using Arduino


In the receiver section, the LDR sensor receives the visible light pulses from the transmitter side and converts it into interpretable electrical pulses, which is fed to the Arduino (Control unit). Arduino receives this pulse and converts it into actual data and displays it on a 16x2 LCD display.

The hardware section consists of the various parts: Arduino UNO LDR Sensor,4*4 Keypad,16*2 Alphanumeric LCD,I2C Interface module for LCD,Breadboard,Connecting Jumpers,5 mm LED.

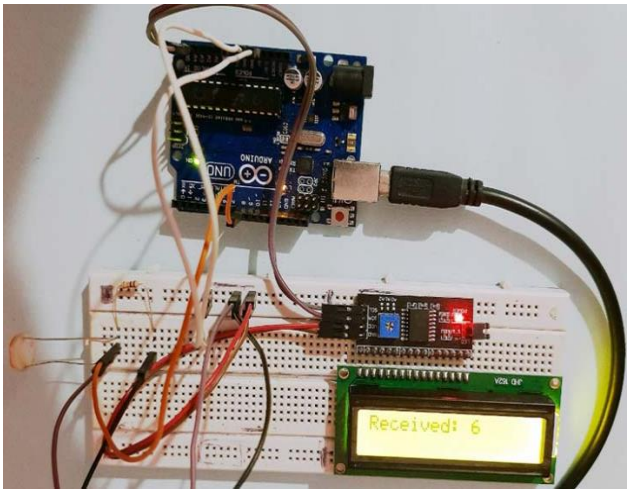





The circuit diagram of the Li-Fi system is divided into two major parts: the transmitter part placed above while the receiver part is placed below. The circuit diagram shows in details how the hardware components of the system are connected for data transmission. However, during the implementation of the system, a single microcontroller (Arduino board) is used.

## Results

The final design verification was done using the complete system; transmitter, receiver, and software, and the results are shown




After uploading the complete code in both the Arduinos, press any button on the keypad at the receiver side and the same digit will be displayed on 16x2 LCD at the receiver side.

## Conclusions

The aim of this work was to design a Li-Fi Data Transmission system through. The Data Transmission system constructed when tested showed satisfactory performances. The Li-Fi data transmission system constructed was very cheap making it satisfy the major aim of the project – incorporation of a Li-Fi medium using off the shelf electronic components and devices.

Consequently, a Li-Fi model has been created which exhibits the essential standard and furthermore underpins the upsides of Li-Fi over Wi-Fi.

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