



e-ISSN: 2278-8875  
p-ISSN: 2320-3765

# International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

Volume 12, Issue 5, May 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.317

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# Audio Transmission- LiFi Technology

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**ABSTRACT:** The number of devices accessing the internet in a world of wireless technologies is increasing every second. Most gadgets access the internet via wireless transmission. Sharing data has unluckily increased network complexity, caused a lack of wireless radio capacity, and increased the risk of radio frequency interference. By using light-emitting diodes, Li-Fi technology is utilised to send data utilising visible light communication. Using an LED as a LiFi transmitter and a photodiode as a LiFi receiver, signals are sent from one system to another. Compared to current technologies, this is a communication mechanism that is far more secure. Due to the rapid advancements in light-emitting diodes over the past decade, Visible Light Communication (VLC) has gained a lot of attention.

**KEYWORDS:** Li-Fi, LED, PIC Microcontroller, APR

## I. INTRODUCTION

In the modern world, gadget communication is very frequent. The portion of the spectrum that may be used for communication via radio waves is quite tiny. WLAN and he two most popular short range wireless technologies at the moment are Bluetooth. However, as advanced technology and user numbers rise, the network becomes overloaded and cannot support high data rates. By reaching a wider bandwidth and higher data rate than current wireless radio tfeasible to allocate more bandwidth to each user for information transport. Although a blinking LED may be annoying, data can be encoded in the light by altering the rate at which the LEDs turn on.

## II. PROPOSED SYSTEM

The proposed system consists of a transmission section and a receiver section. The transmitter section consists of an APR, Li-Fi transmitting module, MIC and the receiver section consists of a Li-Fi receiving module, PIC microcontroller, an amplifier, speaker and a transformer. On the basis of visible light communication technology, the advanced technology called Li-Fi provide dual function of visible light LED for illumination and data transmission. Li-Fi is very latest version of Wi-Fi which uses visible light in place of radio waves. Hence, visible light data transmission rate have higher speed than other broadband. It overcome the problem related with Wi-Fi, because Li-Fi has wider network area so traffic handling capacity improved and it is cheaper than Wi-Fi. The VLC system is compared with other wireless communication system that are in current use like LAN and Wi-Fi. LAN is available in very short range and it is not mobile. And Wi-Fi has low traffic handling capacity as number of user increases Wi-Fi becomes unable to achieve

## III. BLOCK DIAGRAM

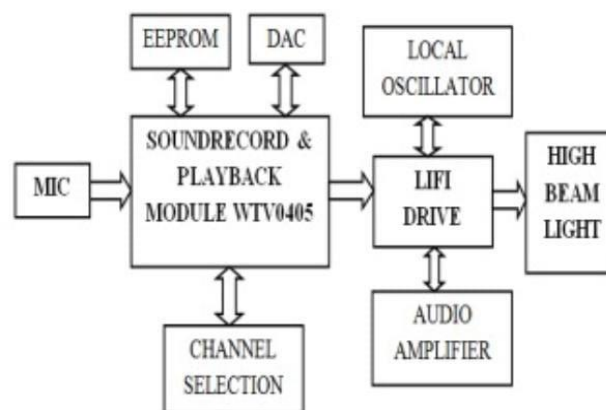


Fig-1: Transmitter Block Diagram



#### IV. COMPONENTS USED

##### TRANSMITTER SECTION

In the process of voice communication through the visible light on the transmitter side, voice is used as the input signal. This signal is converted to an electrical signal through a microphone. The transmitted data will be digitized then the digital signal drives the LED by using on-off-keying (OOK) modulation. LED, turning led ON for ones and OFF for zeros. Hence, the transmission data rate has to be so high that it eliminates the flicker and perceive as a constant light source to human eye. LED, turning led ON for ones and OFF for zero

##### VOICE RECORD AND PLAYBACK

##### DESCRIPTION

WTV-SR is one of the members of recording serial products. WTV-SR module can record as well as fixed voice playback, recording content uploaded and a variety of control modes can be chosen. With the ace chip and module SPI-FLASH, it has an awesome favorable position in the span time of recording and cost execution.

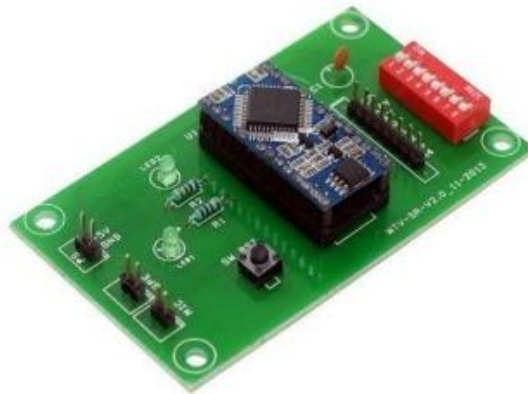
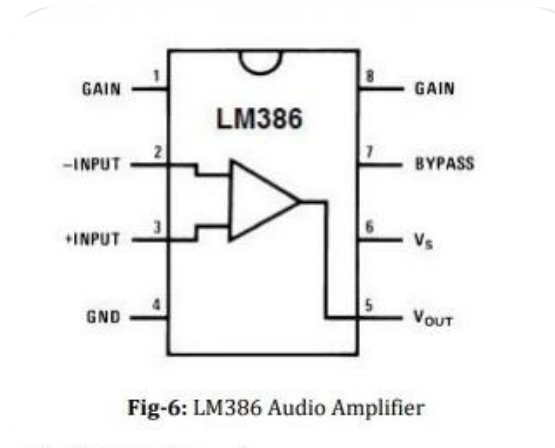


Fig-2: Playback Module

#### V.AUDIO AMPLIFIER

An audio amplifier may boost the sound emitted by a microphone. For a small area, such as a room, this circuit can be utilised as a "Small mic and loudspeaker system." This Several other applications for the circuit include TV sound systems, ultrasonic drivers, radio amplifiers, intercoms, portable music players, and radios. Additionally, it can function as a sound sensor for microcontrollers. It costs little money, uses little energy, and just requires a few basic parts to function. The LM386 IC is used by this design to boost sound. Low voltage sound intensifiers like the LM386 are frequently used in battery-operated musical instruments including radios, guitars, toys, and so on. The pick-up range is 20 to 200, and the inside pick-up setting is 20 (without using the outer section)



### V.LDR SENSOR

Light intensity is measured using LDR. To display light intensity, a pic microcontroller 16F877A and LCD are used. Microcontroller, however, is unable to recognise the change in resistance in the open. In order for a change in resistance to result in a change in voltage, the LDR must also receive biasing voltage and either pull up or draw down resistance. ADC converts the change in analogue voltage into its digital counterpart, which the microcontroller reads.



### VII.SPEAKER:

In this project, the Speaker transforms electrical or analogue signals into audio signals that may be received by the Receptor. With the use of electromagnets, it transforms the audio stream. embodied by the Speaker. Consequently, the Receptor Receives the input that the Transmitter has sent.

### VIII.LIFI RECEIVER

The photo detector picks up the ones and zeros from the LED source, producing an electrical signal equivalent. After being demodulated, this signal is then increased by amplifier for audio. LDR is capable of absorbing strong light. The microprocessor detects the fault and uses the PWM error reduction approach to reduce it based on the brightness of the light. Using speakers, the error-controlled audio signal is output.

### IX.PIC MICROCONTROLLER

An 8-bit CMOS flash-based microcontroller with a 20 MHz operating frequency is the PIC16F877A. The execution of one instruction cycle takes 200 ns. In our undertaking A 40 pin PIC16F877A was utilised. The voice recorder is controlled by it primarily. The voice recorder sends the audio file in serial form to the transmitting module. It accomplishes this via an RS-232 device, which enables serial data transmission by the microcontroller. The PIC receives audio from the receiving module and transfers it to the amplifier in the receiver section.





Fig-5: Pin Diagram Of PIC16F877A

**X.RESULT**

APR was used to record the audio files. Any APR switch that was pressed caused the LED to begin blinking. The fact that the LED is flashing indicates that the audio file is being transferred. Now, When the receiver module is placed in the line of sight of the transmitter, a PIC microcontroller-equipped photodiode receives the audio files and transmits them to the speaker. It was attempted to transmit sound across a distance of around 15-20 m. This is the case because after this gap, the light becomes dispersed and cannot properly fall on the photodiode. A comparison between LiFi and Wi-Fi is shown in the table below.

**Table -1: Wi-Fi vs Li-Fi**

Feature	Wi-Fi	Li-Fi
Full Form	Transmit data using radio waves	Transmit data using light
Interference	Will have	Does not have
Coverage distance	About 32m	About 10 m
Data density	Low	High
Privacy	RF signal cannot be blocked by walls	Light is blocked by walls

**XI. CONCLUSION**

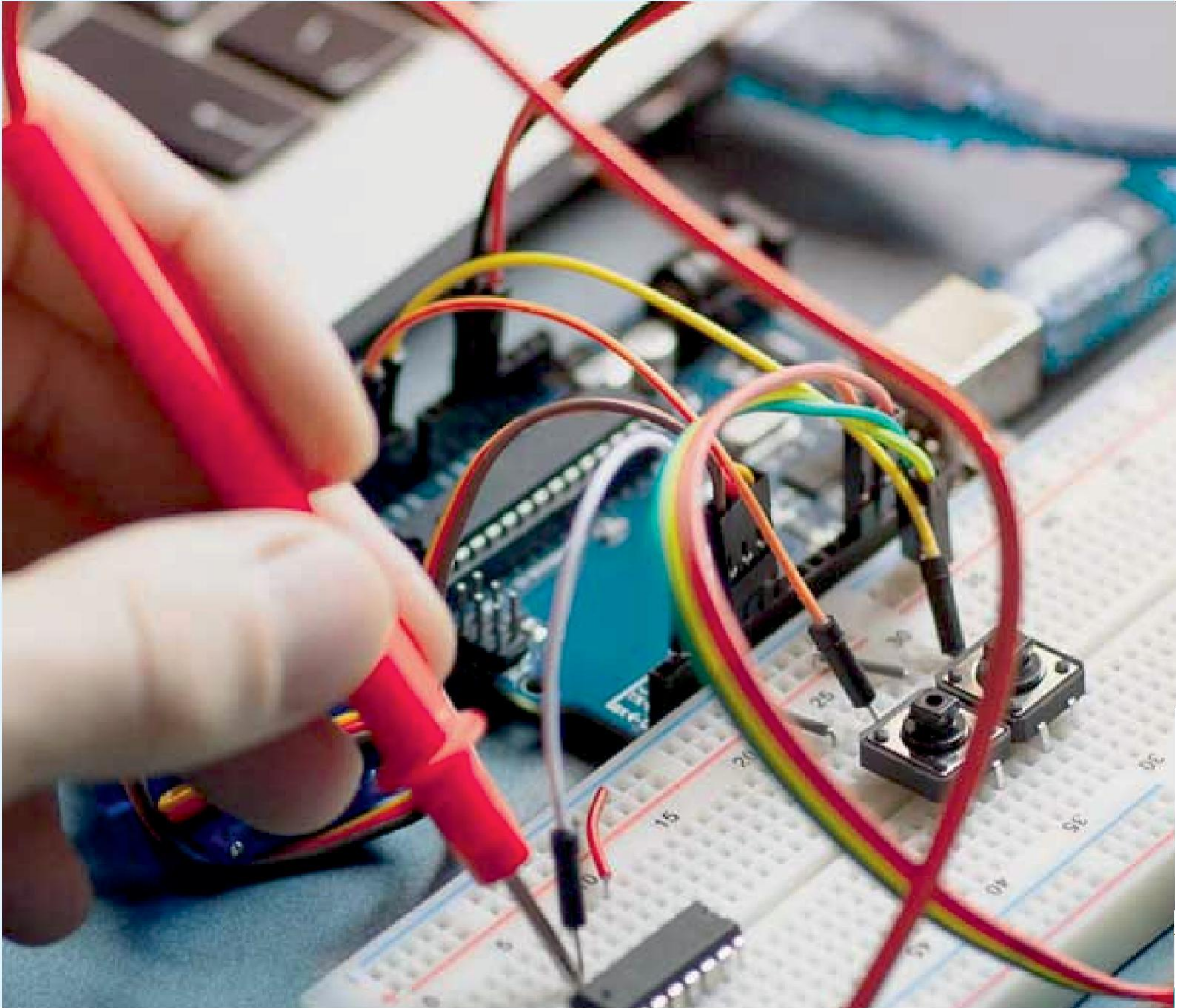
This technology is still under research and surely it will be a breakthrough in communication. It assures data speed of 100gbps which is entirely greater than radio waves. The scope of this Li-Fi technology is ultimately greater. As Li-Fi provides secured, low cost, easy data transmission and provides reliable communication, It can be used in industrial, medical, military applications. Li-Fi is still in its beginning stages, but improvements are being made rapidly, and soon this technology will be able to be used in our daily lives. It is intended that this research will provide the starting steps for further study. In spite of the research problems it is our belief that the VLC system will become one of the most promising technologies for the future generation

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