



A COMPACT BROAD BAND AUDIO TRANSMISSION SYSTEM BASED ON LI-FI NETWORK.

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ABSTRACT

Over the years, the overdependence on Wireless Fidelity (Wi-Fi) information transmission necessitated for an extrade and greater dependable manner of communicate, hence, Light Fidelity (Li-Fi). It entails the usage of a Light Emitting Diode to transmit information with the aid of using blinking (i.e. switching them On and Off) at a velocity now no longer major to the eye. This paper proposed the improvement of the Li-Fi machine the usage of off-the-shelf digital additives. The proposed machine makes use of an embedded machine with a dual-middle Advanced Virtual RISC (AVR) microcontroller (ATmega16L) interfaced to enter/output circuits comprising of the Light Emitting Diode (LED), LM358N Operational Amplifier, and a photodiode. Also, with the aid of using growing a user (Receiver PC) interface the usage of JAVA programming, the pattern information (textual content) transferred become monitored and the rate, efficiency, security, and ability of the machine become tested and observed to be top-notch. This might make the machine an integral manner of communicate with inside the nearest destiny. This information transmission machine isn't like the ones in life due to the fact highly-priced additives had been now no longer with inside the layout, continuously lowering the general value of the implementation. Keywords - Light Fidelity (Li-Fi), Wireless Fidelity (Wi-Fi) Optical communicate, Telecommunication

1. INTRODUCTION

A 5G generation, as they say, LIFI is coined as a large MIMO seen mild communicate community which makes use of LEDs. A destiny generation that ensures to update the 2G, 2.5G, 3G, and the modern 4G structures of communicate. The modern-day technology which rent WIFI outline it as any Wi-fi nearby location community (WLAN) merchandise which are primarily based totally at the Institute of Electrical and Electronics Engineers (IEEE) 802.eleven standard. LIFI is concept of as an opportunity or an change to the presently used WIFI. With an exhausted and congested community, it become important to articulate our minds right into a generation that now no longer most effective is ubiquitous however additionally a creative quantity. Professor Harald Haas at some point of his TED international communicate rightfully coined LIFI because the destiny upcoming generation. Quiet sizable quantities of benefits make LIFI a powerful generation. Visible mild is described as having a wavelength in quite a number four hundred nanometers to seven hundred nanometers, which execs to having a 10,000 instances broader spectrum than the radio wave spectrum hired in WIFI. This generation similarly has the critical benefit of now no longer wanting any base stations and typically requiring unlicensed services. Very excessive information fees may be performed because of low interference, excessive tool bandwidths, and excessive-depth optical output. Moreover, it's miles non-risky and a secure generation which could also be hired in riverbeds and is value- powerful.

2. LITERATURE SURVEY

Visible Light Communication (VLC) is an optical communiqué this is Wi-Fi. It includes statistics with the aid of using modulating mild with inside the scene spectrum. Its working Range is from 400nm to 700nm. The communiqué sign (i.e. the modulating sign) is encoded at the illuminating mild. Motivation to apply the illuminating mild is to keep strength. This generation is considered experienced and secure with contrast to radio frequency (RF) generation. One of the most important benefits of VLC is that we will use the infrastructure round us without making any modifications to it. When we're speaking approximately VLC we're thinking about an illuminating source (LEDs on this paper) that could remove darkness from in addition to ship statistics the usage of the identical illumination

3. IMPLEMENTATION DETAILS

LiFi lets in for information to be transmitted with the aid of using modulating the depth of mild, that is thenacquired with the aid of using a picture graph-touchy detector. The mild sign is then demodulated into digital shape. This modulation is done in this kind of manner thatit isn't perceptible to the human eye. Li -Fi is primarily based totally on Visual Light Communication (VLC) that the usage of mild emitting diodes (LEDs) to completely networked wi-fi machine.

This transceiver can have a modulation approach to make the LED allow to hold the information the usage of the mild. The emergence of LiFi is to conquer the dearth of the modern-day generation.

ADVANTAGES

- Airways, Free from frequency bandwidthproblem
- Increase communication safety
- Smarter power plants

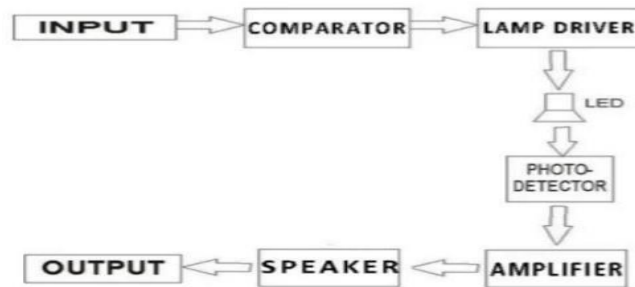


Fig.1 Block Diagram of Power supply

4. PROPOSED SYSTEM

In the proposed machine we're merging a 5 hues into the unmarried hues for the transmission of the information. Due to this merging the colored information specification could be switch into the unmarried color that have excessive depth .Here we're the usage of brought about switch the information. The information sign couldbe switch relying upon the timer and counter. The led blinking suggests the information moving manner from the transmitter .In proposed machine we the usage of the led as transmitter and picture graph detector as receiver. These communicate gadgets shall transmit the information. In this proposed machine we're transmit the image, voice and numeric information. Data are encoded and transmit through led. The picture graph detector gets the mild strength and decoded into unique shape.

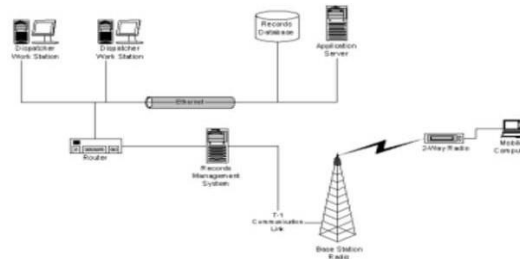


Fig.2 Radio Frequency Transmission and Reception

5. PROBLEM STATEMENT

- It's hazard signal
- It's causes some disease like cancer and tumor
- All electronic gadget used these type of communication
- Interference is high

TRANSMITER

A 4X3 matrix keypad is taken that transmits numeric information from 0-9,*,#. It is interfacedwith keypad driving force IC 91214 b which is likewise referred to as DTMF tone generator. Each key has a distinctive frequency this is made from frequencies one from low tone institution from 697 Hz- 941 Hz, and the opposite from excessive tone institution from 1209 Hz- 1477 Hz.The tone generated is a DTMF frequency that is transformed from virtual to analog shape with the aid of using this IC. The output of this IC is fed tothe op amp 741c to save you sign losses. This IC is similarly related to push pull amplifiers. A manner transfer is furnished to pick out keypad or a microphone. If the transfer is on, microphone is chosen else the

keypad is chosen. A variable resistance is furnished to modify the amplification and sound of the speaker. At the output of the transistors a torch is attached to transform analog indicators into mild shape. While then again microphone converts sound to analog shape.

RECEIVER

The sign acquired within side the mild shape is detected with the aid of using the photodiode which converts the mild sign to analog shape. The photodiode is attached to the op-amp to lessen distortion losses. The output of the op-amp is attached to the IC MT8870 which a DTMF receiver.

Also the output of op-amp is attached to the speaker to transform output analog sign to sound shape. IC MT 8870 converts the analog sign to virtual shape and knows the frequency acquired and converts it into 4-bit BCD shape for showing on 16x2 LCD. Microcontroller AT89c51 is used to interface LCD and DTMF receiver. AT89c51 takes the BCD enter from the DTMF receiver and shows it at the 16x2 LCD. IC 7805 is used, that is a voltage regulator that steps down 8V deliver to 5V for the operating of circuit

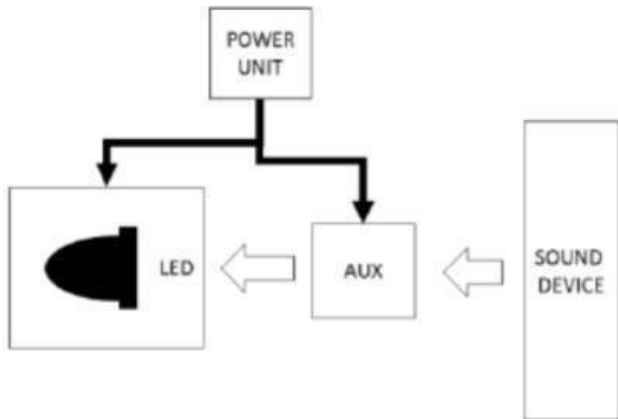


Fig.3 Circuit diagram of Transmitter

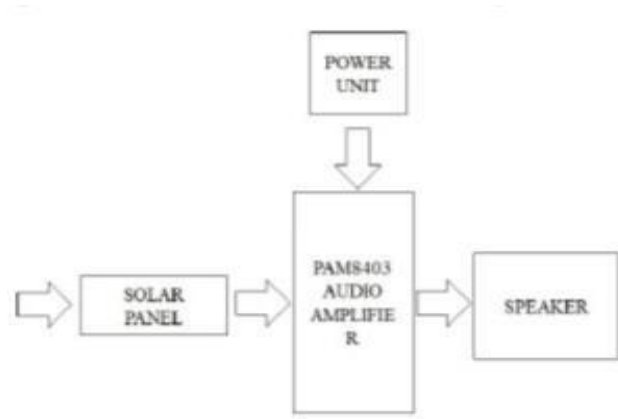


Fig.4 Circuit diagram of Receiver

6. LIGHT EMITTING DIODE

A light-emitting diode (LED) is a two-lead semiconductor junction source. It is a p-n-junction diode, which emits light while activated. When an appropriate voltage is carried out to the leads, electrons are capable of recombine with electron holes in the tool, liberating energy with inside the shape of photons. This impact is known as electroluminescence, and the color of the light (similar to the strength of the photon) is decided with the aid of using the strength band hole of the semiconductor

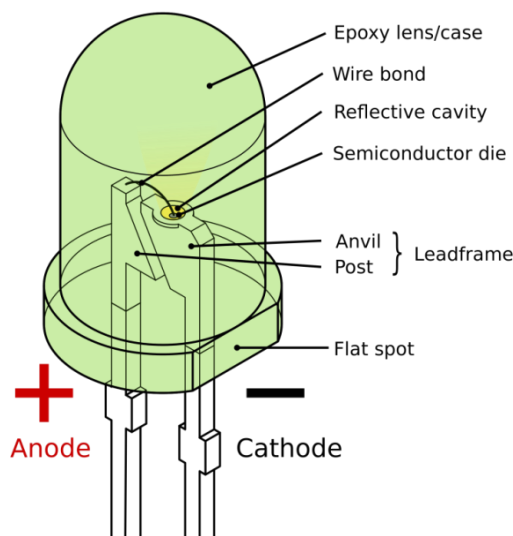


Fig.5 LED

7. LIGHT EMITTING DIODE

An LED is regularly small in location (much less than 1 mm²) and included optical additives can be used to form its radiation pattern. Appearing as sensible digital additives in 1962, the earliest LEDs emitted low-depth infrared mild. Infrared LEDs are nonetheless regularly used as transmitting factors in far off-manipulate circuits, including the ones in far off controls for a extensive kind of customer electronics. The first seen-mild LEDs had been additionally of low depth, and restrained to red. Modern LEDs are to be had throughout the visible ultraviolet, and infrared wavelengths, with very excessive brightness

8. PHOTO DIODE



Fig.6 Photo diode

A photodiode is a semiconductor tool that converts mild into modern-day. The modern-day is generated while photons are absorbed with inside the photodiode. A small quantity of modern-day is likewise produced while no mild is present. Photodiodes can also additionally comprise optical filters integrated lenses, and can have huge or small floor areas. Photodiodes commonly have a slower reaction time as their floor location will increase. The common, conventional sun cellular used to generate electric powered sun strength is a huge location photodiode. Photodiodes are just like ordinary semiconductor diodes besides that they'll be both exposed (to discover vacuum UV or X-rays) or packaged with a window or optical fiber connection to permit mild to attain the touchy a part of the tool. Many diodes designed to be used mainly as a photodiode use a PIN junction in preference to a p-n junction, to boom the rate of reaction. A photodiode is designed to function in opposite bias

9. PRINCIPLE OF OPERATION

A photodiode is a p-n junction or PIN shape. When a photon of enough strength moves the diode, it creates an electron-hole pair. This mechanism is likewise referred to as the internal photoelectric impact. If the absorption happens with inside the junction's depletion region, or one diffusion period far from it, those vendors are swept from the junction with the aid of using the built-in electric powered subject of the depletion region. Thus holes flow in the direction of the anode, and electrons in the direction of the cathode, and a photocurrent is produced.

10. PHOTOVOLTAIC MODE

When utilized in 0 bias or photovoltaic mode, the float of photocurrent out of the tool is constrained and a voltage builds up. This mode exploits the photovoltaic impact that is the idea for sun cells a conventional sun cellular is only a huge location photodiode.

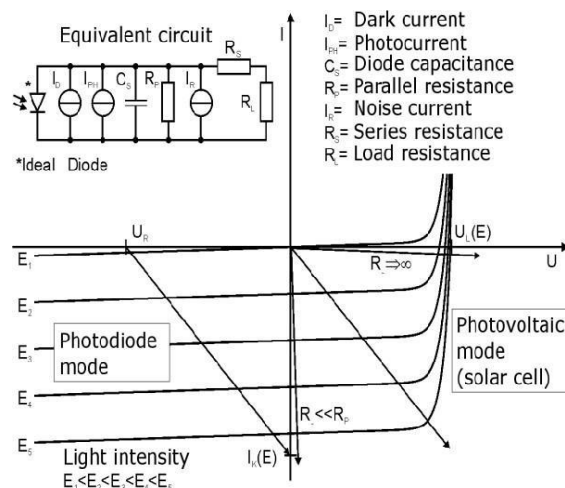


Fig.7 Photovoltaic mode Photoconductive mode diode is regularly

Opposite biased (with the cathode pushed fantastic with admire to the anode). This reduces the reaction time due to the fact the extra opposite bias will increase the width of the depletion layer, which decreases the junction's capacitance. The opposite bias additionally will increase the darkish modern-day without plenty extrude with inside the photocurrent. For a given spectral distribution, the photocurrent is linearly proportional to the luminance (and to the irradiance). Although this mode is faster, the photoconductive mode has a tendency to show off greater digital noise. The leakage modern-day of a very good PIN diode is so low (<1 nA) that the Johnson Nyquist noise of the burden resistance in a normal circuit regularly dominates.

11. OTHER MODES OF OPERATION

Avalanche photodiodes have a comparable shape to ordinary photodiodes, however they may be operated with plenty better opposite bias. This lets in every picture graph- generated provider to be extended with the aid of using avalanche breakdown, ensuing in inner benefit in the photodiode, which will increase the powerful responsively of the tool.

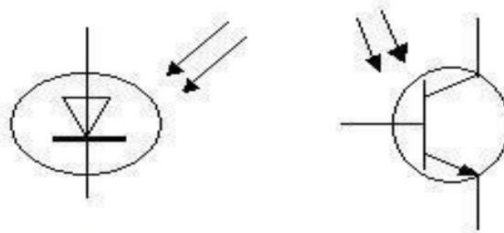


Fig.8 Photo diode and photo transistor

12. RESULT

The very last layout verification become accomplished the usage of the whole machine; transmitter, receiver, and software, Transmitter The transmitter receives a sign from the PC making use of USB Cable then from Arduino's GPIO connecting pins. The transistor which matches as a transfer to the LED's strength deliver is regulated with the aid of using this sign.



Fig.9 Overall view of the project

. A Test information sent a textual content (Li-Fi System) encoding worried figuring out the characters of the textual content in my opinion in ASCII codes after which changing them to binary bits in my opinion earlier than being transmitted as mild indicators.

.Here it has a tendency to be observed that each five V and 12 V deliver may be applied with insidethe transmitter for powering the LED but for straightforwardness and much less complexity of the circuits, five V deliver is desired for low strength operation..

13. CONCLUSION

This paper has proven that's miles viable to construct destiny mobile structures primarily based totally on free-area mild communiqué. In this context, it has highlighted that in an effort to acquire this objective, the point of interest in free- area mild communications needs to be shifted from factor-to-factor link-stage information price enhancements in VLC to optimizing information densities in a wi-fi community. It become proven that LiFi can notably enhance Wi-Fi networks with the aid of using offloading information traffic. This has the ability to increase information fees which are presently most effective viable in fiber-optic communiqué to the give up users, which our Mobile gadgets are of course.

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