TRANSMISSION OF DATA USING VISIBLE LIGHT COMMUNICATION

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ABSTRACT

Visible Light Communication (VLC) the increasing p8hubopularity of solid state lighting device, it penetrates many area of everyday life. Having large capacity wireless data, in this operation requires low power and switching speed is high. White Light Emitting Diode (LED) is using for visible light communication. This high speed wireless data technology is next generation communication for a short range. It consider as a good communication, transferring information signals over light. LED light using in daily life is changed into for communication, visible spectrum overcomes the drawbacks of via electromagnetic waves.

Keyword: *visible light communication (VLC), light emitting diode(LED), etc.*

1.Introduction

Light emitting diode (LED) is a solid state light sources. The level of increasing number of mobile devices like smart phones, laptops and tablets everyone wants to use wireless data but capacity is drying up and wireless RF are getting higher, complexities are increasing and its continue to grow, to overcome all of these problems in the future, so the development of new technologies for future high capacity communication systems, in these future technologies is like as millimeter waves , terahertz waves and optical waves .VLC owns many advantages of LED such as high brightness ,low cost, small size, low power consumption, long lifetime and low heat radiation. VLC explores the unregulated spectrum and acts as supplement rather than substitute of established RF system, excess demand of radio frequencies channel can be off-loaded to VLC net-works.

In a short distance these could provide multi –gigabit-per-second data rates, for example using array of LEDs in a multiple-input multiple-output (MIMO) system. These system besides wireless communication in home environment and it is a healthy way, secured and non-interfered communication is necessary, like hospital, underground mine, underwater, airplane, etc.

2.visible light communication technique (VLC)

The light emitting diode (LED) of visible light communication technology is a using to transmitting signal, air as transmission medium and photodiode as a signal receiver. It uses light between 400 THz (780nm) and 800 THz (375nm) as an optical carrier for data communication and illumination. In this technology high brightness LEDs is a heart, light emitting diode can be switched on and off faster it like a operation speed of LEDs is less than 1μs, causing to appear continuously make a data transmission using binary codes as switching “in” is a logical “1” and switching “off” is a logical “0” . in this digital communication as shown in fig.1.

VLC is typically implemented using white LED light bulbs. This types of devices are normally used for illumination by applying constant current through the light emitting diode, by faster variation of current, optical

output made to vary at extreme high speeds. its normally unseen by human eye. Variation is to carry high speed data. When signals reach the receiver through the indoor wireless channel, in between photodiode will convert the optical signals to electrical ones and original data or information will be recovered.

Fig-1 switching LEDs on and off, transmitting 0 and 1

In Visible light communication provides cable and contact free communication also having great advantages like it has causes no interference with (RF) devices and safety, band licensing-free so it is considered as safe alternative to RF that it can be used in hospital, space stations, and other electromagnetic interference sensible location as in fig.2.

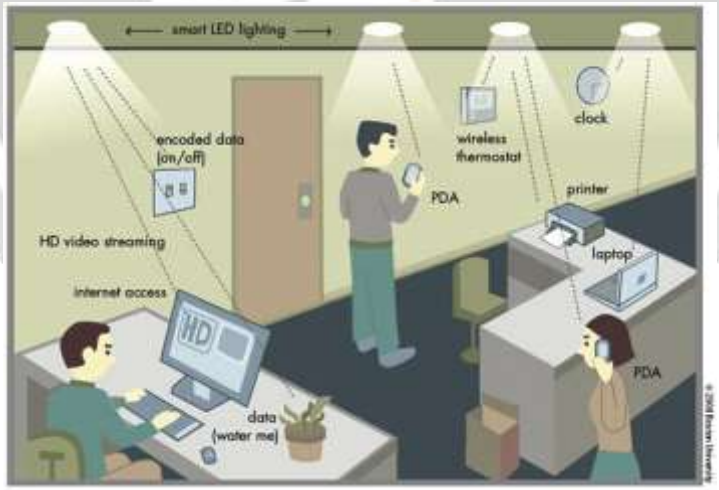

Fig-2 Environment of visible light communication

3. DESIGN AND IMPLEMENTATION

A. VLC block diagram:

Fig.3. The block diagram shows that transceiver system it consisting of two parts is the transmitter and receiver section. The transmitter section it contains a computer works as a data source and buffer and amplifier and

The white Light emitting diode(LED) transmits data by flashing light at high speeds undetectable to the human eye. Finally, transmitter signal reach the receiver the second part, and in-between phototransistor will convert the optical signal to electrical ones and original signal will be recovered and appeared at computer.

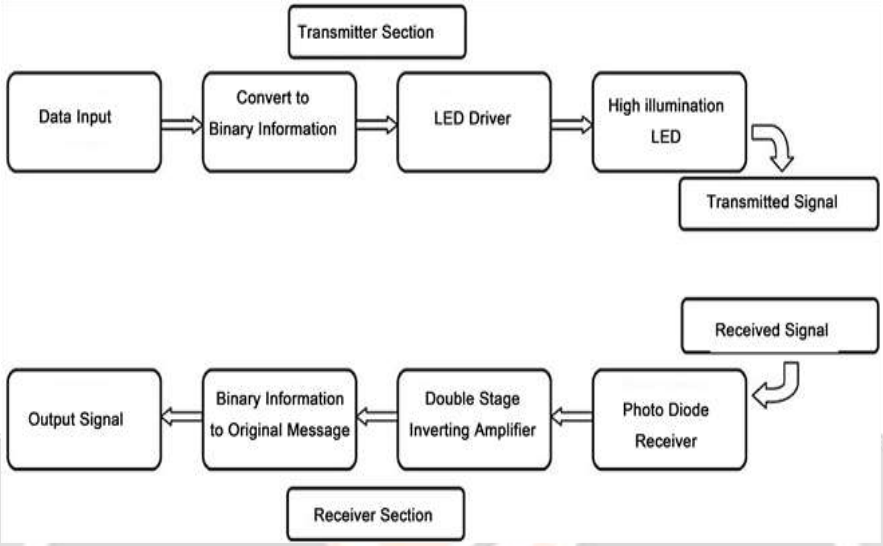

Fig-3 Block diagram of transmitter and receiver.

4. Circuit operation

4.1 AT TRANSMITTER

As shown in fig .4 through DB9 pin no is an output data in low current -15 to +15v (by USB to serial converter 5v to max-232 IC in pin no 13 their signal convert to TTL level 5v to further circuit requires. in pin 12 we get output and feed to buffer noise free output at pin no.8 of IC7414 and it is connected to base of transistor for very high current and voltage amplification, it can drive LED you can take high voltage \current MOSFET to drive hundreds of LED to transmit data as well, now circuit is ready to transmit.

4.2 AT RECEIVER

In the circuit photo transistor Light emitting diode(LED) feed in there is fluctuations or Rs-232 communication protocol relevant signal are coming through light switch on and off in higher speed where human eye cannot detect there switching ,in the data switch\trigger Schmitt-trigger IC 7417 pin no.1 and invert pin no.2 and again pin no.3 to revert process ,this process is to signal amplify to first stage pin no.2 and it make amplified signals from receiver with reduced noise original signal to pin no.4 then the signal goes to pin no.11 of max-232 IC in these the high voltage\uneven signals processed to TTL level of 5v processed and out to pin no.14 of max-232 IC it is connected with receive (RX) pin no.2 of DB9 connector . here the signal is ready to processed by any software application like hyper terminal program.

5. CIRCUIT HARDWARE PROTOTYPE

The prototype is consisting of MAX 232 level converter which converts RS-232 b. voltage level to TTL voltage and TTL voltage level to RS-232 voltage level, in this white LED for the transmission of data, USB to RS 232 cables and phototransistor for detecting the data from the visible light.

5.1 SENDING AND RECEIVING DATA USING HYPER TERMINAL

- In windows operating system it comes with the communication of hyper terminal and terminal emulation program.
- The connection between another computer through internal modem is using to set up a dial-up connection.
- The same way is using to set up a connection for data transfer between two computers (through using the serial ports and ports for serial - ports control of external device or system like scientific instruments, robot or robot communication station).
- Here we are using it for data transmission through the serial ports then connecting the circuits, (transmitter and receiver) to both computers through USB to RS 232.

6. CONCLUSION

Visible light communication (VLC) enchanting challenges for using appropriate future techniques in a cheap processing units , light emitting diode high brightness LEDs ,It is considered as next generation lighting devices, visible light communication with using LEDs would be auspicious technology for ubiquitous communication , In this technology is important from high energy saving using solid state lighting ,The optical wireless communication system is a very good replacement for regular communication system and is a rapidly growing segment if the field of communication, here we proposed as transferring (hyper terminal)data one device to another device .

7. FUTURE WORK

In future, for light fidelity is bright Li-F(high speed data transfer) consortium believes it is possible to achieve more than 10Gbs,it assume that theoretically allowing a high definition film to be download in 30 second.

8. REFFERENCE

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