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Information Transmission System Through Fluorescent Light Using Pulse Width Modulation Technique.

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Abstract- Light reaches nearly universally therefore communication also can go together with light freely. Light Fidelity is branch of wireless communication that is a rising technology. By victimization visible radiation as transmission medium, light Fidelity provides wireless communication. I propose victimization common and low cost fluorescent lamps to transmit info for navigation; as a result of victimization fluorescent lamps to produce light- weight is therefore widespread, and cost-efficient in existing buildings. During this paper I actually have delineated a completely unique light-sensor-based info transmission. During a novel manner, fluorescent light-weight is employed because the medium to transmit info, that is encoded by employing a pulse breadth modulation technique. The user can receive the knowledge that is encoded in light through a photo detector, when a knowledge stream of knowledge is received and processed, it'll be fed into the pc through the interface for any process. The projected system is utilized in indoor direction and navigation applications.

Keywords-Inverter Circuit, Fluorescent Light, Photo receiver, Arduino Development Board, Laptop.

I. INTRODUCTION

Li-Fi basically known as light fidelity is an outcome of twenty first century. The basic principle behind this technology is that the data can be transmitted through fluorescent light whose intensity varies even faster than the human eye. The advantageous thing is the wireless communication which decreases the cost enormously. Li Fi offers a far more secure form of data transfer because it can only be intercepted by those within a line of sight of the light source. Visible Light Communications is a very generic term that suggests any form of data communications via visible, primarily white light. Data Transfer in Visible Light Communication the basis of Light Fidelity is on the thought of using light for transmitting the data in place of Radio waves. Although any light source can be used as transmitter but some of them have practical priorities based on their operational properties. Fluorescent light is a key component in data transfer in this paper, will be equipped with transceivers which will receive as well as transmit the data. As light can be switched on and off much faster than we perceive and this on-off motion can be used to represent binary digits 0s and 1s. Such a sequence of light variation will enable for data. The signal send by transmitter is to be converted into the data. For this reason receivers are to be used. For serving the purpose of receivers to convert the light into electric pulses photodiodes are used. These photodiodes demodulates the received signals into actual data. It could transform wearable computer or laptop. In this paper Free Arduino USB which is a Arduino compatible board is used, which is compatible with all Arduino development tools, software's, codes etc. It contains everything that is required for programming a microcontroller and omits all extra features to keep it simple and cost effective. Light fidelity is the upcoming and on growing technology acting as competent for various other developing and already invented technologies. Since light is the most important source for transmission in this technology. This paper based on light fidelity concept. The aim of this paper is to design a highly secure information transmission system based on a light sensor; fluorescent lamp is used as a transmitting device.

II. BLOCK DIAGRAM

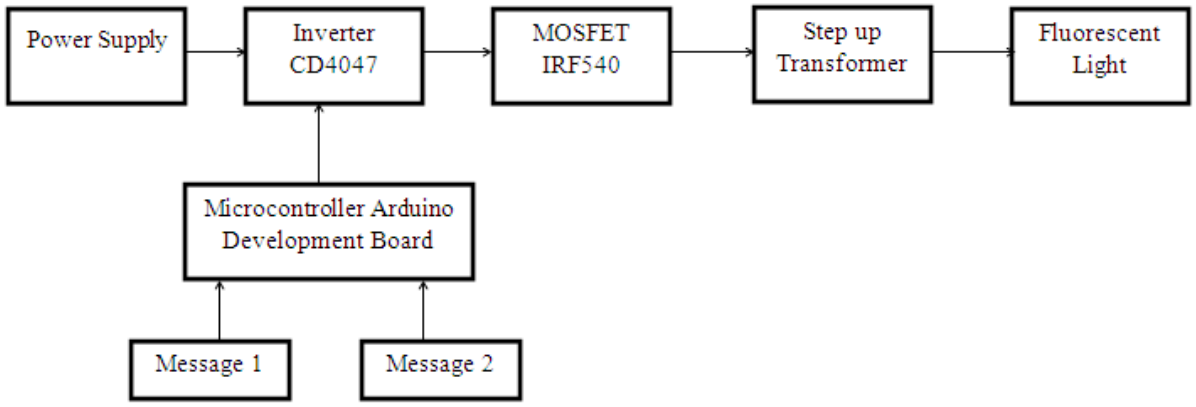


Figure1.Transmitter

In this section, we will outline the hardware system used for data transmission using fluorescent lamp. The whole system is divided into two parts: the transmitter and the receiver. The transmitter sends out messages encoded by the fluorescent light whose flicking is imperceptible to human vision, while the receiver detects the light using a photo detector. In the transmitter section, information can be encoded into the light through arc frequency variation. Here, I use a fluorescent lamp for our system since, first, it is highly used everywhere like buildings, malls, schools, colleges etc. and, second, there is no need to design a expensive circuit for controlling the arc frequency of the lamp, and by simple modifications on the current widely cheap and available circuit, we can furnish our goal. The lighting of the fluorescent lamp is due to the arc current running through the lamp. When the amplitude and frequency of the arc current is appropriate, the light will light up. Amplitude and frequency are the two key buildings, malls, schools, colleges etc. and, second, there is no need to design an expensive circuit for controlling the arc frequency of the lamp, and by simple modifications on the current widely cheap and available circuit, we can furnish our goal. The lighting of the fluorescent lamp is due to the arc current running through the lamp. When the amplitude and frequency of the arc current is appropriate, the light will light up. Amplitude and frequency are the two key factors for the light output. Therefore, changing the frequency of the arc current may encode all the information into the fluorescent light. If the modulation frequencies are very high then the information will be transmitted without flickering due to the characteristic of human vision. Therefore, we can simply transmit digital data through the light.

2.1. Inverter Circuit

In the inverter circuit there are three parts: Oscillator, Integrated Circuit (CD 4047), MOSFET. According to RC variation CD 4047 integrated circuit gives variable input to the MOSFET.MOSFETs operate in push pull configuration.IRF 540 MOSFETs are used in this circuit

2.1.1. Features

- Low power consumption: special CMOS oscillator configuration.
- A stable (free-running) operation.
- True and complemented outputs.
- Only one external R and C required.

2.2 MOSFET (IRF 540)

- Advanced Process Technology.
- Dynamic dv/dt Rating.
- Fast Switching.
- Fully Avalanche Rated.
- Ease of Paralleling.
- Simple Drive Requirements

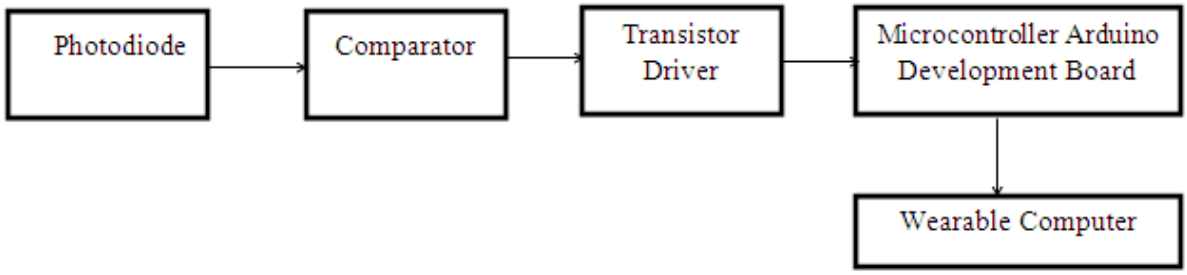


Figure2.Receiver

The receiver detects the fluorescent light and transforms the signals to the comparator that can be sent to the user's mobile wearable device through microcontroller (Arduino Compatible Development Board). The photo detector will detects light levels and its resistance changes based on the amount of light it picks up. The photo detector detecting the fluorescent light processes the data that are eventually fed into the computer. When light is exposed to bright light, a photo resistor's resistance drops drastically. Voltage divider of a photo resistor and a fixed resistor, in which the voltage divided up among the two components, will change due to ambient lighting. In darkness, the photo resistor will have a very high resistance and more voltage. Is allocated with components with an upper resistance value. So, when this voltage divider is connected to a comparator, the voltage divider will create a very high voltage. When the photo resistor is exposed to bright light, will have a Low resistance. So, less voltage will fall across it. So when it is captivated up to a comparator, the circuit of voltage divider will produce a voltage less than the reference voltage. Output of a photo transistor is given to the IC pin number 3 which is a non inverting input and reference voltage is given to the inverting pin number 2.We get the output from the comparator at pin number 6 and it is given to the base of a BC 547 transistor which acts as a inverting switch, output of it is given to the microcontroller (Arduino Compatible Development Board) and get display on the screen.

2.3. Arduino Compatible Development Board

Fig 3.Arduino Development Board

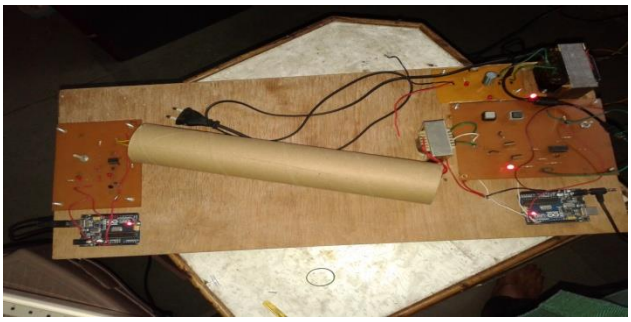
Arduino is an open source embedded development stage consisting of an easy development board based on Atmels AVR microcontroller and an easy to use development condition for writing, compiling and uploading codes to the board. Freeduino USB is a Arduino well-suited board, which is compatible with all Arduino development tools, software's, codes etc. Freeduino USB comes with only the bare essentials present on an Arduino board that is required for getting started. It contains everything which is required for programming a Microcontroller and omits all extra features to keep

it simple and cost effective. Arduino is an open source development platform, which means all the designs are available for free.

2.4. Atmels AVR Microcontroller

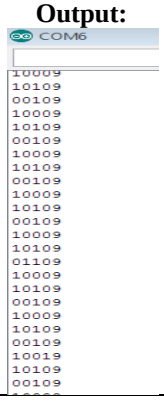
The AVR is a modified Harvard architecture 8-bit RISC single chip microcontroller which was developed by Atmel. The AVR was one of the first microcontroller families to use on-chip ash Memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time. The AVR is a modified Harvard architecture machine where program and data are stored in separate physical memory systems that appear in different address spaces, but having the ability to read data items from program memory using Special instructions.

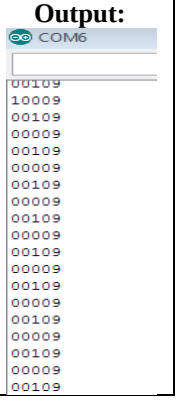
III. IMPLEMENTATION



IV. RESULTS

Message1 (1010)	Message2 (0010)
Output:	**Output:**





When we transmit message bits 1010 then for this transmitter and receiver get synchronize and through fluorescent light transmitter will transmit the information to receiver according to message 1010 similarly for second message i.e.0010.

V. CONCLUSION

Light Sensor Based Information transmission System is a highly secure information transmission system. This system can be used in aircraft, similarly in medical devices and in hospitals, so it can be easily used in such places where Bluetooth, infrared, Wi-Fi and internet are not allowed. So, it will be most helpful transferring medium for us. The use of a conventional fluorescent light as a data transmission medium also has a cost advantage in eliminating the need to wire large numbers of receiving devices. So, in the data transmission
system using a fluorescent lamp, a highly secure coding technique is used that is Manchester coding. Therefore this system is highly secure system. This can be used in military applications, Hospitals,

industrial area. Freeduino USB is used in this project which is an Arduino compatible board and is compatible with all Arduino development tools, softwares, codes etc. Freeduino USB can be programmed directly through a USB connection to a PC through the Arduino IDE, which is a simple and easy to use program development environment. It contains everything that is required for programming a microcontroller and omits all extra features to keep it simple and cost effective.

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