

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Visit: www.ijirset.com

Vol. 8, Issue 3, March 2019

Automatic Intensity Controller and Helmet Detection Using PIC Microcontroller

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ABSTRACT: While driving the vehicle on road during the night time, intensity of head light is high and also rare usage of helmet cause more accidents. Conducting too short a safety distance is a common road traffic problem, often resulting in traffic accidents. Research has identified a lack of vehicle - mountable devices to alert trailing vehicle drivers to maintain adequate safe distance. The excessive of headlight glare from the oncoming traffic deteriorates the eye sight of the driver resulting to temporary visual impair. To overcome this difficulty, intensity control system is constructed by using LDR the head light is automatically dimmed, it can be equipped in vehicle. The helmet is the motorcyclists ' main safety equipment, but it is not used by many drivers. An accident can be fatal if a motorcyclist is without a helmet. To reduce this problem helmet detection system is constructed by using RF transmitter and receiver. The proposed system was reduce collide between two vehicle by using ultrasonic sensor. This overall system is controlled by using PIC microcontroller.

KEYWORDS: Headlight Dimmer, Light Dependent Resistor (LDR), PIC Microcontroller (16f877A), RF transmitter and receiver, Ultrasonic sensor.

I. INTRODUCTION

To protect your body, motorcyclists need to take extra precautions. In a motorcycle accident, the head and brain are most vulnerable to injury. Helmets drivers and passengers significantly increase their chances of survival over non - helmets. Wearing the helmet is necessary for every individual to save their life. So our primary target is to make use of the helmet for two wheelers “compulsory “. This ensures the safety of the bike and driver. Thus to save the human being “Soft switch helmet” the project has been proposed.

Human eyes are very sensitive to light. The can adapt to particular range of vision. Visible light having wavelength the range of 400 to 700 nanometre between infra red and the ultraviolet. If brightness of the vehicle increases, the strain to focus an object increases. This will increase the eye to strain more. So in this we designed to reduce the problem by controlling the bright headlight of the vehicle to low beam automatically when it approaches the vehicle close from the other direction. During the peak hours the traffic will be severe. If the vehicle stops suddenly then the next vehicle gets hit with the previous vehicle. So to avoid minor accidents ultrasonic sensor is used. This sensor gives the information about the distance between the two vehicles and it alerts the driver.

II. EXISTING SYSTEM

The existing system in which the helmet is connected to the mobile phone using wireless communication. It will detect the bike speed so that the owner can instruct the bike rider to ride slowly. One more existing system is that the helmet can detect the person is drunken or not. If he is drunk then the owner will instruct the rider to stop the vehicle. The intensity of the light is controlled only in street lights based on the intensity of light of the vehicle. The distances of the two vehicles is measured and automatically stop the vehicle if it is near.

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III. PROPOSED SYSTEM

Smart vehicle is built by using LDR the light intensity is modulated to high beam and low beam based on vehicle approaching from opposite direction and the ultrasonic sensor is used to measure the distance between two vehicles, if the vehicle distance is less than 10m the buzzer produces the beep sound which makes the driver to be alert. To avoid the head injury during accident helmet is mandatory. So overcome this problem the soft switch is present in the helmet. If the helmet is worn by the person the soft switch will be pressed ON and it will transmit 1s continuously through RF module. Suddenly the rider removes the helmet then it will transmit 0's clutch will not realised so vehicle doesn't start.

IV. OVERVIEW OF LIGHT DEPENDENT RESISTOR (LDR)

Light Dependent Resistor (LDR) is a type of semiconductor and changes its conductivity as light intensity changes proportionally. A light dependent resistor (LDR) is a resistor whose resistance decreases with increasing incident light intensity; thus, it light/dark sensor circuits. An LDR's resistance is usually very high, sometimes as high as 1000 000 ohms, but drops dramatically when illuminated with light resistance.

A Light Dependent Resistor is made of a semiconductor with high resistance. If light is sufficiently high on the device, the photons are absorbed by the device semiconductor give the bound electrons enough energy to jump into the conductive band. The resulting free electron and its partner in the hole conduct electricity, thus reducing resistance. LDR's light - sensitive part is a wavy track of Cadmium Sulphide. Cadmium Sulphide cell depends on the ability of the materials to vary its resistance depending on how much light the cell strikes.

In the circuit, LDR is used to convert the intensity of the approaching vehicle's high beam headlight into an electrical signal. The advantages of LDRs are as follows; they are cheap and available in many sizes and shapes; practical LDRs are available in various sizes and packaging styles; the most popular size has a face diameter of approximately 10 mm and they finally need very small power and voltage to operate.

V. OVERVIEW OF RF TRANSMITTER AND RECEIVER

RF TRANSMITTER

The design of radio transmitter is a complex subject that can be divided into a series of smaller topics. A radio communication system at the transmitter and receiver requires two tuned circuits each, all four tuned to the same frequency. The transmitter is a electronic device that usually propagates an electromagnetic signal like radio, television or other telecommunication with the help of an antenna. Wireless communications systems, including cellular phones, paging devices, personal communication services (PCS) systems, and wireless data networks, have become ubiquitous in society. A mobile terminal apparatus used in the cellular radio communications system receives a transmitted from a base station, by a antenna, inputs the signal to a receiving radio-frequency unit via an antenna duplex, high frequency amplifies the signal, removes unnecessary waves outside the receiving band from the signal, converts the signal to an intermediate. The frequency signal is demodulated by the demodulator and converted to the baseband signal. Generally ,a and receiver is used for performing a radio transmission and receiving operations, whereby a high frequency signal outputted from a modulated is transmitted to an antenna of the radio transmitted and is transmitted there from to a remote radio transmitter and receiver, or the thus transmitted signal is received through another antenna. A predetermined signal process is subjected to the transmitting baseband signal, input to a modulator, which modulates a carrier wave signal. The modulated carrier wave signal is transformed into a radio frequency by a radio frequency transmission circuit and amplified to a pre determined transmitting power and transmitted from the antenna to the base station via the duplex. The RF transmitter used to transmit the signal at 27MHz frequency.

BANDWIDTH

Imagine we have a receiver making, say, 1000-period sums. And he's made to hear a radio frequency of 10,000,000 Hz (10 MHz). That makes a calculation of 10,000 sums per second. It will hear perfectly a 10,000,000 Hz emitter. It will also hear a 10,002,000 Hz emitter. Nearly but will not hear an emitter emitting at 10,500,000 Hz (Well in fact it may hear it if it emits a very powerful signal, but let's not think about that). So, a 10,500,000 Hz emitter won't disturb our

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10,000,000 Hz receiver working. So we can use a second receiver, receiving at 10,500,000 Hz, to hear the 10,500,000 Hz emitter. The 10,500,000 Hz receiver will not be disturbed by the 10,000,000 Hz emitter. Each emitter receives the same frequency signal emitted by the emitter, but is not disturbed by the other emitter using another frequency. If a receiver can be tuned it will be able to choose to which emitter it listens. It can be tuned to listen to the 10,000,000 Hz emitter or listen to the 10,500,000 Hz emitter. It's just a question of frequency of the clock. We're working at 10 MHz and we're doing 10,000 sums per second. We have the ability to simultaneously use several frequencies to allow different emitters and receivers to work at the same location without disturbing each other. But, if we use frequencies between 9 MHz and 11 MHz, Commonly a difference in frequency of ten times the transmission rate is taken. We transmit 10,000 information's per second, so we will rely upon a difference of 100,000 Hz between each emitter-receiver couple. Thus: 9,000,000 Hz, 9,100,000 Hz, and 9,200,000 Hz. The broader the bandwidth,

- The more basic information you convey every second.
- The less information is passed on. Because you use less time to make a sum.
- Within a certain frequency window, the lesser emitter can work together.
- Within the emitter and receiver, the less accurate the clocks must be.

RF RECEIVER

Pin Definition:

- PIN 1: GND
- PIN 2: Digital Output
- PIN 3: Linear Output (For Testing)
- PIN 4: VCC (5V DC)
- PIN 5: VCC (5V DC)
- PIN 6: GND
- PIN 7: GND
- PIN 8: ANT

Specification Table:

Model	SR Mode	Power	Data Rate (bps)	Sensitivity (dbm)	Power Consumption	Modulation	Band Width
RX1	SR	+5V DC	300~5K	- 100	2.70 mA	AM	12MHZ

For remote control or telemetry applications, this compact RF receiver module is suitable. The double - sided circuit board is pre - populated and tuned to 433MHz with Surface Mount Devices (SMD).No module assembly or adjustments are required. RF receiver module RX433 receives RF control signals from the. The RX433 RF receiver module is a highly sensitive passive design that can be easily implemented with low external components. (Download datasheet with hook-up schematic below)

For your custom remote control or telemetry requirements, you can also use RF remote receiver module RX433 with 433 MHz RF transmitters TX433N. The RF receiver has same range of RF transmitter; 7v-12v DC operation and mainly 600ft of receiving.

ADVANTAGES:

- Saves power to a large extent
- Can be updated easily
- Easy to debug
- Power wastage is eliminated

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VI. TRANSMITTER PART

In this helmet block RF transmitter is used to transmit the signal to the receiver part, soft switch is used in this system because it act as a sensor. Switch is ON the signal sent to the receiver part as 1 or else it will send 0. If the switch is ON communication between transmitter and receiver is 1, if it is 1 the vehicle is start and it display “Vehicle Safety System”, the continuous signal is send to the receiver. The helmet is no worn that means switch is OFF the vehicle is not start and it display “Please Wear Helmet”. In this circuit 5V power supply is given.

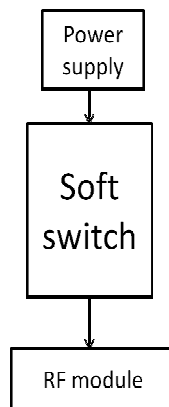


Fig.1.Helmet Block

VII. RECEIVER PART

In receiver part RF receiver is used to detect the helmet is worn or not by using continuous signal of 1's and the LDR is used to dimmed the headlight of the vehicle. Normal open (NO), Normal Close (NC) wire are connected to relay, Normal close is connected to the bright side of the headlight. Normal open is connected to the dimmer. When opposite vehicle light is incident on the head light, then the connection is switched to dimmer. The distance between the two vehicles must be 10m, if not the ultrasonic sensor will alert the rider. If it is less then 10m display the message to the driver and give buzzer sound to alert the driver. In this circuit 220V DC supply is given to step down transformer that converts 220V to 5V.

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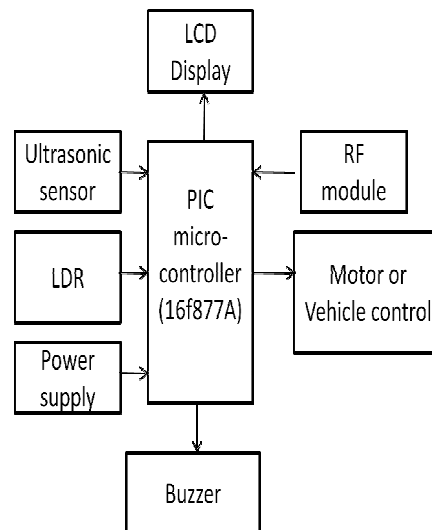


Fig.2. Vehicle Block

VIII. RESULT

The circuit had been designed to be a working model. Until the vehicle is encountered by an opposite vehicle, it can travel with high beam. Once it encounters an opposite vehicle, each of the two vehicles senses the opposite vehicles light. Thus if either of the vehicles are using high beam, it switches to low beam. If the headlight is already in low beam, then no change occurs. The beep sound is produced when distance between the two vehicles is small. If the helmet is worn the clutch is realised and vehicle is stated.

IX. CONCLUSION

The motive of this project is to reduce the accidents by using automatic headlight beam controller and it is designed by using LDR sensing technique. The device is designed in such a way that it senses a vehicle that is approaching from the opposite. Once the sensor senses this approach, it automatically switches the high headlight beam to low headlight beam by the help of LDR Relay. Ultrasonic sensor is used to measure the distance between two vehicles. If the distance is short then it will display the alert message to the rider. The vehicle will move on only when the rider wears a helmet. Hence the death rate will be reduced.

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