

Helmet Operated Ignition System of Two Wheeler using Limit Switch and Micro-controller

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ABSTRACT: In present time many cases of bike accident can be seen around us. People get injured or might be dead and one of the main reason being not wearing helmet. Many people could have saved their life in accident cases if they would have worn helmet at the time of accident. Even though many public awareness programmes are undertaken by government, road rules are violated continuously. So as to overcome these problems, a Smart helmet is proposed having a control system built inside a helmet. Smart Helmet for Motorcyclist is a project undertaken to decrease the risk of death due to head injuries during accidents. The project is expected to improve safety and reduce accidents, especially fatal to the motorcyclist.

KEYWORDS: Transmitter, Receiver, Sensors, Helmet, Ignition system

I. INTRODUCTION

In today's era, especially in the young generation, the craze of motorbikes is really remarkable. The middle class families prefer to buy motorbikes over 4-wheelers, because of their low prices. As the bikers in our country are increasing, the road mishaps are also increasing day by day, due to which many deaths occur, most of them are caused due to most common negligence of not wearing the helmets. This motivates us to think about making a system which ensures the safety of biker, by making it necessary to wear helmet, as per government guidelines. The project aims at the security and safety of the bikers against road accidents. It introduced a security system on the rider with the perfect helmet usage before riding.

In this system, advanced concepts of digital sensors and Microcontroller 8051 based circuitry are used. It consists a Sensor and Micro controller (MCU) system. The bike will not start without wearing helmet by the user, as user wear helmet a signal radiate from sensor and once these signal get sensed by the MCU placed in the ignition switch of the bike, bike will start. There are two circuitry- Transmitter and receiver. The transmitter is mounted on helmet and the receiver is on bike ignition system. The main advantage of the system it uses wireless infrared sensors. If the rider removes the helmet while driving, an alarm will start which will continue until he/she does not wear the helmet and reset the system.

II. RELATED WORK

Components:

- **Micro-controller-** Micro controller AT89S51
The AT89xxx is a low-power, high-performance CMOS 8-bit microcomputer with 4K / 8K bytes of Flash programmable and erasable read only memory
- **Transmitter module-** The ST-TX01-ASK is an ASK Hybrid transmitter module.

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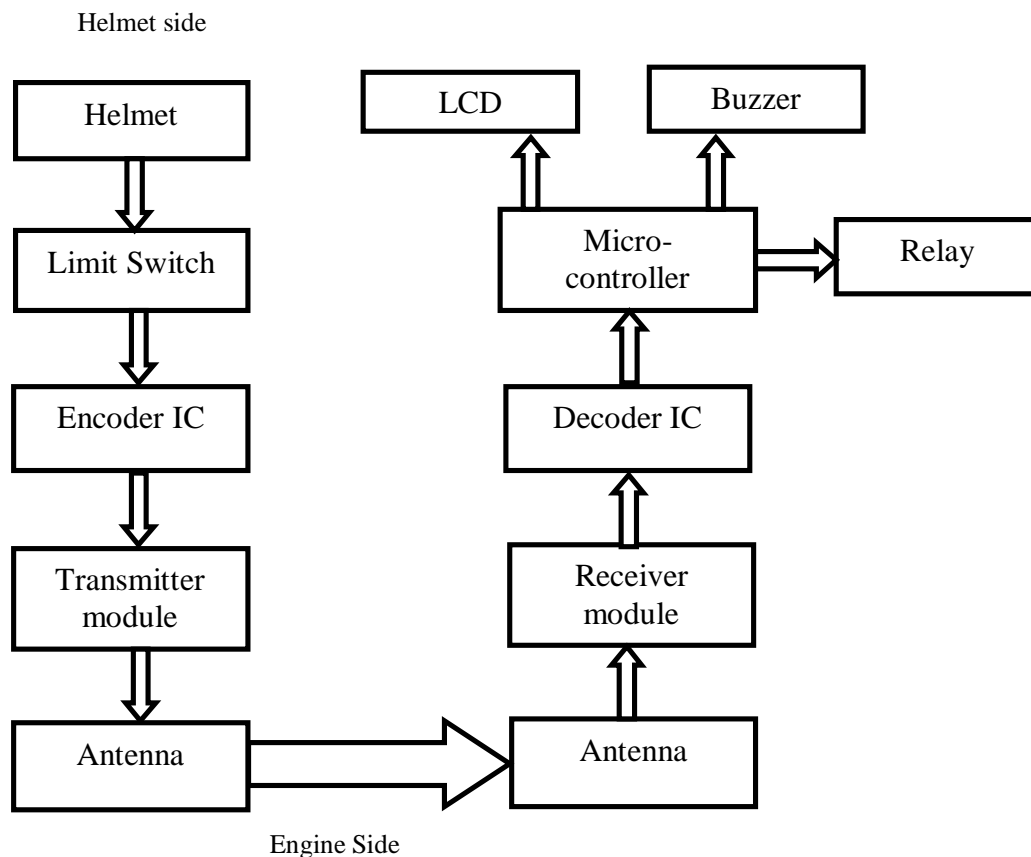
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- **Receiver module-** The ST \square RX04 \square ASK is an ASK superheat receiver module with PLL synthesizer and crystal oscillator. The circuit shape is PLL.
- **Encoder-** The 212 encoders are a series of CMOS LSIs for remote control system applications. They are capable of encoding information which consists of N address bits and 12_N data bits. Each address/ data input can be set to one of the two logic states. The programmed addresses/data are transmitted together with the header bits via an RF or an infrared transmission medium upon receipt of a trigger signal.
- **Decoder-** The 2¹² decoders are a series of CMOS LSIs for remote control system applications. They are paired with Holtek's 2¹² series of encoders. For proper operation, a pair of encoder/decoder with the same number of addresses and data format is chosen. The decoders receive serial addresses and data from a programmed 2¹² series of encoders that are transmitted by a carrier using an RF or an IR transmission medium. They compare the serial input data three times continuously with their local addresses. If no error or unmatched codes are found, the input data codes are decoded and then transferred to the output pins.
- **SPDT Relay-** The relay takes advantage of the fact that when electricity flows through a coil, it becomes an electromagnet. A relay is used to electrically isolate battery.
- **Limit Switch-** The limit switch is placed inside the helmet which gets pressed when the rider wears helmet and actuates the system.
- **LCD Display-** The LCD display is used to display two signals
When helmet is on
When helmet is off
- **Buzzer-** Piezo buzzer is an electronic device is used to produce sound. Piezo buzzer is based on the inverse principle of piezo electricity. It is the phenomena of generating electricity when mechanical pressure is applied to certain materials and the vice versa is also true.

Flowchart:



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III. IMPLEMENTATION

- **Transmitter Circuit:**

Transmitter circuit consist of following components

1. Limit switch
2. Transmitter module
3. Encoder IC
4. LED

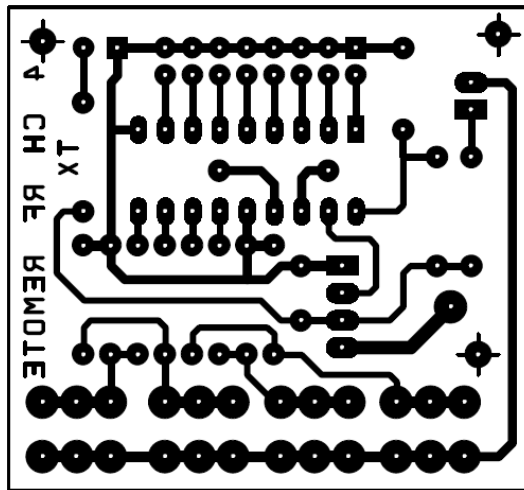


Fig 1: PCB layout

The figure shows the printed circuit board on which the components of the receiver are soldered.

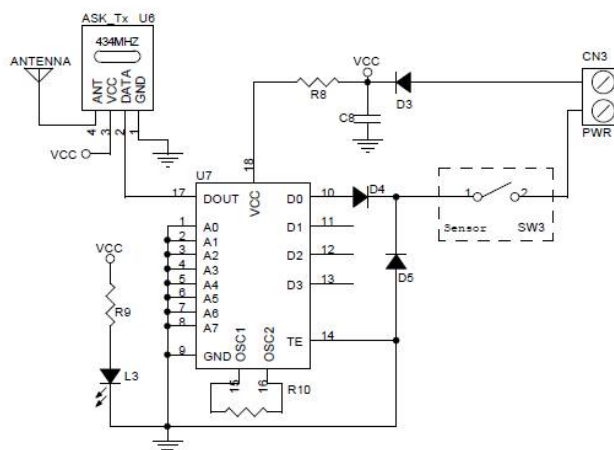


Fig 2: Transmitter circuit

The figure shows the construction of transmitter circuit. The main component of circuit is the encoder. The switch is placed inside the helmet. It is connected to encoder using wires. It is connected to transmitter module. The module than passes the signal to antenna which sends signal wirelessly to receiver.

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• **Receiver Circuit:**

Receiver circuit consist of following components

1. AT89S51 microcontroller
2. RF_Rx module
3. Decoder IC
4. Relay
5. Alarm
6. LCD Display
7. LED

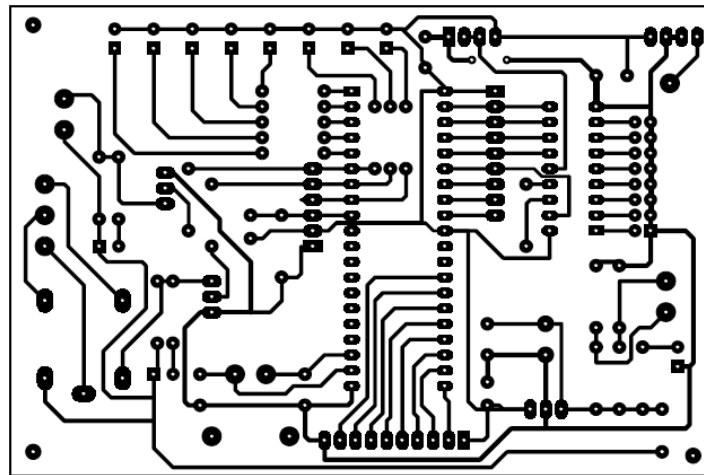


Fig 3: PCB layout

The figure shows the printed circuit board on which the components of the transmitter are soldered.

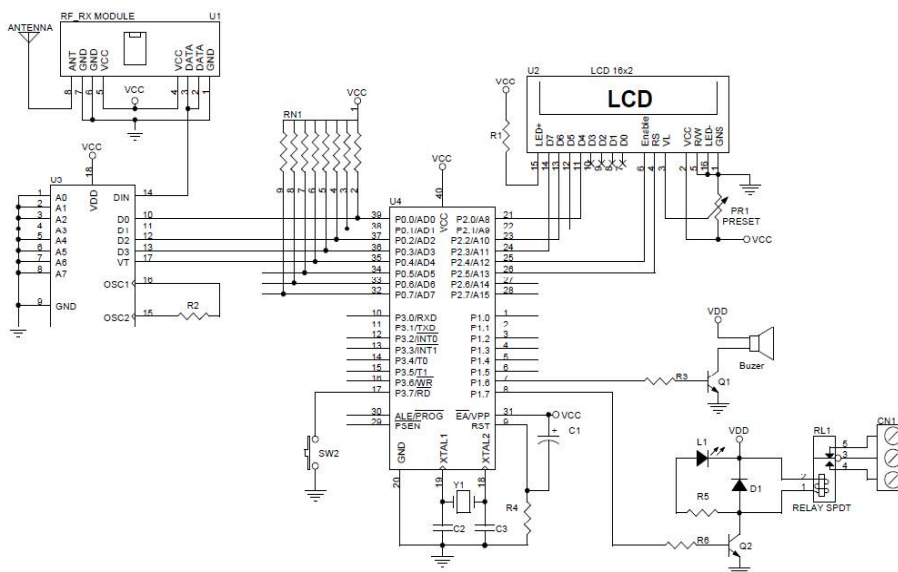


Fig 4: Receiver circuit

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The receiver module has an antenna which receives the signal. It is connected to decoder IC which will decode the signal. The IC will then send signal to micro controller 8051. The micro controller controls LCD screen, relay, and buzzer.

IV. EXPERIMENTAL RESULT

As the rider wears the helmet, the head of rider will press the limit switch. As the switch is pressed, LED glows, encoder IC encodes the signal. This encoded signal is given to transmitter module. The transmitter module has an antenna which sends the signal to receiver.

Now if the rider removes the helmet while ignition is on, the switch will retract, and the signal stops. Thus no signal is sent to receiver.

The transmitter module transmits the signal. The antenna in the receiver module receives the signal. The RF_RX module will receive the signal. It will send the signal to decoder IC. The IC decodes the signal and provides it to the microcontroller. Power supply is given to relay. It converts 12V to 5V because the micro-controller requires 5V to operate.

Until the signal is received the LCD will display "System in normal mode" else it will display "System in alarm mode". If the helmet is removed in between then a window of 5 seconds is provided. If the helmet is not worn within this time period, then an alarm will start. It will continue until it is reset by pressing the button.



Fig 5

V. CONCLUSION

We came to the conclusion that this can be the best alternate if implemented properly in future in order to reduce the number of head injury happening. This being a very innovative idea should be developed further for improvements. This system is very effective for the safety purpose of the user. User has to wear helmet to ride two wheeler vehicle and hence traffic rules will follow with this.

REFERENCES

- [1] Nitin Agarwal, Anshul Kumar Singh, Pushpendra Pratap Singh, Rajesh Sahani "SMART HELMET" International Research Journal of Engineering and Technology (IRJET), Volume 2, Issue 2, 2005
- [2] Sudharsana Vijayan, Vineed T Govind, Merin Mathews, Simna Surendran, Muhammed Sabah M E "ALCOHOL DETECTION USING SMART HELMET SYSTEM" International Journal of Emerging Technology in Computer Science & Electronics (IJETCSE), Volume 8 Issue 1 -APRIL 2014.
- [3] Jennifer William, Kaustubh Padwal, Nexon Samuel, Akshay Bawkar, SmitaRukhande "Intelligent Helmet" International Journal of Scientific & Engineering Research, Volume 7, Issue 3, March-2016
- [4] Prof. Chitte P.P., Mr. Salunke Akshay S., Mr. Thorat Aniruddha N., Mr. Bhosale Nilesh T. "Smart Helmet & Intelligent Bike System" International Research Journal of Engineering and Technology (IRJET), Volume: 03 Issue: 05 | May-2016
- [5] <http://www.dnaindia.com/scitech/report-pune-engineers-design-a-really-smart-helmet-1975630>