

Smart Helmet System For Industry Using PIC

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Abstract- In present time many cases of industry accident can be seen around us. Peoples get injured or might be dead and one of the reason is not handling devices properly. Many peoples could save their life in accident cases if they wear helmet at the time of accident. Continuously industry rules are violated. So as to overcome these problems, a Smart helmet is proposed having a control system built inside a helmet. Smart Helmet for industry is a project undertaken to increase the rate of industrial safety among motorcyclists. The idea is obtained after knowing that the increasing number of fatal accidents over the years is because it consist a RF transmitter and a RF receiver system. the conveyor will not get start without wearing helmet by the user, as user wear helmet a RF signal radiate from transmitter and once these RF signal get sensed by the receiver then the devices will turn on the conveyor will on and light an fan will also turn on.

Keywords- PIC, LCD, Sensors.

I. INTRODUCTION

The most important part of any type of industry is safety. In industry safety and security is a first aspect of all. To avoid any types of unwanted conditions, every industry follows some basic precaution. Communication is the most vital key factor today, to monitor different parameters such as human accident, short circuit, object falling, brain safety, awareness to take necessary actions accordingly to avoid any types of problematic conditions and gives an alert using buzzer. To achieve safety in industry by using a smart safety helmet must be created between workers, moving in the, and a fixed base station. The wired communication network technology system will be not so effective. In practical point of view wired connection and their installation cost is higher and maintenance cost is also high then by comfortably use wireless communication system. But we develop Smart Helmet then used wireless transmission because of RF sensors.

II. METHODS AND MATERIAL

A. Proposed Methodology

Our module consist of following major components from the block diagram, which are explained below:

Micro controller: In this project we have used a microcontroller PIC 16F877A .Which is the heart of the project. This controls all the functions of project. Which will continuously Monitor the helmet is present or not and also turn on and off light and Fan.

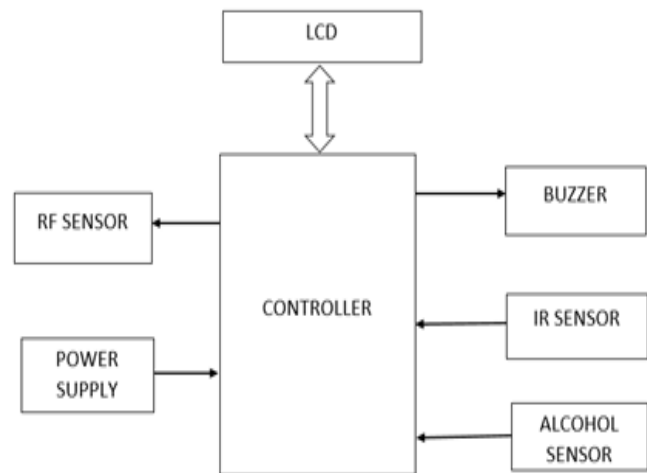


Fig 1: Block diagram of transmitter

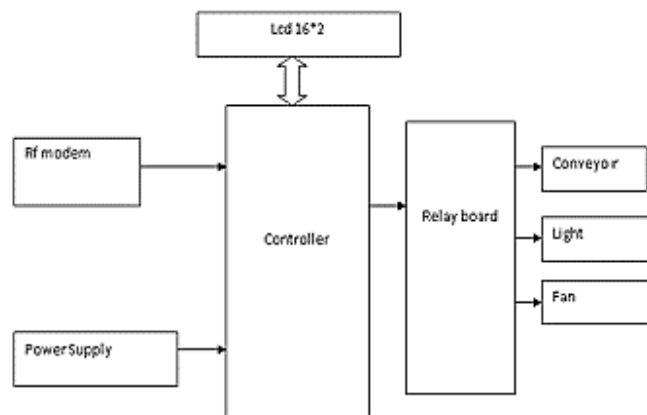


Fig 2: Block Diagram of receiver

RF Sensor: The sensor is used to communicate with the System and helmet we have used cc2500 module which operates over 2.5GHz frequency.

LM7805: It is a 3-terminal 1A positive voltage regulator. This device can be used with external components to obtain variable voltage and current.

Power supply: It is used to supply the power to Max232 and microcontroller. LCD Description: Here we have used the step down transformer which gives 9 volt ac which we convert with the help of bridge Made by 4 diode show in circuit diagram which is further passed to the capacitor of 1000Uf which is used to eliminate the spick after that the voltage is passed to the regulator IC 7805 Which will pass 5V to the Output at Output the 0.1uf Capacitor is connected to output to avoid the noise distortions. The purely DC supply is connected to the Microcontroller PIC16F877A.The micro-controller 89S52isbrain of project all the operation is Control by this. It is consisted of four Port. The Port RB is used to connect the LCD in that we have used RB⁷ to R0⁴ bits for the LCD Port DB4 to DB7. And the Result Set (RS) are is placed at the RD⁰ also Read and write (RW) operation is perform at the bit RD¹. An enable (EN) pin is used at the RD0². The contrast is adjusted with the help of 100E resistor. The RF Modem is connected at the RXD and TXD Pin of controller which will allow to transmute and receive the data. But for communication we require to shift the level of the voltage which will be required for RF modem.

RF Sensor: Receives and Transmits serial data over RF. You can use this board with another RF board at TTL level to get MCU to PC RF data link. RF modem can be used for applications that need two way wireless data transmission. It features high data rate and longer transmission distance. The communication protocol is self-controlled and completely transparent to user interface. The module can be embedded to your current design so that wireless communication can be set up easily.

IR Sensor: An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measures only infrared radiation, rather than emitting it that is called as a passive IR sensor. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detectedby an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received. An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.

Alcohol Sensor: This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common Breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.



Fig 3: Alcohol Sensor

LCD:

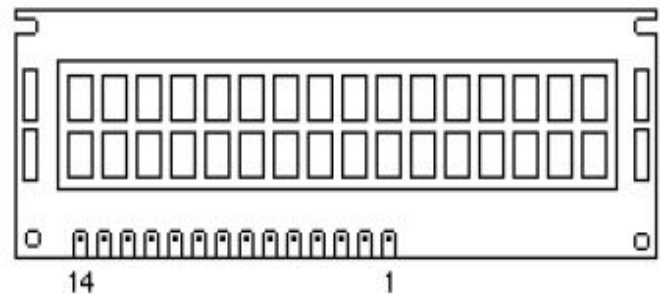


Fig 4: LCD 16*2

A 2 line by 16 Character LCD is Pictured. Data will work on most 1 line x 16 Character, 1 line x 20 Character, 2 line x 16 Character, 2 line x 20 Character, 4line x 20 Character, 2line x 40 1Character etc. modules compatible with the HD44780 LCD module.

IR Proximity Sensor:Uses infrared beam reflection for detecting proximity of objects.



Fig 5:IR Sensor

Proximity Sensor are used to detect objects and obstacles in front of sensor. Sensor keeps transmitting modulated infrared light and when any object comes near, it is detected by the sensor by monitoring the reflected light from the object. It can be used in robots for obstacle avoidance, for automatic doors, for parking aid devices or for security alarm systems, or contact less tachometer by measuring RPM of rotation objects like fan blades.

B. Stimulation on protues:

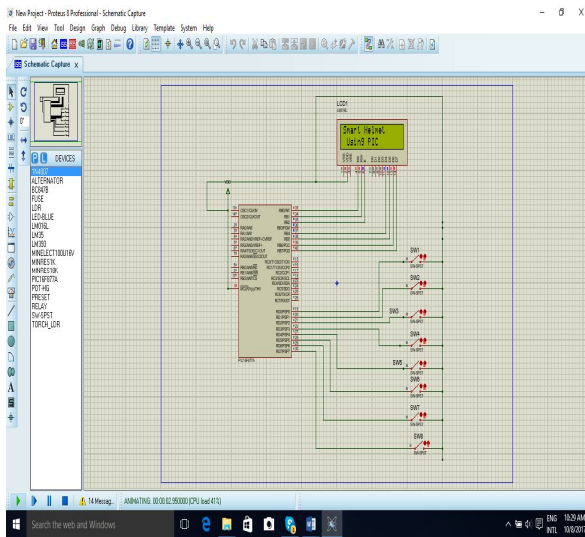


Fig 6: Stimulation on Protues software

C. Working Proto-type



Fig 7: Working Prototype-1

In prototype-I the circuit turns ON when the helmet is weaned by the user and turns off automatically if the helmet is removed. Therefore the above circuit receives the signals from the prototype-II (which is shown below).

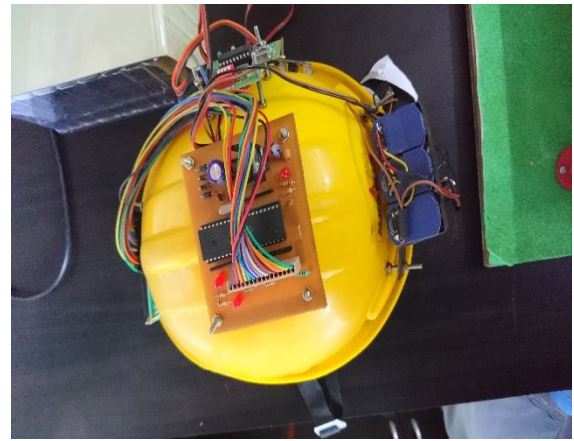


Fig 8: Working Prototype-2

III. ADVANTAGES AND APPLICATIONS

A. Advantages:

1. The system will help to monitor the labor.
2. Accidents will be avoided.
3. Easy to operate.
4. It is small in size and hence portable.

B. Applications:

1. This system is used in industries.
2. The system can be used two wheelers.
3. System can be used in automated industries.

IV. CONCLUSION

By implementing this system a safety of the worker is increased A helmet may not be a 100% full proof but is definitely the rest line of defense for the Worker in case of an accident to prevent fatal brain injuries. The proposed approach makes it Mandatory for the worker to use this protective guard in order to Work on the system and ensures the safety of the human brain and therefore reduces the risks of brain injuries And deaths in case of an accident.

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