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Smart Helmet with Intercommunication System Based GSM/GPS

Nishalini Delcy[1], B. T. Tharani Sri Sakthi[2], V. Thaliban[3], S. Vignesh[4], A. Priya[5]
[1,2]*Asst Prof., Dept. of Electrical and Electronics Engg., Asian College of Engg. and Tech., Coimbatore, India*
[3,4,5]*Student, Dept. of Electrical and Electronics Engg., Asian College of Engg. and Tech., Coimbatore, India*

***Abstract*— Aim of the project to design a helmet with the telecommunication system first priority as safety and involving information and communication technology (ICT), increasing the safety measures. This involves a panic button, to be able to alert the police & ambulance. In a feasible range, who can approach the person in trouble and handle the emergency situation .besides it also contains an inter-helmet communication. For developing a project based on avoided death using microcontroller. In this project, a user can press a button that is located on the project with GPS and GSM technology using microcontroller. Once the button is pressed the microcontroller receive the signal from GPS system which has present location information and the microcontroller allows the GSM system sent the alert message to the predefined as 'MY LIFE IS AN DANGER ,SAVE ME AT LOCATION' followed by GPS link .this project could be designed in small size and light weight something light mobile phone so that carry is not that problem .by just simply pressing a signal key .this will sent the distress alert message along with the location to your near police or hospital and if timely actions are taken many misfortunes could be avoided. Therefore, each helmet includes a microcontroller, handling the panic button, along with the communication system for general conversion and efficient coordination among the public all levels.**

***Index Terms*— microcontroller, sim300, modem, display, IOT, telecommunication system, smart helmet**

I. Introduction

Each working places and travelling way we are see and solve the more problems and sometimes we have feel helpless at the moment very useful the project. All are very important in 'safety '. The best way to ensure safety in a technology surrounded places, is by technology. The device ensure that there always is a communication between societies. Android based application on human security is already out in the market but for non-android users. I thought an idea for developing a project based on human security using micro controller. In this project, a user can press a button that is located on the project with GPS and GSM technology using microcontroller .once the button is located on the project with GPS and GSM technology using microcontroller. Once the button is pressed the microcontroller receives the signal from GPS system which has present location information and then the microcontroller allows the GSM system which has present location information and then the microcontroller allows the GSM system sent the alert message to the predefined number as "MY LIFE IS AN DANGER , SAVE ME AT LOCATION''. The message has received a person to move a next stage of safety alert. Today more than accident and women problem here in our society the project is very useful to avoided the problem and take a first aid

II. Literature Review

A common used equipment at a travelling site is a safety helmet. It is an essential headwear that protect the user from head injurious as they can be fatal. There are many incident which have claimed the lives of workers who did not take proper precaution. A safety helmet therefore has been made mandatory at the place. Now here the only problem now is that a simple helmet therefore , researches came forward to make it more useful and gain more importance .one of the way to make it smart helmet .there has been many prototype but only a handful of them have reached the product stage and even fewer made it to the market . in reference[2] ,the use of many different sensor have allowed the workers so be more efficient but more important stay safe . it also incorporate many other feature such as easy communication , easy navigation of the site , etc. This Smart Helmet shows that the ideas has lot of scope. Discuss how a term of three from the university .has developed an even smart helmet and they are all geared up for starting production [5] . Highlights major innovation in the field. the proactive smart helmet is inspired from a baseball helmet and it incorporate a flexible inner layer which can harden and absorb the shock upon impact, thereby protecting the worker [1]. In similar approach to. some aim to incorporate an emergency notification system (SHENS) which can directly inform the nearest medical institute about an accident [6]. Integration web and cloud services into the helmet to make it even smarter [3]. Finally, suggestions on adding a small display and a set of microphone and speaker are made [4]. Although this product reached the patent stage but there is no news of it hitting the production line. Overall, there have been a lot of prototype and the failures of those prototype has led to an even better and innovation solution.

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A. *Proposed Method and Novelty*

The proposed method includes a build in inter communication system. It is externally implemented into a helmet .the inclusion of panic button to warn the people around in a particular range is usually a separate entity , while the system of reminders via beepers is a completely novel idea in this society .

III. Methodology

- Inter communication system
- Panic button
- GSM/GPS

IV. Intercommunication System

A. *Microcontroller*

Atmel 89c2051 is a 20 pin device, it has 15 digit i/o lines. in AT89c2051 , p3.6 is not seen externally but it help a different sense i.e. it is the output of a precision analog comparator and accessible through software .it has 16 bit timer. There is no external memory address/data bus. Therefore, no external memory connection are possible. In fact ,only port 1 and port 3(except p3.6) function are available in at89c2051.the connections of external crystal and reset circuit of 89c051 is same as that of MCS-51.The pin description of IC AT89C2051 IS Shown below:

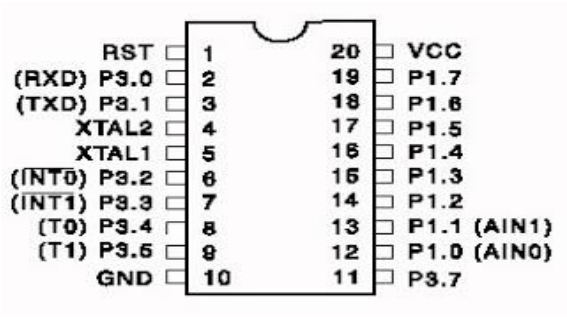

Fig.1. Pin Description

A. *Vcc(Pin 20) Supply Voltage Gnd(Pin 10)Ground.*

Port 1(p1.1 to p1.7)pin 12 to 19: the port 1 is an 8 bit bi-directional I/O port. Port pins P1.2 to P1.7 provide internal pull-ups. P1.0 and P1.1 require external pull-ups.P10 and P1.1 also serve as the positive input (AINO) and the negative input (A1N1) respectively , of the on-chip precision analog comparator. The port output buffers can sink20 mA and can drive LED display directly. When 1s are written to port1 pins , they can be used as inputs . when pin P1.2 to P 1.7 are used as inputs and are externally pulled low ,they will source current (I) because of the internal pull – ups. Port 1 also receives code data during flash programming and verification

B. *PORT 3: PINS P3.0 TO P3.5,P3.7*

These are seven bi directional I/O pins with internal pull-ups . P3.6 is hard wired as an input to the output of the on chip comparator and is not accessible as a general – purpose I/O PIN. The port 3 output buffer can sink20 mA. When 1s are written to port3 pins they are pulled high by internal pull-ups and can be used as input ,As inputs, port 3 pins that are externally being pulled low will source current(I) because of the pull-ups . port 3 also serves the function of various special feature of the AT89C2051. Some control signals for flash programming and verification.

C. *RST(PIN 1)*

Reset input. All I/O pins are reset to 1s as soon as RST pin high for two machine cycles while the oscillator is running resets device .each machine cycle takes 12 oscillator or clock cycle.

TABLE I
PORT PIN AND DESCRIPTION

Port Pin	Alternate Function
P3.0	RXD(serial input port)
P3.1	TXD(serial output port)
P3.2	INT0(external interrupt 0)
P3.3	INT1(external interrupt input)
P3.4	T0(timer 0 external input)

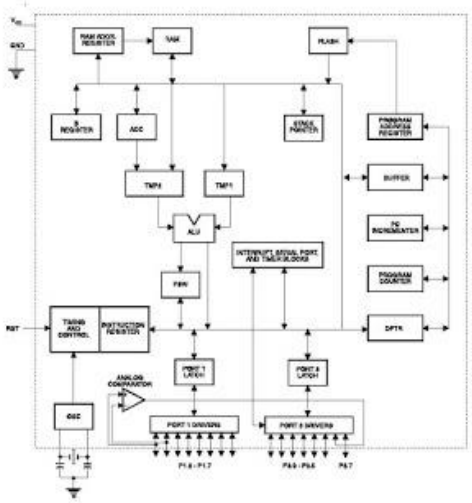

Fig. 2. Block diagram of IC at 89c205

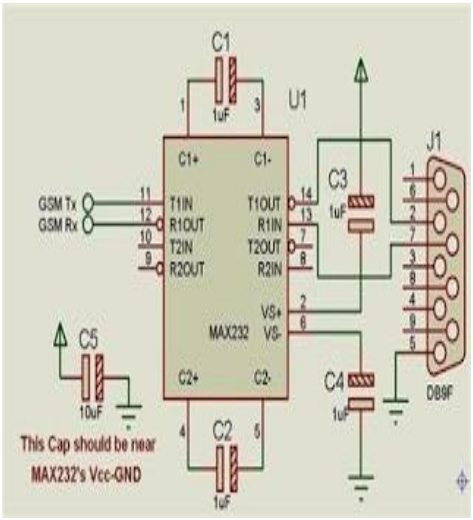

Fig. 3. IC MAX232

D. IC MAX232

The MAX232 is an IC , first create in 987 by MAXIM integrated products, that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits .the MAX232 is a dual driver / receiver and typically convert the RX,TX,CTS and RTS signal. The driver provides RS-232 voltage level outputs signal +5v supply via on-chip charge pumps and external capacitor the pin out diagram of IC MAX232 is shown in Fig. 3.

E. 16CHAR 2 LINE LCD

LCD screen is an electronic display module and find a wide range of applications. A 16*2 LCD means it can display 16 characters per line and there are such lines . in this LCD has registers, namely command and data. The command register stores the command instruction given to the LCD. A command is an instruction given to LCD to do predefined task like initialization it clearing given to LCD to do a predefined task like initializing it, clearing its screen , setting the cursor position , controlling displayed on the LCD. The data is the ASSCII value of the character to be display to be displayed on the LCD

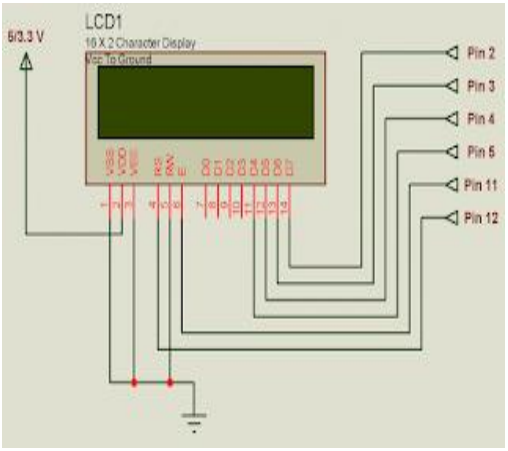

Fig. 4. LCD

F. Ic 7805 Voltage Regulator

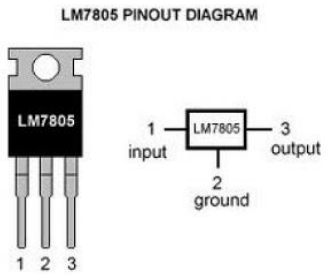

Fig. 5. Voltage regulator

IC7805 is a linear voltage regulator. It provides a 5 volt output. It is a three terminal IC. This voltage source in a circuit may have fluctuations and would not give the fixed voltage as a constant value. Capacitor of suitable values can be connected at input and output pin depending upon the respective voltage

G. GPS

Global positioning system . it is a space based satellite navigation system that provides location and time information GPS gives information about:

- Message transmission time
- Position at that time

H. GSM

Global system for mobile communication It is used for transmitting and receiving data .SIM300 is a tri-band GSM/GPS engine. It works on various frequencies i.e .EGSM 900 MHZ , DCS 800 MHZ AND PCS 900MHZ

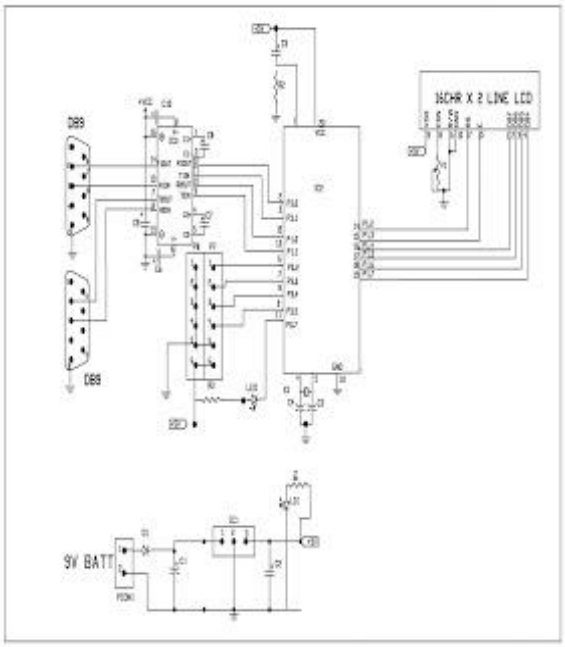

Fig. 6. GSM

V. CONSTRUCTION

In the power supply section IC1 IS 7805 , 5V regulator.9 to 12v one ampere dc is input to power supply capacitor C1 and C2 forms the filter circuit . LED 1 is a power supply indicated led. Resistance R1 is a voltage. AT89C2051, X1 is 11.059 MHZ crystal connected to pin2 and pin3 of the microcontroller along with the capacitor c4 forms the clock frequency input to microcontroller manufacture itself. Capacitor c5 and resistance R2 forms the reset circuit of the microcontroller .we used AT89C2051 microcontroller in our project since it is from 8051 family of the microcontroller This is a small in size and only 20 pin package. its current consumption is quiet low compared to its big brother AT89C51 which has 40 pin package with only two port i.e. port 1 and port 3. RS-232 is max 23 IC with dual trans-receiver is used for level conversion. RS-232 was designed to work on the pc. So, its logic is at +12 and -12 v level. It should be level

to be connect converted to microcontroller which works only on 5v dc capacitor C6,C7,C8,C9 and C10 are associated component and are part of RS232 conversion as given in manufacture data sheet. Both GPS and GSM modems are connected to this RS-232 IC through DB9 connecter. This microcontroller has only one serial port additional serial port is created by software. Data from GPS is received through software serial port and data to gsm is transmitted through on board hardware serial port . p3.0 is RX pin and P3.1 IS TX PIN similarly P1.0 and P1.1 are RX pin and P3.1 is TX and RX pins for software serial port. On the display we have used 6 character 2 line 916*20 texts LCD. Data from microcontroller is sent through its pins P1.4 to pins P.7 data is sent in nibble mode. Pin P1.2 is connected to EN pin on the LCD .variable. Resistance V1 is control resistance

VI. GPS Receiver

Works on 9600 modulation rate. it is used to receive the data from space segment , the GPS values of different satellite are sent to microcontroller AT89C2051,where there are processed and forwarded to GSM ,at the time processing GPS receives $GPGGA values. From these values microcontroller takes only latitude values excluding time, attitude, name of the satellite ,authentication etc. Global system for mobile communication (GSM) works.

VII. Panic Button

The panic button is a simple push button in the external part of the helmet , accessible both internally and externally , which sends an emergency alert to the police or hospital

VIII. Conclusion

The prototype smart helmet is ready and is in working condition. All modules are functioning properly and provide accurate readings. The intercom system needs a bit more work as a result s after testing were lacking quality although we could not make the project reach the product stage but the prototype is more than proof that it has immense potential

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