

# Alarm Security Device (For Economical Formulation) To Protect From Kidnapping

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**Abstract:** With murder, rape, terrorism on the increase favoured by declining density of population, insecurity of individuals is on the rise and happened without aid, resistance, security interference; this exhibits absolute insecurity of global individuals, requiring urgently a security program which can alarm the security forces to offer efficient rescue services by touch(1) the victim can inform his/her (a) close relatives, (b) their appropriate public security officers close to their residence and (c) one emergency line by danger signal of her location, by incorporated Global Positioning System (GPS).(2)This security device incorporates a second mode communicating "I'M SAFE, TRACK ME\*\*\*" for regular, wider use. The **simple, economical** 8051 microcontroller is able to perform the security alert to every global citizen, including illiterate and children as follows – The 8051microcontroller with the double reset switch: red switch giving alarm information, green switch giving casual information- I'm safe (triggered by touch) communicates serially with GPS module [sensing the location] and GSM module [sends the location to incorporated members of team]

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## I. Introduction

With murder, rape, terrorism on the increase favoured by declining density of population, insecurity of individuals is on the rise. For e.g. brutal rape, murder of a girl student in Delhi, Daniel pearl-Jewish journalist murder, was understood after the events only, by terrorist's portrayal; similarly 25 Egyptians beheading was evident after the event and recent increased kidnapping of children, teenagers with suspicious link to human meat legalized in Japan is dreadful.

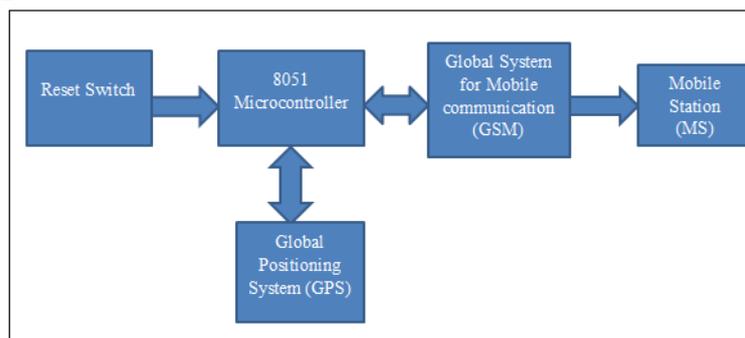
Since these murders, rape happened without aid, resistance and security interference exhibiting absolute insecurity of global individuals, requiring **urgently a security program which can alarm the security forces to offer efficient rescue services.**

So we attempt to develop an **economical** product for human safety, by touch, in the form of a wearable device, where at the time of danger, the victim[whether illiterate or children] can inform the parents, guardians and public security officers for immediate rescue by a touch application simultaneously and regular casual information to parents for location stating "TRACK ME I'M SAFE".

## II. Methodology

Economical security touch device incorporates (a) 8051 microcontroller with double reset switch interfacing with (b) GPS and (c) GSM modules by serial communications; 1) Alarm communication (red switch) to parents, guardians, security forces near the individual's residence and one emergency line by danger signal informing the victim's/users location. 2) Casual communications (green switch) to parents stating "I'M SAFE, TRACK ME\*\*\*"

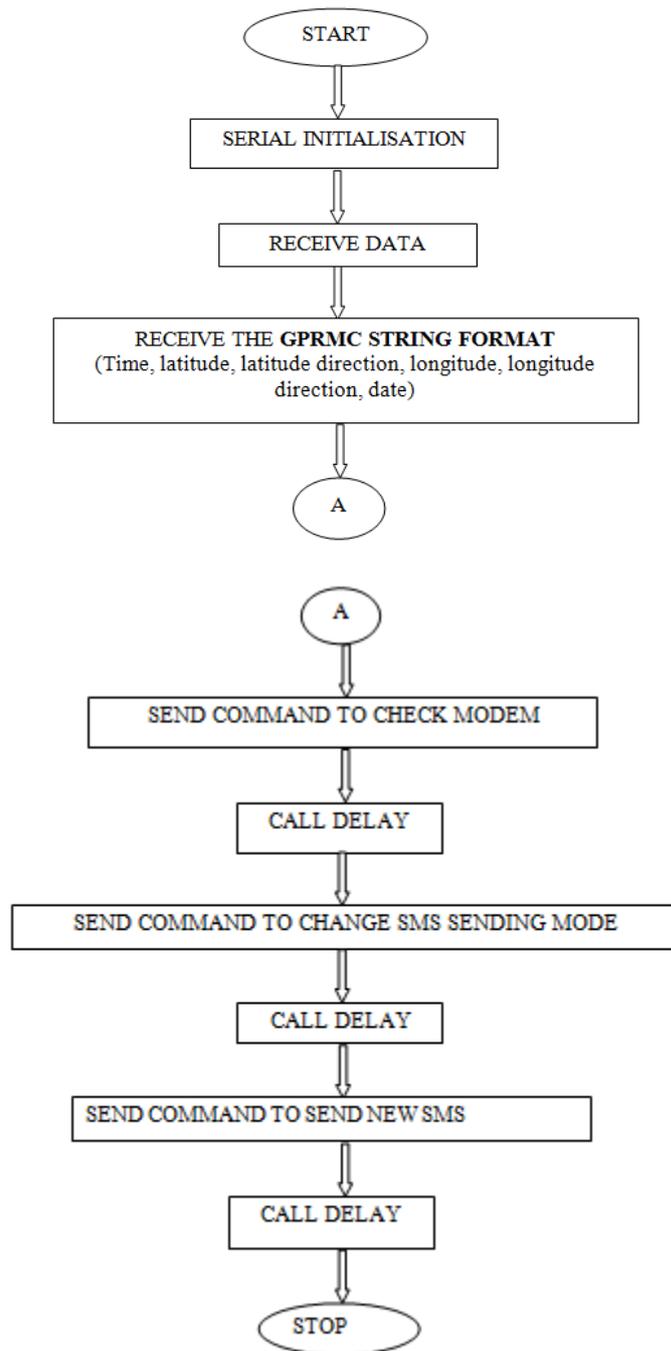
### BLOCK DIAGRAM



**Block diagram for the security design**

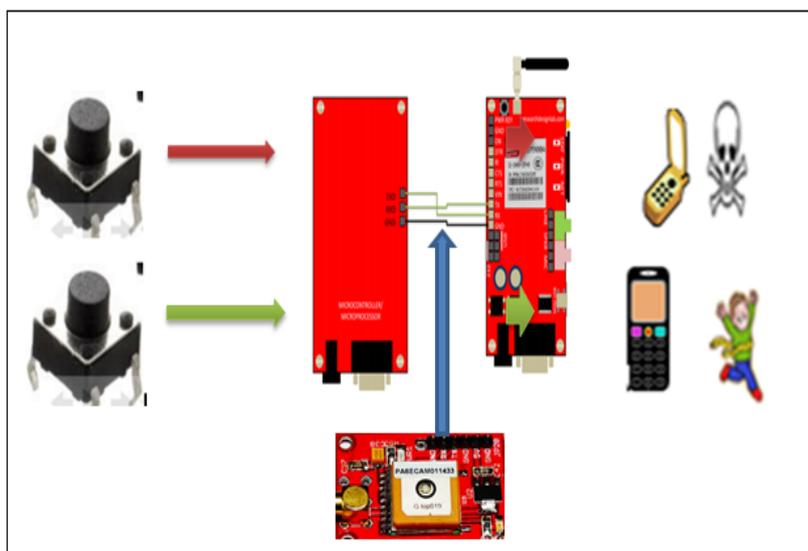
The block diagram says that the 8051<sup>[1-3]</sup> microcontroller is interfaced with a GSM module and a GPS module. To trigger the microcontroller a reset switch is available. Once the reset is pressed the microcontroller is activated which in turn triggers the GPS module which is connected to it. From the GPS module, various information can be obtained such as time, velocity, latitude, longitude, number of active satellites, elevation and azimuth values, date and position. Here we make use of GPS just to get the location of the victim. So we make use of only the latitude and longitudinal values. The data from GPS will be sent to any number of desired contacts via GSM. The communication between microcontroller and GSM modules is serial communication whereas the communication between GSM module and the other specific mobiles are mobile communication. Additional features which can be added along with the above mentioned are making a call using GSM or making the buzzer to get triggered once the reset switched is pressed.

**ALGORITHM:**



**DESCRIPTION OF HARDWARE USED**

This security alert device aims to communicate danger information to relatives, police officers close to residence and track me information to parents by touch application. Since the basic program containing device is large, step up technology to use mini components followed by Nano components which can be accommodated as watch, pendant, belt insert is planned. To improvise this device, only two mode communications via two buttons are planned 1) Track me, I'm safe. 2) In danger mediated by green and red colour respectively; Along with this GPS conveys the location to the concerned. Track me information will be communicated to parents only, whereas "I'm in danger" information will linked to 10 contacts including parents, residence associated police officers. To communicate the desired information by touch, 8051 microcontroller, GSM900, linking with GPS was chosen for the following reasons to achieve the output, once the digital activation is initiated. Pictorial representations of all the components are shown below.

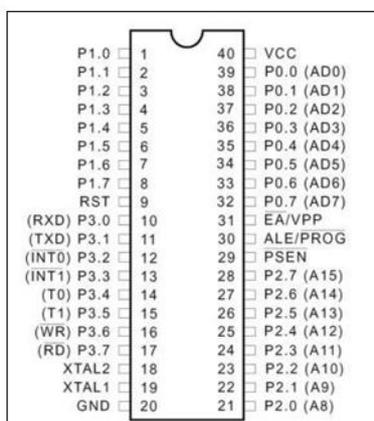


**Components interconnection**

**MICROCONTROLLER-8051**

The features of 8051 microcontroller is that it consists of 4K bytes of internal ROM (on-chip program memory), 128 bytes internal RAM (on-chip data memory), four 8-bit I/O ports (p0 - p3), two 16-bit timers/counters, one serial interface and four register banks. It constitutes of one on chip oscillator (external crystal), 6 interrupt sources (2 external , 3 internal, reset), 64K external code (program) memory(only read), 64K external data memory(can be read and write) by RD and WR, internal or external memory is selectable by EA pin, binary(hex) or decimal arithmetic and it follows Harvard architecture. The most important feature of 8051 is the versatility built in the I/O circuits. The reason for choosing 8051 controller is that it is a low cost controller and it is affordable by common man also.

**PIN DIAGRAM**

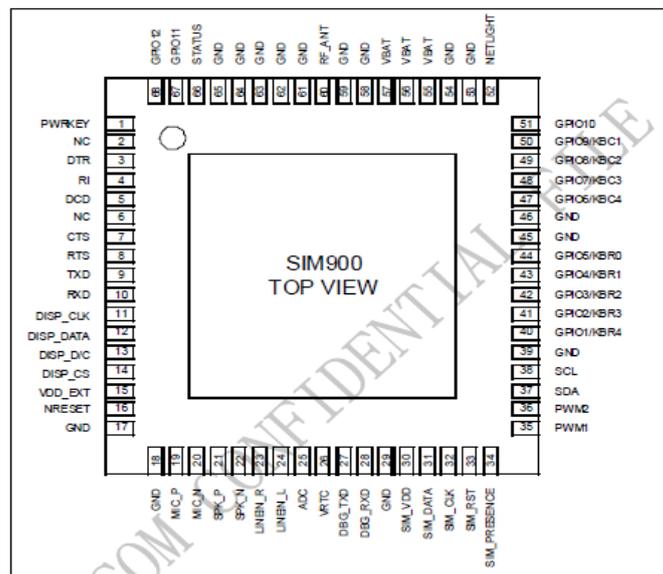


**Pin diagram of 8051 controller<sup>[1]</sup>**

**GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)**

GSM is the most successful digital mobile telecommunication system in the world today. It is used by over 800 million people in more than 190 countries. Global System for Mobile Communication (GSM) is a second generation cellular mobile communication standard developed to cater voice and data services using digital communication techniques. GSM is a typical second generation system, replacing the first generation analog systems, but not offering the high worldwide data rates that the third generation systems, such as UMTS, are promising. GSM has initially been deployed in Europe using 890–915 MHz for uplinks and 935–960 MHz for downlinks – this system is now also called GSM 900 to distinguish it from the later versions. These versions comprise GSM at 1800 MHz (1710–1785 MHz uplink, 1805–1880 MHz downlink), also called DCS (digital cellular system) 1800, and the GSM system mainly used in the US at 1900 MHz (1850–1910 MHz uplink, 1930–1990 MHz downlink), also called PCS (personal communications service) 1900. Two more versions of GSM exist. GSM 400 is a proposal to deploy GSM at 450.4–457.6/478.8–486 MHz for uplinks and 460.4–467.6/488.8–496 MHz for downlinks. This system could replace analog systems in sparsely populated areas [20-21].

**PIN DIAGRAM OF GSM**

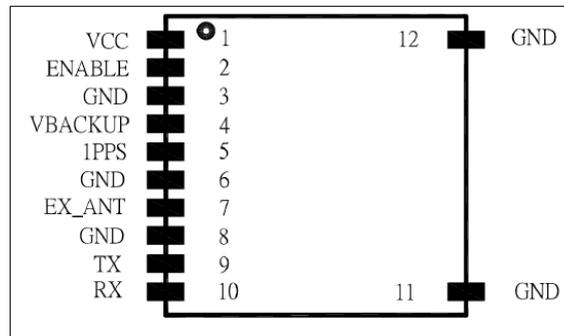


Pin diagram of GSM [21]

**GLOBAL POSITIONING SYSTEM (GPS)**

The Global Positioning System (GPS) is a worldwide radio-navigation system formed by a constellation of 24 or more satellites, several ground stations, and millions of users like you. These system segments—space, ground, and user—work together to provide accurate positions anytime, anywhere in the world, using the system’s “man-made stars” as reference points. It’s like giving every point on the planet its own address [22-24].

**PIN DIAGRAM**



Pindigram of GPS [22]

### III. Results

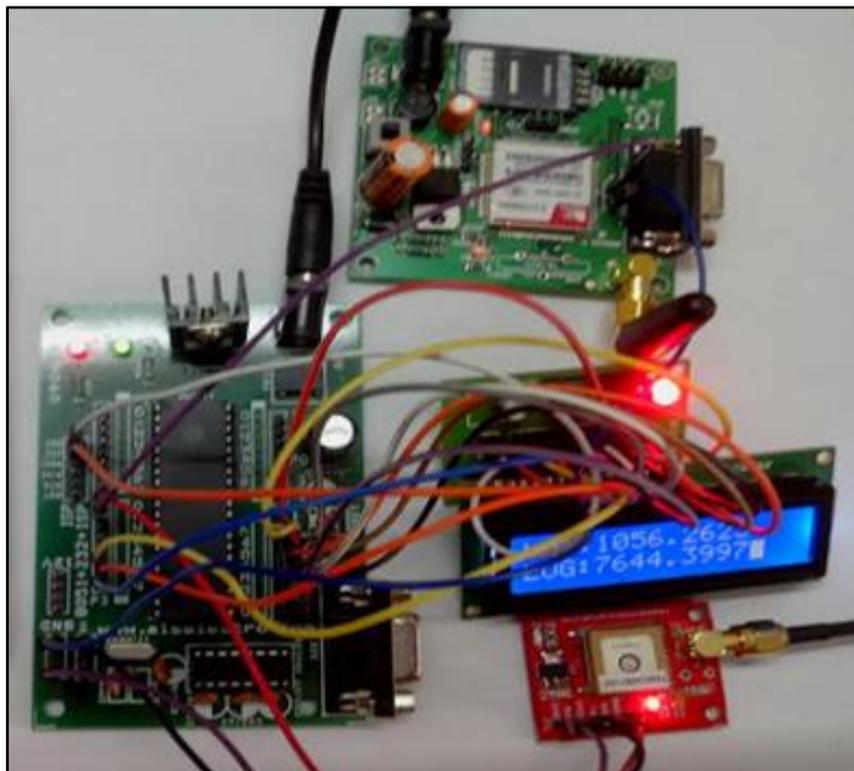
To communicate the desired information by touch, 8051 microcontroller, GSM900, linking with GPS was chosen for the following reasons to achieve the output, once the digital activation is initiated. In this chapter we will know about the hardware and software analysis of each component.

#### Software Analysis

We have used KEIL software for writing the program in Embedded C.  $\mu$ Vision is a window-based software development platform that combines a robust and modern editor with a project manager and make facility tool. It integrates all the tools needed to develop embedded applications including a C/C++ compiler, macro assembler, linker/locator, and a HEX file generator.



**KEIL Software**



**Hardware Interfacing of 8051 with GPS Receiver and GSM900**

#### Message sent after obtaining the location values

The GPS output obtained in Karunya University ladies hostel, Coimbatore is given below  
**\$GPRMC, 100719.720, A, 1056.2597, N, 07644.2814, E, 000.0, 000.**

Required information

A: means data valid

**Latitude: 10<sup>0</sup>56.25970' N**

**Longitude: 76<sup>0</sup>44.28140' E**



Received Message



Satellite view

#### IV. Literature Review

More than 20 publications are available containing solutions to provide security to confront weaker sections of people- women, children; recently with rape, murder are on the increase, associated with decrease in human density, security is further on the decline. Hence this has led to young minds improvising security alerts.

Of these cited publications some have used *Arduino*, some others have used *ARM*, some others have used *PIC*<sup>[4-19]</sup>, and some others have designed *mobile APP*.

We have demonstrated that *simple, economical* 8051 microcontroller is able to perform the security alert, though the information is communicated a bit later as compared to other microcontrollers like Arduino, ARM, and PIC but mobile APP are not initiated by one touch hence in unanticipated dangers it may not address the issue.

Hence strategically the fast performing Arduino, ARM, and PIC can be utilized for high risk circles like politicians, international executives, and officials.

Our target is to supply every global citizen especially including children, illiterates; that's why we have chosen 8051 microcontroller in our security design which is very cost effective

We have improvised a device only to initiate security alert to parents, relatives and police officers near the residence. This alert needs to be forwarded to the security officer located near the endangered person, by the global network of security system.

## V. Conclusion

This security alert device needs to be owned by every global citizen to escape, overcome danger by touch application; hence this product needs to be produced in **bulk** to meet the global requirements. Nano device to enable accommodation inside a watch, pendant, belt insert is our ultimate goal. Cost effectiveness is achieved by using simple economical microcontroller. For high risk officials fast performing but costly security alerts using Arduino, ARM, PIC microcontrollers can be applied. Achieving the purpose of improvising this security device, can be completed, [even as we target manufacturing in bulk (watch, pendant, belt insert contained security device)] by mandatory coordination with government authorities, police officers to enable them to follow closely on security alerts. Government authorities, police officials have to be informed about the availability of this security alert devices, requiring specific "security alert follow up" duty allotment-if mean business.

## Future research

Our device can communicate the location of the victim to parents, security officers only if the victim touches the device to communicate to them. Future research needs to expand on, where the parents can follow on their children any time, by a metallic device attached to tooth, communicating the location by GPS to them. For high risk individuals a **recording device** can be incorporated to this security alert device, to enable the security officer following the security alert to record the conversation.

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