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Intelligent Vehicle Monitoring System using Wireless Communication

Dontha Supriya
M.Tech Student (ES)
Dept.of.ECE, GNIT
supriyadontha@gmail.com

Mrs. Mythili Devi
Associate Professor
Dept.of.ECE, GNIT
teertha_reddy@yahoo.co.in

Mr. SK Saidulu,
Associate Professor
Dept.of.ECE, GNIT
sk.saidulu@gmail.com

Prof B Kedarnath
HOD-ECE
Dept.of.ECE, GNIT
hodece.gnit@gniindia.org

Abstract: - **In this paper the use of mobile phones while driving is one of the most dangerous and widely seen causes of fatal road accidents. The objective of the paper is to develop a device to find people who use mobile phones while driving and evade from stringent laws enforced by the government easily. This novel and ingenious technique facilitates the government to take adequate action against those who are violating these laws. To meet the requirements of an intelligent vehicle monitoring system, this architecture integrates Global Position System (GPS), Global System for Mobile communications (GSM) and a Microcontroller in the whole. This device is used to prevent texting and calling of mobile phones while driving vehicles. If the driver is using the phone while the vehicle is in motion, it triggers a signal which notifies the cops with the vehicle's number plate and the location with the help of GPS system. It receives the mobile signal and detects the presence of mobile. This signal eventually triggers the microcontroller with a glowing LED. Due to the voltage fluctuation, the message is sent to the cops using GSM communication.**

Keywords: **Call detection; Wireless/Mobile Communication; Mobile bug; Speed sensors; Vehicle Monitoring; GSM Modem; GPS based vehicle tracking system; Call Notification.**

1. INTRODUCTION

An Accident is a disaster which is specific, identifiable, unexpected, unusual and unintended external event which occurs in a particular
time and place, without apparent or deliberate cause but with marked effects. It implies generally negative probabilistic outcome which may have been avoided or prevented had circumstances leading up to the accident been recognized, and acted upon, prior to its occurrence. The first one hour is the golden hour and that can make all the difference.

The aim is to reach out quickly to the law breakers, upping the chances of their survival from an accident. Serious injuries can result in disability, fatalities and life-long psychological, emotional and economic damage to loved ones. The working of our project is divided into following sections:
GSM Communication is GSM Modem receives trigger pulse from Mobile Bug Module. It transmits messages to police control room for call detecting. It is controlled by microcontroller by interfacing with RS-232.
Speed Sensors keeps track of the speed of the vehicle and activates the GSM Modem when the speed of the vehicle goes beyond 40km/hr. The GSM Modem is programmed such that it transmits message only when the speed limit exceeds 40km/hr.
If the person, who drives the car, receives a call or a message while driving, then LED glows and their unique ID will be sent to cops using the GSM Modem and at the cops control center they will be having a GSM receiver, the output of which is given to another LED.
GPS Tracking is Module calculates the geographical position of the vehicle. This helps in detecting the location/position, velocity of our system. The module output data like global positioning system fixed data, geographic position-latitude are passed to GSM Modem.

In this modern, fast moving and insecure world, it is become a basic necessity to be aware of one's safety. Maximum risks occur in situations where in an employee travels for money transactions. Also the Company to which he belongs should be aware if there is some problem. What if the person traveling can be tracked and also secured in the case of an emergency?! Here's a system that functions as a tracking and a security system. It's the intelligent vehicle control for critical remote location application. This system can deal with both pace and security. The Vehicle Monitoring and Security System is a GPS based vehicle tracking system that is used for security applications as well. The project uses two main underlying concepts. These are GPS (Global Positioning System) and GSM (Global System for Mobile Communication). The main application of this system in this context is tracking the vehicle to which the GPS is connected, giving the information about its position whenever required. This is done with the help of the GPS satellite and the GPS module attached to the vehicle which needs to be tracked.

Thus we have at the Base station; the complete data about the vehicle. For real time monitoring an automatic monitoring system can be established with GSM, in this vehicle automatically identify and upload critical data about the vehicle and operating conditions. The monitoring device can send modified control parameters and guidelines to the vehicle driver**.** These parameters are temperature, alcohol detection, gas leakage detection, stirring grip checking, etc.

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2. PROPOSED SYSTEM

The project is targeted on motor cars monitoring by black boxes and its possibilities to improve road – traffic safety. During years, there were more attempts of some alternatives of the black box but it was not widespread used.

Proposed design is cost-effective, reliable and has the function of accurate tracking. When large object or vehicles were spread out over ground, the owner corporations often found it difficult to keep track of what was happening. Also the need of tracking in consumer's vehicle use to prevent any kind of theft because police can use tracking reports to locate stolen vehicle. GSM and GPS based tracking system will provide effective, real time vehicle location, and reporting. A GPS-GSM based tracking system will inform where your vehicle is and where it has been, how long it has been. The system uses geographic position and time information from the Global Positioning Satellites.

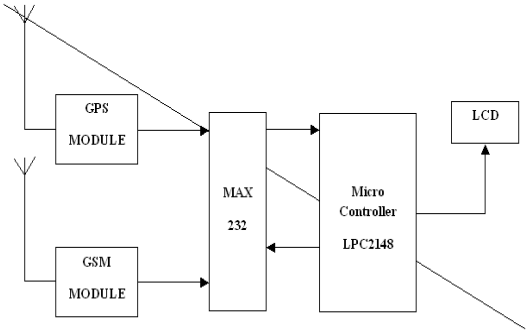


Fig.1. Block Diagram of Intelligent vehicle monitoring system

The LPC2141/42/44/46/48 support emulation and debugging via a JTAG serial port. A trace port allows tracing program execution. Debugging and trace functions are multiplexed only with GPIOs on Port 1. This means that all communication, timer and interface peripherals residing on Port 0 are available during the development and debugging phase as they are when the application is run in the embedded system itself.

Embedded ICE

Standard ARM Embedded ICE logic provides on-chip debug support. The debugging of the target system requires a host computer running the debugger software and an Embedded ICE protocol convertor. Embedded ICE protocol convertor converts the remote debug protocol commands to the JTAG data needed to access the ARM core. The ARM core has a Debug Communication Channel (DCC) function built-in.

The DCC allows a program running on the target to communicate with the host debugger or another separate host without stopping the program flow or even entering the debug state. The DCC is accessed as a co-processor 14 by the program running on the ARM7TDMI-S core. The DCC allows the JTAG port to be used for sending and receiving data without affecting the normal program flow. The DCC data and control registers are mapped in to addresses in the Embedded ICE logic. This clock must be slower than 1 to 6 of the CPU clock (CCLK) for the JTAG interface to operate.

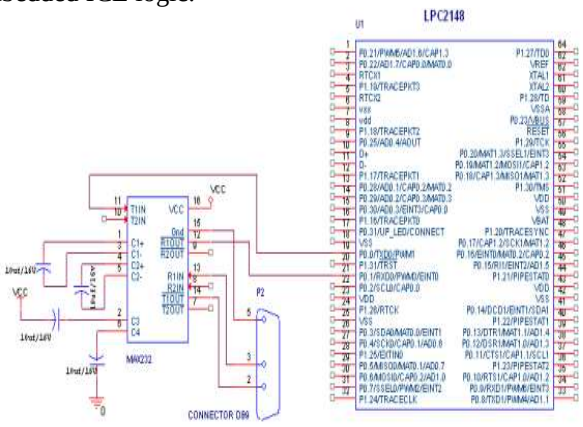
Embedded trace

Since the LPC2141/42/44/46/48 have significant amounts of on-chip memory, it is not possible to determine how the processor core is operating simply by observing the external pins. The Embedded Trace Macro cell (ETM) provides real-time trace capability for deeply embedded processor cores. It outputs information about processor execution to the trace port. The ETM is connected directly to the ARM core and not to the main AMBA system bus. It compresses the trace information and exports it through a narrow trace port. An external trace port analyzer must capture the trace information under software debugger control.

Instruction trace is significantly compressed by only broadcasting branch addresses as well as a set of status signals that indicate the pipeline status on a cycle by cycle basis. Trace information generation can be controlled by selecting the trigger resource.

Real Monitor

Real Monitor is a configurable software module, developed by ARM Inc., which enables real-time debug. It is a lightweight debug monitor that runs in the background while users debug their foreground application. It communicates with the host using the DCC, which is present in the Embedded ICE logic.



Interfacing max232 with LPC2148: It provides 2-channel RS232C port and requires external 10uF capacitors. Carefully check the polarity of capacitor when soldering the board.

RESULTS

Keil compiler is software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

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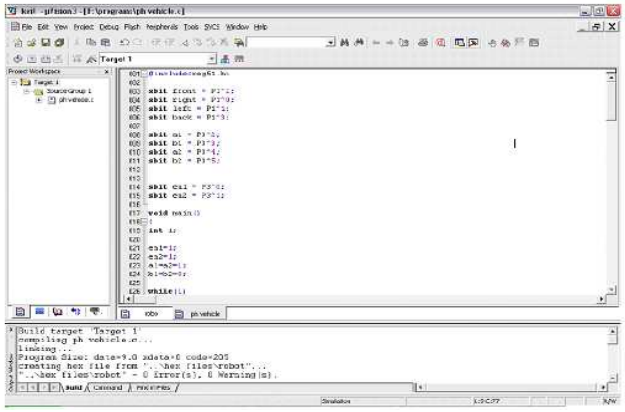
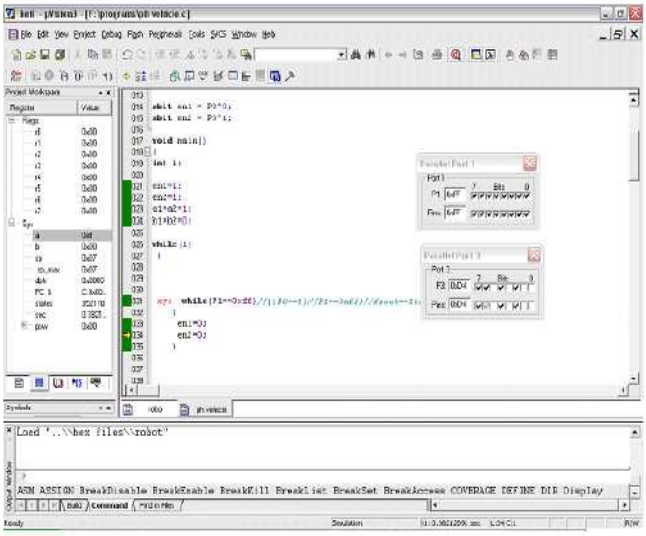


Compilation of source code



Run the Compiled Program

CONCLUSION

Tracking system is becoming increasingly important in large cities and it is more secured than other systems. It is completely integrated so that once it is implemented in all vehicles, then it is possible to track anytime from anywhere. It has real-time capability, emerges in order to strengthen the relations among people, vehicle and road by putting modern information technologies together and able to forms a real-time accurate, effective comprehensive transportation system.

This system has many advantages such as large capability, wide areas range, low operation costs, effective, Strong expandability and Easy to use in vehicle traffic administration. Upgrading this setup is very easy which makes it open to future a requirement which also makes it more efficient.

We can use the EEPROM to store the previous Navigating positions up to 256 location and we can navigate up to N number of locations by increasing its memory. We can reduce the size of the kit by using GPS+GSM on the same module. We can increase the accuracy up to 3m by increasing the cost of the GPS receivers. We can use our kit for detection of bomb by connecting to the bomb detector. With the help of high sensitivity vibration sensors we can detect the accident.

Whenever vehicle unexpectedly had an accident on the road with help of vibration sensor we can detect the accident and we can send the location to the owner, hospital and police. We can use our kit to assist the traffic. By keeping the kits in the entire vehicles and by knowing the locations of all the vehicles. If anybody steals our car we can easily find our car around the globe. By keeping vehicle positioning vehicle on the vehicle.

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