

GPS BASED VEHICLE LOCATION USING ARM 7 LPC 2148

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Abstract - The Project works with the latest Gsm and Gps Technology. The Project consists of Gps and Gsm Modem. The Project works with the latest Gsm and Gps Technology. This Project consists of Gps and Gsm Modem Vehicle Tracking Service" means an Electronics device that reports its location by using Global Positioning system (GPS), data receive from GPS satellites. This device is installed in car/vehicle with antenna and tracking the vehicle. GPS controlled and handled by computer system. The device consists of a micro-controller interfaced with a GPS and a GPRS module. The GPS module receives the information of the vehicle and passes it to the controller. The controller extracts the required information and makes a packet out of it that consists of geographical data and other information. And latitude and longitude information sent as an SMS periodically.

Key Words: ARM7, GSM, GPRS, GPS, tracking system, monitoring system, accelerometer.

1. INTRODUCTION

Now a day the vehicle accident rate has been increasing day by day, when compared to previous decade the theft rate has been increased by 54% in order to avoid this vehicle accident this system provide security to the vehicles. Main aim of this work is to provide security to the vehicle in very reasonable cost so in this work the basic microcontroller AT89S52 is used for cost effective and also for easy understanding. In this work C programming is used for better accuracy and GPS and GSM modules which helps use to trace the vehicle anywhere on the globe. Here, GPS, user segment and control segment are used to trace the vehicle perfectly and here GSM is used to send the exact location of the vehicle and send alert or relax message to this remote device (mobile phone).

To detect the accident, accelerometer sensor used. So, when accident happens, this sensor will be active. And the information sends to microcontroller. At the same time, GPS and GSM modem will also active which are interfaced to the same microcontroller. Through GPS the exact latitude and longitude of the accident location is obtained. And through GSM modem the same data send to the contacts which are stored in the database. So with this system, information is send to the Police Stations, friends etc. and also decrease the total action time and save the lives in emergencies.

1.1 CONCEPT

GPS Module is attached to the vehicle, which is going to be traced. Using this Project we have to send the position of GPS Module (vehicle) to the control unit. The GPS receiver receives signal from the satellite. This signal shows the Latitudes and Longitudes of the GPS receiver. This signal is given to the micro controller. Output from Micro controller is given to the GSM module. GSM module, which is kept at the receiver side, will read this message. This message contains longitude and latitude and receiving time and date. Using this information we can easily find the position of GPS receiver, or simply the position of the vehicle. GPS receiver, which is fixed in transport, will collect the NMEA data from GPS Satellite, which incorporates Latitude, Longitude, time of receiving data, and date. ARM processor will receive these data through serial communication from GPS receiver.

These data are used to identify the position of that transport on the earth. Collected information is given to ARM processor and will be displayed on display board of that vehicle. So ARM processor will send the exact position of that vehicle to GSM module.

This GSM module will send this information to another GSM module, which is kept at the receiver side, where the position of the Transport is needed to be displayed. This information will be sent to ARM processor, which is kept at the receiver side, and position will be displayed at the required place.

2.1 HARDWARE REQUIREMENTS

- ARM7(LPC2148)Microcontroller(ARM 7 Evaluation Board)
- Power Supply (9V Adaptor, 5V Adaptor)
- GSM module
- GPs module.

2.2 SOFTWARE REQUIREMENTS

- Programming Language: Embedded C
- KEIL U Vision IDE
- Flash magic

The system components are shown in block diagram of the system. The block diagram is given below. It consists of

processors along with other components. The overview of hardware of system and block diagram is shown in figure 1.

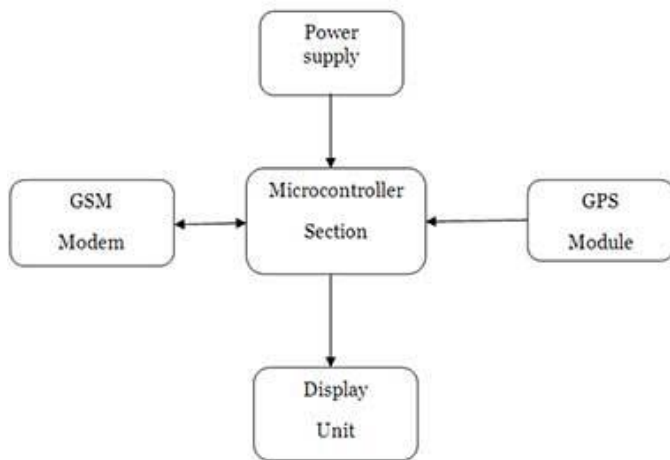


Fig -1: System Block Diagram

3. SYSTEM COMPONENTS

This section gives knowledge about various components related to the system. Some of the important components are given below.

- ARM7 (Advanced RISC Machine) based LPC2148
- Global Positioning System
- GSM/GPRS

3.1 ARM7

The ARM7 is part of family of the ARM (Advanced RISC Machines). It is a low power, 32-bit RISC (Reduced Instruction Set Computer) microprocessor. The original ARM7 was based on ARM6 design. It has very simple, fine and fully static design. It can be used in applications or LPC2148 is the widely used integrated chip from ARM-7 family. It is manufactured by Philips and pre-loaded with many inbuilt peripherals. It is more reliable as well as efficient option for the beginners. It is also beneficial for high end application developer. LPC2148 has huge number of features. Some features are listed below.

- 1) It has 8 to 40 kB of on-chip static RAM.
- 2) It has 32 to 512 kB of on-chip flash program memory.
- 3) It has 128 bit wide interface enables high speed 60 MHz operation.
- 4) It does In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software.
- 5) It does single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms.

6) It has Single 10-bit D/A converter provides variable analog output.

7) Two 32-bit timers/external counters, PWM and watchdog.

8) It has Multiple serial interfaces including two UARTs, two fast I2C-bus (400 kbit/s), SPI and SSP with buffering and variable data length capabilities.

9) It has Vectored interrupt controller with configurable priorities and vector addresses.

10) It has up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.

11) It has On-chip integrated oscillator operates with an external crystal in range from 1 MHz to 30 MHz and with an external oscillator up to 50 MHz.

12) It includes Idle and Power-down power saving modes. Following figure shows lpc2148 pin configuration. The following figure shows the LPC2148 pin diagram.

13) It has low power real-time clock with independent power and dedicated 32 kHz clock input.

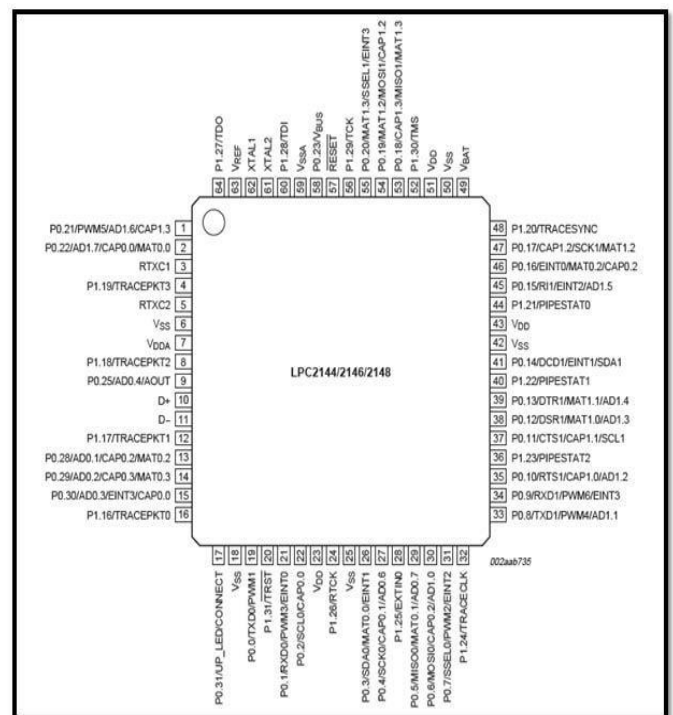


Fig -2: Pin Configuration of LPC2148

3.2 GSM/GPRS

Global System for Mobile communication is a standard accepted worldwide for mobile communication. GSM/GPRS module is used for establishing communication link between a computer and a GSM-GPRS system. GSM is an architecture used for mobile communication in number of countries in

the world. GPRS (Global Packet Radio Service) is an extension of GSM. It allows higher data transmission rate for the efficient communication purpose. GSM/GPRS module consists of a GSM/GPRS modem assembled together. It is assembled with power supply circuit and communication interfaces like RS-232, USB, etc for users' computer. We are using Sim300 in our system.

3.4 GPS

GPS is one of the popular systems in communication. Global positioning system technology became a reality through the efforts of military of the American. It established a satellite-based navigation system consisting of a network of group of satellites orbiting the earth. There are 24 satellites in a system. GPS is also known as the NAVSTAR. It operates all across the world. It works in all weather conditions. It helps users to track locations as well as objects. By using GPS technology we can track each individual having GPS receiver. Thus we can say that the GPS technology can be used by any person having GPS on the earth.

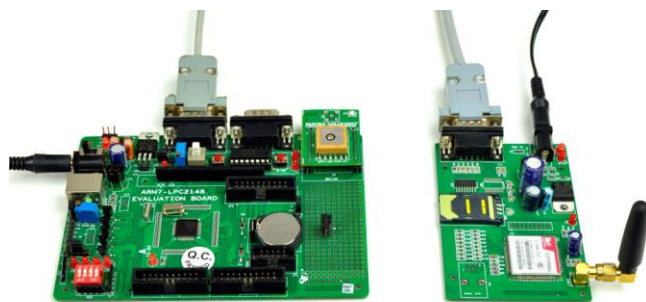


Fig -3: GPS and GSM Modules

4. SCOPE

The aims of this project is to design and implement a GPS based Land Surveying system, and find out time, latitude, and longitude of the boundary points and thereby take the survey of the land.

The GPS Land Surveying System includes 24 satellites that provide location awareness by transmitting longitude, latitude, altitude, and time information to GPS receiving and processing devices worldwide. Here the system will track the position of boundary points of a particular land. The micro controller circuitry receive and process the data coming from the GPS receiver. The micro controller will send the needed information to plot the graph of the land to the PC

5. CONCLUSIONS

With this system, an Embedded System is designed which can be most useful for Accidents. It's a low cost, Power efficient system by which the action time can be minimized and exact location of an accident can also be defined with GPS service and also the information regarding accident can

be sent to particular contact numbers e.g., Police stations, Doctors etc..Because of the flexibility of embedded system, this system is very much compatible to any kind of vehicles. Over all this system is very much affordable to a common man and this can be easily implemented.

6. REFERENCES

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