Fuel Flow Measurement with GPS Tracking

Ch. Rama Krishna
B. Tech Student,
Dept. of Automobile Engineering,
VNR VJIET, Hyderabad, T.S, India.

Shivasailesh K
B. Tech Student,
Dept. of Automobile Engineering,
VNR VJIET, Hyderabad, T.S, India.

Abstract

In our daily life we use petrol for our vehicles and in some cases fraud will be done to avoid that this project is very helpful. If a system is developed for monitoring of pump for filling the container or tank, no operator is required for supervising the system. Automatic measuring controllers are the main concept involved here. Microcontroller monitors the liquid flow and the quantity will be displayed on LCD. A start/stop switch is included to notice the flow of liquid by flow sensor. The sensed level values of the liquid are displayed on the 16x2-line LCD. This project is specially designed for Petrol filling stations. At the same time all the information will be available in the form of SMS to the officials about the quantity filled and the location details using GSM and GPS module interfaced to the controller.

INTRODUCTION

- An embedded system is a special purpose computer system designed to perform one or a few dedicated functions, often with real time computing constraints.
- It is usually embedded as part of a complete device including hardware and mechanical parts.
- Every day we come across the petrol fraud news in the newspapers. Recently the Union Petroleum Minister Dharmendra pradhan Called for a Fuel Dispensing check Around the Country.

- But There Tampering control in petrol Bunks, which can be control by the software chips (it's just around 40,000-50,000), and by the remotes.
- So During checking it can be operated by the remote and perfect values.
- For every one litre there is loss of 5%-10%, we may get approximately 940ml.
- But according to "THE HINDU" news paper there is a petrol scam of 200 cores per month across the country.
- There is a loss to the public and great influence on our economy of the country; it increases the rate of black money due to these illegal activities.
- However public know these illegal activities but they can't prove this things with proof.
- These issues influenced are a lot to think about this project which may helpful a lot to public.

PROPOSED SYSTEM
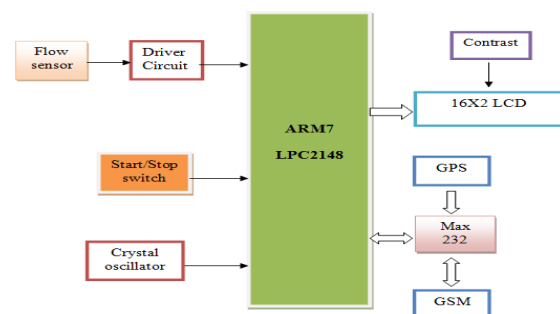
Fig 1: Block diagram representation of proposed system

LPC2148 Controller

The LPC2141/42/44/46/48 microcontrollers are based on a 16-bit/32-bit ARM7TDMI-CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale.

Serial communications interfaces ranging from a USB 2.0 Full-speed device, multiple UARTs, SPI, SSP to I2C-bus and on-chip SRAM of 8 kB up to 40 kB, make these devices very well suited for communication gateways and protocol converters, soft modems, voice recognition and low end imaging, providing both large buffer size and high processing power. Various 32-bit timers, single or dual 10-bit ADC(s), 10-bit DAC, PWM channels and 45 fast GPIO lines with up to nine edge or level sensitive external interrupt pins make these microcontrollers suitable for industrial control and medical systems.

Flow Sensor

Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse signal. This one is suitable to detect flow in water dispenser or coffee machine.

Fig 2: Flow sensor

Features

- Compact, Easy to Install
- High Sealing Performance
- High Quality Hall Effect Sensor
- RoHS Compliant

GSM (Global System for Mobile)

Fig 3: GSM Module

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.

There are various cell sizes in a GSM system such as macro, micro, pico and umbrella cells. Each cell varies as per the implementation domain. There are five different cell sizes in a GSM network macro, micro, pico and umbrella cells. The coverage area of each cell varies according to the implementation environment.

Time Division Multiple Access

TDMA technique relies on assigning different time slots to each user on the same frequency. The security strategies standardized for the GSM system make it the most secure telecommunications standard currently accessible. Although the confidentiality of a call and secrecy of the GSM subscriber is just ensured on the radio channel, this is a major step in achieving end-to-end security.

GSM Modem

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

A GSM modem can also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. GSM modem is usually preferable to a GSM mobile phone. The GSM modem has wide range of applications in transaction terminals, supply chain management, security applications, weather stations and GPRS mode remote data logging.

GPS (Global Positioning System)

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth which has an unobstructed view of four or more GPS satellites.

GPS is made up of three segments: Space, Control and User. The Space Segment is composed of 24 to 32 satellites in Medium Earth Orbit and also includes the boosters required to launch them into orbit. The Control Segment is composed of a Master Control Station, an Alternate Master Control Station, and a host of dedicated and shared Ground Antennas and Monitor Stations. The

User Segment is composed of hundreds of thousands of U.S. and allied military users of the secure GPS Precise Positioning Service, and tens of millions of civil, commercial and scientific users of the Standard Positioning Service (see GPS navigation devices). GPS satellites broadcast signals from space that GPS receivers use to provide three-dimensional location (latitude, longitude, and altitude) plus precise time.

WORKING PRINCIPLE

Microcontroller monitors the liquid flow and the quantity will be displayed on LCD. A start/stop switch is included to notice the flow of liquid by flow sensor. The sensed level values of the liquid are displayed on the 16x2-line LCD.

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RESULTS:
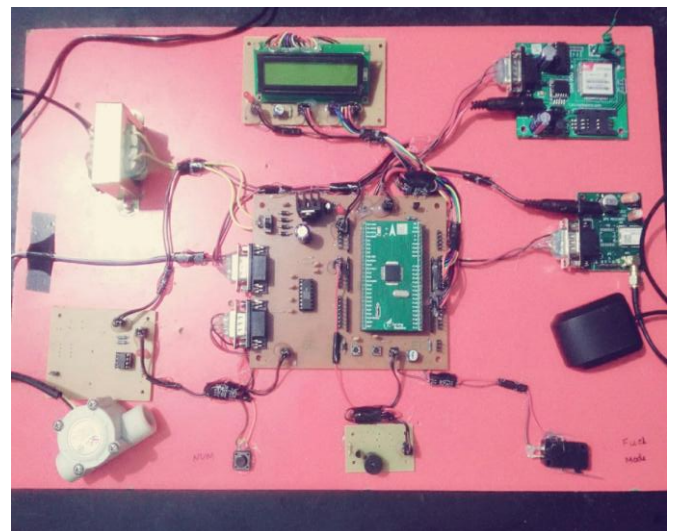
Fig 5: Hardware implementation

Advantages:

- Alert message to mobile phone for remote information
- Mobile number can be changed at any time

Applications:

- Automotives and transport vehicles
- Security, Remote monitoring, Transportation and logistics

CONCLUSION

This project has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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