



ADVANCE TECHNOLOGY FOR DETECTING THE HARMFUL GAS LEAKAGE IN VEHICLES

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ABSTRACT:

This paper presents the planning of a carbon monoxide gas (CO) gas run detector in vehicles. the amount of overtime incidents attributable to excessive CO inhalation has recently enlarged. several cases square measure attributable to driver habits and awareness, for example, air-con switches stay on whereas they're sleeping within the automobile. This habit isn't a decent follow as a result of if there have been gas run into the cabin, particularly CO, true may lead to overtime. Primarily the driving force feels sleepy-eyed once excessive CO concentrations occur within the cabin. Supported that, a vehicle gas run detector system has been developed employing a gas detector and logic detector circuit. Afterwards, the signal from the detector is fed to ARM7 microcontroller on-board system via acceptable interfacing devices, which is able to run on pre-programmed directions.

Keywords: DC motor, Gas sensor, Temperature sensor,, Ultrasonic sensor, GSM, ARM.

1. INTRODUCTION:

The main driver behind this analysis relates to real cases that occurred in recent years in Asian nation. The primary case was reportable in Johor Bahru, Malaysia, wherever a young couple died attributable to monoxide (CO) inhalation. This case

occurred when fatal doses of the gas speeded into the cars inner chamber through its extractor system, that was found to possess been changed. Associate degree examination of the bodies showed that there's no sign of trauma. In second case involving the dangerous CO gas occurred in

Kulai, Johor. This accident concerned a family with 3 kids. As reportable within the newspaper account the escape of CO managed to flow through the ventilating system once the engine of the automobile was left within the running condition for concerning three hours. In a third case, a handful conjointly died as a result of the indrawn an outsized amount of CO that leaked from the air condition unit. The passenger slept within the automobile while not stops the engine or move off the air con system. In the last case elaborated here, an individual tried to kill himself by victimization CO equipped from the cars exhaust employing a pipe connected to the system. These cases represent associate degree illustration that CO gas is toxic and might represent a significant danger once introduced into a vehicles cabin. As reportable in all cases mentioned higher than were attributable to CO gas escape in an exceedingly automobile cabin. Monoxide may be a colorless, odorless, and tasteless gas that's toxic and probably fatal. CO may be a by-product of incomplete combustion. it's a product from inflammable fuels like gas, fuel gas, fuel oil, kerosene, coal, charcoal, gasoline, or wood burn with scant atomic number 8. All cases as mentioned are

often avoided if the gas escape detector may be put in within the user's automobile. CO escape usually happens attributable to one in all 2 events. First, the first system has been altered for an explicit reason. Usually, a customary automobile includes a long system however changed exhaust systems area unit typically slightly shorter. Attributable to this, it's believed that the CO manages to ooze into the cars inner chamber through its extractor system additional simply compared to a customary exhaust. Second, the air condition system in an exceedingly automobile operates by filtering air from the skin before it's used. However, it's suggested to not activate the air condition system whereas the engine idles or whereas the automobile is stall. Automobile air conditioners could gather CO gas whereas the engine idles.

Micro Controller (ARM7) FAMILY:

The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is that the industry's most generally used 32-bit embedded reduced instruction set computing chip answer. Optimized for value and power-sensitive applications, the ARM7TDMI answer provides the low power consumption, small size, and high performance required in transportable, embedded applications.

The ARM7TDMI-S core is that the synthesizable version of the ARM7TDMI core, offered in each VERILOG and VHDL, prepared for compilation into processes supported by in-house or commercially offered synthesis libraries. Optimized for flexibility and that includes the same feature set to the laborious macro cell, it improves time-to-market by reducing development time whereas letting exaggerated style flexibility, and facultative >>98% fault coverage. The ARM720T laborious macro cell contains the ARM7TDMI core, 8kb unified cache, and a Memory Management Unit (MMU) that permits the employment of protected execution areas and virtual storage. This macro cell is compatible with leading in operation systems together with Windows metallic element, Linux, palm OS, and SYMBIAN OS.

The ARM7EJ-S processor may be a synthesizable core that gives all the advantages of the ARM7TDMI – low power consumption, small size, additionally the} thumb instruction set – whereas also incorporating ARM’s latest DSP extensions and technology, facultative acceleration of java-based applications. Compatible with the ARM9™, ARM9E™, and ARM10™ families, and Strong-Arm® design code written for the ARM7TDMI processor is 100 percent binary-compatible with different members of the ARM7 family and forwards-compatible with the ARM9, ARM9E, and ARM10 families, in addition as merchandise in Intel’s robust ARM and x scale architectures. this provides designers a selection of software-compatible processors

with robust price-performance points. Support for the ARM design nowadays includes:

- Operating systems like Windows metallic element, Linux, palm OS and SYMBIAN OS
- More than forty period in operation systems, together with wind river’s VXworks

LPC2148 MICROCONTROLLER

LPC2148 Microcontroller design. The ARM7TDMI-S may be a general purpose 32-bit chip, that offers high performance and really low power consumption. The ARM design relies on Reduced Instruction Set pc (RISC) principles, and therefore the instruction set and connected rewrite mechanism square measure abundant less complicated than those of small programmed advanced Instruction Set Computers (CISC). This simplicity leads to a high instruction outturn and spectacular period interrupt response from alittle and cost-efficient processor core.

Pipeline techniques square measure used in order that all elements of the process and memory systems will operate ceaselessly. Typically, whereas one instruction is being dead, its successor is being decoded, and a 3rd instruction is being fetched from memory. The ARM7TDMI-S processor conjointly employs a novel field strategy referred to as Thumb, that makes it ideally suited to high-volume applications with

memory restrictions, or applications wherever code density is a problem.

The key plan behind Thumb is that of a super-reduced instruction set. primarily, the ARM7TDMI-S processor has 2 instruction sets:

- The normal 32-bit ARM set.
- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length permits it to approach double the density of normal ARM code whereas holding most of the ARM's performance advantage over a conventional 16-bit processor victimization 16-bit registers. this is often attainable as a result of Thumb code operates on an equivalent 32-bit register set as ARM code. Thumb code is in a position to produce up to sixty fifth of the code size of ARM, and one hundred and sixtieth of the performance of identical ARM processor connected to a 16-bit memory system

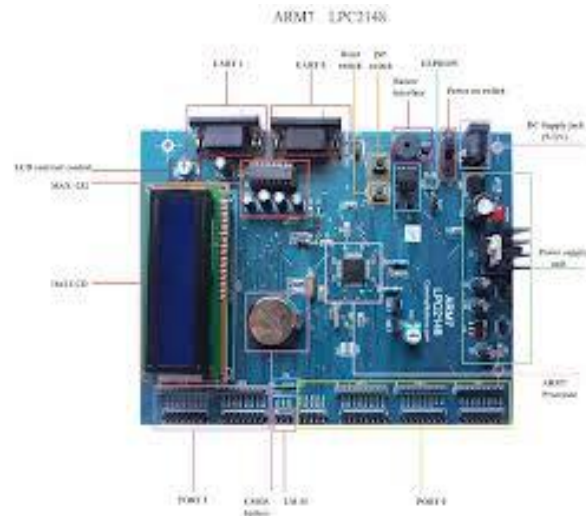


Fig: 3 ARM7TDMI PCB board

GSM Overview:

Global System for Mobile Communications or GSM (originally from Group Special Mobile) is that the world's preferred customary for mobile phone systems. The GSM Association estimate that eightieth of the world mobile market uses the quality. GSM is employed by over one.5 billion individuals across over 212 countries and territories. This presence means subscribers will use their phones throughout the planet, enabled by international roaming arrangements between mobile network operators. GSM differs from its forerunner technologies therein each communication and speech channels area unit digital, and so GSM is taken into account a second generation (2G) movable system. The GSM customary has been a plus to each shoppers, United Nations agency might like the flexibility to drift and switch carriers while not replacement phones, and conjointly to network operators, United Nations agency

will t for instrumentation from several GSM instrumentation vendors.



Fig: 4 GPRS Module

SMS Commands:

–AT+CIMI

Note: scan IMSI

–AT+CMGS=”+919963269547”

–AT+CMGR=1

–AT+CMGD=1,4

Note: Delete it Note: Message

Global system for mobile communication (GSM) is

A globally accepted normal for digital cellular Communication.GSM is that the name of normalization cluster established in 1982 to form a typical European mobile phone standard that will formulate specifications for a pan-European mobile cellular radio system in operation at 900 Mc A GSM electronic equipment may be a wireless electronic equipment that works with a GSM wireless network. A wireless electronic equipment behaves sort of a dial-up electronic equipment. the most distinction between them is that a dial-up electronic equipment sends and receives

knowledge through a hard and fast phonephone line whereas a wireless electronic equipment sends and receives knowledge through radio waves. The operating of GSM electronic equipment relies on commands, the commands continually begin with AT means that Attention) and end with a character. as an example, the dialing command is ATD; ATD3314629080; here the dialing command ends with punctuation mark. The AT commands area unit given to the GSM electronic equipment with the assistance of laptop or controller. The GSM electronic equipment is serially interfaced with the controller with the assistance of easy lay 232.

Frequencies: Originally it had been meant that GSM would operate frequencies within the 900 Mc cellular band. In Sep 1993, nation operator Mercury matched launched a network. Termed DCS 1800 it operated at frequencies in an exceedingly new 1800 Mc band. By adopting new frequencies new operators and more competition was introduced into the market aside from permitting further spectrum to be used and more increasing the general capability.

This trend was followed in several countries, and shortly the term DCS 1800 was born in favor of line of work it GSM because it was strictly identical cellular technology however in operation on a unique band. seeable of the upper frequency used the distances the signals traveled was slightly shorter however this was stipendiary for by further base stations.

In the USA still some of spectrum at 1900 Mc was allotted for cellular usage in 1994. The licensing body, the FCC, failed to ordain that technology ought to be used, and consequently this enabled GSM to realize a grip within the U.S.A. market. this method was referred to as PCS 1900 (Personal Communication System)

THE GSM NETWORK:

GSM provides recommendations, not needs. The GSM specifications outline the functions and interface needs well however don't address the hardware. the rationale for this is often to limit the designers as very little as attainable however still to form it attainable for the operators to shop for instrumentality from completely different suppliers. The GSM network is split into 3 major systems: the switch system (SS), the bottom station system (BSS), and therefore the operation and network (OSS).

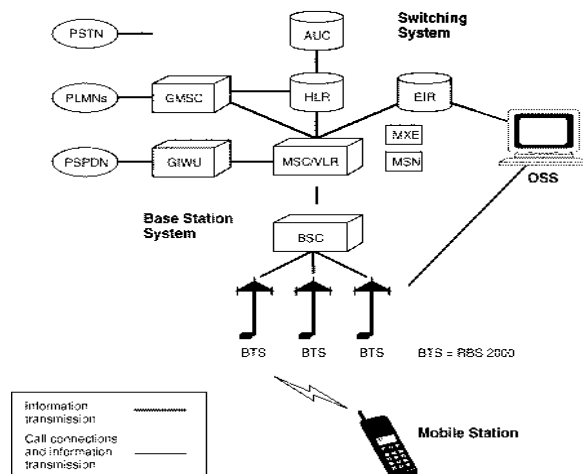


Fig: 5 GSM Network Elements

Ultrasonic sensor:

Ultrasonic sensors service the market by providing a price effective sensing methodology with distinctive properties not possessed by different sensing technologies. By employing a wide selection of supersonic transducers and a number of other totally different frequency ranges, associate supersonic sensing element is designed to unravel several application issues that square measure price preventative or just can't be resolved by different sensors.

Long vary detection: In industrial sensing, a lot of and a lot of applications need detection over distance. supersonic sensors find over long ranges up to forty feet, whereas limit switches and inductive sensors don't.

Broad space find on: whereas some electrical sensors will find over long distances they lack the power to detect over a large space while not employing a sizable amount of sensors. The advantage of Migatron's supersonic sensors is that each wide and slim areas is lined. All it takes is that the correct supersonic electrical device choice. Widest vary of target materials: Only supersonic sensors square measure moth-resistant to focus on material composition. The target material is clear, solid, liquid, porous, soft, wood and any color as a result of all is detected.

Non contact distance measuring: as a result of sound is regular from once it leaves the electrical device to once it returns, distance

measurement is simple and correct to .05% of vary that equates to +or- .002 of an in. at a distance of 4inches. it's Migatron's continued goal to produce supersonic sensors in industriallyhardened packages that square measure electrically and electronically compatible withcustomary controls utilized in today's industrial marketplace.

sense iso-butane, propane, LNG and fag smoke.



Fig: 6 gas sensor



Fig: 7 ultrasonic sensor

Gas Sensor

Ideal sensing element to be used to notice the presence of a dangerous LPG leak in your automobile or in a very station, vessel surroundings. This unit are often simply incorporated into associate degree alarm unit, to sound associate degree alarm or provides a visual indication of the LPG concentration. The sensing element has wonderful sensitivity combined with a fast reaction time. The sensing element may

Temperature sensing element - The LM35

The LM35 series area unit exactness integrated-circuit temperature sensors, whose output voltage is linearly proportional to the uranologist (Centigrade) temperature

Temperature Sensor - The LM35

The LM35 series square measure preciseness integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature

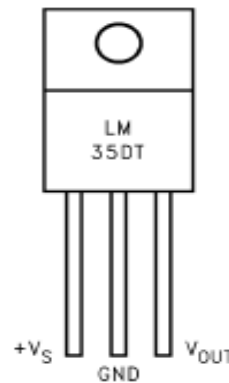


fig: LM35

Features

Calibrated directly in ° Celsius (Centigrade)

Linear + ten.0 mV/°C multiplier

0.5°C accuracy guarantee able (at +25°C)

Rated for full -55° to +150°C vary

Appropriate for remote applications

Low value as a result of wafer-level trimming

Operates from 4 to thirty volts but sixty µA current drain

Low self-heating, 0.08°C in still air

Nonlinearity solely ±1/4°C typical

Low ohmic resistance output, 0.1 Ω for one mA load

Conclusion:

The implementation of a vehicle gas leakage detector corresponds to increased cases of death caused by gas leakage in cars. These devastating events could be avoided if CO detection systems were installed. Therefore, the main idea of this research is to create a simple and easy system that has high sensitivity and can sense the presence of CO gas in a vehicle's cabin.

From the experimental results, the system has then been interfaced to the microcontroller on-board system. The microcontroller has been programmed to send a signal to the logic detector circuit then to the GSM module. The development of software was then tested to ensure it worked properly with the hardware. The

communication test between hardware and software was successful. The hardware responded correctly to the command sent to it. This result shows that, the system has been implemented and tested successfully. This system has been designed to produce greater flexibility, ease of implementation and lower cost & power because the system ARM7TDMI microcontroller which is a Flash based microcontroller can be programmed and erased several times.

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