



DESIGN AND IMPLEMENTATION OF ROBOT THROUGH BI-DIRECTIONAL

Mohammed Azeem¹, Ch.Sridevi Reddy²

¹M.Tech, Dept of ECE, S.R Engineering College, Ananthasagar, Warangal, A.P, India

²Asst professor, Dept of ECE, S.R Engineering College, Ananthasagar, Warangal, A.P, India

ABSTRACT:

The design and construction of a “GSM Technology Demonstrator” mechanism to be used as an academic and advertising tool by one native GSM network supplier specifically MTN, is mentioned. The mechanism are accustomed introduce the general public to new services that don't seem to be typically used, with the aim of boosting the demand and recognition of such services. The “GSM Technology Demonstrator” mechanism is remotely controlled by a portable victimization GPRS and is in a position to receive and reply to SMS and MMS messages. the planning and construction of this telecommunication mechanism needed lots of experience in many alternative fields like Mechanics, physics, Telecommunication, and package development.

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

1. INTRODUCTION:

The object of this analysis is to develop to be employed in the science center of a mobile network service supplier as an academic and advertising tool. within the science center, the golem can play the role of a “GSM Technology Demonstrator”, showing the general public the importance and the way to use the wireless technologies and services enforced in that. The “GSM

technology demonstrator” project has in the main been initiated to handle the challenge of creating famed sure technologies and services offered by MTN, one among the 3 GSM network service suppliers during this country.

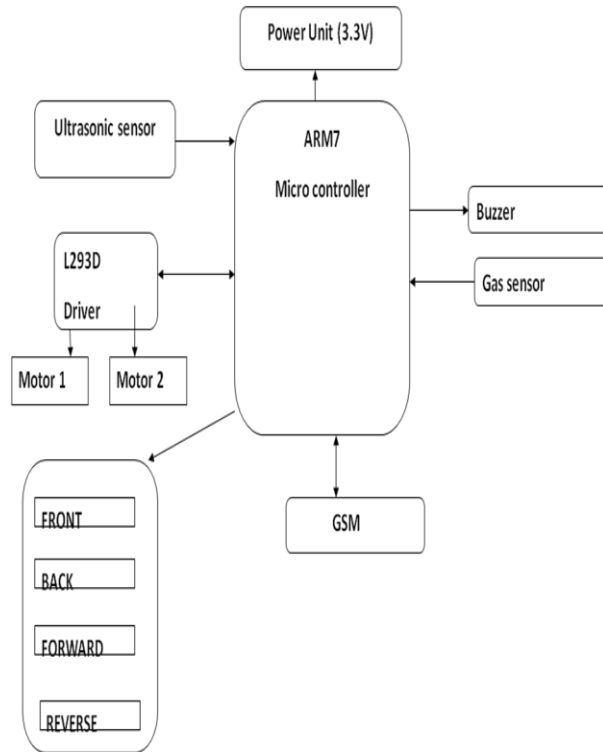


Fig 1 : Reversible robo structure

The project entails the planning and construction of a remotely controlled mobile golem, during which most of the most recent telecommunication technologies like inaudible device for object police work and buzzer makes beep sound for police work any gas by victimization gas device.

This project, initiated by MTN (Mobile phone Networks), was galvanized by the Wars spunky and venturous automech droid R2-D2. The aim is to use the GSM technology demonstrator inside the MTN science center in metropolis to educate children and adults regarding telecommunication technologies..

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 RISC chip answer. Optimized for price and power-sensitive applications, the ARM7TDMI answer provides the low power consumption, small size, and high performance required in moveable, embedded applications.

The ARM7TDMI-S core is that the synthesizable version of the ARM7TDMI core, on the market in each VERILOG and VHDL, prepared for compilation into processes supported by in-house or commercially on the market synthesis libraries. Optimized for flexibility and that includes an even feature set to the laborious macro cell, it improves time-to-market by reducing development time whereas letting enhanced style flexibility, and sanctioning >>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 store. This macro cell is compatible with leading in operation systems as well as Windows metal, Linux, palm OS, and SYMBIAN OS.

The ARM7EJ-S processor could be a synthesizable core that has all the advantages of the ARM7TDMI – low power consumption, small size, and therefore the

the Thumb instruction set – whereas also incorporating ARM's latest DSP extensions and Jazelle technology, sanctioning acceleration of Java-based applications. Compatible with the ARM9™, ARM9E™, and ARM10™ families, and Strong-Arm® design package written for the ARM7TDMI processor is 100% binary-compatible with different members of the ARM7 family and forwards-compatible with the ARM9, ARM9E, and ARM10 families, likewise as merchandise in Intel's sturdy ARM and x scale architectures. This provides designers an alternative of software-compatible processors with sturdy price-performance points. Support for the ARM design these days includes: Operating systems such as Windows CE, Linux, Palm OS and SYMBIAN OS

A. LPC2148 MICROCONTROLLER

LPC2148 Microcontroller design. The ARM7TDMI-S may be a general purpose 32-bit silicon chip, that offers high performance and extremely low power consumption. The ARM design is predicated on Reduced Instruction Set (RISC) principles, and therefore the instruction set and connected rewrite mechanism area unit a lot of easier than those of small programmed advanced Instruction Set Computers (CISC). This simplicity leads to a high instruction output and spectacular period interrupt response from a tiny low and efficient processor core.

Pipeline techniques area unit used so all components of the process and memory systems will operate incessantly. Typically, whereas one instruction is being decoded, its successor is being fetched, and a 3rd instruction is being fetched from memory. The ARM7TDMI-S processor conjointly employs a novel subject strategy called Thumb, that makes it ideally suited to high-volume applications with memory restrictions, or applications wherever code density is a difficulty.

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 doubly the density of normal ARM code whereas retentive most of the ARM's performance advantage over a standard 16-bit processor victimization 16-bit registers. This is often potential as a result of Thumb code operates on constant 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 a similar ARM processor connected to a 16-bit memory system

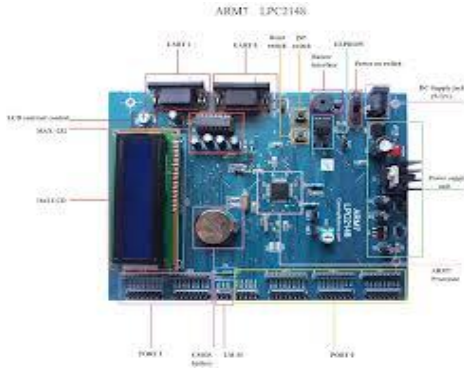


Fig:2 ARM7/TDMI PCB board

GSM Overview: international System for Mobile Communications or GSM (originally from Groupe Special Mobile) is that the world's preferred customary for mobile systems. The GSM Association estimate that eightieth of the globe mobile market uses the standard. GSM is utilized by over one.5 billion people across quite 212 countries and territories. This presence implies that subscribers can use their phones throughout the earth, enabled by international roaming arrangements between mobile network operators. GSM differs from its forerunner technologies during this every signal and speech channels ar digital, and thus GSM is taken under consideration a second generation (2G) movable system. The GSM customary has been a bonus to every shoppers, World Health Organization might get pleasure from the ability to rove and switch carriers whereas not commutation phones, and in addition to network operators, World Health Organization can choose instrumentality from several GSM

instrumentality.



Fig: 3 GPRS Module

SMS Commands:

→AT+CIMI

Note: scan IMSI

→AT+CMGS="919704040791"

→AT+CMGR=1

→AT+CMGD=1,4

Note: Delete it Note: Message

Global system for mobile communication (GSM) is

A globally accepted standard for digital cellular Communication. GSM is the name of standardization Group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a

wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands, the commands always start with AT means Attention) and finish with a <CR> character. For example, the dialing command is ATD<number>; ATD3314629080; here the dialing command ends with semicolon. The AT commands are given to the GSM modem with the help of PC or controller. The GSM modem is serially interfaced with the controller with the help of MAX 232.

New approaches:

Neither of those approaches tried to be the semipermanent resolution as cellular technology required to be additional economical. With the expertise gained from the NMT system, showing that it had been doable to develop a system across national boundaries, and with the political state of affairs in Europe disposition itself to international cooperation it had been set to develop a brand new Pan-European System. moreover it had been GSM system. to realize the fundamental definition of a brand new system a gathering was control in 1982 underneath the auspices of the Conference of European Posts and Telegraphs (CEPT). They shaped a study cluster referred to as

The buff Special Mobile (GSM) to review and develop a pan-European public land mobile system. many basic criteria that the new cellular technology would need to meet were set down for the new GSM system to satisfy. These included: smart subjective speech quality, low terminal and repair

price, support for international roaming, ability to support hand-held terminals, support for vary of latest services and facilities, spectral potency, and at last ISDN compatibility. accomplished that economies of scale would bring important edges. This was the beginnings of the with the degree of under-capacity being projected for the analogue systems, this gave a true sense of urgency to the GSM development. though choices regarding the precise nature of the cellular technology weren't taken at associate degree early stage, all parties concerned had been operating toward a digital system. This call was finally created in February 1987. This gave a spread of benefits. bigger levels of spectral potency can be gained, and additionally to the present the utilization of digital electronic equipment would provide higher levels of integration within the electronic equipment. This successively would end in cheaper handsets with additional options. nonetheless important hurdles still required to be overcome. for instance, several of the strategies for encryption the speech at intervals a sufficiently slender information measure required to be developed, and this display a big risk to the project. nonetheless the GSM system had been started.

Global usage: Originally GSM had been planned as a eu system. but the primary indication that the success of GSM was spreading any abroad occurred once the Australian network supplier, Telstra signed the GSM memo of Understanding.

Frequencies: Originally it had been meant that GSM would operate frequencies within the 900 MHz cellular band. In Sep 1993, British people operator Mercury matched launched a network. Termed DCS 1800 it operated at frequencies during a new 1800 MHz band. By adopting new frequencies new operators and any competition was introduced into the market excluding permitting further spectrum to be used and any increasing the capability.

This trend was followed in several countries, and shortly the term DCS 1800 was born in favor of occupation it GSM because it was strictly constant cellular technology however operational on a unique band. visible of the upper frequency used the distances the signals traveled was slightly shorter however this was salaried for by further base stations.

In the USA yet a little of spectrum at 1900 MHz was allotted for cellular usage in 1994. The licensing body, the FCC, failed to pass that technology ought to be used, and consequently this enabled GSM to realize a grip within the North American nation market. this technique was called PCS 1900 (Personal Communication System)

THE GSM NETWORK:

GSM provides recommendations, not needs. The GSM specifications outline the functions and interface needs thoroughly however don't address the hardware. the explanation for this can be to limit the

designers as very little as doable however still to create it doable for the operators to shop for instrumentality from completely different suppliers. The GSM network is split into 3 major systems: the shift system (SS), the bottom station system (BSS), and therefore the operation and web (OSS).

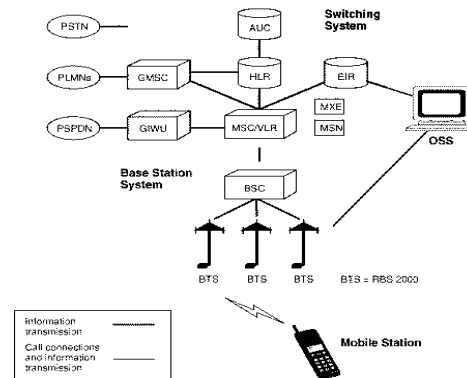


Fig: 4 GSM Network Elements

The operations and maintenance center (OMC) is connected to any or all instrumentation within the switch system and to the BSC. The implementation of OMC is termed the operation and web (OSS). The OSS is that the practical entity from that the network operator monitors and controls the system. the aim of OSS is to supply the client cost-efficient support for centralized, regional and native operational and maintenance activities that area unit needed for a GSM network. a vital operate of OSS is to produce a network summary and support the upkeep activities of various operation and maintenance organizations.

SPECIFICATIONS AND CHARACTERISTICS FOR GSM

The specifications and characteristics for GSM

- Frequency band—the frequency vary such that for GSM is one,850 to 1,990 MHz (mobile station to base station).
- Duplex distance—the duplex distance is eighty MHz.

Duplex distance is that the distance between the transmission and downlink frequencies. A channel has 2 frequencies, eighty MHz apart.

- Channel separation—the separation between adjacent carrier frequencies. In GSM, this can be two hundred kc.
- Modulation—Modulation is that the method of causing an indication by ever-changing the characteristics of a carrier frequency. this can be wiped out GSM via Gaussian minimum shift keying (GMSK).
- Transmission rate—GSM could be a digital system with AN over-the-air bit rate of 270 kbps.

PWM Technique:

Pulse-width modulation (PWM), or pulse-duration modulation (PDM), could also be a modulation technique that conforms the dimension of the heartbeat, formally the heartbeat length, supported modulator signal data. tho' this modulation technique is accustomed cypher data for transmission, its main use is to allow the management of the

ability provided to electrical devices, significantly to physical phenomenon lots like motors. to boot, PWM is one all told the two principal algorithms used in physical phenomenon solar panel chargers, the other being MPPT. The average worth of voltage (and current) fed to the load is controlled by turning the switch between give and wares on and off at a fast pace. The longer the switch is on compared to the off periods, the higher the ability provided to the load is.

The main advantage of PWM is that power loss among the switch devices is improbably low. Once a switch is off there is abundant no current, and once it's on, there is nearly no free fall across the switch. Power loss, being the merchandise of voltage and current, is therefore in every case close to zero. PWM to boot works well with digital controls, which, owing to their on/off nature, can merely set the specified duty cycle.

PWM has to boot been used in sure communication systems where its duty cycle has been accustomed convey data over a communications channel.

Gas Sensor

Ideal detector to be used to observe the presence of a dangerous LPG leak in your automobile or during a station, tank atmosphere. This unit will be simply incorporated into AN alarm unit, to sound AN alarm or provides a visual indication of the LPG concentration. The detector has glorious sensitivity combined with a fast latent period. The detector can even sense

iso-butane, propane, LNG and smoke smoke.



Fig 5: gas sensor

Ultrasonic sensor:

Ultrasonic sensors service the market by providing a price effective sensing technique with distinctive properties not possessed by different sensing technologies. By employing a big variety of supersonic transducers and several other totally different frequency ranges, associate supersonic detector is designed to unravel several application issues that square measure value prohibitory or just can not be solved by different sensors.

Long vary detection: In industrial sensing, additional and additional 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 findion: whereas some picture electrical sensors will find over long distances they lack the flexibility to detect over a good space while not employing a sizable amount of sensors. The advantage of Migatron's supersonic sensors is that each wide and slender areas is coated. All it takes is that the correct supersonic electrical device choice. Widest vary of target materials:Only supersonic sensors square measure run-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 measure is straightforward 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 industrially hardened packages that square measure electrically and electronically compatible with normal controls employed in today's industrial marketplace.



Fig 6 : ultrasonic sensor

Buzzer:

Buzzer can be made using Piezoelectric crystal such as Quartz and an oscillating circuit. When voltage is given, oscillating circuit makes crystal to vibrate to make sound.



fig 7 : buzzer

CONCLUSION:

In this project we are going to demonstrate the GSM based bi-directional robot controlling is as follow: The command based robot controlling system by using GSM. Any object is coming near to the robot is detected by using ultrasonic sensors to identify that buzzer sound will produce. Additionally any gas is found near to the robot it will detected by using gas sensor and send the information to the user by using GSM. In this way we have demonstrated the robot controlling bi-directional by using GSM.

REFERENCES:

[1] MarkoWolf, AndreWeimerskirch, and ThomasWollinger, “State of the Art: Embedding Security in vehicles”, Journal on

Embedded Systems, Volume 2007, Article ID 74706.

[2] Alison Brown, JacobGriesbach and Bruce Bockius, “GPS tracking location based service using Wrist watch GeoZigBee Sensors”, Proceedings of ION NTM, 2007, Som Diego, pp 1-10, December 2007.

[3] Ingrid Verbourwhede, Frank Hoornaert, Joos Vandewalle, Hugo J. Deman “Security and Performance optimization of a new DES”, IEEE Journal on Solid State circuits, vol. 23, no.3, pp 647- 656, 1999.

[4] National Institute of Standards & Technology, “FIPS-46-3: Data Encryption Standard (DES),” October 1977, reaffirmed in October 1999.

[5] Youjing Cui and Shuzhi Sam Ge,”Autonomous Vehicle positioning with GPS in urban canyon Environments”, IEEE TRANSACTIONS ON ROBOTICS AND AUTOMATION, vol. 19, NO. 1, pp 15-25, February 2003.

[6] J.-P. Hubaux, S. C Apkun, and J. Luo, “The Security and privacy of smart vehicles,” IEEE Security & Privacy Magazine, vol. 2, no. 3, pp. 49–55, 2004.

[7] W.Stallings, “Cryptography and Network Security”, Prentice-Hall, Englewood Cliffs, NJ, USA, 4th edition, 2005.