

Security Management System for Oilfield Based on GSM Technology

Batchu Spandana
M.Tech Student, Department of ECE
Sri Vasavi Engg College, Tadepalligudem

Addanki Purna Ramesh
Associate Professor, Department of ECE
Sri Vasavi Engg College, Tadepalligudem.

P.Gopala Reddy
Asst. Professor, Department of ECE
Sri Vasavi Engg College, Tadepalligudem

Abstract— Security Management at the industries mainly during the night times at the oil field is a critical task for the security people. Checking for the oil thefting, power failure, temperature range checking, tilt checking of the tanks, leakage of oil by rotating the pump done by the thieves is a critical task for the security people. To improve the security level by implantation of wireless embedded technology will solve this problem. By reducing the manual power, at the site locations, and by improving the security level with the help of GSM based wireless technology which consist of transmitter (GSM modem) at the site location and receiver is the GSM mobile. Information transmitted by the GSM modem at the plant location will be sent to the respective person's mobile as a text message. The security people will take appropriate action according to the problem. For this we are used LPC2148 (ARM7) based microcontroller, which is the current dominant microcontroller in mobile based products and Software development tools as Keil, flash magic for loading hex file into the microcontroller.

Keywords- LPC2148 (ARM7); Embedded 'C'; Keil; Flash magic; SIM 300 GSM Mode

I. INTRODUCTION

With rapid development of national and international economic construction, there is a great demand and dependent on oil products ex: petroleum in various industries. The international price of oil has been kept at a high level in recent years, so improving production efficiency and wastage due to tilt, over flow occur in valves, to protect oil from thefting on domestic oilfield is urgently needed to be improved. For protect and save oil products for 24 hours need huge human power, even also the implementation of safe management for oilfield is very difficult. We overcome these difficulties, by implementing a perfect scheme using GSM Technology. This system can improve the level of oilfield' security.

II. SYSTEM STRUCTURE

The security management system for oil field based on GSM Technology design is divided in to two sub systems (1) Transmitting section and (2) Receiving section.

The transmitting system consists of (1) Sensor Unit, (2) LPC2148 (ARM7) Microcontroller, (3) SIM300 GSM Modem. Further the sensor unit is divided into five categories (a) TSOP1738 -IR transmitter and receiver as a tank over flow sensor (b) L7805 as a power failure indication unit (c) Limit switch as a Valve rotation unit (d) Mercury tilt switch as a Tilt sensor (e) LM-35Temperature sensor.

The receiving section consists of GSM based Mobiles. Fig.1shows the Block diagram of the security management system for oil field based on GSM Technology.

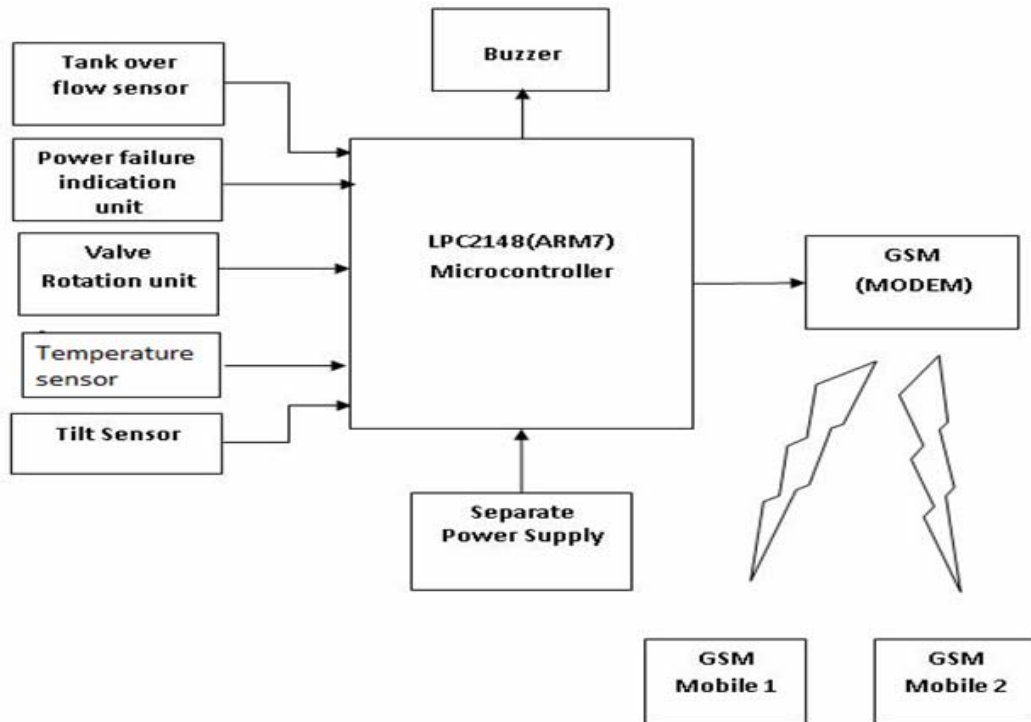


Fig.1 Block diagram of security management system for oil field based on GSM Technology

The TSOP1738 -IR transmitter and receiver, L7805, Limit switch, Mercury tilt switch, LM-35 modules are interfaced to I/O ports of the LPC2148 (ARM7) Microcontroller. The LPC 2148 controller continuously monitors the tank level, tilt of the valve, angle of the valve rotation. If any change of parameters occurs at the corresponding modules the controller turns on buzzer, displays the message on LCD display and at the same time the controller activates the GSM Modem and GSM Modem sends the message to the two authorized persons by using GSM based wireless technology.

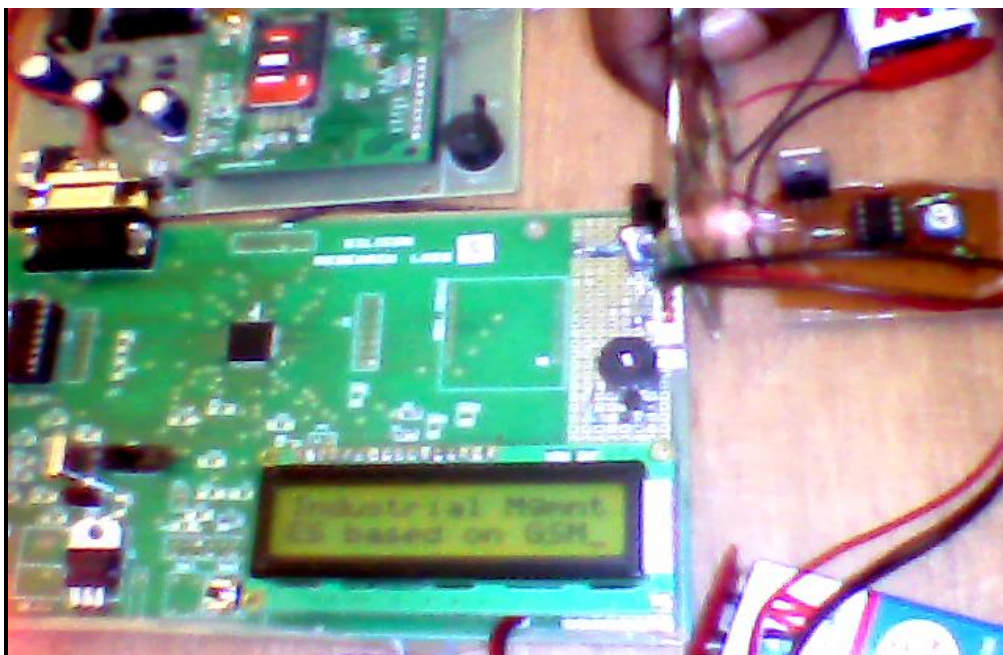


Fig.2 Main circuit board without chassis



Fig.3 Main circuit board with chassis

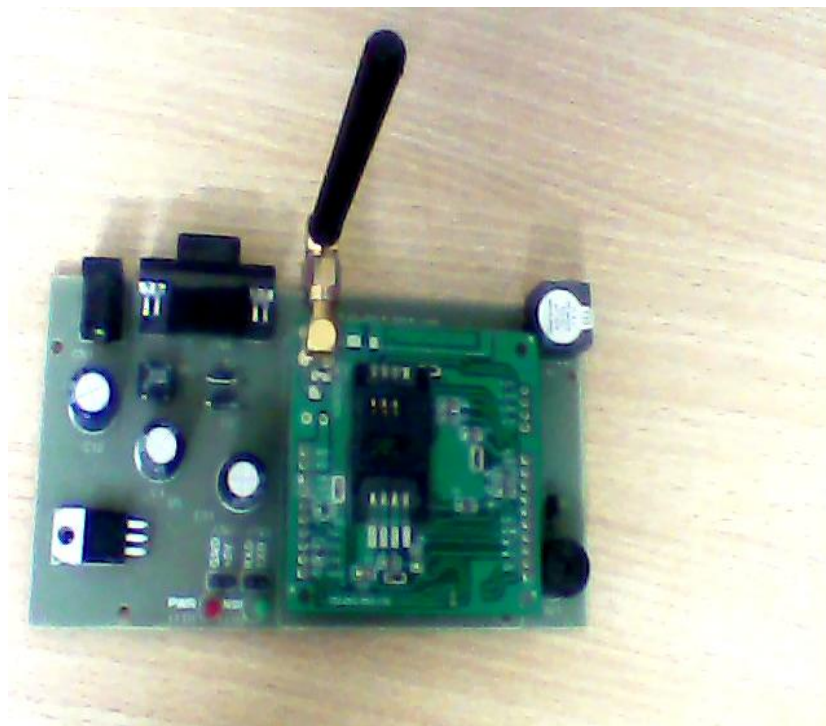


Fig.4 Ir transmitter and receiver

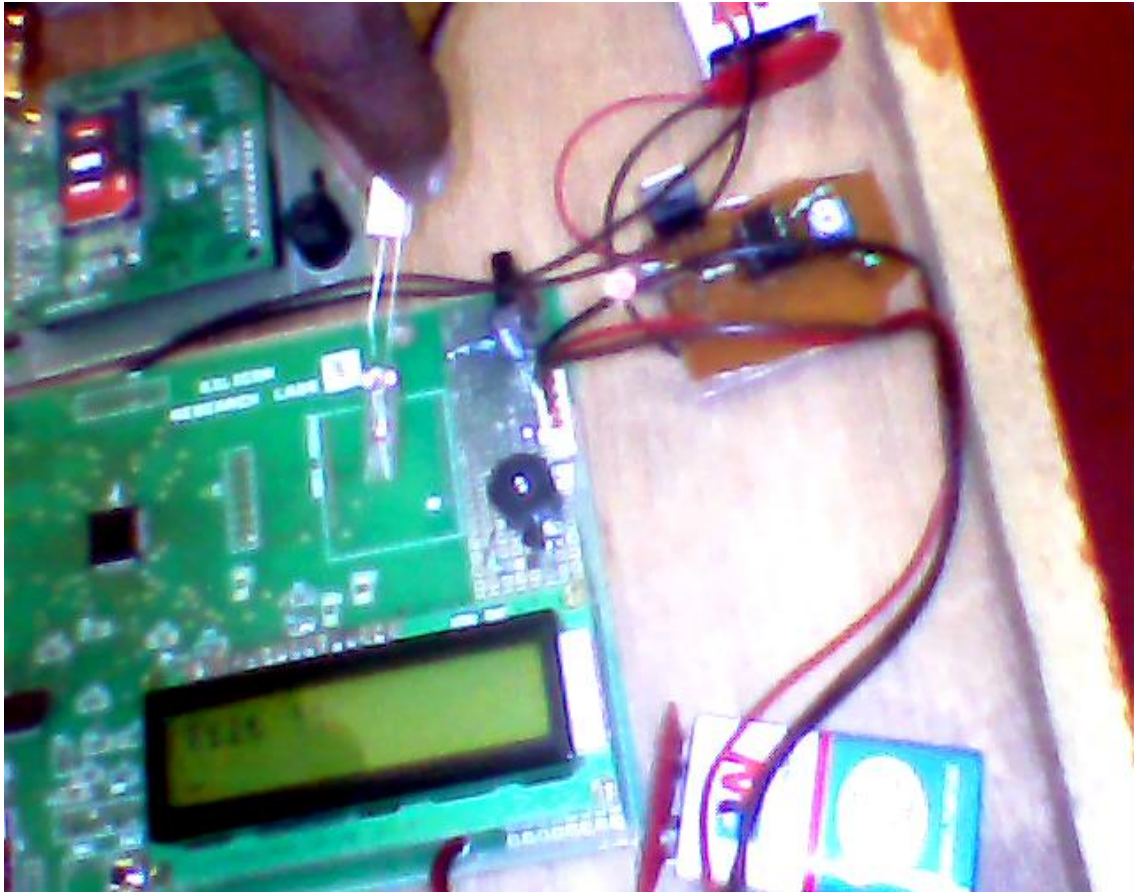


Fig.5 LCD displaying Tilt (Tilt occurred at the position of valve)

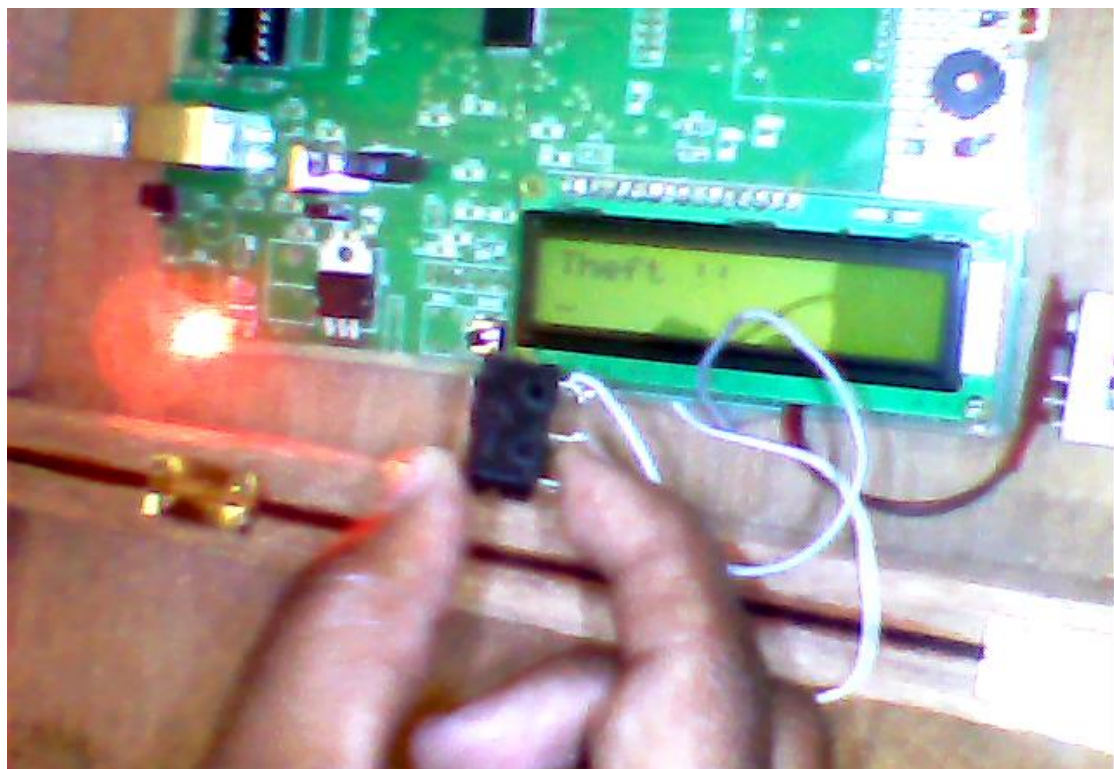


Fig.6 LCD displaying Theft

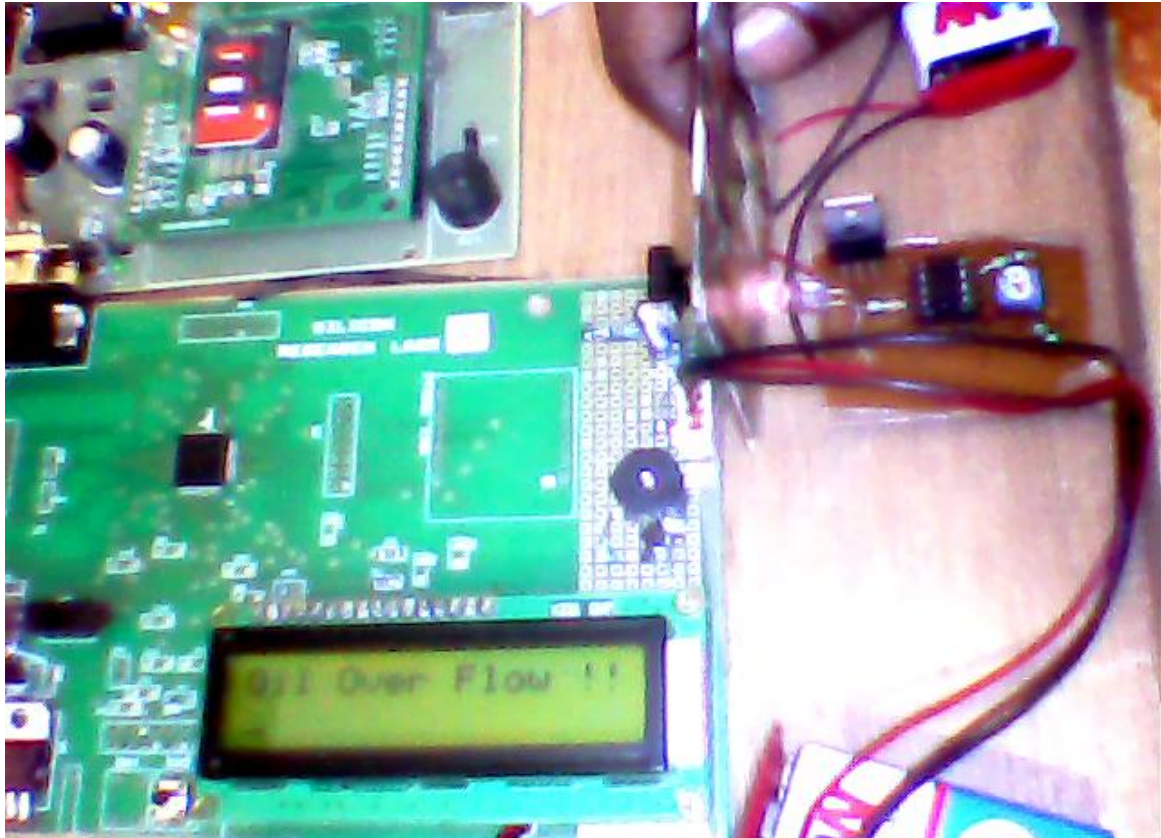


Fig.7 LCD displaying oil over flow

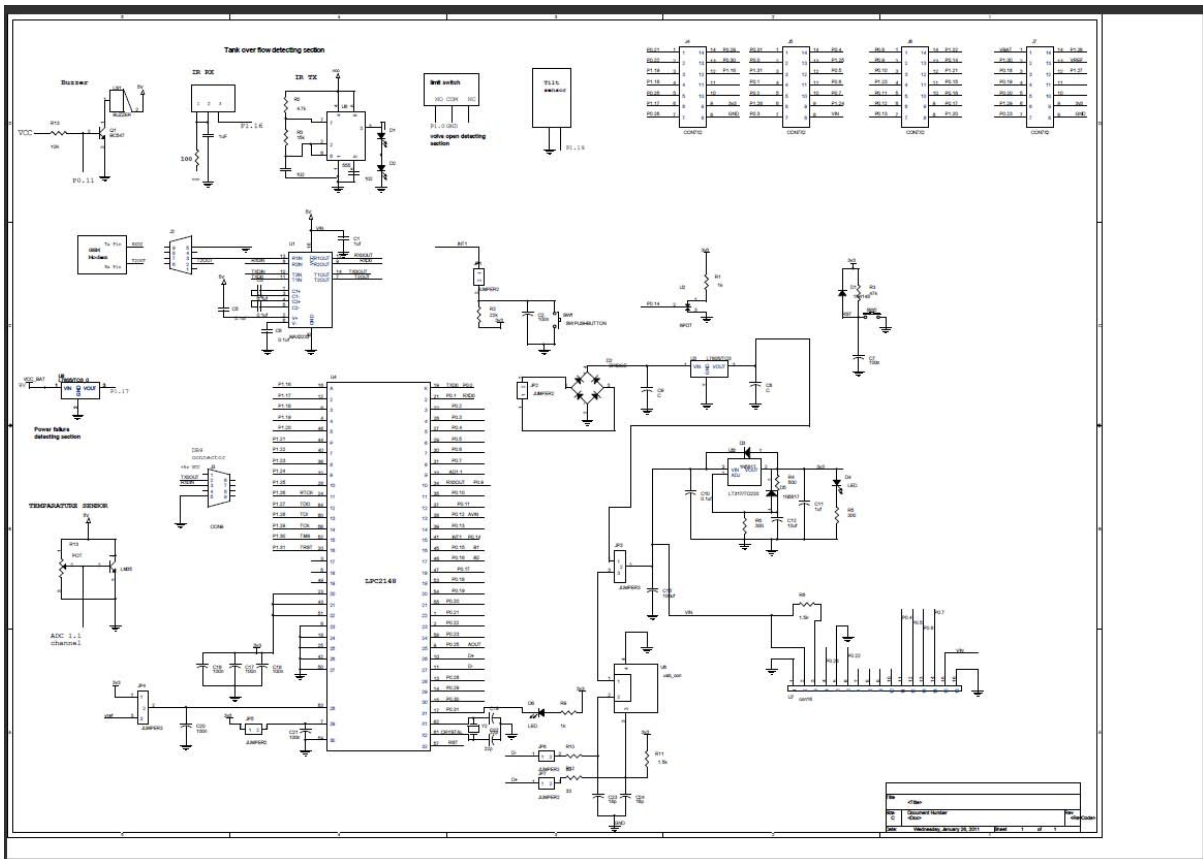
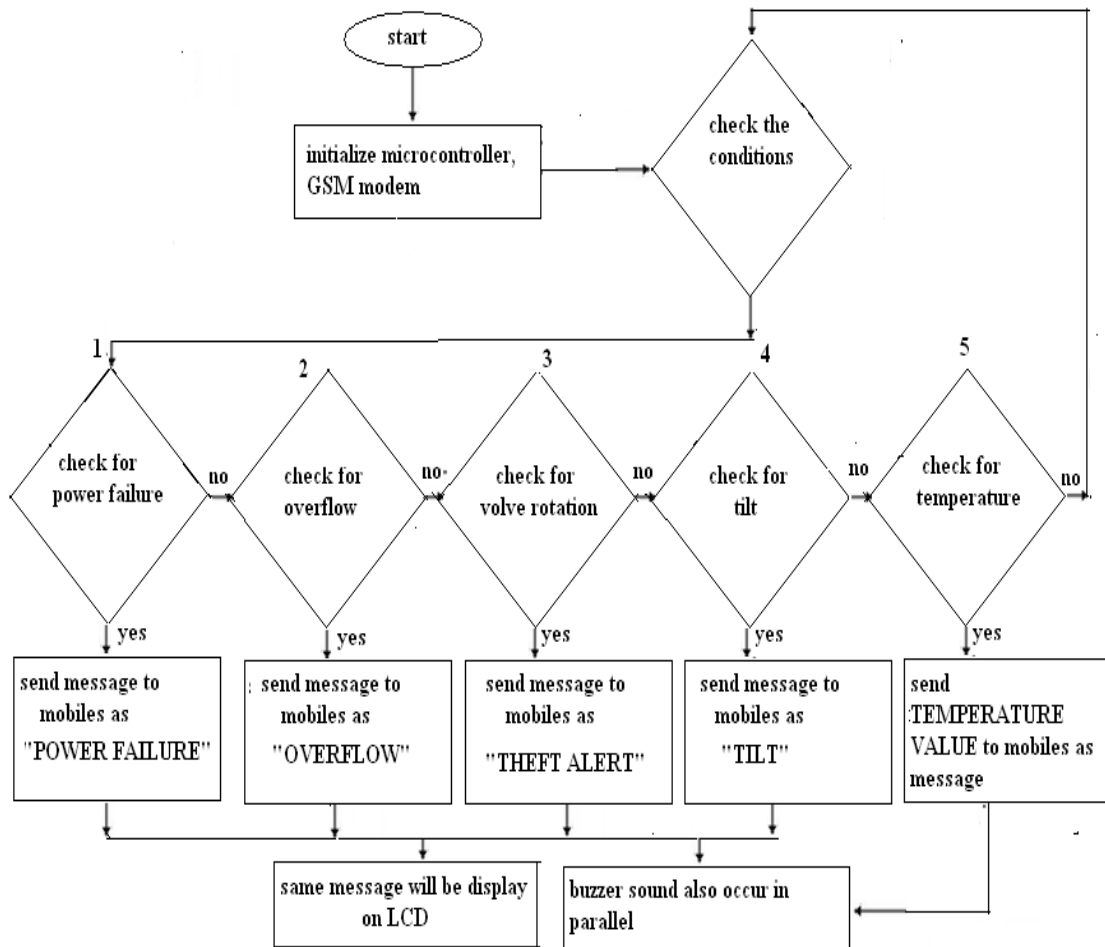


Fig.8 Schematic view

III ALGORITHM

- Step1: The user has to initialize the microcontroller and GSM modem.
- Step2: Microcontrollers continuously check the conditions one after the other.
- Step3: First chek for the power failure condition. If yes send message to mobile as” power failure”.
- Step4: Same message will display on LCD and buzzer sound will also occur.
- Step5: If the condition is no, go for the next condition
- Step6: Check for the overflow. if the condition is yes send message to mobile as “overflow ” repeat the step4.if condition no repeat step5.
- Step7: Check for the. Volve rotation if the condition is yes send message to mobile as “theft alert”. Repeat the step4.if condition no repeat step5.
- Step8: Check for tilt. If the condition is yes send message to mobile as “tilt”. Repeat the step4.if condition no repeat step5.
- Step9: Check for temperature. . if the condition is yes send temperature value to the mobile and buzzer sound will also occur.
- Step10: This process repeats continuously

IV SYSTEM FLOW CHART



V CONCLUSION

The security management system for oilfield adopted GSM technology and Embedded System. It provides better security compared with human and free cost of maintenance. There is possibility for extending security for more parameters.

REFERENCES

- [1] Cao Liting, "Distributed Security System for Intelligent Building Based On Wireless Communication Network", Proceedings of 2006 IEEE International Conference on Information Acquisition, Weihai, Shandong, China, 177-182
- [2] Agranat I D, "Engineering web technologies for embedded applications", IEEE Internet Computing, vol.2no.3, 1998
- [3] Yougjun Xu, Lingyi Liu, and Peifu Shen, "Low Power Processor Design Wireless Sensor Network Application", International Conference on Wireless Communication, Networking and Mobile(WCNM2005), Wuhan Chian, September 23-26,2005
- [4] LIU Chong, and XIAO Nanfeng, "Design and implementation of home service robot and home intelligent security control", Information of Micro-computer, vol.22, no,pp.212-214,2006
- [5] "The specification of chip", Princeton Technology Corp. <http://www.princeton.com.tw>