ARM Based System for Earth Movers work status Monitoring and position tracing using GSM and GPS

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Abstract-   The paper discussed a kind of design of Earthmovers tracing and monitoring system based on ARM. The architecture and working theory of this system is introduces the vehicle location and other parameter monitoring which uses the ARM LPC 2138 as combinative with GPS, GSM and EPROM. It explores location solutions and changeable parameters monitoring like fuel working halts and storing.

Keywords – Monitoring ARM, GPS Module, GSM Module, Fuel, EPROM

I. INTRODUCTION

In case of construction, mining, transportations and agricultural work the Earth movers like the Bulldozer, Excavators, Tractors, and Poclains and heavy trucks are playing very important roles. These earth movers have very high initial as well as maintenance cost and due to this there any kind of malfunctioning is not affordable to owners. The owners of the Earth mover can't keep watch on their earth movers, when it moves in remote places, so that malfunctioning with them may takes place. If these earth movers have the remote monitoring system which only under observation of owner so any time owner can catch the earthmover movements, it will be monitoring and find positioning and control system as well. Nowadays the most widely used positioning system is GPS it can collect the longitude and latitude of the view point. The design such System Based on ARM a combination of GPS and GSM can upload the information of the Earth movers such as the position and speed and other parameters to the Monitoring center in time, to make it convenient to keep watch on remote Earth movers. What's more, owner can block Earth movers, for avoiding robbery or any malfunctioning.

II.DESIGN OF HARDWARE SYSTEM

A.   System structure –

In proposed work the system consists of ARM, GSM module, GPS module LCD and the sensors. The sensor interfaces can be connected to the earth mover unites for the detection of a variety of status data. The block diagram of the terminal board is shown in figure 1. The hardware structure of the system is dominated by ARM controller, GPS module, and GSM module, antenna, and other components. ARM controller as a central processing unit of the system, ARM embedded system has a critical influence on overall performance with real-time simulation and tracking. It has own of static RAM, embedded high speed Flash memory and A/ D converter. It has Real-time clock and watchdog. The rich on-chip resources can meet the needs of general industrial control. It works stably and faster, is accessible to the plan. This design adapts the current leading GPS technology and the integrated positioning. A GPS receiver module with high sensitivity, low power consumption, and 20 channels solutions to help Users gain and continuously track GPS signals at a very low signal intensity, which means can be used in the environment where it has never been thought to be accessible, such as Buildings in the city, dense forest and many indoor environment, with a positioning accuracy of less than 10 meters. GSM module is used for wireless communication. Having gained the domestic network card of Radio equipment, it operates in dual-band GSM900 and GSM1800, with power consumption of 2W and1W respectively. Through this Interface, system can have real-time monitoring of Earth mover's Information, in order to make response timely. The GPS tracks latitude and longitude of the earth mover. With the help of multimedia cell phone or pc with internet, we can find exact location

of the earth mover equipped with this system.

In case of power failure, transaction details are retained and available for use when the power supply is resumed, and this includes transactions in progress at the time of the power failure which are automatically saved.

This system is not only useful for control and stops the fuel theft by the driver but also it restricts the driver to work at another site without permission of the owner.
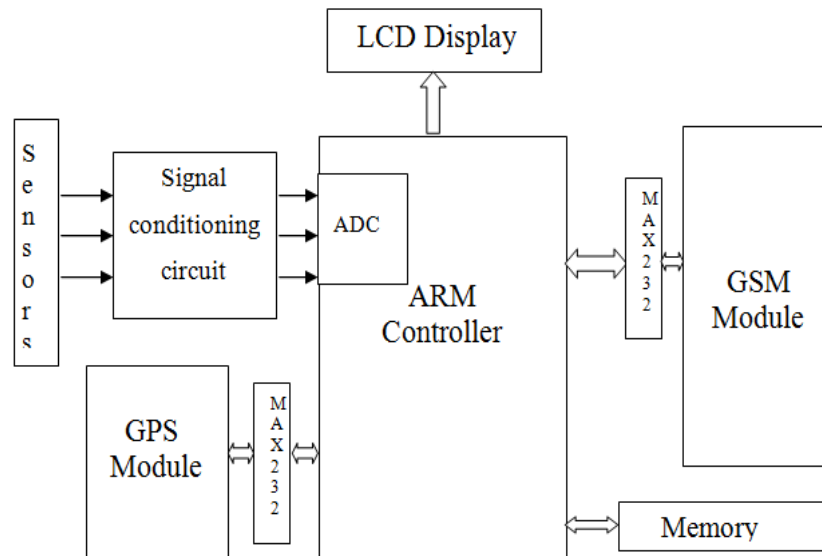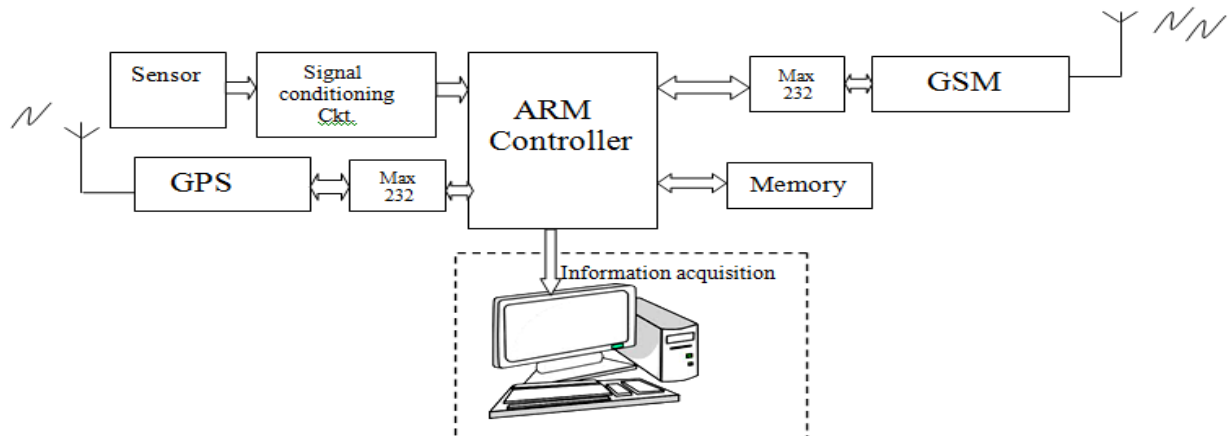
Figure 1

B. Transmitter and Receiver

Figure 2

The GPS gives us latitude and longitude, if put these values on goggle maps on multimedia cell phone or pc it gives us location and thorough this owner can track the object, when it moves out of coverage area he can also take respective actions.
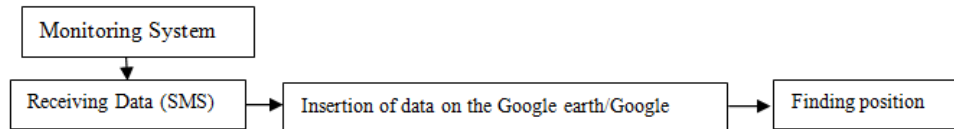
Figure 3

GSM Module

Messages sent by the user are received by the **GSM** module.
1) ARM will play important role in sending and receiving commands to GPS. 2) ARM extracts the location name and sends the same to the GSM via serial communication. ARM will find location and send details to GSM Mobile using serial communication system.

GPS Module

The Signal from the GPS satellites is received and the receiver used a standard form of message decoding. These standards are called as NMEA 1) the receiver has a Serial Communication facility which is used to interface with the external devices like PC or ARM. The PC or ARM (with LCD) is connected as per the pin details 2)The Antenna of the GPS receiver is fixed at Line of site to the satellite and once the Receiver receives the signals, the Receiver transfers data to the ARM serial communication Pins which in turn is displayed to the LCD. The data displayed on the LCD is the Latitude and Longitude of the particular location where u keep the antenna of the receiver. In this way a Particular Location is identified. 3) The Antenna receives the data, transfers to the ARM through Serial Port. Micro controller displays on the LCD. The same data can be transferred to the GSM through serial communication.

LCD
A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.
The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD.

MAX232

MAX232 is used to interface the ARM to standard RS-232 port of GPS Receiver and GSM Modem. It is a signal level converter necessary for conversion between TTL and RS-232 standards. The MAX232 requires 5 external 10uF capacitors. These are used by the internal charge pump to create +10 volts and -10 volts. The MAX232 includes 2 receivers and 2 transmitters so two serial ports can be used with a single chip.

III.   EXPERIMENT AND RESULT

The test set for this evaluation system the gives

[1] Working hours with fuel consumption.

[2] Ignition started and Stopped with current information.

[3] Latitude and longitude with information.

[4] Previous information and current information.

[5] Refueling and halts.

IV.CONCLUSION

The Earthmover monitoring system play the important role in remote monitoring and tracing of Earthmover, and also gives the record details of work through storing every detail

REFERENCES

[1] A monitor system based on virtual instrument for fuel cell commuter by Su Zhou; Haiyang Yu; Fengxiang Chen; Coll. of Automotive Eng., Tongji Univ.China.
[2] Intelligent Earth movers Power Control Based on Machine Learning of Optimal   Control Parameters and Prediction of Road Type and Traffic Congestion by Jungme Park, Zhihang Chen, Leonidas Kiliaris, Ming L. Kuang, M. Abul Masseur IEEE vehicular technology, vol. 58, no. 9, November 2009
[3] Investigation for a Global AVL System by Nick Papadoglou and Elias Stipidis IEEE, intelligent transportation systems, vol. 2, no. 3, September 2001 Zhang Wen, Research on embedded positioning system of Earth movers, Manufacturing Automation, Vol 32, pp.152-154, July 2010
[4] Wang Lei, Jiang Bing, Chen Wenjian, Design of onboard navigation System based on ARM platform, Microprocessors, Vol 6, pp.104-106,June 2006
[5] Xiang Shuaiqiu, Zhan Shaobin, Jiang Tao, On the main technological schemes and algorithm for Earth movers location system, Geospatial information, Vol 6, pp.87-90, June 2008
[6] Liu Lei, Jin Zhigang, Tao Chunhua, Survey of virtualization technology research and realization, Geospatial information, Vol 1, pp.175-177, January 2009