Anti-Theft Tracking System and Security System for Automobiles using GSM and ARM

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***Abstract* - In this project the development of a motorcycle security system that uses a microcontroller to detect theft and inform the owner using a mobile phone when theft occurs. This system protects motorcycle from theft and provides a reliable security system to motorcyclist with affordable price. The microcontroller is the interface between the GSM module and the vehicle. It stimulates the module in message forwarding and it is programmed in such a way that it switches OFF the engine once it receives a message from the user, thus emphasizing its significance in preventing vehicle hi-jack. The process happens in a short period of time, and hence proves to be vital for theft control. For security purpose we need to interface EEPROM for password. And here we are also sending the coordinates in the way of LAT &LOT getting from GPS nothing but vehicle location to the user .They are much smaller and simplified so that they can include all the functions required on a single chip. Having the micro- controller is of great use, as it has low design cost and adds intelligence to the system.**

***Index Terms* - GSM, GPS, EEPROM**

I. INTRODUCTION

There are various GPS (Global Positioning System) based tracking systems prevailing today. Still in the Indian scenario they are not in much of use because of economy. Similarly, all over the world the systems installed are predominantly for the four wheelers; but for a country like India where majority of the population thrives using two wheelers, here is the cheapest source of an anti-theft tracking system. This system works purely on GSM (Global System for Mobiles) and proves to be enormously effective. A security system is essential for motorist nowadays as the number of motorcycle theft increases every year. Various security systems are available in the market with variety of functions, operating modes and features. Most of the systems are expensive which make motorcyclists could not afford to have a security system that is efficient. Real time tracking is one of the best ways to keep our vehicle protected from thieves and criminals. Tracking vehicles in real time works by sending information from the transmitter to the receiver every second. This allows you to monitor where our vehicle is any time you want, without the unnecessary lag. Global Positioning System or GPS is often used in vehicle tracking. It utilizes a constellation of at least 24 satellites orbiting the earth that give off precise microwave signals. The GPS receiver accurately determines the location, speed, direction, and time of an object by using multiple satellites. The GPS system is often mistaken to require a clear line of sight so the satellites can transmit the accurate location, speed and direction of an object. However, the artificial satellites can still provide a very useful reading even if the line of sight of the GPS is obstructed. This makes the GPS an excellent navigational tool because it can still track our location even during the most extreme conditions, such as being inside a tunnel, cave or jungle.

II. PROPOSED SYSTEM

It is aimed at development of an ARM based Anti theft tracking system. The proposed architecture consists of a GPS signal receiver and GSM connected to ARM7, and keypad is interfaced with the lpc2148 using I2C protocol. This complete setup will be positioned in the vehicle. The GPS fitted in the vehicle will be sending the location information to the controller continuously. The same will be routed to the GSM modem through the controller. GSM will forward this information to the pre fed mobile nos. the user after receiving the message can initiate few tasks. To simulate these tasks few relays or LEDs have been added in the circuit.

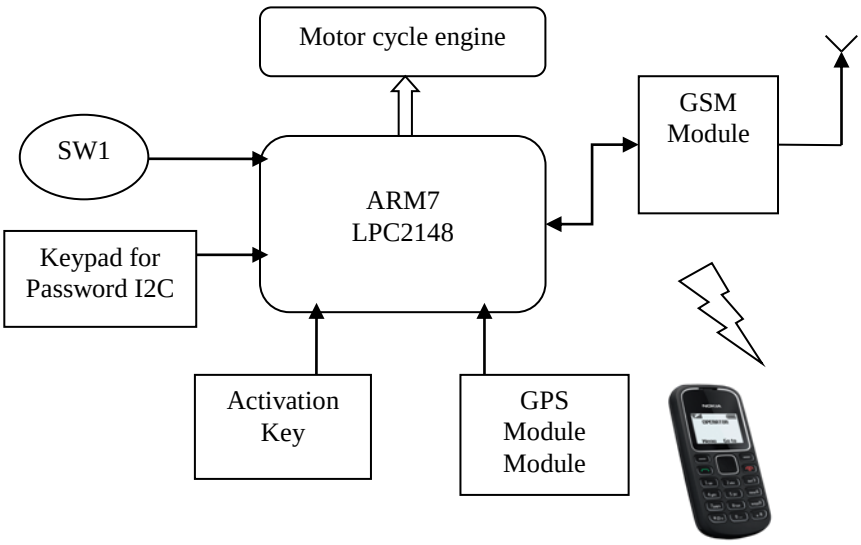

Fig 1: Block Diagram

III. HARDWARE IMPLEMENTATION

The LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combines the microcontroller with embedded high speed flash memory of 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 the code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2148 microcontrollers are ideal for the applications where miniaturization is a key requirement, such as access control and point-of-sale. A blend of serial communications interfaces ranging from a USB 2.0 Full Speed device, multiple UARTS, SPI, SSP to I2Cs 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 particularly suitable for industrial control and medical systems.

3.1. I2C Serial EEPROM

The Microchip Technology Inc. 24AA04/24LC04B (24XX04*) is a 4 Kbit Electrically Erasable PROM. The device is organized as two blocks of 256 x 8-bit memory with a 2-wire serial interface. Low-voltage design permits operation down to 1.7V, with standby and active currents of only 1 µA and 1 mA, respectively. The 24XX04 also has a page write capability for up to 16 bytes of data. The 24XX04 is available in the standard 8-pin PDIP, surface mount SOIC, TSSOP, 2x3 DFN, 2x3 TDFN, and MSOP packages and is also available in the 5-lead SOT-23, or 4-lead Chip Scale package.

3.2. Global positioning system:

The Global Positioning System (GPS) offers the capability to accurately determine location anywhere on earth in addition to speed, altitude, heading, and a host of other critical positioning data. GPS is widely used in military, consumer, and service markets with applications ranging from container shipping to weapons systems and handheld devices.

The GPS system consists of 24 satellites orbiting in six planes around the earth. The satellites transmit a microwave signal, which is read by the GPS receiver on earth. The GPS receiver requires a successful lock onto at least four GPS satellites to gather an accurate signal for calculating position and velocity. The module triangulates its position with relation to three satellites, using a fourth satellite as a clock source. The GPS system is designed such that at any point, a GPS module on earth has a clear view of at least four satellites, barring any obstruction such as buildings, interiors of a canyon, dense foliage, or mountains. This application note details important data considerations and implementation methods to integrate a GPS receiver with a CY8C29466 device and enable data logging through an SD card. Finally, the GPS data is parsed and displayed onto an LCD screen. This application note guides an ARM7 developer in integrating GPS applications and providing portable code that can be bolted into a user's application

Fig 2: GPS Module

3.3. GSM Modem

Introduction SIM300

Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz. SIM300 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4.With a tiny configuration of 40mm x 33mm x 2.85mm , SIM300 can fit almost all the space requirements in our applications, such as smart phone, PDA phone and other mobile devices. In this hardware SIM300 is only interfaced with RS232, Regulated power Supply 4.0V SIM Tray Antenna with LED indications.

AT Commands:

A command line is a string of characters sent from a DTE to the modem (DCE) while the modem is in a command state. A command line has a prefix, a body, and a terminator. Each command line (with the exception of the A/ command) must begin with the character sequence AT and must be terminated by a carriage return. Commands entered in upper case or lower case is accepted, but both the A and T must be of the same case, i.e., “AT or “at. The default terminator is the ENTER key <CR> character. Characters that precede the AT prefix are ignored. The command line interpretation begins upon receipt of the ENTER key character. Characters within the command line are parsed as commands with associated parameter values. The basic commands consist of single ASCII characters, or single characters proceeded by a prefix character (e.g., “&” or “+”), followed by a decimal parameter. Missing decimal parameters are evaluated as 0.

3.4. Hex Keypad:

The hex keypad is a peripheral that connects to the DE2 through JP1 or JP2 via a 40-pin ribbon cable. It has 16 buttons in a 4 by 4 grid, labeled with the hexadecimal digits 0 to F. An example of this can be seen in Figure 3, below. Internally, the structure of the hex keypad is very simple. Wires run in vertical columns (we call the m C0 to C3) and in horizontal rows (called R0 to R3).

These 8 wires are available externally, and will be connected to the lower 8 bit s of t he port. Each key on the keypad is essentially a switch that connects a row wire to a column wire. When a key is pressed, it makes an electrical connection between the row and column. The internal structure of the hex keypad is shown in Figure 3.

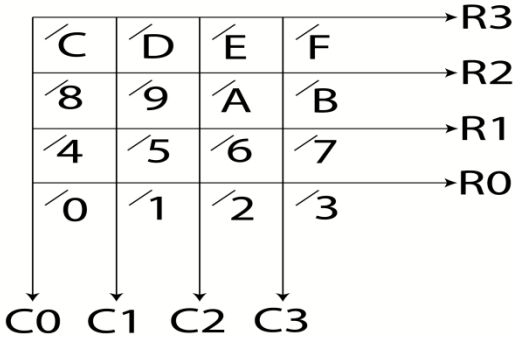

Fig 3: Hex Keypad

IV. HARDWARE & RESULTS

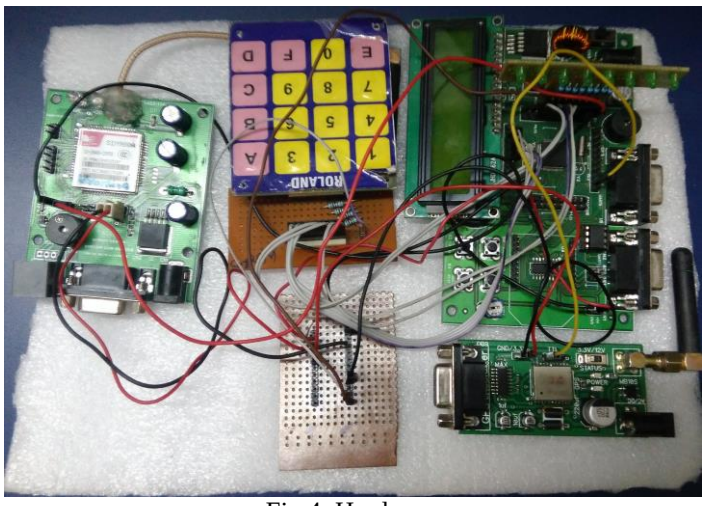

Fig 4: Hardware

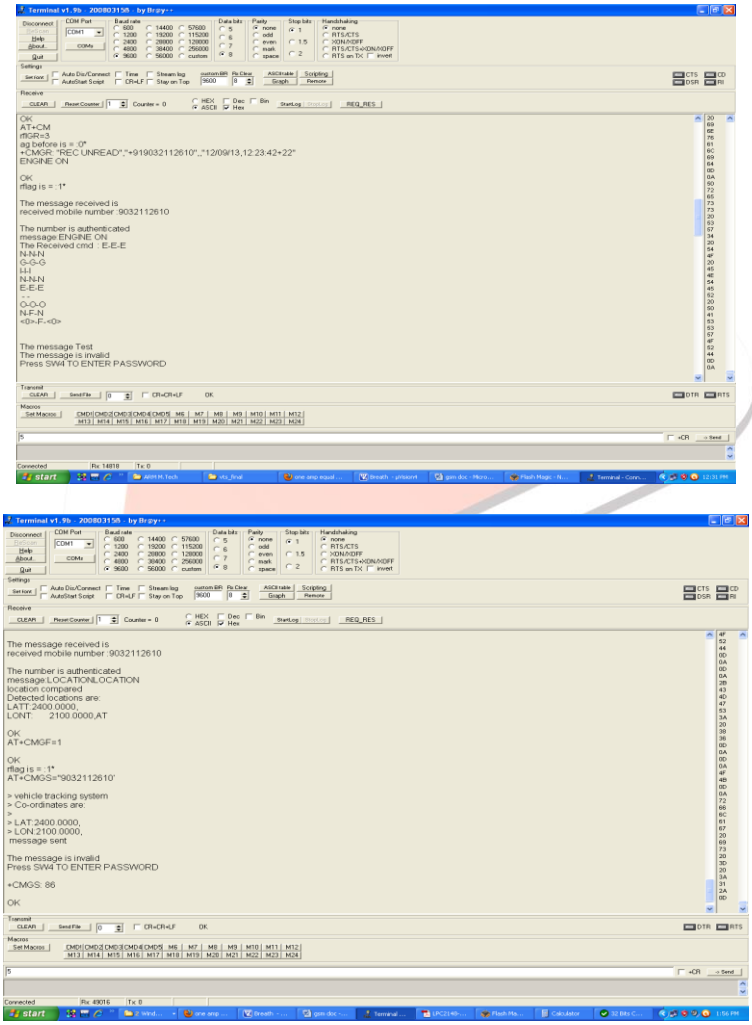

Fig 5: Data Display in PC Terminal

V. CONCLUSION

In this paper, we have proposed a novel method of Anti theft tracking system used to track the theft vehicle by using GPS and GSM technology. This system puts into the sleeping mode vehicle handled by the owner or authorized persons; otherwise goes to active mode. The mode of operations changed by persons or remotely. When the theft identified, the responsible people send SMS to the micro controller, then issue the control signals to stop the engine motor. After that all the doors locked. To open the doors or to restart the engine authorized person needs to enter the passwords. In this method, easily track the vehicle place and doors locked.

VI. REFERENCES

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