Design and implementation of fingerprint based bank locker system using ARM7 and GSM

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Abstract - *Today we are moving in world's advancement, so the security is major concern in order to keep data isolate from the run authorized users to access in today's world, we need high degree security system for the protection of our document, important data, as well as memory & jewellery's. In this we will use fingerprint and GUM for bank locker system. In this by using the micro controller we put door which can automatic open when the fingerprint matched. Biometric is basically the measurement & use of unique characteristics of living beings to make them distinguish from one another. And this is more reliable then password & tokens which can be lost or stolen by the humans. So biometric means fingerprint bank locker system is more useful than other & it is also more secure. The technology can be used to identify and validate number of objects.*

Key Words*: ARM7, GSM, Fingerprint Module, Motor drive, DC Motor, LCD, Keyboard, Buzzer.*

1. INTRODUCTION

 In today's world security is the most necessary factor in every rural as well as in urban areas. But most of the people cannot find way to secure their valuable things like money, jewellery, etc. so the safest place to accumulate those things is the bank lockers. But the conventional security system provides the security by using keys which will be repeated by using duplicate keys and also the key will get lost by human mistakenly. Thus to overcome this problem we are implementing the fingerprint based bank locker system using ARM7 and GSM technology, As today fingerprint based system provides high degree of accuracy in terms security. In this project by using GSM And fingerprint we have provided high degree of security for the money in the bank offices and houses. We can store the number of users fingerprint but as we have used GSM technology so that only authorized person can open the bank locker.

1.1. Problem Statement

Security:

      As today's era is more concern about security so in our project we are implementing fingerprint based bank locker system using ARM7 and GSM technology which will give us more security than traditional bank locker system that uses keys for their bank accounts. Also this system can be implemented by using PIN for more

1.2 Objectives:

We are using biometric system for storing the fingerprint of the users. We are implementing this system by using advanced technology i.e. ARM7 and GSM technology. Which can provide high degree of security.

2. BLOCK DIAGRAM
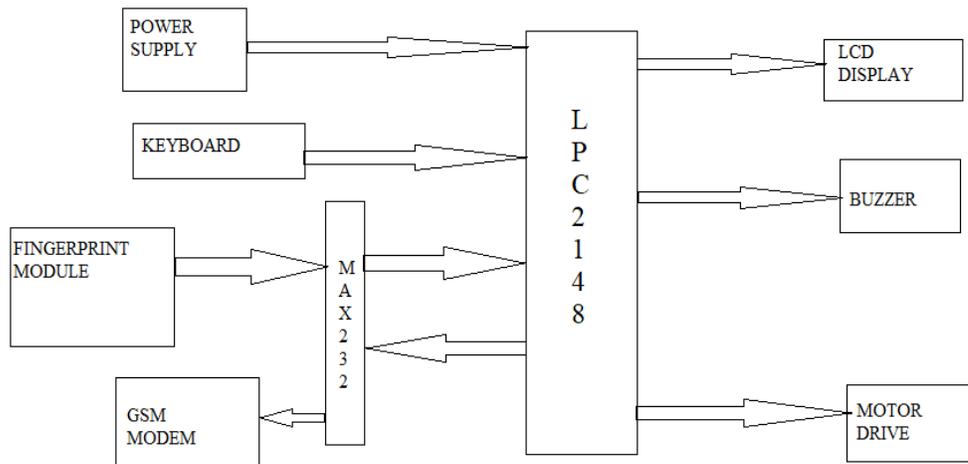
Fig (1) Block Diagram of LPC2148

2.1. Fingerprint module:

1 - UART Transmit (3.3V)
2 - UART Receive (3.3V)
3 - GND
4 - Vin (5V)
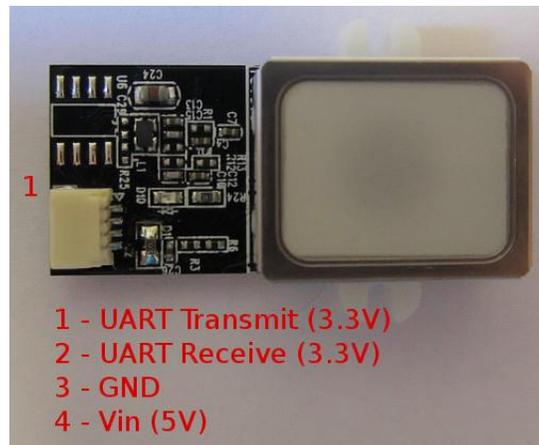
Fig (2) Fingerprint Module

The GT-511C3 FPS (fingerprint scanner) is a small embedded module that consists of an optical sensor mounted on a small circuit board. The optical sensor scans a fingerprint and the microcontroller and software provides the modules functionality which automatically processes the scanned fingerprint.

Features:

- Simple UART & USB communication protocol

- Complies with USB 2.0 full-speed specification

- Ultra-thin optical sensor

- Resolution 450 dpi

- Capable of 360° recognition

- High-accuracy and high-speed fingerprint identification technology

- Works well with dry, moist or rough fingerprints
- 1:1 verification, 1:N identification

2.2. GSM:

SIM800 support Quad-band 850/900/1800/1900MHz, it can transmit Voice, SMS and data information with low power consumption. With tiny size of 24*24*3mm, it can fit into slim and compact demands of customer design. Featuring Bluetooth and Embedded AT, it allows total cost savings and fast time-to-market for customer applications. Dual frequency 900 / 1800MHz.

Features:

Dual frequency 900 / 1800MHz

• GPRS multi-slot class 12/10

• GPRS mobile station class B

• Low power consumption

Fig (3) GSM Module

2.3. LCD:

 16×2 LCD is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots. A Single character with all its Pixels is shown in the below picture.

Features:

- Operating Voltage is 4.7V to 5.3V.
- Alphanumeric LCD display module, meaning can display alphabets and numbers.
- Consists of two rows and each row can print 16 characters.
- Each character is build by a 5×8 pixel box.
- Can work on both 8-bit and 4-bit mode.
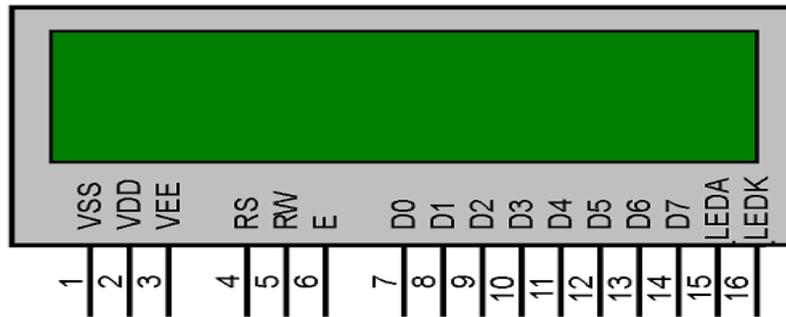
Fig (4) LCD Display

2.4. ARM:

LPC2148 Pro Development Board is a powerful development platform based on LPC2148 ARM7TDMI microcontroller with 512K on-chip memory. This board is powered by USB port and does not need external power supply. The on-chip USB controller provides direct high speed interface to a PC/laptop with speeds up to 12Mb/s. The UART boot loader eliminates need of an additional programmer and allows you to program using serial port. The on board peripherals include SD/MMC card interface, USB2.0 interface, wireless module interface, ULN2003 500mA current sinking driver, L293D DC motor controller, 16X2 character LCD and many more. The on-chip peripherals and the external hardware on the development board are interconnected using pin headers and jumpers.

Features:

- 40 kB of on-chip static RAM and 512 kB of on-chip flash memory.

- On-chip integrated oscillator operates with an external crystal from 1 MHz to 25 MHz.

- USB 2.0 Full-speed compliant device controller with 2 kB of endpoint RAM.

- Two 10-bit ADCs provide a total of 14 analog inputs.

- Single 10-bit DAC provides variable analog output.

- Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM   unit (six outputs) and watchdog.
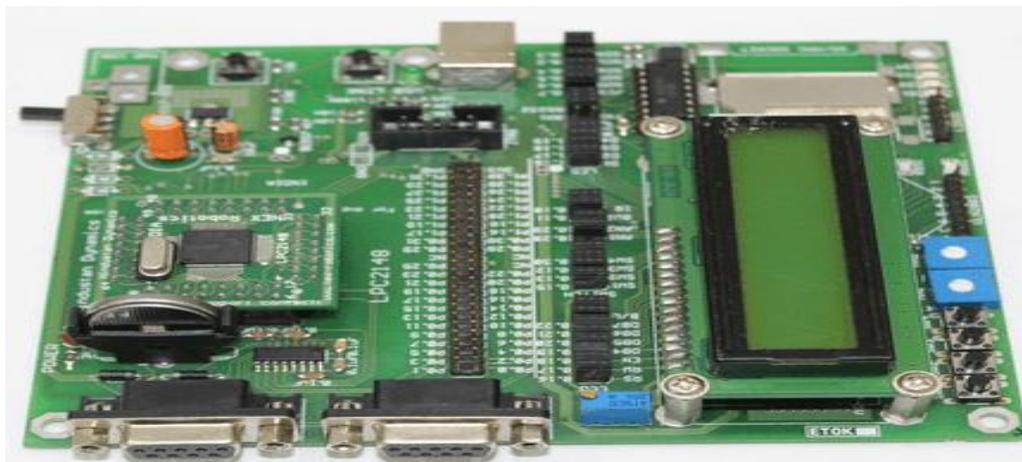

Fig (5) ARM 7 Development Board

2.5. DC Motor:

A **DC motor** is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

Fig (6) DC Motor

3. CONCLUSION:

While preparing this paper we have first studied earlier banking systems. That systems are good, but has some disadvantages & unauthorized person can open the bank locker. But in this paper, we have implemented the bank locker system using fingerprint & GSM. As Fingerprint will be unique for each person this system will work better than other systems. Also only authorized person will be able to open the bank locker & person will receive authontication mail through GSM.

4. REFERENCES:

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