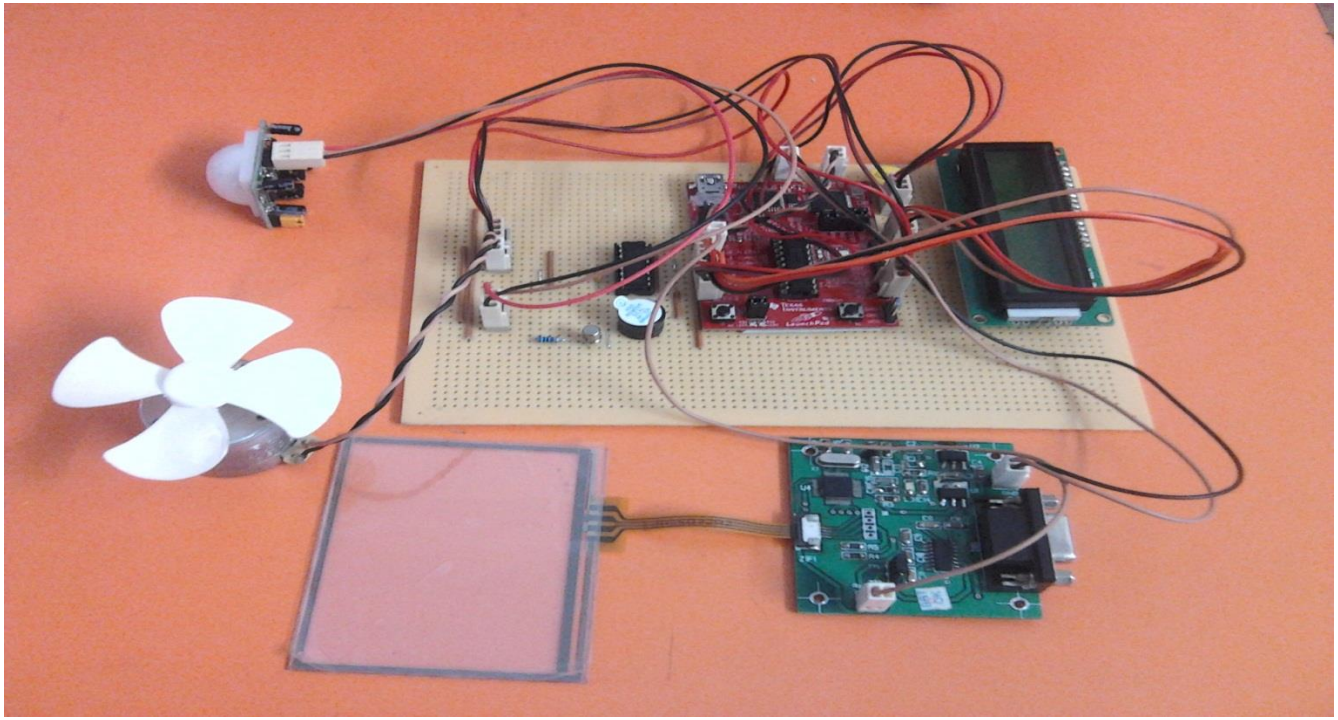
E-SAFE



PROJECT BY:

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ABSTRACT

The aim of the project is to build a locking system for safe. It is done by using PIR sensors, Resistive analog touch panel, Motor and LCD interfaced to MSP 430. The safe is opened only when the pre-defined pattern set to touch panel is recognized by microcontroller The 7 segment LCD display continuously displays the status of the lock system. There are four LEDs with the IR sensors which displays the pattern is correct or not. Initially the IR sensors and LEDs are in sleep mode. When the PIR sensor senses an obstacle the touch panel is activated and the LCD displays ATTEMPT 1. If the correct pattern is recognized by the touch panel then the lock is opened. If the pattern is wrong then the LCD displays to make a second attempt. If three attempts go wrong an buzzer is activated.

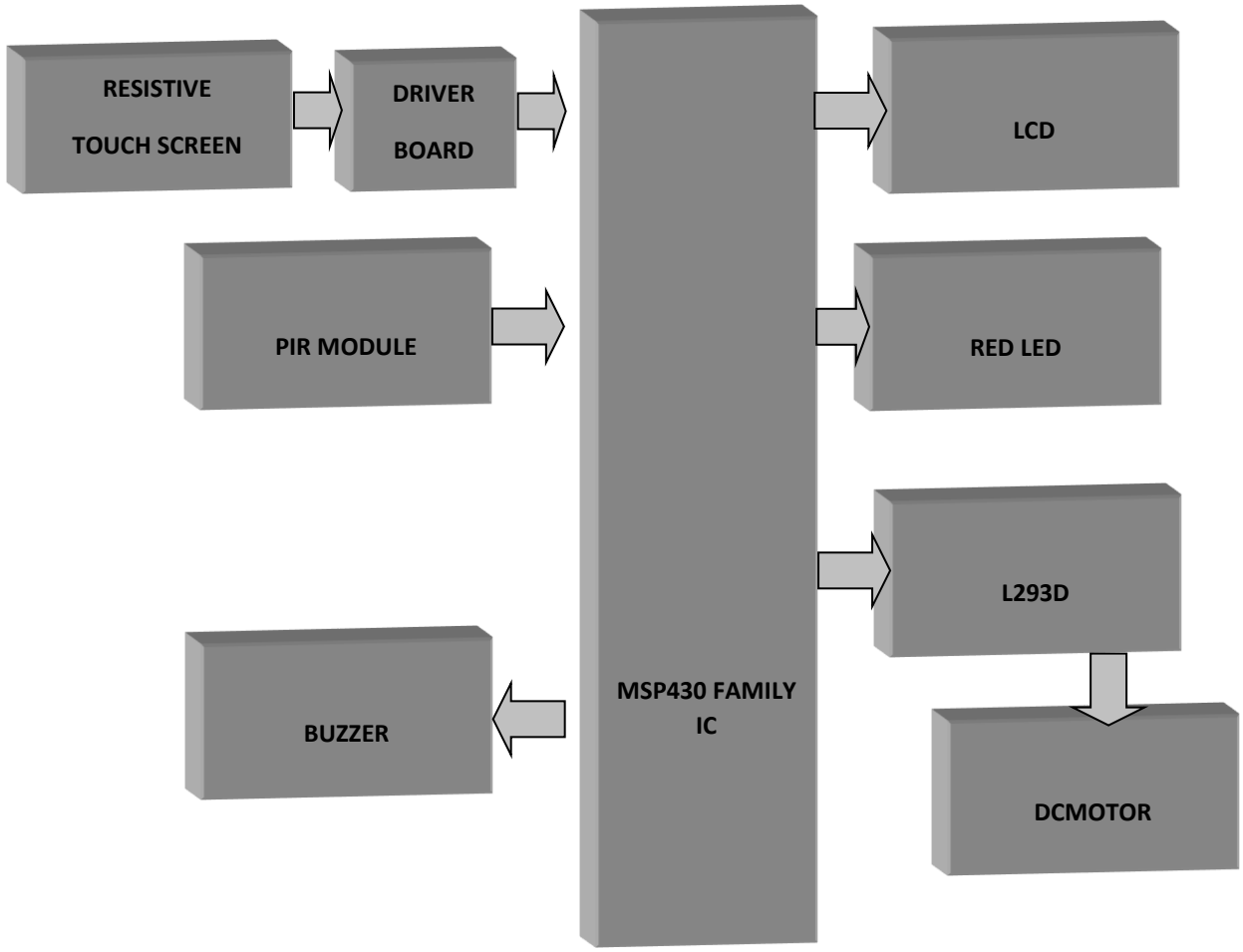
MOTIVATION

Main motivation to the project came from the idea of avoiding the need to use robust mechanical parts in the portable safe. It is quite common for anyone to loose keys or to get robbed by anyone at any point of time. There may be a huge loss if the safe had valuable things. There are systems which use a number code instead of keys but this might not be a good idea for anybody who has many things to remember. It's quite common that they forget the code and end up in the same situation when using keys. Keeping all the above points in mind we cane across an idea where the safe can Use an intelligent, modern and simple technique for its locking system. The whole idea is to use a touchpad where a pattern is used to unlock A system. Fortunately this was implemented and we are Successful In making it to work.

Solution To The Problem

This system will first detects human motion by using PIR sensor based on the voltage level variations and then it will provide access to the pattern and by using touch screen user will provide the unlock pattern which is fixed, if the pattern is correct then user can access the system i.e. door will get open which will be indicated by rotating the motor in forward direction and also by glowing the green led and then system will wait for the input from the push button switch to close the door. If the unlock pattern provided by the user is wrong for 3 times then system will get shutdown by blowing the buzzer as well as glowing the red led and again it will wait for the PIR input.

BLOCK DIAGRAM:



Hardware Interfacing with MSP430 Launchpad

MSP430 microcontroller is a 16-bit, RISC-based, mixed-signal processor designed for ultra-low power. The CPU consists of an instruction decoder, arithmetic logic unit, and a register file. The instruction decoder is responsible for translating the numeric program instructions into processor actions. The arithmetic logic unit carries out additions, subtractions, logical operations and so on. The register file consists of 16 registers. The registers are numbered R0 to R15. The first four of these (R0 – R3) have special designation, the remaining, R4 – R15 are for general users and can be used as instruction operands.

Interfacing:

P2.3: PIR Sensor

P1.1/RXD: Analog Resistive Touch Panel

P1.2-P1.5: Data pins (D4-D7) of 16*2 character display LCD

P2.0 and P2.2: Pin4 and Pin6 of 16*2 character display LCD

P2.4-P2.5: Quadruple Half H-Drive & D.C Motor

P2.2: Buzzer

P1.0: Red LED (On board)

P1.6: Green LED (On board)

P1.7: Push button (On board switch)

Left Over Pins: XIn, XOut ,TEST,RST.

How the analog resistive touch panel works

The interface controller chip which senses pressed positions of a transparent analog resistive touch panel can eliminate unstable data (voltage value) generated by softly pressing it or some external noises coming into the circuitry. By the internal filtering process, all of the pressed positions can be sensed with a high degree of accuracy and these data are sent to the driver with serial communication. When pressing the touch panel, the controller generates X-Y coordinates of the pressed position. If you maintain a continuous press, the controller keeps generating a string of data continuously. When releasing the press, a single data is generated.

A) AHL Mode (Original Mode)

Header	X Data	Comma	Y Data	CR
("T" or "R")	(4 bytes)	","	(4 bytes)	0DH

• T as a header for pressing the touch panel, and R as a header for releasing it

• Position values of both X and Y are from 0 to 1023 in decimal

• The origin of X and Y axes is at the bottom left corner with proper line connections.

The controller outputs the digital position data converted from the analog voltage of the pressed position. For example, when the analog voltage of the pressed point is 2(V) for applying 5(V) to the terminals, “409” is the outputted data.

2(V) / 5(V) x 1023 = 409

- Input: 2.7 -5.5 Volts
- MSP430 pins used: P1.1/RXD

RESULTS

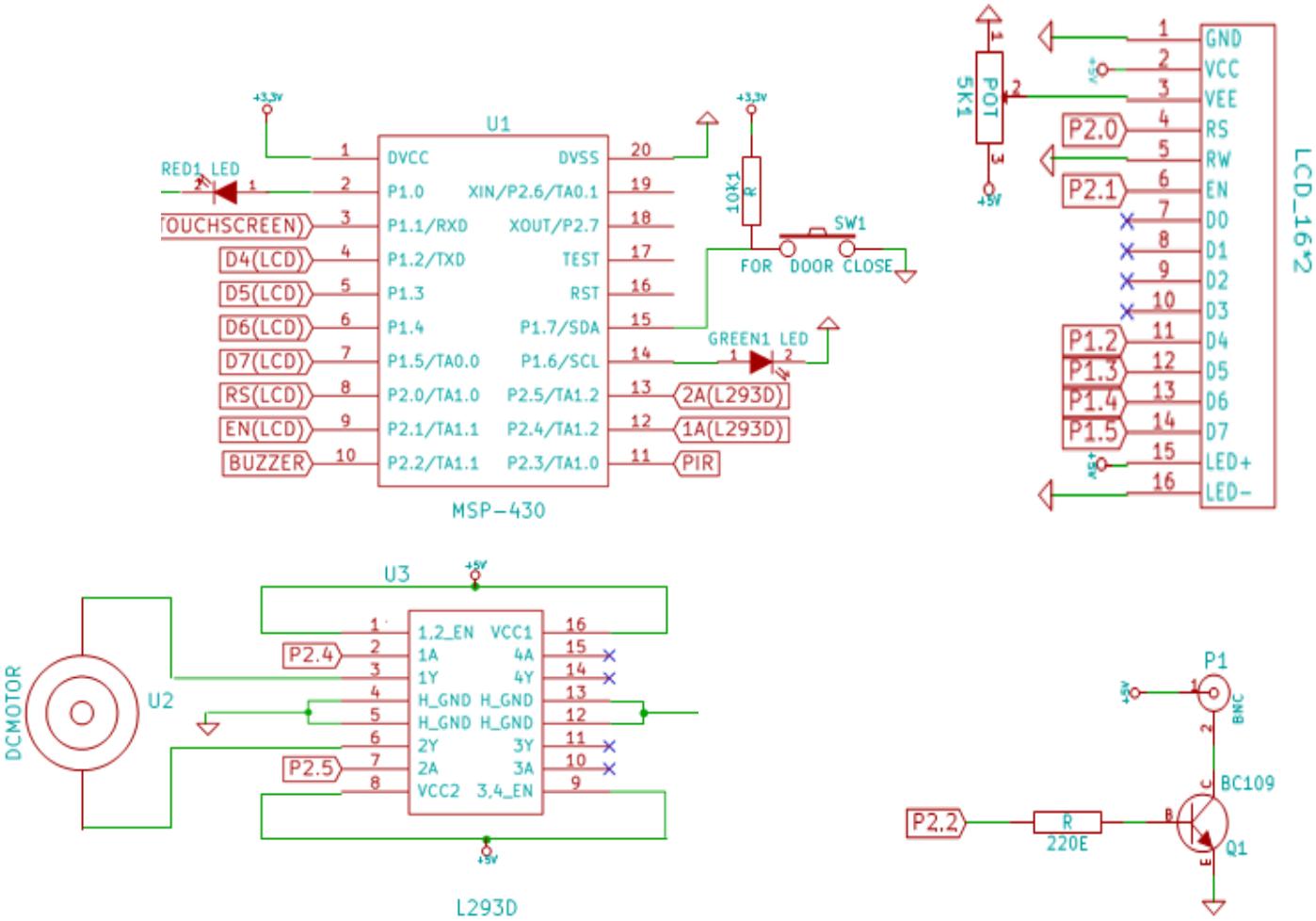
- Successful interfacing with Analog Resistive Touch Panel , D.C Motor and working with optimum results.
- Maximum Utilization of Launch Pad.
- All components including the Launch Pad work on common supply (+5 vdc).
- LEDs and PUSH Buttons on the Launch Pad are used.
- Comprehensive use of drive boards.

CONCLUSION

- The outcome of the project was as expected
- Major changes made from the evolution of project idea to building the hardware project.
    - Firstly, it was the LED sensors then KEYPAD and finally its the Analog Resistive Touch Pannel for the reason that is evolution of new technology.
    - Secondly, the relay component got replaced by D.C motor the reason being motors upto a range of 36v can be used with flexible rotating speeds using the pulse width modulation.

Appendix

Schematic



Team Members and their Tasks

Chidi Okafor: Interfacing Analog Resistive Touch Panel, Software Design
Alem Abreha: Interfacing IR sensors, Software Design
Rajiv Gautham: Hardware schematic, PCB Layout, hardware integration, Presentations, Assist with report
Akshay Reddy: Power Management for each Interfacing device, interfacing D.C motor with MSP430 using H-Drive.
Ashritha Rasa: Display interfacing with MSP430 using a 16*2 LCD

Parts List

I. MSP430 Launch Pad
II. Analog Resistive Touch Panel
III. Basic 16*2 Character LCD
IV. PIR Sensor
V. Quadruple Half-H driver & DC-Motor
VI. Resistors, Transistors, Capacitor, Potentiometer, Buzzer

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