Door Locker Security System

Problem:

We want to implement an embedded system to be a security system for any door

The system requirements:

- Enter a password firstly for admin to generate the system
- Display options for user
- There are two options :
    - Open the door.
    - Change the password.
- The password will be needed to be entered by user for both options.
- The first option (opening the door) if :
    - The password matches then, open the door.
    - The password doesn't match then, display the main options again.
- The second option (changing the password) if :
    - The password matches then, change the password to the given one.
    - The password doesn't match then, display the main options again.
- If the door open, three logical requirements must be achieved:
    - The motor should rotate for 15 seconds during opening (clock-wise).
    - The door hold opening for 2 or 3 seconds.
    - The motor should rotate for 15 seconds during opening (Anti-clock-wise).
- If the password entered wrongly for three times do both for 1 minuets:
    - Turn the buzzer on .
    - Raise error message.

Solution

We will use :

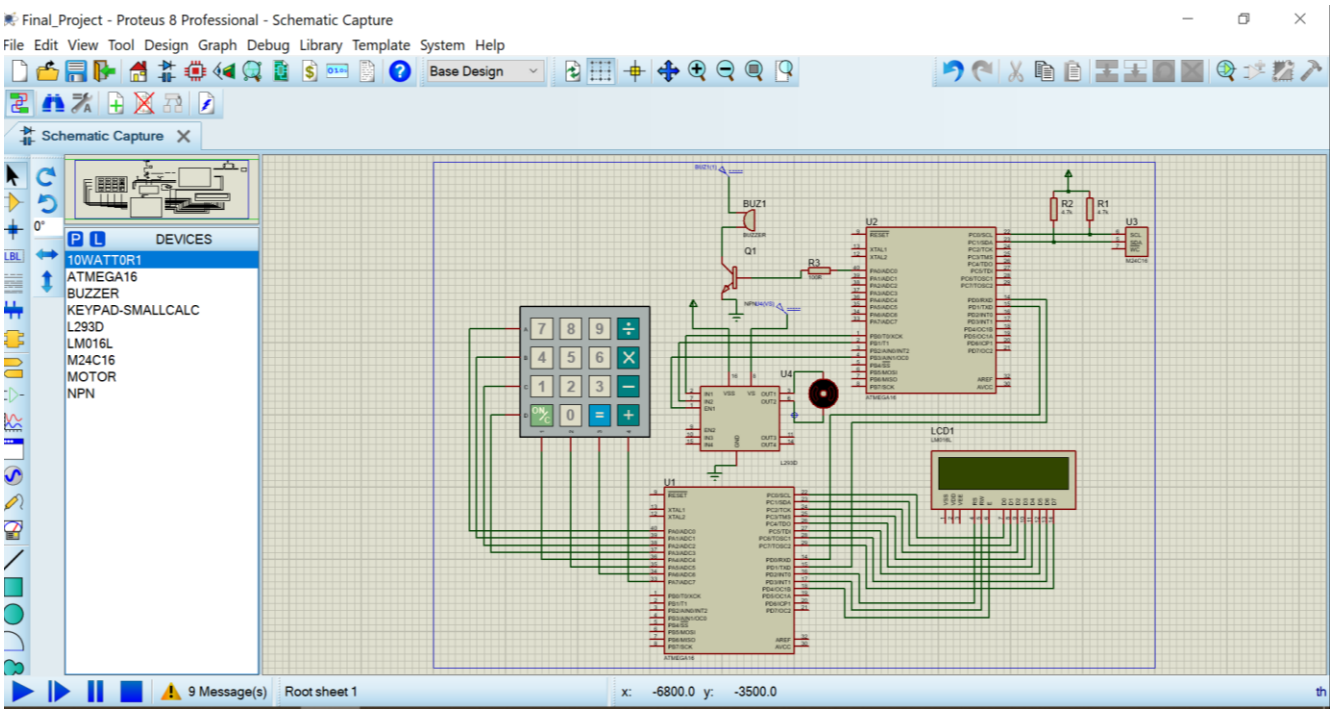
Hardware

- Two atmeg16 (AVR) micro-controllers
- LCD 2x16
- Keypad 4x4
- Buzzer (DC with sound)
- External EEPROM
- H-bridge
- DC-Motor
- NPN transistor
- Two 4.7Kohm resistance
- One 100 ohm resistance

Software

- Eclipse
- Proteus

Circuit connection



The project will be one two micro-controller AVR (atmega16) communicated through UART peripheral as the first one will be:

HMI MC

- To get input keys by keypad.
- Display messages and options by LCD (2x16).

And the second will be:

Control MC

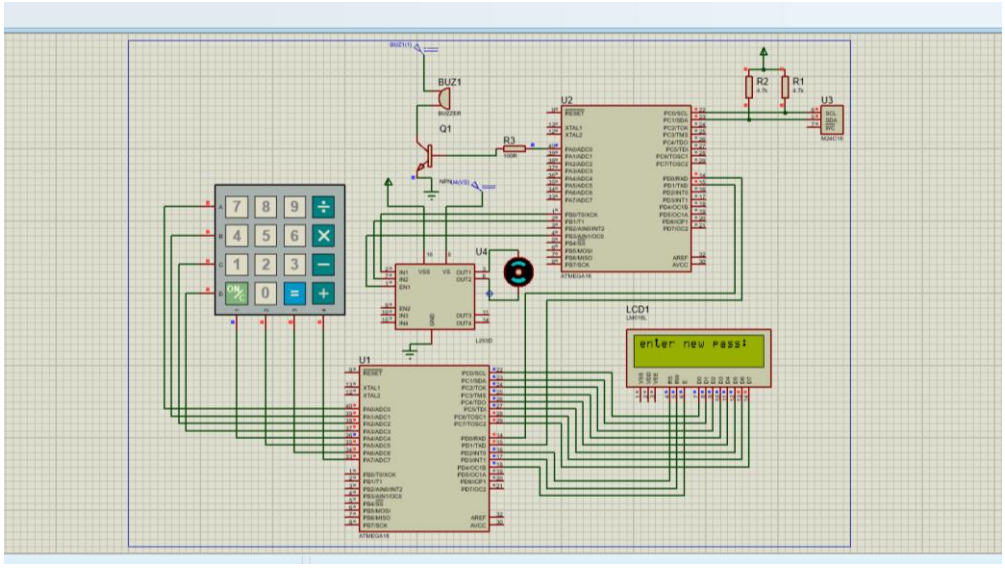
- Getting received password from HMI MC and sore it in external EEPROM.
- If password correct :
    - Change password in EEPROM if needed.
    - Control the door by rotating dc-motor.
- If password not correct :
    - Turn on buzzer and raise error to HMI MC to display error message.

Manual

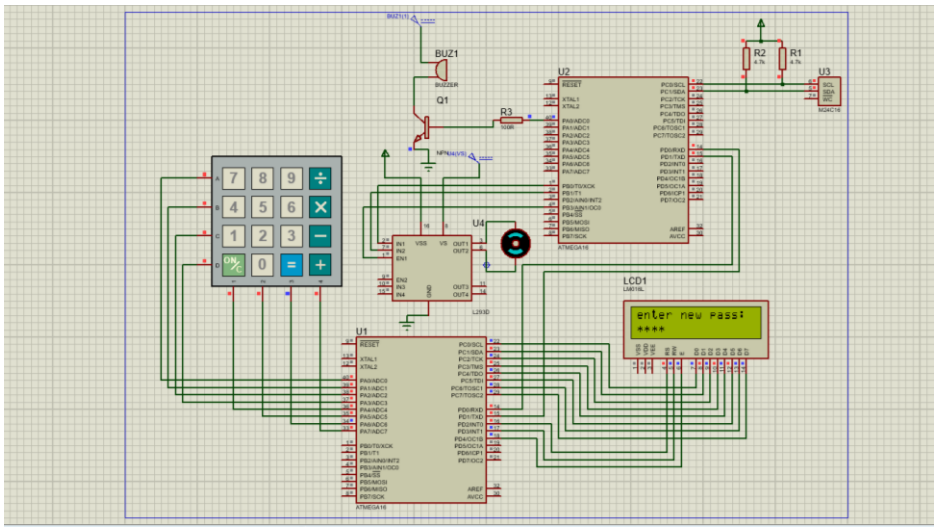
- Keypad keys from 0:9 used as password characters.
- '+' character for opening the door option.
- '-' character for changing password.
- '=' character used as enter.

Screen shots from running the project

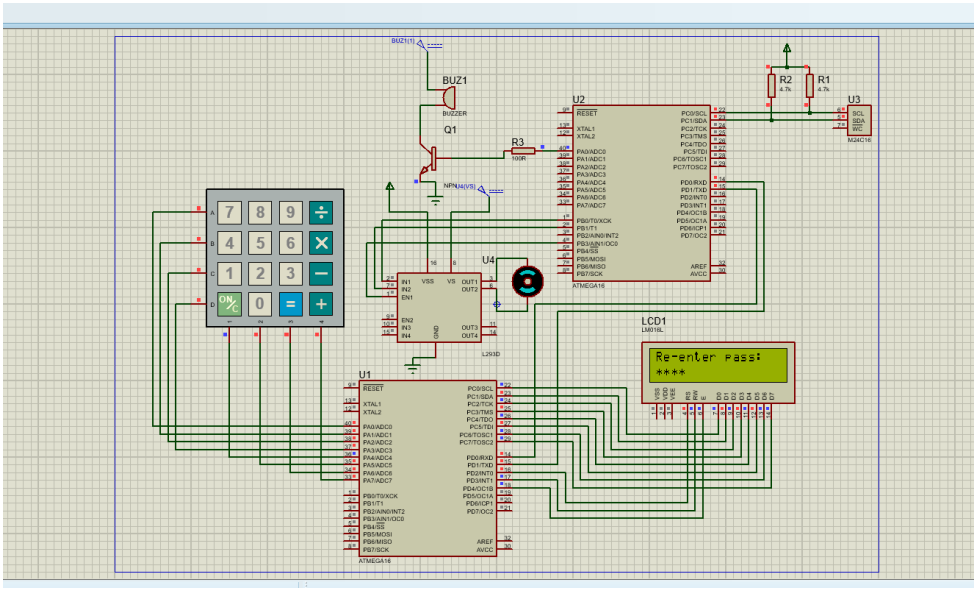
1)



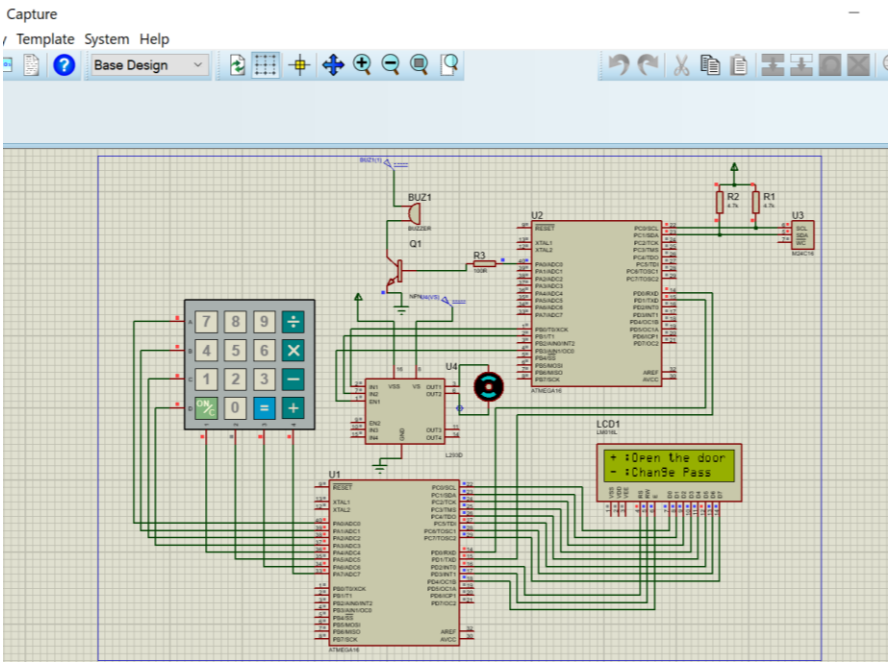
2)


BUZ1
Q1
R3
R2
R1
U1
U2
U3
U4
LCD1
enter new pass:
****

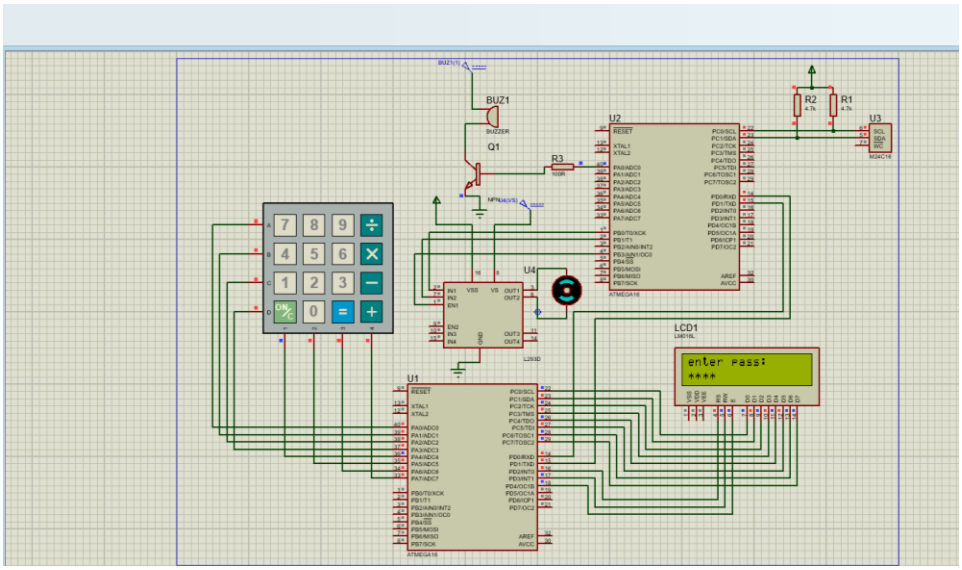
3)


BUZ1
Q1
R3
R2
R1
U1
U2
U3
U4
LCD1
Re-enter pass:
****

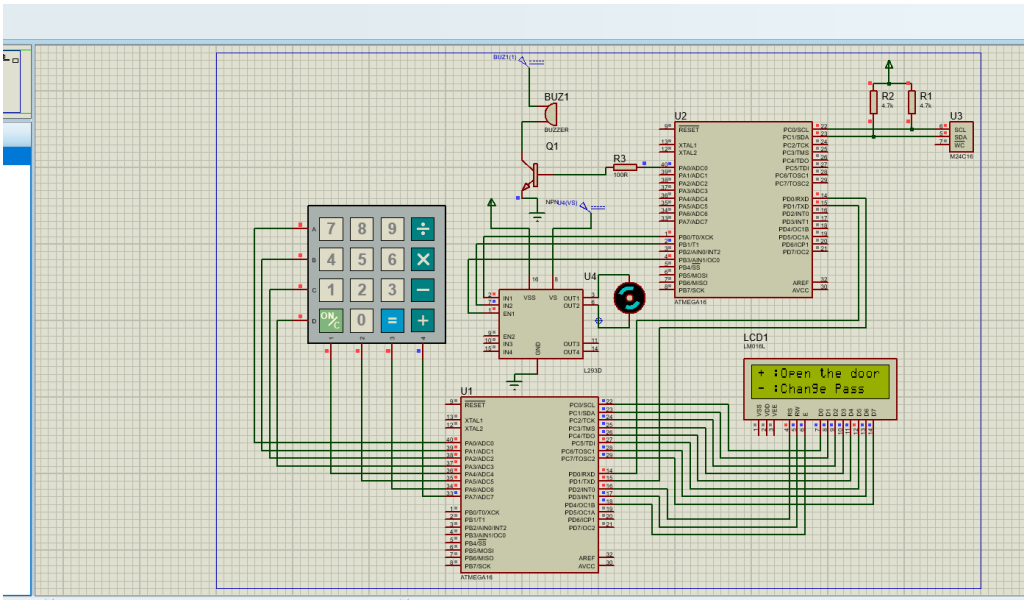
4)


Capture
Template System Help
Base Design
BUZ1
Q1
R3
R2
R1
U1
U2
U3
U4
LCD1
+ :Open the door
- :Change Pass

5)


BUZ1
BUZZER
Q1
R3
100R
U2
ATMEGA16
R2
4.7k
R1
4.7k
U3
M24C16
U4
L293D
LCD1
LM016L
enter Pass:
****
U1
ATMEGA16

6)


BUZ1
BUZZER
Q1
R3
100R
U2
ATMEGA16
R2
4.7k
R1
4.7k
U3
M24C16
U4
L293D
LCD1
LM016L
+ :Open the door
- :ChanGe Pass
U1
ATMEGA16