

# **System Description**

## **For**

### **[SMART-HOME-PROJECT]**



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## **1- Project Overview:**

It is a popular project nowadays, it is a very comfortable application for humans, it aims to convert anything around to be controllable and smart. In this project we have implemented some requirements for the smart home application:

- ☐ Remote controlled by mobile using UART.
  - ☐ Controlling the system by using LCD and Keypad “user mode only” by SPI.
  - ☐ We are capable of controlling 6 lamps “5 Lamps, 1 Dimming Lamp, Door and Air-Conditioner”.
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Login systems are admin and user modes “admin mode is remote controlled only”

- ☐ Admin mode can register one user and switch to user mode.
  - ☐ Usernames and password are kept into memory even if the system is powered off “EEPROM”.
  - ☐ If user password is entered wrong more than 3 trials, the system breaks down and fire alarm until reset.
  - ☐ Admin and user modes can control all of the devices except user cannot control the door.
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On starting the system, you will have to pair your mobile phone to the system using bluetooth. After pairing, this mobile phone will be the administrator of the system and will have the ability to control everything, switch to user mode or register a new user for the system.

If it is the first time for the user to register on the system, the user will be asked to register by creating a password and confirm it. After the new password is set, the user will be asked to login; Accordingly, the system will check the password before following up. "CAUTION: THE SYSTEM WILL BE BLOCKED IF THE PASSWORD IS ENTERED WRONG MORE THAN 3 TIMES, AND IT WILL TRIGGER THE ALARM "

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### **1.2 - Specifications - LCD & keypad:**

1. They are used to login to the system as in user mode only.
  2. After login, user can control all features except the main door.
  3. User mode is only activated by the admin of the system.
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### **1.3 - Specifications - EEPROM:**

1. Storing user password.
  2. Storing alarm status.
  3. Storing the main door status.
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### **1.4 - Specifications - TTL/Bluetooth:**

1. Transmitting/Receiving between MC and PC/mobile.
2. Every action, Message is printed on Mobile/PC screen.
3. Transmitting/Receiving the commands to run and follow the system.

## **1.5 - Specifications - Led, Dimmer:**

Dimmer is a circuit that can control the amount of current that flows to the led using potentiometer.

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## **1.6 - Specifications - Temperature Sensor, DC motor:**

Temperature sensor reads the present temperature, if the temperature is higher than 24 °C, Air condition will be on, if the temperature becomes lower than 24 °C, Air condition will be turned off. In user mode the temperature can be configured to the desired temperature.

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## **1.7 - Specifications - Main Door:**

The actuator used is a servo motor to control the main door only in admin mode, it is controlled by a certain command which is sent by Mobile/PC “Open\Close the door”.

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## **1.8 - Components Used in The Project:**

1. 24AA16 EEPROM.
  2. Bluetooth module HC-05.
  3. 7 led.
  4. Dimming circuit.
  5. LM35 temperature sensor.
  6. DC motor.
  7. Keypad.
  8. LM01602A Character LCD.
  9. Servo motor.
  10. 2 Microcontrollers (ATMEGA32 “Master/slave SPI connection protocol”).
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## **2 - System Functions:**

- 2.1 U8 Password\_Exist(u8 location)

Checks the given specific location in the EEPROM to check if there is a password already existing in this location, in case yes then this means that this is not the first time for the user to login and he/she already got an account.

This function return 0 if the location is empty, and return 1 if there is a password existing.

- 2.2 Void getPassword(u8 location, s8\* Store)

Extracts the password from the EEPROM given location and stores it in an array using pointer.

- 2.3 Void Menu1(void)

If the user got no already account, then it will make the user to provide a new password and save it in the EEPROM. If the user already got an account it will print on the LCD “Welcome Home”, and then proceed with the application.

- 2.4 Void Menu2(void)

In case the user made a new password or already got an account, this function will be called it will ask the user for the password that he created for his/her account. In case the password was entered wrong more than 3 times the alarm will fire and it won't be able to be disabled. If the user entered the password correctly, the application will proceed to the main menu of the application.

- 2.5 Void MenuMenu(void)

Initiates the user main application menu lets the user control the provided options in the application, i.e., Lamps, air conditioner.

- 2.6 Void ALARM(void)

Checks specific location in the EEPROM if the alarm was fired once it will be always enabled, otherwise it won't do anything.

- 2.7 Void Door(void)

This function provides the menu and options for controlling the main door.

- 2.8 Void DoorCheck(void)

Checks specific location the EEPROM if the "Main door" was opened or closed.

- 2.9 Void ROOM1(void)

Controls the option provided for this room using SPI communication protocol

- 2.10 Void ROOM2(Void)

Controls the option provided for this room using SPI communication protocol

- 2.11 Void AdminMenu(Void)

Initiates the Admin menu if admin mode is in progress menu lets the admin control the provided options in the application, i.e., Lamps, air conditioner, door...etc

### 3 - Project Flow Chart:

