

Chapter Four

Design and Implementation of the Pharmacy circuit

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4.1 Design principle

In this chapter first standard and recommended requirement of smart home pharmacy circuit represented then based on the requirements, design details and block diagram represented ,and finally , component selection criteria and brief explanation of the selected components for each stage stated .

The system was supposed to store the medicine in appropriate temperature ,it work as a reminder for the elders and for the handicapped persons to remind them about the time and the doctor prescription of the medicine when the time occurs as a protection to make it far from child hand a keypad was added to lock the pharmacy from reach of child , the system shown the expiration date ,the system sent an SMS message to the users mobile phone showing the following information medicine name expiration date.In order to fulfill the preceding tasks ,block diagram of the system shown in figure (4.1) is designed .

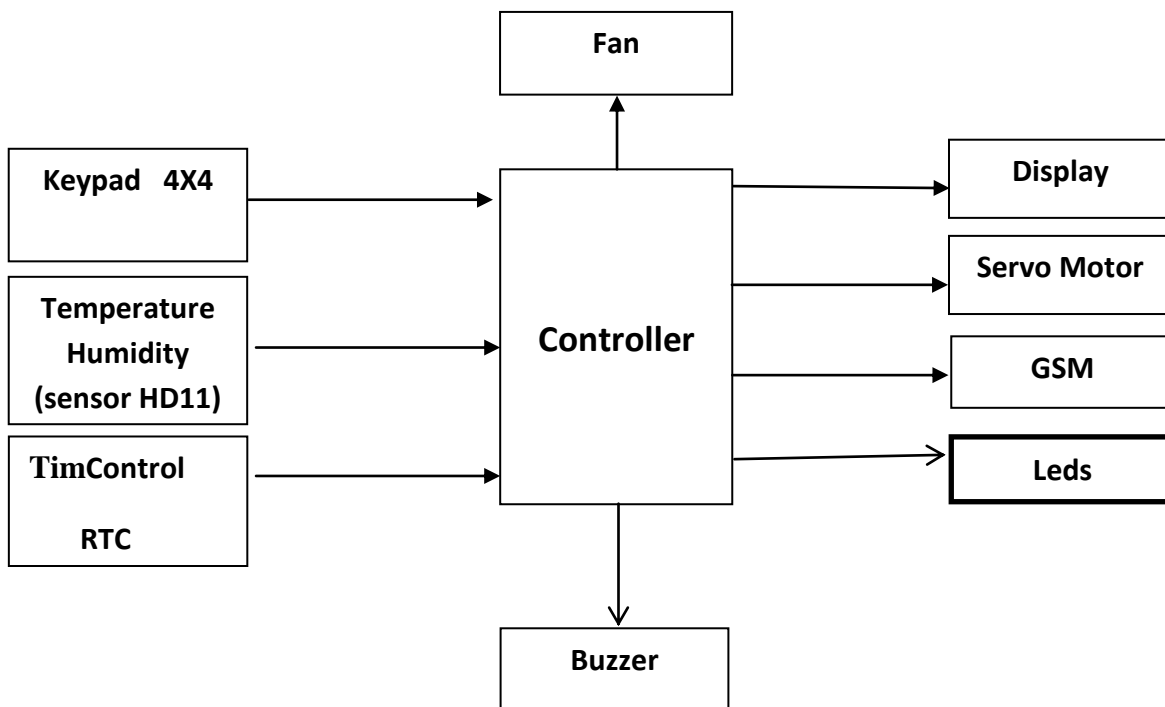


Fig. 4.1 Block diagram of Smart Home Pharmacy

4.2 Keypad

Keypad was required to enter the password ,required to open the pharmacy , to enter the expire date of each drug .It connected to the microcontroller as shown in figure (4.2)So that keypad was connected directly to adriano and need 5 volt to work arduino , VI=5 VOLT from arduino,Rows R1, R2, R3 and R4 , Columns C1, C2, C3 and C4,keypad pins(1,2,3,4,5,6,7,8) arduino digital pins(32,33,34,35,36,37,38,39).

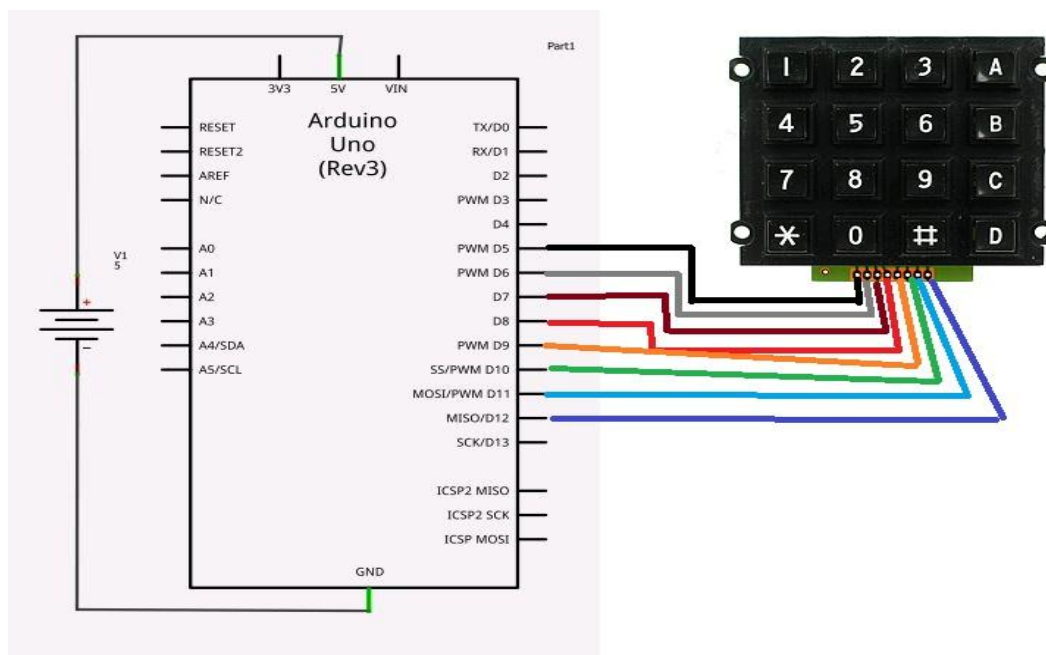


Fig. 4.2 keypad andArduino connection

4.3Temperatureand humidity sensor (DHT11)

In this project DHT11 sensor it used to sense the temperature and humidity and if it above or below standard rangetempreture (25C) it provided the arduino to control ,temperature & humidity sensing technology, it ensures high reliability and excellent long-term stability, offering excellent quality,fast response Time (Seconds)) 6 S , Its small size, low power consumption ,Measurement

Range(0°C - 50°C),DHT11's power supply need 5V DC ,VIN =5 VOLT from arduino ,it connected to arduino and need 10k ohms to save from high current.

see the data sheet in picture .

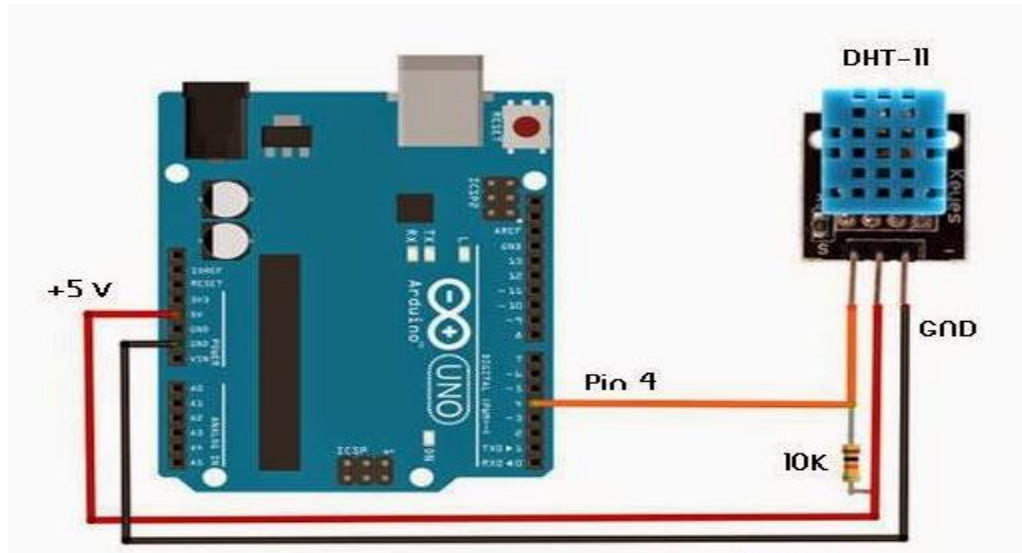


Fig. 4.3 DHT11 and Arduino connected

4.4Time control

In this project real time clock used as timer through limiting the time required to give the drug when it reached that time given the arduino signal to control, It communicated with a microprocessor via a simple serial interface ,SCL (clock SDA (data)Through them as much as reading data , need 5 voltage to work and connected directly VIN =5 VOLT , RTC pins (5V ,GND, SCL , SDA) arduino analog pins (21,20).

as shown the datasheet in the picture.

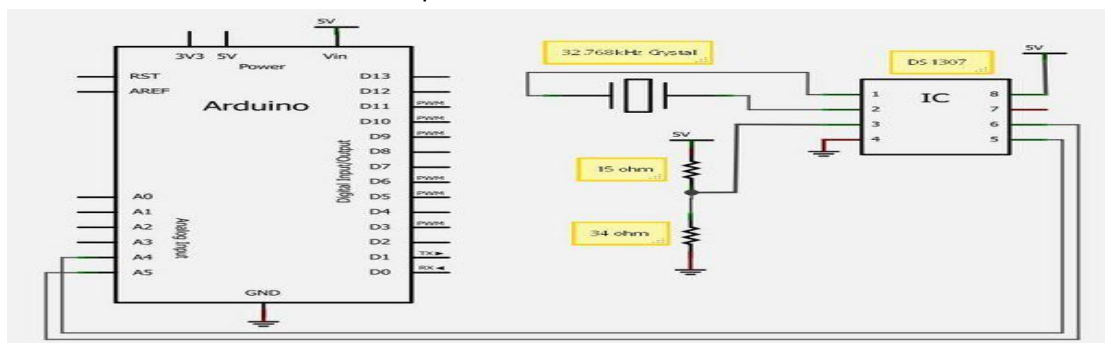


Fig. 4.4 RTC connected to Arduino

4.5 GSM Transmitter

It was used to sent message to the user such as (expire date , name of drug and time to take it),Operating voltage 5V supplied from the arduino board,VIN =5 VOLTfrom arduinconnected with arduino on pins 2, 3 (Software Serial) because pins 2,3 are digital pins and pin 7 (reset),sent messages by programming the text of the message inside the code and for the specified time the program was sent the message.

figure(4.5) depicts the datasheet.

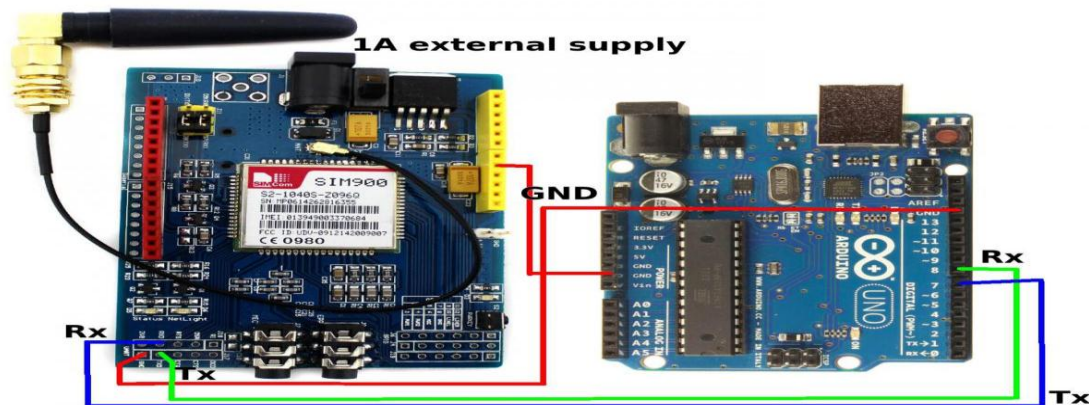


Fig. 4.5 GSM Transmitter and Arduino connection

4.6 Display screen

In this project LCD Screen used to display time ,date , expire date and name of drug , it need 5 volt to workVIN =5 VOLT ,it was connected directly to arduino , LCD pins (Rsenable ,D4,D5,D6,D7)arduinopins (40,41,42,43,44,45)respectively A register select (RS) pin that controls where in the LCD's memory you're written date.

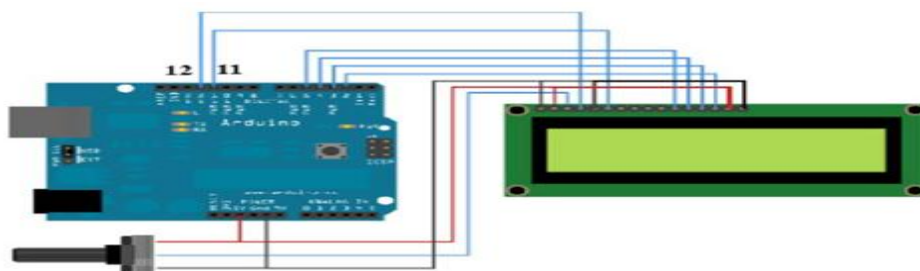


Fig 4.6LCDconnected to Arduino

4.7 Servo Motormodel – SG90 -9g

In this project Servo Motor was opened the room when the medicine is time taken need one power line, one ground, and one control pin the servo motor has a connector with three pins directly with Arduino, The darkest or even black one is usually the ground connected this to the Arduino GND ,Connected the power cable that in all standard should be red to 5V on the Arduino Connect the remaining line on the servo connector to a digital pin on the Arduino , servo analog pins (8,9,10) 5volt signal ground ,figure(4.7) depicts the datasheet.

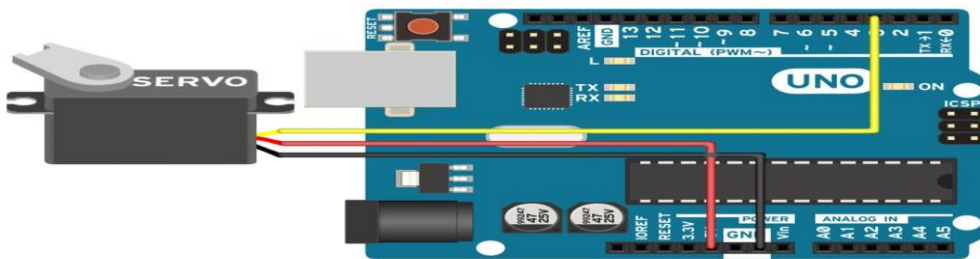


Fig. 4.7 servo motor and Arduino connection

4.8 Fan

When the temperature is high, the arduino send signal to fan to work ,used to cool the pharmacy to save the medicine ,diode The diode to protect against currents generated by the existence of a current file in a magnetic field. This magnetic field has a reduced energy so that this energy returned to the transistor or circuit until it is dipped with a diode protection , resistor protect for high current, it need 9 volt to work It is connected to an external power supply.

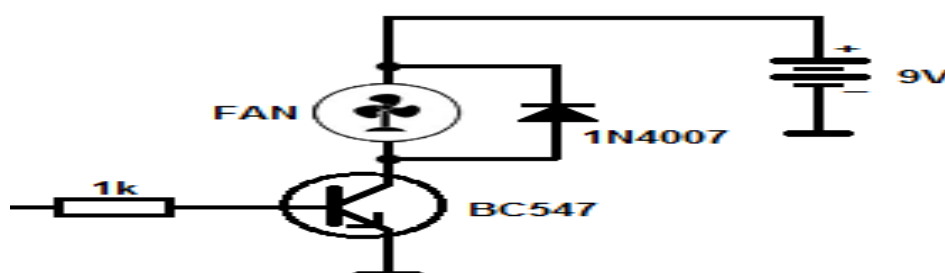


Fig 4.8 circuit of Fan with arduino

4.9 Buzzer

In this project Buzzer gave sound (name of drugs)when it time , it used when the user enter error password it gave sound ,and it gave another sound true password ,) So that Buzzerwas connected directly to adriano and need 5 volt to work arduino , VI=5 VOLT.

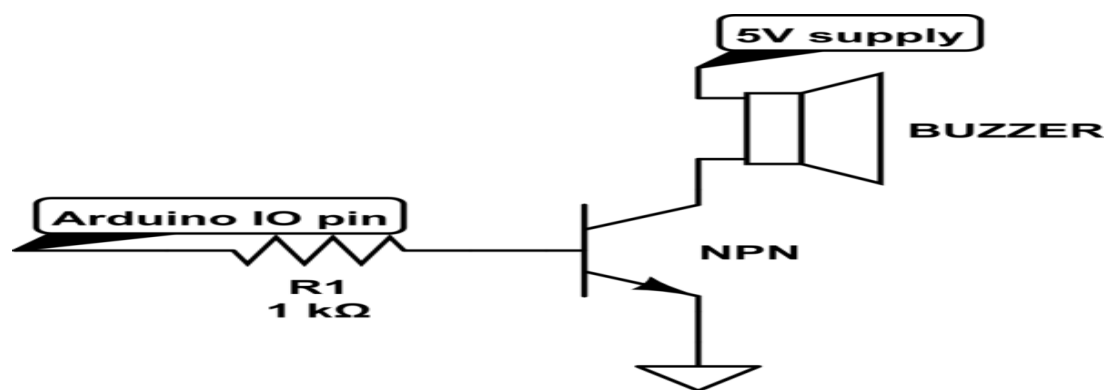


Fig. 4.9Buzzerand Arduino connection

4.10 leds

In this project leds on when the pharmacy open and another leds explained how many medicine in the room ,So that ledswere connected directly to adriano and need 5 volt to work arduino , VI=5 VOLTfrom arduino.

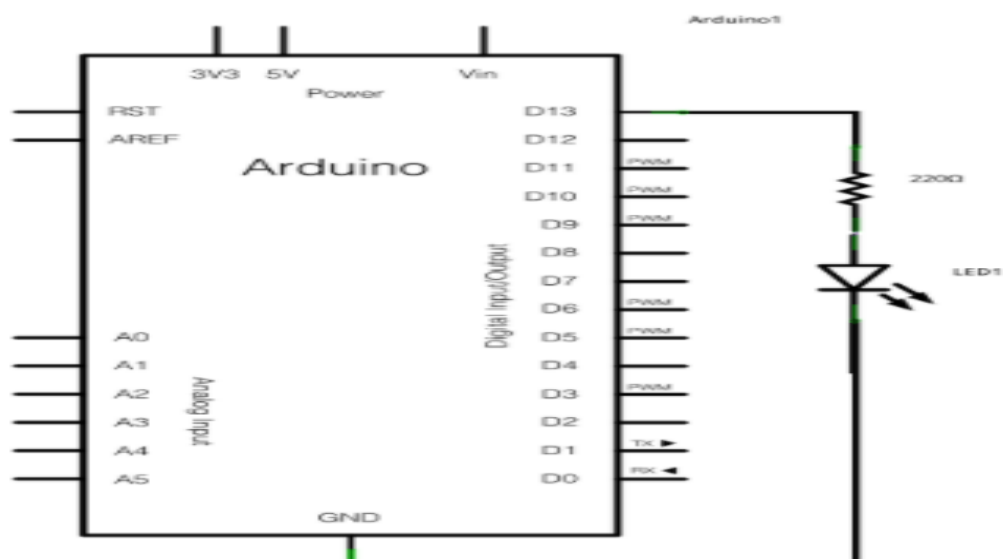


Fig. 4.10Ledand Arduino connection

4.11 Controller

Microprocessor (Arduino) used to process data, where it received data from the keypad and received the temperature and humidity of the DHT11 and then processed ,after that sent message to GSM , sent to LCD the expire date of the medicine .

A microcontroller (also microcomputer, MCU or μC) is a small computer in a single integrated circuit consisting internally of a relatively simple CPU, clock, timers, I/O ports, and memory. Microcontrollers are designed for small or dedicated applications thus, in contrast to microprocessors used in personal computers, 5Vregulated power supply used to power the microcontroller and other components on the board.
