



ARDUINO BASED ALARM CLOCK

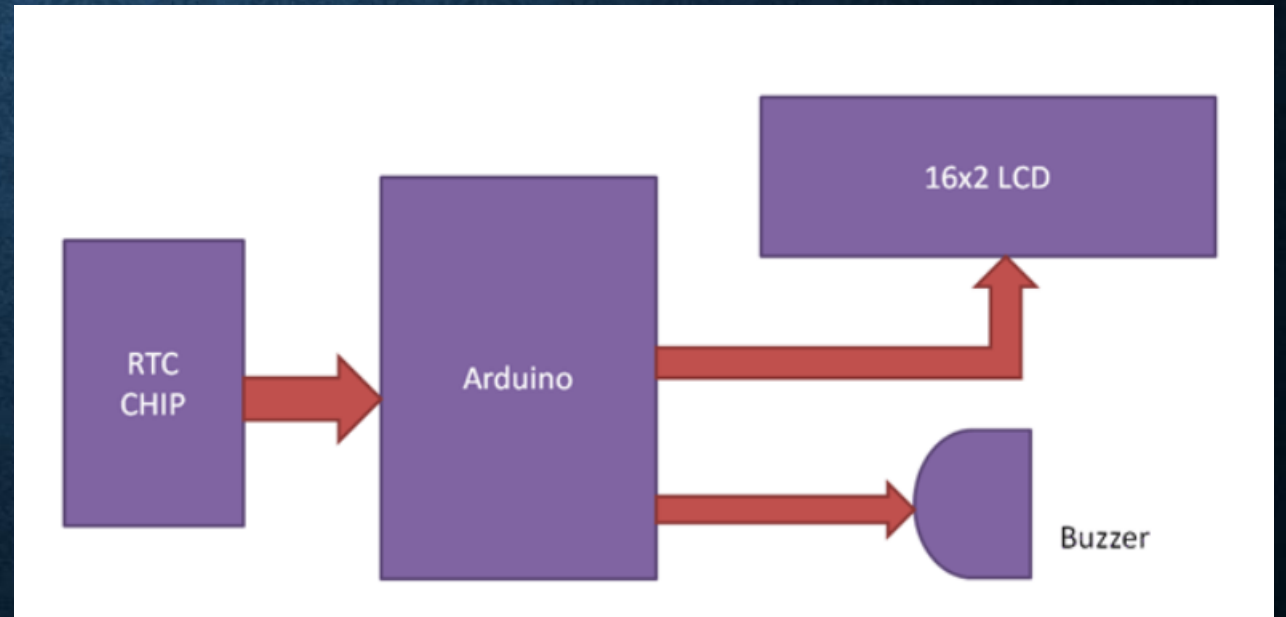
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INTRODUCTION

- In this **Arduino alarm clock project** we have used a 16x2 LCD module to display the time in - "hour, minute, seconds, date, month and year" format. An Alarm option is also added and we can set up the alarm time. Once alarm time is saved in internal EEPROM of arduino, it remains saved even after reset or electricity failure. Real time clocks are commonly used in our computers, houses, offices and electronics device for keeping them updated with real time.
- I2C protocol is a method to connect two or more devices using two wires to a single system, and so this protocol is also called as two wire protocol. It can be used to communicate 127 devices to a single device or processor. Most of I2C devices run on 100 KHz frequency.

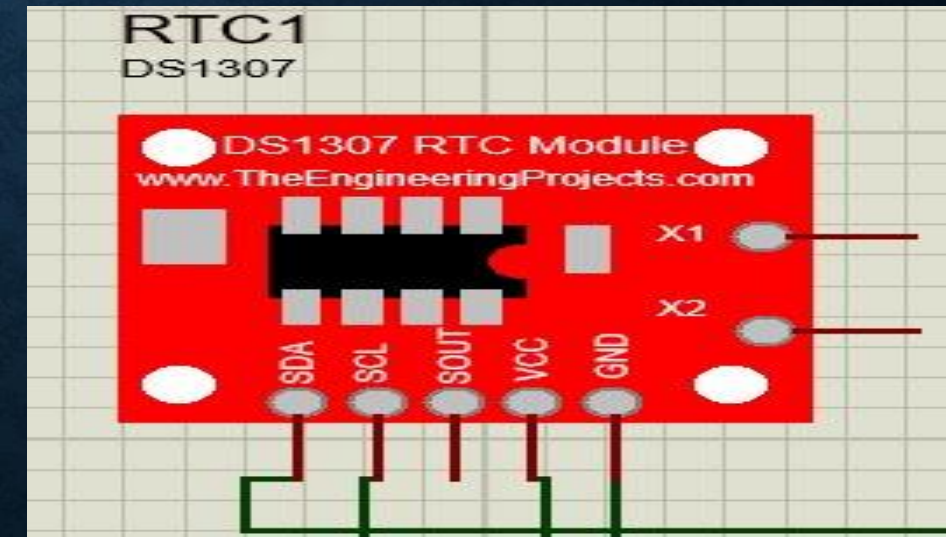
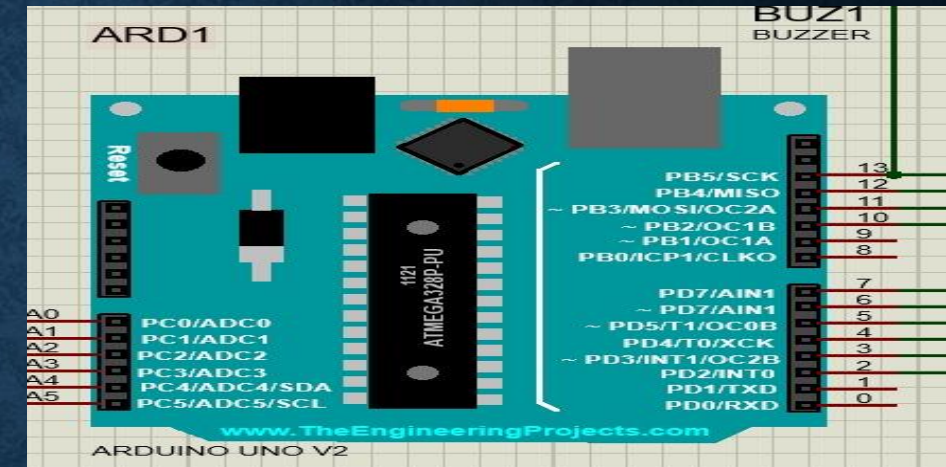


RTC MODULE

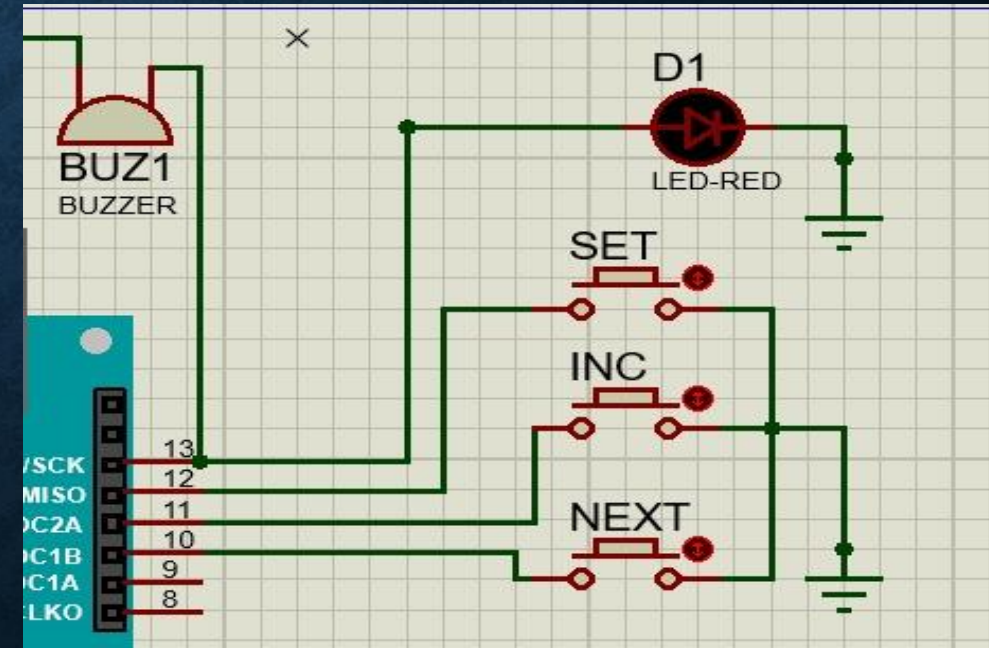
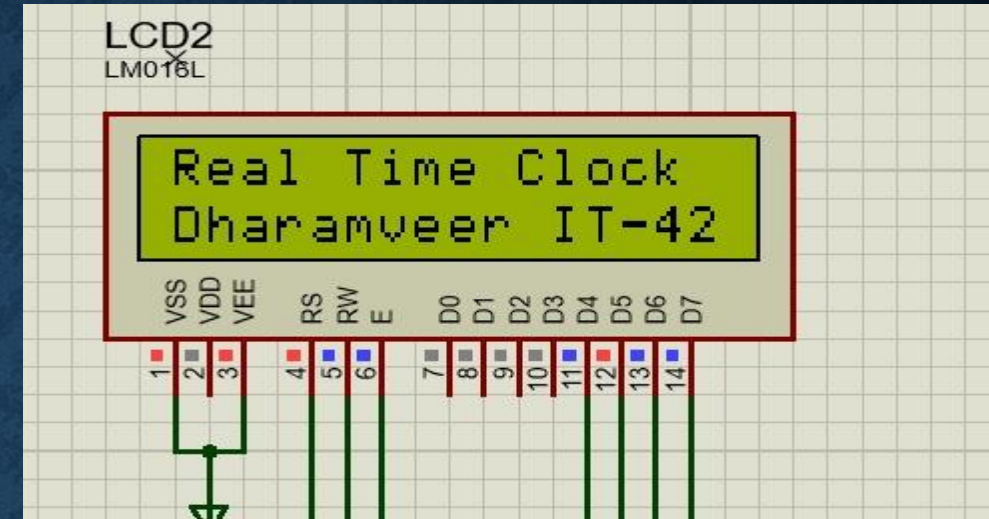
- ❖ Real Time Clock or RTC is a battery powered clock that measures time even when there is no external power or the microcontroller is reprogrammed.
- ❖ An RTC displays clock and calendar with all timekeeping functions. The battery, which is connected to the RTC is a separate one and is not related or connected to the main power supply.

COMPONENTS USED

- **Arduino UNO** :- The Arduino Uno is a microcontroller board based on the ATmega328 . It has 14 digital input/output pins, 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.
- **DS 1307 RTC Module** :- It is a frequently used real time clock(RTC) IC for clock and calendar. The clock function provides seconds, minutes and hours while the calendar function provides day, date, month and year values.



- **Push Buttons :-** Pushbuttons or switches connect two points in a circuit when you press them.
- **16X2 LCD Display** – LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.
- **Buzzer** – The buzzer is a sounding device that can convert audio signals into sound signals.
- **LED-** A light-emitting diode (LED) is a semiconductor device that emits light when an electric current flows through it.



SOFTWARE USED

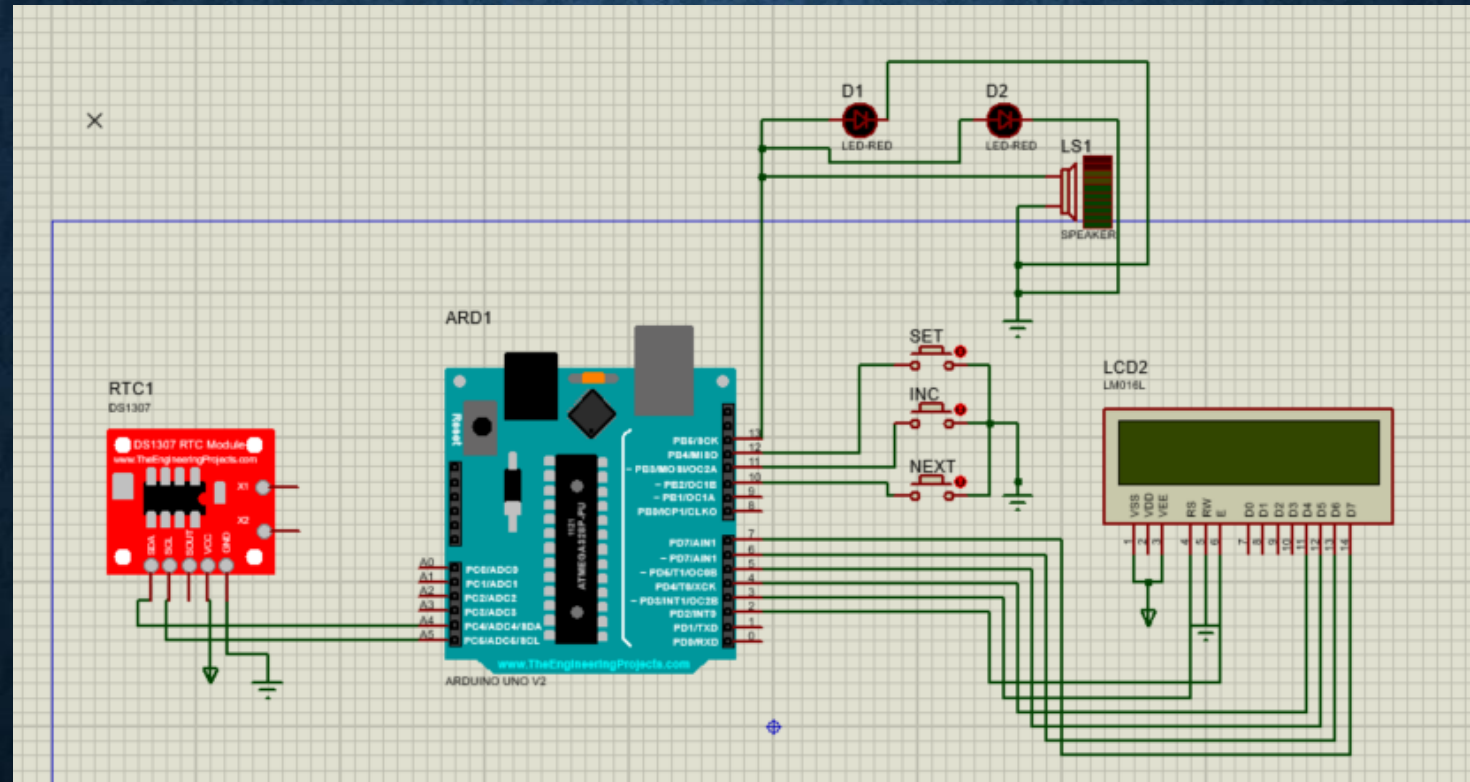
- Proteus 8 Professional

Proteus 8 Professional is a software which can be used to **draw schematics, PCB layout, code and even simulate the schematic**. It is developed by Labcenter Electronic Ltd

- Arduino 1.8.19 IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - **contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus**. It connects to the Arduino hardware to upload programs and communicate with them

SIMULATOR DIAGRAM



PROGRAM DESCRIPTION

- To program for this real time clock, we have used some libraries for extracting time/date from DS1307 and for displaying on LCD, which are given below:

```
#include <Wire.h>
#include<EEPROM.h>
#include <RTCLib.h>
#include <LiquidCrystal.h>
```


AND INITIALIZATION OF RTC, LCD AND INPUT OUTPUT ARE PERFORMED IN SETUP LOOP.

```
void setup()  
{  
  Wire.begin();  
  RTC.begin();  
  lcd.begin(16,2);  
  pinMode(INC, INPUT);  
  pinMode(next, INPUT);  
  pinMode(set_mad, INPUT);  
  pinMode(buzzer, OUTPUT);  
  digitalWrite(next, HIGH);  
  digitalWrite(set_mad, HIGH);  
  digitalWrite(INC, HIGH);  
}
```

REST OF THINGS LIKE READING TIME, SETTING ALARM IS PERFORMED IN VOID LOOP SECTION.

```
lcd.print("Time:");  
lcd.setCursor(6,0);  
lcd.print(HOUR=now.hour(),DEC);  
lcd.print(":");  
lcd.print(MINUT=now.minute(),DEC);  
lcd.print(":");  
lcd.print(SECOND=now.second(),DEC);
```


**MATCH FUNCTION MATCHES THE CURRENT TIME TO THE ALARM SET TIME,
IF MATCHED IT CALLS BEEP FUNCTION TO GIVE POWER TO BUZZER AND
LEDS**

```
void match()
{
    int tem[17];
    for(int i=11;i<17;i++)
    {
        tem[i]=EEPROM.read(i);
    }
    if(HOUR == tem[11] && MINUT == tem[12])
    {
        beep ();
        beep ();
        beep ();
        beep ();
        lcd.clear();
        lcd.print("Wake Up.....");
        lcd.setCursor(0,1);
        lcd.print("Wake Up.....");
        beep();
        beep();
        beep();
        beep();
    }
}
```

REFERENCES

- https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3915584
- <https://codemint.net/electrical-engineering/design-and-implementatation-of-arduino-based-digital-clock-with-alarm/index.html>
- <https://www.engineersgarage.com/diy-arduino-based-alarm-clock/>

**THANK
YOU**