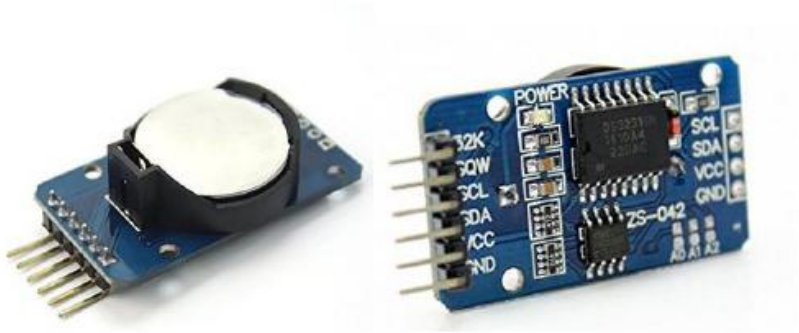
LCD clock display

Overview



This lesson will teach you how to display time and temperature on LCD and how to set the time on it.

Specification

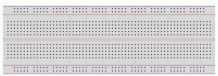
Please view DS3231-datasheet.pdf.

Path: \Public_materials\Datasheet\ DS3231-datasheet.pdf

Pin definition

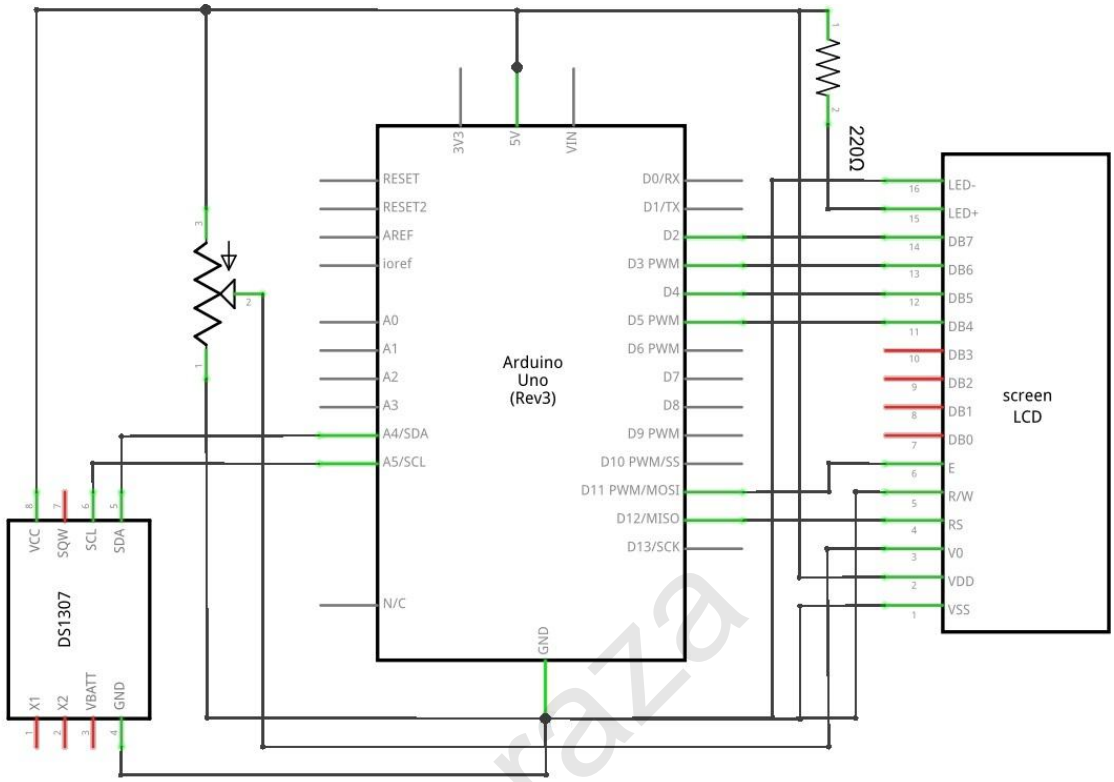
DS3231	Arduino
32K	->null
SQW	->null
SCL	->A5
SDA	->A4
VCC	->5V
GND	->GND

Hardware required

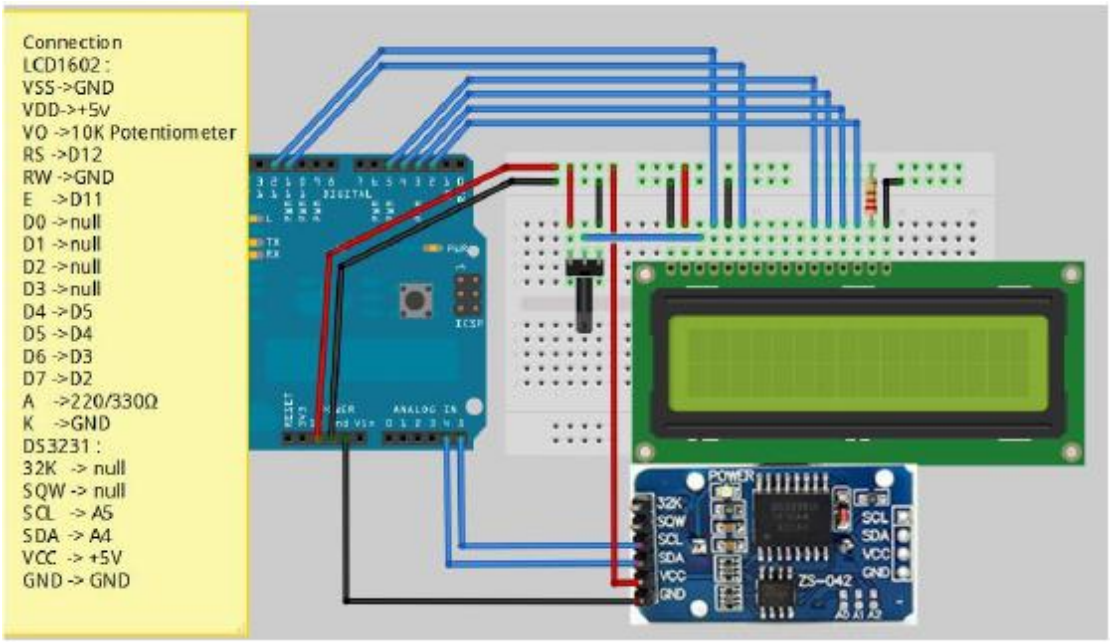
Material diagram	Material name	Number
	DS3231	1
	LCD1602	1
	220/330Ω resistor	1
	10KΩ Potentiometer	1
	USB Cable	1
	MEGA 2560	1
	Breadboard	1
	Jumper wires	Several

Connection

Schematic



Connection diagram



Sample code

Note: sample code under the **Sample code** folder

You need to add the DS3231 to the Arduino library file directory, otherwise the compiler does not pass. **Please refer to 'How to add library files.docx'.**

```
#include <DS3231.h>
#include <Wire.h>
#include <LiquidCrystal.h>
// initialize the library with the numbers of the interface pins
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);

DS3231 Clock;
//initialize variable
boolean Century=false;
boolean h12;
boolean PM;
byte ADay, AHour, AMinute, ASecond, ABits;
boolean ADy, A12h, Apm;
int second,minute,hour,date,month,year,val;

String comdata ="";
int numdata[7] = {0},mark = 0;

void setup()
{
    Wire.begin();
    Serial.begin(9600);
    // set up the LCD's number of columns and rows:
    lcd.begin(16,2);
    // Print a message to the LCD.
    lcd.print(" Welcome to ");
    lcd.setCursor(0,1); //Display position
    lcd.print("        Smraza");
    Serial.println("set_time :");
    Serial.println("year mouth day week hour minute second");
    Serial.println();
    Serial.println("week : 1 -> Sunday; 2 -> Monday; 3 -> Tuesday: ....7 -> Saturday");
    Serial.println();
    Serial.println("for example :2016-5-20 Tue 0:33:30 ");
    Serial.println("set_time :");
    Serial.println("16 5 20 3 0 33 30");
    Serial.println();
    delay(2000);
    lcd.clear();
}
```

```
void loop()
{
    Serial_data();
    delay(150);
}
void WriteDS3231()
{
    Clock.setSecond(numdata[6]);
    Clock.setMinute(numdata[5]);
    Clock.setHour(numdata[4]);
    Clock.setDoW(numdata[3]);
    Clock.setDate(numdata[2]);
    Clock.setMonth(numdata[1]);
    Clock.setYear(numdata[0]);
}
void Serial_data()
{
    int j = 0;
    while (Serial.available() > 0)     //Serial data detection
    {
        comdata += char(Serial.read());
        delay(2);
        mark = 1;
        Print_time();
    }
    if(mark == 1)
    {
        Serial.println(comdata);                //Already detected data
        for(int i = 0; i < comdata.length() ; i++) //data conversion
        {
            if(comdata[i] == ' ')
            {
                j++;
            }
            else
            {
                numdata[j] = numdata[j] * 10 + (comdata[i] - '0');
            }
        }
        comdata = String("");
        Serial.print("set_time... ");
        WriteDS3231();
        Serial.println(" OK ");
        for(int i = 0; i < 7; i++)
```

```
            {
                numdata[i] = 0;
            }
            mark = 0;
        }
        Print_time();
}
void Print_time()
{
        int second,minute,hour,date,month,year,dow,temperature;
        second=Clock.getSecond();
        minute=Clock.getMinute();
        hour=Clock.getHour(h12,PM);
        date=Clock.getDate();
        month=Clock.getMonth(Century);
        year=Clock.getYear();
        dow=Clock.getDoW();

        temperature=Clock.getTemperature();
        lcd.setCursor(0, 0);
        lcd.print("20"); // Show 20 Century
        if (year>=10)     // Display year
        {
            lcd.print(year,DEC);
        }
        else
        {
            lcd.print("0");
            lcd.print(year,DEC);
        }
        lcd.print('-');

        lcd.setCursor(5, 0);
        if (month>=10) //Display month
        {
            lcd.print(month,DEC);
        }
        else
        {
            lcd.print("0");
            lcd.print(month,DEC);
        }
        lcd.print('-');

        lcd.setCursor(8, 0);
        if (date>=10) // Display date
```

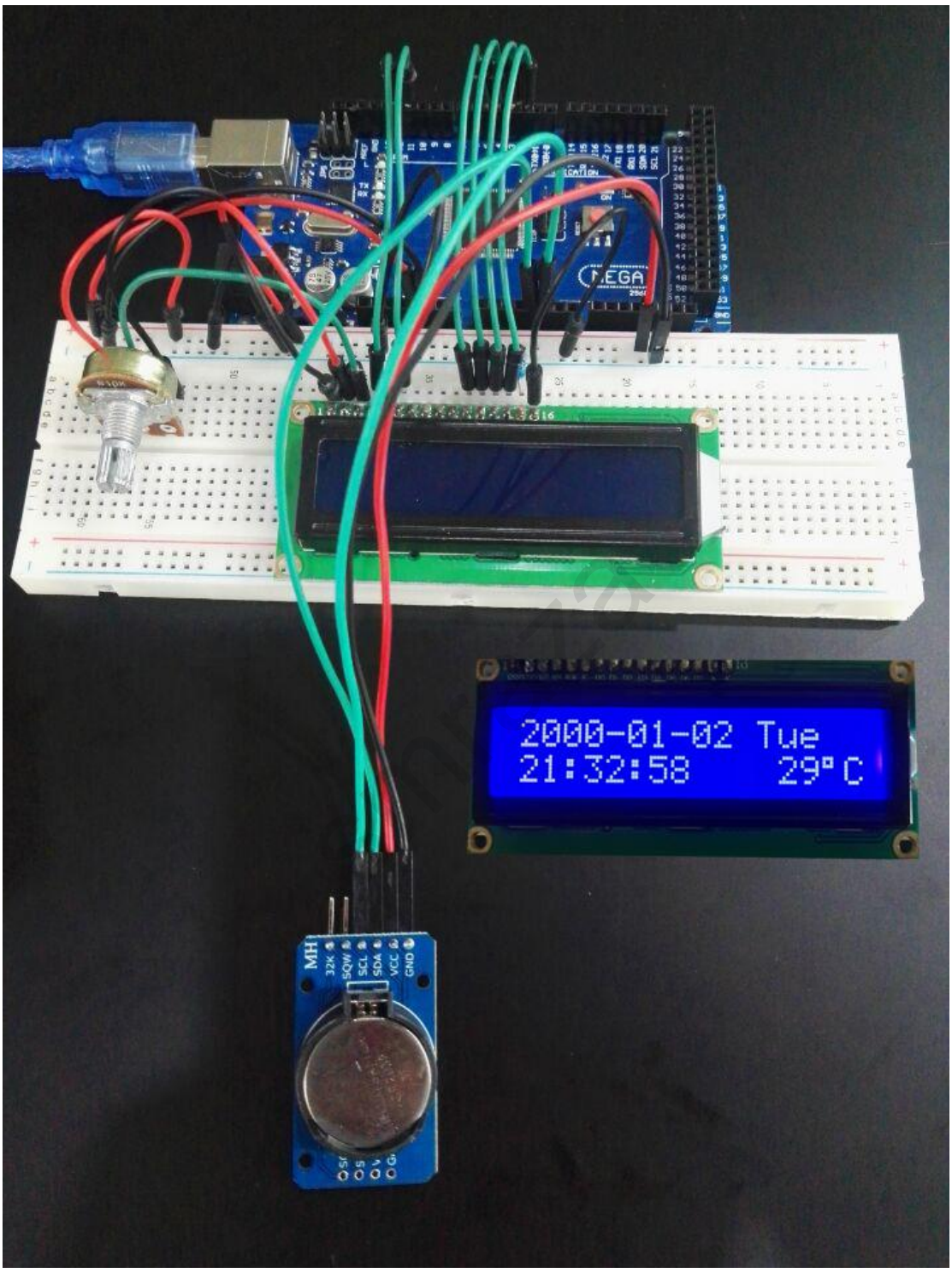
```
{
    lcd.print(date,DEC);
}
else
{
    lcd.print("0");
    lcd.print(date,DEC);
}
lcd.setCursor(11, 0);
switch (dow) // Display Week
{
    case 1: // When Dow is equal to 1, execute the following statement
        lcd.print("Mon");
        break;
    case 2: // When Dow is equal to 2, execute the following statement
        lcd.print("Tue");
        break;
    case 3:
        lcd.print("Wed");
        break;
    case 4:
        lcd.print("Thu");
        break;
    case 5:
        lcd.print("Fri");
        break;
    case 6:
        lcd.print("Sat");
        break;
    case 7:
        lcd.print("Sun");
        break;
}
lcd.setCursor(0, 1);//Move the cursor to the second line.
if (hour>=10)       //Display hours
{
    lcd.print(hour,DEC);
}
else
{
    lcd.print("0");
    lcd.print(hour,DEC);
}
lcd.print(':');
```

```
    lcd.setCursor(3, 1);
    if (minute>=10) // Display minutes
    {
        lcd.print(minute,DEC);
    }
    else
    {
        lcd.print("0");
        lcd.print(minute,DEC);
    }
    lcd.print(':');

    lcd.setCursor(6, 1);
    if (second>=10) //Display seconds
    {
        lcd.print(second,DEC);
    }
    else
    {
        lcd.print("0");
        lcd.print(second,DEC);
    }

    lcd.setCursor(12, 1);
    lcd.print(temperature); // Display temperature
    lcd.write(0xdf);          // Display temperature symbol
    lcd.print("C");
}
/*Tips :Open the serial port monitor, you can modify the time according to the prompt。
*/
```

Example picture



Language reference

Tips：click on the following name to jump to the web page.
If you fail to open, use the Adobe reader to open this document.
boolean
byte

Application effect

When the program is uploaded, it will display the time and temperature on the LCD.

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* About Smraza:
* We are a leading manufacturer of electronic components for Arduino and Raspberry Pi.
* Official website: http://www.smraza.com/
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