

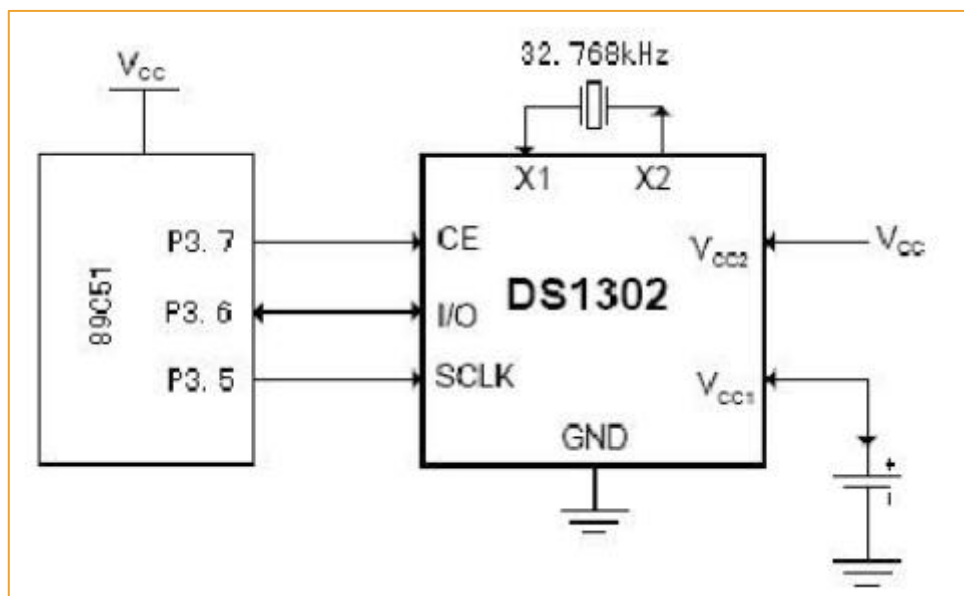
DS1302 electronic clock module experiment

Introduction to DS1302 electronic clock module

At present, there are many popular serial clock circuits, such as DS1302, DS3231, DS1307, PCF8485 and so on. They are widely used for their simple interfaces, low cost, and ease of use. In this lesson, we will use the DS1302 real-time clock module, as shown below. DS1302 is a high performance, low power consumption, with RAM real-time clock circuit introduced by DALLAS company, it can time the year, month, day, Sunday, hour, minute, second, with leap year compensation function, working voltage of 2.5v ~ 5.5v. Adopt three-wire interface to communicate synchronously with CPU, and can transmit multi-byte clock signal or RAM data at one time in burst mode. The DS1302 has a 31-by-8 RAM register for temporary storage of data. DS1302 is an upgraded product of DS1202, compatible with DS1202, but with the addition of dual power pins of main power supply/backup power supply, and the ability to charge the backup power supply at a trickle current.



The surface is the typical application circuit of DS1302. As you can see in the figure, the DS1302 requires almost no external components.



DS1302 pin arrangement, where Vcc1 is the backup power supply, VCC2 is the main power supply. In the case of the main power off, can also keep the clock running continuously. The DS1302 is powered by the larger of Vcc1 or Vcc2. When Vcc2 is larger than Vcc1 + 0.2V, Vcc2 will supply power to DS1302. When Vcc2 is less than Vcc1, DS1302 is powered by Vcc1. X1 and X2 are oscillating sources, externally connected to 32.768kHz crystal oscillator. RST is a reset/slice selector that starts all data transfers by setting the RST input driver to a high level. RST input has two functions: first, RST switches on the control logic, allowing the address/command sequence to be fed into the shift register; Second, RST provides a way to terminate single-byte or multi-byte data transfers. When RST is high, all data transfers are initialized to allow operation of DS1302. If the RST is set to a low level during the transfer, the data transfer is terminated and the I/O pin becomes a high resistance state. When powered on, RST must be kept low until Vcc > 2.0V. Only when SCLK is low can RST be set to a high level. I/O is the serial data input/output terminal (bi-directional).

DS1302 clock chip structure

The main component of DS1302 consists of eight modules, divided into four functional groups: TCXO, power control, reset and RTC.

Experimental purpose

- Learn the working principle and characteristics of DS1302 clock module;
- Use DS1302 clock module to make a clock

Experimental principle

Using the working characteristics of the vibration switch, when the circuit board is in the static state, the vibration switch is in the off state, when an external force touches the circuit board and causes the spring vibration of the circuit board, which leads to the contact between the spring and the wire and leads to the conduction, the trigger alarm, LED bright, buzzer ring; When the vibration switch returns to the static state, the LED goes out and the buzzer does not sound.

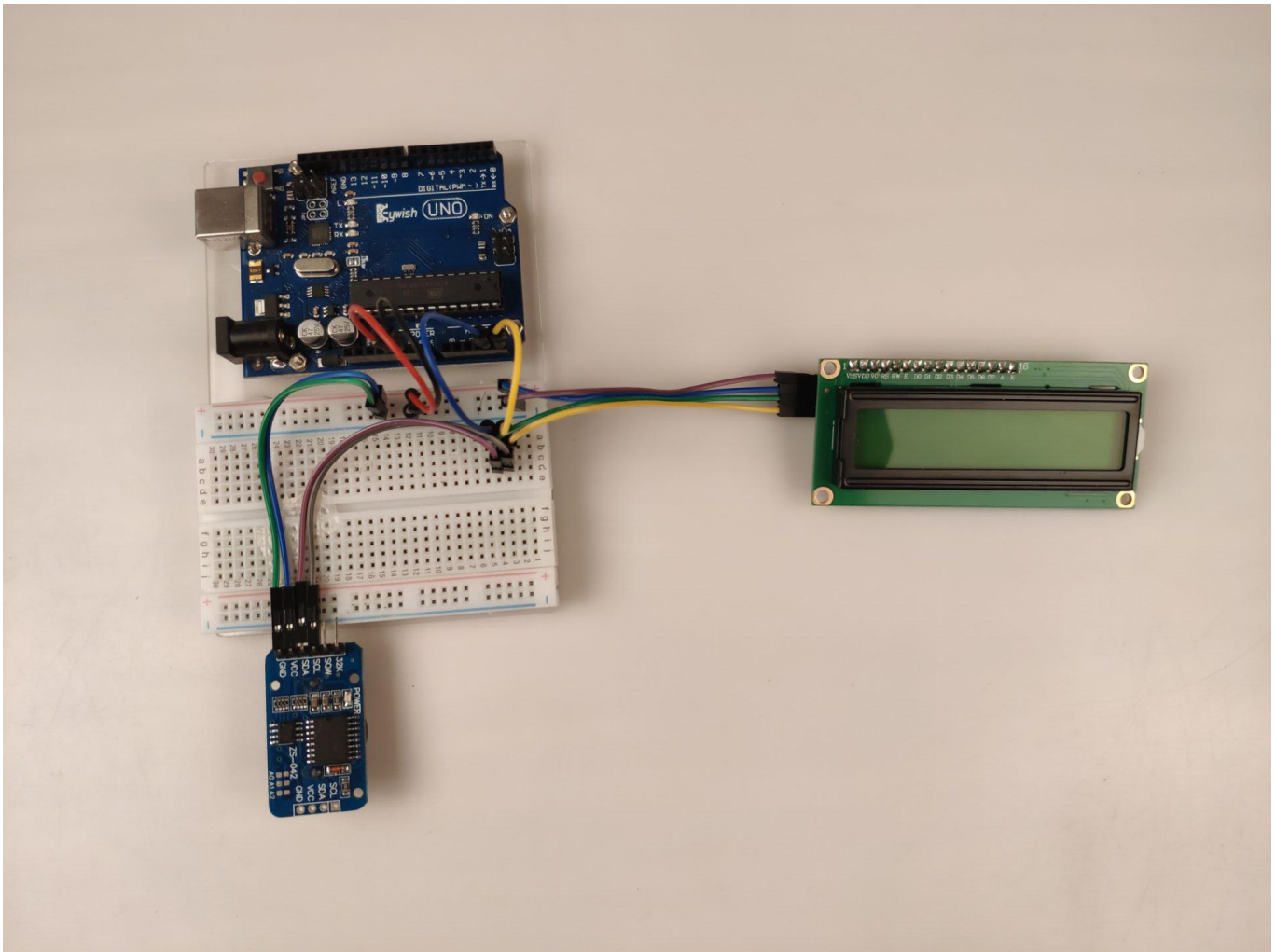
The component list

- ◆ Keywish Arduino Uno R3 motherboard *1
- ◆ USB cable *1
- ◆ DS1302 clock module * 1
- ◆ Bread plate
- ◆ LED1602 module *1
- ◆ jump lines

Wiring

Arduino Uno R3	LCD1602
----------------	---------

GND	GND
5V	VCC
A4	DAT
A5	CLK
Arduino Uno R3	DS1302 clock module
2	RST
3	DAT
4	CLK
GND	6(GND)
5V	VCC



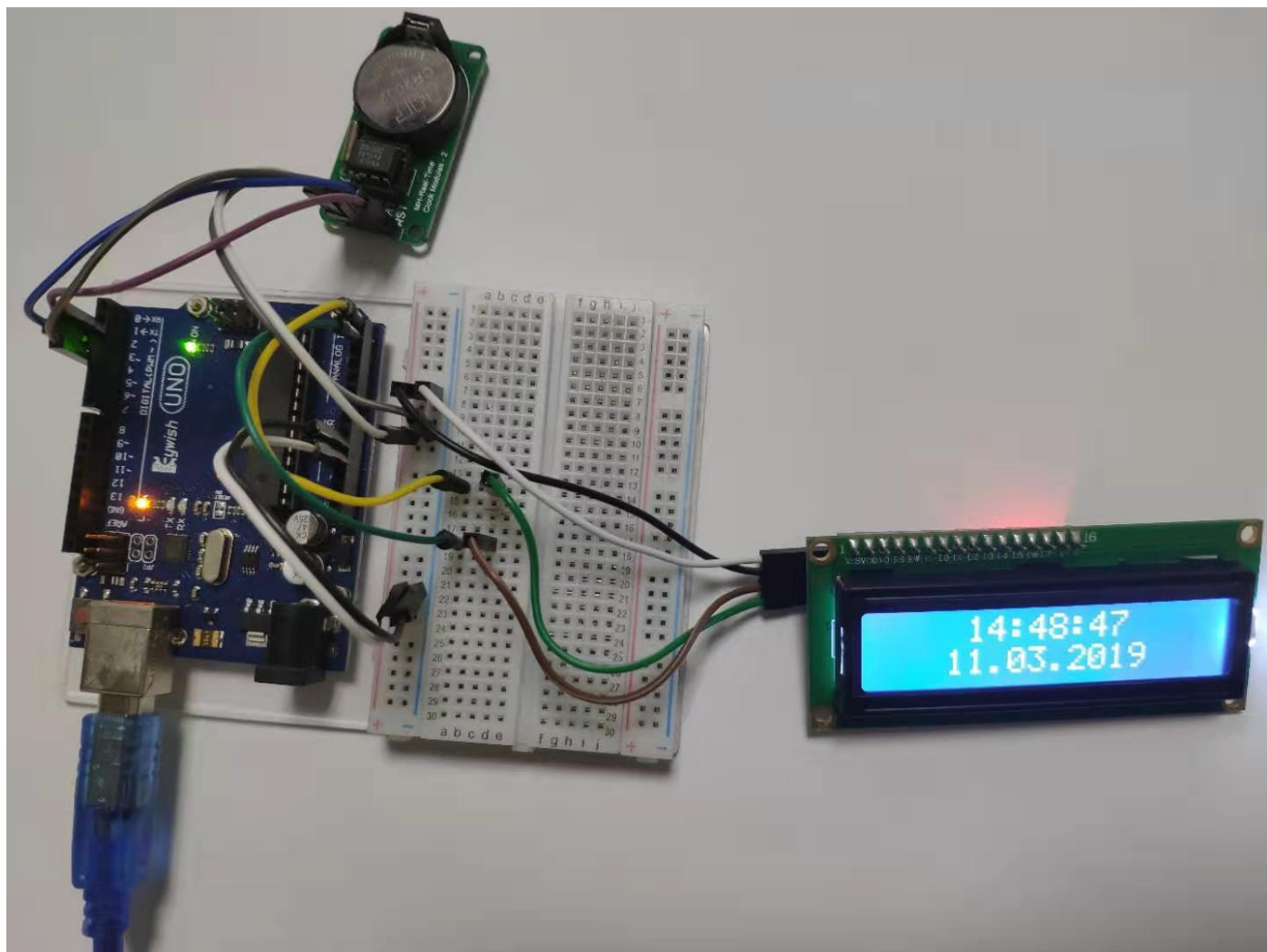
Code

```
#include "DS1302.h"
```

```
#include "LCD.h"
#include "LiquidCrystal_I2C.h"
#include <Wire.h>
// Init the DS1302
DS1302 rtc(2, 3, 4);
LiquidCrystal_I2C lcd(0x27,2,1,0,4,5,6,7); // 0x27 is the I2C bus address for an unmodified
backpack
void setup()
{
    rtc.halt(false);
    rtc.writeProtect(false);
    rtc.setTime(14, 34, 50);    // Set the time to 12:00:00 (24hr format)
    rtc.setDate(11, 3, 2019);  // Set the date to August 6th, 2010
    lcd.begin(16,2);
    lcd.setBacklightPin(3, POSITIVE);
    lcd.setBacklight(HIGH);
    // Start the I2C interface
    Wire.begin();
    // Start the serial interface
    Serial.begin(9600);
}

void loop()
{
    lcd.clear();                // clean
    lcd.setCursor(4,0);         // line0 display
    lcd.print(rtc.getTimeStr());
    delay(10);
    lcd.setCursor(3, 1);
    lcd.print(rtc.getDateStr());
    delay(1000);
}
```

Experiment Result



Mlock programming program

MBlock writes the program as shown in the figure below:

Init LCD

--LCD initialization

DS3231clock setYear 19 setMonth 4 setDate 27 setDoW 6 setHour 14 setMinute 25 setSecond 32

--D

S3231Set the times

液晶显示屏在 1 行 1 列打印

——Content display location

DS3231时钟读取 年 月 日

--LCD display of content

