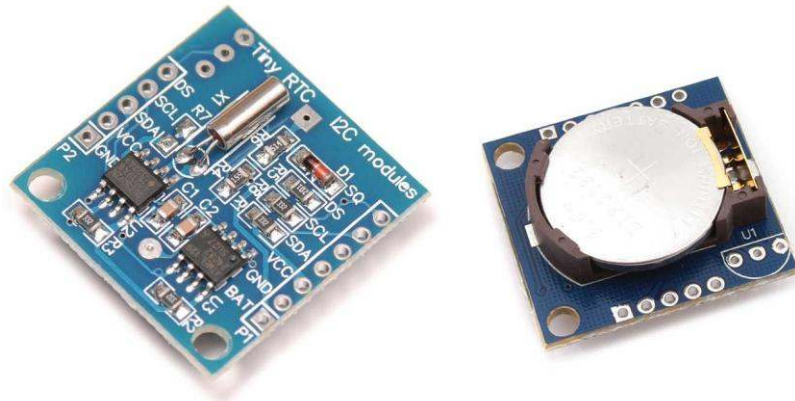


DS1307 I2C Real Time Clock Module



Introduction

- Real Time Clock (RTC) is used to track the current time and date. It is generally used in computers, laptops, mobiles, embedded system applications devices etc.
- In many embedded system, we need to put time stamp while logging data i.e. sensor values, GPS coordinates etc. For getting timestamp, we need to use RTC (Real Time Clock).
- Some microcontrollers like LPC2148, LPC1768 etc., have on-chip RTC. But in other microcontrollers like PIC, ATmega16/32, they do not have on-chip RTC. So, we should use external RTC chip
- There are different types of ICs used for RTC like DS1307, DS12C887 etc.

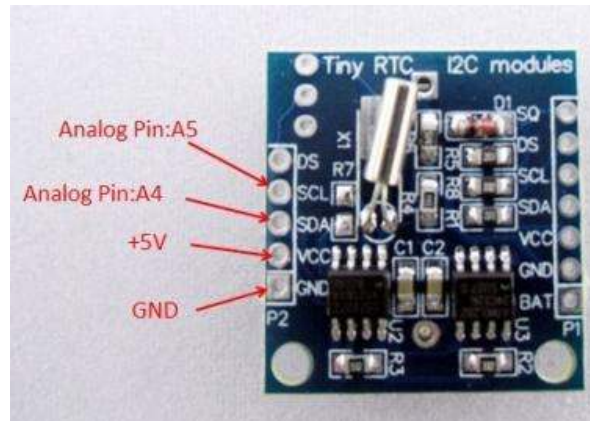
This RTC module is based on the clock chip DS1307 which supports the I2C protocol. It uses a Lithium cell battery (CR1225). The clock/calendar provides seconds, minutes, hours, day, date, month, and year information. The end of the month date is automatically adjusted for months with fewer than 31 days, including corrections for leap year. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator.

Features

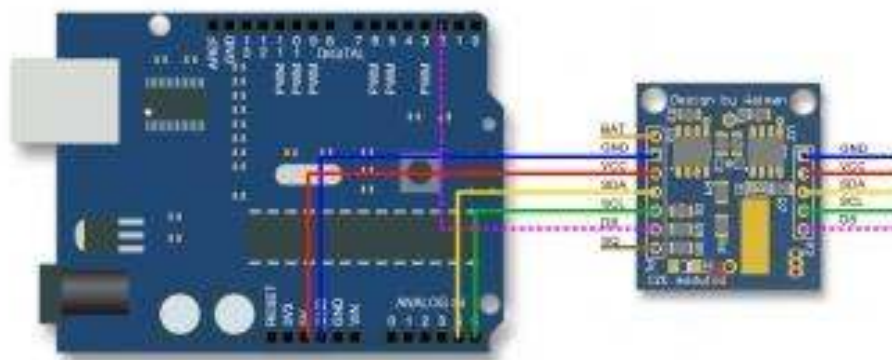
- 5V DC supply
- Programmable Square-Wave output signal
- Automatic Power-Fail detect and switch circuitry
- Consumes less than 500nA in Battery-Backup Mode with Oscillator Running
- 56-Byte, Battery-Backed, Non-volatile (NV)RAM for data storage

Hardware

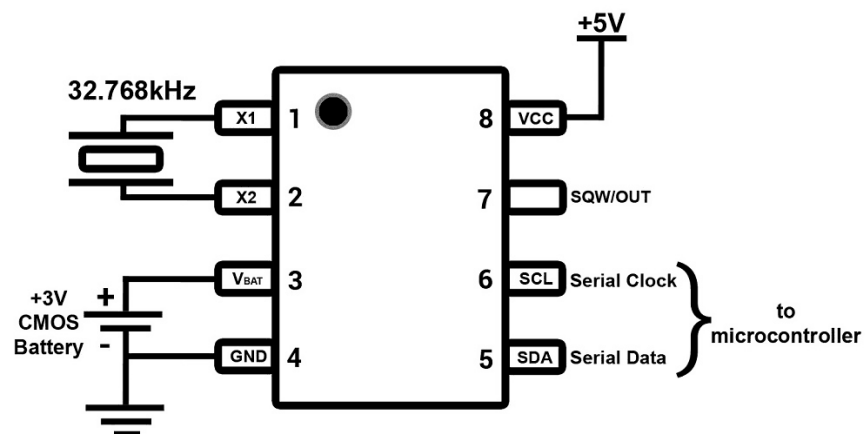
The RTC module uses the I2C bus to communicate with Arduino & Crowduinom. Arduino has one I2C port with A4 and A5, connect the RTC module to Arduino as below:



Connection diagram



RTC DS1307 Pin Diagram



- The RTC DS1307 is 8 pin IC, shown in above fig.
- The RTC DS1307 uses external crystal of frequency 32.768 kHz, so we need to connect crystal with 32.768 kHz to X1 and X2 pin.
- Connect 3 Volt CMOS battery to Vbat pin. RTC DS1307 has inbuilt mechanism to detect 5 volt VCC, if external 5 volt VCC is not there, then it takes the supply from 3 volt CMOS battery.
- The SDA (Serial Data) and SCL (Serial Clock) pins are I2C serial communication pins which are used to connect with microcontroller's I2C pins.
- SQW/OUT pin is square wave output driver. The SQW/OUT pin outputs one of four square-wave frequencies 1Hz, 4kHz, 8kHz, 32kHz by setting internal register bits.