Adafruit DS1307 Library Documentation

Release 1.0

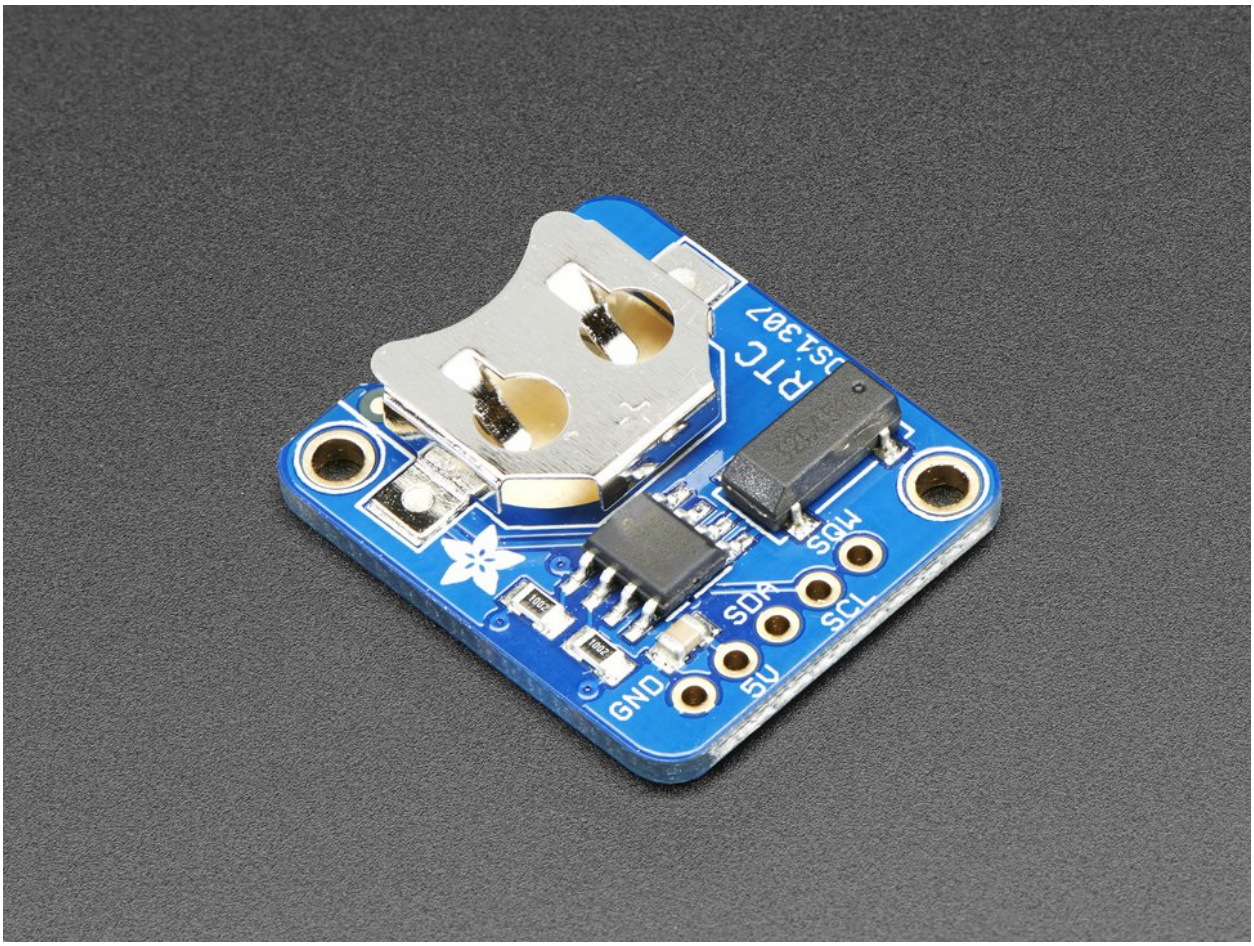
Phiilip Moyer

Feb 25, 2019

Contents

This is a great battery-backed real time clock (RTC) that allows your microcontroller project to keep track of time even if it is reprogrammed, or if the power is lost. Perfect for datalogging, clock-building, time stamping, timers and alarms, etc. The DS1307 is the most popular RTC - but it requires 5V power to work.

The DS1307 is simple and inexpensive but not a high precision device. It may lose or gain up to two seconds a day. For a high-precision, temperature compensated alternative, please check out the DS3231 precision RTC. If you do not need a DS1307, or you need a 3.3V-power/logic capable RTC please check out our affordable PCF8523 RTC breakout.



CHAPTER 1

Dependencies

This driver depends on:

- Adafruit CircuitPython
- Bus Device
- Register

Please ensure all dependencies are available on the CircuitPython filesystem. This is easily achieved by downloading the Adafruit library and driver bundle.

CHAPTER 2

Usage Notes

Of course, you must import the library to use it:

```
import busio
import adafruit_ds1307
import time
```

All the Adafruit RTC libraries take an instantiated and active I2C object (from the `busio` library) as an argument to their constructor. The way to create an I2C object depends on the board you are using. For boards with labeled SCL and SDA pins, you can:

```
from board import *
```

You can also use pins defined by the onboard `microcontroller` through the `microcontroller.pin` module.

Now, to initialize the I2C bus:

```
myI2C = busio.I2C(SCL, SDA)
```

Once you have created the I2C interface object, you can use it to instantiate the RTC object:

```
rtc = adafruit_ds1307.DS1307(myI2C)
```

To set the time, you need to set `datetime` to a `time.struct_time` object:

```
rtc.datetime = time.struct_time((2017,1,9,15,6,0,0,9,-1))
```

After the RTC is set, you retrieve the time by reading the `datetime` attribute and access the standard attributes of a struct_time such as `tm_year`, `tm_hour` and `tm_min`.

```
t = rtc.datetime
print(t)
print(t.tm_hour, t.tm_min)
```

CHAPTER 3

Contributing

Contributions are welcome! Please read our Code of Conduct before contributing to help this project stay welcoming.

CHAPTER 4

Building locally

To build this library locally you'll need to install the circuitpython-build-tools package.

```
python3 -m venv .env
source .env/bin/activate
pip install circuitpython-build-tools
```

Once installed, make sure you are in the virtual environment:

```
source .env/bin/activate
```

Then run the build:

```
circuitpython-build-bundles --filename_prefix adafruit-circuitpython-ds1307 --library_
↪location .
```

4.1 Sphinx documentation

Sphinx is used to build the documentation based on rST files and comments in the code. First, install dependencies (feel free to reuse the virtual environment from above):

```
python3 -m venv .env
source .env/bin/activate
pip install Sphinx sphinx-rtd-theme
```

Now, once you have the virtual environment activated:

```
cd docs
sphinx-build -E -W -b html . _build/html
```

This will output the documentation to `docs/_build/html`. Open the index.html in your browser to view them. It will also (due to -W) error out on any warning like Travis will. This is a good way to locally verify it will pass.

CHAPTER 5

Table of Contents

5.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/ds1307_simpletest.py

```
# Simple demo of reading and writing the time for the DS1307 real-time clock.
# Change the if False to if True below to set the time, otherwise it will just
# print the current date and time every second.  Notice also comments to adjust
# for working with hardware vs. software I2C.

import time
import board
# For hardware I2C (M0 boards) use this line:
import busio as io
# Or for software I2C (ESP8266) use this line instead:
#import bitbangio as io

import adafruit_ds1307

# Change to the appropriate I2C clock & data pins here!
i2c_bus = io.I2C(board.SCL, board.SDA)

# Create the RTC instance:
rtc = adafruit_ds1307.DS1307(i2c_bus)

# Lookup table for names of days (nicer printing).
days = ("Sunday", "Monday", "Tuesday", "Wednesday", "Thursday", "Friday", "Saturday")


#pylint: disable-msg=bad-whitespace
#pylint: disable-msg=using-constant-test
if False:   # change to True if you want to set the time!
```

(continues on next page)

(continued from previous page)

```
    #                       year, mon, date, hour, min, sec, wday, yday, isdst
    t = time.struct_time((2017,  10,   29,   15,  14,  15,    0,   -1,    -1))
    # you must set year, mon, date, hour, min, sec and weekday
    # yearday is not supported, isdst can be set but we don't do anything with it at this time
    print("Setting time to:", t)      # uncomment for debugging
    rtc.datetime = t
    print()
#pylint: enable-msg=using-constant-test
#pylint: enable-msg=bad-whitespace

# Main loop:
while True:
    t = rtc.datetime
    #print(t)      # uncomment for debugging
    print("The date is {} {}/{}/{}".format(days[int(t.tm_wday)], t.tm_mday, t.tm_mon, t.tm_year))
    print("The time is {}:{:02}:{:02}".format(t.tm_hour, t.tm_min, t.tm_sec))
    time.sleep(1) # wait a second
```

5.2 adafruit_ds1307 - DS1307 Real Time Clock module

CircuitPython library to support DS1307 Real Time Clock (RTC).

This library supports the use of the DS1307-based RTC in CircuitPython.

Beware that most CircuitPython compatible hardware are 3.3v logic level! Make sure that the input pin is 5v tolerant.

- Author(s): Philip R. Moyer and Radomir Dopieralski for Adafruit Industries

5.2.1 Implementation Notes

Hardware:

- Adafruit DS1307 RTC breakout (Product ID: 3296)

Software and Dependencies:

- **Adafruit CircuitPython firmware (0.8.0+) for the ESP8622 and M0-based boards:** https://github.com/adafruit/circuitpython/releases
- Adafruit's Register library: https://github.com/adafruit/Adafruit_CircuitPython_Register
- Adafruit's Bus Device library: https://github.com/adafruit/Adafruit_CircuitPython_BusDevice

Notes:

1. Milliseconds are not supported by this RTC.
2. Alarms and timers are not supported by this RTC.
3. Datasheet: https://datasheets.maximintegrated.com/en/ds/DS1307.pdf

class adafruit_ds1307.**DS1307**(*i2c_bus*)

Interface to the DS1307 RTC.

datetime

Gets the current date and time or sets the current date and time then starts the clock.

datetime_register
Current date and time.

disable_oscillator
True if the oscillator is disabled.

CHAPTER 6

Indices and tables

- genindex
- modindex
- search

Python Module Index

a

Index

A

D