Adafruit Thermistor Library Documentation

Release 1.0

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Contents

Thermistors are resistors that predictably change resistance with temperature. This driver uses an analog reading and math to determine the temperature. They are commonly used as a low cost way to measure temperature.

Dependencies

This driver depends on:

- Adafruit CircuitPython

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

Installing from PyPI

On supported GNU/Linux systems like the Raspberry Pi, you can install the driver locally from PyPI. To install for current user:

```
pip3 install adafruit-circuitpython-thermistor
```

To install system-wide (this may be required in some cases):

```
sudo pip3 install adafruit-circuitpython-thermistor
```

To install in a virtual environment in your current project:

```
mkdir project-name && cd project-name
python3 -m venv .env
source .env/bin/activate
pip3 install adafruit-circuitpython-thermistor
```

Usage Example

The hardest part of using the driver is its initialization. Here is an example for the thermistor on the Circuit Playground and Circuit Playground Express. Its a 10k series resistor, 10k nominal resistance, 25 celsius nominal temperature and 3950 B coefficient.

CHAPTER 4

Contributing

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

Documentation

For information on building library documentation, please check out this guide.

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6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/thermistor_simpletest.py

```python
1   # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2   # SPDX-License-Identifier: MIT
3
4   import time
5   import board
6   import adafruit_thermistor
7
8   # these values work with the Adafruit CircuitPlayground Express.
9   # they may work with other thermistors as well, as they're fairly standard,
10  # though the pin will likely need to change (ie board.A1)
11  # pylint: disable=no-member
12  pin = board.TEMPERATURE
13  resistor = 10000
14  resistance = 10000
15  nominal_temp = 25
16  b_coefficient = 3950
17
18  thermistor = adafruit_thermistor.Thermistor(
19      pin, resistor, resistance, nominal_temp, b_coefficient
20  )
21
22  # print the temperature in C and F to the serial console every second
23  while True:
24      celsius = thermistor.temperature
25      fahrenheit = (celsius * 9 / 5) + 32
26      print("== Temperature ==\n{} *C\n{} *F\n".format(celsius, fahrenheit))
27      time.sleep(1)
```

6.2 `adafruit_thermistor`

A thermistor is a resistor that varies with temperature. This driver takes the parameters of that resistor and its series resistor to determine the current temperature. To hook one up, connect an analog input pin to the connection between the resistor and the thermistor. Be careful to note if the thermistor is connected on the high side (from analog input up to high logic level/3.3 or 5 volts) or low side (from analog input down to ground). The initializer takes an optional high_side boolean that defaults to True and indicates if that the thermistor is connected on the high side vs. low side.

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6.2.1 Implementation Notes

Hardware:

- Adafruit 10K Precision Epoxy Thermistor - 3950 NTC (Product ID: 372)
- Adafruit Circuit Playground Express (Product ID: 3333)

Software and Dependencies:

- Adafruit CircuitPython firmware: https://github.com/adafruit/circuitpython/releases

Notes:

1. Check the datasheet of your thermistor for the values.

class adafruit_thermistor.**Thermistor**(*pin*, *series_resistor*, *nominal_resistance*, *nominal_temperature*, *b_coefficient*, *, *high_side=True*)

> **Parameters**
>
> - **pin** (`Pin`) – Analog pin used for the thermistor
> - **series_resistor** (`int`) – resistance in series between you analog input and the thermistor, normally a 10K resistor is placed between VCC and the analog pin
> - **nominal_resistance** (`int`) – nominal resistance of the thermistor. normally 10k
> - **b_coefficient** (`int`) – thermistor's B coefficient. Typically this is a value in the range of 3000-4000
> - **high_side** (`bool`) – indicates if the thermistor is connected on the high side or low side of the resistor. Defaults to `True`
>
> **Quickstart: Importing and using the adafruit_thermistor library**
>
> Here is one way of importing the `Thermistor` class so you can use it with the name `thermistor`. First you will need to import the libraries to use the sensor
>
> ```python
> import board
> import adafruit_thermistor
> ```
>
> Once this is done you can define your `Thermistor` object and define your sensor object
>
> ```python
> thermistor = adafruit_thermistor.Thermistor(board.A0, 10000, 10000, 25,
> ↪3950)
> ```
>
> Now you have access to the temperature with the `temperature` attribute. This temperature is in Celsius.

```
temperature = thermistor.temperature
```

temperature
> The temperature of the thermistor in Celsius

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