Adafruit INA219 Library Documentation

Release 1.0

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Contents

CircuitPython driver for the INA219 current sensor.

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

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-ina219
```

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

```
sudo pip3 install adafruit-circuitpython-ina219
```

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-ina219
```

CHAPTER 3

Usage Example

see example

CHAPTER 4

Contributing

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

CHAPTER 5

Documentation

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

CHAPTER 6

Table of Contents

6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/ina219_simpletest.py

```
# SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
# SPDX-License-Identifier: MIT

"""Sample code and test for adafruit_ina219"""

import time
import board
from adafruit_ina219 import ADCResolution, BusVoltageRange, INA219


i2c_bus = board.I2C()

ina219 = INA219(i2c_bus)

print("ina219 test")

# display some of the advanced field (just to test)
print("Config register:")
print("  bus_voltage_range:    0x%1X" % ina219.bus_voltage_range)
print("  gain:                 0x%1X" % ina219.gain)
print("  bus_adc_resolution:   0x%1X" % ina219.bus_adc_resolution)
print("  shunt_adc_resolution: 0x%1X" % ina219.shunt_adc_resolution)
print("  mode:                 0x%1X" % ina219.mode)
print("")

# optional : change configuration to use 32 samples averaging for both bus voltage␣
↪and shunt voltage
```

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```
ina219.bus_adc_resolution = ADCResolution.ADCRES_12BIT_32S
ina219.shunt_adc_resolution = ADCResolution.ADCRES_12BIT_32S
# optional : change voltage range to 16V
ina219.bus_voltage_range = BusVoltageRange.RANGE_16V

# measure and display loop
while True:
    bus_voltage = ina219.bus_voltage  # voltage on V- (load side)
    shunt_voltage = ina219.shunt_voltage  # voltage between V+ and V- across the shunt
    current = ina219.current  # current in mA
    power = ina219.power  # power in watts

    # INA219 measure bus voltage on the load side. So PSU voltage = bus_voltage +
↪shunt_voltage
    print("Voltage (VIN+) : {:6.3f}   V".format(bus_voltage + shunt_voltage))
    print("Voltage (VIN-) : {:6.3f}   V".format(bus_voltage))
    print("Shunt Voltage  : {:8.5f} V".format(shunt_voltage))
    print("Shunt Current  : {:7.4f}  A".format(current / 1000))
    print("Power Calc.    : {:8.5f} W".format(bus_voltage * (current / 1000)))
    print("Power Register : {:6.3f}   W".format(power))
    print("")

    # Check internal calculations haven't overflowed (doesn't detect ADC overflows)
    if ina219.overflow:
        print("Internal Math Overflow Detected!")
        print("")

    time.sleep(2)
```

6.2 adafruit_ina219

CircuitPython driver for the INA219 current sensor.

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6.2.1 Implementation Notes

Hardware:

- Adafruit INA219 High Side DC Current Sensor Breakout
- Adafruit INA219 FeatherWing

Software and Dependencies:

- Adafruit CircuitPython firmware (2.2.0+) for the ESP8622 and M0-based boards: https://github.com/adafruit/circuitpython/releases
- Adafruit's Bus Device library: https://github.com/adafruit/Adafruit_CircuitPython_BusDevice

class adafruit_ina219.**ADCResolution**
Constants for `bus_adc_resolution` or `shunt_adc_resolution`

class adafruit_ina219.**BusVoltageRange**
Constants for `bus_voltage_range`

class adafruit_ina219.**Gain**
Constants for gain

class adafruit_ina219.**INA219**(*i2c_bus*, *addr=64*)
Driver for the INA219 current sensor

bus_voltage
The bus voltage (between V- and GND) in Volts

calibration
Calibration register (cached value)

current
The current through the shunt resistor in milliamps.

power
The power through the load in Watt.

set_calibration_16V_400mA()
Configures to INA219 to be able to measure up to 16V and 400mA of current. Counter overflow occurs at 1.6A.

Note: These calculations assume a 0.1 ohm shunt resistor is present

---

set_calibration_16V_5A()
Configures to INA219 to be able to measure up to 16V and 5000mA of current. Counter overflow occurs at 8.0A.

Note: These calculations assume a 0.02 ohm shunt resistor is present

---

set_calibration_32V_1A()
Configures to INA219 to be able to measure up to 32V and 1A of current. Counter overflow occurs at 1.3A.

Note: These calculations assume a 0.1 ohm shunt resistor is present

---

set_calibration_32V_2A()
Configures to INA219 to be able to measure up to 32V and 2A of current. Counter overflow occurs at 3.2A.

..note :: These calculations assume a 0.1 shunt ohm resistor is present

shunt_voltage
The shunt voltage (between V+ and V-) in Volts (so +-.327V)

class adafruit_ina219.**Mode**
Constants for mode

CHAPTER 7

Indices and tables

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