Erriez I2C Voltage/Current/Power sensor library for Arduino

1.0.0

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Contents

Chapter 1

Erriez INA219 I2C Voltage/Current/Power Monitor library for Arduino

This is an INA219 I2C Voltage/Current/Power Monitor library for Arduino.

Library features

- TODO

Hardware

Any Arduino hardware with a TWI interface and `Wire.h` support.

Pins board - INA219	VCC	GND	SDA	SCL
Arduino UNO (ATMega328 boards)	5V	GND	A4	A5
Arduino Mega2560	5V	GND	D20	D21
Arduino Leonardo	5V	GND	D2	D3
Arduino DUE (ATSAM3X8E)	3V3	GND	20	21
ESP8266	3V3	GND	GPIO4 (D2)	GPIO5 (D1)
ESP32	3V3	GND	GPIO21	GPIO22

Examples

- `ErriezINA219` Getting started.

Library dependencies

- `Wire.h`

Library installation

Please refer to the `Wiki` page.

Other Arduino Libraries and Sketches from Erriez

- Erriez Libraries and Sketches

Chapter 2

Class Index

2.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 3

File Index

3.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 4

Class Documentation

4.1 INA219 Class Reference

INA219 class.

```
#include <ErriezINA219.h>
```

Public Member Functions

- INA219 (uint8_t i2cAddress=INA219_I2C_ADDRESS, float shuntResistor=INA219_SHUNT_RESISTOR)

  INA219 constructor.
- bool begin ()

  Initialize INA219.
- bool powerDown ()

  Set INA219 in power-down mode.
- bool powerUp ()

  Power-up INA219.
- bool read ()

  Read voltage and current from INA219.
- void registerWrite (uint8_t reg, uint16_t val)

  Write to INA219 register.
- uint16_t registerRead (uint8_t reg)

  Read from INA219 register.
- uint8_t getI2CStatus ()

  Return status of the last I2C write, returned by Wire endTransfer()
- void dumpRegisters (Stream ∗serial)

  Print I2C registers on serial port.

Public Attributes

- float busVoltage

  Bus voltage in V.
- float shuntVoltage

  Shunt voltage in mV.
- float current

  Current in mA.
- float power

  Power in mW.
- bool overflow

  Overflow.
- bool available

  Successful conversion.

4.1.1 Detailed Description

INA219 class.

Definition at line 106 of file ErriezINA219.h.

4.1.2 Constructor & Destructor Documentation

4.1.2.1 INA219()

```
INA219::INA219 (
            uint8_t i2cAddress = INA219_I2C_ADDRESS,
            float shuntResistor = INA219_SHUNT_RESISTOR )
```

INA219 constructor.

Parameters

i2cAddress	I2C address
shuntResistor	Shunt register in ohm, default: INA219_SHUNT_RESISTOR = 0.1 Ohm

Definition at line 46 of file ErriezINA219.cpp.

4.1.3 Member Function Documentation

4.1.3.1 begin()

```
bool INA219::begin ( )
```

Initialize INA219.

Return values

true	INA219 detected
false	INA219 not detected

Definition at line 59 of file ErriezINA219.cpp.

4.1.3.2 dumpRegisters()

```
void INA219::dumpRegisters (
             Stream * serial )
```

Print I2C registers on serial port.

This function is optimized away by the compiler when not used

Parameters

serial	Serial port

Definition at line 239 of file ErriezINA219.cpp.

4.1.3.3 getI2CStatus()

```
uint8_t INA219::getI2CStatus ( )
```

Return status of the last I2C write, returned by Wire endTransfer()

Return values

0	Success
1	Data too long to fit in transmit buffer
2	Received NACK on transmit of address
3	Received NACK on transmit of data
4	Other error

Definition at line 226 of file ErriezINA219.cpp.

4.1.3.4 powerDown()

```
bool INA219::powerDown ( )
```

Set INA219 in power-down mode.

Return values

true	Success
false	Error: I2C write register failed

Definition at line 71 of file ErriezINA219.cpp.

4.1.3.5 powerUp()

```
bool INA219::powerUp ( )
```

Power-up INA219.

Return values

true	Success
false	Error: I2C write register failed

Definition at line 90 of file ErriezINA219.cpp.

4.1.3.6 read()

```
bool INA219::read ( )
```

Read voltage and current from INA219.

Variables

Return values

true	Conversion completed
false	Error: I2C read failed, or INA219 is in power-down

Definition at line 112 of file ErriezINA219.cpp.

4.1.3.7 registerRead()

```
uint16_t INA219::registerRead (
             uint8_t reg )
```

Read from INA219 register.

Parameters

reg	INA219 register 0..5

Return values

true	Register read success
false	Error: I2C read failed

Definition at line 191 of file ErriezINA219.cpp.

4.1.3.8 registerWrite()

```
void INA219::registerWrite (
            uint8_t reg,
            uint16_t val )
```

Write to INA219 register.

Parameters

reg	INA219 register 0..5
val	16-bit INA219 register value

Returns

Result of Wire endTransmission()

Definition at line 209 of file ErriezINA219.cpp.

The documentation for this class was generated from the following files:

- src/ErriezINA219.h
- src/ErriezINA219.cpp

Chapter 5

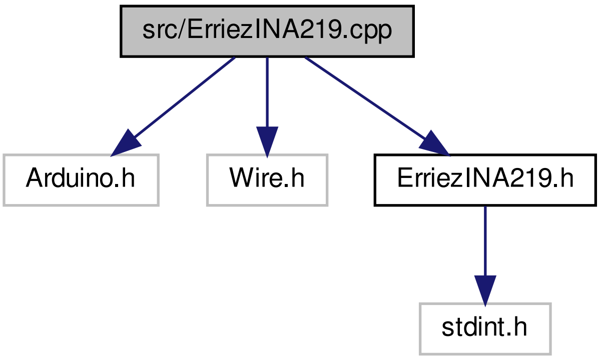
File Documentation

5.1 src/ErriezINA219.cpp File Reference

INA219 voltage and current sensor library for Arduino.

```
#include <Arduino.h>
#include <Wire.h>
#include "ErriezINA219.h"
```

Include dependency graph for ErriezINA219.cpp:



5.1.1 Detailed Description

INA219 voltage and current sensor library for Arduino.

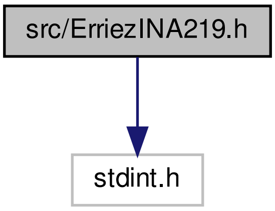
Source: https://github.com/Erriez/ErriezINA219 Documentation: https://erriez.github.io/ErriezINA219

5.2 src/ErriezINA219.h File Reference

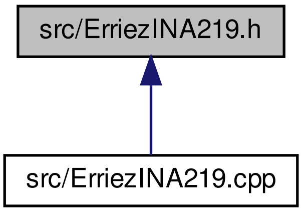
INA219 voltage and current sensor library for Arduino.

```
#include <stdint.h>
```

Include dependency graph for ErriezINA219.h:



This graph shows which files directly or indirectly include this file:



Classes

- class INA219

  INA219 class.

Macros

- #define INA219_I2C_ADDRESS 0x40

  Default I2C address.
- #define INA219_SHUNT_RESISTOR 0.1

  Default shunt resistor in Ohm.
- #define INA219_REG_CONFIG 0x00

  Config register.
- #define INA219_REG_SHUNTVOLTAGE 0x01

Shunt/voltage register.

- #define INA219_REG_BUSVOLTAGE 0x02

  Bus voltage register.
- #define INA219_REG_POWER 0x03

  Power register.
- #define INA219_REG_CURRENT 0x04

  Current register.
- #define INA219_REG_CALIBRATION 0x05

  Calibration register.
- #define INA219_CONFIG_RST 15

  Reset.
- #define INA219_CONFIG_BRNG 13

  Bus voltage range.
- #define INA219_CONFIG_BRNG_16V (0 << 13)

  Bus voltage range 16V.
- #define INA219_CONFIG_BRNG_32V (1 << 13)

  Bus voltage range 32V.
- #define INA219_CONFIG_GAIN_MASK (3 << 12)

  PGA Gain and Range.
- #define INA219_CONFIG_GAIN_1 (0 << 12)

  ±40 mV.
- #define INA219_CONFIG_GAIN_2 (1 << 12)

  ±80 mV.
- #define INA219_CONFIG_GAIN_4 (2 << 12)

  ±160 mV.
- #define INA219_CONFIG_GAIN_8 (3 << 12)

  ±320 mV.
- #define INA219_CONFIG_BADC_MASK 0x0780

  Bus ADC Resolution/Averaging.
- #define INA219_CONFIG_BADC(adc) ((adc & INA219_CONFIG_BADC_MASK) << 7)

  Bus ADC mask and shift.
- #define INA219_CONFIG_SADC_MASK 0x0078

  Shunt ADC Resolution/Averaging.
- #define INA219_CONFIG_SADC(adc) ((adc & INA219_CONFIG_BADC_MASK) << 3)

  Shunt ADC mask and shift.
- #define INA219_CONFIG_xADC_9B 0

  9 bit
- #define INA219_CONFIG_xADC_10B 1

  10 bit
- #define INA219_CONFIG_xADC_11B 2

  11 bit
- #define INA219_CONFIG_xADC_12B 3

  12 bit
- #define INA219_CONFIG_xADC_2S 9

  2 samples
- #define INA219_CONFIG_xADC_4S 10

  4 samples
- #define INA219_CONFIG_xADC_8S 11

  8 samples
- #define INA219_CONFIG_xADC_16S 12

  16 samples

- #define INA219_CONFIG_xADC_32S 13

  32 samples
- #define INA219_CONFIG_xADC_64S 14

  64 samples
- #define INA219_CONFIG_xADC_128S 15

  128 samples
- #define INA219_CONFIG_MODE_MASK 0x0007

  Operating Mode.
- #define INA219_CONFIG_MODE(mode) ((mode & INA219_CONFIG_MODE_MASK) << 0)

  Config mode mask and shift.
- #define INA219_CONFIG_MODE_POWER_DOWN 0

  Power-Down.
- #define INA219_CONFIG_MODE_SHUNT_TRG 1

  Shunt voltage, triggered.
- #define INA219_CONFIG_MODE_BUS_TRG 2

  Bus voltage, triggered.
- #define INA219_CONFIG_MODE_SHUNT_BUS_TRG 3

  Shunt and bus voltage, triggered.
- #define INA219_CONFIG_MODE_ADC_OFF 4

  ADC off (disabled)
- #define INA219_CONFIG_MODE_SHUNT_CNT 5

  Shunt voltage, continuous.
- #define INA219_CONFIG_MODE_BUS_CNT 6

  Bus voltage, continuous.
- #define INA219_CONFIG_MODE_SHUNT_BUS_CNT 7

  Shunt and bus voltage, continuous.
- #define REG_CONFIG_VALUE 0x399F

  Default config register value.

5.2.1 Detailed Description

INA219 voltage and current sensor library for Arduino.

Source: `https://github.com/Erriez/ErriezINA219` Documentation: `https://erriez.github.io/ErriezINA219`

5.2.2 Macro Definition Documentation

5.2.2.1 REG_CONFIG_VALUE

```
#define REG_CONFIG_VALUE 0x399F
```

Default config register value.

Shunt and bus: BADC: +/-320 mV Continuous conversion 532 us conversion time

Definition at line 100 of file ErriezINA219.h.

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