
python-periphery

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python-periphery is a pure Python library for GPIO, LED, PWM, SPI, I2C, MMIO, and Serial peripheral I/O interface access in userspace Linux. It is useful in embedded Linux environments (including Raspberry Pi, BeagleBone, etc. platforms) for interfacing with external peripherals. python-periphery is compatible with Python 2 and Python 3, is written in pure Python, and is MIT licensed.

1.1 GPIO

1.1.1 Code Example

```
from periphery import GPIO

# Open GPIO /dev/gpiochip0 line 10 with input direction
gpio_in = GPIO("/dev/gpiochip0", 10, "in")
# Open GPIO /dev/gpiochip0 line 12 with output direction
gpio_out = GPIO("/dev/gpiochip0", 12, "out")

value = gpio_in.read()
gpio_out.write(not value)

gpio_in.close()
gpio_out.close()
```

1.1.2 API

class periphery.GPIO (*path, line, direction*)

class CdevGPIO (*path, line, direction, edge='none', bias='default', drive='default', inverted=False, label=None*)
Character device GPIO

Instantiate a GPIO object and open the character device GPIO with the specified line and direction at the specified GPIO chip path (e.g. “/dev/gpiochip0”). Defaults properties can be overridden with keyword arguments.

Parameters

- **path** (*str*) – GPIO chip character device path.

- **line** (*int*, *str*) – GPIO line number or name.
- **direction** (*str*) – GPIO direction, can be “in”, “out”, “high”, or “low”.
- **edge** (*str*) – GPIO interrupt edge, can be “none”, “rising”, “falling”, or “both”.
- **bias** (*str*) – GPIO line bias, can be “default”, “pull_up”, “pull_down”, or “disable”.
- **drive** (*str*) – GPIO line drive, can be “default”, “open_drain”, or “open_source”.
- **inverted** (*bool*) – GPIO is inverted (active low).
- **label** (*str*, *None*) – GPIO line consumer label.

Returns GPIO object.

Return type *CdevGPIO*

Raises

- *GPIOError* – if an I/O or OS error occurs.
- *TypeError* – if *path*, *line*, *direction*, *edge*, *bias*, *drive*, *inverted*, or *label* types are invalid.
- *ValueError* – if *direction*, *edge*, *bias*, or *drive* value is invalid.
- *LookupError* – if the GPIO line was not found by the provided name.

class periphery.**GPIO** (*line*, *direction*)

class Sysfs**GPIO** (*line*, *direction*)
Sysfs GPIO

Instantiate a GPIO object and open the sysfs GPIO with the specified line and direction.

direction can be “in” for input; “out” for output, initialized to low; “high” for output, initialized to high; or “low” for output, initialized to low.

Parameters

- **line** (*int*) – GPIO line number.
- **direction** (*str*) – GPIO direction, can be “in”, “out”, “high”, or “low”,

Returns GPIO object.

Return type *SysfsGPIO*

Raises

- *GPIOError* – if an I/O or OS error occurs.
- *TypeError* – if *line* or *direction* types are invalid.
- *ValueError* – if *direction* value is invalid.
- *TimeoutError* – if waiting for GPIO export times out.

class periphery.**GPIO**

Bases: object

read ()

Read the state of the GPIO.

Returns True for high state, False for low state.

Return type bool

Raises *GPIOError* – if an I/O or OS error occurs.

write (*value*)

Set the state of the GPIO to *value*.

Parameters **value** (*bool*) – True for high state, False for low state.

Raises

- *GPIOError* – if an I/O or OS error occurs.
- *TypeError* – if *value* type is not bool.

poll (*timeout=None*)

Poll a GPIO for the edge event configured with the `.edge` property with an optional timeout.

For character device GPIOs, the edge event should be consumed with `read_event()`. For sysfs GPIOs, the edge event should be consumed with `read()`.

timeout can be a positive number for a timeout in seconds, zero for a non-blocking poll, or negative or None for a blocking poll. Default is a blocking poll.

Parameters **timeout** (*int, float, None*) – timeout duration in seconds.

Returns True if an edge event occurred, False on timeout.

Return type bool

Raises

- *GPIOError* – if an I/O or OS error occurs.
- *TypeError* – if *timeout* type is not None or int.

read_event ()

Read the edge event that occurred with the GPIO.

This method is intended for use with character device GPIOs and is unsupported by sysfs GPIOs.

Returns a namedtuple containing the string edge event that occurred (either "rising" or "falling"), and the event time reported by Linux in nanoseconds.

Return type *EdgeEvent*

Raises

- *GPIOError* – if an I/O or OS error occurs.
- *NotImplementedError* – if called on a sysfs GPIO.

static poll_multiple (*gpios, timeout=None*)

Poll multiple GPIOs for the edge event configured with the `.edge` property with an optional timeout.

For character device GPIOs, the edge event should be consumed with `read_event()`. For sysfs GPIOs, the edge event should be consumed with `read()`.

timeout can be a positive number for a timeout in seconds, zero for a non-blocking poll, or negative or None for a blocking poll. Default is a blocking poll.

Parameters

- **gpios** (*list*) – list of GPIO objects to poll.
- **timeout** (*int, float, None*) – timeout duration in seconds.

Returns list of GPIO objects for which an edge event occurred.

Return type list

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if `timeout` type is not `None` or `int`.

close()

Close the sysfs GPIO.

Raises `GPIOError` – if an I/O or OS error occurs.

devpath

Get the device path of the underlying GPIO device.

Type `str`

fd

Get the line file descriptor of the GPIO object.

Type `int`

line

Get the GPIO object's line number.

Type `int`

name

Get the line name of the GPIO.

This method is intended for use with character device GPIOs and always returns the empty string for sysfs GPIOs.

Type `str`

label

Get the line consumer label of the GPIO.

This method is intended for use with character device GPIOs and always returns the empty string for sysfs GPIOs.

Type `str`

chip_fd

Get the GPIO chip file descriptor of the GPIO object.

This method is intended for use with character device GPIOs and is unsupported by sysfs GPIOs.

Raises `NotImplementedError` – if accessed on a sysfs GPIO.

Type `int`

chip_name

Get the name of the GPIO chip associated with the GPIO.

Type `str`

chip_label

Get the label of the GPIO chip associated with the GPIO.

Type `str`

direction

Get or set the GPIO's direction. Can be "in", "out", "high", "low".

Direction "in" is input; "out" is output, initialized to low; "high" is output, initialized to high; and "low" is output, initialized to low.

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if *direction* type is not str.
- `ValueError` – if *direction* value is invalid.

Type str

edge

Get or set the GPIO's interrupt edge. Can be “none”, “rising”, “falling”, “both”.

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if *edge* type is not str.
- `ValueError` – if *edge* value is invalid.

Type str

bias

Get or set the GPIO's line bias. Can be “default”, “pull_up”, “pull_down”, “disable”.

This property is not supported by sysfs GPIOs.

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if *bias* type is not str.
- `ValueError` – if *bias* value is invalid.

Type str

drive

Get or set the GPIO's line drive. Can be “default” (for push-pull), “open_drain”, “open_source”.

This property is not supported by sysfs GPIOs.

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if *drive* type is not str.
- `ValueError` – if *drive* value is invalid.

Type str

inverted

Get or set the GPIO's inverted (active low) property.

Raises

- `GPIOError` – if an I/O or OS error occurs.
- `TypeError` – if *inverted* type is not bool.

Type bool

class periphery.**EdgeEvent**

Bases: periphery.gpio.EdgeEvent

EdgeEvent containing the event edge and event time reported by Linux.

Parameters

- **edge** (*str*) – event edge, either “rising” or “falling”.

- **timestamp** (*int*) – event time in nanoseconds.

class `periphery.GPIOError`
Bases: `exceptions.IOError`
Base class for GPIO errors.

1.2 LED

1.2.1 Code Example

```
from periphery import LED

# Open LED "led0" with initial state off
led0 = LED("led0", False)
# Open LED "led1" with initial state on
led1 = LED("led1", True)

value = led0.read()
led1.write(value)

# Set custom brightness level
led1.write(led1.max_brightness / 2)

led0.close()
led1.close()
```

1.2.2 API

class `periphery.LED` (*name*, *brightness=None*)
Bases: `object`

Instantiate an LED object and open the sysfs LED corresponding to the specified name.

brightness can be a boolean for on/off, integer value for a specific brightness, or `None` to preserve existing brightness. Default is preserve existing brightness.

Parameters

- **name** (*str*) – Linux led name.
- **brightness** (*bool*, *int*, *None*) – Initial brightness.

Returns LED object.

Return type *LED*

Raises

- *LEDError* – if an I/O or OS error occurs.
- `TypeError` – if *name* or *brightness* types are invalid.
- `LookupError` – if LED name does not exist.
- `ValueError` – if *brightness* value is invalid.

read ()
Read the brightness of the LED.

Returns Current brightness.

Return type int

Raises `LEDError` – if an I/O or OS error occurs.

write (*brightness*)

Set the brightness of the LED to *brightness*.

brightness can be a boolean for on/off, or integer value for a specific brightness.

Parameters **brightness** (*bool*, *int*) – Brightness value to set.

Raises

- `LEDError` – if an I/O or OS error occurs.
- `TypeError` – if *brightness* type is not bool or int.

close ()

Close the sysfs LED.

Raises `LEDError` – if an I/O or OS error occurs.

devpath

Get the device path of the underlying sysfs LED device.

Type str

fd

Get the file descriptor for the underlying sysfs LED “brightness” file of the LED object.

Type int

name

Get the sysfs LED name.

Type str

max_brightness

Get the LED’s max brightness.

Type int

brightness

Get or set the LED’s brightness.

Value can be a boolean for on/off, or integer value a for specific brightness.

Raises

- `LEDError` – if an I/O or OS error occurs.
- `TypeError` – if *brightness* type is not bool or int.
- `ValueError` – if *brightness* value is invalid.

Type int

class periphery.**LEDError**

Bases: `exceptions.IOError`

Base class for LED errors.

1.3 PWM

1.3.1 Code Example

```
from periphery import PWM

# Open PWM chip 0, channel 10
pwm = PWM(0, 10)

# Set frequency to 1 kHz
pwm.frequency = 1e3
# Set duty cycle to 75%
pwm.duty_cycle = 0.75

pwm.enable()

# Change duty cycle to 50%
pwm.duty_cycle = 0.50

pwm.close()
```

1.3.2 API

class periphery.**PWM**(*chip*, *channel*)

Bases: object

Instantiate a PWM object and open the sysfs PWM corresponding to the specified chip and channel.

Parameters

- **chip** (*int*) – PWM chip number.
- **channel** (*int*) – PWM channel number.

Returns PWM object.

Return type *PWM*

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if *chip* or *channel* types are invalid.
- *LookupError* – if PWM chip does not exist.
- *TimeoutError* – if waiting for PWM export times out.

PWM_STAT_RETRIES = 10

PWM_STAT_DELAY = 0.1

close ()

Close the PWM.

enable ()

Enable the PWM output.

disable ()

Disable the PWM output.

devpath

Get the device path of the underlying sysfs PWM device.

Type str

chip

Get the PWM chip number.

Type int

channel

Get the PWM channel number.

Type int

period_ns

Get or set the PWM's output period in nanoseconds.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not int.

Type int

duty_cycle_ns

Get or set the PWM's output duty cycle in nanoseconds.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not int.

Type int

period

Get or set the PWM's output period in seconds.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not int or float.

Type int, float

duty_cycle

Get or set the PWM's output duty cycle as a ratio from 0.0 to 1.0.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not int or float.
- *ValueError* – if value is out of bounds of 0.0 to 1.0.

Type int, float

frequency

Get or set the PWM's output frequency in Hertz.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not int or float.

Type int, float

polarity

Get or set the PWM's output polarity. Can be "normal" or "inversed".

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not str.
- *ValueError* – if value is invalid.

Type str

enabled

Get or set the PWM's output enabled state.

Raises

- *PWMError* – if an I/O or OS error occurs.
- *TypeError* – if value type is not bool.

Type bool

class `periphery.PWMError`

Bases: `exceptions.IOError`

Base class for PWM errors.

1.4 SPI

1.4.1 Code Example

```
from periphery import SPI

# Open spidev1.0 with mode 0 and max speed 1MHz
spi = SPI("/dev/spidev1.0", 0, 1000000)

data_out = [0xaa, 0xbb, 0xcc, 0xdd]
data_in = spi.transfer(data_out)

print("shifted out [0x{:02x}, 0x{:02x}, 0x{:02x}, 0x{:02x}]".format(*data_out))
print("shifted in  [0x{:02x}, 0x{:02x}, 0x{:02x}, 0x{:02x}]".format(*data_in))

spi.close()
```

1.4.2 API

class `periphery.SPI` (*devpath*, *mode*, *max_speed*, *bit_order*='msb', *bits_per_word*=8, *extra_flags*=0)

Bases: `object`

Instantiate a SPI object and open the spidev device at the specified path with the specified SPI mode, max speed in hertz, and the defaults of "msb" bit order and 8 bits per word.

Parameters

- **devpath** (*str*) – spidev device path.

- **mode** (*int*) – SPI mode, can be 0, 1, 2, 3.
- **max_speed** (*int*, *float*) – maximum speed in Hertz.
- **bit_order** (*str*) – bit order, can be “msb” or “lsb”.
- **bits_per_word** (*int*) – bits per word.
- **extra_flags** (*int*) – extra spidev flags to be bitwise-ORed with the SPI mode.

Returns SPI object.

Return type *SPI*

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *devpath*, *mode*, *max_speed*, *bit_order*, *bits_per_word*, or *extra_flags* types are invalid.
- *ValueError* – if *mode*, *bit_order*, *bits_per_word*, or *extra_flags* values are invalid.

transfer (*data*)

Shift out *data* and return shifted in data.

Parameters *data* (*bytes*, *bytearray*, *list*) – a byte array or list of 8-bit integers to shift out.

Returns data shifted in.

Return type bytes, bytearray, list

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *data* type is invalid.
- *ValueError* – if data is not valid bytes.

close ()

Close the spidev SPI device.

Raises *SPIError* – if an I/O or OS error occurs.

fd

Get the file descriptor of the underlying spidev device.

Type int

devpath

Get the device path of the underlying spidev device.

Type str

mode

Get or set the SPI mode. Can be 0, 1, 2, 3.

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *mode* type is not int.
- *ValueError* – if *mode* value is invalid.

Type int

max_speed

Get or set the maximum speed in Hertz.

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *max_speed* type is not int or float.

Type int, float

bit_order

Get or set the SPI bit order. Can be “msb” or “lsb”.

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *bit_order* type is not str.
- *ValueError* – if *bit_order* value is invalid.

Type str

bits_per_word

Get or set the SPI bits per word.

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *bits_per_word* type is not int.
- *ValueError* – if *bits_per_word* value is invalid.

Type int

extra_flags

Get or set the spidev extra flags. Extra flags are bitwise-ORed with the SPI mode.

Raises

- *SPIError* – if an I/O or OS error occurs.
- *TypeError* – if *extra_flags* type is not int.
- *ValueError* – if *extra_flags* value is invalid.

Type int

class periphery.**SPIError**

Bases: exceptions.*IOError*

Base class for SPI errors.

1.5 I2C

1.5.1 Code Example

```
from periphery import I2C

# Open i2c-0 controller
i2c = I2C("/dev/i2c-0")
```

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```
# Read byte at address 0x100 of EEPROM at 0x50
msgs = [I2C.Message([0x01, 0x00]), I2C.Message([0x00], read=True)]
i2c.transfer(0x50, msgs)
print("0x100: 0x{:02x}".format(msgs[1].data[0]))

i2c.close()
```

1.5.2 API

class `periphery.I2C` (*devpath*)

Bases: `object`

Instantiate an I2C object and open the i2c-dev device at the specified path.

Parameters `devpath` (*str*) – i2c-dev device path.

Returns I2C object.

Return type *I2C*

Raises *I2CError* – if an I/O or OS error occurs.

transfer (*address, messages*)

Transfer *messages* to the specified I2C *address*. Modifies the *messages* array with the results of any read transactions.

Parameters

- **address** (*int*) – I2C address.
- **messages** (*list*) – list of I2C.Message messages.

Raises

- *I2CError* – if an I/O or OS error occurs.
- `TypeError` – if *messages* type is not list.
- `ValueError` – if *messages* length is zero, or if message data is not valid bytes.

close ()

Close the i2c-dev I2C device.

Raises *I2CError* – if an I/O or OS error occurs.

fd

Get the file descriptor of the underlying i2c-dev device.

Type `int`

devpath

Get the device path of the underlying i2c-dev device.

Type `str`

class `Message` (*data, read=False, flags=0*)

Instantiate an I2C Message object.

Parameters

- **data** (*bytes, bytearray, list*) – a byte array or list of 8-bit integers to write.

- **read** (*bool*) – specify this as a read message, where *data* serves as placeholder bytes for the read.
- **flags** (*int*) – additional i2c-dev flags for this message.

Returns Message object.

Return type *Message*

Raises *TypeError* – if *data*, *read*, or *flags* types are invalid.

```
class periphery.I2CError
    Bases: exceptions.IOError

    Base class for I2C errors.
```

1.6 MMIO

1.6.1 Code Example

```
from periphery import MMIO

# Open am335x real-time clock subsystem page
rtc_mmio = MMIO(0x44E3E000, 0x1000)

# Read current time
rtc_secs = rtc_mmio.read32(0x00)
rtc_mins = rtc_mmio.read32(0x04)
rtc_hrs = rtc_mmio.read32(0x08)

print("hours: {:02x} minutes: {:02x} seconds: {:02x}"
      ↪secs))

rtc_mmio.close()

# Open am335x control module page
ctrl_mmio = MMIO(0x44E10000, 0x1000)

# Read MAC address
mac_id0_lo = ctrl_mmio.read32(0x630)
mac_id0_hi = ctrl_mmio.read32(0x634)

print("MAC address: {:04x}{:08x}".format(mac_id0_lo, mac_id0_hi))

ctrl_mmio.close()
```

1.6.2 API

```
class periphery.MMIO(physaddr, size)
    Bases: object
```

Instantiate an MMIO object and map the region of physical memory specified by the address base *physaddr* and size *size* in bytes.

Parameters

- **physaddr** (*int*, *long*) – base physical address of memory region.

- **size** (*int*, *long*) – size of memory region.

Returns MMIO object.

Return type *MMIO*

Raises

- *MMIOError* – if an I/O or OS error occurs.
- *TypeError* – if *physaddr* or *size* types are invalid.

read32 (*offset*)

Read 32-bits from the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters **offset** (*int*, *long*) – offset from base physical address, in bytes.

Returns 32-bit value read.

Return type *int*

Raises

- *TypeError* – if *offset* type is invalid.
- *ValueError* – if *offset* is out of bounds.

read16 (*offset*)

Read 16-bits from the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters **offset** (*int*, *long*) – offset from base physical address, in bytes.

Returns 16-bit value read.

Return type *int*

Raises

- *TypeError* – if *offset* type is invalid.
- *ValueError* – if *offset* is out of bounds.

read8 (*offset*)

Read 8-bits from the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters **offset** (*int*, *long*) – offset from base physical address, in bytes.

Returns 8-bit value read.

Return type *int*

Raises

- *TypeError* – if *offset* type is invalid.
- *ValueError* – if *offset* is out of bounds.

read (*offset*, *length*)

Read a string of bytes from the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters

- **offset** (*int*, *long*) – offset from base physical address, in bytes.
- **length** (*int*) – number of bytes to read.

Returns bytes read.

Return type *bytes*

Raises

- `TypeError` – if *offset* type is invalid.
- `ValueError` – if *offset* is out of bounds.

write32 (*offset*, *value*)

Write 32-bits to the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters

- **offset** (*int*, *long*) – offset from base physical address, in bytes.
- **value** (*int*, *long*) – 32-bit value to write.

Raises

- `TypeError` – if *offset* or *value* type are invalid.
- `ValueError` – if *offset* or *value* are out of bounds.

write16 (*offset*, *value*)

Write 16-bits to the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters

- **offset** (*int*, *long*) – offset from base physical address, in bytes.
- **value** (*int*, *long*) – 16-bit value to write.

Raises

- `TypeError` – if *offset* or *value* type are invalid.
- `ValueError` – if *offset* or *value* are out of bounds.

write8 (*offset*, *value*)

Write 8-bits to the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters

- **offset** (*int*, *long*) – offset from base physical address, in bytes.
- **value** (*int*, *long*) – 8-bit value to write.

Raises

- `TypeError` – if *offset* or *value* type are invalid.
- `ValueError` – if *offset* or *value* are out of bounds.

write (*offset*, *data*)

Write a string of bytes to the specified *offset* in bytes, relative to the base physical address of the MMIO region.

Parameters

- **offset** (*int*, *long*) – offset from base physical address, in bytes.
- **data** (*bytes*, *bytearray*, *list*) – a byte array or list of 8-bit integers to write.

Raises

- `TypeError` – if *offset* or *data* type are invalid.
- `ValueError` – if *offset* is out of bounds, or if *data* is not valid bytes.

close ()

Unmap the MMIO object's mapped physical memory.

base
Get the base physical address of the MMIO region.
Type int

size
Get the mapping size of the MMIO region.
Type int

pointer
Get a ctypes void pointer to the memory mapped region.
Type ctypes.c_void_p

class `periphery.MMIOError`
Bases: `exceptions.IOError`
Base class for MMIO errors.

1.7 Serial

1.7.1 Code Example

```
from periphery import Serial

# Open /dev/ttyUSB0 with baudrate 115200, and defaults of 8N1, no flow control
serial = Serial("/dev/ttyUSB0", 115200)

serial.write(b"Hello World!")

# Read up to 128 bytes with 500ms timeout
buf = serial.read(128, 0.5)
print("read {:d} bytes: _{:s}_".format(len(buf), buf))

serial.close()
```

1.7.2 API

class `periphery.Serial` (*devpath*, *baudrate*, *databits*=8, *parity*='none', *stopbits*=1, *xonxoff*=False, *rtscts*=False)
Bases: object

Instantiate a `Serial` object and open the tty device at the specified path with the specified baudrate, and the defaults of 8 data bits, no parity, 1 stop bit, no software flow control (`xonxoff`), and no hardware flow control (`rtscts`).

Parameters

- **devpath** (*str*) – tty device path.
- **baudrate** (*int*) – baudrate.
- **databits** (*int*) – data bits, can be 5, 6, 7, 8.
- **parity** (*str*) – parity, can be “none”, “even”, “odd”.
- **stopbits** (*int*) – stop bits, can be 1 or 2.

- **xonxoff** (*bool*) – software flow control.
- **rtscts** (*bool*) – hardware flow control.

Returns Serial object.

Return type *Serial*

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *devpath*, *baudrate*, *databits*, *parity*, *stopbits*, *xonxoff*, or *rtscts* types are invalid.
- *ValueError* – if *baudrate*, *databits*, *parity*, or *stopbits* values are invalid.

read (*length*, *timeout=None*)

Read up to *length* number of bytes from the serial port with an optional timeout.

timeout can be positive for a blocking read with a timeout in seconds, zero for a non-blocking read, or negative or *None* for a blocking read that will block until *length* number of bytes are read. Default is a blocking read.

For a non-blocking or timeout-bound read, *read()* may return less than the requested number of bytes.

For a blocking read with the VMIN setting configured, *read()* will block until at least VMIN bytes are read. For a blocking read with both VMIN and VTIME settings configured, *read()* will block until at least VMIN bytes are read or the VTIME interbyte timeout expires after the last byte read. In either case, *read()* may return less than the requested number of bytes.

Parameters

- **length** (*int*) – length in bytes.
- **timeout** (*int*, *float*, *None*) – timeout duration in seconds.

Returns data read.

Return type bytes

Raises *SerialError* – if an I/O or OS error occurs.

write (*data*)

Write *data* to the serial port and return the number of bytes written.

Parameters **data** (*bytes*, *bytearray*, *list*) – a byte array or list of 8-bit integers to write.

Returns number of bytes written.

Return type int

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *data* type is invalid.
- *ValueError* – if *data* is not valid bytes.

poll (*timeout=None*)

Poll for data available for reading from the serial port with an optional timeout.

timeout can be positive for a timeout in seconds, zero for a non-blocking poll, or negative or *None* for a blocking poll. Default is a blocking poll.

Parameters **timeout** (*int*, *float*, *None*) – timeout duration in seconds.

Returns `True` if data is available for reading from the serial port, `False` if not.

Return type `bool`

flush()

Flush the write buffer of the serial port, blocking until all bytes are written.

Raises `SerialError` – if an I/O or OS error occurs.

input_waiting()

Query the number of bytes waiting to be read from the serial port.

Returns number of bytes waiting to be read.

Return type `int`

Raises `SerialError` – if an I/O or OS error occurs.

output_waiting()

Query the number of bytes waiting to be written to the serial port.

Returns number of bytes waiting to be written.

Return type `int`

Raises `SerialError` – if an I/O or OS error occurs.

close()

Close the tty device.

Raises `SerialError` – if an I/O or OS error occurs.

fd

Get the file descriptor of the underlying tty device.

Type `int`

devpath

Get the device path of the underlying tty device.

Type `str`

baudrate

Get or set the baudrate.

Raises

- `SerialError` – if an I/O or OS error occurs.
- `TypeError` – if `baudrate` type is not `int`.
- `ValueError` – if `baudrate` value is not supported.

Type `int`

databits

Get or set the data bits. Can be 5, 6, 7, 8.

Raises

- `SerialError` – if an I/O or OS error occurs.
- `TypeError` – if `databits` type is not `int`.
- `ValueError` – if `databits` value is invalid.

Type `int`

parity

Get or set the parity. Can be “none”, “even”, “odd”.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *parity* type is not str.
- *ValueError* – if *parity* value is invalid.

Type str

stopbits

Get or set the stop bits. Can be 1 or 2.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *stopbits* type is not int.
- *ValueError* – if *stopbits* value is invalid.

Type int

xonxoff

Get or set software flow control.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *xonxoff* type is not bool.

Type bool

rtscts

Get or set hardware flow control.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *rtscts* type is not bool.

Type bool

vmin

Get or set the VMIN termios setting for minimum number of bytes returned from a blocking read. Can be between 0 and 255.

When configured in conjunction with VTIME, VTIME acts as an interbyte timeout that restarts on every byte received, and a blocking read will block until at least VMIN bytes are read or the VTIME timeout expires after the last byte read. See the *termios* man page for more information.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *vmin* type is not int.
- *ValueError* – if *vmin* value is invalid.

Type int

vtime

Get or set the VTIME termios setting for timeout in seconds of a blocking read. Can be between 0 to 25.5 seconds, with a resolution of 0.1 seconds.

When configured in conjunction with VMIN, VTIME acts as an interbyte timeout that restarts on every byte received, and a blocking read will block until at least VMIN bytes are read or the VTIME timeout expires after the last byte read. See the *termios* man page for more information.

Raises

- *SerialError* – if an I/O or OS error occurs.
- *TypeError* – if *vtime* type is not float or int.
- *ValueError* – if *vtime* value is invalid.

Type float

class `periphery.SerialError`

Bases: `exceptions.IOError`

Base class for Serial errors.

1.8 Version and Helper Functions

`periphery.__version__ = '2.1.0'`

Module version string.

`periphery.version = (2, 1, 0)`

Module version tuple.

`periphery.sleep(seconds)`

Sleep for the specified number of seconds.

Parameters `seconds` (*int, long, float*) – duration in seconds.

`periphery.sleep_ms(milliseconds)`

Sleep for the specified number of milliseconds.

Parameters `milliseconds` (*int, long, float*) – duration in milliseconds.

`periphery.sleep_us(microseconds)`

Sleep for the specified number of microseconds.

Parameters `microseconds` (*int, long, float*) – duration in microseconds.

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