
Adafruit SEESAW Library Documentation

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CircuitPython module for use with the Adafruit ATSAMD09 seesaw.

CHAPTER 1

Dependencies

This driver depends on:

- [Adafruit CircuitPython](#)
- [Bus Device](#)

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-seesaw
```

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

```
sudo pip3 install adafruit-circuitpython-seesaw
```

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-seesaw
```


CHAPTER 3

Usage Example

See `examples/seesaw_simpletest.py` for usage 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](#).

6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/seesaw_simpletest.py

```
1  # Simple seesaw test using an LED attached to Pin 15.
2  #
3  # See the seesaw Learn Guide for wiring details:
4  # https://learn.adafruit.com/adafruit-seesaw-atsamd09-breakout?view=all#circuitpython-
   ↪wiring-and-test
5  import time
6
7  from board import SCL, SDA
8  import busio
9  from adafruit_seesaw.seesaw import Seesaw
10
11 i2c_bus = busio.I2C(SCL, SDA)
12
13 ss = Seesaw(i2c_bus)
14
15 ss.pin_mode(15, ss.OUTPUT)
16
17 while True:
18     ss.digital_write(15, True) # turn the LED on (True is the voltage level)
19     time.sleep(1) # wait for a second
20     ss.digital_write(15, False) # turn the LED off by making the voltage LOW
21     time.sleep(1)
```

6.2 Other Examples

Here are some other examples using the Seesaw library

Listing 2: examples/seesaw_crickit_test.py

```

1  from board import SCL, SDA
2  import busio
3  from adafruit_seesaw.seesaw import Seesaw
4  from adafruit_seesaw.pwmout import PWMOut
5  from adafruit_motor import servo
6
7  # from analogio import AnalogOut
8  # import board
9
10 i2c_bus = busio.I2C(SCL, SDA)
11 ss = Seesaw(i2c_bus)
12 pwm1 = PWMOut(ss, 17)
13 pwm2 = PWMOut(ss, 16)
14 pwm3 = PWMOut(ss, 15)
15 pwm4 = PWMOut(ss, 14)
16
17 pwm1.frequency = 50
18 pwm2.frequency = 50
19 pwm3.frequency = 50
20 pwm4.frequency = 50
21
22 S1 = servo.Servo(pwm1)
23 S2 = servo.Servo(pwm2)
24 S3 = servo.Servo(pwm3)
25 S4 = servo.Servo(pwm4)
26
27 servos = (S1, S2, S3, S4)
28
29 CRCKIT_NUM_ADC = 8
30 CRCKit_adc = (2, 3, 40, 41, 11, 10, 9, 8)
31
32 CRCKIT_NUM_DRIVE = 4
33 CRCKit_drive = (42, 43, 12, 13)
34
35 CAPTOUCH_THRESH = 500
36
37 _CRCKIT_M1_A1 = 18
38 _CRCKIT_M1_A2 = 19
39 _CRCKIT_M1_B1 = 22
40 _CRCKIT_M1_B2 = 23
41
42 cap_state = [False, False, False, False]
43 cap_justtouched = [False, False, False, False]
44 cap_justreleased = [False, False, False, False]
45
46 motor1_dir = False
47 motor2_dir = True
48
49 test_servos = False
50 test_motors = False
51 test_drives = False

```

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```

52 test_speaker = False
53
54 counter = 0
55
56 # analog_out = AnalogOut(board.A0)
57 # analog_out.value = 512
58
59 while True:
60     counter = (counter + 1) % 256
61
62     if counter % 32 == 0:
63         print("----- analog -----")
64         str_out = ""
65         for i in range(8):
66             val = ss.analog_read(CRCKit_adc[i]) * 3.3 / 1024
67             str_out = str_out + str(round(val, 2)) + "\t"
68
69         print(str_out + "\n")
70
71     for i in range(4):
72         val = ss.touch_read(i)
73         cap_justtouched[i] = False
74         cap_justreleased[i] = False
75
76         if val > CAPTOUCH_THRESH:
77             print("CT" + str(i + 1) + " touched! value: " + str(val))
78
79             if not cap_state[i]:
80                 cap_justtouched[i] = True
81
82                 cap_state[i] = True
83
84             else:
85                 if cap_state[i]:
86                     cap_justreleased[i] = True
87
88                 cap_state[i] = False
89
90     if cap_justtouched[0]:
91         test_servos = not test_servos
92         if test_servos:
93             print("Testing servos")
94         else:
95             print("Stopping servos")
96
97     if cap_justtouched[1]:
98         test_drives = not test_drives
99         if test_drives:
100             print("Testing drives")
101         else:
102             print("Stopping drives")
103
104     if cap_justtouched[2]:
105         test_motors = not test_motors
106         if test_motors:
107             print("Testing motors")
108         else:

```

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```

109         print("Stopping motors")
110
111     if cap_justtouched[3]:
112         test_speaker = not test_speaker
113         if test_speaker:
114             print("Testing speaker")
115         else:
116             print("Stopping speaker")
117
118     if test_servos:
119         if counter % 32 == 0:
120             print("----- servos -----")
121             servonum = int(counter / 32) % 4
122
123             if counter < 128:
124                 print("SER" + str(servonum) + " LEFT")
125                 servos[servonum].angle = 0
126             else:
127                 print("SER" + str(servonum) + " RIGHT")
128                 servos[servonum].angle = 180
129
130     if test_drives:
131         if counter % 32 == 0:
132             print("----- drives -----")
133             drivenum = int(counter / 64) % 4
134
135             if counter % 64 == 0:
136                 print("DRIVE" + str(drivenum) + " ON")
137                 ss.analog_write(CRCKIT_drive[drivenum], 65535)
138
139             else:
140                 print("DRIVE" + str(drivenum) + " OFF")
141                 ss.analog_write(CRCKIT_drive[drivenum], 0)
142
143     if test_motors:
144         if counter < 128:
145             if motor1_dir:
146                 ss.analog_write(_CRCKIT_M1_A1, 0)
147                 ss.analog_write(_CRCKIT_M1_A2, counter * 512)
148             else:
149                 ss.analog_write(_CRCKIT_M1_A2, 0)
150                 ss.analog_write(_CRCKIT_M1_A1, counter * 512)
151         else:
152             if motor1_dir:
153                 ss.analog_write(_CRCKIT_M1_A1, 0)
154                 ss.analog_write(_CRCKIT_M1_A2, (255 - counter) * 512)
155             else:
156                 ss.analog_write(_CRCKIT_M1_A2, 0)
157                 ss.analog_write(_CRCKIT_M1_A1, (255 - counter) * 512)
158         if counter == 255:
159             print("----- motor 1 -----")
160             motor1_dir = not motor1_dir
161
162         if counter < 128:
163             if motor2_dir:
164                 ss.analog_write(_CRCKIT_M1_B1, 0)
165                 ss.analog_write(_CRCKIT_M1_B2, counter * 512)

```

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```

166         else:
167             ss.analog_write(_CRCKIT_M1_B2, 0)
168             ss.analog_write(_CRCKIT_M1_B1, counter * 512)
169         else:
170             if motor2_dir:
171                 ss.analog_write(_CRCKIT_M1_B1, 0)
172                 ss.analog_write(_CRCKIT_M1_B2, (255 - counter) * 512)
173             else:
174                 ss.analog_write(_CRCKIT_M1_B2, 0)
175                 ss.analog_write(_CRCKIT_M1_B1, (255 - counter) * 512)
176         if counter == 255:
177             print("----- motor 2 -----")
178             motor2_dir = not motor2_dir

```

Listing 3: examples/seesaw_joy_featherwing.py

```

1  import time
2
3  from board import SCL, SDA
4  import busio
5  from micropython import const
6
7  from adafruit_seesaw.seesaw import Seesaw
8
9  # pylint: disable=bad-whitespace
10 BUTTON_RIGHT = const(6)
11 BUTTON_DOWN = const(7)
12 BUTTON_LEFT = const(9)
13 BUTTON_UP = const(10)
14 BUTTON_SEL = const(14)
15 # pylint: enable=bad-whitespace
16 button_mask = const(
17     (1 << BUTTON_RIGHT)
18     | (1 << BUTTON_DOWN)
19     | (1 << BUTTON_LEFT)
20     | (1 << BUTTON_UP)
21     | (1 << BUTTON_SEL)
22 )
23
24 i2c_bus = busio.I2C(SCL, SDA)
25
26 ss = Seesaw(i2c_bus)
27
28 ss.pin_mode_bulk(button_mask, ss.INPUT_PULLUP)
29
30 last_x = 0
31 last_y = 0
32
33 while True:
34     x = ss.analog_read(2)
35     y = ss.analog_read(3)
36
37     if (abs(x - last_x) > 3) or (abs(y - last_y) > 3):
38         print(x, y)
39         last_x = x
40         last_y = y

```

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```

41
42     buttons = ss.digital_read_bulk(button_mask)
43     if not buttons & (1 << BUTTON_RIGHT):
44         print("Button A pressed")
45
46     if not buttons & (1 << BUTTON_DOWN):
47         print("Button B pressed")
48
49     if not buttons & (1 << BUTTON_LEFT):
50         print("Button Y pressed")
51
52     if not buttons & (1 << BUTTON_UP):
53         print("Button x pressed")
54
55     if not buttons & (1 << BUTTON_SEL):
56         print("Button SEL pressed")
57
58     time.sleep(0.01)

```

Listing 4: examples/seesaw_soil_simpletest.py

```

1  import time
2
3  from board import SCL, SDA
4  import busio
5
6  from adafruit_seesaw.seesaw import Seesaw
7
8  i2c_bus = busio.I2C(SCL, SDA)
9
10 ss = Seesaw(i2c_bus, addr=0x36)
11
12 while True:
13     # read moisture level through capacitive touch pad
14     touch = ss.moisture_read()
15
16     # read temperature from the temperature sensor
17     temp = ss.get_temp()
18
19     print("temp: " + str(temp) + "  moisture: " + str(touch))
20     time.sleep(1)

```

Listing 5: examples/seesaw_minift_featherwing.py

```

1  import time
2
3  import board
4  from micropython import const
5
6  from adafruit_seesaw.seesaw import Seesaw
7
8  # pylint: disable=bad-whitespace
9  BUTTON_RIGHT = const(7)
10 BUTTON_DOWN = const(4)
11 BUTTON_LEFT = const(3)
12 BUTTON_UP = const(2)

```

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```

13 BUTTON_SEL = const(11)
14 BUTTON_A = const(10)
15 BUTTON_B = const(9)
16
17 # pylint: enable=bad-whitespace
18 button_mask = const(
19     (1 << BUTTON_RIGHT)
20     | (1 << BUTTON_DOWN)
21     | (1 << BUTTON_LEFT)
22     | (1 << BUTTON_UP)
23     | (1 << BUTTON_SEL)
24     | (1 << BUTTON_A)
25     | (1 << BUTTON_B)
26 )
27
28 i2c_bus = board.I2C()
29
30 ss = Seesaw(i2c_bus, 0x5E)
31
32 ss.pin_mode_bulk(button_mask, ss.INPUT_PULLUP)
33
34 while True:
35     buttons = ss.digital_read_bulk(button_mask)
36     if not buttons & (1 << BUTTON_RIGHT):
37         print("Button RIGHT pressed")
38
39     if not buttons & (1 << BUTTON_DOWN):
40         print("Button DOWN pressed")
41
42     if not buttons & (1 << BUTTON_LEFT):
43         print("Button LEFT pressed")
44
45     if not buttons & (1 << BUTTON_UP):
46         print("Button UP pressed")
47
48     if not buttons & (1 << BUTTON_SEL):
49         print("Button SEL pressed")
50
51     if not buttons & (1 << BUTTON_A):
52         print("Button A pressed")
53
54     if not buttons & (1 << BUTTON_B):
55         print("Button B pressed")
56
57     time.sleep(0.01)

```

6.3 adafruit_seesaw.seesaw

An I2C to whatever helper chip.

- Author(s): Dean Miller

6.3.1 Implementation Notes

Hardware:

- Adafruit [ATSAMD09 Breakout with seesaw](#) (Product ID: 3657)

Software and Dependencies:

- Adafruit CircuitPython firmware: <https://circuitpython.org/>
- or Adafruit Blinka: <https://circuitpython.org/blinka>
- Adafruit's Bus Device library: https://github.com/adafruit/Adafruit_CircuitPython_BusDevice

class `adafruit_seesaw.seesaw.Seesaw` (*i2c_bus*, *addr=73*, *drdy=None*)
Driver for Seesaw i2c generic conversion trip

Parameters

- **i2c_bus** (*I2C*) – Bus the SeeSaw is connected to
- **addr** (*int*) – I2C address of the SeeSaw device
- **drdy** (*DigitalInOut*) – Pin connected to SeeSaw's 'ready' output

analog_read (*pin*)
Read the value of an analog pin by number

analog_write (*pin*, *value*)
Set the value of an analog output by number

digital_read (*pin*)
Get the value of an input pin by number

digital_read_bulk (*pins*, *delay=0.008*)
Get the values of all the pins on the 'A' port as a bitmask

digital_read_bulk_b (*pins*, *delay=0.008*)
Get the values of all the pins on the 'B' port as a bitmask

digital_write (*pin*, *value*)
Set the value of an output pin by number

digital_write_bulk (*pins*, *value*)
Set the mode of pins on the 'A' port as a bitmask

digital_write_bulk_b (*pins*, *value*)
Set the mode of pins on the 'B' port as a bitmask

eeeprom_read8 (*addr*)
Read a single byte directly to the device's EEPROM

eeeprom_write (*addr*, *buf*)
Write multiple bytes directly to the device's EEPROM

eeeprom_write8 (*addr*, *val*)
Write a single byte directly to the device's EEPROM

get_i2c_addr ()
Return the device's I2C address stored in its EEPROM

get_options ()
Retrieve the 'options' word from the SeeSaw board

get_temp ()
Read the temperature

get_version()
Retrieve the 'version' word from the SeeSaw board

moisture_read()
Read the value of the moisture sensor

pin_mode(pin, mode)
Set the mode of a pin by number

pin_mode_bulk(pins, mode)
Set the mode of all the pins on the 'A' port as a bitmask

pin_mode_bulk_b(pins, mode)
Set the mode of all the pins on the 'B' port as a bitmask

read(reg_base, reg, buf, delay=0.008)
Read an arbitrary I2C register range on the device

read8(reg_base, reg)
Read an arbitrary I2C byte register on the device

set_GPIO_interrupts(pins, enabled)
Enable or disable the GPIO interrupt

set_i2c_addr(addr)
Store a new address in the device's EEPROM and reboot it.

set_pwm_freq(pin, freq)
Set the PWM frequency of a pin by number

sw_reset()
Trigger a software reset of the SeeSaw chip

touch_read(pin)
Read the value of a touch pin by number

uart_set_baud(baud)
Set the serial baudrate of the device

write(reg_base, reg, buf=None)
Write an arbitrary I2C register range on the device

write8(reg_base, reg, value)
Write an arbitrary I2C byte register on the device

6.4 adafruit_seesaw.crickit - Pin definition for Adafruit CRICKIT

6.5 adafruit_seesaw.analoginput

class `adafruit_seesaw.analoginput.AnalogInput(seesaw, pin)`
CircuitPython-compatible class for analog inputs

This class is intended to be a compatible subset of `analogio.AnalogIn`

Parameters

- **seesaw** (`Seesaw`) – The device
- **pin** (`int`) – The pin number on the device

reference_voltage

The reference voltage for the pin

value

The current analog value on the pin, as an integer from 0..65535 (inclusive)

6.6 adafruit_seesaw.digitalio

class `adafruit_seesaw.digitalio.DigitalIO(seesaw, pin)`

CircuitPython-compatible class for digital I/O pins

This class is intended to be a compatible subset of `digitalio.DigitalInOut`.

Due to technical limitations, PULL_DOWNs are not supported.

Parameters

- **seesaw** (*Seesaw*) – The device
- **pin** (*int*) – The pin number on the device

direction

Retrieve or set the direction of the pin

drive_mode

Retrieve or set the drive mode of an output pin

pull

Retrieve or set the pull mode of an input pin

switch_to_input (*pull=None*)

Switch the pin to input mode

switch_to_output (*value=False, drive_mode=<sphinx.ext.autodoc.importer._MockObject object>*)

Switch the pin to output mode

value

Retrieve or set the value of the pin

6.7 adafruit_seesaw.keypad

class `adafruit_seesaw.keypad.KeyEvent(num, edge)`

Holds information about a key event in its properties

Parameters

- **num** (*int*) – The number of the key
- **edge** (*int*) – One of the EDGE properties of `adafruit_seesaw.keypad.Keypad`

class `adafruit_seesaw.keypad.Keypad(i2c_bus, addr=73, drdy=None)`

On compatible SeeSaw devices, reads from a keypad.

Parameters

- **i2c_bus** (*I2C*) – Bus the SeeSaw is connected to
- **addr** (*int*) – I2C address of the SeeSaw device
- **drdy** (*DigitalInOut*) – Pin connected to SeeSaw's 'ready' output

EDGE_FALLING = 2

Indicates that the key was recently pressed

EDGE_HIGH = 0

Indicates that the key is currently pressed

EDGE_LOW = 1

Indicates that the key is currently released

EDGE_RISING = 3

Indicates that the key was recently released

count

Retrieve or set the number of keys

interrupt_enabled

Retrieve or set the interrupt enable flag

read_keypad (*num*)

Read data from the keypad

Parameters *num* (*int*) – The number of bytes to read

set_event (*key, edge, enable*)

Control which kinds of events are set

Parameters

- **key** (*int*) – The key number
- **edge** (*int*) – The type of event
- **enable** (*bool*) – True to enable the event, False to disable it

6.8 adafruit_seesaw.neopixel

`adafruit_seesaw.neopixel.GRB = (1, 0, 2)`

Green Red Blue

`adafruit_seesaw.neopixel.GRBW = (1, 0, 2, 3)`

Green Red Blue White

class `adafruit_seesaw.neopixel.NeoPixel` (*seesaw, pin, n, *, bpp=3, brightness=1.0, auto_write=True, pixel_order=None*)

Control NeoPixels connected to a seesaw

Parameters

- **seesaw** (*Seesaw*) – The device
- **pin** (*int*) – The pin number on the device
- **n** (*int*) – The number of pixels
- **bpp** (*int*) – The number of bytes per pixel
- **brightness** (*float*) – The brightness, from 0.0 to 1.0
- **auto_write** (*bool*) – Automatically update the pixels when changed
- **pixel_order** (*tuple*) – The layout of the pixels. Use one of the order constants such as RGBW.

`__getitem__(key, color)`
Set one pixel to a new value

brightness
Overall brightness of the pixel

`fill (color)`
Set all pixels to the same value

`show ()`
Update the pixels even if `auto_write` is False

`adafruit_seesaw.neopixel.RGB = (0, 1, 2)`
Red Green Blue

`adafruit_seesaw.neopixel.RGBW = (0, 1, 2, 3)`
Red Green Blue White

6.9 `adafruit_seesaw.pwmout`

class `adafruit_seesaw.pwmout.PWMOut (seesaw, pin)`
A single seesaw channel that matches the `PWMOut` API.

duty_cycle
16-bit value that dictates how much of one cycle is high (1) versus low (0). 65535 (0xffff) will always be high, 0 will always be low, and 32767 (0x7fff) will be half high and then half low.

fraction
Expresses `duty_cycle` as a fractional value. Ranges from 0.0-1.0.

frequency
The overall PWM frequency in Hertz.

6.10 `adafruit_seesaw.robohat` - Pin definition for RoboHAT

class `adafruit_seesaw.robohat.MM1_Pinmap`
This class is automatically used by `adafruit_seesaw.seesaw.Seesaw` when a RoboHAT board is detected.

It is also a reference for the capabilities of each pin.

analog_pins = (35, 34)
The pins capable of analog output

pwm_pins = (16, 17, 18, 19, 11, 10, 9, 8, 40, 41, 42, 43)
The pins capable of PWM output

pwm_width = 16
The effective bit resolution of the PWM pins

touch_pins = (7, 6, 5, 4)
The pins capable of touch input

6.11 `adafruit_seesaw.samd09` - Pin definition for Adafruit SAMD09 Breakout with seesaw

class `adafruit_seesaw.samd09.SAMD09_Pinmap`

This class is automatically used by `adafruit_seesaw.seesaw.Seesaw` when a SAMD09 Breakout is detected.

It is also a reference for the capabilities of each pin.

analog_pins = (2, 3, 4, 5)

The effective bit resolution of the PWM pins

pwm_pins = (4, 5, 6, 7)

No pins on this board are capable of touch input

pwm_width = 8

The pins capable of PWM output

6.12 `adafruit_seesaw.tftshield18` - Pin definitions for 1.8" TFT Shield V2

class `adafruit_seesaw.tftshield18.Buttons` (*right, down, left, up, select, a, b, c*)

static `__new__` (*_cls, right, down, left, up, select, a, b, c*)

Create new instance of Buttons(right, down, left, up, select, a, b, c)

`__repr__` ()

Return a nicely formatted representation string

a

Alias for field number 5

b

Alias for field number 6

c

Alias for field number 7

down

Alias for field number 1

left

Alias for field number 2

right

Alias for field number 0

select

Alias for field number 4

up

Alias for field number 3

class `adafruit_seesaw.tftshield18.TFTShield18` (*i2c_bus=<sphinx.ext.autodoc.importer._MockObject object>, addr=46*)

buttons

Return a set of buttons with current push values

set_backlight (*value*)

Set the backlight on

set_backlight_freq (*freq*)

Set the backlight frequency of the TFT Display

tft_reset (*rst=True*)

Reset the TFT Display

CHAPTER 7

Indices and tables

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