sparkfun_qwiic_button Release 2.0.1

SparkFun Electronics

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Python module for the SparkFun Qwiic Button

This module is also compatible with the following products:

- SparkFun Qwiic Button Green LED
- SparkFun Qwiic Button Breakout
- Qwiic Arcade Red
- Qwiic Arcade Blue
- Qwiic Switch

Please remember that SparkX products are experimental, therefore full functionality is not gauranteed.

This python package is a port of the existing SparkFun Qwiic Button Arduino Library

This package can be used in conjunction with the overall SparkFun qwiic Python Package

New to qwiic? Take a look at the entire SparkFun qwiic ecosystem.

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CHAPTER

ONE

CONTENTS

- Supported Platforms
- Dependencies
- Installation
- Documentation
- Example Use

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CHAPTER

TWO

SUPPORTED PLATFORMS

The Qwiic Button Python package current supports the following platforms:

- Raspberry Pi
- NVidia Jetson Nano
- Google Coral Development Board

CHAPTER
THREE

DEPENDENCIES

This driver package depends on the qwiic I2C driver: Qwiic_I2C_Py

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DOCUMENTATION

The SparkFun Qwiic Button module documentation is hosted at ReadTheDocs

CHAPTER

FIVE

INSTALLATION

5.1 PyPi Installation

This repository is hosted on PyPi as the sparkfun-qwiic-button package. On systems that support PyPi installation via pip, this library is installed using the following commands

For all users (note: the user must have sudo privileges):

```
sudo pip install sparkfun-qwiic-button
```

For the current user:

```
pip install sparkfun-qwiic-button
```

To install, make sure the setuptools package is installed on the system.

Direct installation at the command line:

```
python setup.py install
```

To build a package for use with pip:

```
python setup.py sdist
```

A package file is built and placed in a subdirectory called dist. This package file can be installed using pip.

```
cd dist
pip install sparkfun-qwiic-button-<version>.tar.gz
```

EXAMPLE USE

See the examples directory for more detailed use examples.

```
from __future__ import print_function
import qwiic_button
import time
import sys
def run_example():
   print("\nSparkFun Qwiic Button Example 1")
   my_button = qwiic_button.QwiicButton()
   if my_button.begin() == False:
       print("\nThe Qwiic Button isn't connected to the system. Please check your_
⇔connection", \
            file=sys.stderr)
       return
   print("\nButton ready!")
   while True:
        if my_button.is_button_pressed() == True:
           print("\nThe button is pressed!")
        else:
           print("\nThe button is not pressed!")
       time.sleep(0.02)
if __name__ == '__main__':
   try:
       run_example()
   except (KeyboardInterrupt, SystemExit) as exErr:
       print("\nEnding Example 1")
       sys.exit(0)
```

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7.1 API Reference

7.1.1 qwiic_button

Python module for the Qwiic Button.

This python package is a port of the exisiting [SparkFun Qwiic Button Arduino Library](https://github.com/sparkfun/SparkFun_Qwiic_Button_Arduino_Library)

This package can be used in conjunction with the overall [SparkFun Qwiic Python Package](https://github.com/sparkfun/Qwiic_Py)

New to qwiic? Take a look at the entire [SparkFun Qwiic Ecosystem](https://www.sparkfun.com/qwiic).

class qwiic_button.**QwiicButton**(address=None, i2c_driver=None)

Parameters

- address The I2C address to use for the device. If not provided, the default address is used.
- i2c_driver An existing i2c driver object. If not provided a driver object is created.

Returns The GPIO device object.

Return type Object

LED_config (brightness, cycle_time, off_time, granularity=1)

Write brightness, cycle_time, off_time, and granularity parameters to their respective registers: LED_BRIGHTNESS, LED_PULSE_CYCLE_TIME, LED_PULSE_OFF_TIME, LED_PULSE_GRANULARITY

Parameters

- brightness between 0 (led off) and 255 (max brightness)
- cycle_time total pulse cycle in in milliseconds Range 0 to 0xFFFF
- off_time off time between pulses in milliseconds Range 0 to 0xFFFF
- **granularity** the amount of steps it takes to get to led brightness If not provided, granularity defaults to 1

Returns Nothing

Return type Void

```
LED off()
    Write zero's to all the LED registers:
                                                LED_BRIGHTNESS, LED_PULSE_CYCLE_TIME,
    LED_PULSE_OFF_TIME, and LED_PULSE_GRANULARITY defaults to zero.
        Returns Nothing
        Return type void
LED_on (brightness)
    Set LED on without pulse
        Parameters brightness – between 0 (led off) and 255 (max brightness)
        Returns Nothing
        Return type Void
available()
    Return the event_available bit of the BUTTON_STATUS register
        Returns event_available bit
        Rtve bool
begin()
    Initialize the operation of the Qwiic Button Run is_connected() and check the ID in the ID register
        Returns Returns true if the intialization was successful, otherwise False.
        Return type bool
clear event bits()
    Clear the is_pressed, has_been_clicked, and event_available bits of the BUTTON_STATUS register
         Returns Nothing
        Return type Void
disable_clicked_interrupt()
    Clear the clicked_enable bit of the INTERRUPT_CONFIG register
        Returns Nothing
        Return type Void
disable_pressed_interrupt()
    Clear the pressed_enable bit of the INTERRUPT_CONFIG register
         Returns Nothing
        Return type Void
enable_clicked_interrupt()
    Set the clicked_enable bit of the INTERRUPT_CONFIG register
        Returns Nothing
        Return type Void
enable_pressed_interrupt()
    Set pressed_enable bit of the INTERRUPT_CONFIG register to a 1
         Returns Nothing
        Return type Void
get_I2C_address()
    Returns the current I2C address of the Qwiic Button
```

```
Returns current I2C address
        Return type int
get_debounce_time()
    Returns the value in the BUTTON_DEBOUNCE_TIME register
        Returns debounce time in milliseconds
        Return type int
get_firmware_version()
    Read the register and get the major and minor firmware version number.
         Returns 16 bytes version number
        Return type int
has_button_been_clicked()
    Returns the value of the has_been_clicked status bit of the BUTTON_STATUS register
        Returns has_been_clicked bit
        Return type bool
is_button_pressed()
    Returns the value of the is_pressed status bit of the BUTTON_STATUS register
        Returns is_pressed bit
        Return type bool
is_clicked_queue_empty()
    Reads the is_empty bit of the CLICKED_QUEUE_STATUS register
        Returns clicked_is_empty
        Return type bool
is_clicked_queue_full()
    Reads the is_full bit of the CLICKED_QUEUE_STATUS register
        Returns clicked_is_full
        Return type bool
is connected()
    Determine if a Qwiic Button device is connected to the system.
        Returns True if the device is connected, otherwise False.
        Return type bool
is pressed queue empty()
    Returns the is_empty bit of the PRESSED_QUEUE_STATUS register
        Returns pressed_is_empty
        Return type bool
```

Returns the is_full bit of the PRESSED_QUEUE_STATUS register

is_pressed_queue_full()

Returns pressed_is_full

Return type bool

7.1. API Reference

pop_clicked_queue()

Returns contents of CLICKED_QUEUE_BACK register and writes a 1 to popRequest bit of CLICKED_QUEUE_STATUS register.

Returns CLICKED_QUEUE_BACK

Return type int

pop_pressed_queue()

Returns contents of PRESSED_QUEUE_BACK register and writes a 1 to popRequest bit of PRESSED_QUEUE_STATUS register.

Returns PRESSED_QUEUE_BACK

Return type int

reset_interrupt_config()

Enable pressed and clicked interrupts and clear the event_available bit of BUTTON_STATUS register

Returns Nothing

Return type Void

set_I2C_address (new_address)

Change the I2C address of the Qwiic Button

Parameters new_address – the new I2C address to set the Qwiic Button to The function itself checks if the entered parameter is a valid I2C address

Returns True if the change was successful, false otherwise.

Return type bool

set_debounce_time (time)

Write two bytes into the BUTTON_DEBOUNCE_TIME register

Parameters time – the time in milliseconds to set debounce time to The max debounce time is 0xFFFF milliseconds, but the function checks if the entered parameter is valid

Returns Nothing

Return type void

time_since_first_click()

Returns the four bytes of CLICKED_QUEUE_BACK register. Time in milliseconds

Returns CLICKED_QUEUE_BACK

Return type int

time since first press()

Returns the four bytes of PRESSED_QUEUE_BACK. Time in milliseconds

Returns PRESSED_QUEUE_BACK

Return type int

time_since_last_click()

Returns the four bytes of CLICKED_QUEUE_FRONT register. Time in milliseconds

Returns CLICKED_QUEUE_FRONT

Return type int

time_since_last_press()

Returns the four bytes of PRESSED_QUEUE_FRONT. Time in milliseconds.

Returns PRESSED_QUEUE_FRONT

Return type int

class qwiic_button.**QwiicButton**(address=None, i2c_driver=None)

Parameters

- address The I2C address to use for the device. If not provided, the default address is
 used.
- i2c_driver An existing i2c driver object. If not provided a driver object is created.

Returns The GPIO device object.

Return type Object

7.2 Example One

Listing 1: examples/qwiic_button_ex1_buttonPress.py

```
#!/usr/bin/env python
2
   # qwiic_button_ex1.py
   # Simple Example for the Qwiic Button. Checks whether the button is pressed and
   # then prints its status.
   # Written by Priyanka Makin @ SparkFun Electronics, January 2021
9
10
   # This python library supports the SparkFun Electroncis qwiic
11
   # qwiic sensor/board ecosystem on a Raspberry Pi (and compatable) single
12
   # board computers.
13
14
   # More information on qwiic is at https://www.sparkfun.com/qwiic
15
   # Do you like this library? Help support SparkFun. Buy a board!
   #-----
19
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33
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   # LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
   # OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
```

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7.2. Example One 19

```
# SOFTWARE.
38
39
   # Example 1
40
41
   from __future__ import print_function
42
   import qwiic_button
43
   import time
44
   import sys
45
46
   def run_example():
47
48
        print("\nSparkFun Qwiic Button Example 1")
        my_button = qwiic_button.QwiicButton()
51
        if my_button.begin() == False:
52
            print("\nThe Qwiic Button isn't connected to the system. Please check your,
53
    \hookrightarrowconnection", \
                 file=sys.stderr)
54
            return
55
       print("\nButton ready!")
56
57
       while True:
58
59
            if my_button.is_button_pressed() == True:
60
                print("\nThe button is pressed!")
62
63
                print("\nThe button is not pressed!")
64
65
            time.sleep(0.02)
66
67
       __name__ == '__main__':
68
       try:
69
            run_example()
70
        except (KeyboardInterrupt, SystemExit) as exErr:
71
            print("\nEnding Example 1")
72
            sys.exit(0)
```

7.3 Example 2

Listing 2: examples/qwiic_button_ex2_LEDon.py

(continues on next page)

(continues on next page)

```
# board computers.
13
14
   # More information on qwiic is at https://www.sparkfun.com/qwiic
15
16
   # Do you like this library? Help support SparkFun. Buy a board!
17
18
19
   # Copyright (c) 2019 SparkFun Electronics
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22
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23
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   # SOFTWARE.
   #-----
39
   # Example 2
40
41
   from __future__ import print_function
42
   import qwiic_button
43
   import time
   import sys
45
46
   brightness = 100
47
48
49
   def run_example():
51
       print("\nSparkFun Qwiic Button Example 2")
52
       my_button = qwiic_button.QwiicButton()
53
       if my_button.begin() == False:
54
          print("\nThe Qwiic Button isn't connected to the system. Please check your,
55
   →connection", \
56
               file=sys.stderr)
           return
57
58
       print("\nButton ready!")
59
60
       while True:
61
62
           if my_button.is_button_pressed() == True:
               print("\nThe button is pressed!")
64
               my_button.LED_on(brightness)
65
66
67
           else:
               print("\nThe button is not pressed.")
```

7.3. Example 2 21

```
my_button.LED_off()
69
70
            time.sleep(0.02)
71
72
   if __name__ == '__main__':
73
74
       try:
            run_example()
75
        except (KeyboardInterrupt, SystemExit) as exErr:
76
            print("\nEnding Example 2")
77
            sys.exit(0)
```

7.4 Example 3

Listing 3: examples/qwiic_button_ex3_LEDconfig.py

```
#!/usr/bin/env python
2
   # qwiic_button_ex3.py
3
4
   # Simple Example for the Qwiic Button. Checks whether the button is pressed and
5
   # and the LED pulses if it is.
8
   # Written by Priyanka Makin @ SparkFun Electronics, January 2021
9
10
   # This python library supports the SparkFun Electroncis qwiic
11
   # qwiic sensor/board ecosystem on a Raspberry Pi (and compatable) single
   # board computers.
14
   # More information on qwiic is at https://www.sparkfun.com/qwiic
15
16
   # Do you like this library? Help support SparkFun. Buy a board!
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37
   # SOFTWARE.
38
   #_____
```

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```
# Example 3
40
41
   from __future__ import print_function
42
   import qwiic_button
43
   import time
   import sys
45
   brightness = 250
                        # The maximum brightness of the pulsing LED. Can be between 0 and
47
    →255
   cycle_time = 1000
                       # The total time for the pulse to take. Set to a bigger number.
48
    \hookrightarrow for a slower pulse or a smaller number for a faster pulse
   off_time = 200  # The total time to stay off between pulses. Set to 0 to be_
    \rightarrowpulsing continuously.
50
   def run_example():
51
52
       print("\nSparkFun Qwiic Button Example 3")
53
       my_button = qwiic_button.QwiicButton()
54
55
        if my_button.begin() == False:
56
            print("\nThe Qwiic Button isn't connected to the system. Please check your,
57
    ⇔connection", \
                file=sys.stderr)
58
59
            return
61
       print("\nButton ready!")
62
       my_button.LED_off()
63
64
       while True:
65
66
            if my_button.is_button_pressed() == True:
67
68
                print("\nThe button is pressed!")
69
                my_button.LED_config(brightness, cycle_time, off_time)
70
71
            else:
72
                print("\nThe button is not pressed.")
73
74
                my_button.LED_off()
75
                               # Let's not hammer too hard on the I2C bus
            time.sleep(0.02)
76
77
   if __name__ == '__main__':
78
79
       try:
80
            run_example()
        except (KeyboardInterrupt, SystemExit) as exErr:
81
            print("\nEnding Example 3")
82
            sys.exit(0)
83
```

7.4. Example 3 23

7.5 Example 4

Listing 4: examples/qwiic_button_ex4_queueUsage.py

```
#!/usr/bin/env python
2
   # qwiic_button_ex4.py
   # Simple Example for the Qwiic Button. Shows how to use he FIFO Queue on the Qwiic,
   \hookrightarrow But ton.
6
   # Written by Priyanka Makin @ SparkFun Electronics, January 2021
   # This python library supports the SparkFun Electroncis qwiic
10
   # qwiic sensor/board ecosystem on a Raspberry Pi (and compatable) single
11
   # board computers.
12
13
   # More information on qwiic is at https://www.sparkfun.com/qwiic
   # Do you like this library? Help support SparkFun. Buy a board!
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   # SOFTWARE.
37
38
   # Example 4
39
40
   from __future__ import print_function
41
   import qwiic_button
   import time
43
   import sys
44
45
   def run_example():
46
47
       print("\nSparkFun Qwiic Button Example 4")
48
49
       my_button = qwiic_button.QwiicButton()
50
       if my_button.begin() == False:
51
           print("\nThe Qwiic Button isn't connected to the system. Please check your_
    →connection", \
                                                                            (continues on next page)
```

```
file=sys.stderr)
53
           return
54
55
       print("\nButton ready!")
56
57
       while True:
58
59
            # If the queue of pressed events is not empty
60
           if my_button.is_pressed_queue_empty() == False:
61
                # Then print the time since the last and first button press
62
                print("\n" + str(my_button.time_since_last_press() / 1000.0) + "s since_
    →he button was last pressed
               print(str(my_button.time_since_first_press() / 1000.0) +"s since the...
   →button was first pressed ")
           # If the queue is empty
65
           else:
66
                print("\nButton Pressed Queue is empty! ")
67
            # If the queue of clicked events is not empty
69
           if my_button.is_clicked_queue_empty() == False:
70
                # Then print the time since the last and first button click
71
               print("\n" + str(my_button.time_since_last_click() / 1000.0) + "s since_
72.
   \hookrightarrowthe button was last clicked ")
               print(str(my_button.time_since_first_click() / 1000.0) + "s since the_
73
   ⇒button was first clicked")
           # If the queue is empty
           else:
75
                print("\nButton Clicked Queue is empty!")
76
77
           time.sleep(0.02)
                               # Let's not hammer too hard on the I2C bus
78
79
80
       __name__ == '__main__':
       try:
81
           run_example()
82
       except (KeyboardInterrupt, SystemExit) as exErr:
83
           print("\nEnding Example 4")
84
           sys.exit(0)
85
```

7.6 Example 5

Listing 5: examples/qwiic_button_ex5_popQueue.py

(continues on next page)

7.6. Example 5 25

```
# board computers.
12
13
   # More information on qwiic is at https://www.sparkfun.com/qwiic
14
15
   # Do you like this library? Help support SparkFun. Buy a board!
16
17
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   # OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
   # SOFTWARE.
   #-----
38
   # Example 5
39
40
   from __future__ import print_function
41
   import qwiic_button
42
   import time
43
   import sys
44
45
   def run_example():
46
47
       print("\nSparkFun Qwiic Button Example 5")
48
       my_button = qwiic_button.QwiicButton()
49
51
       if my_button.begin() == False:
          print("\nThe Qwiic Button isn't connected to the system. Please check your,
52
   ⇔connection". \
               file=sys.stderr)
53
54
           return
55
       print("\nButton ready!")
56
57
       while True:
58
59
           print("\nType 'p' to pop a value from the pressed queue.")
60
           val = raw_input("Type 'c' to pop a value from the clicked queue: ")
61
           # If the character is c or C, then pop a value off of the clicked queue
62
           if val == "c" or val == "C":
63
               print("\nPopped Clicked Queue! The first value of clicked queue was: ")
64
               print(str(my_button.pop_clicked_queue() / 1000.0))
65
           # If the character is p or P, then pop a value off of the pressed queue
66
           if val == "p" or val == "P":
```

(continues on next page)

```
print("\nPopped Pressed Queue!")
68
                print(str(my_button.pop_clicked_queue() / 1000.0))
69
70
                                # Let's not hammer too hard on the I2C bus
            time.sleep(0.02)
71
72
   if __name__ == '__main__':
73
       try:
74
           run_example()
75
       except (KeyboardInterrupt, SystemExit) as exErr:
76
           print("\nEnding Example 5")
77
           sys.exit(0)
```

7.7 Example 6

Listing 6: examples/qwiic_button_ex6_changeI2CAddress.py

```
#!/usr/bin/env python
2
   # qwiic_button_ex5.py
3
4
   # Simple Example for the Qwiic Button. Shows how to change the I2C address of
   # the Qwiic Button
7
8
   # Written by Priyanka Makin @ SparkFun Electronics, January 2021
9
10
   # This python library supports the SparkFun Electroncis qwiic
11
   # qwiic sensor/board ecosystem on a Raspberry Pi (and compatable) single
   # board computers.
13
14
   # More information on qwiic is at https://www.sparkfun.com/qwiic
15
16
   # Do you like this library? Help support SparkFun. Buy a board!
17
   #-----
19
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```

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7.7. Example 6 27

```
#-----
   # Example 5
40
41
   from __future__ import print_function
42
   import qwiic_i2c
43
   import qwiic_button
   import time
45
   import sys
46
47
   def run_example():
48
49
       print("\nSparkFun Qwiic Button Example 6")
51
       my_button = qwiic_button.QwiicButton()
52
       if my_button.begin() == False:
53
           print("\nThe Qwiic Button isn't connected to the system. Please check your,
54
   ⇔connection", \
               file=sys.stderr)
           return
56
57
       print("\nButton ready!")
58
59
       print("\nEnter a new I2C address for the Qwiic Button to use.")
60
       print("\nDon't use the 0x prefix. For instance, if you wanted to")
61
       print("\nchange the address to 0x5B, you would type 5B and hit enter.")
62
       new_address = raw_input("\nNew Address: ")
64
       new_address = int(new_address, 16)
65
66
       # Check if the user entered a valid address
67
       if new_address > 0x08 and new_address < 0x77:</pre>
68
69
           print("\nCharacters received and new address valid!")
           print("\nAttempting to set Qwiic Button address...")
70
71
           my_button.set_I2C_address(new_address)
72.
           print("\nAddress successfully changed!")
73
           # Check that the Qwiic Button acknowledges on the new address
74
           time.sleep(0.02)
           if my_button.begin() == False:
               print("\nThe Qwiic Button isn't connected to the system. Please check...
77
   →vour connection", \
                   file=sys.stderr)
78
79
80
           else:
81
               print("\nButton acknowledged on new address!")
82
       else:
83
           print("\nAddress entered not a valid I2C address")
84
85
   if __name__ == '__main__':
86
87
       try:
           run_example()
88
       except (KeyboardInterrupt, SystemExit) as exErr:
89
           print("\nEnding Example 6")
90
           sys.exit(0)
91
```

7.8 Example 7

Listing 7: examples/qwiic_button_ex7_2Buttons.py

```
#!/usr/bin/env python
2
   # qwiic_button_ex7.py
   # Simple Example for the Qwiic Button. Daisy chain together two Qwiic Buttons
   # with different I2C addresses. This example works for a Qwiic Button with the
   # default address of 0x6F and one with an address changed to 0x5B. To change
   # the address of a Qwiic Button, please visit example 6.
10
   # Written by Priynka Makin @ SparkFun Electronics, January 2021
11
12
   # This python library supports the SparkFun Electroncis qwiic
13
   # qwiic sensor/board ecosystem on a Raspberry Pi (and compatable) single
14
   # board computers.
   # More information on qwiic is at https://www.sparkfun.com/qwiic
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   # Do you like this library? Help support SparkFun. Buy a board!
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40
41
   # Example 7
   from __future__ import print_function
44
   import qwiic i2c
45
   import qwiic_button
46
   import time
47
   import sys
48
50
   def run_example():
51
       print("\nSparkFun Qwiic Button Example 7")
52
       my_button1 = qwiic_button.QwiicButton()
```

(continues on next page)

7.8. Example 7 29

```
my\_button2 = qwiic\_button.QwiicButton(0x5B)
54
55
       if my_button1.begin() == False:
56
            print("\nThe Qwiic Button 1 isn't connected to the system. Please check your_
57
    \hookrightarrowconnection", \
                file=sys.stderr)
58
            return
59
       if my_button2.begin() == False:
60
            print("\n The Qwiic Button 2 isn't connected to the system. Please check your_
61
    →connection", \
                file=sys.stderr)
62
            return
       print("\nButton's ready!")
65
66
       while 1:
67
68
            # Check if button 1 is pressed
69
            if my_button1.is_button_pressed() == True:
70
                print("\nButton 1 is pressed!")
71
72
            # Check if button2 is pressed
73
            if my_button2.is_button_pressed() == True:
74
                print("\nButton 2 is pressed!")
75
                               # Don't hammer too hard on the I2C bus
            time.sleep(0.02)
78
   if __name__ == '__main__':
79
80
       try:
            run_example()
81
       except (KeyboardInterrupt, SystemExit) as exErr:
82
            print("\nEnding Example 7")
83
            sys.exit(0)
84
```

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