



Application Note

BRT_AN_080

LDSBus Python SDK on IDM2040 User Guide

Version 1.0

Issue Date: 29-11-2021

This document provides information about how to setup and use the LDSBus Python SDK on IDM2040.

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1 Introduction

This document describes how to use IDM2040 with LDSU circuitpy example including the Installation procedure for Thonny Python IDE and steps to execute LDSU circuitpy examples.

The Python SDK will run on IDM2040 with appropriate LDSBus interface. IDM2040 has built-in LDSBus interface and is capable of supplying up to 24v to the LDSBus. More information on the IDM2040 is available at <https://brtchip.com/product/>.

2 Credits

Open Source Software

- Thonny Python IDE: <https://thonny.org>

3 Getting Started with IDM2040

3.1 Hardware Overview

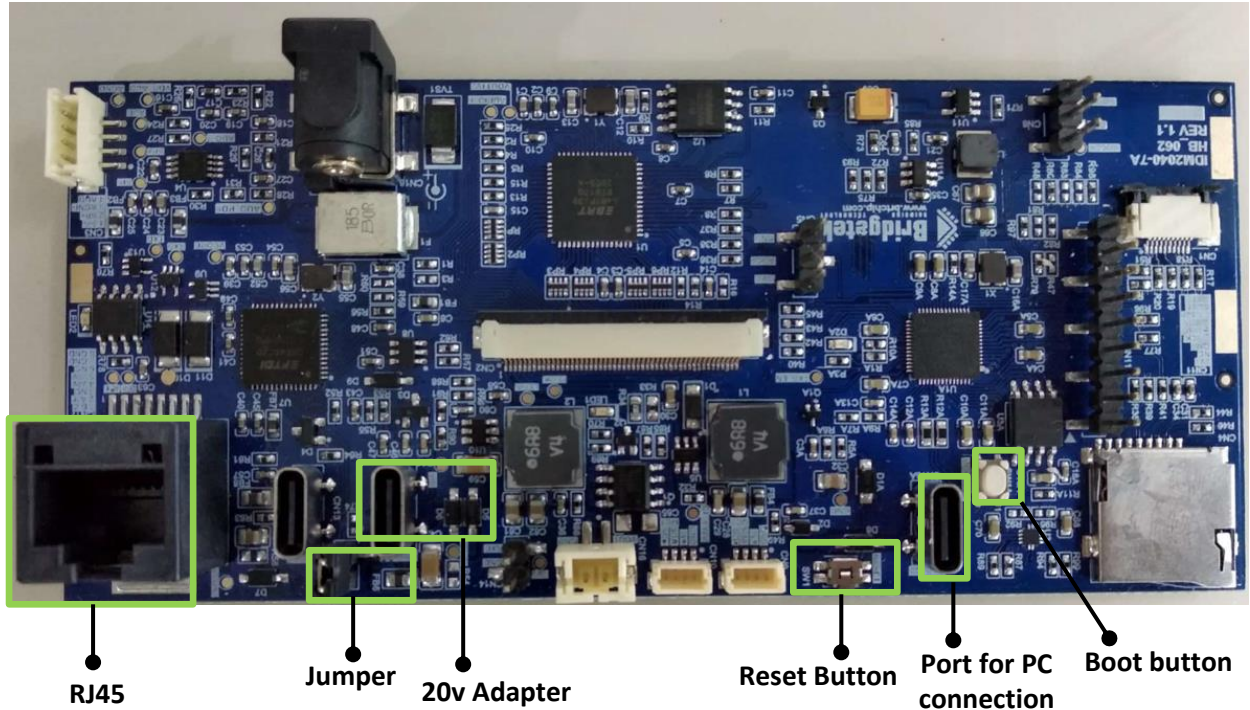
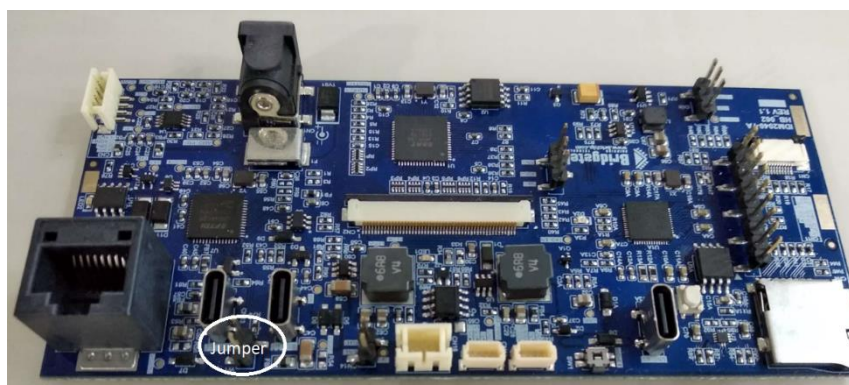


Figure 1 - IDM2040 Hardware Features

3.2 Hardware Setup Instructions

Follow these steps to setup the IDM2040 Hardware Setup –

- a. Remove the Jumper.



- b. Connect the LDSU module to HVT.



- c. Using RJ45 cable, connect HVT to IDM2040 RJ45 connector.



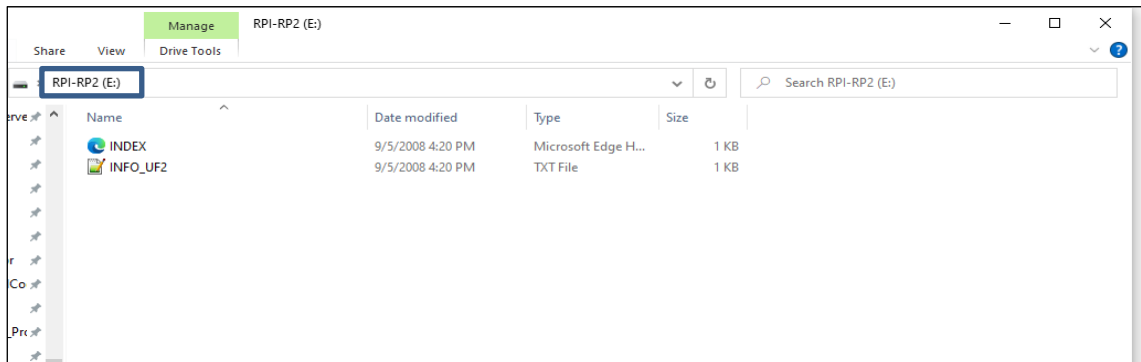
- d. Connect the 20v supply adapter using a USB-C cable to the USB-C port on the IDM2040.



- e. Turn on the 20v adapter using the AC power supply.
- f. Connect IDM2040 to PC using Type-C cable.



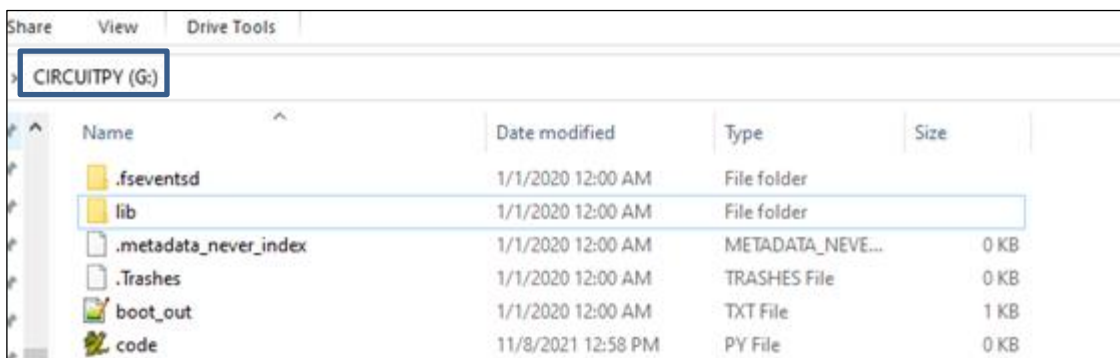
- g. Press the Boot button the IDM2040 board; Hold it for a few seconds and release it after resetting the board. Windows will open a drive named "RP1-RP2".



- h. In the given example package, there must be an ".uf2" file, copy the file and paste it into "RP1-RP2" drive.

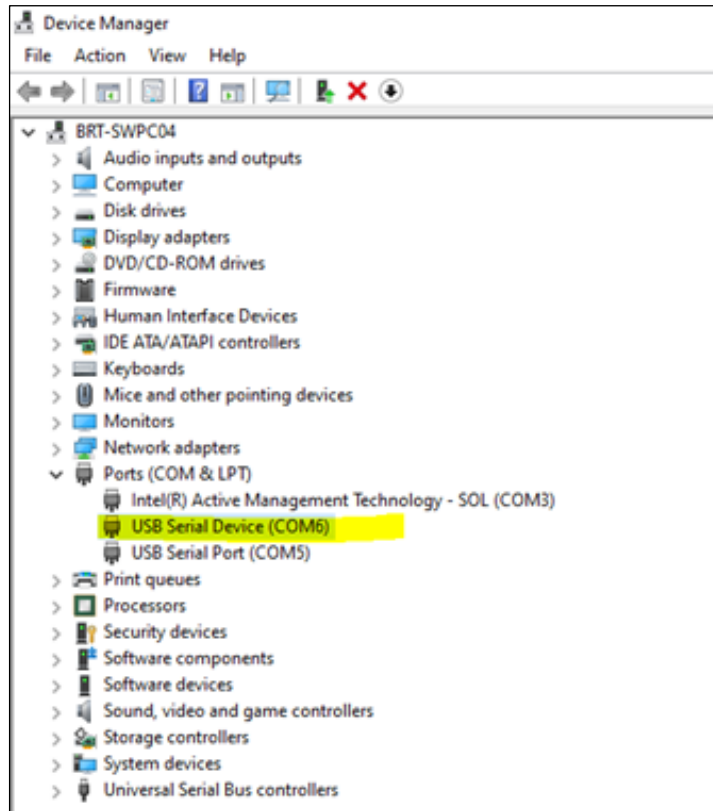
Name	Date modified	Type	Size
SAMPLES	11/11/2021 1:40 PM	File folder	
IDM2040_FIRMWARE.uf2	11/11/2021 1:36 PM	UF2 File	1,512 KB

- i. Upon copying the ".uf2" file to "RP1-RP2", the device will reboot automatically and again will appear as a new drive, such as "CIRCUITPY".



The "code.py" is the main file which runs every time the IDM2040 is reset. Open this file and delete any content inside of it before saving.

- j. The COM port for this device will appear in Device Manager. Here is an example screen showing the IDM2040's COM Port as COM6.

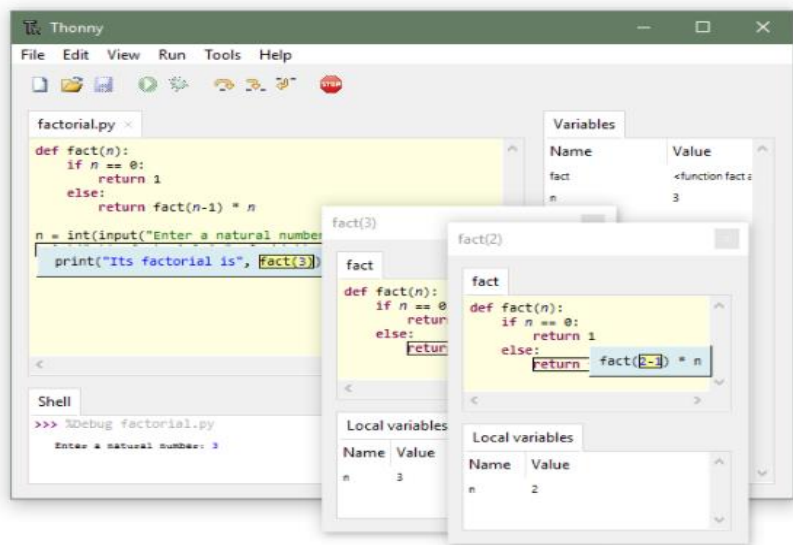


4 Thonny Python IDE - Installation/Setup Instructions

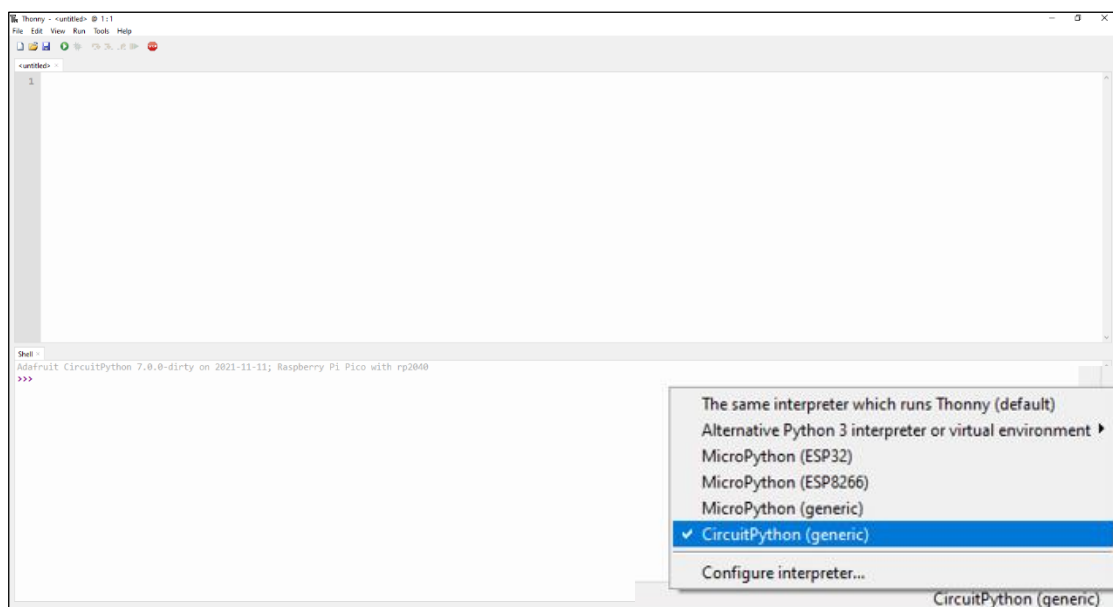
Follow these steps to install and setup Thonny Python IDE –

- a. Download the Thonny Python IDE package from <https://thonny.org/>.
- b. Click **Windows** to download the windows version.

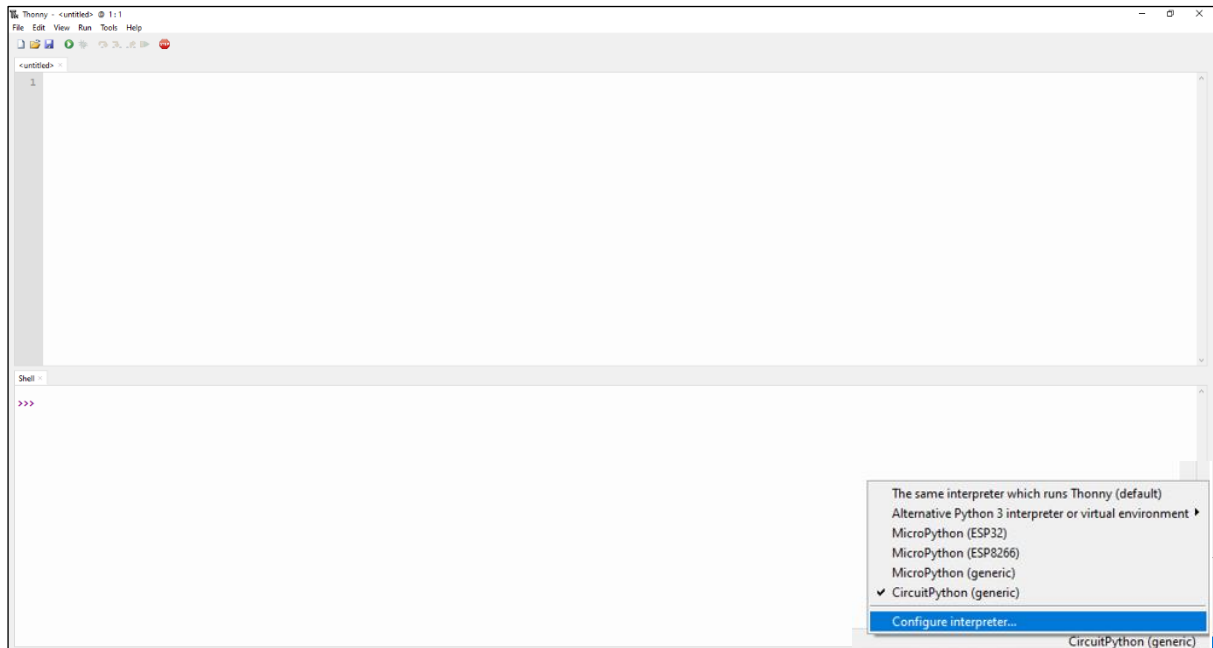
Thonny
 Python IDE for beginners



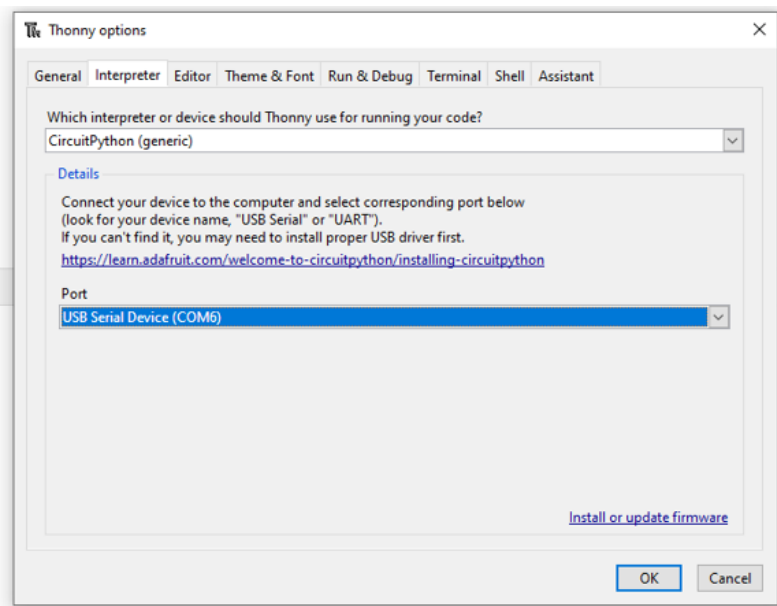
- c. Upon downloading the application, complete the installation by clicking the executable file (.exe) and following the installation wizard. Upon completing the installation, open the Thonny Python IDE from the *Windows Startup*.
- d. To open the Properties, click the left mouse button at the right bottom corner. Select **"CircuitPython (generic)"**.



- e. Click **"Configure Interpreter..."**.



- f. Click on the Port drop down and select the port appeared for IDM2040 in device manager after connecting. In this example screenshot COM port appeared as COM6. Click **[OK]**.



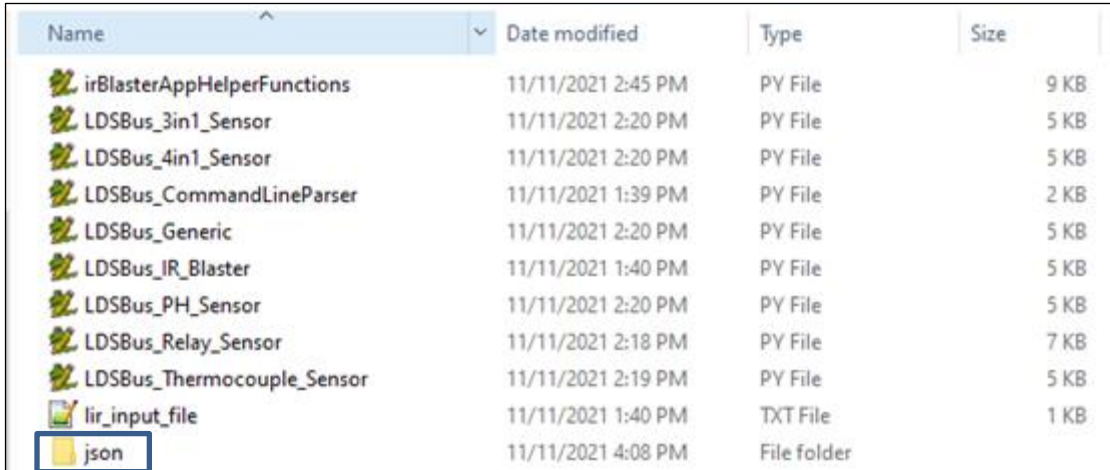
- g. Thonny will report the device information at the interpreter prompt ("*Adafruit CircuitPython 7.0.0-dirty on 2021-11-11; Raspberry Pi Pico with rp2040*") if the device port is correct.

```
Adafruit CircuitPython 7.0.0-dirty on 2021-11-11; Raspberry Pi Pico with rp2040  
>>>
```

5 Procedure to run LDSU Circuitpy Sample Example using Thonny

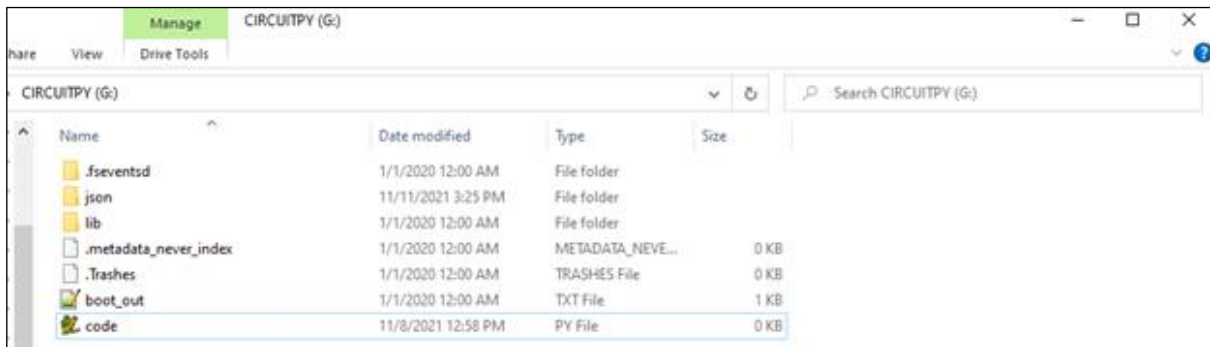
Follow these steps to run the LDSU circuitpy sample example –

- a. Open the sample package file. As part of the sample package there is a folder by name **"json"** which contains various sensor json file.



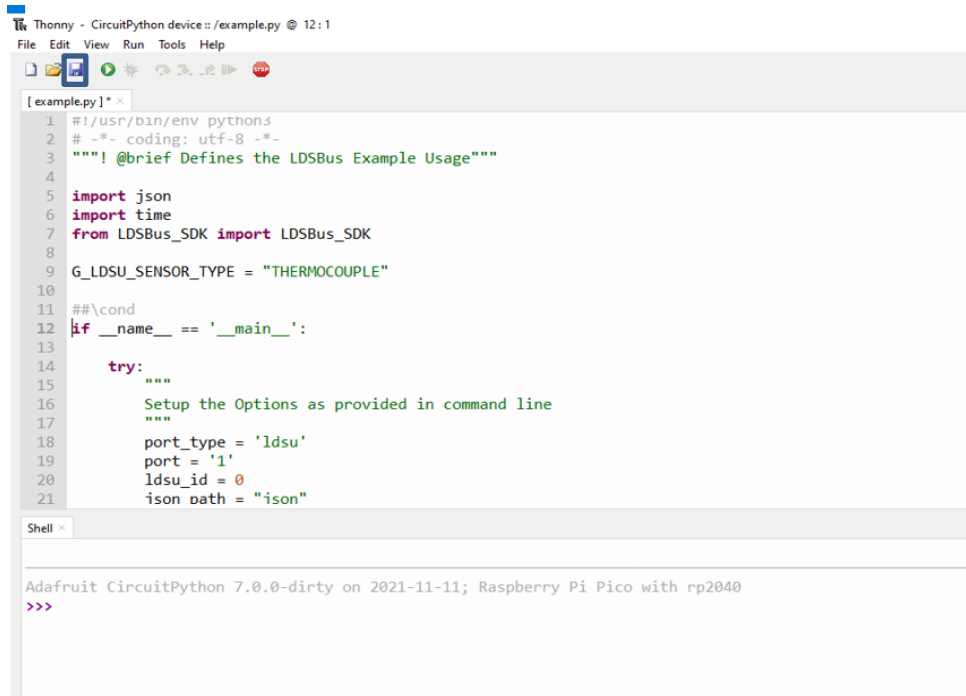
Name	Date modified	Type	Size
irBlasterAppHelperFunctions	11/11/2021 2:45 PM	PY File	9 KB
LDSBus_3in1_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_4in1_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_CommandLineParser	11/11/2021 1:39 PM	PY File	2 KB
LDSBus_Generic	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_IR_Blaster	11/11/2021 1:40 PM	PY File	5 KB
LDSBus_PH_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_Relay_Sensor	11/11/2021 2:18 PM	PY File	7 KB
LDSBus_Thermocouple_Sensor	11/11/2021 2:19 PM	PY File	5 KB
lir_input_file	11/11/2021 1:40 PM	TXT File	1 KB
json	11/11/2021 4:08 PM	File folder	

- b. Copy and paste the "json" folder to the "CIRCUITPY" storage device.



Name	Date modified	Type	Size
.fseventsd	1/1/2020 12:00 AM	File folder	
json	11/11/2021 3:25 PM	File folder	
lib	1/1/2020 12:00 AM	File folder	
.metadata_never_index	1/1/2020 12:00 AM	METADATA_NEVE...	0 KB
.Trashes	1/1/2020 12:00 AM	TRASHES File	0 KB
boot_out	1/1/2020 12:00 AM	TXT File	1 KB
code	11/8/2021 12:58 PM	PY File	0 KB

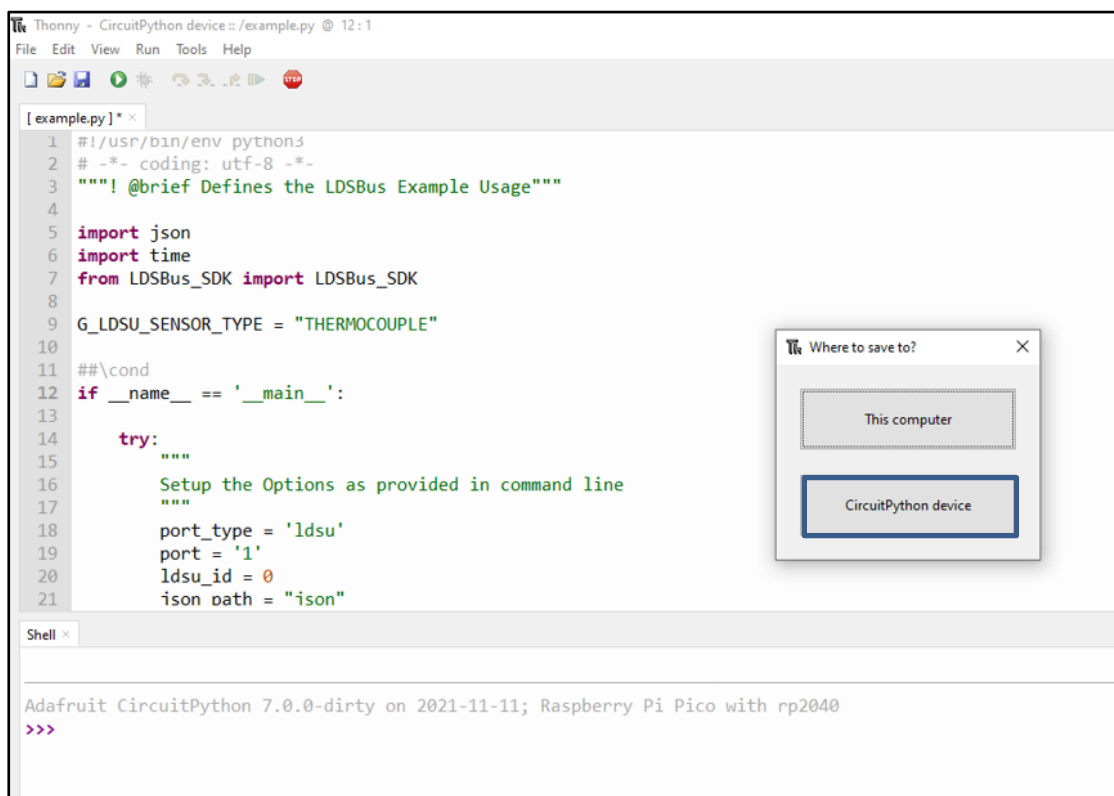
- c. Open any given example using a text editor such as notepad ++ and copy it to the Thonny Editor and save it. For example, open "*LDSBus_Thermocouple_Sensor.py*" and copy/paste on Thonny Editor. Click **[Save]**.



```

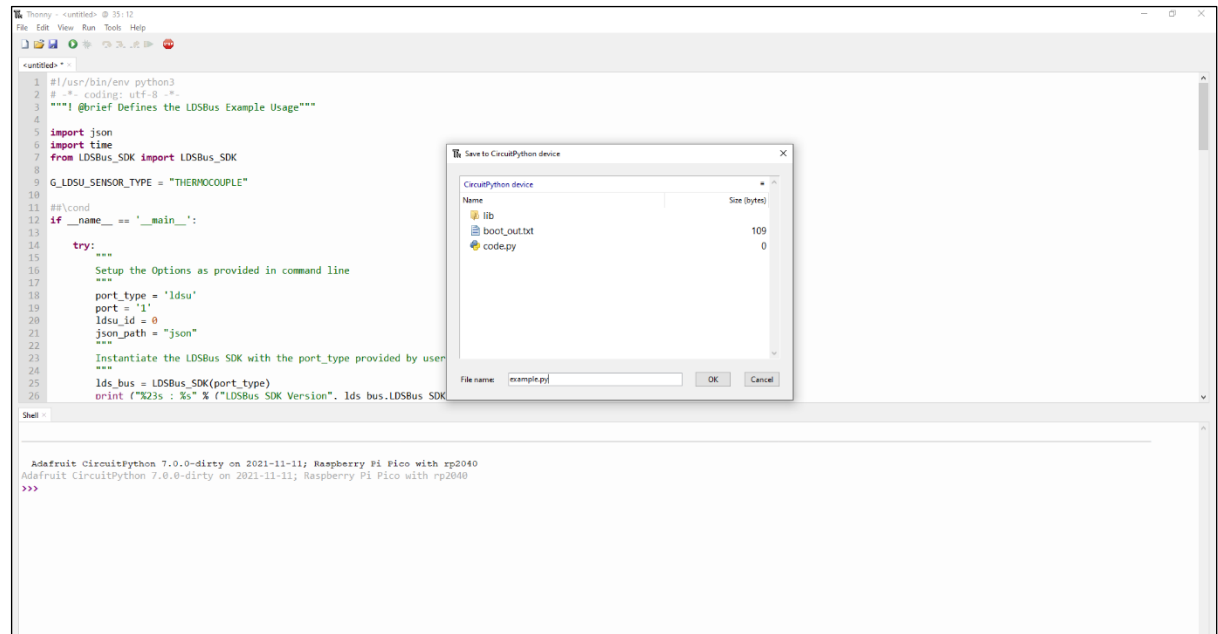
1  #!/usr/bin/env python3
2  # -*- coding: utf-8 -*-
3  """! @brief Defines the LDSBus Example Usage"""
4
5  import json
6  import time
7  from LDSBus_SDK import LDSBus_SDK
8
9  G_LDSU_SENSOR_TYPE = "THERMOCOUPLE"
10
11  ##\cond
12  if __name__ == '__main__':
13
14      try:
15          """
16          Setup the Options as provided in command line
17          """
18          port_type = 'ldsu'
19          port = '1'
20          ldsu_id = 0
21          ison path = "ison"
  
```

- d. Upon clicking **[Save]**, a "Where to save to?" dialog box will be displayed. Click and select *CircuitPython device*.

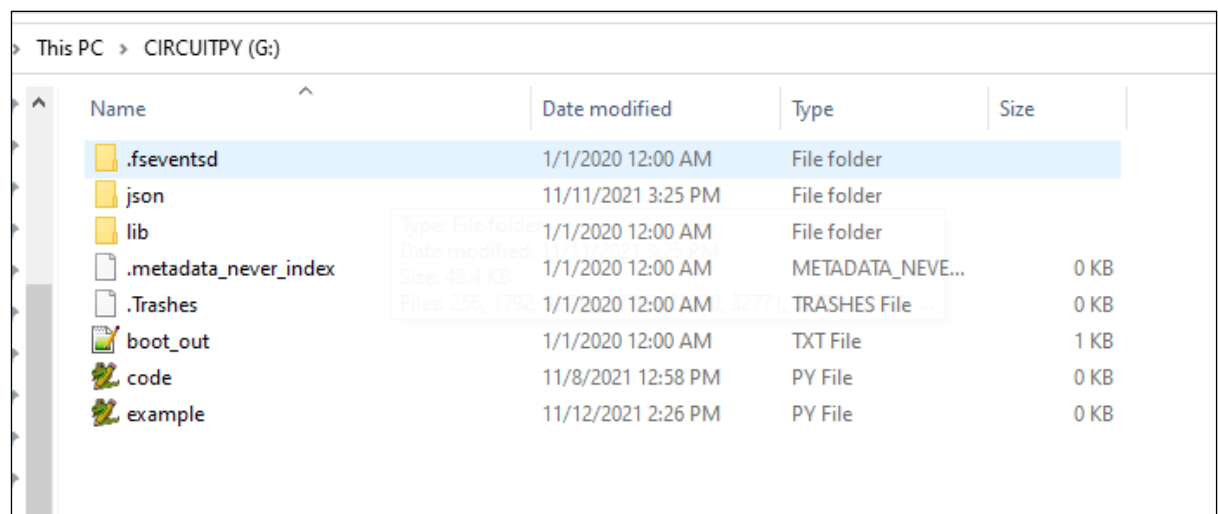


- e. Enter a file name and click **[OK]**.

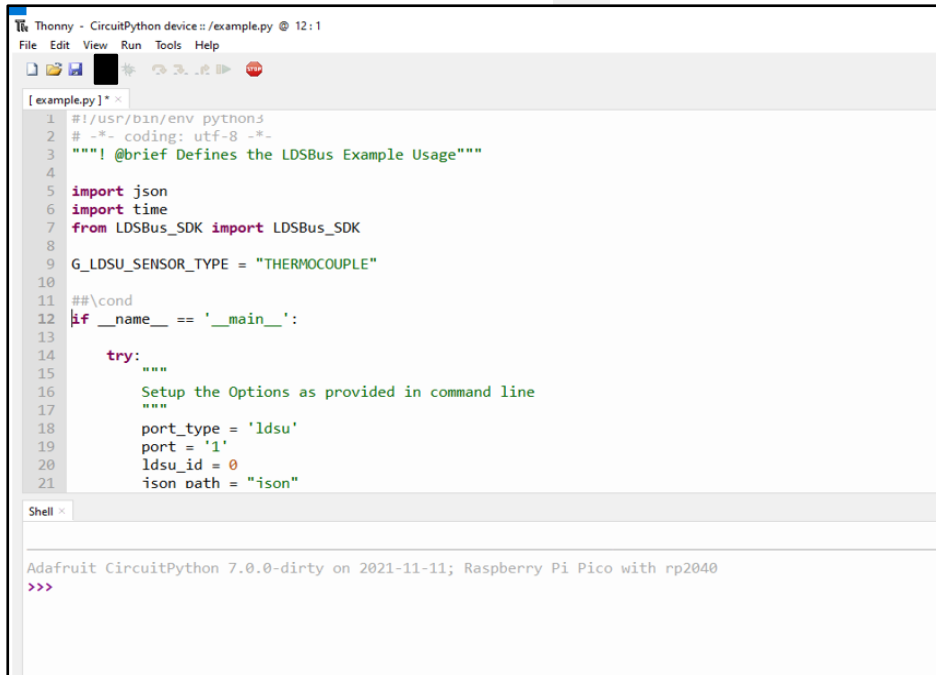
Note: When sample code is saved to “code.py” then every time it reboots, it will begin running “code.py”. In order to avoid this, specify a different name.



- f. The file will be saved to “CIRCUITPY” drive.



- g. To run the example from Thonny Editor, click  (Run current script).



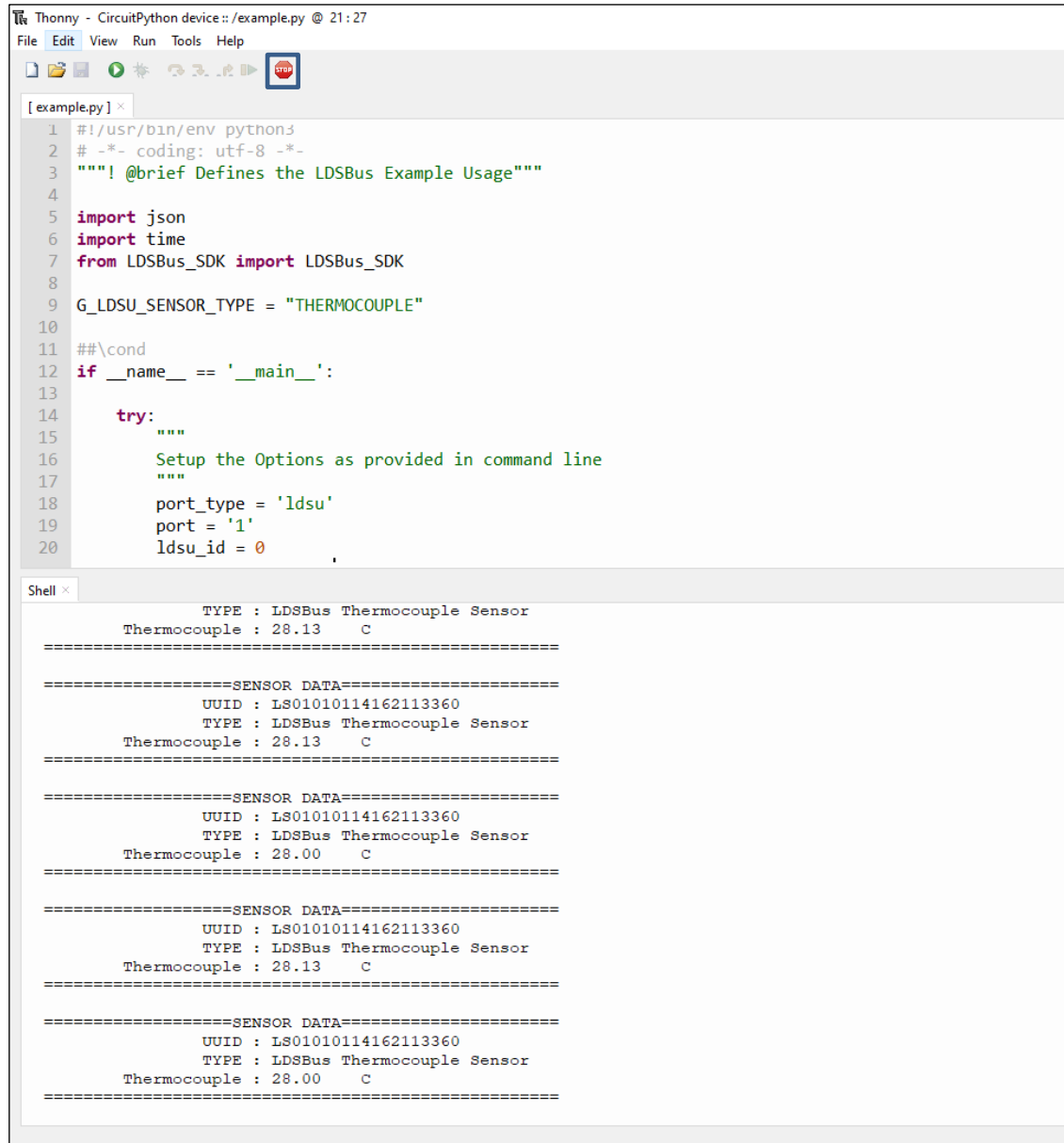
```

Thonny - CircuitPython device: /example.py @ 12:1
File Edit View Run Tools Help

[ example.py ] * x
1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """! @brief Defines the LDSBus Example Usage"""
4
5 import json
6 import time
7 from LDSBus_SDK import LDSBus_SDK
8
9 G_LDSU_SENSOR_TYPE = "THERMOCOUPLE"
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12 if __name__ == '__main__':
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```

- i. To stop the execution, click  (Stop). Users can update the code as required or can copy/paste another example to try in the Thonny editor.

Note: Upon making any changes to the script file, remember to Save and Run the script.



The screenshot shows the Thonny IDE interface. The top window displays a Python script named `example.py`. The script imports `json` and `time` from the `LDSBus_SDK` module, sets a sensor type to `"THERMOCOUPLE"`, and contains a `try` block for setup. The bottom window, titled `Shell`, shows the output of the script, which prints sensor data including UUIDs and temperatures.

```

1 #!/usr/bin/env python3
2 # -*- coding: utf-8 -*-
3 """! @brief Defines the LDSBus Example Usage"""
4
5 import json
6 import time
7 from LDSBus_SDK import LDSBus_SDK
8
9 G_LDSU_SENSOR_TYPE = "THERMOCOUPLE"
10
11 ##\cond
12 if __name__ == '__main__':
13
14     try:
15         """
16         Setup the Options as provided in command line
17         """
18         port_type = 'ldsu'
19         port = '1'
20         ldsu_id = 0
  
```

```

          TYPE : LDSBus Thermocouple Sensor
    Thermocouple : 28.13    C
=====
=====SENSOR DATA=====
          UUID : LS01010114162113360
          TYPE : LDSBus Thermocouple Sensor
    Thermocouple : 28.13    C
=====
=====SENSOR DATA=====
          UUID : LS01010114162113360
          TYPE : LDSBus Thermocouple Sensor
    Thermocouple : 28.00    C
=====
=====SENSOR DATA=====
          UUID : LS01010114162113360
          TYPE : LDSBus Thermocouple Sensor
    Thermocouple : 28.13    C
=====
=====SENSOR DATA=====
          UUID : LS01010114162113360
          TYPE : LDSBus Thermocouple Sensor
    Thermocouple : 28.00    C
=====
  
```

- j. Remember to copy the following files - "irBlasterAppHelperFunctions" and "lir_input_file.txt" before trying the LDSBus_IR_Blaster.py example.

Name	Date modified	Type	Size
ison	11/11/2021 4:08 PM	File folder	
irBlasterAppHelperFunctions	11/11/2021 2:45 PM	PY File	9 KB
LDSBus_3in1_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_4in1_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_CommandLineParser	11/11/2021 1:39 PM	PY File	2 KB
LDSBus_Generic	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_IR_Blaster	11/11/2021 1:40 PM	PY File	5 KB
LDSBus_PH_Sensor	11/11/2021 2:20 PM	PY File	5 KB
LDSBus_Relay_Sensor	11/11/2021 2:18 PM	PY File	7 KB
LDSBus_Thermocouple_Sensor	11/11/2021 2:19 PM	PY File	5 KB
lir_input_file	11/11/2021 1:40 PM	TXT File	1 KB

Refer to [BRT AN 078 LDSU IR Blaster Application](#) for more details on "LDSBus_IR_Blaster.py" example.

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Appendix A – References

Document References

[BRT_API_002 LDSBus Python SDK Guide](#)

[BRT_AN_078 LDSU IR Blaster Application](#)

Acronyms and Abbreviations

Terms	Description
HVT	High Voltage T-Junction
IDE	Integrated Development Environment
LDSBus	Long Distance Sensor Bus
USB	Universal Serial Bus

Appendix B – List of Tables & Figures

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Figure 1 - IDM2040 Hardware Features 5

Appendix C – Revision History

Document Title: BRT_AN_080 LDSBus Python SDK on IDM2040 User Guide
Document Reference No.: BRT_000378
Clearance No.: BRT#187
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Revision	Changes	Date
1.0	Initial Release	29-11-2021