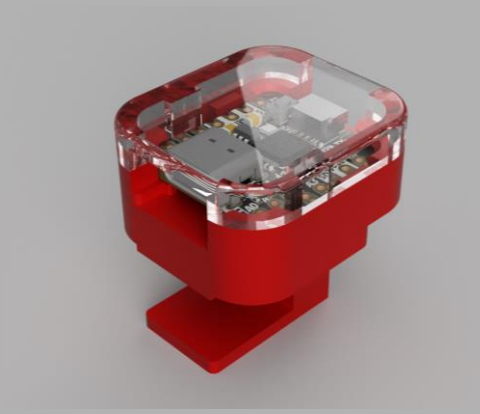


SERIAL HAND RAISER ASSEMBLY GUIDE

An accessible serial hand raiser device

Milad Hajihassan
https://github.com/milador/Serial-Hand-Raiser

Contents

Components List

1. ADAFRUIT QT PY - SAMD21 DEV BOARD **x 1**

The bill of materials can also be downloaded from GitHub repository under main directory.

https://github.com/milador/Serial-Hand-Raiser/blob/main/Documentation/Serial_Hand_Raiser_BOM.csv

Software

The Serial-Hand-Raiser software can be downloaded from the GitHub repository under software directory.

https://github.com/milador/Serial-Hand-Raiser/blob/main/Software/Serial_Hand_Raiser/Serial_Hand_Raiser.ino

Installing Arduino IDE

The Arduino IDE is required to compile and upload the source code to the MCU in your Adafruit QT Py board. You can download and install the Arduino from official Arduino website that you can find using following link:

https://www.arduino.cc/en/software

Installing Arduino Libraries

The following instructions on how to install additional Arduino libraries helps you to get started with setting up Arduino IDE with required libraries and dependencies.

https://www.arduino.cc/en/guide/libraries

Board Support Packages

You can find the official instructions to install Board Support Packages on Adafruit website using following link:

https://learn.adafruit.com/adafruit-qt-py/arduino-ide-setup

Alternatively, you can perform following instructions to install Board Support Packages:

1. Open and start the Arduino IDE.
2. Go to ***File > Preferences***.
3. Add following link as a new line under ***Additional Board Manager URLs***
    - ***https://www.adafruit.com/package_adafruit_index.json***
4. Restart the Arduino IDE
5. Open the ***Boards Manager*** option from the ***Tools > Board*** menu and install ***Adafruit SAMD Boards by Adafruit***
6. Wait until the IDE finishes installing the cross-compiling toolchain and tools associated with Board Support Package. This may take few minutes.
7. That's it! The installation of Board Support Packages is finished.

Required Software and libraries

The USB version of the software requires the following files and libraries:

- Adafruit_NeoPixel library
- Serial_Hand_Raiser.ino

Serial-Hand-Raiser is using Adafruit_NeoPixel library to provide visual feedback using RGB LED.

You can use the following instructions to download and install the required libraries:

1) Visit the Serial_Hand_Raiser.ino raw source code file under ***Serial-Hand-Raiser*** github repository page.
2) Right click on the source code or any place on this page and select ***Save Page As…***
3) Select the directory you would like to save the software in your computer.
4) Change ***File name*** from ***Serial_Hand_Raiser*** to ***Serial_Hand_Raiser.ino***
5) Change ***Save as type*** to ***All Files***.
6) Click on ***Save*** button.
7) Open the directory you selected in ***step 3***.
8) Double left click or open ***Serial_Hand_Raiser*** file
9) Arduino IDE will ask your permission to create a new sketch folder named ***Serial_Hand_Raiser*** and move ***Serial_Hand_Raiser.ino*** under this folder.
10) Click on the ***Ok*** button.
11) Arduino IDE should now open the ***Serial_Hand_Raiser.ino*** file automatically.

Uploading Software

Note: Make sure all files are included in your local copy of Software directory before uploading it to the Adafruit* QT PY *board. The libraries can be installed in Arduino libraries.

You can go ahead and upload the downloaded ***Serial_Hand_Raiser.ino*** code to Adafruit QT PY board using Arduino IDE once all the necessary libraries are installed.

1. Start the Arduino IDE
2. Open ***Serial_Hand_Raiser.ino***
3. Select the Board under ***Tools > Board > Adafruit SAMD Boards*** as ***Adafruit QT PY (SAMD21)***
4. Select the correct port number under ***Tools > Port*** which should show ***COM XX (Adafruit QT PY)***

Note: It's very important to make sure the correct Board and port number are selected as selecting the wrong board may result problems with bootloader of Adafruit* QT PY *board.

5. Press the ***Verify*** button to make sure there is no problem with the software and libraries.
6. Press ***Upload*** button

You can now go ahead and upload the software. Arduino IDE will show you a ***Done Uploading*** message indicating the software is uploaded to your Serial-Hand-Raiser.

You can now use the web app or Serial Monitor in Arduino IDE on 9600 baud-rate to send actions and colors to the Serial Hand Raiser.

Hardware Assembly

Enclosure design

The enclosure/housing files in STL format can be downloaded from GitHub repository under Hardware directory.

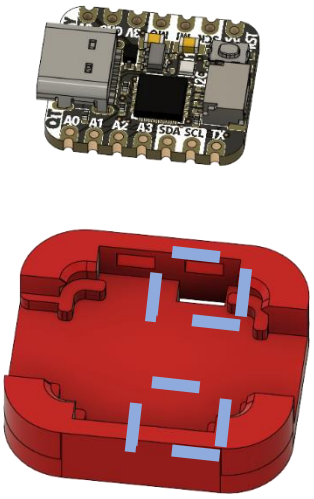
- Hand_Raiser_Bottom.STL
- Hand_Raiser_Holder.STL
- Hand_Raiser_Top.STL

https://github.com/milador/Serial-Hand-Raiser/tree/main/Hardware/Case/STL

Serial-Hand-Raiser Assembly

1

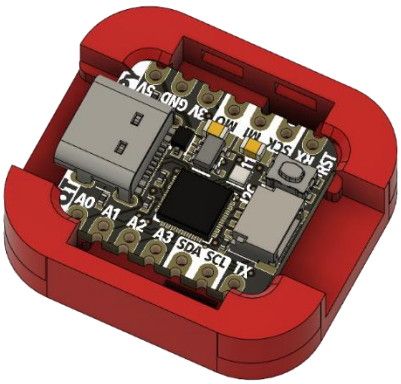
Step 1: Serial-Hand-Raiser bottom case x 1.



2

Step 2: Align the QT PY board according to the inner edges of Serial-Hand-Raiser bottom case.

Make sure USB Port is on the opposite side of button case cutouts.



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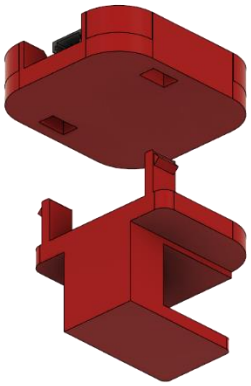
Step 3: Snap in the QT PY board to the Serial-Hand-Raiser bottom case.

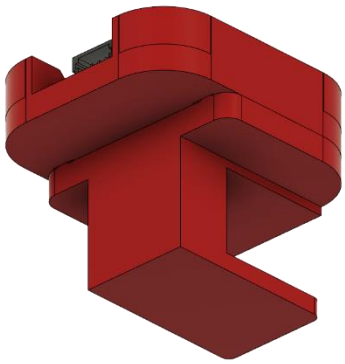
4

Step 4: Turn around the Serial-Hand-Raiser bottom case.



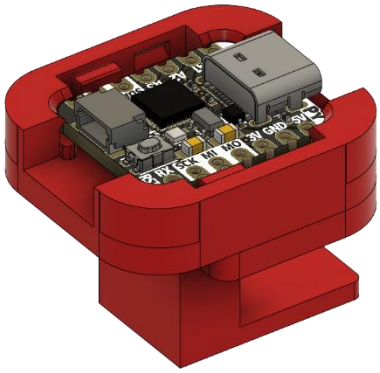
5

Step 5: Serial-Hand-Raiser holder case x 1.



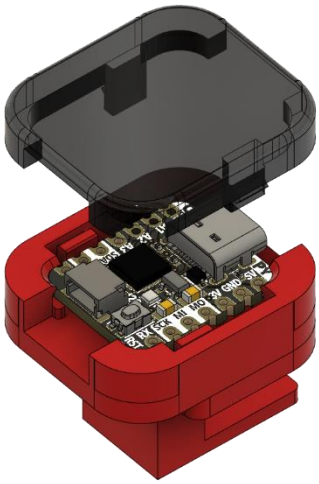
6

Step 6: Snap in the Serial-Hand-Raiser holder case to the Serial-Hand-Raiser bottom case.



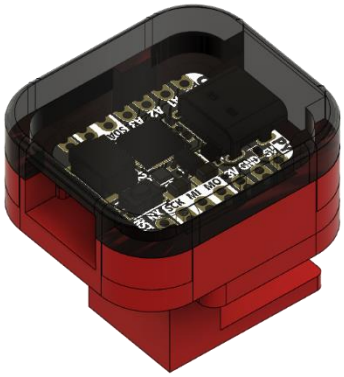
7

Step 7: Turn the unit to its top side.



8

Step 8: Serial-Hand-Raiser bottom case x 1.



9

Step 9: Snap in the Serial-Hand-Raiser top case to the Serial-Hand-Raiser bottom case.