Program mBot Mega with Raspberry Pi in Python

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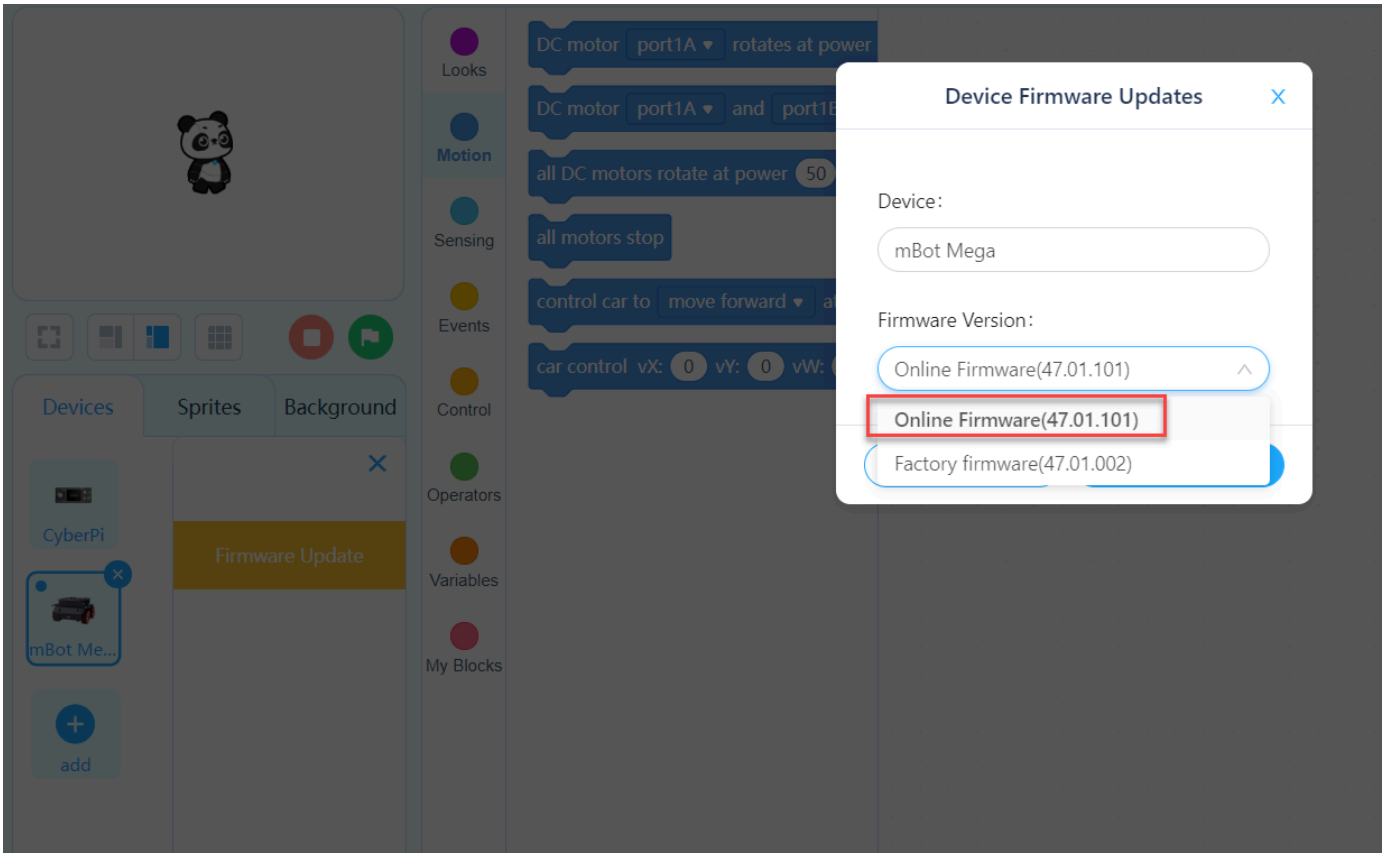
Admin
June 02, 2021 09:23

To use Raspberry Pi to communicate with mBot Mega, drive its motors, and obtain the output data of its sensors, you need to update the firmware of mBot Mega on mBlock 5 to the online firmware first and then connect it to Raspberry Pi.



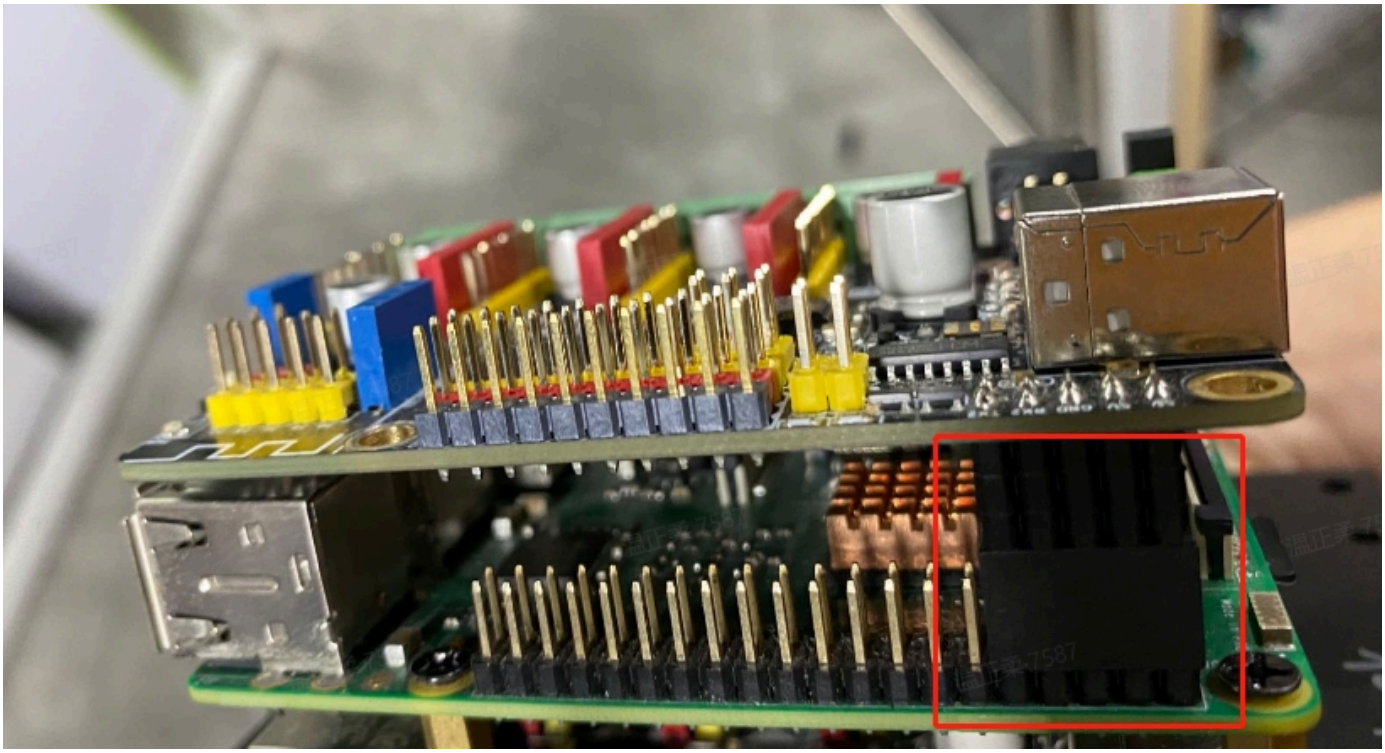
For details about how to update the firmware, see Updating the Firmware of mBot Mega.

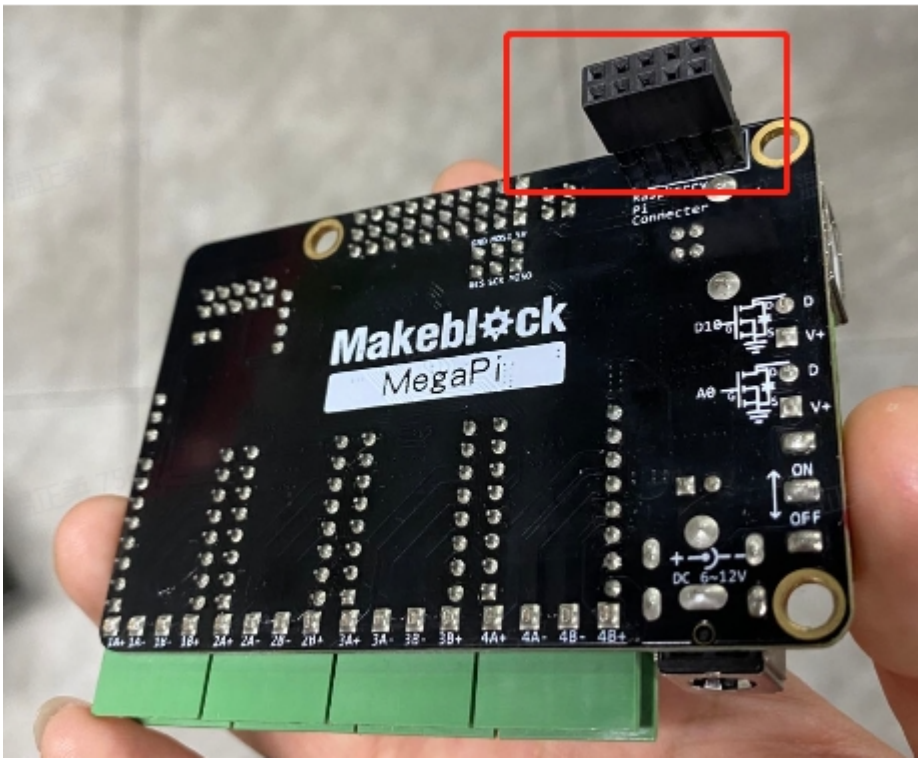
Prepare the Raspberry Pi:

Here are some steps to successfully connect mBot Mega to Raspberry Pi:

The first connection method： GPIO method

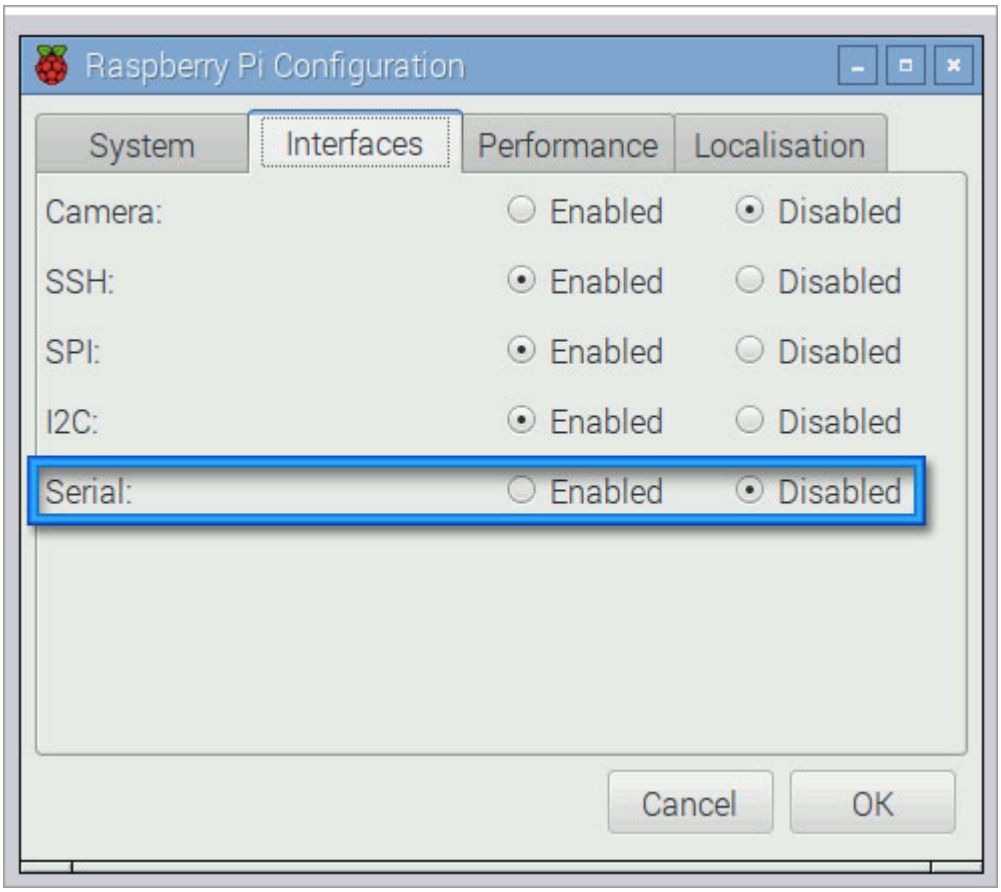
Connect Raspberry Pi and MegaPi with a cable or 2.54mm female header connector (see the pictures for your reference)





Tip: When you connect Raspberry Pi and MegaPi with a 2.54mm female header connector, you only need one battery pack to power both of them.

First in your Raspberry Pi, disable the login prompt
from **Desktop** > **Menu** > **Preferences** > **Raspberry Pi Configuration**.



- If you are using raspberry 3 B+, since the Bluetooth function takes up the ttyAMA0 port, you have two ways to solve this problem.

a. Disable the pi3 bluetooth and restore UART0/ttyAMA0 over GPIOs 14&15

b. Switch pi3 blutooth function to use the mini-UART(ttyS0) and restore UART0/ttyAMA0 over GPIOs 14&15.

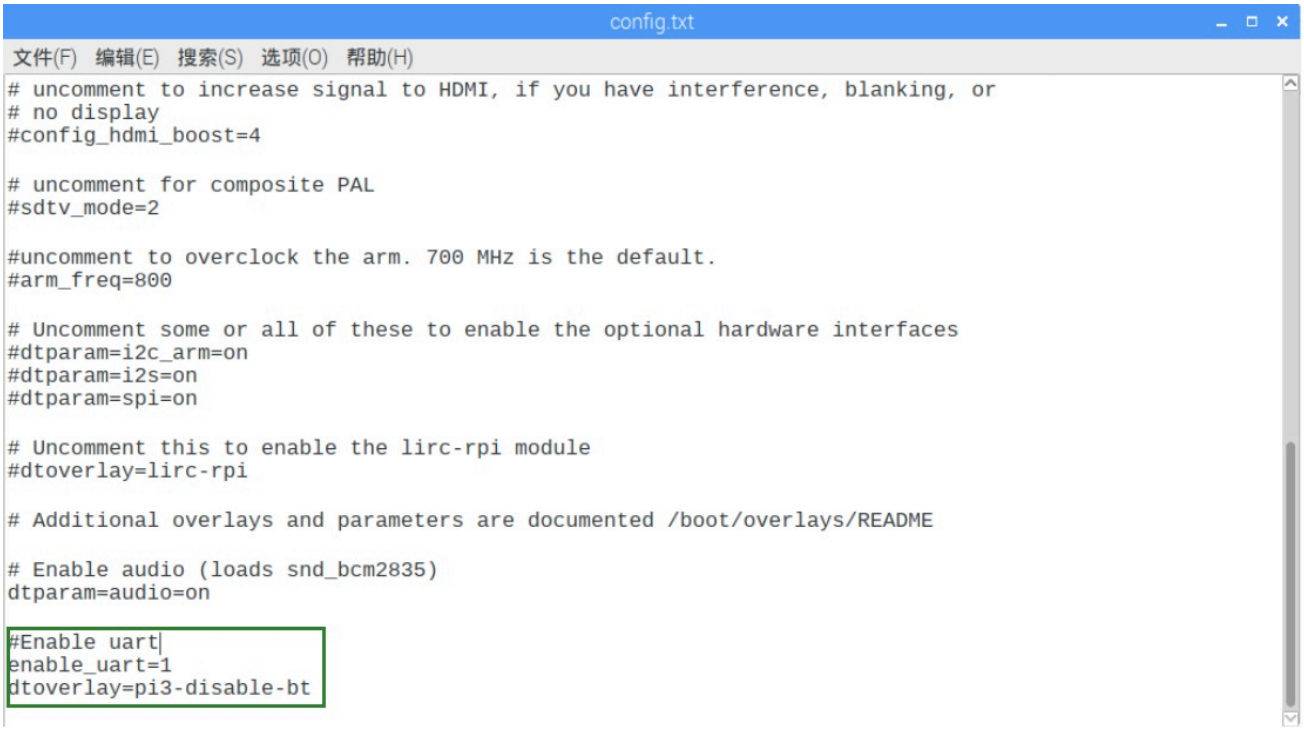
- Here, I disable the pi3 bluetooth as an example

a. Search for pi3-disable-bt in file /boot/overlays/README, it will show you how to disable the bluetooth; if you want switch the bluetooth to mini-UART(ttyS0), you can search for pi3-miniuart-bt.

```
Name:   pi3-disable-bt
Info:   Disable Pi3 Bluetooth and restore UART0/ttyAMA0 over GPIOs 14 & 15
        N.B. To disable the systemd service that initialises the modem so it
        doesn't use the UART, use 'sudo systemctl disable hciuart'.
Load:   dtoverlay=pi3-disable-bt
Params: <None>


Name:   pi3-disable-wifi
Info:   Disable Pi3 onboard WiFi
Load:   dtoverlay=pi3-disable-wifi
Params: <None>


Name:   pi3-miniuart-bt
Info:   Switch Pi3 Bluetooth function to use the mini-UART (ttyS0) and restore
        UART0/ttyAMA0 over GPIOs 14 & 15. Note that this may reduce the maximum
        usable baudrate.
        N.B. It is also necessary to edit /lib/systemd/system/hciuart.service
```

b. Modify the file /boot/config.txt. At the end of the file, add the following content.

```
#Enable uart

enable_uart=1

dtoverlay=pi3-disable-bt
```



c. Reboot Raspberry Pi

d. Open the Terminal and input the following command:

```
sudo systemctl disable hciuart
```

e. Now you can use ttyAMA0 as UART over GPIOs 14&15

- install python library for Makeblock

```
# pip3 install makeblock
```

- enter the initial code for Python

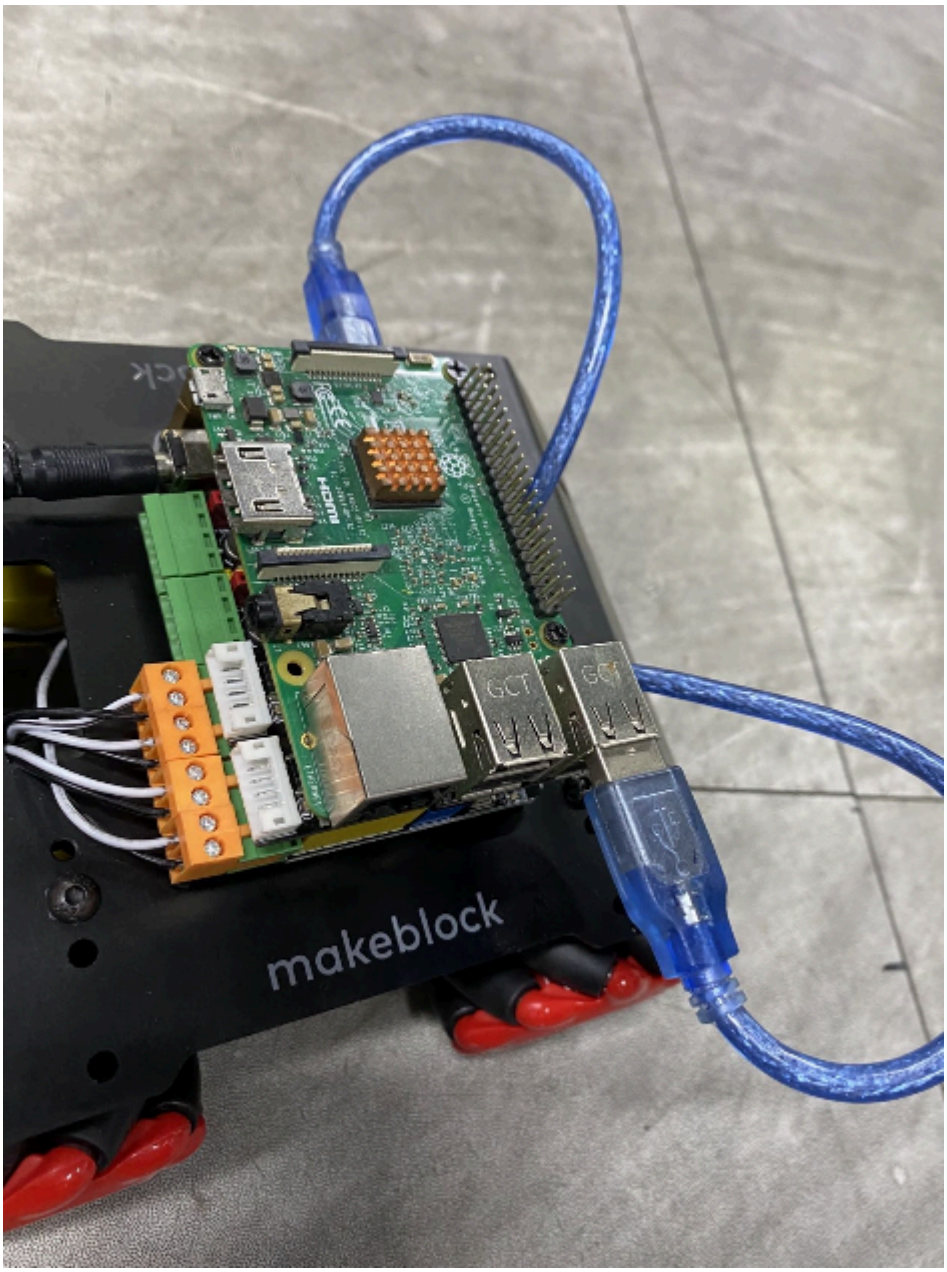
```
from time import sleep
from makeblock import MegaPi,SerialPort
megapi = MegaPi.connect(SerialPort.connect("/dev/ttyAMA0"))
```

- compile your code in Python

The second connection method: USB cable connection method

a. Connect mBot Mega to the computer and update it to the online firmware (47.01.101) on mBlock.

Tips: When you connect Raspberry Pi and MegaPi with a cable, you need to use two different battery packs to power each of them, respectively.


makeblock

Please connect mBot Mega to the computer first and update to the online firmware on mBlock.

- install python library for Makeblock

```
# pip3 install makeblock
```

- enter the initial code for Python

```
from time import sleep
from makeblock import MegaPi,SerialPort
megapi = MegaPi.connect()
# or megapi = MegaPi.connect(SerialPort.connect("/dev/ttyUSB0"))
```

- Tip: When using USB connection, there are two ways to connect to the USB serial port.
  Method 1: Do not specify the serial port—: MegaPi.connect(), MegaPi.connect() connects to the USB serial port by default.

Method 2: Specify the serial port: MegaPi.connect(SerialPort.connect("/dev/ttyUSB0")), not necessarily ttyUSB0, subject to actual conditions.

- compile your code in Python

Some related content for reference:

Open source schematic of Megapi:

http://t.hk.uy/kPk

http://t.hk.uy/kPn

To control the sensors and motors on mBot Mega with Raspberry Pi, you need to install the corresponding library first.

- To control the obstacle avoidance and line following sensors and the impact switches, use the library: https://gist.github.com/xeecos/ceeb8fd83cc15b4e83b713bb75a982fd
- To control the RGB LED module, use the library: https://gist.github.com/xeecos/0a326e03f44633fed726867b0e71a3fe
- To control the motors, use the library: https://gist.github.com/xeecos/5fa6cb5876a8c9449562d8026942fff1/revisions

Comments

1 comment

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K T
August 06, 2021 01:23

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Thanks for the post, have couple questions:

1. How different it is to connect Raspberry Pi 4B to Mega?

2. I bought the makeblock robotic arm addon pack and wonder if it can also be controlled by Pi through Mega? Any library I can use?

Thanks a lot.

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