About this Manual

Thanks for choosing our PiArm.

PiArm is a three-degree-of-freedom robotic arm for Raspberry Pi. It has 3 replaceable parts — Shovel Bucket, Hanging Clip and Electromagnet — to help you accomplish different tasks.

In addition, the PiArm offers both remote control and build-in Dual Joystick Module control, as well as examples of two programming platforms, Ezblock and Jupyter.

This manual introduces lists, assembly, program, etc. The program part is divided into two chapters: To Play in Ezblock and To Play in Jupyter and each of them can get you stated on making PiArm work in way you want.

★ To Play in Ezblock

If you are a programming newbie, please check this chapter for it introduces a block-based visual programming software — Ezblock Studio to guide you to grasp the programming. There are 7 examples to help you completely grasp the blockly program skill and the use of several functions of PiArm.

★ To Play in Jupyter

If you prefer a code-based approach to programming, here we recommend using open-source web application Jupyter to write python programs. Skip to read this chapter directly for it introduces the RPi environment configuration, Jupyter Notebook installation and the methods of running the provided Python example codes and checking running effects.

Absorbed the application of these functions, you are expected to create your own marvellous and inspiring projects. We will be glad if you are willing to share your experience and harvest on our forum.

Thanks once again for your unremitting support for SunFounder company.

Content

Component List

M1.5 x 4
Self-tapping Screw
(16)

M2 x 4
Screw
(14)

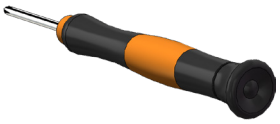
M2.5 x 6
Screw
(8)

M3 x 4
Countersunk Screw
(2)

M4 x 10
Countersunk Screw
(1)

Metal Washer
(14)

PVC Washer
(1)



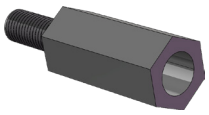
Screwdriver
(1)

R2056
Nylon Rivet
(4)

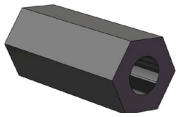
R2664
Nylon Rivet
(5)

R3065
Nylon Rivet
(12)

R3090
Nylon Rivet
(1)

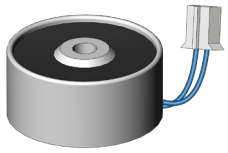


M2.5 x 8 + 6
Nylon Standoff
(4)

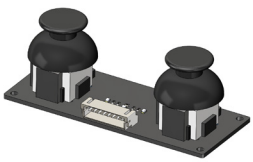


M2.5 x 11
Nylon Standoff
(4)

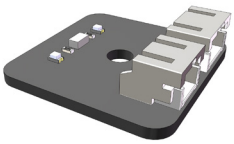
Socket Wrench
(1)



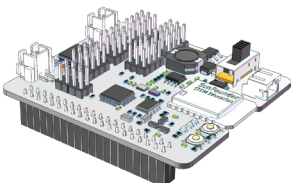
Electromagnet
(1)



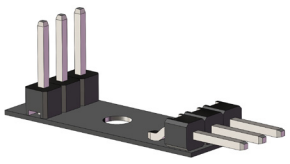
Dual Joystick
Module
(1)



Switch Module
(1)

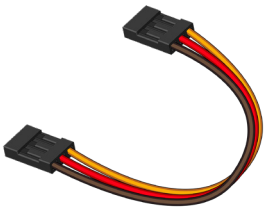


Robot HAT
(1)

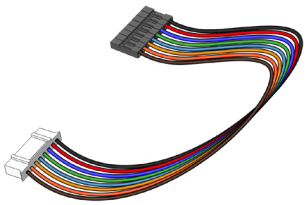


3 Pin Transfer
Module
(1)

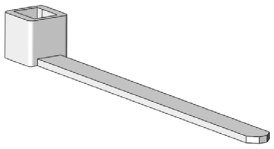
3 Pin Cable
(Short)
(1)



3 Pin Cable
(1)



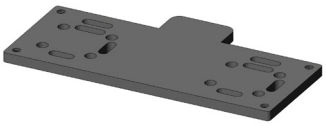
8 Pin Cable
(1)



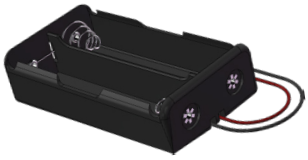
Cable Tie
(1)

Spiral Cable Wrap
(1)

Battery Ribbon
(1)



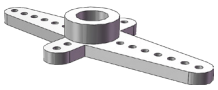
Acrylic Plate
(1)



Battery Holder
(1)

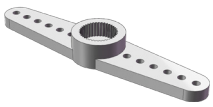
Metal Gear Servo
(3)

Servo
Screw A



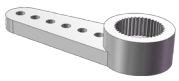
Cross Servo
Arm

Servo
Screw B



Double-Side
Servo Arm

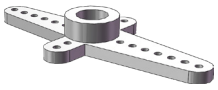
Servo
Screw B



One-Side Servo
Arm

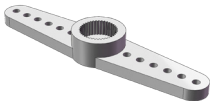
Full
Metal Gear Servo
(2)

Servo
Screw A



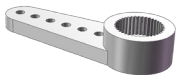
Cross Servo
Arm

Servo
Screw B

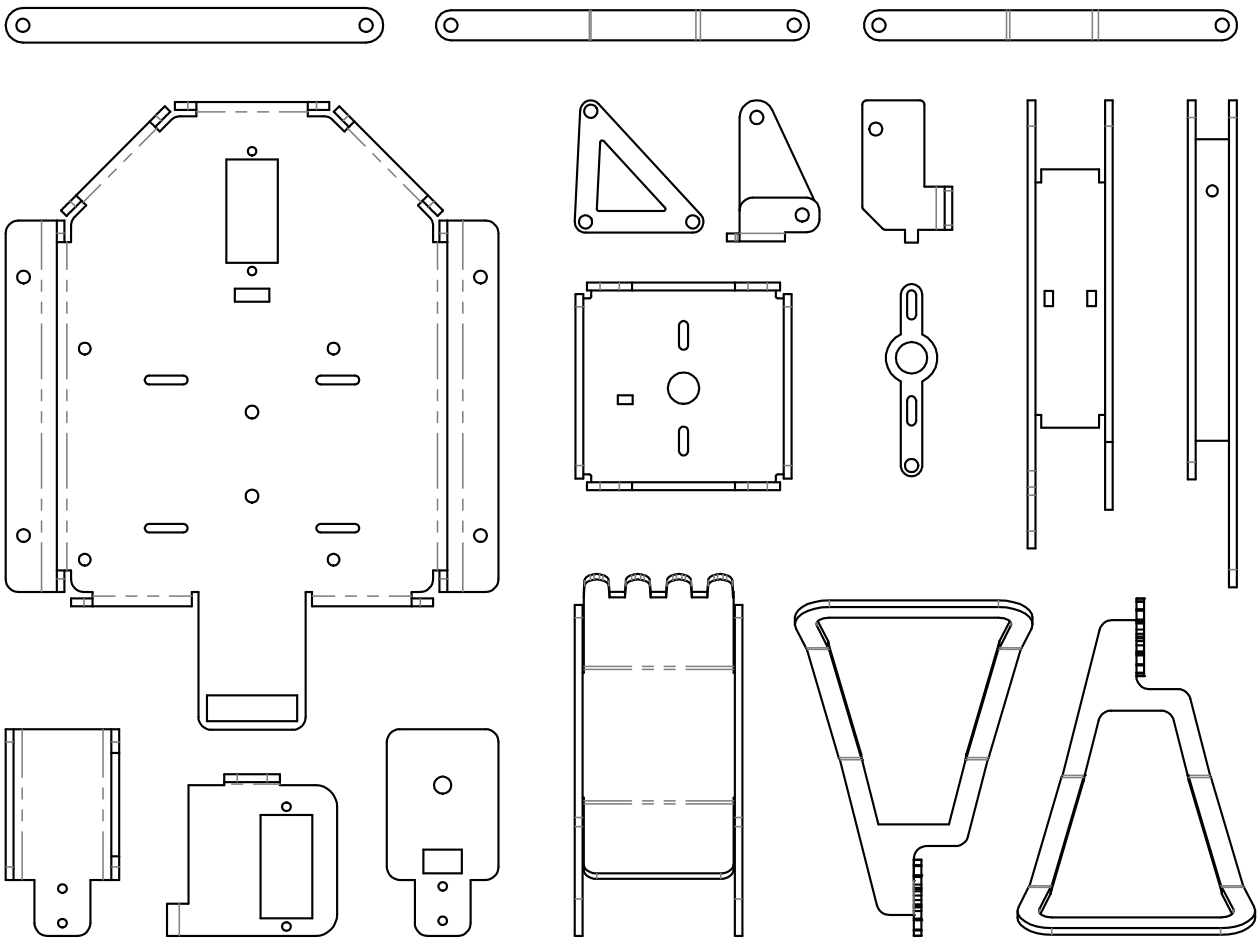


Double-Side
Servo Arm

Servo
Screw B



One-Side Servo
Arm

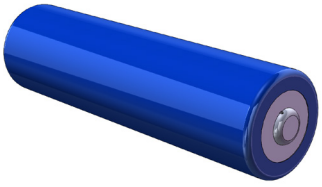


Structural Plate

Self-provided Component

1. You are recommend to use 18650 batteries without a protective board. Otherwise, the product may be cut power and stop running because of the overcurrent protection of the protective board.

2. Please use a battery with the largest possible power to increase the duration of use.



18650 Rechargeable Li-ion Battery (2)

Burn System

In addition to playing this product, you ought to flash the system into the Raspberry Pi.

Required Components

Raspberry Pi	1 * Power Adapter
1 * Mirco SD Card	1 * Personal Computer

Procedures

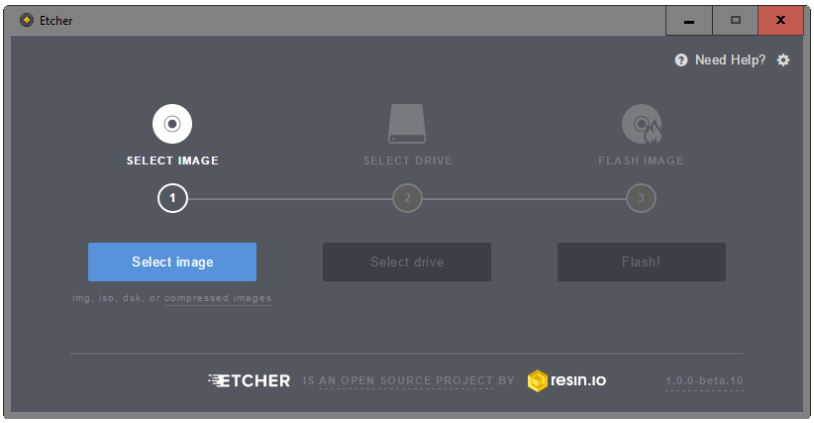
1. Prepare the tool of image burning. Here we use the **Etcher**. You can download the software here: https://www.balena.io/etcher/.

2. Download the **Ezblock for Raspberry Pi** image file here: http://ezblock.cc/download/index.html

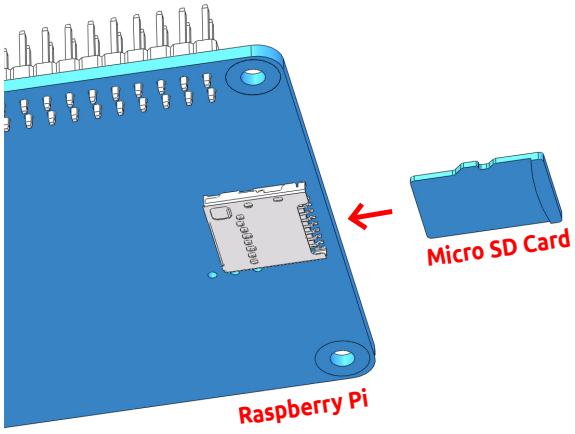
3. Unzip the package downloaded and you will see the **.img** file inside.

Note: Do not extract the .img file.

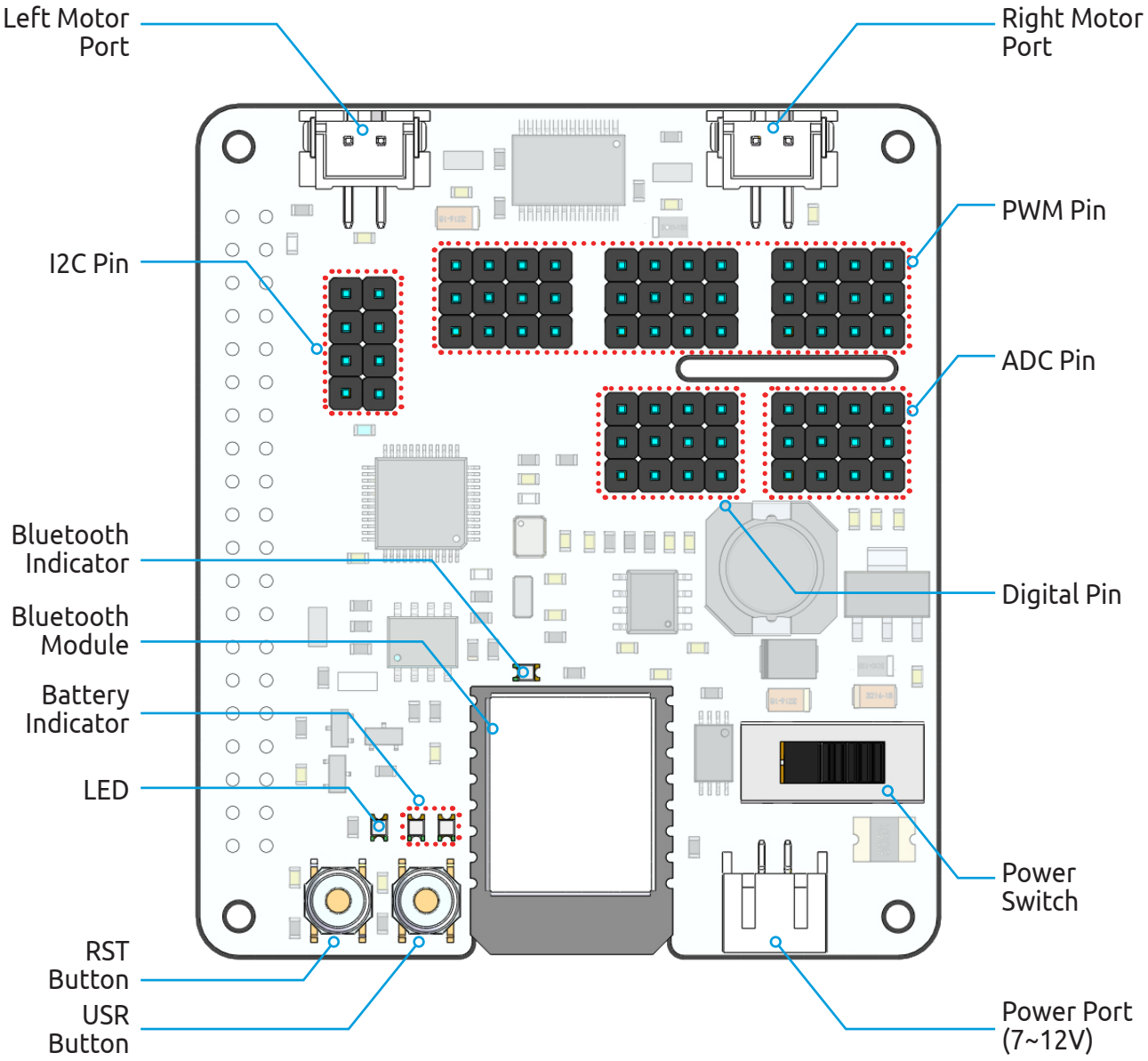
4. With Etcher, flash the image file into the SD card.



5.At this point, Ezblock for Raspberry Pi is installed. Please insert the Micro SD card into your Raspberry Pi



About Robot HAT



RST Button:

- Short pressing RST Button causes program resetting.
- Long press RST Button till the LED lights up then release, and you will disconnect the Bluetooth.

USR Button:

- The function of USR Button can be set by your programming. (Pressing down leads to a input “0”; releasing produces a input “1”.)

LED:

- Set by your program. (Outputting 1 turns the LED on; Outputting 0 turns it off.)

Battery Indicator:

- The voltage ranging above 7.8V, two LEDs light up; ranging 6.7V~7.8V, one LED turns on; ranging below 6.7V, all LEDs turn off.

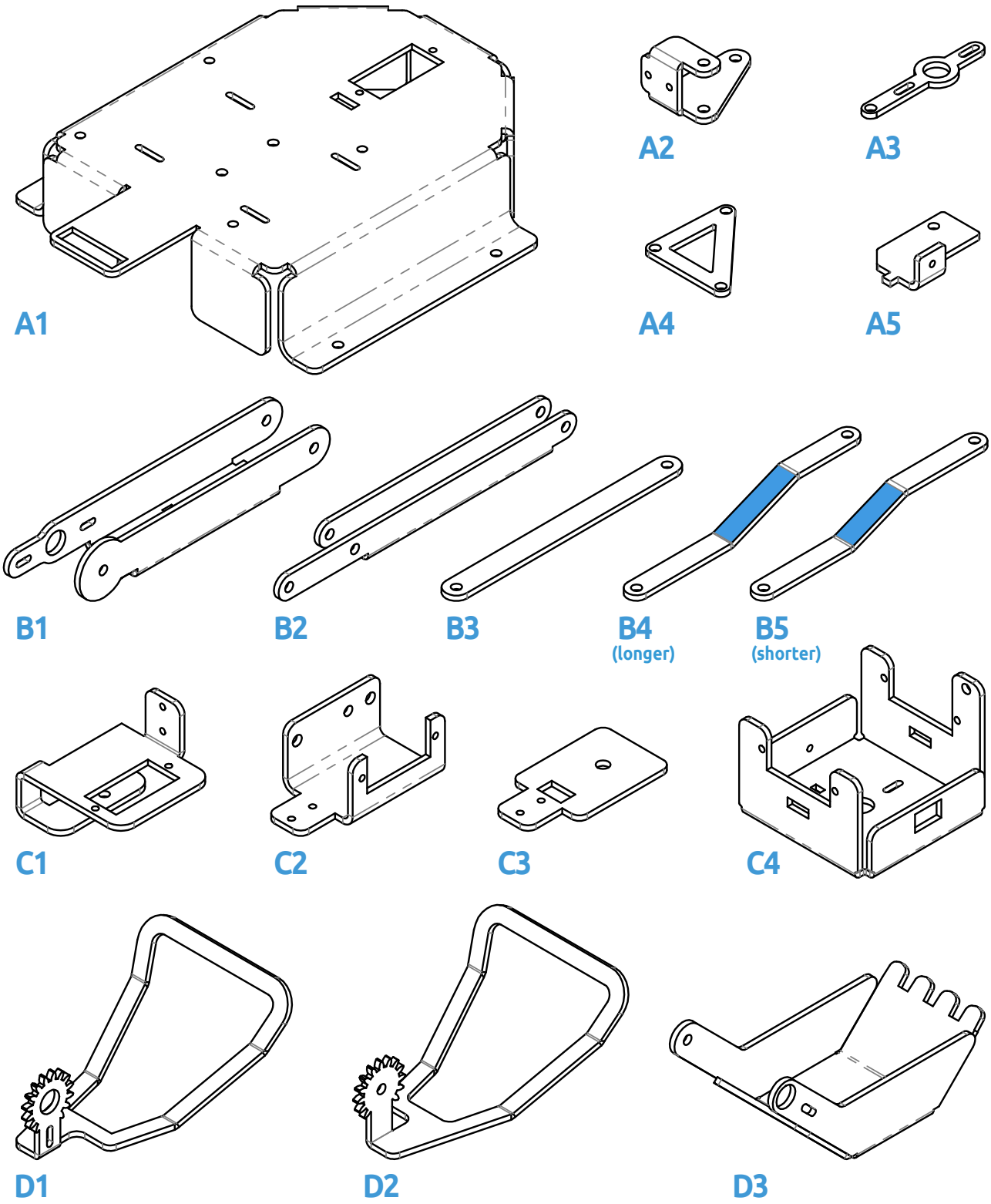
Bluetooth Indicator:

- The Bluetooth indicator keeps turning on at a well Bluetooth connection, blink at a Bluetooth disconnection, blink fast at a signal transmission.

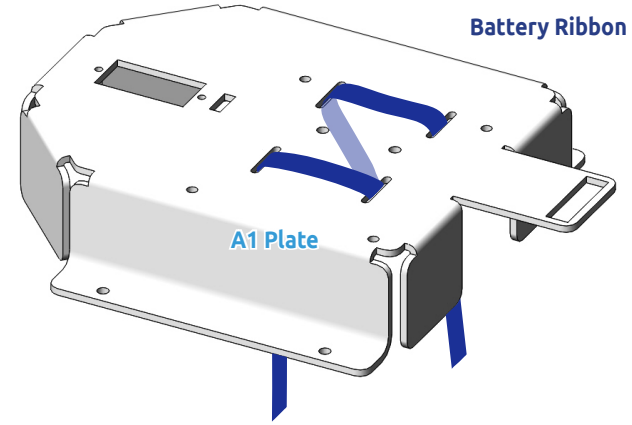
Building the PiArm

Now get familiar with these components in this package. In the following steps, there are so many details that you need to notice especially in the operation of calibrating the servo angle. In addition, you ought to check whether your wiring conforms to the instruction of this manual.

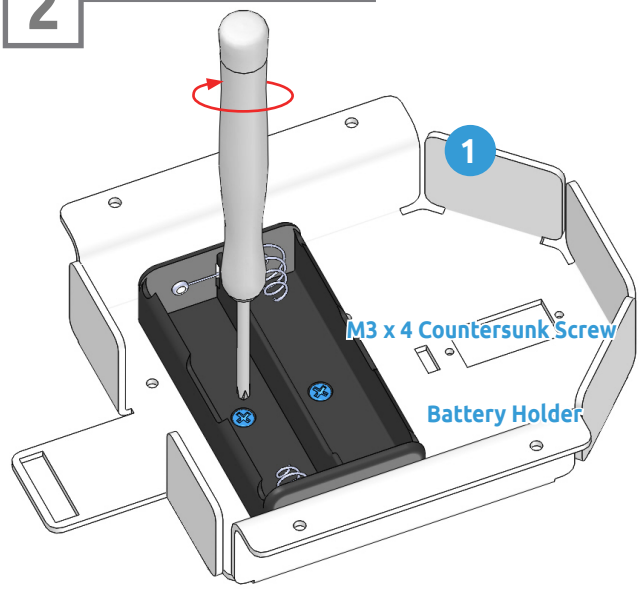
Structural Plate



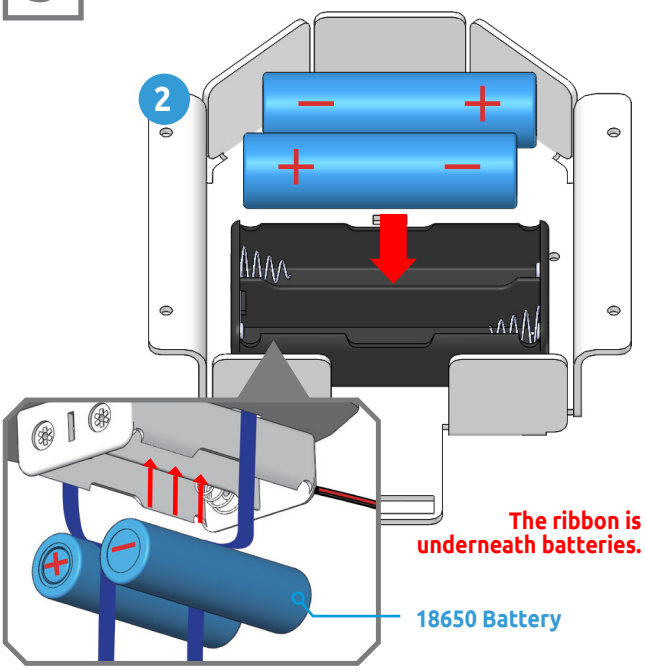
1 Assemble Battery Holder 1



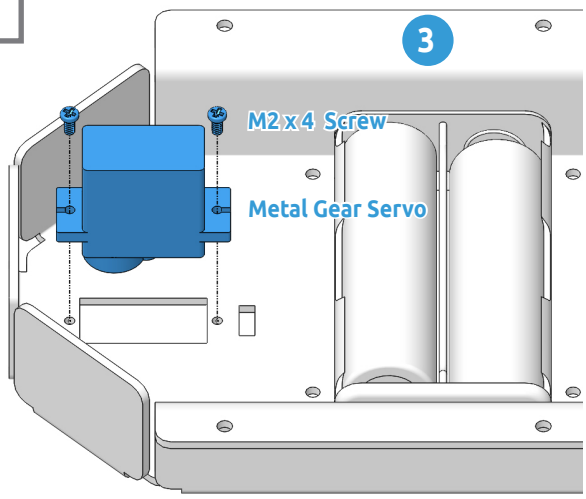
2 Assemble Battery Holder 2



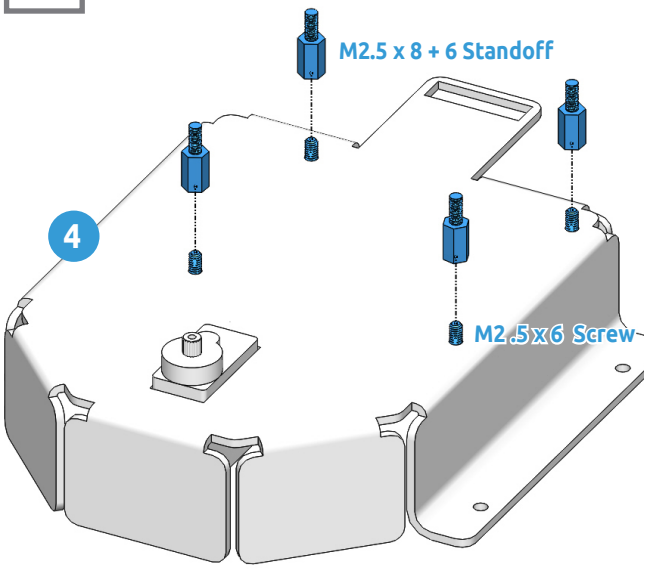
3 Put In the Batteries



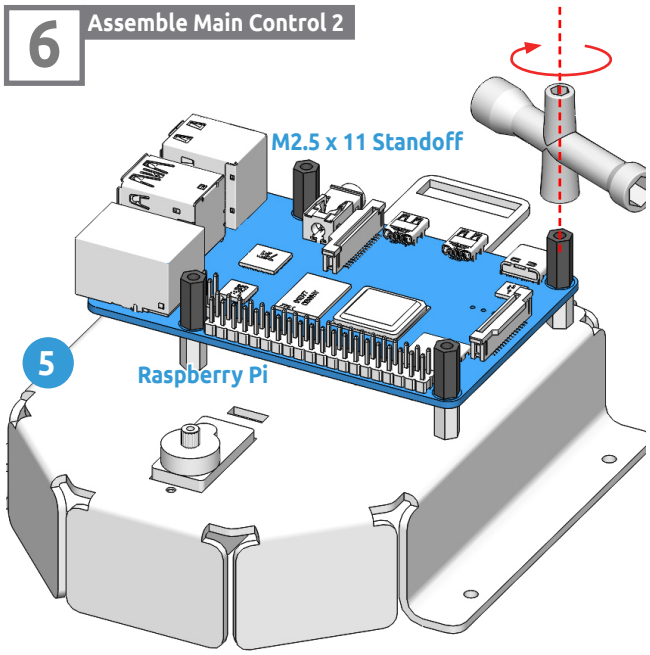
4 Assemble Middle Servo



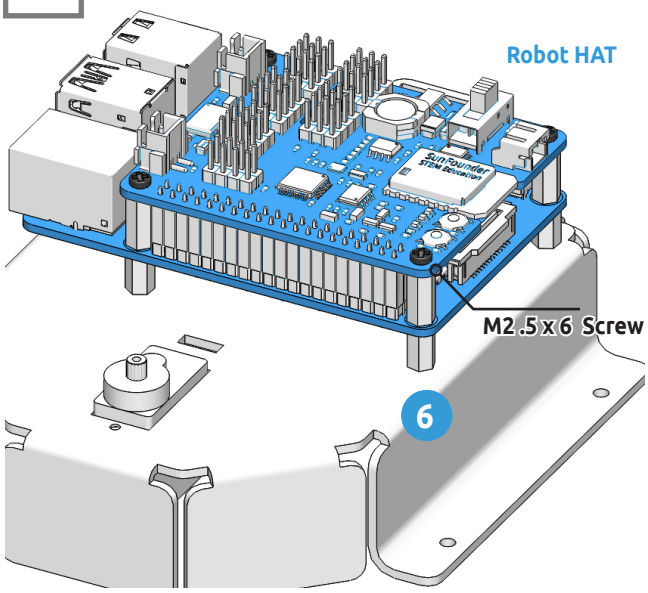
5 Assemble Main Control 1



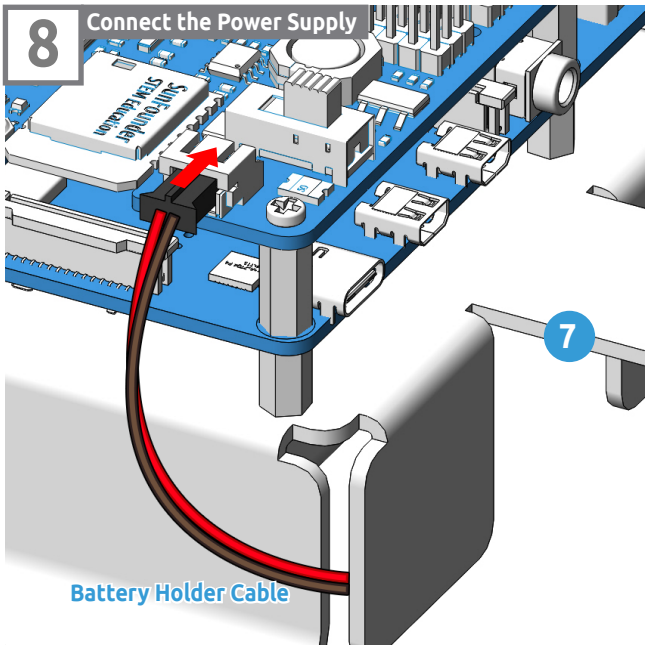
6 Assemble Main Control 2



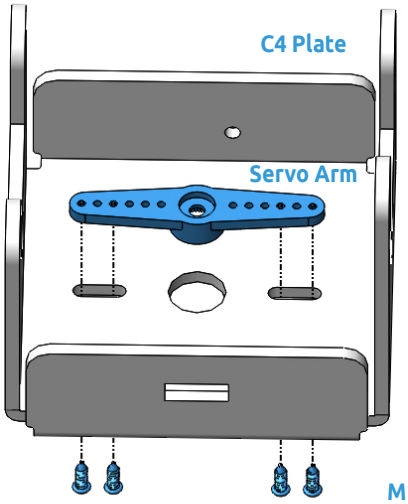
7 Assemble Main Control 3



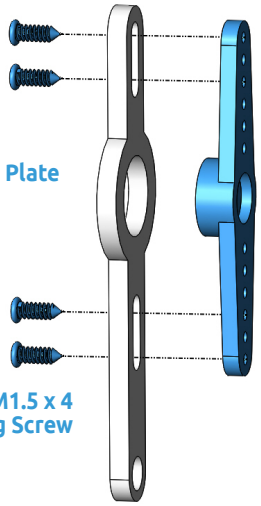
8 Connect the Power Supply



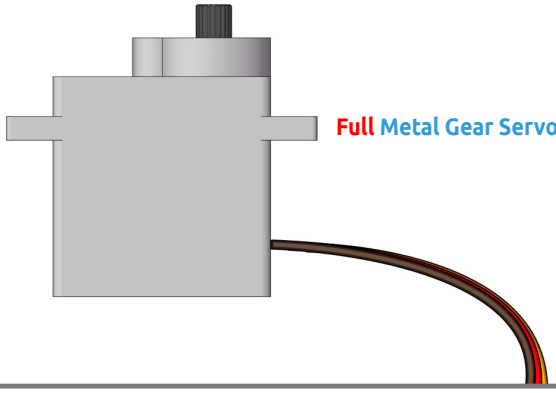
9 Complete the Middle Part

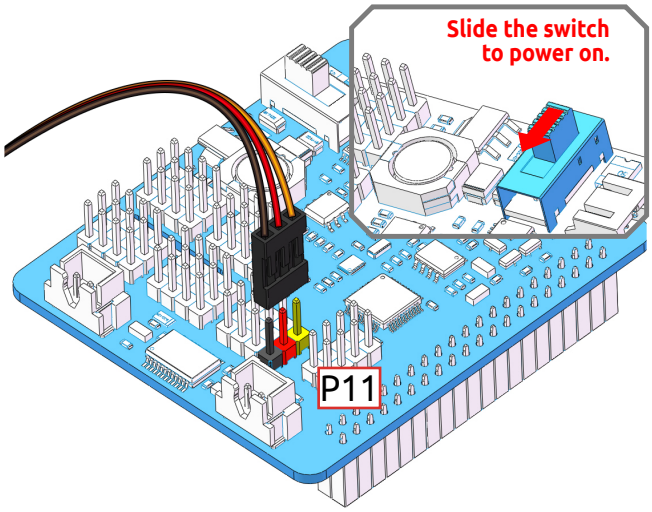


10 Complete the Left Servo Part 1



11 Servo Zeroing



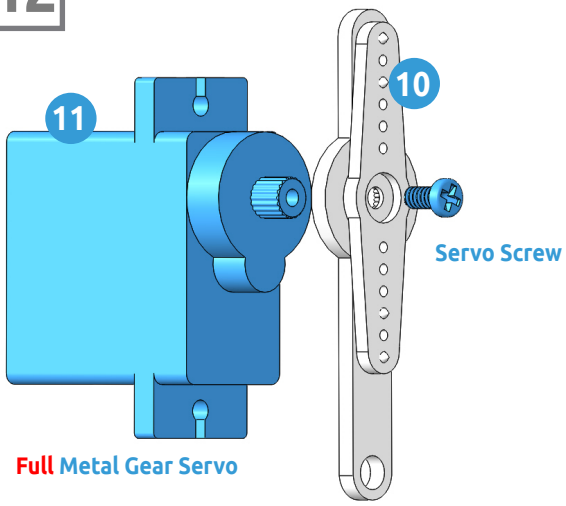


After burning the Ezblock system, P11 was set to calibrate the servo angle to 0 °. Therefore, before assembling each servo, you need to plug the servo pin into P11 and keep the power on.

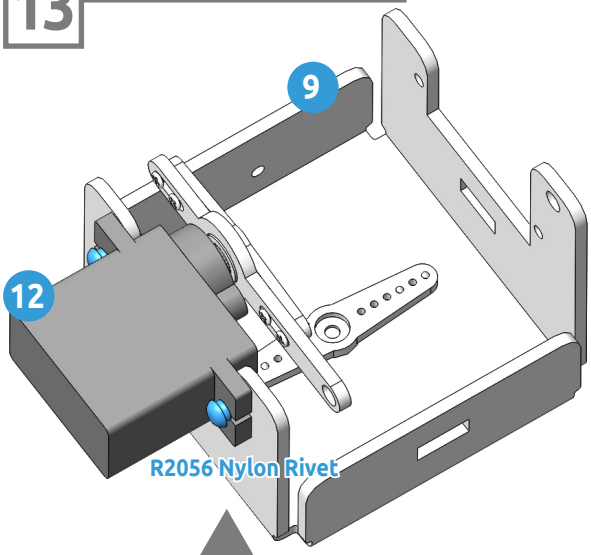
You can put a servo arm into the output shaft and twist gently. If Servo arm returns later, the function will take effect. If not, press Reset Button to restart it.

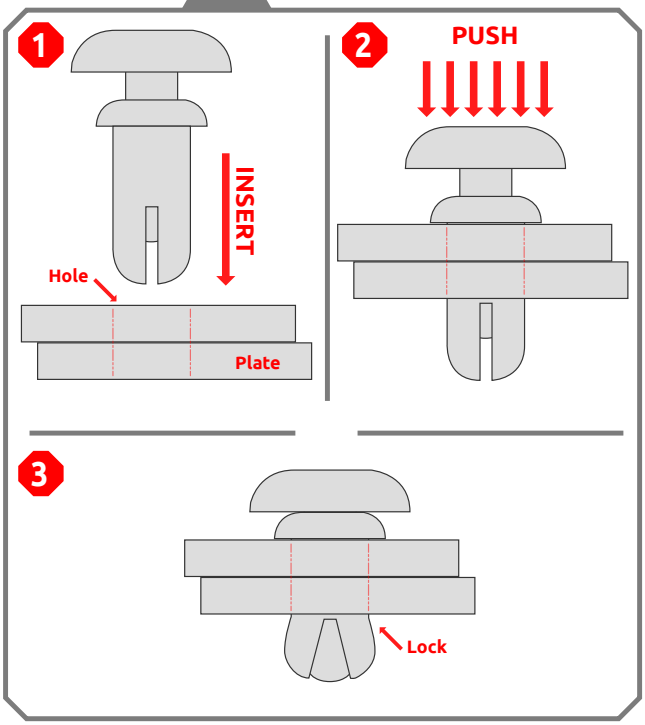
NOTE: This function will be invalid after writing any programs.

12 Complete the Left Servo Part 2

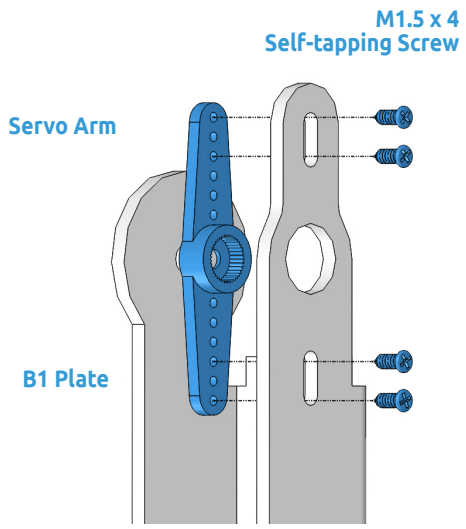


13 Assemble the Left Servo Part

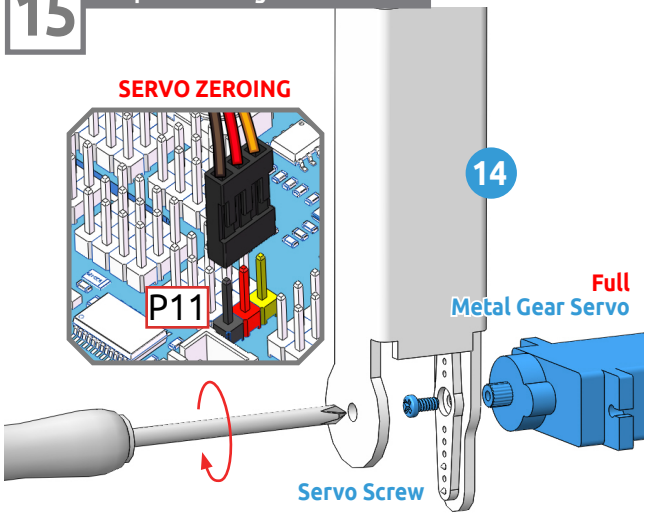




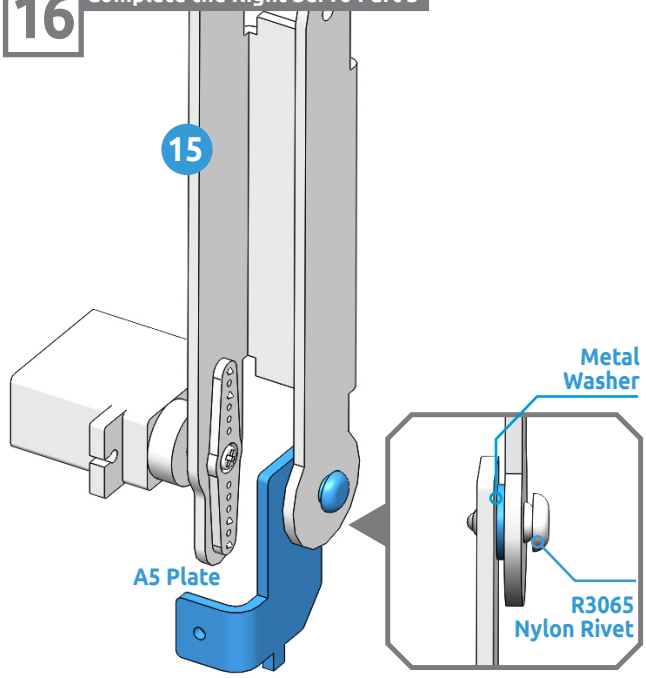
14 Complete the Right Servo Part 1



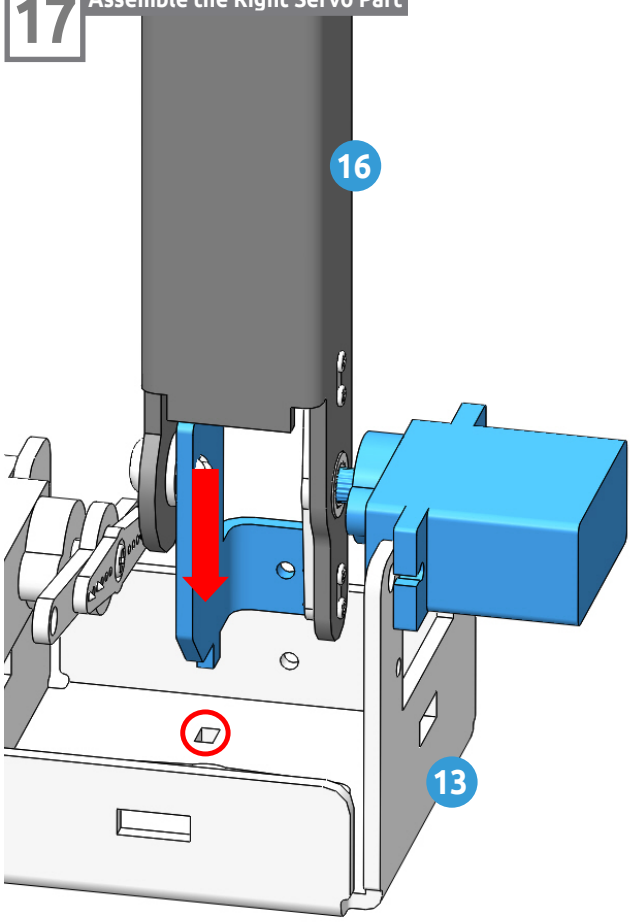
15 Complete the Right Servo Part 2



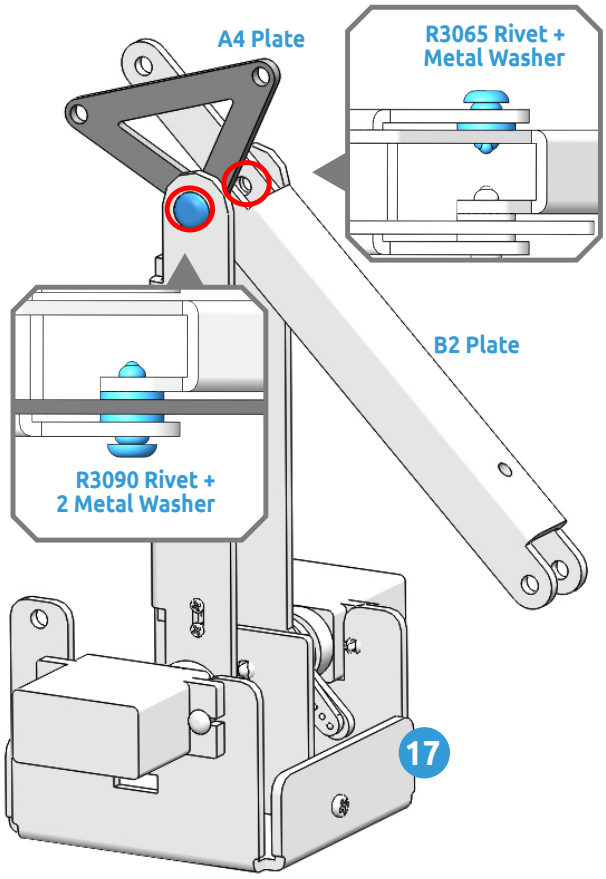
16 Complete the Right Servo Part 3

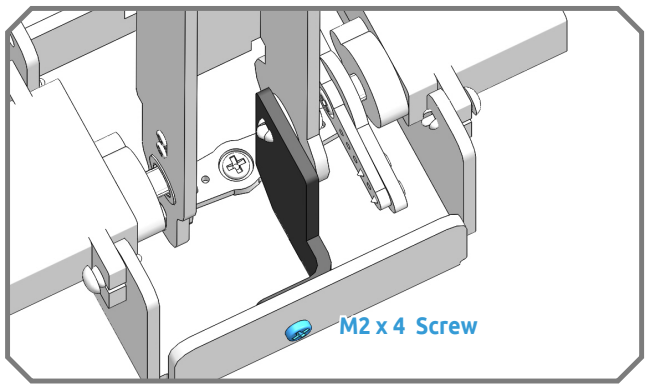


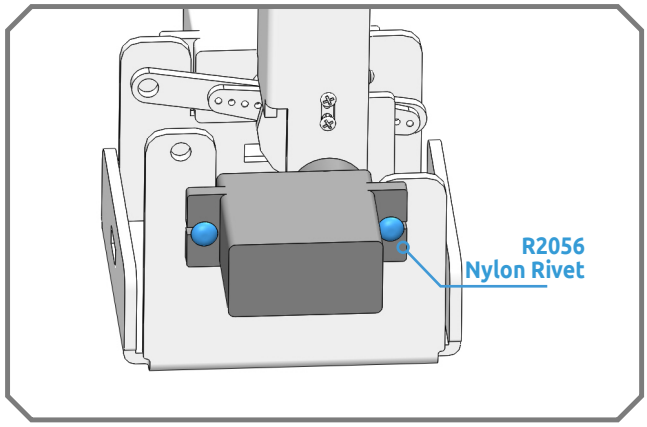
17 Assemble the Right Servo Part



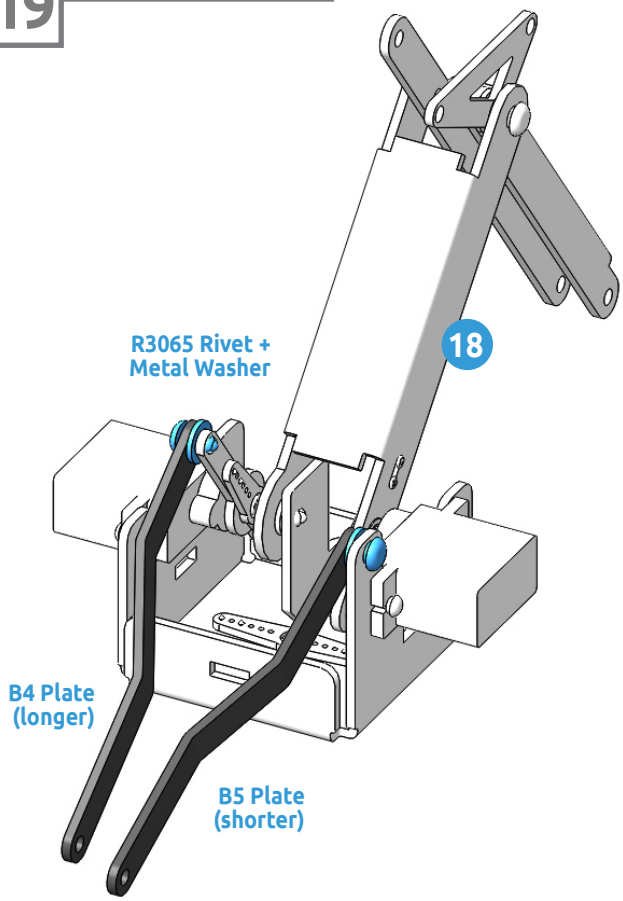
18 Complete the Arm Part 1



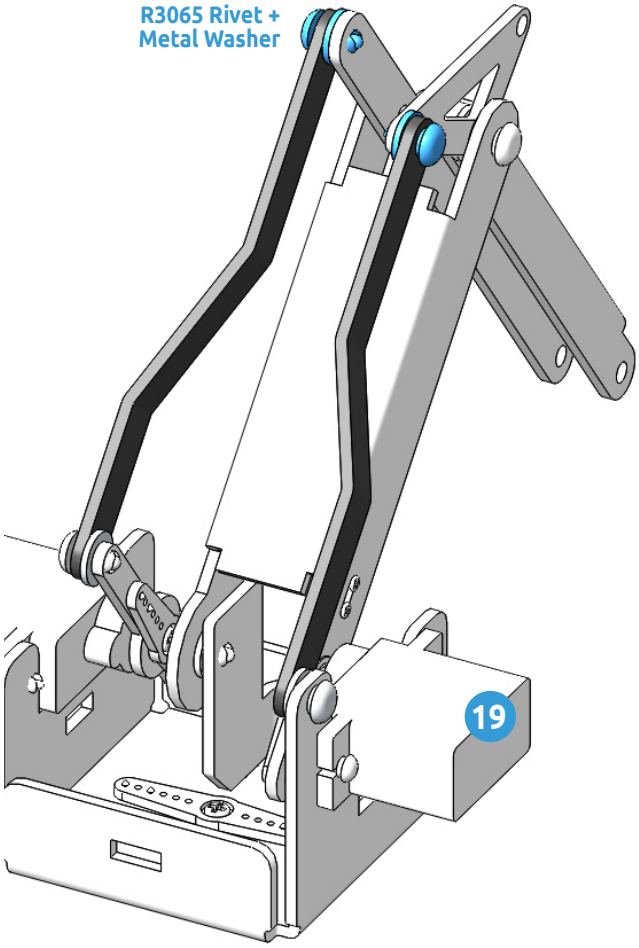




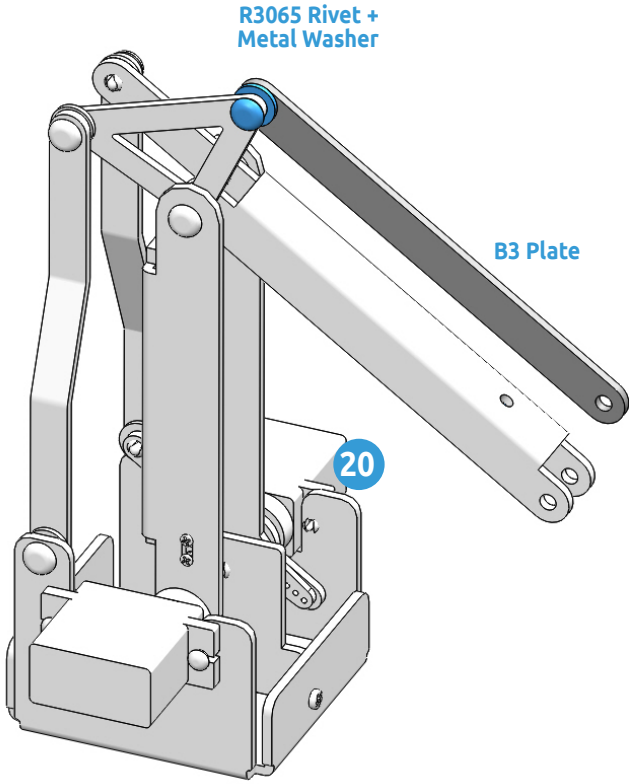
19 Complete the Arm Part 2



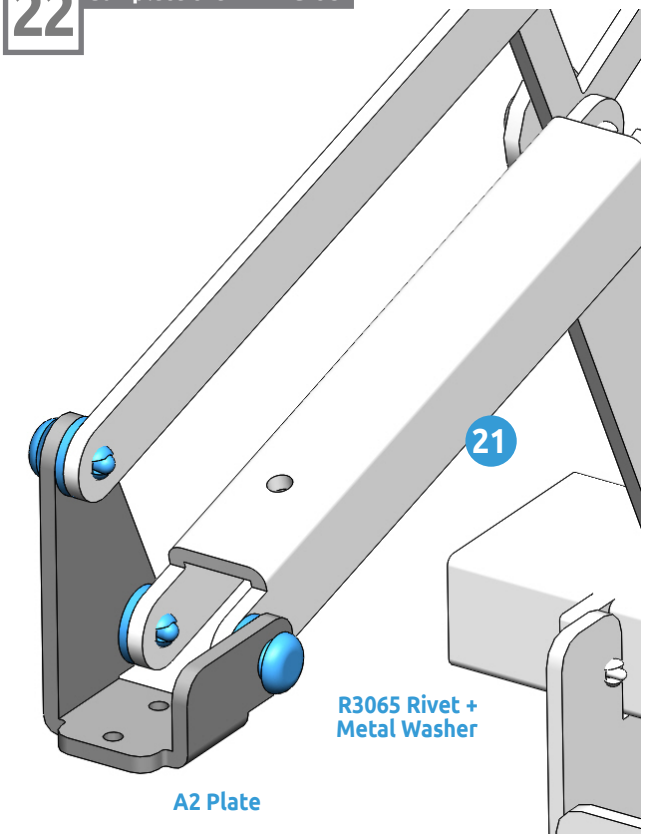
20 Complete the Arm Part 3



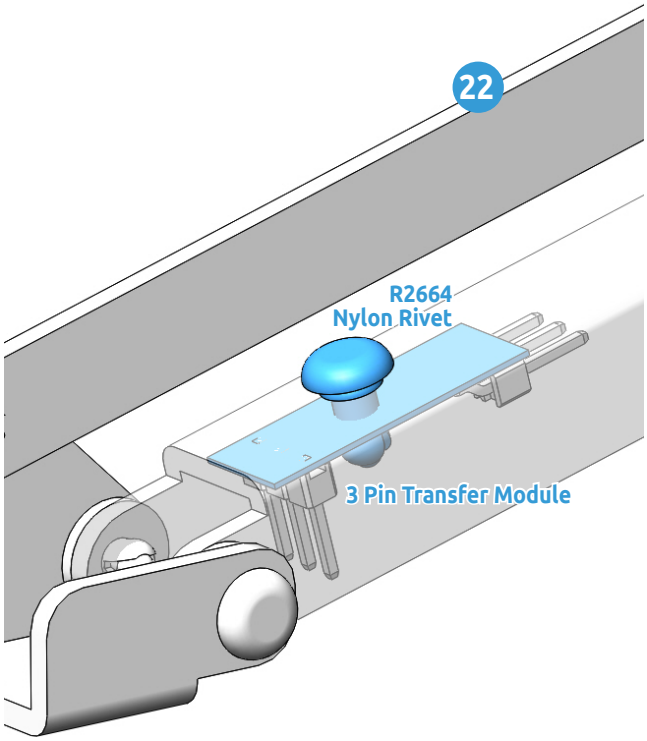
21 Complete the Arm Part 4



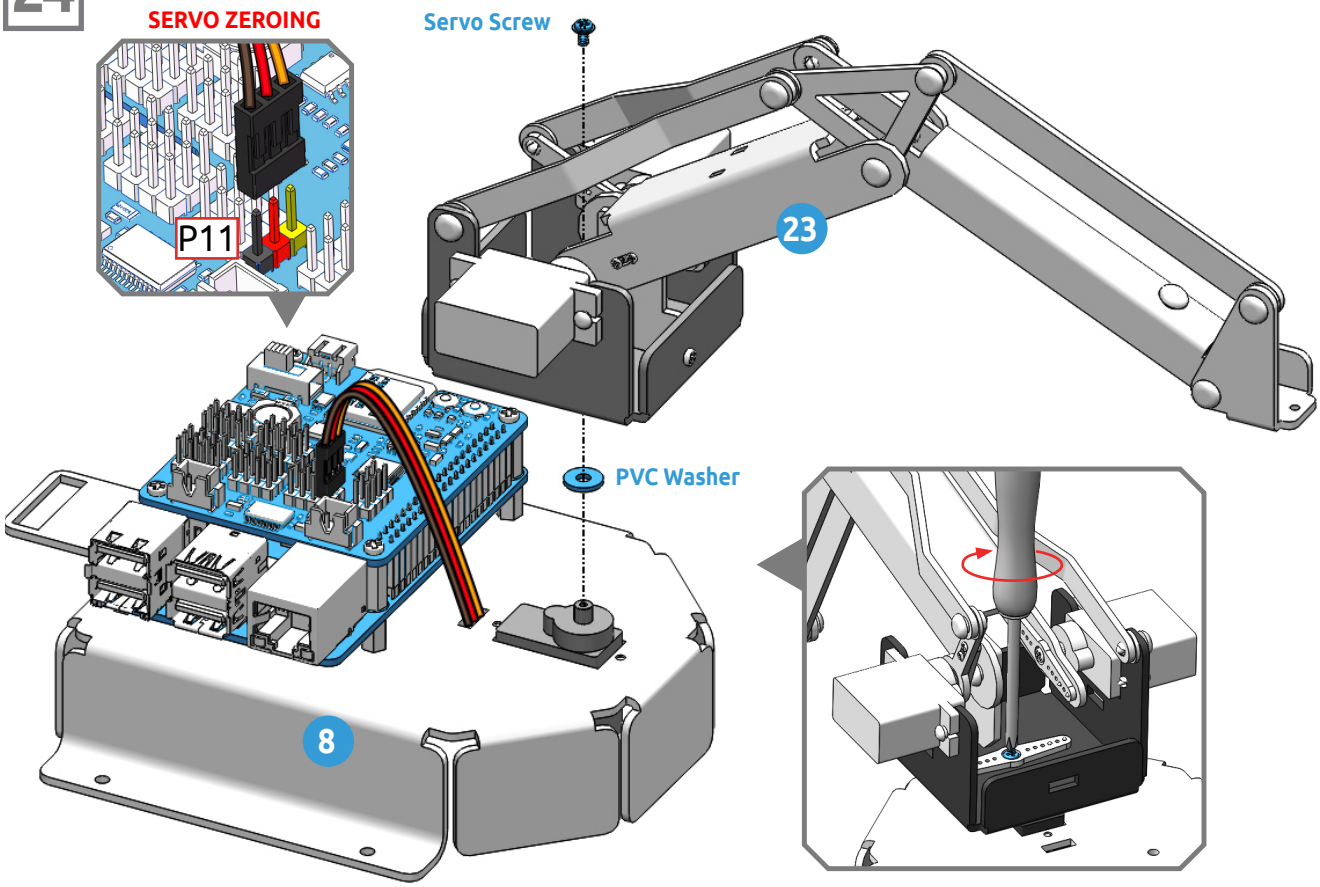
22 Complete the Arm Part 5



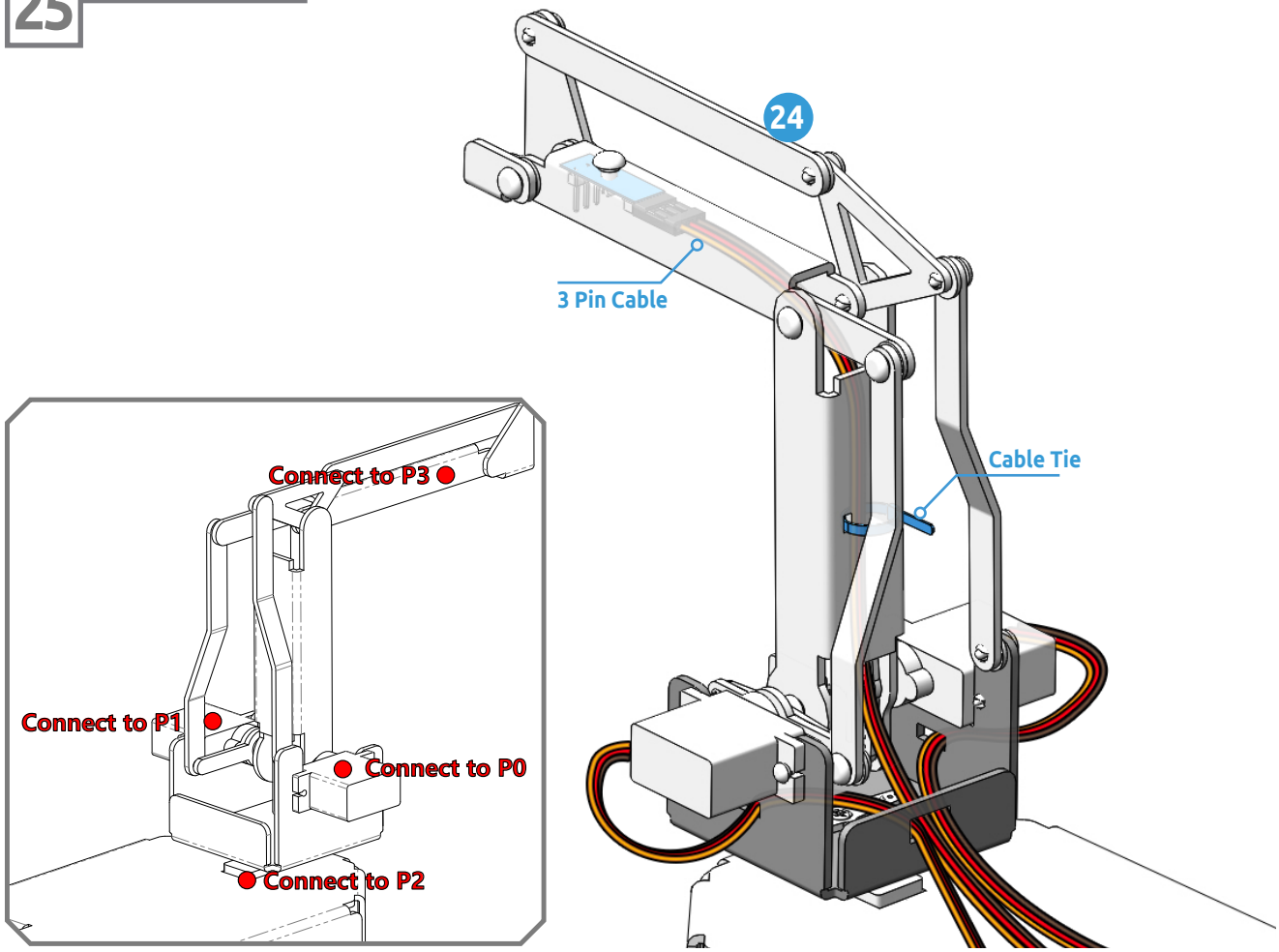
23 Complete the Arm Part 6



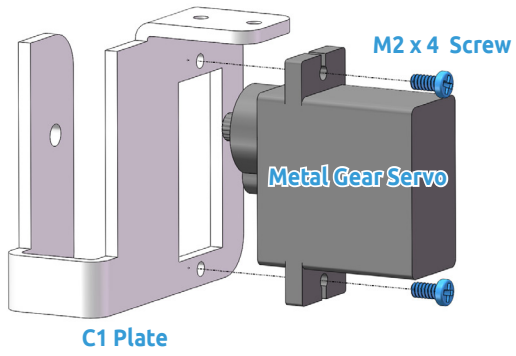
24 Assemble the Arm Part



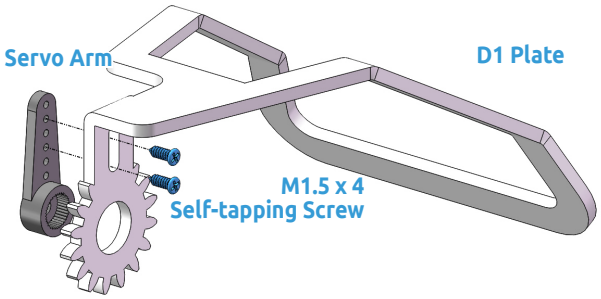
25 Reconnect All Cables



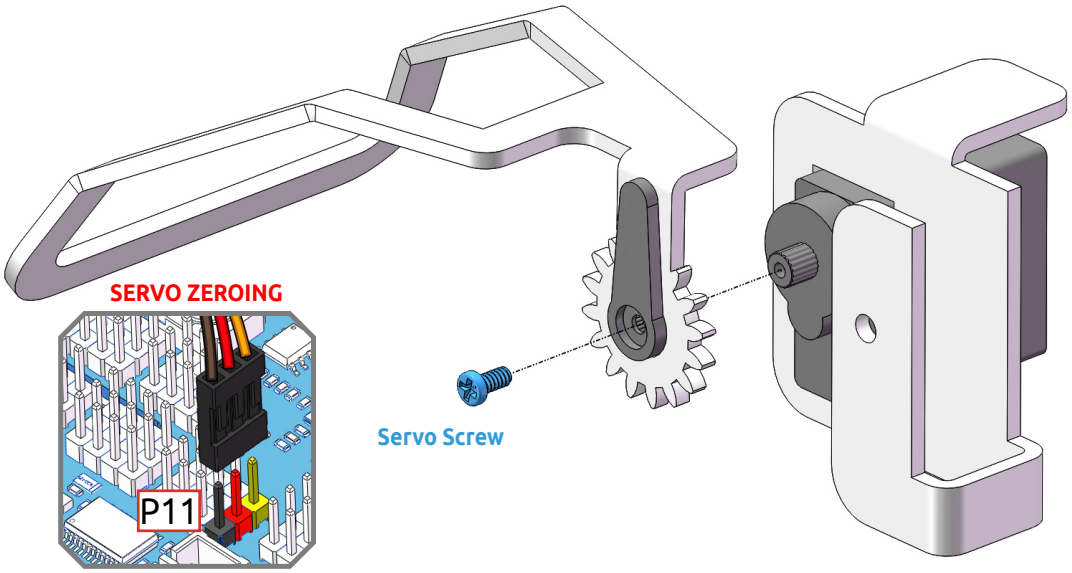
1 Complete Hanging Clip 1



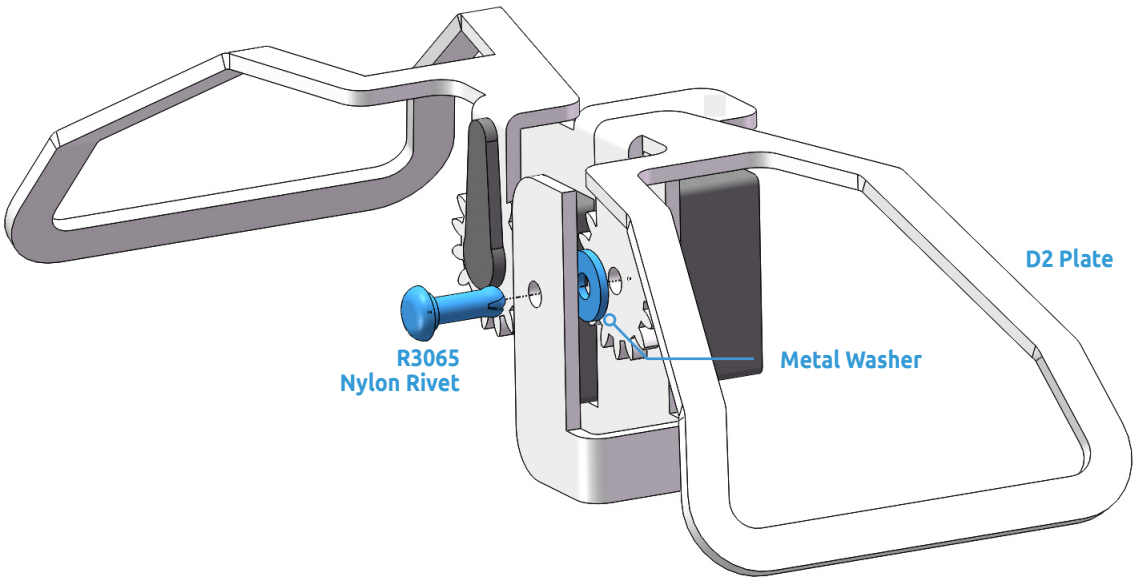
2 Complete Hanging Clip 2



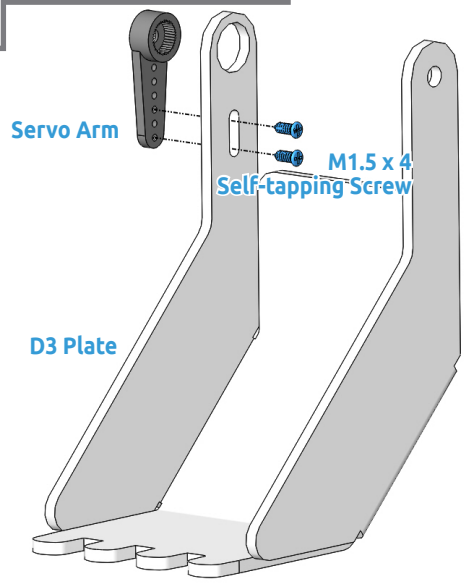
3 Complete Hanging Clip 3



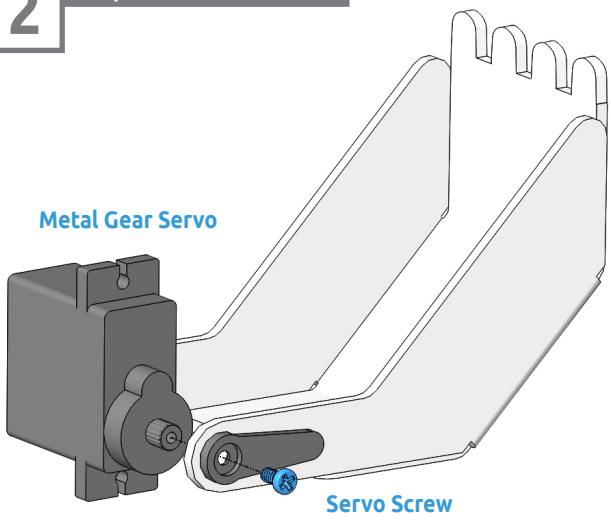
4 Complete Hanging Clip 4



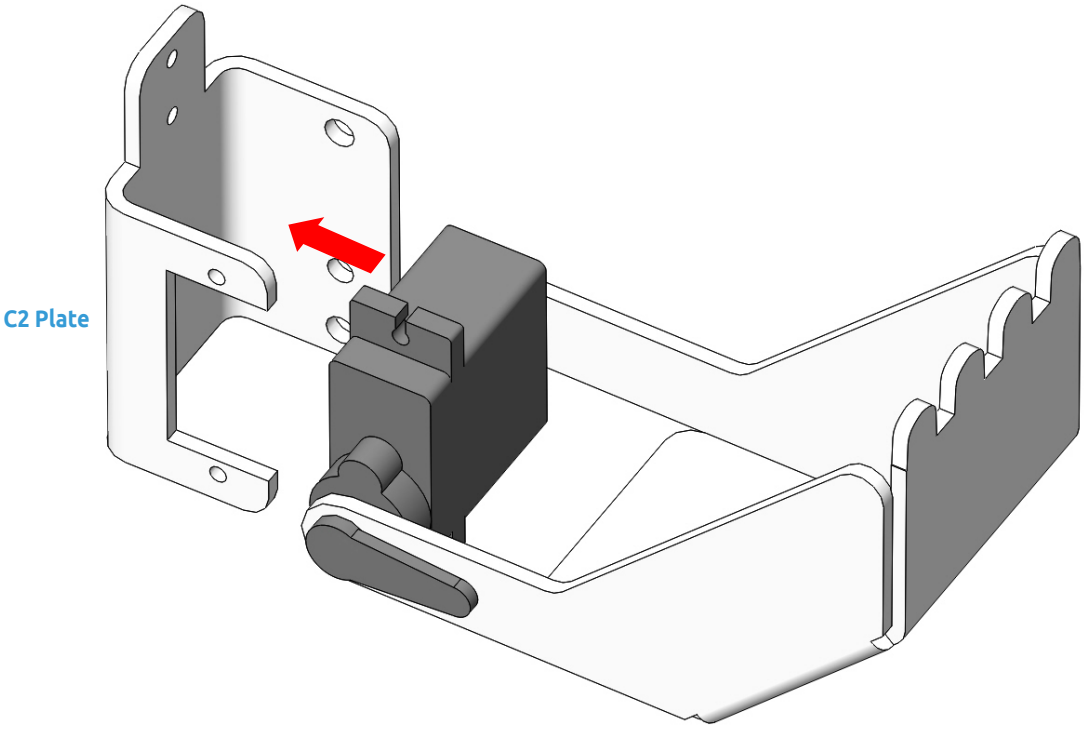
1 Complete Shovel Bucket 1

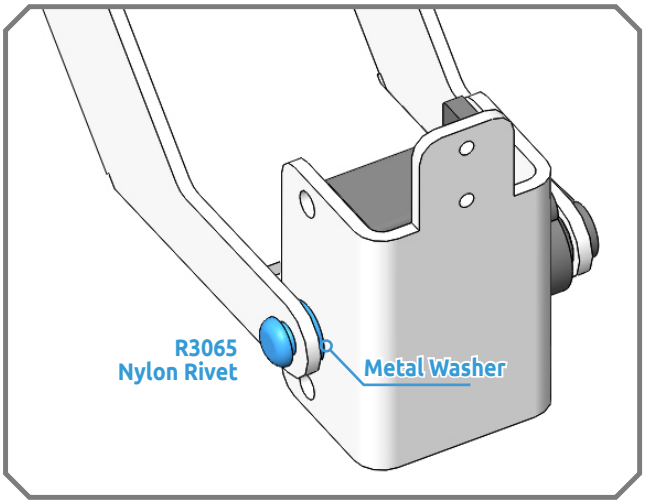


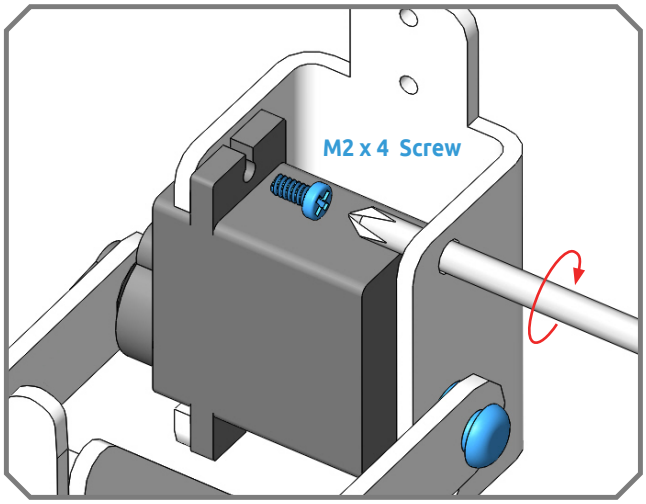
2 Complete Shovel Bucket 2



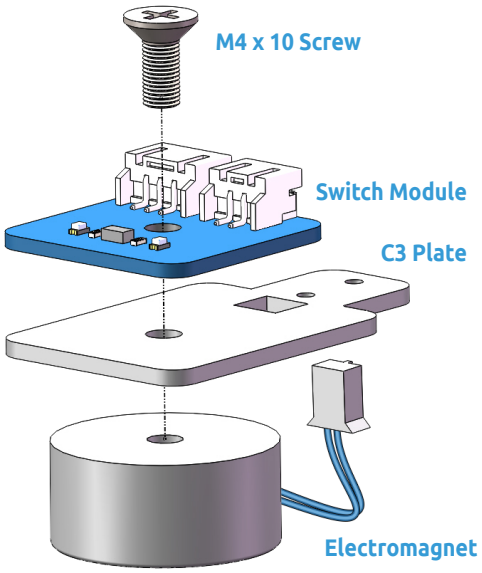
3 Complete Shovel Bucket 3



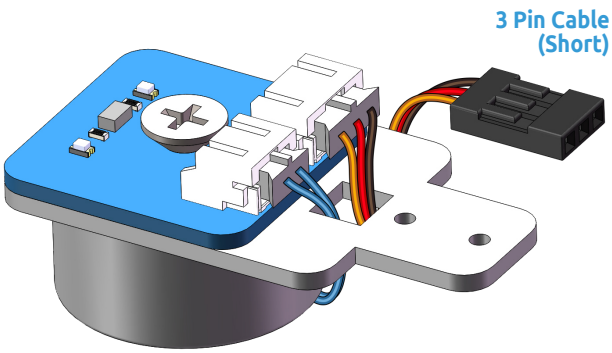




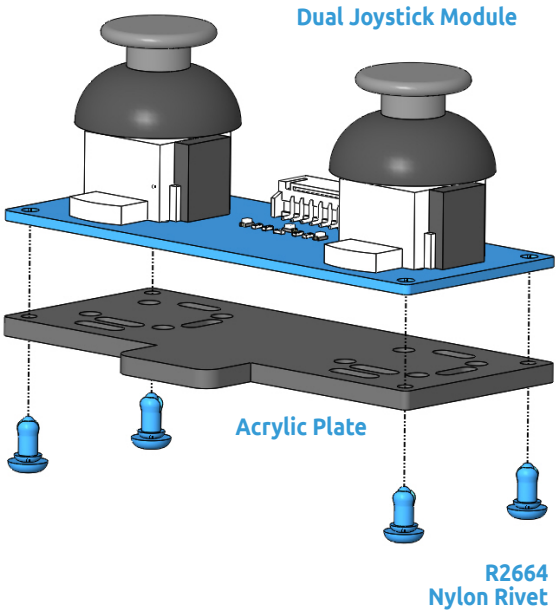
1 Complete Electromagnet 1



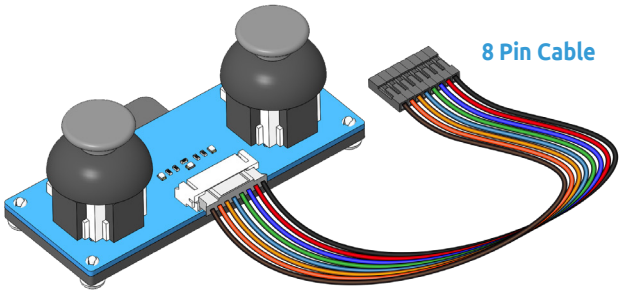
2 Complete Electromagnet 2



1 Complete Joystick Part 1



2 Complete Joystick Part 2



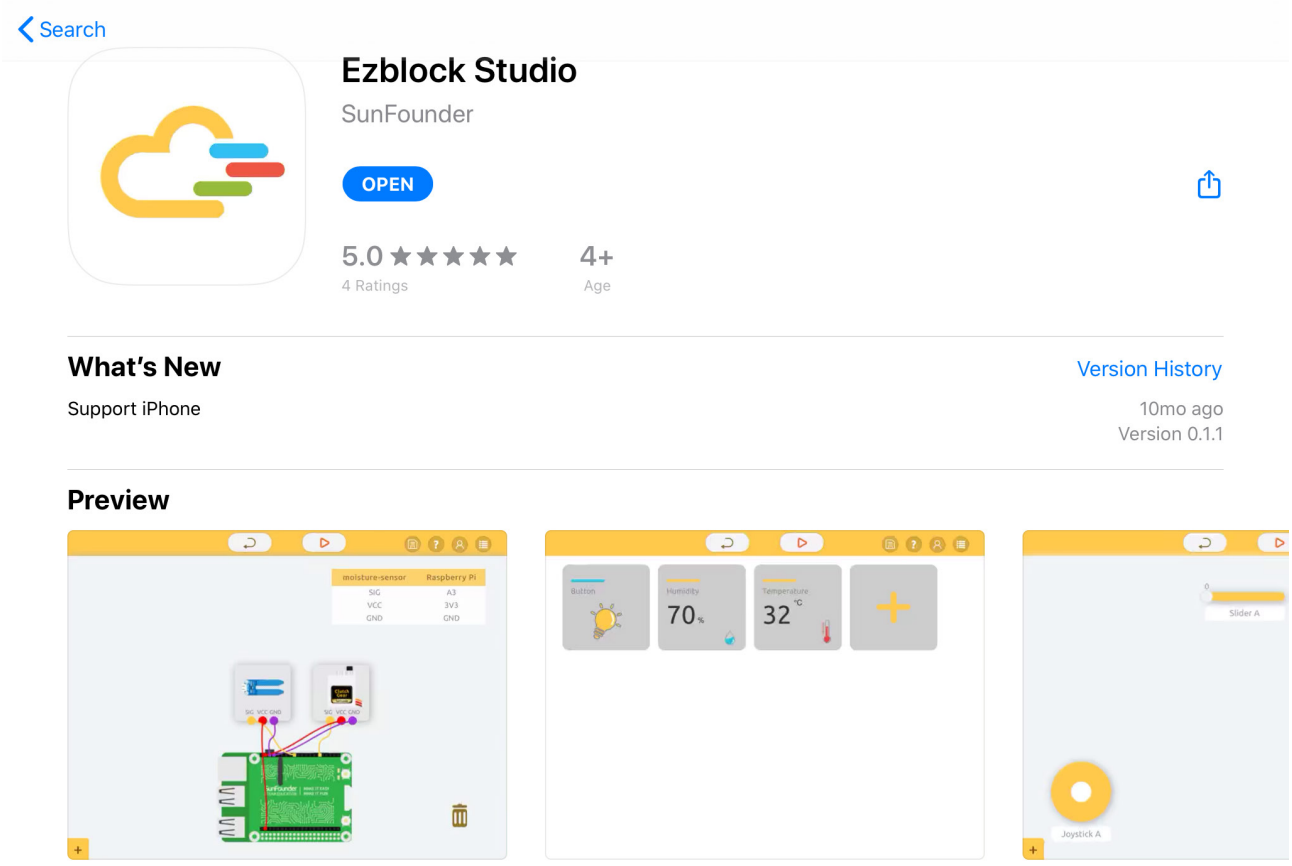
To Play in Ezblock

Introduce Ezblock Studio

Ezblock Studio is a new open-source platform for building electronic projects and graphical programming.

Ezblock Studio also serves as a coding platform that runs on your phone, tablet and computer. In addition, the Ezblock Studio applies Blocks and Python, making it easier to learn programming. By and large, Ezblock Studio integrates Hardware Simulator, Bluetooth Debugger, IoT Panel and Customizable Remote Controller, which are conducive to the operation of prototyping, debugging, and so on.

Open App Store (iOS/Mac OS X system) or Play Store (Android/Windows/Linux system), then search and download Ezblock Studio.

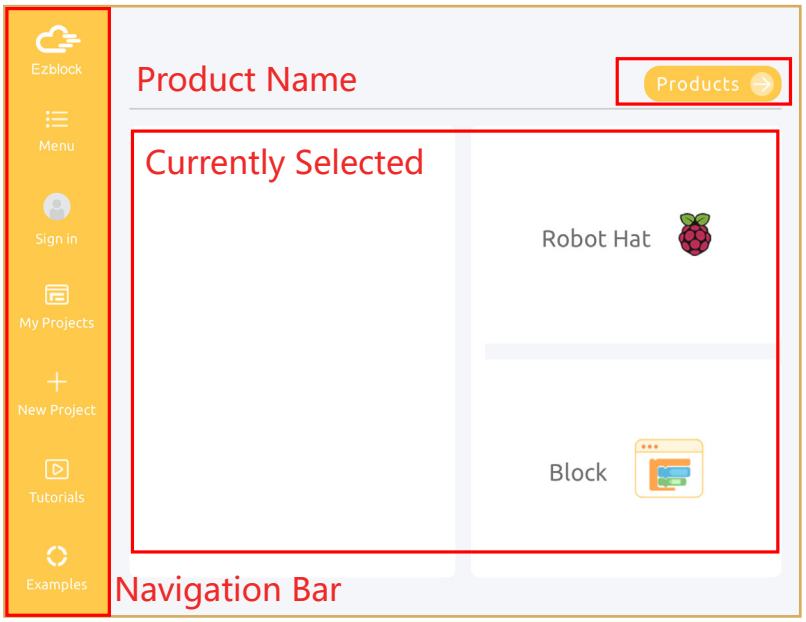


Quick Guide on Ezblock

This chapter is used to help learning basic operation of Ezblock, from choosing products to flashing the project to your control board.

Home Page

When enter the Ezblock Studio, we can see the main page as shown below. The Main page consists of three parts:



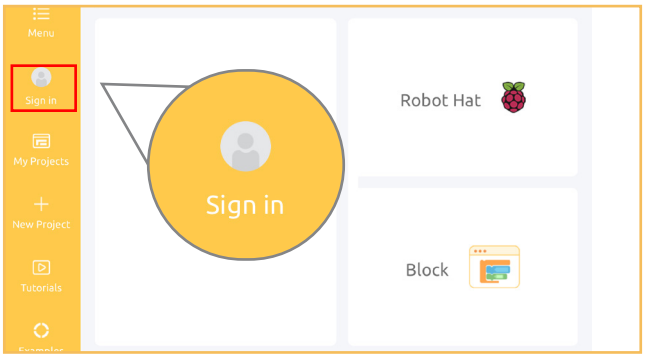
1. Currently Selected
2. Products.
3. Navigation Bar

Currently Selected shows our currently selected products, control board and programming environment.

Click **Products** button, we can turn to the products selecting page.

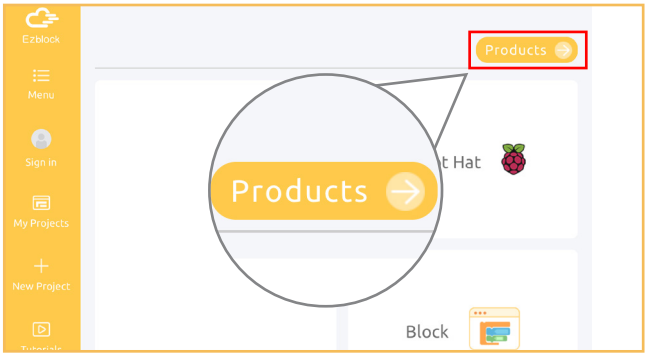
Navigation bar is composed of some sub menus designed for leading in different pages of the App.

- **Menu**: Some information of the App, such as language setting and FAQ.
- **Sign in**: Sign in your account.
- **My Project**: Turn to My Project page.
- **New Project**: Create a new project.
- **Tutorials**: Teach projects step by step.
- **Examples**: Project examples.



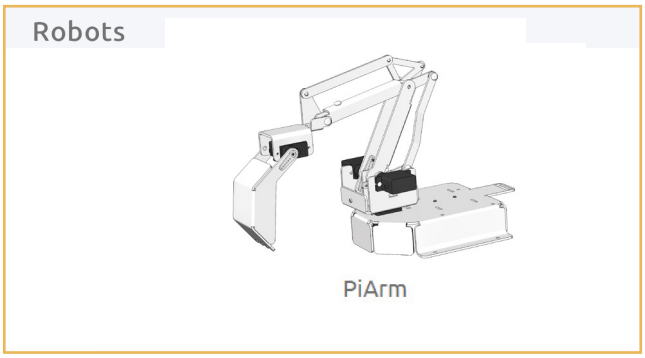
Sign in or Sign up

We suggest you create a new account at the first time you use it so as to save your projects in the cloud.



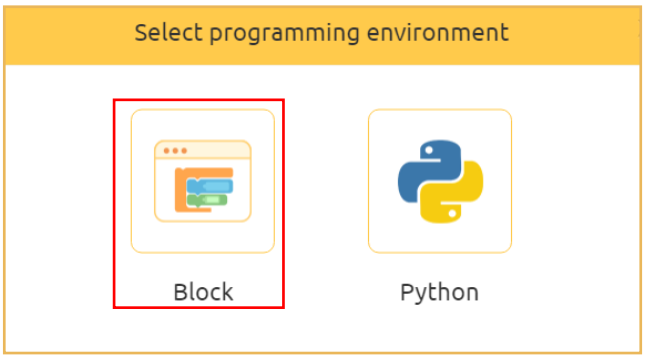
Go to Product Page

Go to the home page of Ezblock Studio and click the word, Product in the top right corner to enter the product selection page.



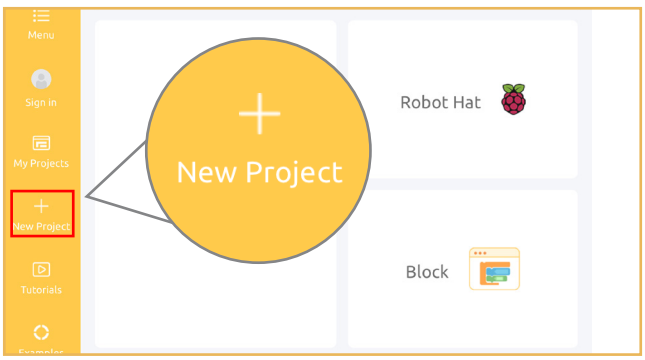
Choose Product

Choose the product, PiArm under the Robots category.



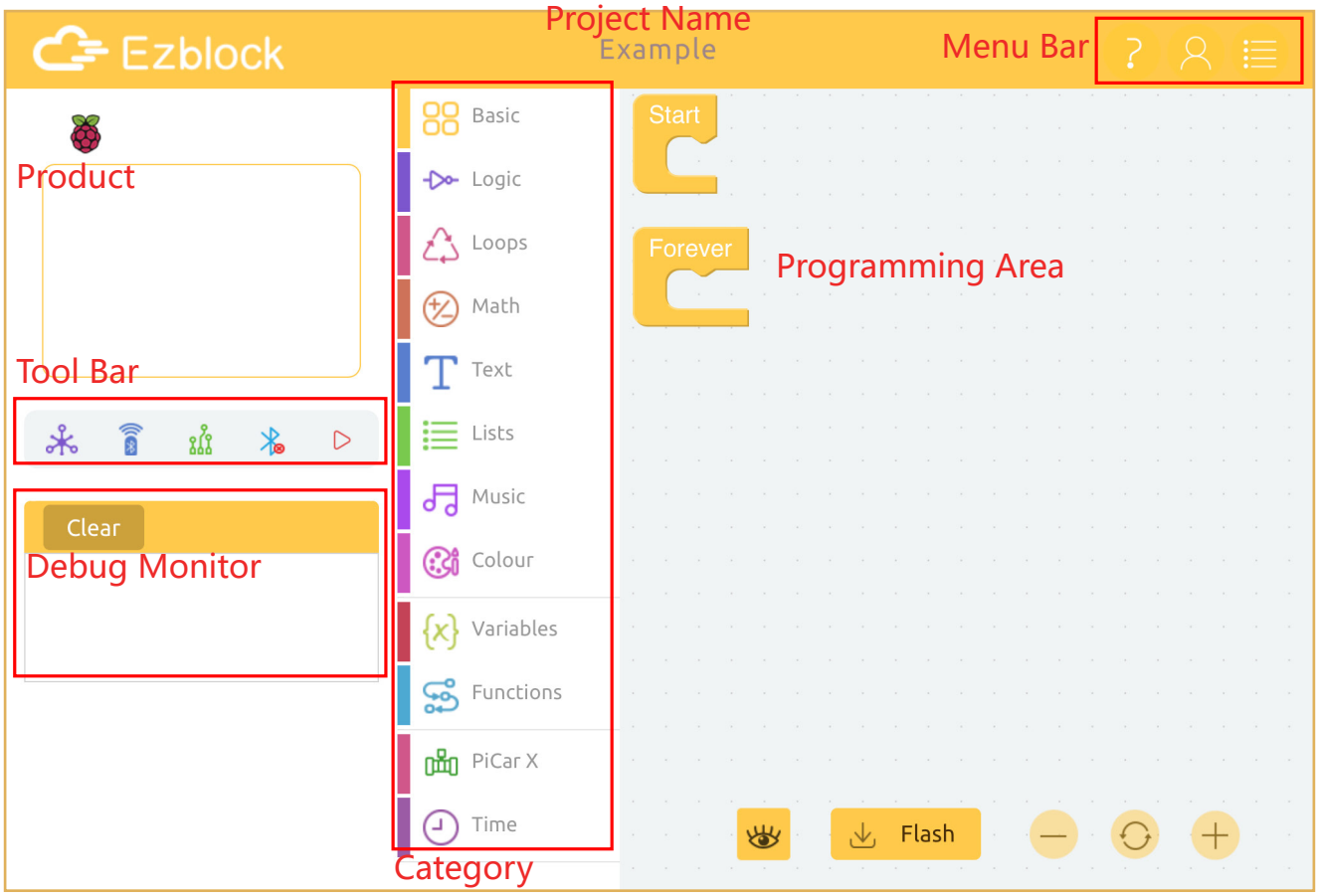
Select Environment

Select the programming environment, Block.



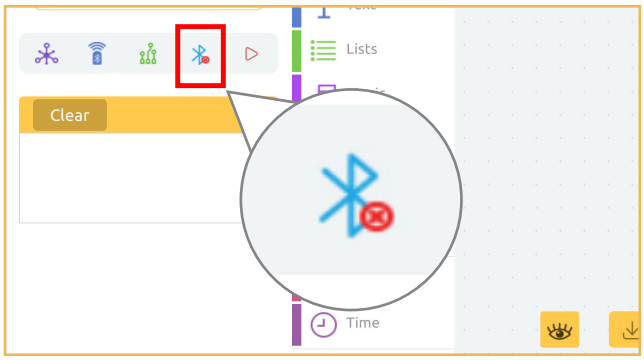
Create a New Project

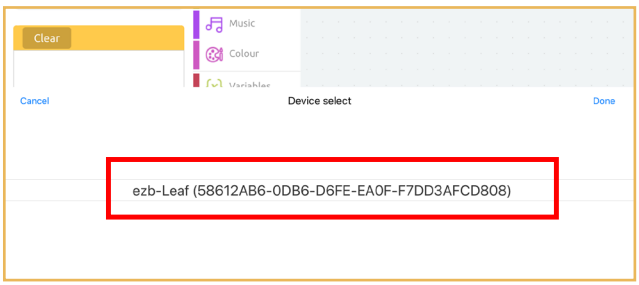
Click the button, New Project on the left side of main page to create a new project.



Programming Page

We can program by dragging the blocks from Category to Programming Area. Click the icons on Tool Bar and Menu Bar to perform some functions. Please refer to the appendix for more details.

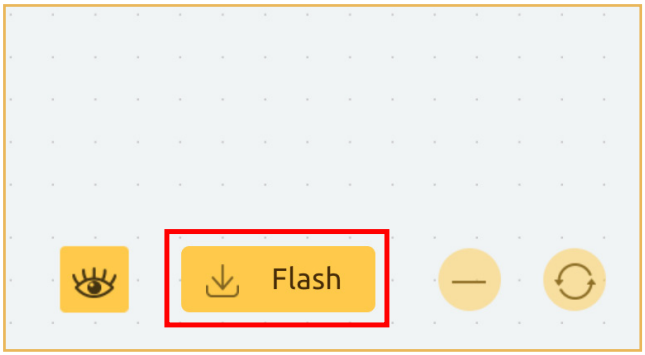




Connect Bluetooth

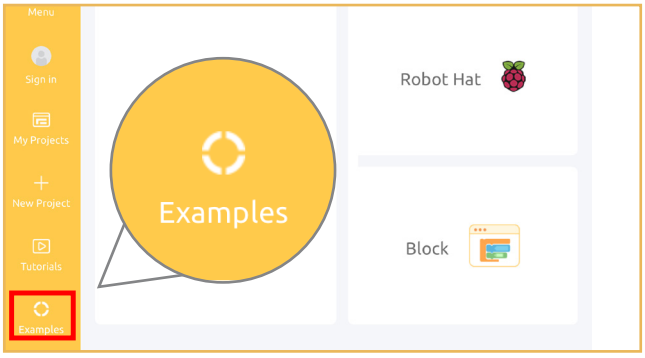
Click the Bluetooth connection button, then in device selection prompt, choose your device and click Done, and wait "Connected" to appear.

In case of cross connection between several RPi boards, Robot HAT decrease its Bluetooth signal strength while being connected. You need to put it as close as possible to your device. As long as they are connected, the signal strength will return to normal.



Flash Your Code

After the connection is done, click the Flash button to compile and download the code to the Raspberry Pi.



Enter Example Page

In addition to creating new projects, you can also directly open ready-made programs in Example.

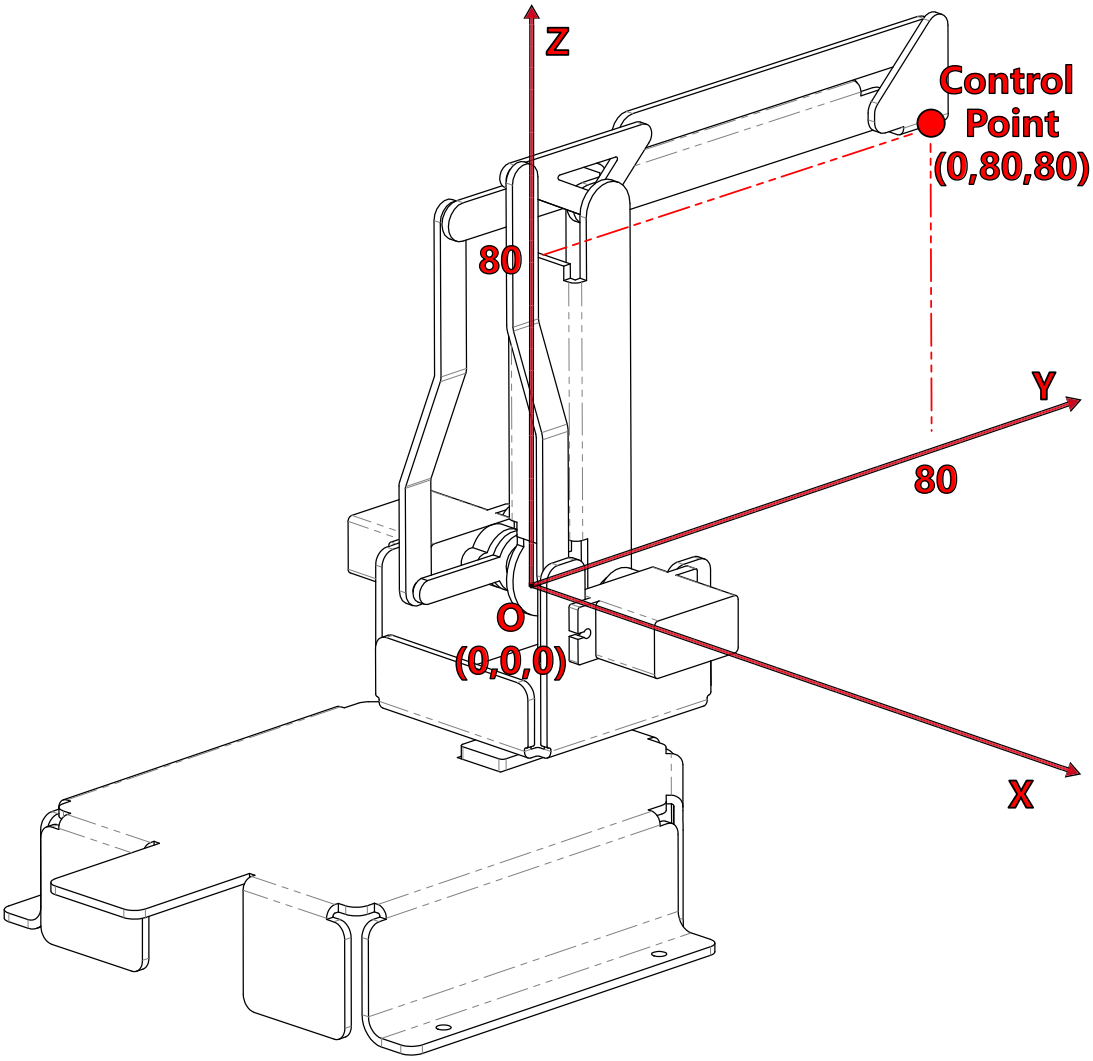
Open an Example Project

Here we open Example-Set Position. This is the first code that we will use later.

Set Postion

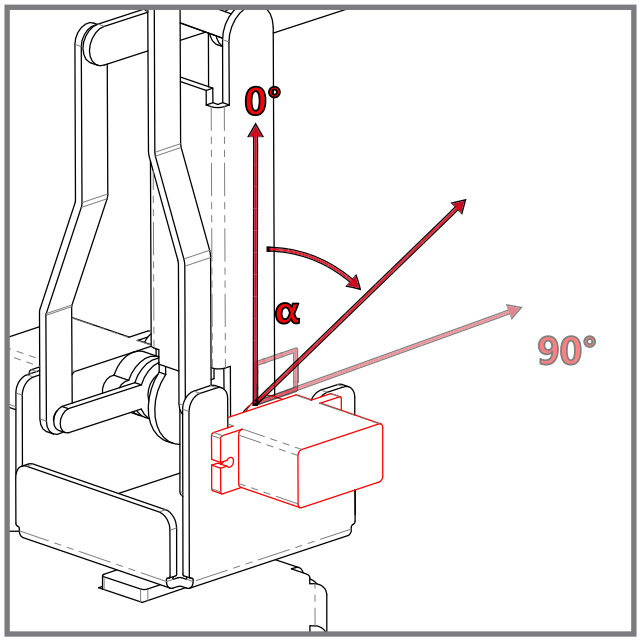
Here we use two basic methods to set the position of the PiArm.

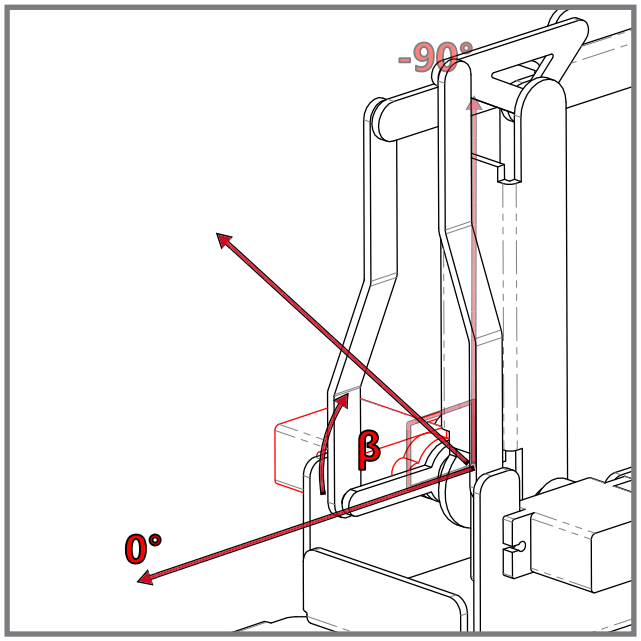
- Modify the coordinate values— PiArm has a space rectangular coordinate system whose origin is located at the center point of the output shaft of the servos on both sides. The control point is located at the top of the arm, and the scale unit is in millimeters. In the initial state, the coordinate of the control point is (0, 80, 80).

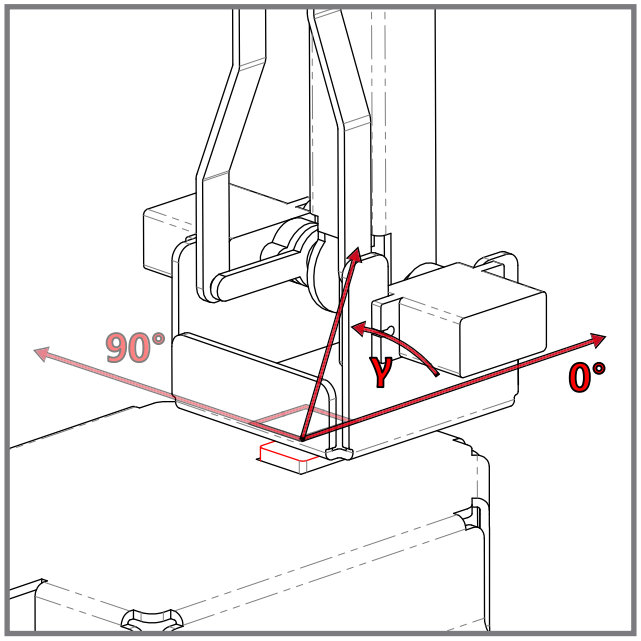


You can change the position of the control point via the following blocks.

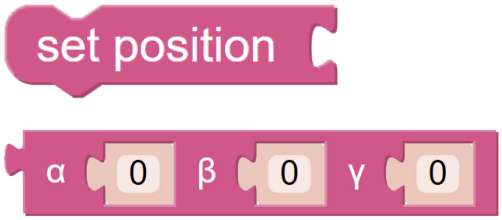
- Modify the angle values of servos— the rotation angles of the three servo output shafts of PiArm are marked with 「α」 「β」 「γ」. Rotation direction is anti-clockwise direction. In the initial state, the angles of all three servos are 0° .



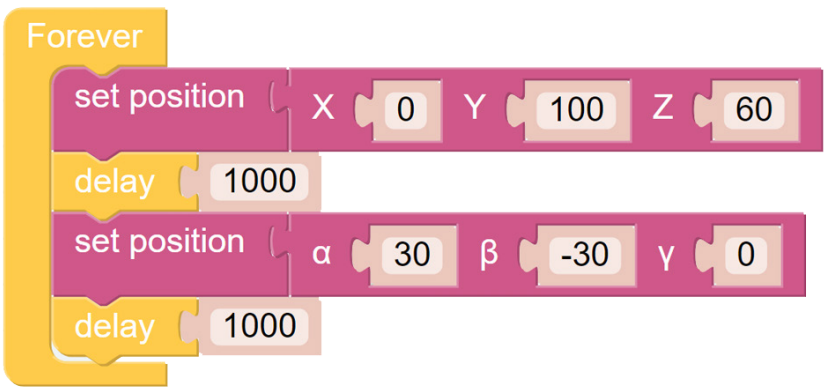




You can use the following blocks to let the servo rotate.



These blocks should look like the following picture when used.

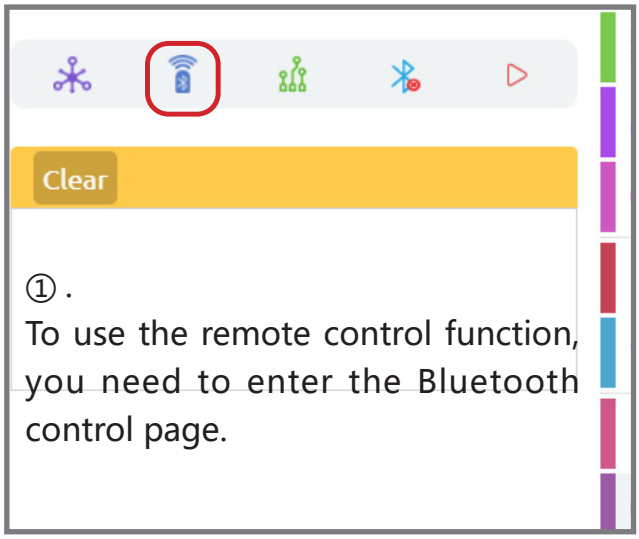


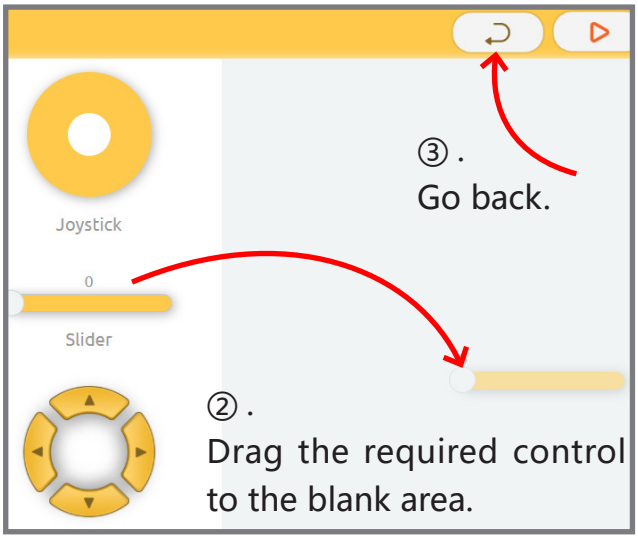
TIPS:

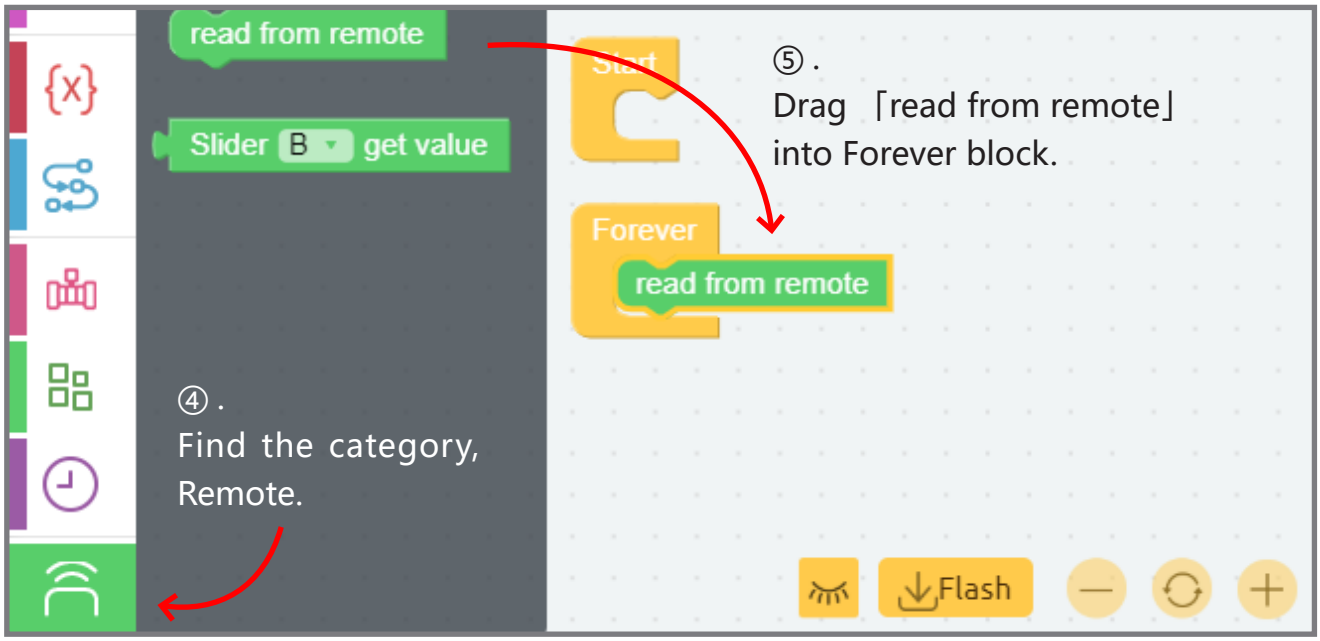
The Example contains a complete example of Set Position, which can help you better understand how to use Set Position.

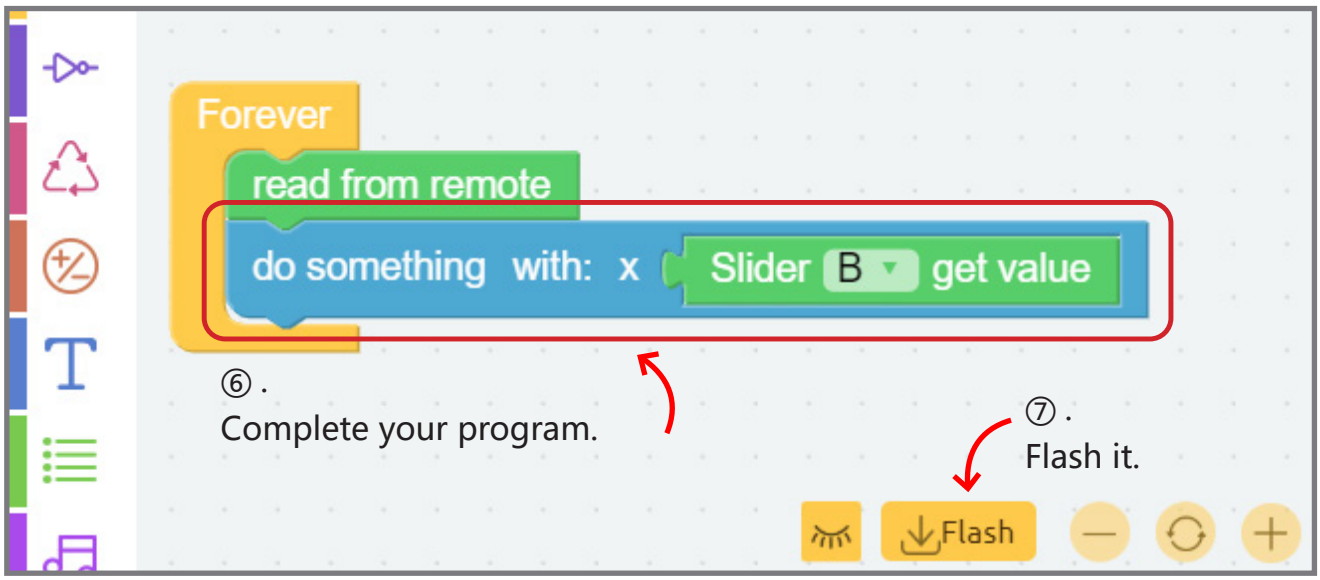
Quick Guide on Remote Control

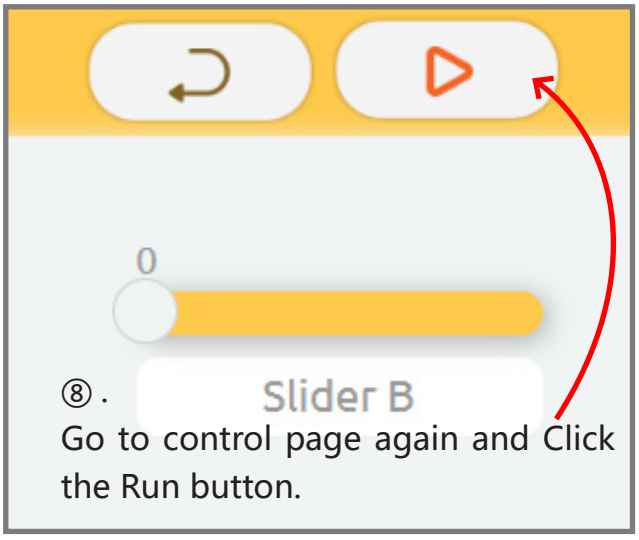
This chapter is used to help learning remote control operation of Ezblock.



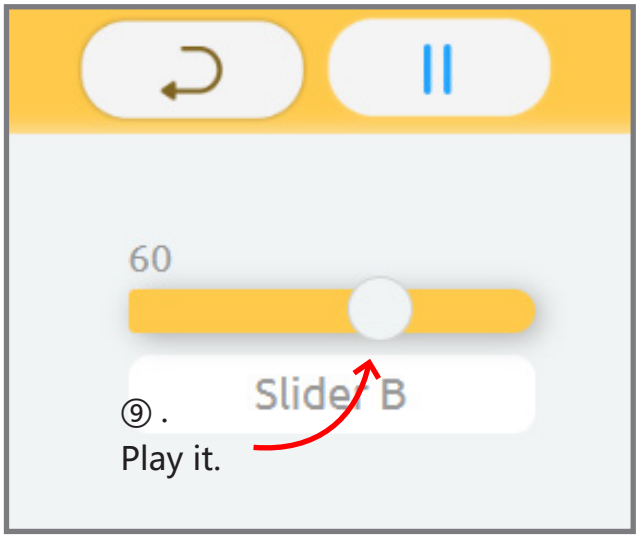








⑧.
Go to control page again and Click the Run button.

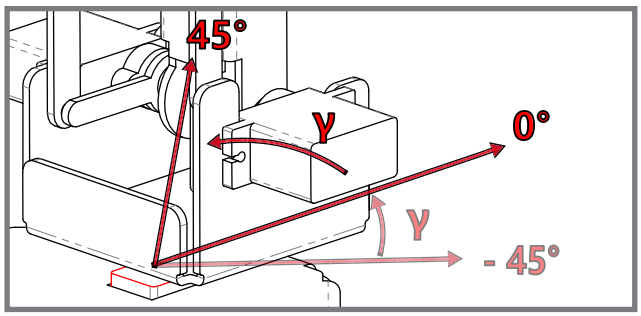


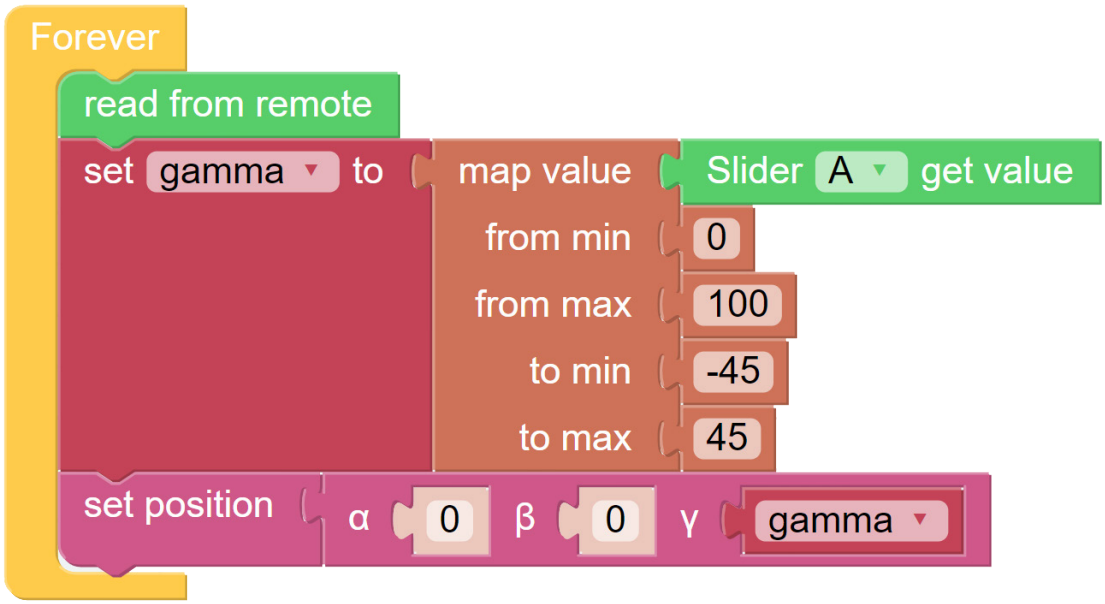
⑨.
Play it.

Set Angle by Slider

Here we use the Slider in the Ezblock's remote control, which will be used to adjust the servo angle to operate the PiArm.

It is important to note that the Slider value of Ezblock ranges 0~100, and you need to map the slider value to the appropriate angle value. Here, we have mapped the value of Slider A to the range -45° ~45° to adjust the Angle 「γ」. The codes would look like this.



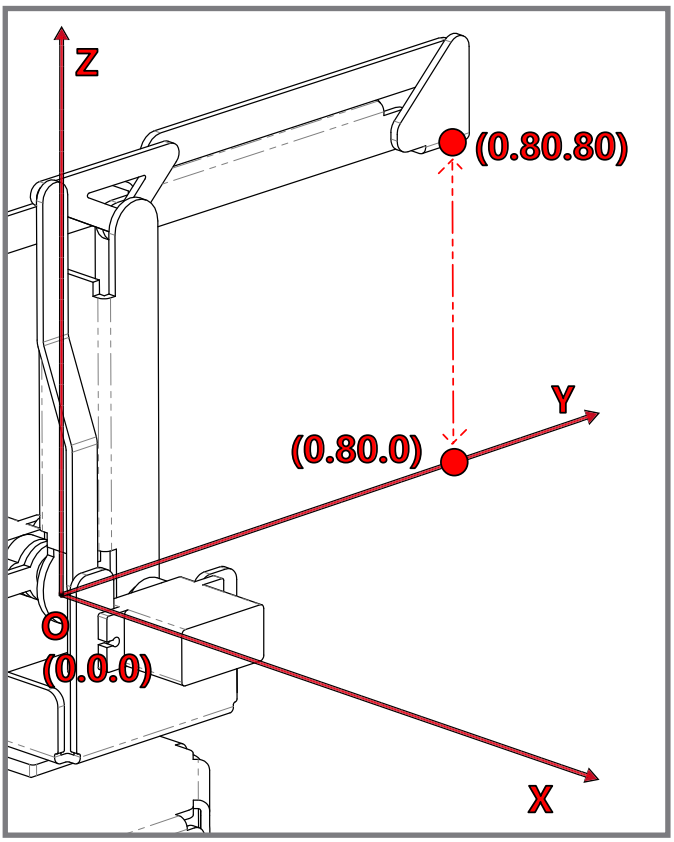


TIPS: Example contains a complete example of Set Angle by Slider to help you better use the PiArm. Please check for yourself.

Set Coordinate by Button

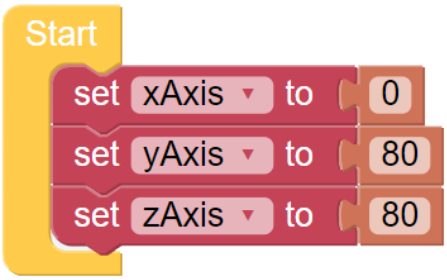
Here, we use Button and D-pad in Ezblock's remote control, which will be used to modify the coordinate value of the control point to make PiArm move.

It should be noted that the arm length of PiArm is limited, and if the coordinate value is set beyond the limit of its mechanical motion, the PiArm will rotate to an unpredictable Position.

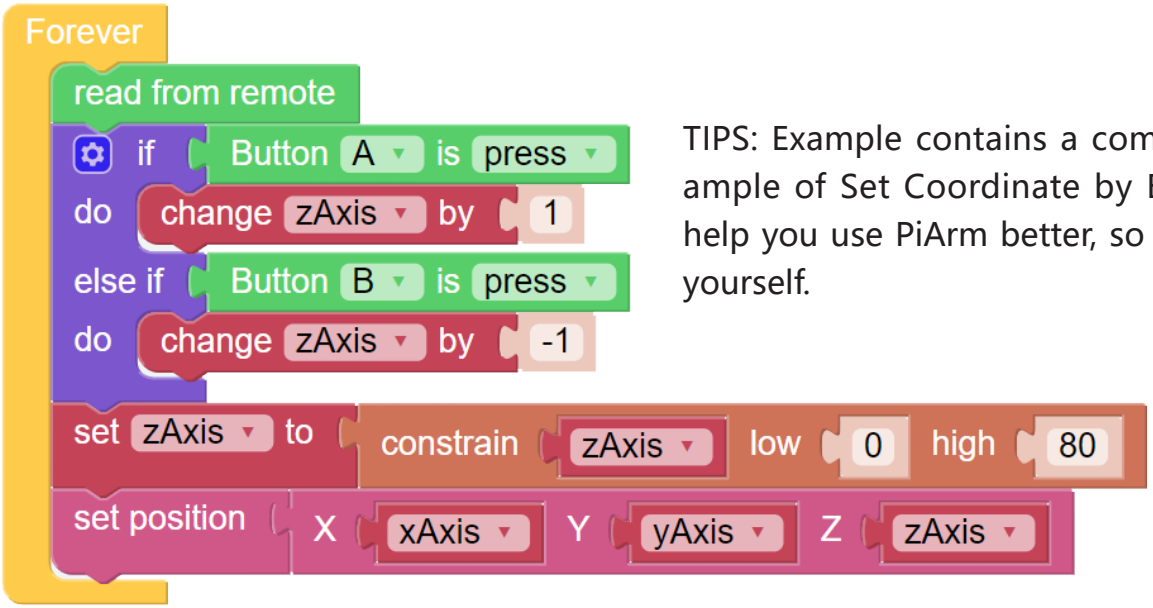


In other words, the total arm length of PiArm is 160mm, which means that the limit value of the control point moving along the Y-axis should ranges from (0,0,0) to (0,160,0). However, due to the limitations of the structure itself, the range of activities should be much smaller than this range.

Therefore, you need to set limits on the range of each coordinate value.



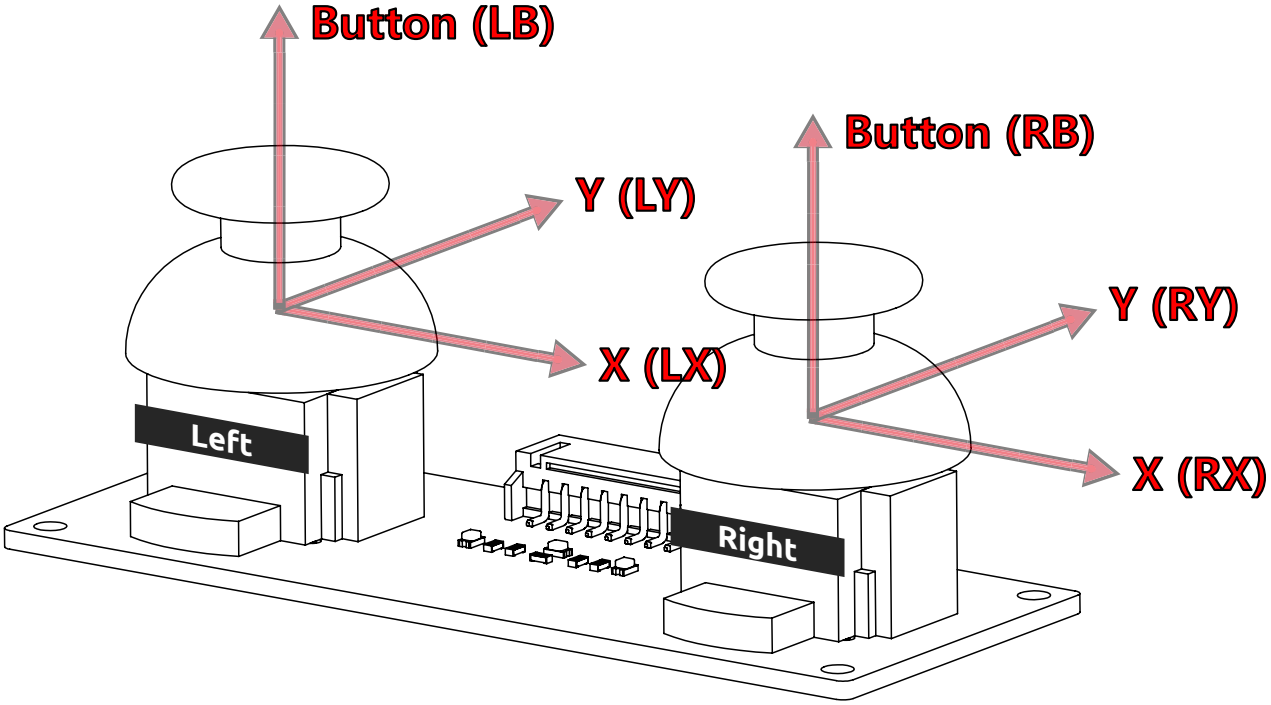
Here, we try to set the z-axis of the control point. In order to avoid being too large or too small, the range of activity of the expected control point on the Z-axis should range 0~80 . Then, you need to add restrictions to the code that modifies the coordinate values, as shown below.



TIPS: Example contains a complete example of Set Coordinate by Button to help you use PiArm better, so check for yourself.

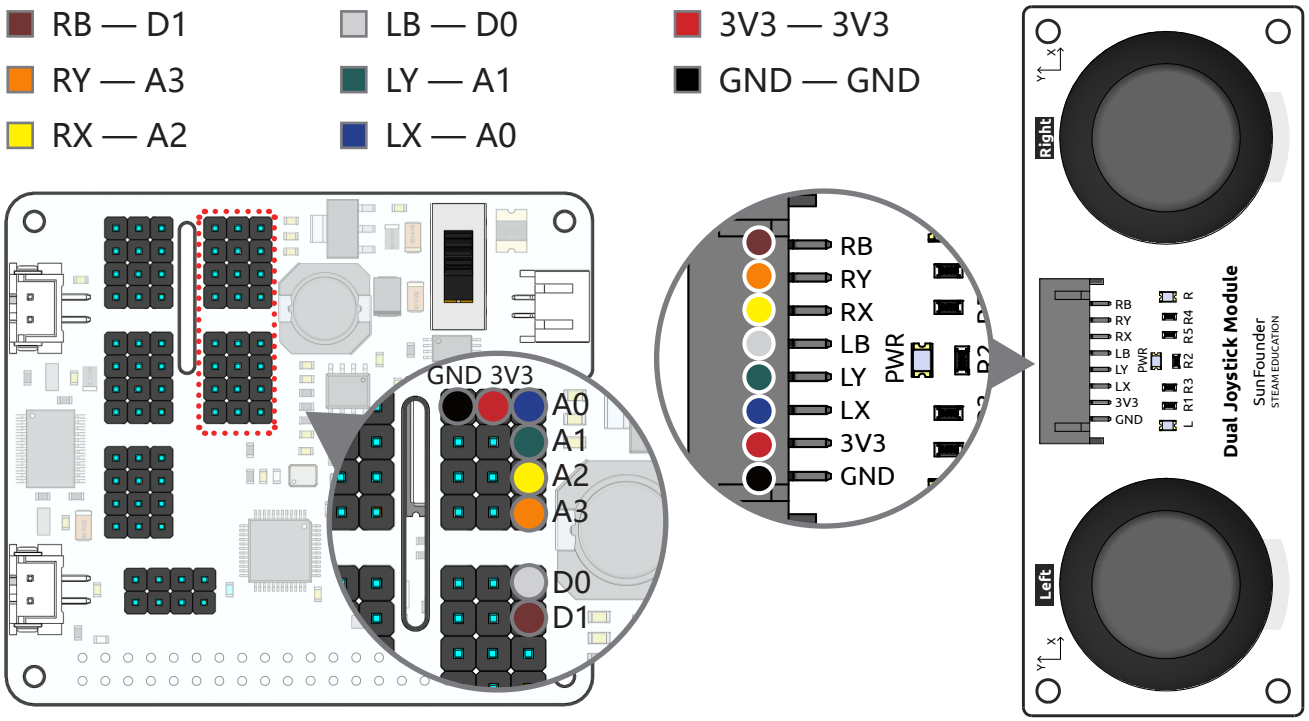
Play PiArm by Joystick Module

PiArm provides a Dual Joystick Module for you to control. Each Joystick can output electrical signals in X, Y, and Z directions.

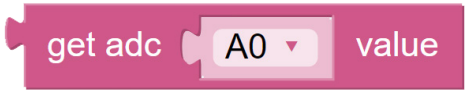


Before use, you need to correctly wire the Dual Joystick Module according to the marks in the picture below so that the main control board can receive the corresponding electrical signals.

- RB — D1
- RY — A3
- RX — A2
- LB — D0
- LY — A1
- LX — A0
- 3V3 — 3V3
- GND — GND



You can get the values of X and Y axes of Joystick via the following blocks.

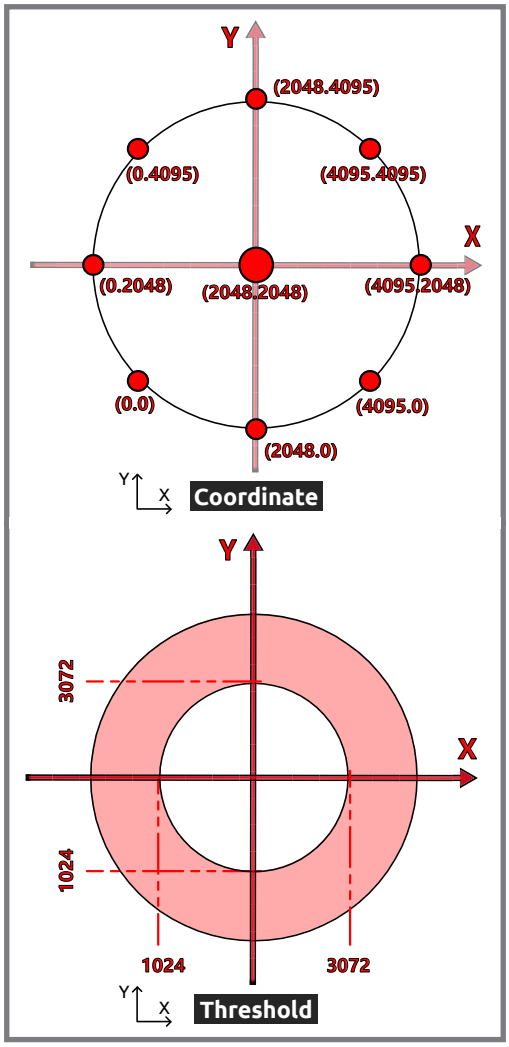


Joystick readings are in planar coordinates system ranging 0~4095, with the origin (0,0) at the bottommost left corner.

In other words, the coordinate value is (2048,2048) when the joystick is not toggled. If you toggle the joystick to the left, you get (0,2048). When you toggle the joystick straight down, you get (2048,0) as is shown on the right.

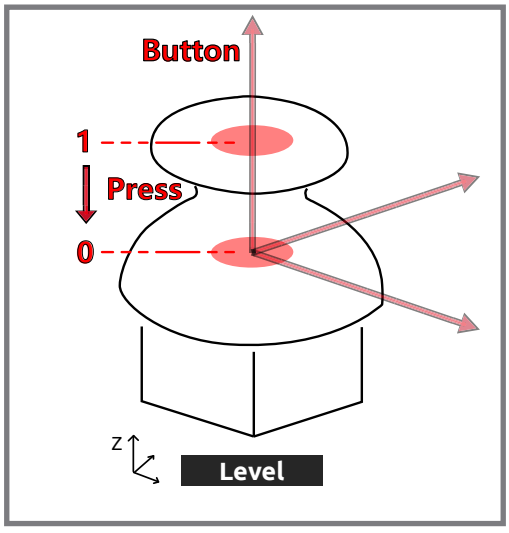
However, the electrical signal is easy to fluctuate and it is difficult to get an absolutely stable reading, so we usually set a numerical interval to judge its use.

We propose that the boundary values be 3072 and 1024. When the reading of Joystick is greater than 3072, the Joystick is considered to be toggled up (or to the right); otherwise, if the reading is less than 1024, the Joystick is considered to be toggled down (or to the left).



You can read the working state of Button on the Z axis via the following blocks.

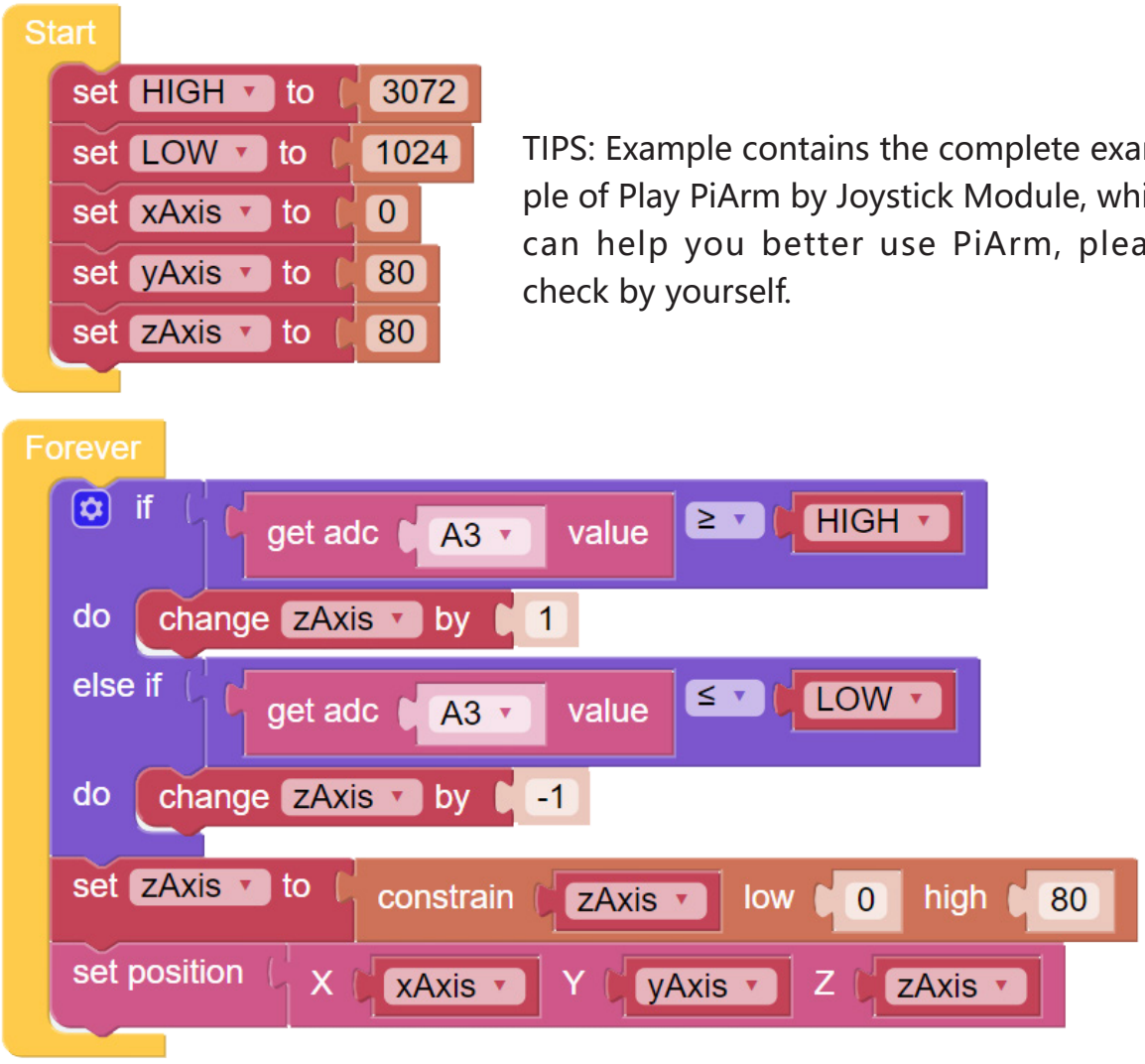
The Z-axis Button will output low level (0) when pressed and output high level (1) when released.



We can use Dual Joystick Module to set PiArm's position.

Here, we try to toggle the right joystick forward and backward (In other word, read the signal of RY pin) to make the control point rise and fall along the Z-axis.

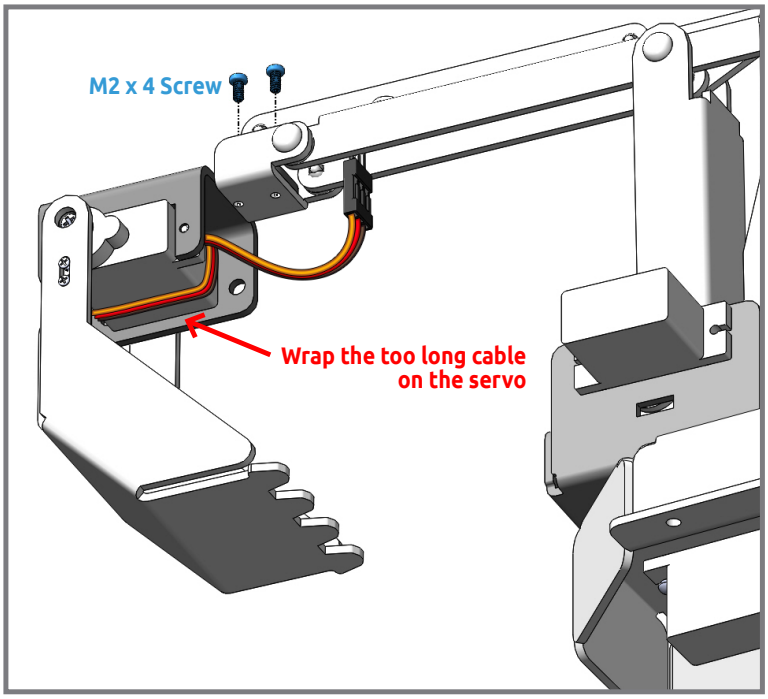
The codes are shown below.



TIPS: Example contains the complete example of Play PiArm by Joystick Module, which can help you better use PiArm, please check by yourself.

Play Shovel Bucket

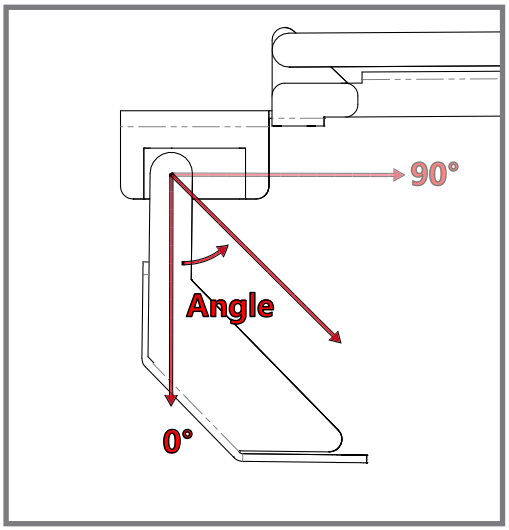
Let's use the Z-axis button of Dual Joystick Module to control the Shovel Bucket. To use the Shovel Bucket parts, you need to call the initialization Block. Then the relevant function blocks are called.




```
set bucket pin as P3
```

```
set shovel bucket angle to 0
```

The working direction of the shovel is to rotate from the outside to the inside, as shown in the right picture.



Here, we press the left button to let the Shovel Bucket rotate (Angle increases); press the right button and you will make Angle decrease. The codes are shown below.

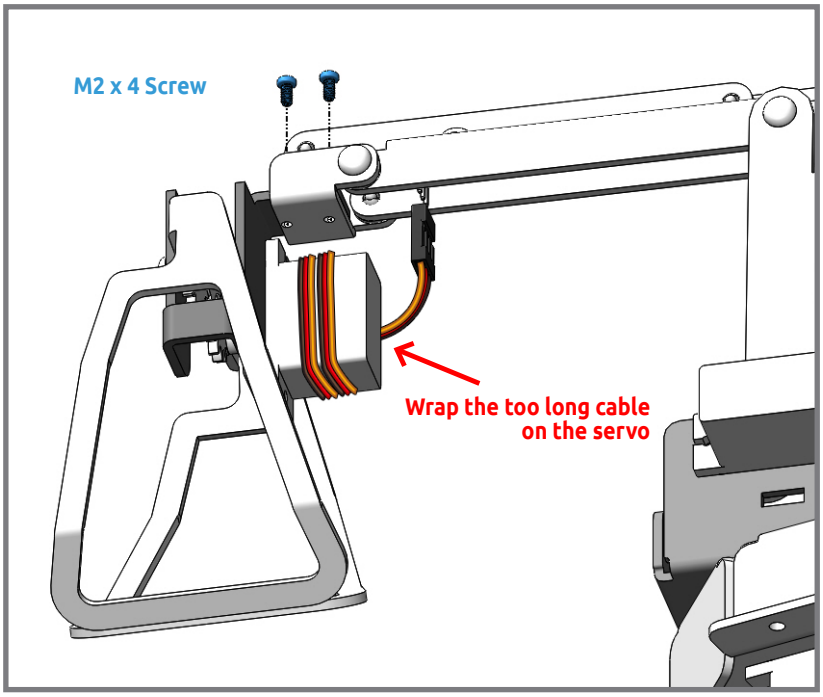
```
Start
    set angle to 0
    set bucket pin as P3
```

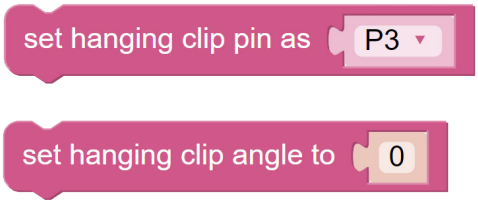
```
Forever
    if get pin D0 value = 0
    do change angle by 5
    else if get pin D1 value = 0
    do change angle by -5
    set angle to constrain angle low 0 high 90
    set shovel bucket angle to angle
```

TIPS: The Example contains the complete sample code of Play Shovel Bucket, which can help you better use PiArm. Please check.

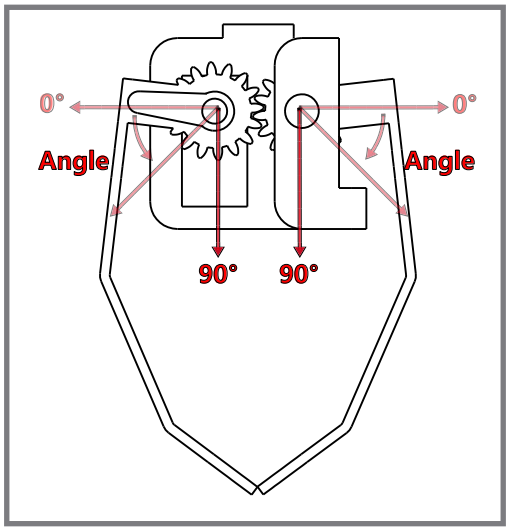
Play Hanging Clip

Let's use the Z-axis button for the Dual Joystick Module to control Hanging Clip.To use the Hanging Clip part, you need to first call the initialization Block. Then the relevant function blocks are called.

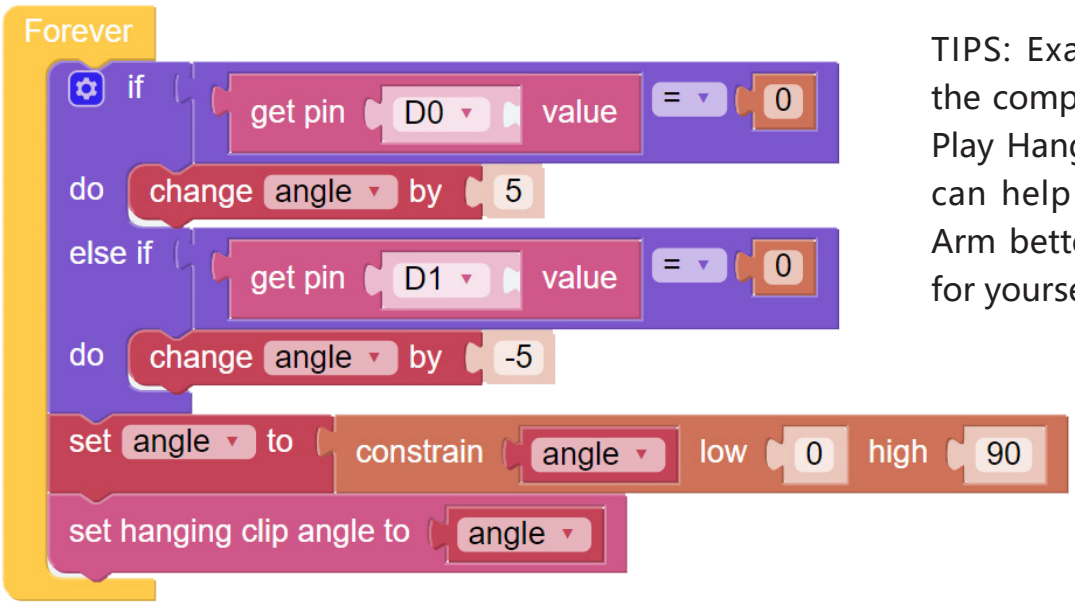




The working direction of Hanging Clip is to close from the outside to the inside, as shown in the right picture.



Here, we press the left button to make Hanging Clip close (Angle is 90 degrees when the Hanging Clip is completely closed), and press the right button to open. The codes are shown below.

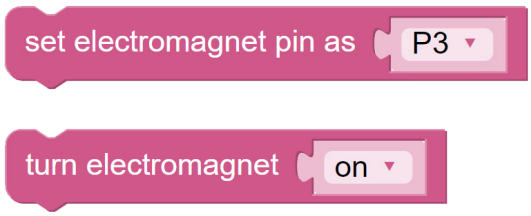


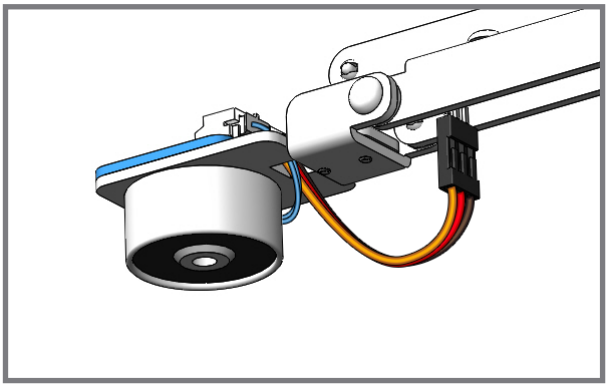
TIPS: Example contains the complete example of Play Hanging Clip, which can help you to use Pi-Arm better. Please check for yourself.

Play Electromagnet

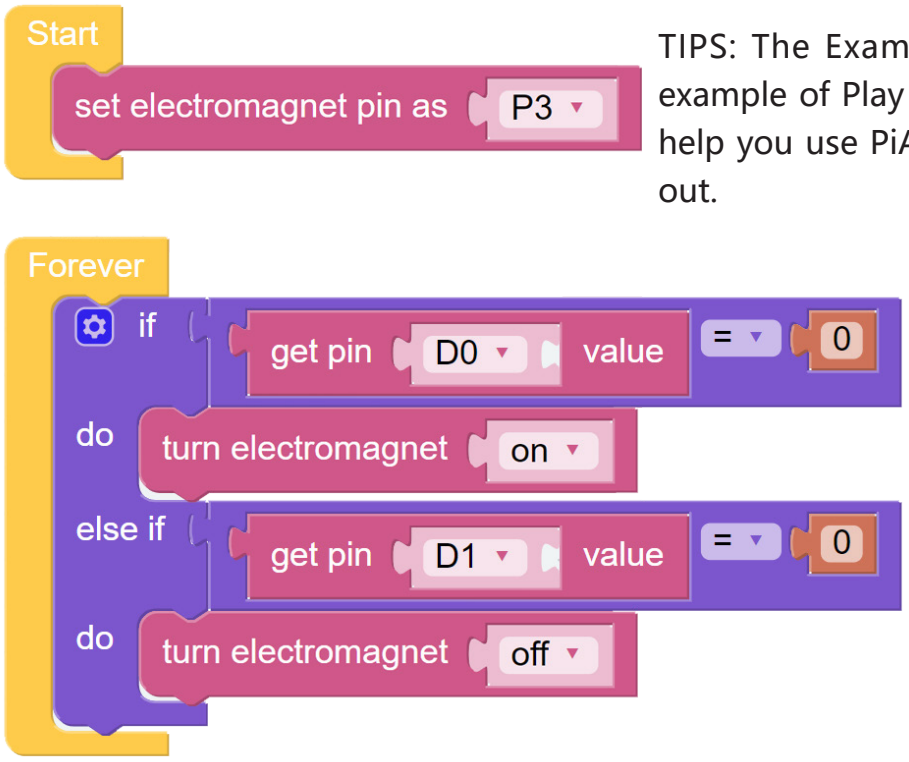
Let's use the Z-axis button of Dual Joystick Module to control Electromagnet.

To use the Eletromagnet part, you need to call the initialization Block first. The relevant function block is then called.





Here, we press the left button to make the Electromagnet work and the right button to stop. The codes are shown below.



TIPS: The Example contains a complete example of Play Electromagnet, which can help you use PiArm better. Please check it out.

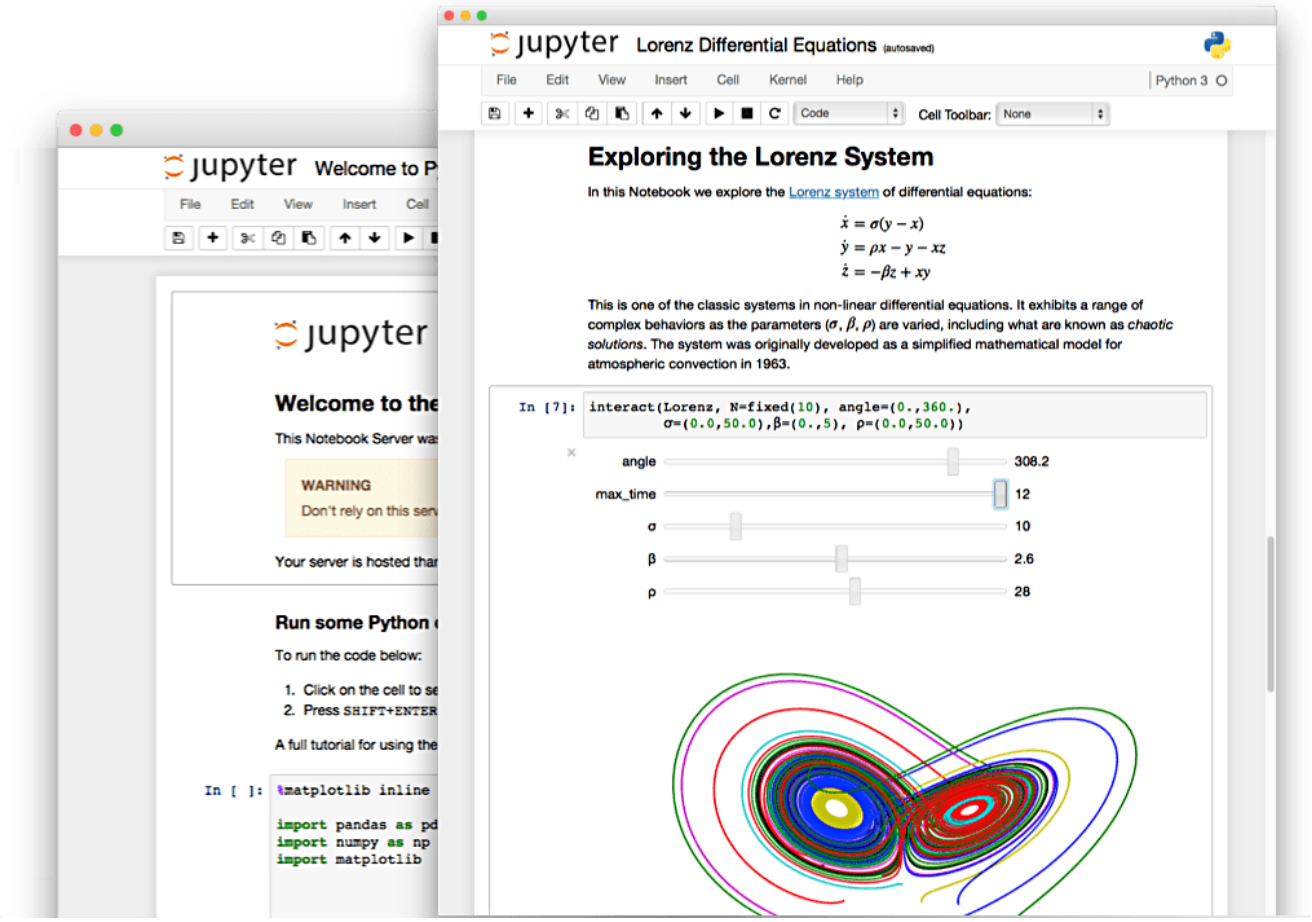
To Play in Jupyter

Introduce Jupyter Notebook

In order to let you have a good experience in Raspberry Pi programming, we recommend you to use Jupyter. In this chapter, we will show you how to setup Jupyter Notebook on the Raspberry Pi.

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.

You can view it from the following address: https://jupyter.org/



Quick Guide on RPi Setting

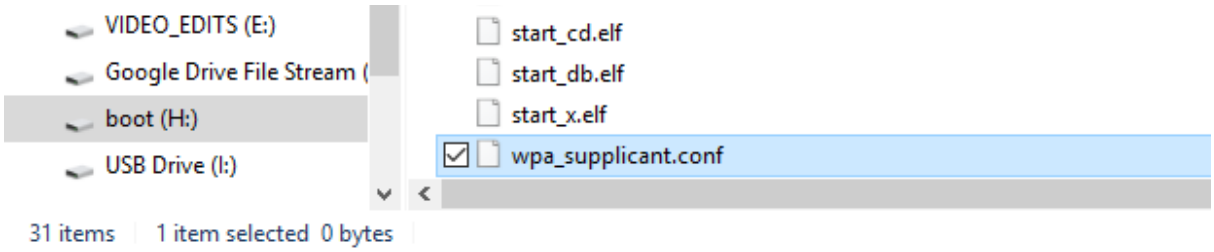
This chapter is used to set up Raspberry Pi.

Note: First, you must burn the Ezblock system. If you use the Raspberry Pi OS, the sample python we provide will not be available.

Connect the Raspberry Pi to the Internet

You need to modify a Wi-Fi configuration file wpa_supplicant.conf in the Micro SD card by your PC that is located in the directory /etc/wpa_supplicant/.

If your personal computer is working on a linux system, you can access the directory directly to modify the configuration file; however, if your PC use Windows system, then you can't access the directory and what you need next is to go to the directory, /boot/ to create a new file with the same name, wpa_supplicant.conf.



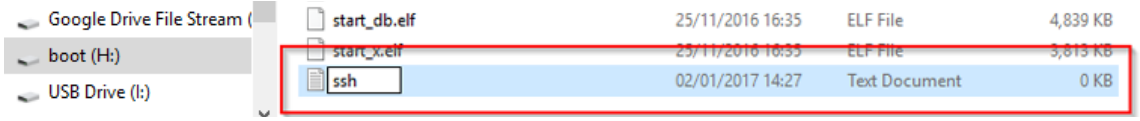
Input the following content in the file:

```
ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
update_config=1
country=COUNTRY
network={
ssid="SSID"
psk="PASSWORD"
key_mgmt=WPA-PSK
priority=1
}
```

Replace COUNTRY with the code of country. Google "ISO 3166-1" to see all alpha 2 codes.

Replace "SSID" and "PASSWORD" with yours.

You also need to add an empty ssh file to enable the remote access the command line function.



Now, the OS is configured. When the Micro SD card is inserted into the Raspberry Pi, you can use it immediately.

Get the IP Address

After the Raspberry Pi is connected to Wi-Fi, we need to get the IP address of it. There are many ways to know the IP address, and two of them are listed as follows.

★ Checking via Router

If you have permission to log in the router (such as a home network), you can check the addresses assigned to Raspberry Pi on the admin interface of router.

The default hostname of the system is raspberrypi, and you need to find it. (If you are using ArchLinuxARM system, please find alarmpi.)

★ Network Segment Scanning

You can also use network scanning to look up the IP address of Raspberry Pi. You can apply the software, Advanced IP scanner and so on.

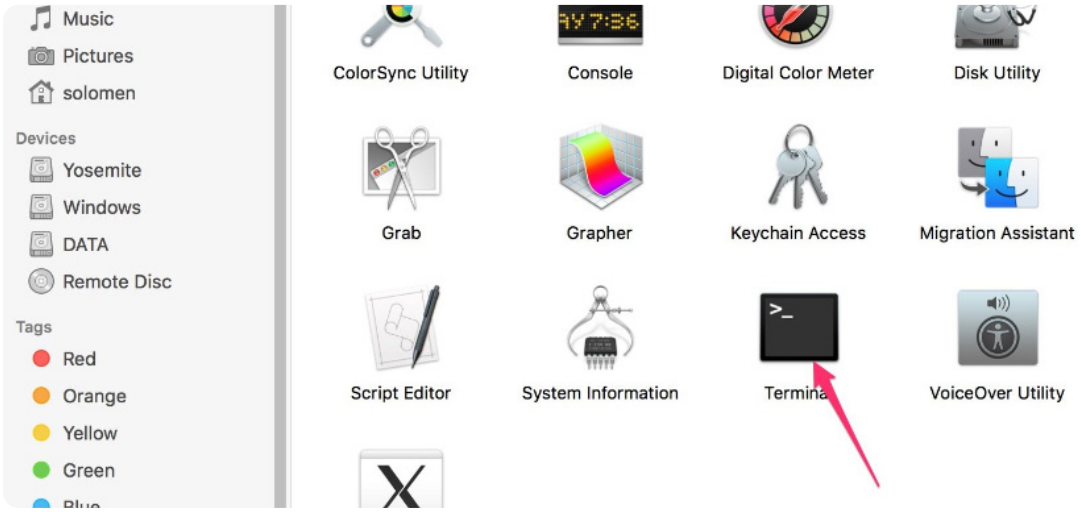
Scan the IP range set, and the name of all connected devices will be displayed. Similarly, the default hostname of the system is raspberrypi, now you need to find the hostname.

Remote Control

We can open the Bash Shell of Raspberry Pi by applying SSH. Bash is the standard default shell of Linux. The Shell itself is a program written in C that is the bridge linking the customers and Unix/Linux. Moreover, it can help to complete most of the work needed.

★ For Linux or/Mac OS X Users

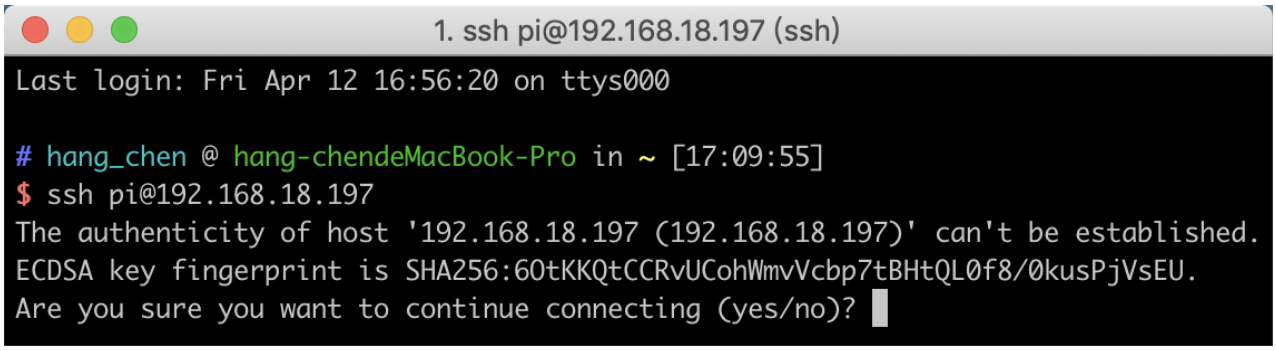
1. Go to Applications->Utilities, find the Terminal, and open it.



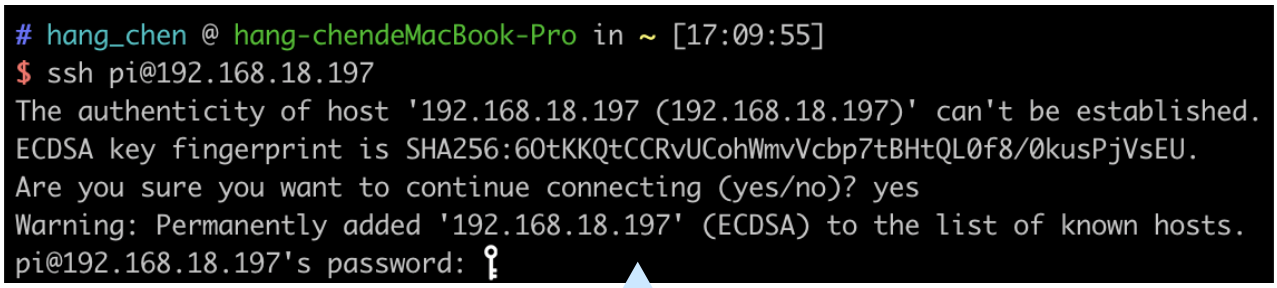
2. Type in ssh pi@ip_address. “pi” is your username and “ip_address” is your IP address. For example:

```
ssh pi@192.168.18.197
```

3. Input “yes”.

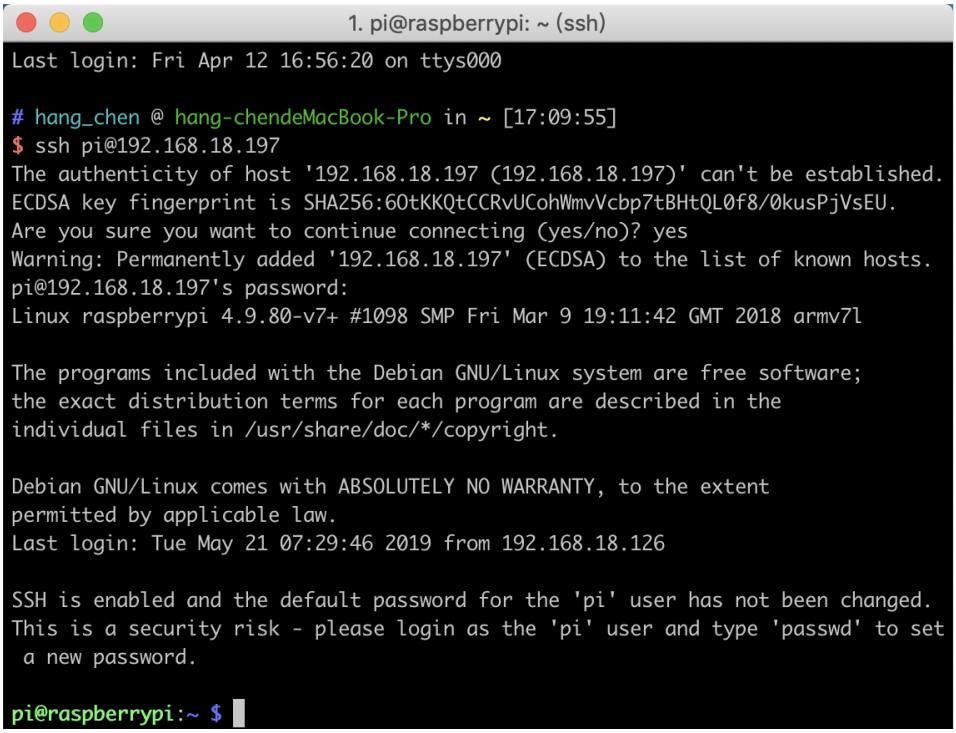


4. Input the passcode and the default password is “raspberry”.



When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct passcode.

5. We now get the Raspberry Pi connected and are ready to go to the next step.

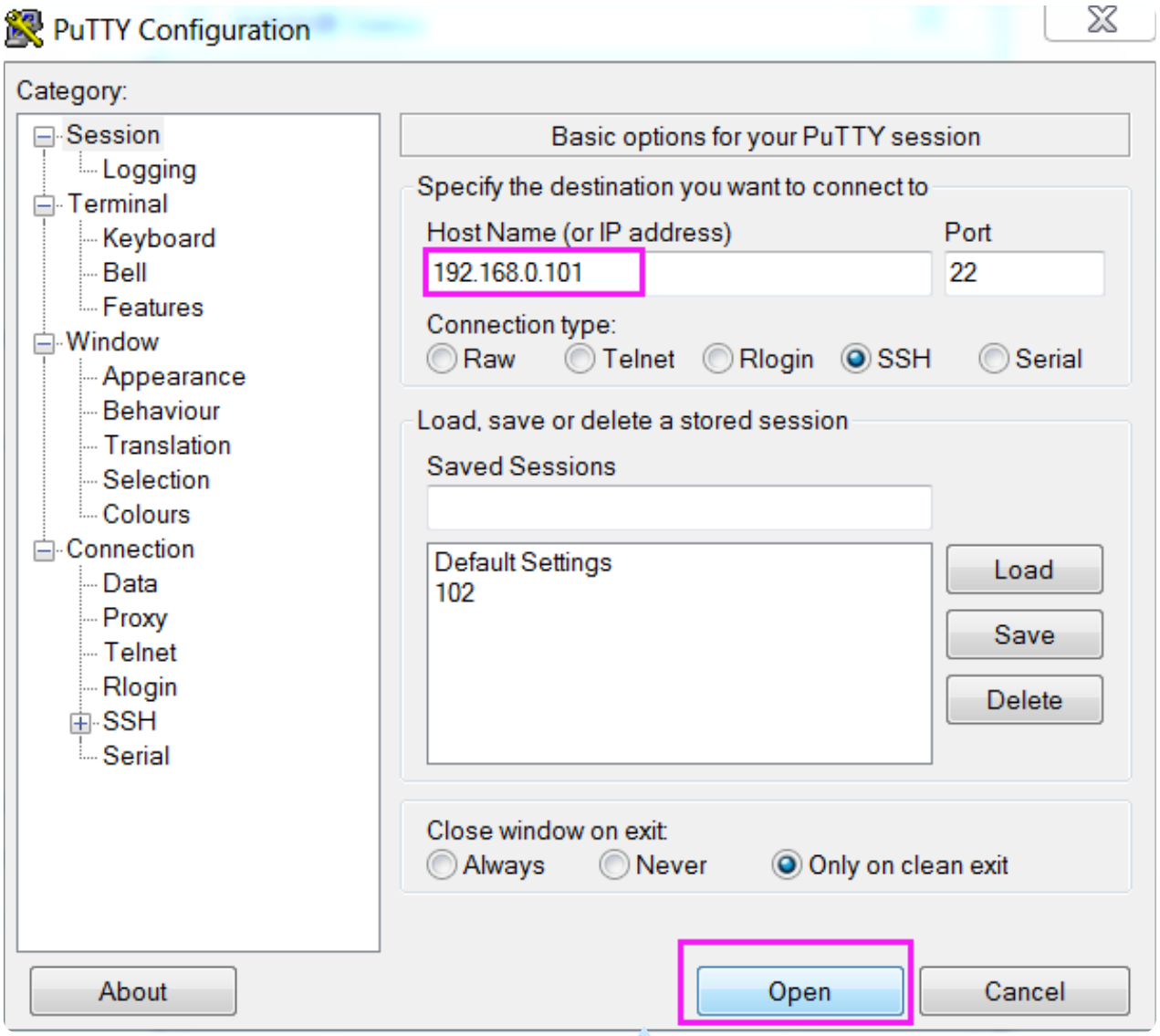


★ For Windows Users

If you're a Windows user, you can use SSH with the application of some software. Here, we recommend PuTTY.

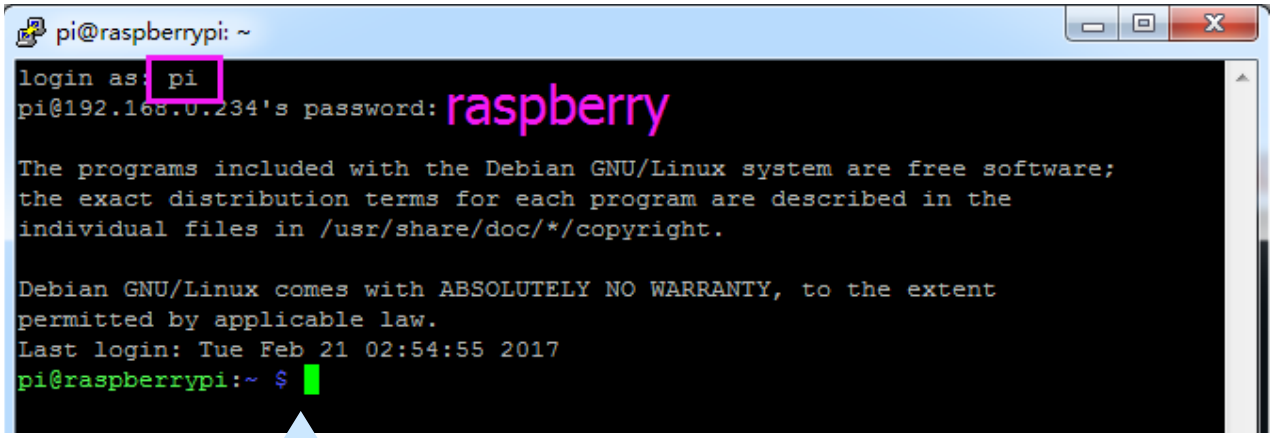
1) Download PuTTY.

2) Open PuTTY and click Session on the left tree-alike structure. Enter the IP address of the RPi in the text box under Host Name (or IP address) and 22 under Port (by default it is 22). Click Open.



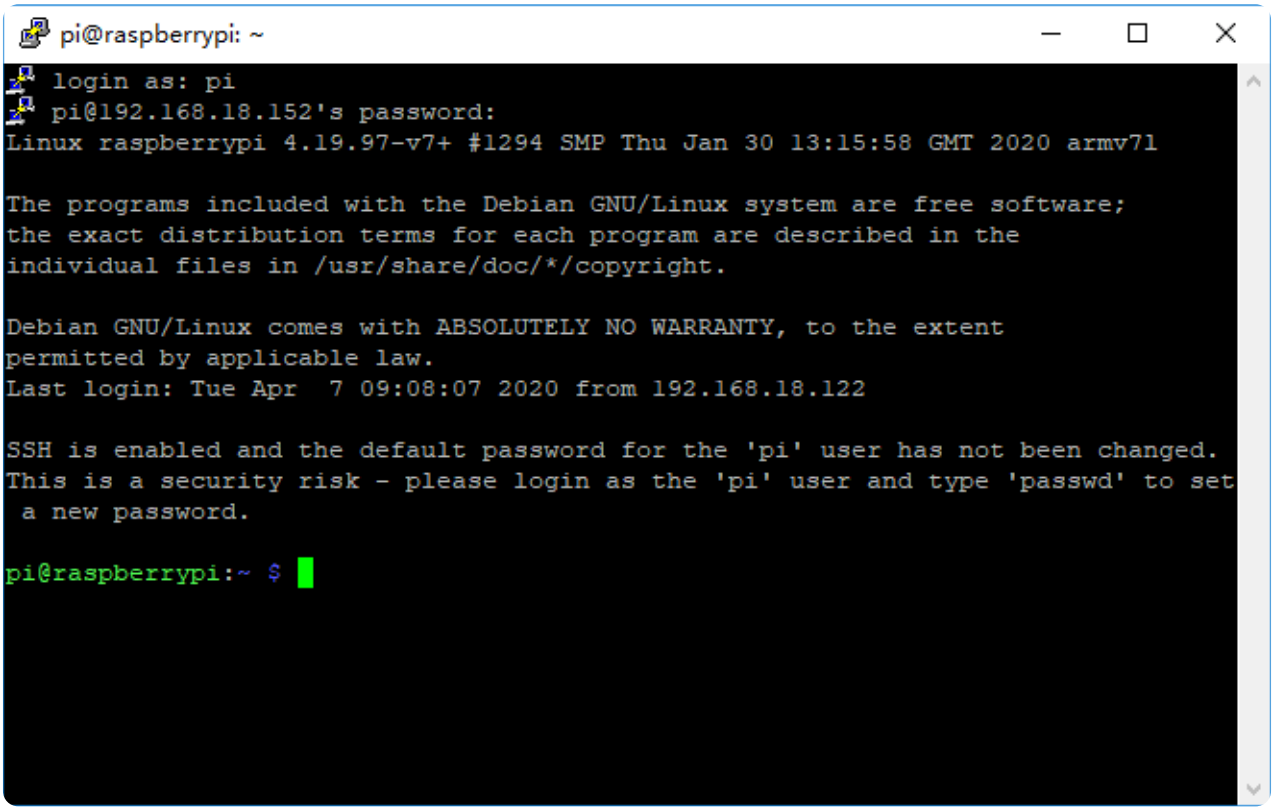
When you first log in to the Raspberry Pi with the IP address, there prompts a security reminder. Just click Yes.

3) When the PuTTY window prompts “login as:”, type in “pi” (the user name of the RPi), and password: “raspberry” (the default one, if you haven’t changed it).



When you input the password, the characters do not display on window accordingly, which is normal. What you need is to input the correct passcode.

4) Here, we get the Raspberry Pi connected and it is time to conduct the next steps.



Download the Code

We can download the example codes by using git clone in the Raspberry Pi.

① Change directory to /home/pi

```
cd /home/pi/
```

cd, short for change directory is to change from the current path to the intended directory. Informally, here is to go to the path /home/pi/.

② Clone the repository from github.

```
git clone https://github.com/sunfounder/PiArm
```

Stop Ezblock Service

The running of codes is based on Ezblock Studio. Please stop Ezblock at first.

```
sudo service ezblock stop
```

If you want to restart Ezblock, please run:

```
sudo service ezblock start
```

Ezblock is a startup program, and you can select the different commands to decide whether the program runs at startup or not:

```
sudo service ezblock-rest stop
```

```
sudo service ezblock-rest start
```

Quick Guide on Jupyter Notebook Setting

① Type the following command in terminal to install Jupyter. This will take you 15 to 30 minutes, please wait patiently.

```
sudo pip3 install jupyter
```

② Enter the following instructions to enable Jupyter Notebook.

```
jupyter notebook --ip 0.0.0.0 --port 8888
```

③ After successful startup, you will see the following information in Terminal. The message ends up with a string of token characters, please copy them.

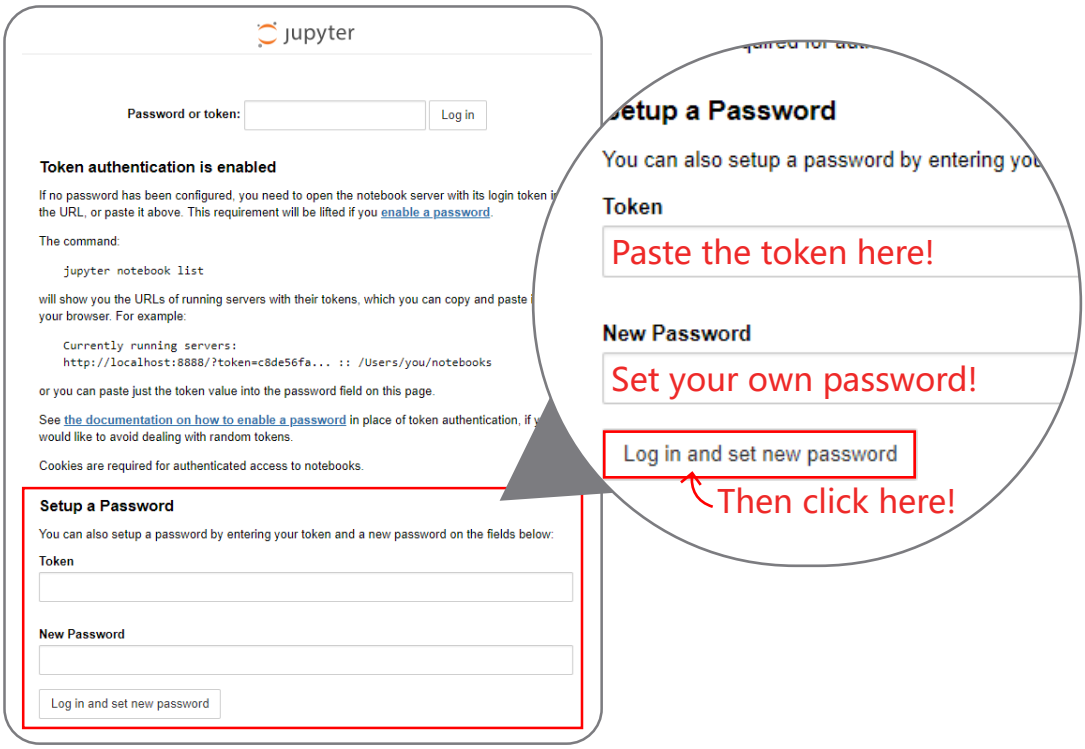
```
[I 11:27:58.912 NotebookApp] Serving notebooks from local directory: /home/pi
[I 11:27:58.912 NotebookApp] The Jupyter Notebook is running at:
[I 11:27:58.913 NotebookApp] http://localhost:8888/?token=6a8be635148c55b42351e1f7b9c92bd593c264f9ab68ff7b
[I 11:27:58.913 NotebookApp]  or http://127.0.0.1:8888/?token=6a8be635148c55b42351e1f7b9c92bd593c264f9ab68ff7b
[I 11:27:58.913 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 11:27:59.138 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///C:/Users/sunfounder/AppData/Roaming/jupyter/runtime/nbserver-11844-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=6a8be635148c55b42351e1f7b9c92bd593c264f9ab68ff7b
     or http://127.0.0.1:8888/?token=6a8be635148c55b42351e1f7b9c92bd593c264f9ab68ff7b
```

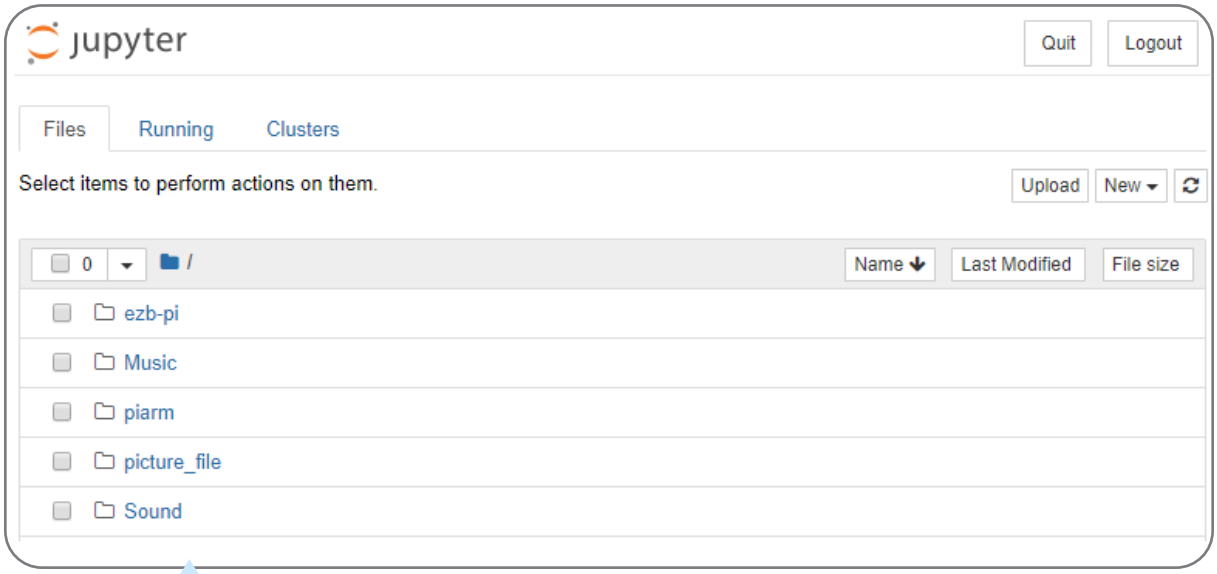
This is the token!

④ Input the IP address and port of Raspberry Pi in the browser, as follows:

⑤ You will see the following page:

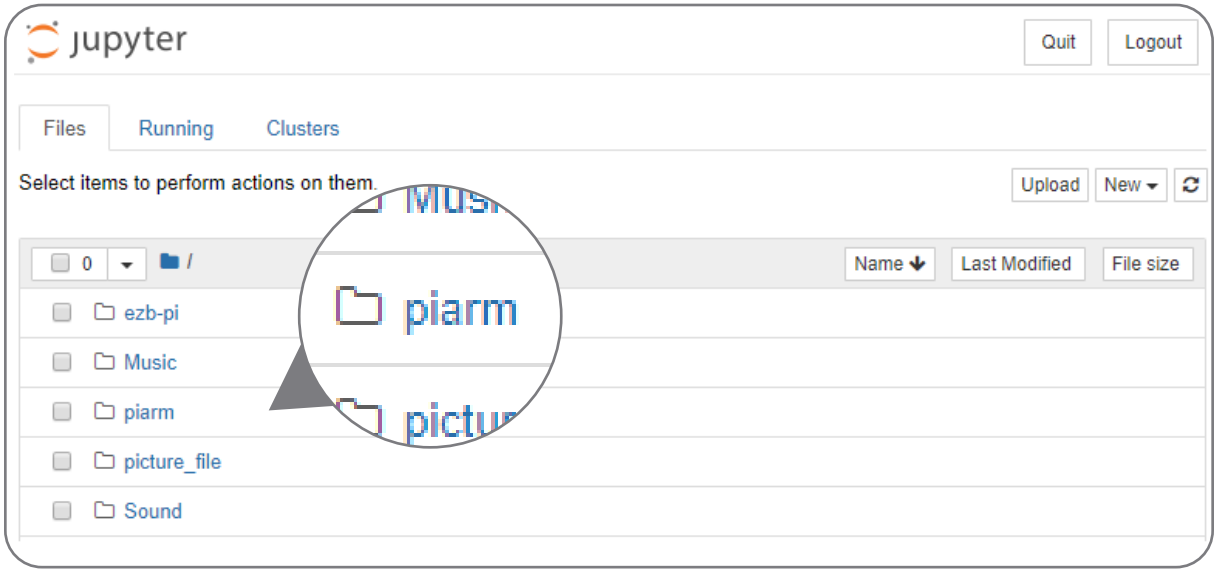


⑥ At this point, you have logged in successfully and entered the Jupyter Notebook page.



To enable your new password，you have to restart Jupyter Notebook. Please use Ctrl-C on the terminal to stop the server and shut down all kernels. Then, restart it!

⑦ Go to the piarm directory to see the relevant sample codes.



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