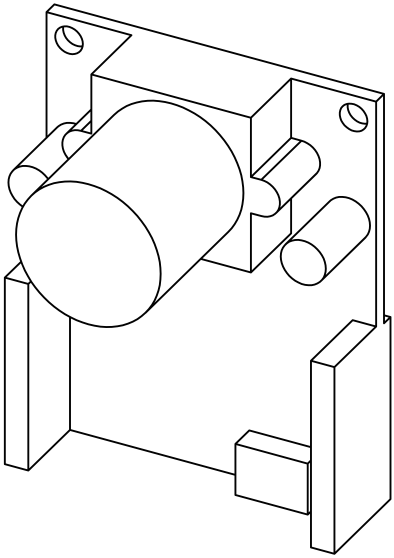
UFACTORY

Vision Camera Kit

User Guidance



SHENZHEN UFACTORY CO.,LTD.
V2.2

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Vision Kit User Manual

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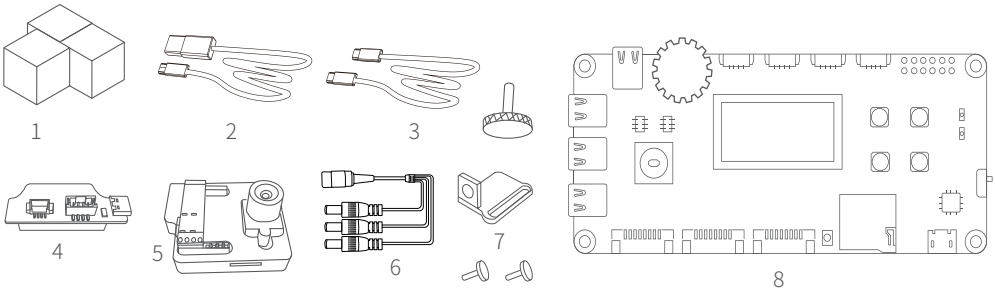


1.1 Hardware

1.Target object * 3

2.USB cable *1

3.USB Type C cable*2

4.uArm 30P bottom expansion board * 1

5.OpenMv Kit* 1

6.DC Power Supply 3-in-1 cable * 1

7.OpenMv mounting bracket (with M3 screws)*1

8.uArm Controller* 1

1.2 Software

1.Arduino IDE
www.arduino.cc

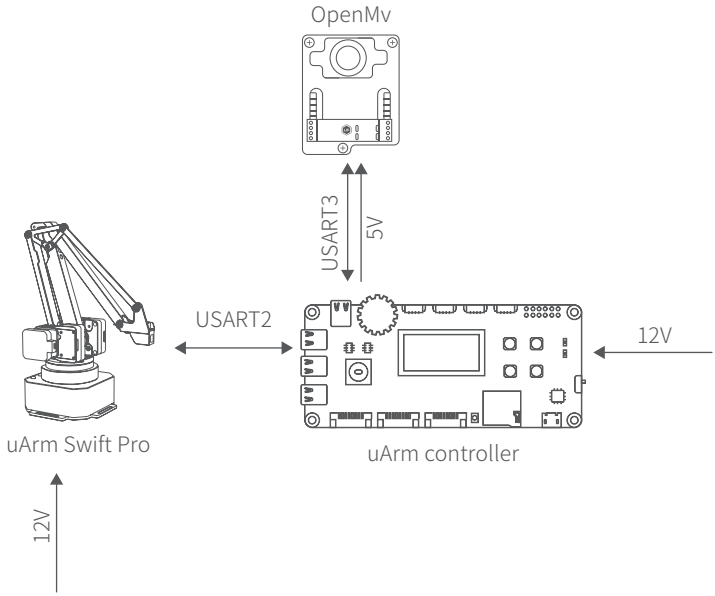
2.OpenMv IDE
www.openmv.io

3.Vision.ino for Controller [Github]
https://bit.ly/2W6S8Sr

4.Color_tracking_test.py for OpenMv [Github]
https://bit.ly/2Ea18Mq

5.UArmSwiftPro_2ndUART.hex for uArm[Github]
https://bit.ly/30PWn4i

2. System Structure



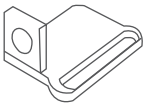
3 Installation Tutorial

3.1 Hardware installation tutorial

3.1.1 Visual Kit Installation Tutorial

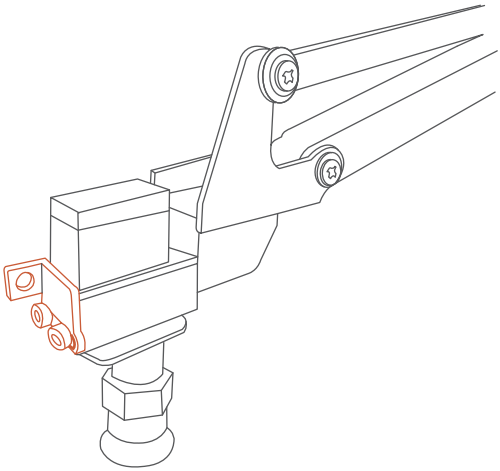
1 Attach the vacuum cup to the arm.

2 Attach the OpenMv mounting bracket to the end of the arm with M3 screws as shown below .

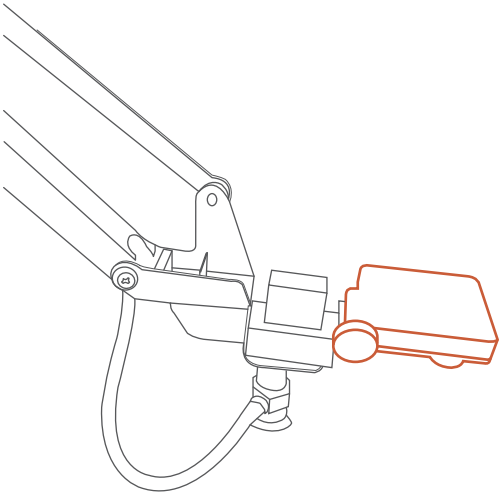


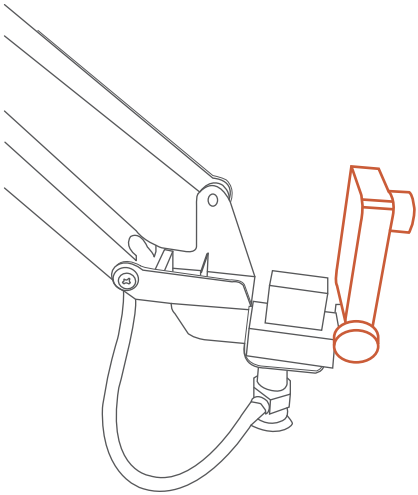
OpenMv mounting bracket

M3 screws



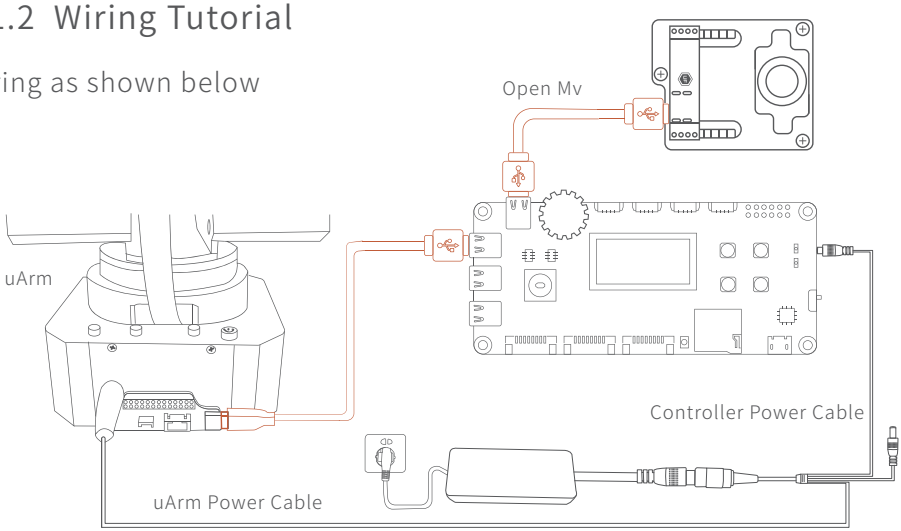
3.Tighten the screws on the end of the uArm by hand.





3.1.2 Wiring Tutorial

Wiring as shown below



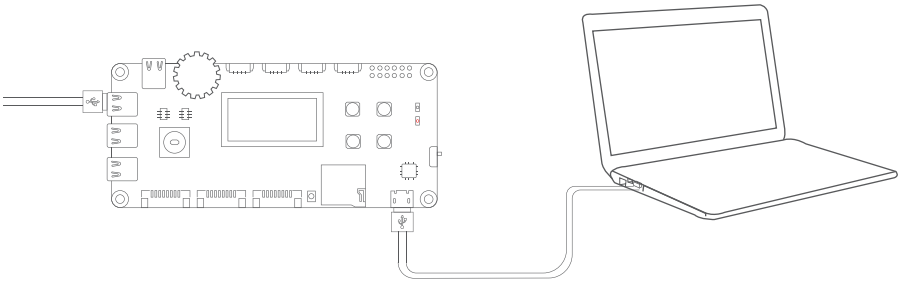
3.2 Software installation tutorial

3.2.1 uArm controller & uArm swift pro firmware writing tutorial

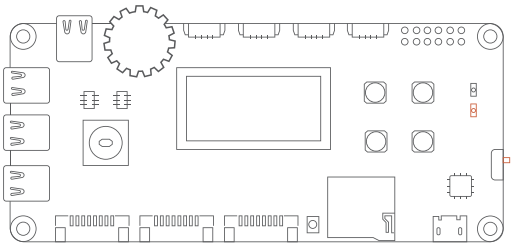
uArm Controller firmware writing

The uArm Controller firmware has been written before leaving the factory. To rewrite the firmware, please refer to the following steps.

(1) Connect the uArm Controller to the computer with a usb cable.



(2) Turn on the switch and the uArm Controller power indicator lights up



(3) Download XLoader xloader.russemotto.com/

(4) Download the hex-controller-vision.ino.hex

http://bit.ly/2NPbOY1

click the link

http://bit.ly/2XCfh0C

to learn how to download single directory from GitHub.

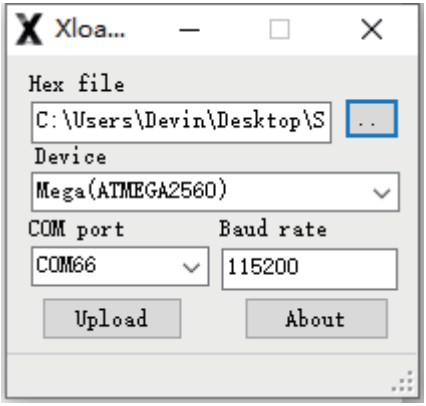
(5) Open XLoader and select your controller's COM port from the drop down menu on the lower left.

(6) Select the appropriate device from the dropdown list titled "Device".

(7) Check that Xloader set the correct baud rate for the device: 115200 for Mega (ATMEGA2560).

(8) Now use the browse button on the top right of the form to browse to your hex file.

(9) Once your hex file is selected, click "Upload" The upload process generally takes about 3 seconds to finish. Once completed, a message will appear in the bottom left corner of XLoader telling you how many bytes were uploaded. If there was an error, it would show instead of the total bytes uploaded. Steps should be similar and may be done through the command prompt.



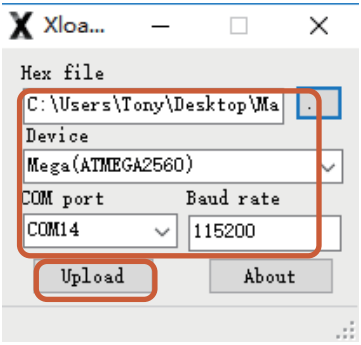
If you want to change the code in the firmware, Please follow the file named readme.md in the following link:

https://github.com/uArm-Developer/Controller/tree/master/scene_demo/vision_scratch%20cube

uArm swift pro firmware writing tutorial

Connect uArm Swift Pro to your computer. Open XLoader (https://xloader.russemotto.com/) and load uArmSwiftPro_2ndUART.hex (https://bit.ly/30PWn4i)

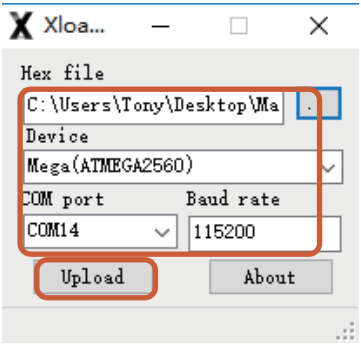
Click the "Upload" button to upload the code to uArm Swift Pro.



3.2.2 uArm swift pro Firmware Recovery

In the uArm Swift Pro, a specific firmware for the visual kit has been flashed. This firmware cannot be used for controlling the robot arm with uArm Studio. If you want to control uArm with the uArm Studio, please restore the firmware as follows:

Connect uArm Swift Pro to your computer, open XLoader (http://xloader.russemotto.com/), and load SWIFTPRO3.2.0.hex (http://download.ufactory.cc/firmware/SWIFTPRO3.2.0.hex?attname=). Click the "Upload" button to upload the code to uArm Swift Pro.



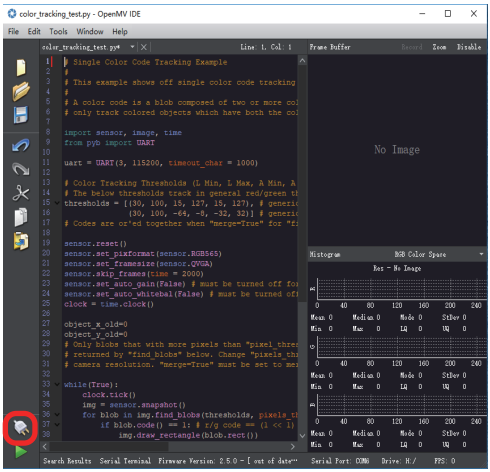
3.3 OpenMv tracking code writing

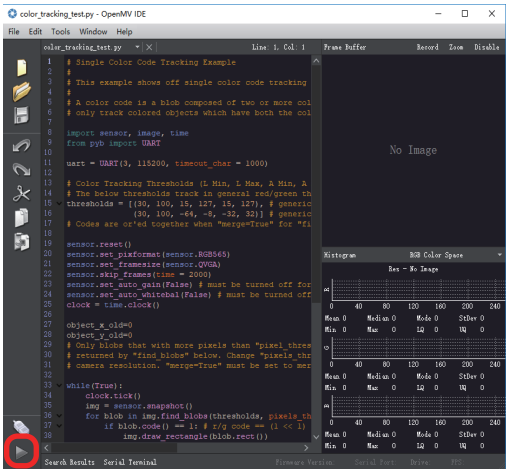
All OpenMv Kits have been written with the tracking code before leaving the factory. If you need to rewrite the tracking code, please refer to the following steps.

(1) Download OpenMv tracking code Open the color_tracking_test.py
https://bit.ly/2Ea18Mq

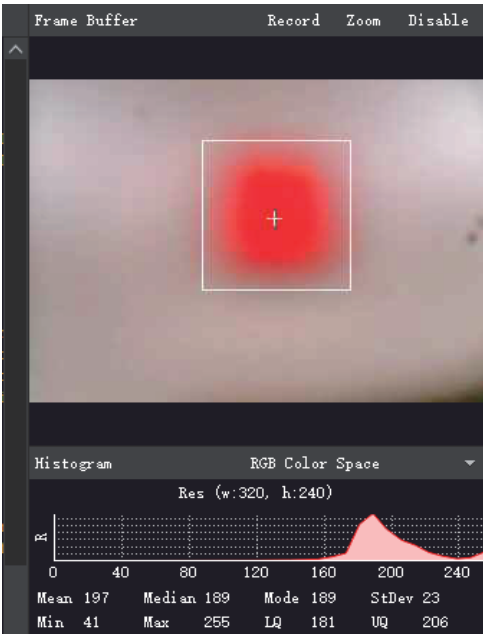
(2) Connect OpenMv to the computer with a USB cable

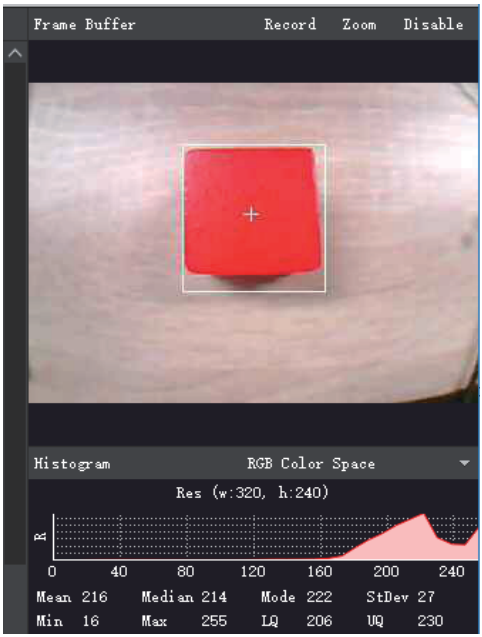
(3) Open OpenMv IDE, load color_tracking_test.py
https://bit.ly/2Ea18Mq click "Start".



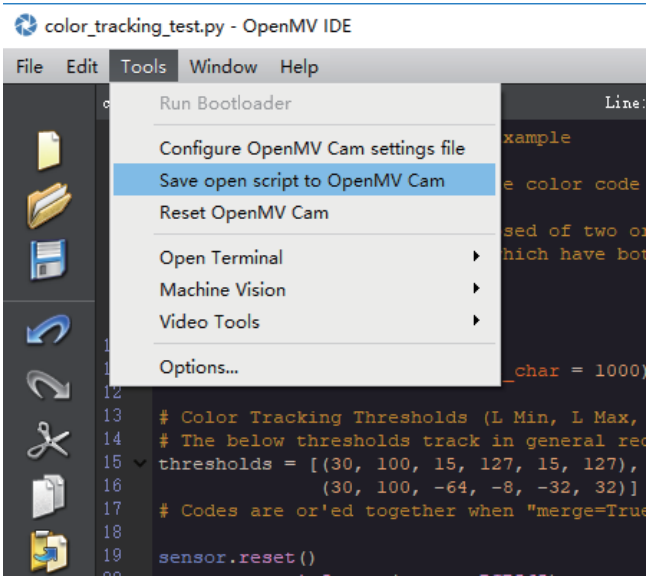


(4) Rotate the OpenMv lens to adjust the focal length





(5) Save the code to OpenMv



3.3.1 Adjusting the Tracking color

The current code tracks the red cube by default, and the color to be tracked can be adjusted according to actual needs.

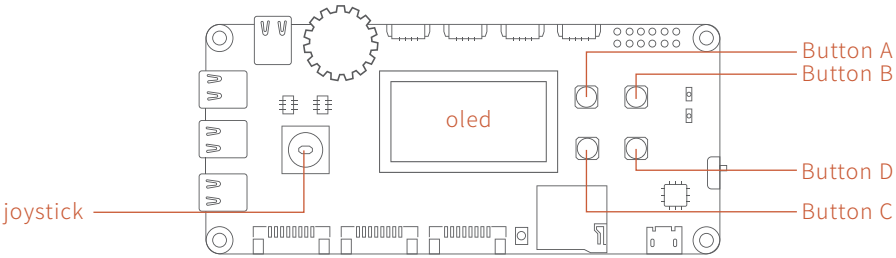
The adjustment method is as follows:

Char color_sel=0, tracking yellow objects;

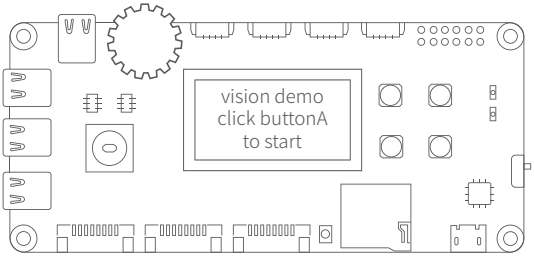
Char color_sel=1, tracking red objects;

Char color_sel=2, track green objects.

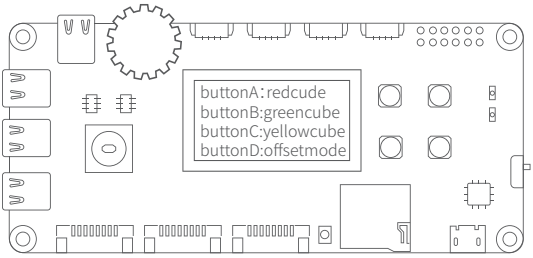
3.4 uArm-Visual Object Sorting System Example



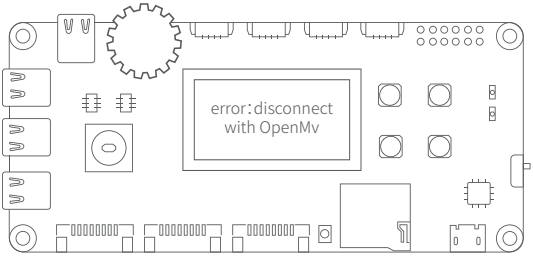
After power-on, the display of uArm Controller oled will show a startup interface, click button A according to the displayed content.



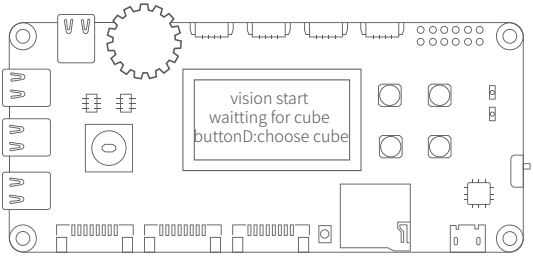
Click button A to enter the mode selection interface.



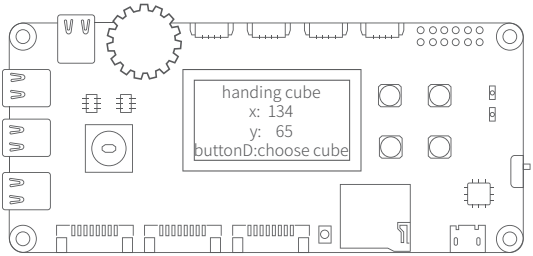
buttonA-C is the selection of the grip module, corresponding to different color squares, buttonD is the offset setting mode. After confirming the desired color of the object, click the corresponding button to enter the grip mode. Make sure that the connection to the uArm is normal, otherwise, you will not able to enter the grip mode. After entering the grip mode, if it fails to connect with the OpenMv, a message will be shown on the display.



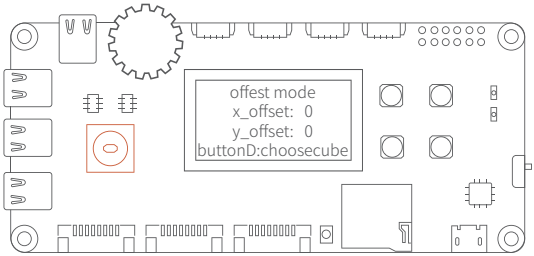
If it is connected to OpenMv but does not find the corresponding color square, oled will display a message saying that are waitting for the cube.



When an object is found, oled will enter the grip mode and display the locations of x and y.

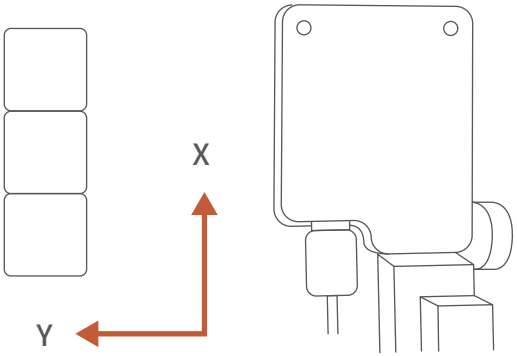


If you find that the gripping location of uArm grab is inconsistent with the placement location, you can adjust the offset metric with the joystick in the offset mode.Hold down the button D until the oled displays the following picture and then enter offset mode

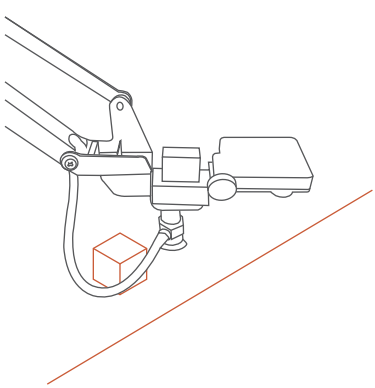


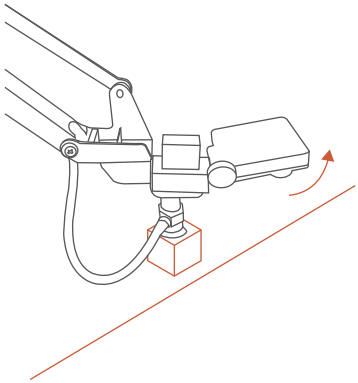
If you want to return to the color selection interface, press buttonD twice to enter the color selection interface, and press buttonD to enter the offset setting mode.

Note: If your problem cannot be solved with the above solutions, please set the offset metrics to zero and then restart the system. Due to the positional deviation, the vacuum cup may not be able to grab the target object accurately. In this case, adjust the camera's mounting position in such a way that the vacuum cup can accurately grab the target object.
As shown in the figure below, in general, there is no positional deviation in the Y-axis direction, and the main deviation comes from the X-axis direction. The X-axis deviation can be eliminated by adjusting the mounting angle of the camera; or adjust the offset metric in the offset setting mode, to observe the deviation between the uArm gripping position and the placement position of the object. Please wait for the uArm to complete the gripping process before adjusting the offset metrics of uArm in the calibration mode.

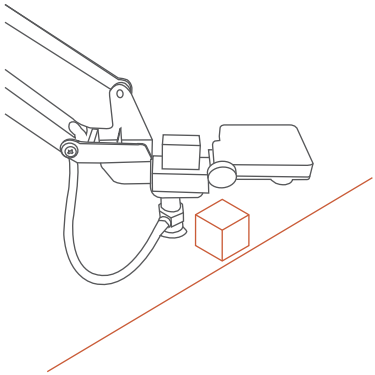


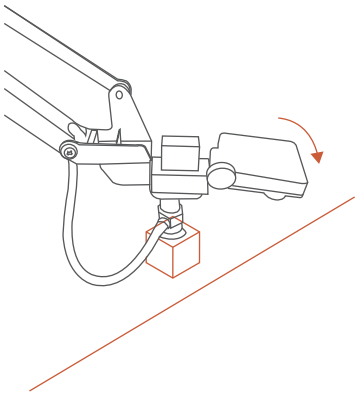
If the object is behind the suction cup when grabbing, adjust the camera up.





If the object is in front of the suction cup when grabbing, adjust the camera down.





Old Visual Camera Kit User Manual: http://bit.ly/uArmVisionCameraKitENv1-7

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