UFACTORY

UARM Swift Pro

Quick-Start Guide

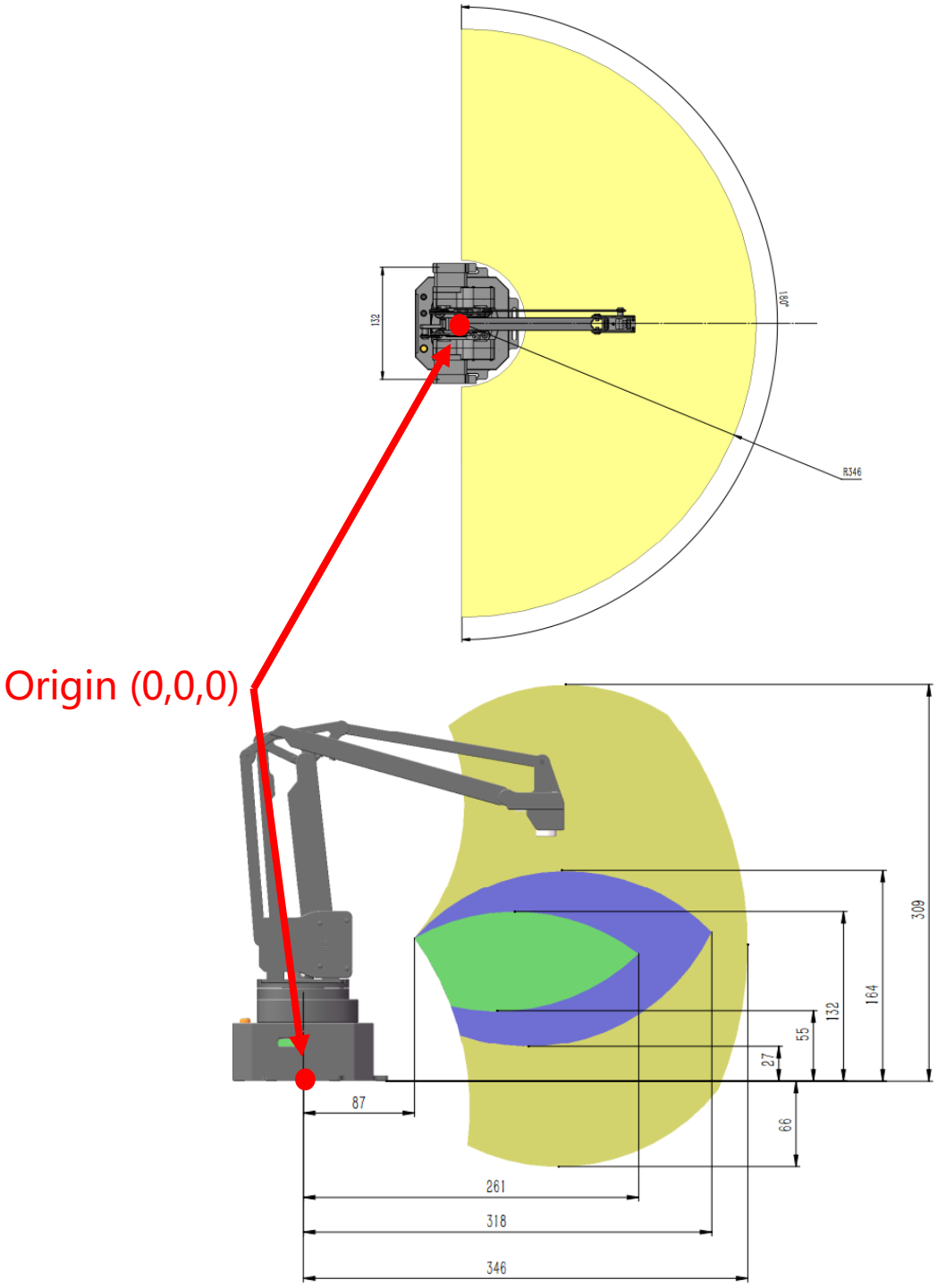
V1.0.16

Dec. 2017

Contents

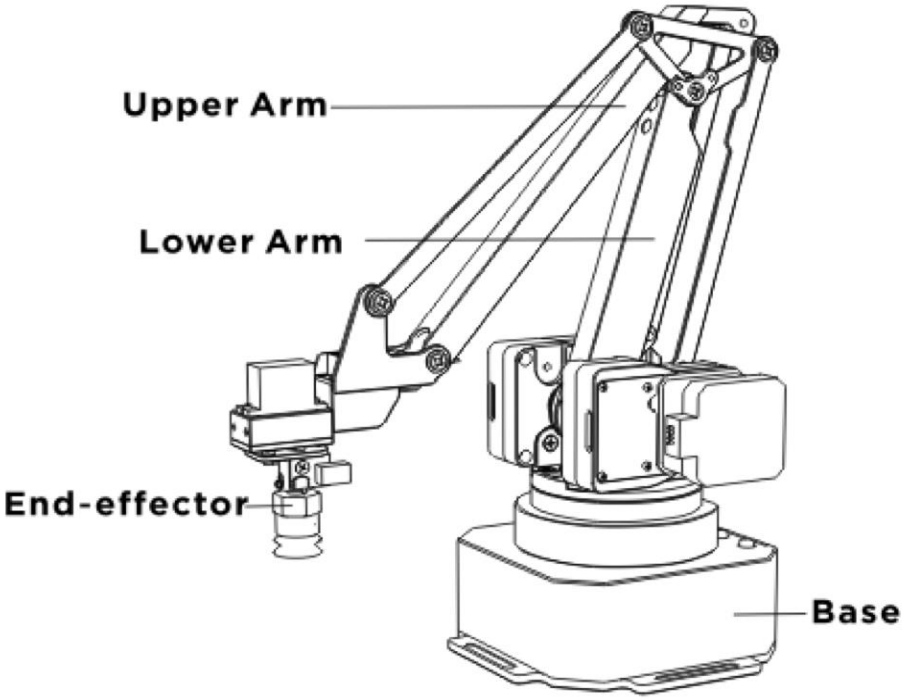
Safety Instructions

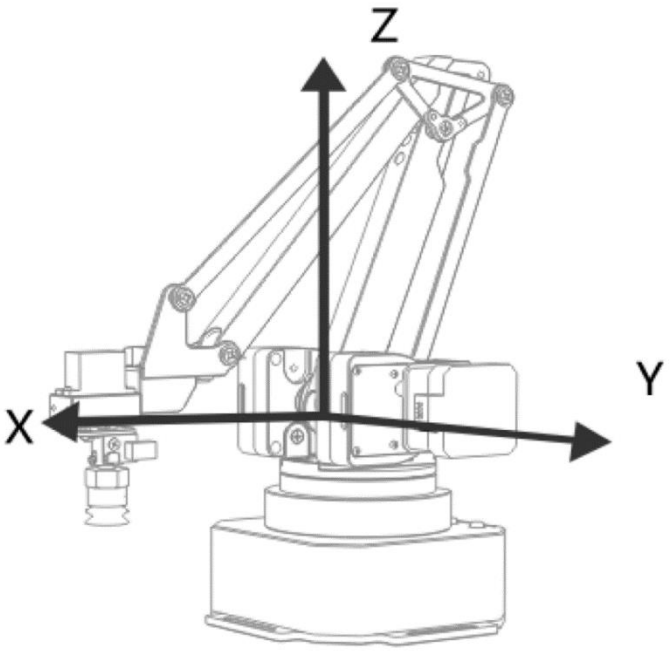
1. Please don't put your hands between the arms when uArm is moving.
2. Please use the official power supply for safety reasons.
3. Please clear a space for uArm, in case of knocking down anything.



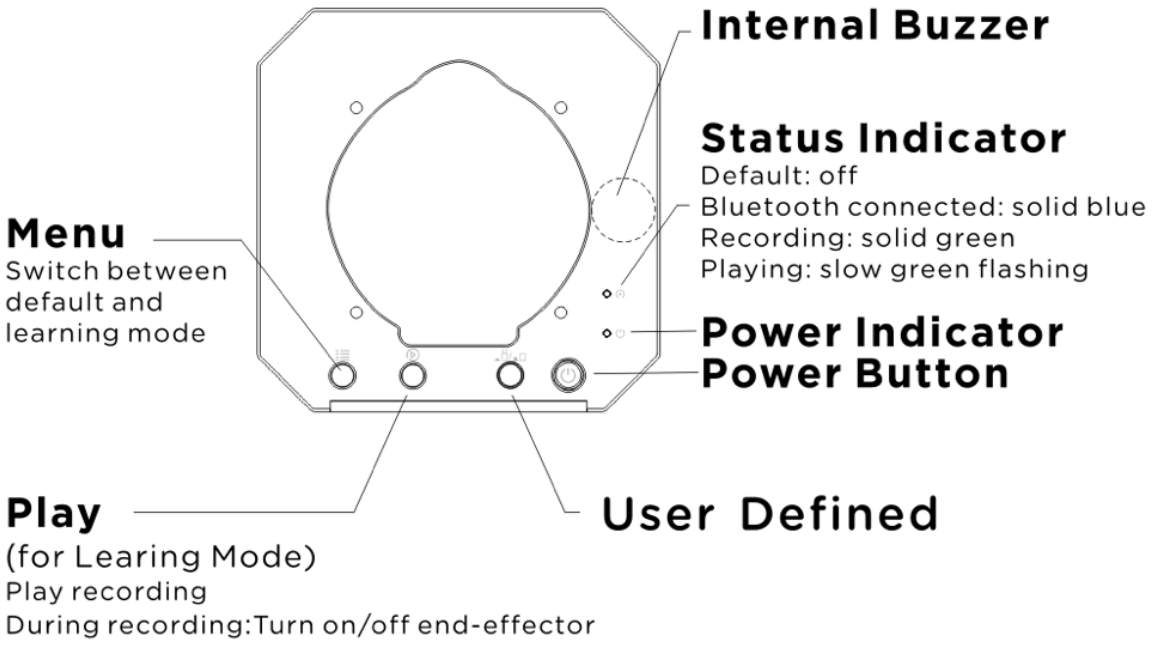
Product Overview

1.Reference Frame

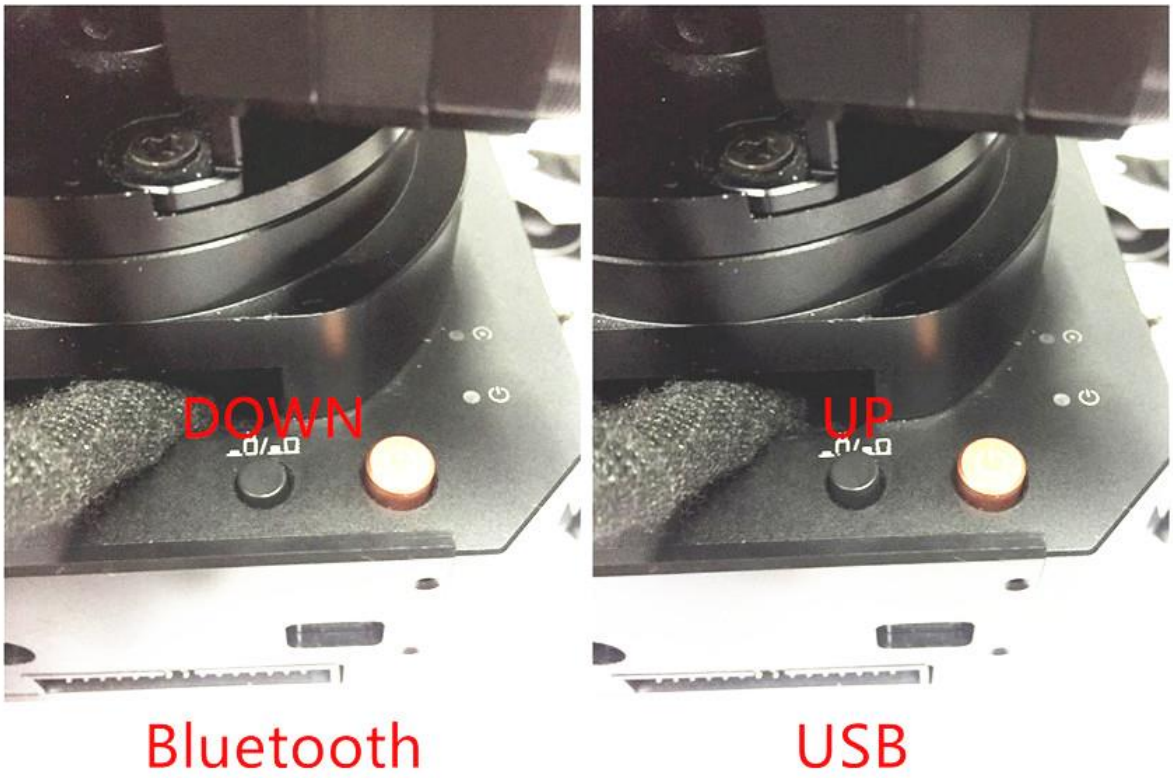




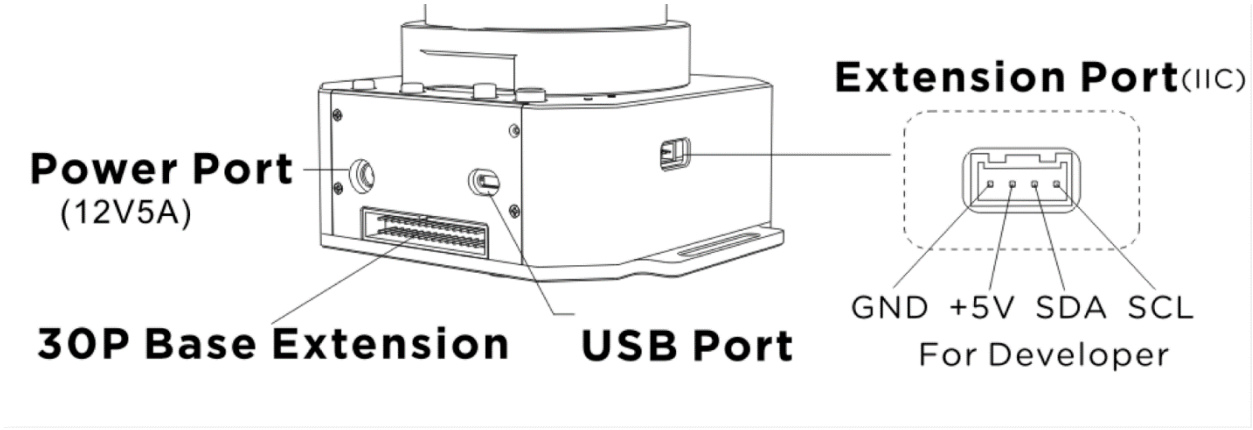
2. Buttons & Indicator Lights

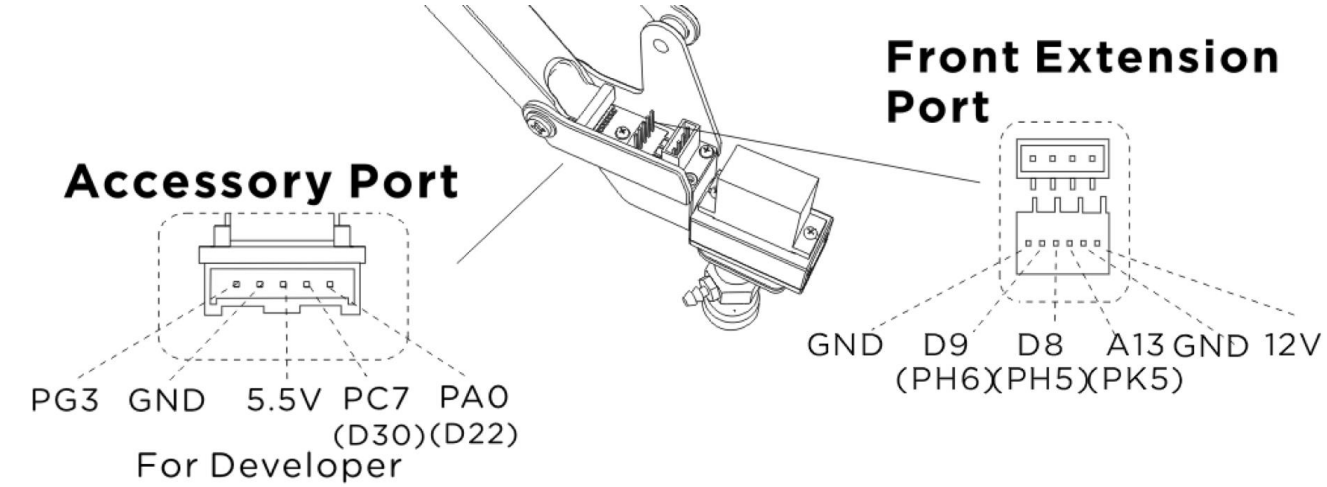


Caution: By default, the user defined button is for switching between Bluetooth and USB mode. Please ensure the button is UP while communicating with uArm via USB.



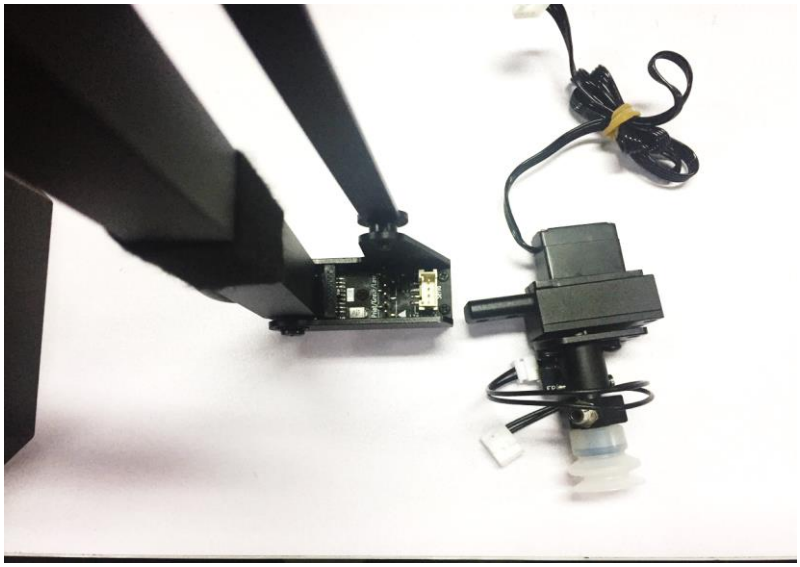
3.Extension Description





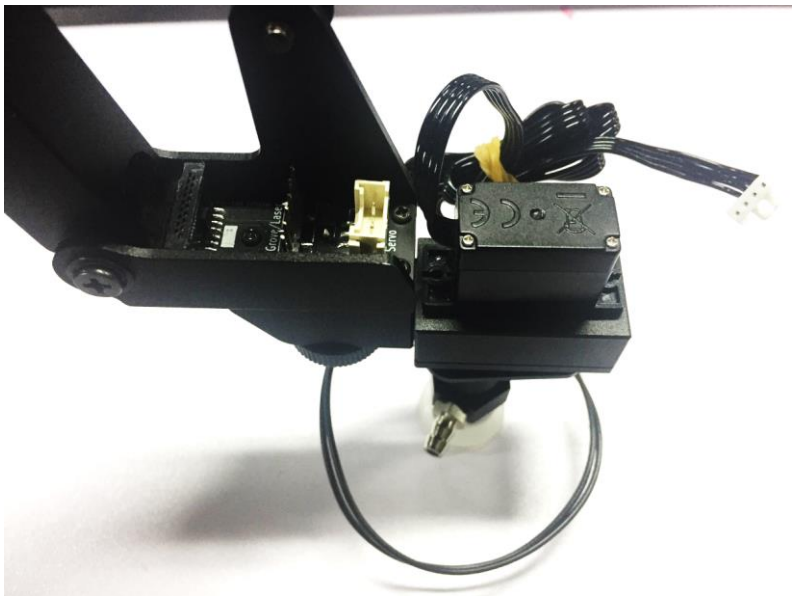
Hardware Installation

1. Suction Cup (Default)



Preparation

Step 1: Install the suction to the end-effector and lock the nut tightly



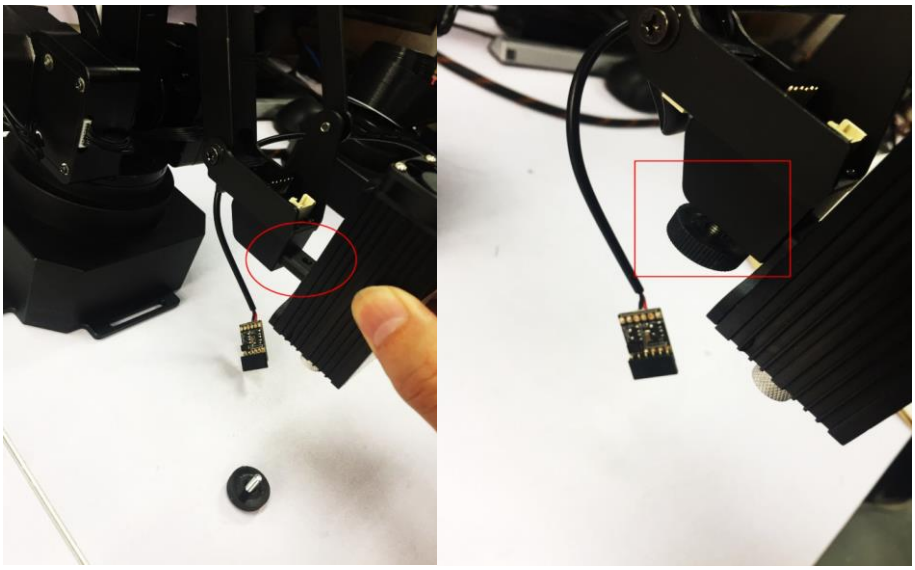
Note: Similarly, if you want to uninstall suction cup, unlock the nut.

Step 2: Plug the wire of 4th axis motor, suction tube and limited switch

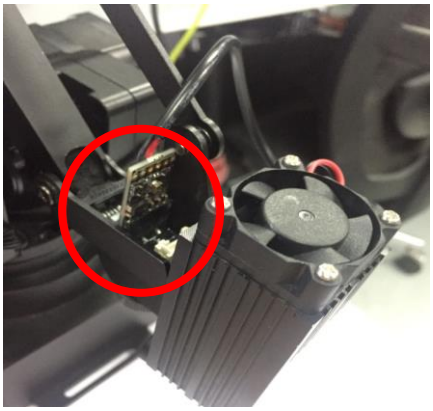
2. Laser

Preparation (Required Parts: Laser head, Thumb nut)

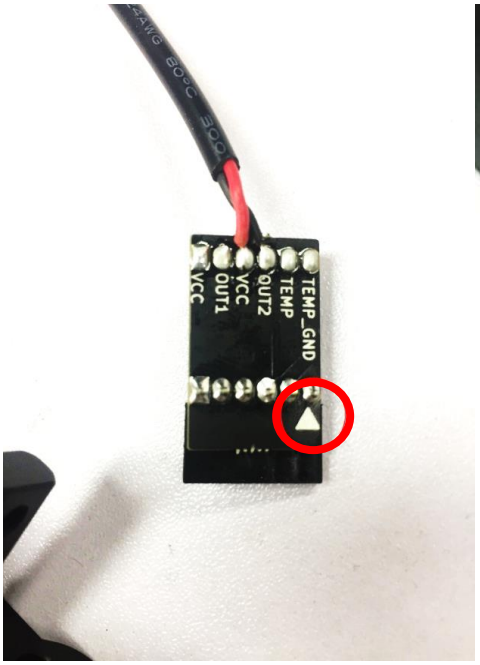
Step 1: Install the laser head and lock the nuts tightly

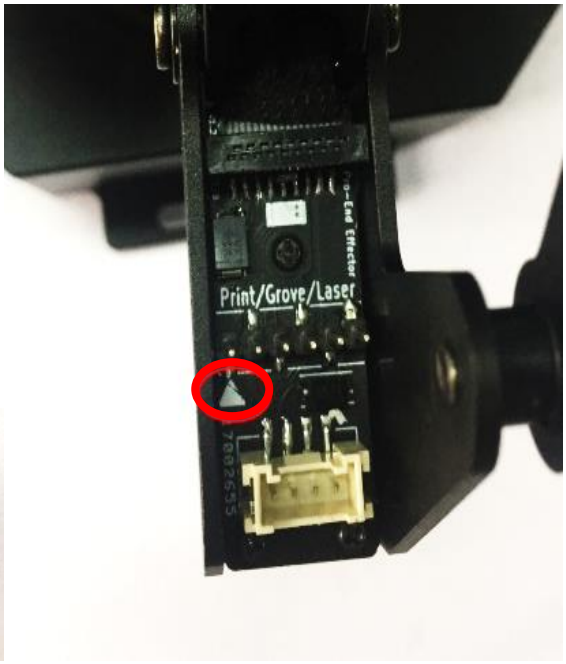


Step 2: Plug in the board of laser to the end-effector

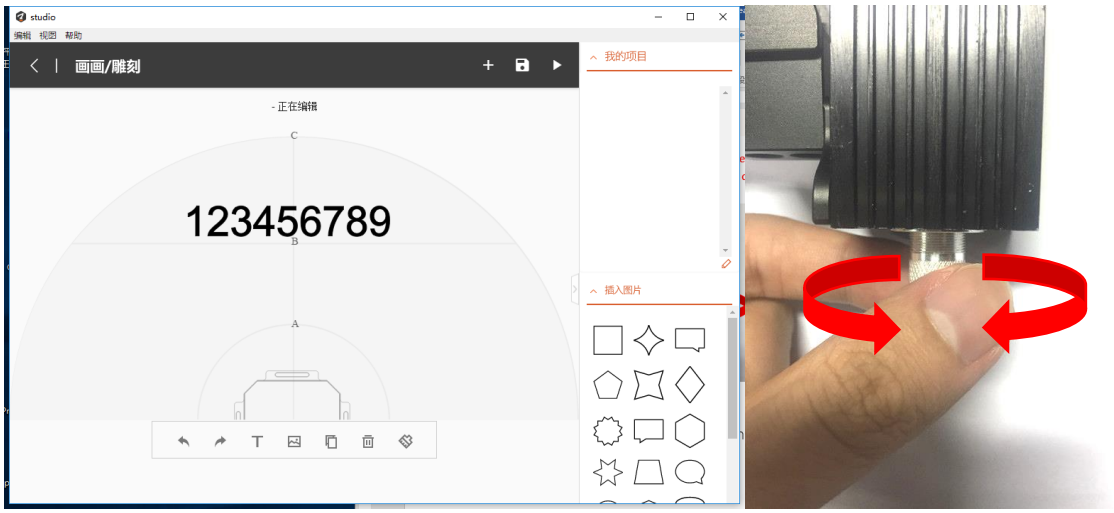


(Please pay attention to the direction)





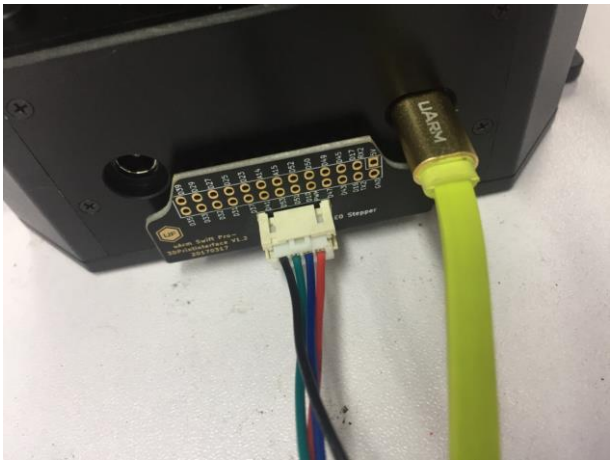
Caution: If the laser could not engrave the paper, please open the uarm studio and start the laser engraving, then focus adjust the lens of laser slowly. Please do not touch the light of laser during the engraving.

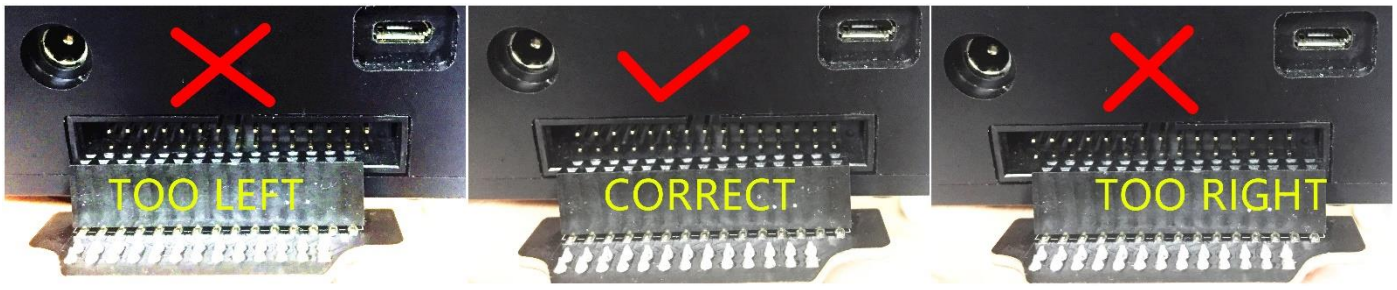


3. 3D Printing

Step 1: Install the 3D printing extruder and locked the nut tightly

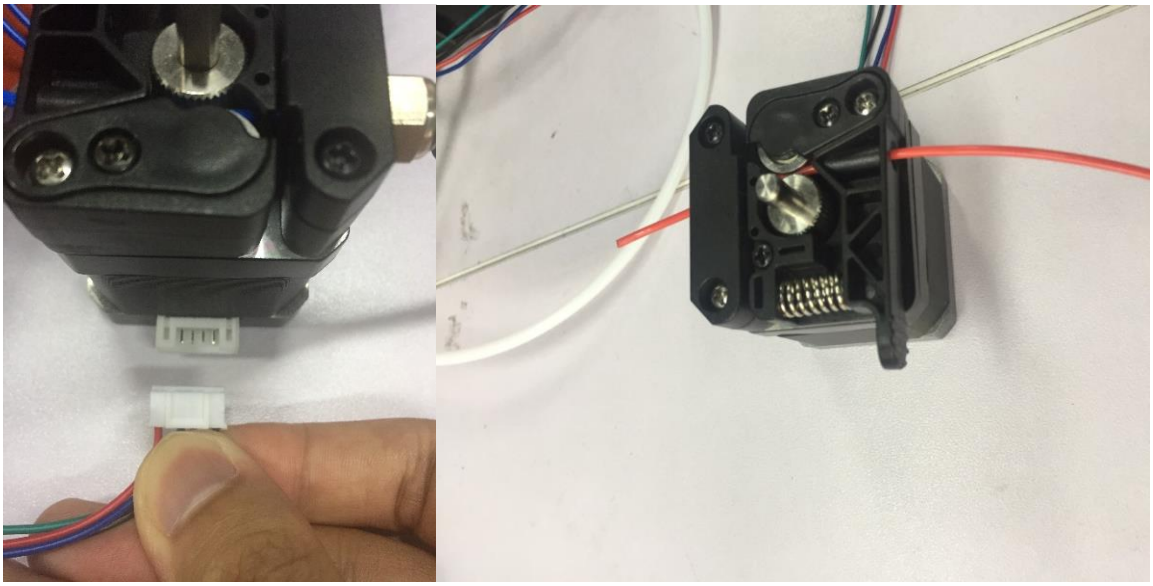
Step 2: Install the 3D printing feeding system





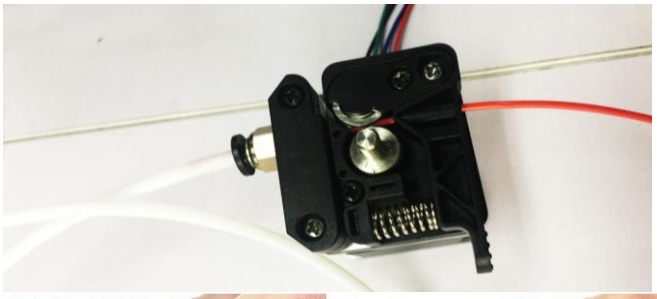
Caution: Please ensure the connection is correct. Or the computer wont recognize the uarm.

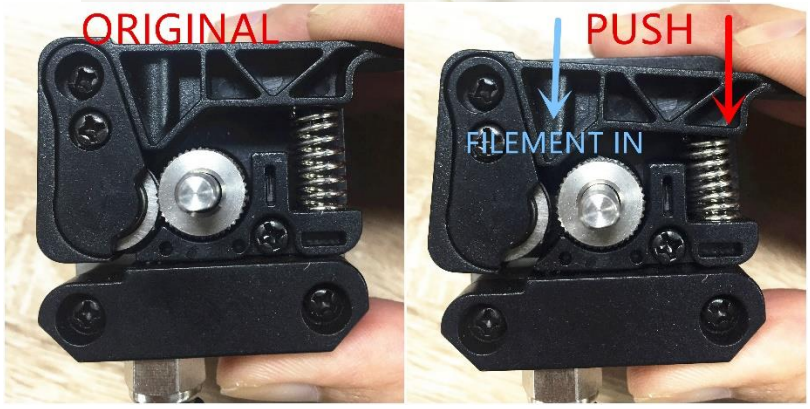
(Connect the motor with the extension board with the 4-color cable)



(Feed the PLA material we offered into the feeding system)

Step 3: Install the PTFE tube



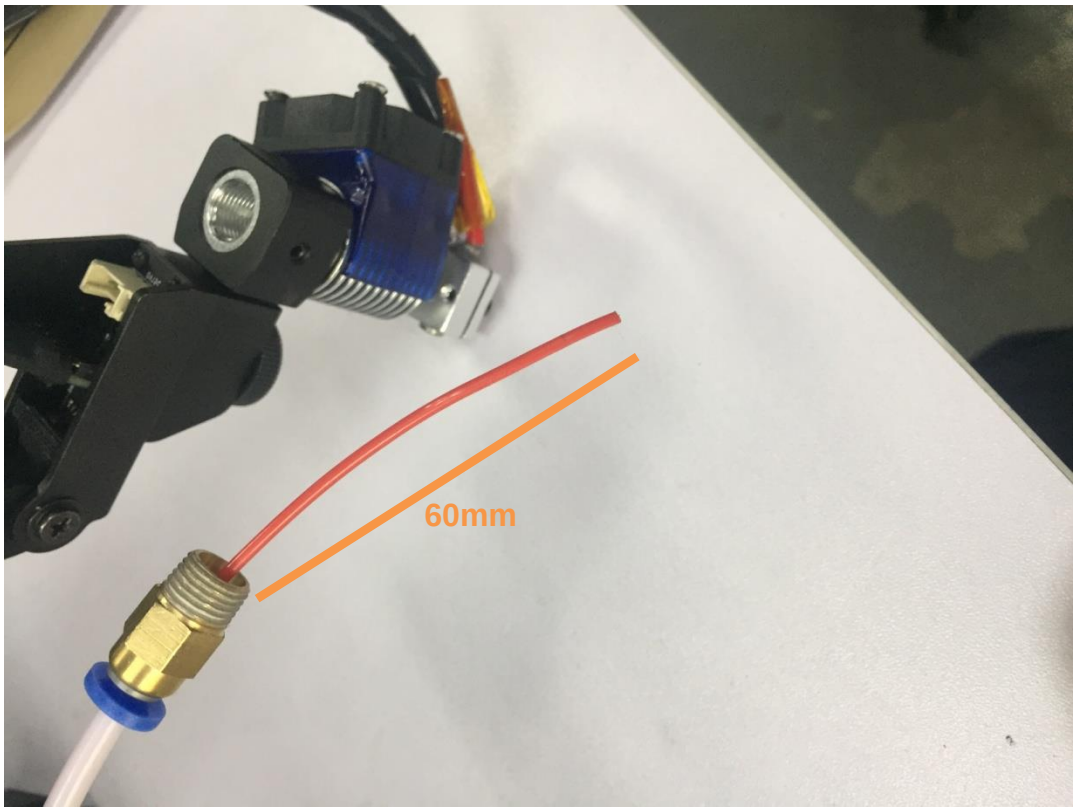


Feeding the filament

Installing the tube

Step 4:

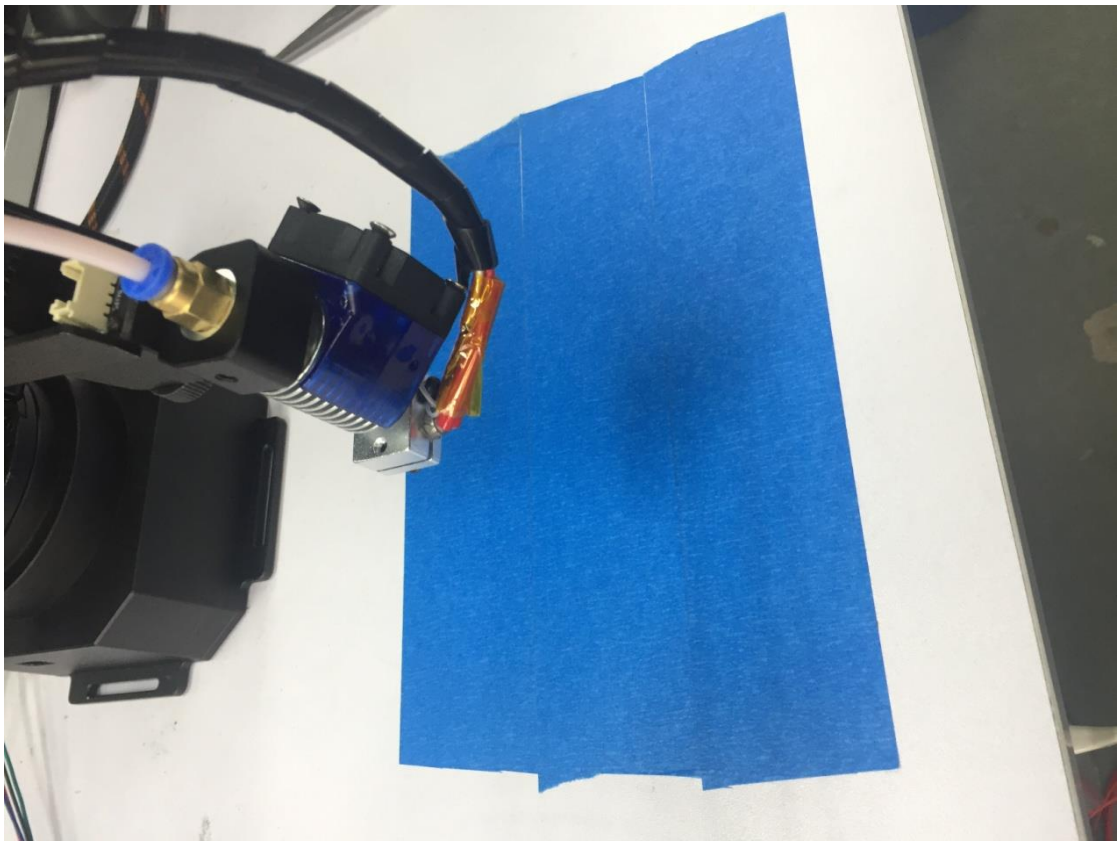
Keep feeding the material until it's 60mm out of the other side of PTFE tube.



Caution: Sometimes the filament can' t be extruded, that might be caused by the top of filament. If the tip is deformed during the cutting off, the filament won' t go through the heat end successfully.

Step 5: Install the tube to the extruder

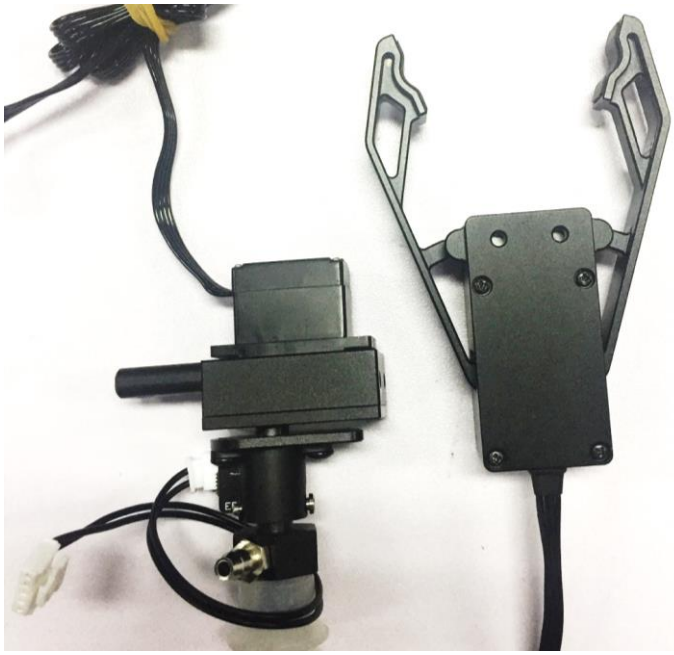
Step 6: Stick the masking tape on the table



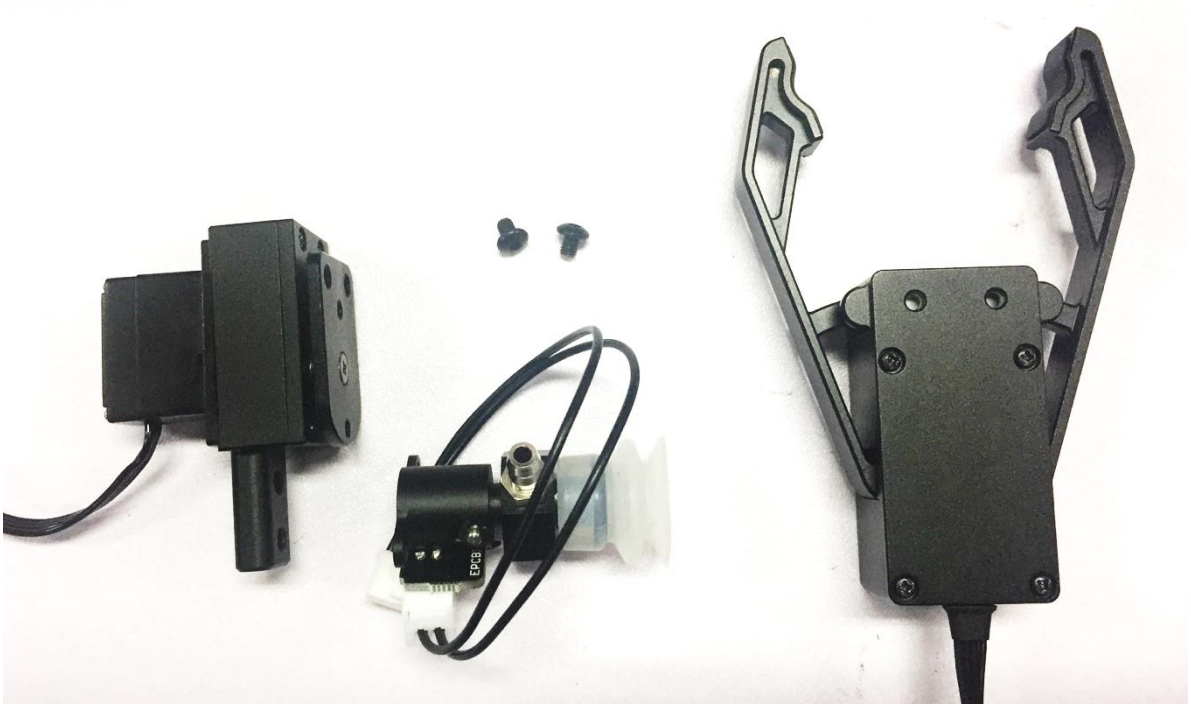
Caution: someone might get trouble with the not horizontal, please try to calibrate the arm following this link .

4. Swift Gripper

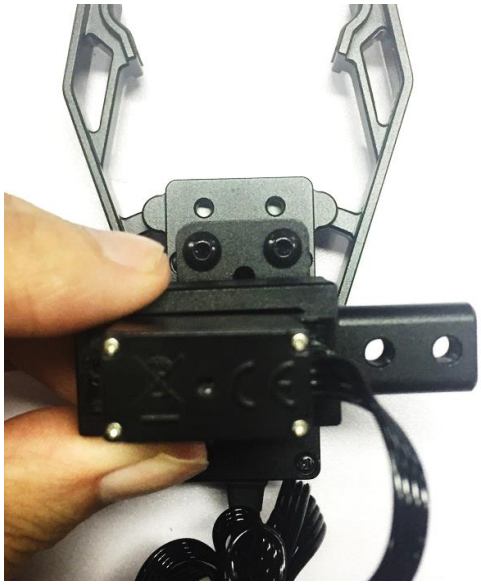
Preparation



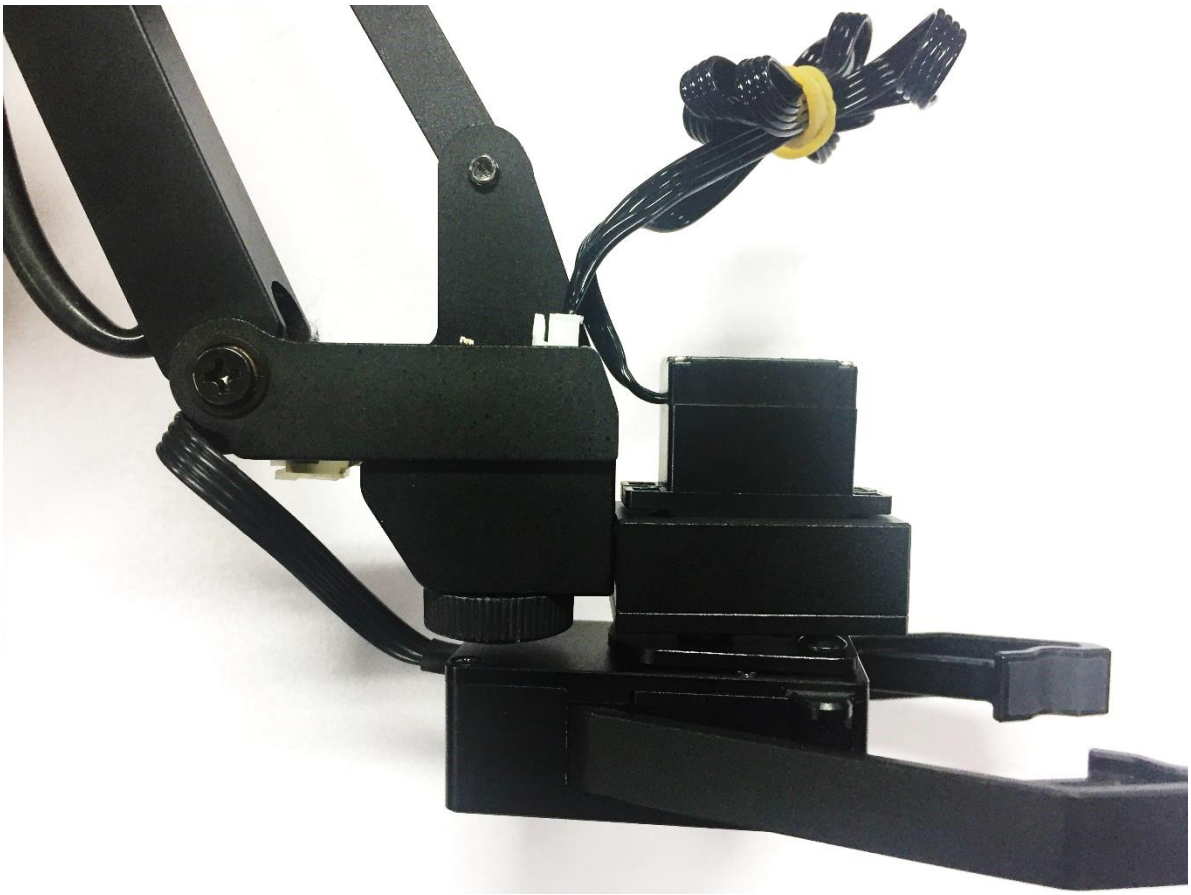
Step 1: Unscrew suction cup with the hex bar wrench.



Step 2: Fix the gripper and lock the nut tightly

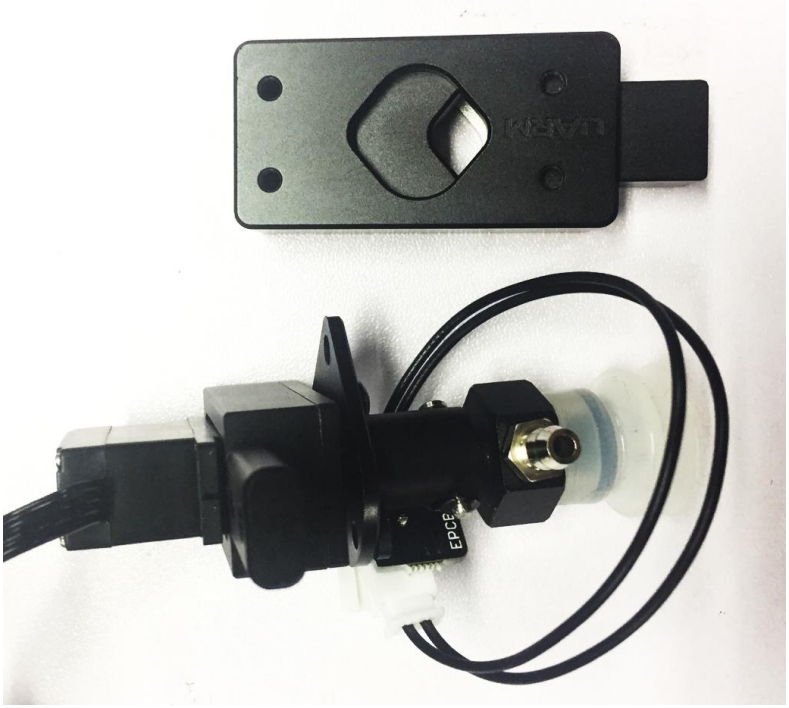


Step 3: Plug the 4th axis motor and gripper

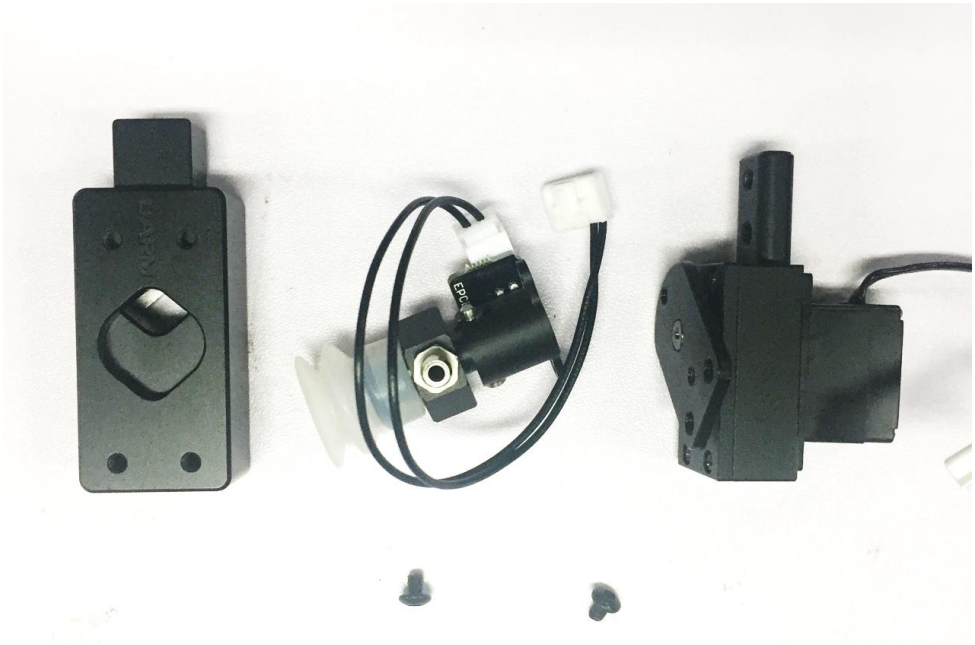


5. Swift Universal Holder

Preparation

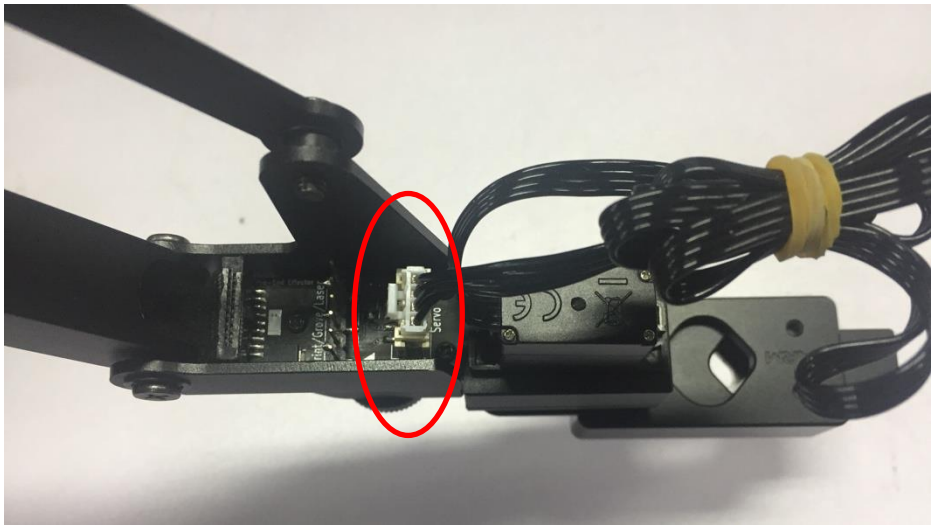


Step 1 : Unscrew suction cup with the hex bar wrench.



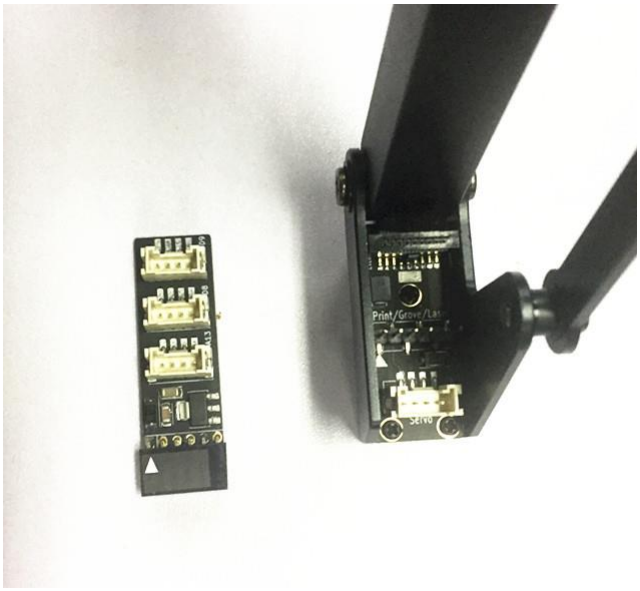
Step 2: Fix the gripper and lock the nut tightly

Step 3: Plug in the 4th axis motor

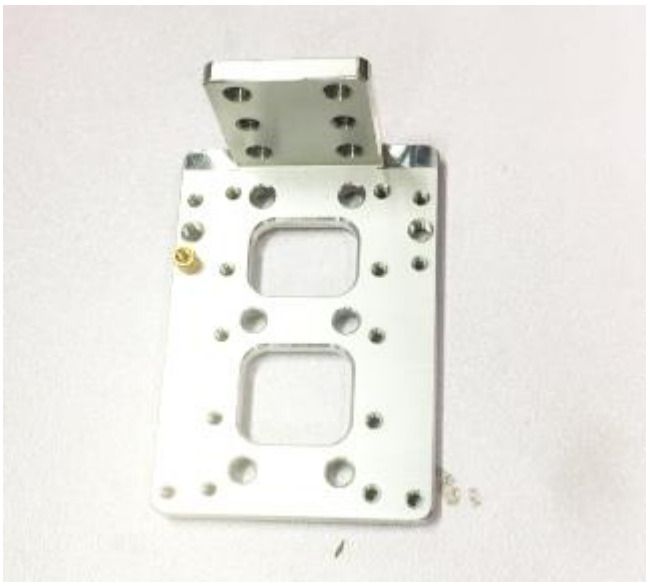


6. Seeed Grove Modules

Seeed Grove modules is a series of different sensors which helps us to extend the function of uArm to a completely new level. We are offering two parts to help you to connect the uArm with Grove much more easily.



Grove Extension



Grove mounting block

Caution:

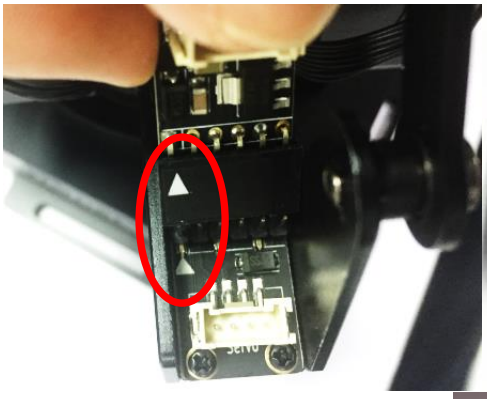
Grove extension for the uArm end-effector is just designed for(Step 1,2)

- *PIR Motion Sensor*
- *Mini Fan Module*
- *Electromagnet Module*
- *Ultrasonic Ranger*
- *Other Digital or Analog modules.*

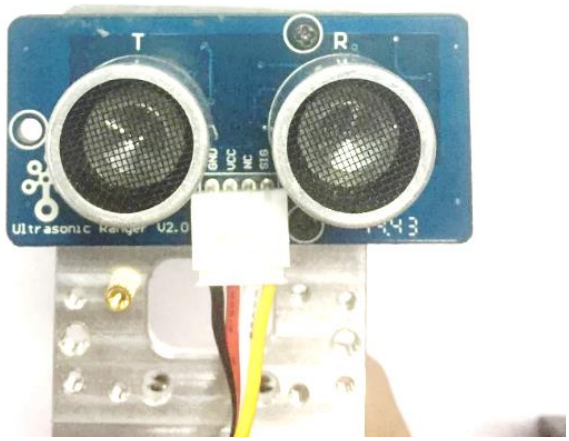
For the IIC module like: *(Step 3)*

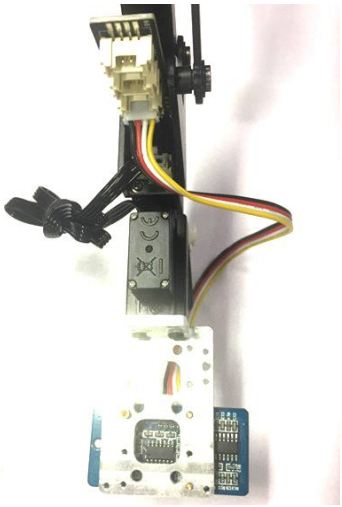
- Temperature Sensor
- LCD RGB Backlight Module
- Color Sensor
- Gesture Sensor
- *Other Digital or Analog modules.*

Step 1 : Plug in the Grove breakout and fix the grove module to the mounting block.



Step 2 : Wiring.

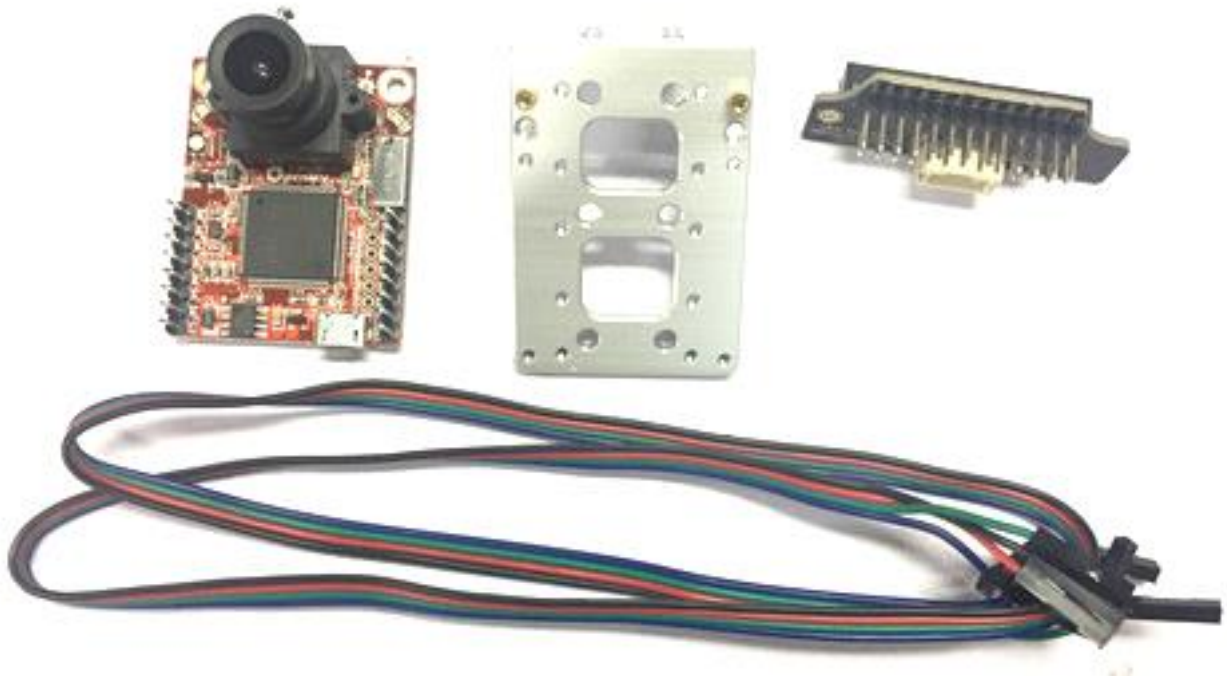




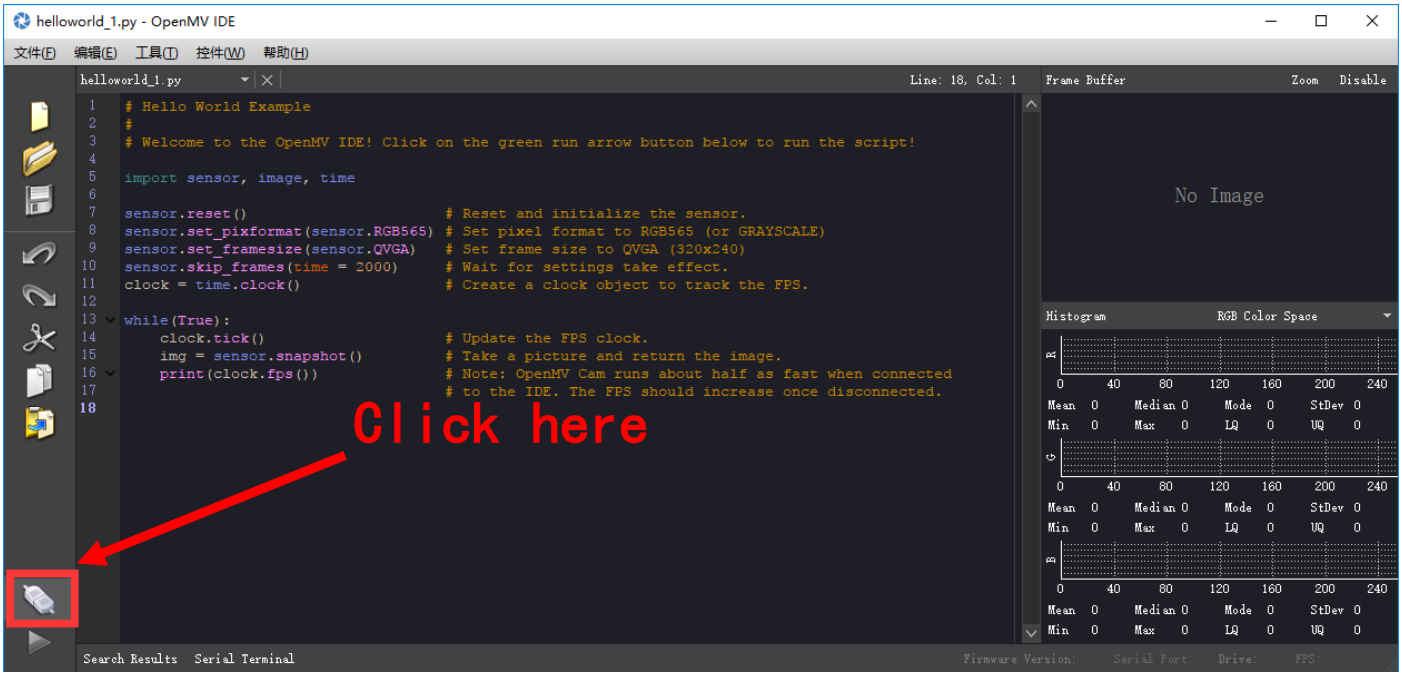
Step 3 : For the IIC modules

7. OpenMV Module (the firmware should be 3.1.9 or later)

Preparation

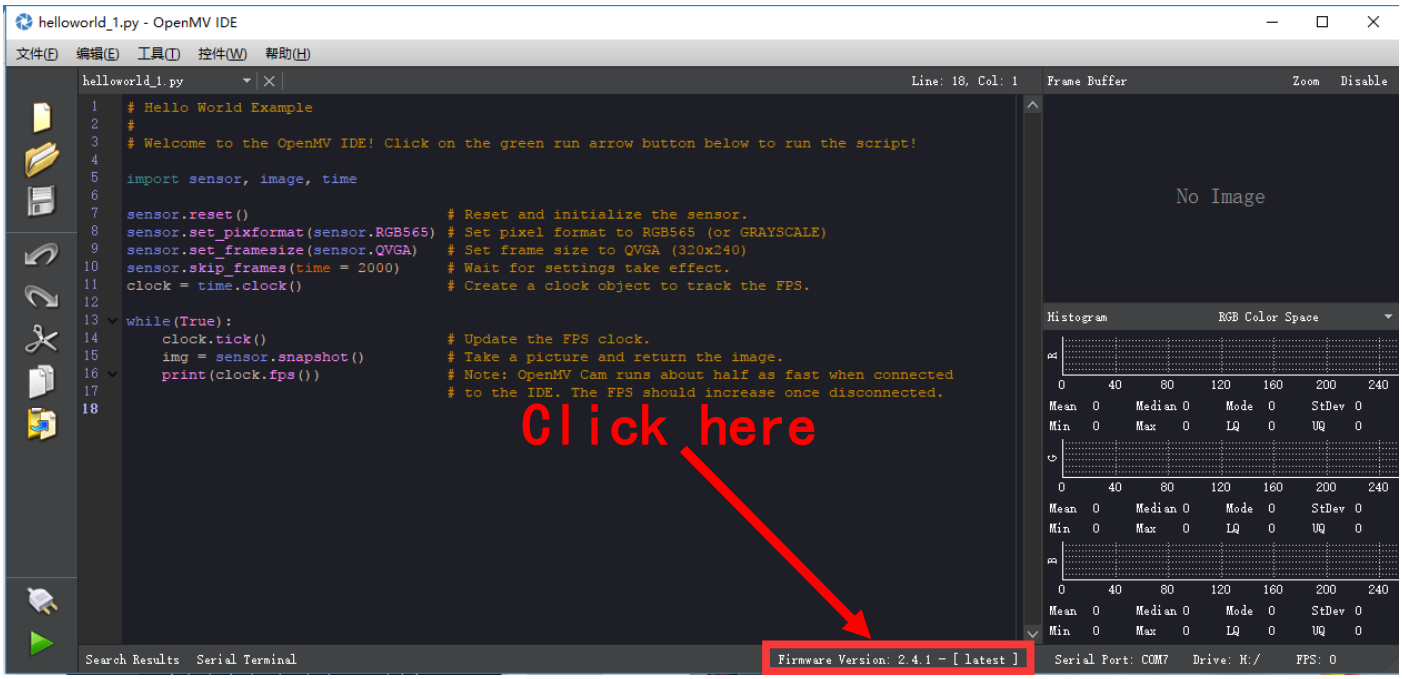


Step 1 : Download the latest OpenMV IDE

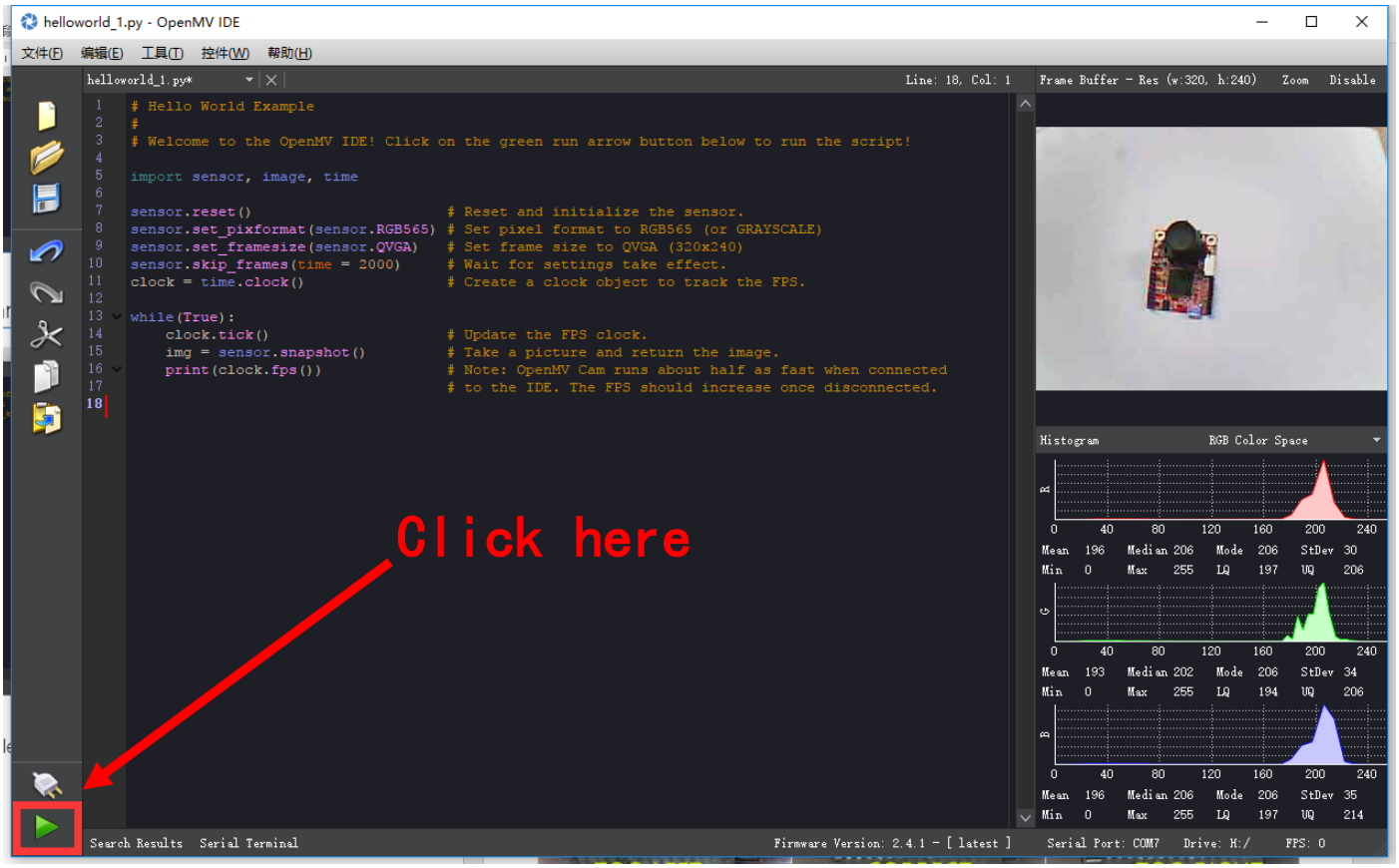


(Download the latest OpenMV IDE from: https://openmv.io/pages/download and plug in the OpenMV camera to the computer and click Connect in the left of picture)

Step 2 : Upgrade the latest firmware to OpenMV by OpenMV IDE

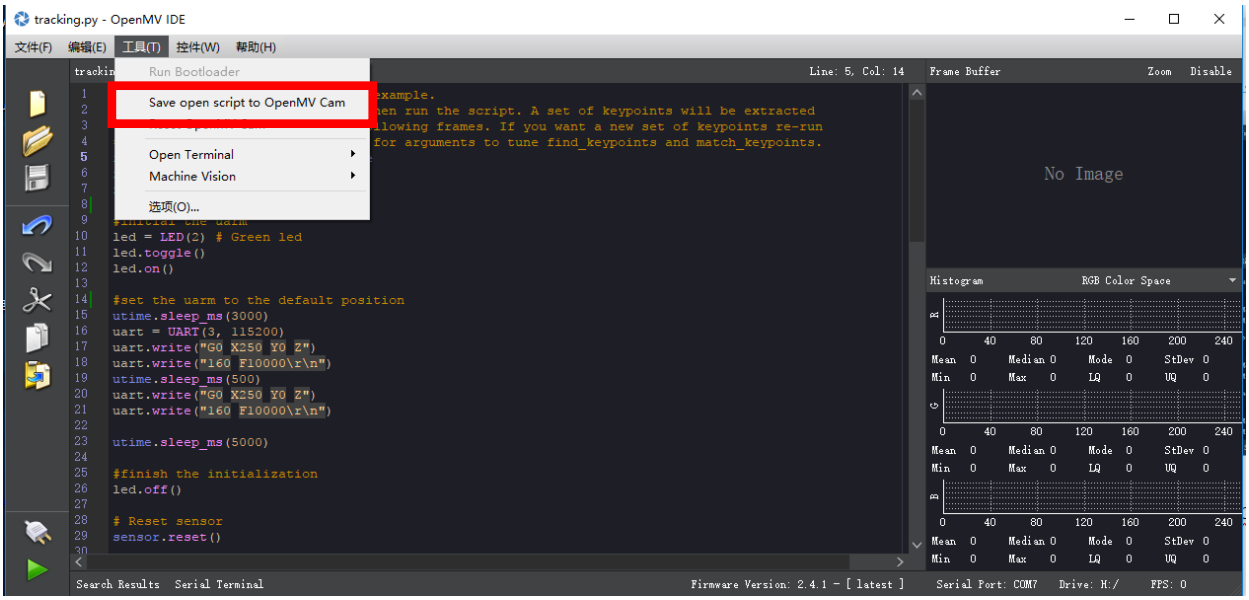


Step 3 : Run the helloworld.py and focus the lens in the right window



Note: After IDE get the video, then rotate the lens to finish focusing(to see the objects 20cm away) then tight the screw.

Step 4 : Get the tracking.py code and save it to the OpenMV



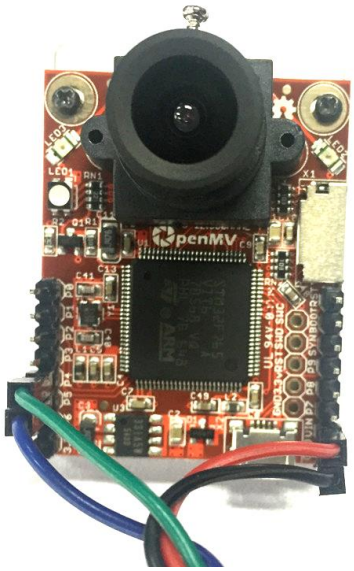
You could find the tracking.py from: https://github.com/uArm-Developer/OpenMV-Examples

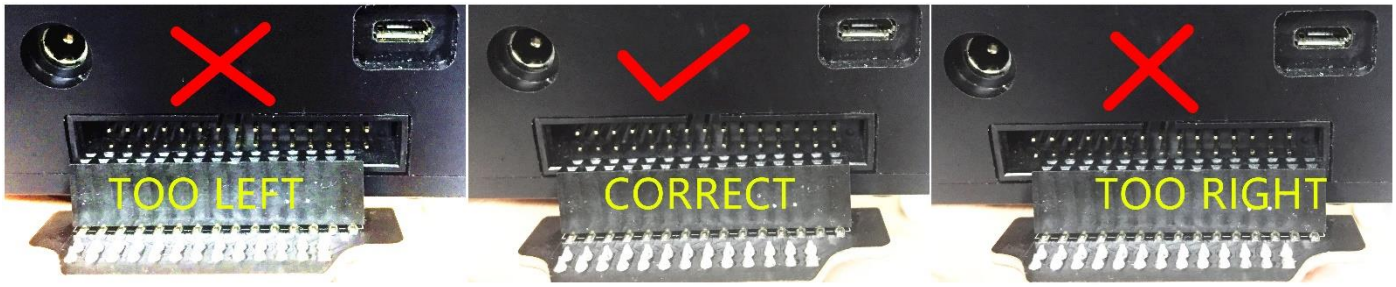
Note: The file system of OpenMV 2.4.1 is not very stable, and make sure the file has been stored into the module. Here is our steps:

(1) Open the disk of OpenMV, and drag the tracking.py file into the disk and renamed it main.py;

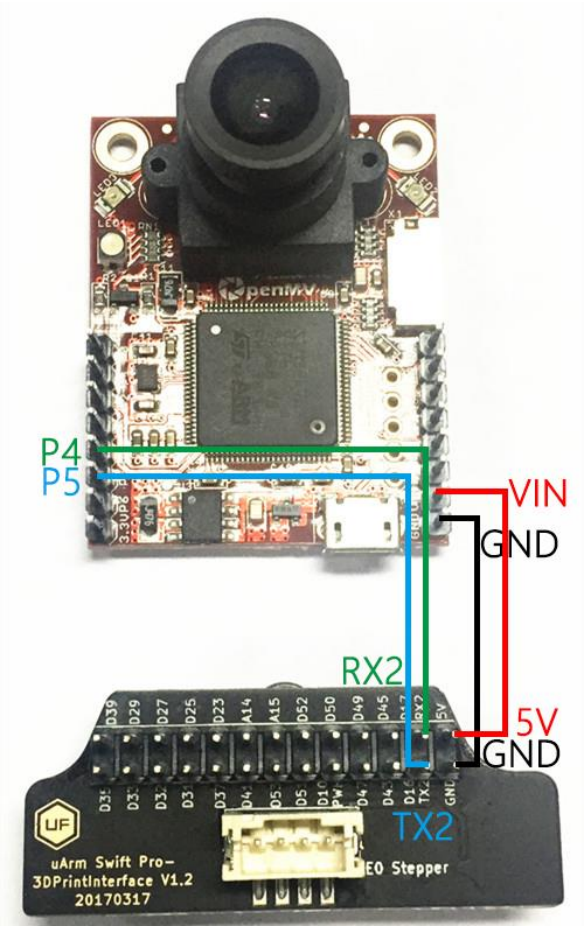
(2) If the code has been stored successfully, power on the module, the blue light turns on.

Step 5 ：Unplug the OpenMV module and wiring the module

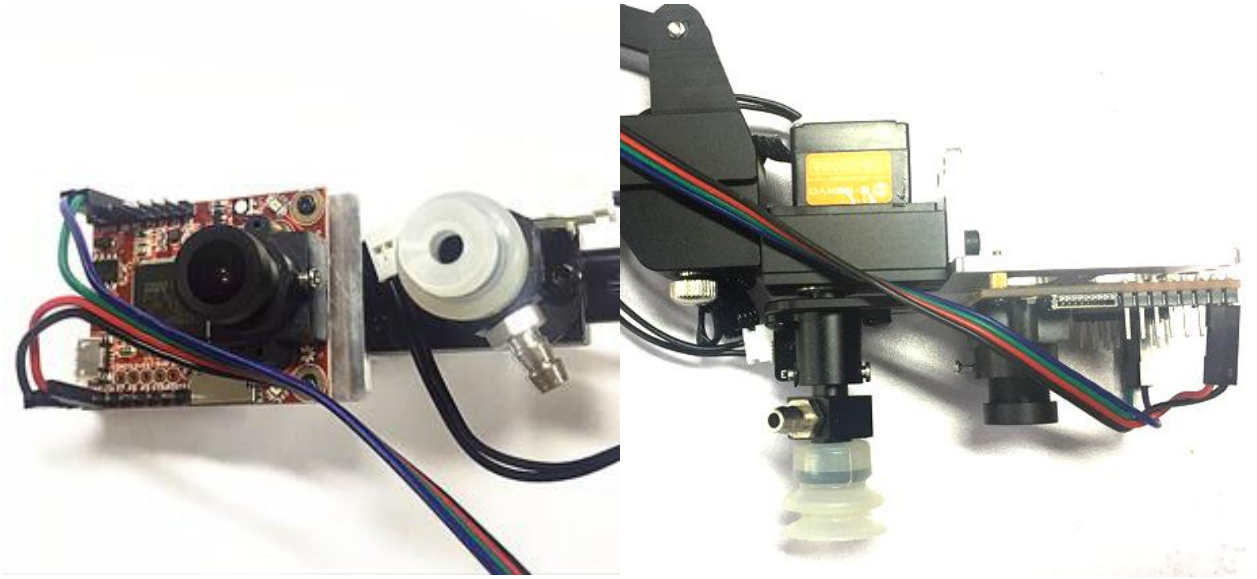




Caution: Please ensure the connection is correct. Or the computer wont recognize the uarm.



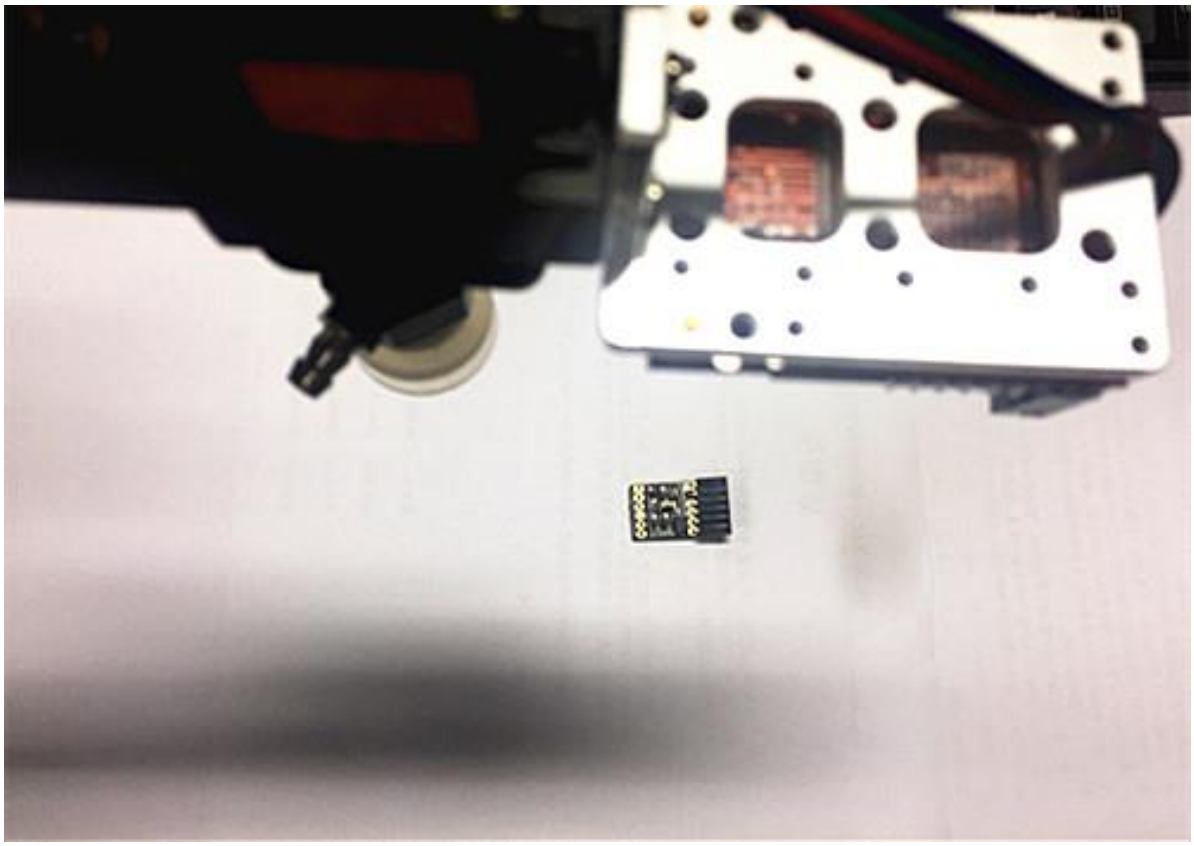
Step 6 : Install the camera module to the end-effector



Note: Please pay attention to the assembling direction of OpenMV, or the arm will move to the opposite direction. And make sure the OpenMV is disconnected with you PC or the IDE will control the OpenMV.

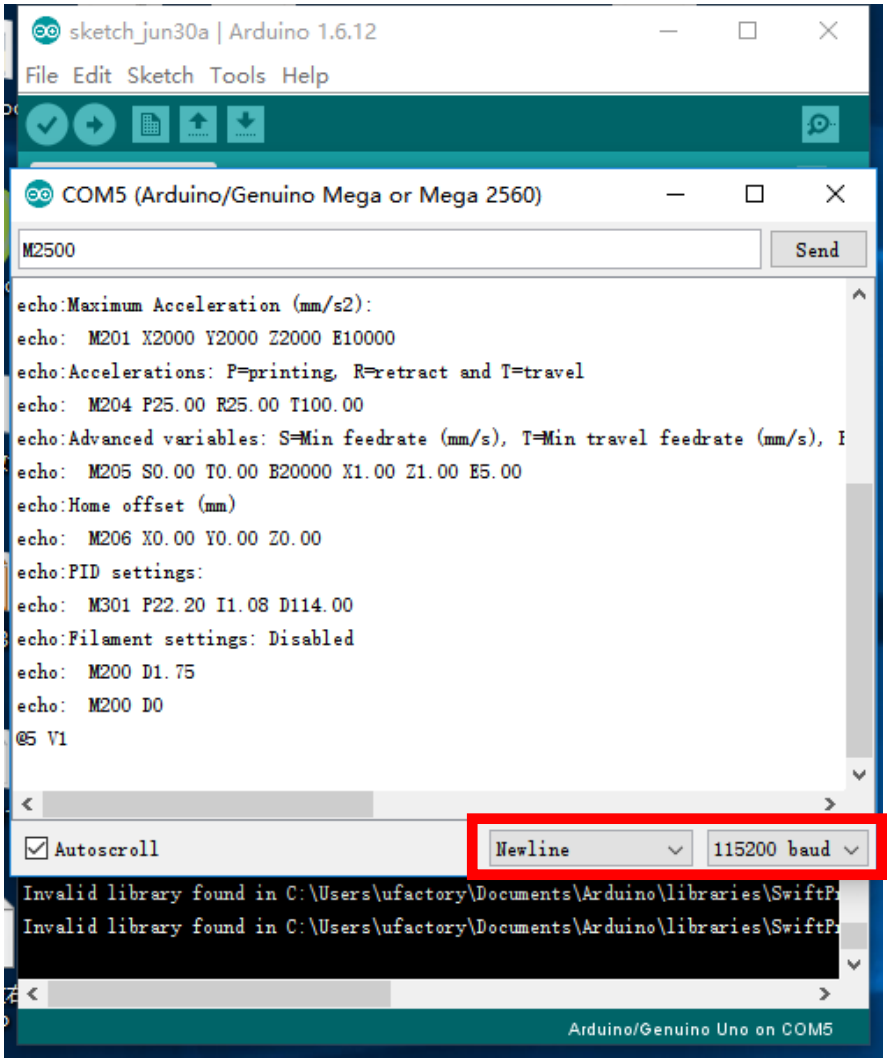
Step 7 : Keep the table clean and non-reflective and get something with a lot of details like a pcb with resistors

Step 8 : Put the object in front of uArm Swift Pro about 25cm away



Step 9 : Connect the USB port and power port of uArm, press the power button and open a serial monitor (for example Arduino IDE).

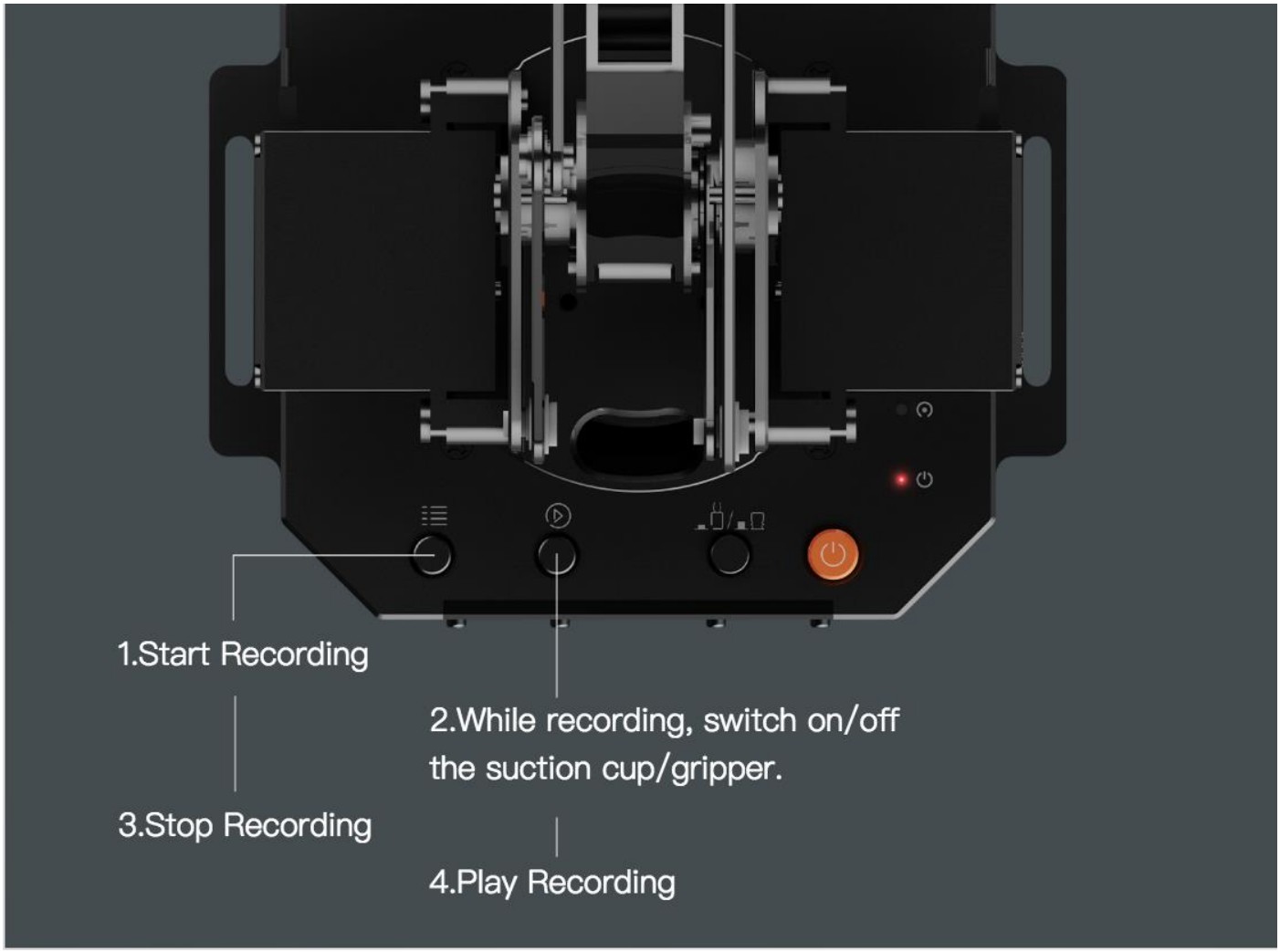
Step 10 : Adjust the settings (newline & 115200 baud) and then send the M2500 command which will switch the main UART port from USB to the port of OpenMV.



Step 11 : Move the object slowly, and the arm will follow it.

Offline Learning Mode

Use buttons on the base to “teach” uArm by hand.



Teach:

1. Start learning mode. Press the once, and the status indicator truns green.
2. Teach the robot manually. Press the once to turn on the end-effector, again to turn off. (If is down end-effector is gripper, or it is pump. Please remember to keep the button up after learning or it will turn on the Bluetooth. Page 5)
3. Finish the learning process. Press once, and the status indicator turns off.

PLAY:

1. One-time playback: Press once, or Loop playback: press & hold for 2 seconds.
2. The status indicator starts flashing green slowly.
3. Press once to stop playing.

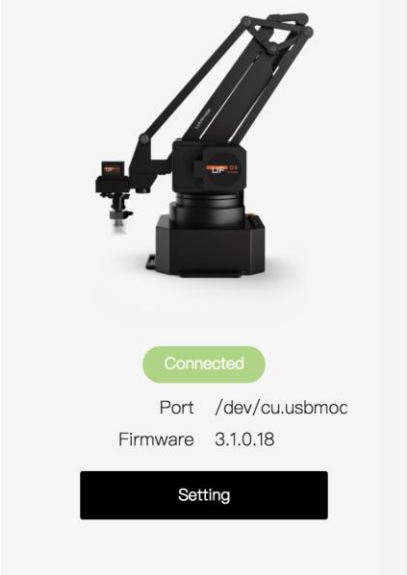
Software: uArm Studio (Win/Mac)

1.Download uArm Studio from:

http://www.ufactory.cc/#/en/support/

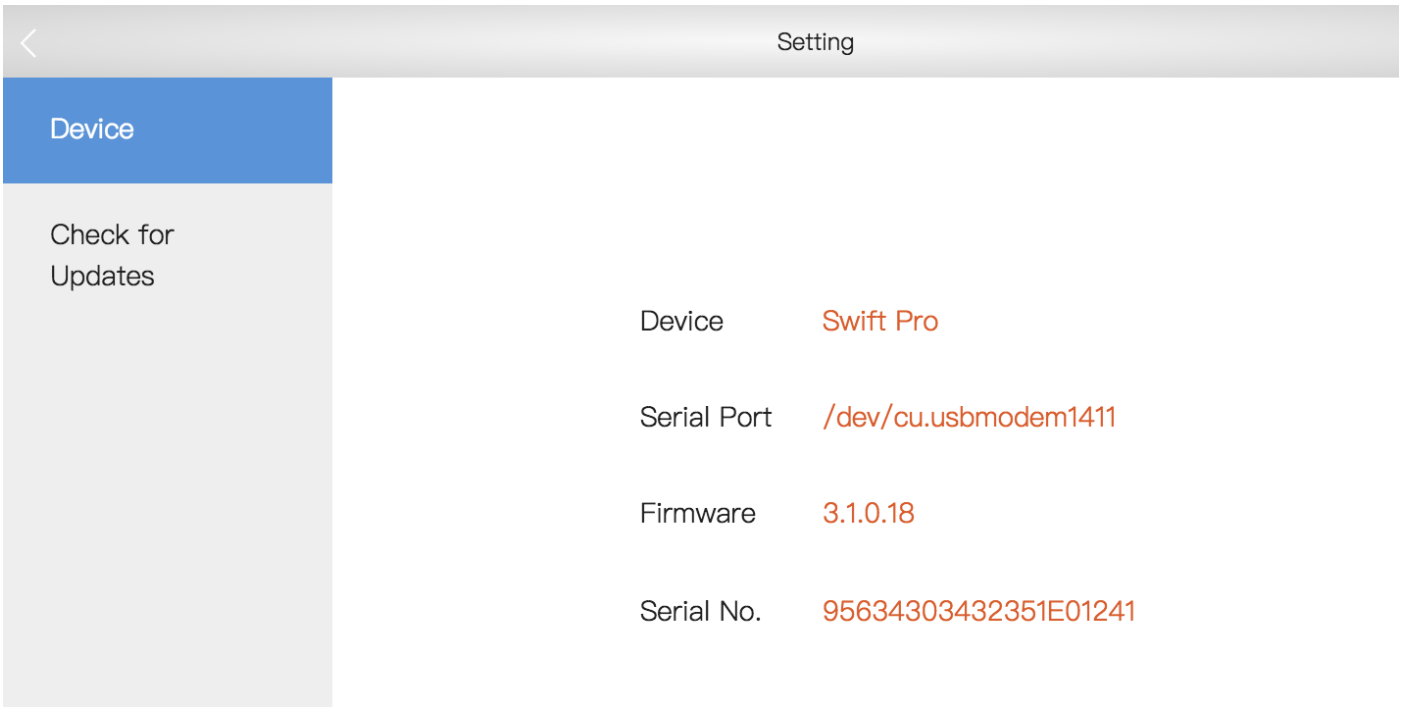
* Windows(Win7/8 or before) users will be reminded to install driver. Simply follow the instructions to install.

2.Device Connection



1) Plug in the power cable.
2) Press down the power button.
3) Connect uArm to your computer via USB.

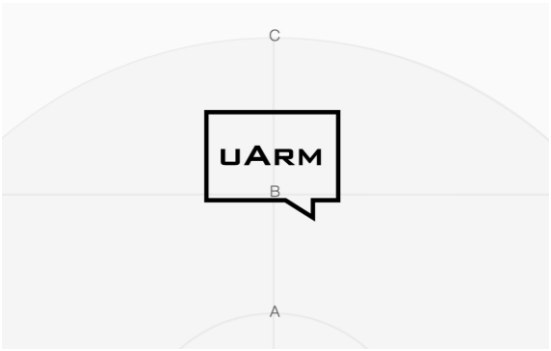
Status of device connection is displayed on home page.
More info is displayed in “Setting”.



3.Drawing/Laser Engraving

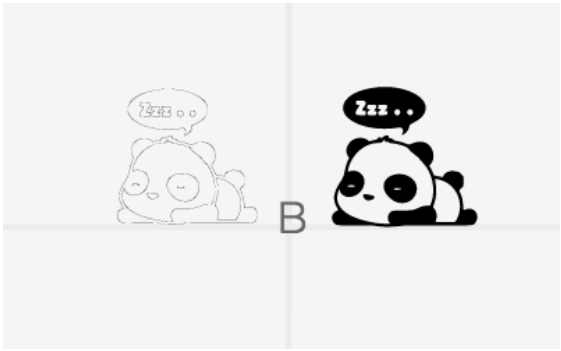
1) Design a pattern.

Insert text/shape



Insert an image

(“outline” or “black & white”.)



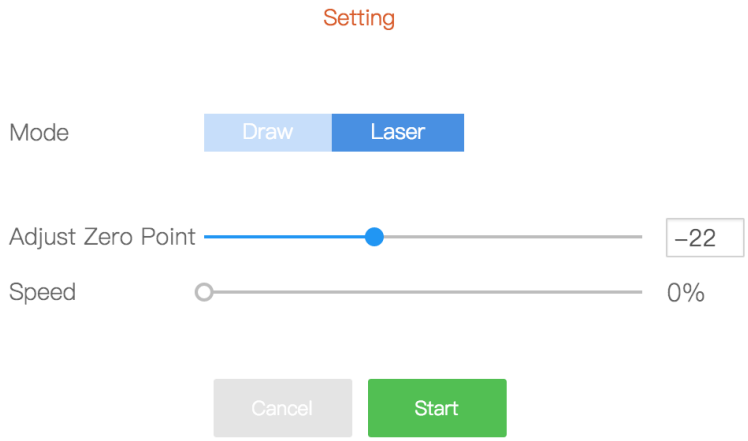
2) Click the play button to continue.

3) Adjust Zero Point

IMPORTANT:

Please adjust zero point before drawing/engraving.

Ensure the pen/laser is TOUCHING the platform.



For laser engraving, you can also adjust the speed of engraving.

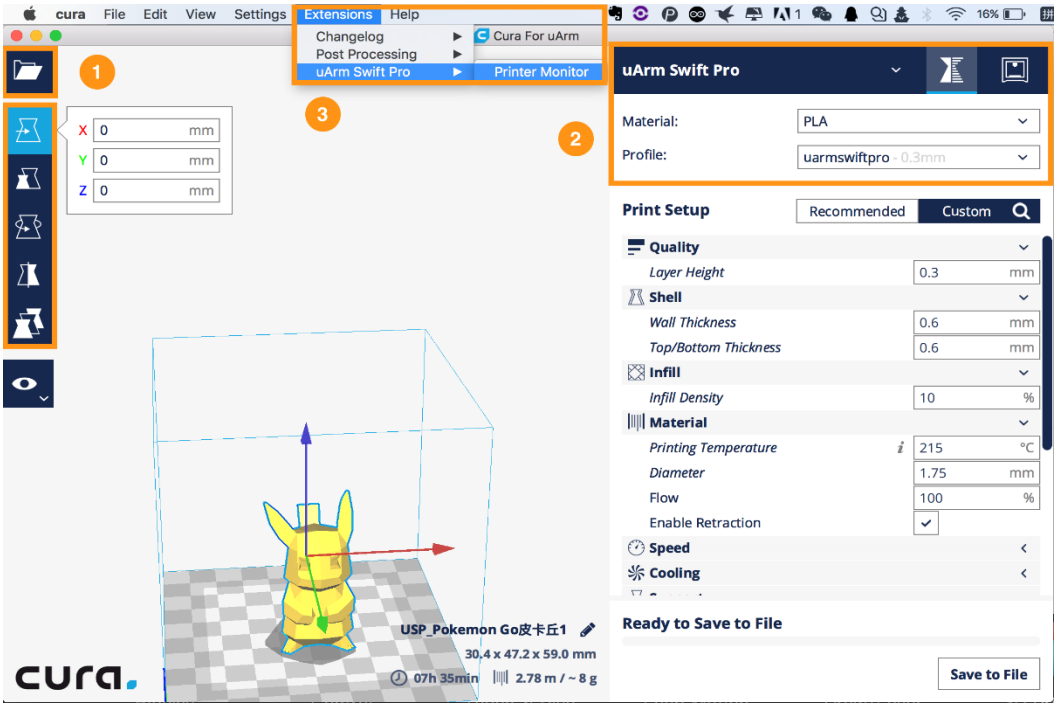
4) Start drawing/engraving!

4.3D Printing

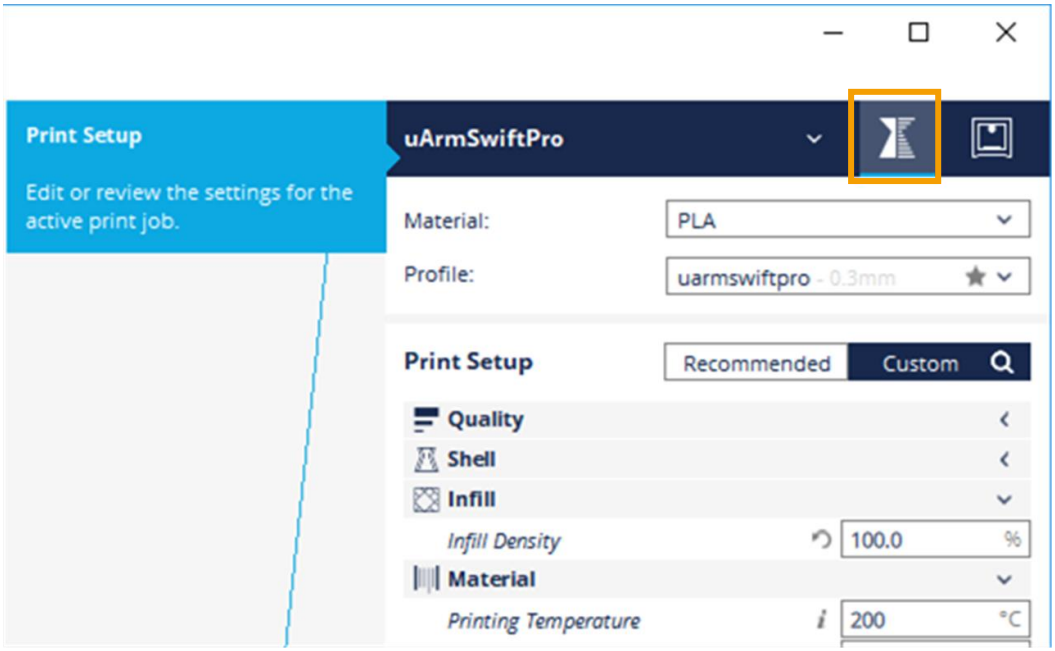
Preparation

1) Download CuraForuArm
2) Double-click .dmg/.exe file to install.
3) Enter the 3D Printing section in Studio, and CuraForuArm window will pop up automatically. If not, click the "Open Cura" button.

CuraForuArm Interface



1) Import an .stl file, edit the size/position of the model.
2) Select “uArm Swift Pro” as the printer, and choose the related profile. It is recommended to keep the default settings unchanged.



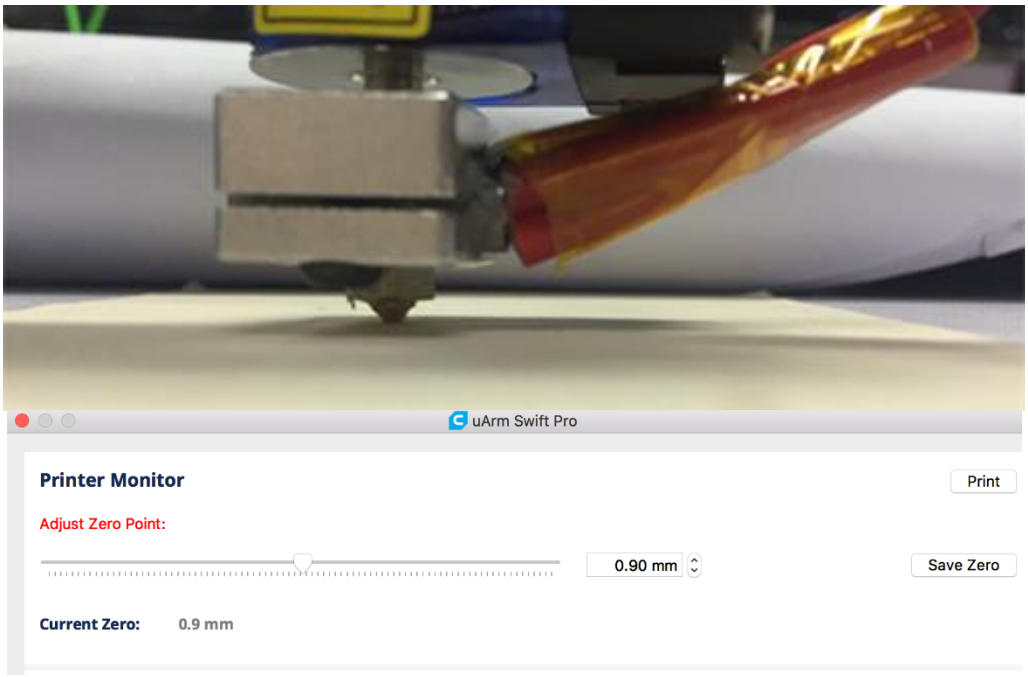
When setting the parameters of printer please choose the print setup option(orange rectangle), if you choose the printer monitor option(the right button) you can hardly find the printer.

3) Open Printer Monitor.

⚠ IMPORTANT: Please adjust zero point before printing.
Ensure the hot end is JUST TOUCHING the platform.

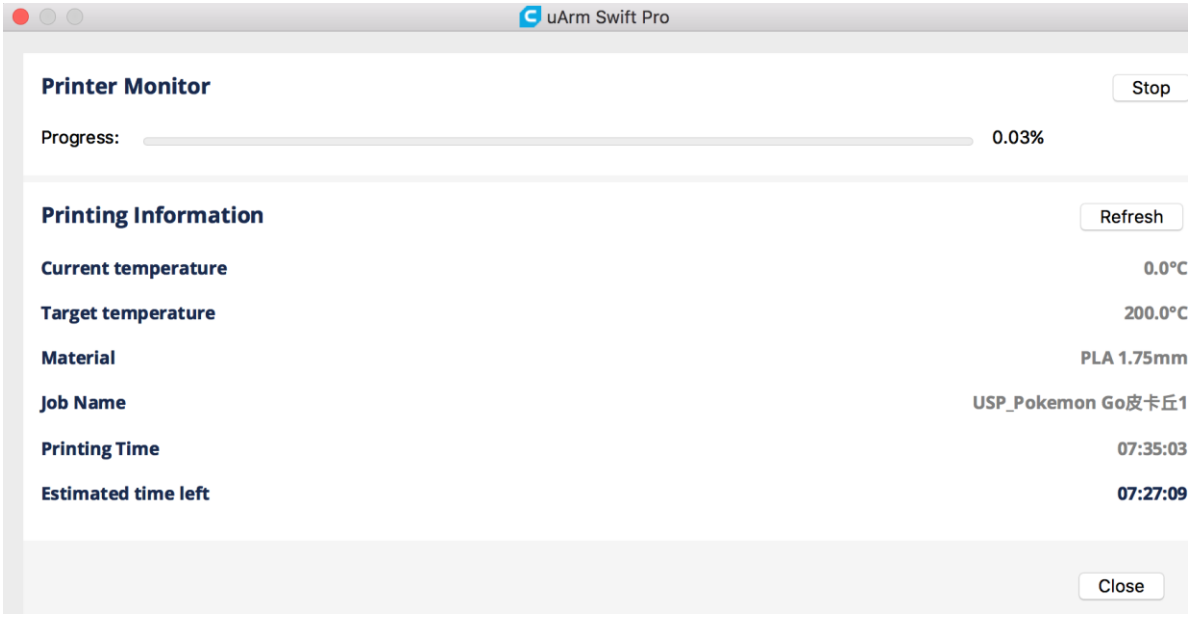
Then click “Save Zero”.

(The zero point of each arm is not the same, please adjust the zero point following the step 3) before printing.)



4) Start printing!

The 3D extruder will automatically heat up to 200℃ to print.
uArm will remain still during the pre-heating section.
Please don’t touch the metal part of the extruder for safety reason.



5.Teach & Play: Learning Mode

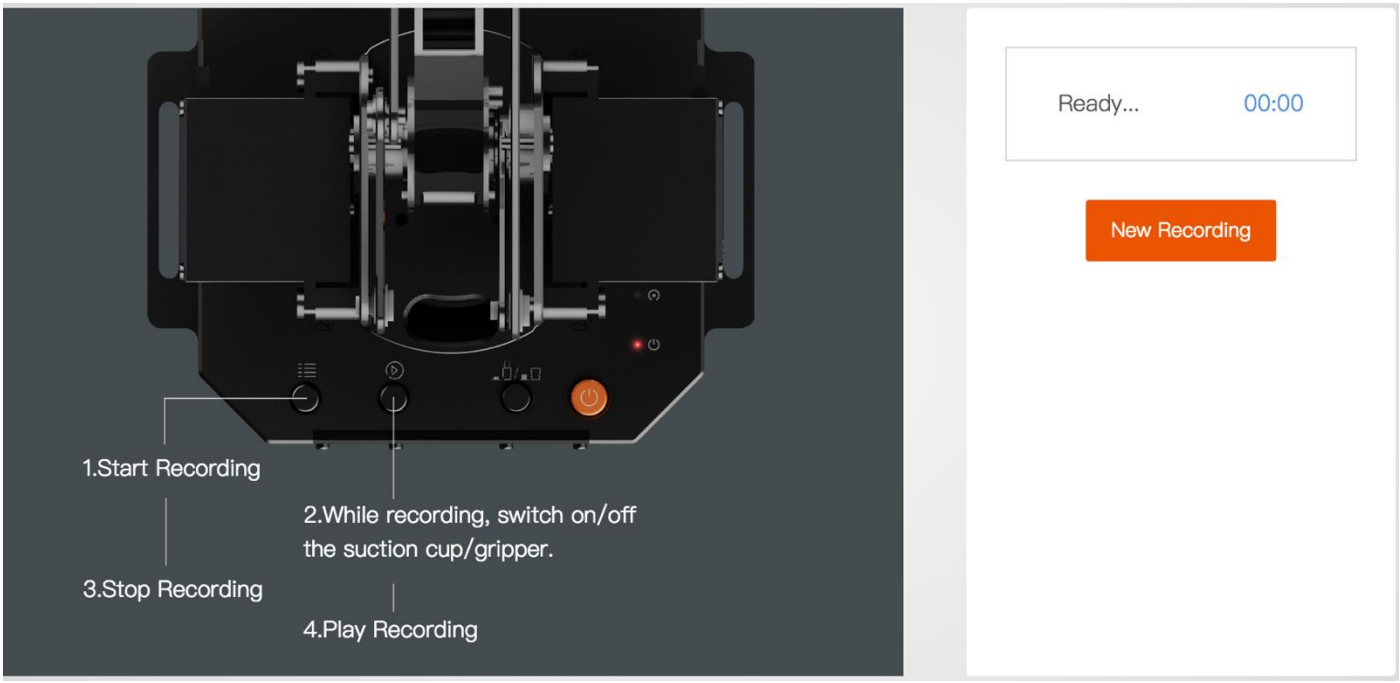
What is Teach & Play?

Teach uArm by hand, and then replay the recording anytime.

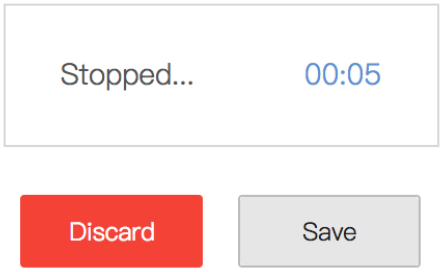
How?

1) Make a recording

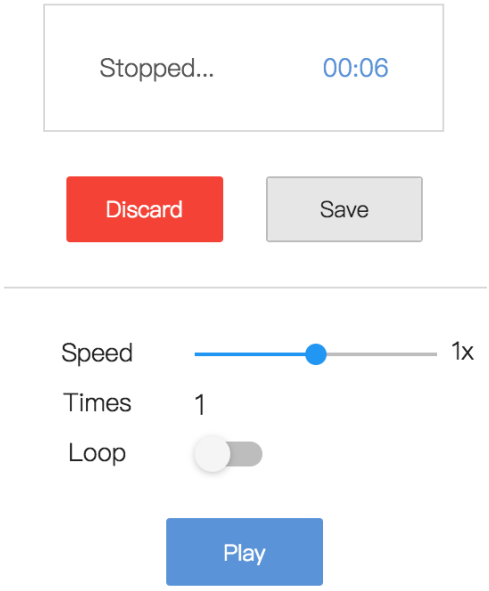
- Click the "New Recording" button to start "teaching", OR,
- Use the buttons on the base (usage of the buttons is the same as that under "*Offline Learning Mode*").



2) Save your recording



3) Replay the recording in different speed and times



What makes "Teach & Play" different from "Offline Learning Mode"?

1) No time limit while "teaching" with uArm Studio.
2) You may save, export your recordings and import recordings made by others.
3) You may apply your recording in Blockly (visual programming interface, which is explained up next).

6.Blockly: Visual Programming

What is Blockly?

Blockly in uArm Studio is a visual programming interface specially designed for controlling uArm.

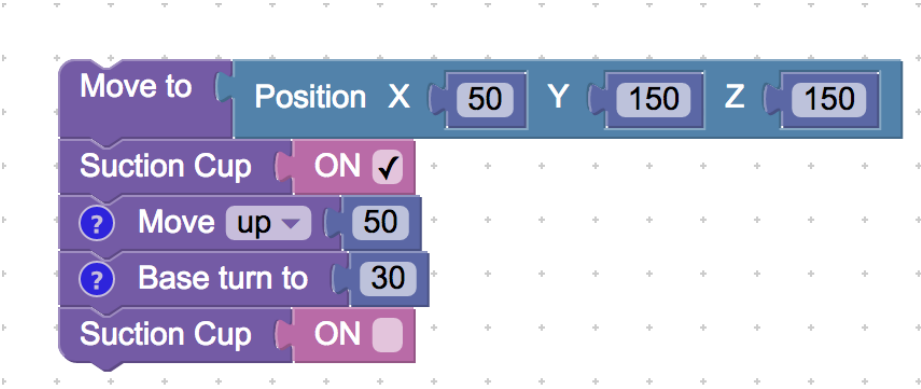
Getting Started

Three “missions” are prepared to get you through Blockly quickly.

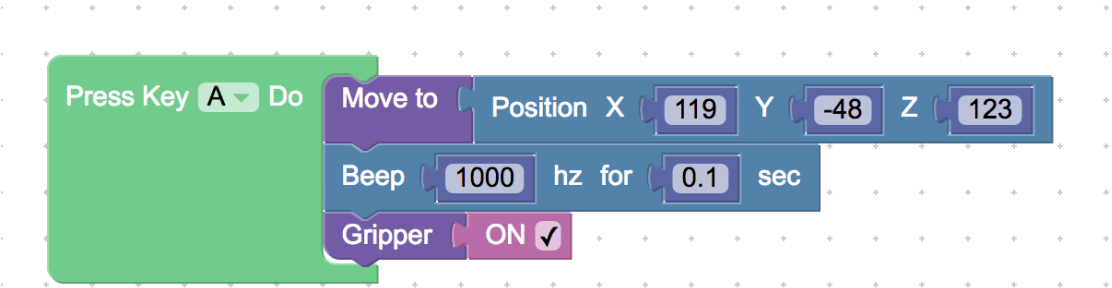
Please try them out!

What can you do with Blockly?

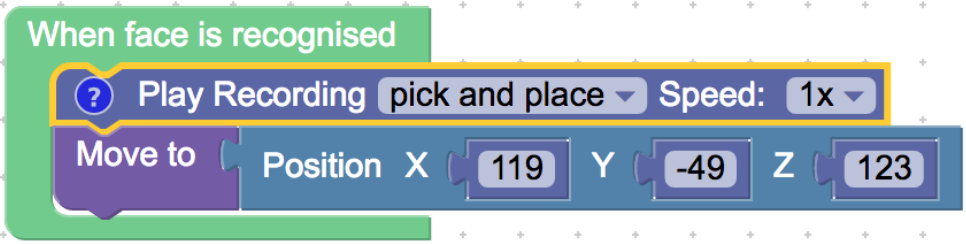
1) Control uArm’ s basic movements



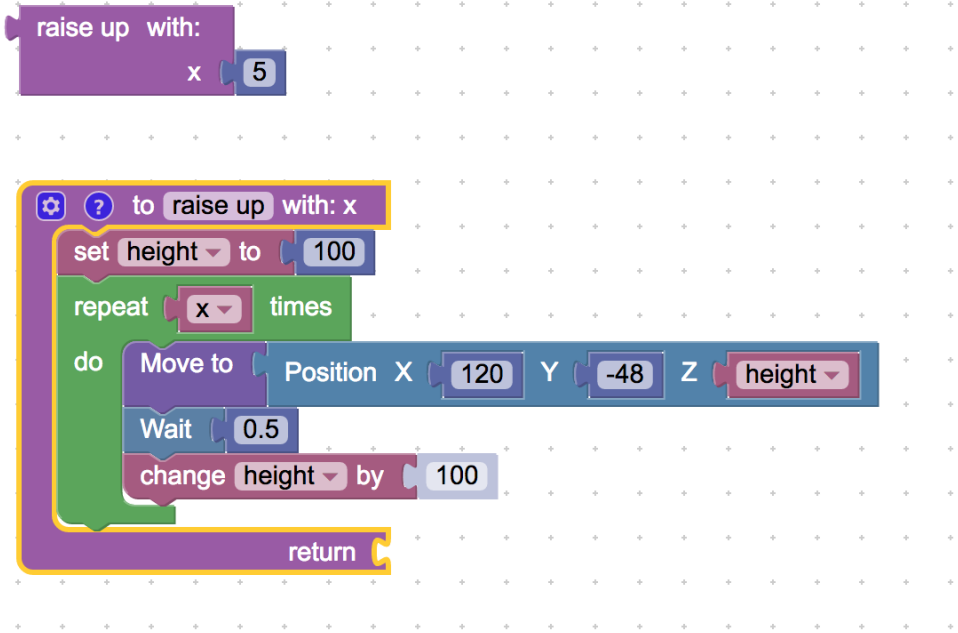
2) Change events (i.e. how you trigger commands)



3) Apply recorded movements



4) Dig deeper into programming (functions, variables, etc.)



For Developers

1.Communication Protocol

1) Introduction:

- *u*Arm gCode is an important part of the uArm software.
- Based on the standard gCode protocol, we add a new protocol head in front of the gCode so that it can be more easily to use and debug.
- What's more, it is designed to be compatible with the standard gCode. (We offer the code of decode the standard gCode)

2) Example:

- Sending command from PC

"#25 G0 X180 Y0 Z150 F5000"

//move to [180,0,150] with the speed 5000mm/min

- Reply from uArm "$25 ok"

3) Commands(TBD).

Command can be divided into two parts:

Command with underline: it's the new added protocol head.

- The command from PC starts with '#', while the command from uArm starts with'$'.

- And the data following the symbol decided by the PC, and the reply from the uArm should have the same data which indicates it finish the command. (In the example above, PC sends the command with '#25' and uArm replies the command with '$25')

Command without the underline: it's the standard gCode.

Caution

1.There should be blank space between each parameter;
2.The letters in the command should be capitalized;

GCode Command (v1.2)	Description	Feedback
1. #***n*** is used for the debug, if you don't want to use it please remove it directly. (For Example: G2202 N***0*** V***90***\n) 2. '\n' is the symbol of line feed.		
Moving Command (parameters are in underline)		
#***n*** G0 X***100*** Y***100*** Z***100*** F***1000***\n	Move to XYZ(mm), F is speed(mm/min)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** G1 X***100*** Y***100*** Z***100*** F***1000***\n	**After entering the laser mode (M2400 S1)**, command **G1** means laser on, **G0** means off.	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** G2004 P***1000***\n	Delay microsecond	$***n*** ok \n
#***n*** G2201 S***100*** R***90*** H***80*** F***1000***\n	Polar coordinates, S is stretch(mm), R is rotation(degree),H is height(mm), F is speed(mm/min)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** G2202 N***0*** V***90***\n	Move the motor to the position ,N is ID of joints(0~3),V is angle(0~180)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** G2204 X***10*** Y***10*** Z***10*** F***1000***\n	Relative displacement	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** G2205 S***10*** R***10*** H***10*** F***1000***\n	Polar coordinates for relative displacement	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
Setting Command (parameters are in underline)		
#***n*** M17\n	Attach all the joint motors	$***n*** ok \n
#n M204 P200 T200 R200\n	Set accelerations and save P = Printing moves R = Extruder only (no X, Y, Z) moves T =Hot End Travel (non printing) moves	$***n*** ok \n
#***n*** M2019\n	Detach all the joint motors	$***n*** ok \n
#***n*** M2120 V***0.2***\n	Set time cycle of feedback, return Cartesian coordinates, V is time(seconds)	@3 X***154.71*** Y***194.91*** Z***10.21***\n
#*n* M2122 V*1*\n	Report (@9 V0) when stop. V1: Enable V0: Disable	$*n* ok \n

#***n*** M2201 N***0***\n	attach motor, N is ID of joints(0~3)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2202 N***0***\n	Detach motor, N is ID of joints(0~3)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2203 N***0***\n	Check if the motor is attached, N is ID of joints(0~3)	$***n*** ok V***1***\n (1 attached,0 detached)
#***n*** M2210 F***1000*** T***200***\n	buzzer,F is frequency, T is time (ms)	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2211 N***0*** A***200*** T***1***\n	Read EEPROM N(0~2,0 is internal EEPROM,1 is USR_E2PROM, 2 is SYS_E2PROM), A is address, T is type (1 char,2 int,4 float)	$***n*** ok V***10***\n
#***n*** M2212 N***0*** A***200*** T***1*** V***10***\n	Write EEPROM N(0~2,0 is internal EEPROM,1 is USR_E2PROM, 2 is SYS_E2PROM), A is address, T is type (1 char,2 int,4 float)V is the input data	$***n*** ok\n
#***n*** M2213 V***0***\n	Default function of base buttons (0 false, 1 true)	$***n*** ok\n
#***n*** M2220 X***100*** Y***100*** Z***100***\n	Convert coordinates to angle of joints	$***n*** ok B***50*** L***50*** R***50***\n (B joint 0,L joint 1,R joints 2, 0~180)
#***n*** M2221 B***0*** L***50*** R***50***\n	Convert angle of joints to coordinates	$***n*** ok X***100*** Y***100*** Z***100***\n
#***n*** M2222 X***100*** Y***100*** Z***100*** P***0***\n	Check if it can reach,P1 polar, P0 Cartesian coordinates	$***n*** ok V***1***\n (1 reachable, 0 unreachable)
#***n*** M2231 V***1***\n	pump V1 working, V0 stop	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2232 V***1***\n	gripper V1 close, V0 open	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2234 V***1***\n	Enable/disable Bluetooth (1:enable, 0:disable)	$***n*** ok\n
#***n*** M2240 N***1*** V***1***\n	Set the digital IO output	$***n*** ok \n or $***n*** E***x*** \n (refer to Err output)
#***n*** M2241 N***1*** V***1***\n	Set the digital IO direction (V1 Output; V0 Input;)	$n ok \n

#***n*** M2245 V***btname***\n	Set the name of Bluetooth, 11 letters limited	$n ok \n
#***n*** M2304 P***0***\n	Please check the Grove modules below	
#***n*** M2305 P***0*** N***1***\n	Please check the Grove modules below	
#***n*** M2306 P***0*** V***1000***\n	Please check the Grove modules below	
#***n*** M2307 P***0*** V***1***\n	Please check the Grove modules below	
#***n*** M2400 S***0***\n	Set the mode of arm (0:Normal 1:Laser 2:3D printing 3:Universal holder)	$***n*** ok \n
#***n*** M2401\n	Set the current position into the reference position	$***n*** ok \n
#***n*** M2410\n	Set the height zero point	$***n*** ok \n
#***n*** M2411 S***100***\n	Set the offset of end-effector (mm)	$***n*** ok \n
#***n*** M2500\n	Switch the uart0 to uart2 for external TTL uart communication (For example OpenMV)	$***n*** ok \n
Querying Command (parameters are in underline)		
#***n*** P2200\n	Get the current angle of joints	$***n*** ok B***50*** L***50*** R***50***\n
#***n*** P2201\n	Get the device name	$***n*** ok V***3.2***\n
#***n*** P2202\n	Get the hardware version	$***n*** ok V***1.2***\n
#***n*** P2203\n	Get the software version	$***n*** ok V***3.2***\n
#***n*** P2204\n	Get the API version	$***n*** ok V***3.2***\n
#***n*** P2205\n	Get the UID	$***n*** ok V***0123456789AB***\n
#***n*** P2206 N***0***\n	Get the angle of number 0 joint (0~2)	$n ok V***80***\n
#***n*** P2220\n	Get current coordinates	$***n*** ok X***100*** Y***100*** Z***100***\n
#***n*** P2221\n	Get current polar coordinates	$***n*** ok S***100*** R***90*** H***80***\n

#***n*** P2231\n	Get the status of pump	$***n*** ok V***1***\n (0 stop, 1 working, 2 grabbing things)
#***n*** P2232\n	Get the status of gripper	$***n*** ok V***1***\n (0 stop, 1 working, 2 grabbing things)
#***n*** P2233\n	Get the status of limited switch	$***n*** ok V***1*** (1 triggered, 0 untriggered)
#***n*** P2234\n	Get the status of power connection	$***n*** ok V***1*** (1 connected, 0 unconnected)
#***n*** P2240 N***1***\n	Get the status of digital IO	$***n*** ok V***1***\n (1 High, 0 Low)
#***n*** P2241 N***1***\n	Get the status of analog IO	$***n*** ok V***295***\n (return the data of ADC)
#***n*** P2242\n	Get the default value of AS5600 in each joint	$***n*** ok B***2401*** L***344*** R***1048***\n
#***n*** P2400\n	Check current status	$***n*** ok V***1***\n (0: normal; 1: laser; 2: 3D printing; 3: Universal holder;)
Ticking feedback		
@1	Ready	
@3	Timed feedback , ”M2120”	
@4 N***0*** V***1***\n	Report the button event. N: 0 = Menu button, 1 = Play button V: 1 = Click, 2 = Long Press	
@5 V***1***\n	Report event of power connection	
@6 N***0*** V***1***\n	Report event of limit switch in end-effector	
@7 temp error	Temperature error in 3D printing	
@9 V0\n	Stop movement	
Err Output		
E20	Command not exist	
E21	Parameter error	
E22	Address out of range	
E23	Command buffer full	
E24	Power unconnected	

E25	Operation failure	

Grove modules					
Grove Num	Module	Commands	Description	Support Ports	Return
1	Chainable RGB LED	#***n*** M2304 P***3***\n	Deinit	3, 4, 5	$***n*** ok\n
		#***n*** M2305 P***3*** N1 V***2***\n	Init Module 1 in Port ***3.*** V is the number of LEDs chained.	3, 4, 5	$***n*** ok\n or E25 init fail
		#***n*** M2307 P***3*** V***0*** R228 G128 B100\n	Set the color of ***0***th LED	3, 4, 5	$***n*** ok\n
2	Button	#***n*** M2304 P3\n	Deinit	3, 4, 5	
		#***n*** M2305 P3 N2\n	Init Module 2 in Port ***3***	3, 4, 5	
		Press down			@11 P***3*** N2 V0\n
		Click			@11 P***3*** N2 V1\n
		Long pressed			@11 P***3*** N2 V2\n
3	Slide Potentiometer	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N3\n	Init Module 3 in Port1	1, 2	$***n*** ok \n
		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N3 V583\n
4	Vibration Motor	#***n*** M2304 P***3***\n	Deinit	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N4\n	Init Module 4 in Port ***3***	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2307 P***3*** V1\n	V1: turn on; V0: turn off	3, 4, 5, 8, 9	$***n*** ok \n
5	Light Sensor	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N5\n	Init Module 5 in Port ***1***	1, 2	$***n*** ok \n
		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N5 V583\n
6	Angle Sensor	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N6\n	Init Module 6 in Port ***1***	1, 2	$***n*** ok \n
		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N6 V583\n
7	Air Quality Sensor	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N7\n	Init Module 7 in Port ***1***	1, 2	$***n*** ok \n

		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N7 V583\n
8	Sound Sensor	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N8\n	Init Module 8 in Port ***1***	1, 2	$***n*** ok \n
		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N8 V583\n
9	6-Axis Accelerometer & Compass	#***n*** M2304 P***0***\n	Deinit	0	$***n*** ok \n
		#***n*** M2305 P***0*** N9\n	Init Module 9 in Port ***0***	0	$***n*** ok \n
		#***n*** M2306 P***0*** V***1000***\n	Set report interval (ms) XYZ is the acceleration of each axis. H is the clockwise angle between the magnetic north and x-axis T is the clockwise angle between the magnetic north and the projection of the positive x-axis in the horizontal plane	0	@11 P***0*** N9 X2.0 Y2.0 Z2.0 H2.0 T2.0\n
10	Color Sensor	#***n*** M2304 P***0***\n	Deinit	0	$***n*** ok \n
		#***n*** M2305 P***0*** N10\n	Init Module 10 in Port ***0***	0	$***n*** ok \n
		#***n*** M2306 P***0*** V***1000***\n	Set report interval (ms)	0	@11 P***0*** N10 R218 G31 B128\n
11	Gesture Sensor	#***n*** M2304 P***0***\n	Deinit	0	$***n*** ok \n
		#***n*** M2305 P***0*** N11\n	Init Module 11 in Port ***0***	0	$***n*** ok \n
		#***n*** M2306 P***0*** V***1000***\n	Set report interval (ms)	0	@11 P***0*** N11 V1\n 1: right 2: left 4: up 8: down 16: forward 32: backward 64: clockwise 128:counter clockwise
12	Ultrasonic	#***n*** M2304 P***3***\n	Deinit	4, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N12\n	Init Module 12 in Port ***3***	4, 8, 9	$***n*** ok \n
		#***n*** M2306 P***3*** V1000\n	Set report interval (ms)	4, 8, 9	@11 P***3*** N12 V4\n Value in cm

13	Fan	#***n*** M2304 P***4***\n	Deinit	4, 8, 9	$***n*** ok \n
		#***n*** M2305 P***4*** N13\n	Init Module 13 in Port ***4***	4, 8, 9	$***n*** ok \n
		#***n*** M2307 P***4*** V120\n	Set Fan speed(0~255)	4, 8, 9	$***n*** ok \n
14	Electromagnet	#***n*** M2304 P***3***\n	Deinit	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N14\n	Init Module 14 in Port ***3***	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2307 P***3*** V1\n	1:turn on 0: turn off	3, 4, 5, 8, 9	$***n*** ok \n
15	Temperature & Humidity	#***n*** M2304 P***0***\n	Deinit	0	$***n*** ok \n
		#***n*** M2305 P***0*** N15\n	Init Module 15 in Port ***0***	0	$***n*** ok \n
		#***n*** M2306 P***0*** V***1000***\n	Set report interval (ms)	0	@11 P***0*** N15 T23.3 H82.2\n
16	PIR Sensor	#***n*** M2304 P***3***\n	Deinit	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N16\n	Init Module 16 in Port ***3***	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2306 P***3*** V1000\n	Set report interval (ms)	3, 4, 5, 8, 9	@11 P***3*** N16 V1\n 1: Motion detected 0: no motion detected
17	1602 LCD	#***n*** M2304 P***0***\n	Deinit	0	$***n*** ok \n
		#***n*** M2305 P***0*** N17\n	Init Module 17 in Port ***0***	0	$***n*** ok \n
		#***n*** M2307 P***0*** R128 G120 B10\n	Set backlight color	0	$***n*** ok \n
		#***n*** M2307 P***0*** T***0***\n	0: turn off display 1: turn on display 2: clear	0	$***n*** ok \n
		#***n*** M2307 P***0*** V***0*** S***Test***\n	V(0~1): row selected S: the display string	0	$***n*** ok \n
18	Line Finder	#***n*** M2304 P***3***\n	Deinit	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N18\n	Init Module 18 in Port ***3***	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2306 P***3*** V1000\n	Set report interval (ms)	3, 4, 5, 8, 9	@11 P***3*** N18 V1\n 1: object detected 0: no object detected

19	Infrared Reflective Sensor	#***n*** M2304 P***3***\n	Deinit	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2305 P***3*** N19\n	Init Module 19 in Port ***3***	3, 4, 5, 8, 9	$***n*** ok \n
		#***n*** M2306 P***3*** V1000\n	Set report interval (ms)	3, 4, 5, 8, 9	@11 P***3*** N19 V1\n 1: object detected 0: no object detected
20	EMG Detector	#***n*** M2304 P***1***\n	Deinit	1, 2	$***n*** ok \n
		#***n*** M2305 P***1*** N20\n	Init Module 20 in Port ***1***	1, 2	$***n*** ok \n
		#***n*** M2306 P***1*** V***1000***\n	Set report interval (ms)	1, 2	@11 P***1*** N20 V583\n

d. Different modes for uArm Swift Pro

Since different types of the end-effectors have different length and height, so we designed the command M2400, which could help us to fit the uArm into different situations easily. With this command, there is no need to concern about how to adjust the parameters for different situations.

Currently we offer 4 kinds of mode:
M2400 V0 : Normal mode (end-effector tools: suction)
M2400 V1 : Laser mode (end-effector tools: laser)
M2400 V2 : 3D printing mode (end-effector tools: extruder)
M2400 V3 : Universal holder mode (end-effector tools: universal holder)

For the gripper, there is no special mode since gripper has the fingers and can rotate horizontally.

uArm Community

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Release Note

Version	Note	
1.0.7	Modify several steps of 3D printing and fix the misunderstanding Add the laser mode command G1	Tony
1.0.8	Add more details about OpenMV Add the note of laser focusing Add the caution of installing base extension Add the caution of user defined button	Tony
1.0.9	Modify the steps of laser focusing and grove installing	Tony
1.0.10	Add more details to OpenMV tutorial Add details to offline learning modess Add M2500 command in command list	Tony
1.0.11	Modify the OpenMV instructions Add more Gcode commands	Tony
1.0.12	Add the details of installing the tube in 3D printing mode	Tony
1.0.13	Add new picture of working range	Tony
1.0.14	Add cautions in 3D printing	Tony
1.0.15	Modify several commands of Gcode	David
1.0.16	Add more note in 3D printing function (page33)	Tony