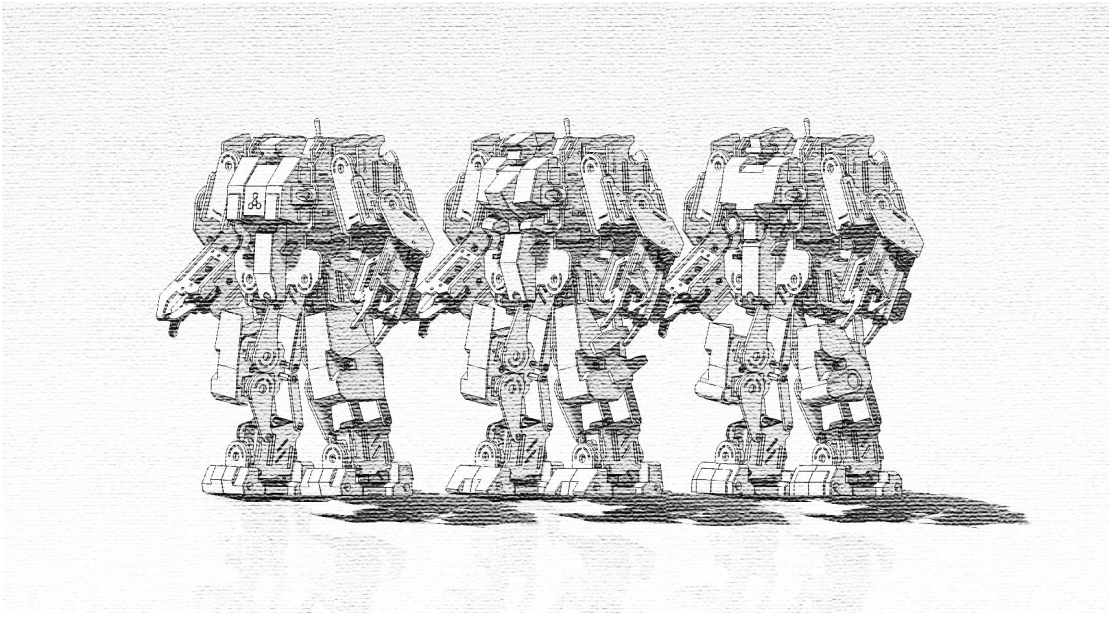
Ai.Frame4.4.0 Apollo Quick Start



Cautions:

- Apollo is not a normal toy, do not leave it with children under 13
- The Acrylic parts are crisp, do not dropping, clashing
- Do not force the joints to turn when Apollo is powered on
- Go through this quick start carefully before get started with Apollo

Ai.Frame4.4.0 Apollo:

Apollo is an open source self-assembly humanoid robot, contains laser cutting Acrylic parts and 3D-printing parts, and has 3 options for its armor: Type A, type B and type C. It uses 2mm Acrylic board to do laser cutting for the frame parts and ABS material for 3D-printing parts.

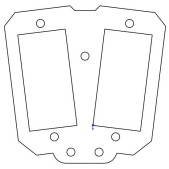
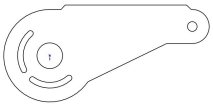
Feathers:

- 16 DOF for 14 micro metal gear servos and 2 mini plastic gear servos
- Open source and upgrade-able hardware and software
- Acrylic and ABS material body
- Height: 22cm
- Weight; 485g
- Control and program via Bluetooth module or USB interface

List Of Parts:

name	view	quality	note

AI.FRAME

XF-5-2		4	
XF-5-3		4	
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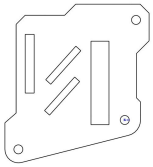
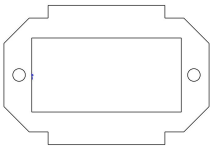
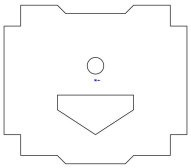
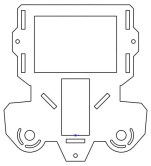
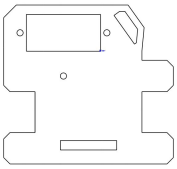
XF-5-5		8	
XF-5-6		12	
XF-5-7		4	
XF-5-8		1	
XF-5-9		2	

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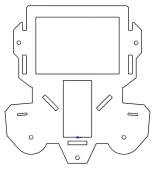
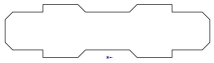
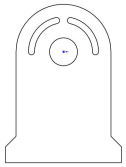
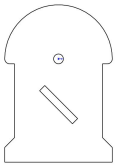
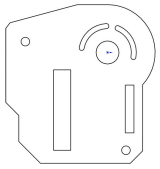
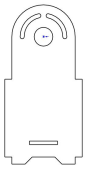
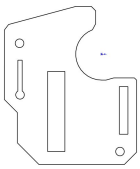
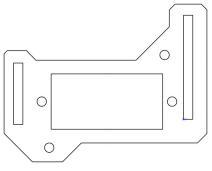
XF-5-10		1	
XF-5-11		3	
XF-5-13		2	
XF-5-13-2		2	
XF-5-20		2	
XF-5-21		2	
XF-5-21-2		2	
XF-5-22		2	

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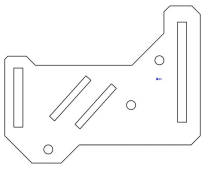
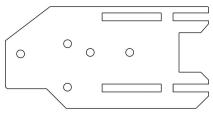
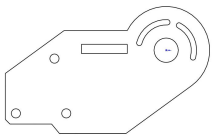
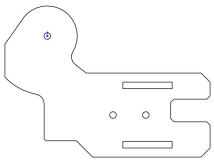
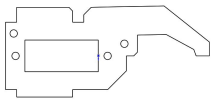
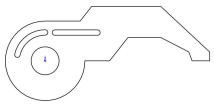
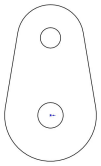
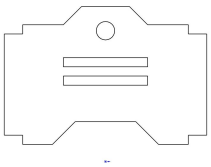
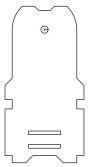
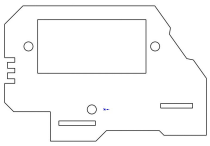
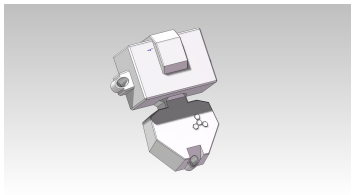
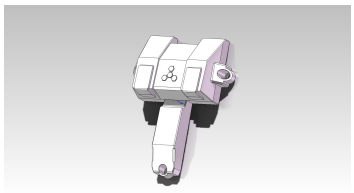
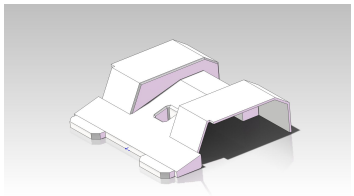
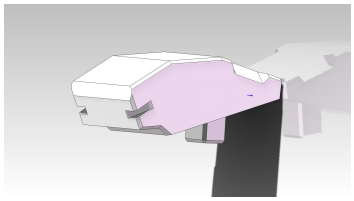
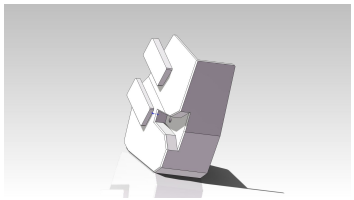
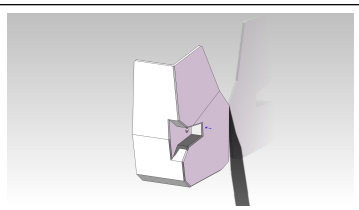
XF-5-22-2		2	
XF-5-23-2		2	
XF-5-23-3		2	
XF-5-23		2	
XF-5-24		4	
XF-5-25		2	
XF-5-27		16	
XF-5-28		2	

XF-5-29		2	
XF-5-30		2	
XF-5-A11		1	
XF-5-A12		1	
XF-5-A13		1	
XF-5-A14		1	
XF-5-A15		1	
XF-5-A16		1	

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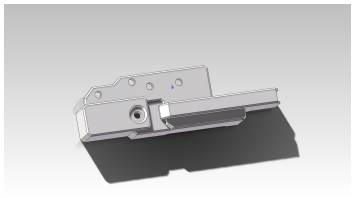
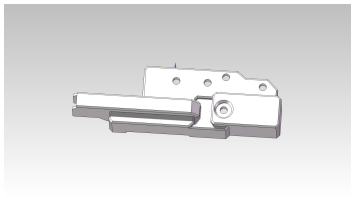
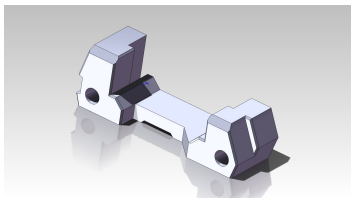
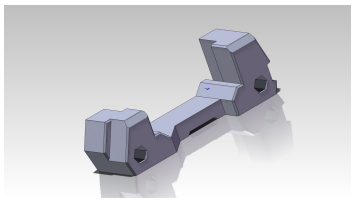
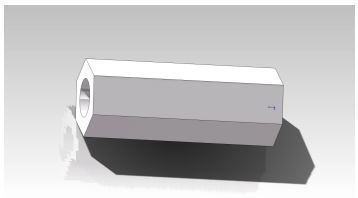
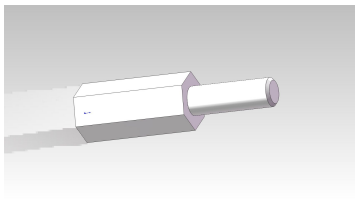
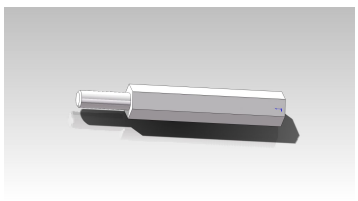
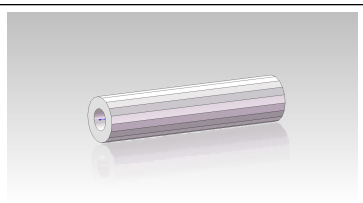
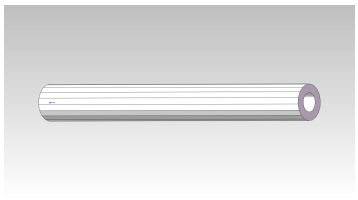
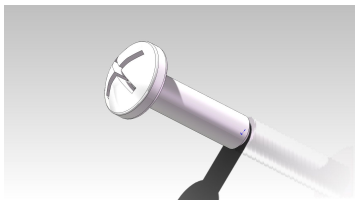
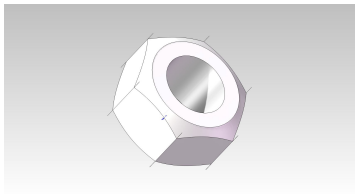
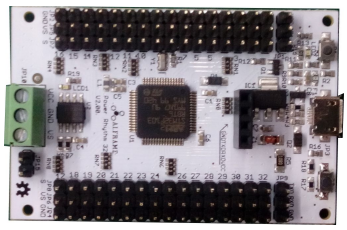
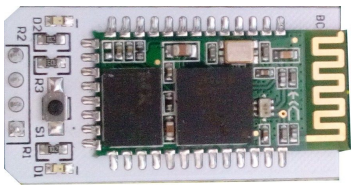
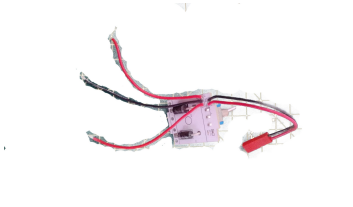
XF-5-A18		1	
XF-5-A19		1	
XF-5-A171		2	
XF-5-A172		2	
Nylon rod m2*10		10	
Nylon rod m2*8+6		6	
Nylon rod m2*18+6		16	
Metal rod m2*18		4	

Metal rod m2*34		3	
Nylon screw m2*8		28	Only used on the axles and rotation joints
Metal nut m2		74	
Metal screw with pad and spring m2*8		88	Used to connect parts and servos
White metal screw m2*8		2	Used to attach the mini servo pads to mini servos
Black metal screw m1.4*8		16	Used to attach servo pads and parts together with XF-5-27
Servo pad		14	

Mini servo pad		2	
Micro metal gear servo		14	
Mini plastic gear servo		2	
Power Rhythm 32 servo control board		1	User guide: https://github.com/AiFrame/Power_Rhythm_32/tree/master/Guide
Bluetooth module		1	User guide: https://github.com/AiFrame/Bluetooth_module/tree/master/Guide
Power board		1	
Battery		1	

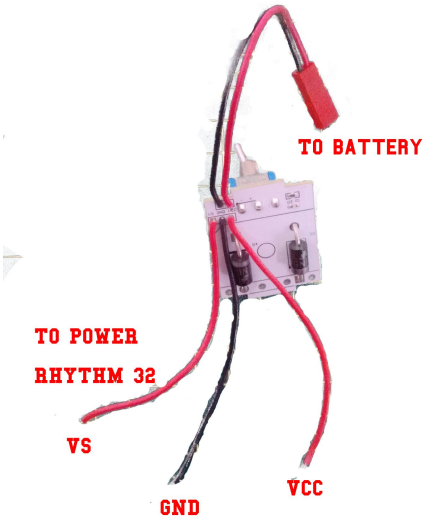
Joystick 1 Bluetooth		1	Manual: https://github.com/AiFrame/Joystick/tree/master/Manual

Assemble:

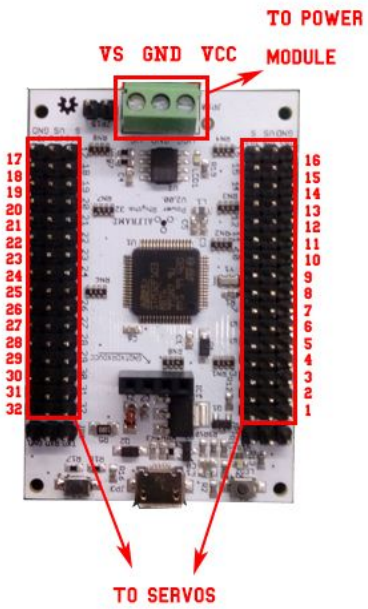
We have made a video showing how to assemble a complete Apollo, here is the Youtube video link:
https://www.youtube.com/watch?v=aImeWtCxFCc
Please pay attention, assembling a new version Apollo is a bit difference: In the video, the plastic screws is used on the axle and rotational joints, and the metal screws is used to attach parts together. And at the 1:58, the upper plastic rod needs to be replaced with the brass one as well as the upper one at 2:50, 4 plastic rod (18 + 6 mm) need to be replaced with brass ones (18 mm) without thread. Also the three longest (34mm) plastic rod needs to be replaced with brass ones too. The black metal screws (m1.4*8) do not needed to be assembled.

Electronics Connection:

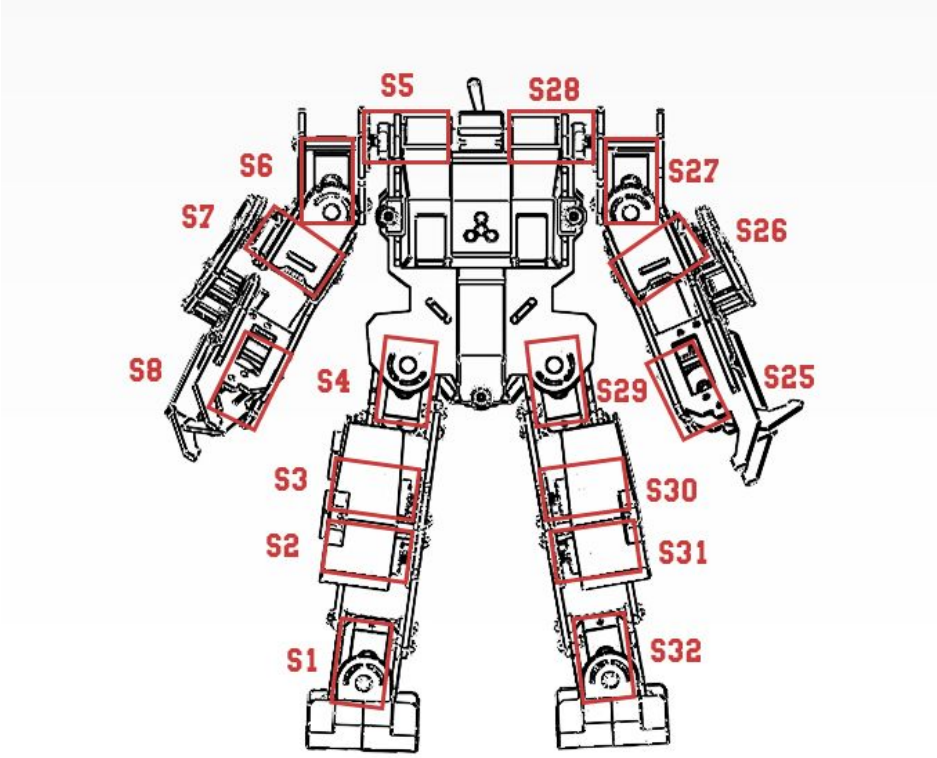
- Power board



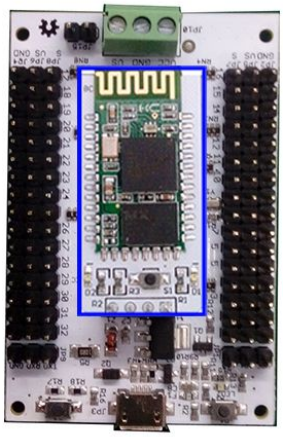
- Power Rhythm 32



- Servos

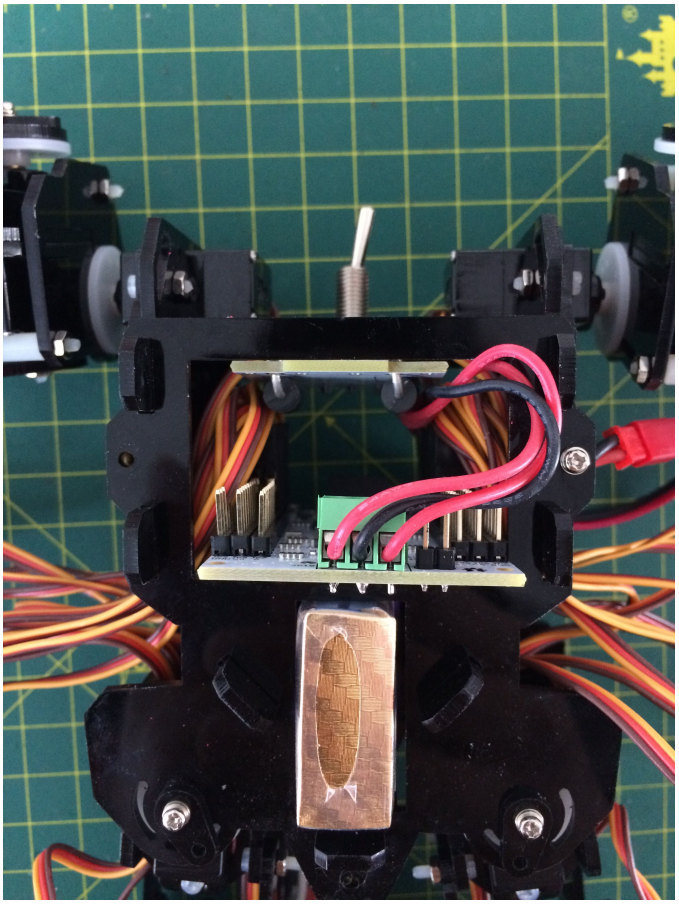


- Bluetooth module

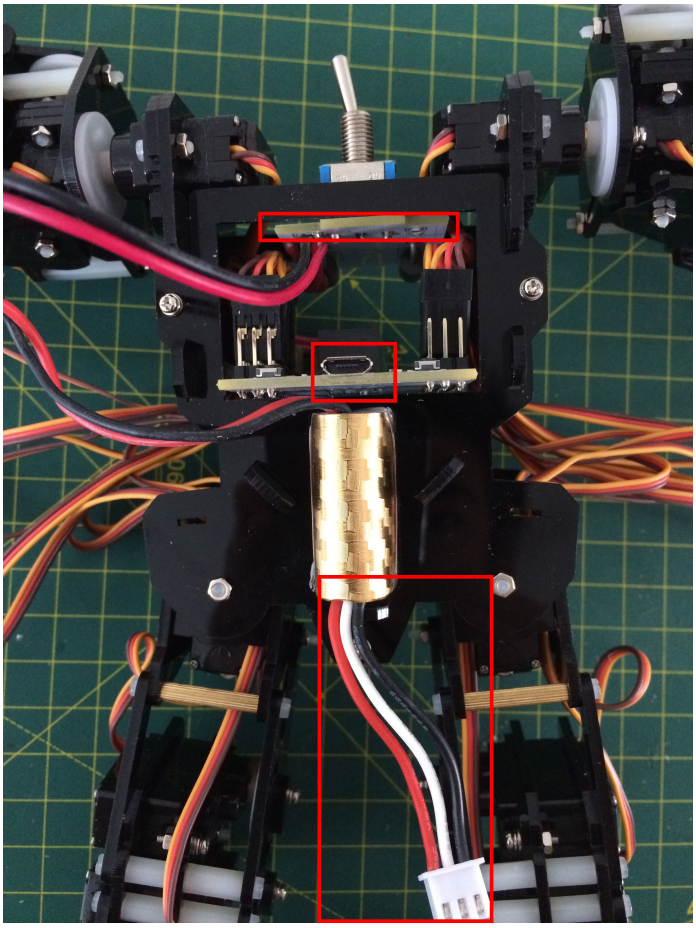


Place The Battery And Boards:

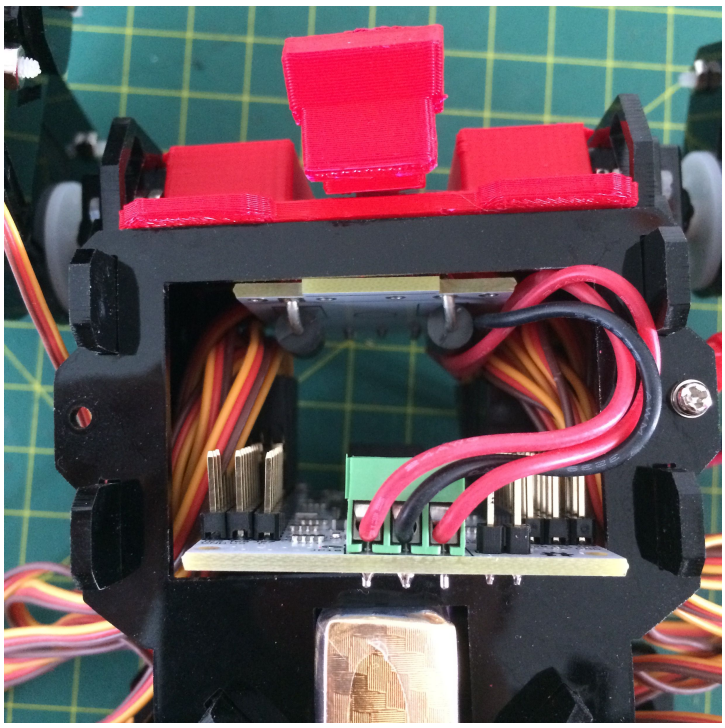
- Place the battery and boards as shown below. Make sure that the USB port is on the back side, and the charging cable is on the lower side.
  Front view



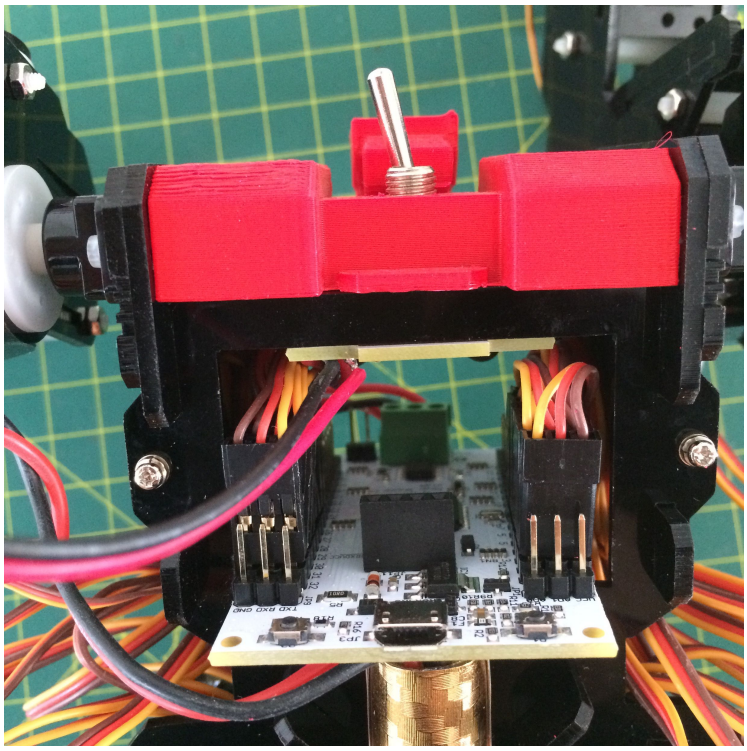
Back view:



- Assemble the upper armor, the switch must goes through it
  Front view:



Back view:

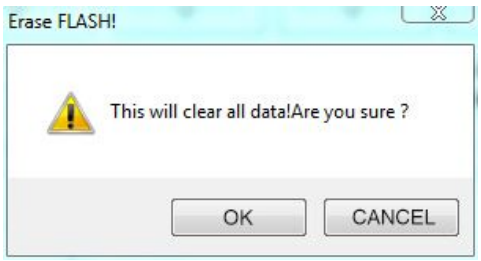


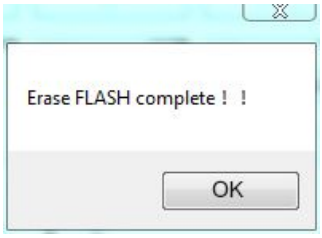
Initialize Apollo:

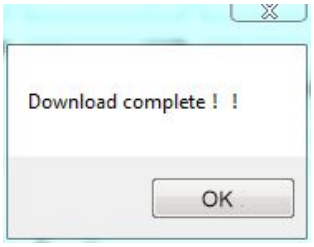
- Initialize Power Rhythm32:
  1. Install the drivers for Power Rhythm 32 (see how to install the drivers: https://github.com/AiFrame/Power_Rhythm_32/tree/master/Guide)
  2. Get Connected With Servo Rhythm Controller (see how to use the software: https://github.com/AiFrame/Servo_Rhythm_Controller/tree/master/Manual)

     a. Make sure the robot is powered off, plug Power Rhythm 32 to your computer via USB cable
     b. Wait for Windows to recognize it
     c. Open Servo Rhythm Controller
     d. Select the right COM port number in the list box, click on the “OPEN” button to connect the Power Rhythm 32. If you don't know the COM port number you are using, just try from COM1, COM2 etc… Do not change any other configurations.

  3. Click the “ERASE FLASH” button, click the “OK” button on the popping up message box
  4. Click “OK” when finish erasing flash, this will set the flash data at the initial state



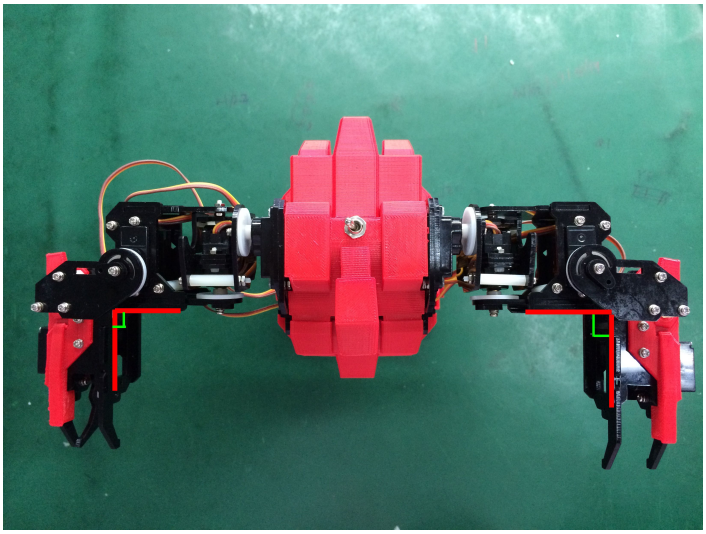




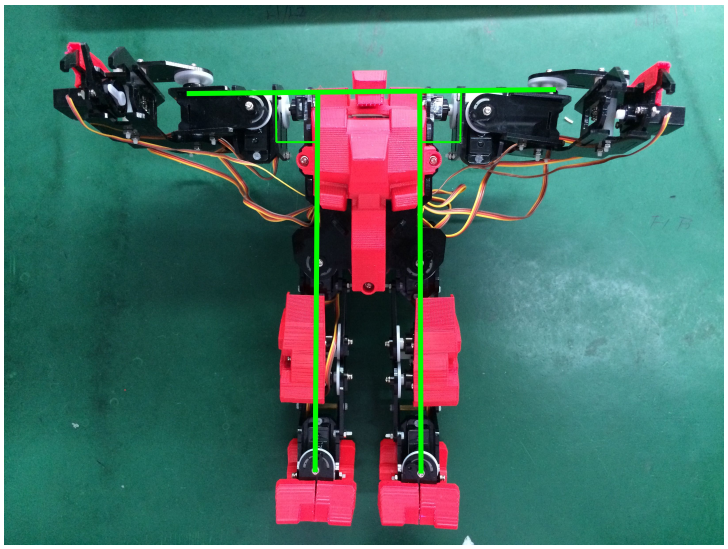
5. Click “CENTER ALL” button
6. Click “STANDBY” button set the signal output at the initial state, when finish click “OK”, click “EXIT” and disconnect Power Rhythm 32 from PC

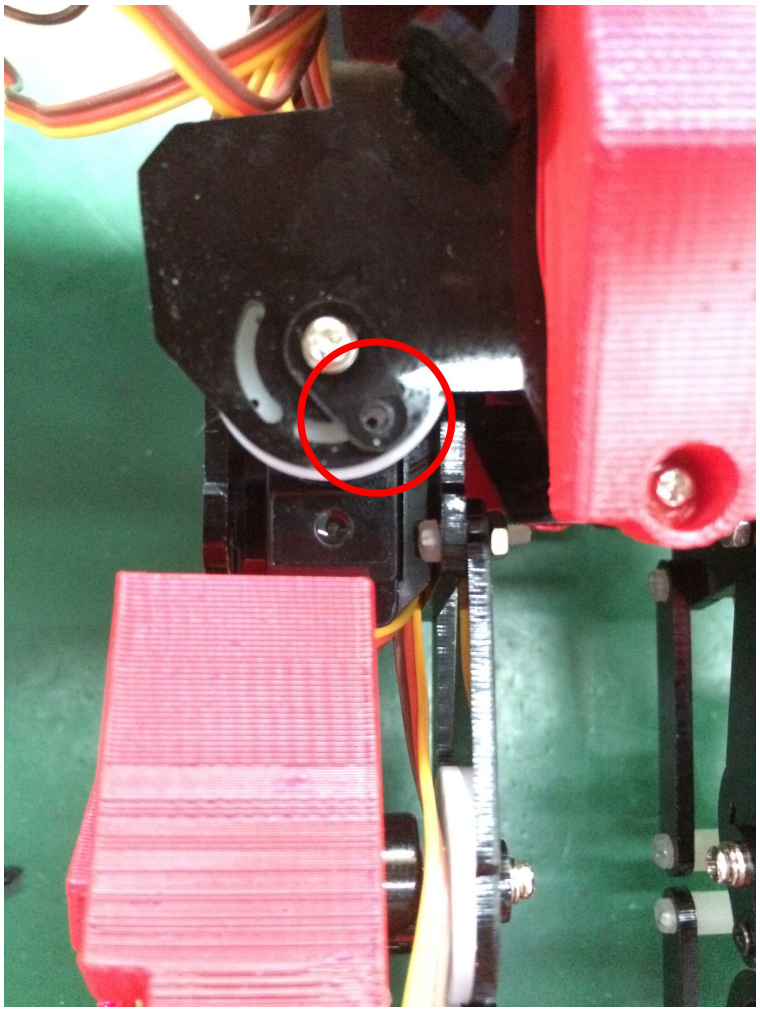
- Initialize the joints:
  1. Power on the robot, when you hear the noise and the servos stop turning, go to the next step
  2. Adjust the joints to the positions shown in the pictures below, rotate the XF-5-27 parts to get the hole overlapped with one on the servo pads, then screw on and tighten the black metal screws (m1.4*8)

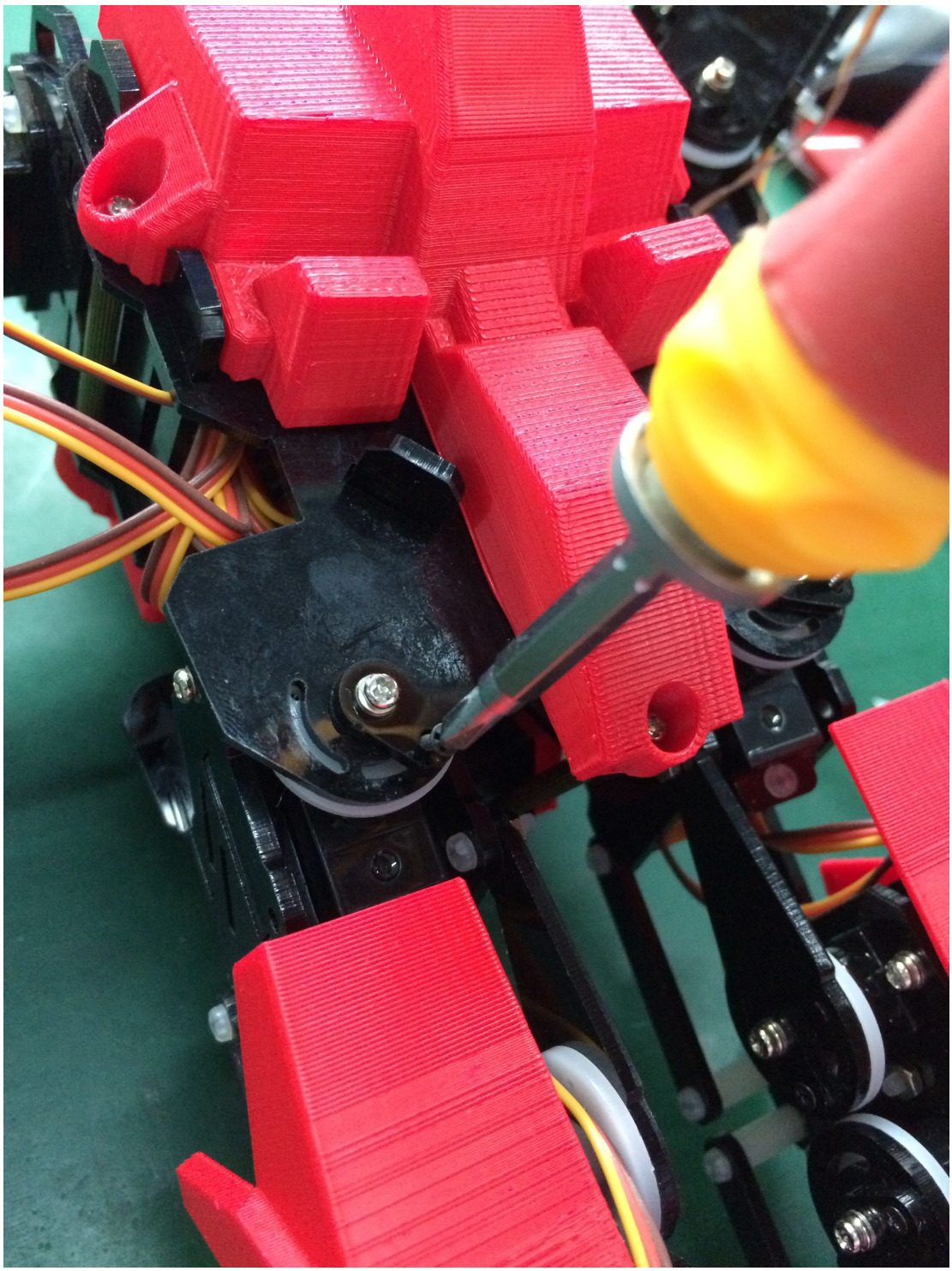
     Top view:

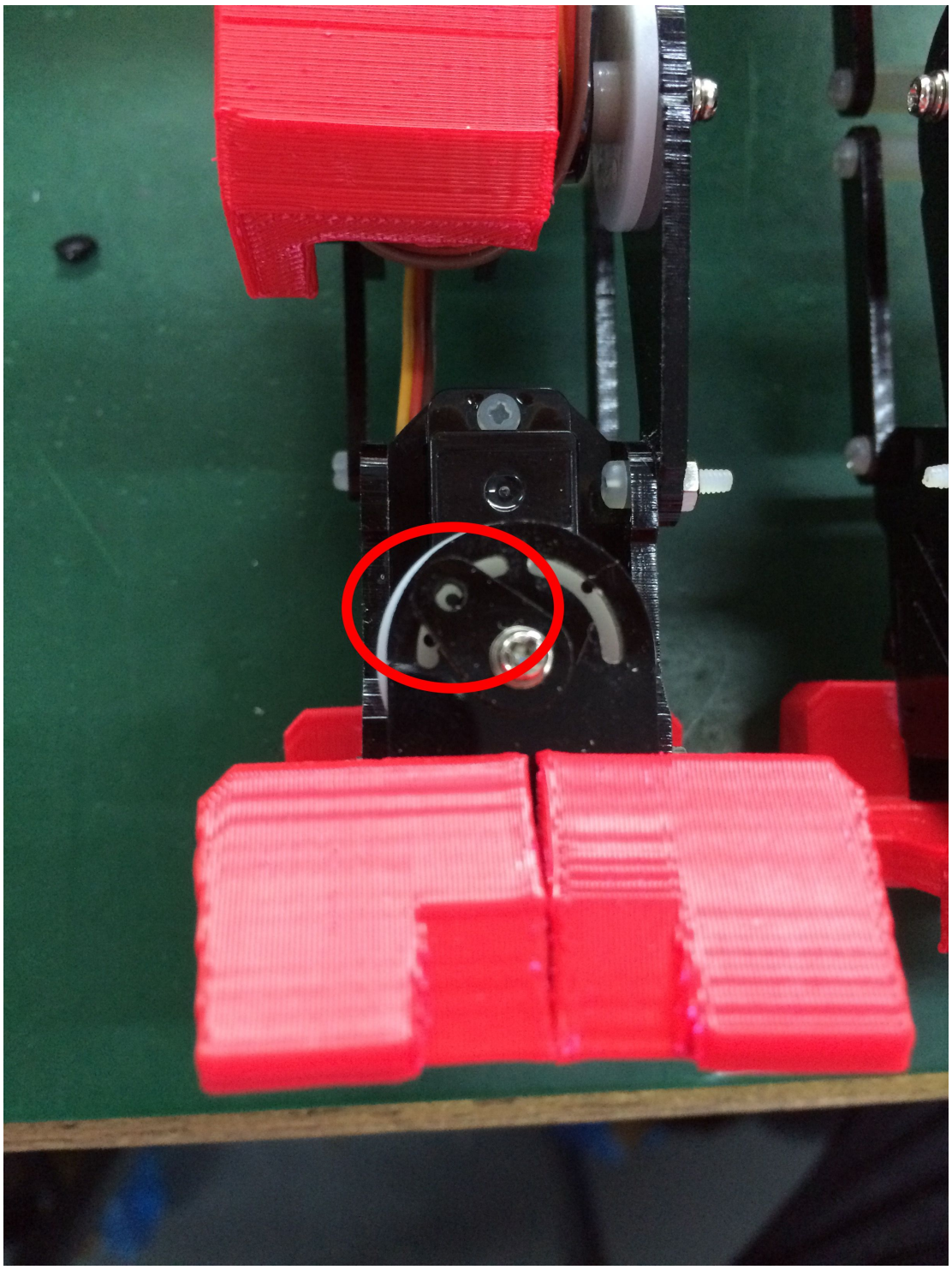


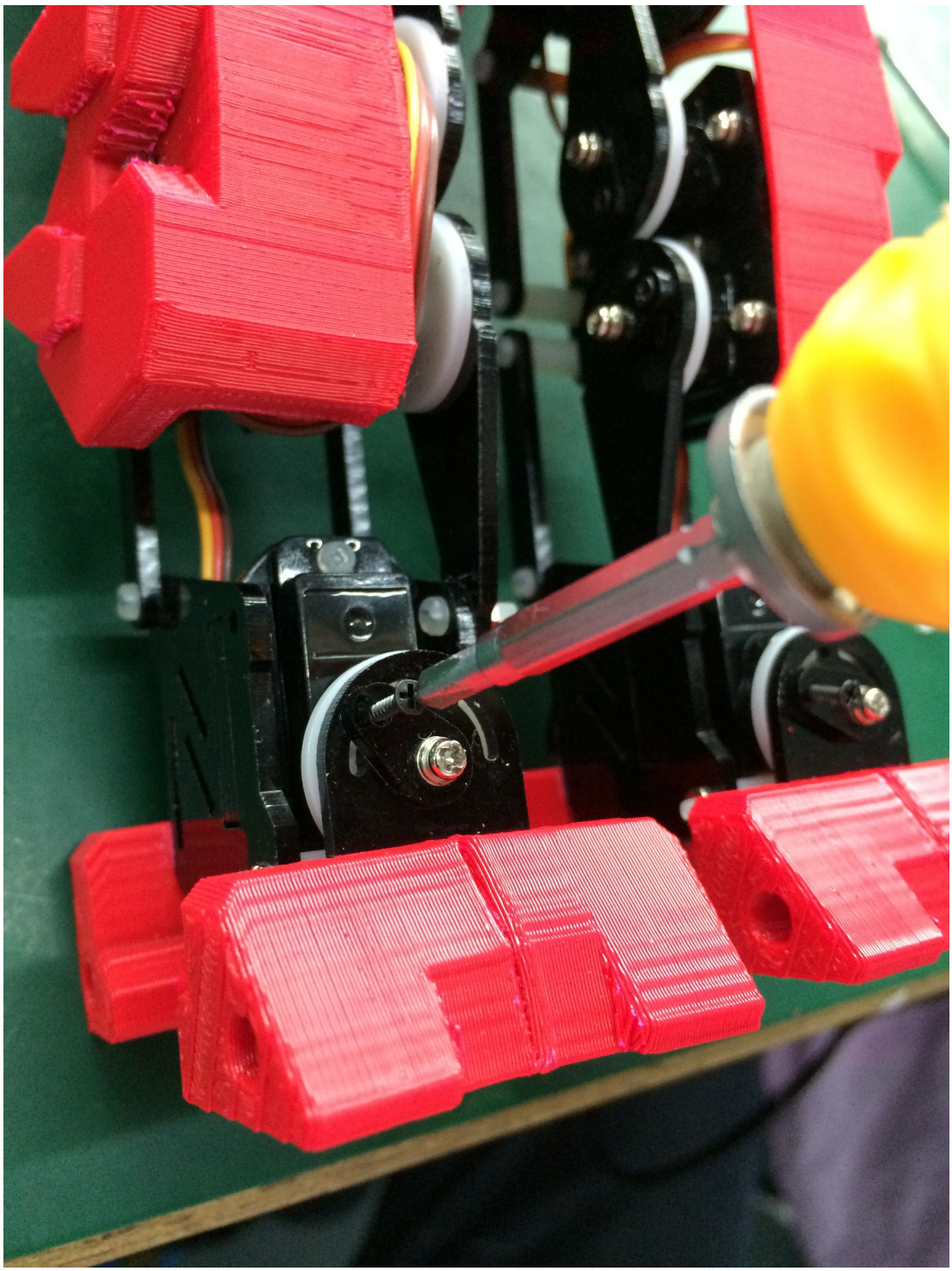
     Front View:

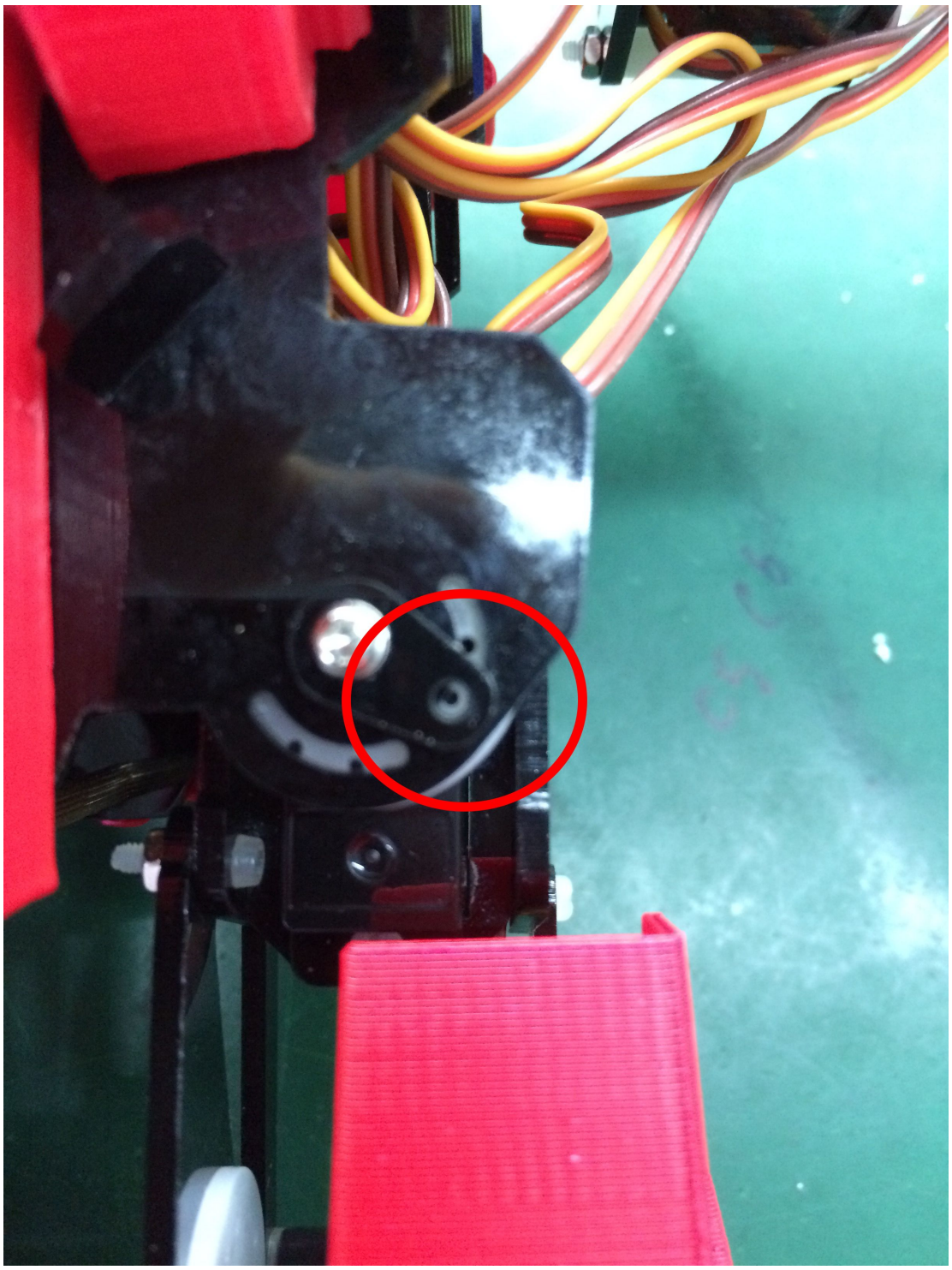


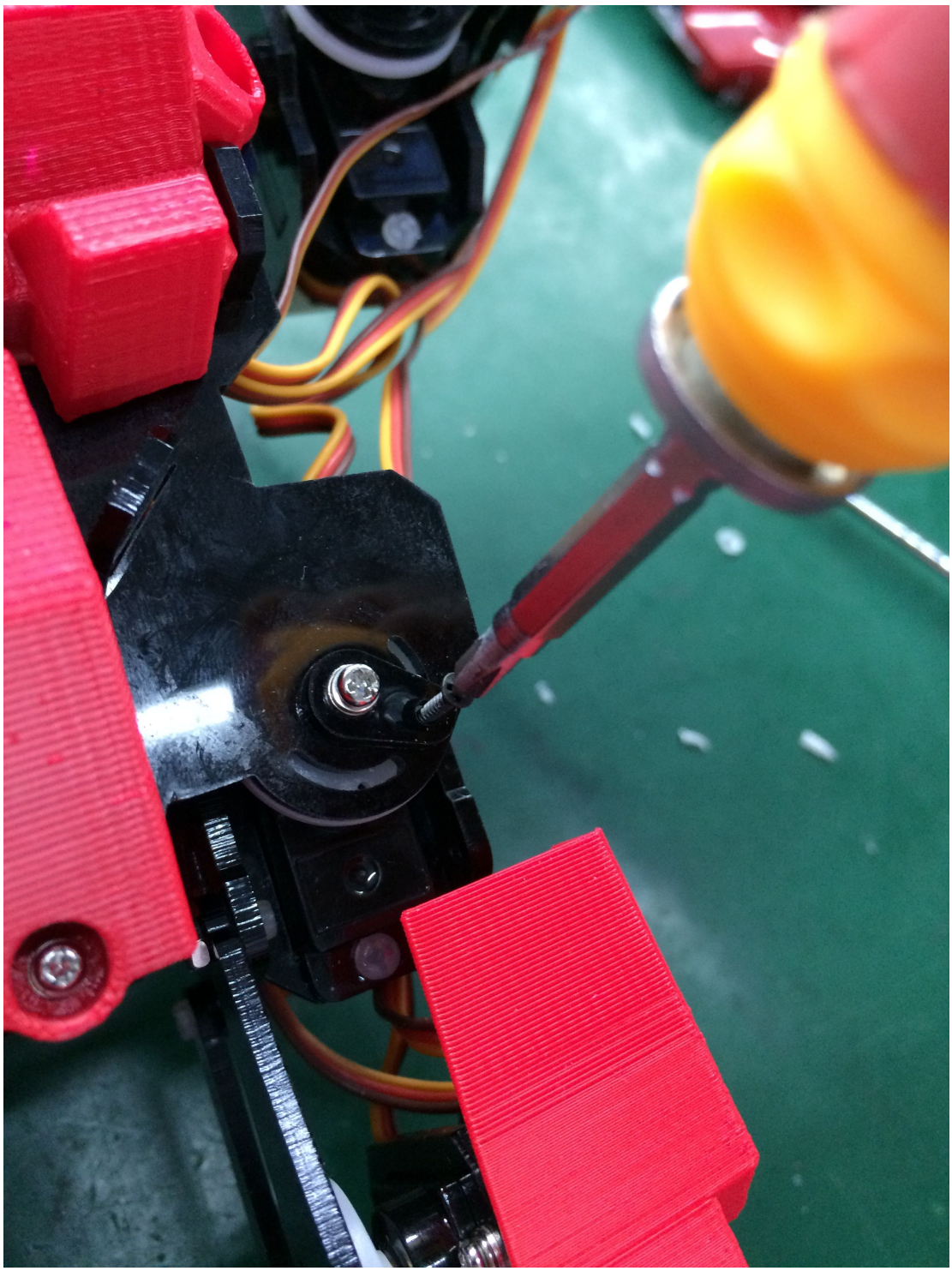


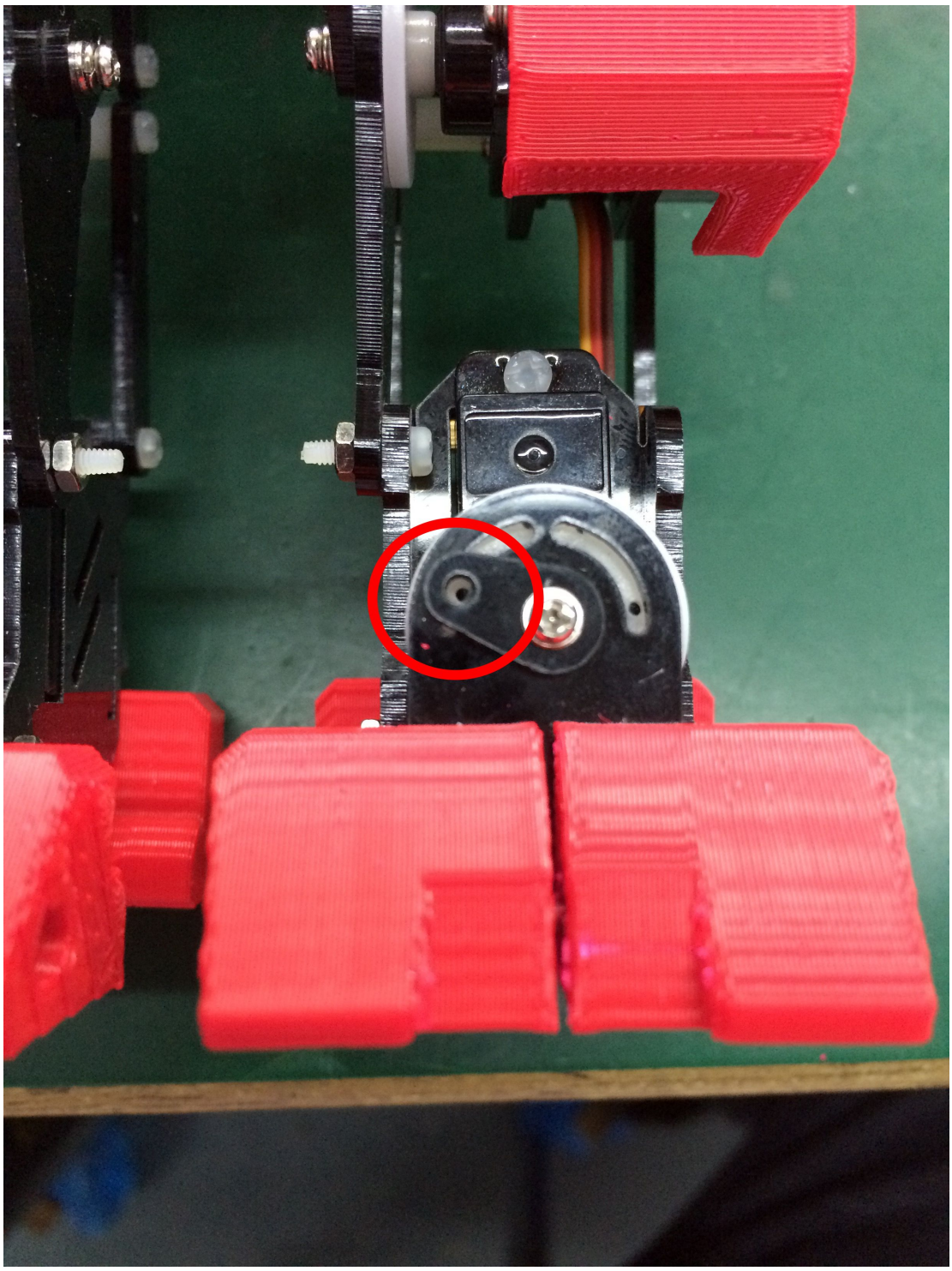


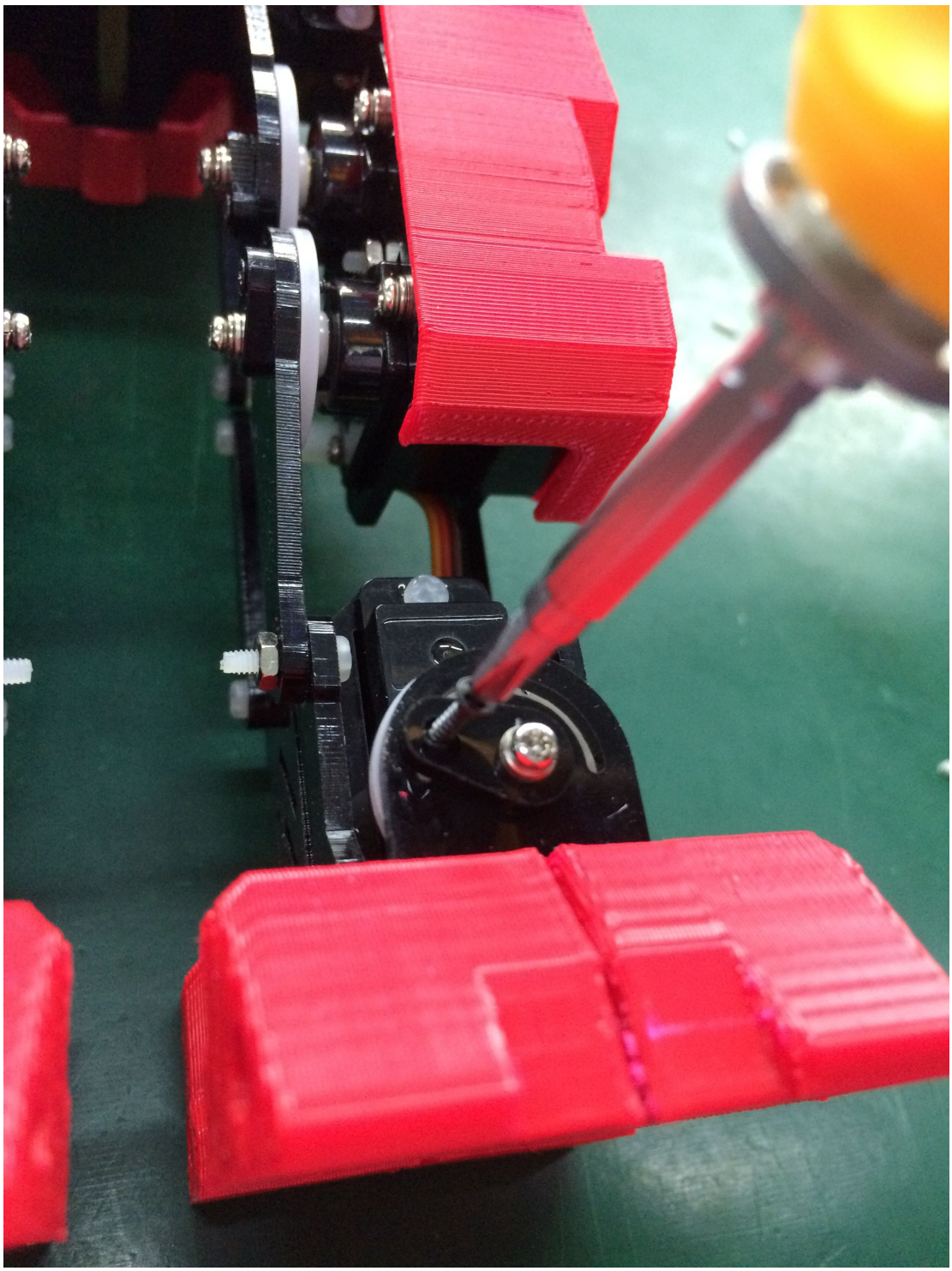




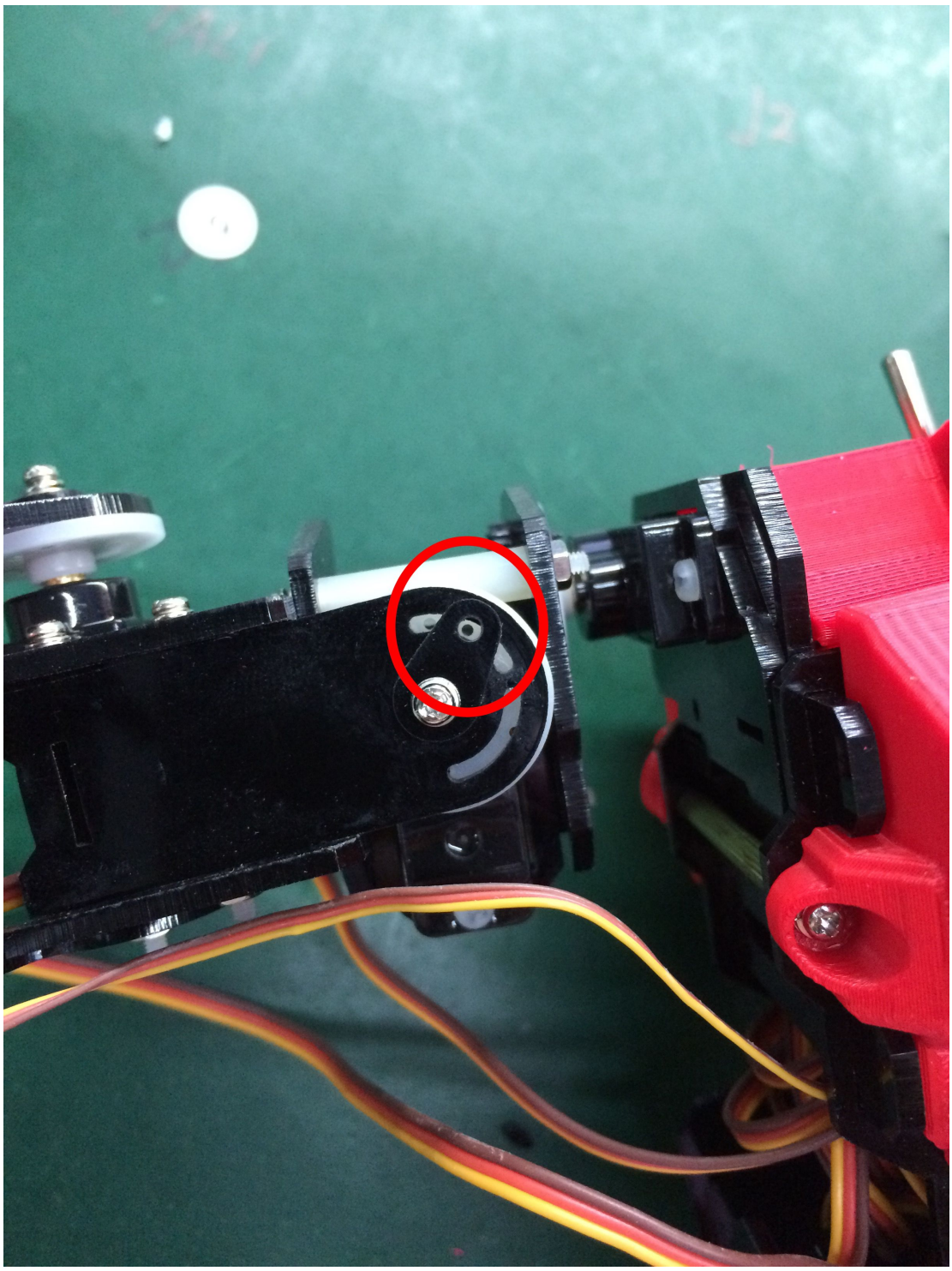


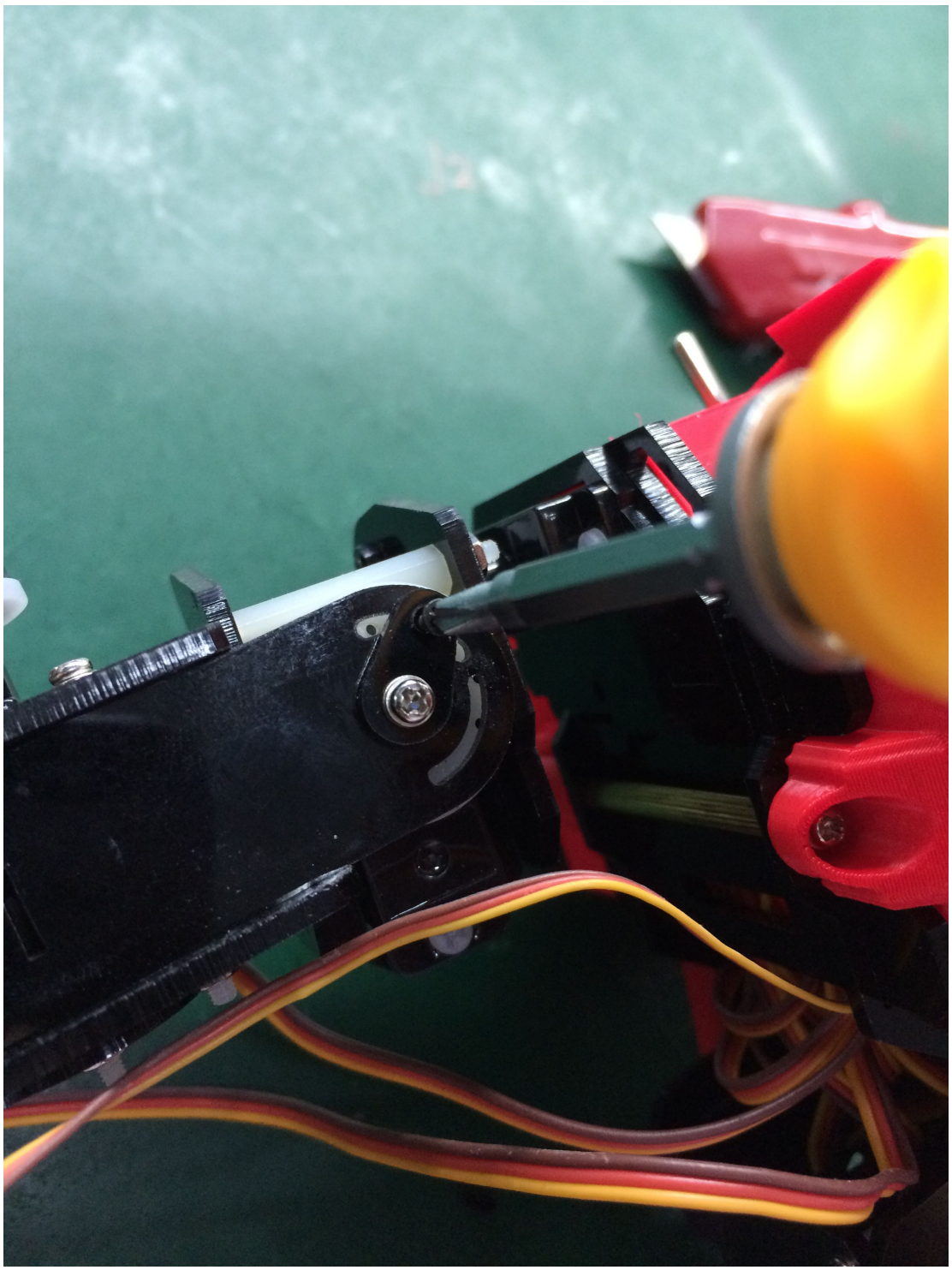




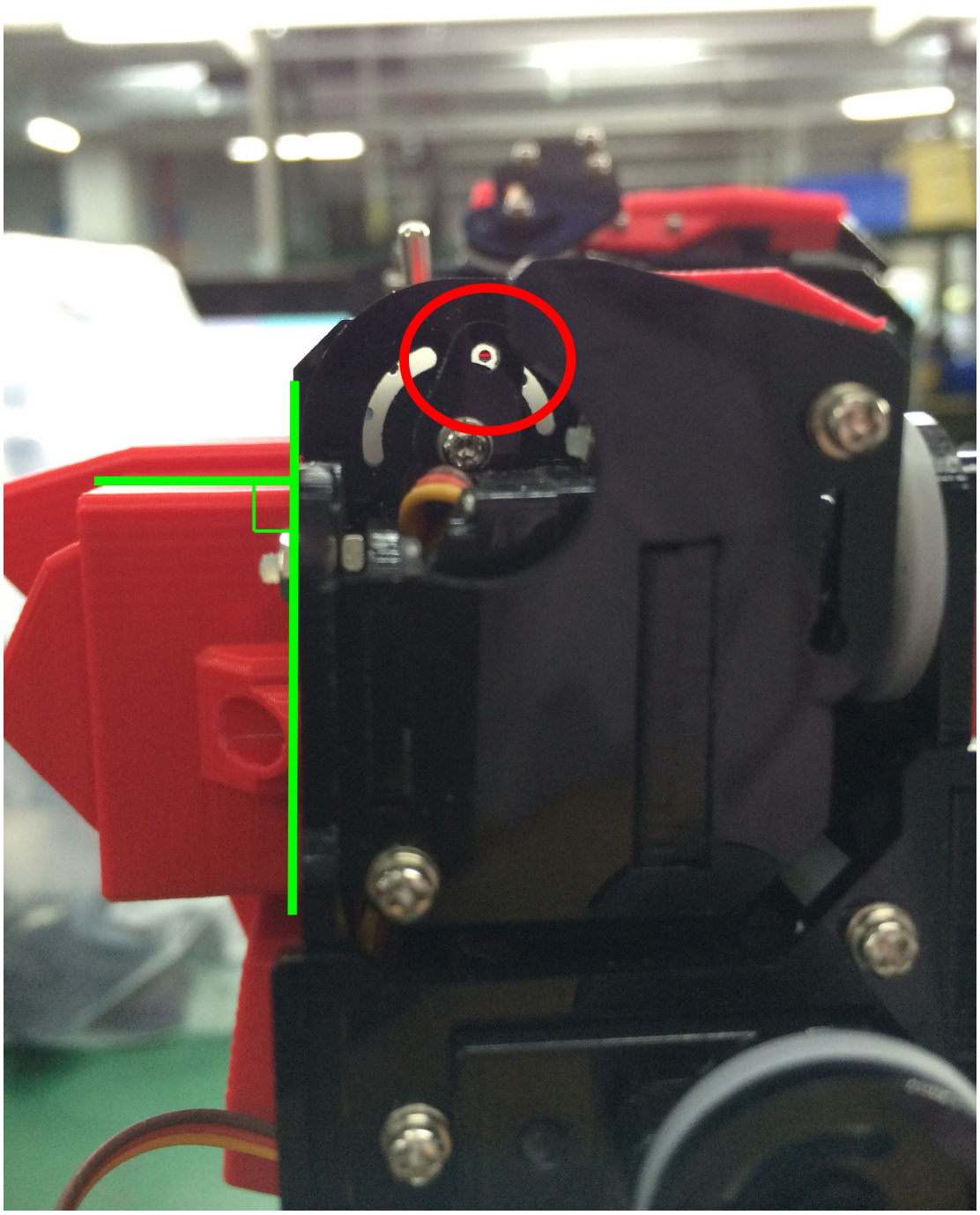


Left hand:

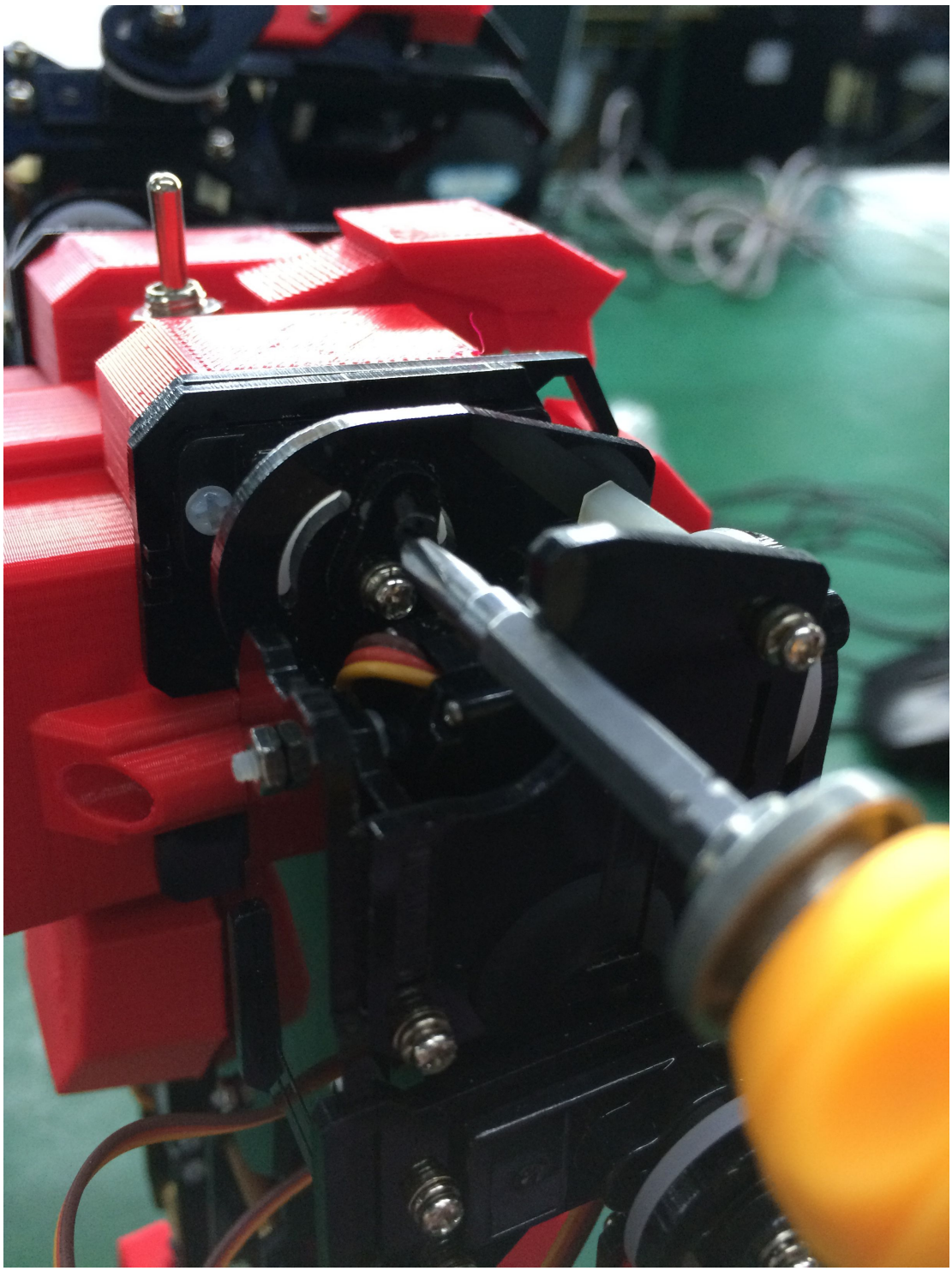




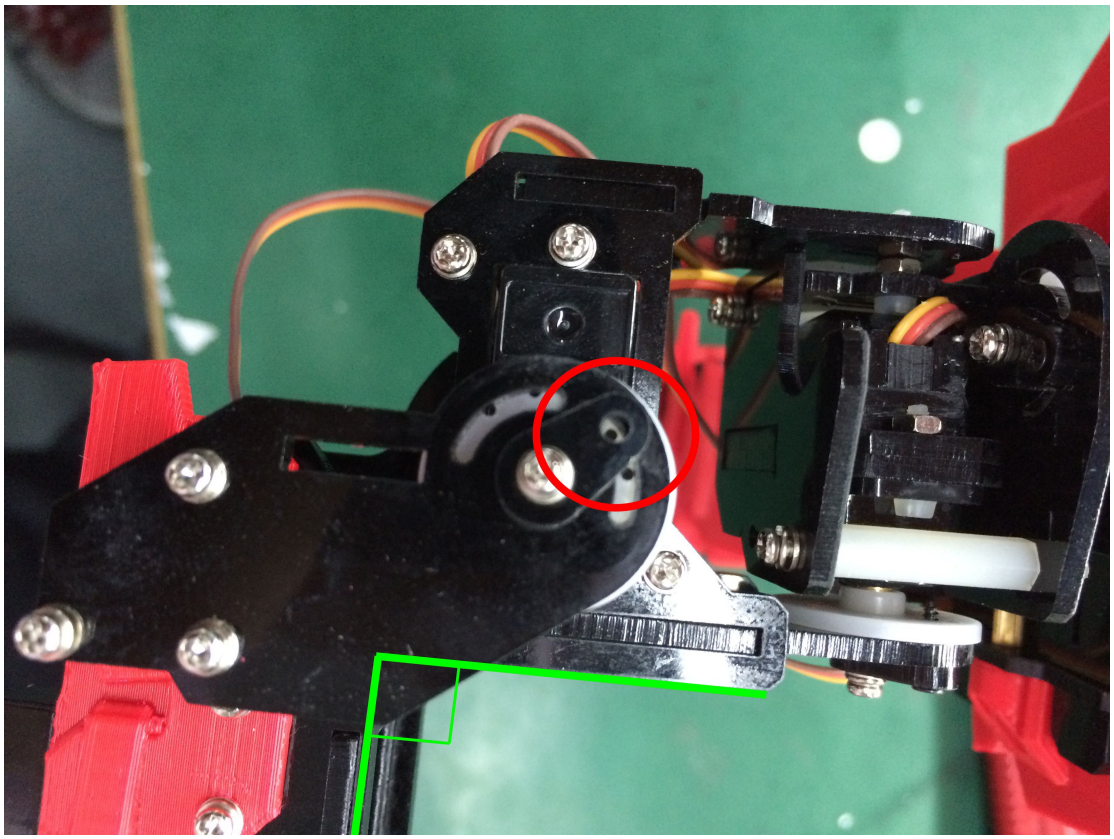
AI.FRAME



AI.FRAME



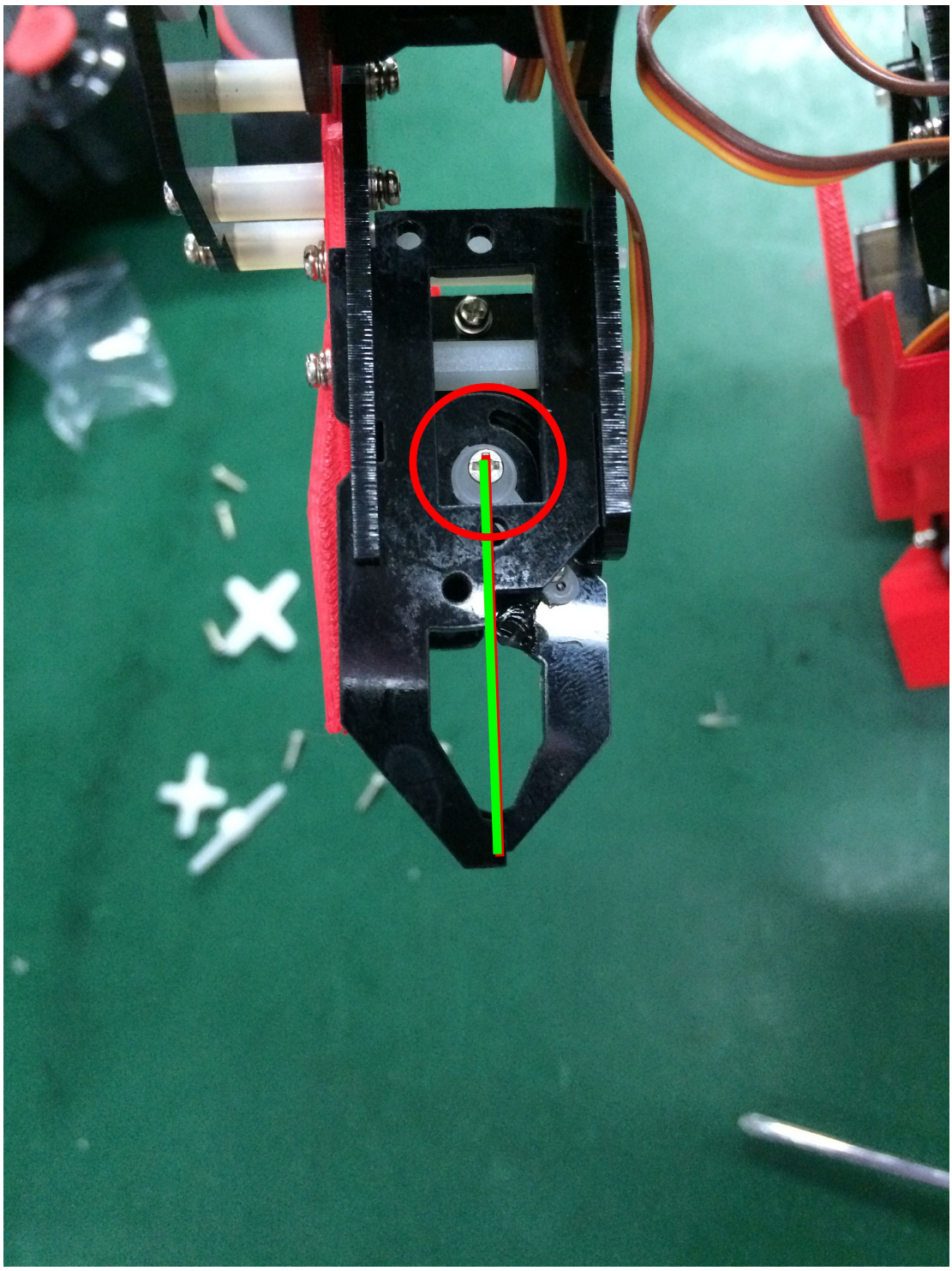
AI.FRAME



Use the black metal screws (m1.4*8) in the picture below:

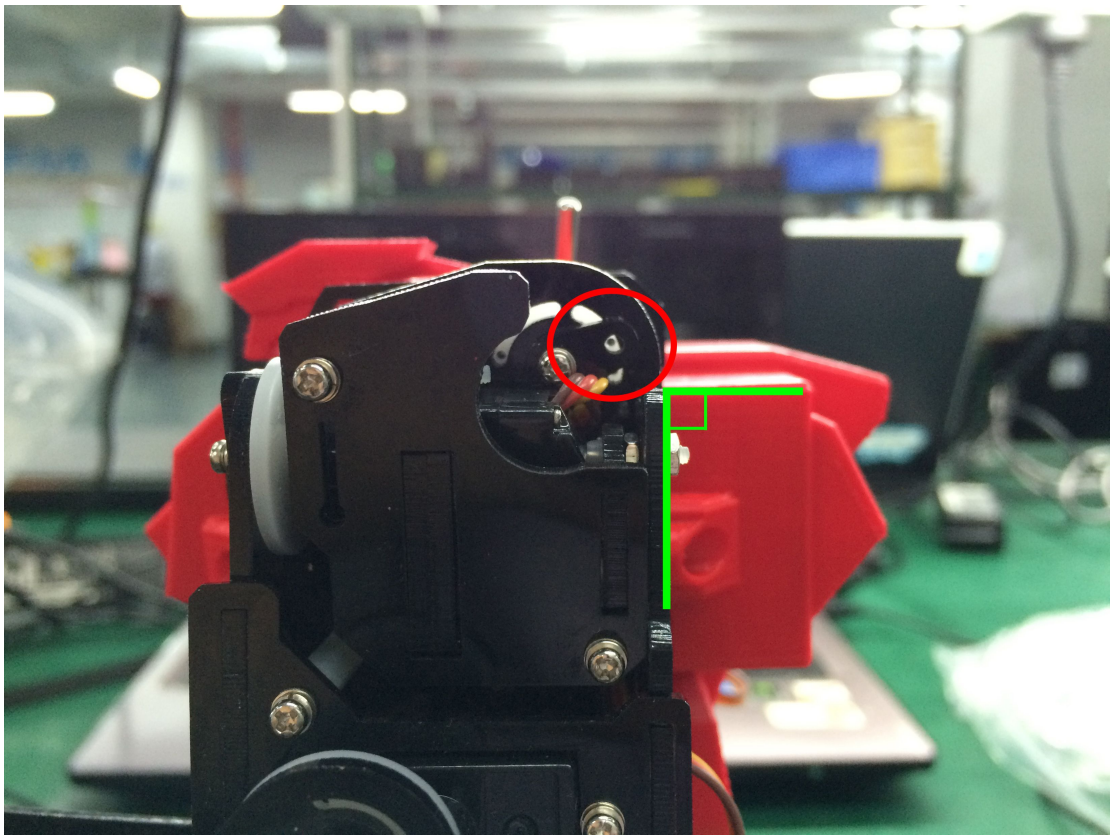
AI.FRAME

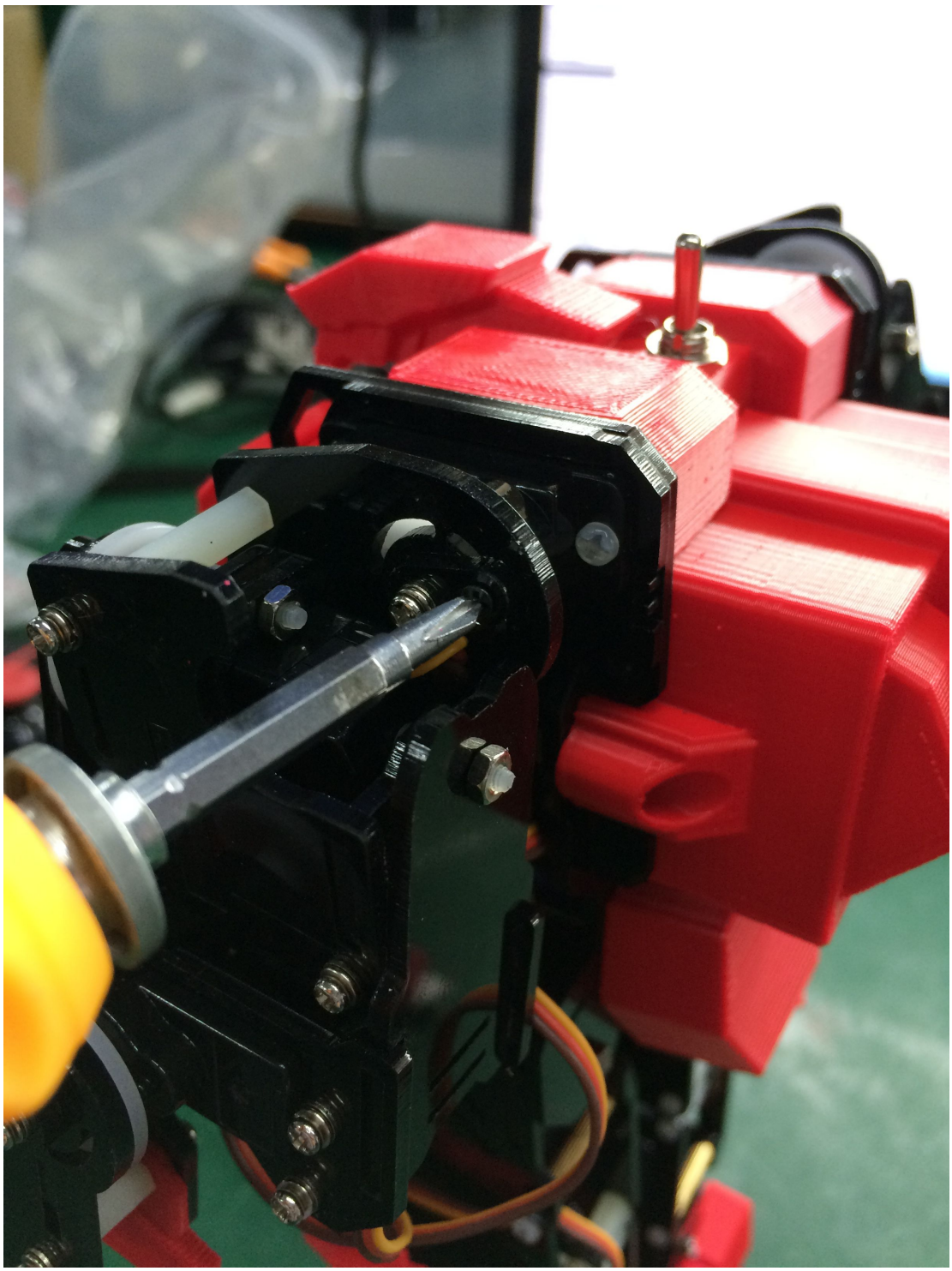
Use the white metal screws m2*8 in the picture below:



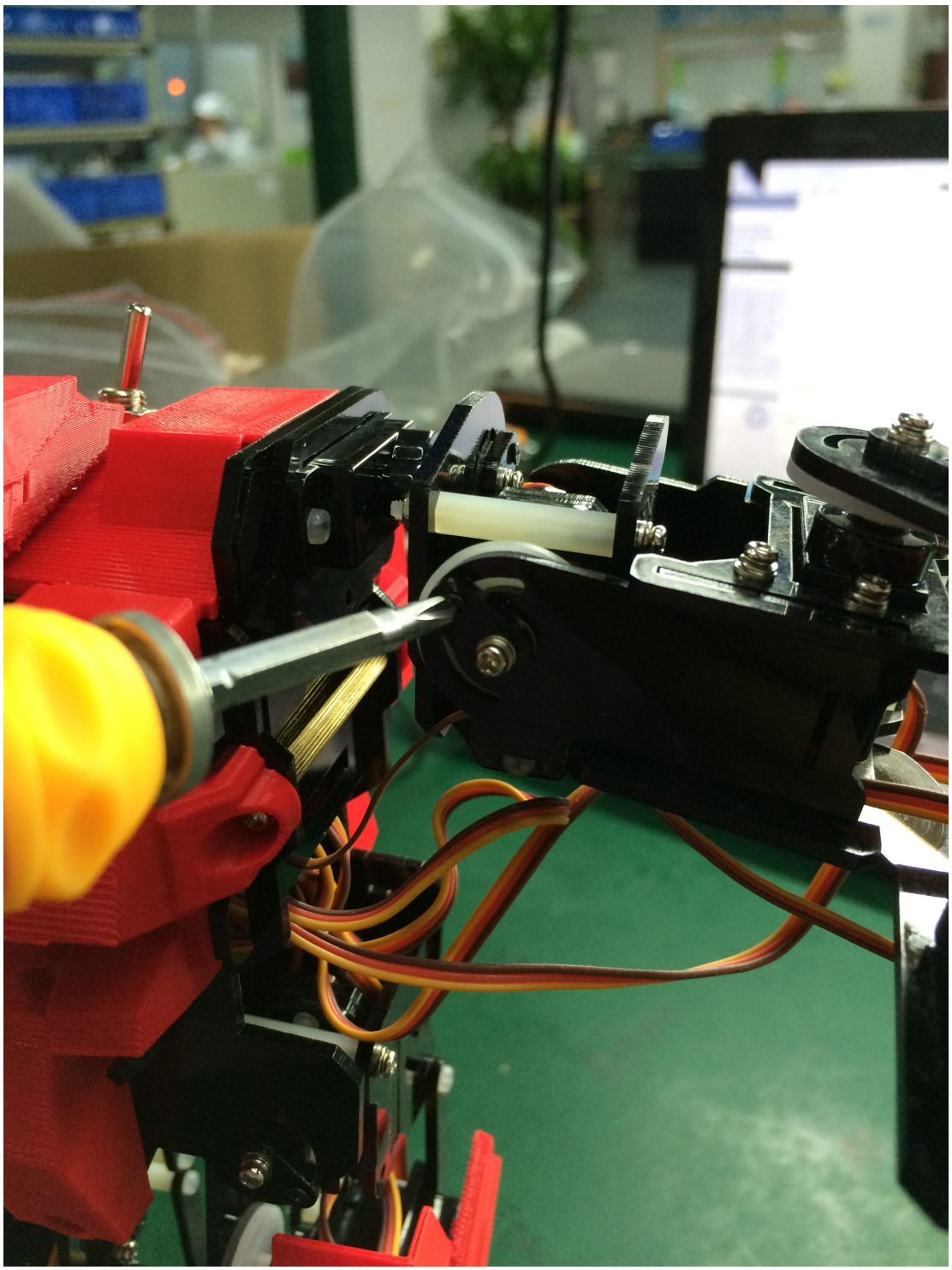
Right hand:

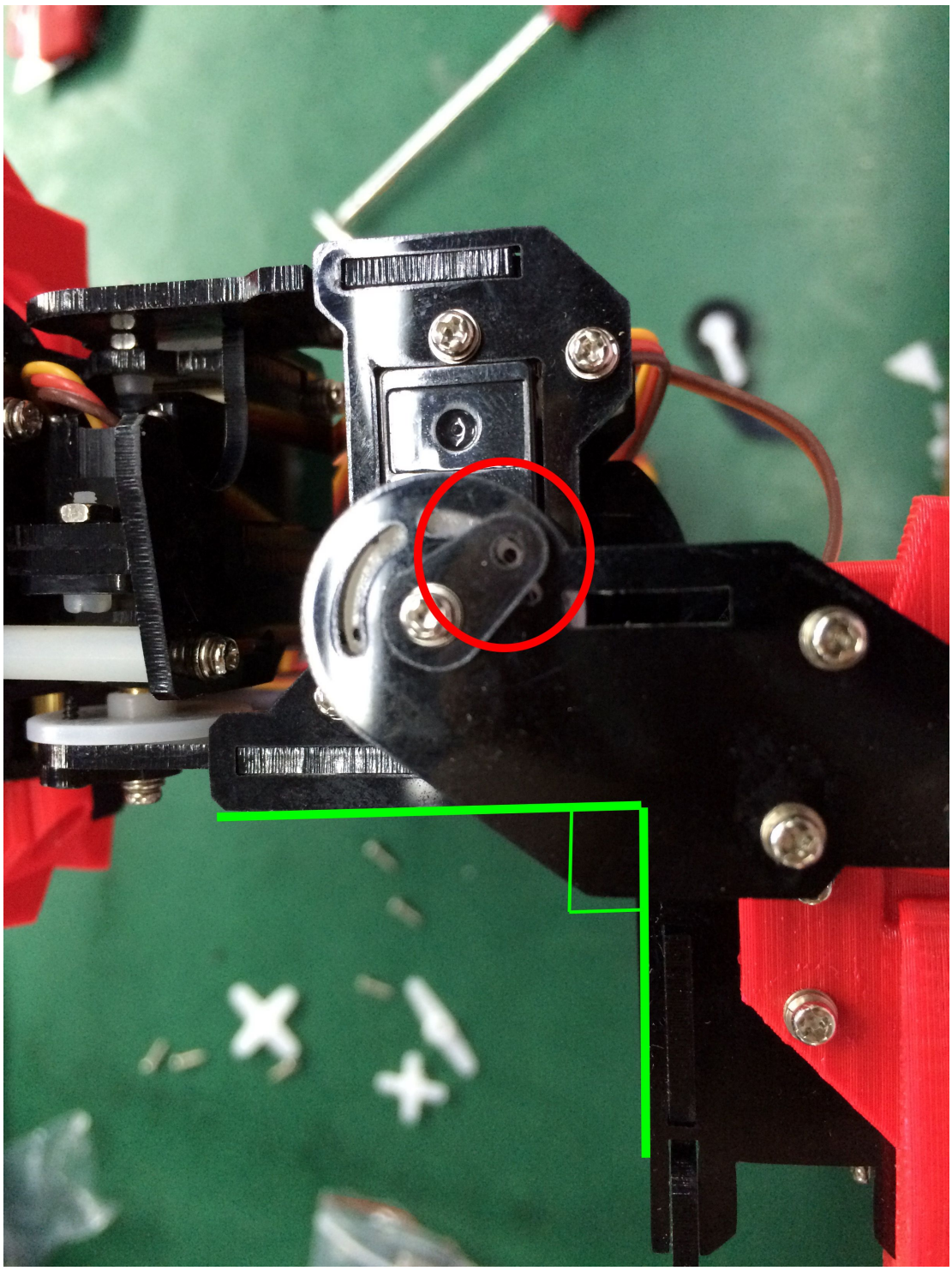
AI.FRAME

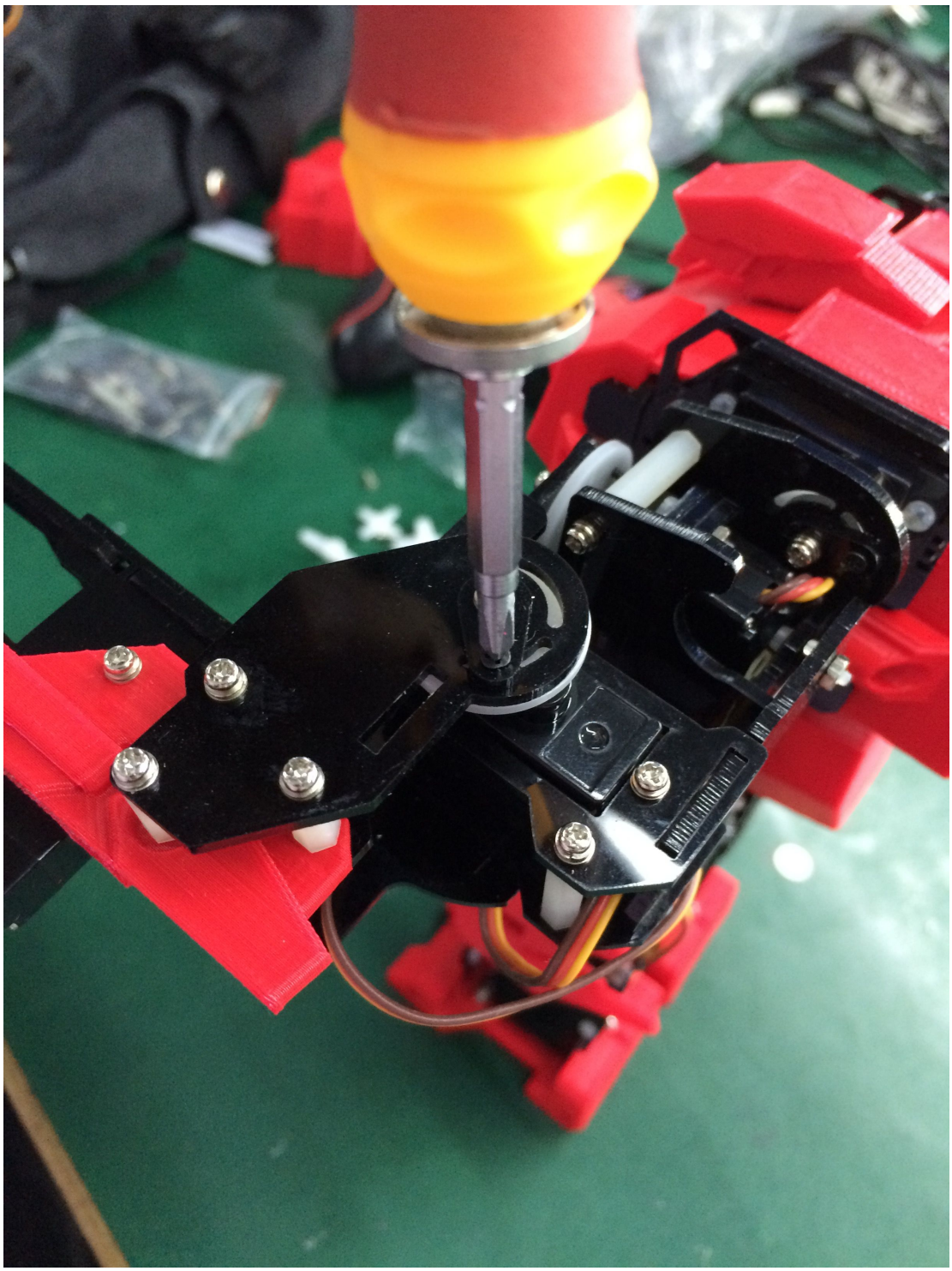




AI.FRAME

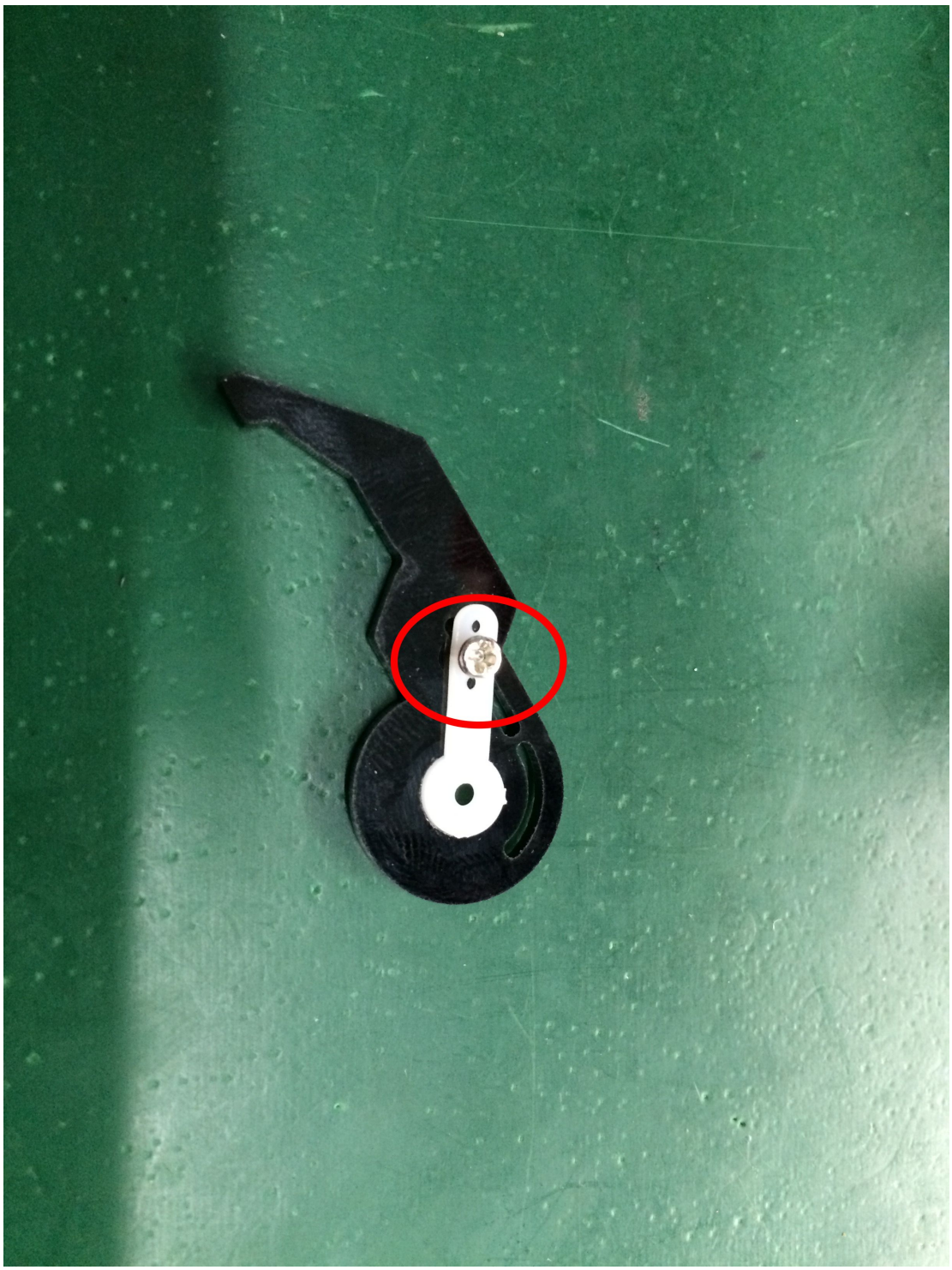




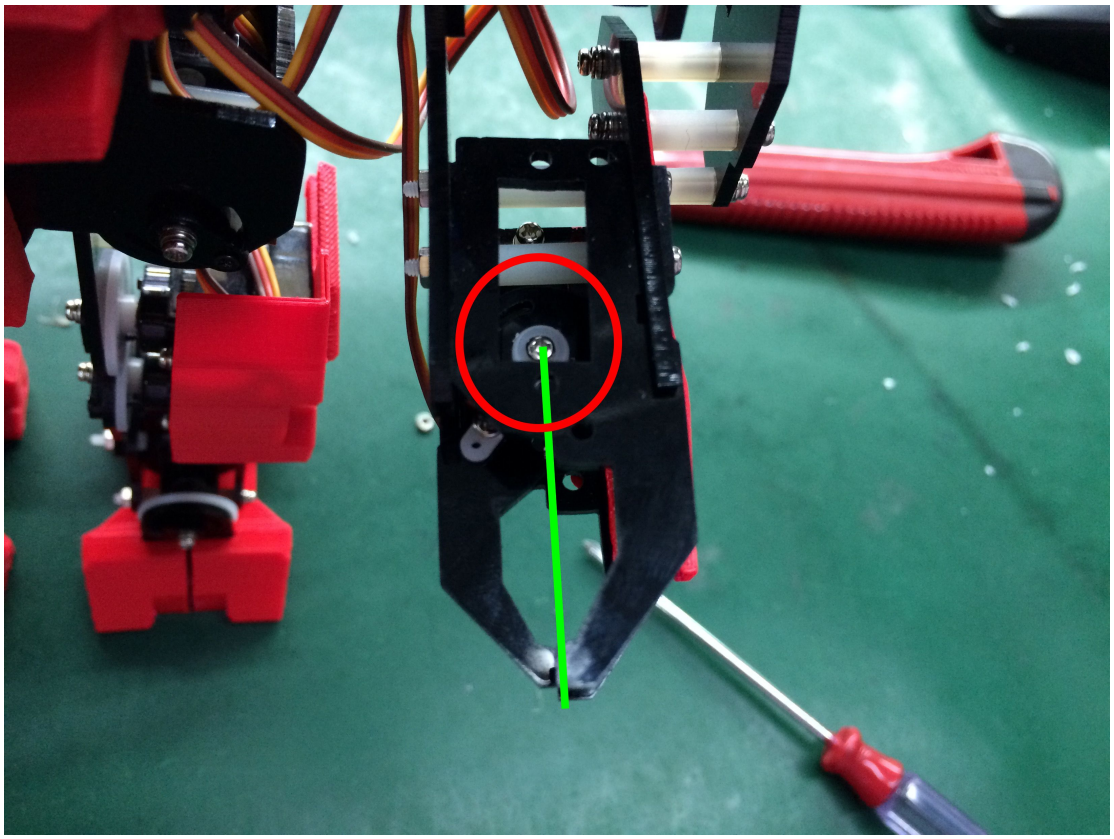


Use the black metal screws (m1.4*8) in the picture below:

AI.FRAME

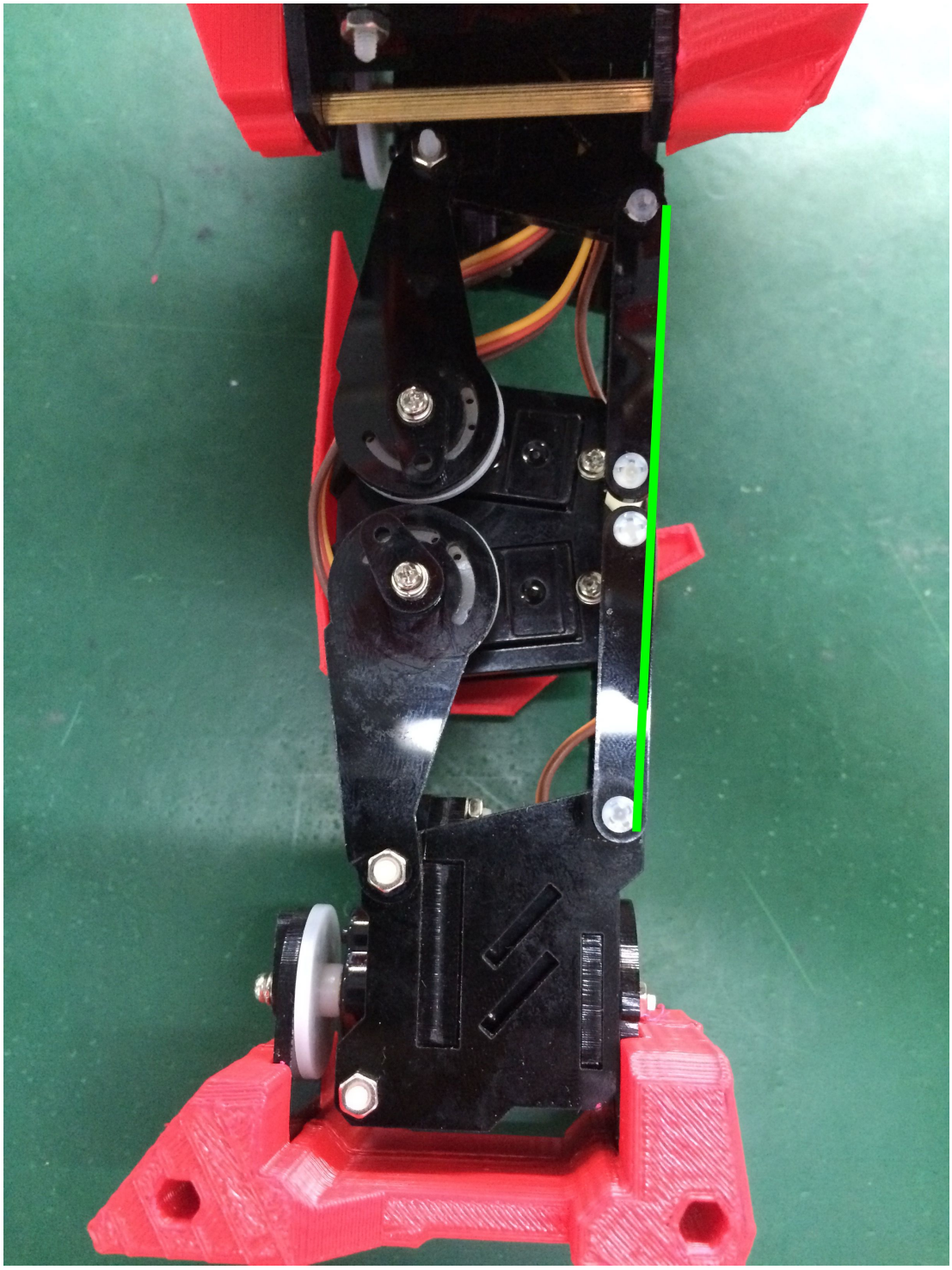


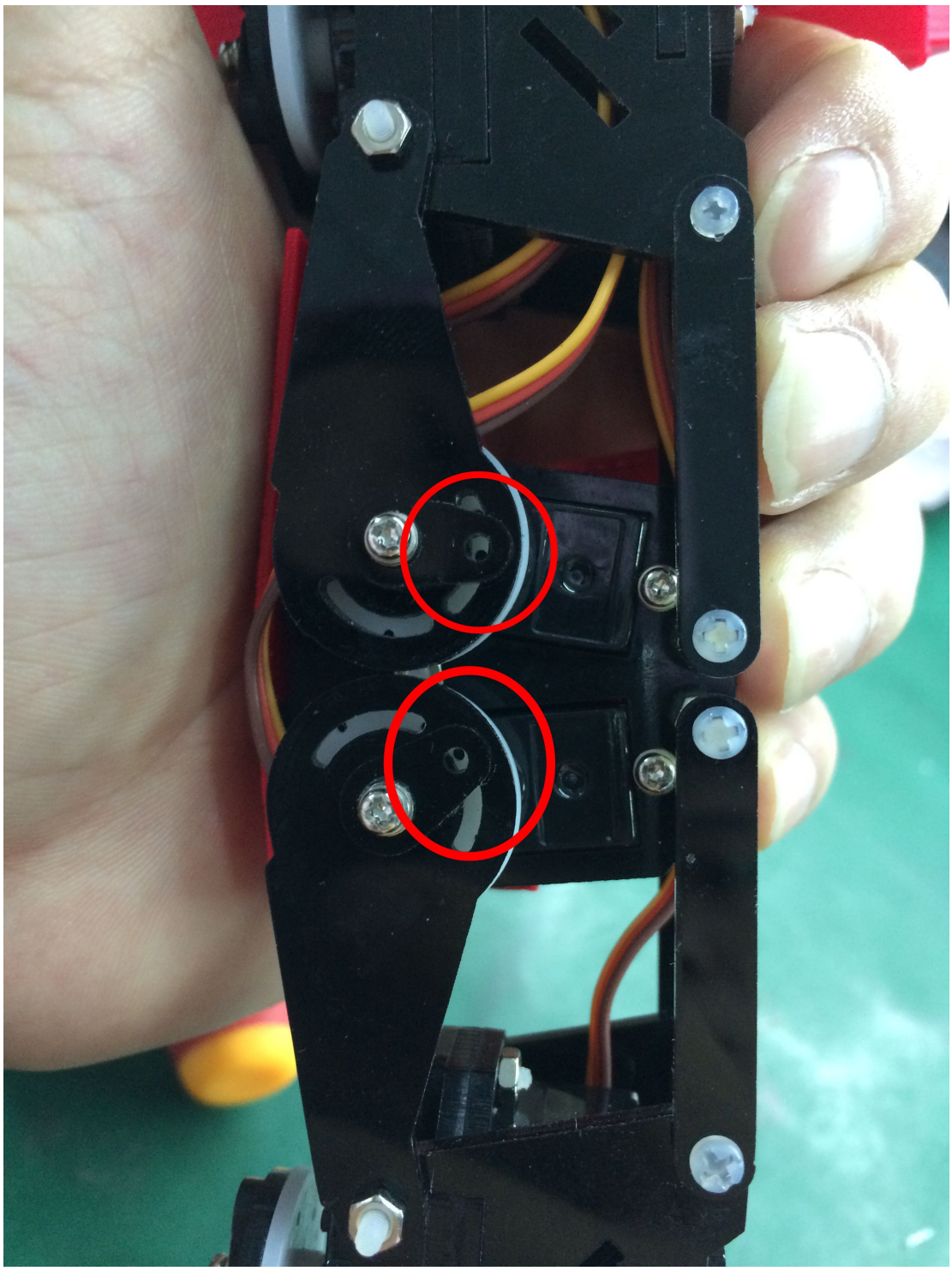
Use the white metal screws m2*8 in the picture below:

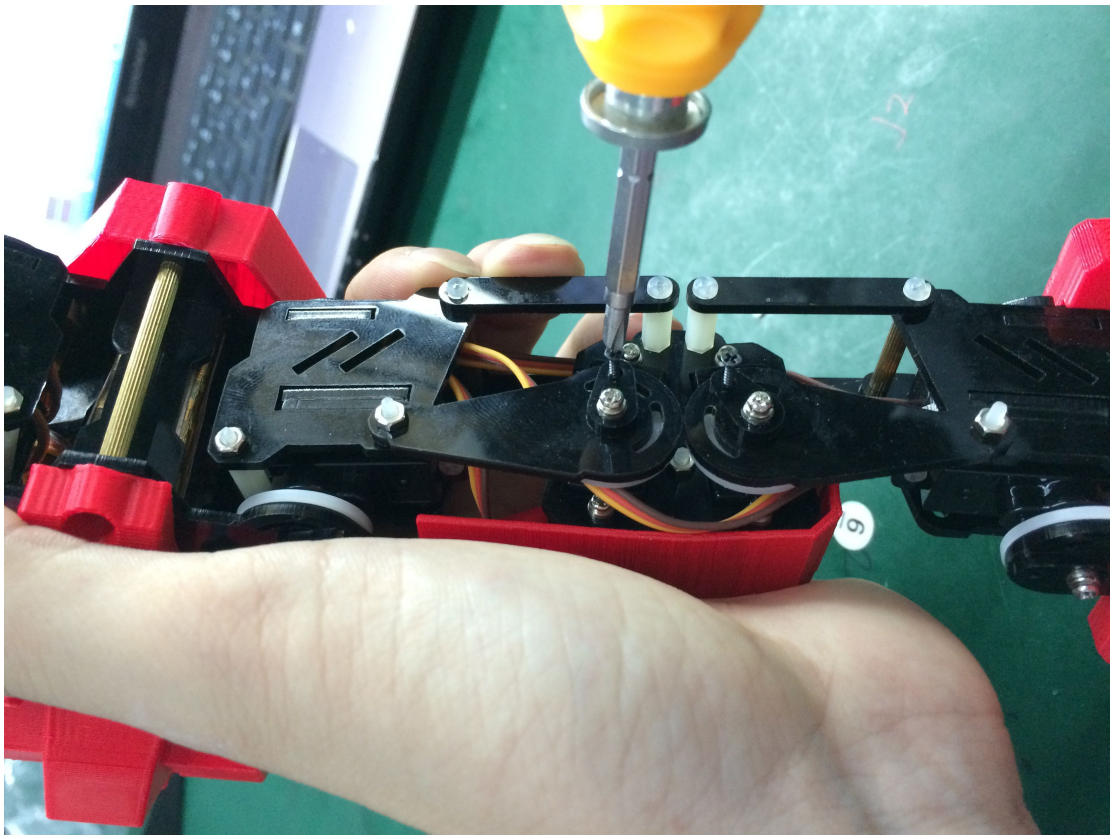


Left leg;

AI.FRAME

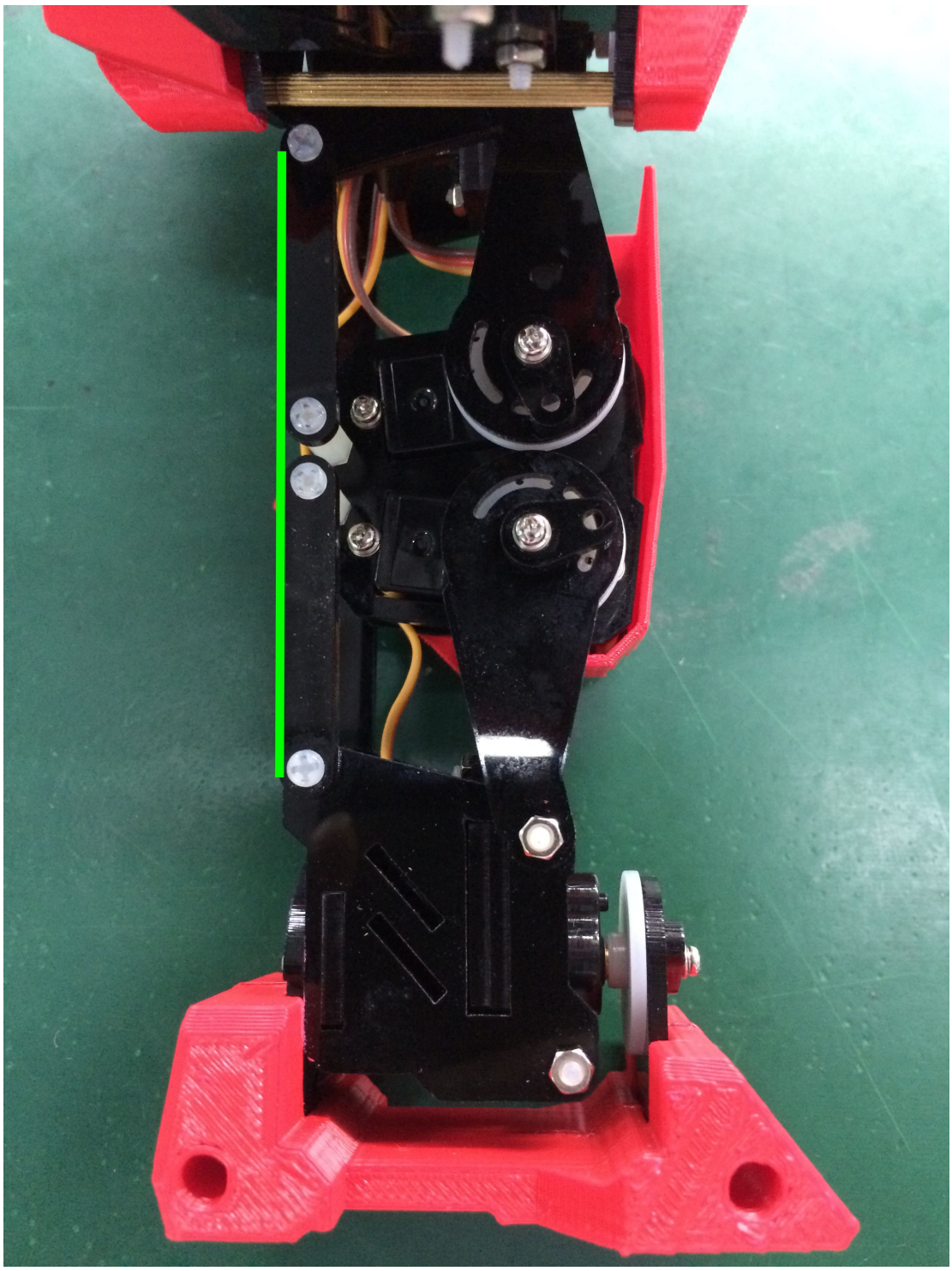


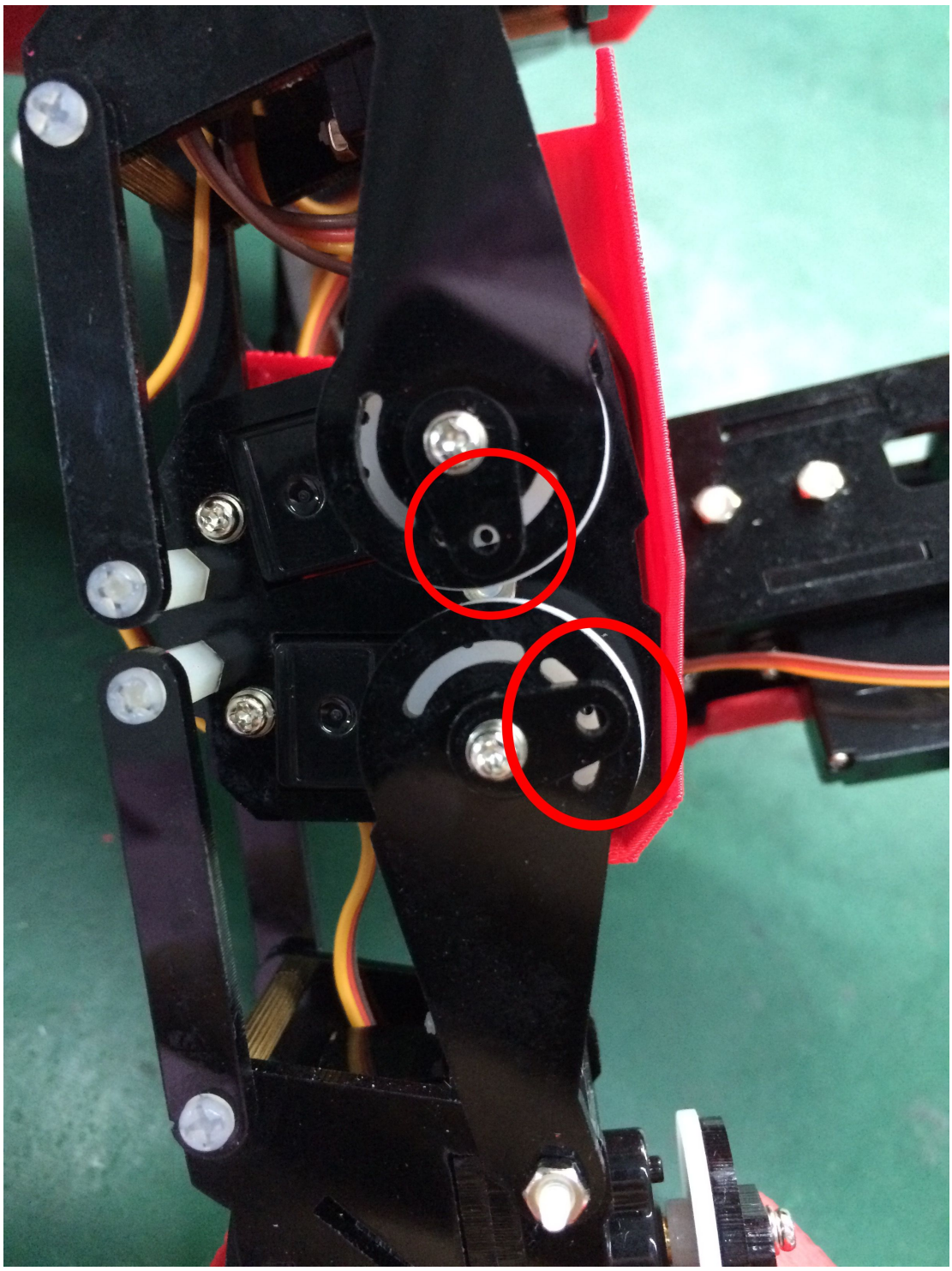


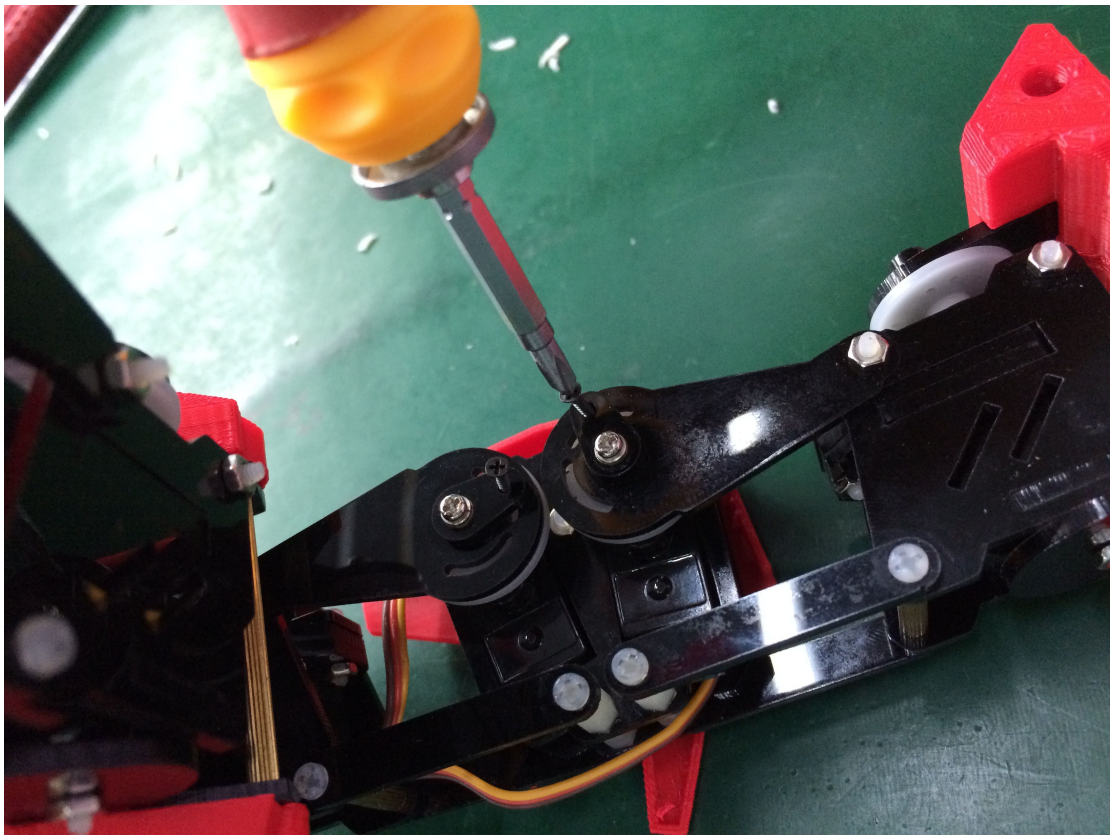


Right leg:

AI.FRAME







Power off when all the steps are done

Import the commands:

- Make sure the robot is powered off, connect it to the PC via USB cable
- Open Servo Rhythm Controller, click “OPEN” button to open the COM port of Power Rhythm 32 (see how to use the software: https://github.com/AiFrame/Servo_Rhythm_Controller/tree/master/Manual)
- Import the “0STANDBY.txt” files, click “STANDBY” button to set up the standby position, change the value in edit box “TIME (MS)” to set up the time for robot getting back to standby position
- Import the NO.1 - 24 “.TXT” files one by one in order, click “DOWNLOAD” button to save the commands to the flash in robot, click “CLEAR” button before next importing

Controlling With Joystick:

- Power on the Joystick and the robot at the same time, wait about 10 seconds for auto setup and connection via Bluetooth.
- Press and hold the key(s) to control the movement of the robot. When release all the buttons, robot gets back to the standby position.
- Key functions:
  1. PAD UP: Walk forward.
  2. PAD DOWN: Walk backward.

3. PAD LEFT: Walk towards left.
4. PAD RIGHT: Walk towards right.
5. PAD UP & PAD LEFT: Walk left front
6. PAD UP & PAD RIGHT: Walk right front
7. PAD DOWN & PAD LEFT: Walk left back
8. PAD DOWN & PAD RIGHT: Walk right back
9. BUTTON TRIANGLE: Salute
10. BUTTON FORK: Squat
11. BUTTON SQUARE: Play a sword
12. BUTTON CIRCLE: Fire the rubber gun once
13. BUTTON FORK & PAD LEFT: Squat to left
14. BOTTON FORK & PAD RIGHT: Squat to right
15. BUTTON FORK & BUTTON SQUARE: Hit back
16. BUTTON TRIANGLE & BUTTON CIRCLE: Hit front
17. SELECTE: Get up when back to the ground
18. START: Get up when face to the ground
19. L1: Turn left
20. R1: Turn right
21. L2: Hit left
22. R2: Hit right
23. L1 & L2; Left hit in fast move
24. R1 & R2: Right hit in fast move
25. L3: After pressed and holden, push and drag in the LX, LY, RX and RY directions to control the left hand
26. R3: After pressed and holden, push and drag in the LX, LY, RX and RY directions to control the right hand
27. L3 & R3: After pressed and holden, push and drag in the LX, LY, RX and RY directions to control the both hands

See how to use the joystick :
https://github.com/AiFrame/Joystick/tree/master/Manual]

Software download: https://github.com/AiFrame/Servo_Rhythm_Controller
Web site: http://aiframe.me
Email: support@aifame.me
Forum: http://forum.aiframe.me