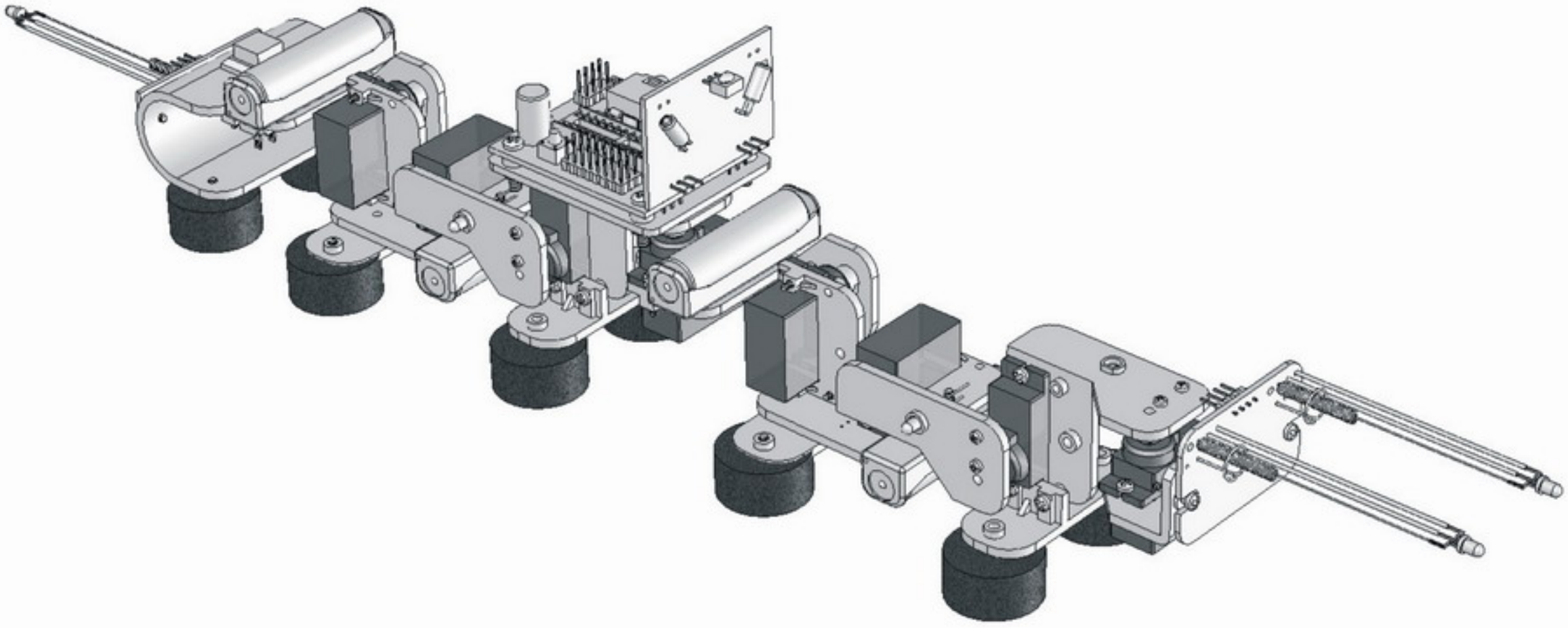
Caterpillar

Manual:RS001



Manufacturer:
DAGU Hi-Tech Electronic Co.,LTD
WWW.AREXX.COM.CN

European Importer:
AREXX Engineering
ZWOLLE, HOLLAND

© DAGU CHINA

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http://www.arexx.com.cn
E-mail:info@arexx.com.cn

Product Description

Thank you for your selecting our Caterpillar, which consists of eight servos,several sensors, electronic parts, hardware parts, and metal parts.It is a good educational tool for learning basic electronic and programing skills.

Product Features

1. 8 degrees of freedom.
2. Can be programmed by the user.
3. Additional inputs for a wide range of sensors.

Build it now! Realize your dream! Create your next masterpiece!

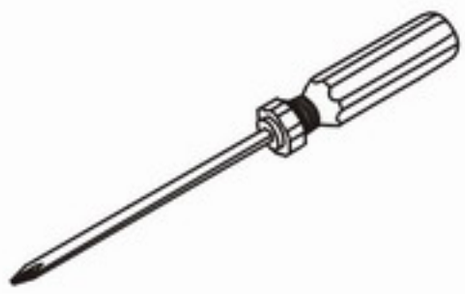
⚠ Warnings:

- No return is possible after having opened the bags with components and pieces.
- Prior to the assembly read the manual thoroughly.
- Be careful when using tools.
- Keep this kit away from young children during construction and operation. (They might get hurt by the tools or swallow small components).
- Observe the correct polarity of the battery.
- Keep dry. When the Caterpillar gets wet DO NOT USE.Remove batteries immediately.
- Let the caterpillar dry until completely dry.
- If it is not used for a long time, remove the battery.

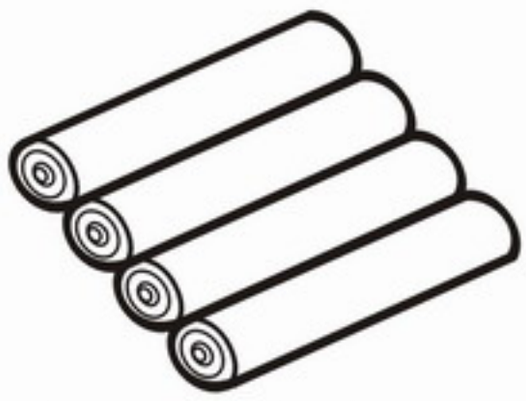
Necessary Tools:

Before you start assembling we suggest you first read the manual thoroughly.
Please follow the assbembling instructions precisely to avoid problems.
Incorrect assembly will result in poor operation

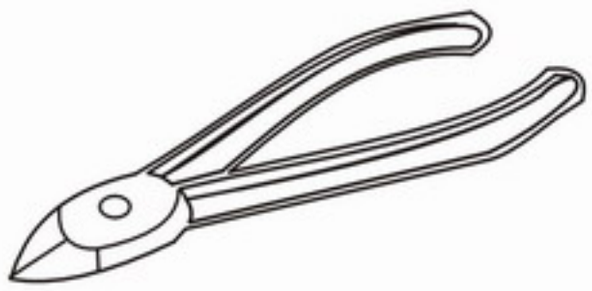
Before you start you will require the following tools:



Phillips screwdriver



4*AAA batteries

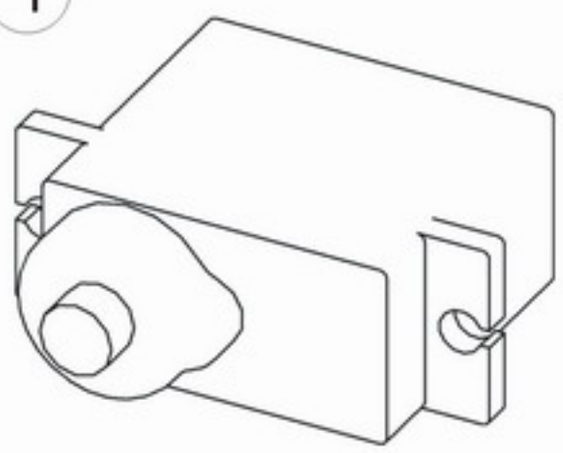


Side cutters

Soldering Iron

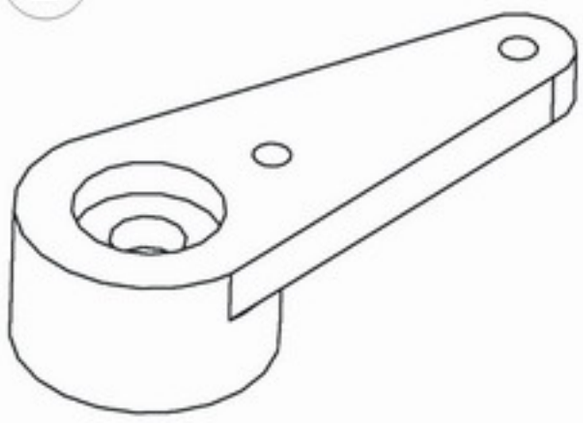
Components list 1 (Hardware and plastic parts):

1



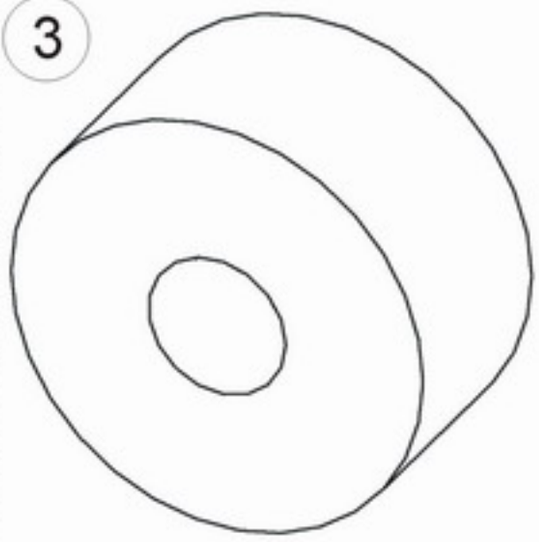
Miniature servo
8 pcs

2



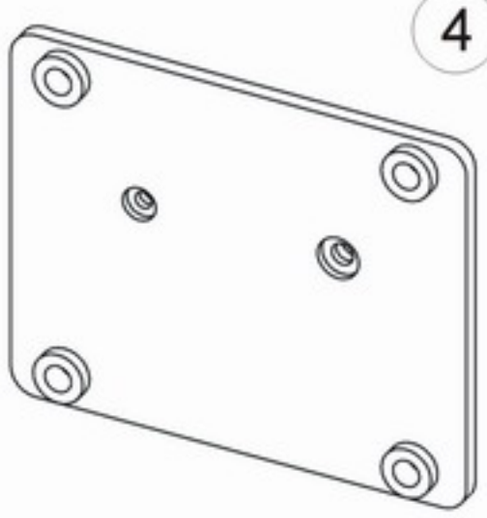
Servo horn
8 pcs

3



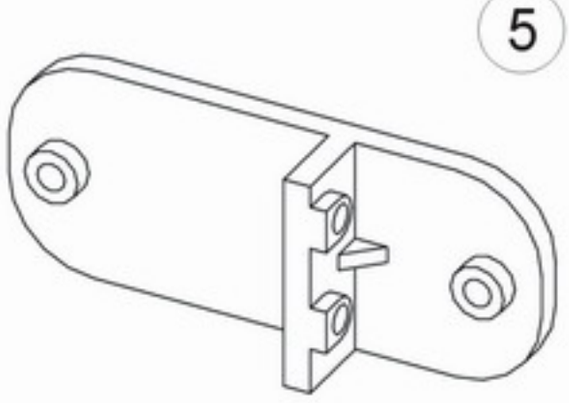
EVA feet
10 pcs

4



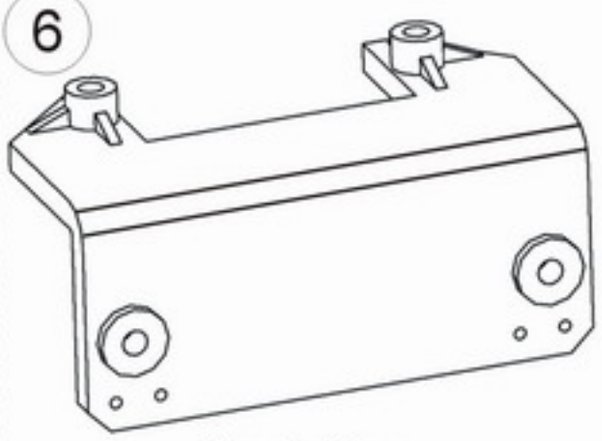
PCB mounting bracket
1 pc

5



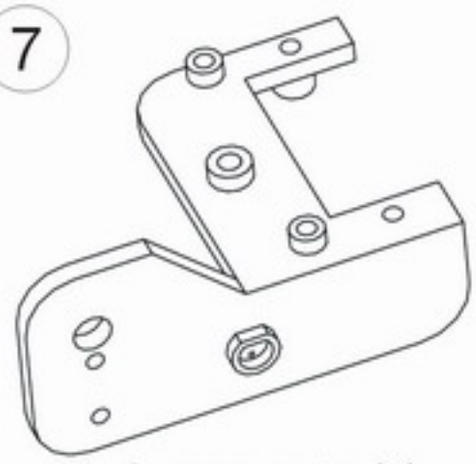
Foot plate
4 pcs

6



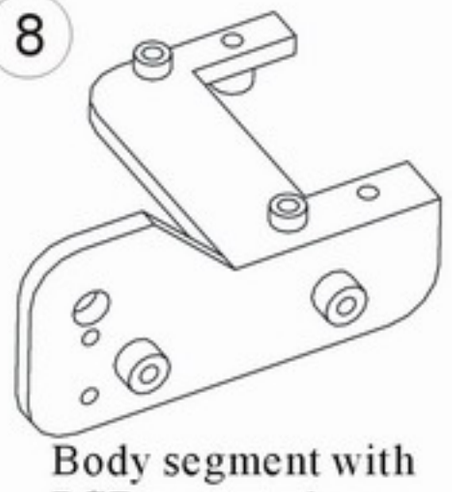
Head piece
1 pc

7



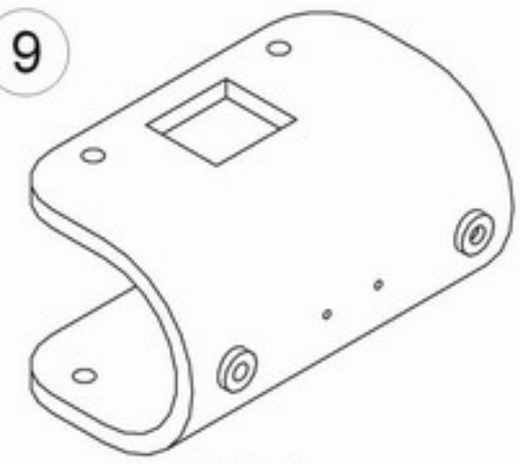
Body segment with
LED socket 7 pcs

8



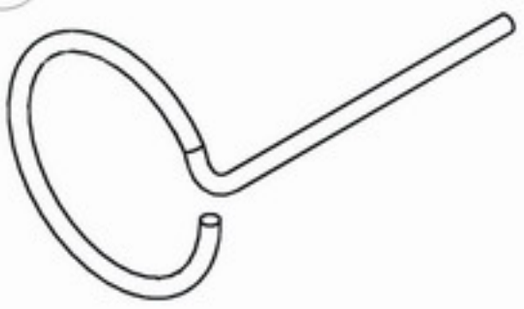
Body segment with
PCB mount 1 pc

9



Tail piece
1 pc

10

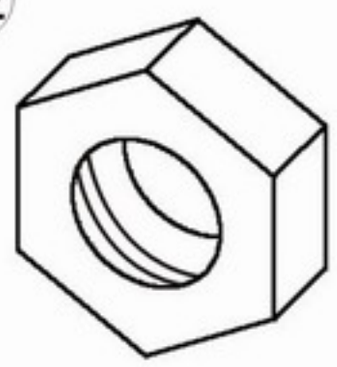


Antenna ring
3 pcs

11

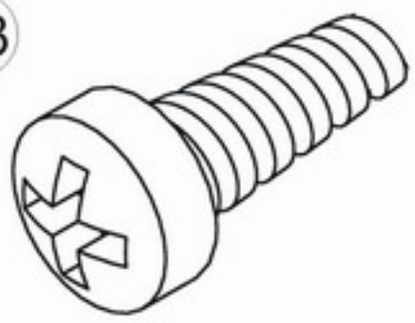
Spiral wrap
1 pc

12



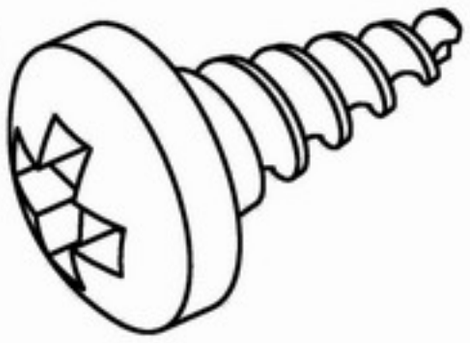
Nut M3
4 pcs

13



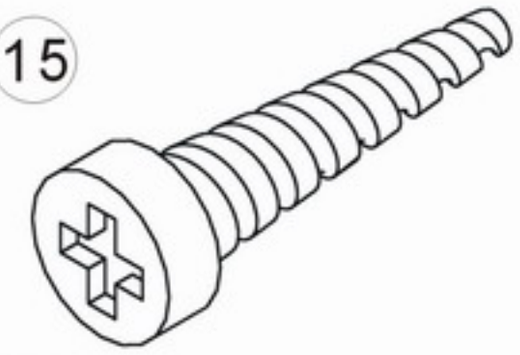
Self-Tapping screw (M2.0*6)
16 pcs

14



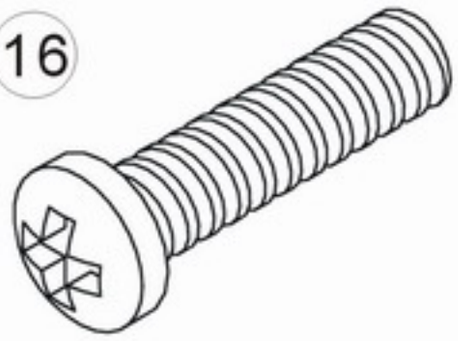
Self-Tapping screw (M2.6*6)
18 pcs

15



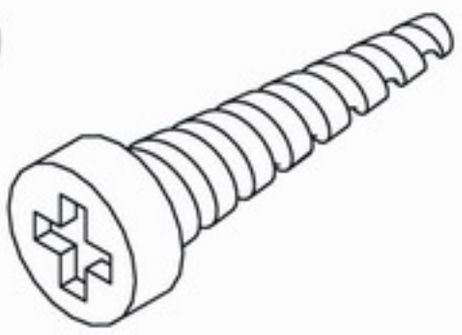
Self-Tapping screw (M3*10)
10 pcs

16



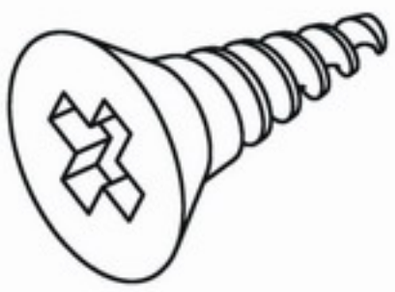
Screw (M3*12)
4 pcs

17



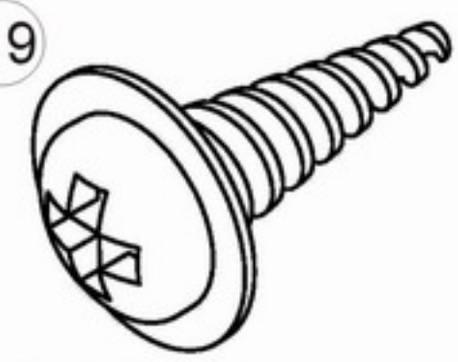
Self-Tapping screw
(M2.6*10)
8 pcs

18



Flat self-tapping screw
(M2.6*6)
6pcs

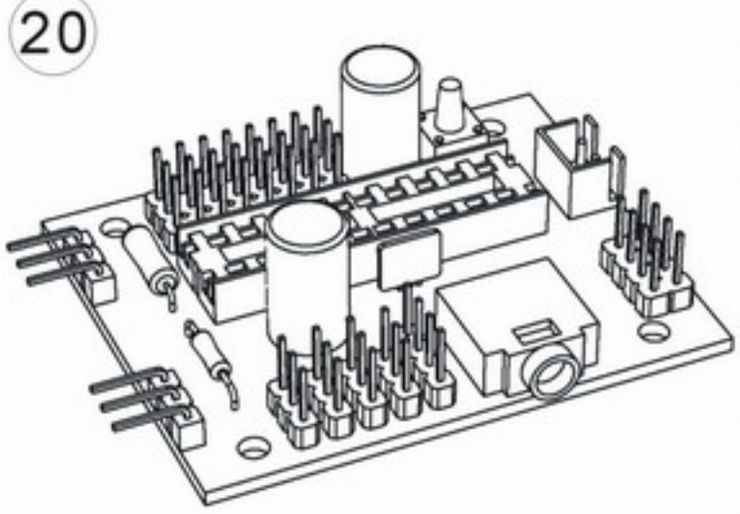
19



Self-Tapping screw pan
head (M2.0*8) 8pcs

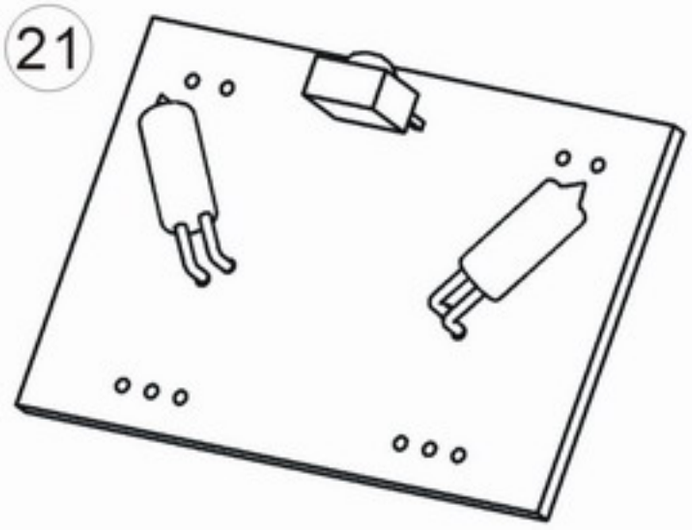
Components list 2 (Electronic parts):

20



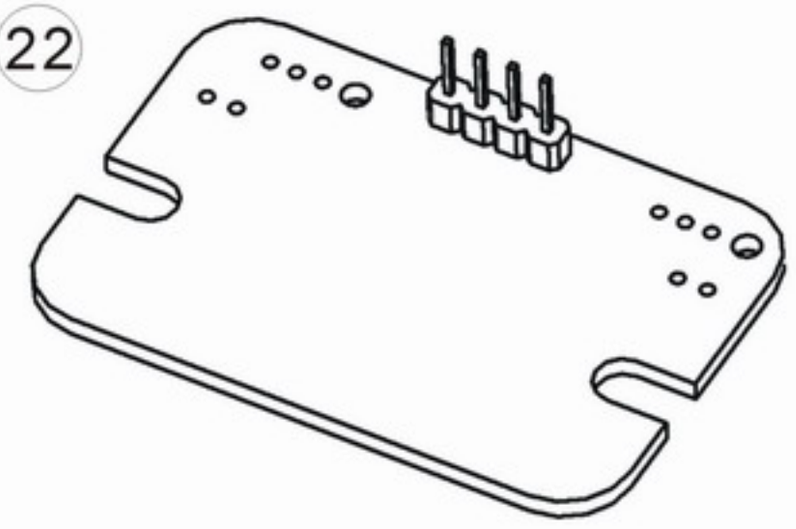
Main board 1 pc

21



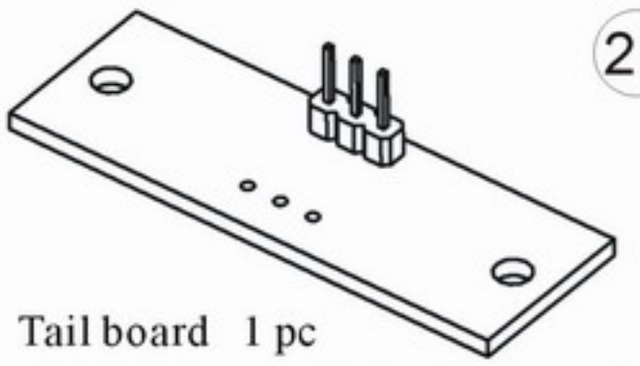
Roll sensor board 1 pc

22



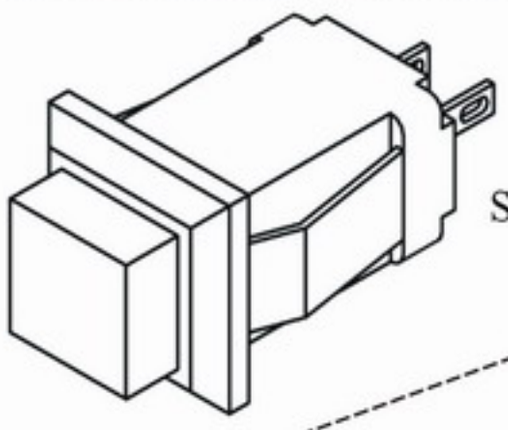
Head board 1 pc

23



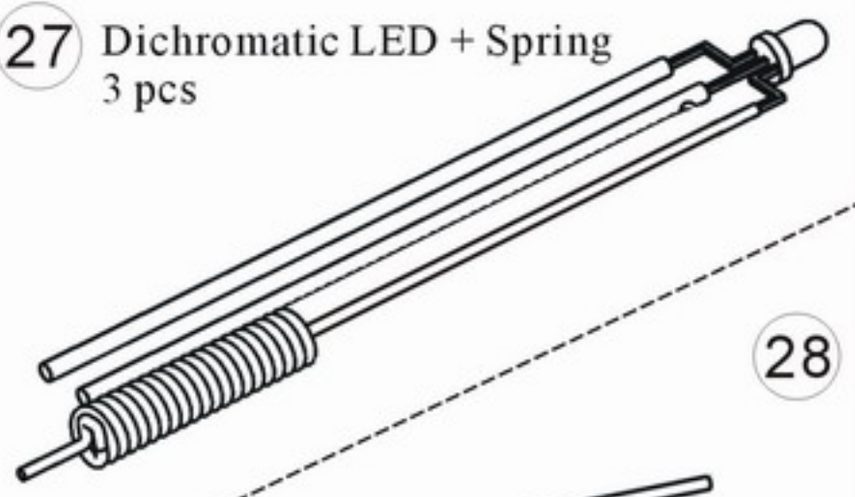
Tail board 1 pc

25



Switch 1 pc

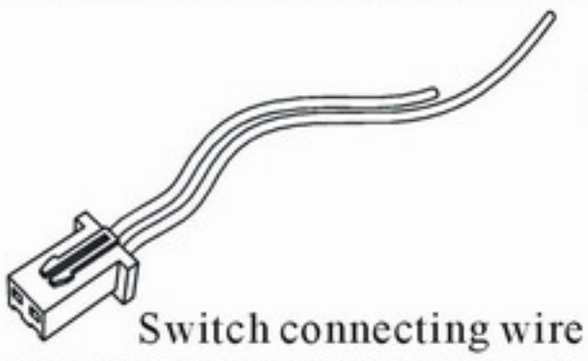
27 Dichromatic LED + Spring
3 pcs



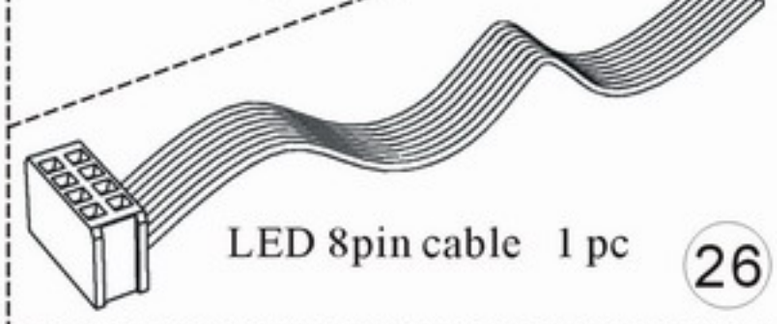
28

Red LED 4 pcs

24



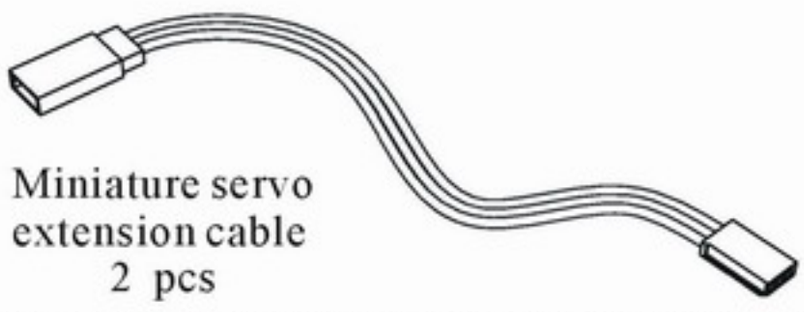
Switch connecting wire 1 pc



LED 8pin cable 1 pc

26

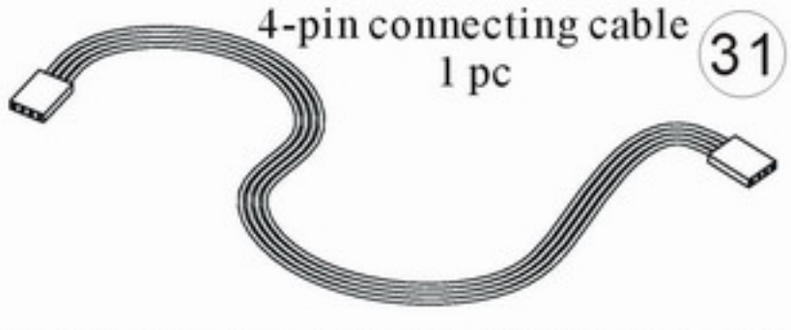
29



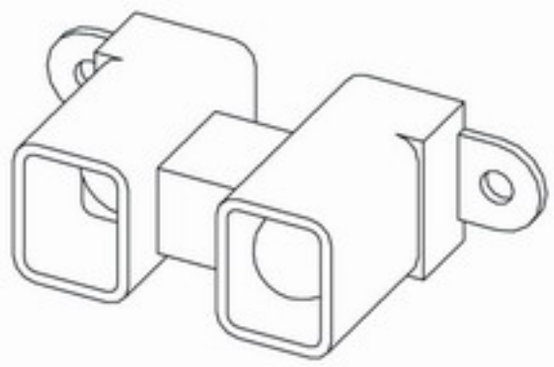
Miniature servo
extension cable
2 pcs

4-pin connecting cable
1 pc

31

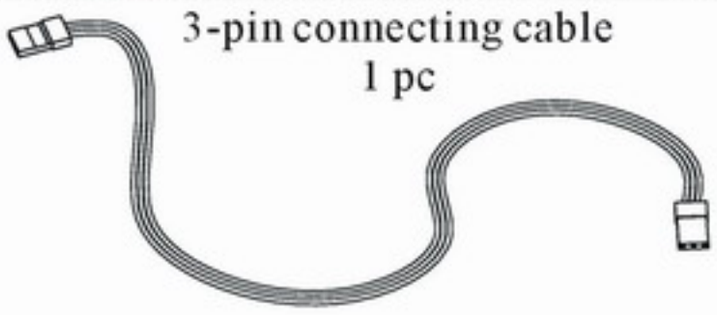


33 Recommend sensor



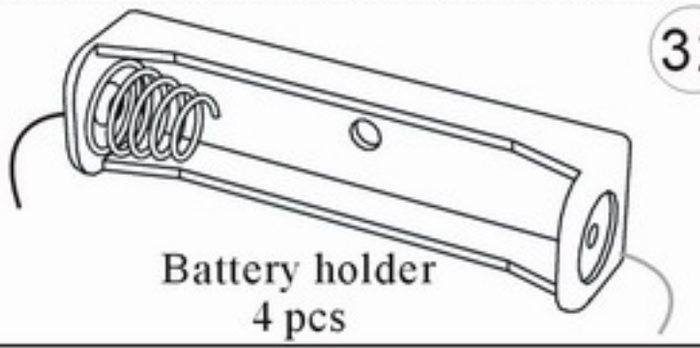
SHARP GP2D12
(Not included)

30



3-pin connecting cable
1 pc

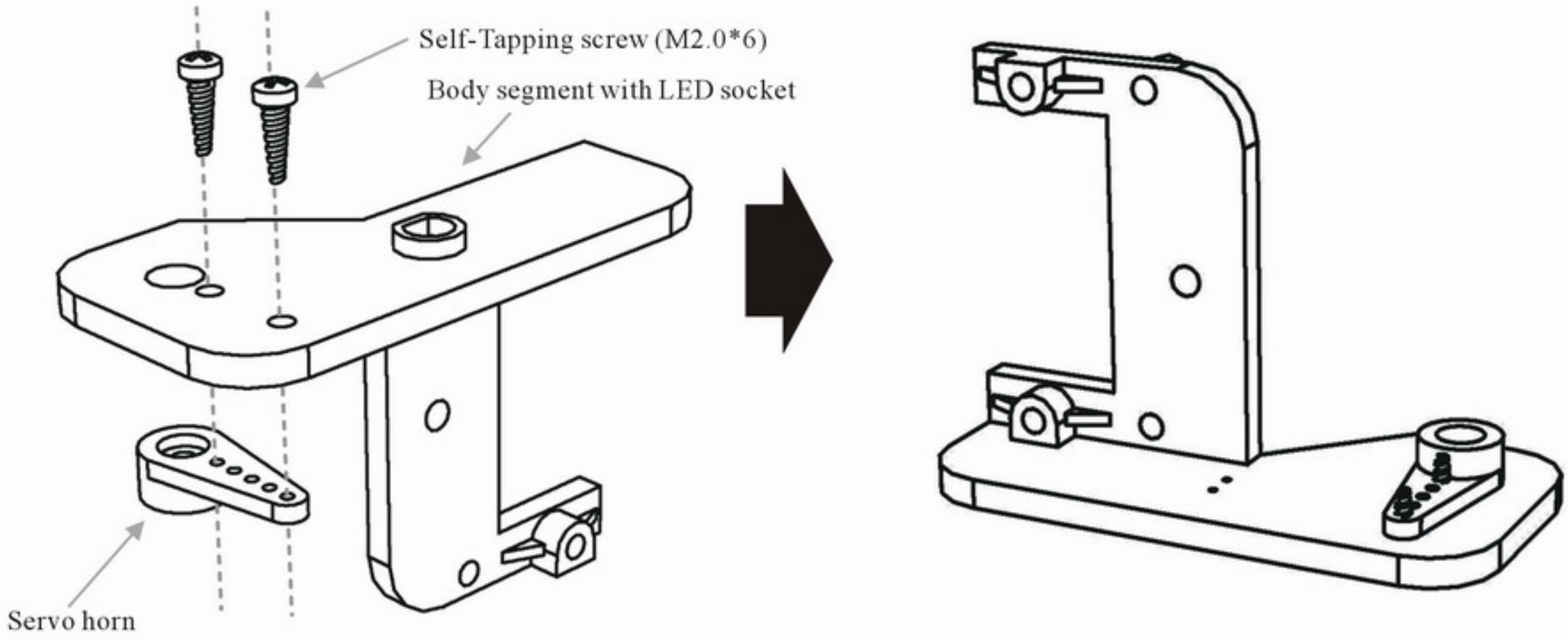
32



Battery holder
4 pcs

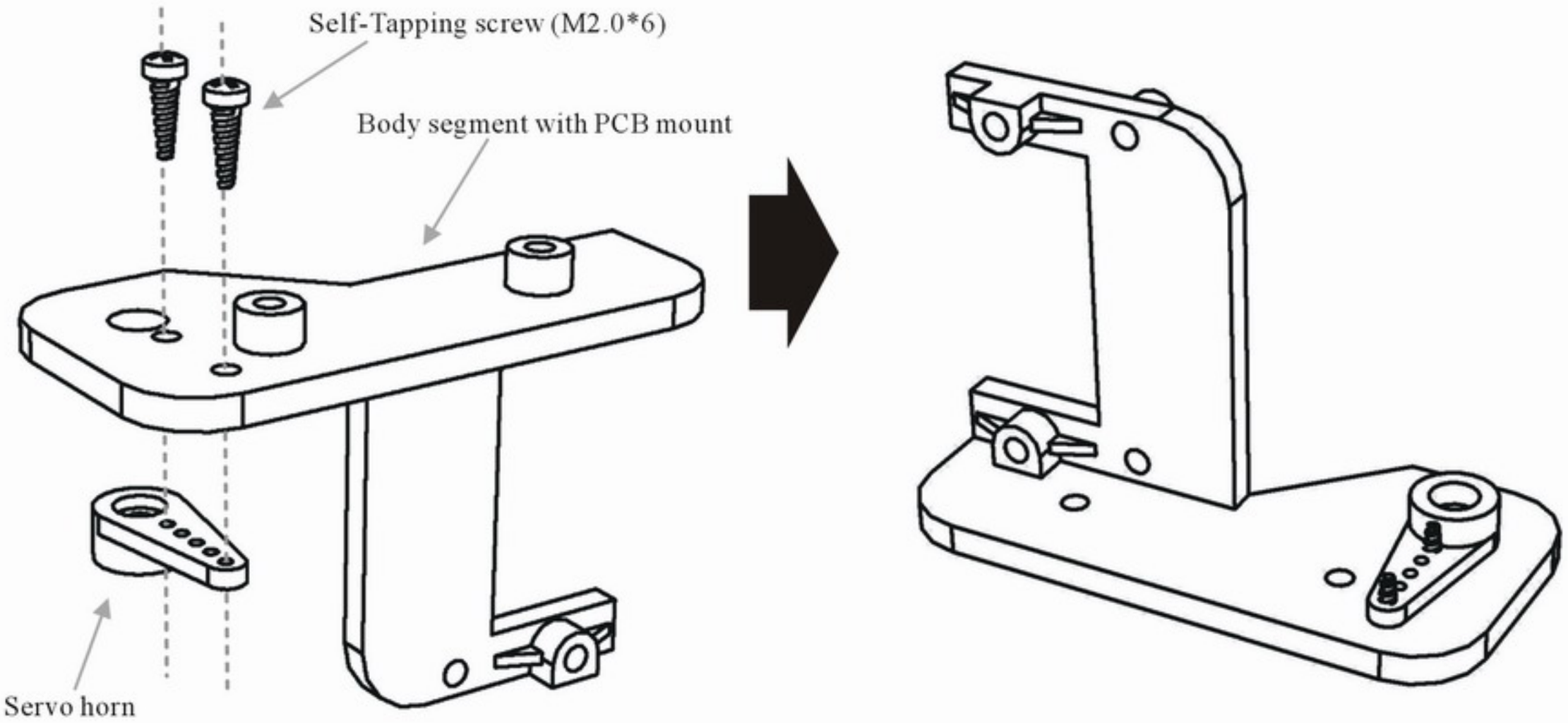
Mechanical Assembly Instructions:

STEP 1: Mount the servo horns to the 7 body segments for following steps.

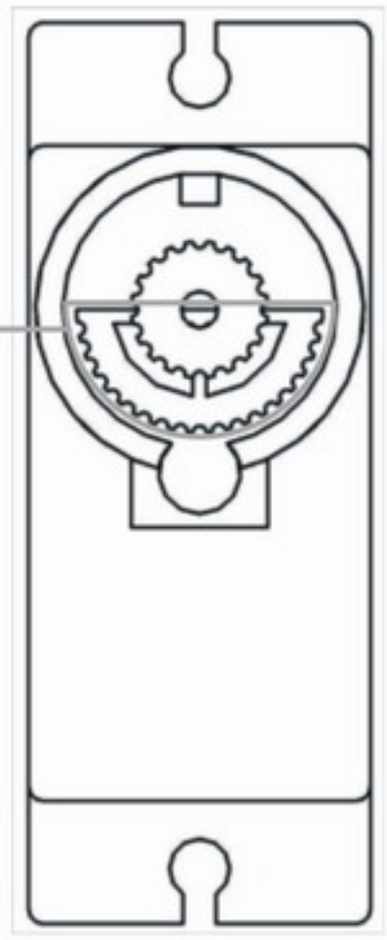


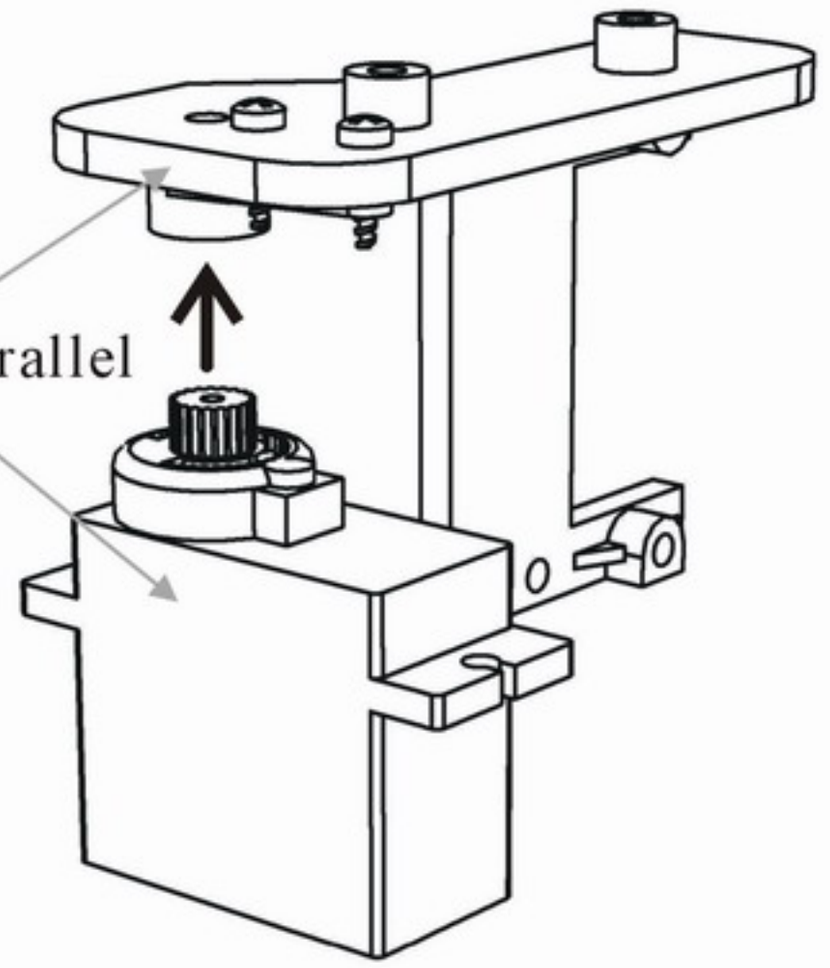
Attention: The body segment (7 pcs)is different from the segment with PCB mount(only 1 pc).

STEP 2: Like last step, mount the last servo horn onto the body segment with the PCB mounts.



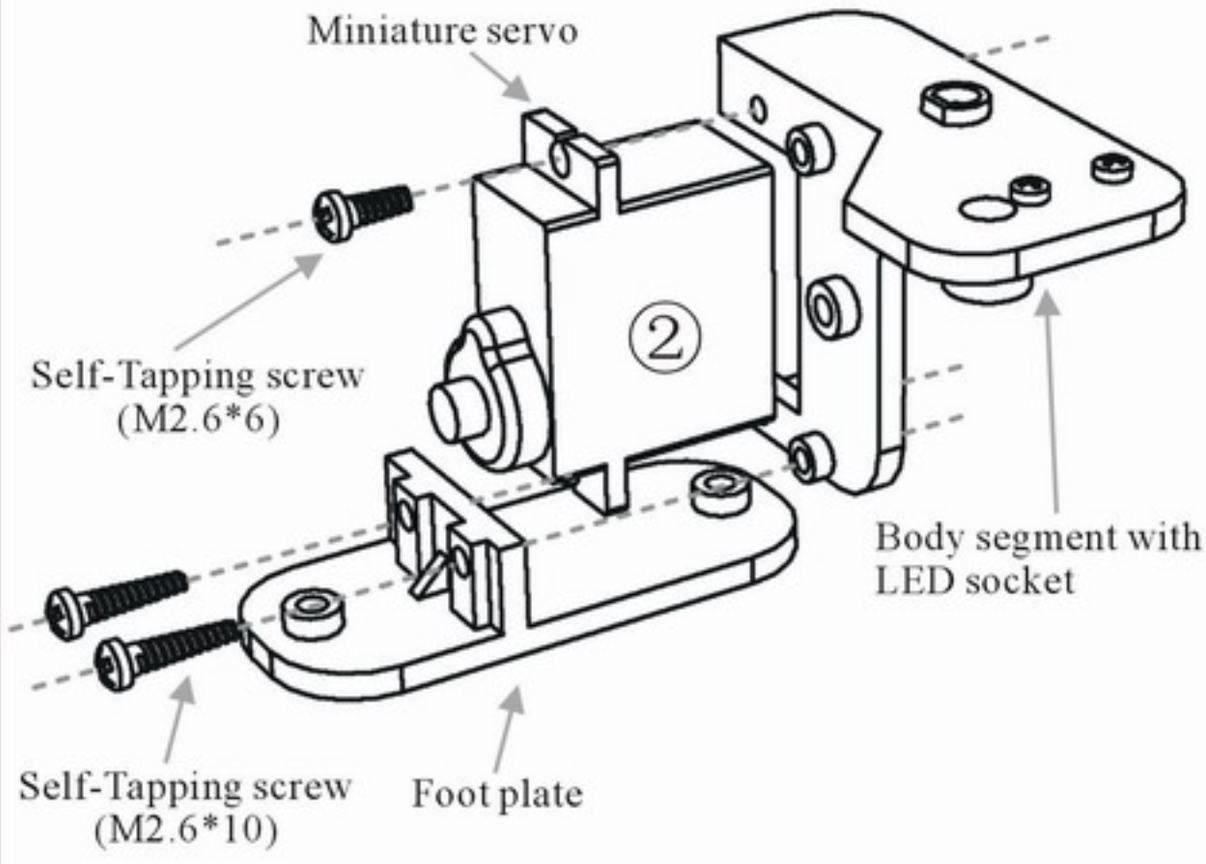
STEP 3: Rotate the servo with its servo horn, adjust the servo gear to the middle position.



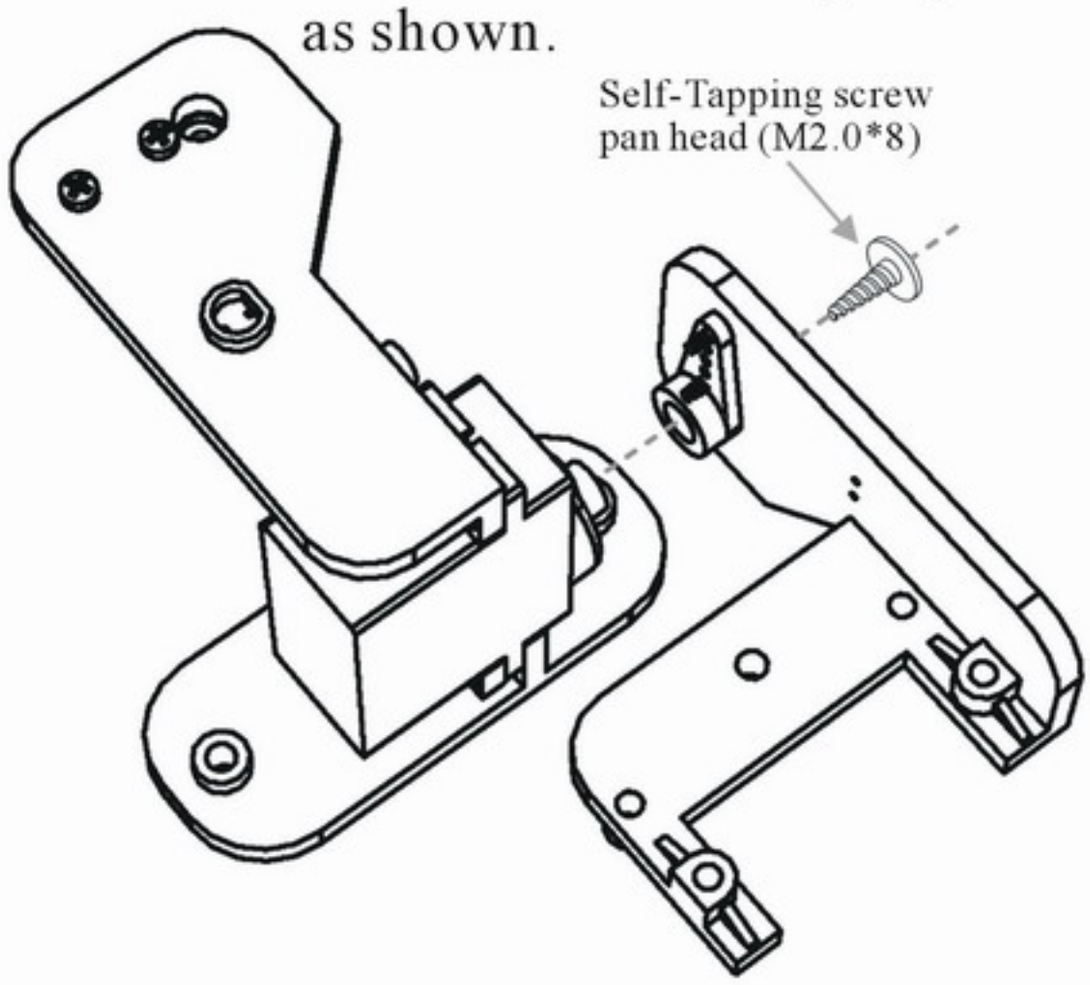


Attention:
In order to make sure the servos are mounted correctly, please attach the servo as shown in following steps.

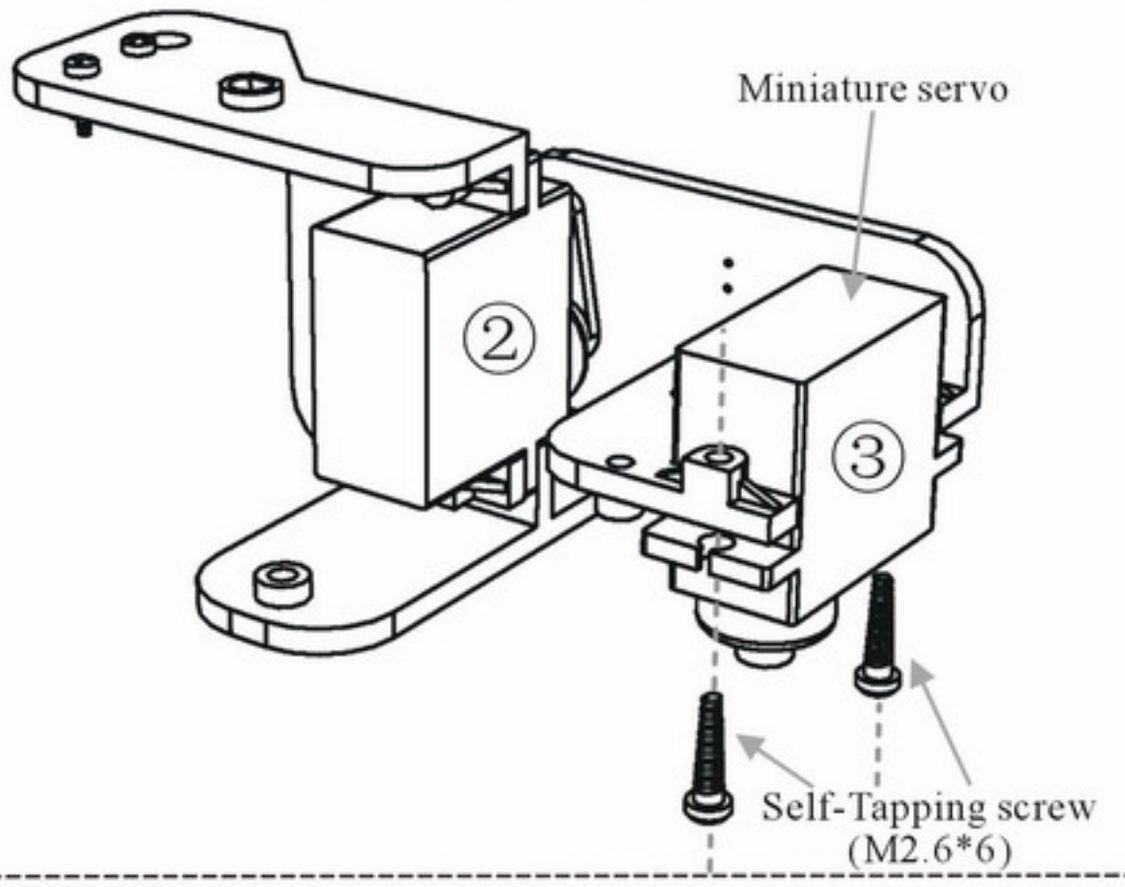
STEP 4: Mount the servo and foot plate to the body segment as shown.



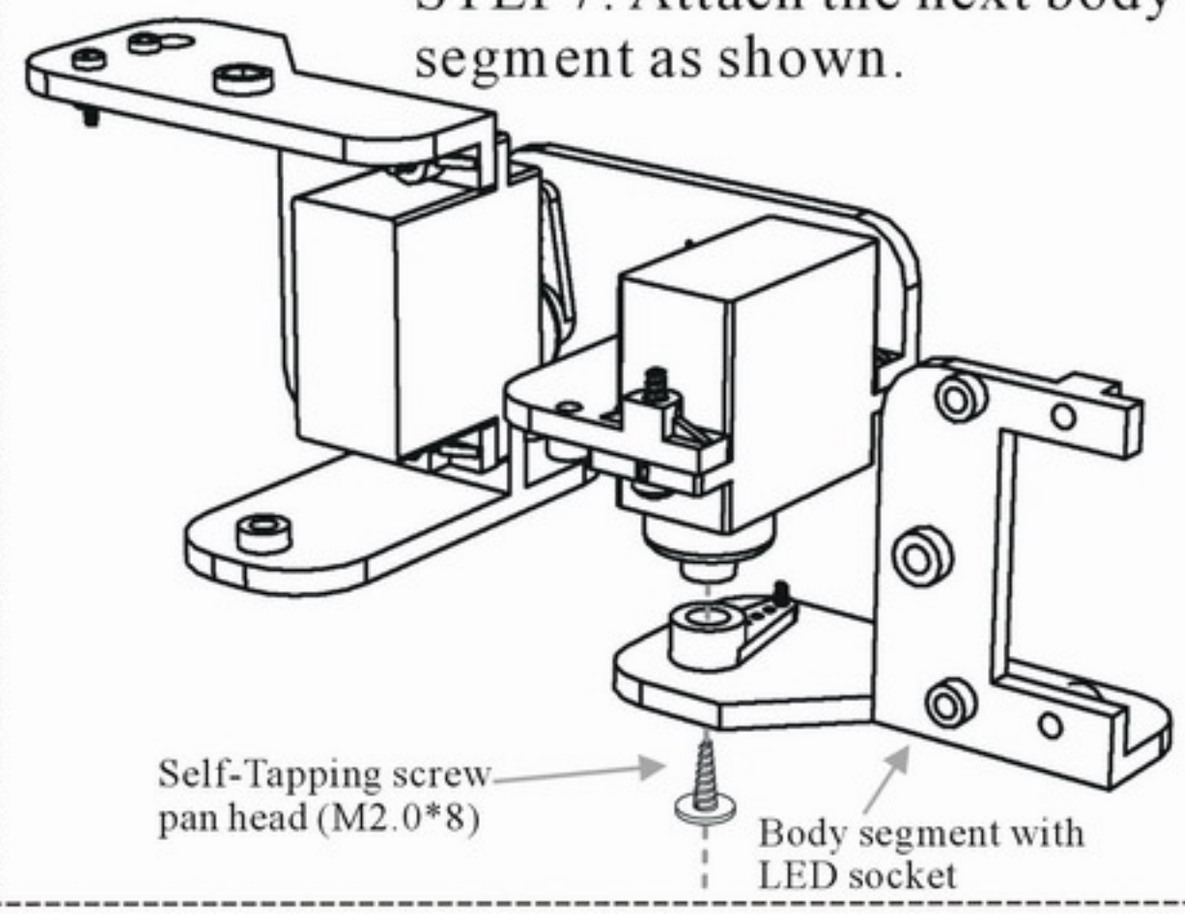
STEP5: Attach the next body segment as shown.



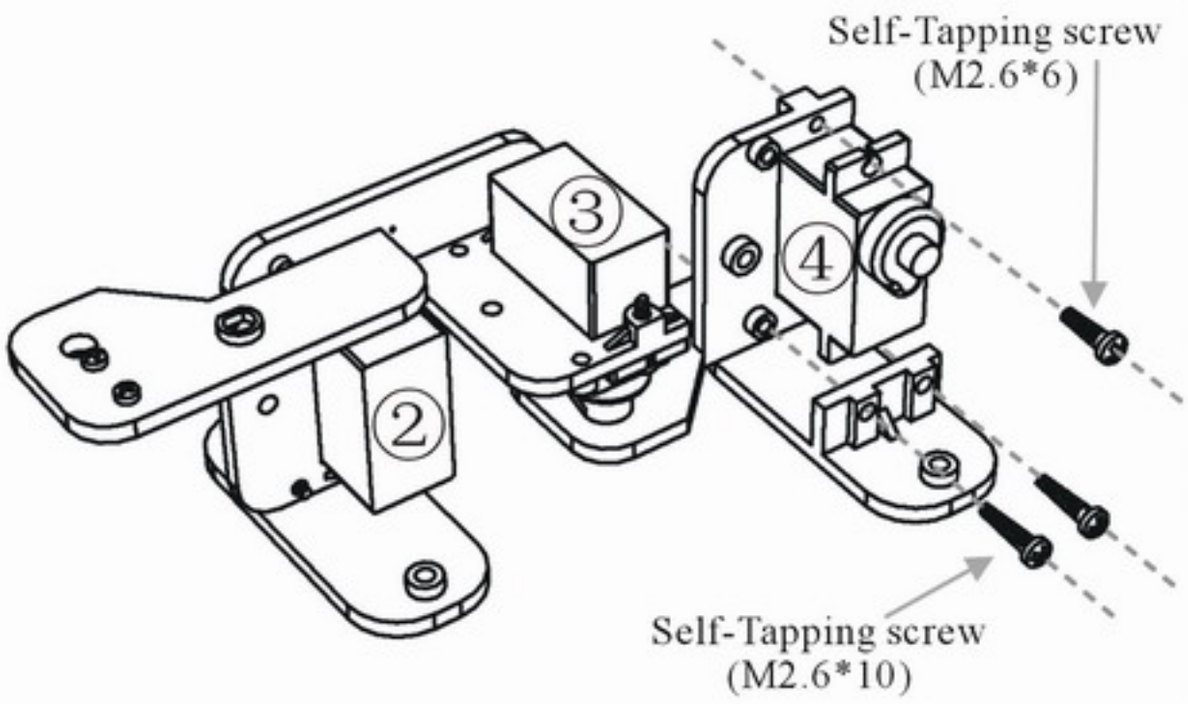
STEP6: Mount the next servo



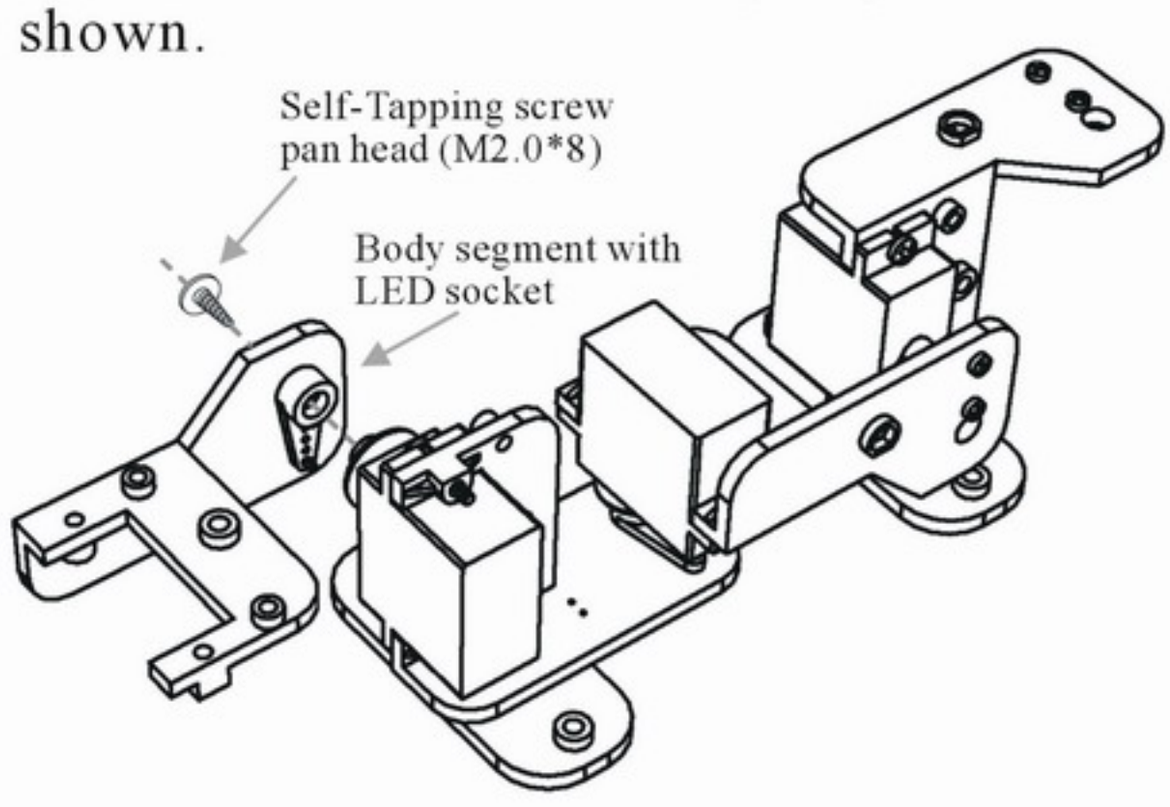
STEP7: Attach the next body segment as shown.



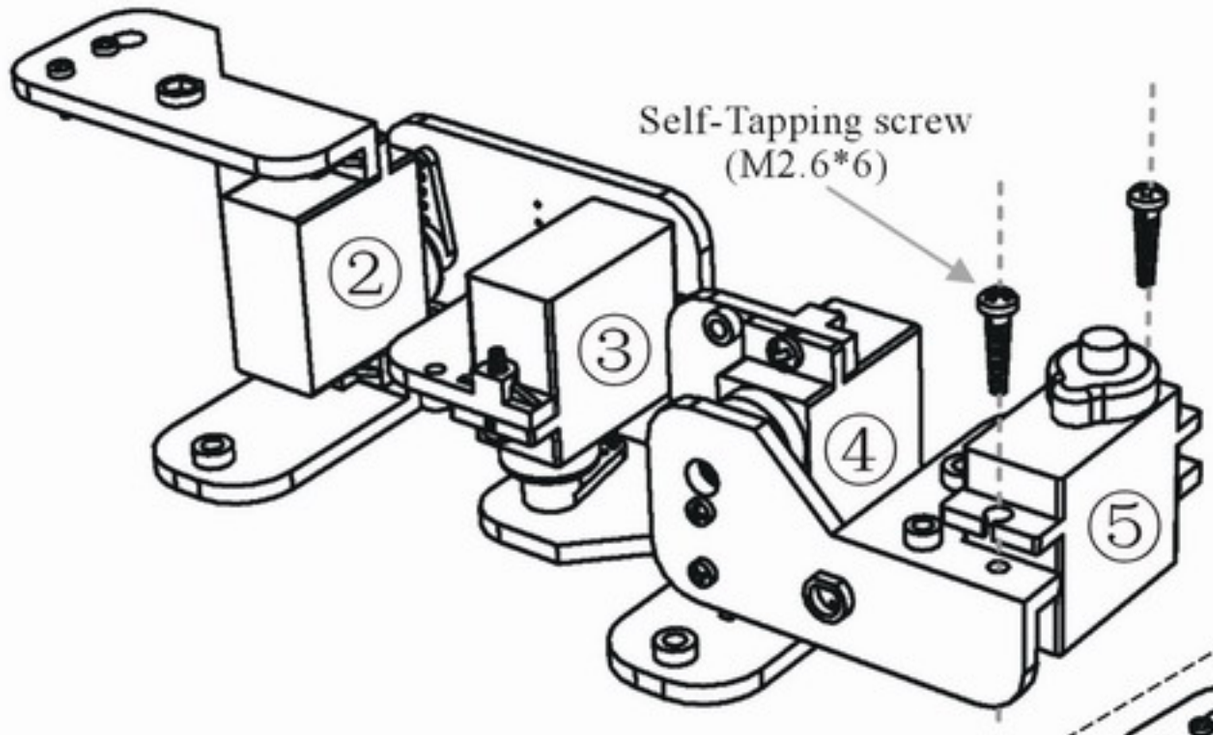
STEP8: Mount the next servo and foot plate

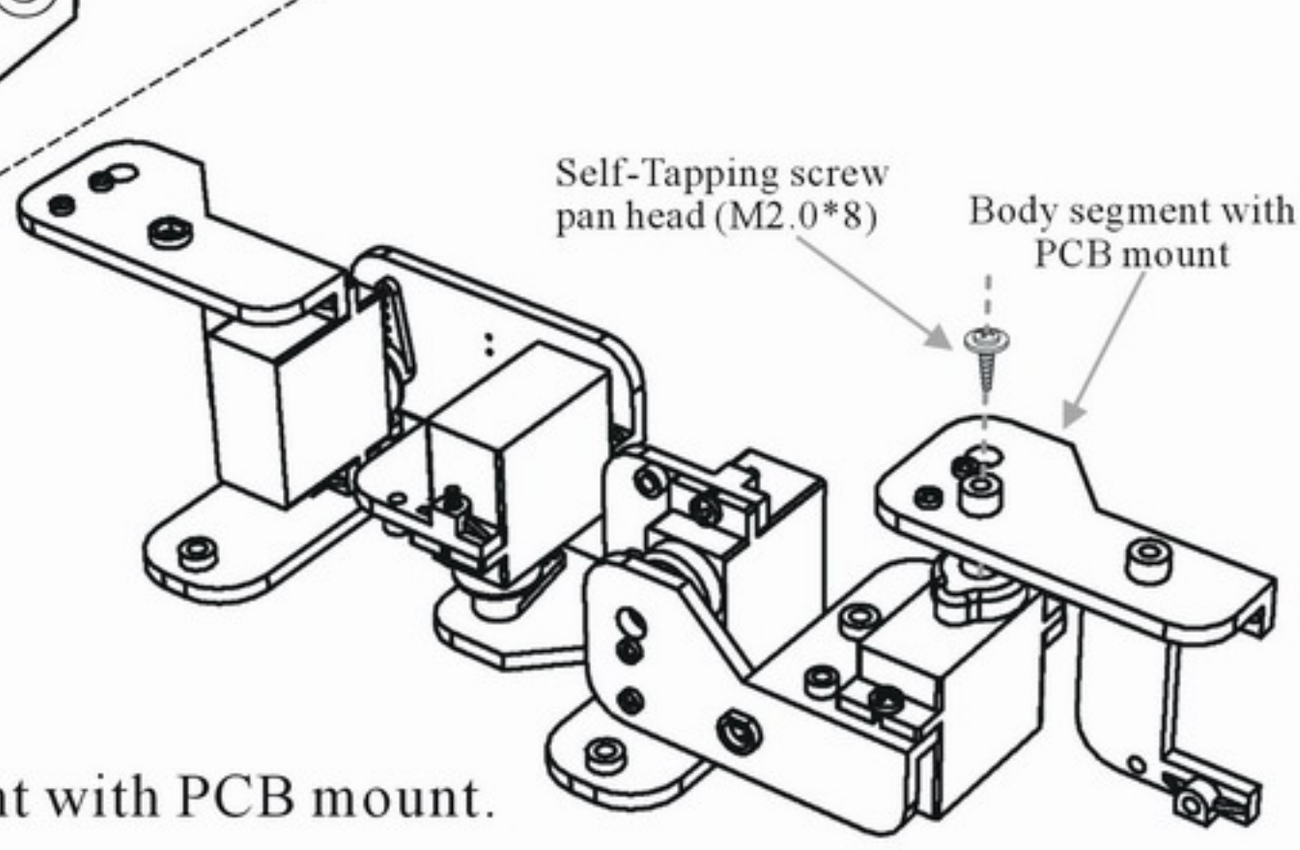


STEP9: Attach the next body segment as shown.



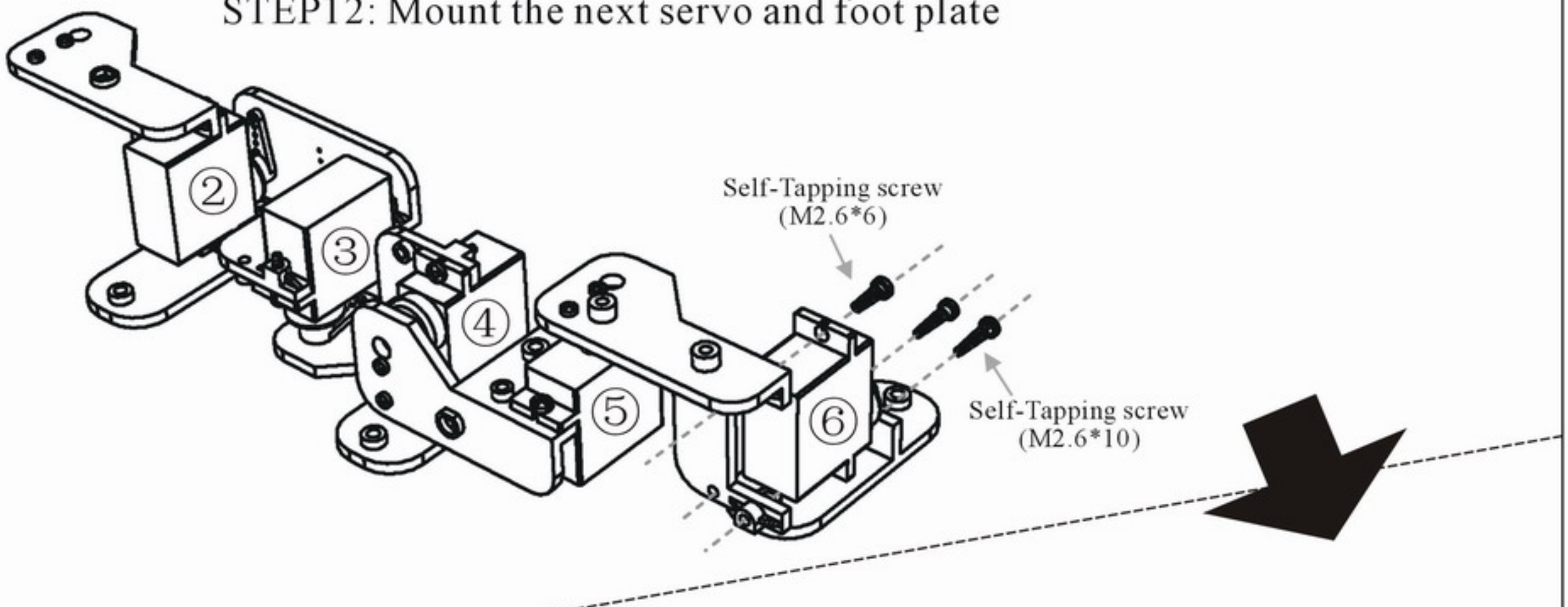
STEP10: Mount the next servo



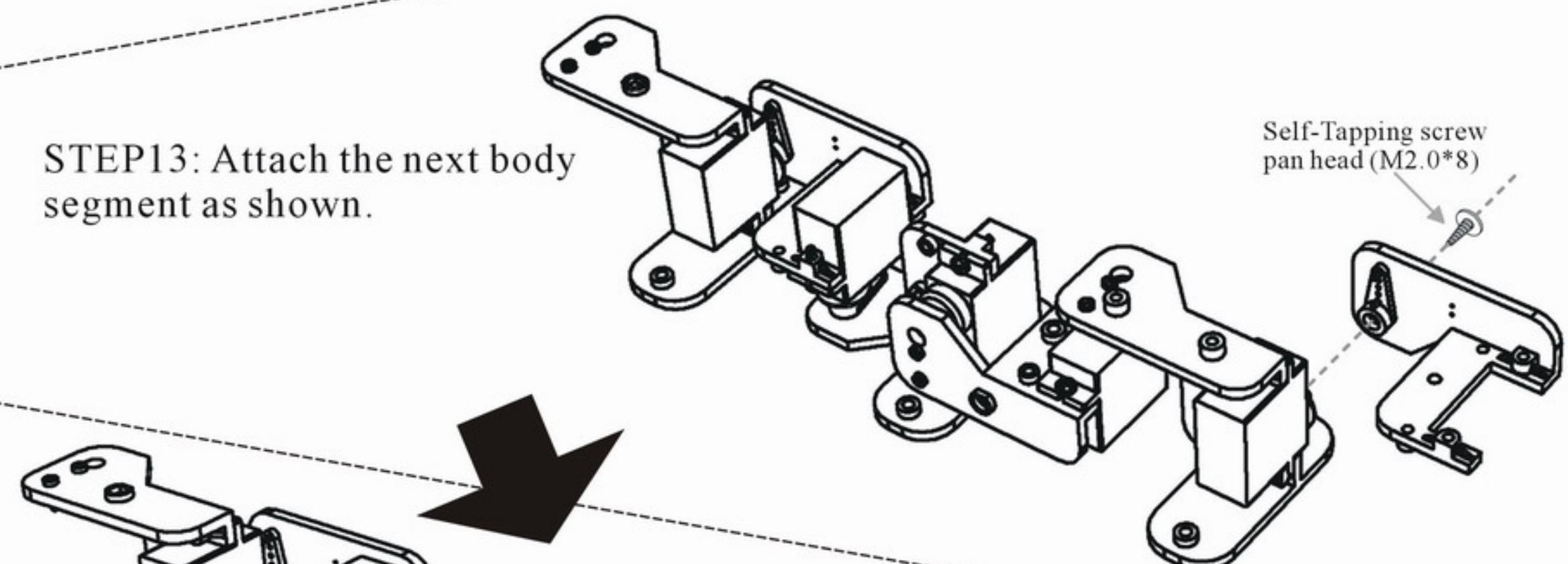


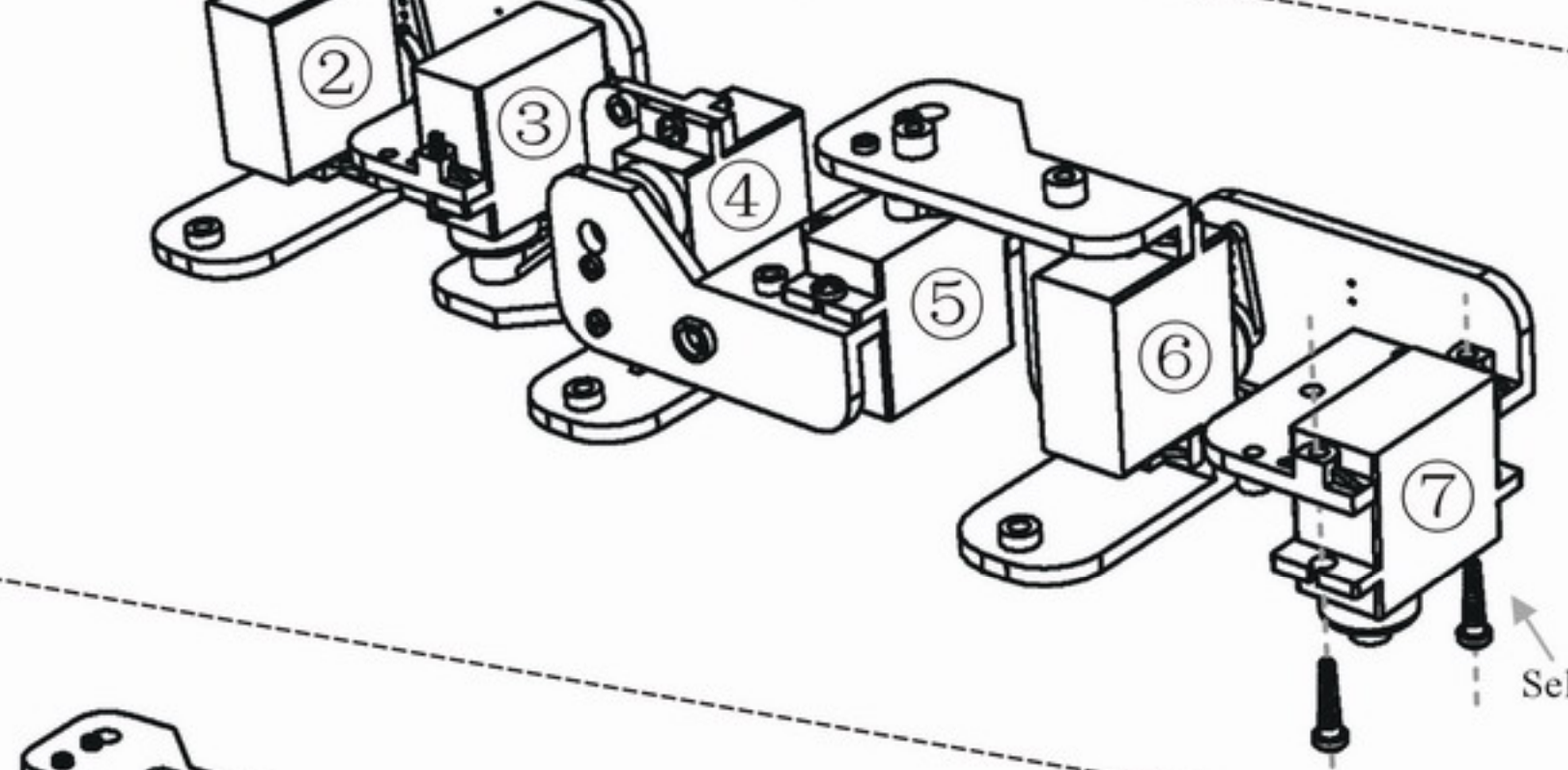
STEP11: Attach the body segment with PCB mount.

STEP12: Mount the next servo and foot plate

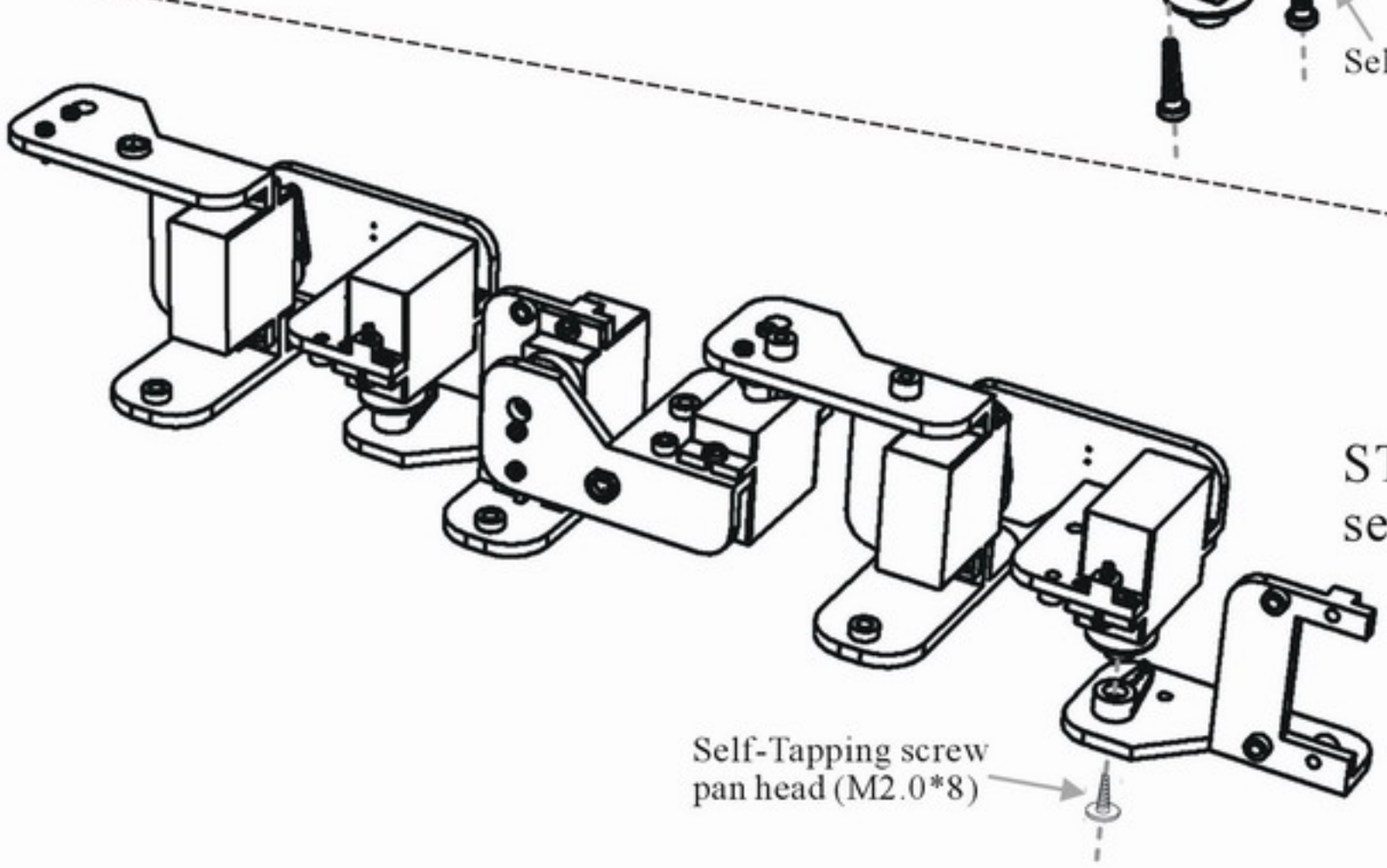


STEP13: Attach the next body segment as shown.



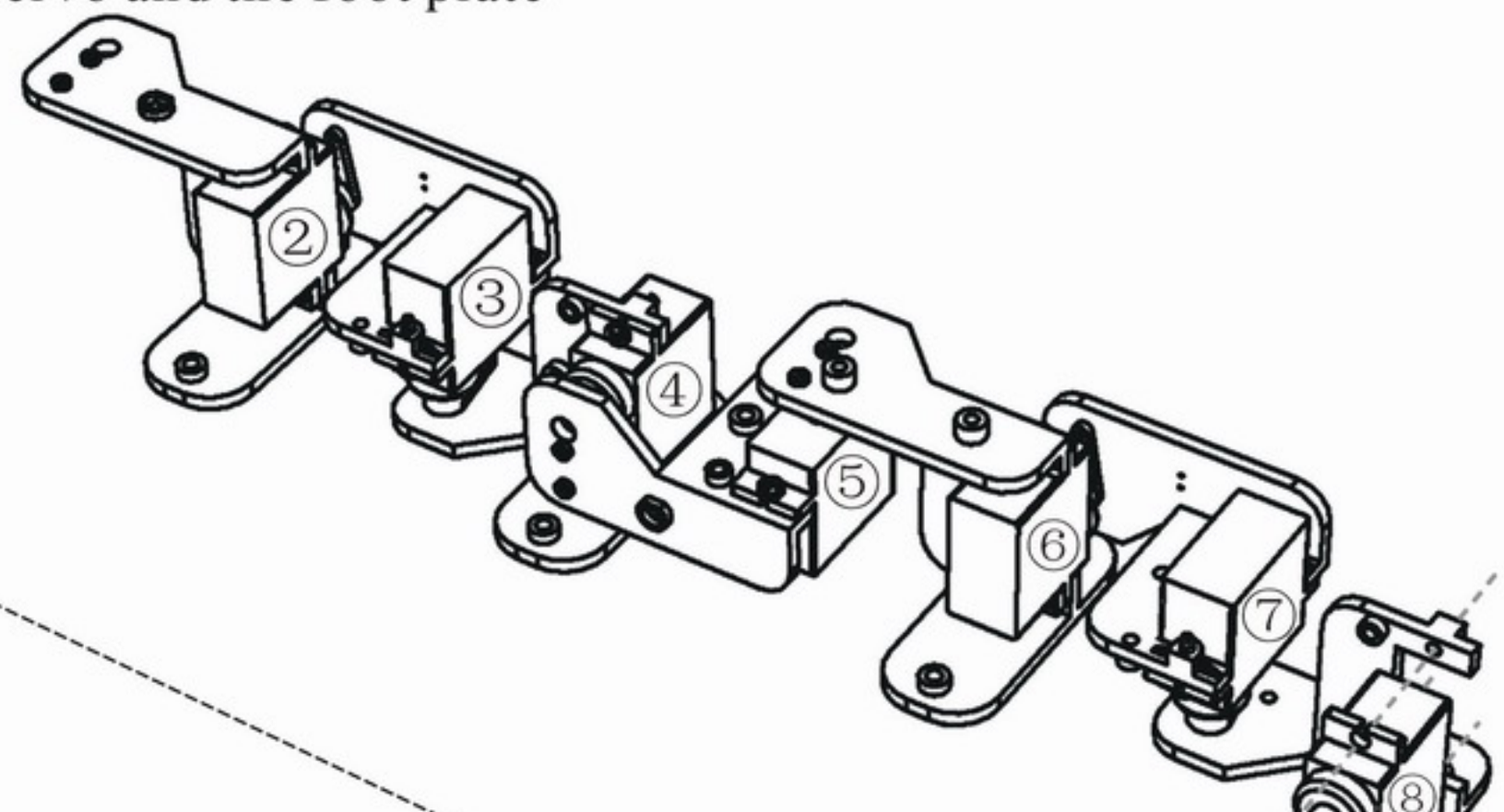


STEP14: Mount the next servo

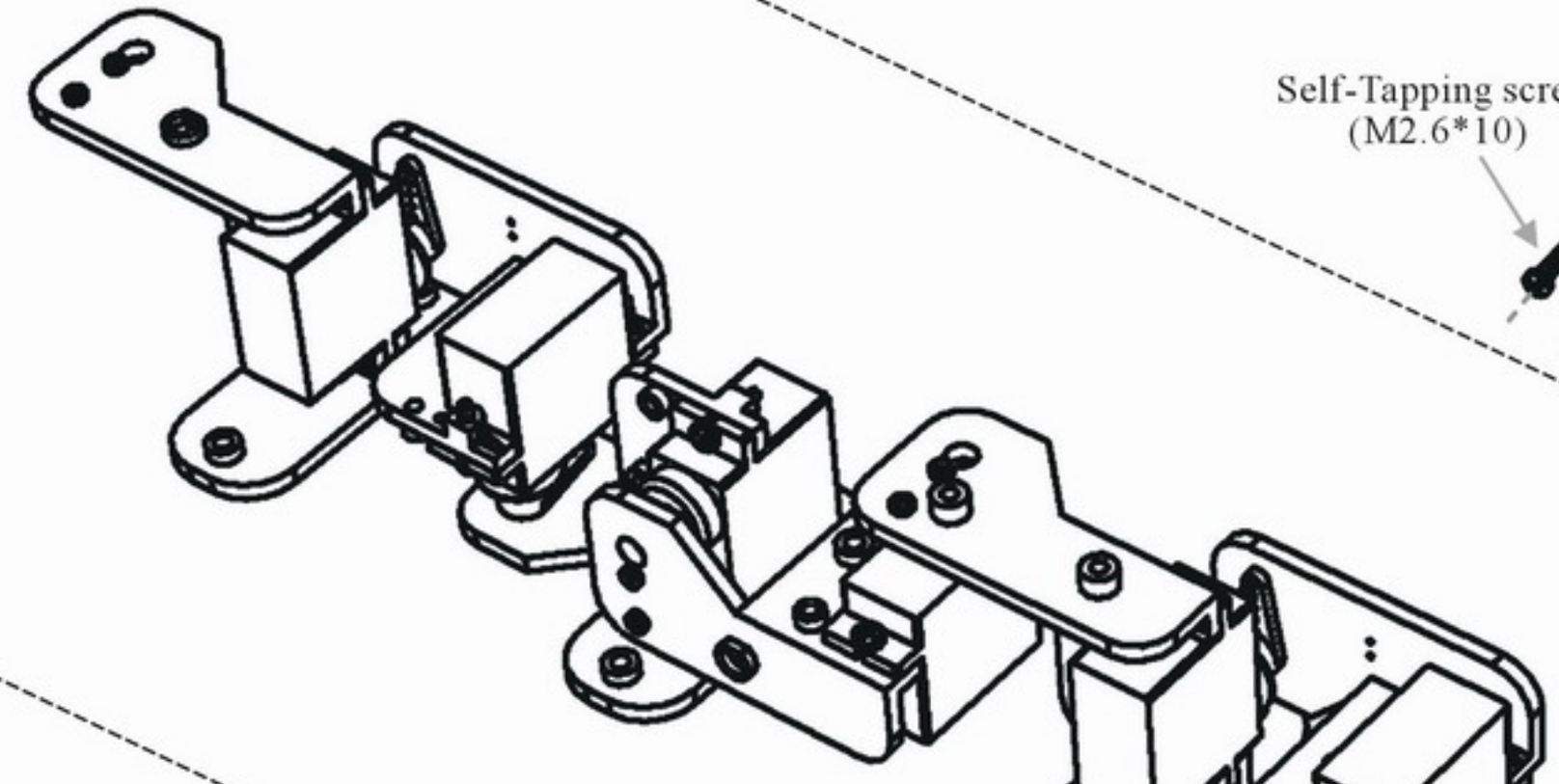


STEP15: Attach the next body segment as shown.

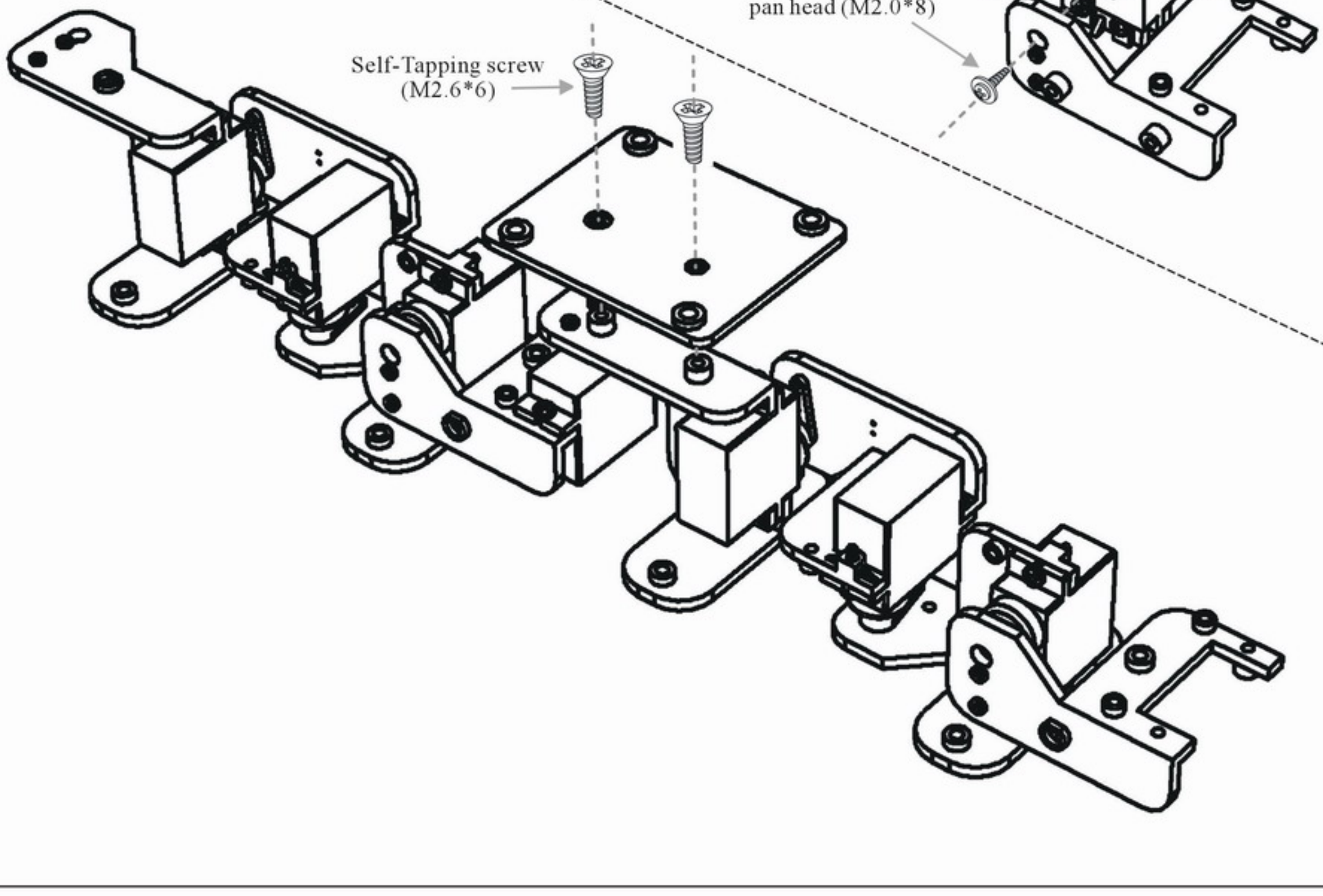
STEP16: Mount the next servo and the foot plate



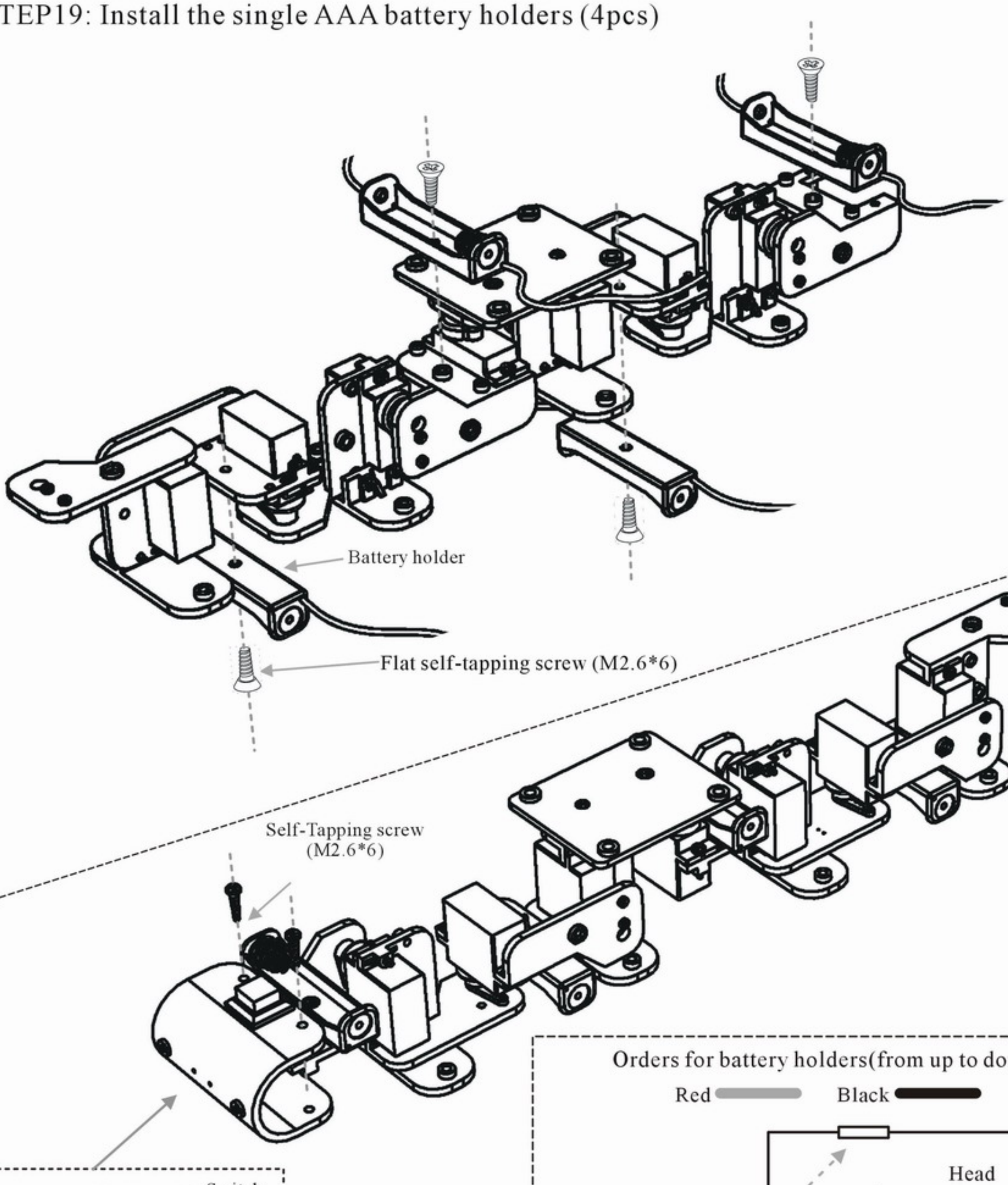
STEP17: Attach the next body segment as shown.

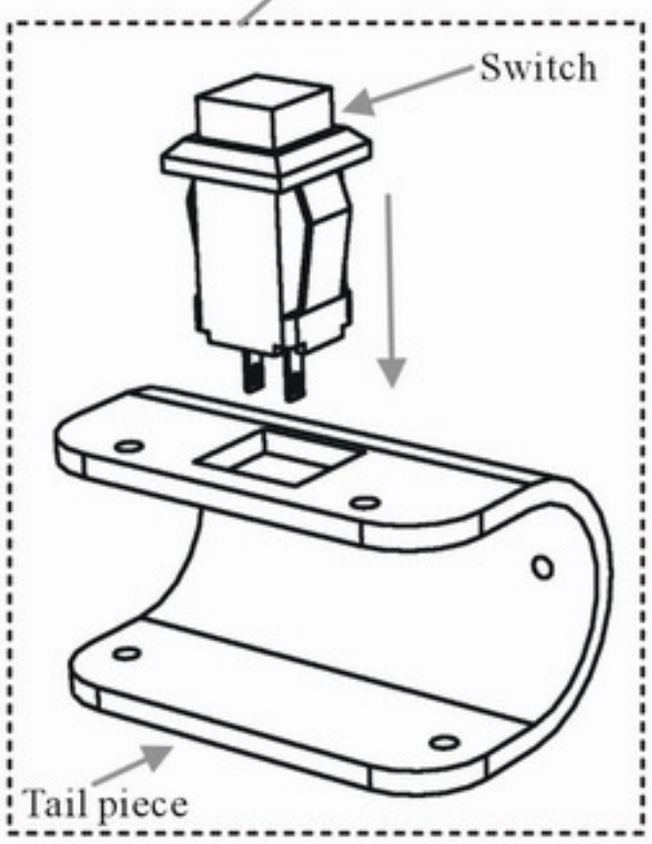


STEP18: Attach the PCB mounting bracket

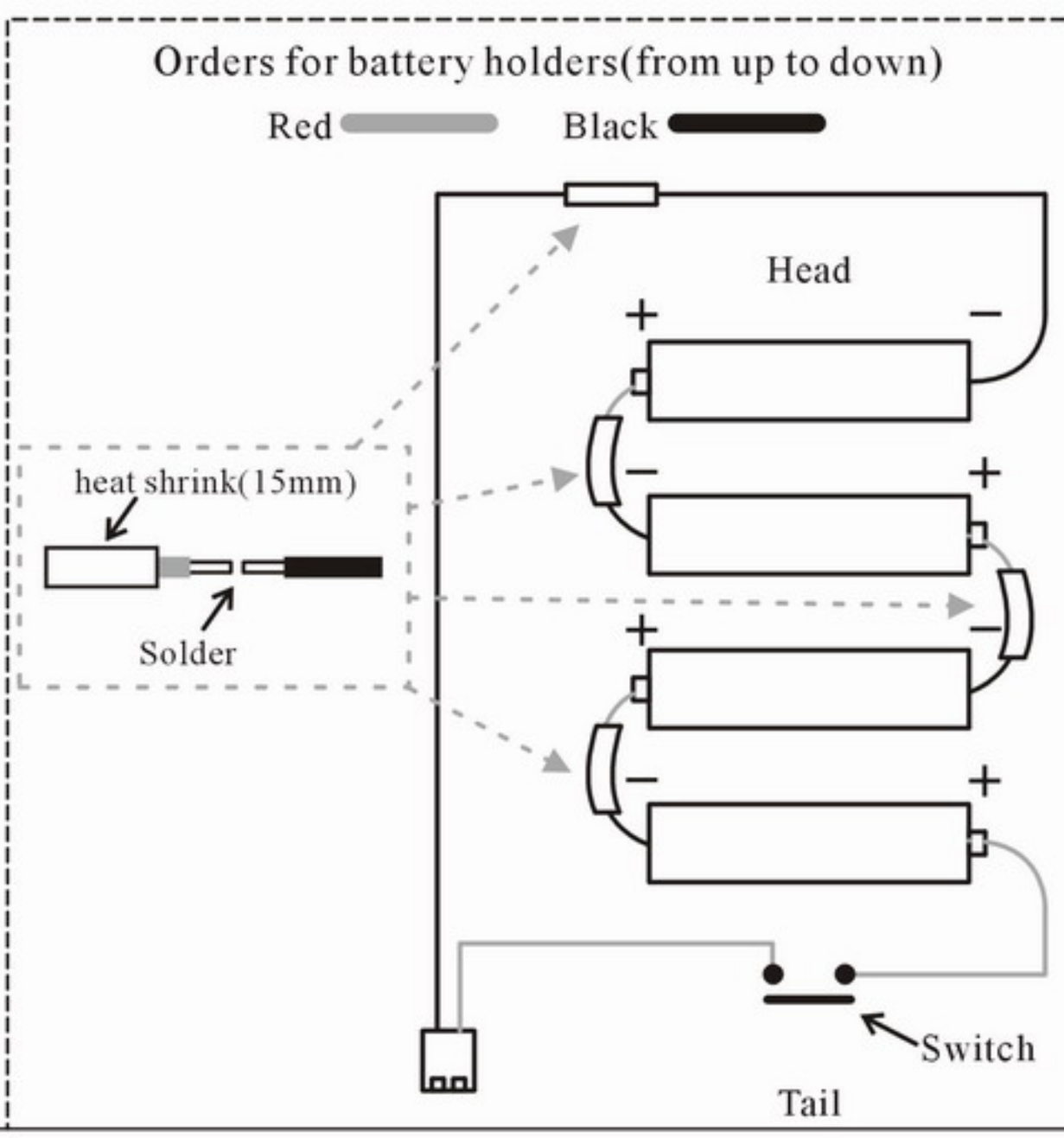


STEP19: Install the single AAA battery holders (4pcs)

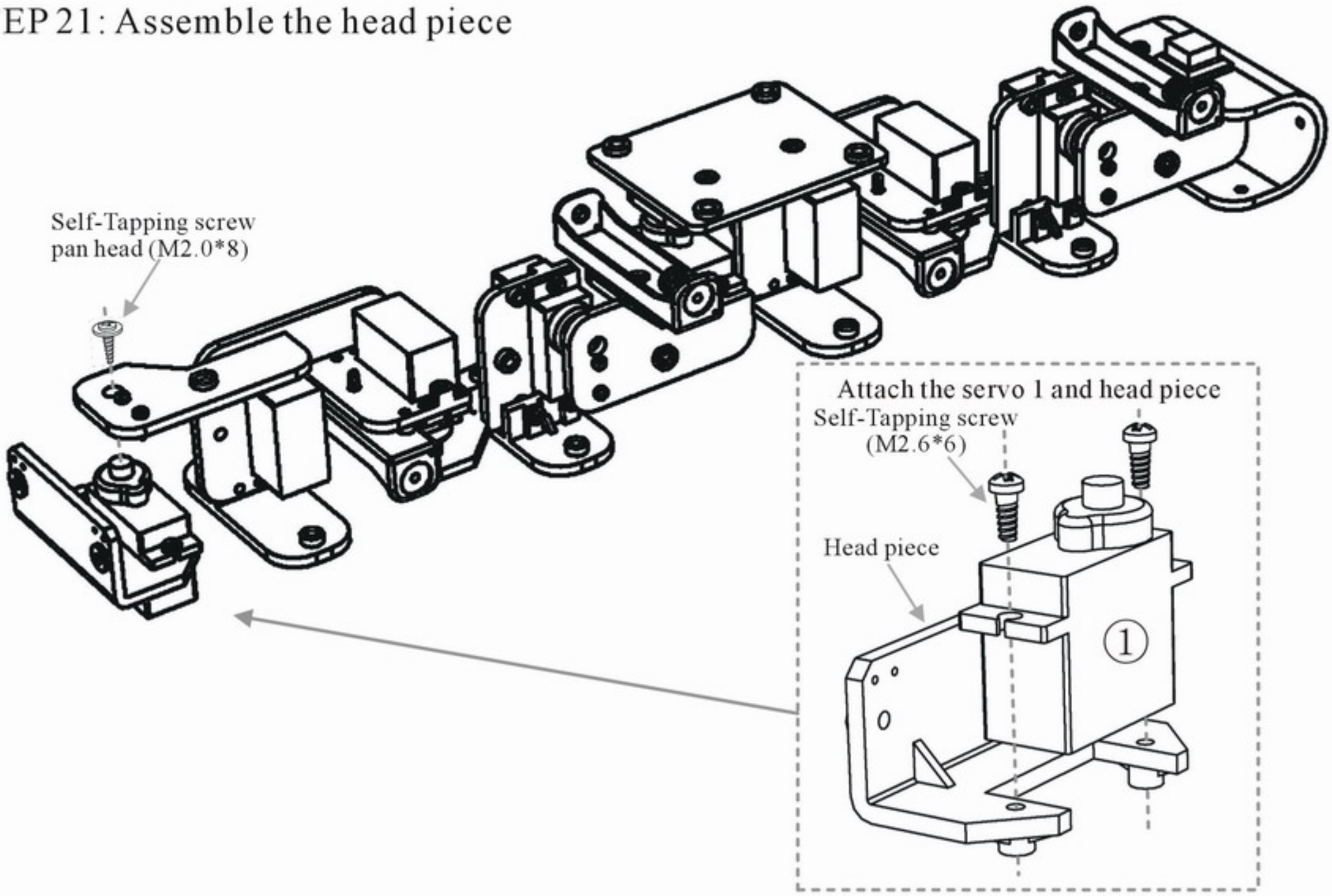




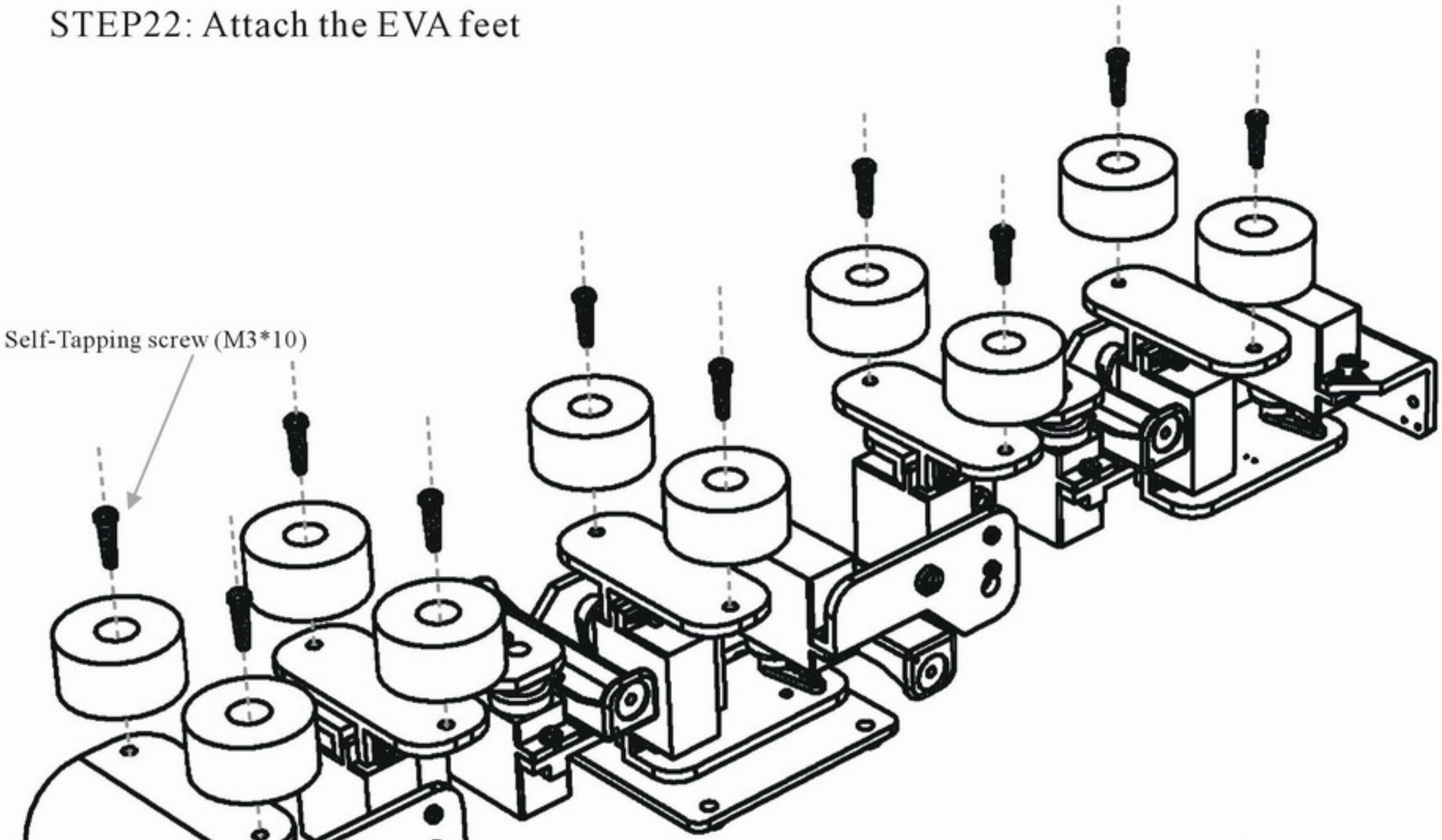
STEP20: Assemble the tail piece and switch



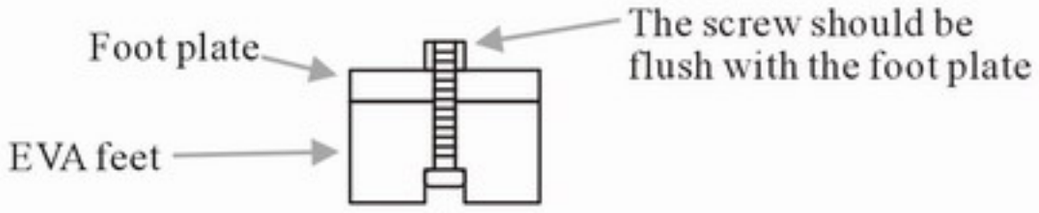
STEP 21: Assemble the head piece



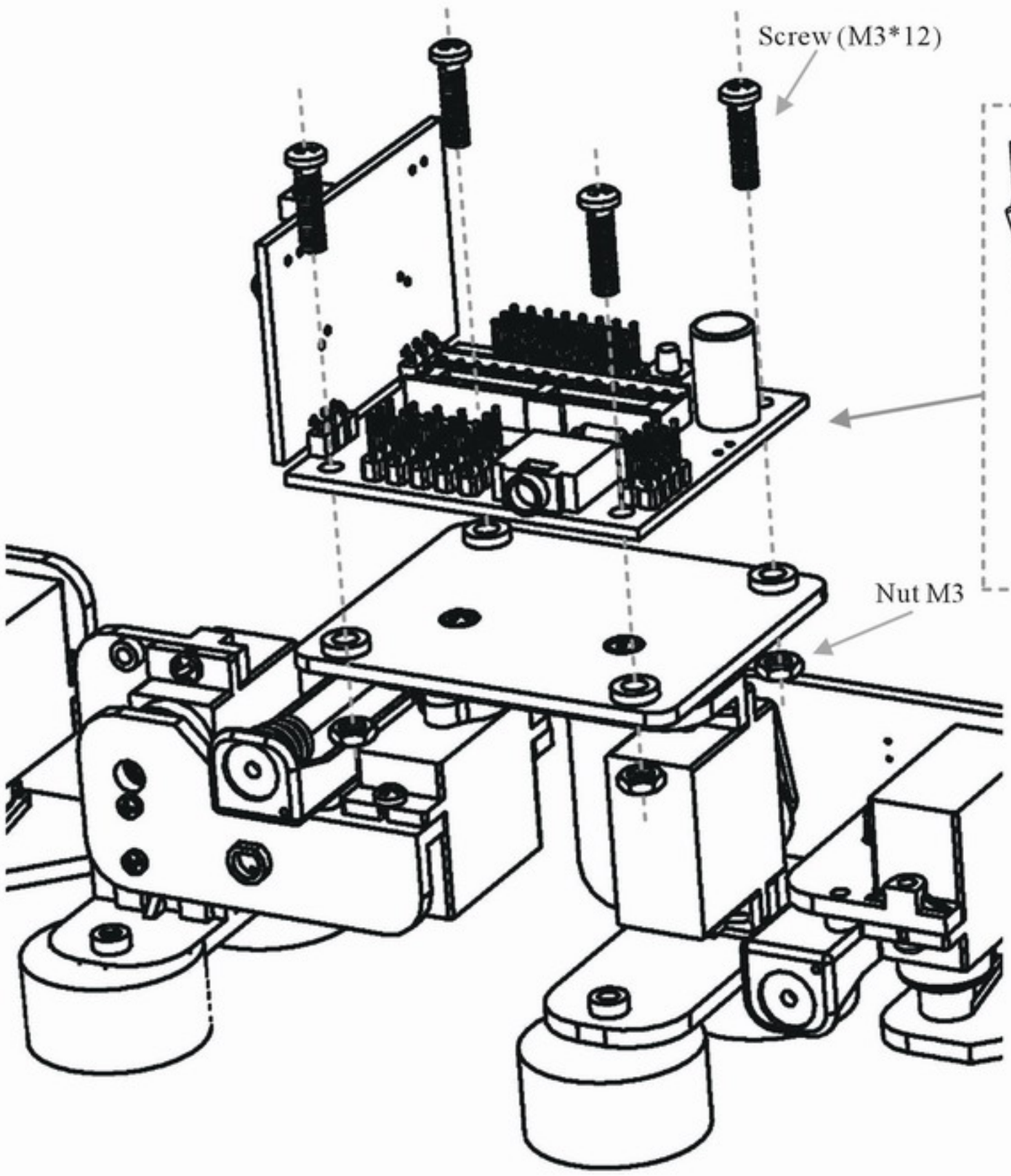
STEP22: Attach the EVA feet

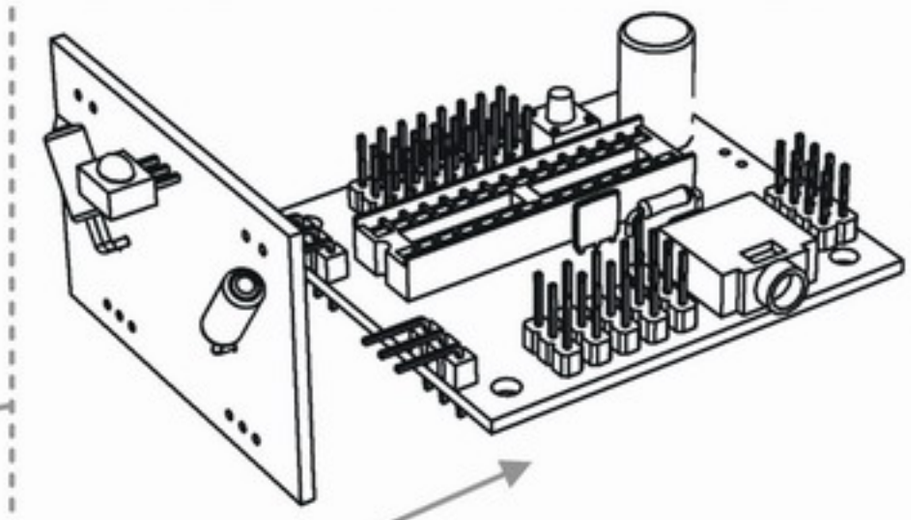


Attach the foot using the M3*10
self-tapping screw as shown



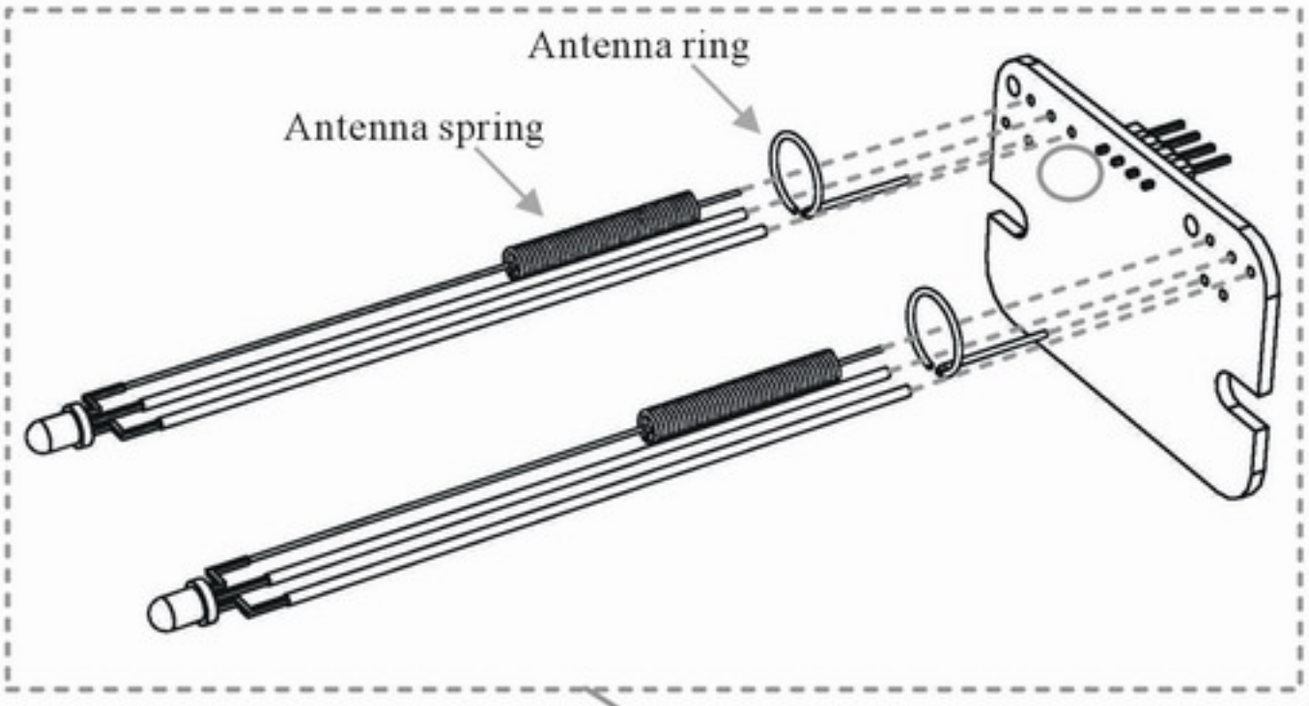
STEP 23: Install the main circuit board.





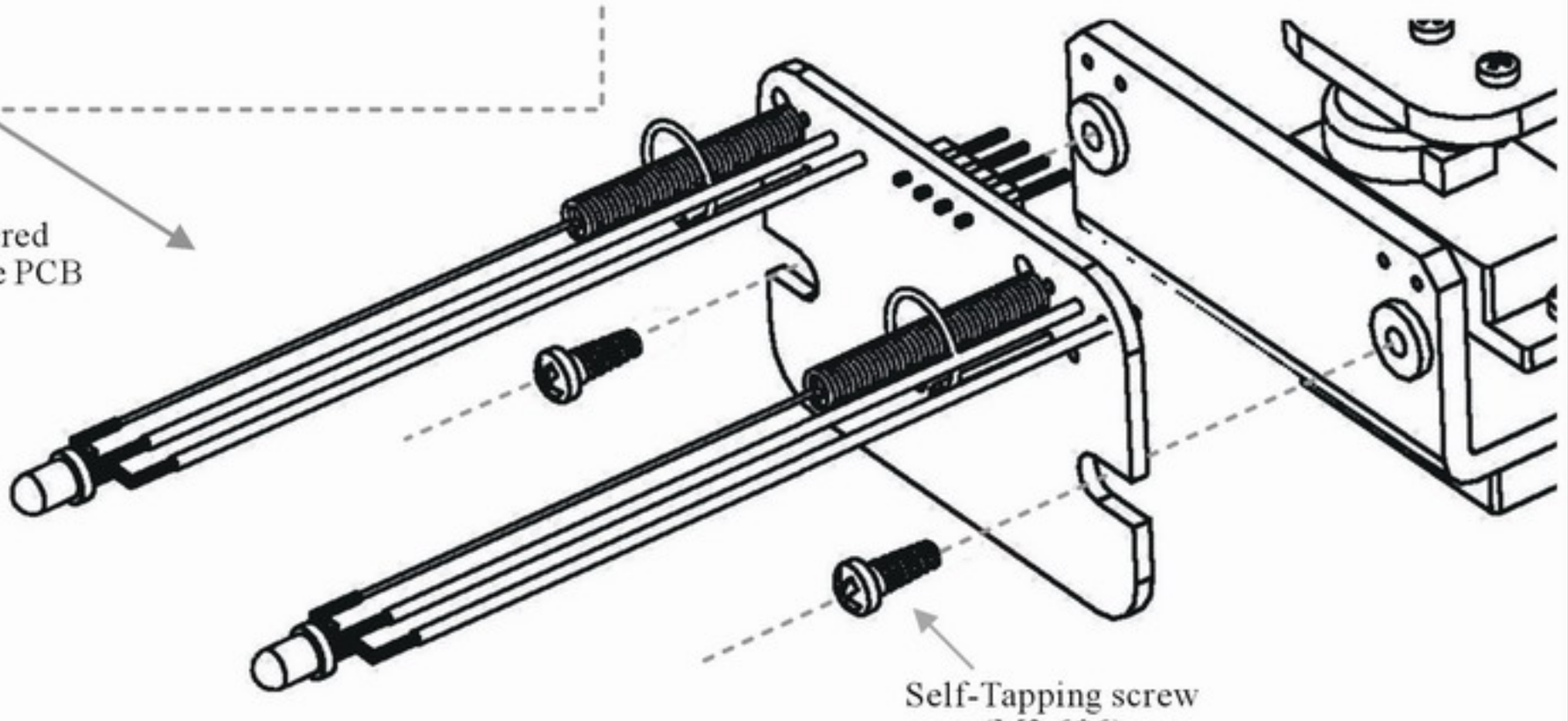
Solder the roll sensor PCB to the mainboard. Mount he main-board with the 4 M3*12 screws as shown.

STEP 24: Install the head antenna

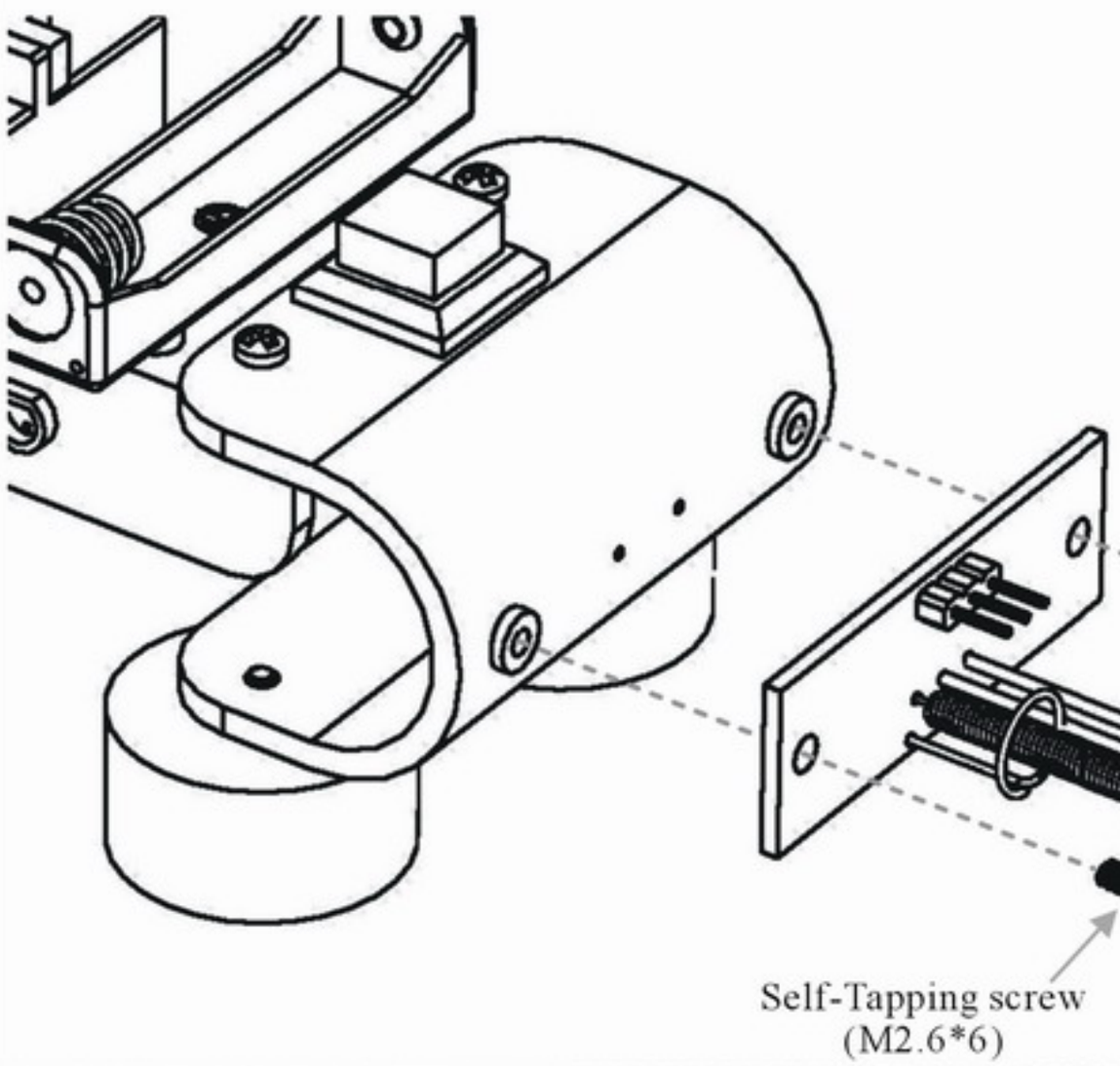


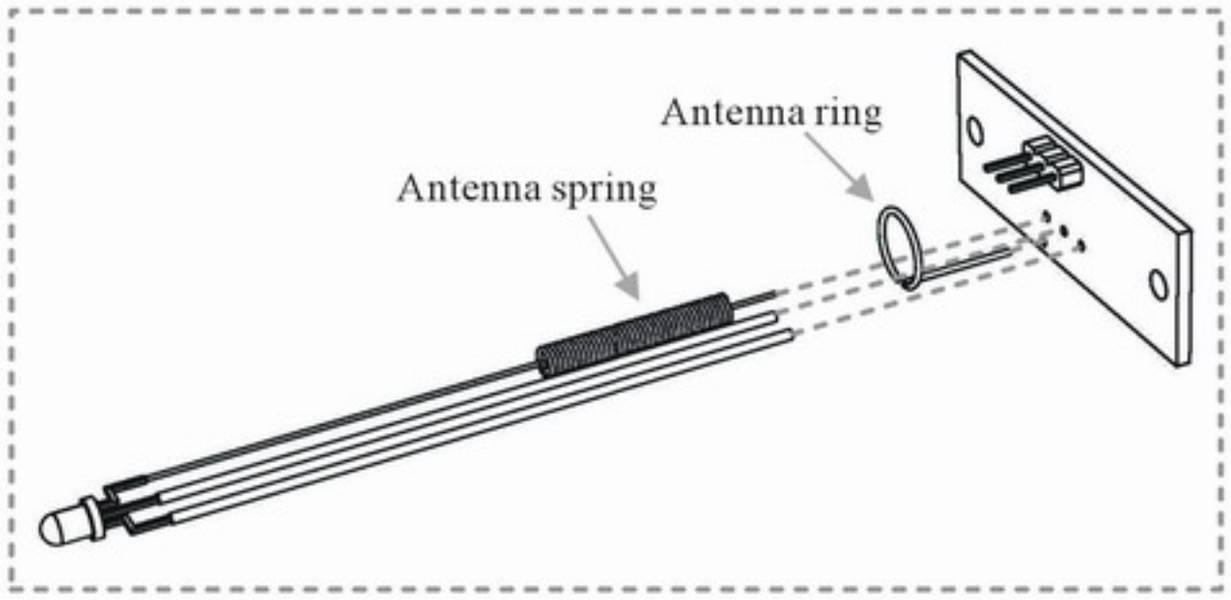
Solder the antenna rings to the PCB first. Then solder the antenna as shown.
The springs should sit in the center of the antenna rings without touching.

Once the antenna have been soldered to the head PCB mount, mount the PCB on the head piece as shown.



STEP 25: Install the tail antenna



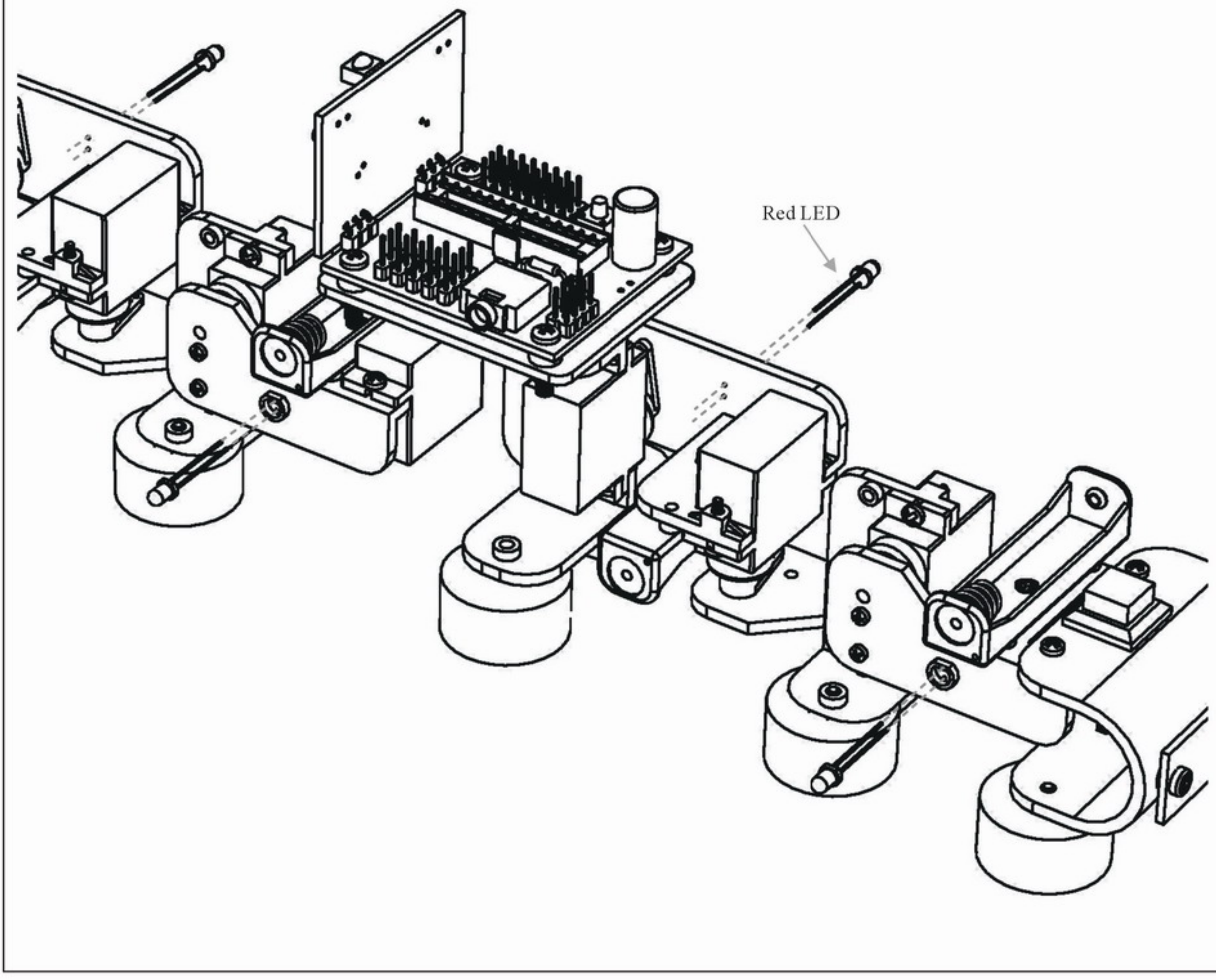


Solder the antenna ring to the PCB first.
Then solder the antenna make sure the spring does not touch the antenna ring.

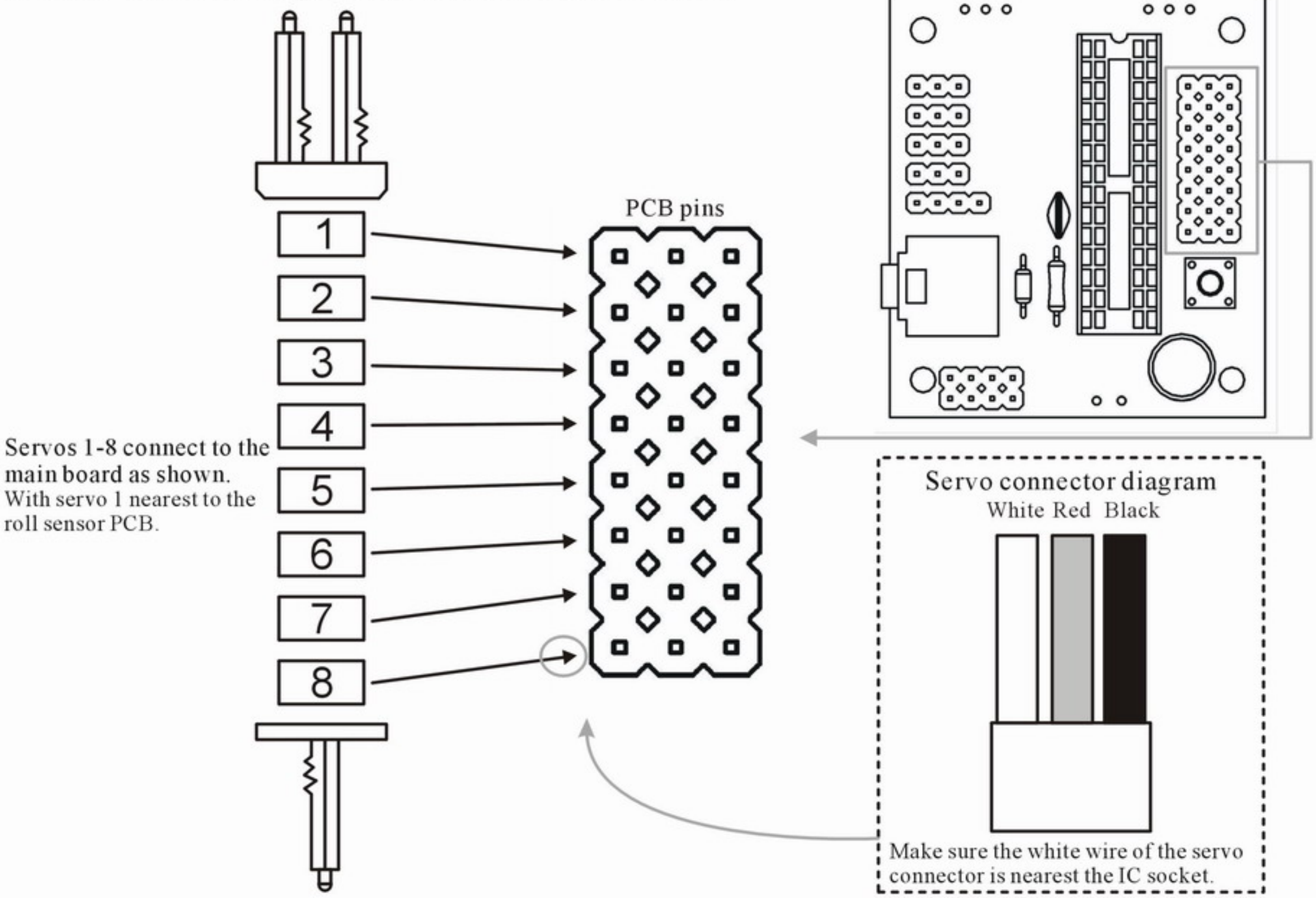
Warning: The spring is very sharp!

Self-Tapping screw
(M2.6*6)

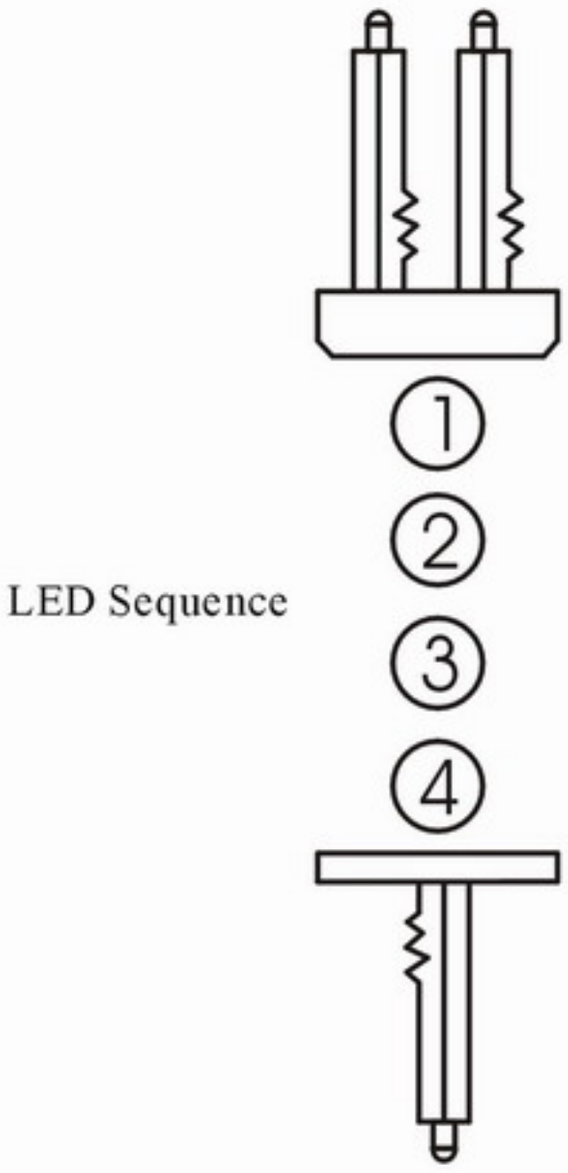
STEP 26: Mount the LEDs (4pcs)

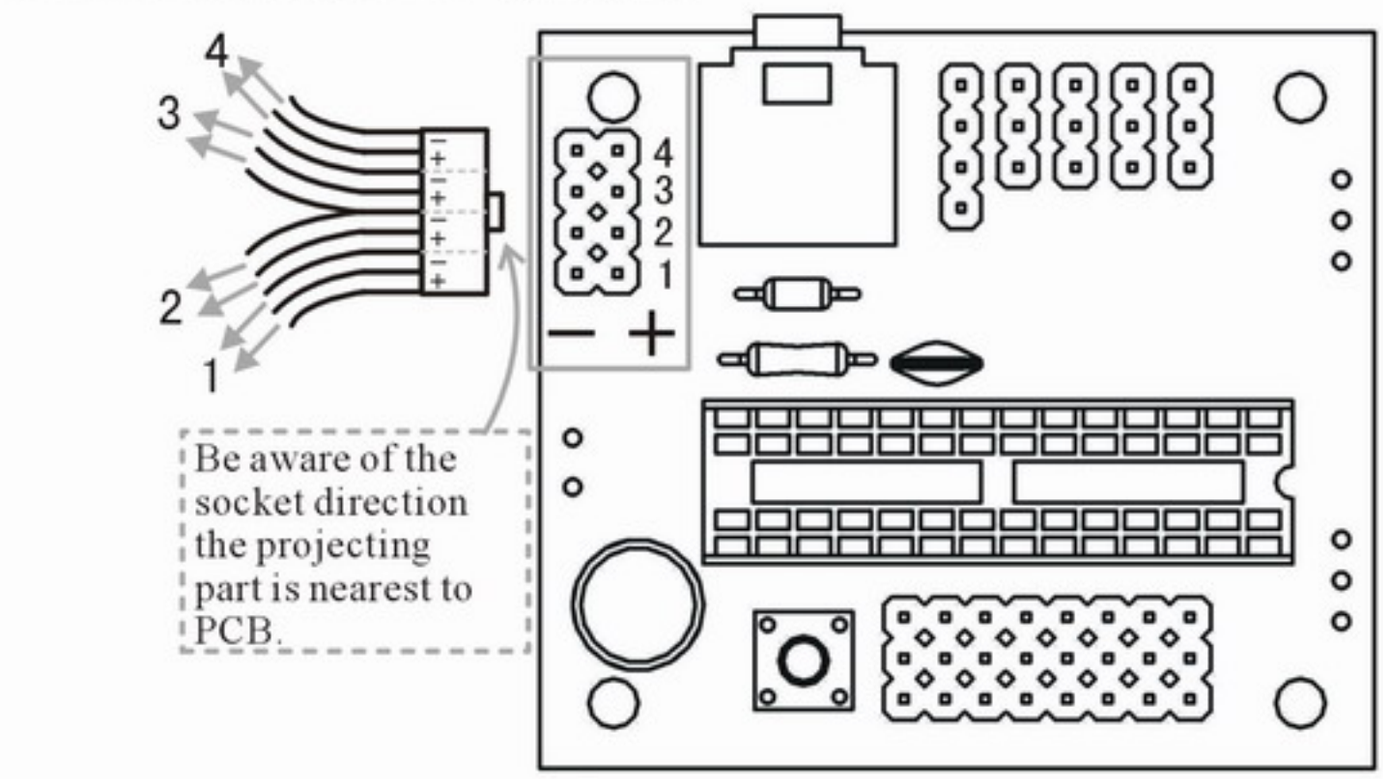


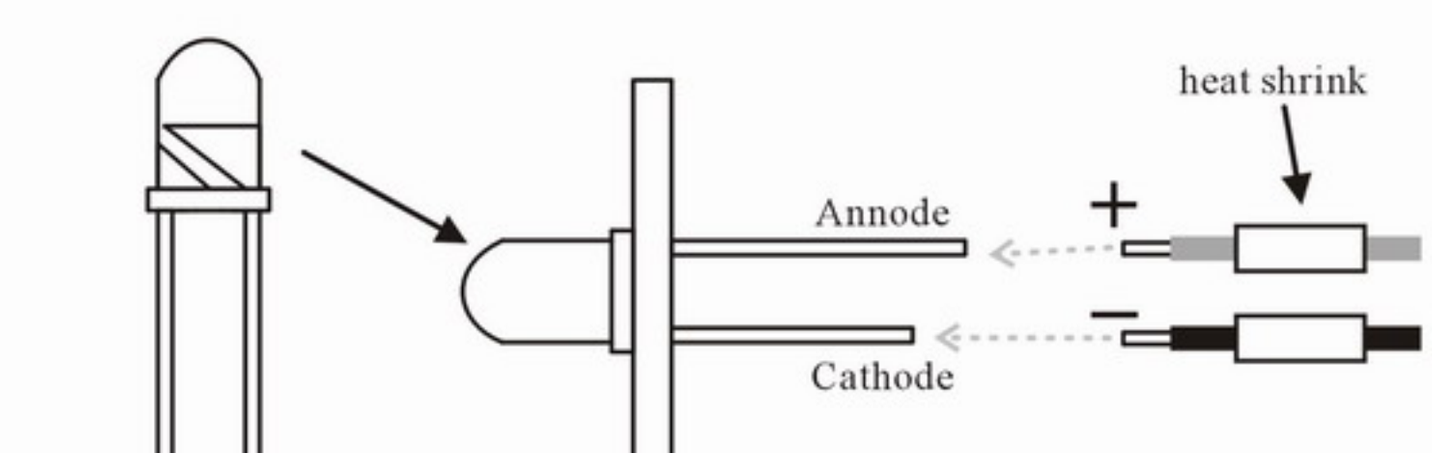
STEP 27: Connecting the servos to the main board



STEP 28: Connecting the LEDs to the main board.



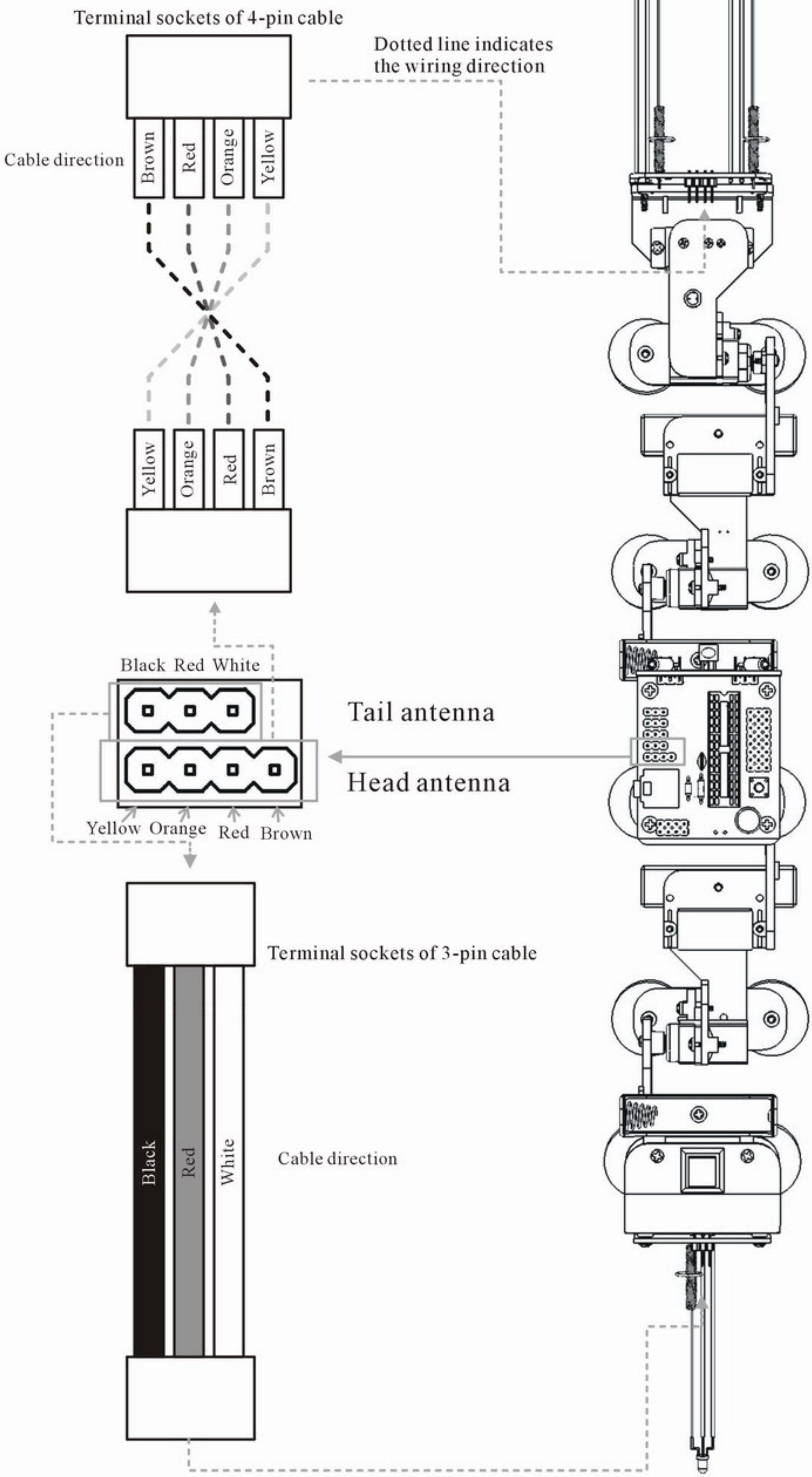




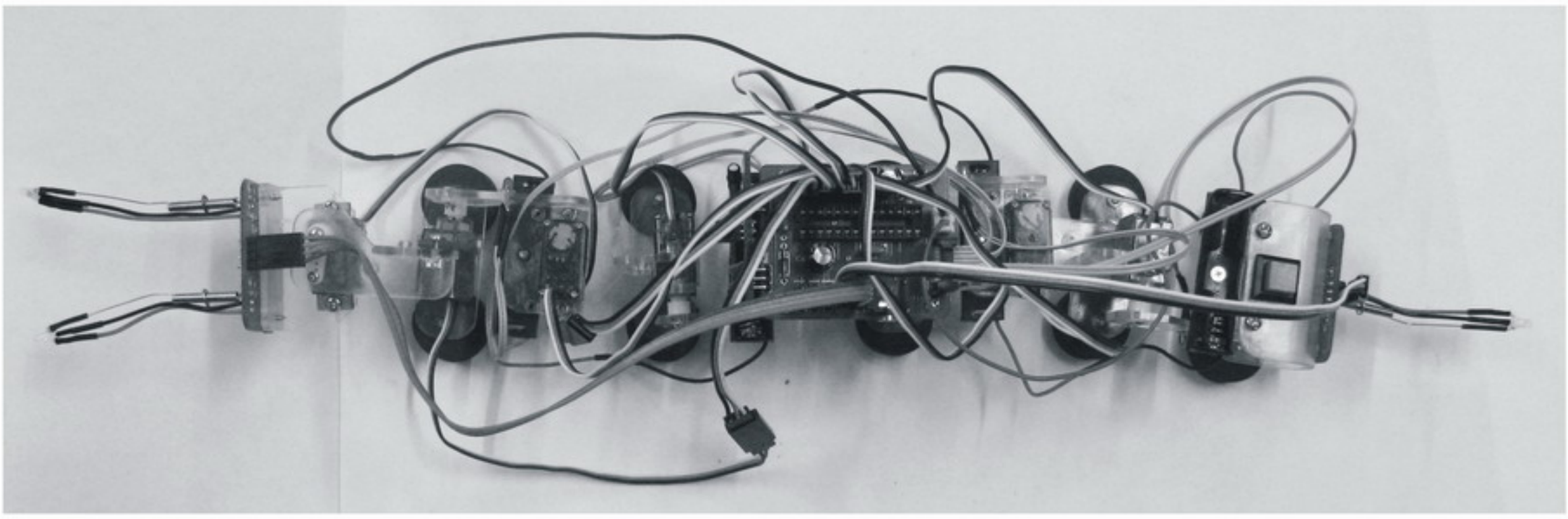
1.Cut heat shrink into pieces 15mm long.
2.Strip insulation from ends of wire.
3.Place heat shrink over wires before soldering.
4.Solder wires to LED, make sure that the positive is connected to the annode.
5.Gently heat the heat shrink with a cigarette lighter.

Warning:
Do not hold heat on the LED for longer than 1 second, otherwise the LED may be damaged.
If necessary, wait till LED cools then try again.

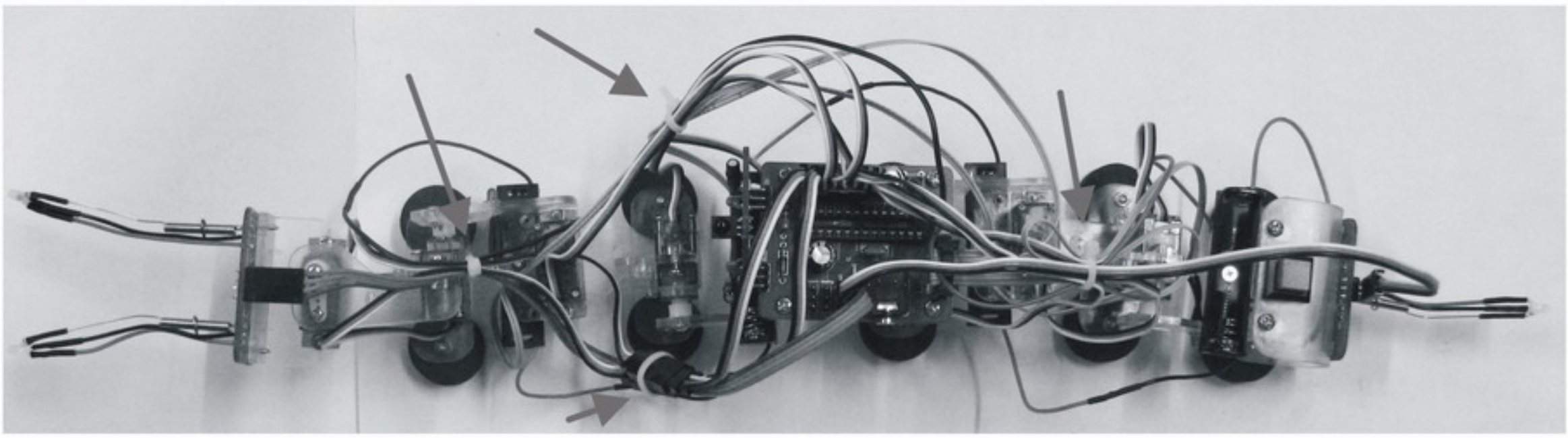
STEP 29: Connecting the head board and tail board to the main board



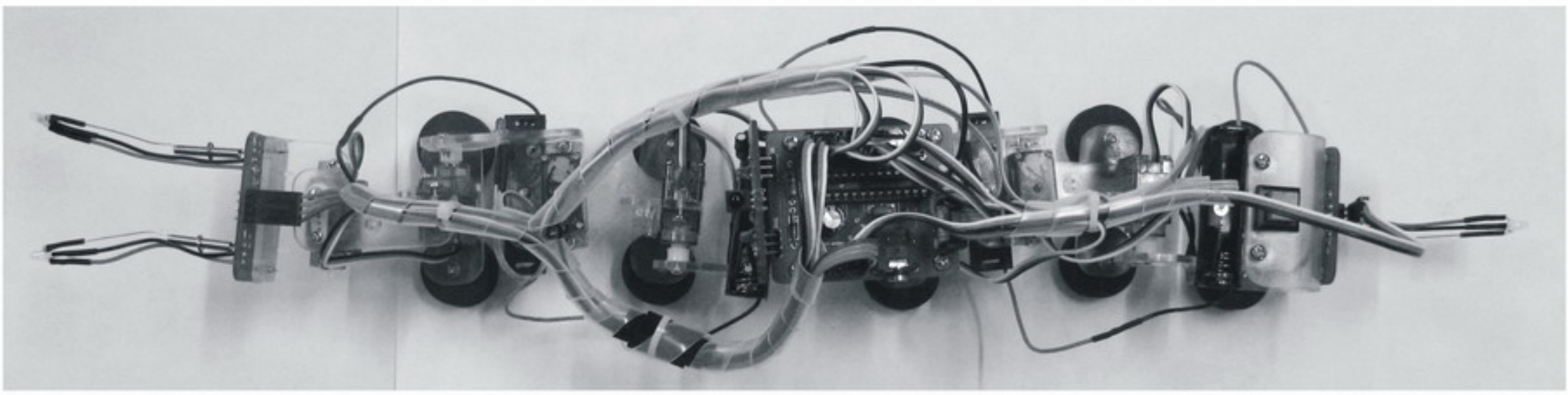
STEP 30:



Once everything is wired up, your caterpillar should look like this.
We need to tidy up the wires, but still leave enough play that the caterpillar can move freely.



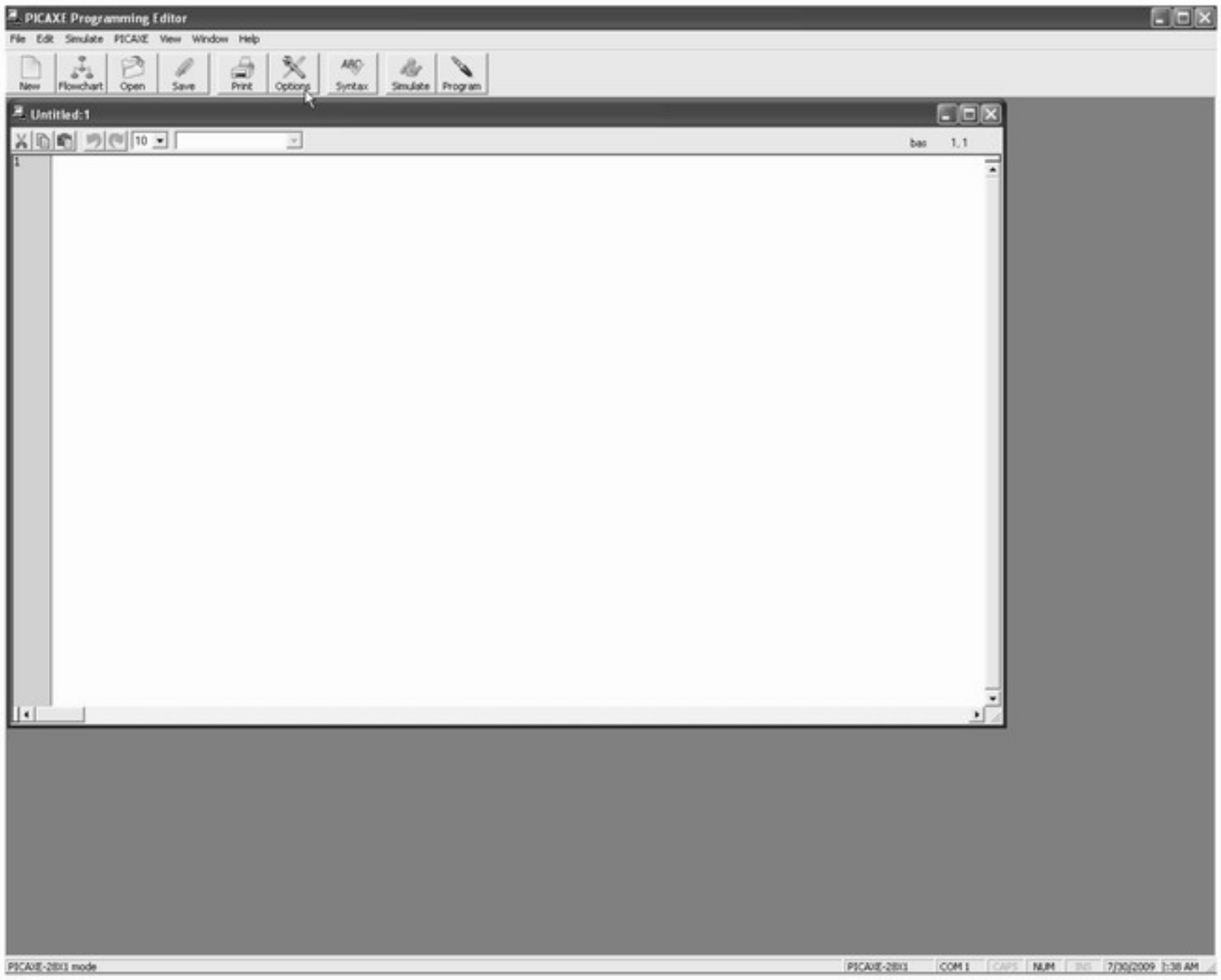
Loosely tie your cables as shown. Make sure the cable ties are not tight as you will need to ajust the cables. Gently flex the caterpillar in all directions. To check that no cables are pulling tight. Run cables both sides of the roll sensor for even weight distributions.



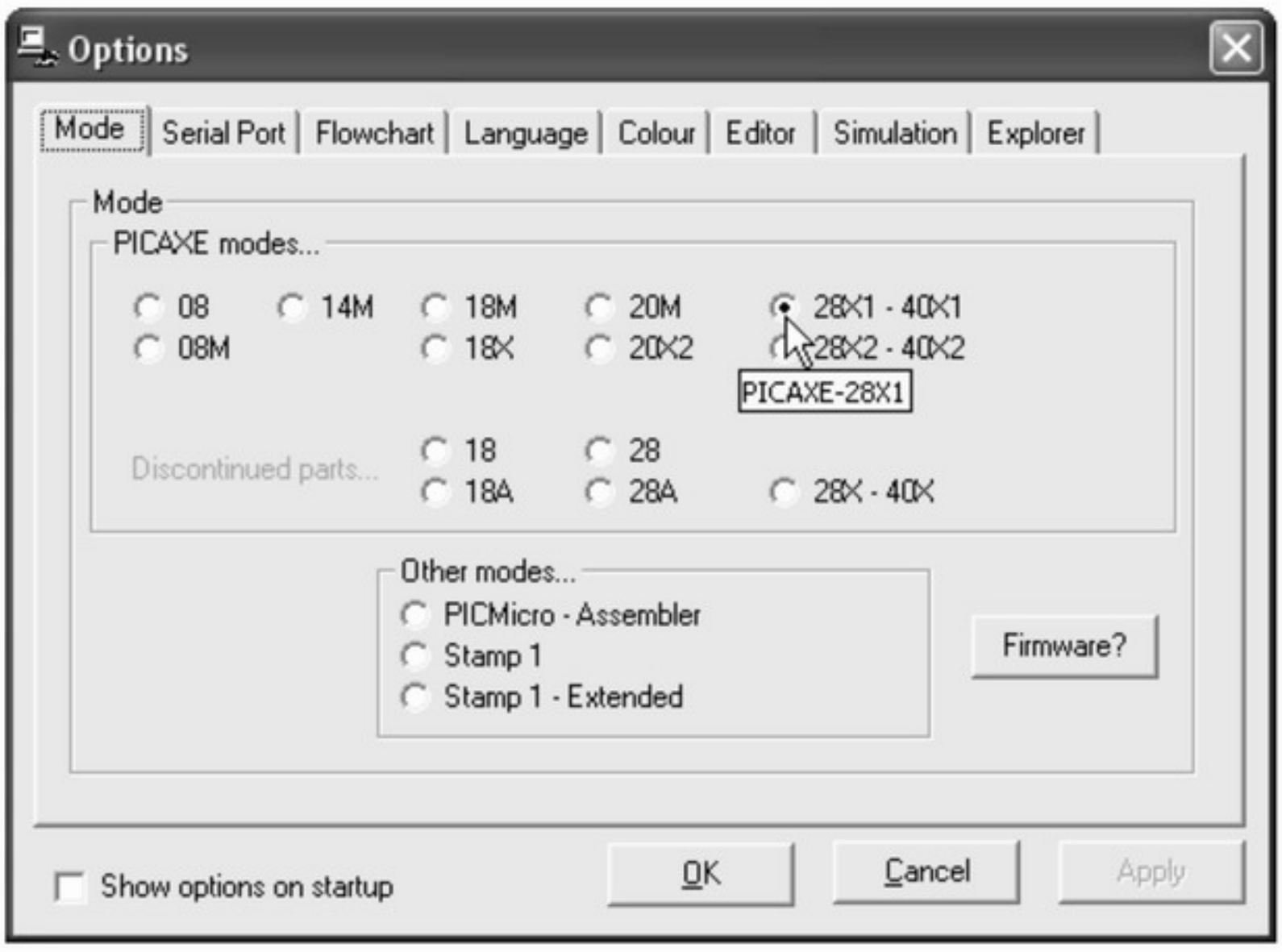
Use the spiral wrap to tidy your wires.Be particularly careful with the LED wires and battery wires. If they are not loose enough then they will fatigue and break with the constant movement of the caterpillar.

Once you have completed the caterpillar you are ready to program it. Install the program editor from the CD or you can download the latest version from http://www.rev-ed.co.uk/picaxe/

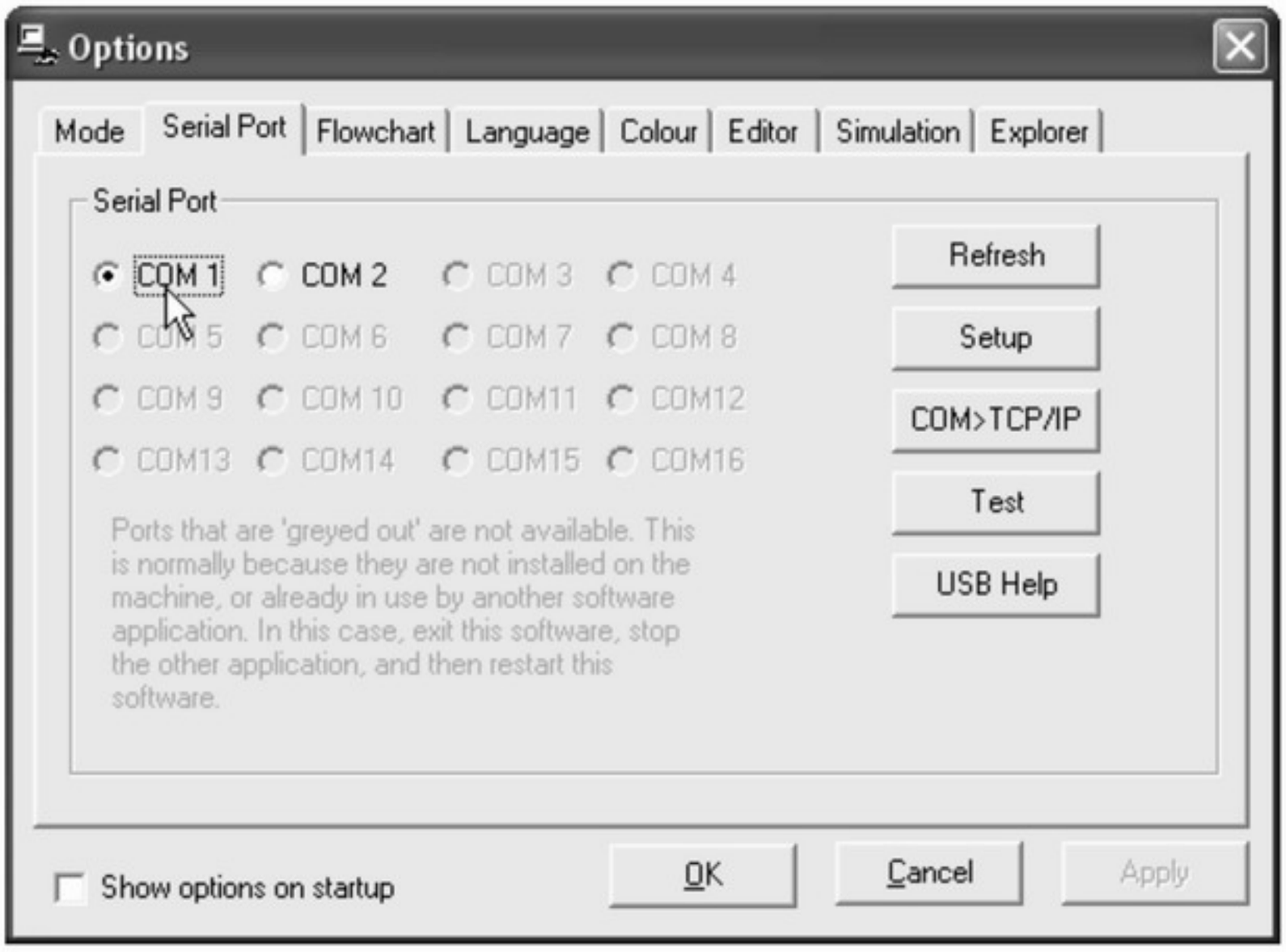
When you have the program editor running for the first time, select "Options" from the menu at the top of the screen.



You will have a list of modes available to you. For the Caterpillar select the 28X1-40X1 option.

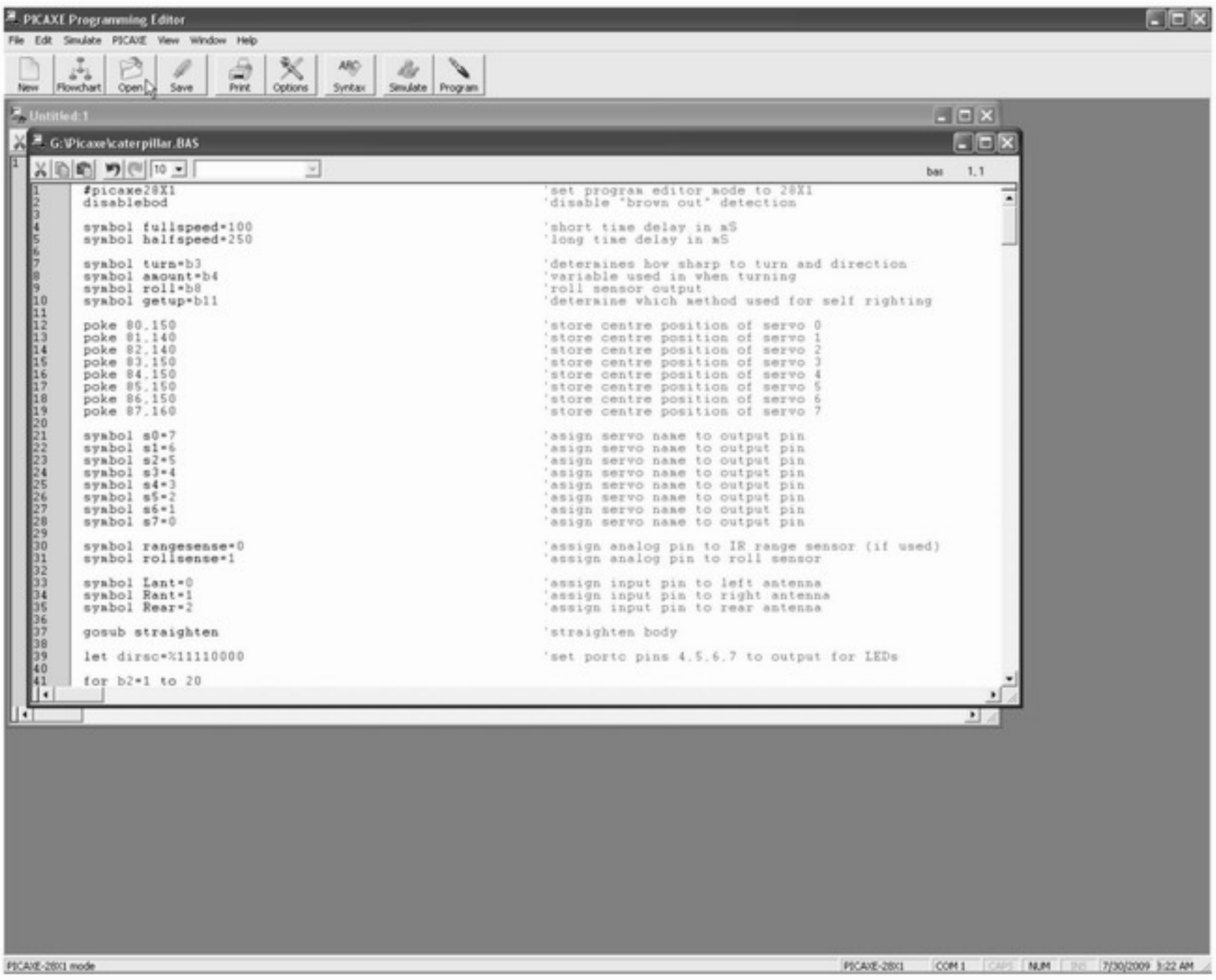


Now select the "Serial Port" tab and make sure you have selected the correct serial port. If you are using a serial cable it will probably be COM1 or COM2. If you are using a USB to serial cable then it will probably appears as COM3 or COM4. Select the apropriate port and then press "OK". The program editor is now ready to program your caterpillar.



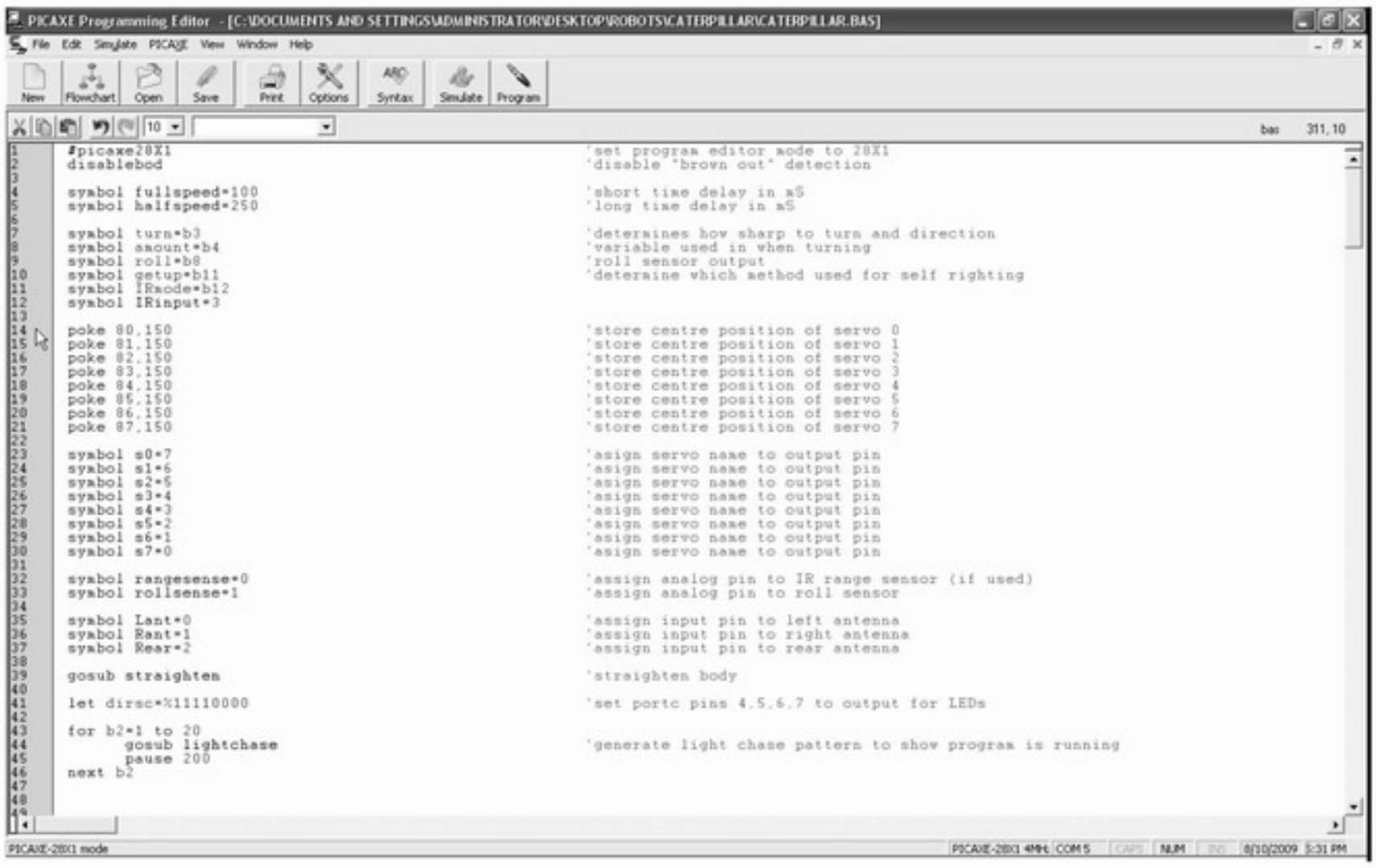
Select "Open" from the menu at the top of the screen and goto the CD-ROM. Open the Picaxe folder and you will see a program called "Caterpillar.bas"

Select the program and press the "Open" button. A window will appear with the caterpillar program in it. Make sure the serial cable is plugged into the caterpillar and that the batteries are in. Have the caterpillar turned off.



Select "Program" from the menu at the top of the screen, A window with a task bar will appear. Now turn on the caterpillar, the taskbar should move forward,backward and forward again as the program is loaded. When the program has loaded successfully and the caterpillar lights start flashing, turn off the caterpillar and remove the serial cable.

Place the caterpillar on the floor and turn it on. The antenna should light up green and the lights on the caterpillars sides should chase. If any of the antenna are orange/red when they are not touching anything then turn off the caterpillar and adjust the antenna or antenna ring so that they are not touching.



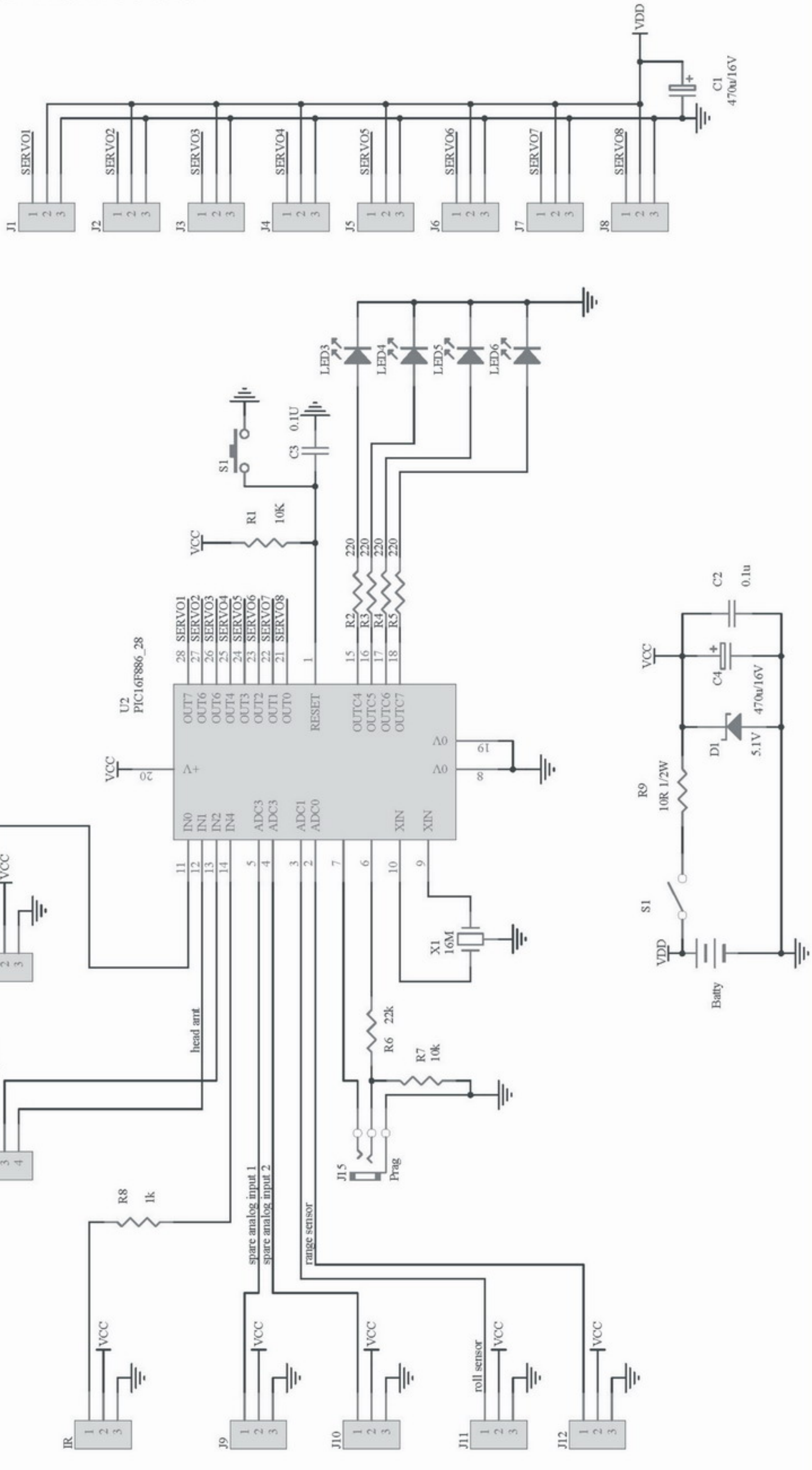
Once your caterpillar is finished and you power it up for the first time you may find that it is not very straight. By adjusting the servo center values at the start of the program you can correct this problem. A value of 150 is the theoretical center position but can vary from 130 to 170 depending on the individual servo and how well you centered your servos during construction.

The caterpillar should now crawl along the floor. When the head antenna touch an object then the caterpillar should respond by backing away and turning away from the object. If the tail antenna is touched when backing up the caterpillar should stop backing up. If the tail antenna is touched while going forward then it should turn around to investigate. If the caterpillar gets knocked over then it will get back on it's feet. With a universal remote set to the appropriate "SONY TV" code you can take control your caterpillar by remote.

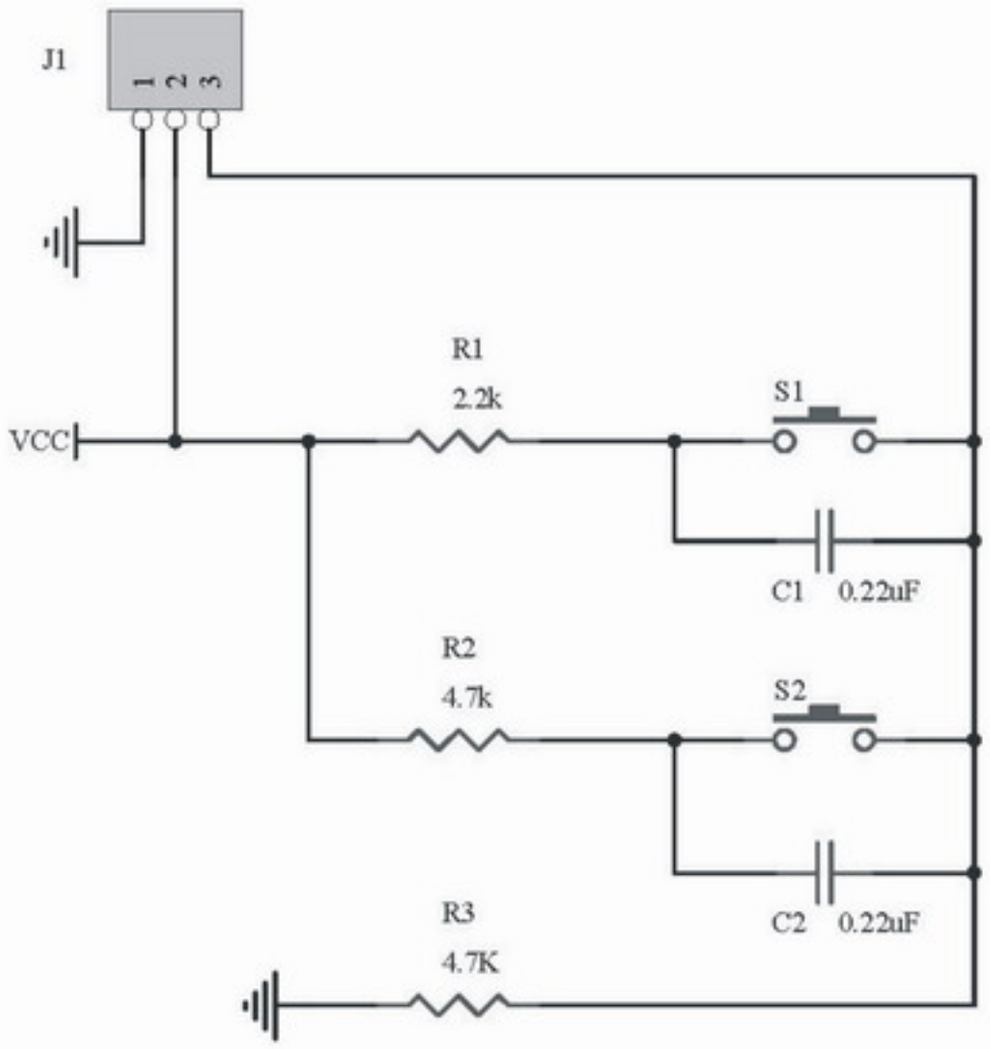
It is now up to you to experiment with the program. You can use the existing movement subroutines or create new ones. Add a "SHARP GP2D12" so that the caterpillar can detect objects before it touches them. Connecting a suitable radio transceiver to the program sock et will allow serial communications between a PC and the caterpillar while it is running.

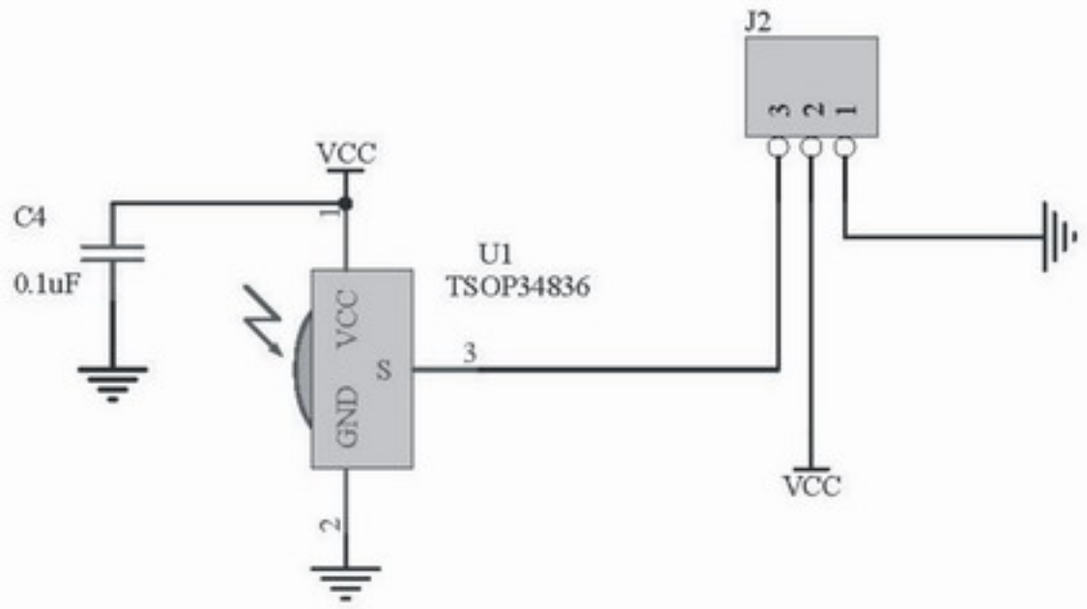
There are 3 analog inputs available (including the range sensor input) for additional sensors to be added.

Caterpillar main board

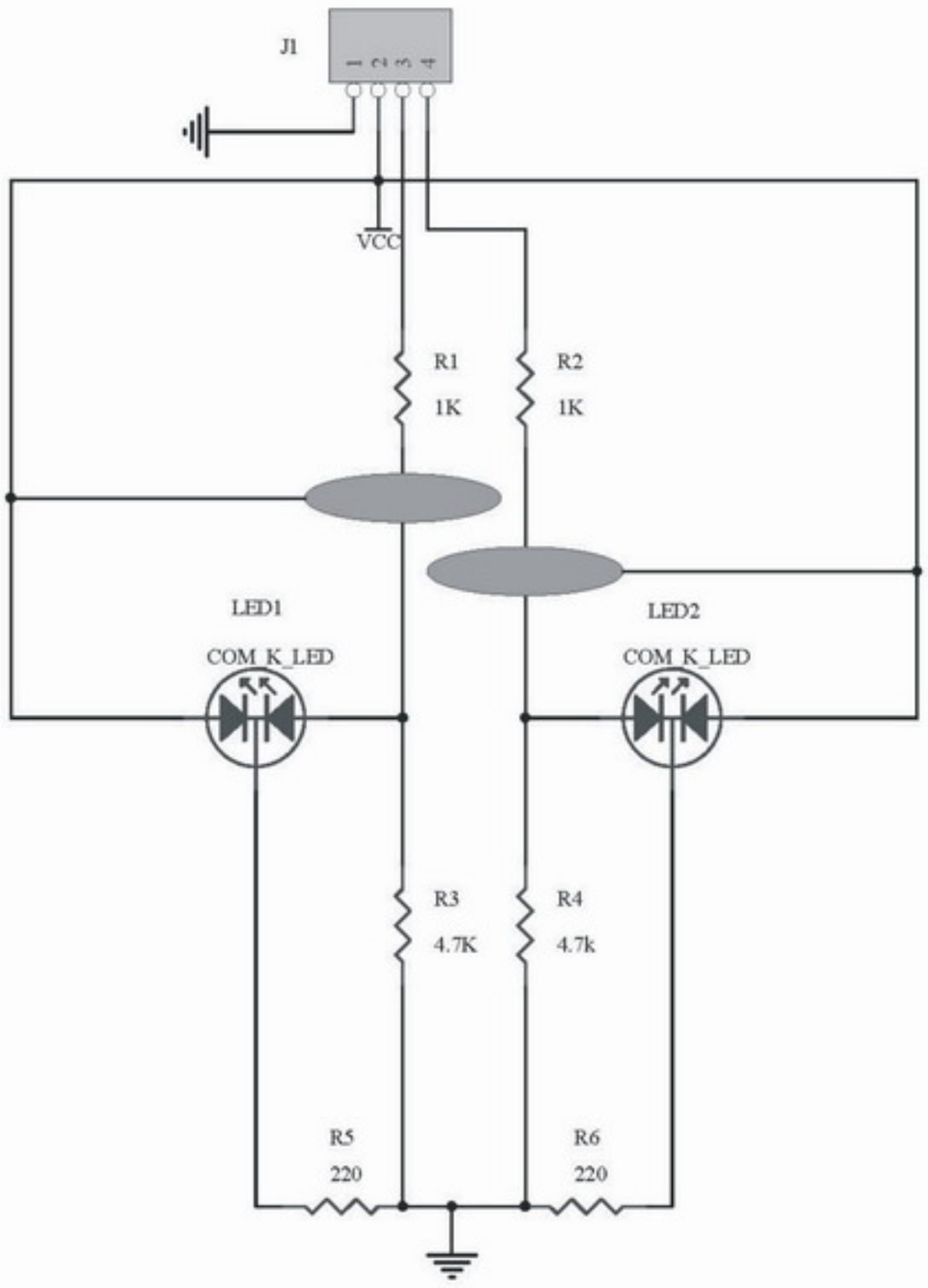


Roll sensor





Head Antenna



Tail Antenna