Making Music with Makeblock

by **Makerworks** on June 17, 2013

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Intro: Making Music with Makeblock

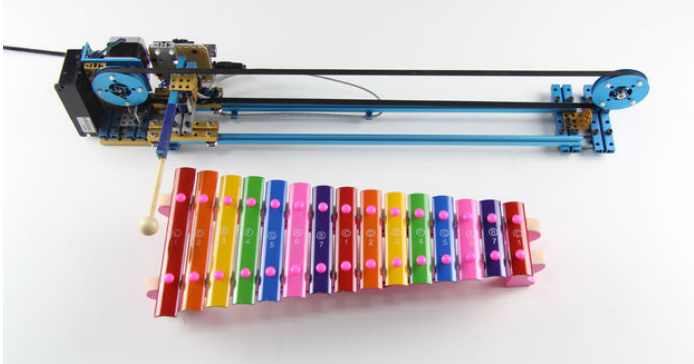
Makeblock is an aluminum extrusion based construction system that provides an integrated solution for aspects of mechanics, electronics and software design. With Makeblock you can make professional robots, toy machines or even art-ware. It's super easy-to-use and helps bring your creations to life. The only limit is your imagination.

For more information, please visit Makeblock website listed below:
http://makeblock.cc/

The Music Robot was built with the timing belt, sliding rail, step motor, electromagnet, motor driver and an Arduino Uno. And even you can build a play the piano robot with Makeblock by yourself.

So far the robot can be controlled by application via USB cable installed on computer, and it can also be controlled by the Smartphone through the Bluetooth. The special application for Android Phone is in planning.

Getting Started
This instructable, Making Music with Makeblock, will show you the step-by-step instructions on how to build a robot to play the Xylophone by Makeblock.
Now let's have some fun!

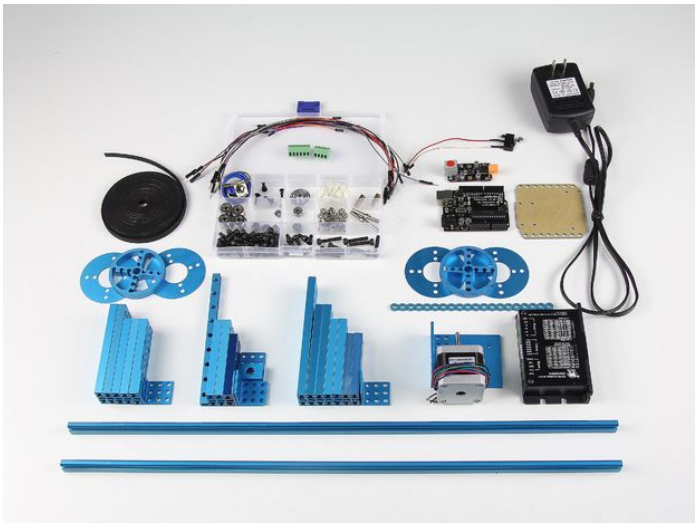


Step 1: Materials list

Materials list:
1 × Beam 0808-144
3 × Beam 0824-64
7 × Beam 0824-80
4 × Beam 0824-96
1 × Beam 0824-128
4 × Bracket 3×3
1 × Bracket P3
1 × Step Motor Bracket
2 × Timing Pulley 90T
4 × Timing Pulley Slice 90T
1 × Link Rod
1 × Rubber band
2 × Slider 496
1 × Timing Belt
8 × Bearing for Slider
4 × Flange Bearing 4×8×3mm
1 × Shaft Connector 4mm
2 × Threaded Shaft 4×31mm
2 × Shaft Collar 4mm
2 × Headless Screw M3×5
2 × Copper Stud M4-15
12 × Plastic Rivet R4120
4 × Plastic Rivet R3075
2 × Countersunk Screw M3×8
14 × Screw M4×8
49 × Screw M4×14
8 × Screw M4×22
26 × Nut M4

Electronic Modules List:
1 × Arduino
1 × Acrylic Arduino Bracket
1 × Me – Motor Driver
1 × Limit Switch
1 × Step Motor
1 × Step Motor Controller
1 × Solenoid - 12v
1 × Wall Adapter Power Supply - 12VDC
Jumper Wires

Xylophone:
1 × Xylophone
1 × Xylophone Hammer



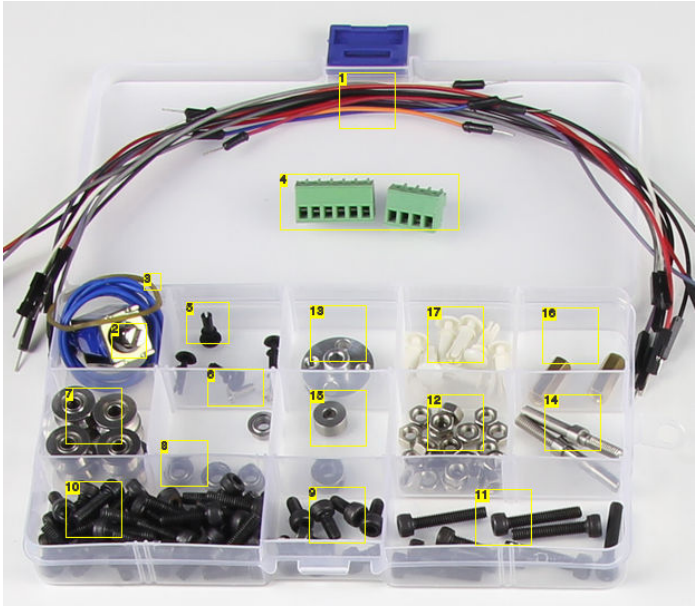


Image Notes
1. Jumper Wires
2. Solenoid - 12v
3. Rubber band
4. Step Motor Controller Screw Terminals
5. Plastic Rivet R3075
6. Countersunk Screw M3×8
7. Bearing for Slider
8. Flange Bearing 4×8×3mm
9. Screw M4×8
10. Screw M4×14
11. Screw M4×22
12. Nut M4
13. Shaft Connector 4mm
14. Threaded Shaft 4×31mm
15. Shaft Collar 4mm
16. Copper Stud M4-15
17. Plastic Rivet R4120

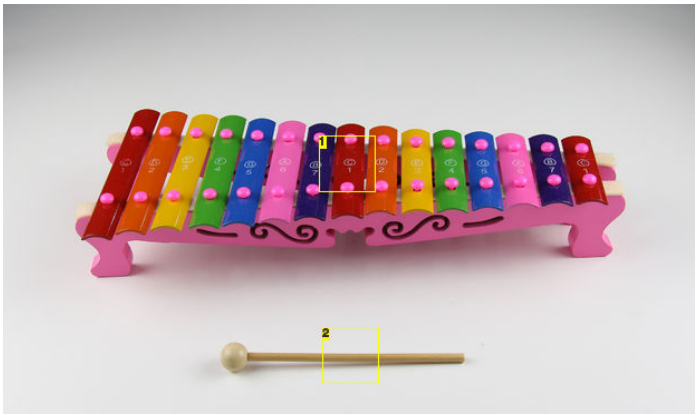


Image Notes
1. Xylophone
2. Xylophone hammer

Step 2: Tools

Tools

1.5mm Hexagonal Screwdriver

3mm Hexagonal Screwdriver

Cross Screwdriver

Slotted Screwdriver

Pincer Pliers

Scissors

Glue Gun

Adhesive Tape

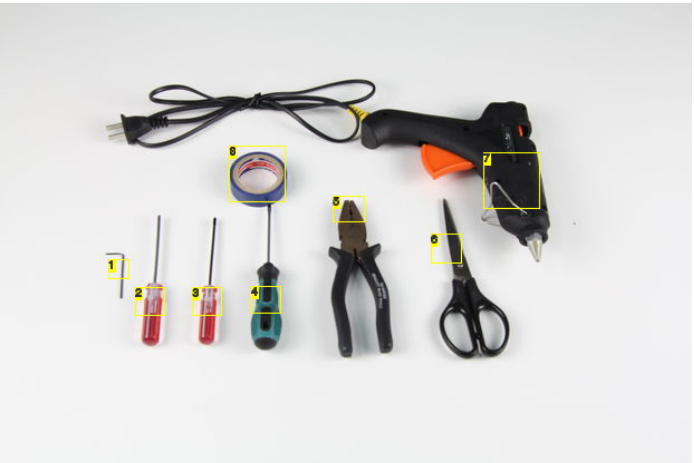


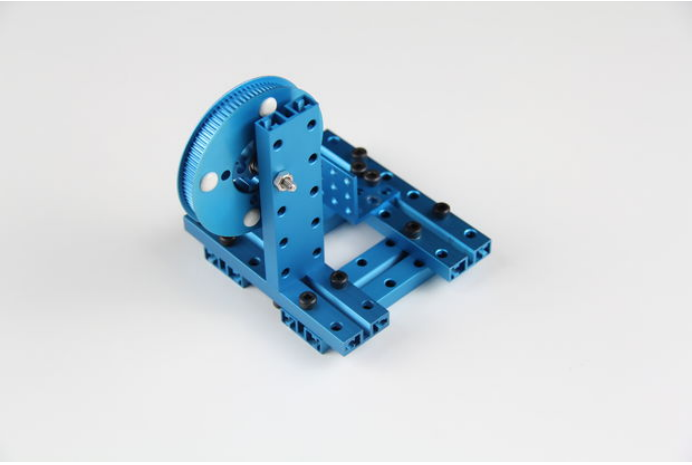
Image Notes
1. 1.5mm Hexagonal Screwdriver
2. 3mm Hexagonal Screwdriver
3. Cross Screwdriver
4. Slotted Screwdriver
5. Pincer Pliers
6. Scissors
7. Glue Gun
8. Adhesive Tape

Step 3: Driven Pulley Holder

Materials List:
3 × Beam 0824-80
2 × Beam 0824-96
1 × Bracket 3×3
1 × Timing Pulley 90T
2 × Timing Pulley Slice 90T
4 × Plastic Rivet R4120
2 × Flange Bearing 4×8×3mm
1 × Threaded Shaft 4×31mm
1 × Shaft Collar 4mm
1 × Headless Screw M3×5
2 × Screw M4×8
1 × Nut M4
10 × Screw M4×14

Procedure:
1. Install the Beam 0824-80 on Beam 0824-96 by using a Screw M4×14.
2. Install the other 3 Screw M4×14.
3. Install another Beam 0824-80 on Beam 0824-96 with 4 Screw M4×14.
4. Install the Beam 0824-80 on Beam 0824-96 to make a Driven Pulley Holder.
5. Install the Bracket 3×3 on Beam 0824-96 with 2 Screw M4×8.
6. Put a Timing Pulley Slice 90T on the Timing Pulley 90T.
7. Insert a Plastic Rivet R4120 into the holes on the Timing Pulley Slice 90T and the Timing Pulley 90T.
8. Insert the other 3 Plastic Rivet R4120.
9. Turn over the Timing Pulley Slice 90T and the Timing Pulley 90T.
10. Put the other Timing Pulley Slice 90T on the Timing Pulley 90T.
11. Press the Plastic Rivet R4120.
12. Insert the Threaded Shaft 4×31mm into the Flange Bearing 4×8×3mm.
13. Insert the Threaded Shaft 4×31mm with the Flange Bearing 4×8×3mm into the Timing Pulley 90T.
14. Insert the other Flange Bearing 4×8×3mm into the Timing Pulley 90T.
15. Put the Shaft Collar 4mm on the Threaded Shaft 4×31mm.
16. Insert a Headless Screw M3×5 into the Shaft Collar 4mm.

17. Install the Driven Pulley on the holder.



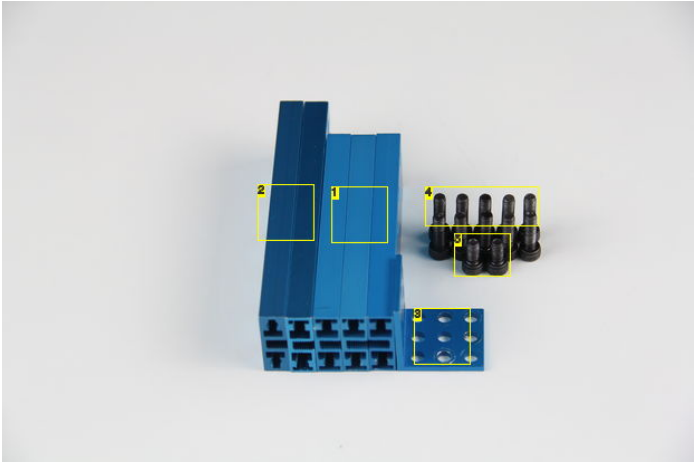
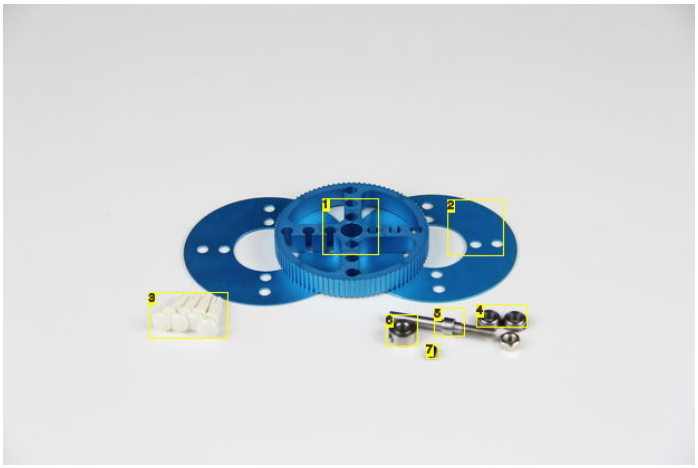


Image Notes
1. Beam 0824-80
2. Beam 0824-96
3. Bracket 3×3
4. Screw M4×14
5. Screw M4×8



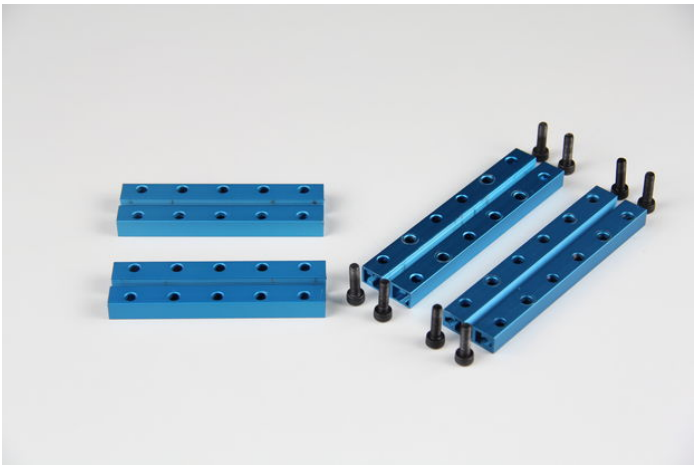
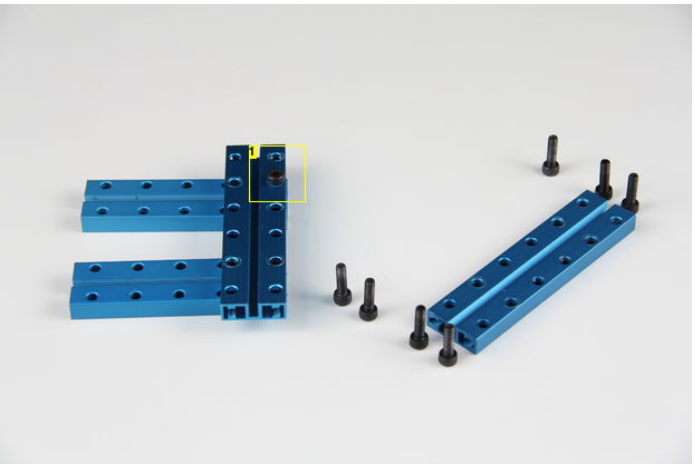


Image Notes
1. Timing Pulley 90T
2. Timing Pulley Slice 90T
3. Plastic Rivet R4120
4. Flange Bearing 4×8×3mm
5. Threaded Shaft 4×31mm
6. Shaft Collar 4mm
7. Headless Screw M3×5



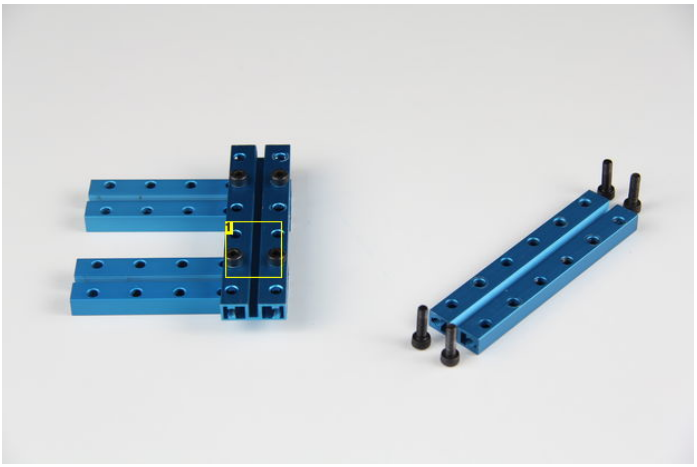


Image Notes
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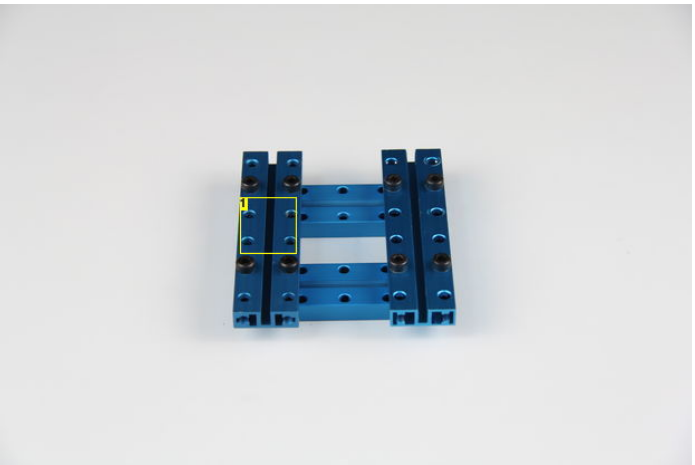


Image Notes
1. Step 2

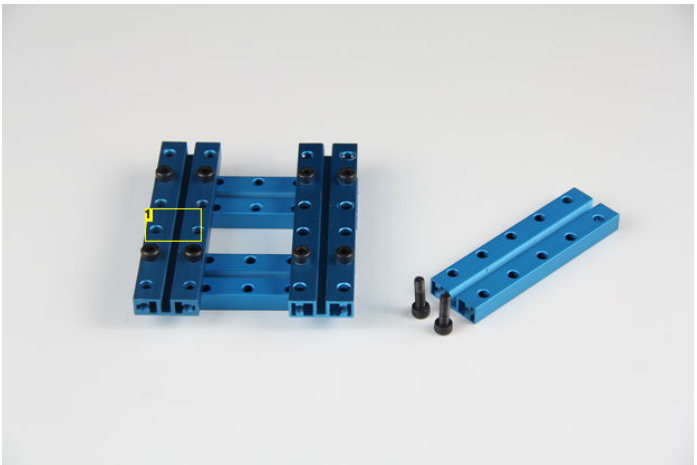


Image Notes
1. Step 3

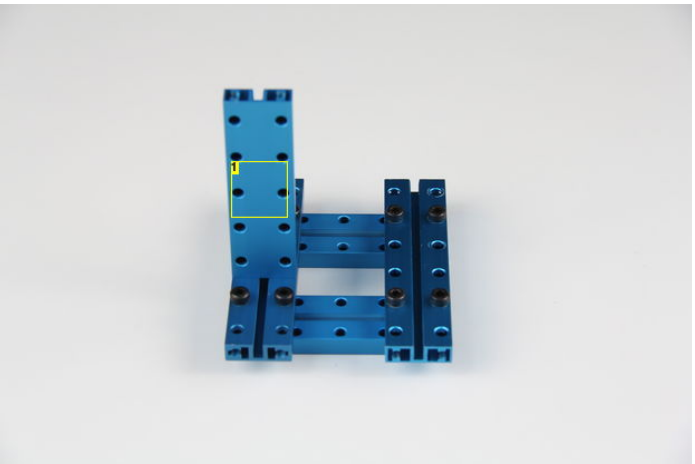


Image Notes
1. Install the Beam 0824-80 here by using two Screw M4×14 from the buttom of Beam 0824-96.

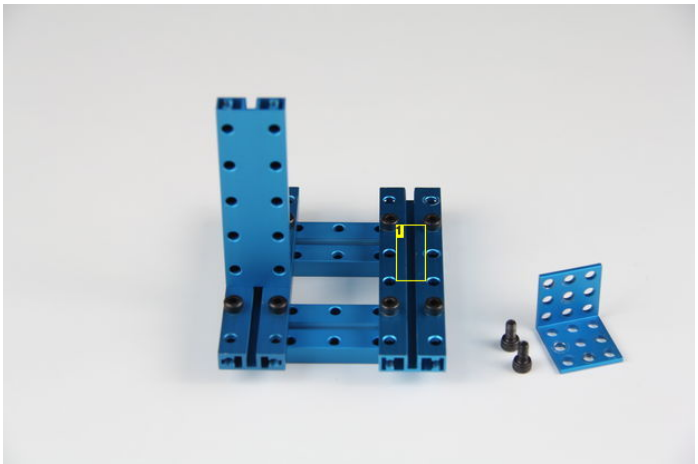


Image Notes
1. Step 4

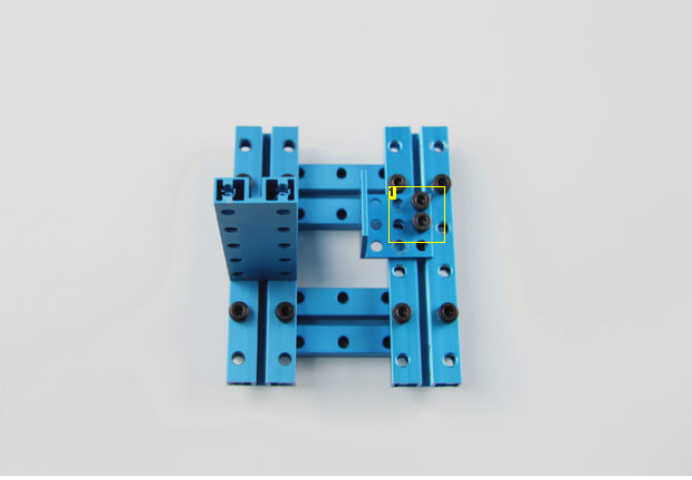


Image Notes
1. Install the Bracket 3×3 here.

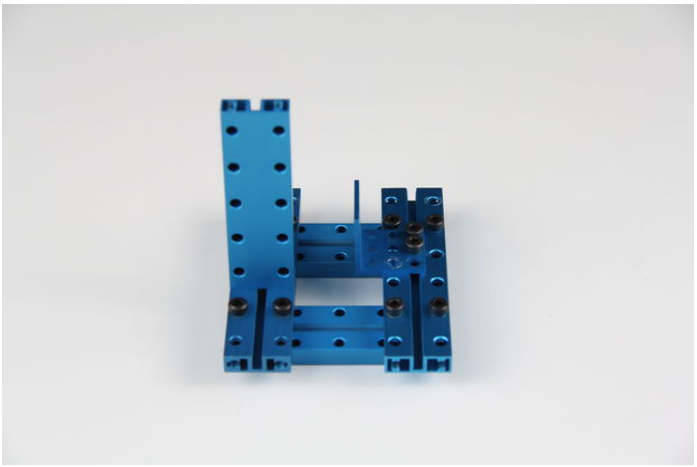


Image Notes
1. Step 5

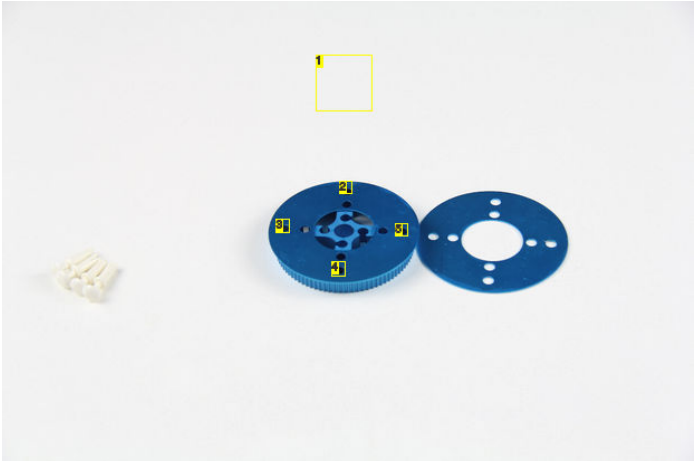


Image Notes
1. Step 6
2. Insert the Plastic Rivet R4120 here.
3. Insert the Plastic Rivet R4120 here.
4. Insert the Plastic Rivet R4120 here.
5. Insert the Plastic Rivet R4120 here.

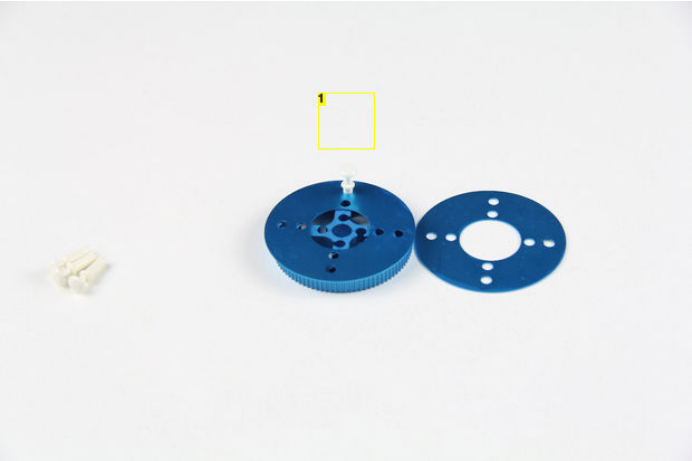


Image Notes
1. Step 7

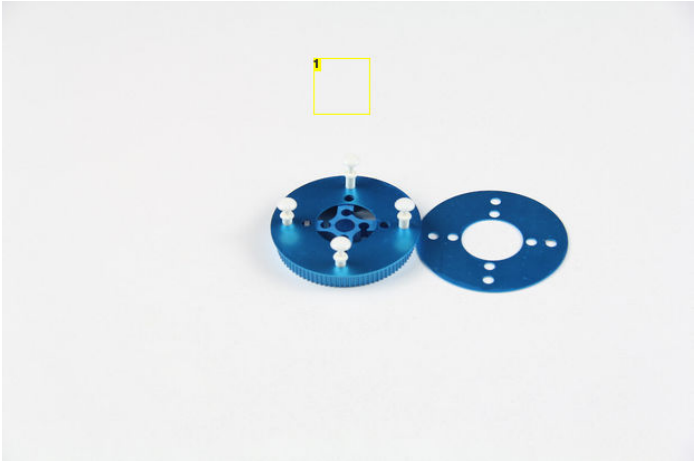


Image Notes
1. Step 8

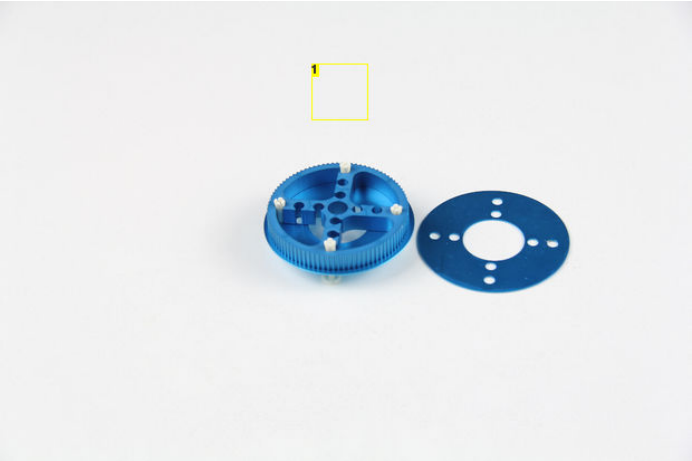


Image Notes
1. Step 9

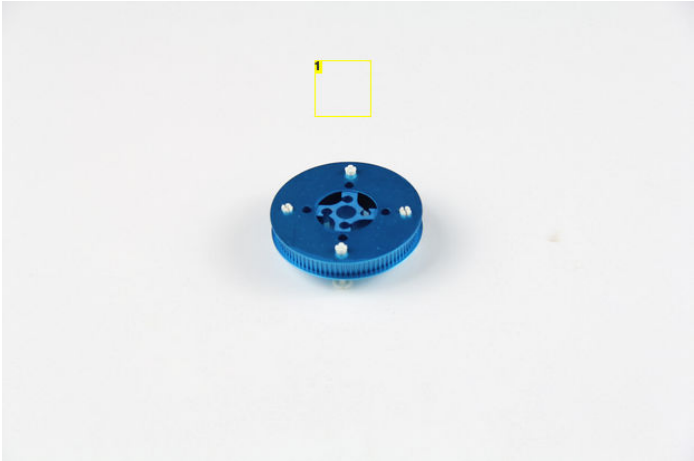
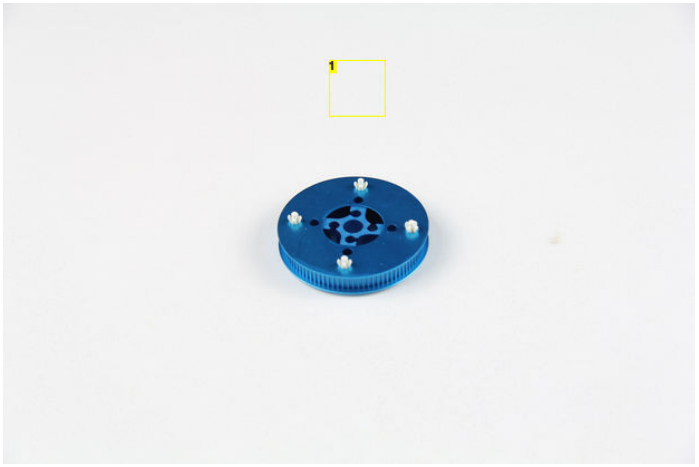


Image Notes
1. Step 10



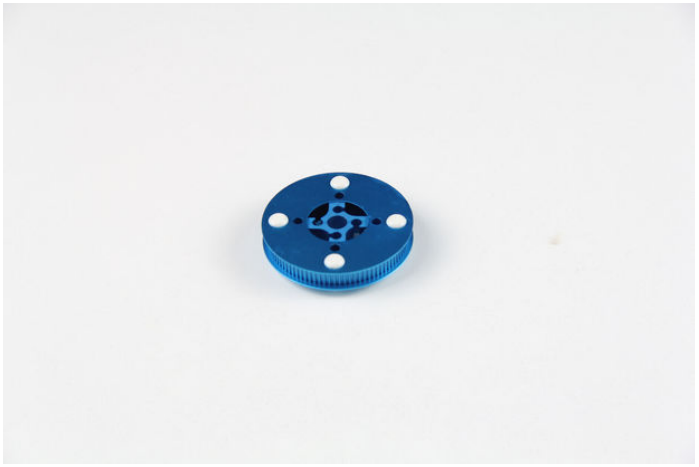
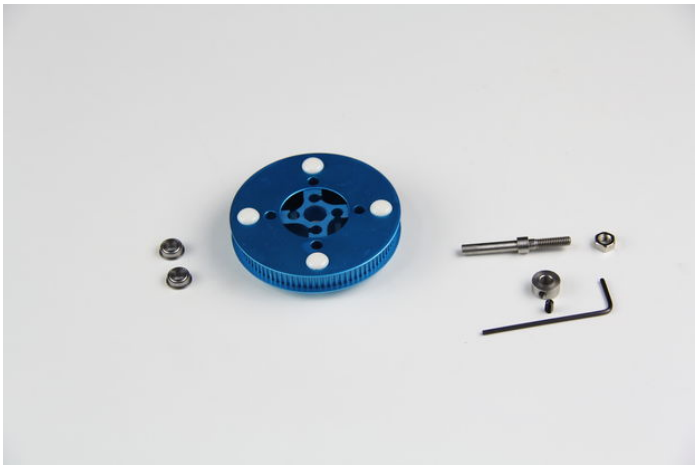
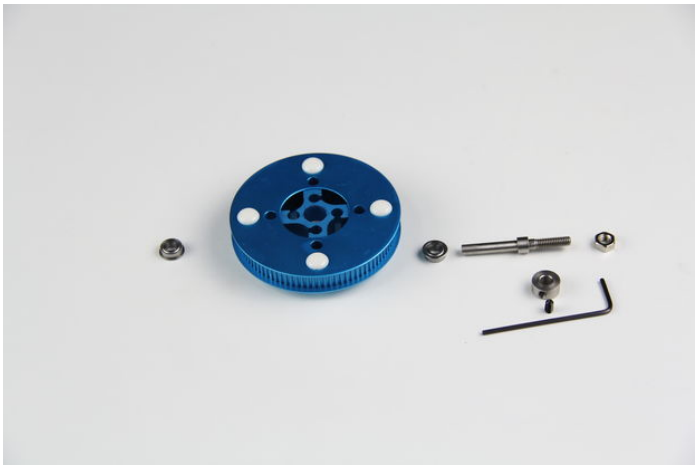


Image Notes
1. Step 11





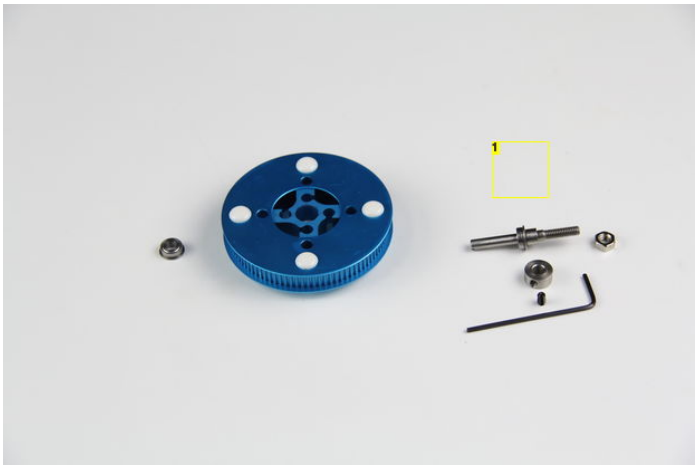


Image Notes
1. Step 12

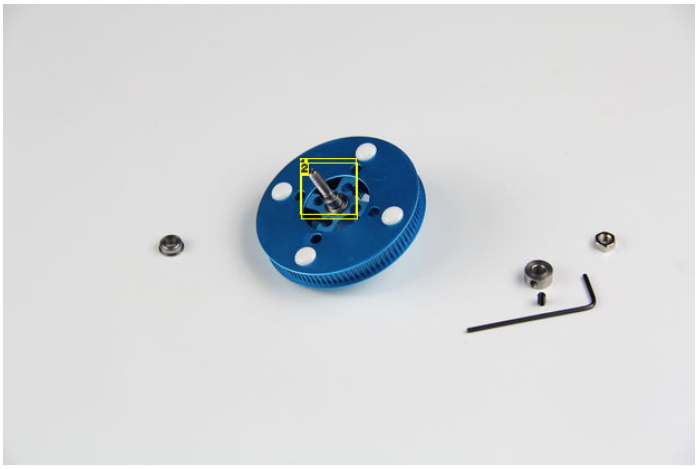


Image Notes
1. Step 13
2. Step 13

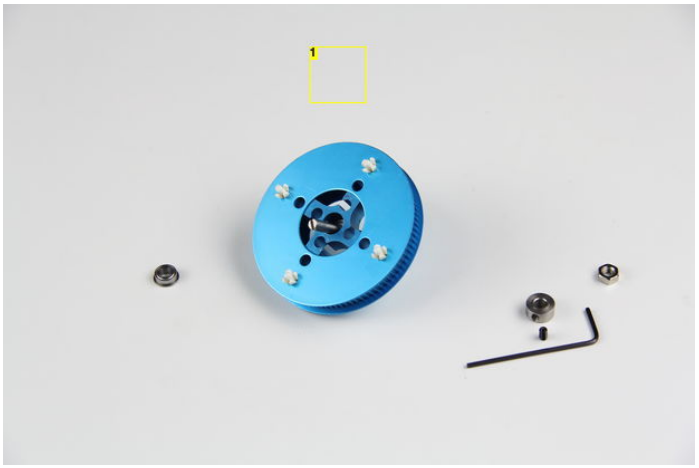


Image Notes
1. Turn over the Driven Pulley

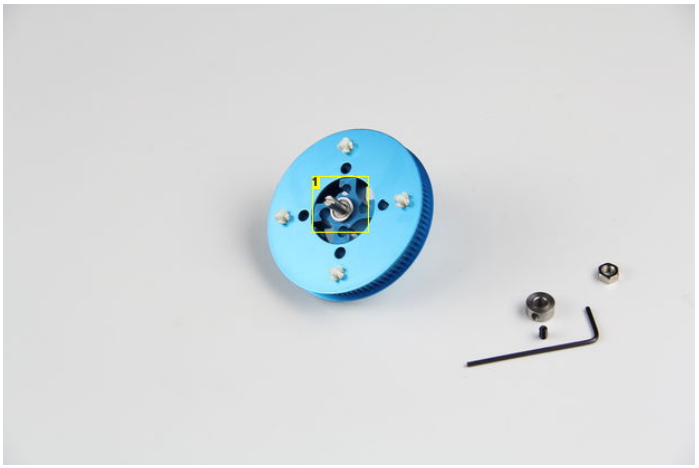


Image Notes
1. Step 14

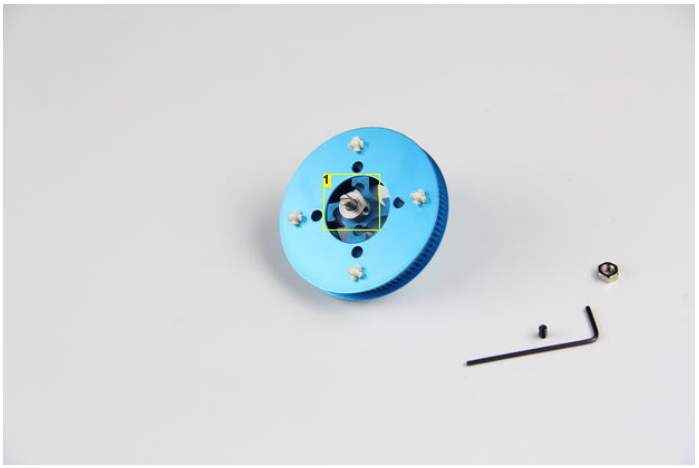


Image Notes
1. Step 15

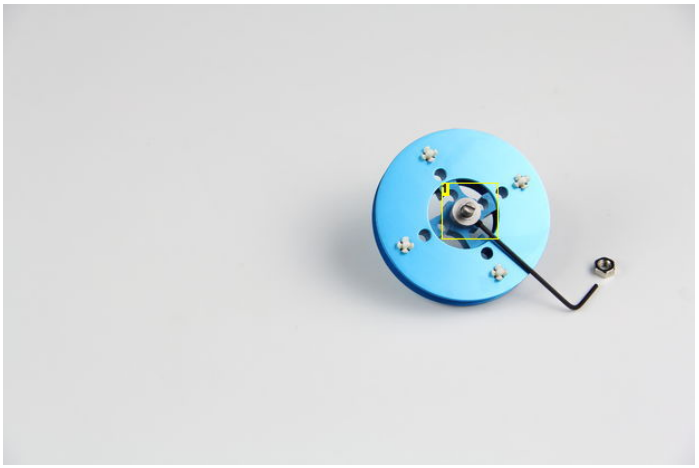
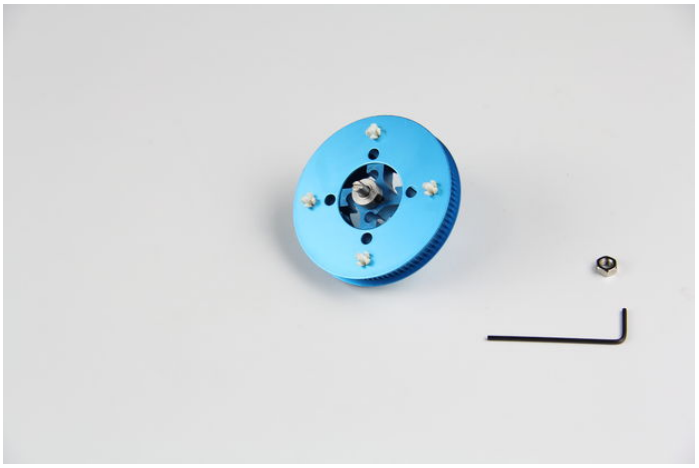


Image Notes
1. Step 16



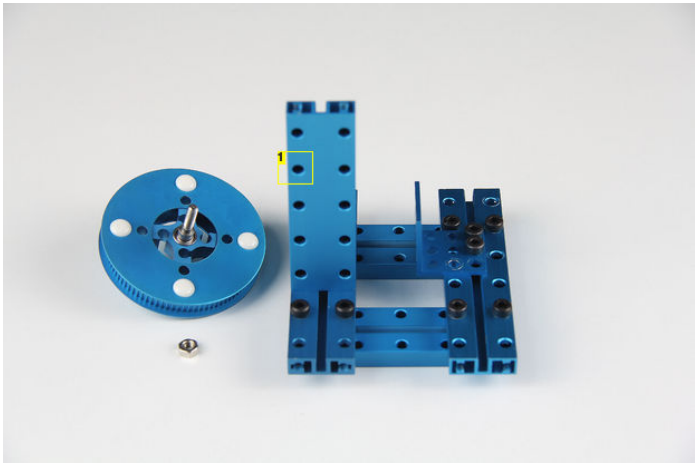


Image Notes
1. Install the Driven Pulley here.

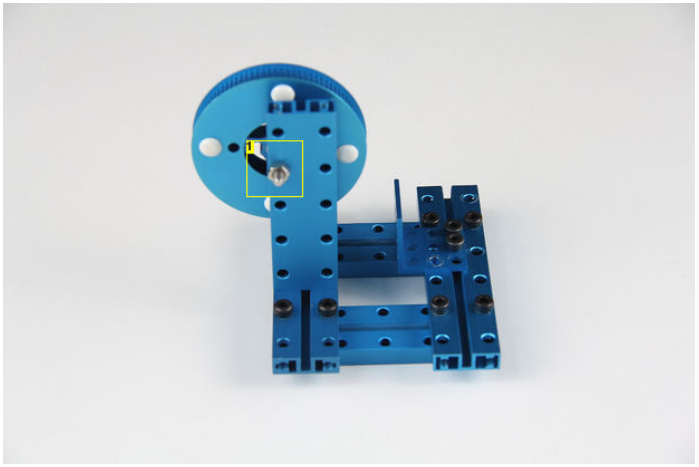


Image Notes
1. Step 17

Step 4: Cut Link Rod

Materials list:
1 × Link Rod

Procedure:
Cut the Link Rod by using the Pincer Pliers.

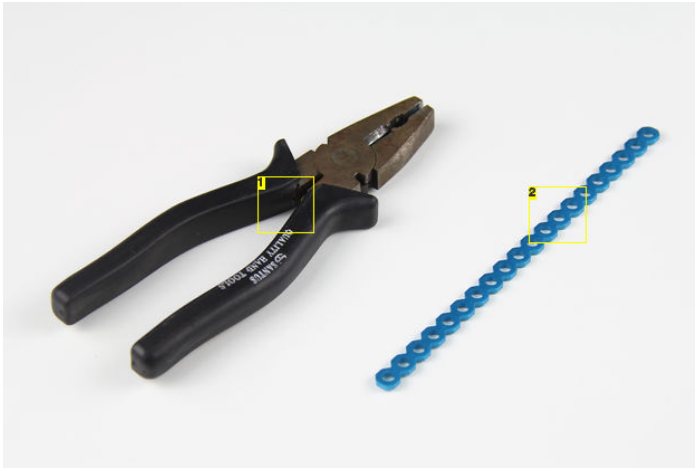
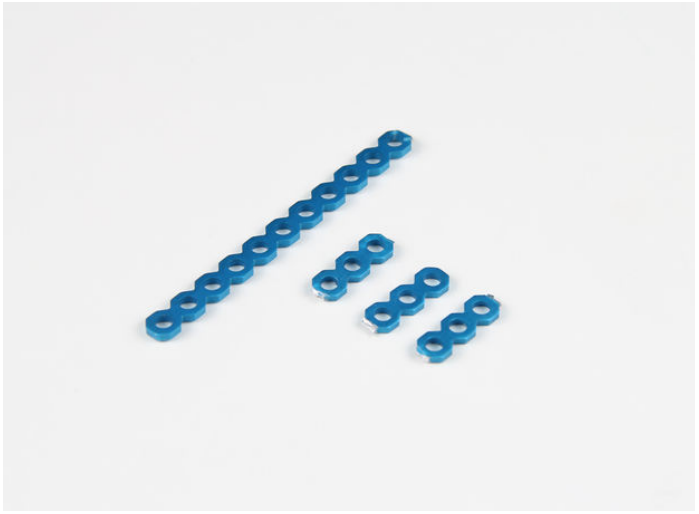


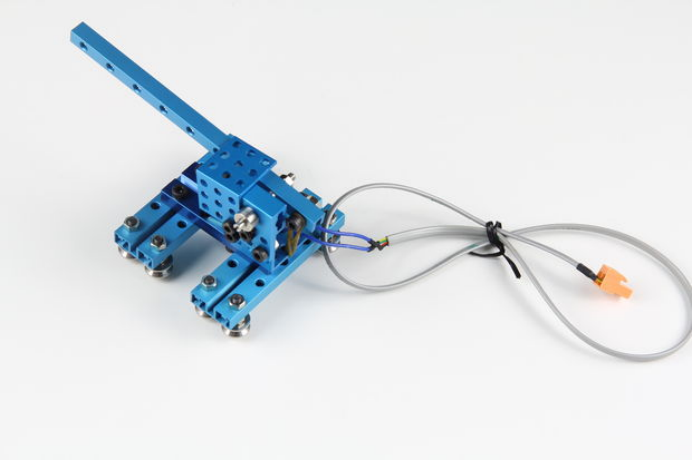
Image Notes
1. Pincer Pliers
2. Link Rod



Step 5: Slider Device and Music Play Arm

Materials List:
1 × Beam 0808-144
1 × Beam 0824-64
2 × Beam 0824-80
2 × Bracket 3×3
1 × Bracket P3
8 × Bearing for Slider
2 × Flange Bearing 4×8×3mm
1 × Threaded Shaft 4×31mm
1 × Shaft Collar 4mm
1 × Headless Screw M3×5
2 × Copper Stud M4-15
1 × Link Rod
5 × Screw M4×8
9 × Screw M4×14
8 × Screw M4×22
22 × Nut M4
1 × Solenoid - 12v

Procedure:
1. Insert the Screw M4×22 into the Bearing for Slider.
2. Insert the other 3 Screw M4×22 into the Bearing for Slider.
3. Insert and tighten Nut M4 per screw.
4. Insert the 4 Screw M4×22 with Bearing for Slider and Nut M4 into the Beam 0824-64.
5. Insert and tighten Nut M4 per screw on the Beam 0824-64.
6. Do the same as 1~5 discribe to install another Slider Device.
7. Insert 2 Screw M4×14 into the Beam 0824-64 to install it on the Slider Device.
8. Insert 2 Screw M4×14 into the Bracket 3×3 and the Beam 0824-64 to install them on the other Slider Device.
8. Insert 2 Screw M4×14 into the Bracket 3×3 and the Beam 0824-64 to install them on the other Slider Device.
9. Install 2 Copper Stud M4-15 on the Beam 0824-64 by 2 Screw M4×14.
10. Put the Solenoid - 12v on the Beam 0824-64 next to the Copper Stud M4-15.
11. Use the Link Rod and 2 Screw M4×14 to fix the Solenoid on the Beam 0824-64.
12. Insert the Flange Bearing 4×8×3mm into the Bracket P3.
13. Insert the Threaded Shaft 4×31mm into the other Flange Bearing 4×8×3mm.
14. Insert the Threaded Shaft 4×31mm with the Flange Bearing 4×8×3mm into the Bracket P3.
15. Put the Shaft Collar 4mm on the Threaded Shaft 4×31mm.
16. Insert a Headless Screw M3×5 into the Shaft Collar 4mm.
17. Tie the electromagnet core of the Solenoid - 12v to the Beam 0808-144 by Iron Wire.
18. Install the Rubber Band into the Bracket 3×3.
19. Install the Music Play Arm on the the Bracket 3×3.
20. Insert a Screw M4×14 into the Beam 0808-144 with a Nut M4.
21. Connect the Bracket 3×3 and the Beam 0808-144 by the Rubber Band.
22. Install the other Bracket 3×3 on the Bracket P3.



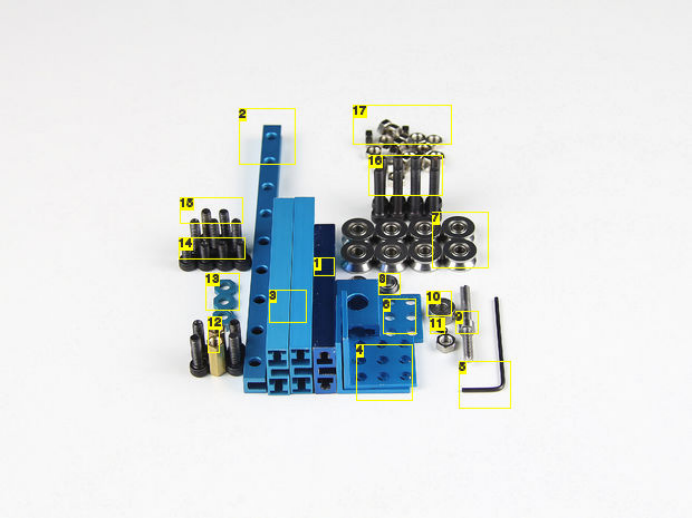
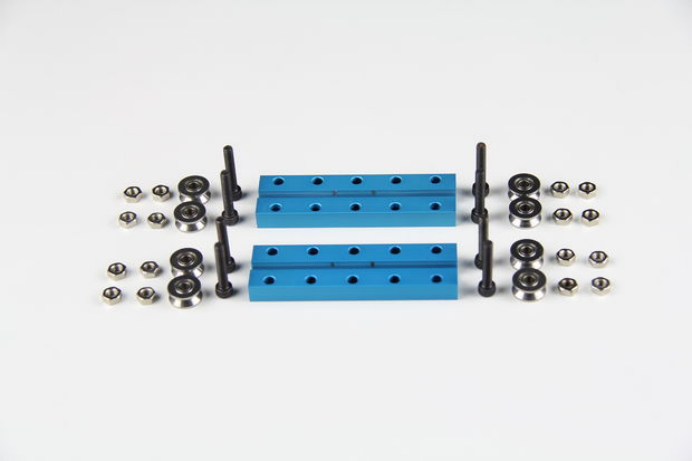


Image Notes
1. Beam 0824-64
2. Beam 0808-144
3. Beam 0824-80
4. Bracket 3×3
5. 1.5mm hexagonal screwdriver
6. Bracket P3
7. Bearing for Slider
8. Flange Bearing 4×8×3mm
9. Threaded Shaft 4×31mm
10. Shaft Collar 4mm
11. Headless Screw M3×5
12. Copper Stud M4-15
13. Link Rod

14. Screw M4×8
15. Screw M4×14
16. Screw M4×22
17. Nut M4



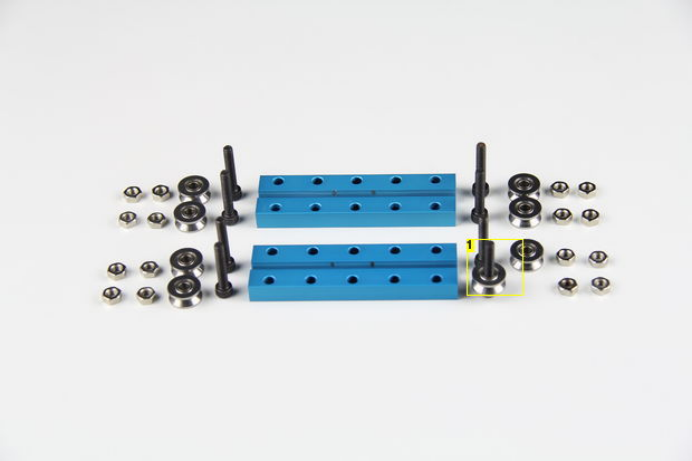


Image Notes
1. Step 1

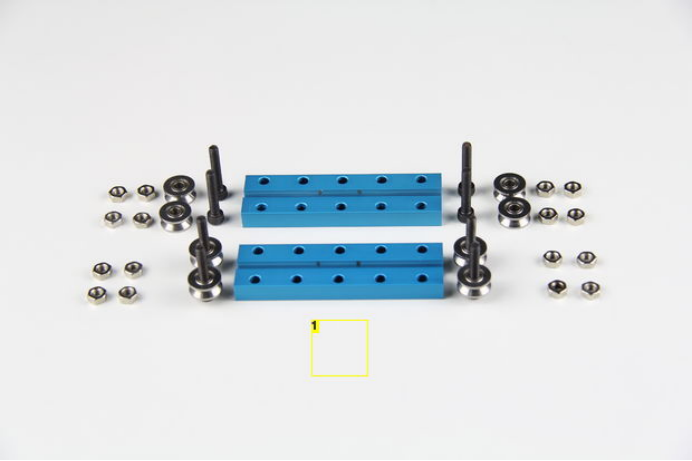


Image Notes
1. Step 2

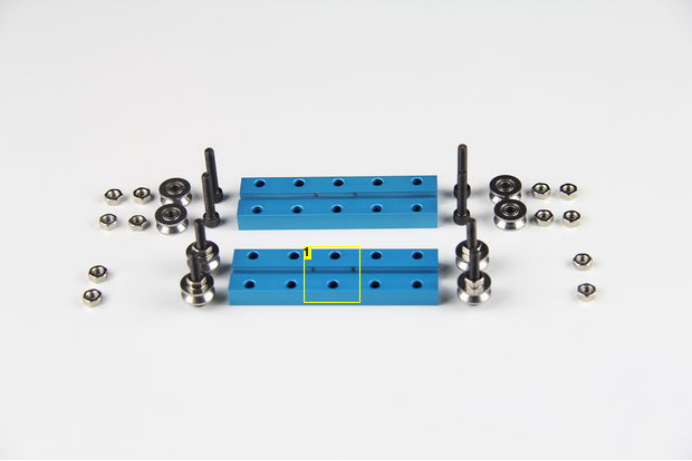


Image Notes
1. Step 3

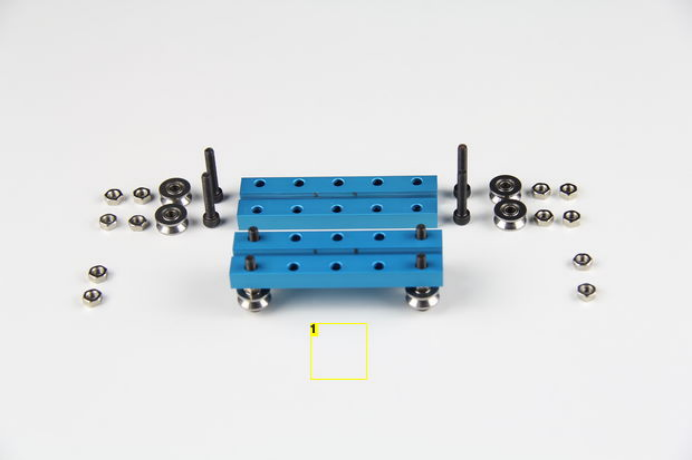


Image Notes
1. Step 4

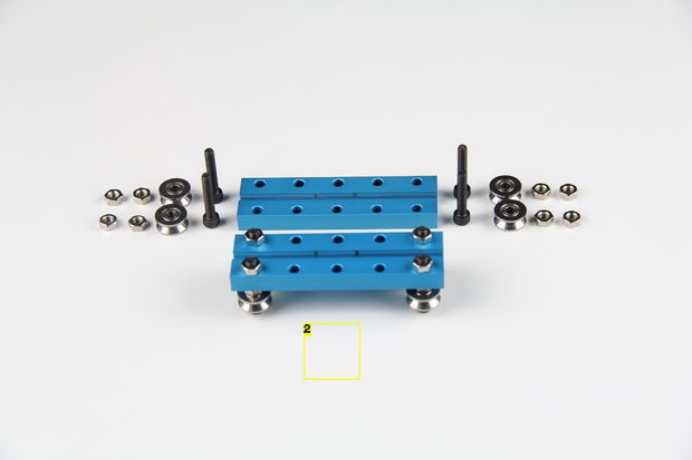
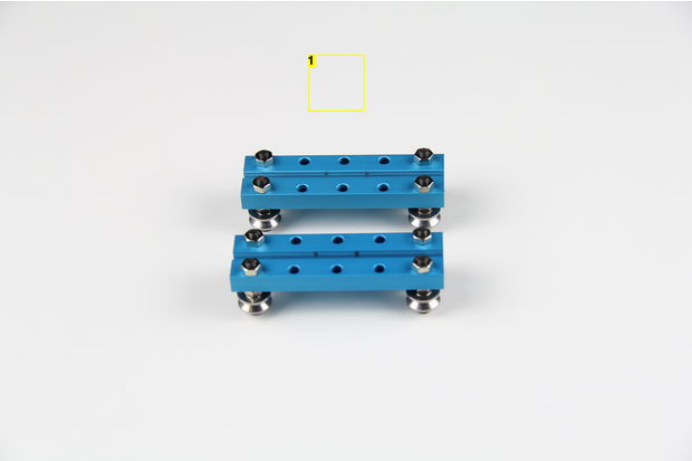


Image Notes
1. Step 5
2. Step 5



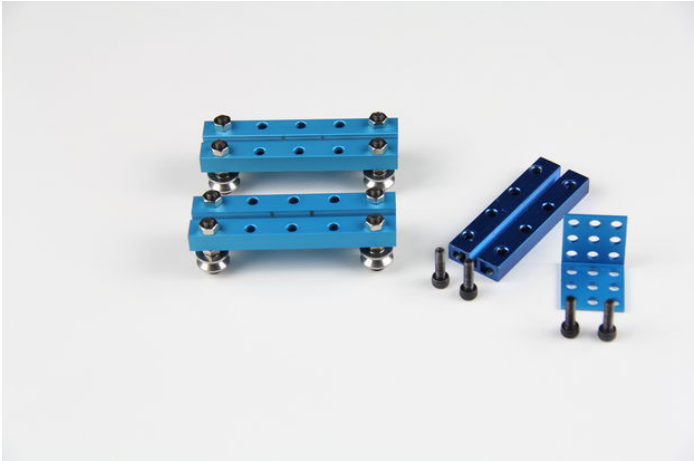


Image Notes
1. Step 6

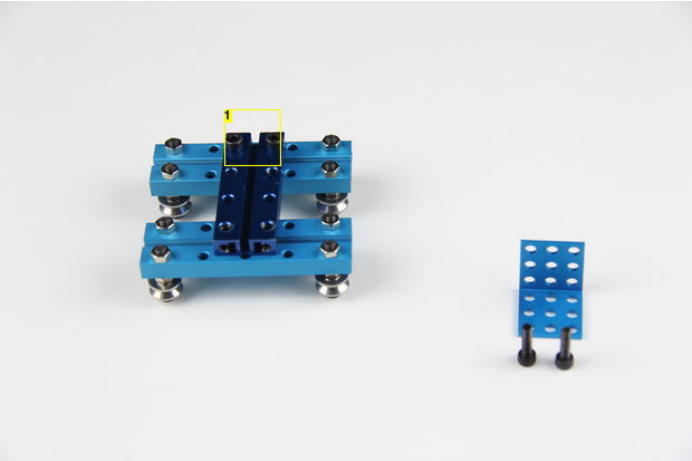


Image Notes
1. Step 7

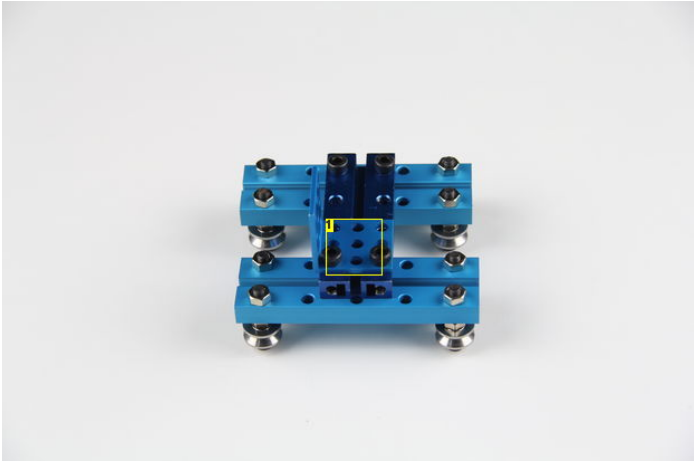
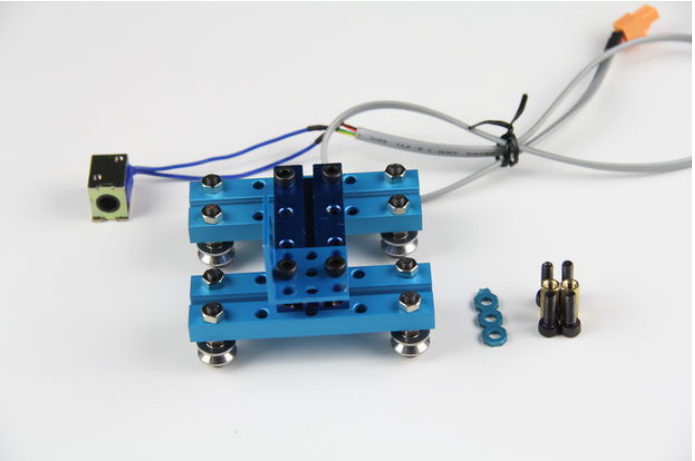


Image Notes
1. Step 8



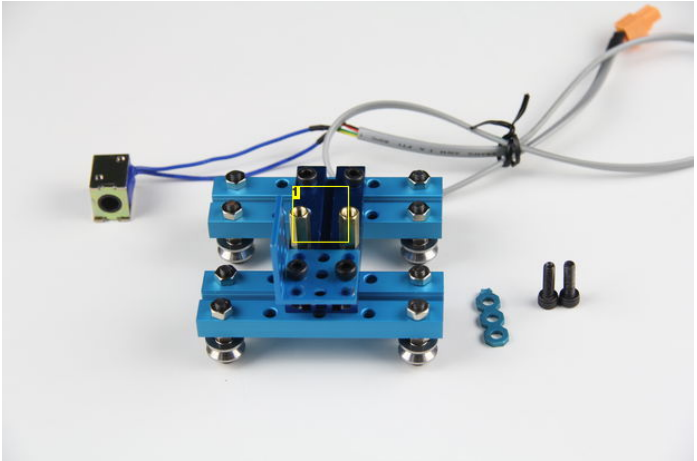


Image Notes
1. Step 9

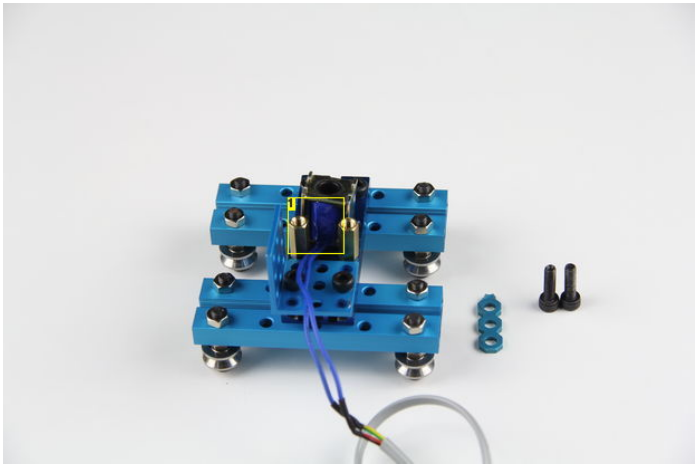


Image Notes
1. Step 10

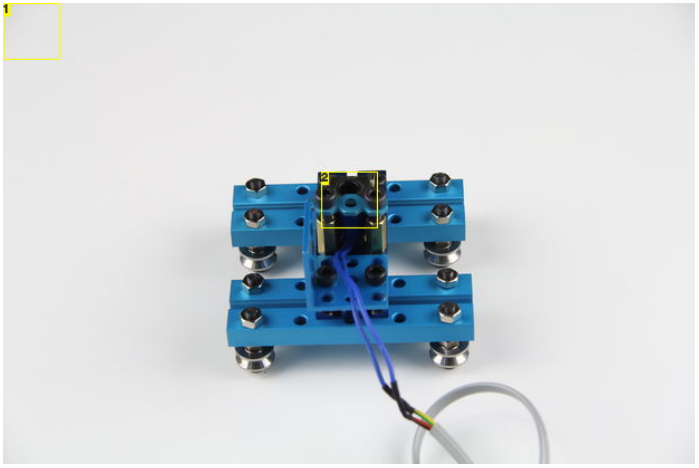


Image Notes
1. Step 11
2. Step 11

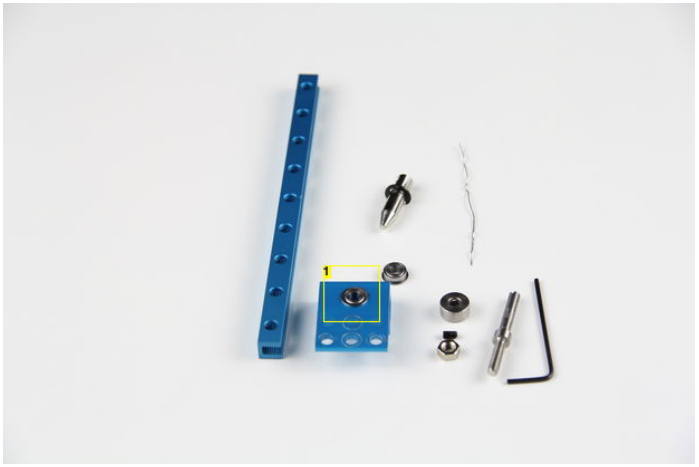


Image Notes
1. Step 12

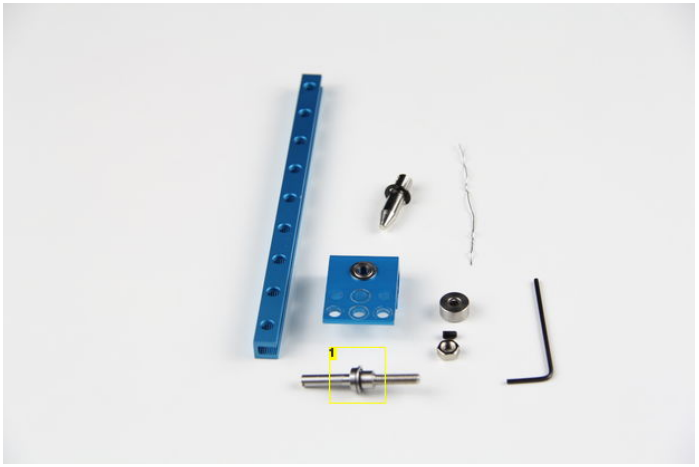


Image Notes
1. Step

Image Notes
1. Step 14

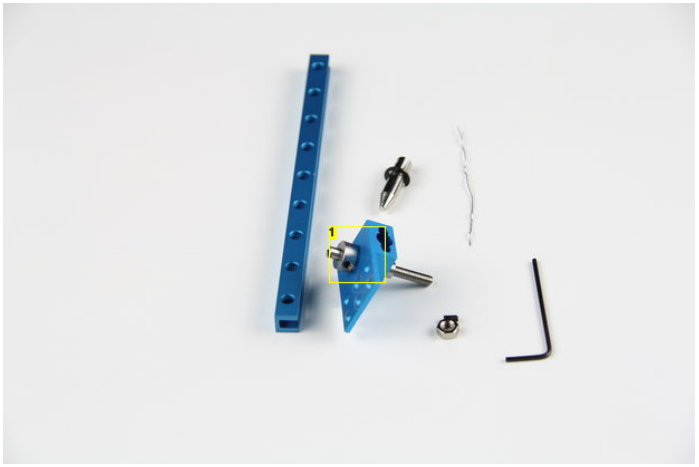
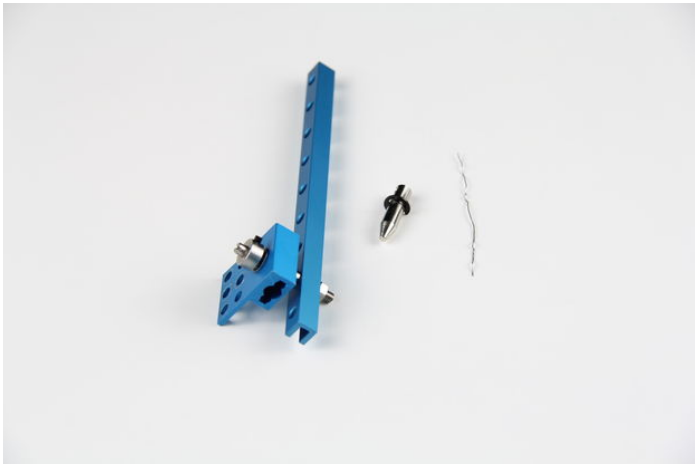


Image Notes
1. Step 15

Image Notes
1. Step 16



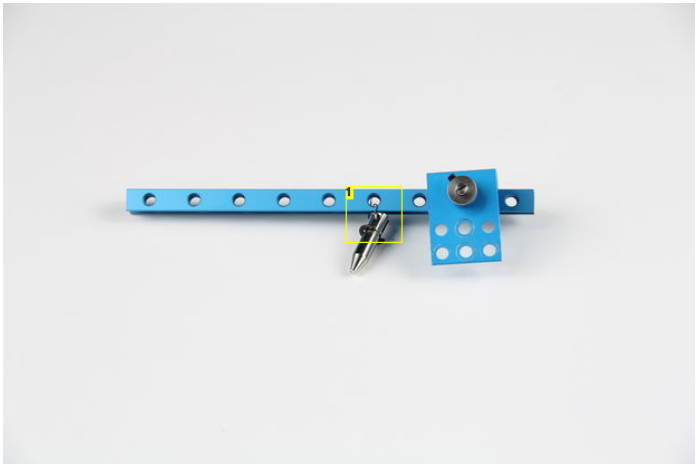
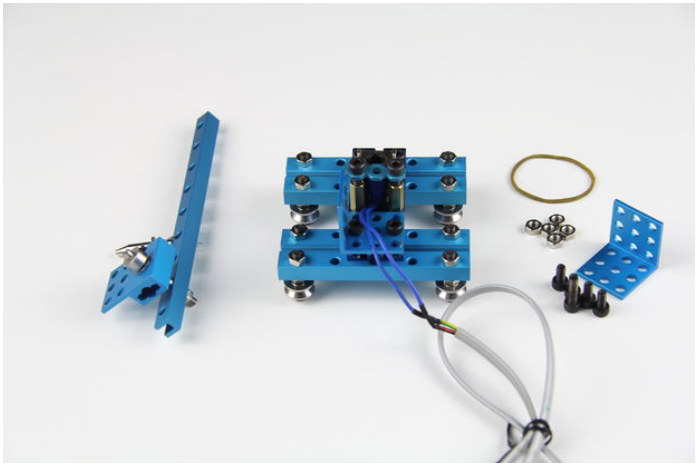


Image Notes
1. Step 17



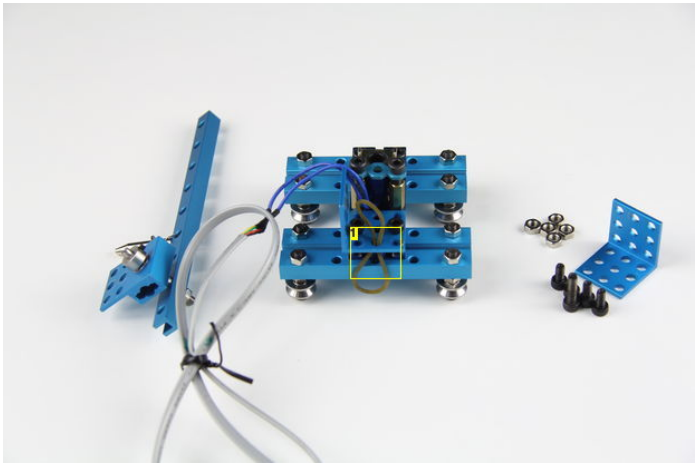


Image Notes
1. Step 18

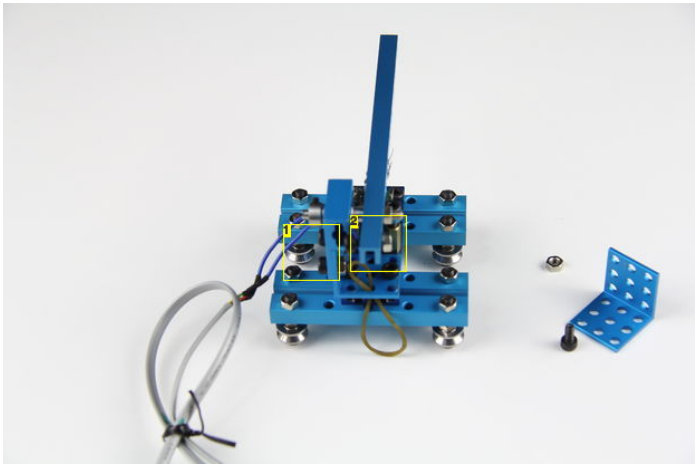


Image Notes
1. Step 19
2. Step 20

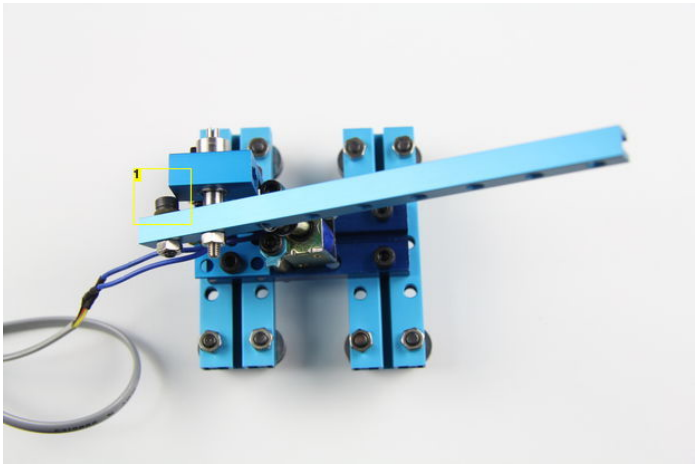


Image Notes
1. Step 21

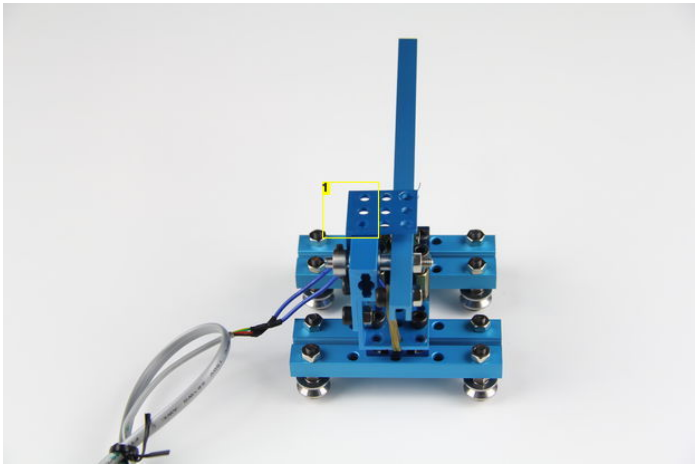
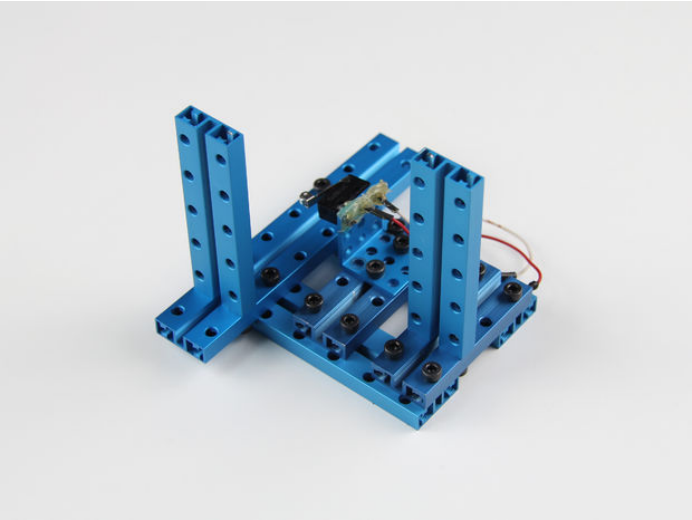


Image Notes
1. Step 22

Step 6: Step motor and electronic modules Holder

Materials List:
2 × Beam 0824-64
2 × Beam 0824-80
2 × Beam 0824-96
1 × Beam 0824-128
1 × Bracket 3×3
2 × Screw M4×8
1 × Limit Switch
16 × Screw M4×14

Procedure:
1. Install the Beam 0824-64 on Beam 0824-96 by using a Screw M4×14.
2. Install the other 3 Screw M4×14.
3. Install another Beam 0824-64 on Beam 0824-96 with 4 Screw M4×14.
4. Install the Beam 0824-128 on Beam 0824-96 with 4 Screw M4×14.
5. Install the Beam 0824-80 on Beam 0824-64 to make the Step Motor Holder.
6. Install another Beam 0824-80 on Beam 0824-128 to make the Electronic Modules Holder.
7. Use the Glue Gun to install the Limit Switch on the Bracket 3×3.
8. Install the Bracket 3×3 with the Limit Switch on Beam 0824-64.



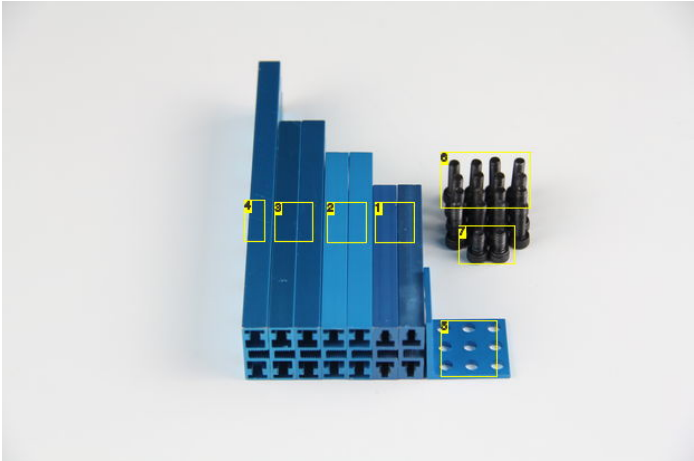
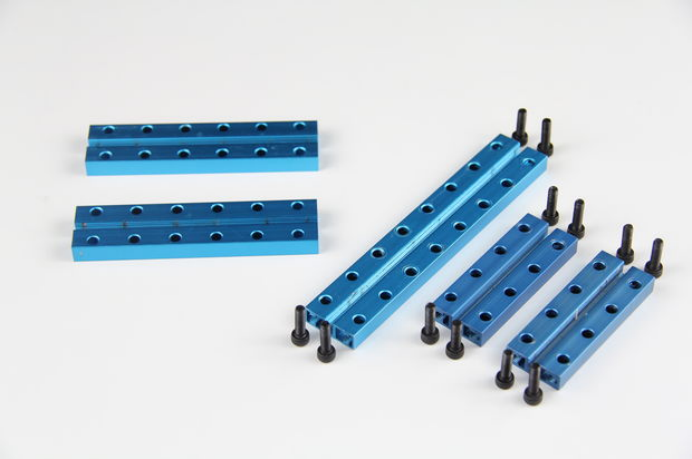


Image Notes
1. Beam 0824-64
2. Beam 0824-80
3. Beam 0824-96
4. Beam 0824-128
5. Bracket 3×3
6. Screw M4×14
7. Screw M4×8



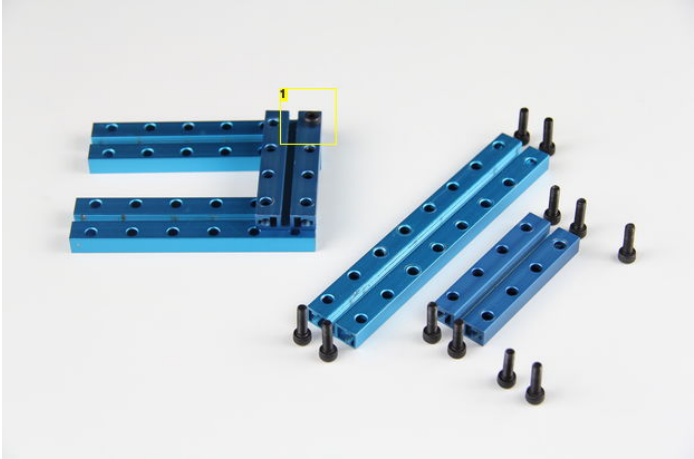


Image Notes
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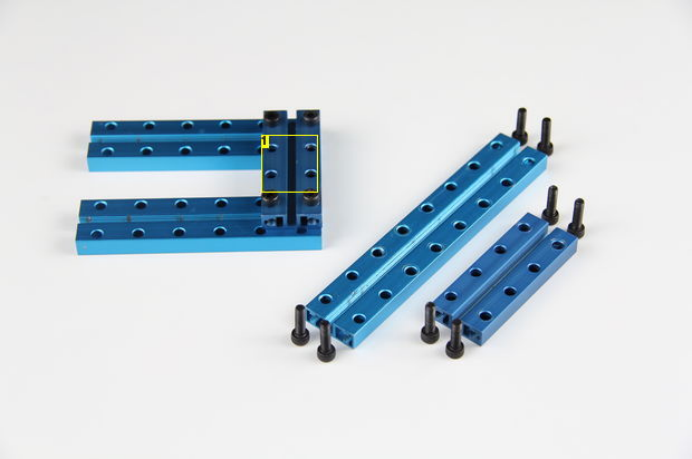


Image Notes
1. Step 2

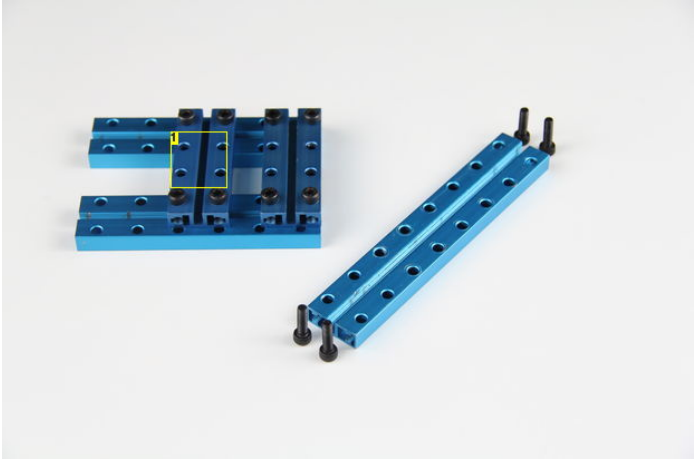
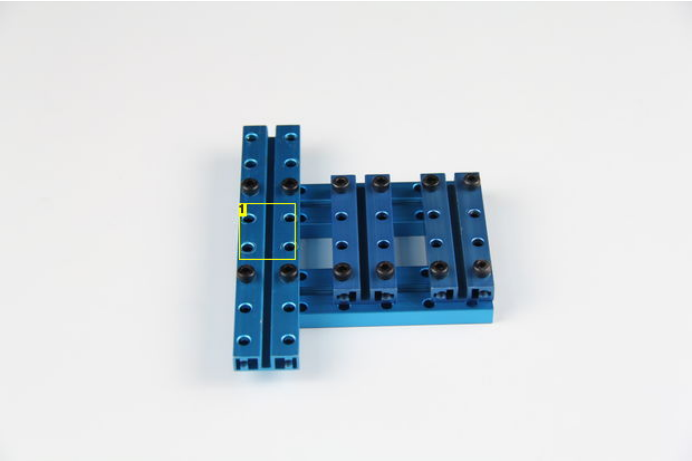


Image Notes
1. Step 3



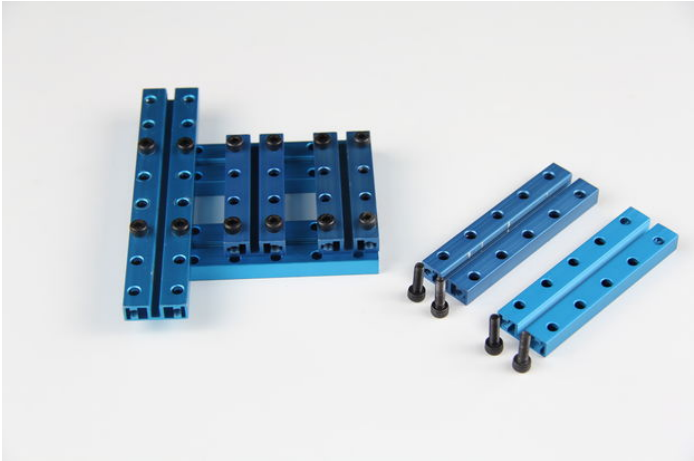


Image Notes
1. Step 4

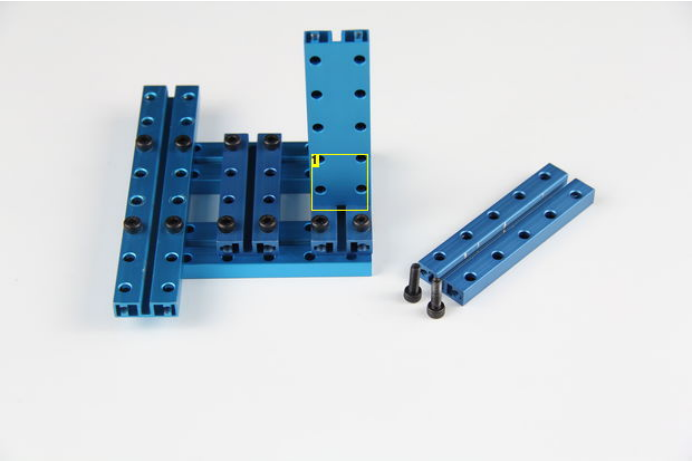


Image Notes
1. Step 5

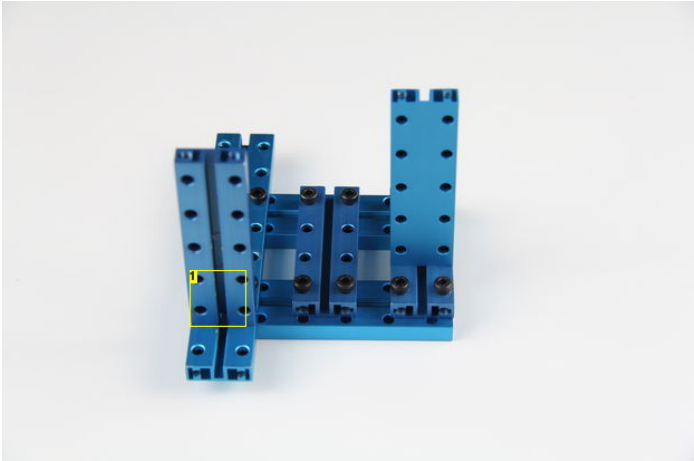


Image Notes
1. Step 6

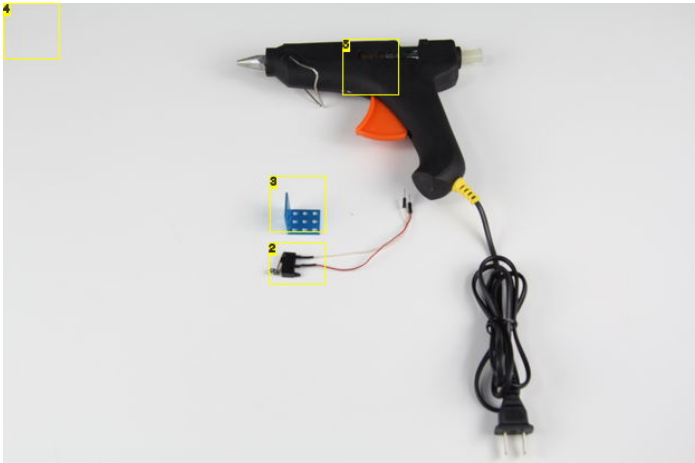
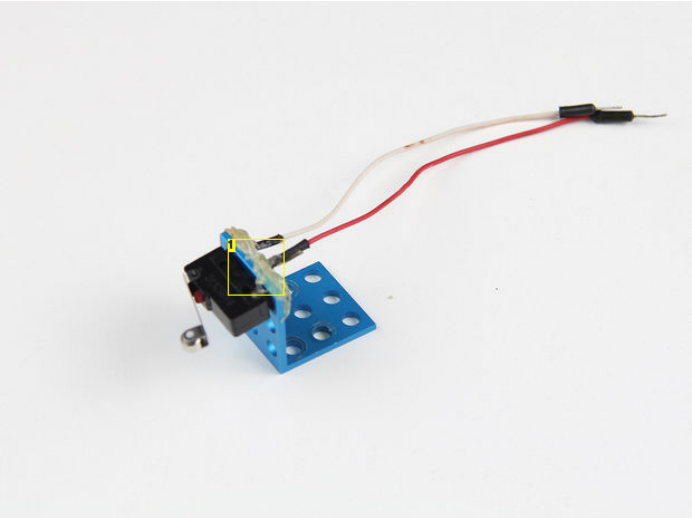


Image Notes
1. Limit Switch
2. Limit Switch
3. Bracket 3×3
4. Bracket 3×3
5. Glue gun



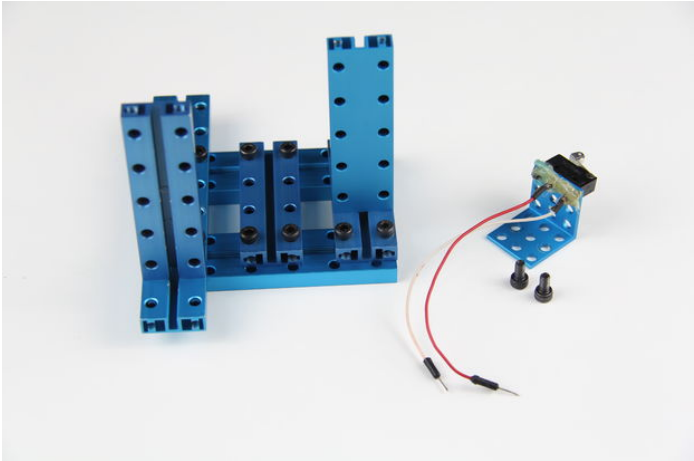


Image Notes
1. Step 7

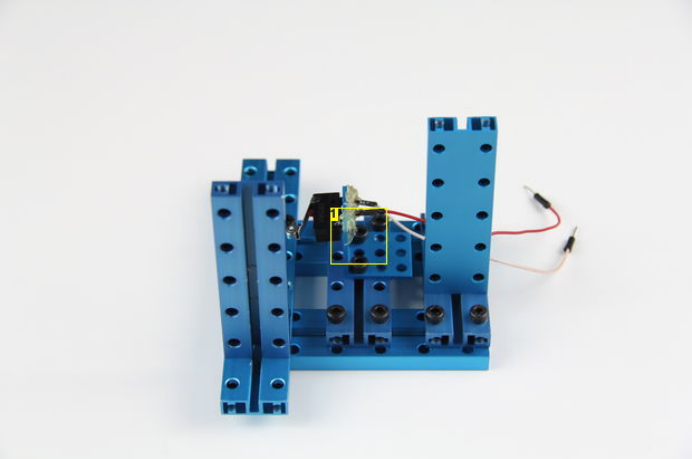
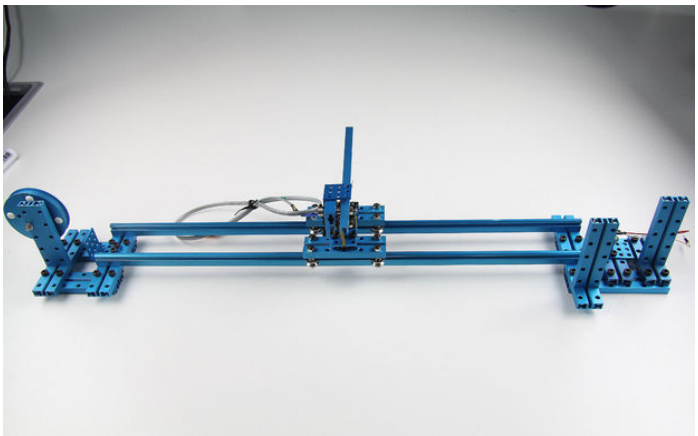


Image Notes
1. Step 8

Step 7: Install to the Slider

Materials List:
2 × Slider 496
8 × Screw M4×14

Procedure:
1. Install the Slider Device to the Slider.
2. Install the Driven Pulley Holder to the Slider.
3. Install the Step Motor and Electronic Modules Holder to the Slider.



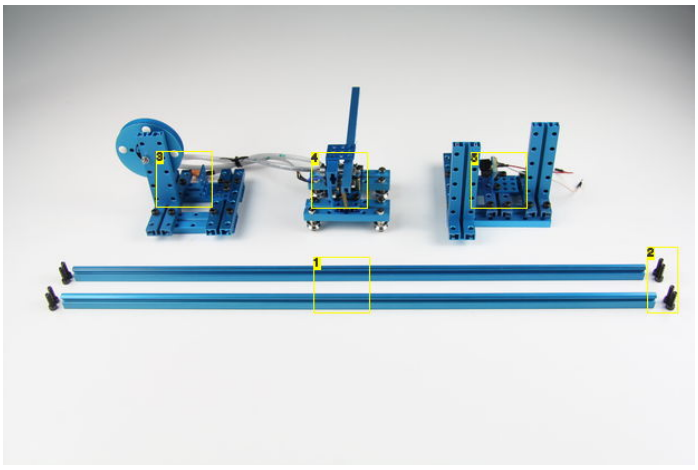
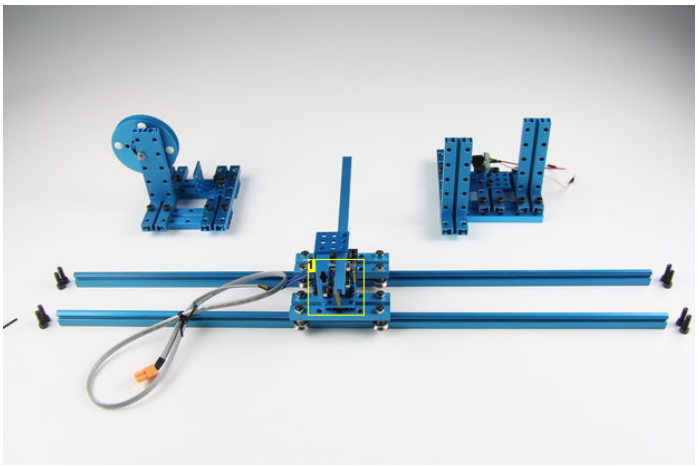


Image Notes
1. Slider 496
2. Screw M4×14
3. Driven Pulley Holder
4. Slider Device and Music Play Arm
5. Step motor and electronic modules Holder



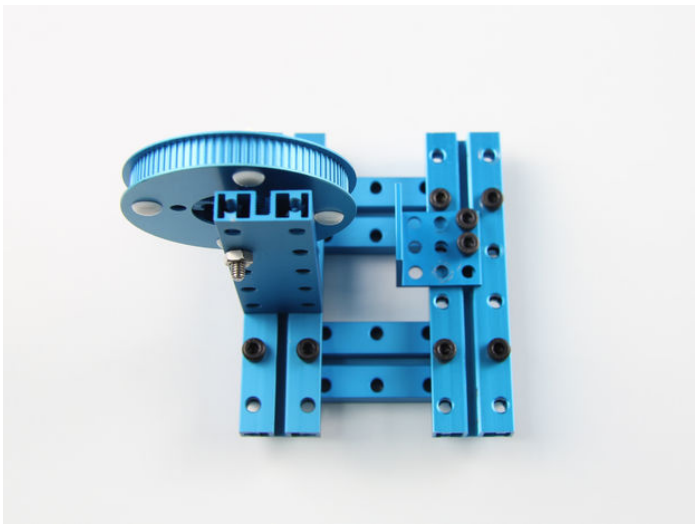
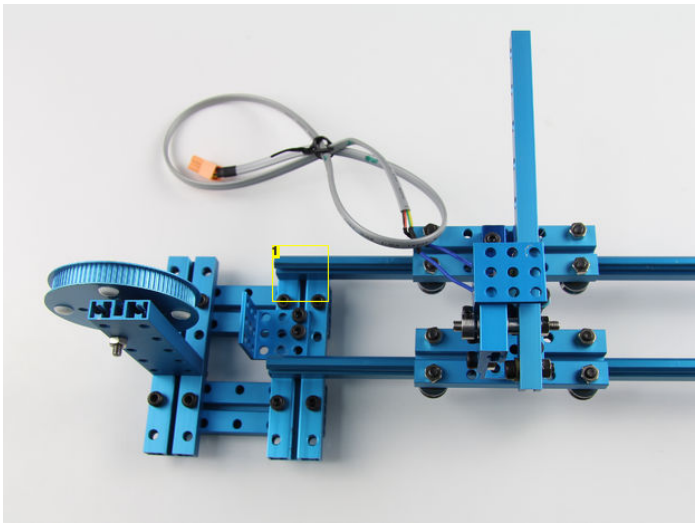


Image Notes
1. Step 1



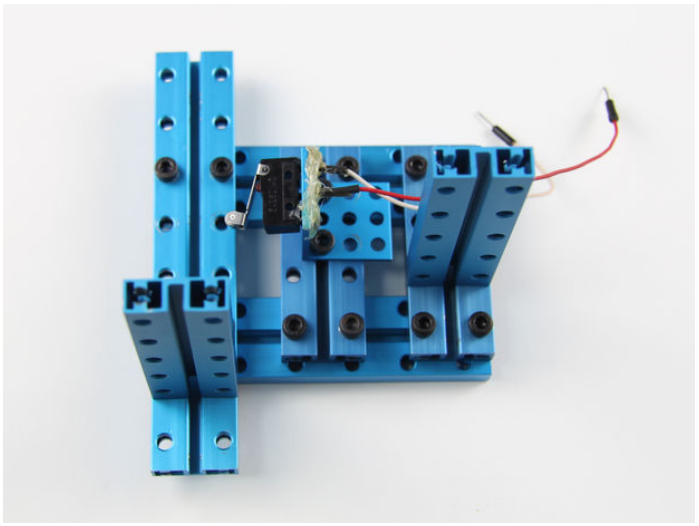
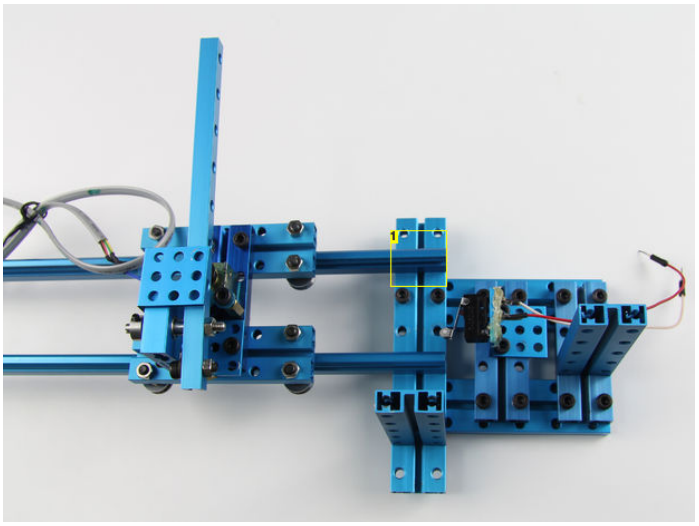


Image Notes
1. Step 2



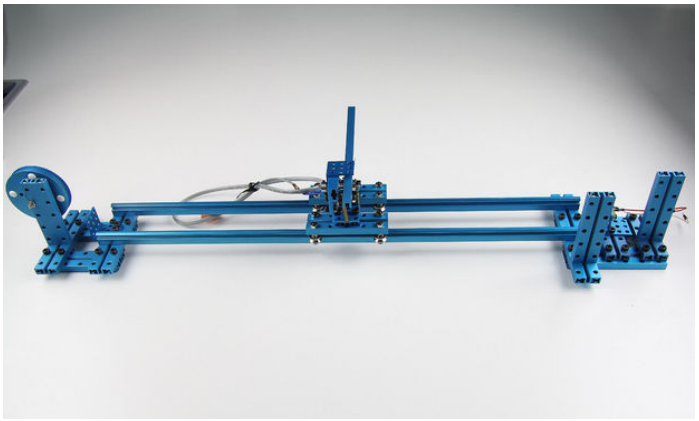


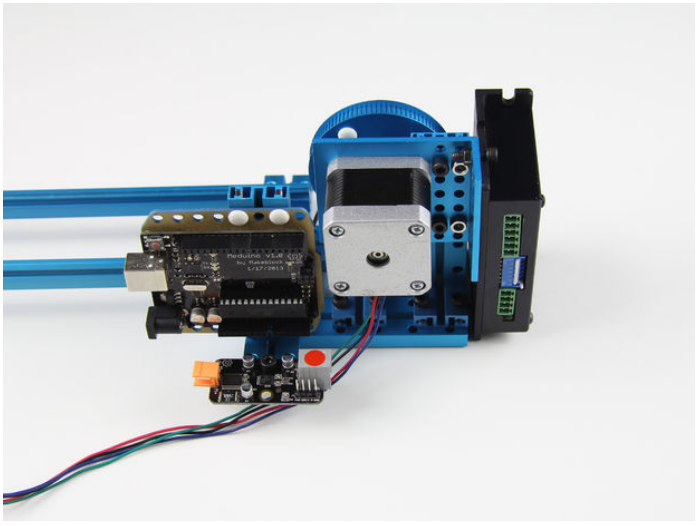
Image Notes
1. Step 3

Step 8: Add Electronic Modules

Electronic Modules List:
1 × Arduino
1 × Acrylic Arduino Bracket
1 × Me – Motor Driver
1 × Step Motor
1 × Step Motor Controller
Jumper Wires

Materials List:
1 × Step Motor Bracket
1 × Timing Pulley 90T
2 × Timing Pulley Slice 90T
8 × Plastic Rivet R4120
4 × Plastic Rivet R3075
1 × Shaft Connector 4mm
1 × Headless Screw M3×5
2 × Countersunk Screw M3×8
3 × Screw M4×8
6 × Screw M4×14
3 × Nut M4

Procedure:
1. Put a Timing Pulley Slice 90T on the Timing Pulley 90T.
2. Insert a Plastic Rivet R4120 into the holes on the Timing Pulley Slice 90T and the Timing Pulley 90T.
3. Insert the other 3 Plastic Rivet R4120.
4. Turn over the Timing Pulley Slice 90T and the Timing Pulley 90T.
5. Put the other Timing Pulley Slice 90T on the Timing Pulley 90T.
6. Press the Plastic Rivet R4120.
7. Put the Step Motor Bracket on the Step Motor.
8. Insert 2 Countersunk Screw M3×8 into the Step Motor Bracket to install the Step Motor.
9. Install the Shaft Connector 4mm on the Timing Pulley 90T by 2 Screw M4×14.
10. Put the capstan with the Shaft Connector 4mm on the Step Motor.
11. Insert a Headless Screw M3×5 into the Shaft Connector 4mm.
12. Install the Step Motor on the Step Motor Holder.
13. Install the Step Motor Controller on the Step Motor Bracket.
14. Put the Arduino on the Acrylic Arduino Bracket.
15. Insert a Plastic Rivet R3075 into the holes on the Arduino and the Acrylic Arduino Bracket.
16. Insert the other 3 Plastic Rivet R3075.
17. Press the Plastic Rivet R3075.
18. Install the Arduino on the Electronic Modules Holder by 4 Plastic Rivet R4120.
19. Install the Me – Motor Driver on Beam 0824-128 by a Screw M4×8.



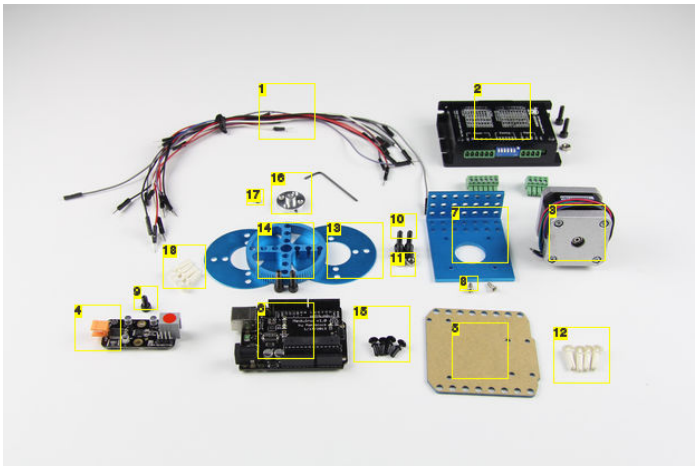


Image Notes
1. Jumper Wires
2. Step Motor Controller
3. Step Motor
4. Me – Motor Driver
5. Acrylic Arduino Bracket
6. Arduino
7. Step Motor Bracket
8. Countersunk Screw M3×8
9. Screw M4×8
10. Screw M4×14
11. Nut M4
12. Plastic Rivet R4120
13. Timing Pulley Slice 90T
14. Timing Pulley 90T

15. Plastic Rivet R3075
16. Shaft Connector 4mm
17. Headless Screw M3×5
18. Plastic Rivet R4120

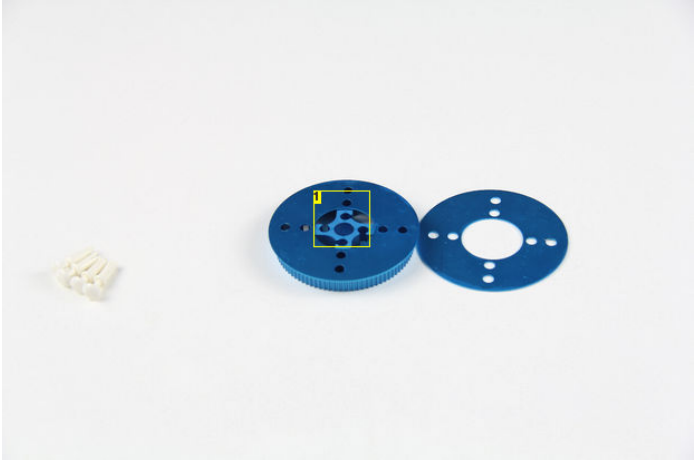


Image Notes
1. Step 1

Image Notes
1. Step 2

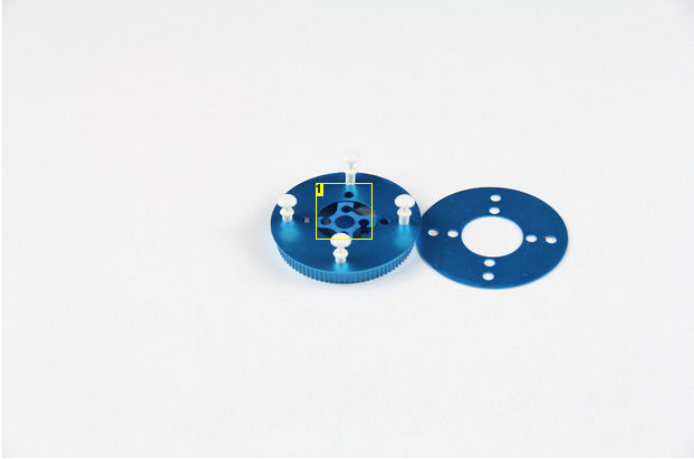


Image Notes
1. Step 3

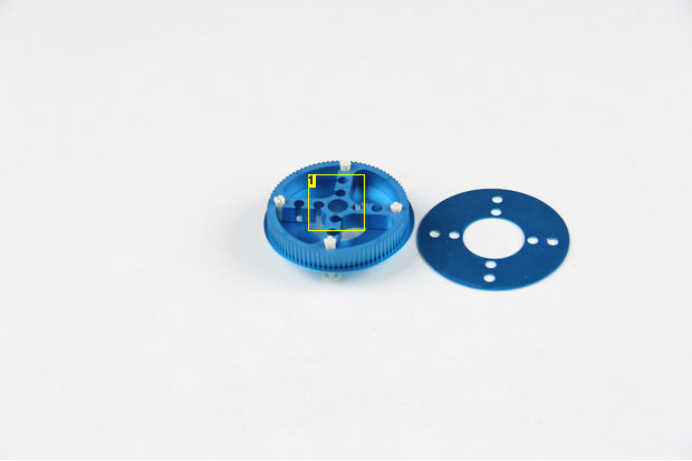


Image Notes
1. Step 4

Image Notes
1. Step 5

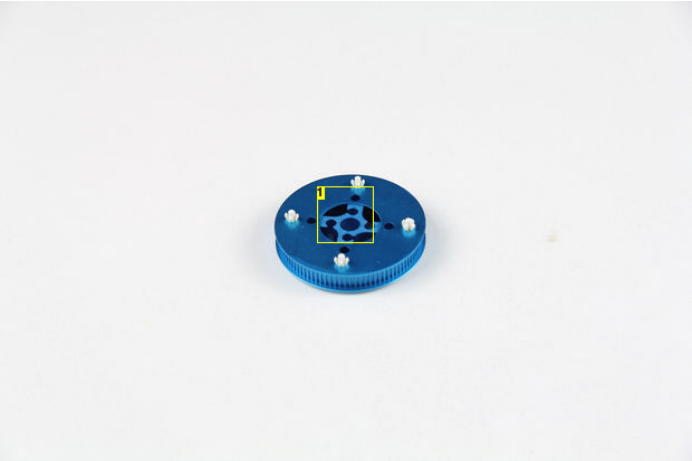
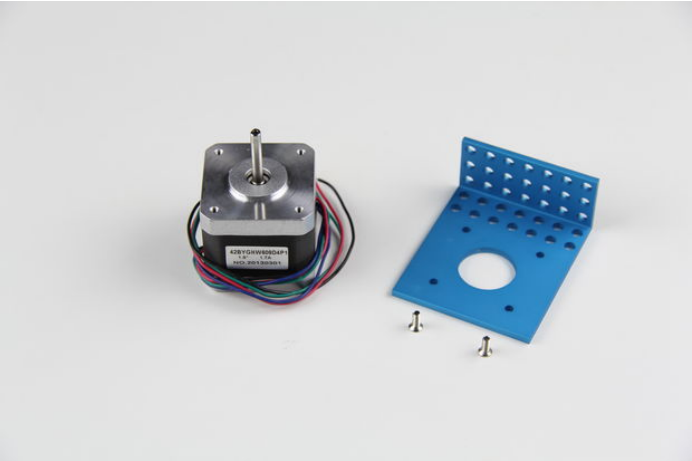


Image Notes
1. Step 6



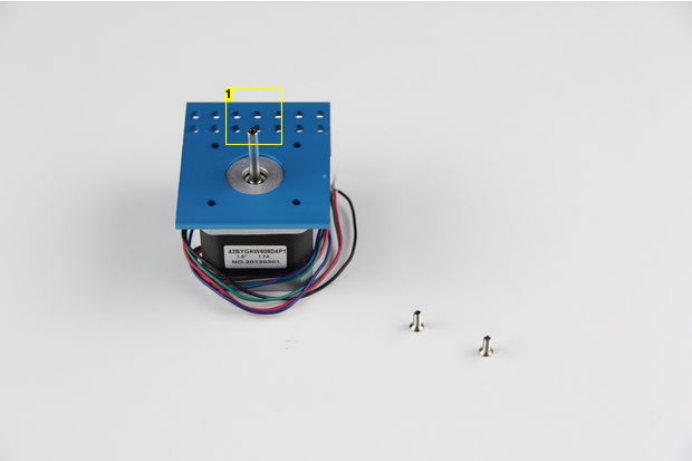


Image Notes
1. Step 7

Image Notes
1. Step 8

Image Notes
1. Step 9

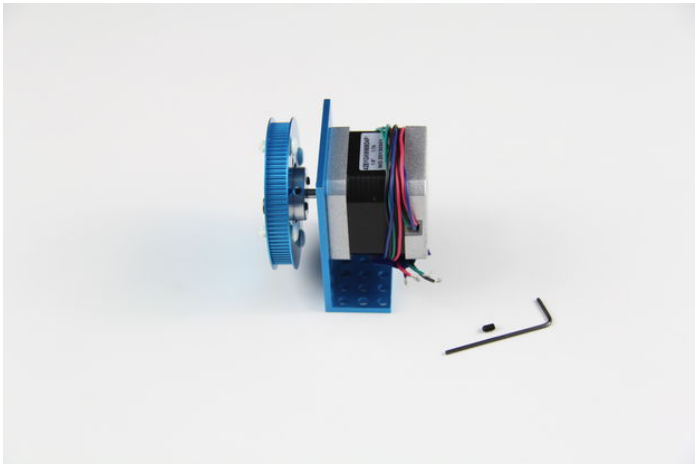
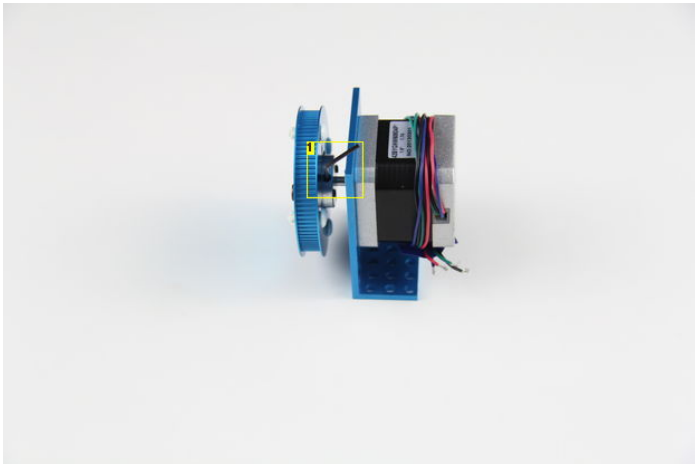


Image Notes
1. Step 10



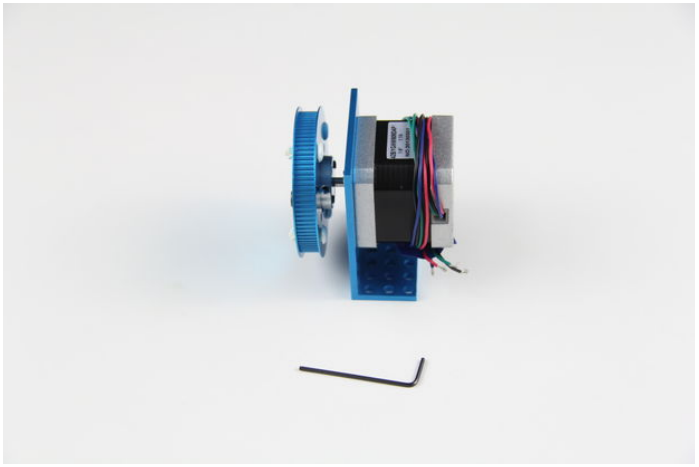
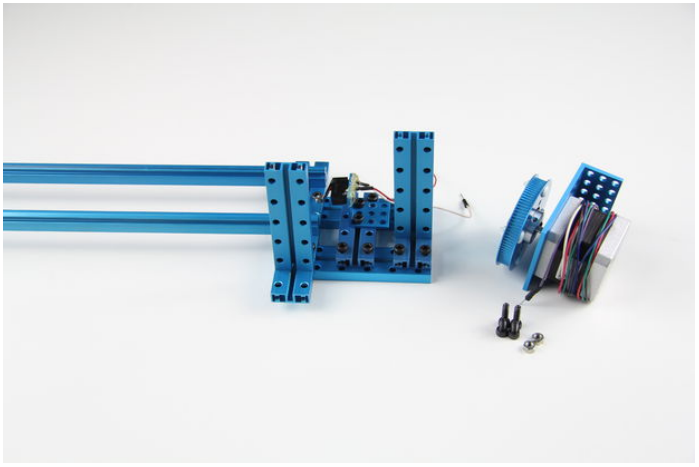
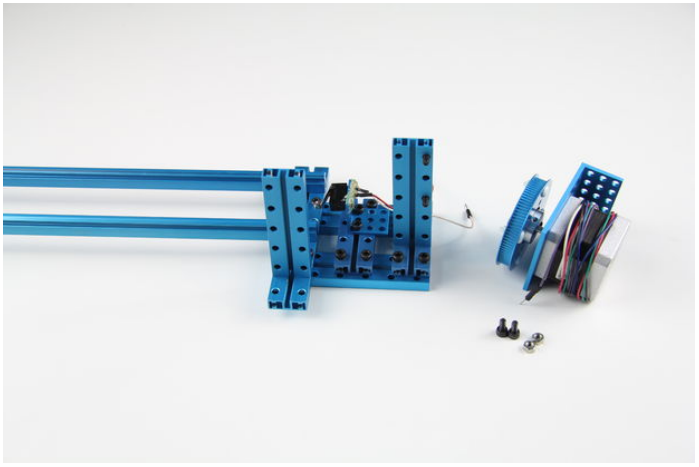
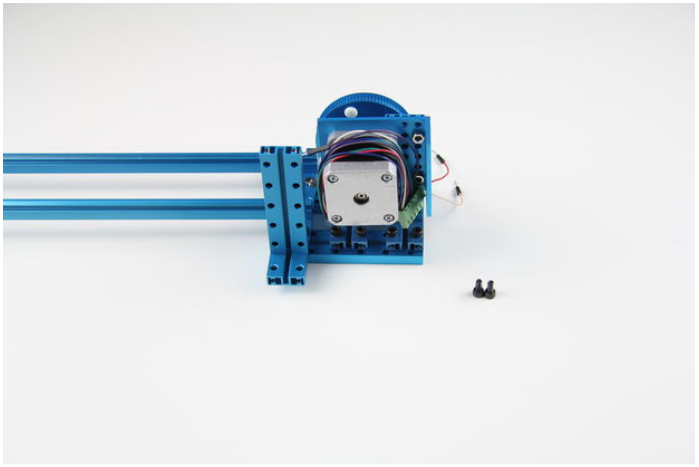


Image Notes
1. Step 11







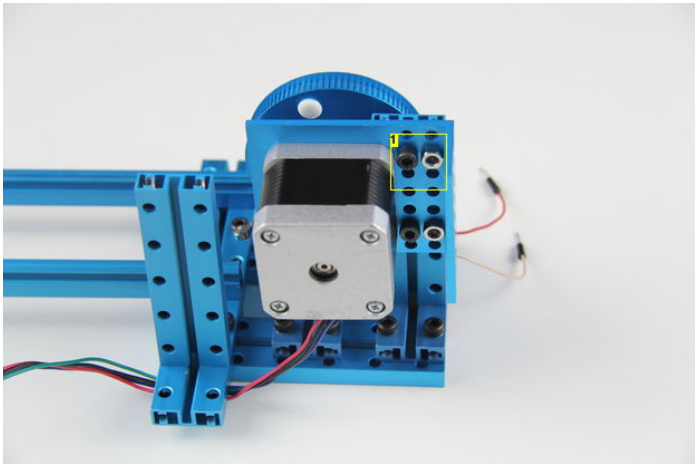
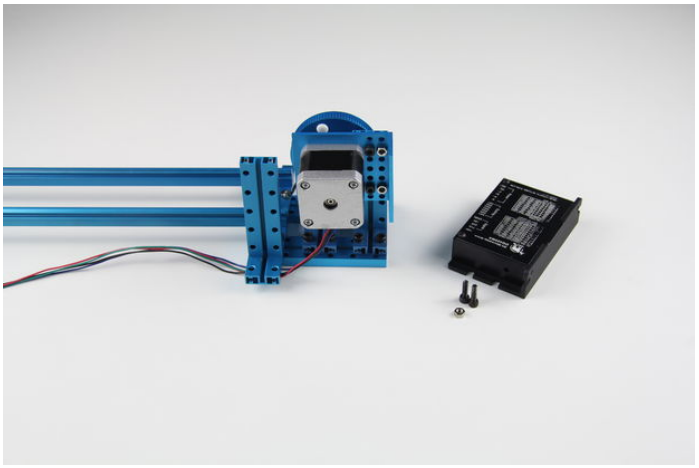


Image Notes
1. Step 12



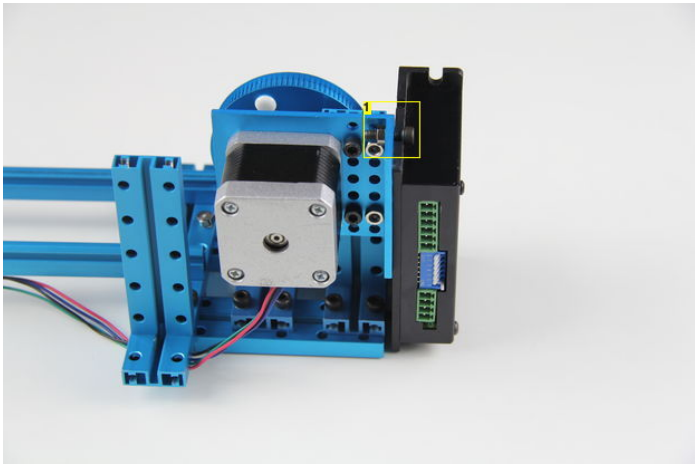
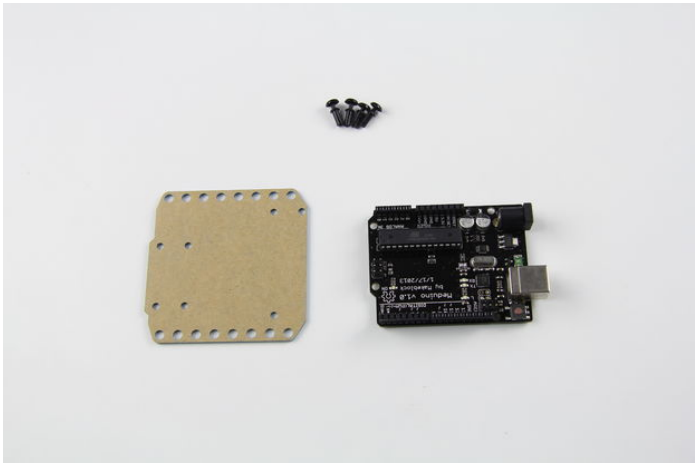


Image Notes
1. Step 13



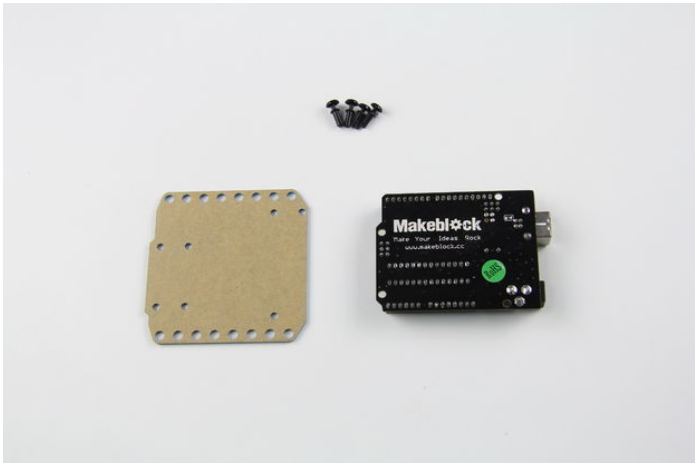


Image Notes
1. Step 14

Image Notes
1. Step 15

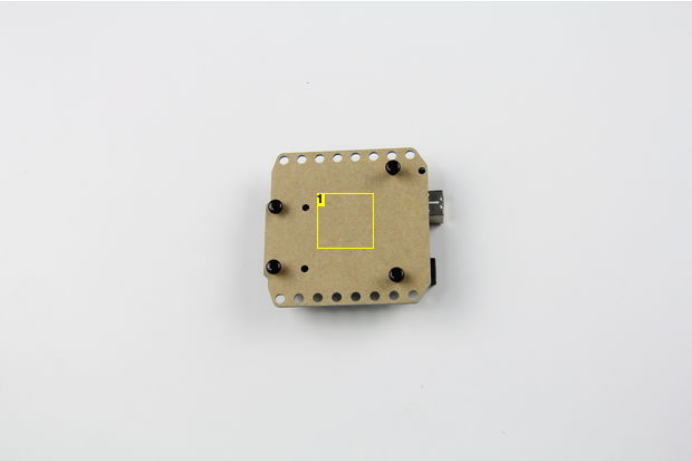


Image Notes
1. Step 16

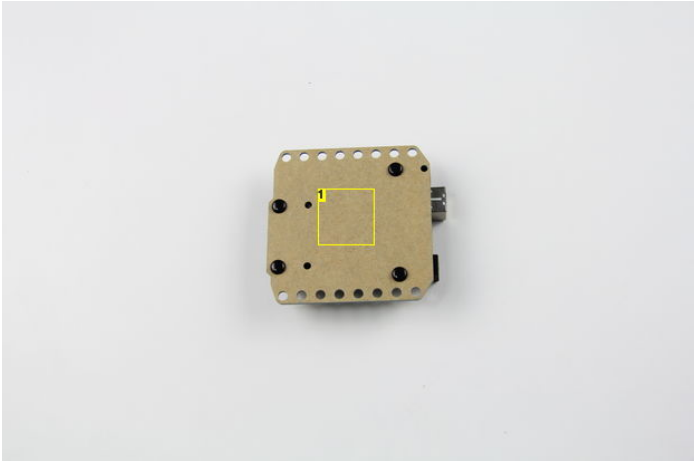
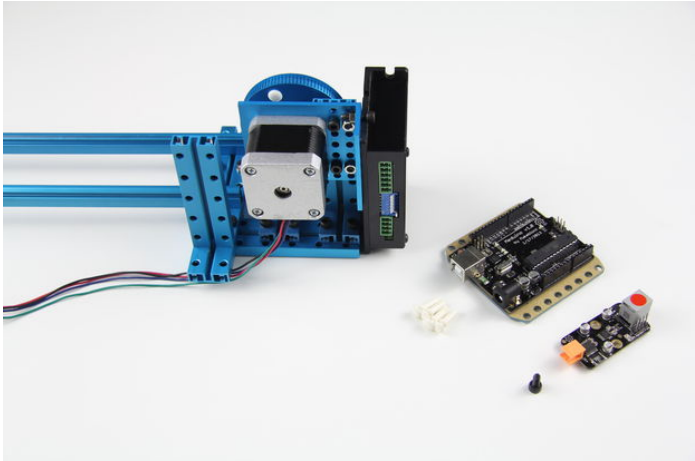
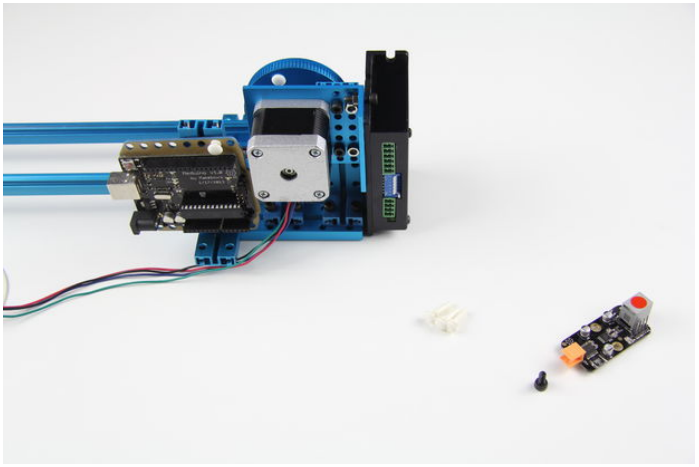
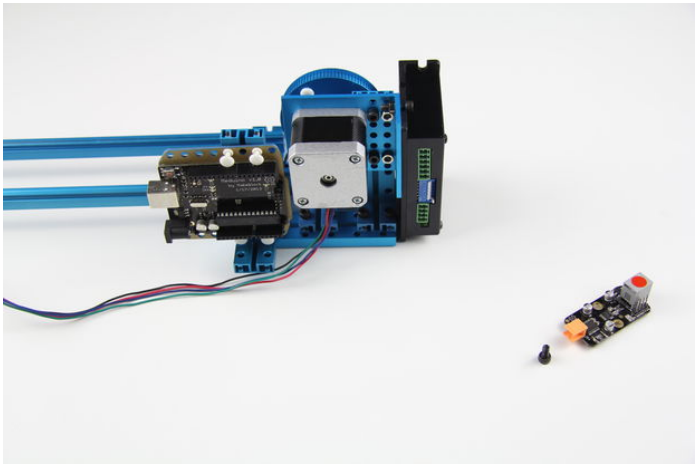
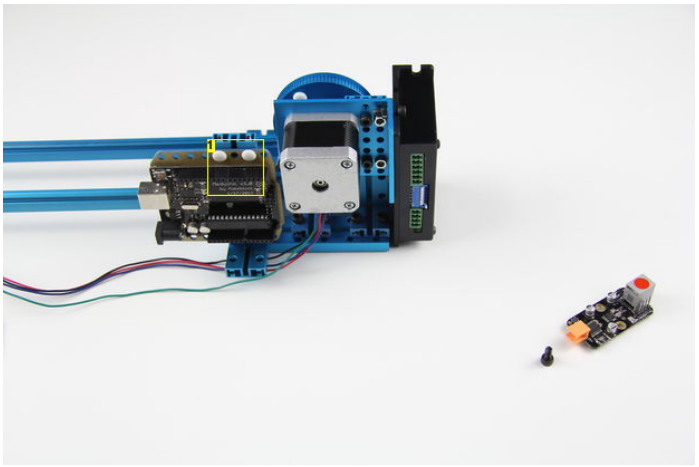


Image Notes
1. Step 17









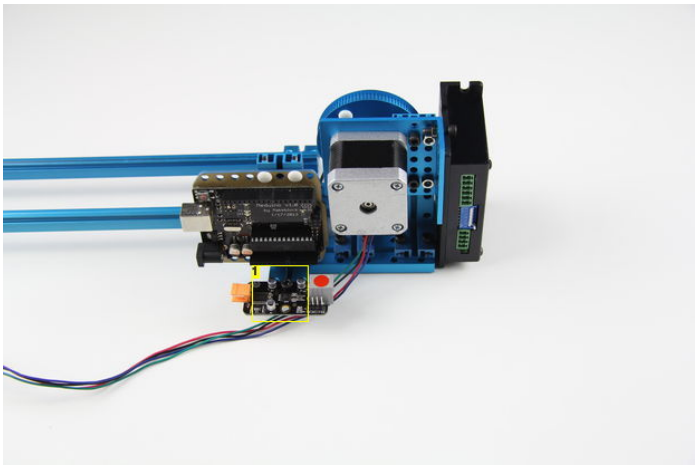


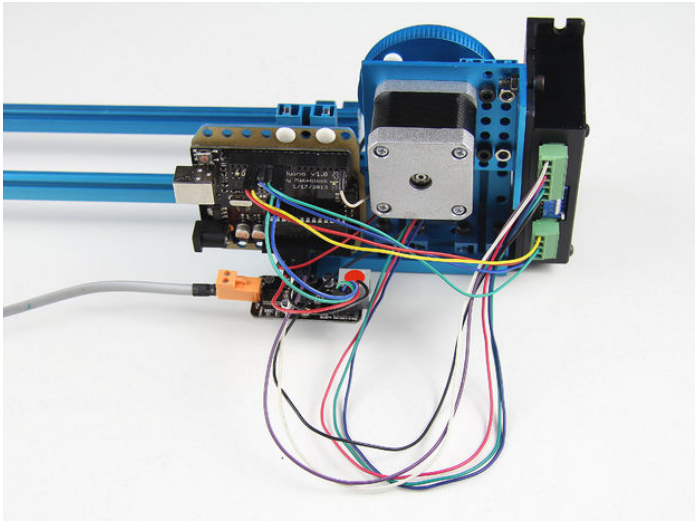
Image Notes
1. Step 18

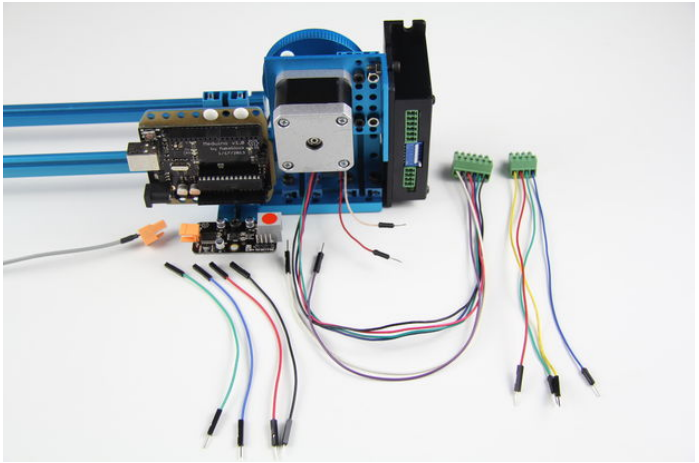
Image Notes
1. Step 19

Step 9: Connect the Electronic Modules

Materials List:
Jumper Wires

Procedure:
1. Connect the Step Motor to the Step Motor Controller.
2. Connect the Step Motor Controller to Arduino.
3. Connect the Limit Switch to Arduino.
4. Connect the Me-Motor Driver to Arduino.





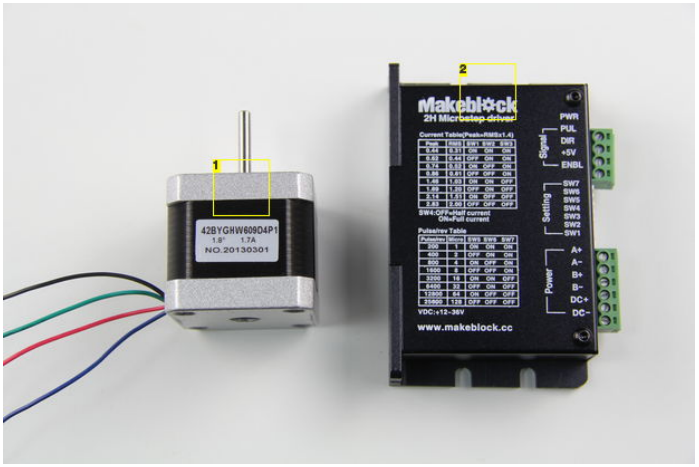
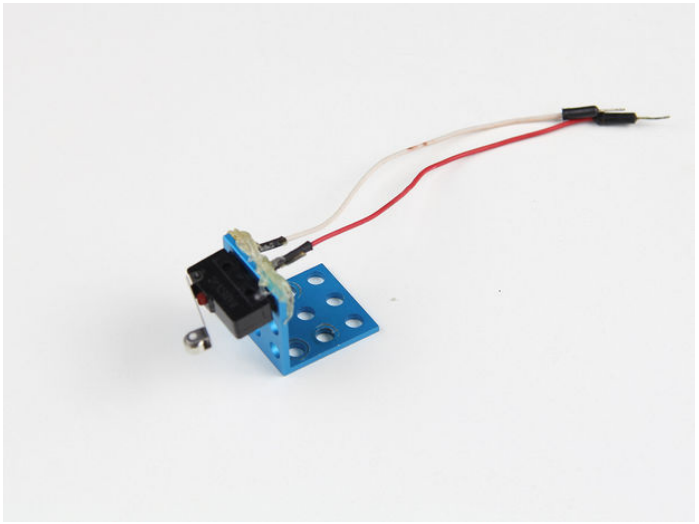
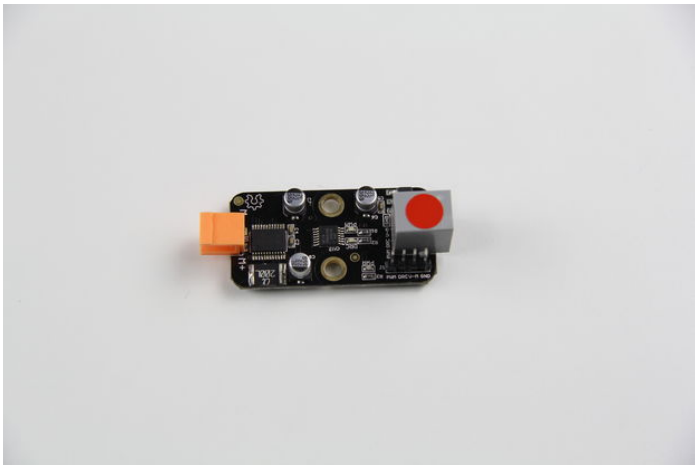


Image Notes
1. Step Motor
2. Step Motor Controller



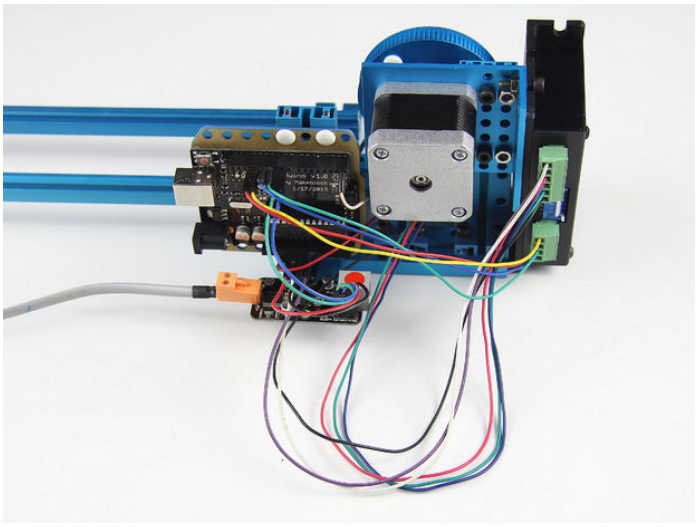


Step Motor	Step Motor Controller
Black	A+
Green	A-
Red	B+
Blue	B-

Step Motor Controller	Arduino
PUL	12
DIR	13
+5V	5V
ENBL	11
DC+	Vin
DC-	GND

Limit Switch	Arduino
NO	8
COM	GND

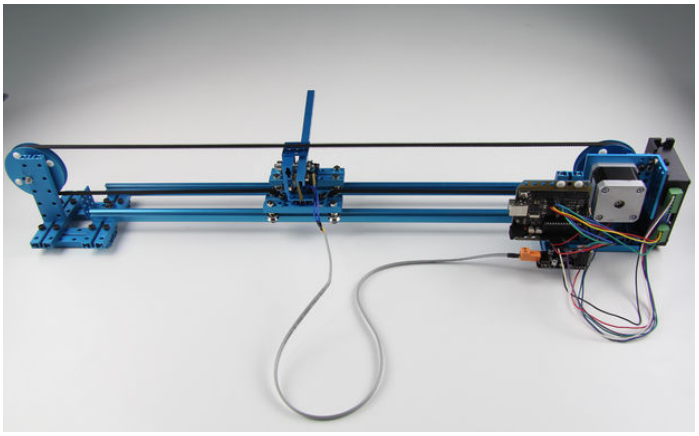
Me – Motor Driver	Arduino
PWM	10
DRC	9
V-M	Vin
GND	GND

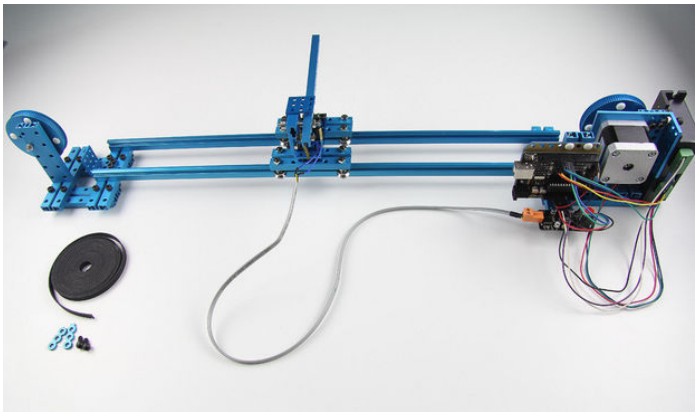


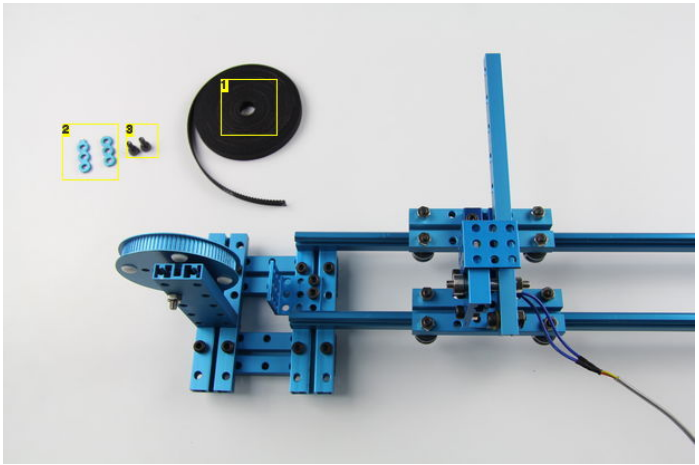
Step 10: Add Timing Belt

Materials List:
1 × Timing Belt
1 × Link Rod
2 × Screw M4×8

Procedure:
1. Install the Timing Belt on the Slider Device by the Link Rod and a Screw M4×8.
2. Install the Timing Belt on the Driven Pulley.
3. Install the Timing Belt on the Capstan.
4. Measure the length of the Timing Belt.
5. Cut the Timing Belt.
6. Install the Timing Belt on the Slider Device by the Link Rod and a Screw M4×8.







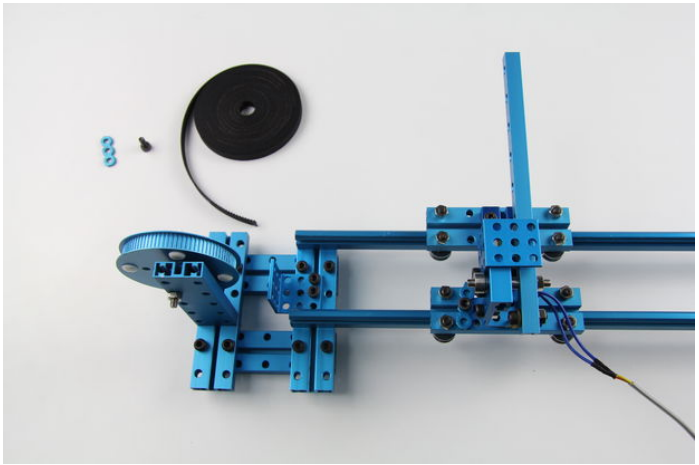
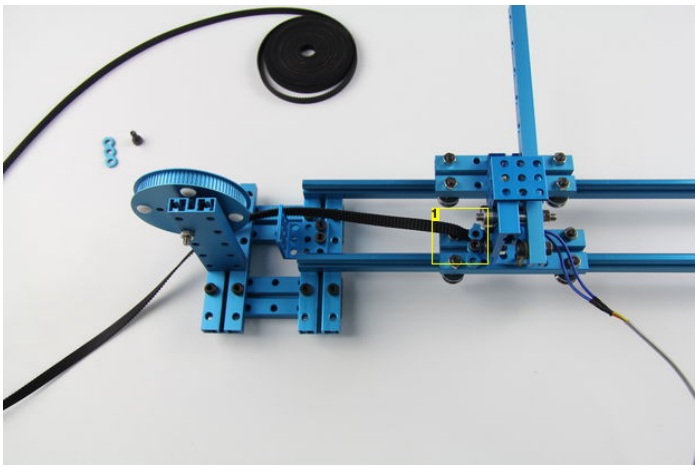


Image Notes

1. Timing Belt
2. Link Rod
3. Screw M4×8



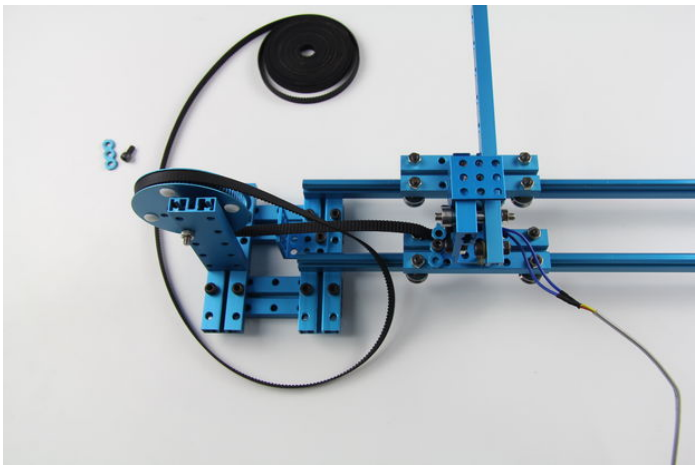


Image Notes
1. Step 1

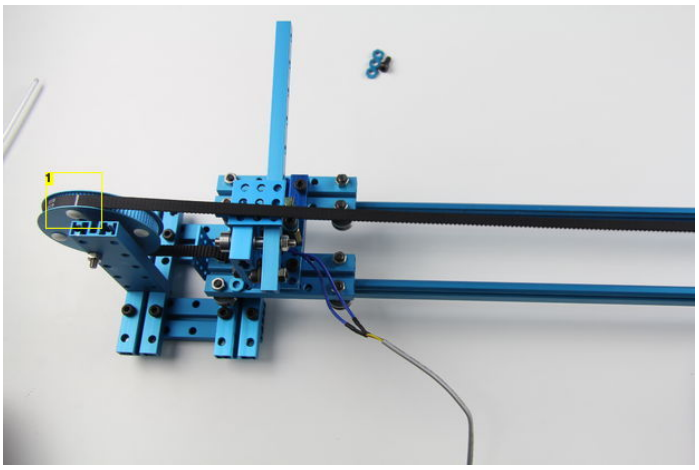


Image Notes
1. Step 2

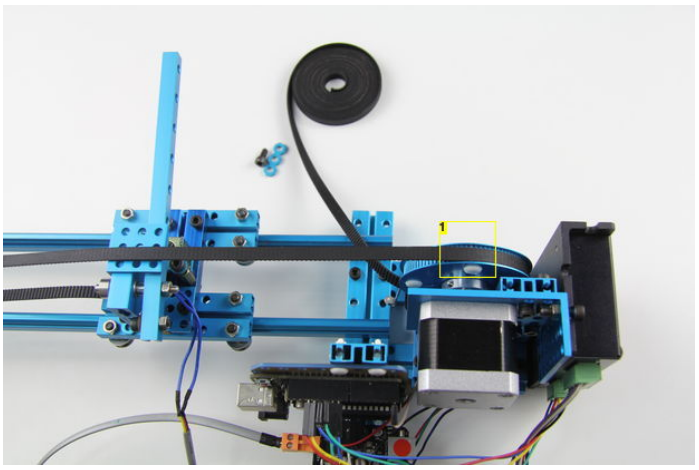


Image Notes
1. Step 3

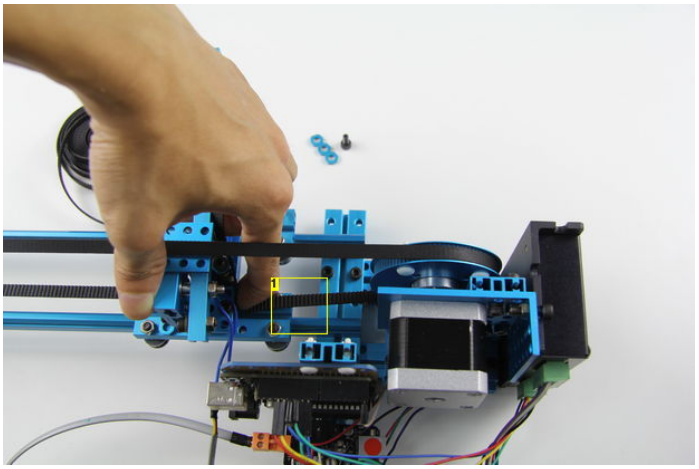


Image Notes
1. Step 4

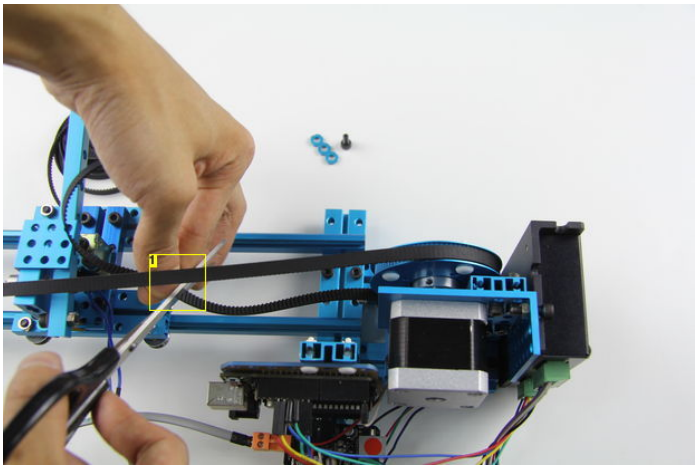
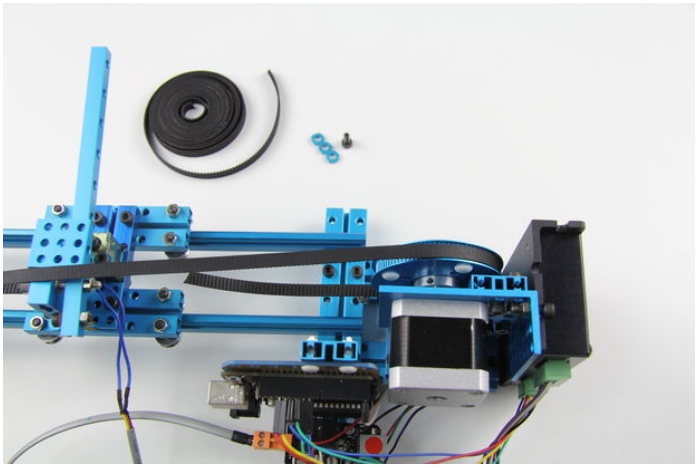
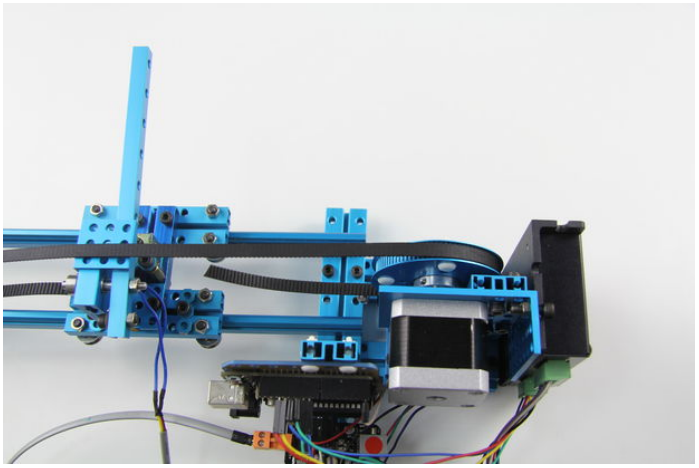
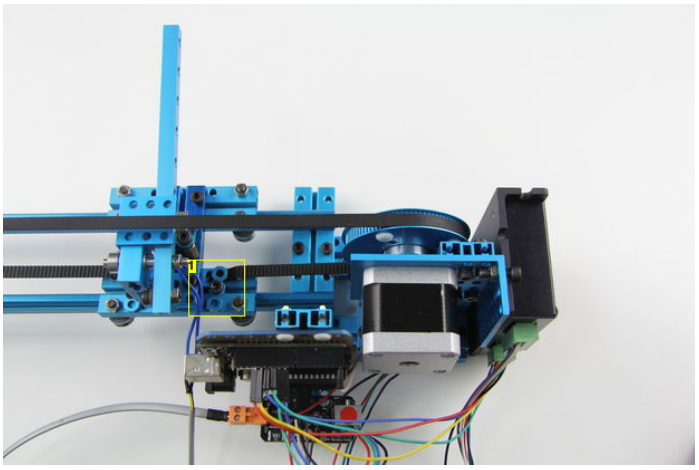


Image Notes
1. Step 5







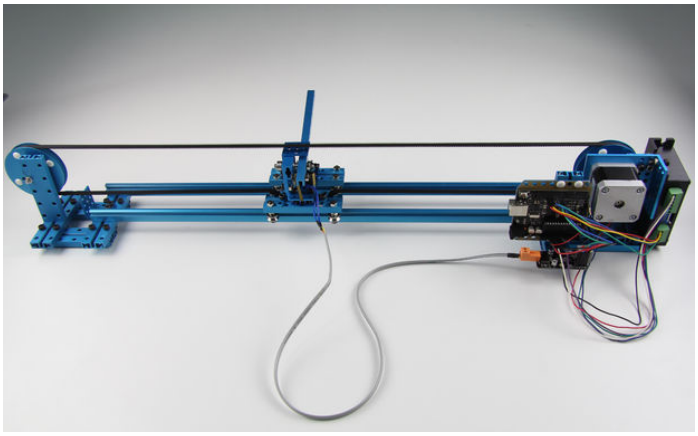


Image Notes
1. Step 6

Step 11: Add Xylophone hammer

Materials List:
1 × Xylophone Hammer
1 × Adhesive Tape

Procedure:
Install the Xylophone Hammer on Beam 0808-144 by the Adhesive Tape.

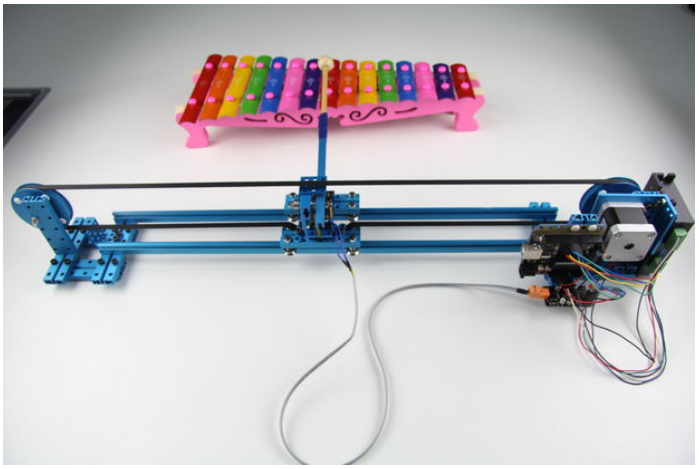
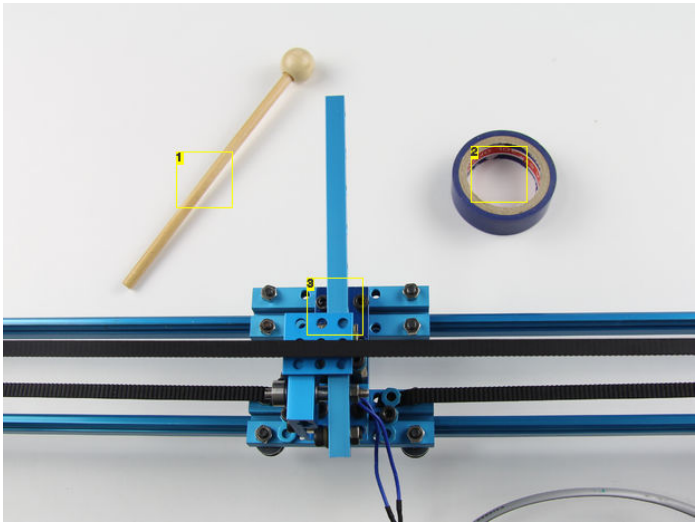


Image Notes
1. Xylophone
2. Xylophone Hammer



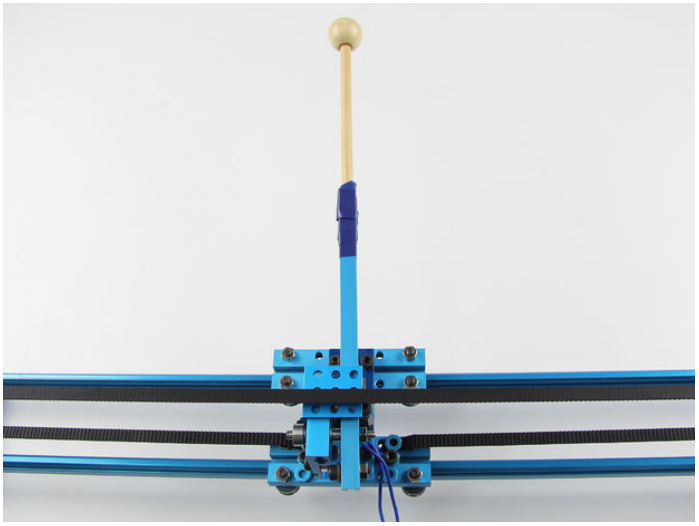
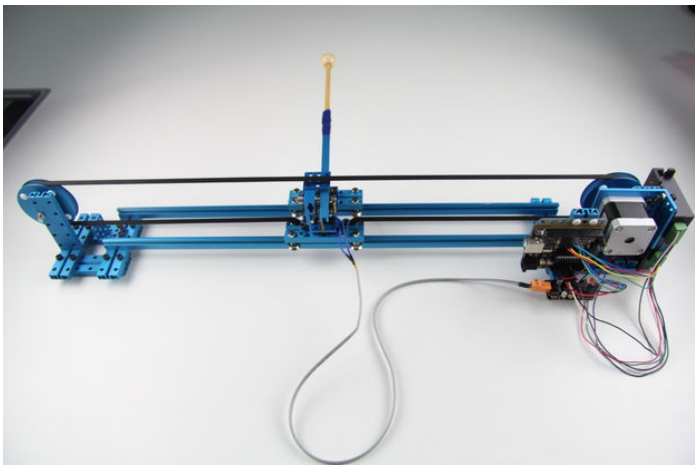
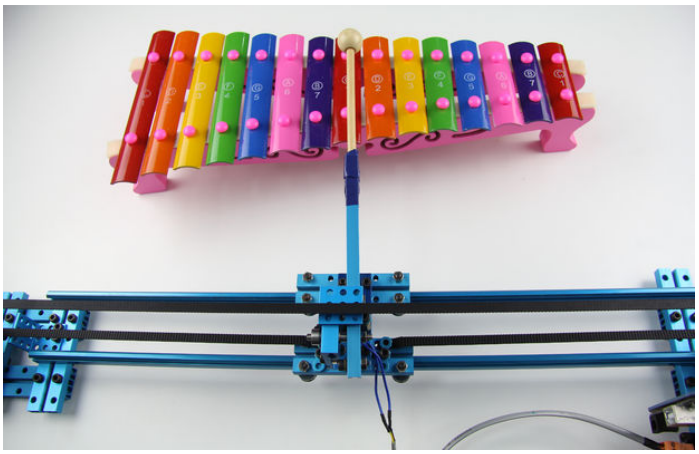


Image Notes
1. Xylophone Hammer
2. Adhesive Tape
3. Slider Device and Music Play Arm





Step 12: Upload the Arduino Code and Play the Music

Materials list:
1 × USB Cable(A plug to B plug)
1 × Wall Adapter Power Supply - 12VDC

Procedure:
1. Connect the Arduino to the computer by using the USB cable.
2. Connect the Wall Adapter Power Supply - 12VDC on the Arduino.
3. Upload the Arduino Code of the Music Robot.

The Arduino Code and the application for windows can be downloaded here:
http://makeblock.cc/download/

The Music Robot can also be controlled by the SmartPhone through the bluetooth, and the special application for Android Phone is in planning.

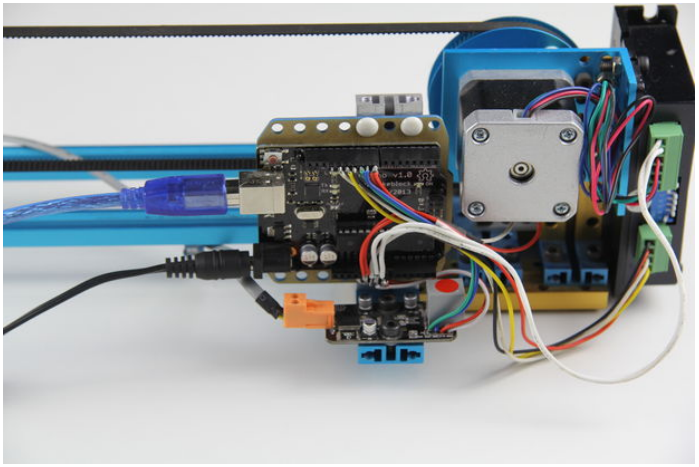
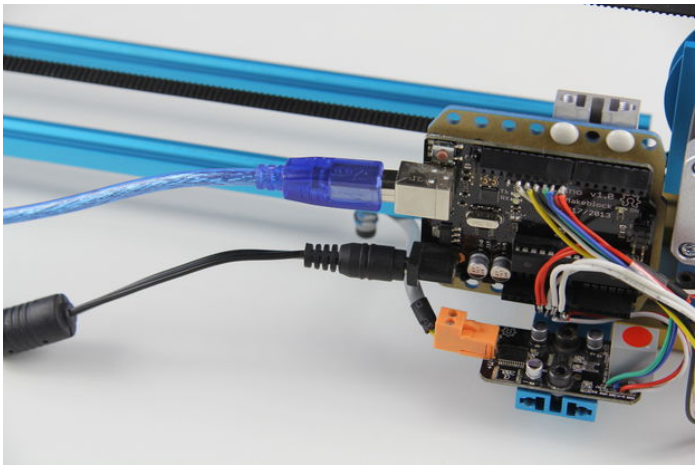
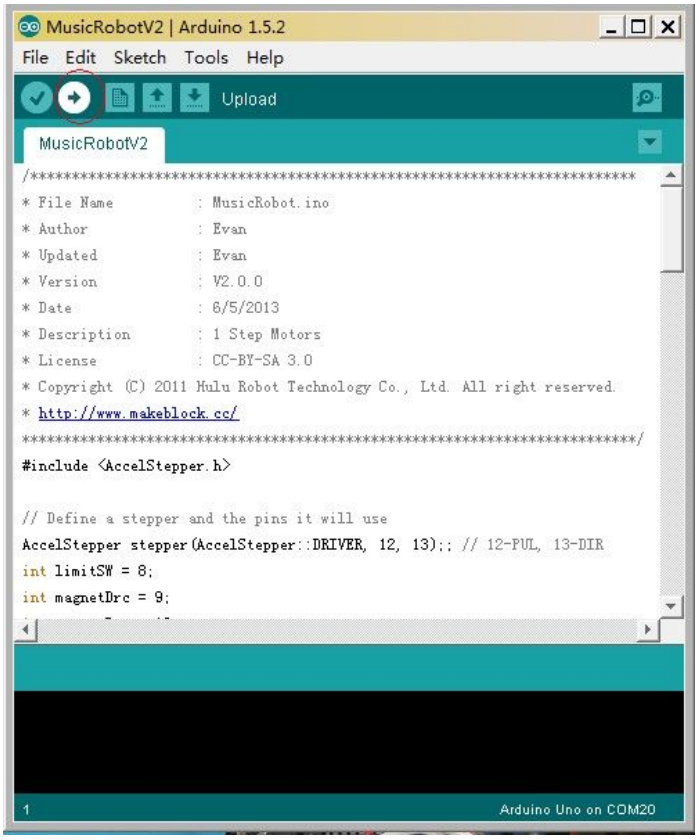
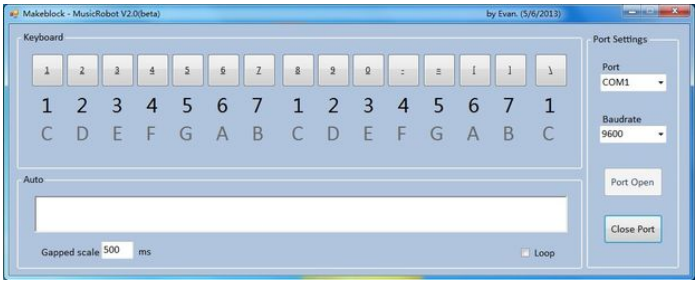


Image Notes
1. USB Cable(A plug to B plug)
2. Wall Adapter Power Supply - 12VDC

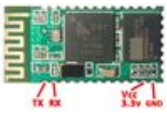






Related Instructables

A New Way to Make an Aluminium Alloy Robot by schang10



Cheap 2-Way Bluetooth Connection Between Arduino and PC by techbitar

Go Baby Go - Joystick controlled powered device by GoBabyGo

Arduino AND Bluetooth HC-05 Connecting easily by Mohannad Rawashdeh

Beginners guide to building Arduino robots with Bluetooth and Android by ZRob314

Make a scary scarab robot by djsures