

# LipSync (all versions)

## ASSEMBLY MANUAL

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Version 1.5

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VERSION	DESCRIPTION	CONNECTION TYPE
LipSync Mouse	Works like a mouse	USB
LipSync Wireless	Works like a mouse	USB & wireless
LipSync Macro	Works like a keyboard	USB & wireless
LipSync Gaming	Works like a joystick	USB

# Part 0a

## OBTAINING COMPONENTS AND FILES

**Components should be ordered at least 2 weeks in advance. See Part 0b for the full list of components and its purchase links.**

All components can be purchased through the links listed under each item.  
Required parts from Digikey can be purchased with these cart links:

Canada: <http://www.digikey.ca/short/jb9vm5>

United States: <http://www.digikey.com/short/jb9vm5>

If you are building the **LipSync Wireless** or the **LipSync Macro**, order parts #44 (bluetooth module) and #45 (1-position female header). These parts are not included in the Digikey carts above.

Download all the necessary files and directories to assemble a LipSync:

### LipSync Mouse:

<https://github.com/makersmakingchange/LipSync/blob/master/README.md>

### LipSync Wireless:

<https://github.com/makersmakingchange/LipSync-Wireless/blob/master/README.md>

### LipSync Macro:

<https://github.com/makersmakingchange/LipSync-Macro/blob/master/README.md>

### LipSync Gaming:

<https://github.com/makersmakingchange/LipSync-Gaming/blob/master/README.md>

# Part 0b

## COMPONENT CHECKLIST

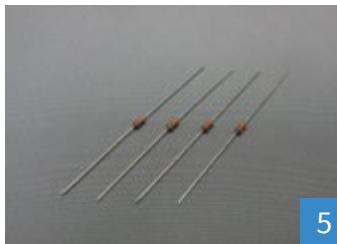
- 1 (1) LipSync Circuit Board Package (3 boards)
- 2 (1) Arduino Micro **OR**  
(1) Genuino Micro
- 3 (2) Right Angle Push Buttons
- 4 (2) 300 Ohm 1/4W T/H Resistors
- 5 (4) 10k Ohm Mini 1/4W T/H Resistors
- 6 (1) NXP Semiconductors Pressure Sensor
- 7 (1) 0.01uF Ceramic T/H Radial Capacitor
- 8 (1) 1.0uF Ceramic T/H Radial Capacitor
- 9 (1) 470pF Ceramic T/H Capacitor

<input type="checkbox"/>	10	(2) 17-Position Straight Female T/H Headers	<input type="checkbox"/>	22	(1) Joystick Baseplate	<input type="checkbox"/>	34	(4) Bumpers
<input type="checkbox"/>	11	(2) 3-Position Right Angle Male Headers	<input type="checkbox"/>	23	(1) Rear Housing	<input type="checkbox"/>	35	(4) Nuts M3
<input type="checkbox"/>	12	(2) 3-Position Straight Female Header	<input type="checkbox"/>	24	(2) Buttons	<input type="checkbox"/>	36	(1) Tubing 3/32" ID x 45mm
<input type="checkbox"/>	13	(2) 4-Position Straight Female T/H Headers	<input type="checkbox"/>	25	(1) Mouthpiece	<input type="checkbox"/>	37	(1) Light Pipe
<input type="checkbox"/>	14	(1) Break Away Male Headers	<input type="checkbox"/>	26	(1) Filter	<input type="checkbox"/>	38	(1) Threaded Insert 5/8"-27
<input type="checkbox"/>	15	(1) 5mm Bi-Color T/H LED	<input type="checkbox"/>	27	(1) Luer Lock Fitting	<input type="checkbox"/>	39	(1) Threaded Adapter 5/8"-27
<input type="checkbox"/>	16	(1) Shunt Connector	<input type="checkbox"/>	28	(4) Force Resistive Sensor	<input type="checkbox"/>	40	(1) USB Cable
<input type="checkbox"/>	17	(1) 2N3906 PNP-Type T/H Transistor	<input type="checkbox"/>	29	(4) Screws Phillips Head M3	<input type="checkbox"/>	41	(1) USB Adapter
<input type="checkbox"/>	18	(1) 6-Position Straight Female T/H Header	<input type="checkbox"/>	30	(6) Compression Springs	<input type="checkbox"/>	42	(1) Cable Tie
<input type="checkbox"/>	19	(1) Front Housing	<input type="checkbox"/>	31	(2) Standoffs M3 10mm	<input type="checkbox"/>	43	<b>OPTIONAL</b> (1) Magic Arm 11" and Clamp
<input type="checkbox"/>	20	(1) Joystick Front Plate	<input type="checkbox"/>	32	(2) Standoffs M3 15mm	<input type="checkbox"/>	44	<b>OPTIONAL</b> (1) SparkFun Bluetooth Module
<input type="checkbox"/>	21	(1) Joystick Rocker	<input type="checkbox"/>	33	(1) Luer Lock Nut	<input type="checkbox"/>	45	<b>OPTIONAL</b> (1) 1-Position Straight Female T/H Header



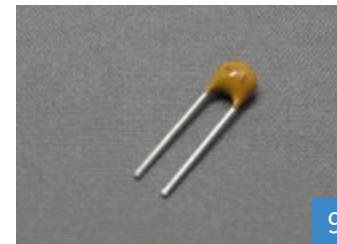
LipSync Circuit Board Pack:  
(1) Main Interface Board  
(1) Pressure Sensor Board  
(1) Joystick Board  
[Mouse ver.](#)   [Macro ver.](#)  
[Wireless ver.](#)   [Gaming ver.](#)  
NOTE: Same files for all versions.

1



(4) 10k Ohm Mini Axis Through Hole Resistors  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

5



(1) 470pF Ceramic Through Hole Radial Capacitor [capacitor label: 471]  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

9



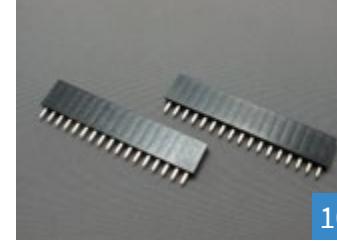
(1) Arduino Micro/ Genuino Micro microcontroller  
[Arduino](#)   [Digikey](#)   [Robotshop](#)  
[Adafruit](#)   [Pololu](#)  
**COMPATIBILITY NOTE:** The "Arduino Micro" or "Genuino Micro" **MUST** be used.

2



(1) NXP Pressure Sensor [component label: MPXV7002DP]  
[Digikey.ca](#)  
[Digikey.com](#)

6



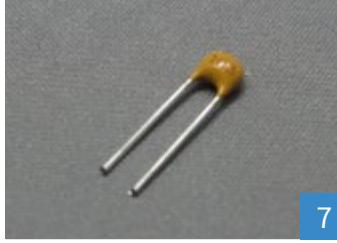
(2) 17-Position Straight Female Through Hole Headers  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

10



(2) Right Angle Push Buttons  
[Digikey.ca](#)  
[Digikey.com](#)

3



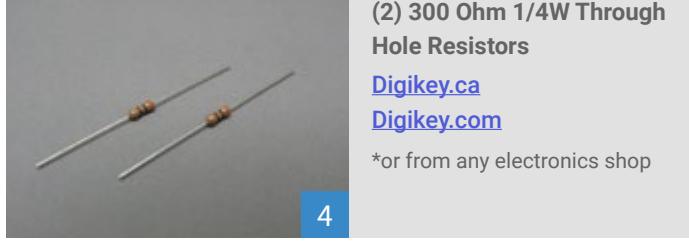
(1) 0.01uF Ceramic Capacitor [capacitor label: 103]  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

7



(2) 3-Position Right Angle Male Header  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

11



(2) 300 Ohm 1/4W Through Hole Resistors  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

4



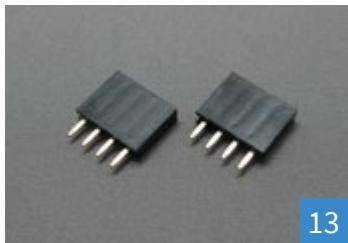
(1) 1.0uF Ceramic Capacitor [capacitor label: 105]  
[Digikey.ca](#)  
[Digikey.com](#)  
\*or from any electronics shop

8



(2) 3-Position Straight Female Header  
[Digikey.ca](#)  
[Digikey.com](#)  
**\*ONLY from the above source**

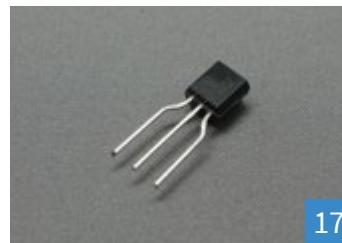
12



(2) 4-Position Straight  
Female Header  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

13



(1) 2N3906 PNP-Type T/H  
Transistor  
[Digikey.ca](#)  
[Digikey.com](#)

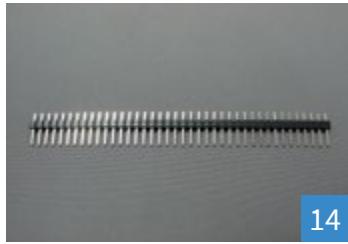
\*or from any electronics shop

17



(1) Joystick Rocker  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

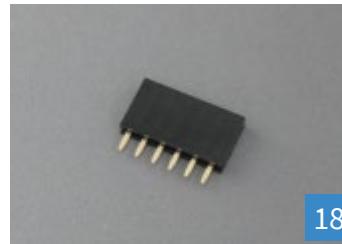
21



(17) Break Away Male Headers  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

14



(1) 6-Position Straight  
Female T/H Headers  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

18



(1) Joystick Top Plate  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

22



(1) 5mm Bi-Color T/H LED  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

15



(1) Front Housing  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

NOTE: Same file for all versions.  
3D printed files and print settings  
can be found in "Housing\_design.zip"

19



(1) Rear Housing  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

23



(1) Shunt Connector  
[Digikey.ca](#)  
[Digikey.com](#)

\*or from any electronics shop

16



(1) Joystick Base Plate  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

NOTE: Same file for all versions.  
3D printed files and print settings  
can be found in "Housing\_design.zip"

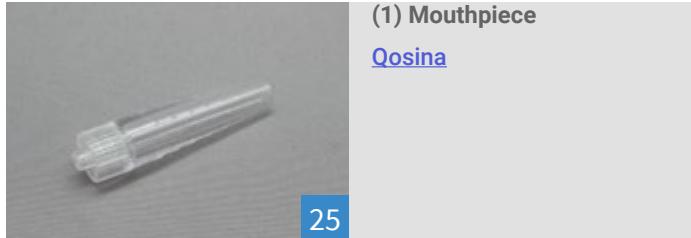
20



(2) Buttons  
[Mouse ver.](#) [Macro ver.](#)  
[Wireless ver.](#) [Gaming ver.](#)

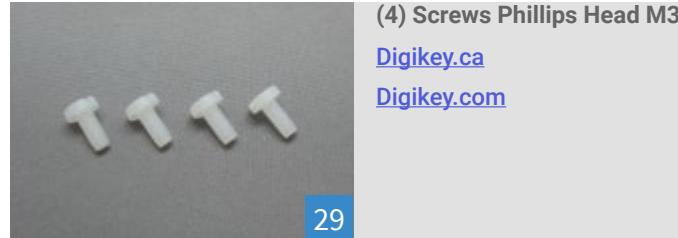
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NOTE: Same file for all versions.  
3D printed files and print settings  
can be found in "Housing\_design.zip"



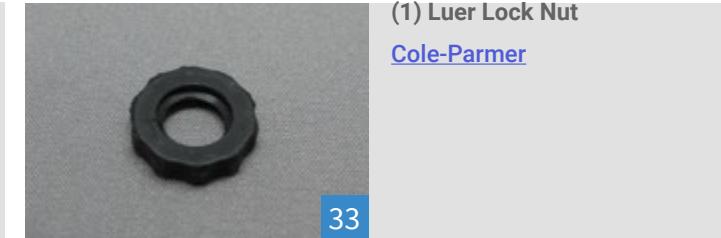
(1) Mouthpiece  
[Qosina](#)

25



(4) Screws Phillips Head M3  
[Digikey.ca](#)  
[Digikey.com](#)

29



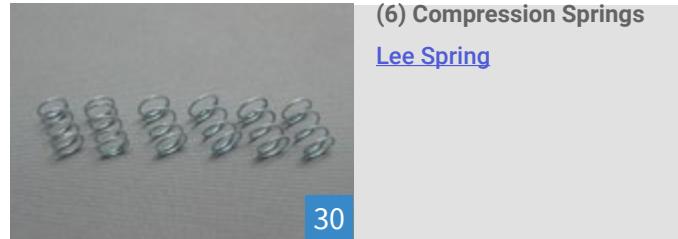
(1) Luer Lock Nut  
[Cole-Parmer](#)

33



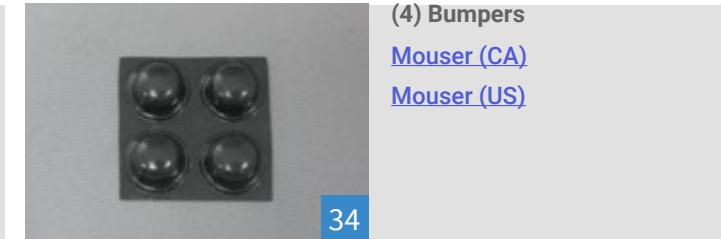
(1) Filter  
[Qosina](#)

26



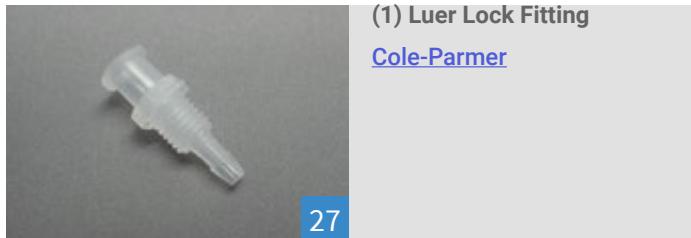
(6) Compression Springs  
[Lee Spring](#)

30



(4) Bumpers  
[Mouser \(CA\)](#)  
[Mouser \(US\)](#)

34



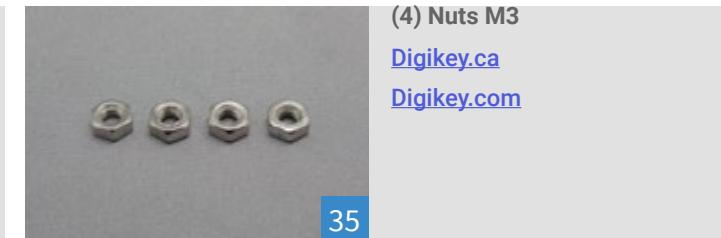
(1) Luer Lock Fitting  
[Cole-Parmer](#)

27



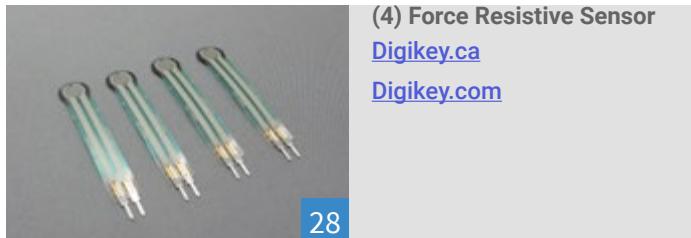
(2) Standoffs M3 10mm  
[Digikey.ca](#)  
[Digikey.com](#)

31



(4) Nuts M3  
[Digikey.ca](#)  
[Digikey.com](#)

35



(4) Force Resistive Sensor  
[Digikey.ca](#)  
[Digikey.com](#)

28



(2) Standoffs M3 15mm  
[Digikey.ca](#)  
[Digikey.com](#)

32



(1) Tubing 3/32" ID x 45mm  
[US Plastic](#)

36



37

(1) Light pipe  
[Mouser](#)



41

(1) USB Adapter  
[Amazon.ca](#)  
[Amazon.com](#)



45

(OPTIONAL) (1) 1-Position  
Straight Female T/H Header  
[Digikey.ca](#)  
[Digikey.com](#)

\*REQUIRED for the LipSync Wireless and LipSync Macro.



38

(1) Threaded Insert 5/8"-27  
[B&H Photo Video](#)  
[Adorama](#)



42

(1) Cable Tie  
[Mouser \(CA\)](#)  
[Mouser \(US\)](#)

**NOTE:** Max cable width of 0.2mm  
is recommended.



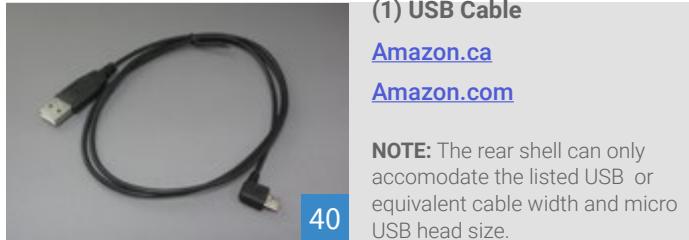
39

(1) Threaded Adapter 5/8"-27  
[Amazon.com](#)  
[Camvate](#)



43

(OPTIONAL) (1) Magic Arm  
11" and Clamp  
[Amazon.com](#)



40

(1) USB Cable  
[Amazon.ca](#)  
[Amazon.com](#)

**NOTE:** The rear shell can only accomodate the listed USB or equivalent cable width and micro USB head size.



44

(OPTIONAL) (1) SparkFun  
Bluetooth Module  
[Digikey.ca](#)  
[Digikey.com](#)

\*REQUIRED for the LipSync Wireless and LipSync Macro.

# Part 0c

## EQUIPMENT CHECKLIST

- Small spool of 60Pb/40Tn solder wire
- Adjustable tabletop vise
- Temperature adjustable soldering iron set at 350°C
- Safety glasses
- Needle nose pliers
- Small fan or fume extractor
- Fine file or sandpaper (150-220 grit)
- Hobby knife
- Baby powder
- Flush cutters
- Super glue
- ABS, high strength PLA, or PETG filament 100g
- Desolder pump



= Solder the part outlined in the white outline



= Component number



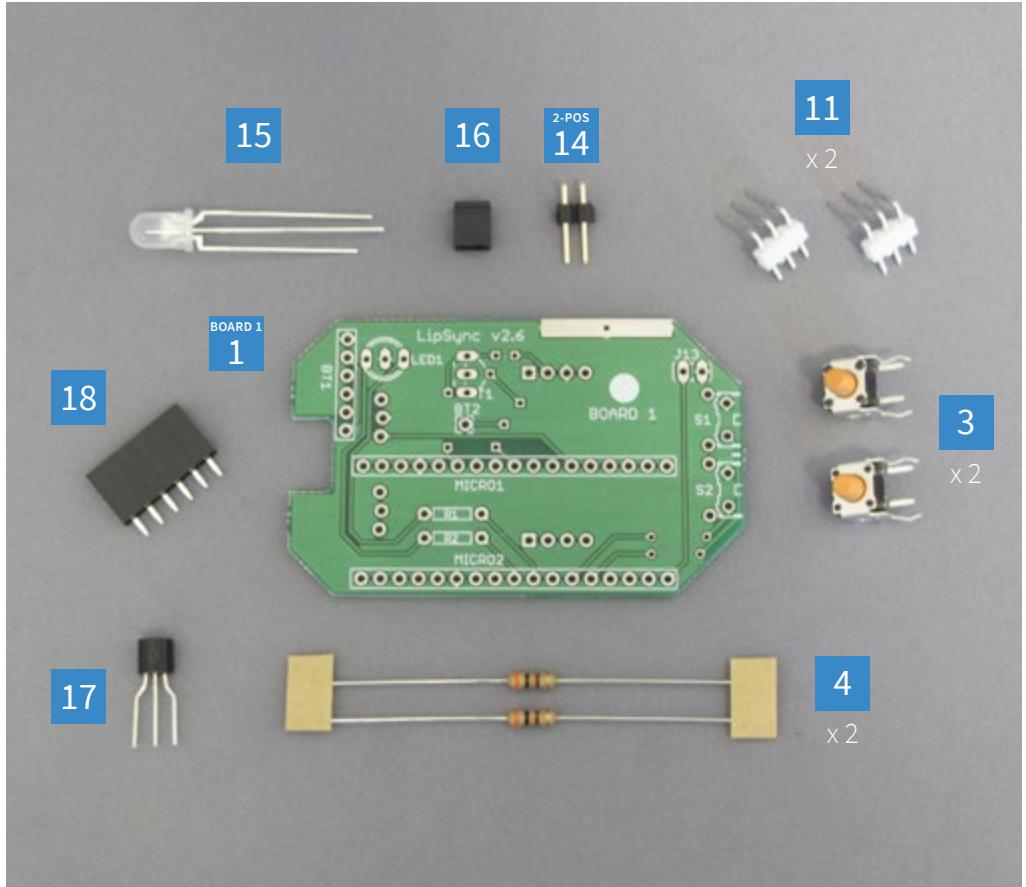
= Name of plated through-hole



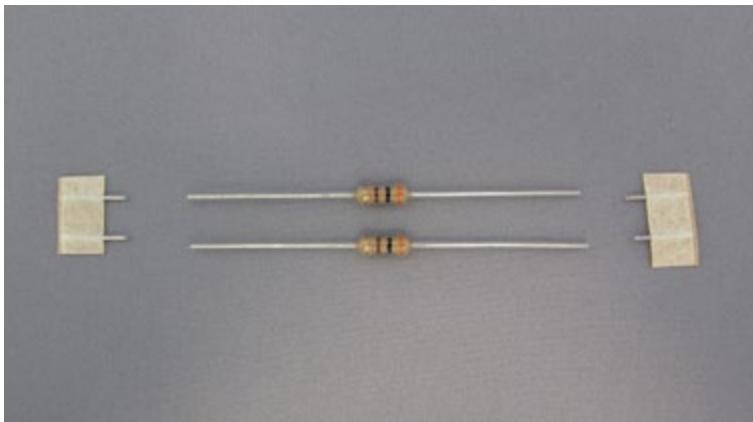
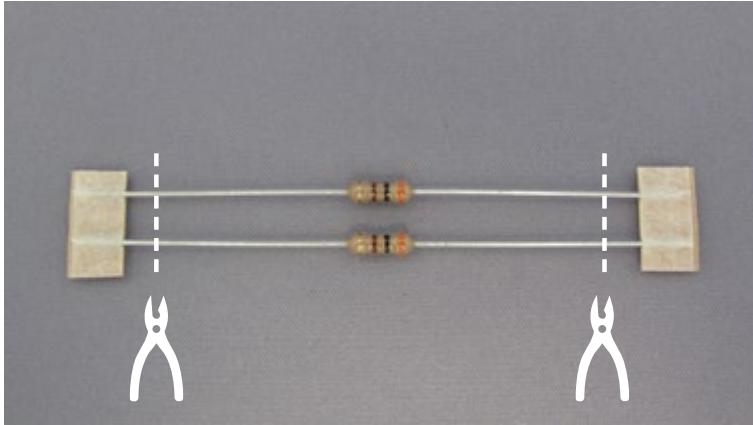
### CAUTION

- Safety glasses should be worn at all times during the assembly.
- Be aware of electrostatic discharge when soldering
- Be aware that too much heat can damage component

# Part 1

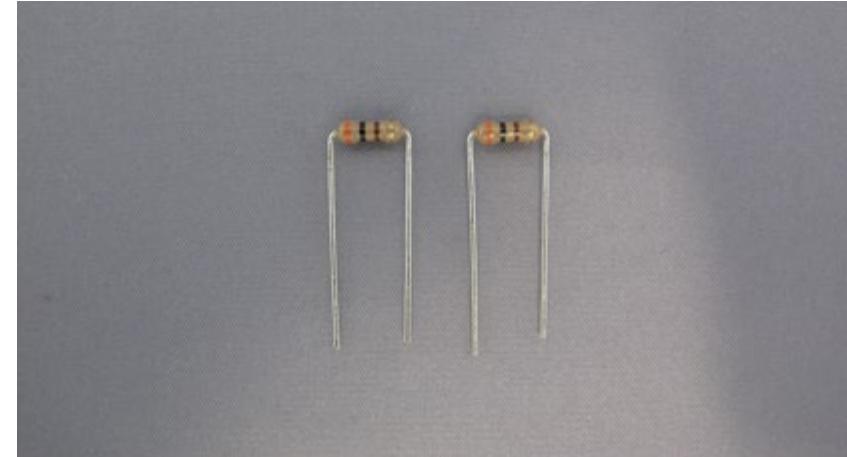
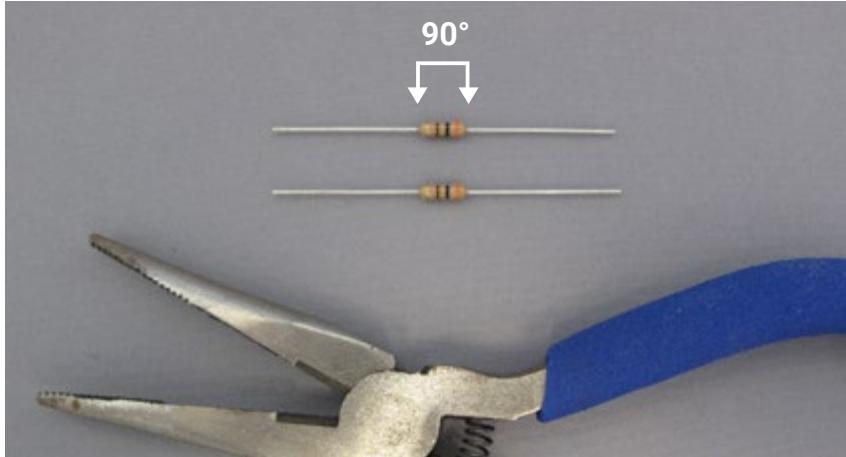


4  
x 2

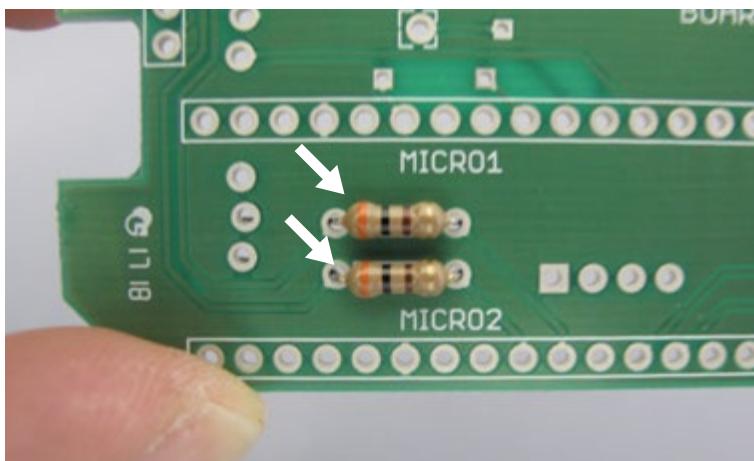


01.

**02.**

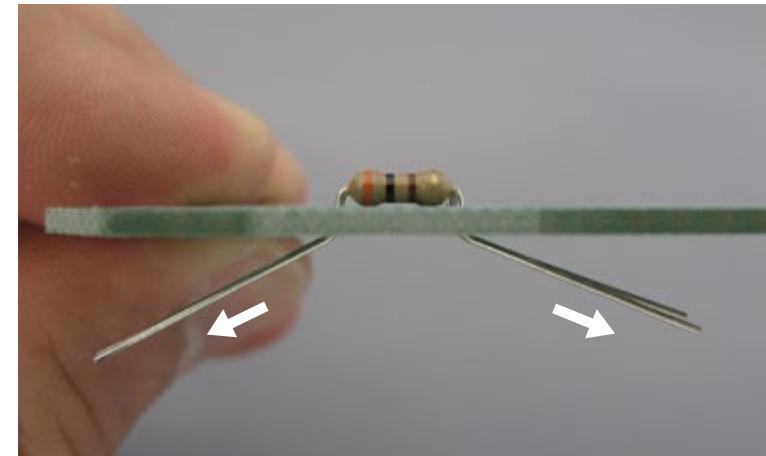


**03.**

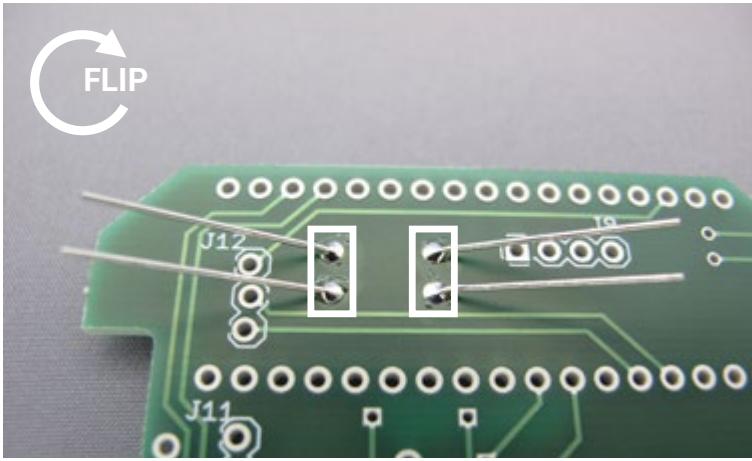


BOARD 1
1
HOLE
R1
HOLE
R2

**04.**

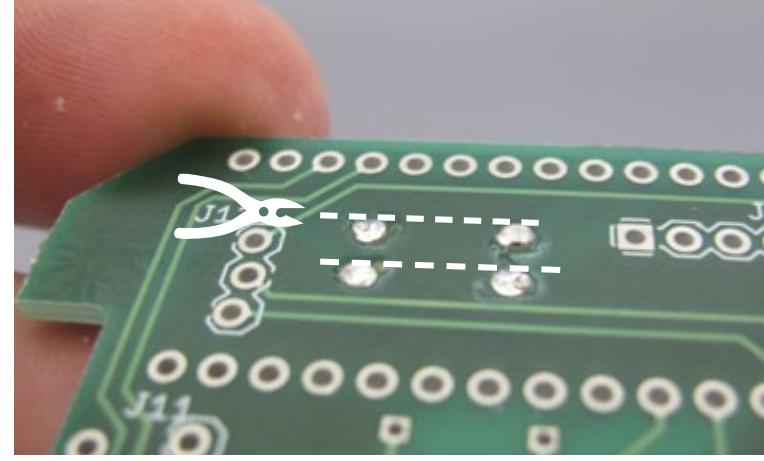


**05.**

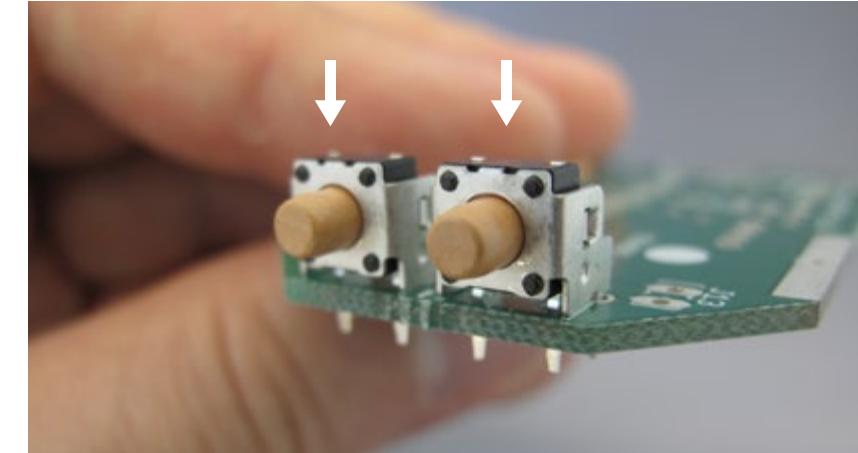
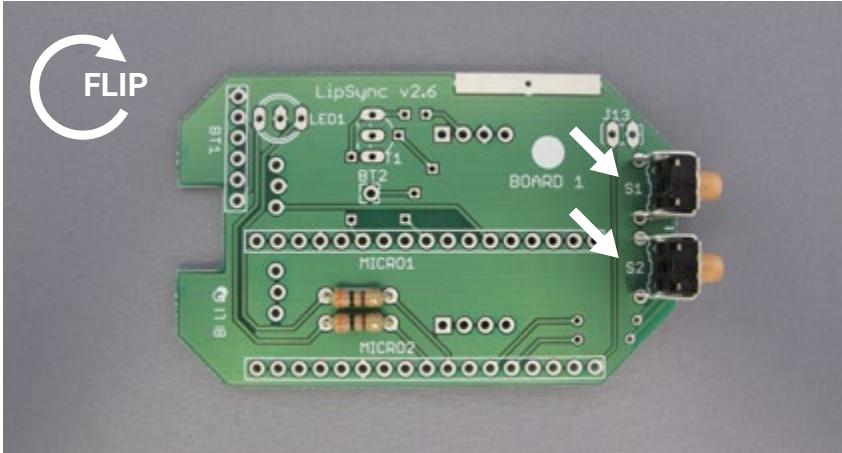


x 4

**06.**



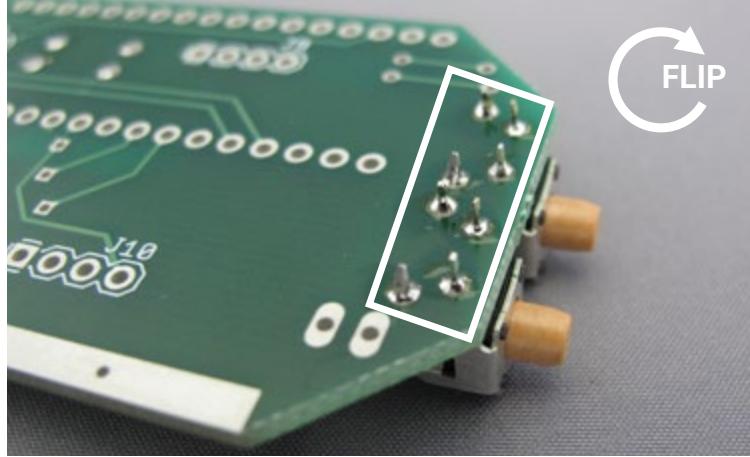
**07.**



3  
x 2

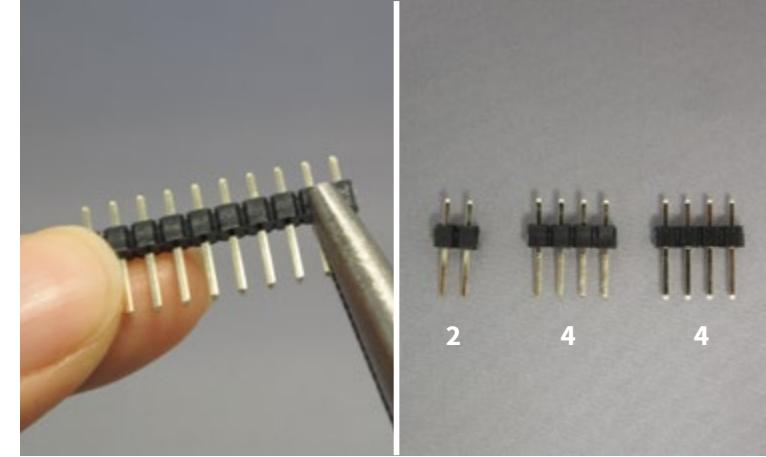
HOLE  
S1  
HOLE  
S2

# 08.

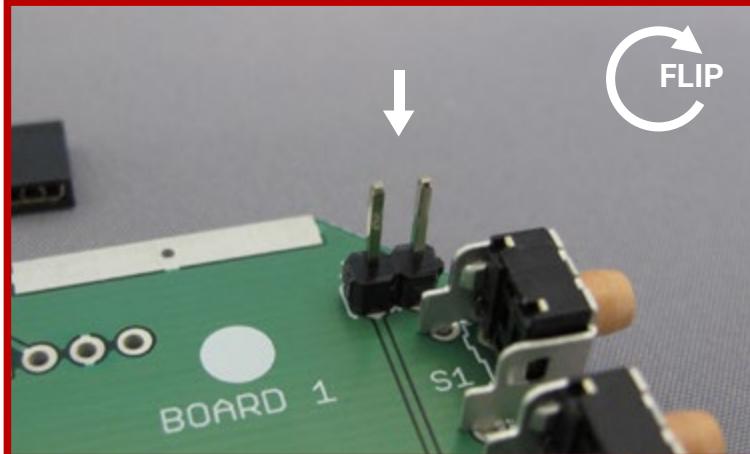


14

# 09.

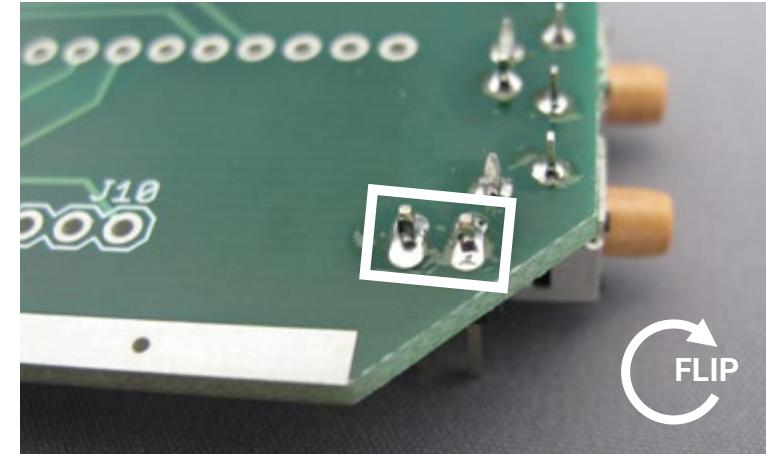


# 10.

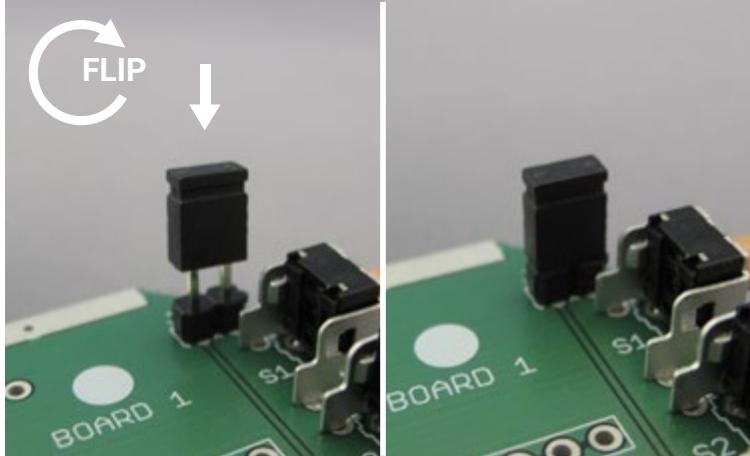


x 2

# 11.

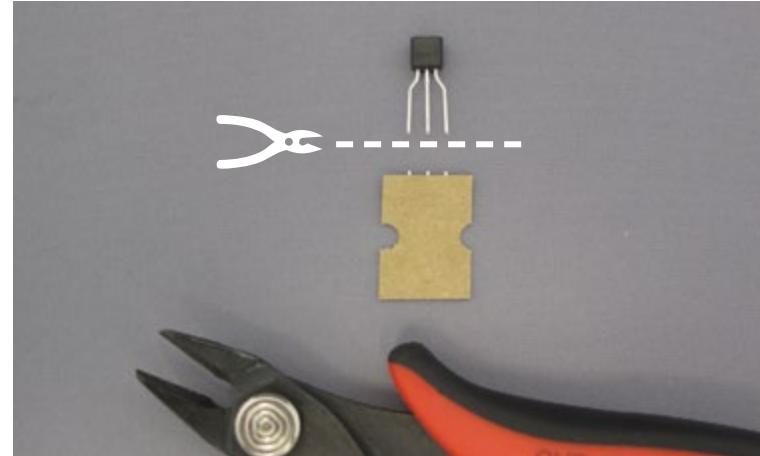


12.



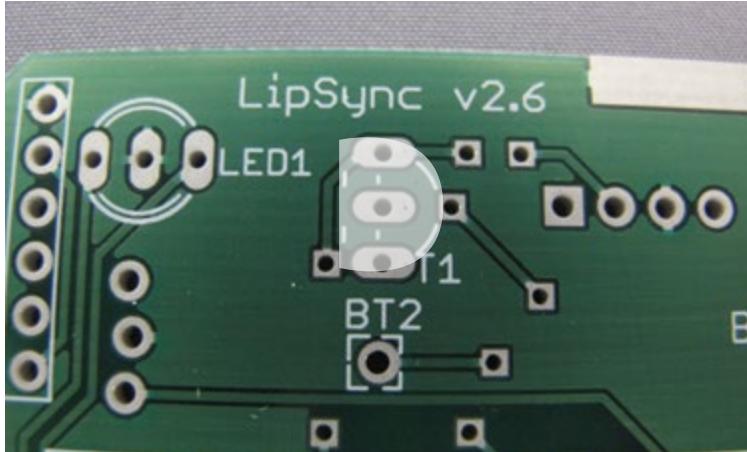
16

13.



17

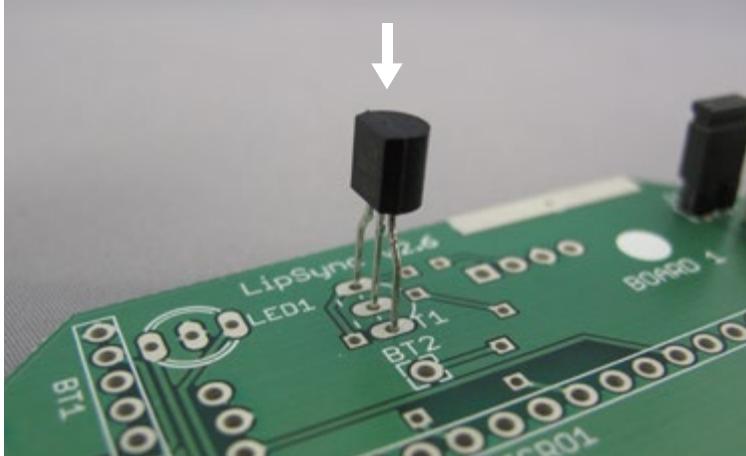
14.



HOLE  
T1

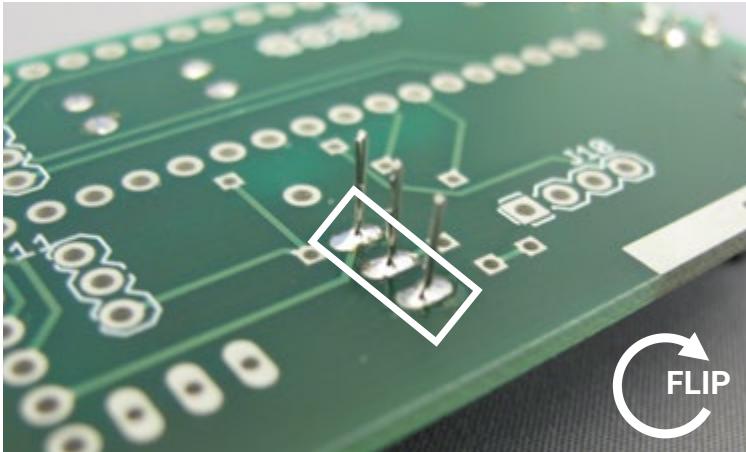
**NOTE:** The silkscreen outline for hole T1 on Board 1 matches the orientation of which the transistor is inserted.

**15.**



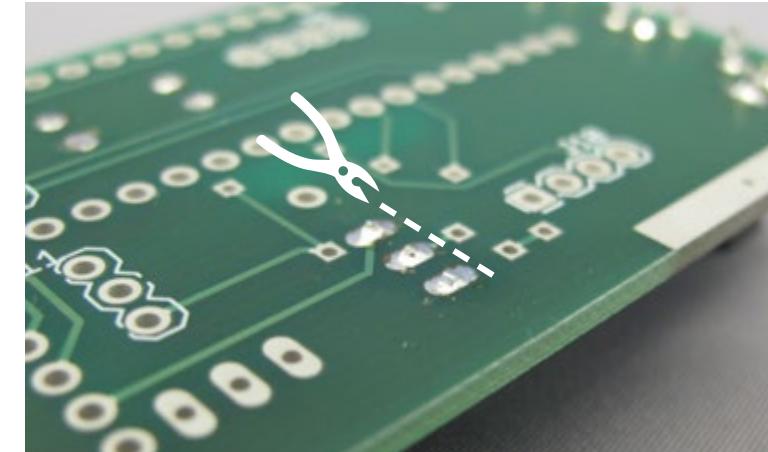
**i NOTE:** After inserting the transistor, there will be a gap between the transistor and Board 1

**16.**

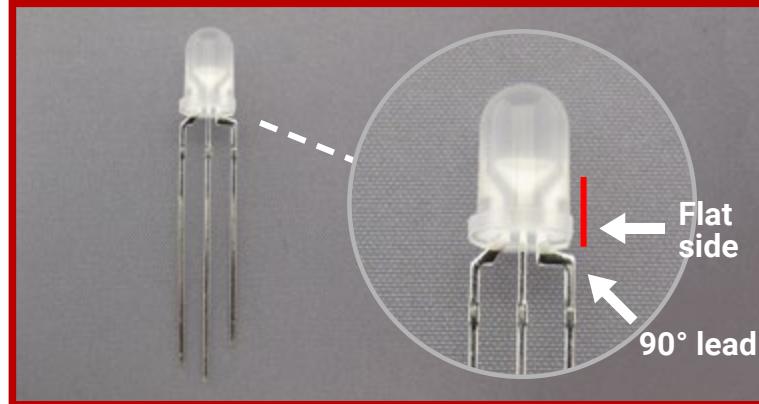


x 3

**17.**



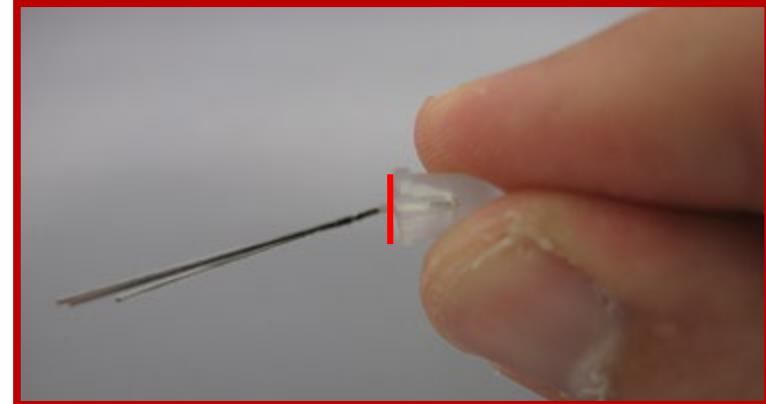
# 18.



**⚠️ IMPORTANT:** The flat side of the LED head and the 90° lead should be on the **RIGHT** when installed.

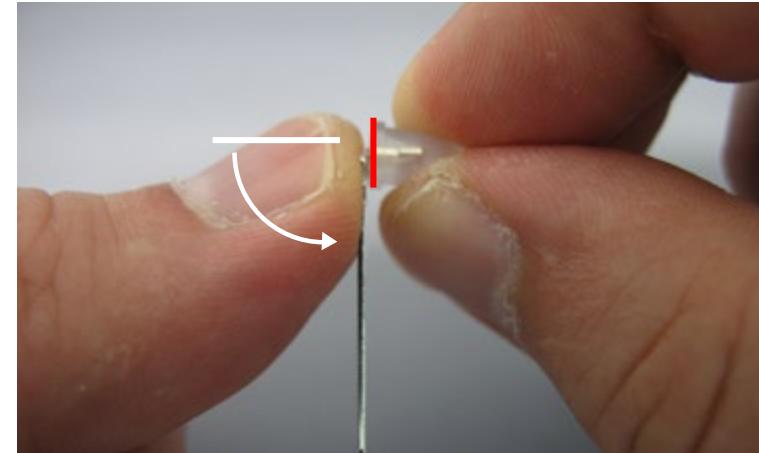
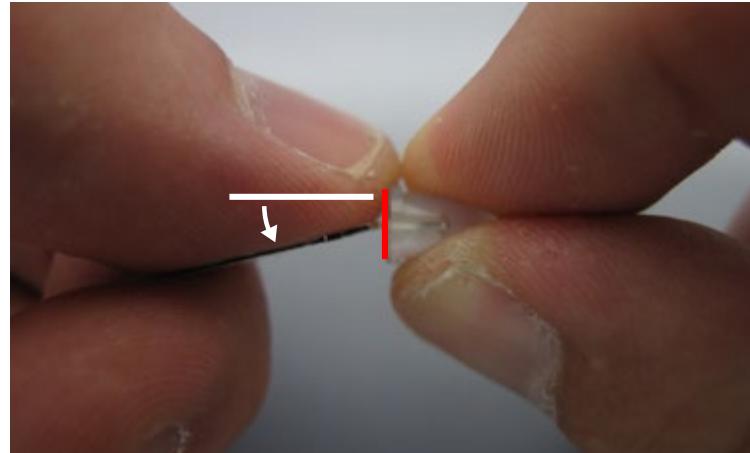
15

# 19.



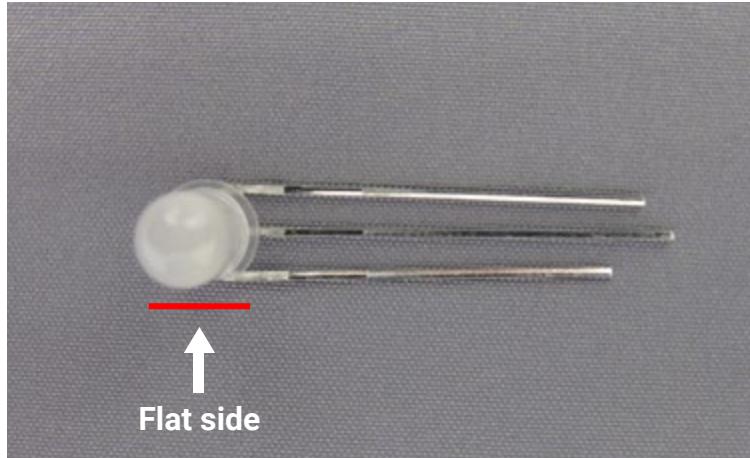
**⚠️ IMPORTANT:** Hold the LED so that the flat side and the 90° lead is facing **TOWARDS** you.

# 20.



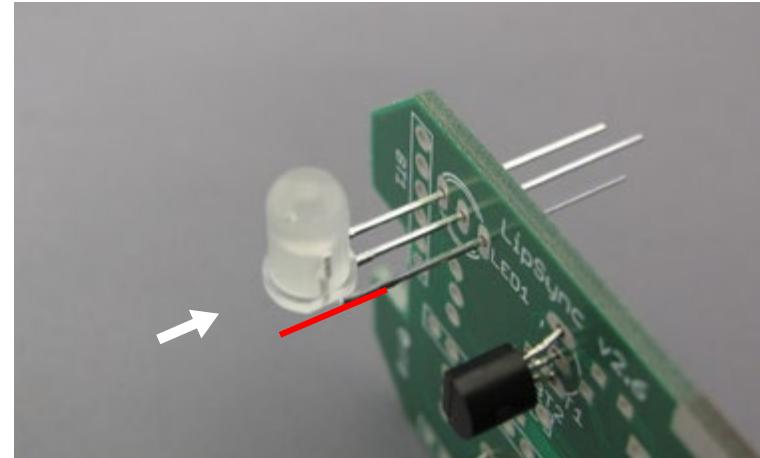
**ℹ️ NOTE:** Using a finger, bend the leads by 90° right at the base.

**21.**

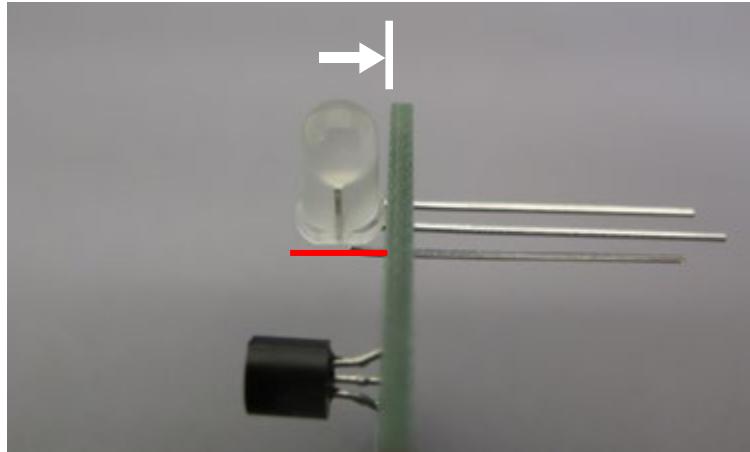


HOLE  
LED1

**22.**

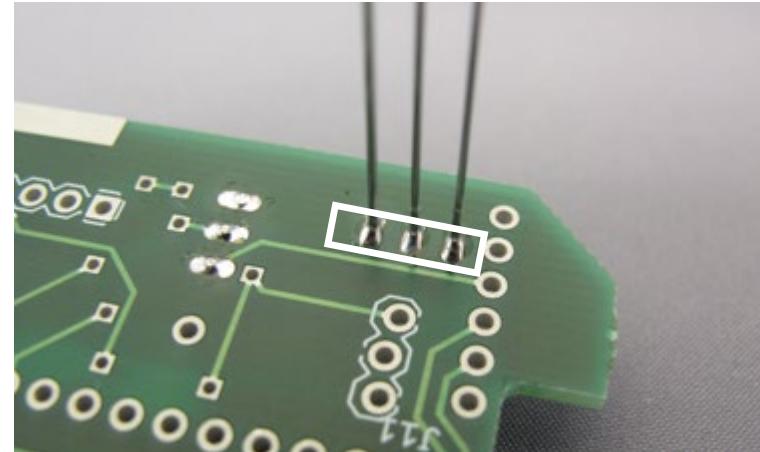


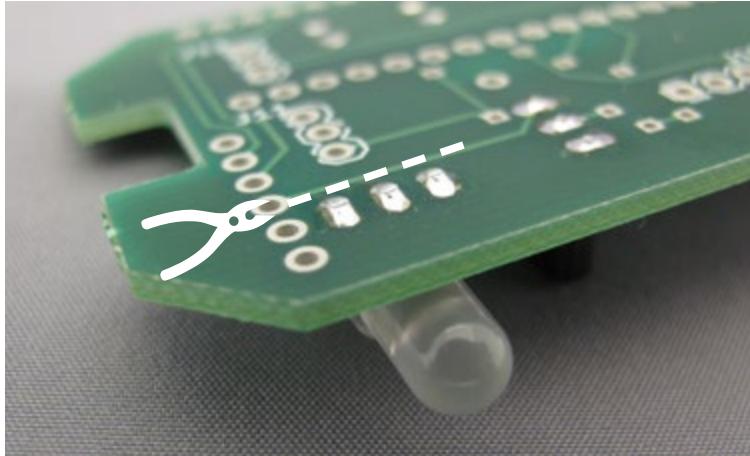
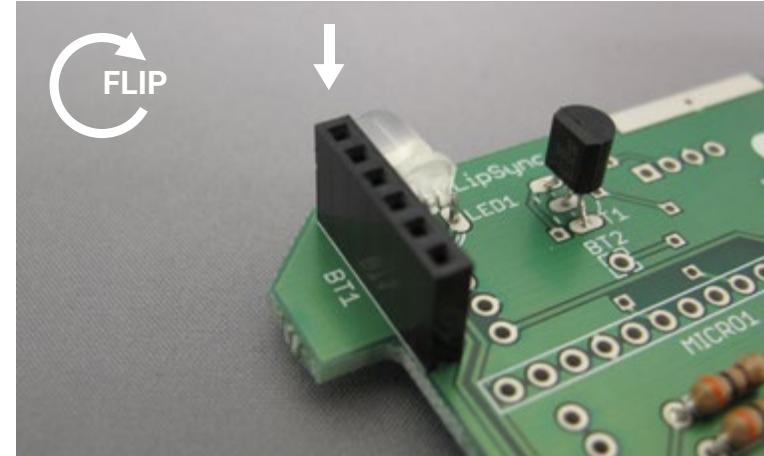
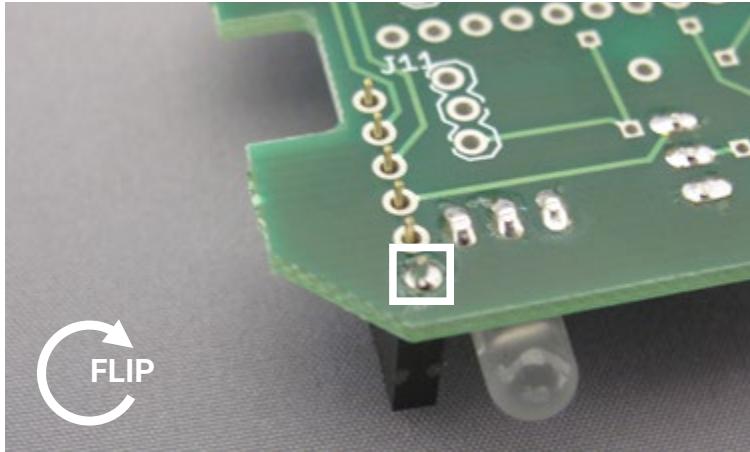
**23.**



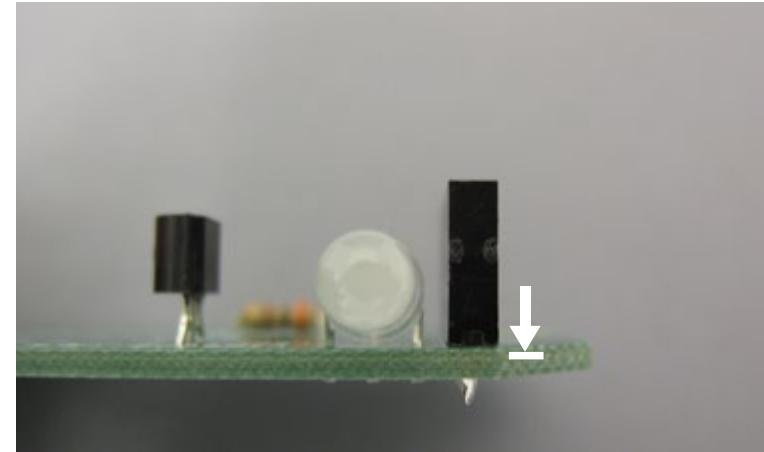
x 3

**24.**



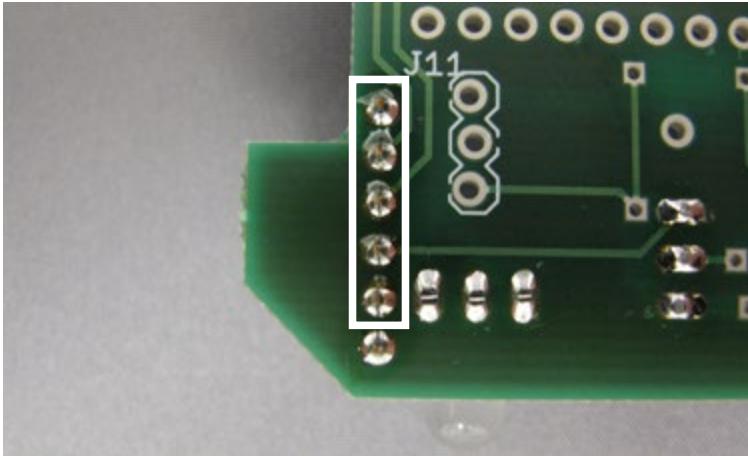
**25.****26.****27.**

x 1

**28.**

**NOTE:** Check that component is flush to the board

**29.**



x 5

**11**

x 2

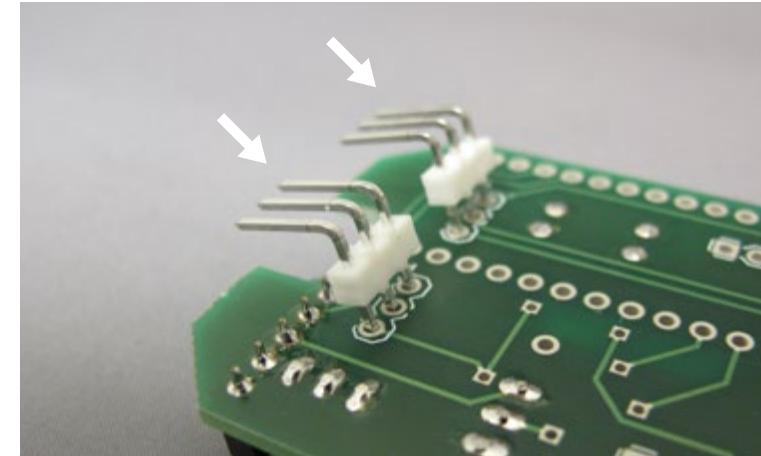
SECTION

**J11**

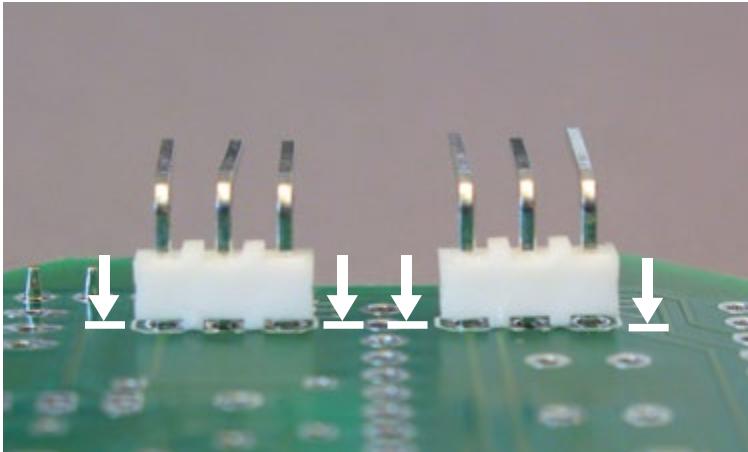
SECTION

**J12**

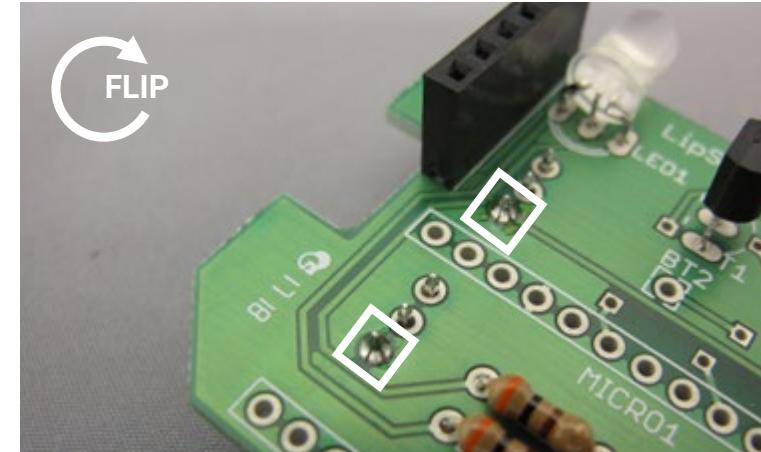
**30.**



**31.**

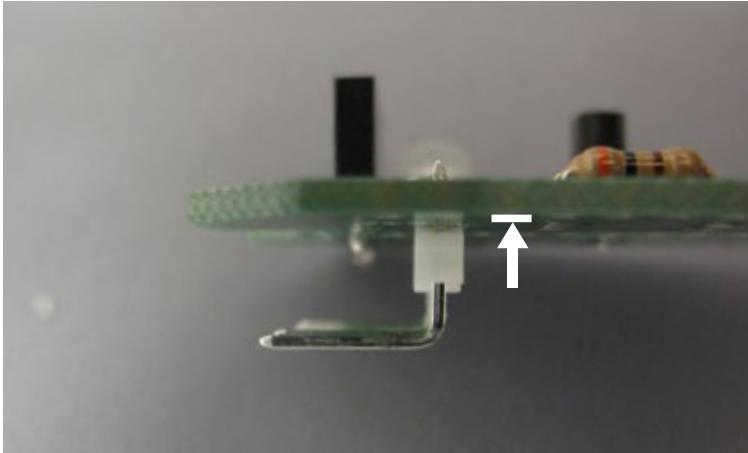


**32.**

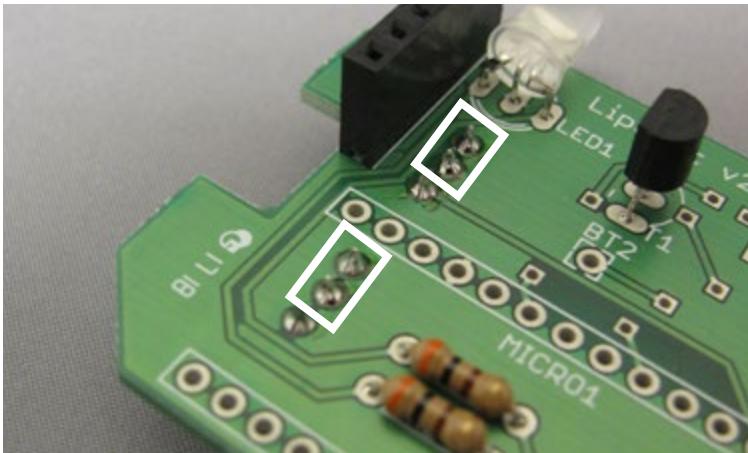


x 2

**33.**



**i** **NOTE:** Check that component is flush to the board



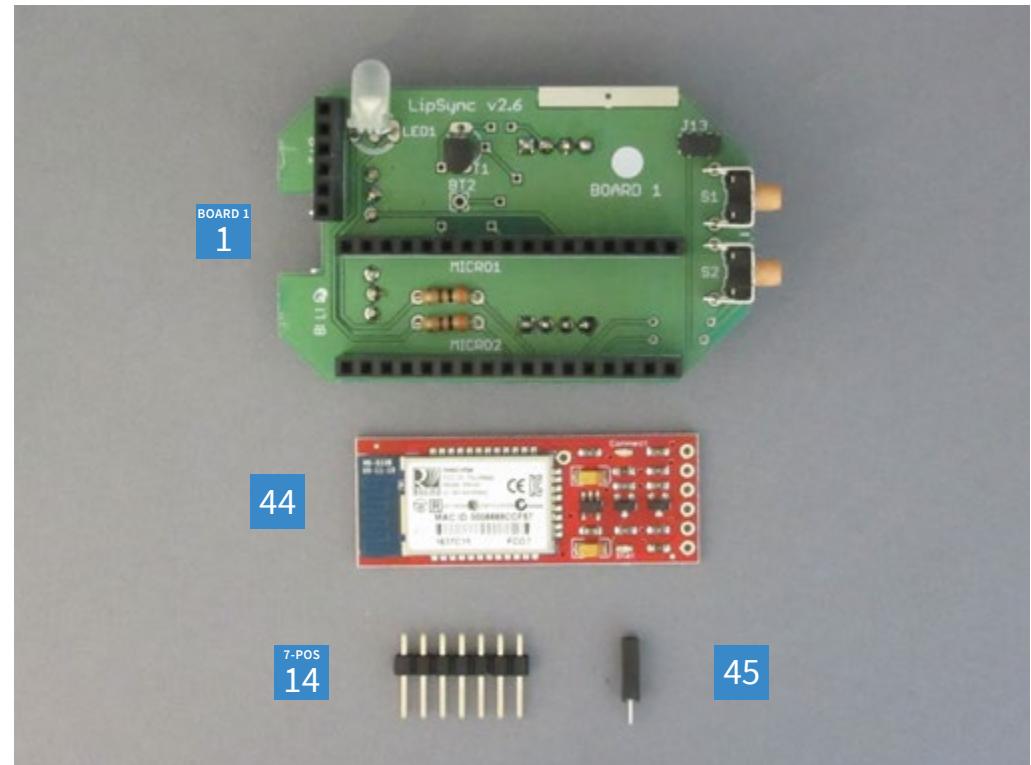
x 4

**34.**

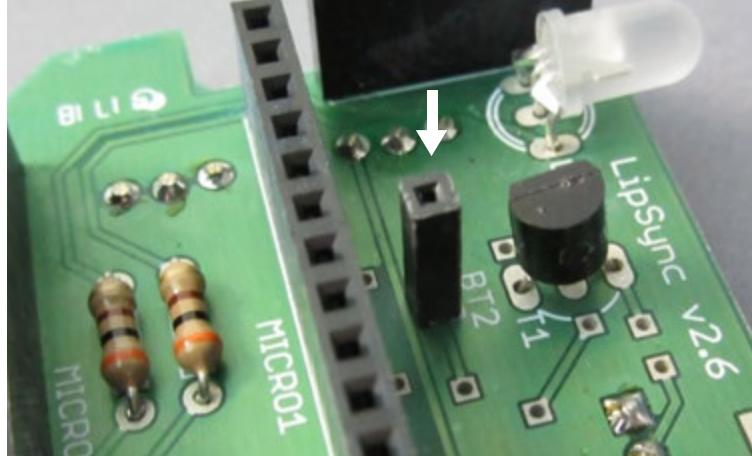
# Part 2

## (OPTIONAL) INSTALLING THE BLUETOOTH COMPONENT

If you are building the LipSync Wireless or the LipSync Macro, complete Part 2.  
If not, skip to Part 3.



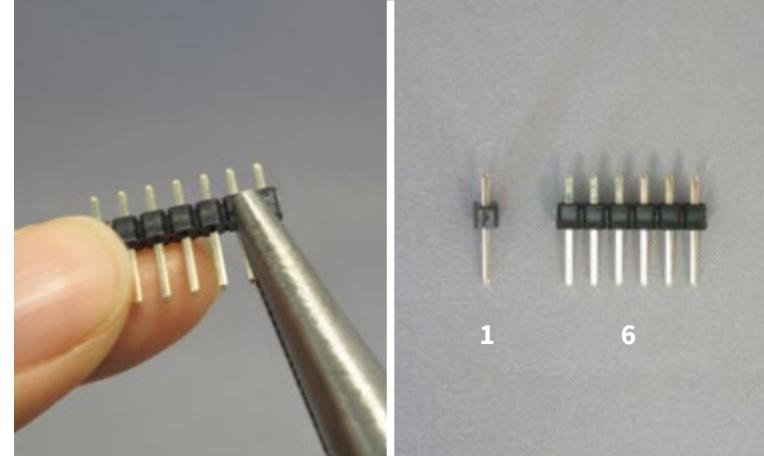
# 01.



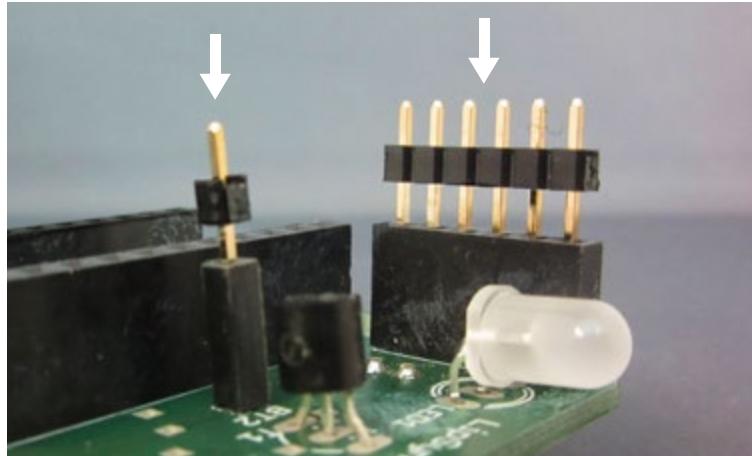
BOARD 1  
1  
45  
HOLE  
BT2

1-POS  
14  
6-POS  
14

# 02.



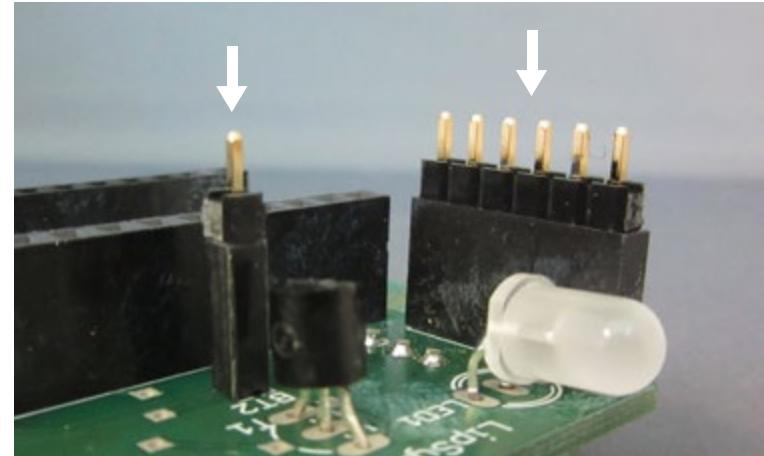
# 03.



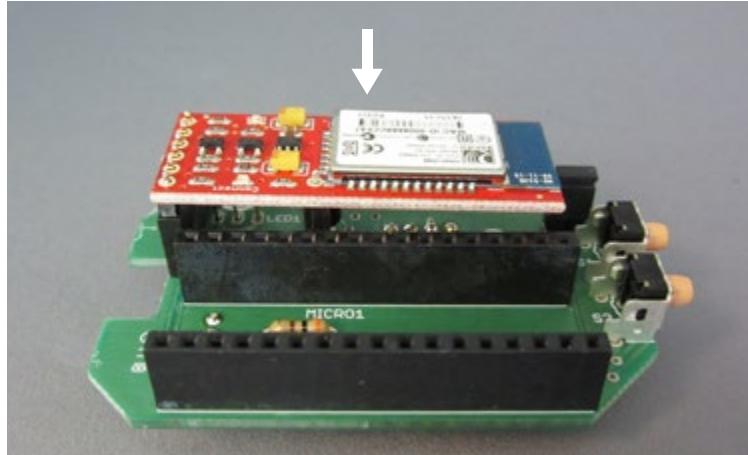
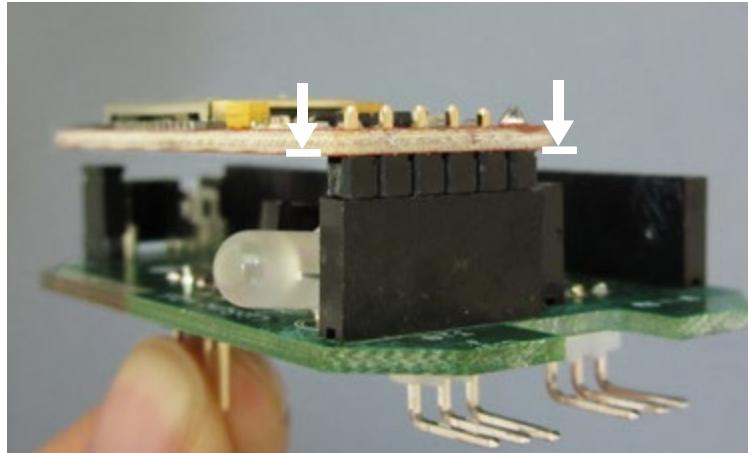
**⚠️ IMPORTANT:** The **LONG** leads are inserted.

20

# 04

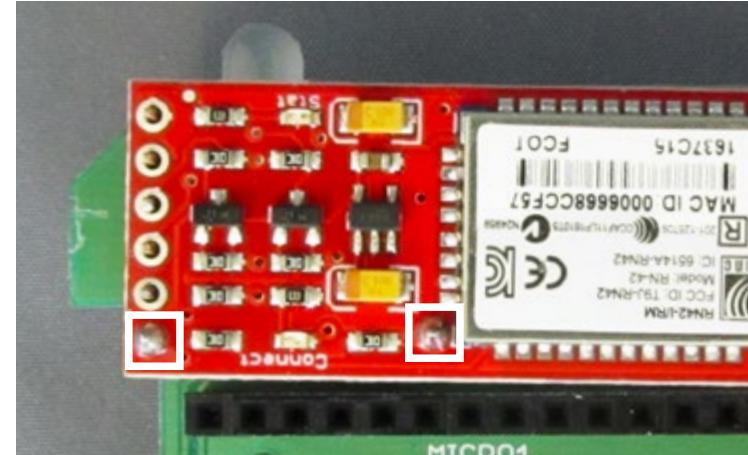
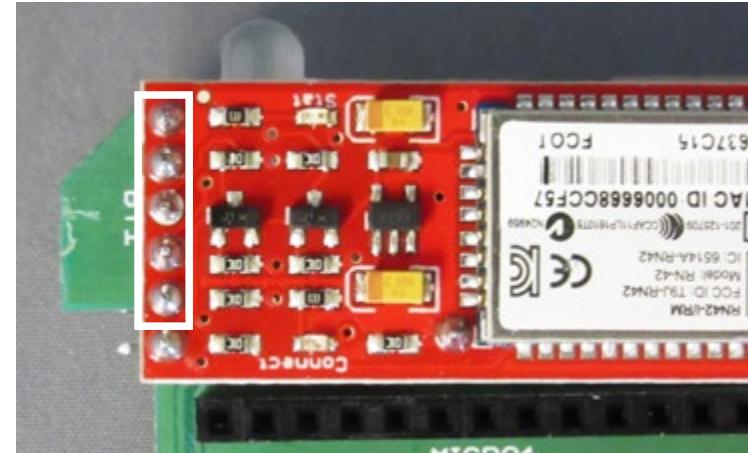


# 05.



44

# 06.



x 2



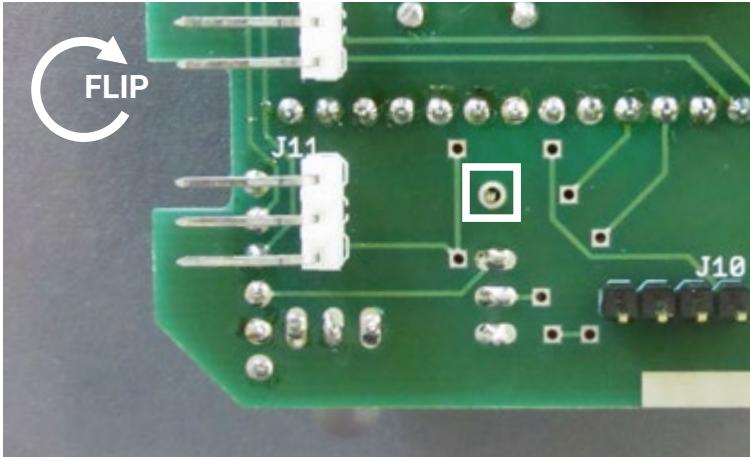
x 5



# 07.

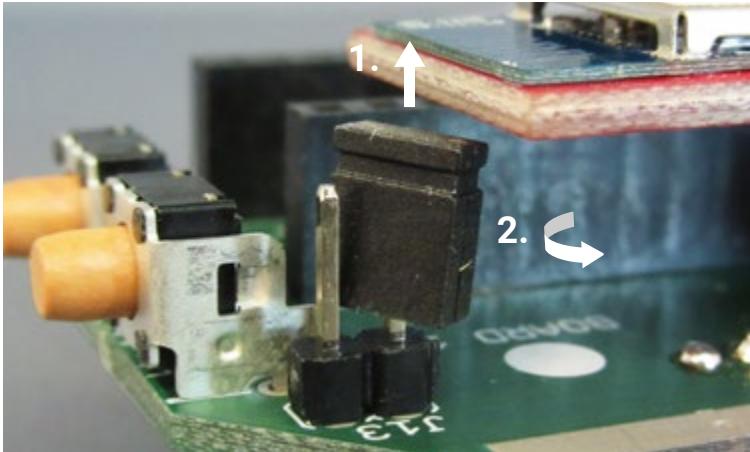
**NOTE:** Check that the bluetooth module is flush.

**09.**

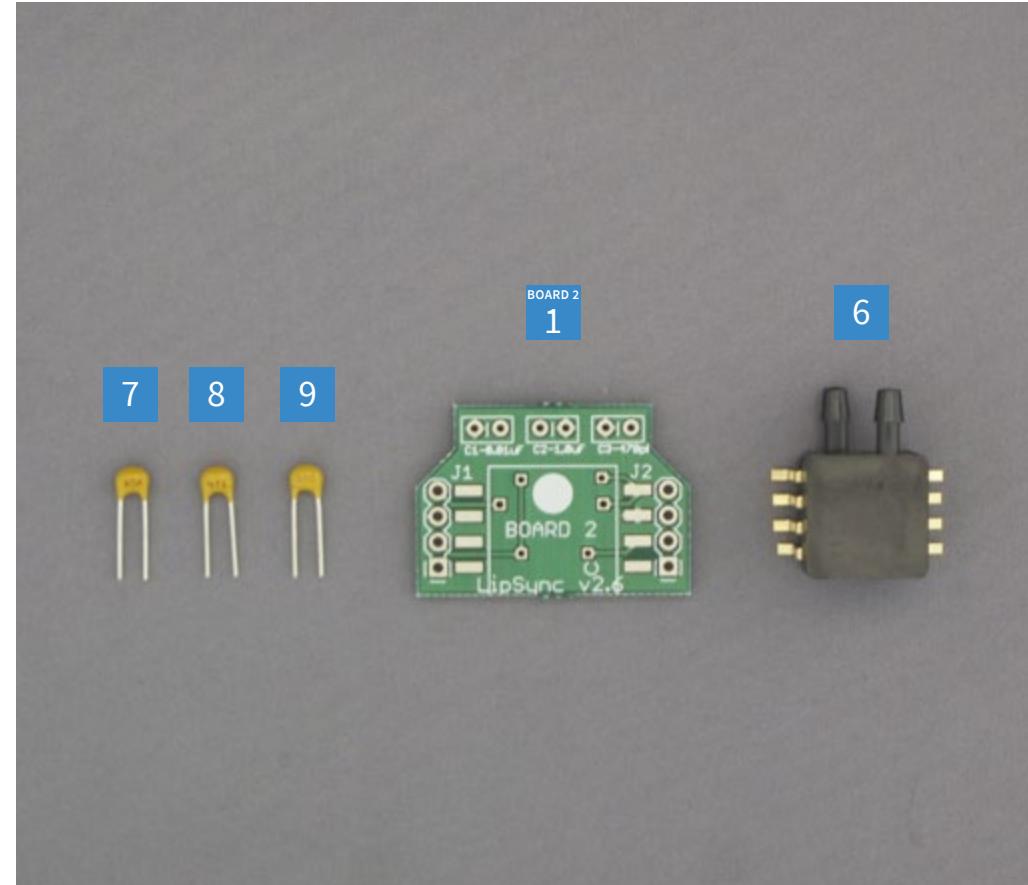


# PART 3

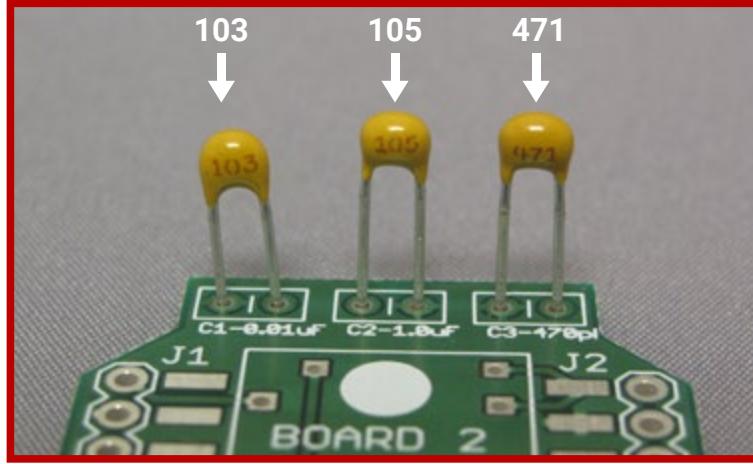
**10.**



**NOTE:** The shunt connector is taken off when using Bluetooth.



# 01.

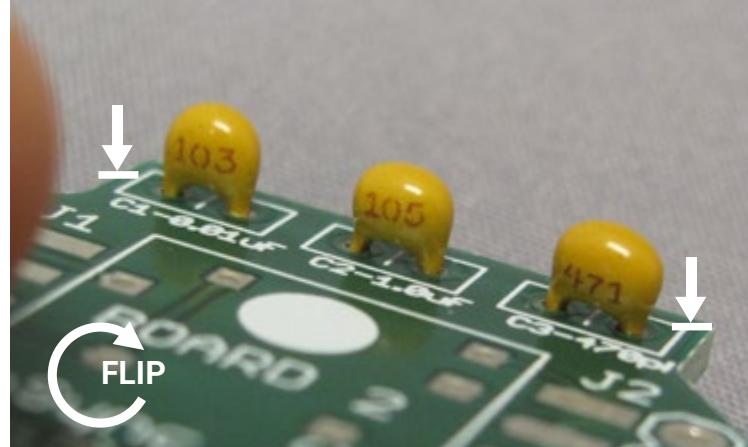


BOARD 2
1
7
8
9

**⚠ NOTE:** The capacitors **MUST** be inserted in the order shown.



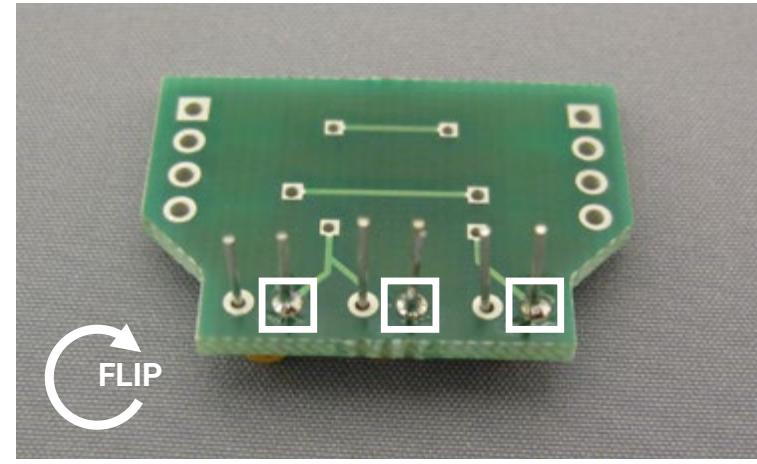
# 03.



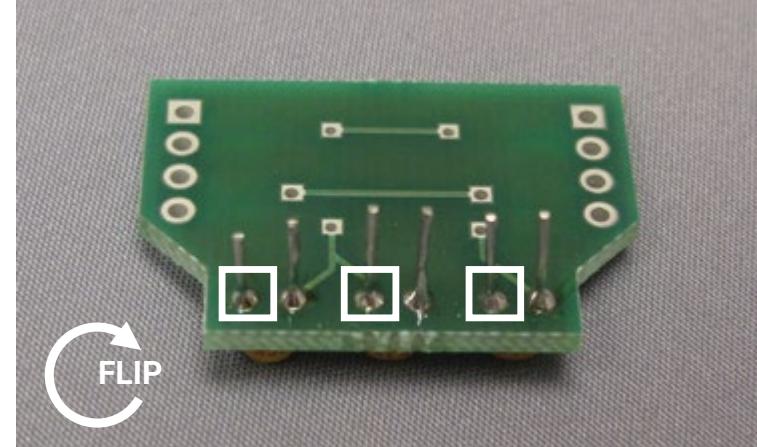
**i NOTE:** Check that component is flush to the board

23

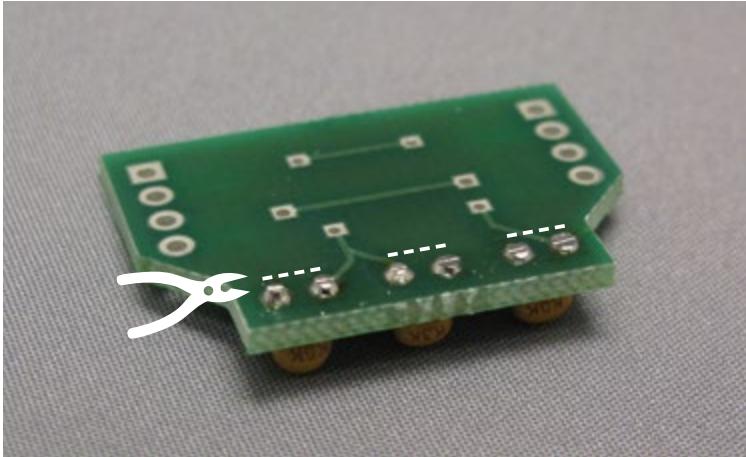
# 02.



# 04.



05.

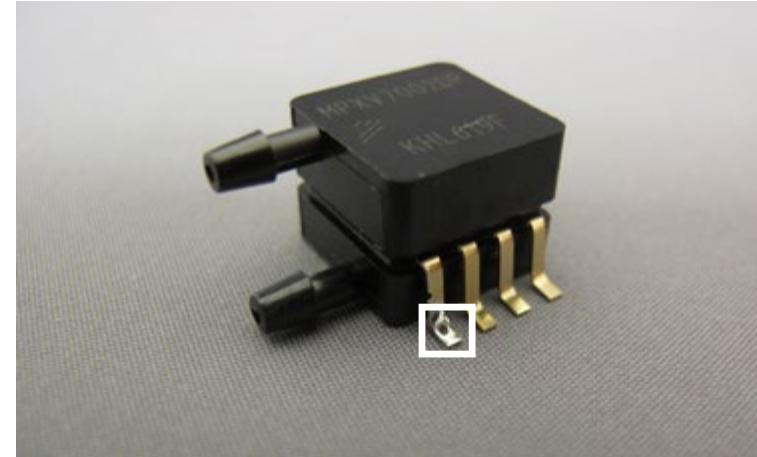


6

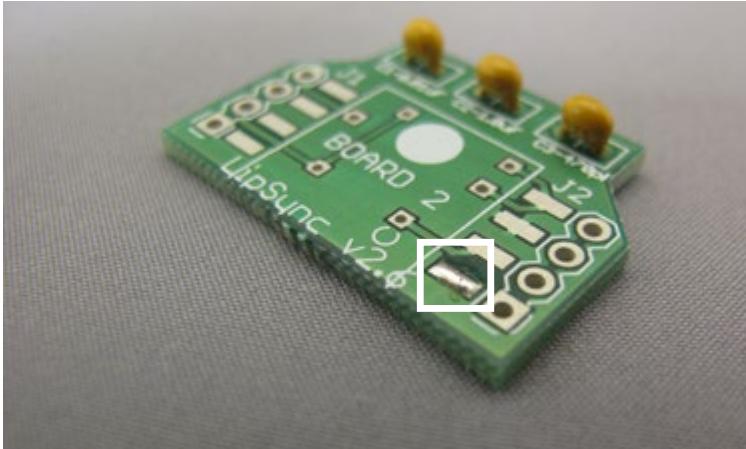


x 1

06.

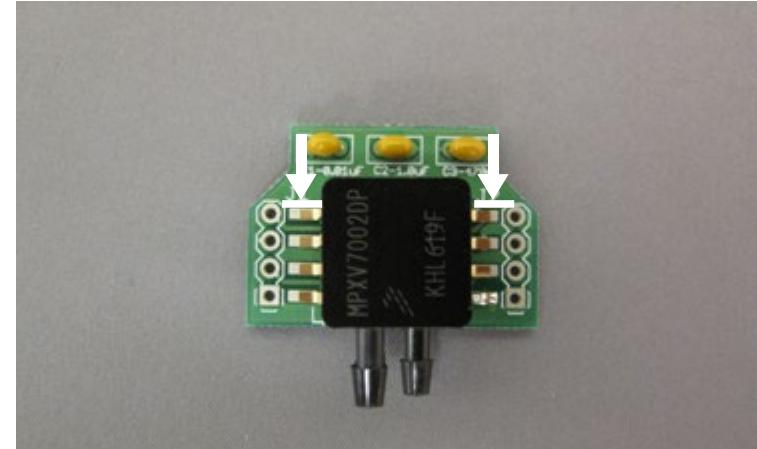


07.

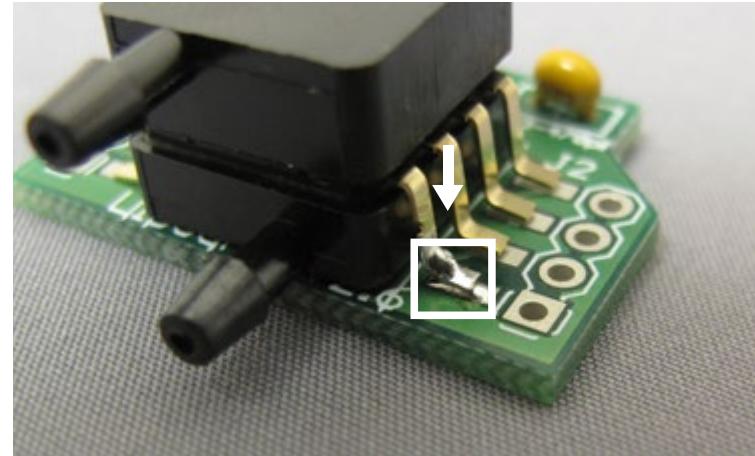
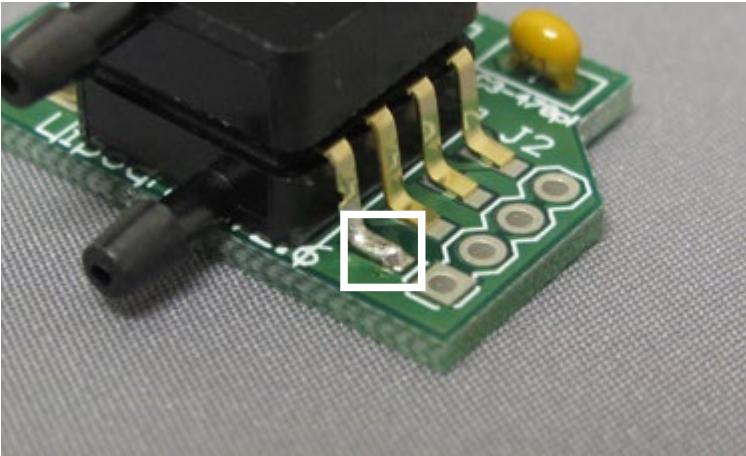


x 1

08.

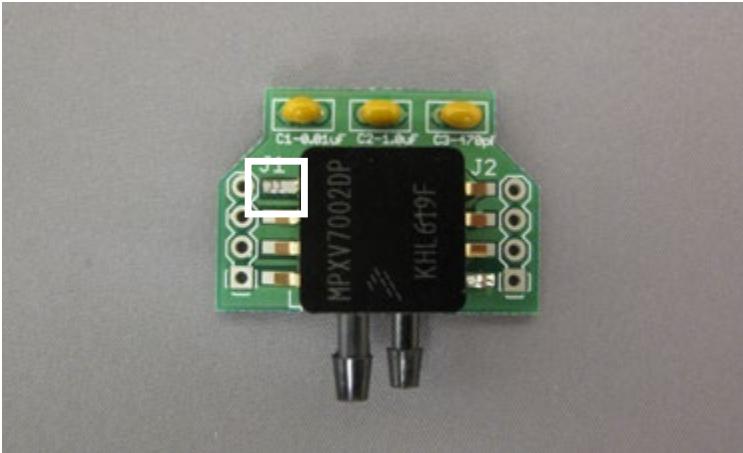


09.



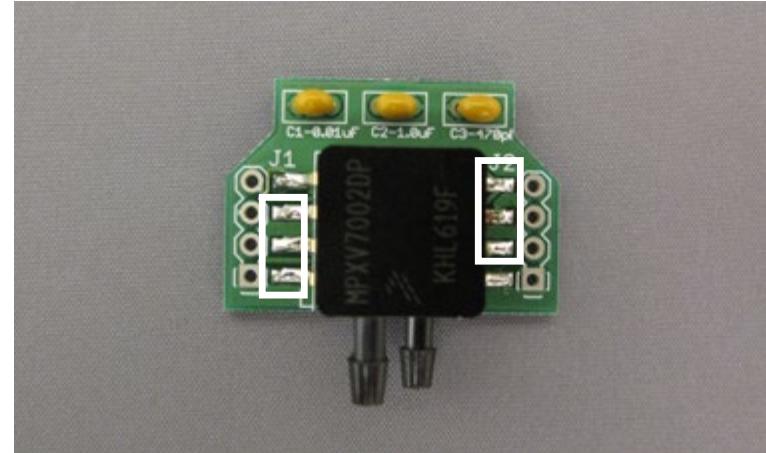
**i NOTE:** Place the solder tip on the lead to reflow the solder on the two components. The pressure sensor should "drop" onto Board 2.

10.

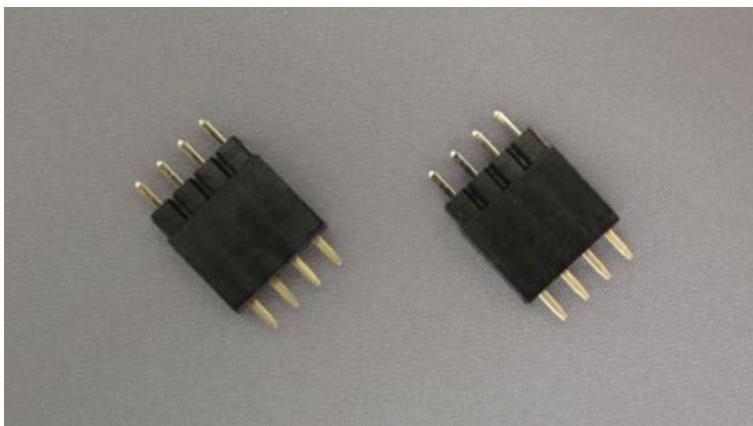
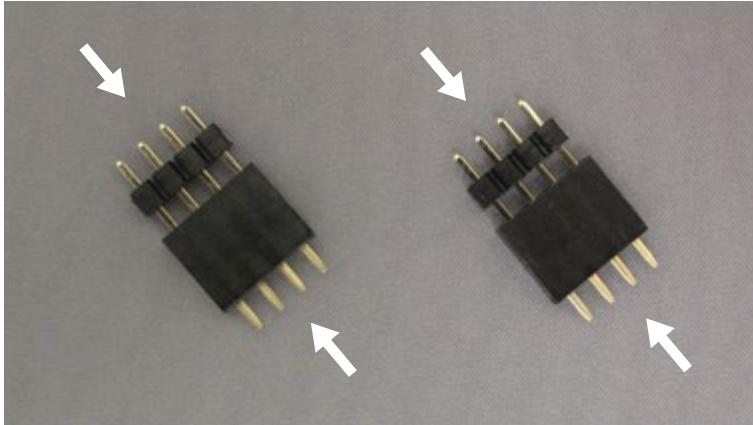
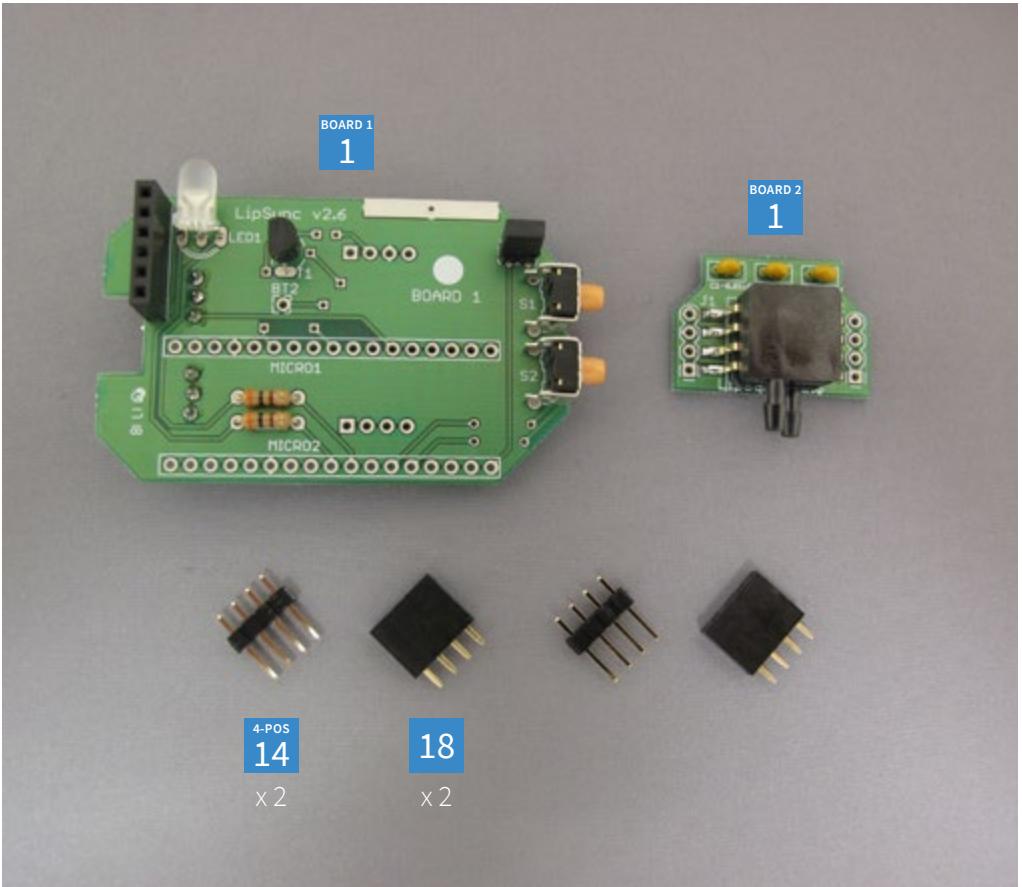


x 7

11.

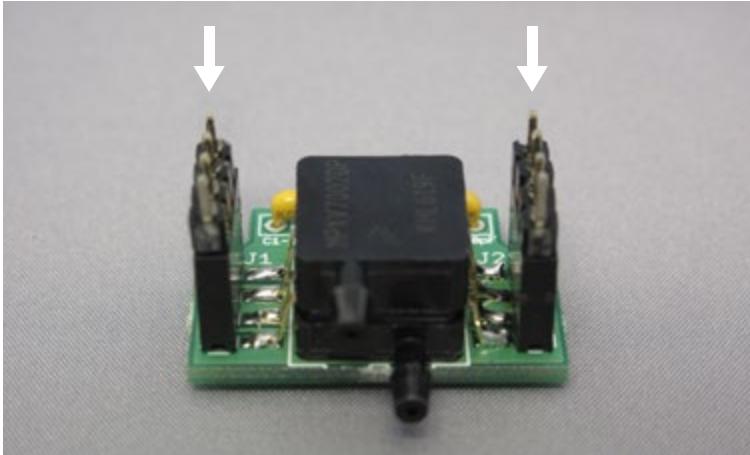


# Part 4



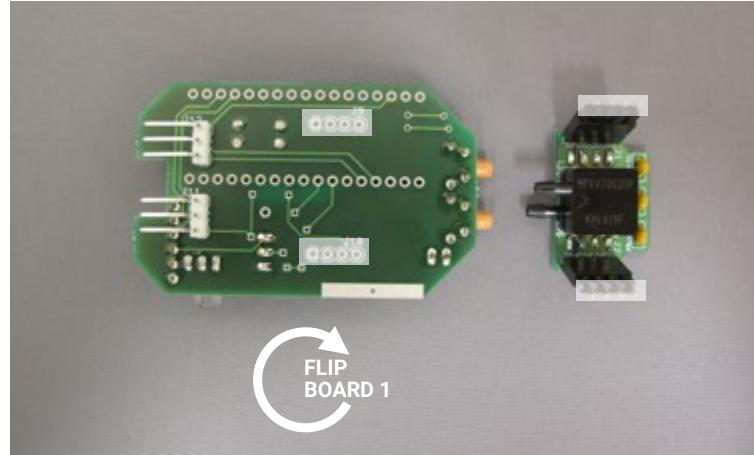
01.

# 02.



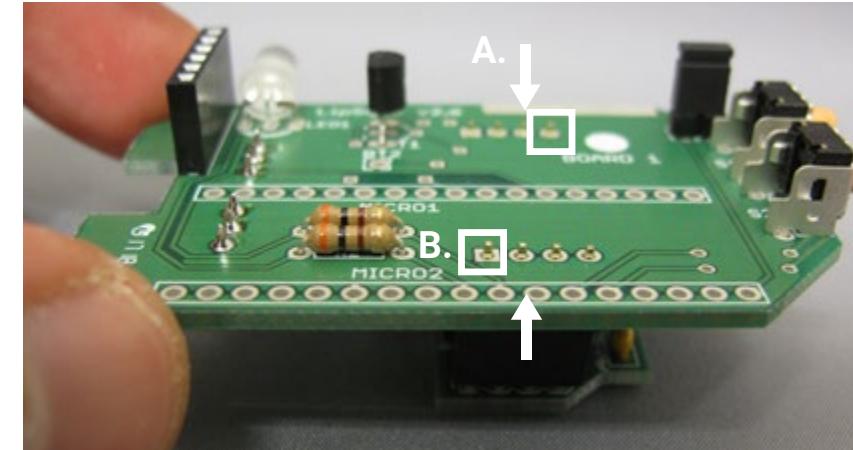
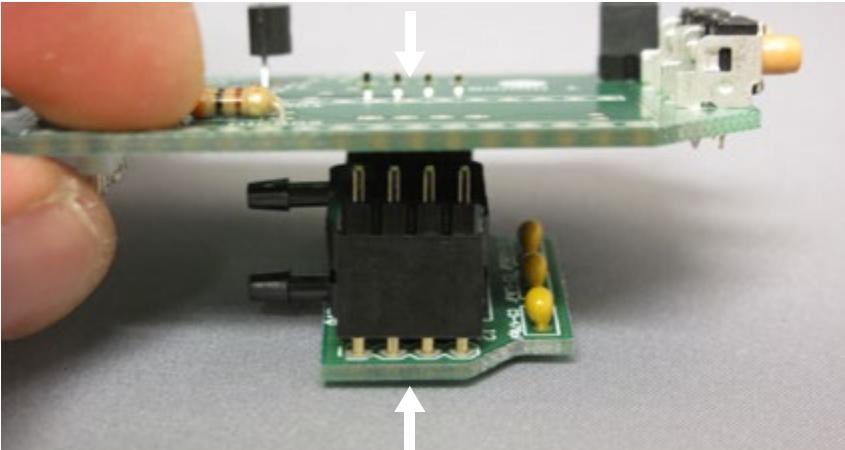
BOARD 2  
1  
HOLE  
J1  
HOLE  
J2

# 03.



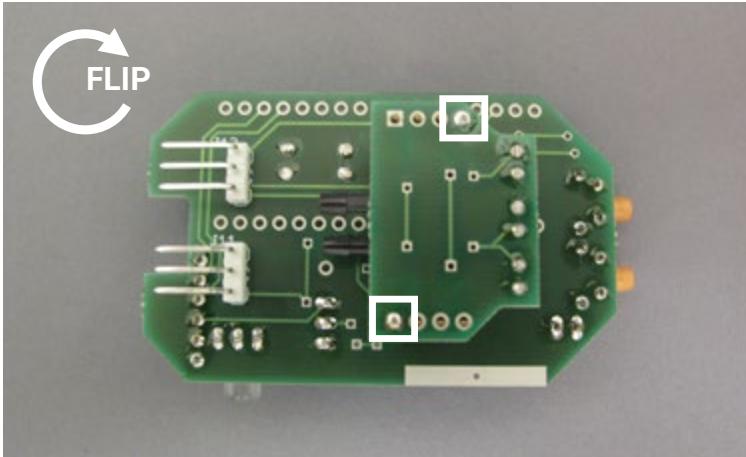
BOARD 1  
1

# 04.

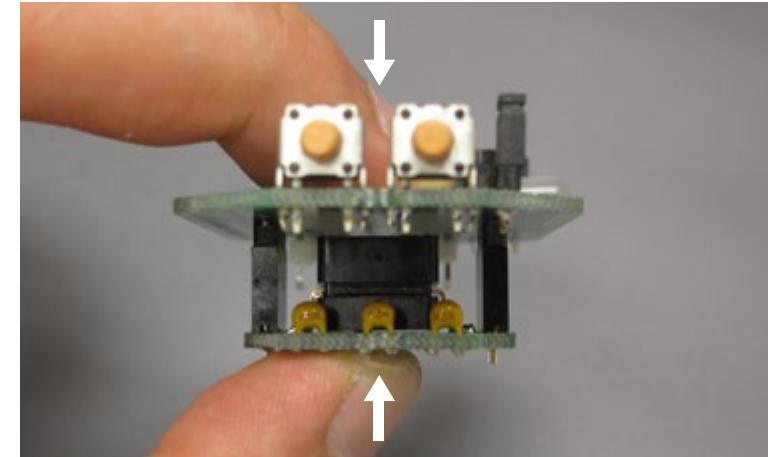


HOLE  
J9  
HOLE  
J10  
x 2

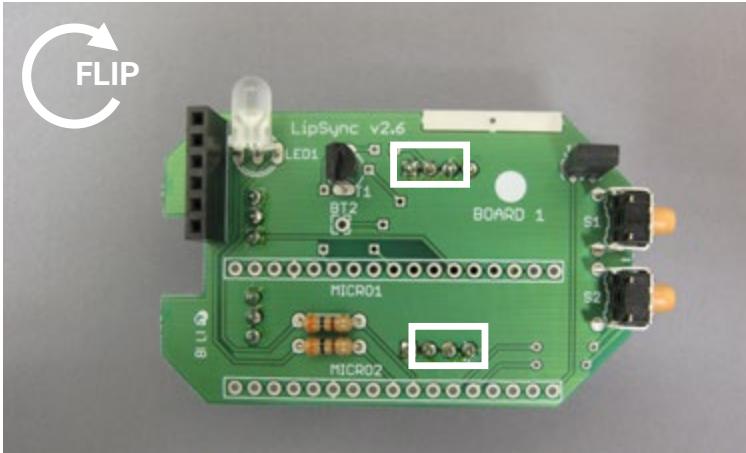
**05.**



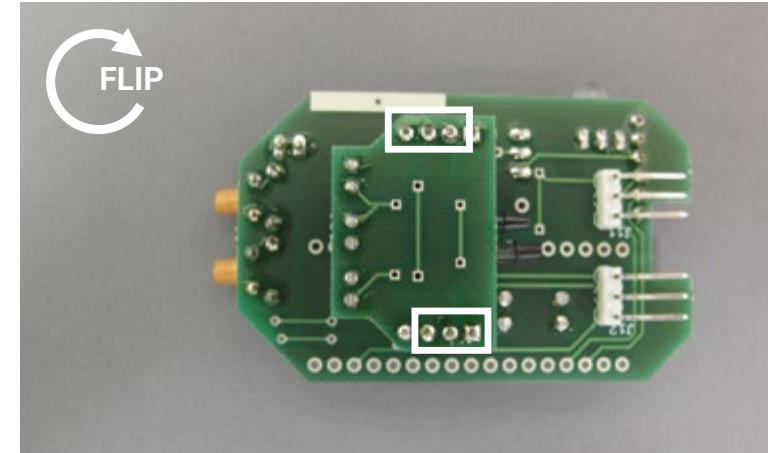
**06.**



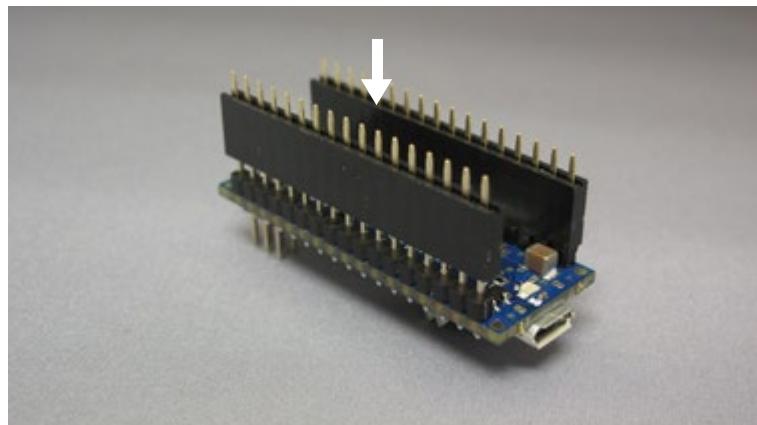
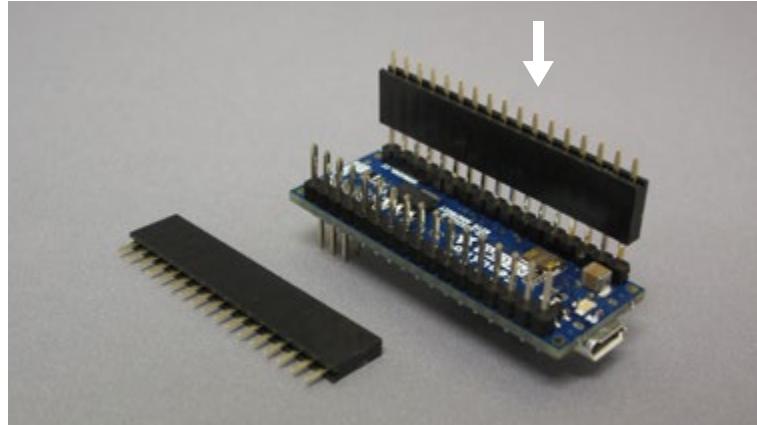
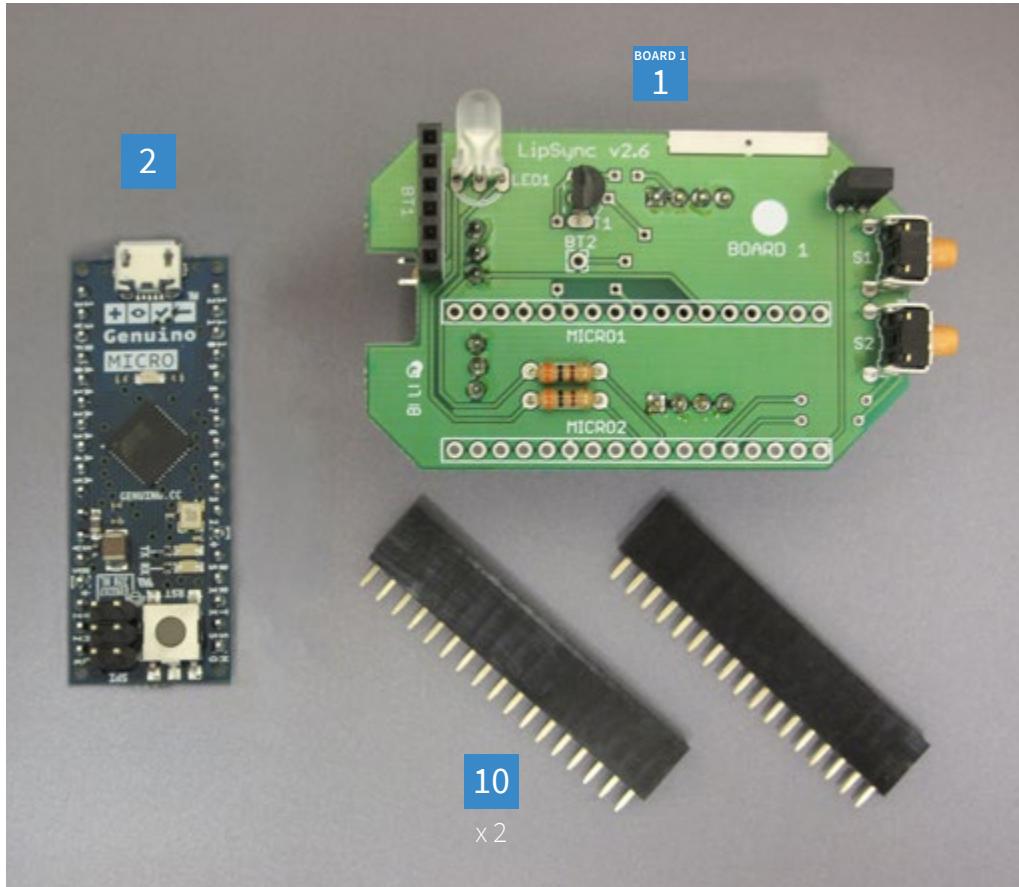
**07.**



**08.**



# Part 5



01.

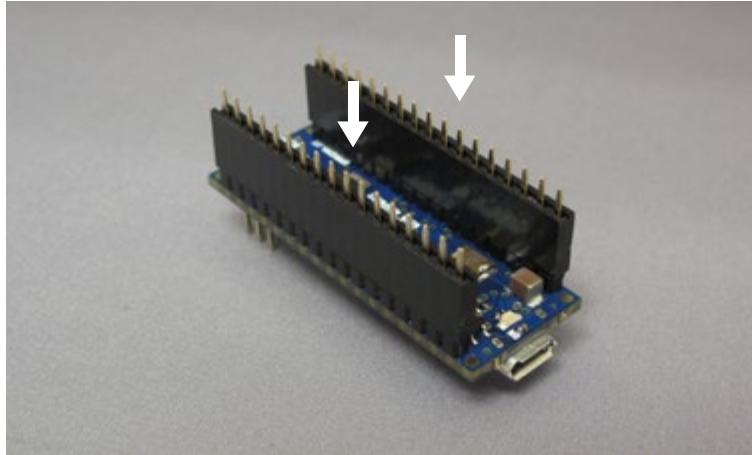
2

10

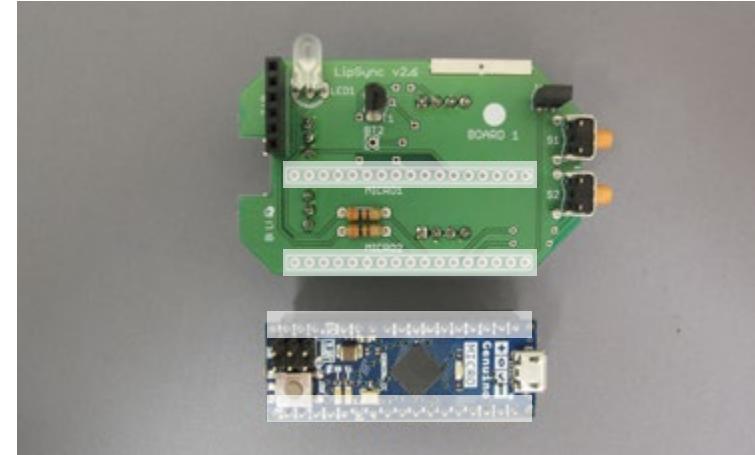
x2

BOARD 1  
1  
MICRO  
1  
MICRO  
2

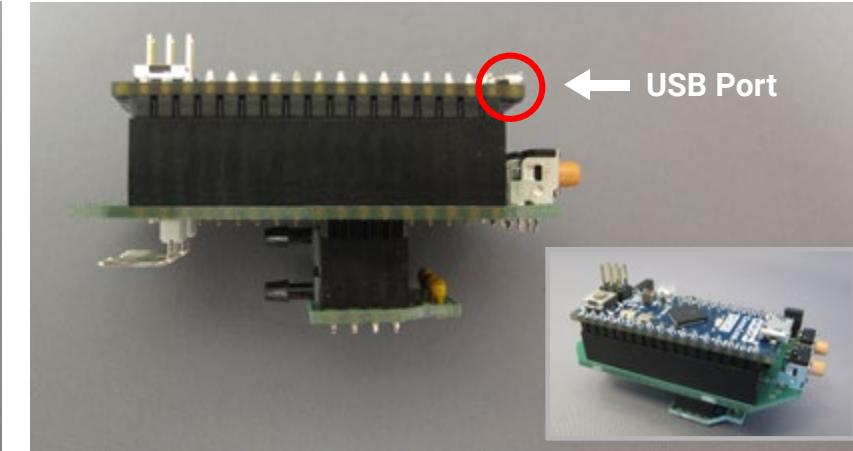
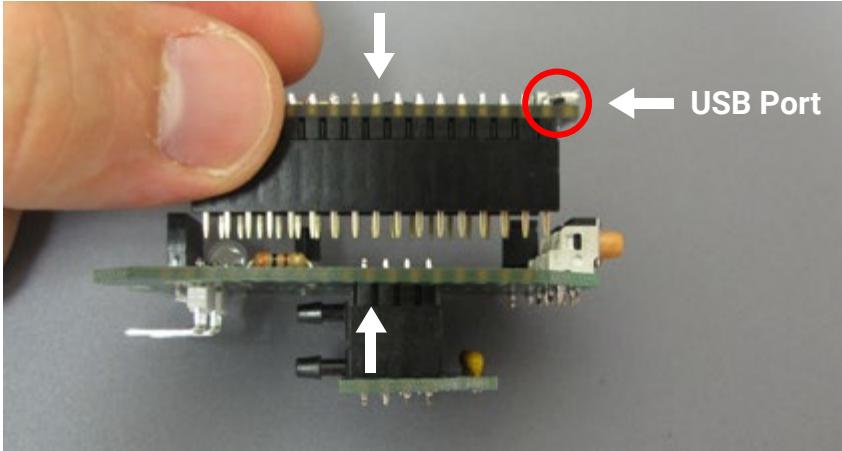
02.



03.

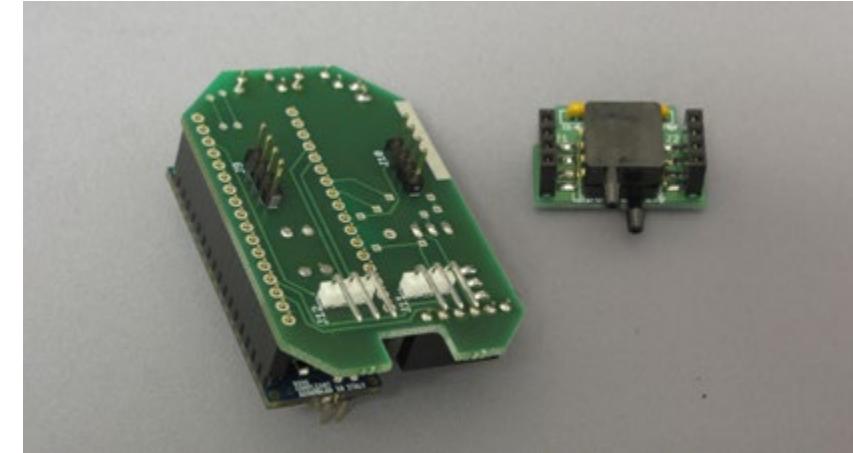
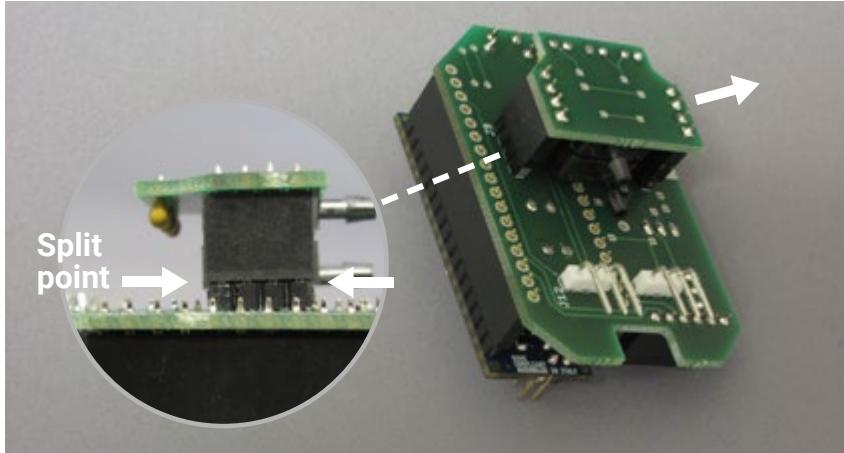


04.

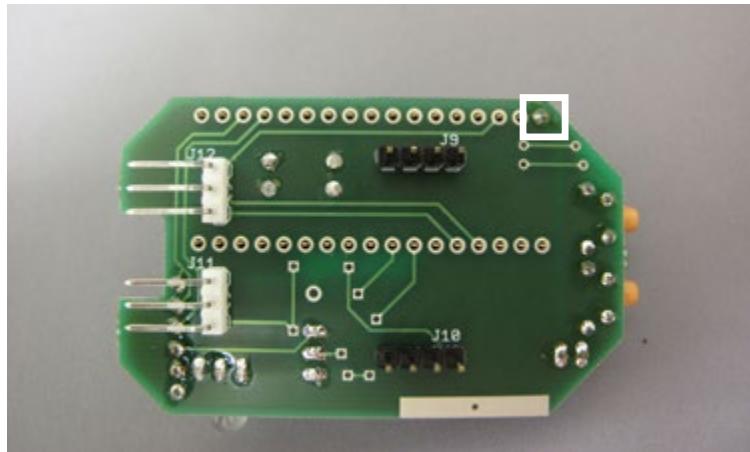


**i** NOTE: USB Port should be on the right side during installation

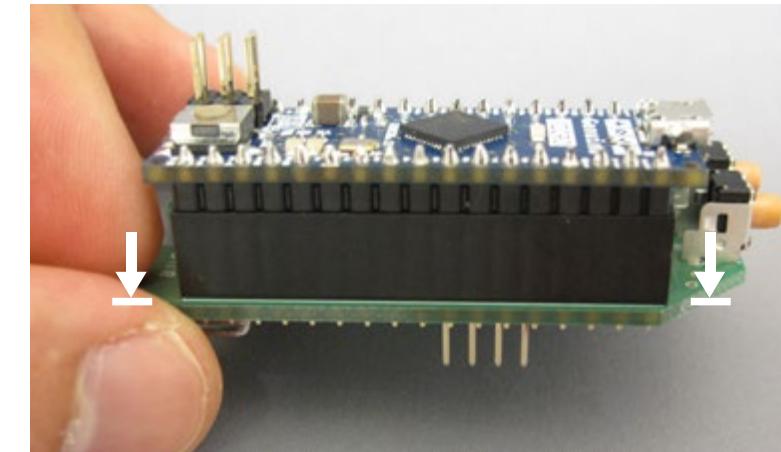
**05.**



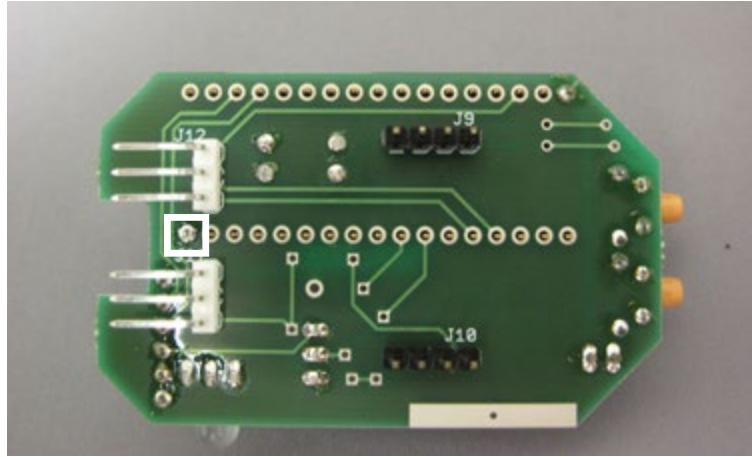
**06.**



**07.**

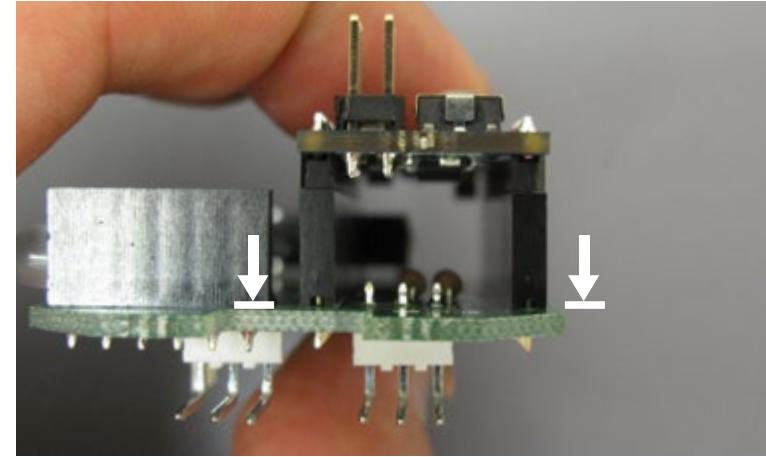


**08.**



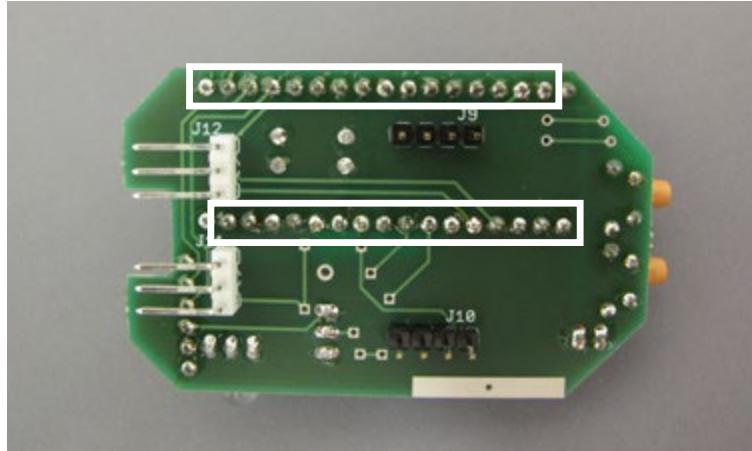
x 1

**09.**



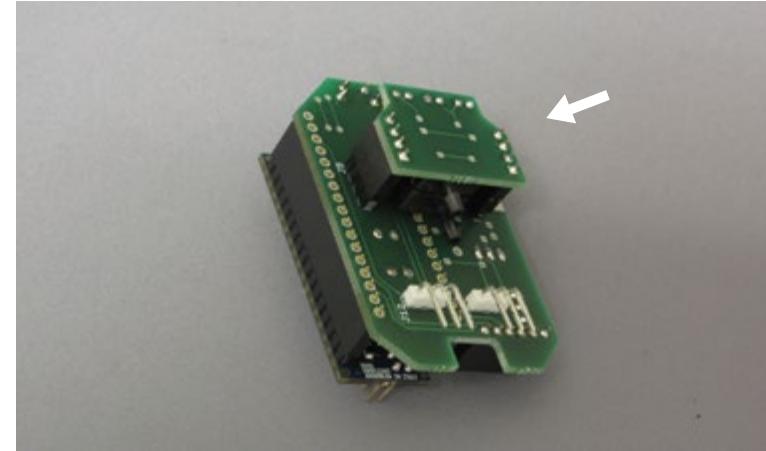
**NOTE:** Check that component is flush to the board

**10.**

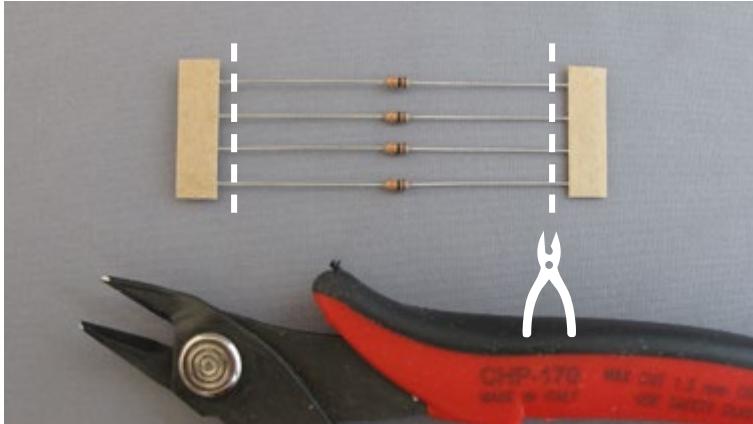
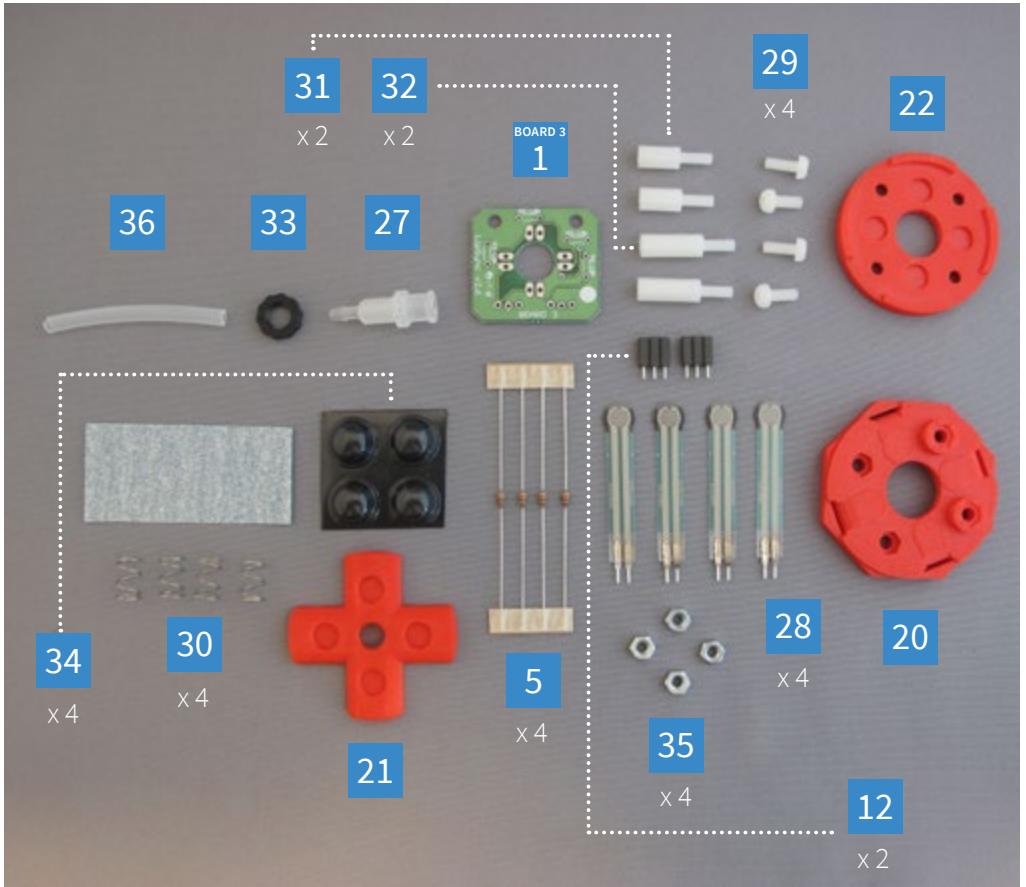


x 32

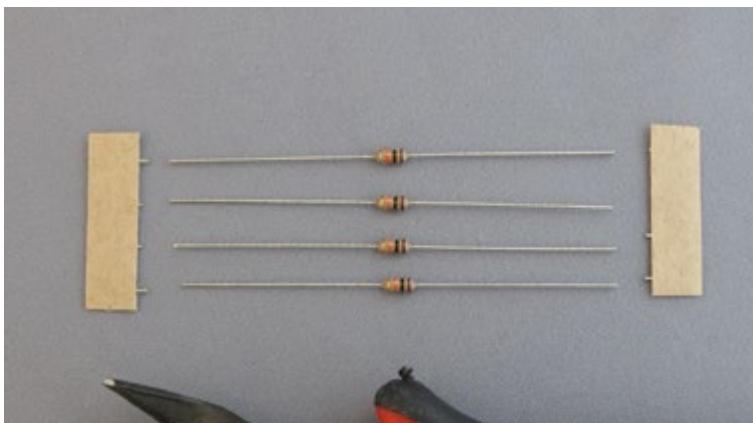
**11.**



# Part 6

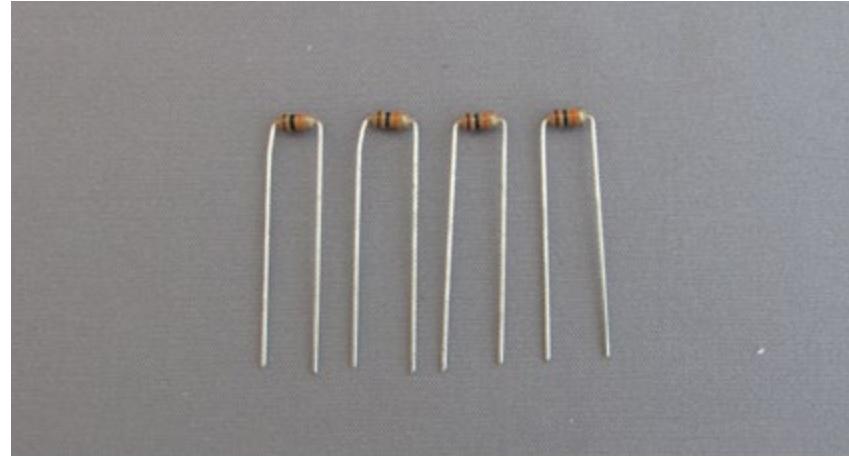
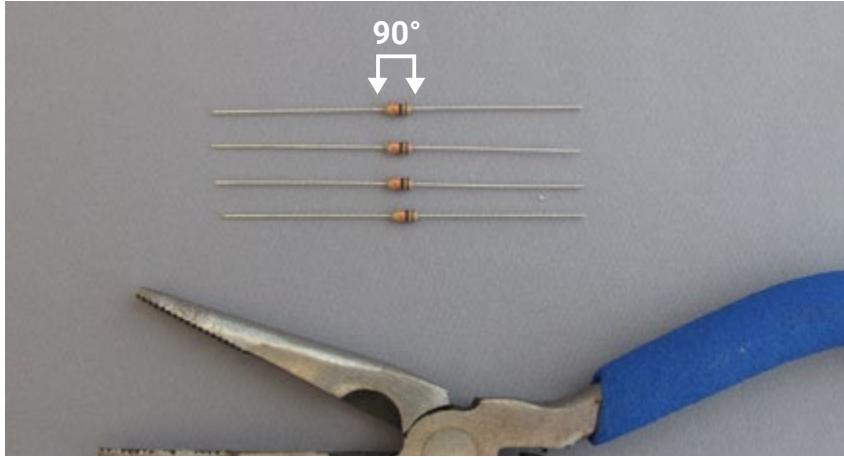


5  
x 4

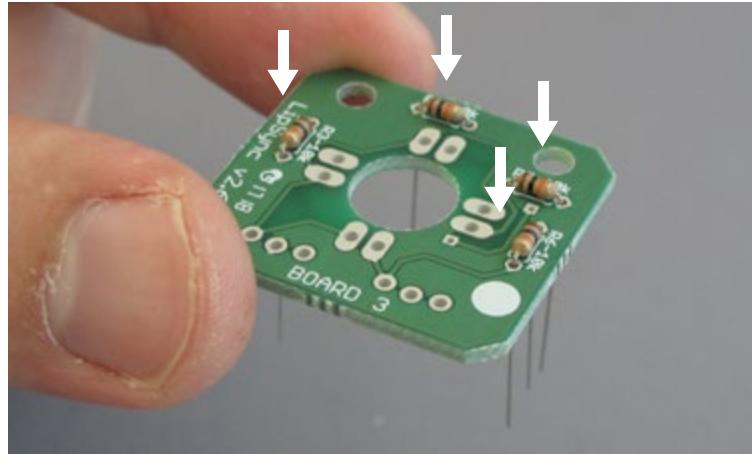


01.

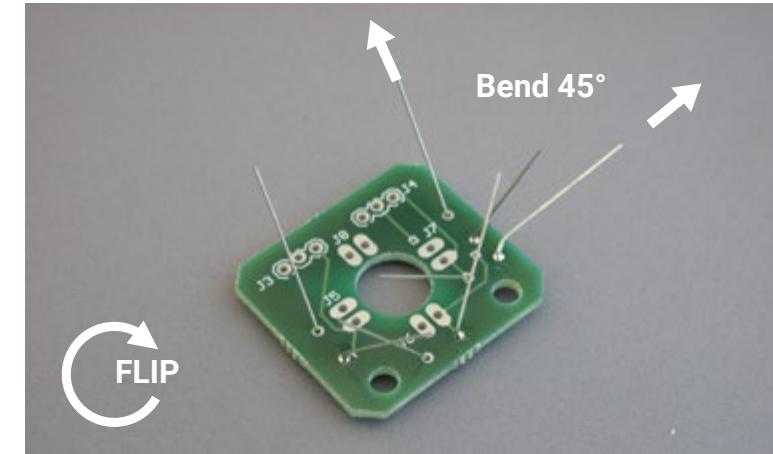
**02.**



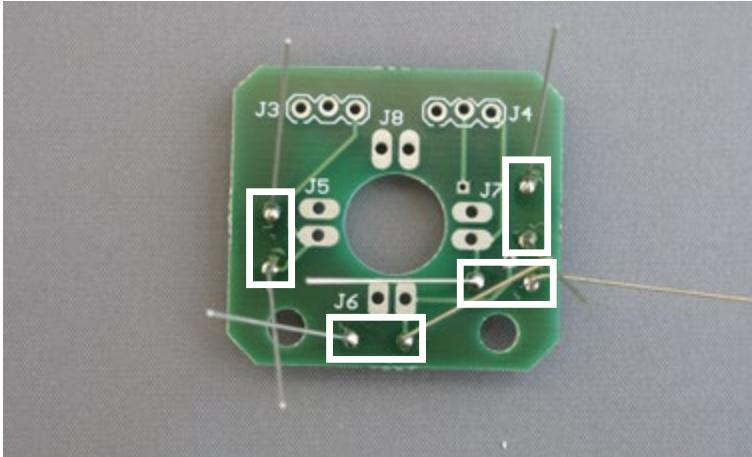
**03.**



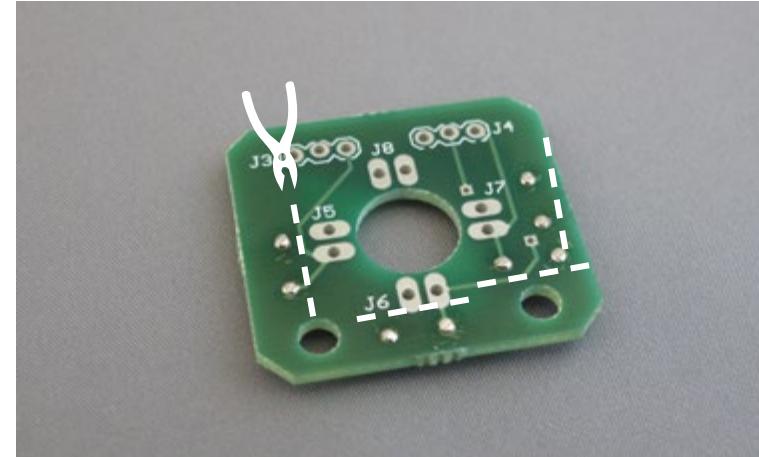
**04.**



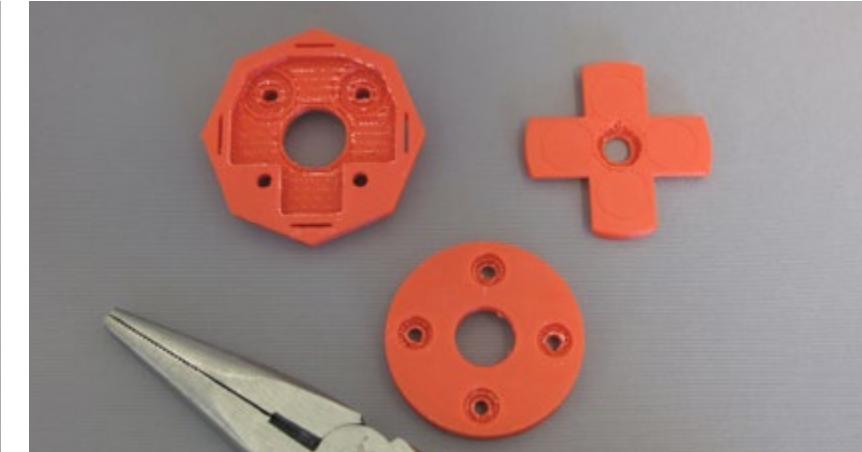
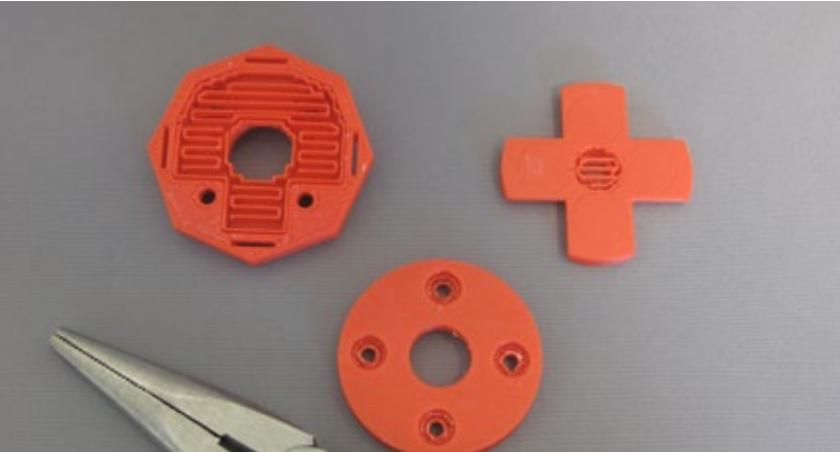
05.



06.



07.

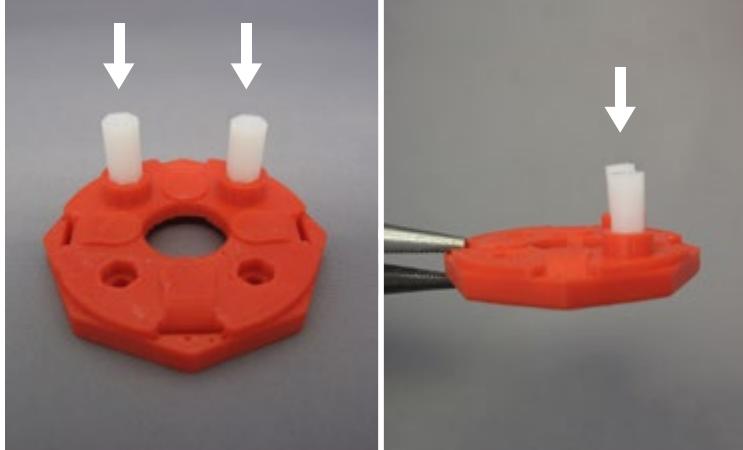


20

21

22

# 08.



**NOTE:** Insert the 10mm standoffs

31

x 2

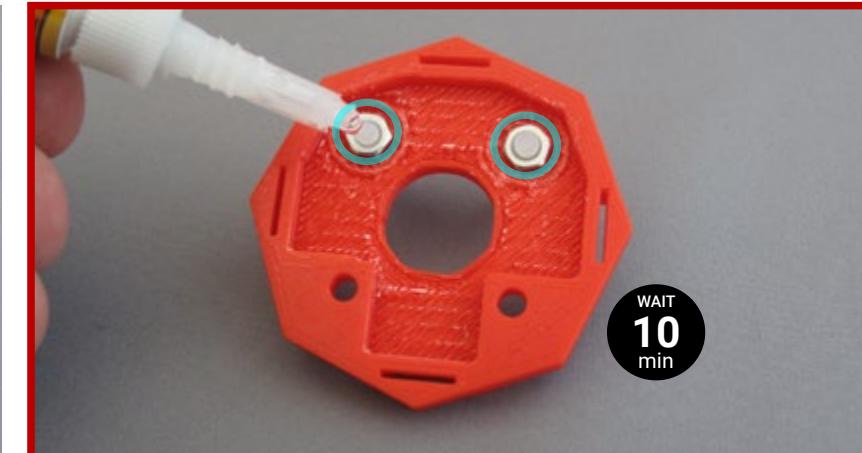
# 09.



35

x 2

# 10.



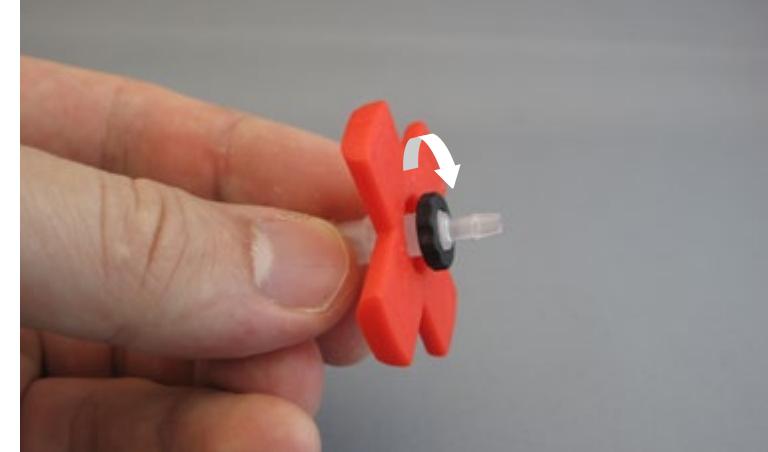
**IMPORTANT:**  
Only add a small  
**DROP** of superglue

**11.**

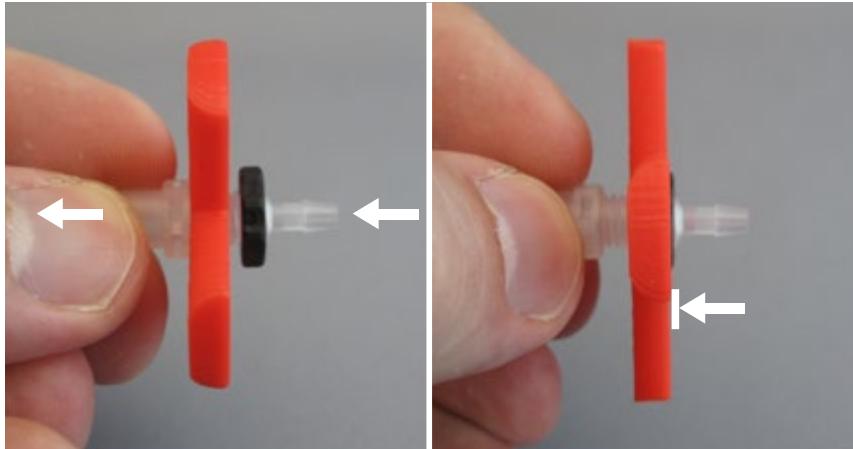


21  
27  
33

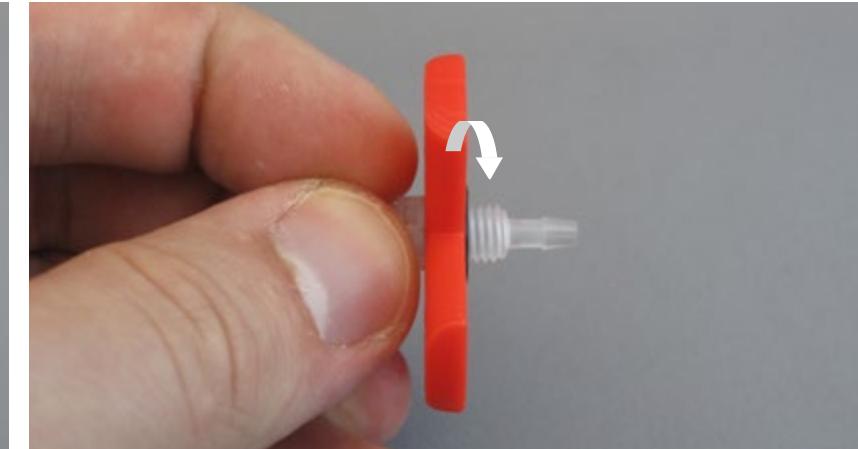
**12.**



**13.**



37



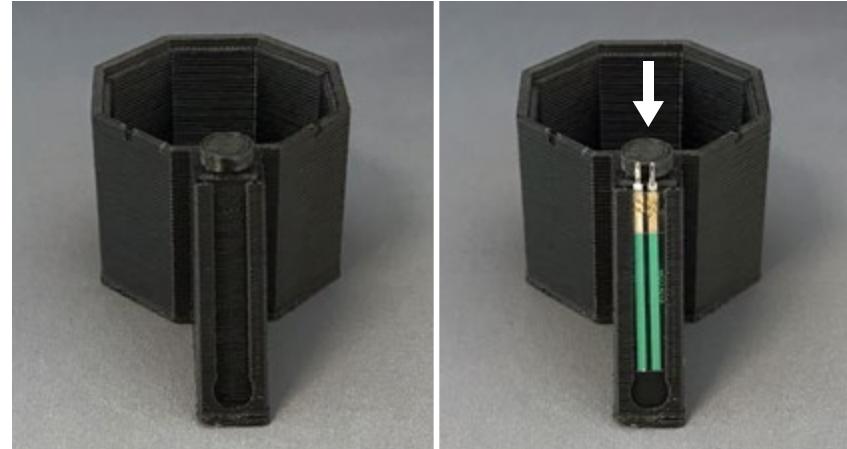
**i NOTE:** The luer lock nut should sit flush to the rocker. Once flushed, twist the luer lock fitting the rest of the way.

**14.**



**⚠️ IMPORTANT:**  
Apply enough  
superglue  
between where the  
transparent luer  
lock filter and black  
luer lock nut meet.

**15.**

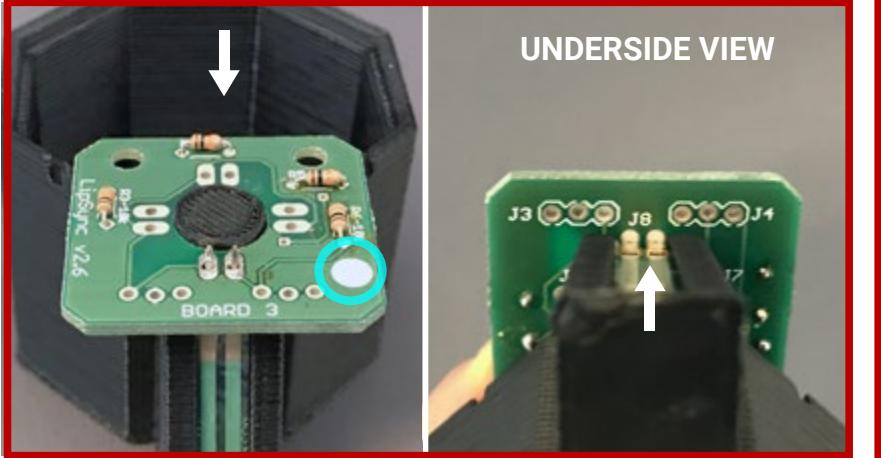


Use the joystick  
stand holder  
to assist with  
Steps 15-19

**28**

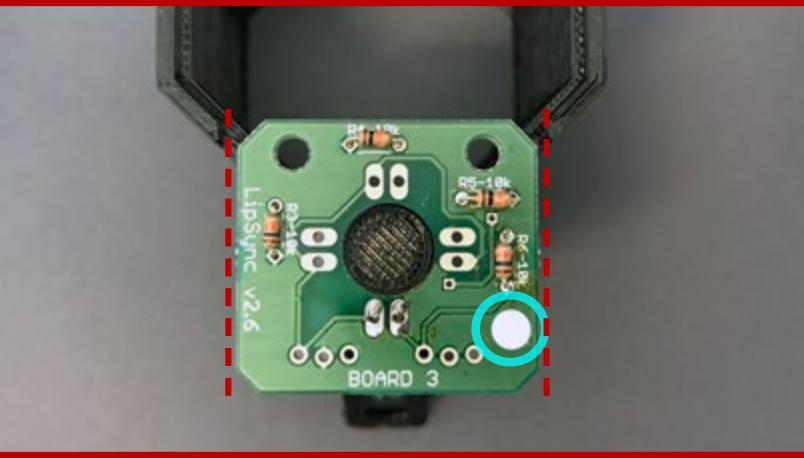
**⚠️ IMPORTANT:**  
Orient the FSR with  
the metallic side  
facing down

**16.**



HOLE  
J5

**⚠️ IMPORTANT:**  
Place Board 3 onto the holder with the FSR leads inserted into Hole J8 with the **white circle facing up**.



**17.**



x 2

28

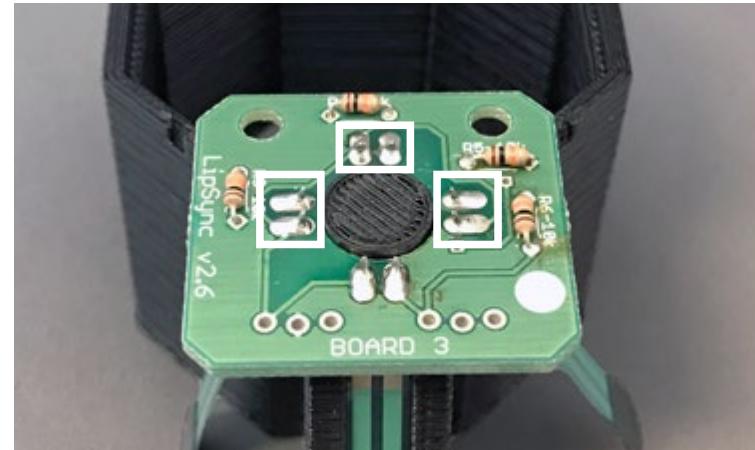
x 3

HOLE  
J6

HOLE  
J7

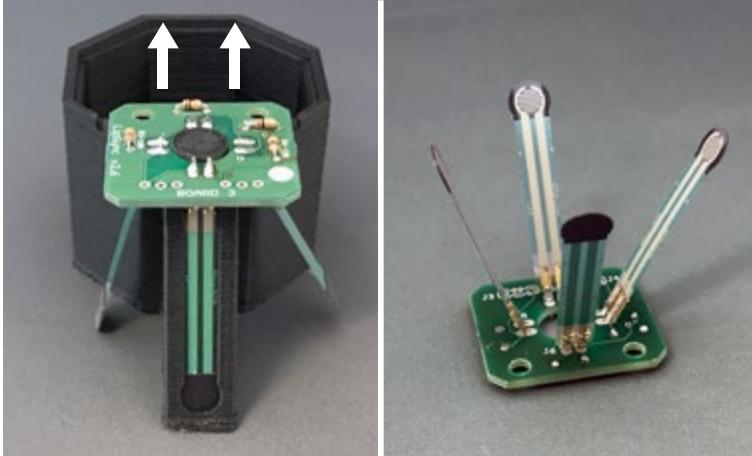
HOLE  
J8

**18.**



Repeat steps 15-17 for the 3 remaining FSRs

**19.**



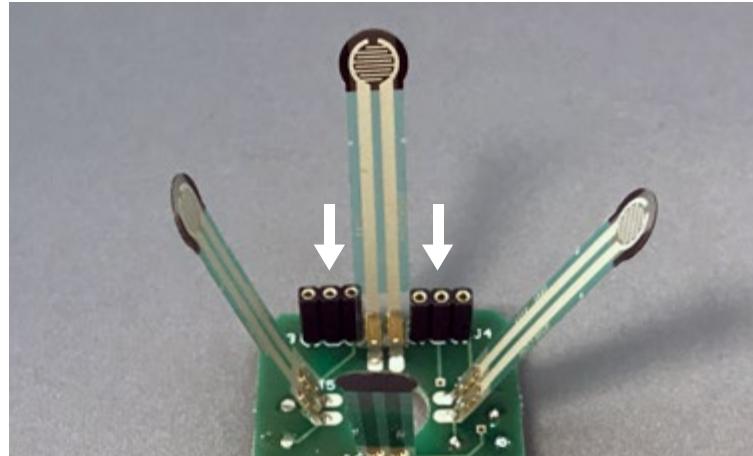
12

x 2

HOLE  
J3

HOLE  
J4

**20.**

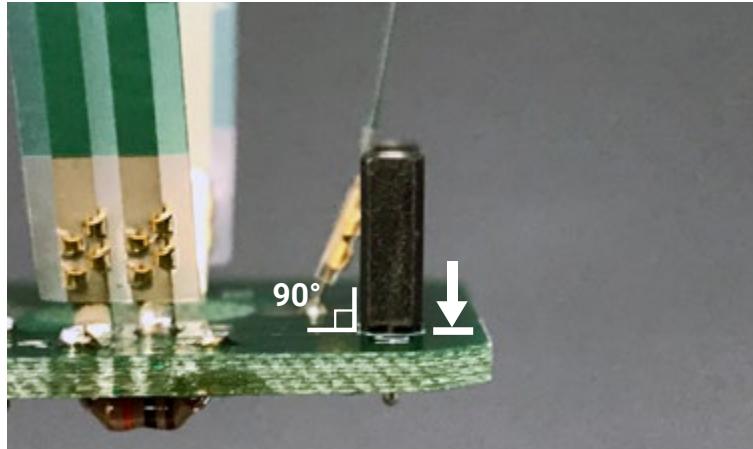


**21.**



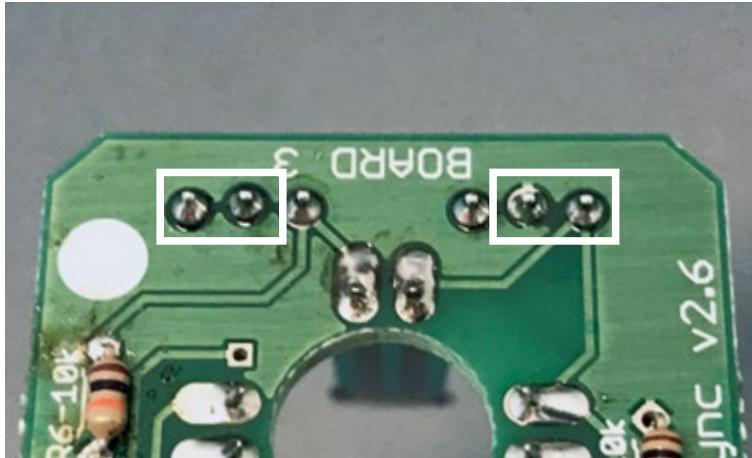
x 2

**22.**



**NOTE:** Check that component is flush to the board

23.

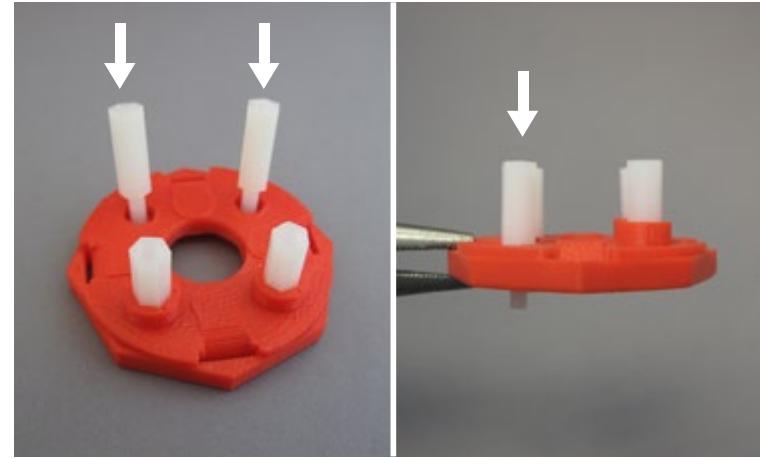


x 4

32

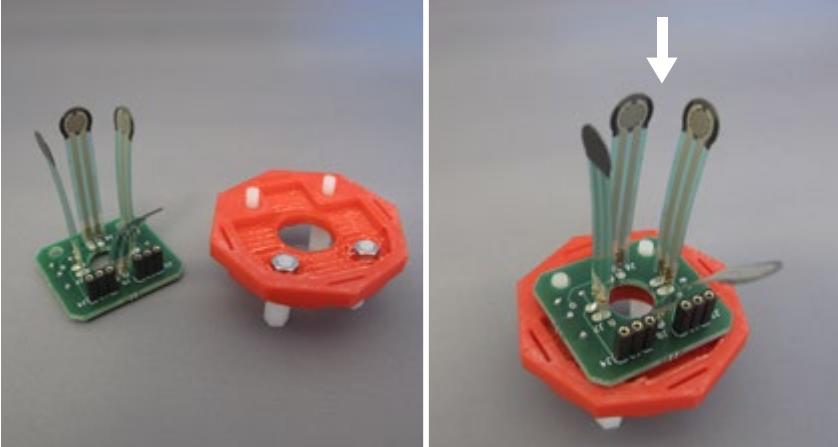
x 2

24.

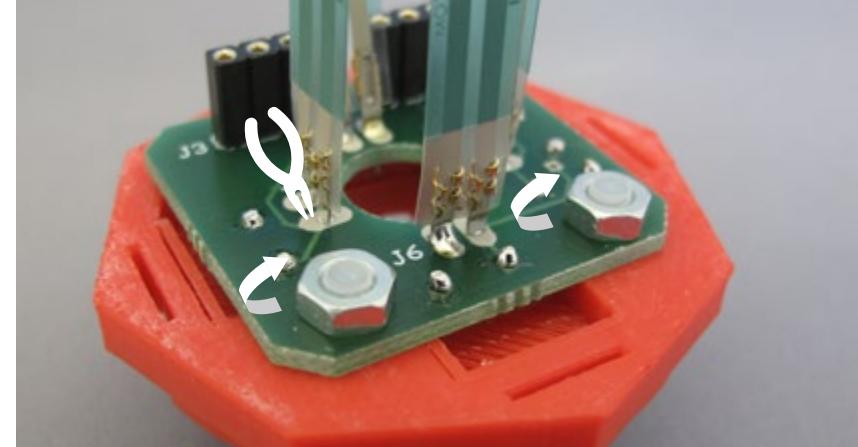


**NOTE:** Insert the 15mm standoffs

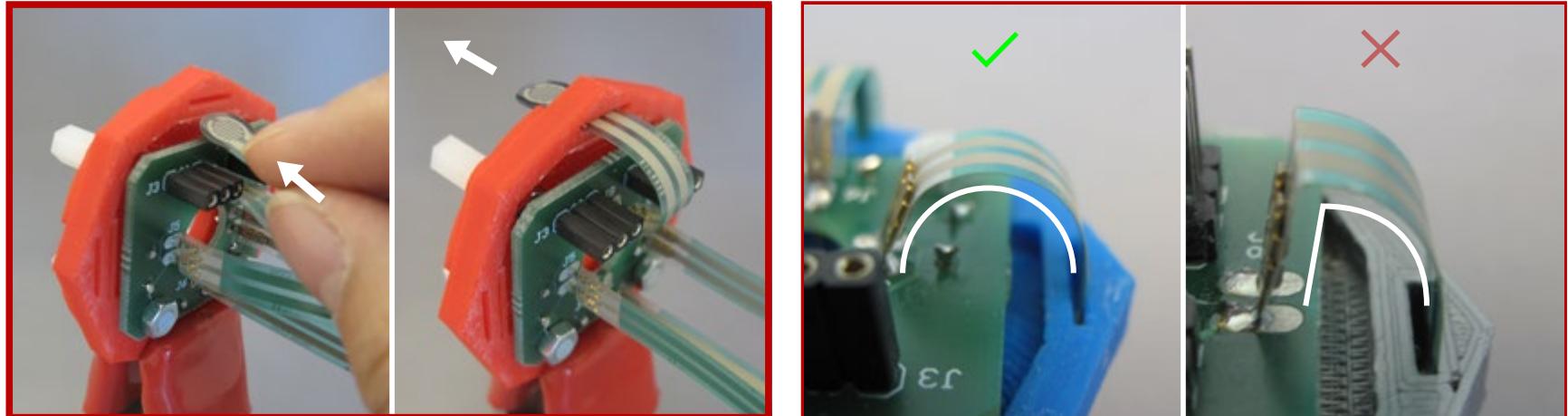
25.



26.



**27.**

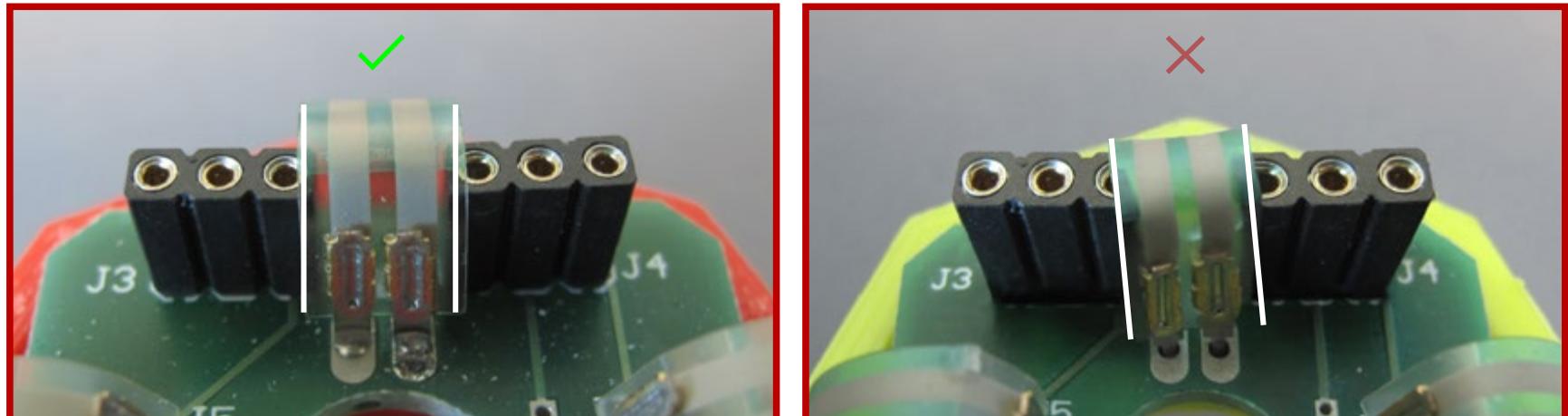


**CAUTION:**

Bend the FSR so it arcs

**GRADUALLY.** Do not fold or bend it abruptly as the ribbon breaks easily.

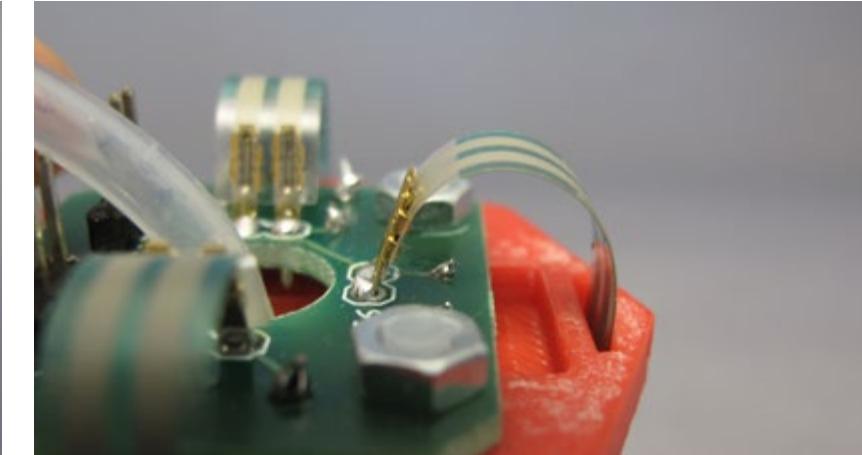
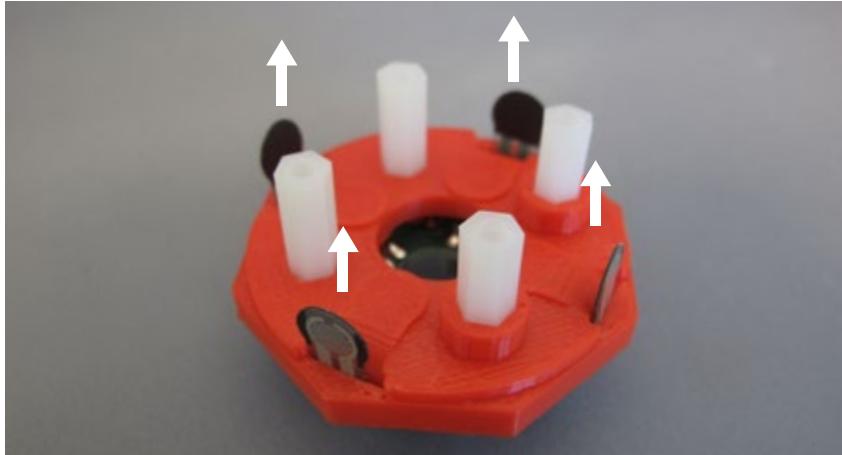
**28.**



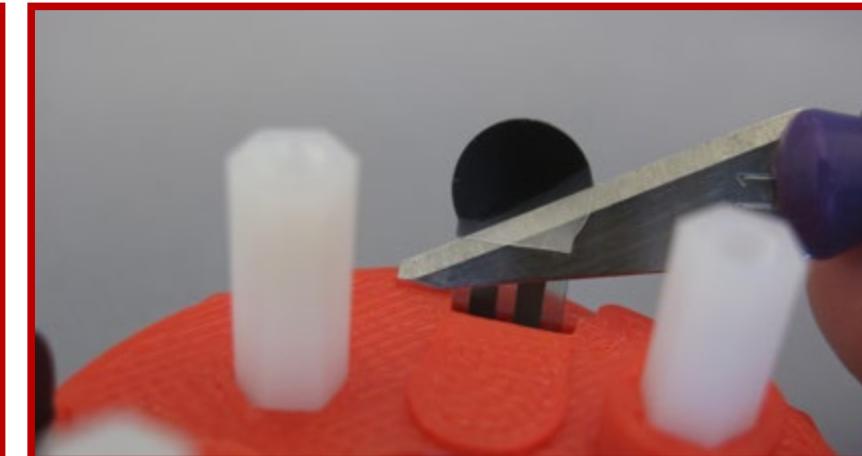
**CAUTION:**

One FSR ribbon will slightly overlap the 3-position female headers. The ribbon should not cover the through hole if soldered straight.

**29.**



**30.**

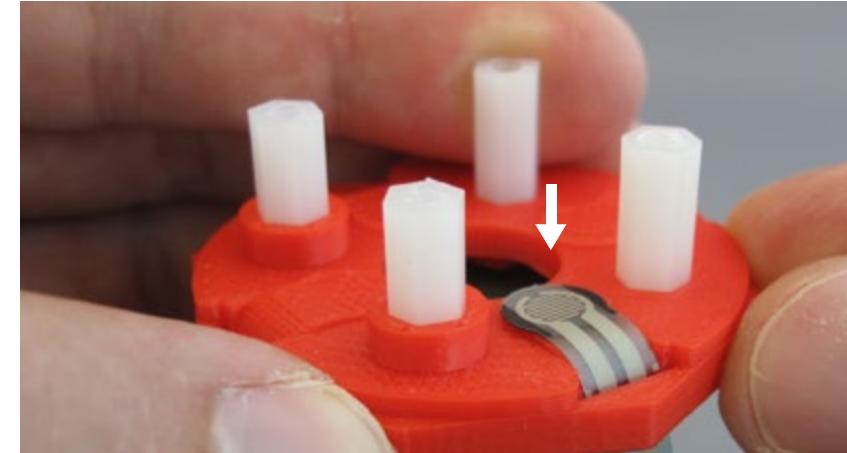


**⚠ CAUTION:**

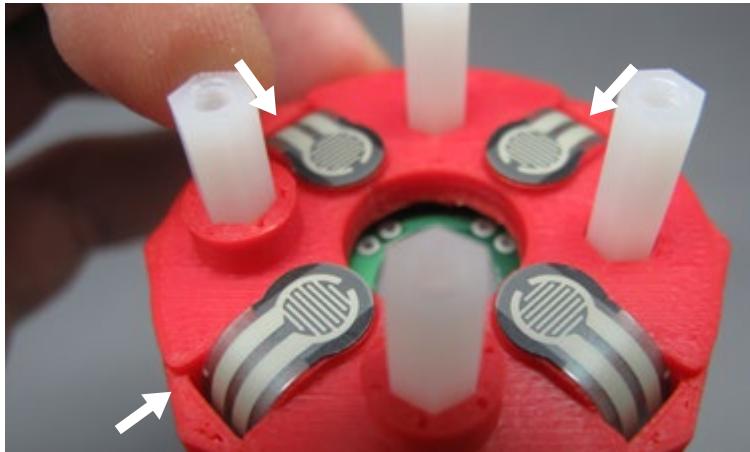
On the back of each FSR is a clear adhesive lining over the black pad.

**CAREFULLY**  
remove the lining with a hobby knife from the bottom corner.  
**Do not remove the black pad.**

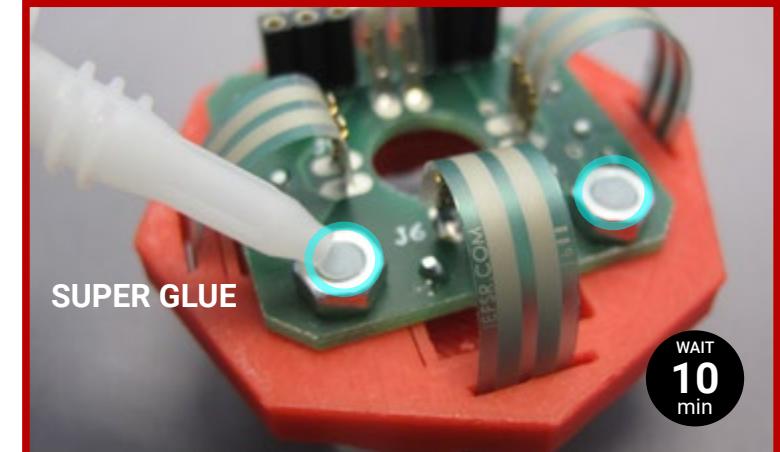
31.



32.

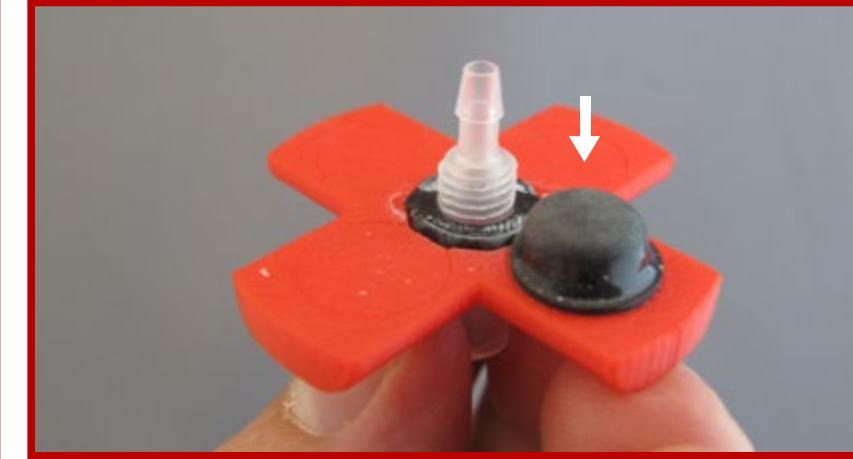
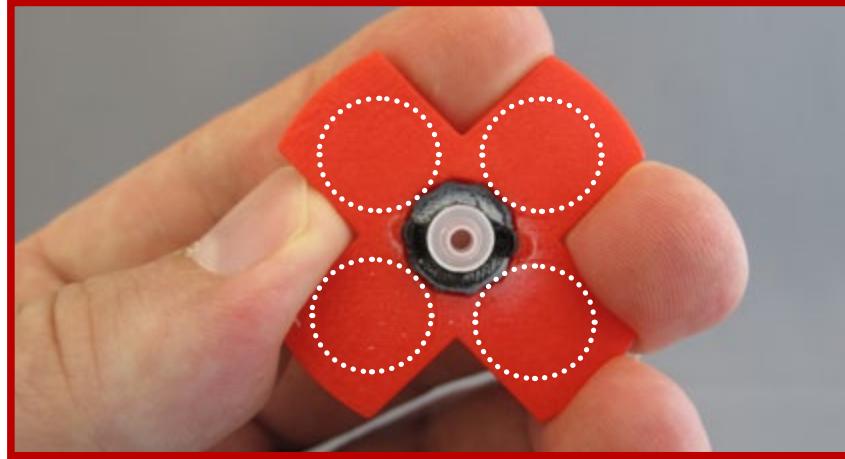


33.



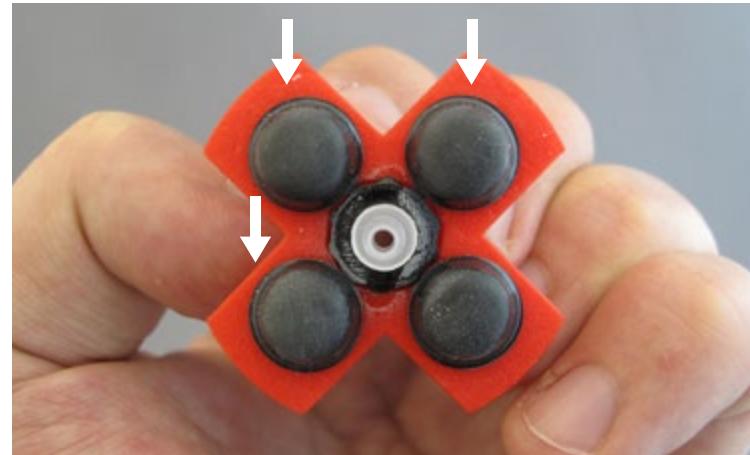
**IMPORTANT:** Only add a small **DROP** of superglue

**34.**

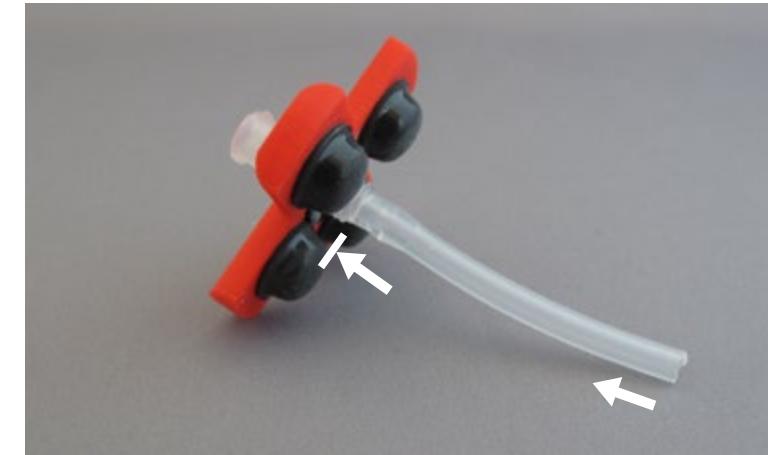


**IMPORTANT:**  
On the flat side of  
the rocker are 4  
circular outlines.  
Place a bumper  
directly on each  
outline.

**35.**

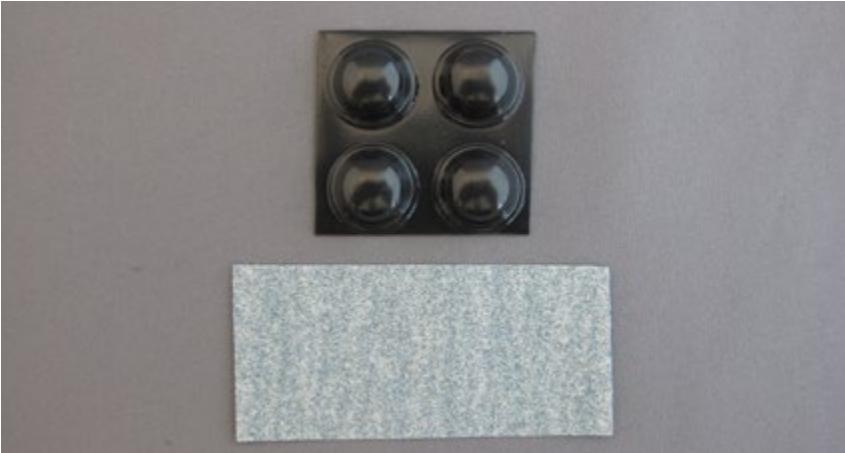


**36.**



**36**

37.



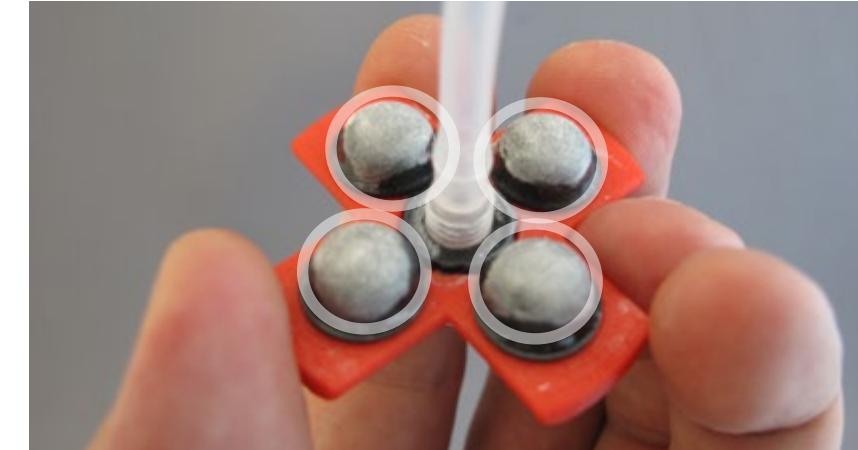
34

x4

**i NOTE:** Sand the top surface and around the bumpers



38.



**i NOTE:** Apply baby powder with your finger

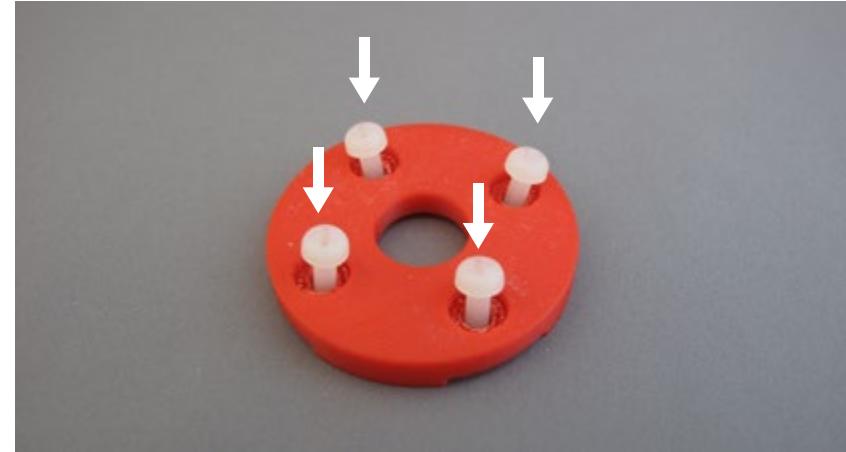
**39.**



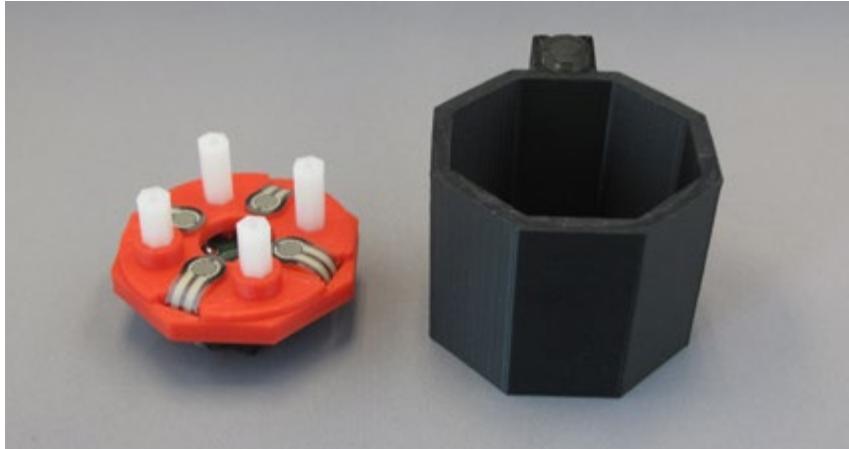
22

29

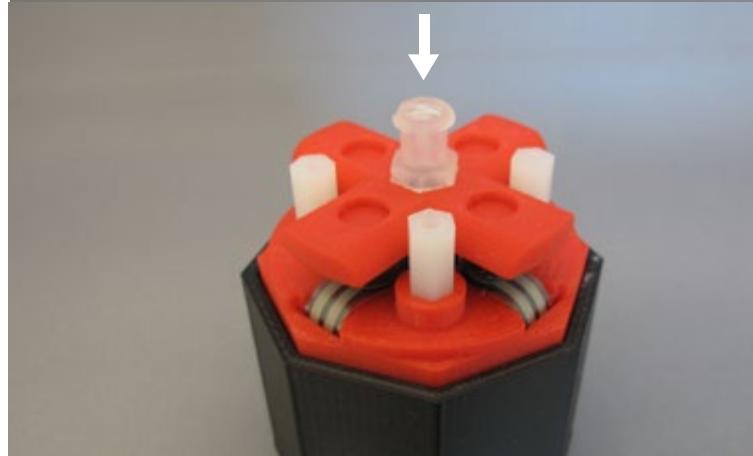
x 4



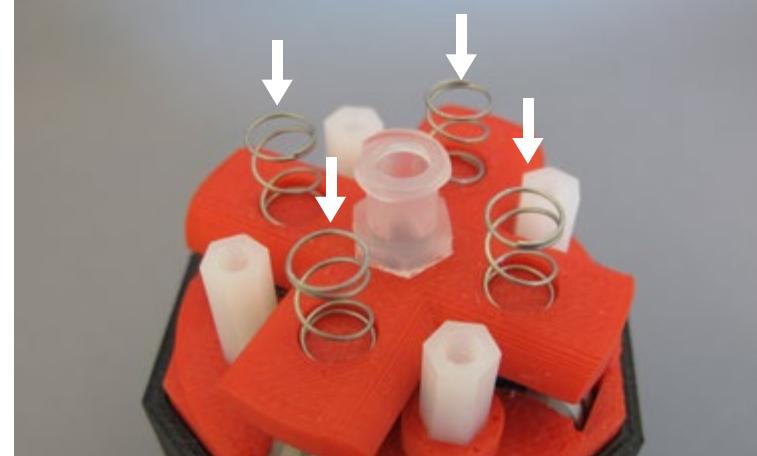
**40.**



41.

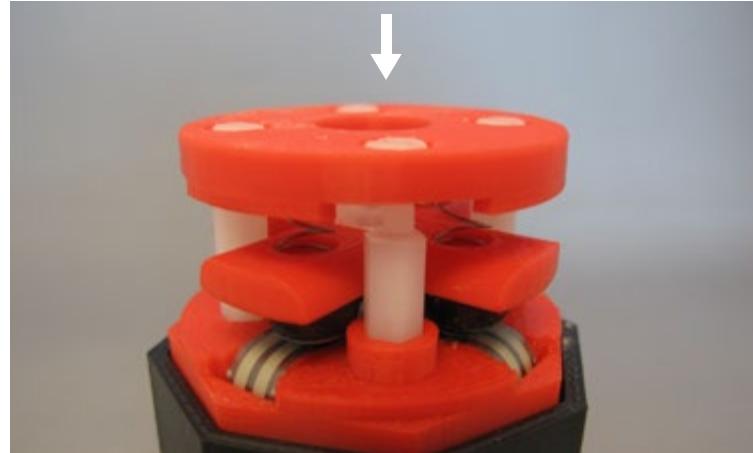


42.

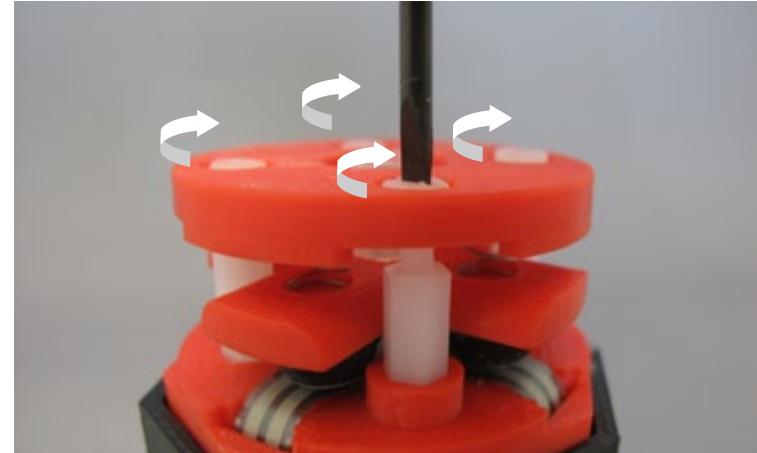


30  
x 4

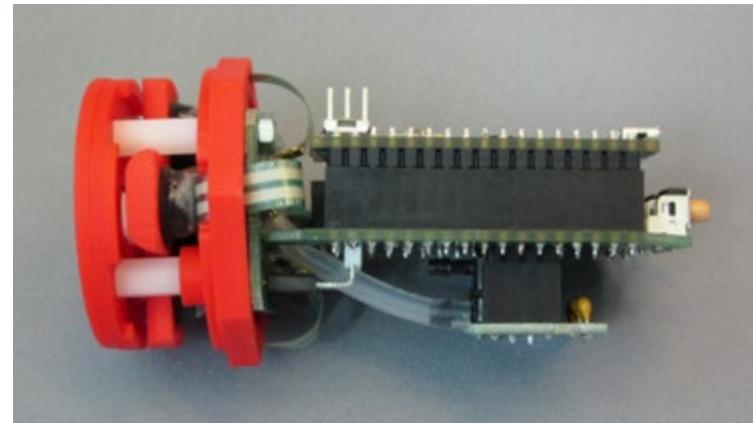
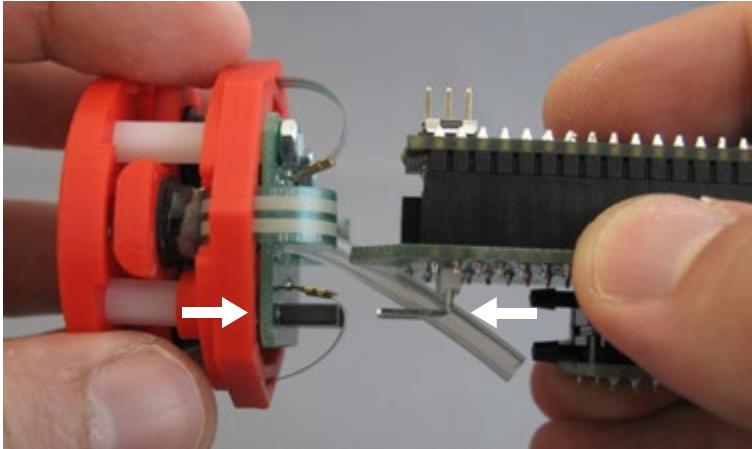
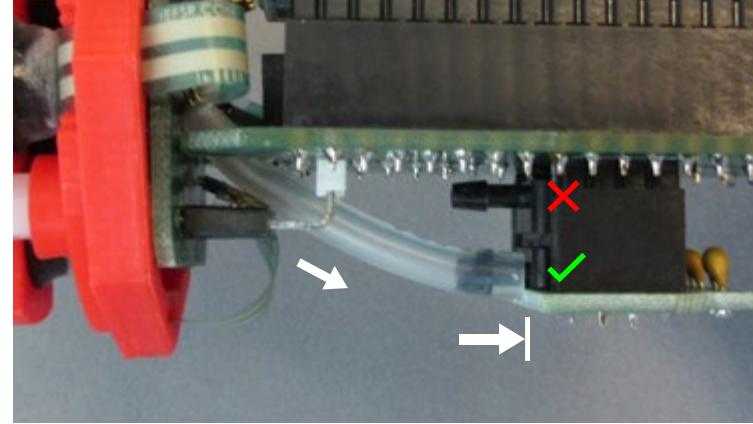
43.



44.



**45.**



**46.**

**47.**

# Part 7



23  
37

01.



40  
42

02.



**NOTE:** Tighten the cable tie until snug

**03.**



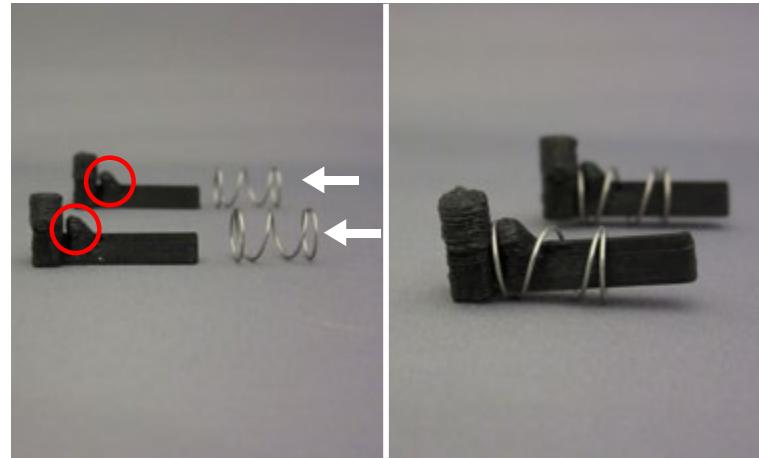
30

x 2

24

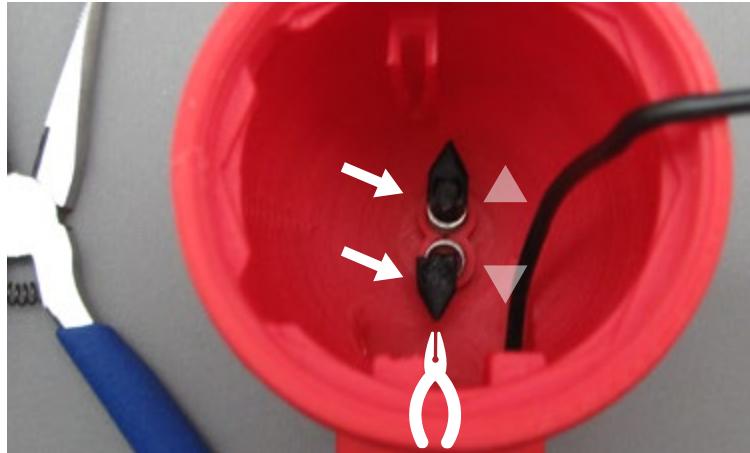
x 2

**04.**



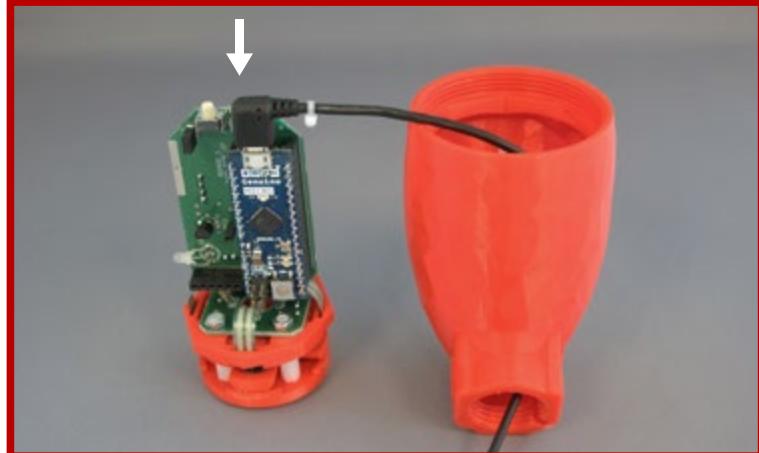
**i NOTE:** Push springs onto the spring catch highlighted in red.

**05.**



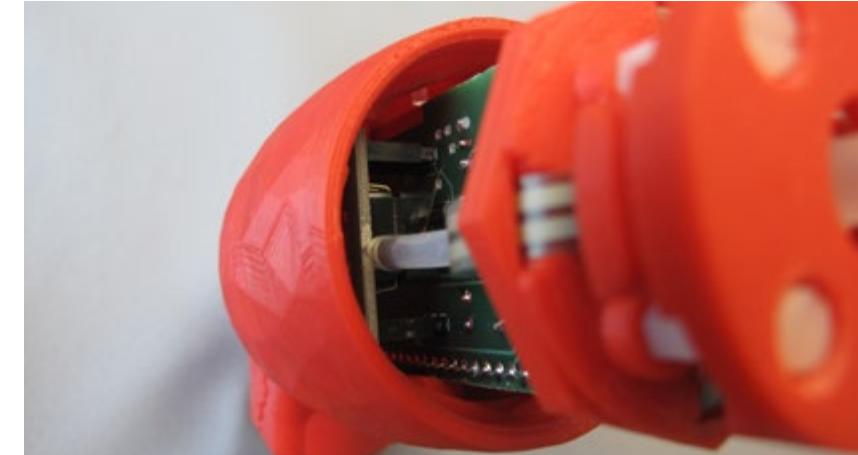
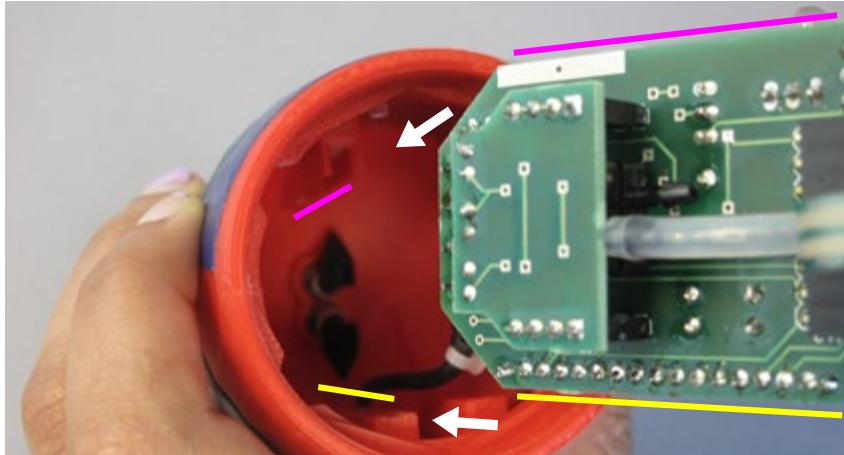
**IMPORTANT:** Push both buttons until they click into place.

**06.**



**CAUTION:** If need be, unplug cable gently while holding onto the port.

**07.**



**NOTE:** Slide the assembly along the internal tracks in the rear chamber housing.

**08.**



**09.**



**CAUTION:** Twist on hand tight

**10.**



26

**⚠ CAUTION:** Twist on hand tight

**11.**



25

**12.**



38

**13.**



39

# Part 8

## SETTING UP THE DEVICE

For **LipSync Mouse**, **LipSync Wireless**, and **LipSync Macro** follow Steps A-C:

- A. Upload the microcontroller code.
- B. Calibrate the joystick.
- C. Read through the Startup Guide for complete information on using the LipSync.

**NOTE:** The Startup Guide includes information about device compatibility, mounting, sip-and-puff functions, and speed control among others.

OR

For **LipSync Gaming**, don't follow Steps A-C.

Instead, follow the instructions in the Setup Guide: [https://github.com/makersmakingchange/LipSync-Gaming/blob/master/LipSync\\_Gaming\\_Setup\\_Guide.pdf](https://github.com/makersmakingchange/LipSync-Gaming/blob/master/LipSync_Gaming_Setup_Guide.pdf)

## A - UPLOADING THE MICROCONTROLLER CODE

1. Download and install the latest version of Arduino IDE:  
<https://wwwarduino.cc/en/main/software>
2. Download and save the latest LipSync microcontroller code. Right-click on the hyperlink of the microcontroller code and select "Save Target/Link As".  
**LipSync Mouse:** [https://github.com/makersmakingchange/LipSync/raw/master/Software/LipSync\\_Mouse\\_Firmware/LipSync\\_Firmware.ino](https://github.com/makersmakingchange/LipSync/raw/master/Software/LipSync_Mouse_Firmware/LipSync_Firmware.ino)  
**LipSync Wireless:** [https://github.com/makersmakingchange/LipSync-Wireless/raw/master/Software/LipSync\\_Wireless\\_Firmware/LipSync\\_Wireless\\_Firmware.ino](https://github.com/makersmakingchange/LipSync-Wireless/raw/master/Software/LipSync_Wireless_Firmware/LipSync_Wireless_Firmware.ino)  
**LipSync Macro:** [https://github.com/makersmakingchange/LipSync-Macro/raw/master/Software/LipSync\\_Macro\\_Firmware/LipSync\\_Macro\\_Firmware.ino](https://github.com/makersmakingchange/LipSync-Macro/raw/master/Software/LipSync_Macro_Firmware/LipSync_Macro_Firmware.ino)
3. Open the Arduino IDE and click on **Tools** → **Board** → **Arduino/Genuino Micro**
4. Connect to the PC using the LipSync USB cable.
5. Click on **Tools** → **Port**
6. Click the right arrow at the top left of the Arduino IDE to upload the microcontroller code to the LipSync device.
7. Once upload is complete, a message saying "Upload Successful" will show at the bottom left of the Arduino IDE.

## B - JOYSTICK CALIBRATION

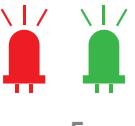
Calibrate your LipSync joystick before first using your device.

**⚠️ IMPORTANT:** Allow the LipSync to initialize for 3 seconds before moving the mouthpiece **each time** after it's connected to a device.



1

Press both speed adjustment buttons on the back of the LipSync for a few seconds until LED comes on



x 5

2

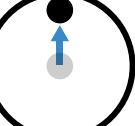
LED slowly blinks red & green 5 times



3 sec.  
pause



x 6



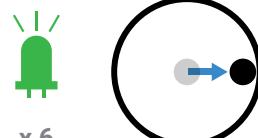
x 1

3

While LED blinks green 6 times, move the mouthpiece to the 12 o'clock position (up direction)

4

LED blinks red 1 time when position is measured



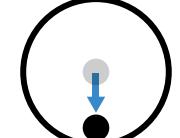
x 6



x 1

5

While LED blinks green 6 times, move the mouthpiece to the 3 o'clock position (right direction) time when position is measured



x 6

6

LED blinks red 1 time when position is measured  
While LED blinks green 6 times, move the mouthpiece to the 6 o'clock position (down direction) time when position is measured



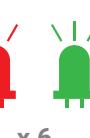
x 6

8

LED blinks red 1 time when position is measured  
While LED blinks green 6 times, move the mouthpiece to the 9 o'clock position (left direction) time when position is measured



x 1



x 6

11

LED rapidly blinks red and green 6 times when calibration is complete