

LipSync (all versions)

ASSEMBLY MANUAL

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 | OPTIONAL (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 | OPTIONAL (1) SparkFun Bluetooth Module |
| <input type="checkbox"/> | 21 | (1) Joystick Rocker | <input type="checkbox"/> | 33 | (1) Luer Lock Nut | <input type="checkbox"/> | 45 | OPTIONAL (1) 1-Position Straight Female T/H Header |



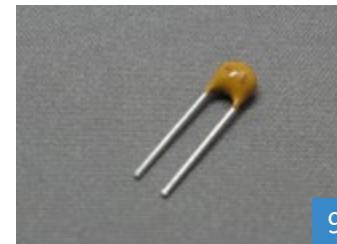
LipSync Circuit Board Pack:
(1) Main Interface Board
(1) Pressure Sensor Board
(1) Joystick Board
[Mouse ver.](#) [Macro ver.](#)
[Wireless ver.](#) [Gaming ver.](#)
NOTE: Same files for all versions.

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



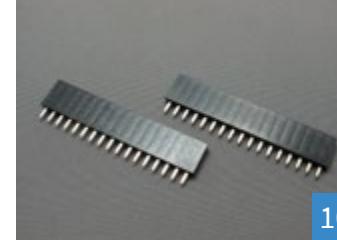
(1) Arduino Micro/ Genuino Micro microcontroller
[Arduino](#) [Digikey](#) [Robotshop](#)
[Adafruit](#) [Pololu](#)
COMPATIBILITY NOTE: The "Arduino Micro" or "Genuino Micro" **MUST** be used.

2



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

6



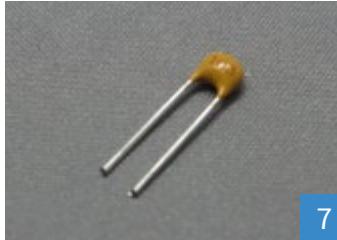
(2) 17-Position Straight Female Through Hole Headers
[Digikey.ca](#)
[Digikey.com](#)
*or from any electronics shop

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

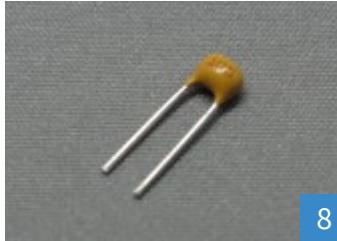
11



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

*or from any electronics shop

4



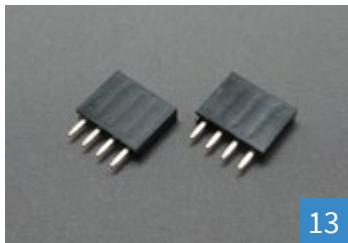
(1) 1.0uF Ceramic Capacitor [capacitor label: 105]
[Digikey.ca](#)
[Digikey.com](#)
*or from any electronics shop

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](#)

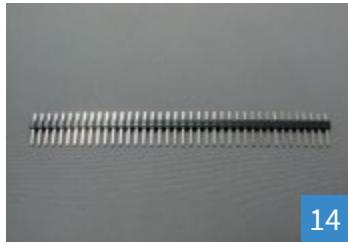
*or from any electronics shop

17



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

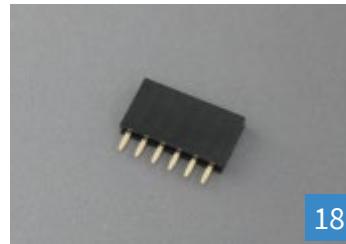
21



(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"

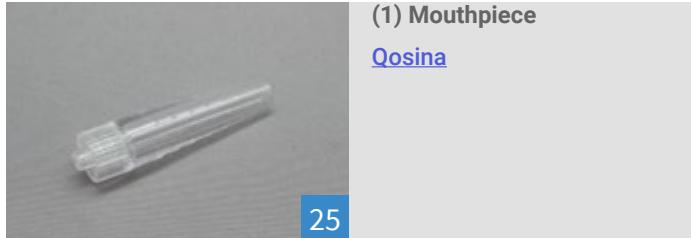
20



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

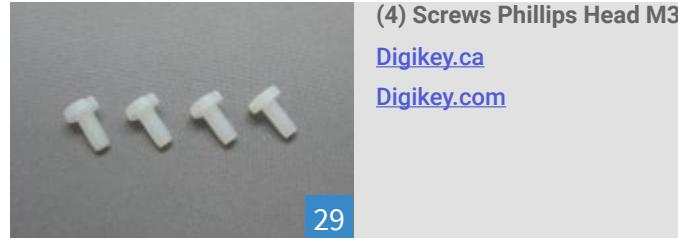
24

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



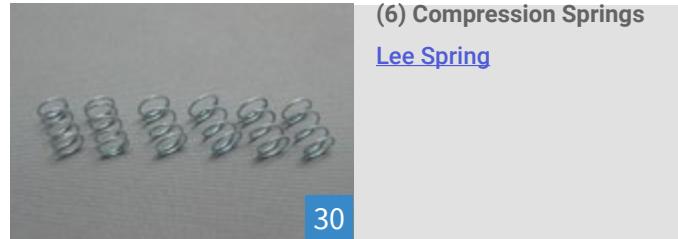
(1) Luer Lock Nut
[Cole-Parmer](#)

33



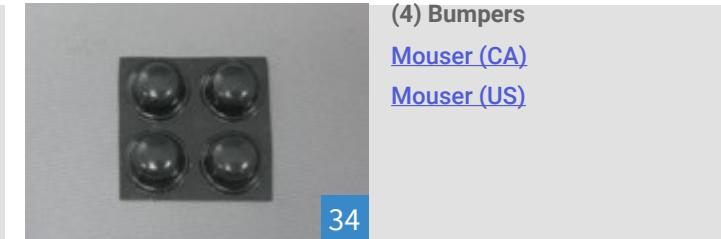
(1) Filter
[Qosina](#)

26



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

30



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

34



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

27



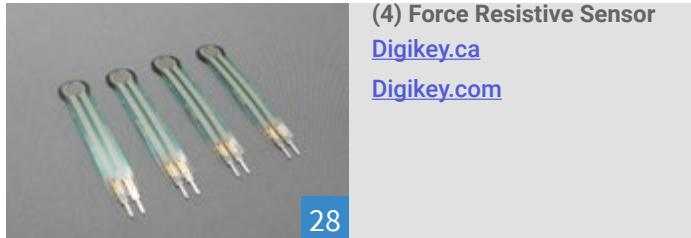
(2) Standoffs M3 10mm
[Digikey.ca](#)
[Digikey.com](#)

31



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

35



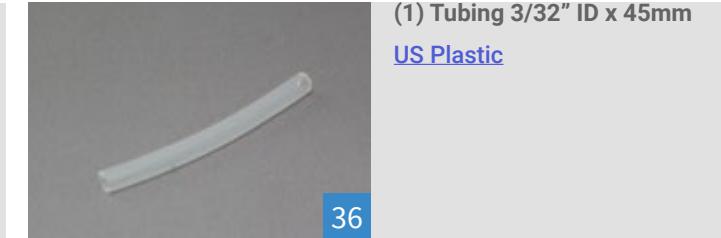
(4) Force Resistive Sensor
[Digikey.ca](#)
[Digikey.com](#)

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

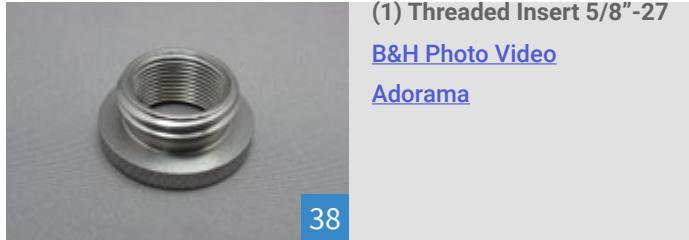
(1) USB Adapter
[Amazon.ca](#)
[Amazon.com](#)



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.



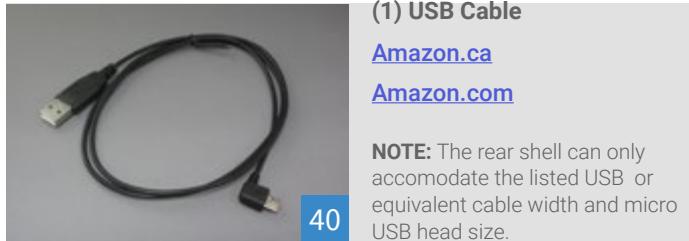
39

(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



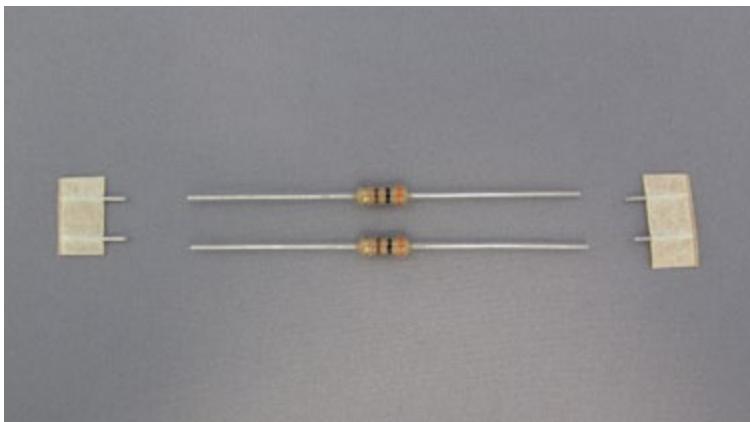
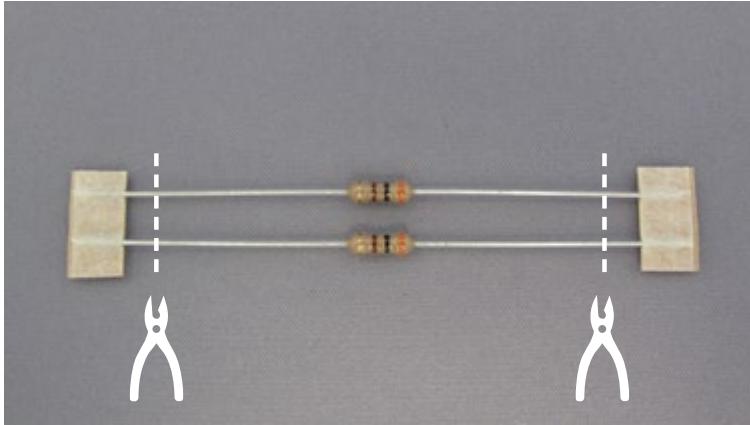
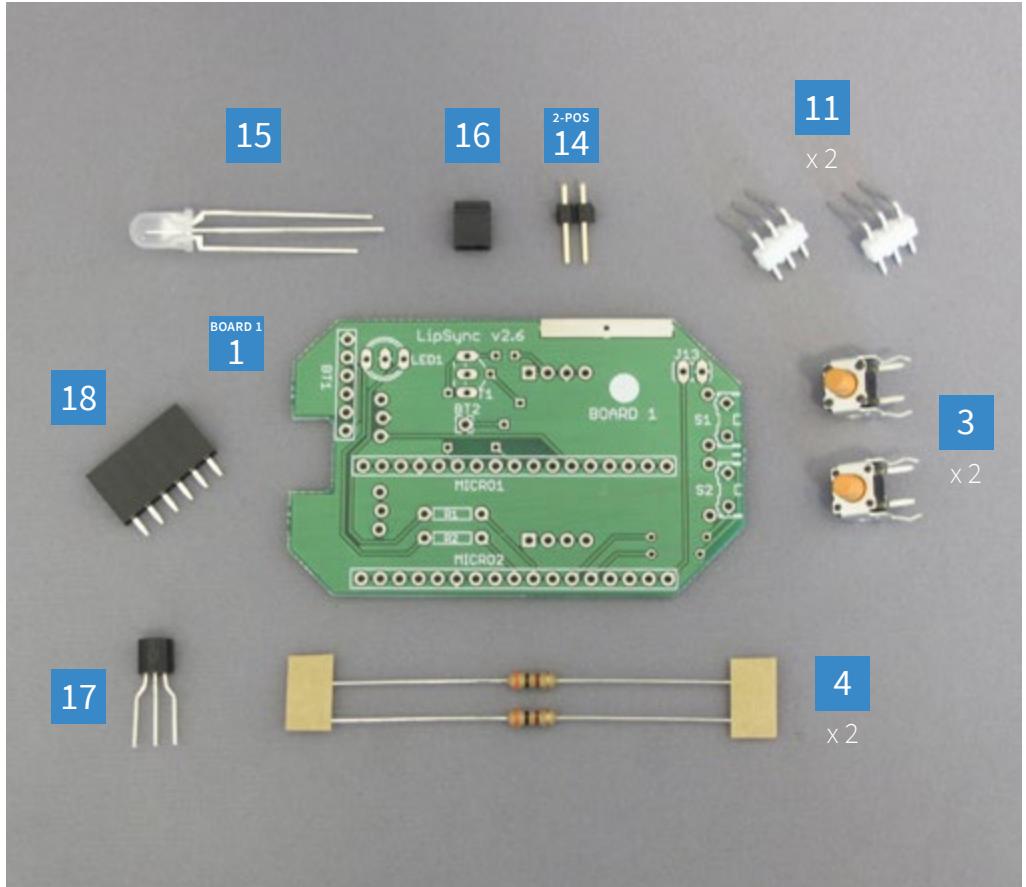
= Name of plated through-hole



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

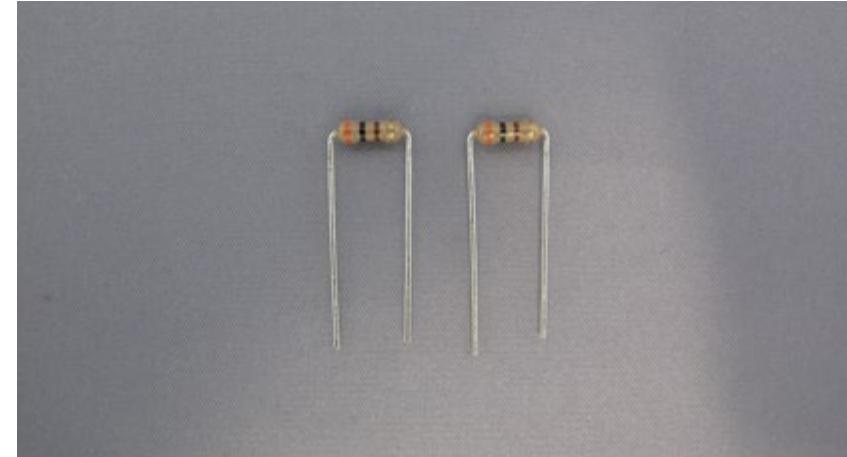
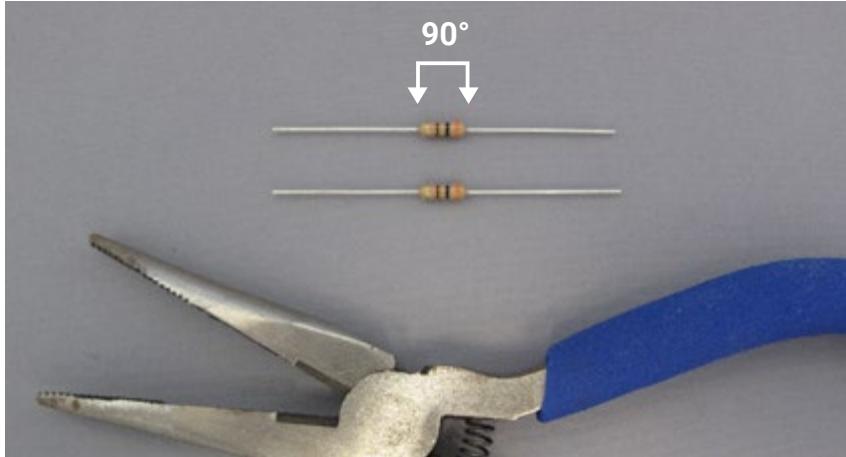
Part 1



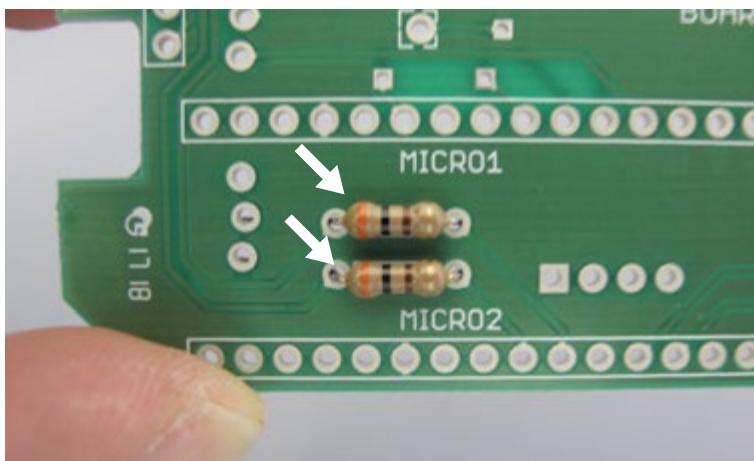
4
x 2

01.

02.

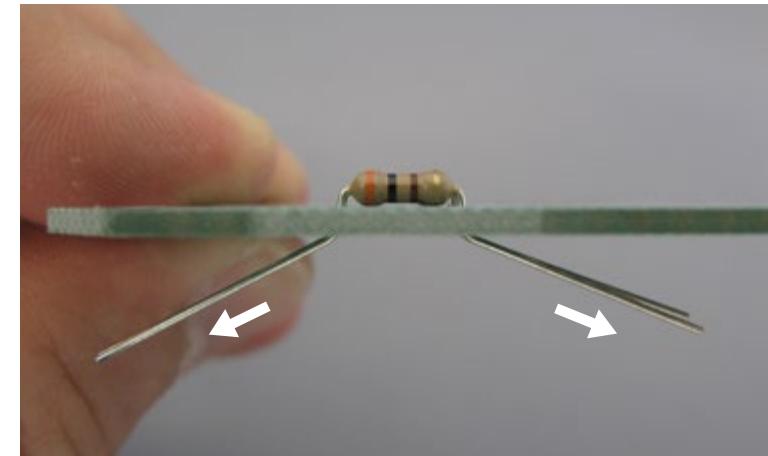


03.

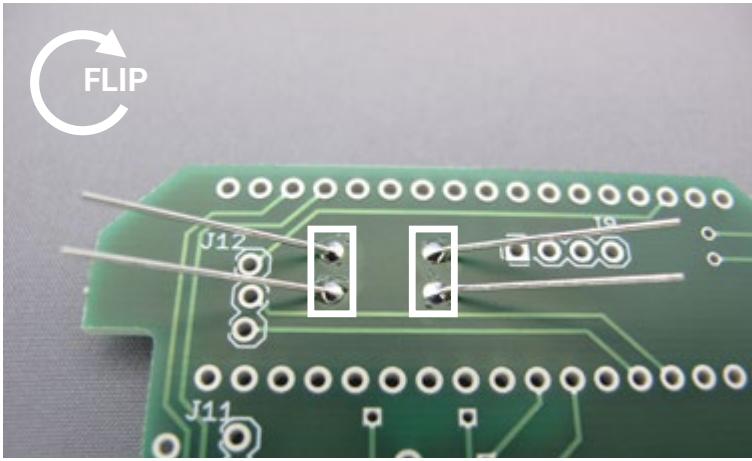


BOARD 1
1
HOLE
R1
HOLE
R2

04.

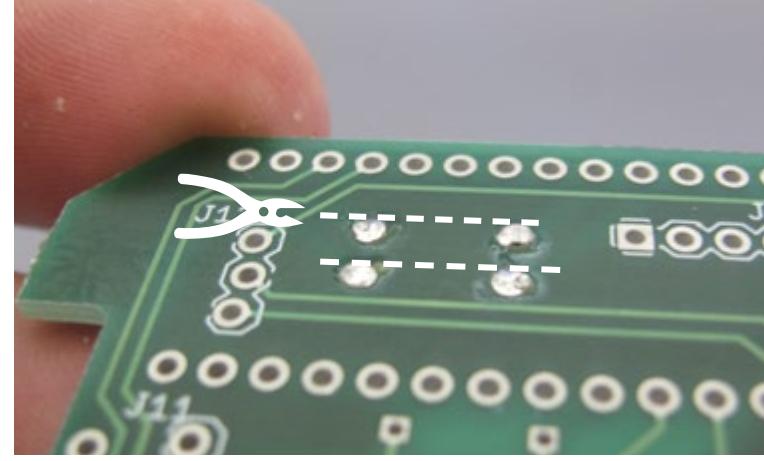


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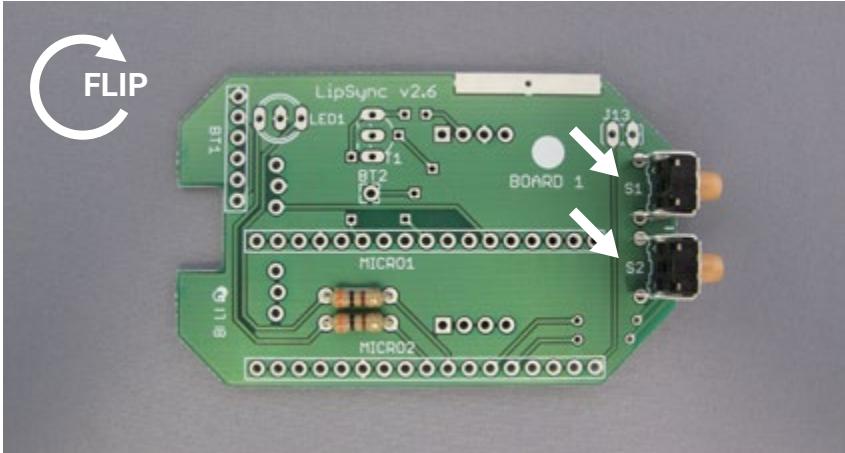


x 4

06.



07.

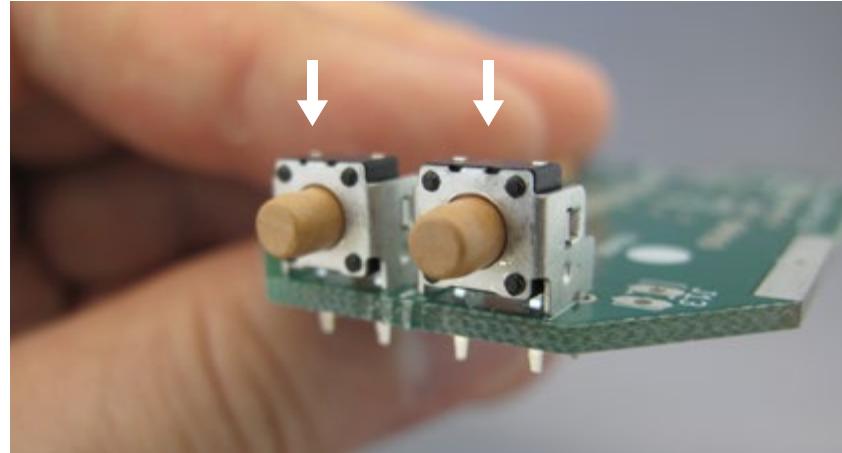


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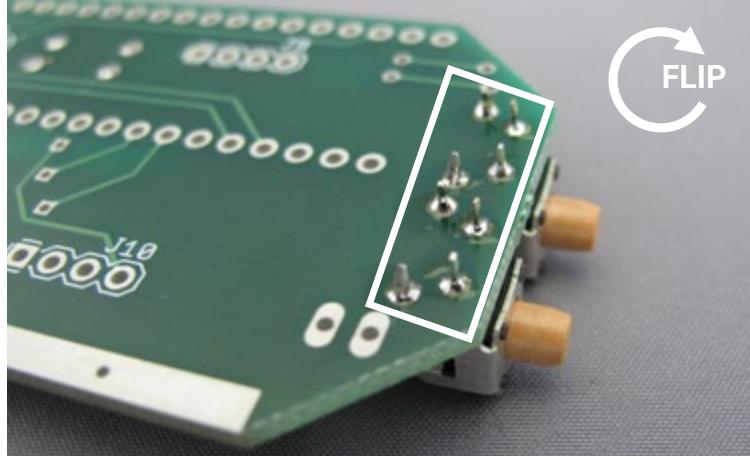
x 2

HOLE
S1

HOLE
S2

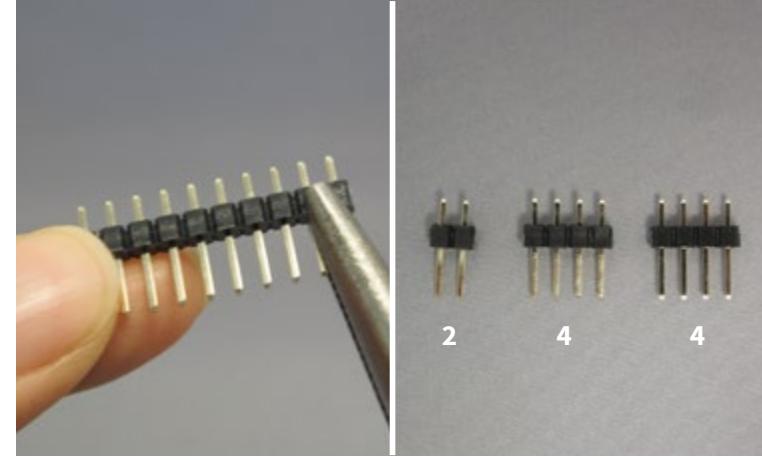


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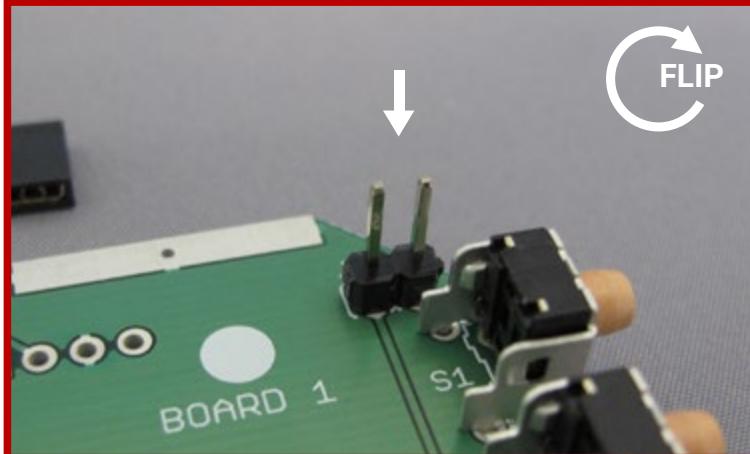


14

09.

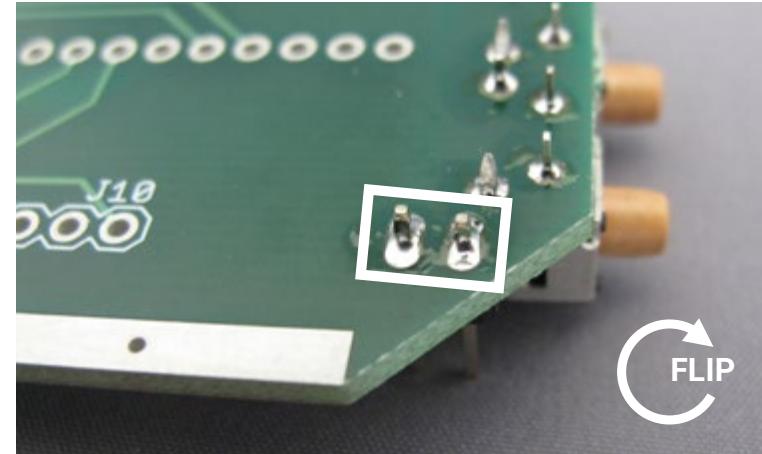


10.



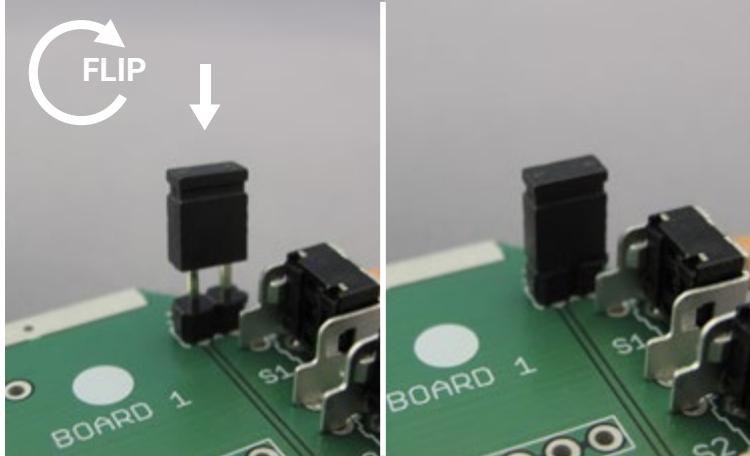
x 2

11.



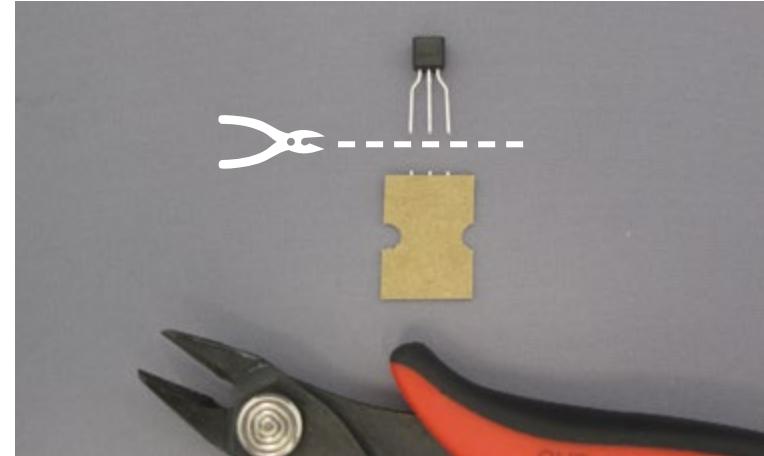
IMPORTANT: The **SHORT** leads are inserted.

12.



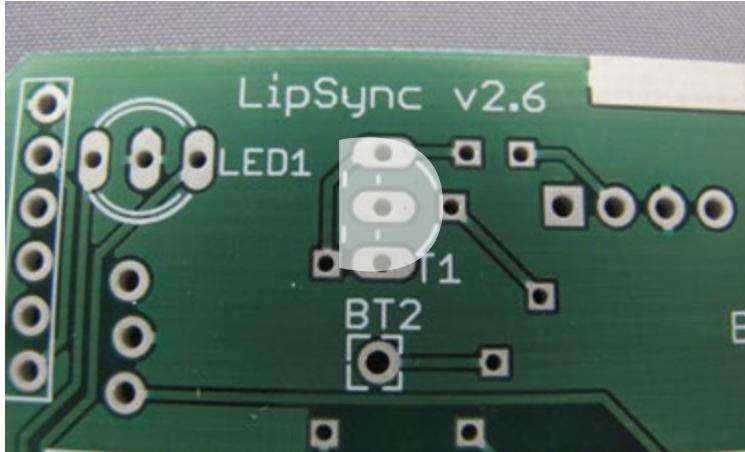
16

13.



17

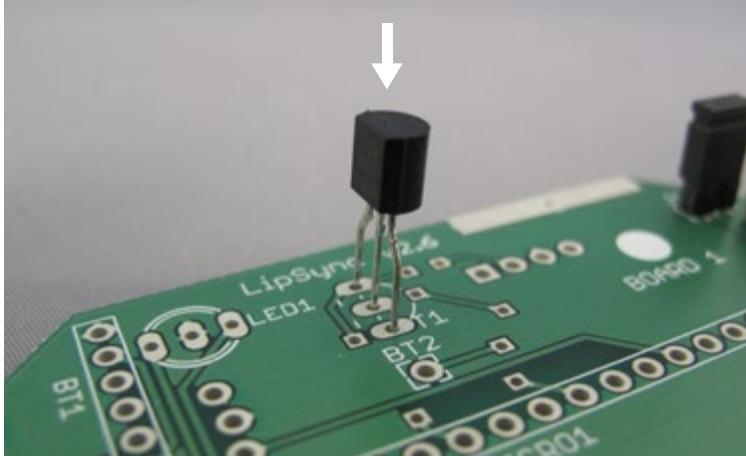
14.



HOLE
T1

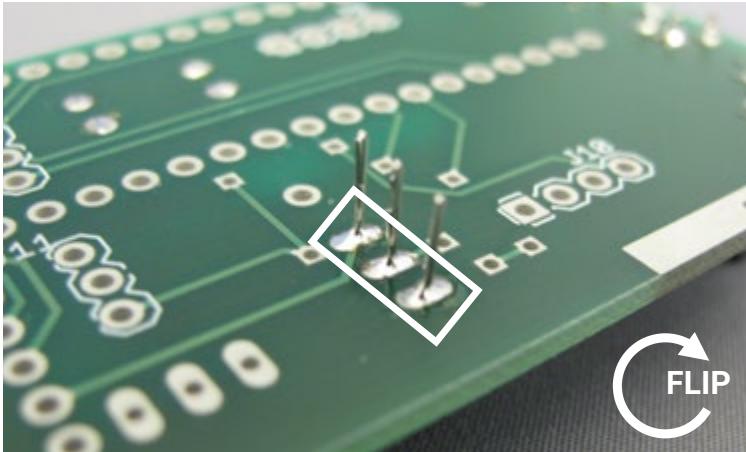
NOTE: The silkscreen outline for hole T1 on Board 1 matches the orientation of which the transistor is inserted.

15.



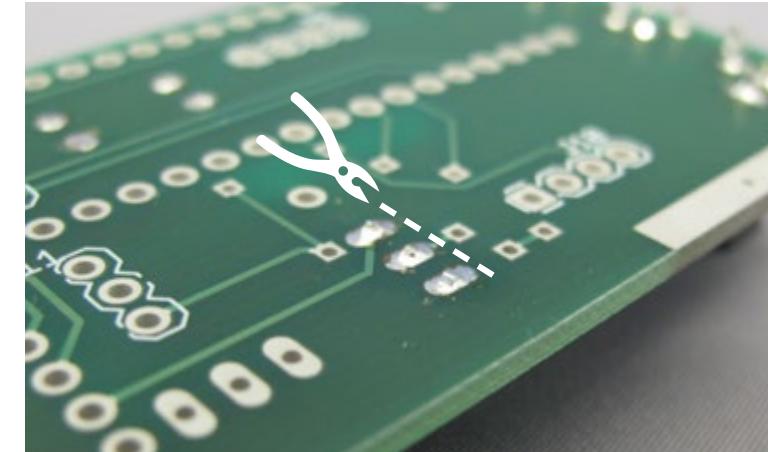
i NOTE: After inserting the transistor, there will be a gap between the transistor and Board 1

16.

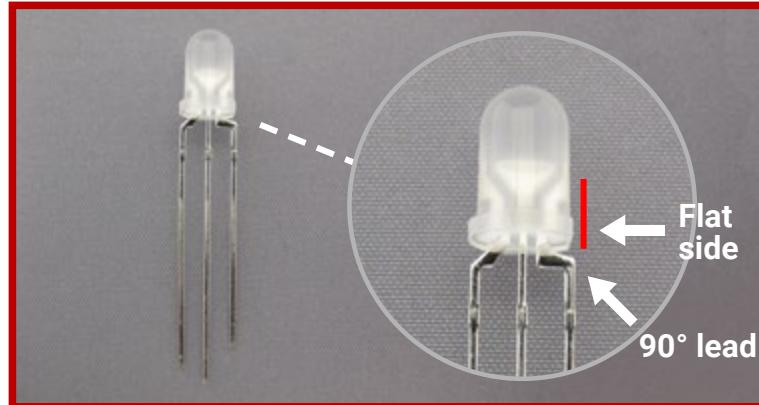


x 3

17.



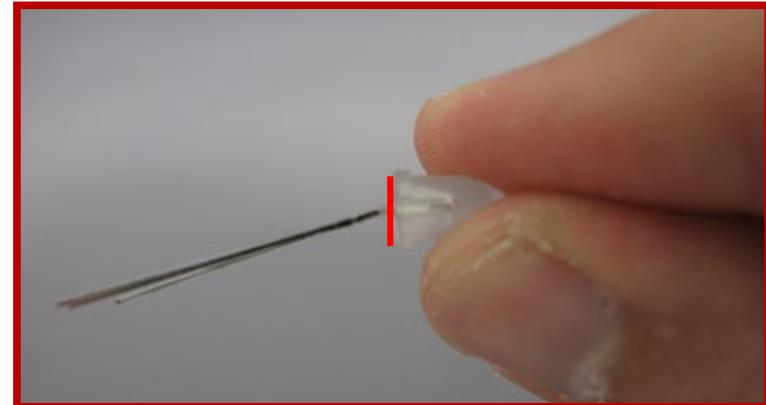
18.



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

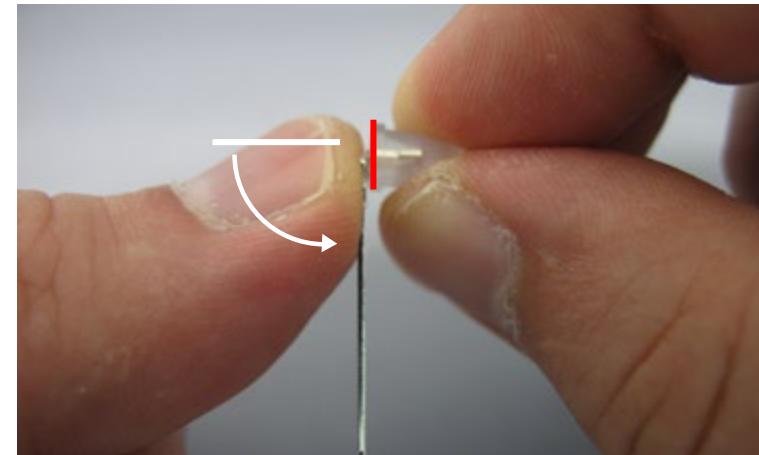
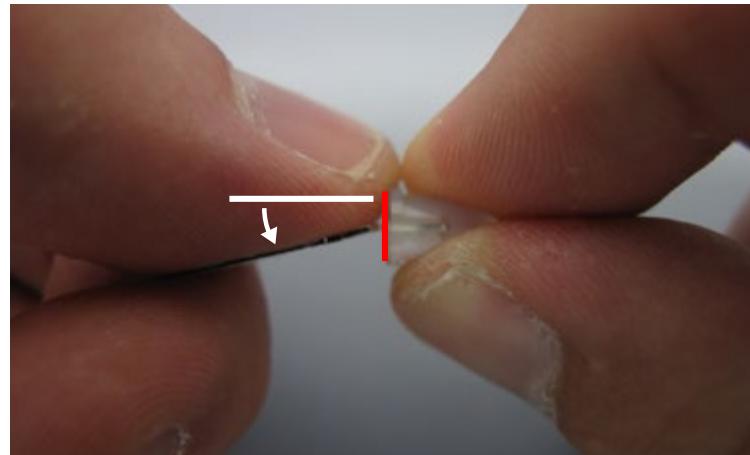
15

19.



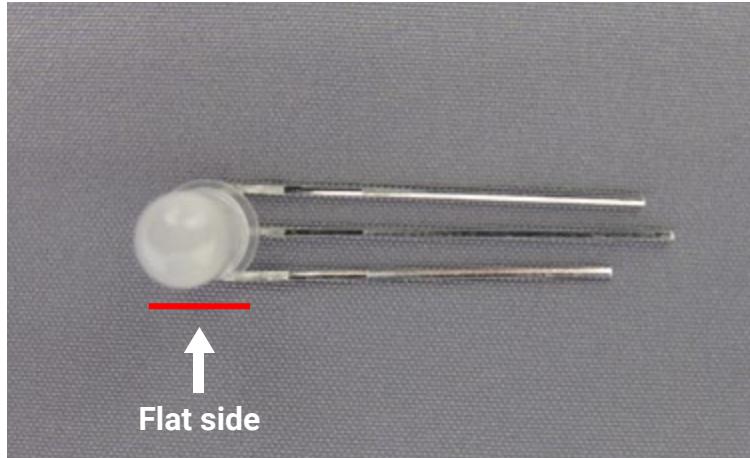
⚠️ IMPORTANT: Hold the LED so that the flat side and the 90° lead is facing **TOWARDS** you.

20.



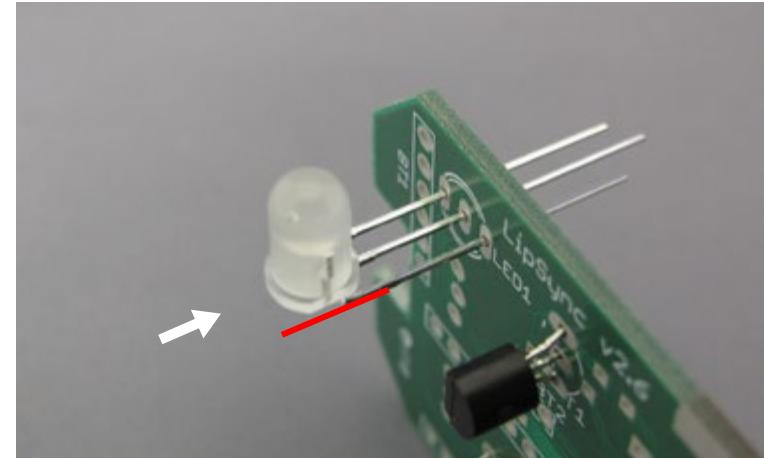
ℹ️ NOTE: Using a finger, bend the leads by 90° right at the base.

21.

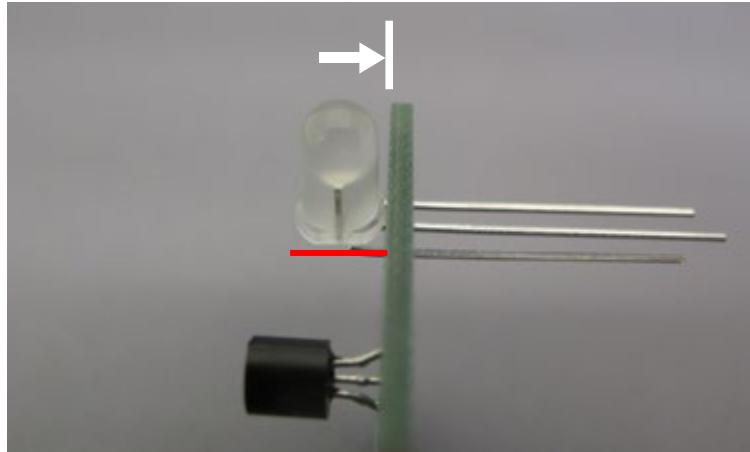


HOLE
LED1

22.

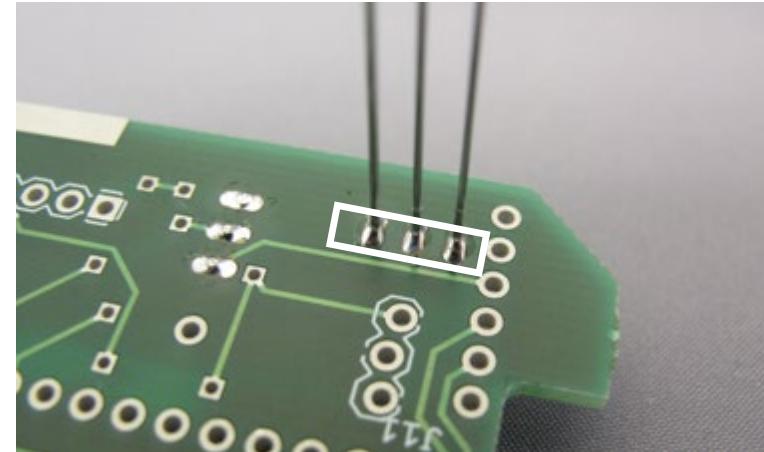


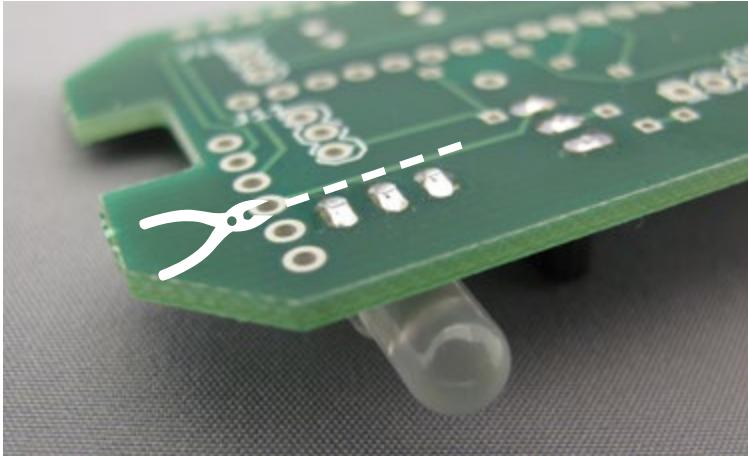
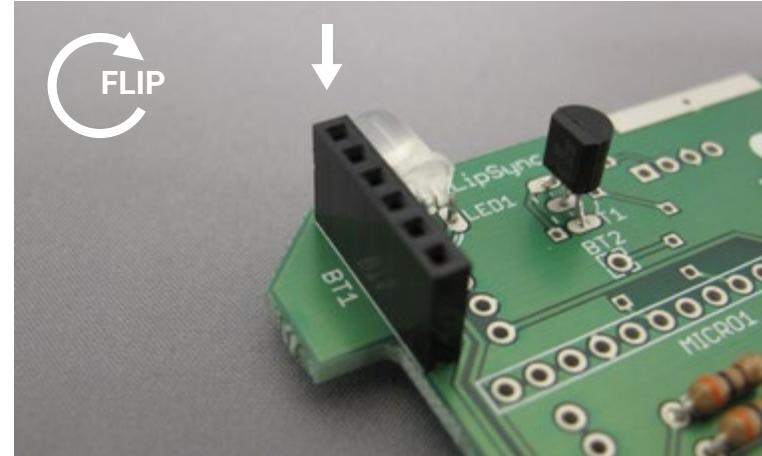
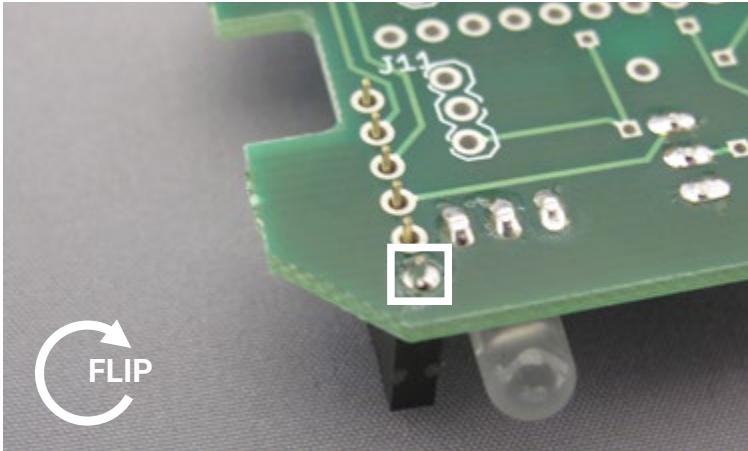
23.



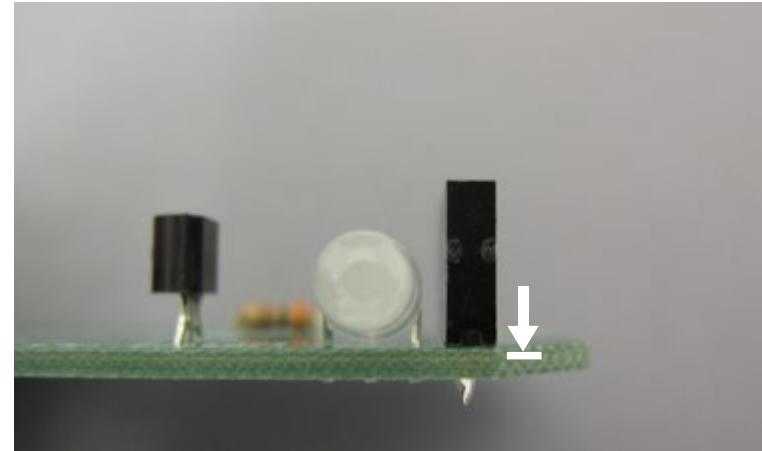
x 3

24.



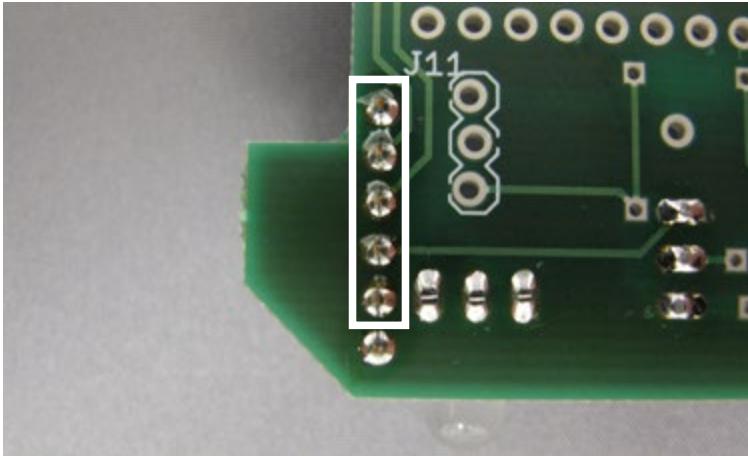
25.**26.****27.**

x 1

28.

NOTE: Check that component is flush to the board

29.

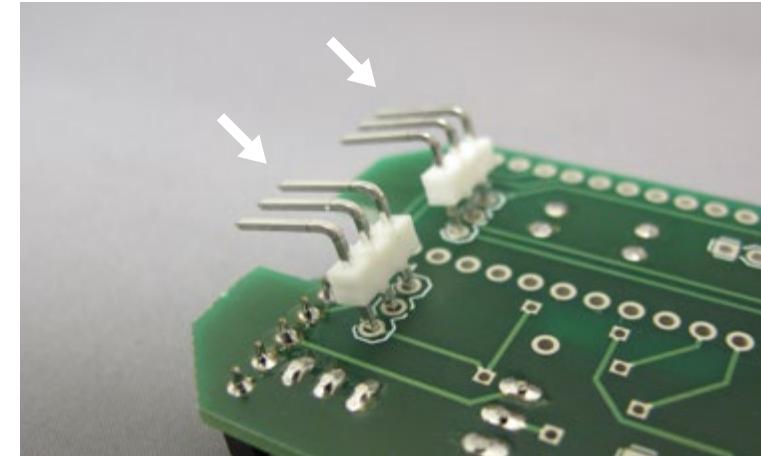


x 5

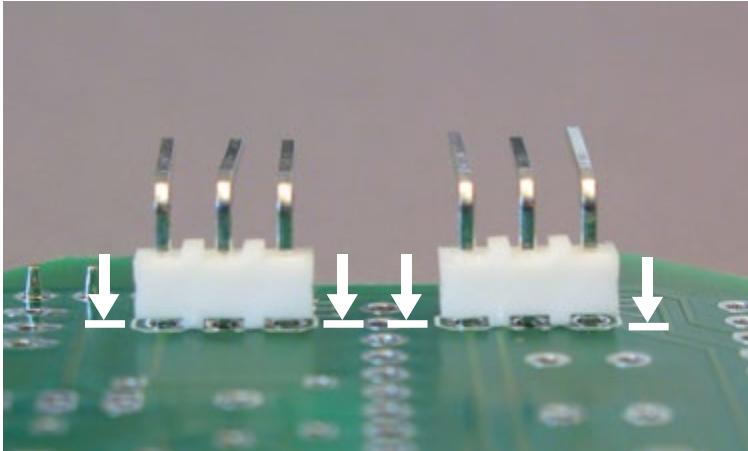
11
x 2

SECTION
J11
SECTION
J12

30.

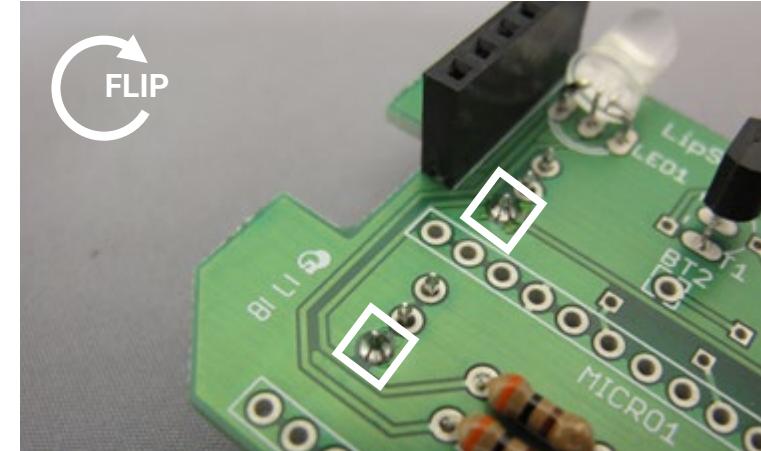


31.



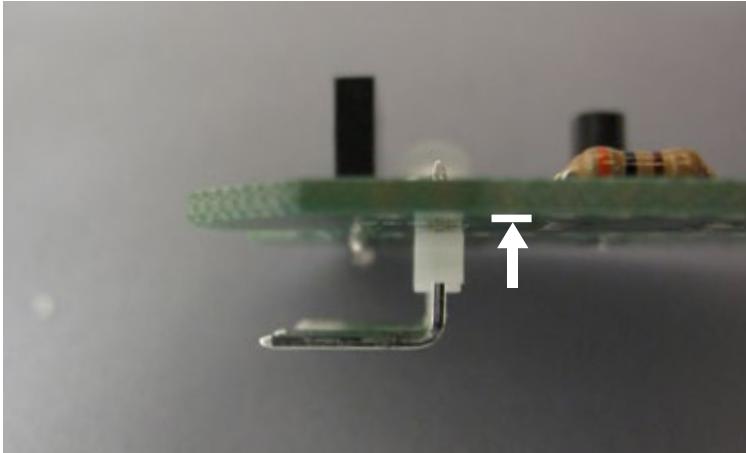
18

32.

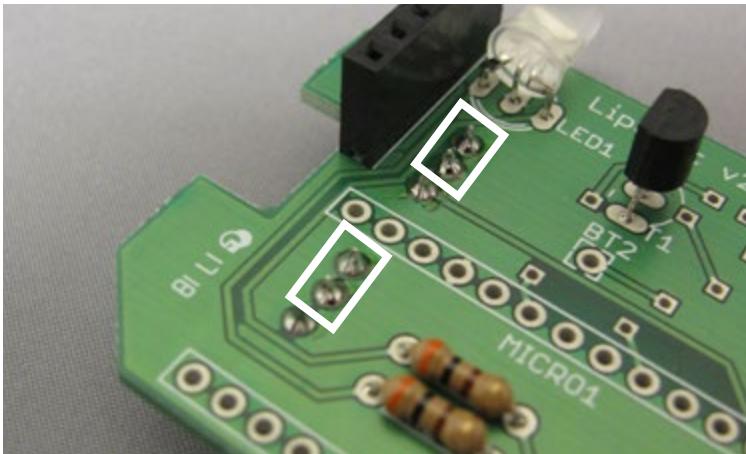


x 2

33.



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



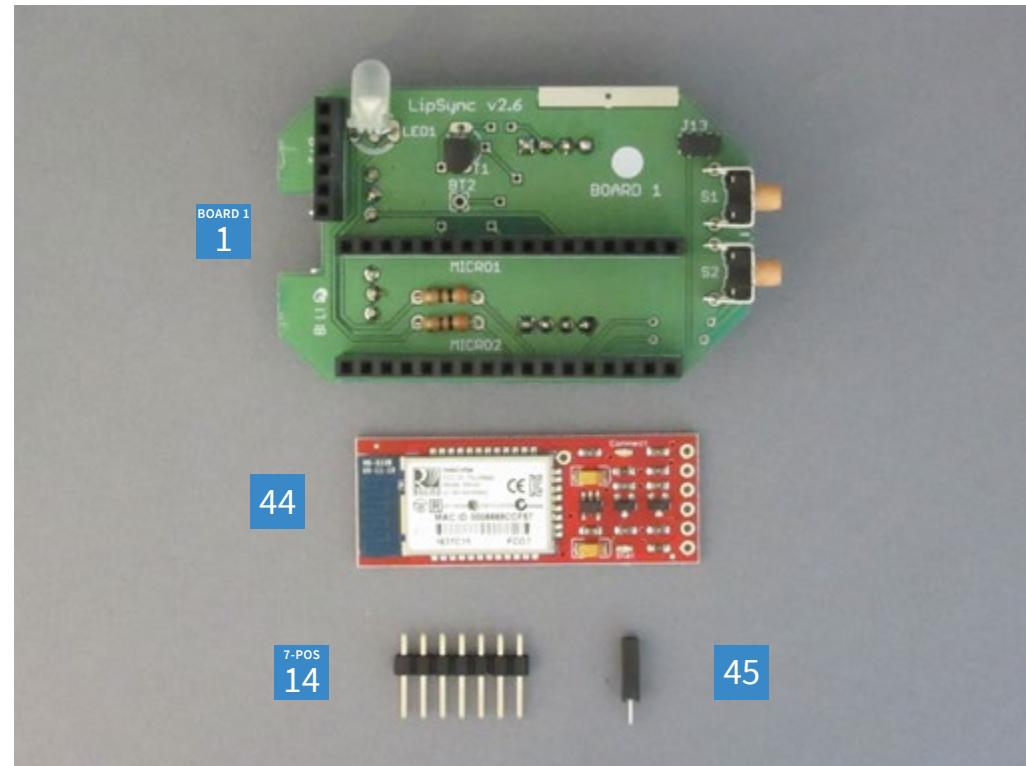
x 4

34.

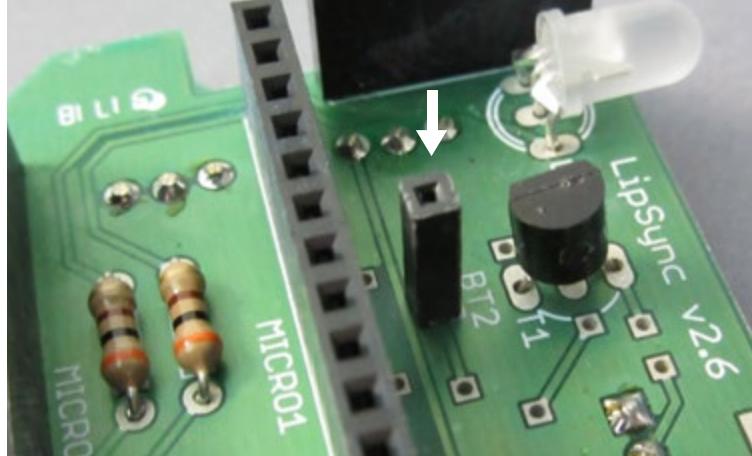
Part 2

(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.



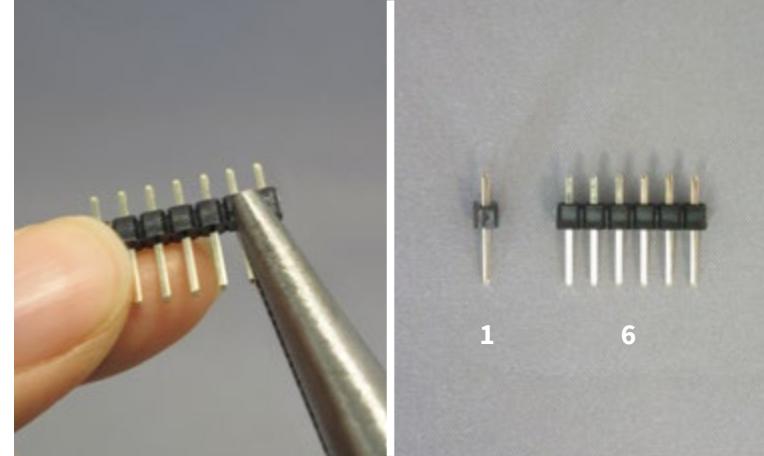
01.



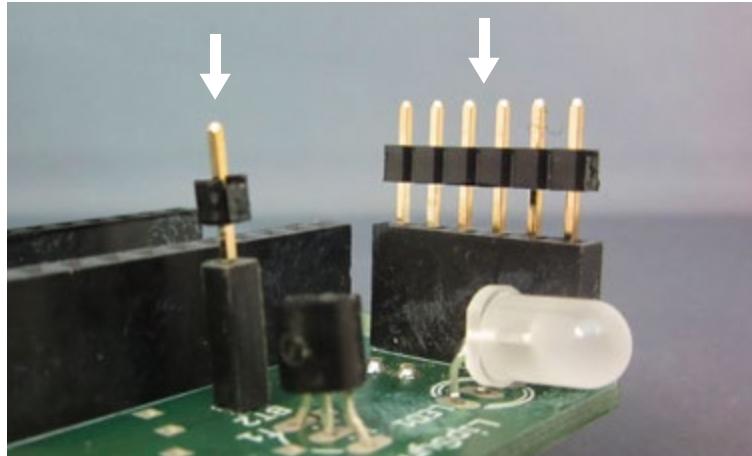
BOARD 1
1
45
HOLE
BT2

1-POS
14
6-POS
14

02.

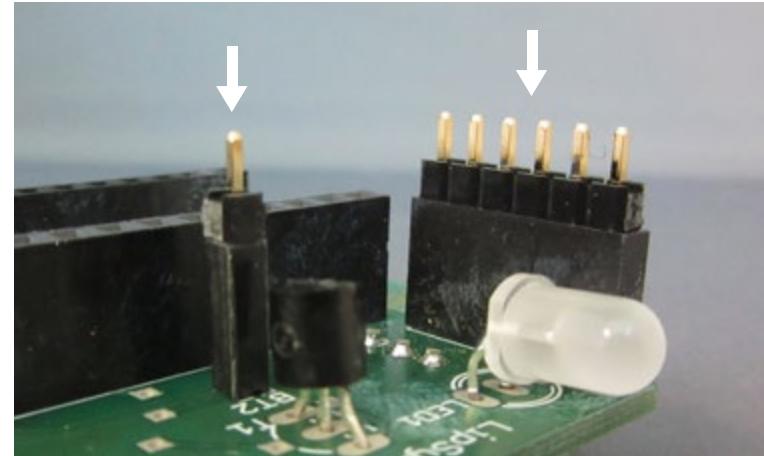


03.

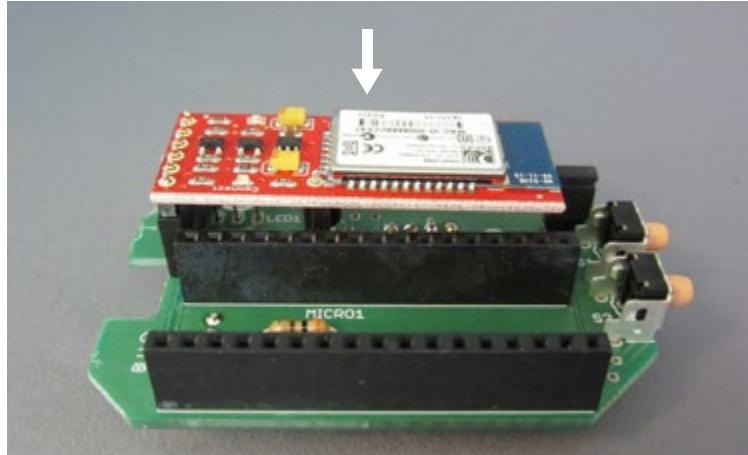
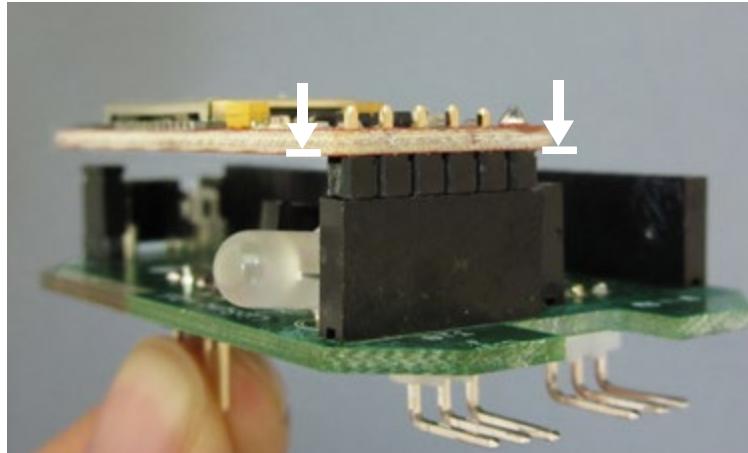


⚠️ IMPORTANT: The **LONG** leads are inserted.

04

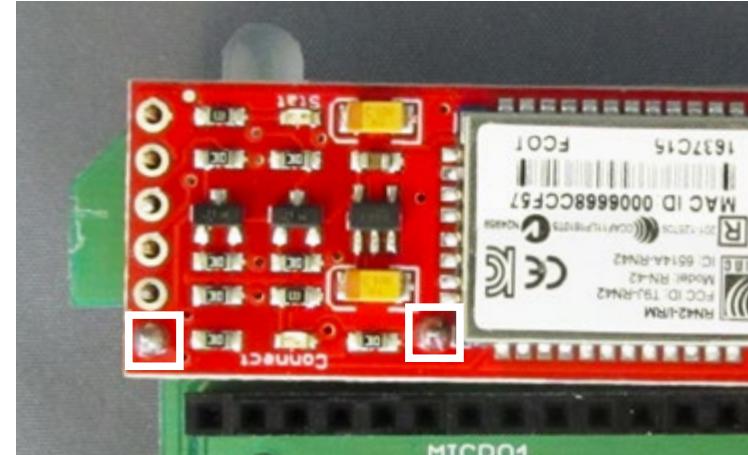
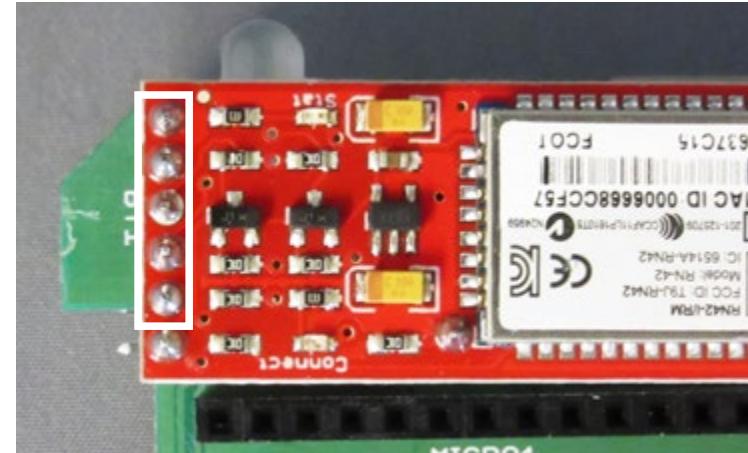


05.



44

06.



x 2



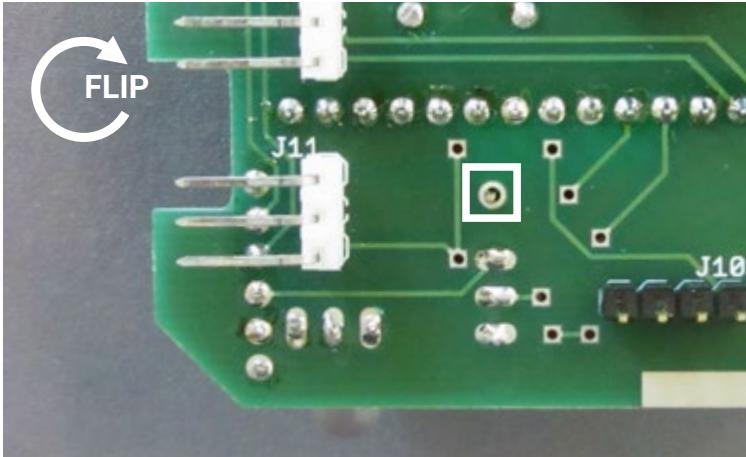
x 5



07.

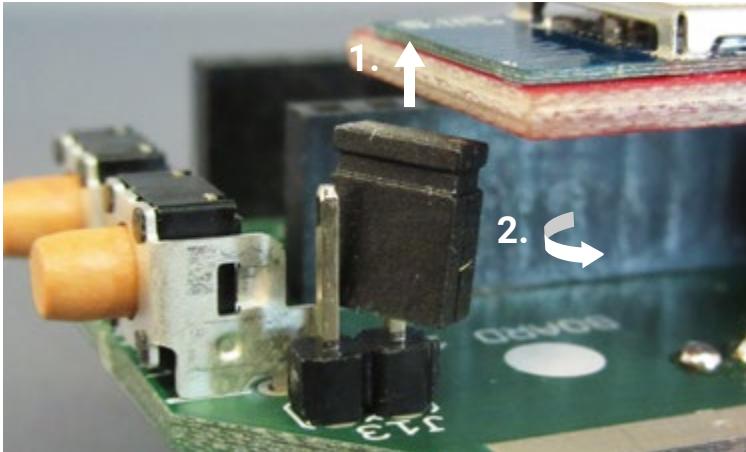
NOTE: Check that the bluetooth module is flush.

09.

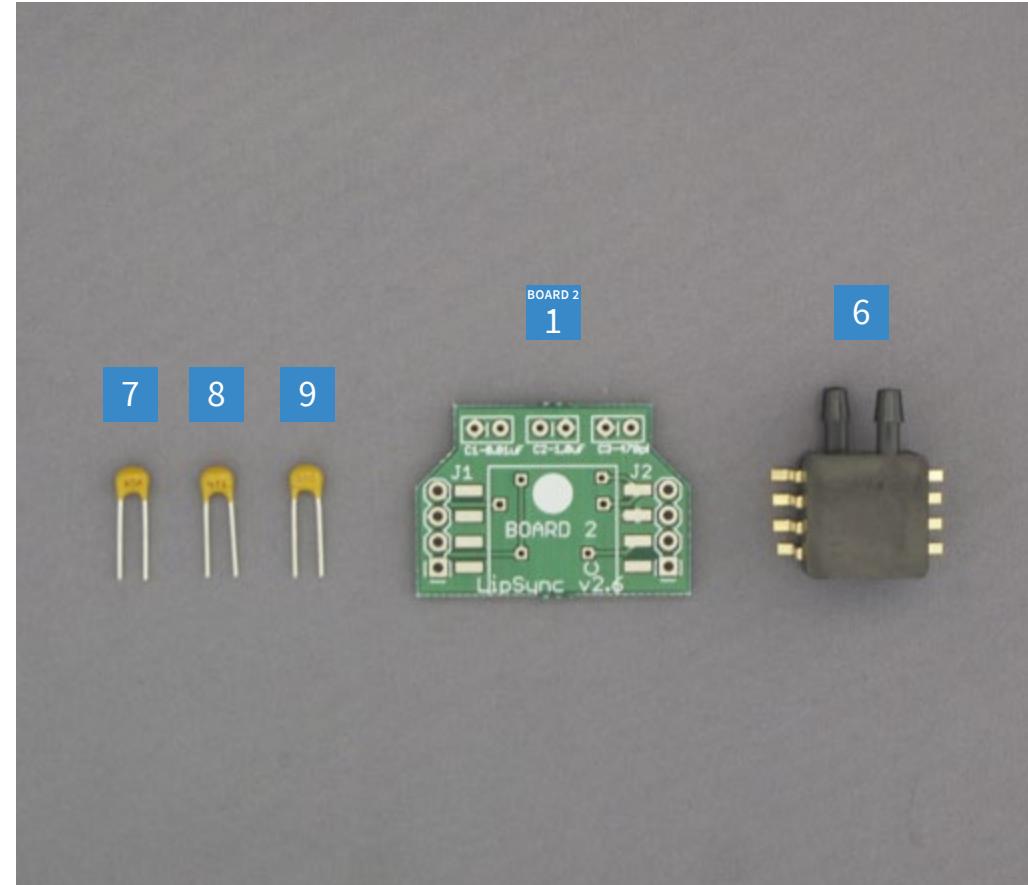


PART 3

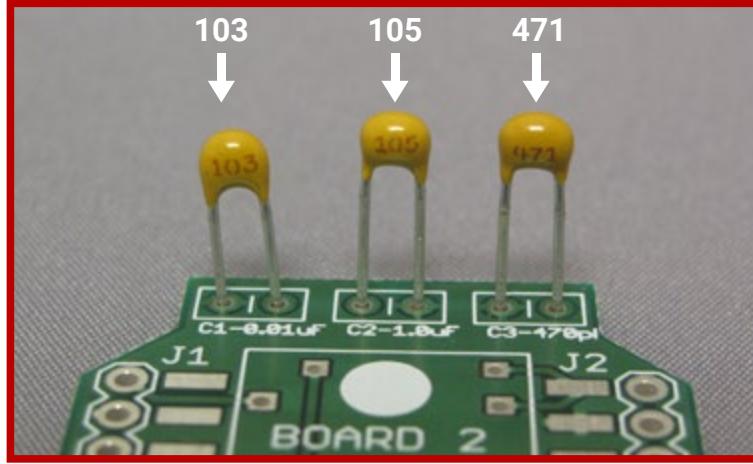
10.



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



01.

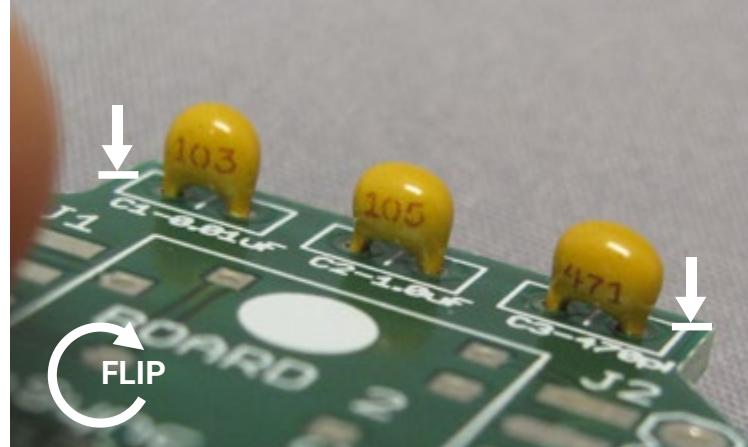


| BOARD 2 |
|---------|
| 1 |
| 7 |
| 8 |
| 9 |

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



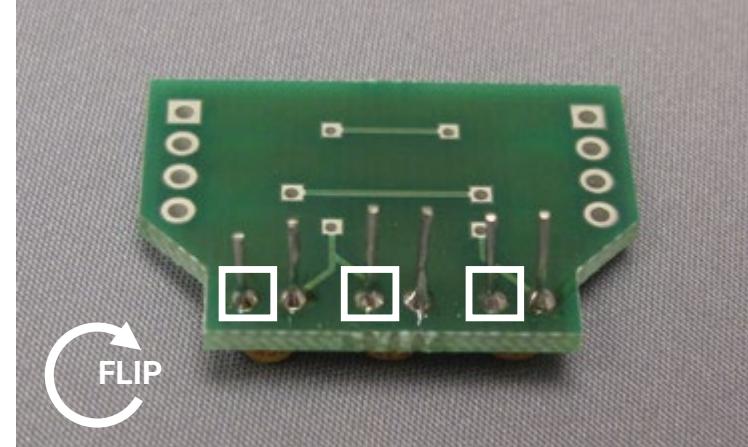
03.



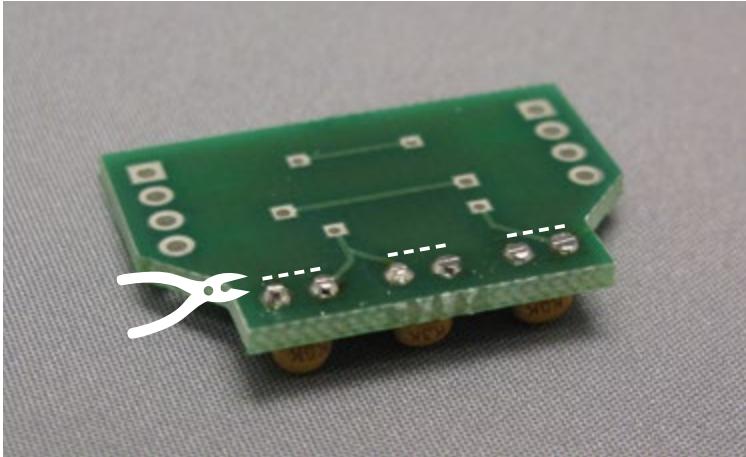
i NOTE: Check that component is flush to the board

23

04.



05.

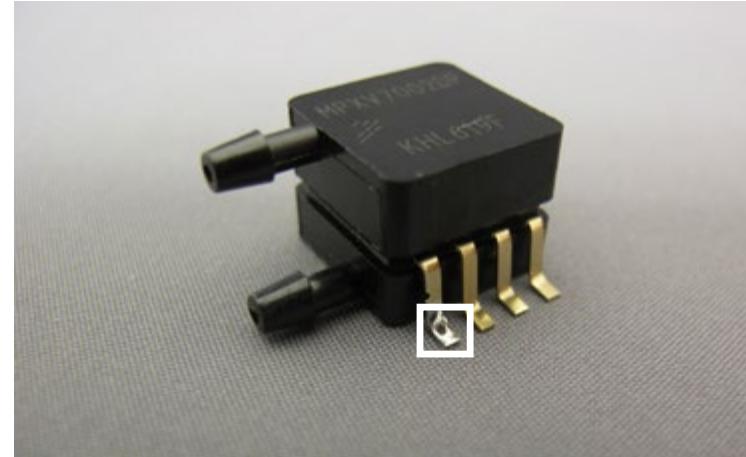


6

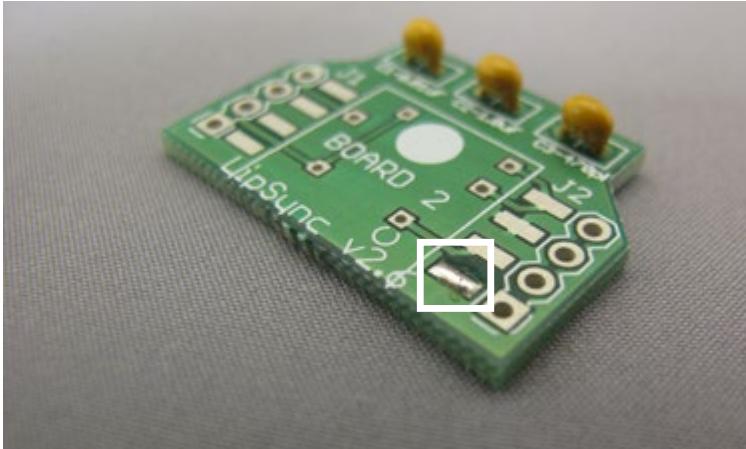


x 1

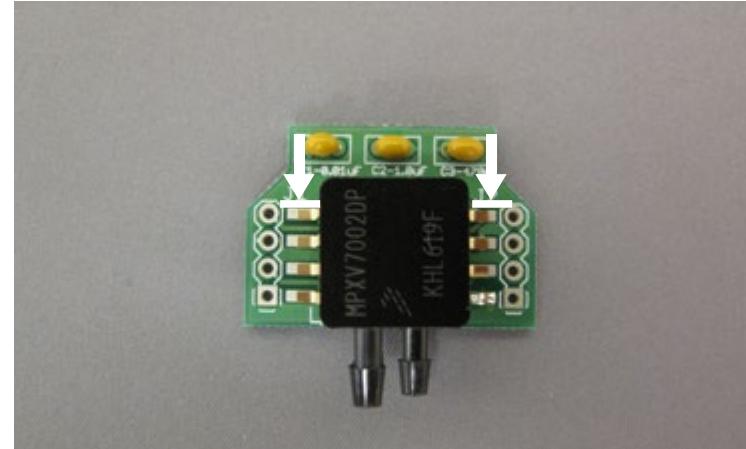
06.



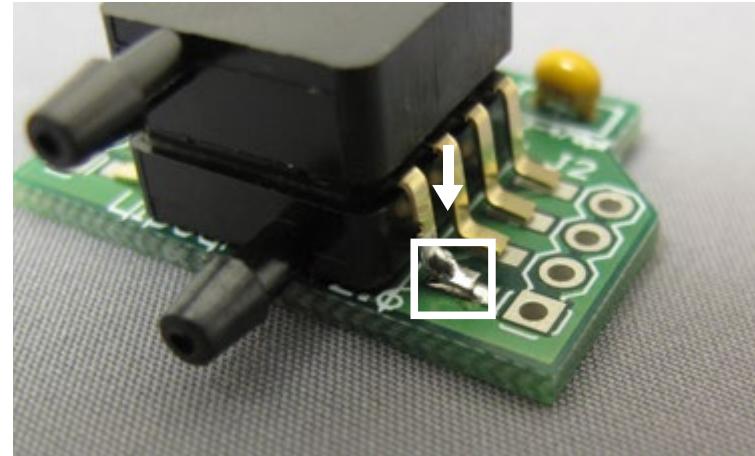
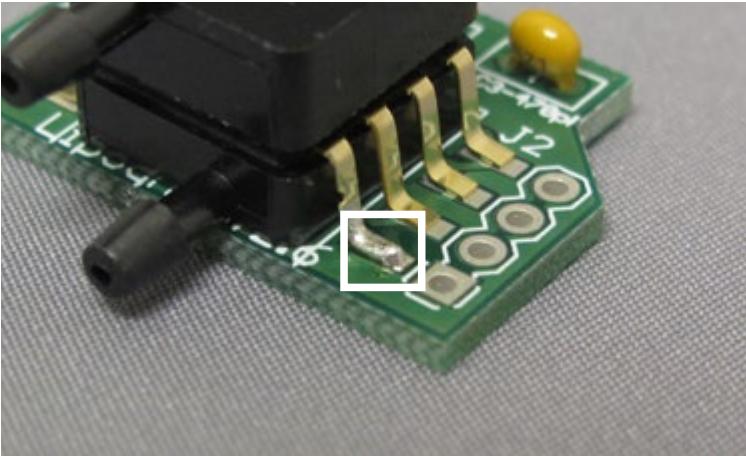
07.



08.

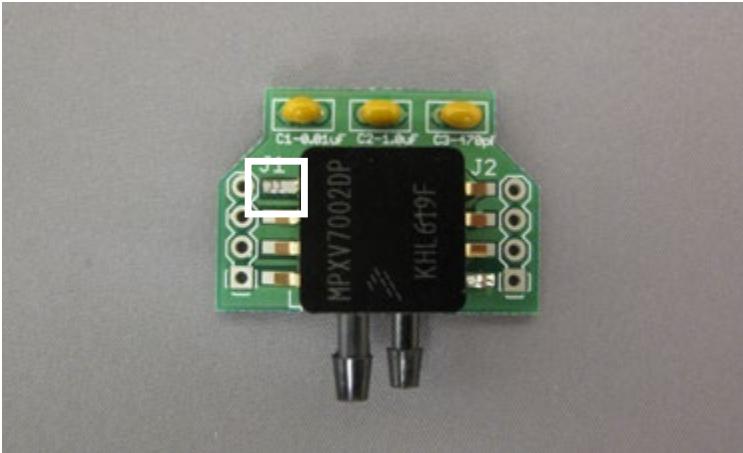


09.



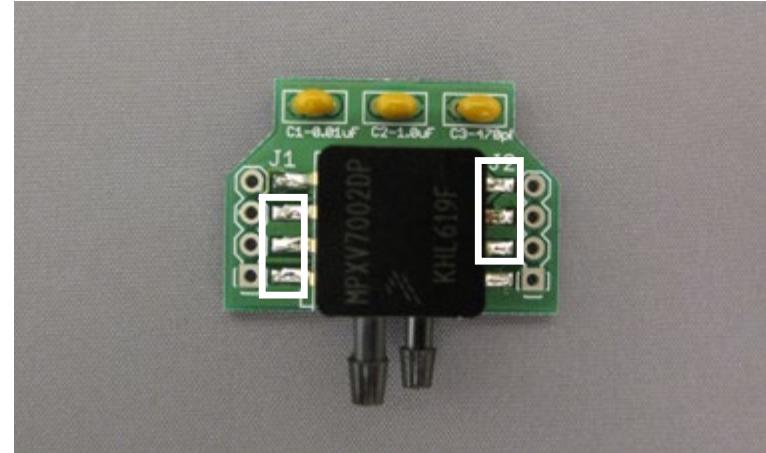
i NOTE: Place the solder tip on the lead to reflow the solder on the two components. The pressure sensor should "drop" onto Board 2.

10.

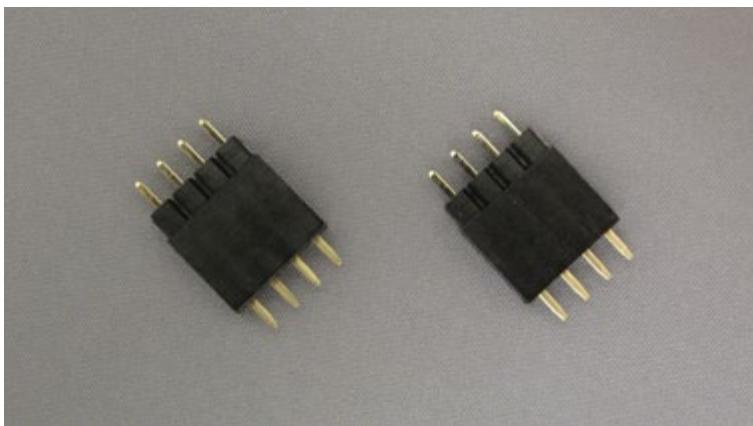
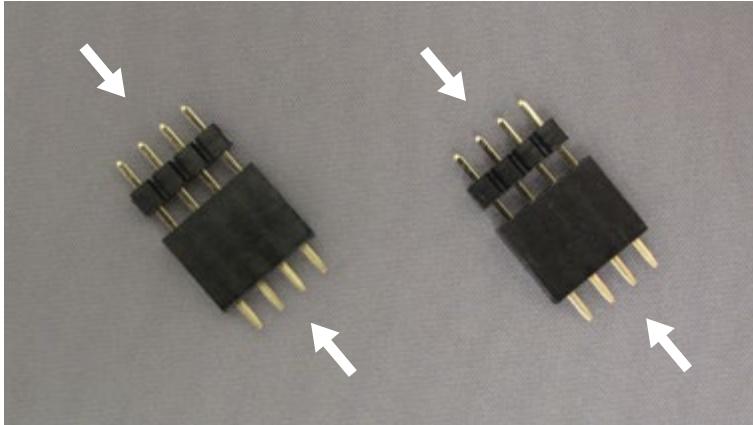
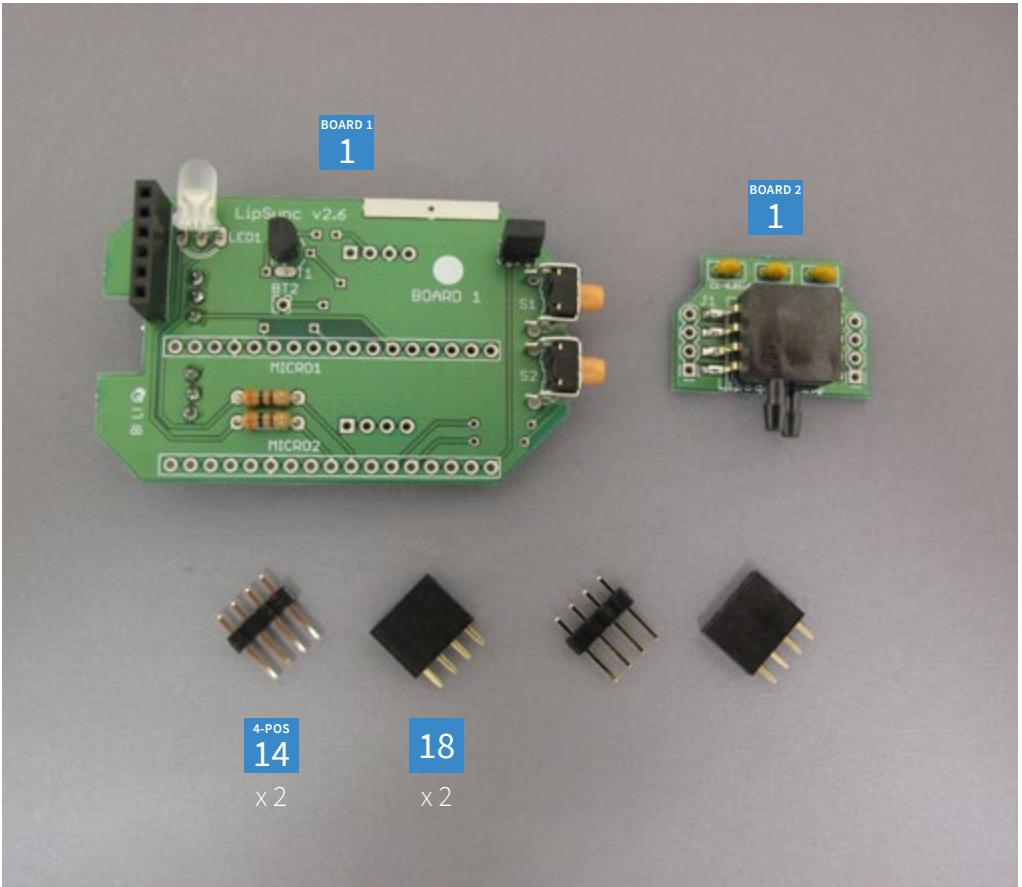


x 7

11.



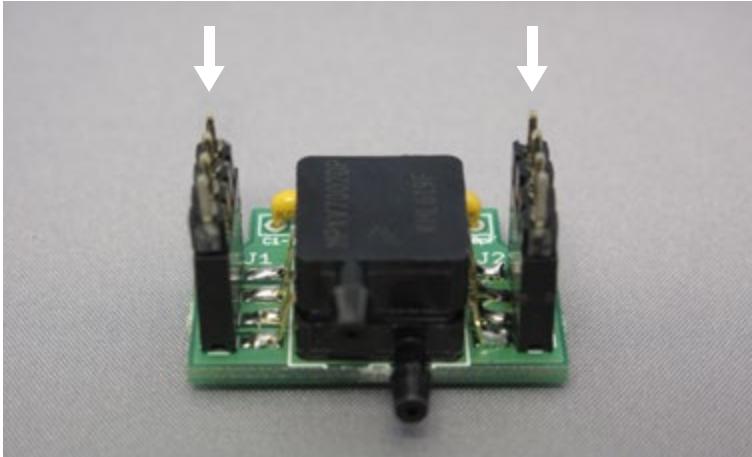
Part 4



01.

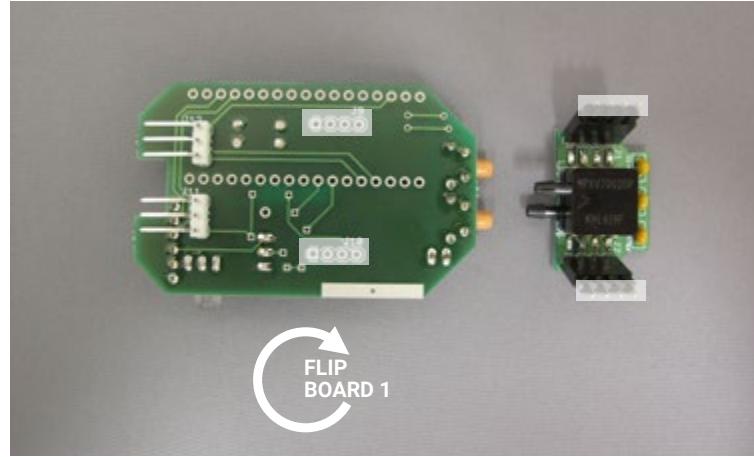
4-POS
14
x 2
18
x 2

02.



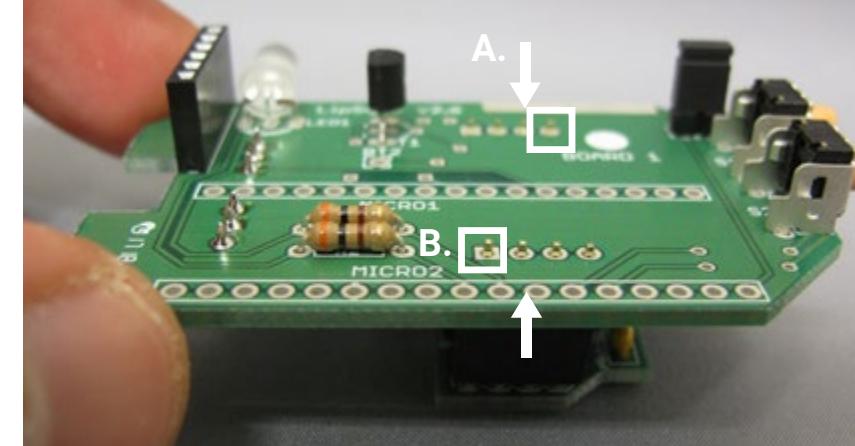
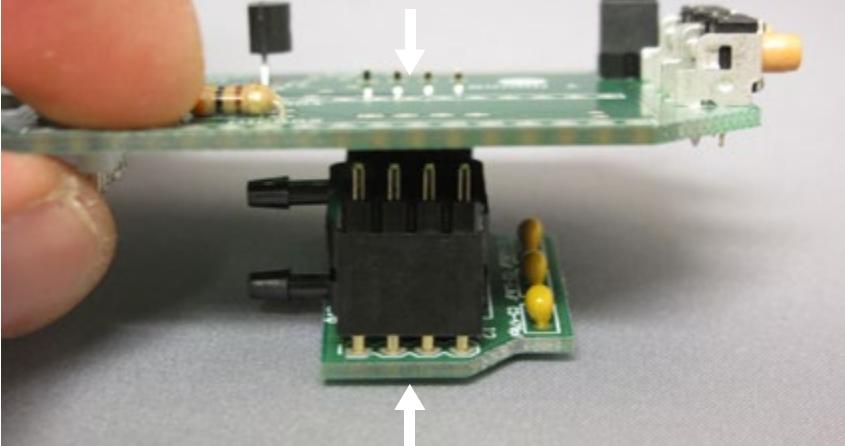
BOARD 2
1
HOLE
J1
HOLE
J2

03.



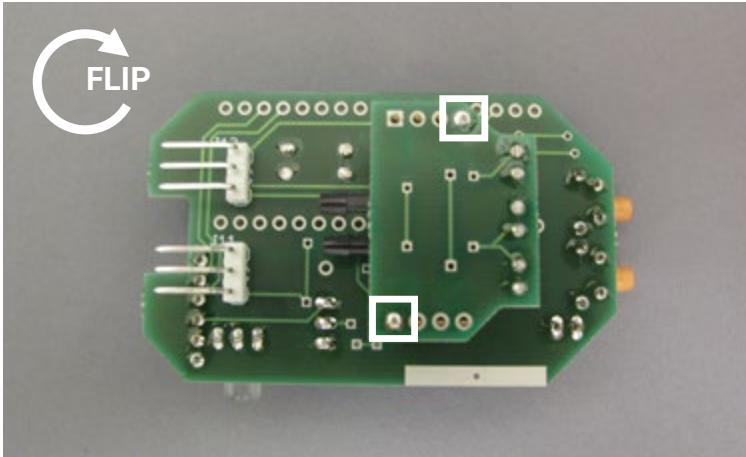
BOARD 1
1

04.

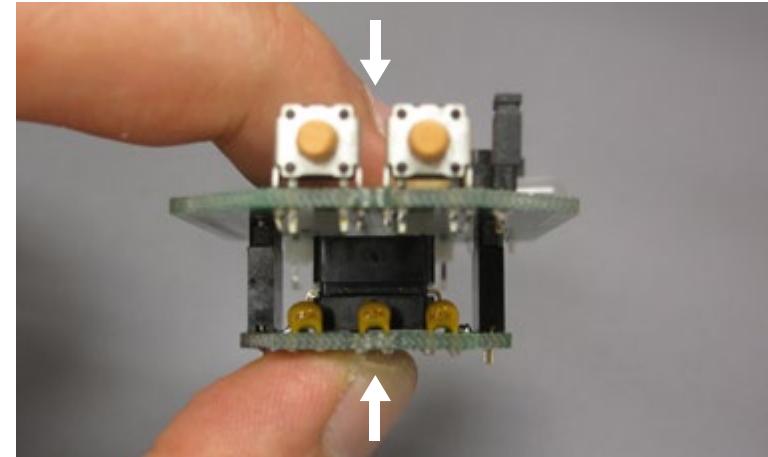


HOLE
J9
HOLE
J10
x 2

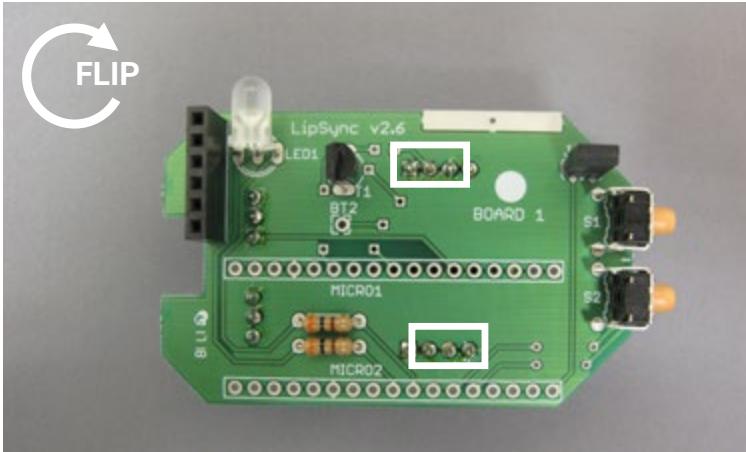
05.



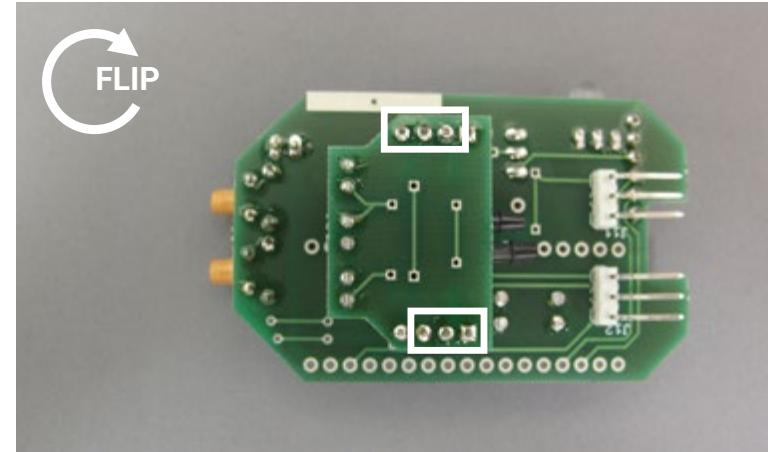
06.



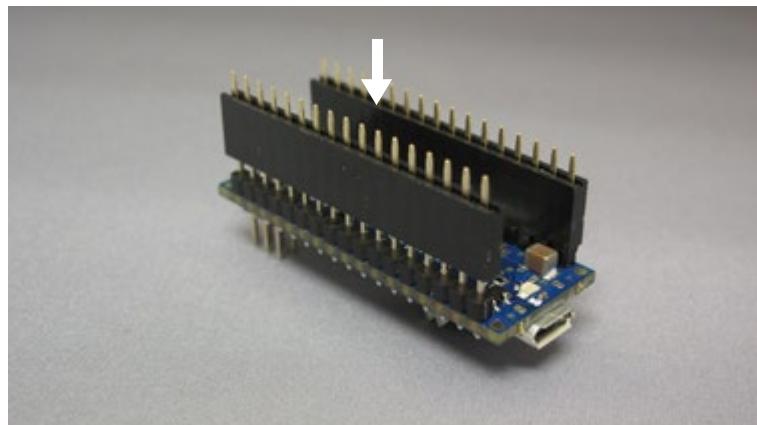
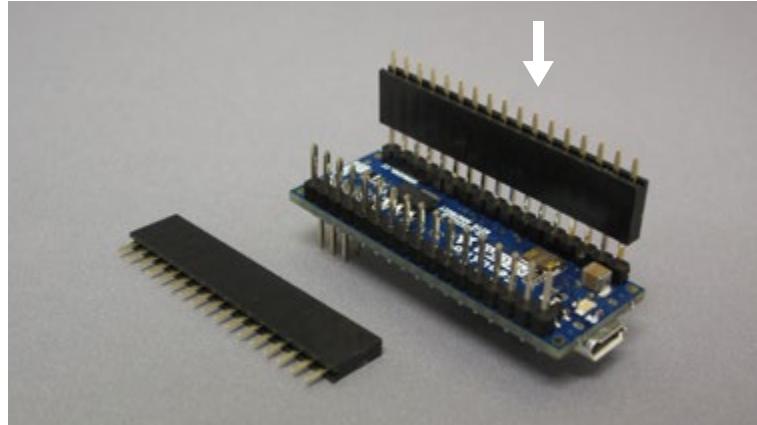
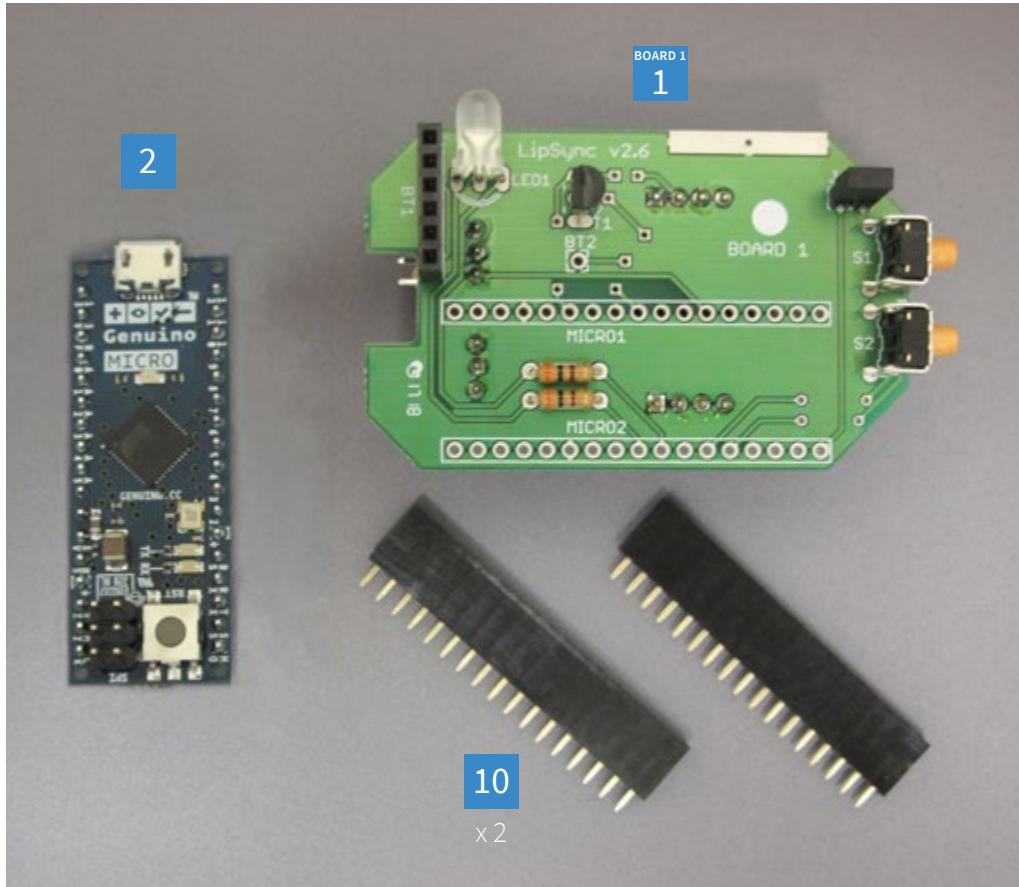
07.



08.



Part 5



01.

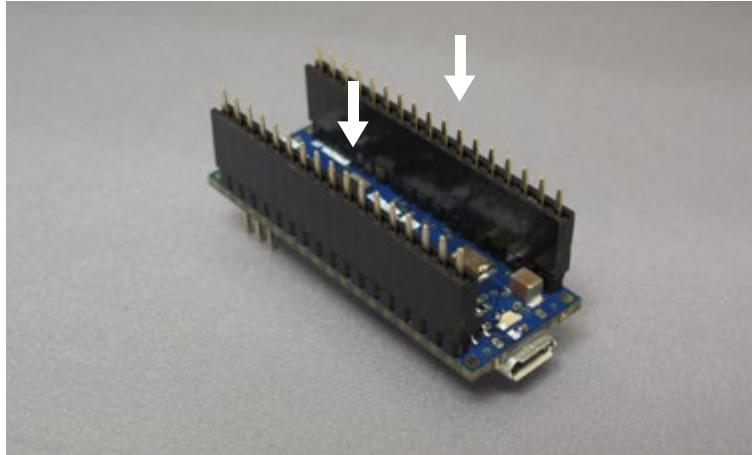
2

10

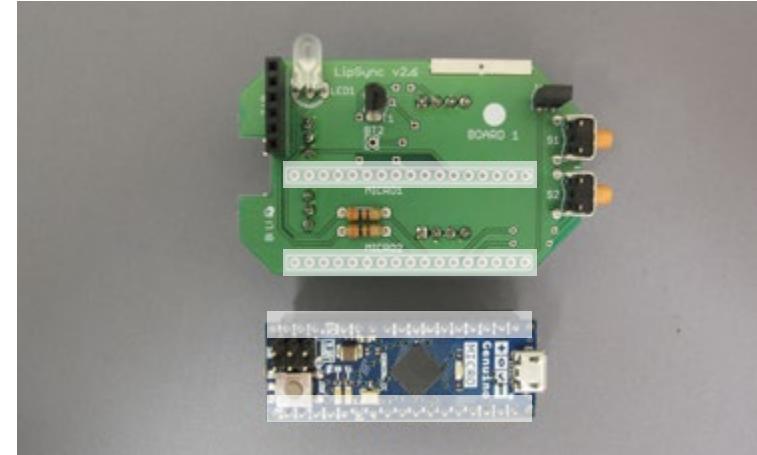
x2

BOARD 1
1
MICRO
1
MICRO
2

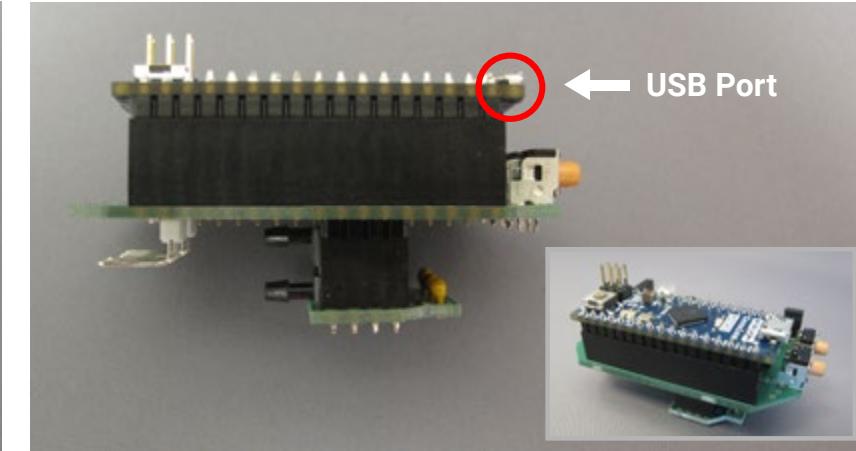
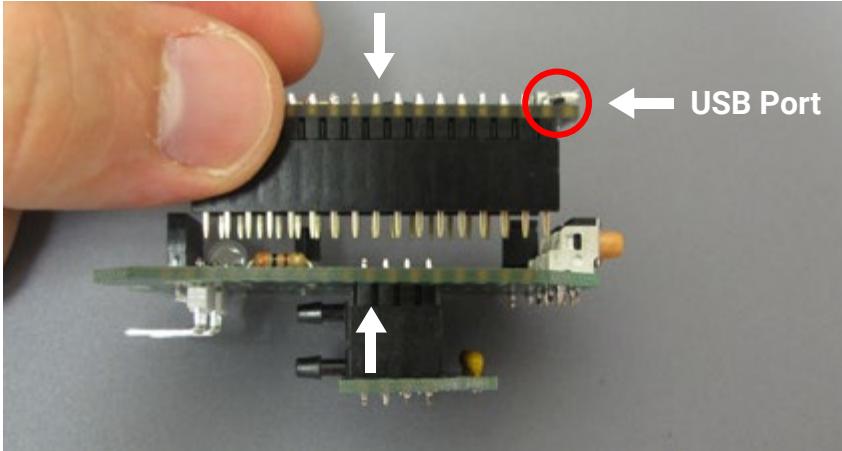
02.



03.

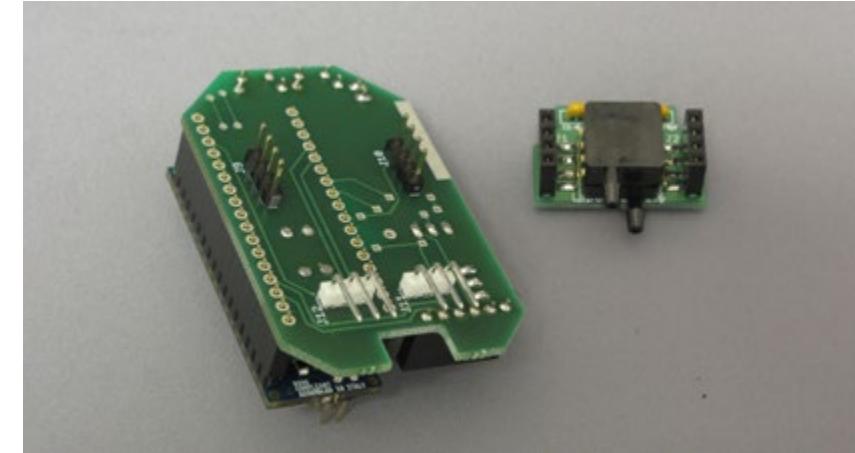
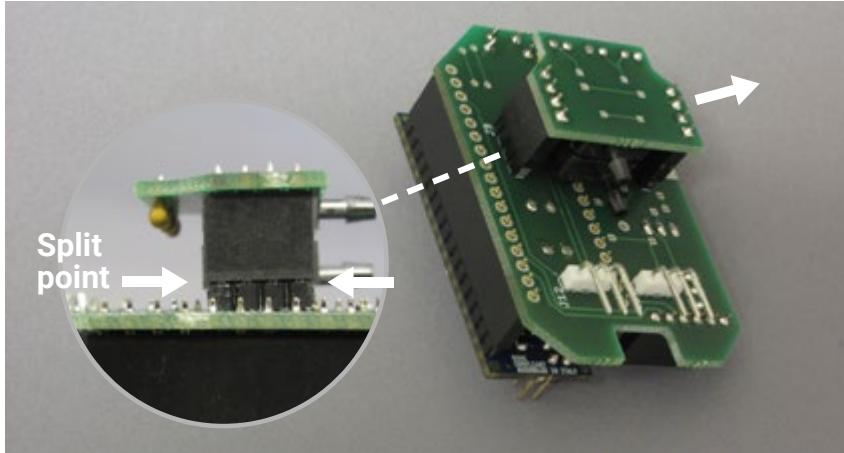


04.

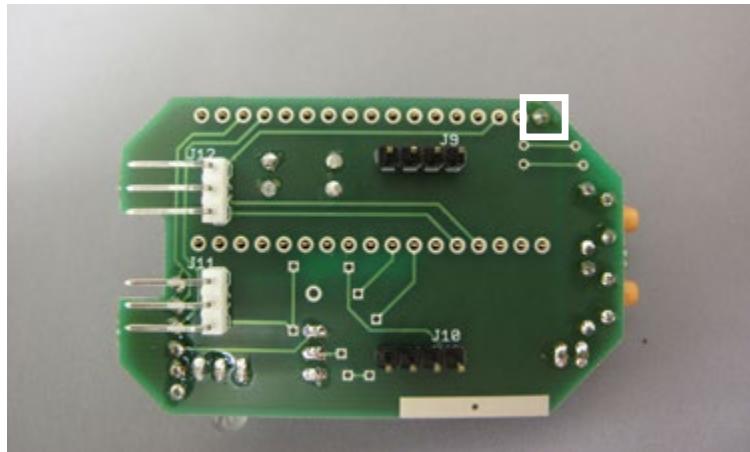


i NOTE: USB Port should be on the right side during installation

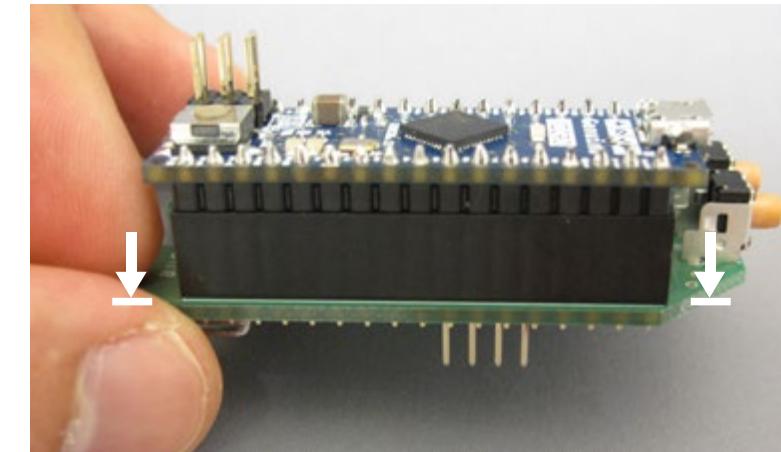
05.



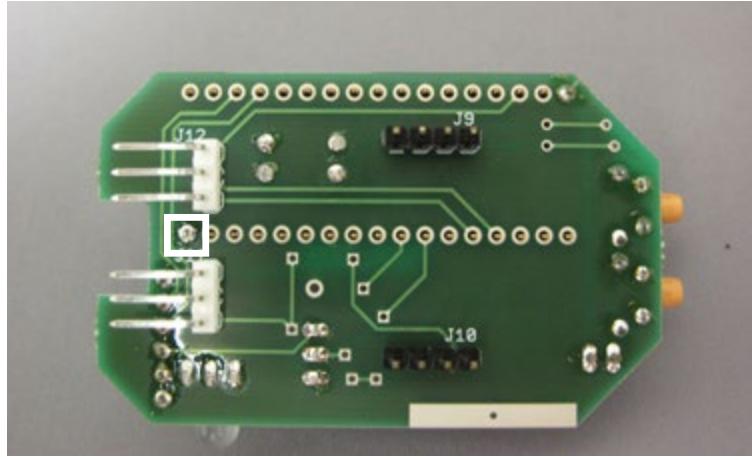
06.



07.

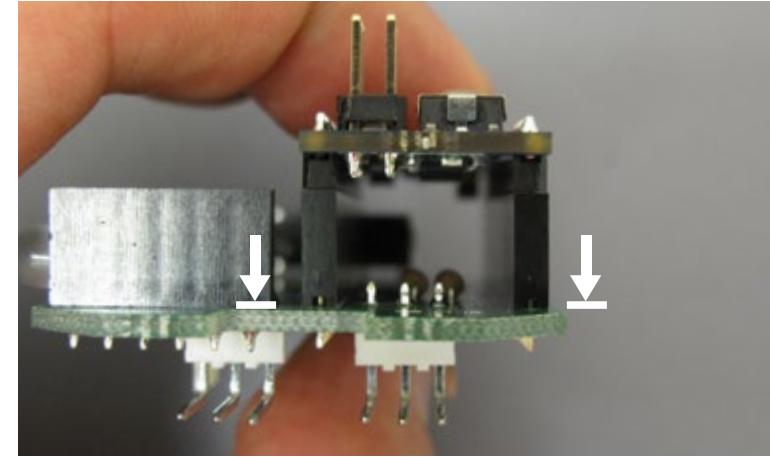


08.



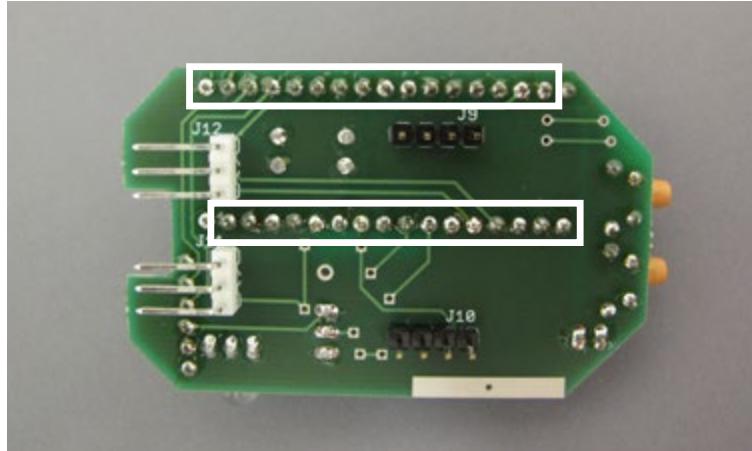
x 1

09.



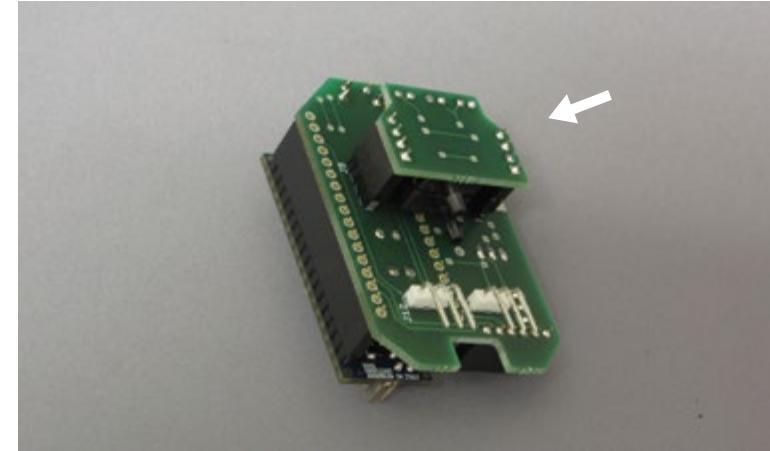
NOTE: Check that component is flush to the board

10.

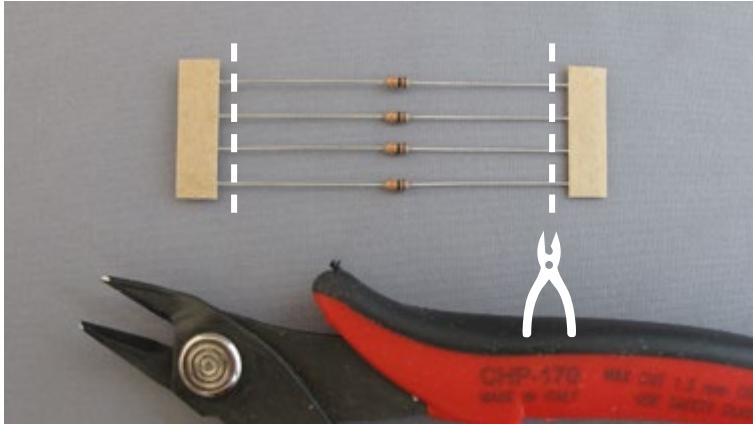
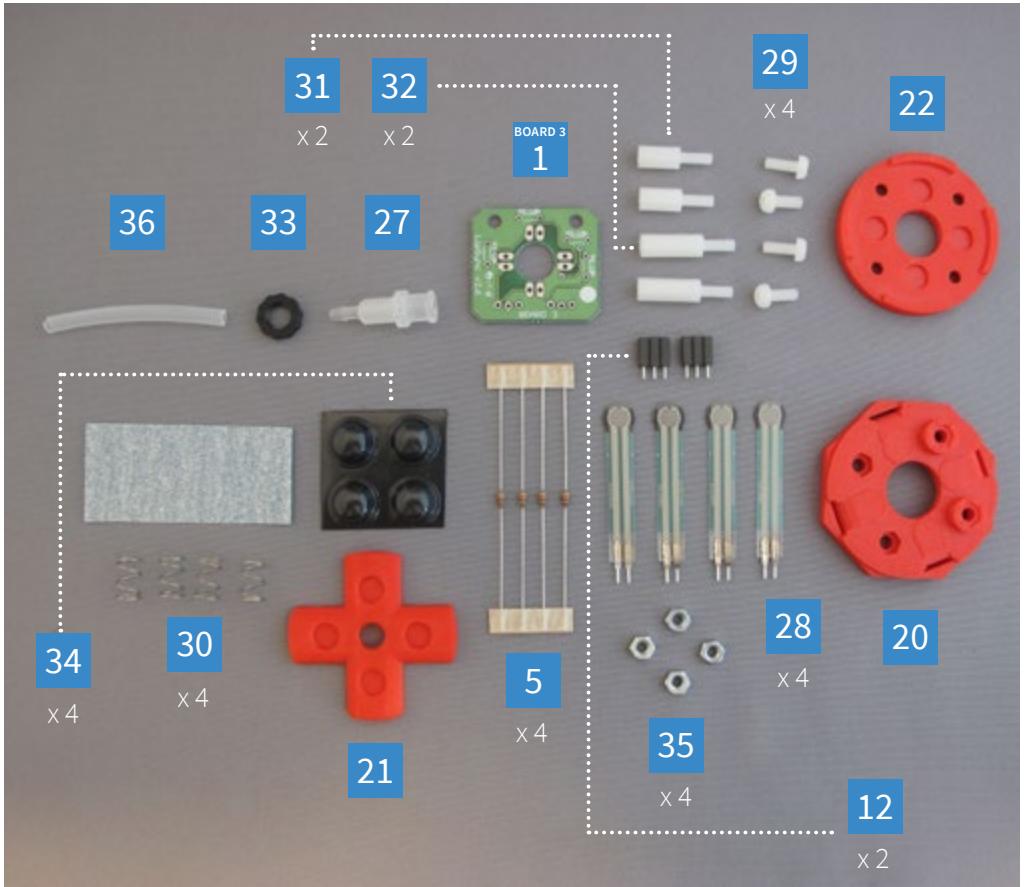


x 32

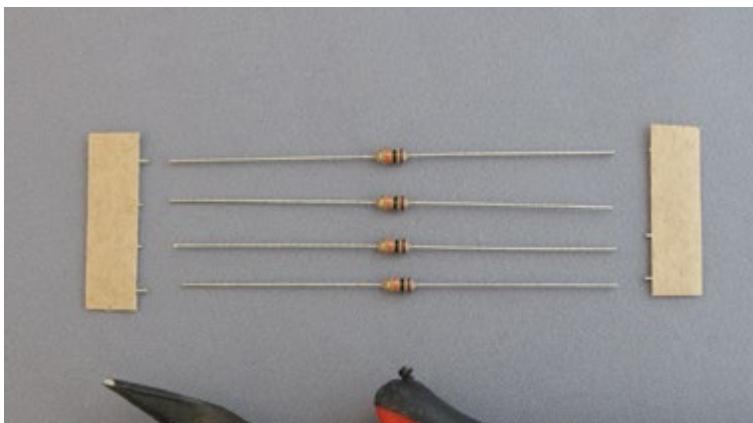
11.



Part 6

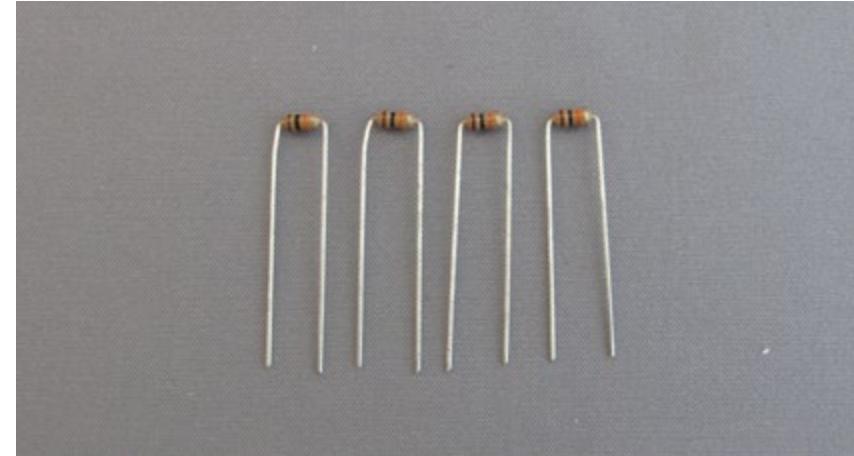
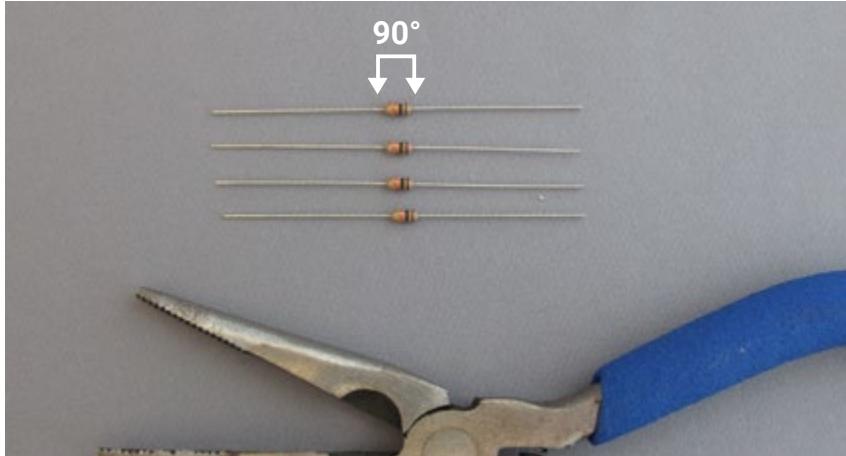


5
x 4

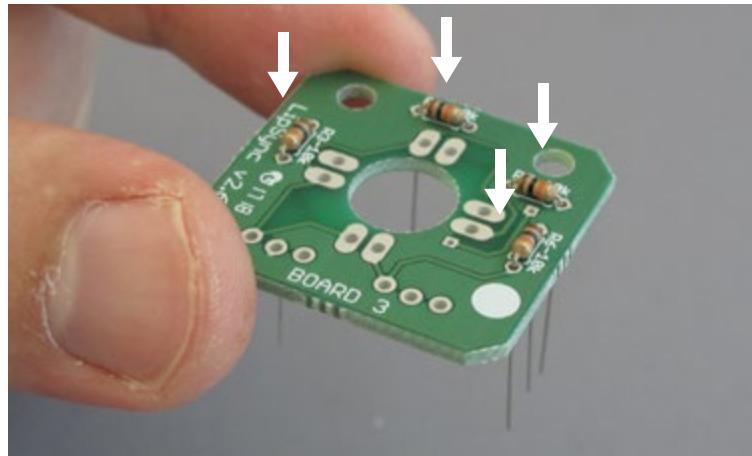


01.

02.



03.



BOARD 3

1

x 4

HOLE

R3

HOLE

R4

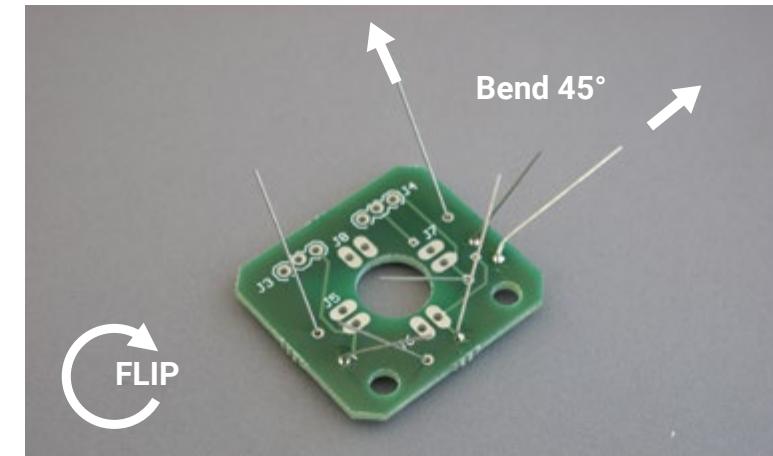
HOLE

R5

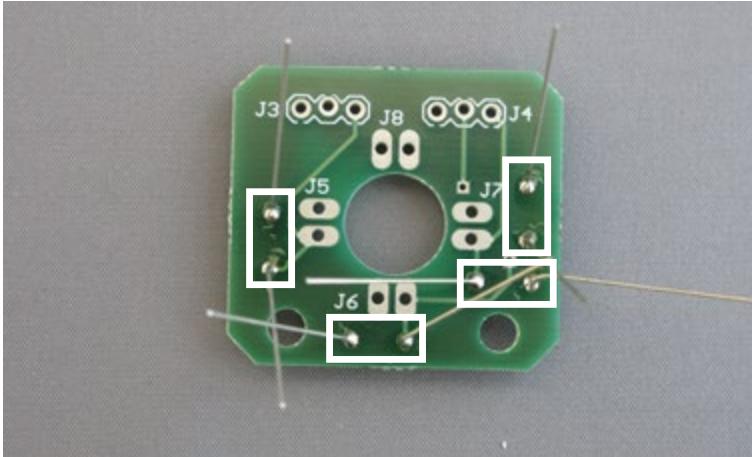
HOLE

R6

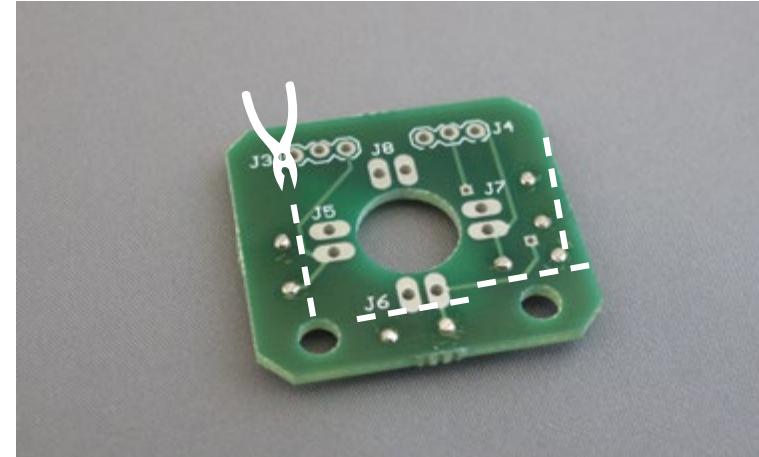
04.



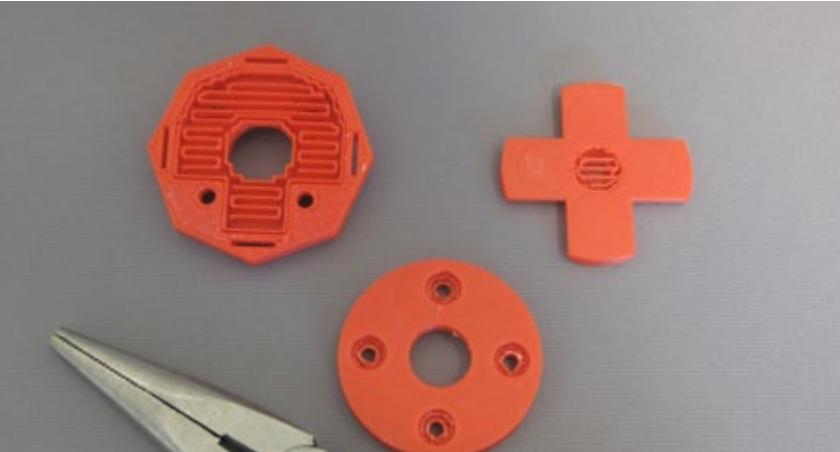
05.



06.



07.

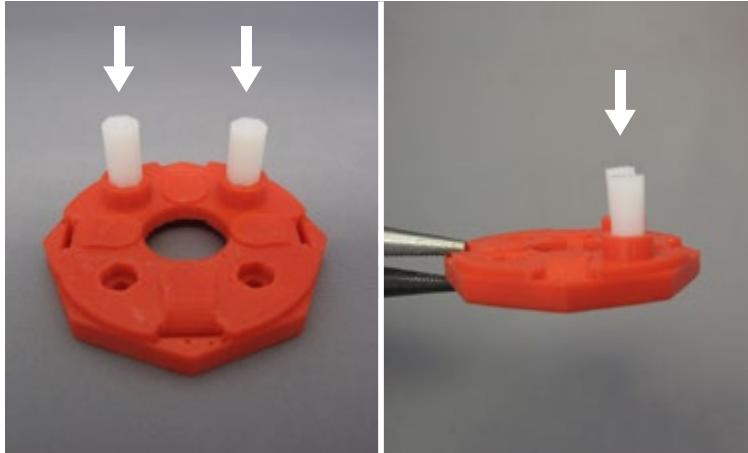


20

21

22

08.



NOTE: Insert the 10mm standoffs

31

x 2

09.



35

x 2

10.



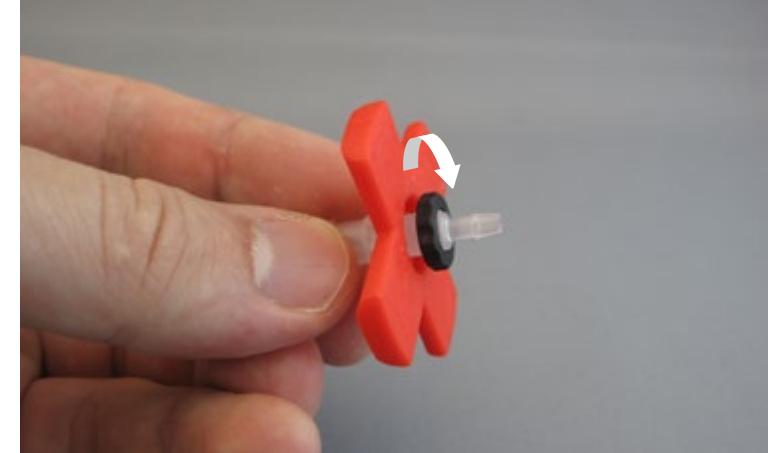
IMPORTANT:
Only add a small
DROP of superglue

11.

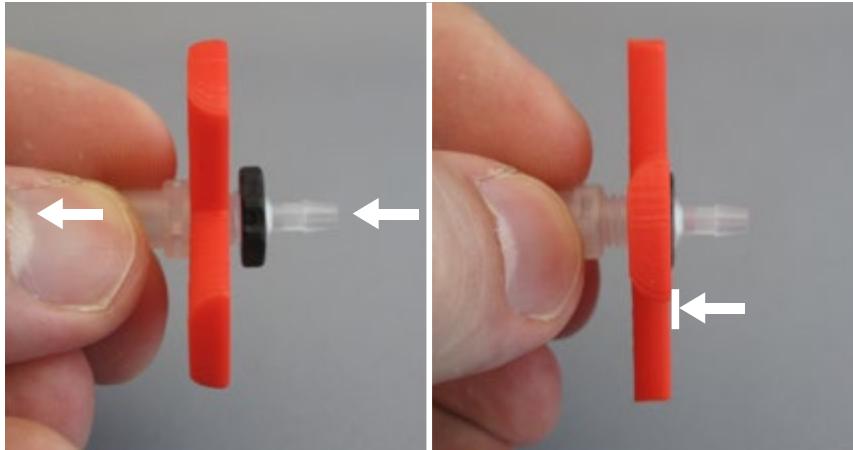


21
27
33

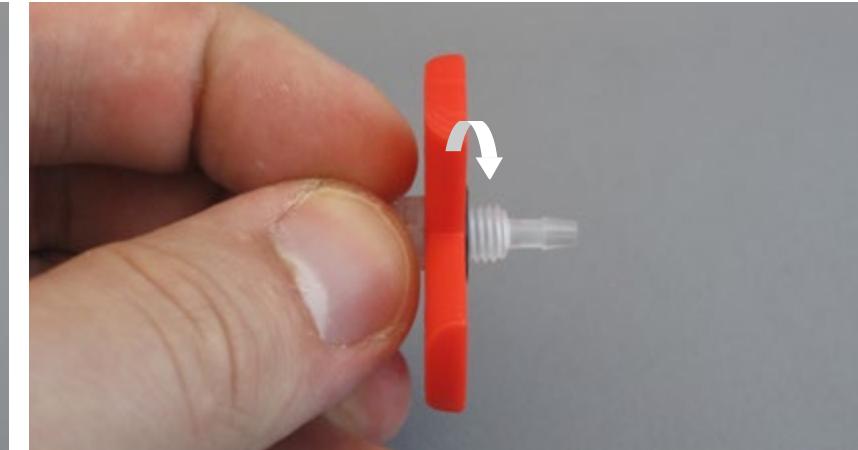
12.



13.



37



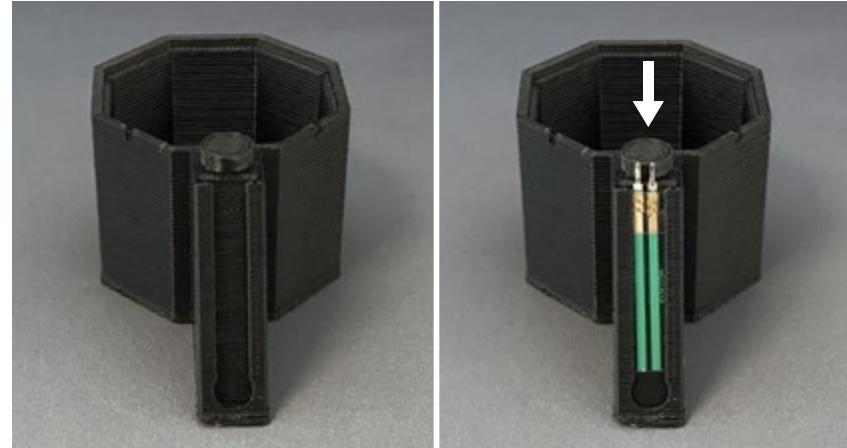
i NOTE: The luer lock nut should sit flush to the rocker. Once flushed, twist the luer lock fitting the rest of the way.

14.



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

15.

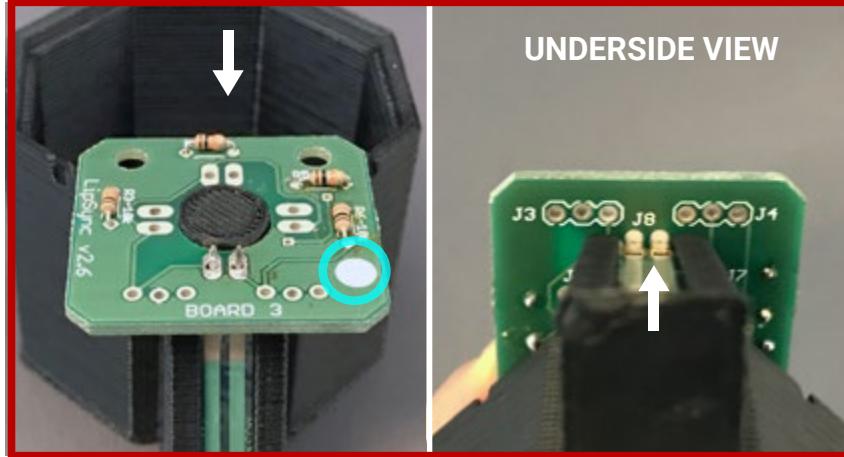


Use the joystick
stand holder
to assist with
Steps 15-19

28

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

16.

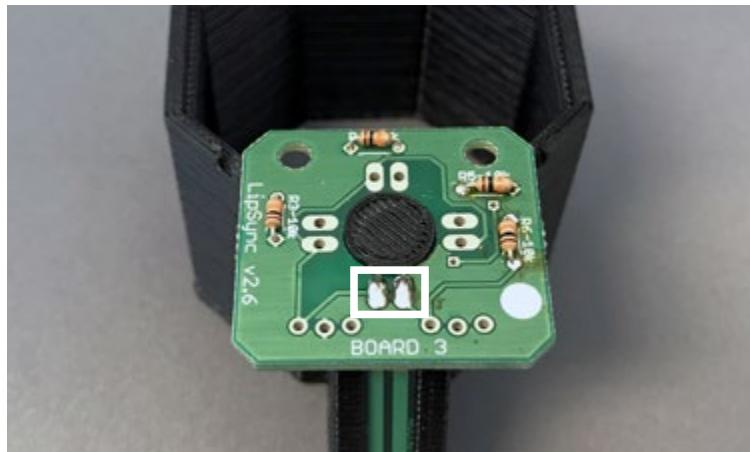


HOLE
J5

⚠️ 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

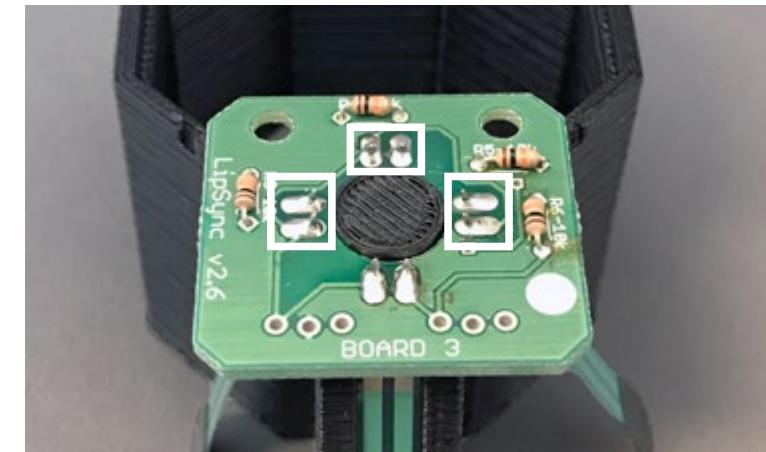
x 3

HOLE
J6

HOLE
J7

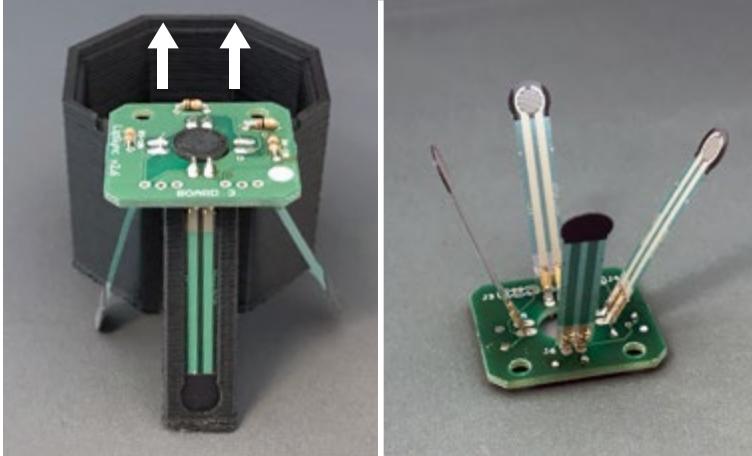
HOLE
J8

18.



Repeat steps 15-17 for the 3 remaining FSRs

19.



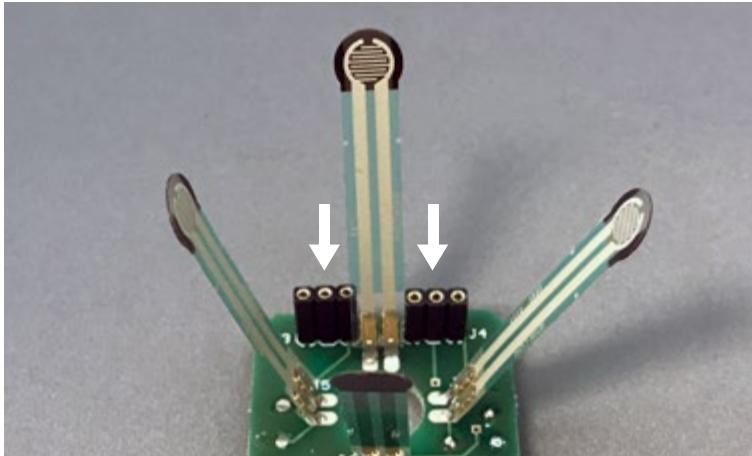
12

x 2

HOLE
J3

HOLE
J4

20.

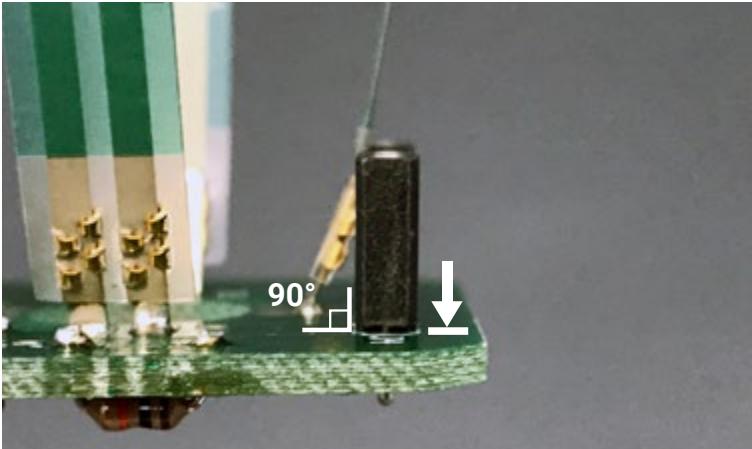


21.



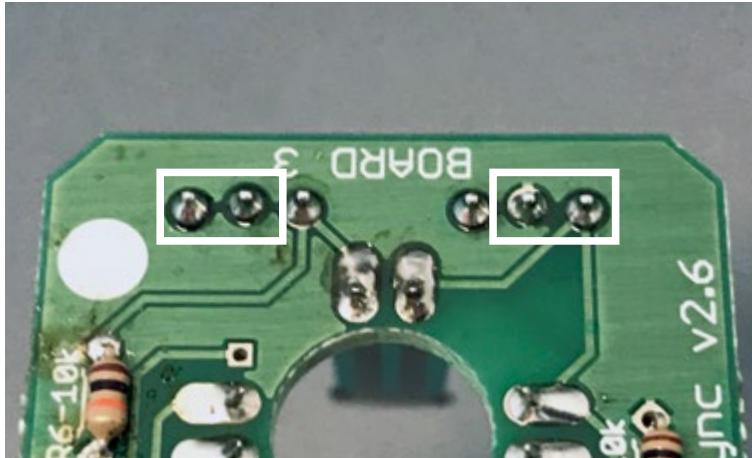
x 2

22.



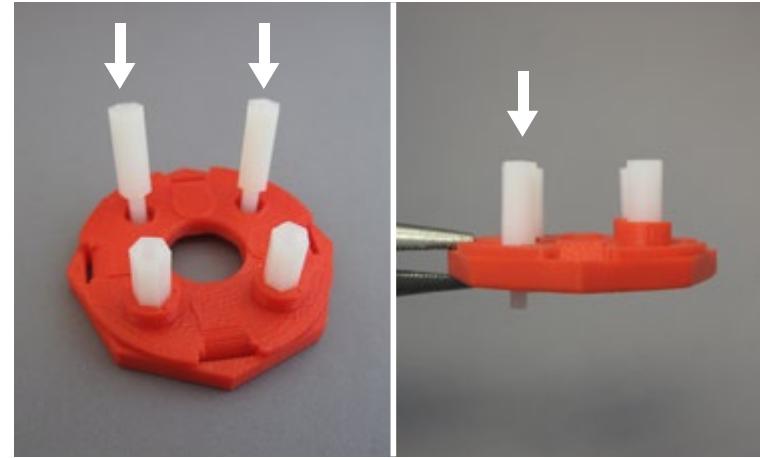
NOTE: Check that component is flush to the board

23.



x 4

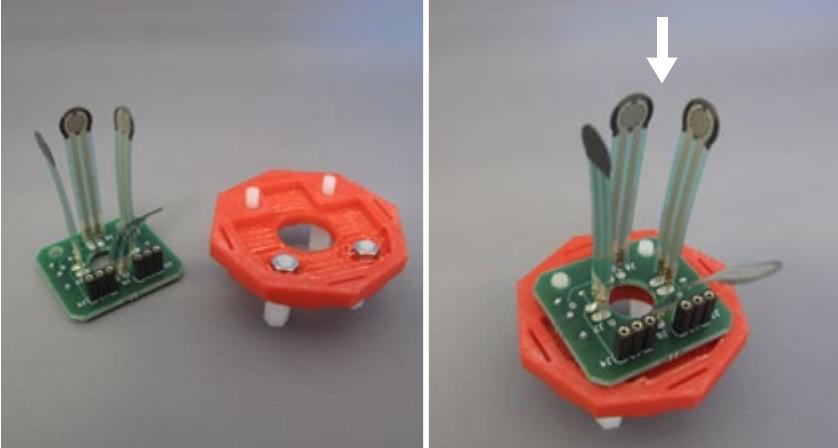
24.



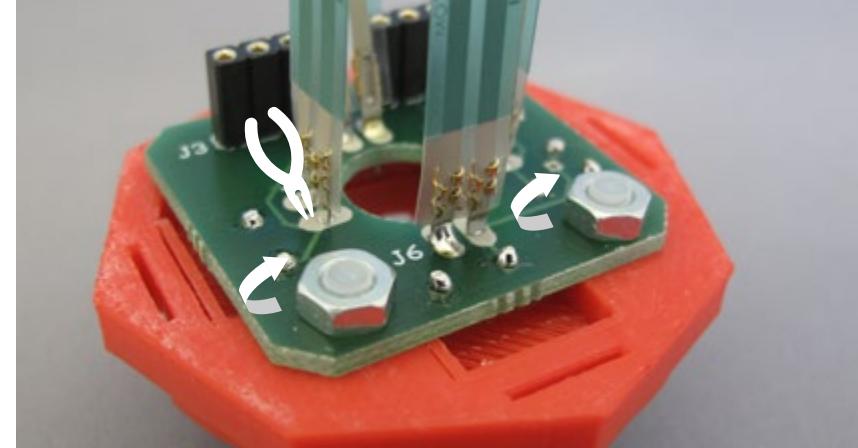
32
x 2

NOTE: Insert the 15mm standoffs

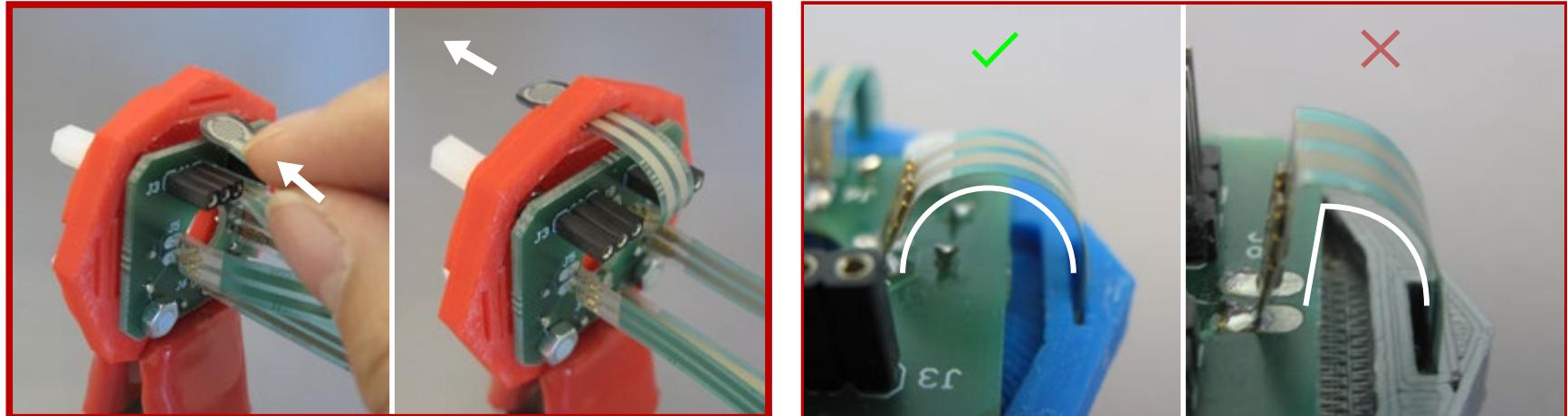
25.



26.



27.

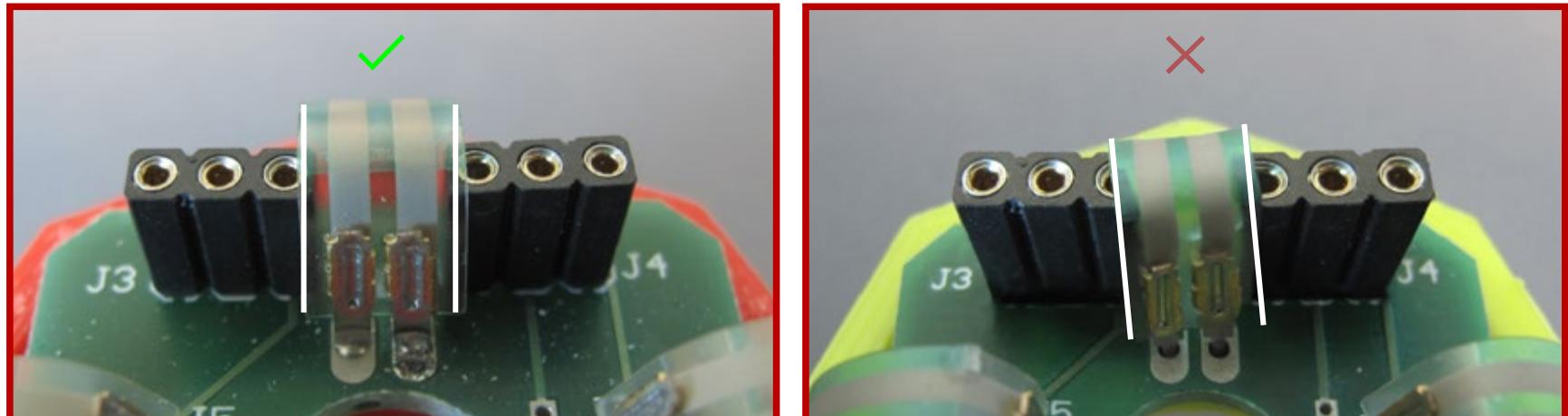


CAUTION:

Bend the FSR so it arcs

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

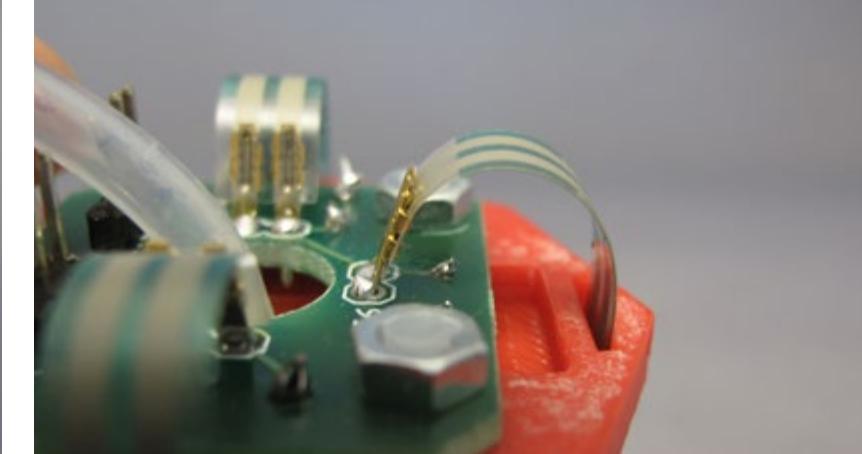
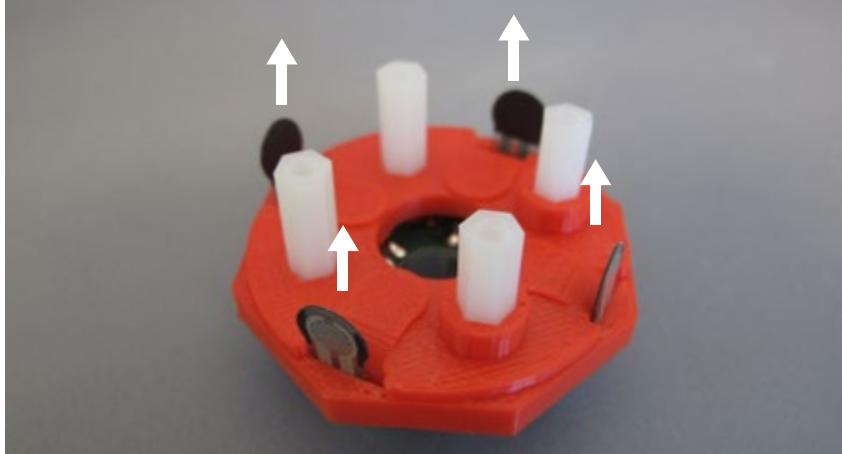
28.



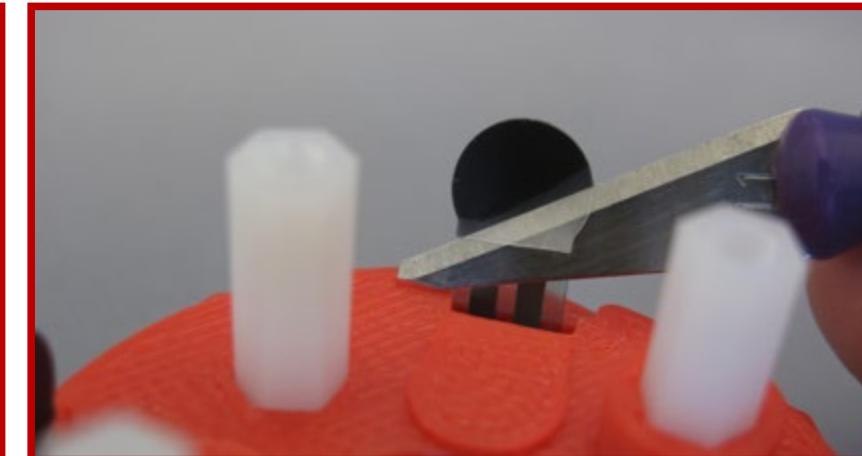
CAUTION:

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

29.



30.

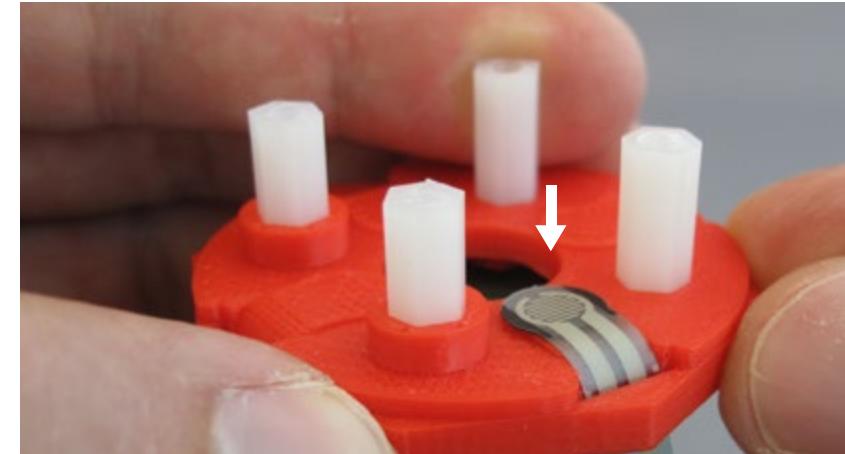


⚠ CAUTION:

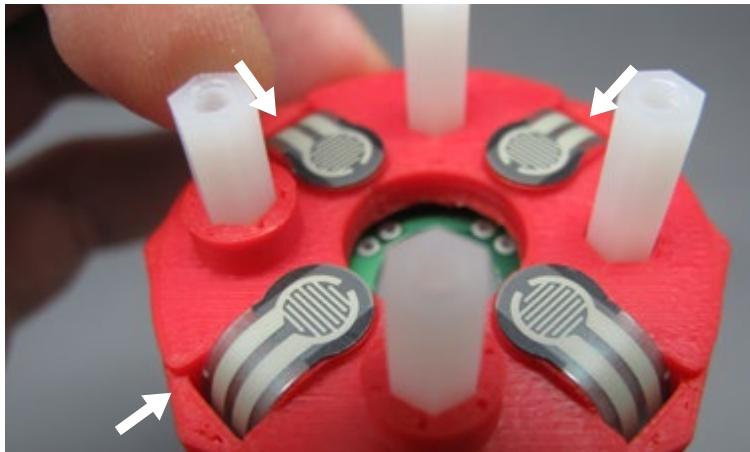
On the back of each FSR is a clear adhesive lining over the black pad.

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

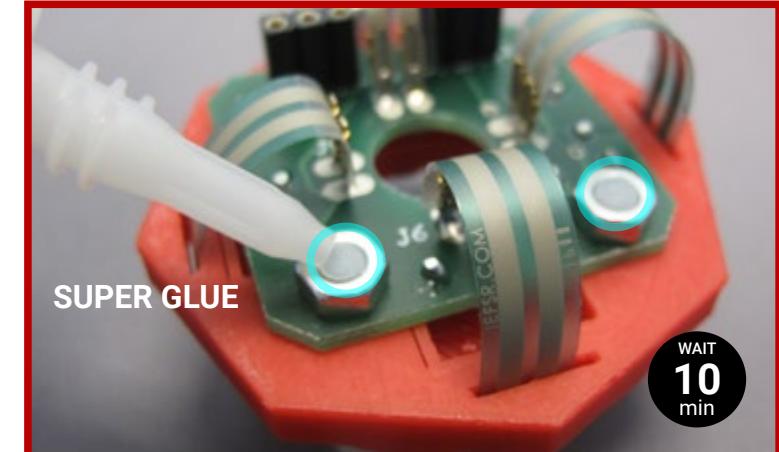
31.



32.

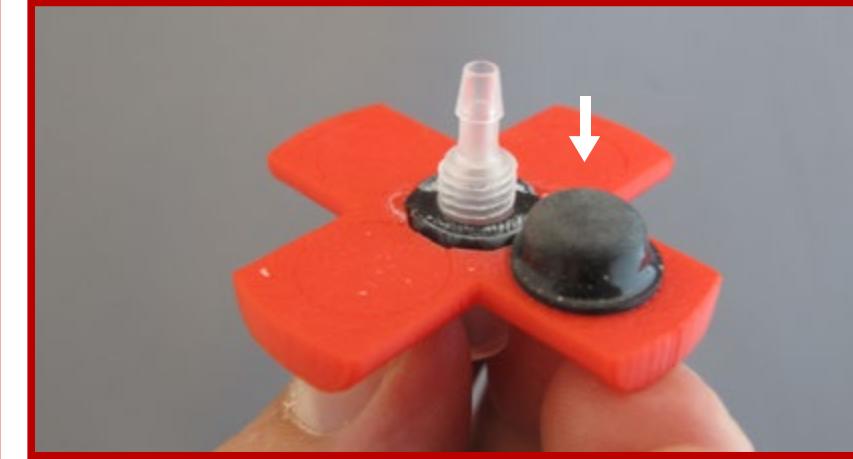
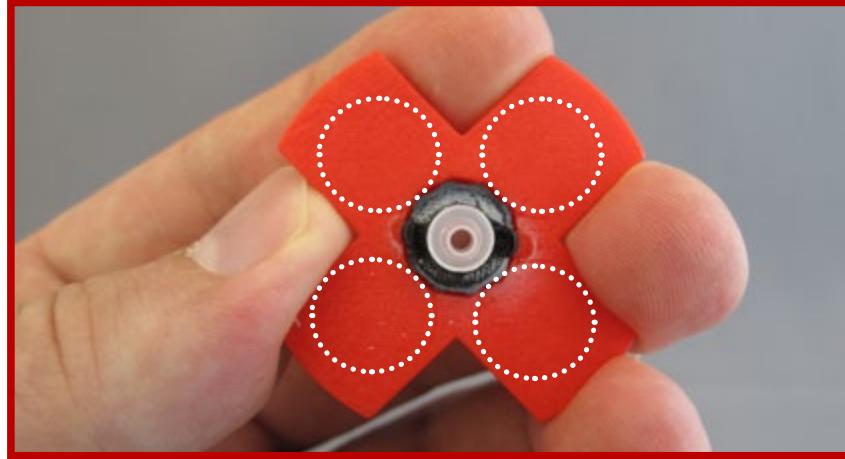


33.



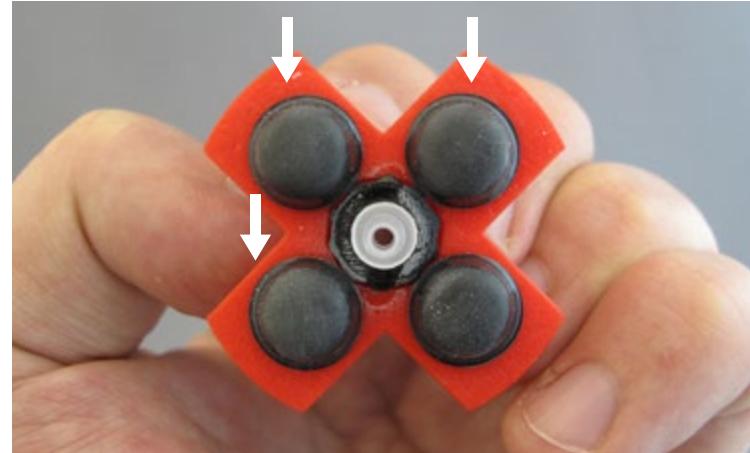
IMPORTANT: Only add a small **DROP** of superglue

34.

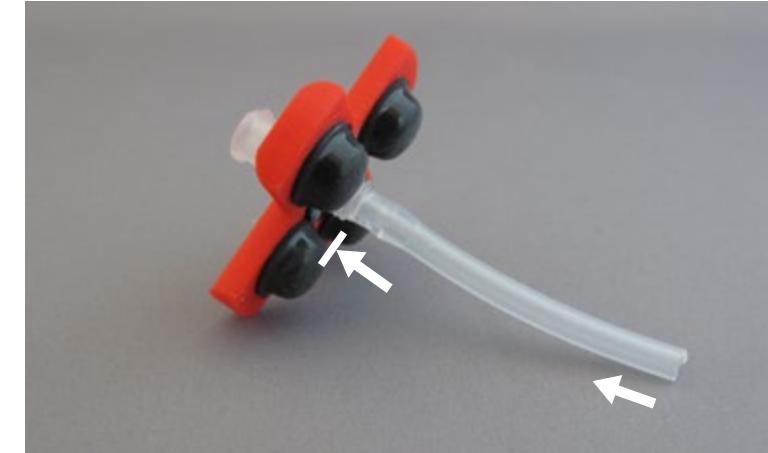


IMPORTANT:
On the flat side of
the rocker are 4
circular outlines.
Place a bumper
directly on each
outline.

35.

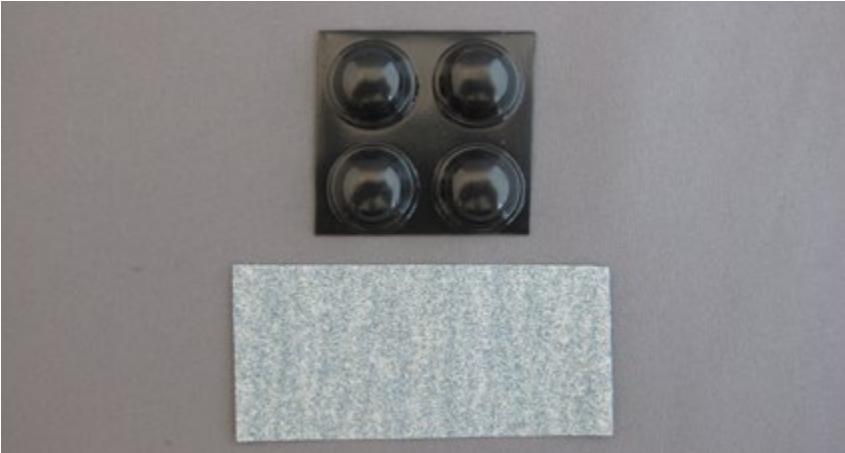


36.



36

37.



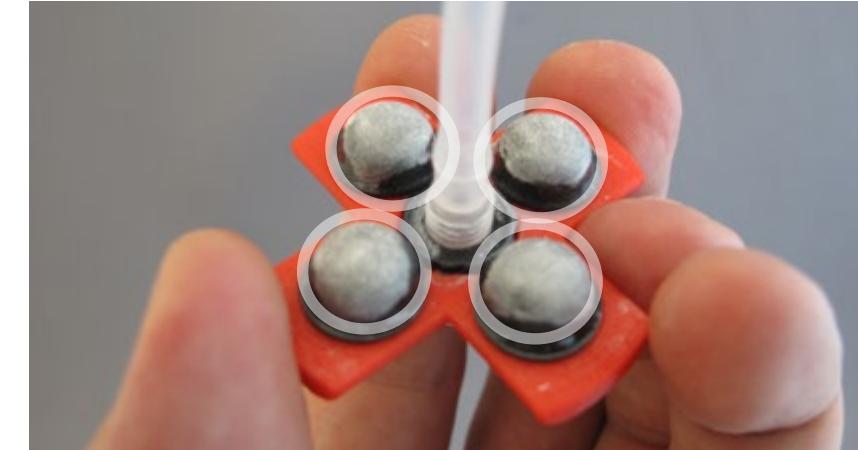
34

x4

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

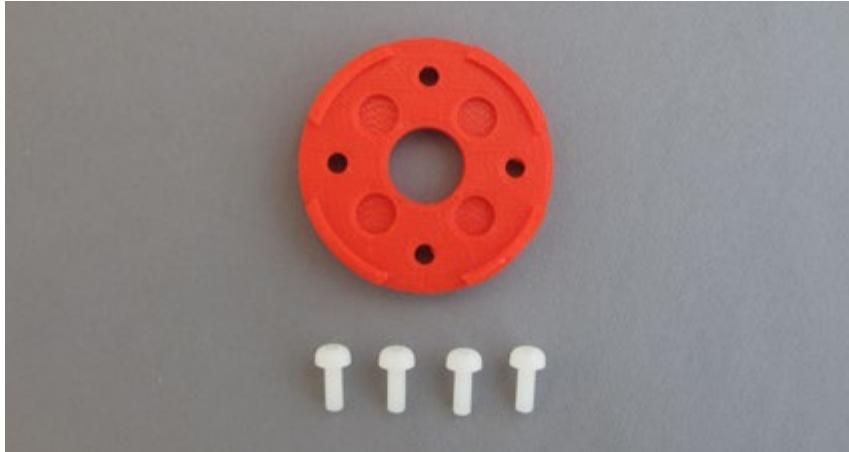


38.



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

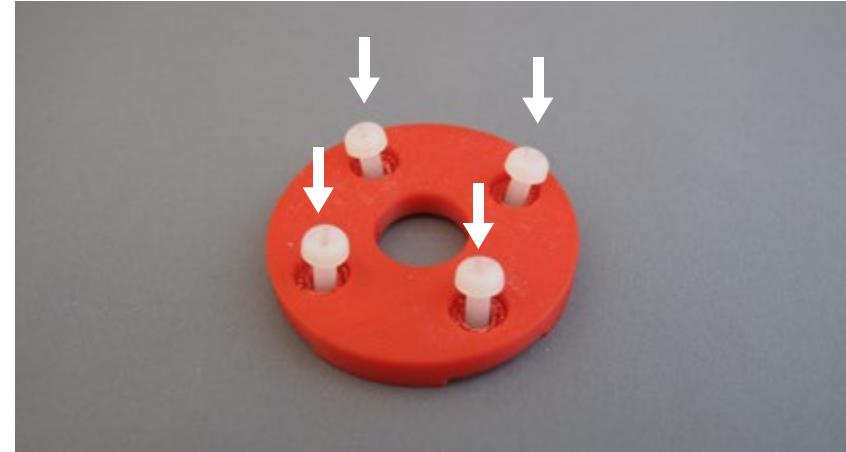
39.



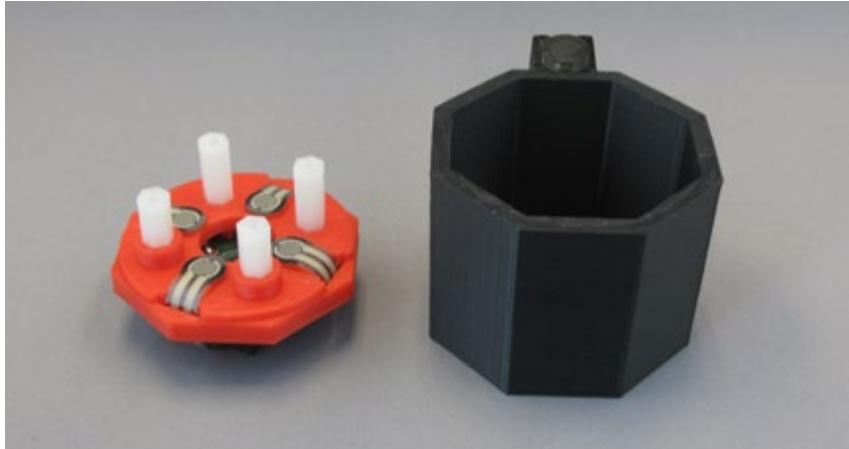
22

29

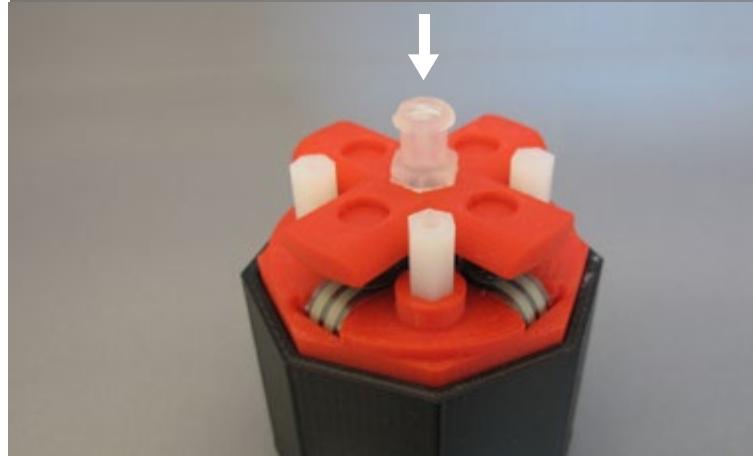
x 4



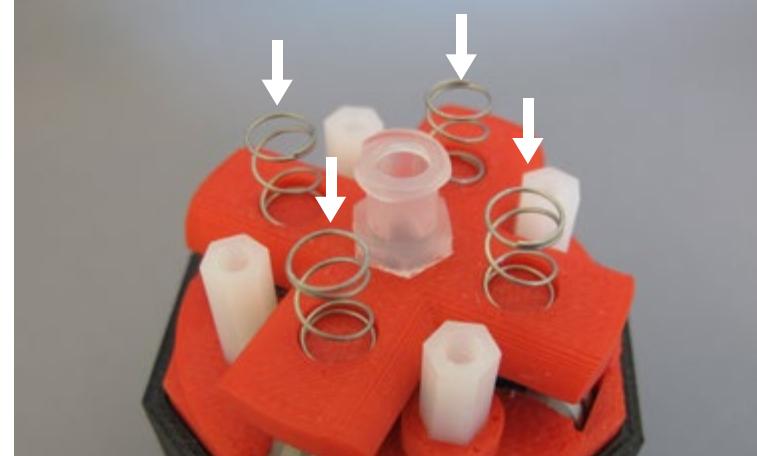
40.



41.



42.

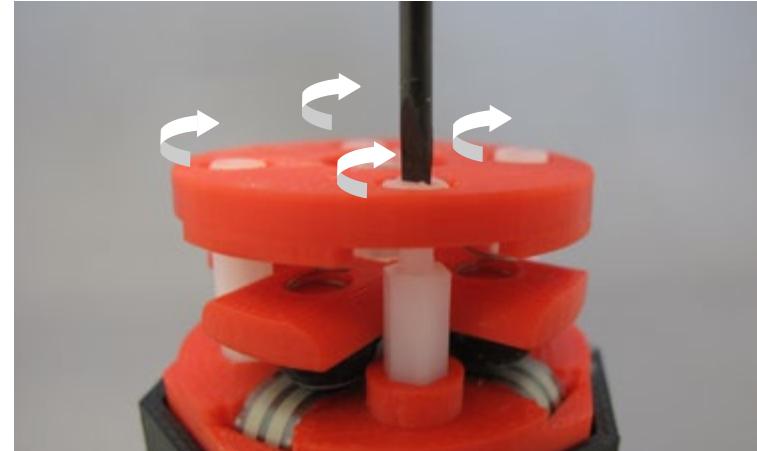


30
x 4

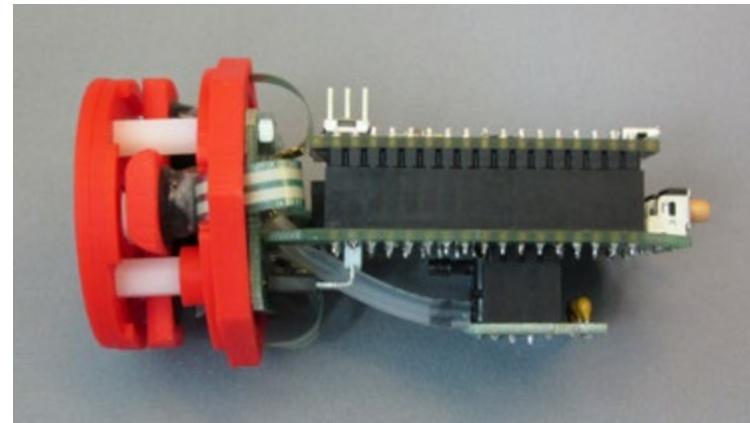
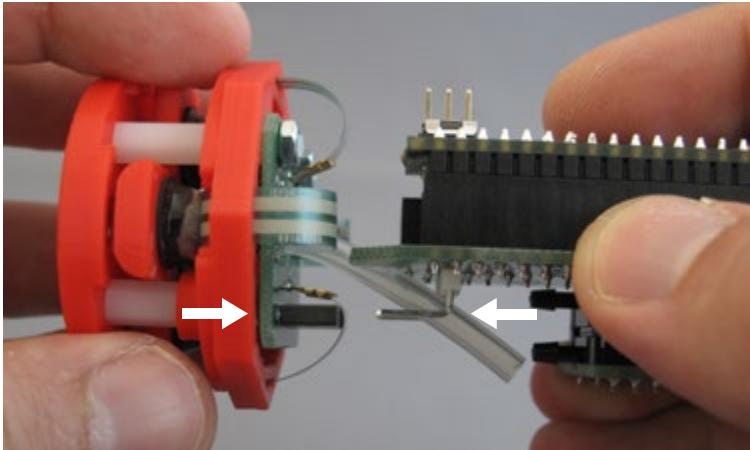
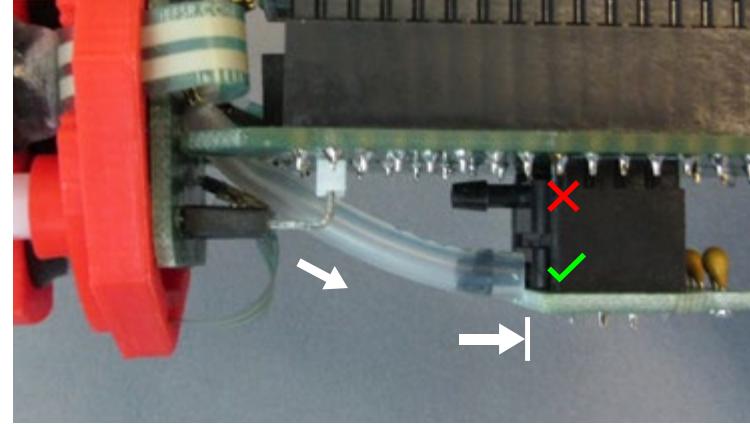
43.



44.



45.



46.

47.

Part 7



23
37

01.



40
42

02.



NOTE: Tighten the cable tie until snug

03.



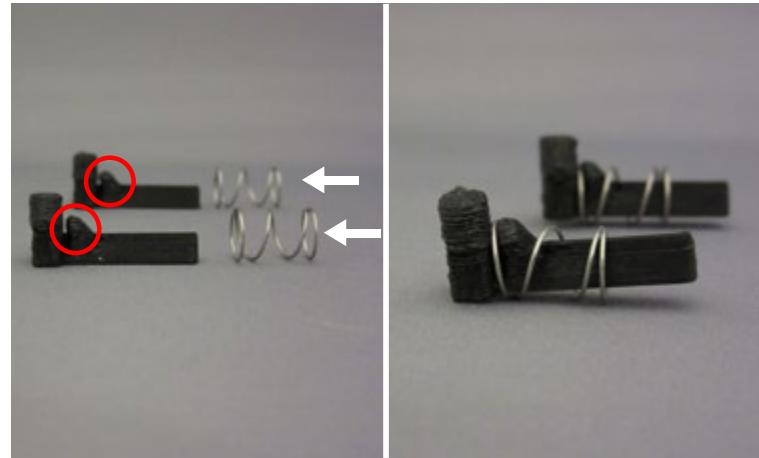
30

x 2

24

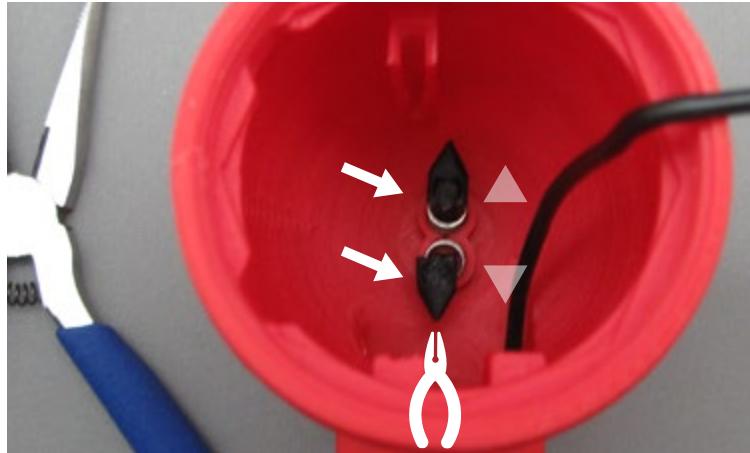
x 2

04.



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

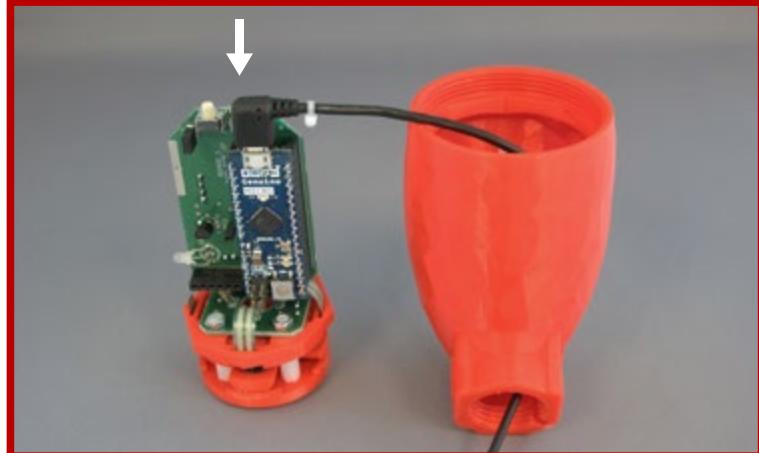
05.



IMPORTANT: Push both buttons until they click into place.

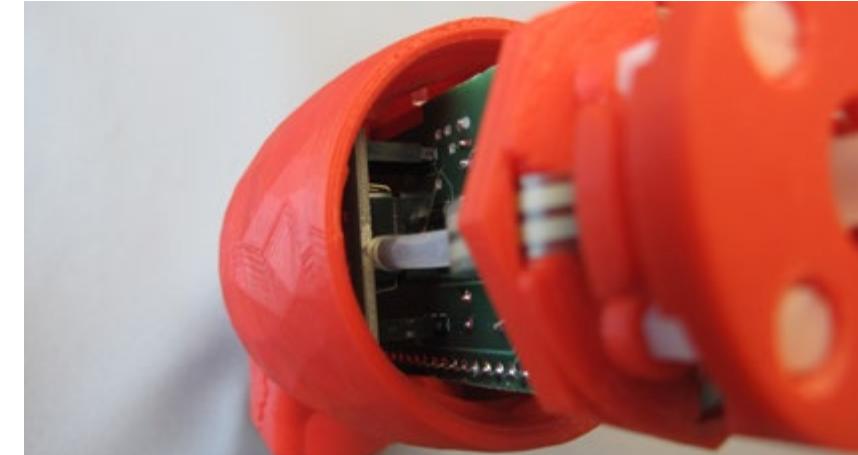
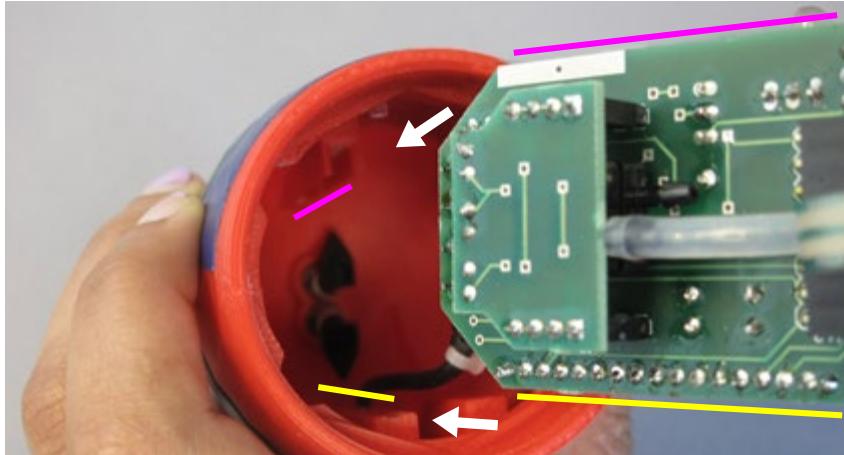
51

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

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_Firmware/LipSync_Firmware.ino
LipSync Wireless: 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
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

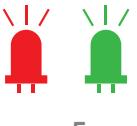
Calibrate your LipSync joystick before first using your device.

⚠️ 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

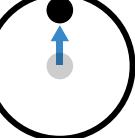
LED slowly blinks red & green 5 times



3 sec.
pause



x 6



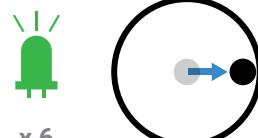
x 1

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



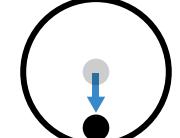
x 6



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

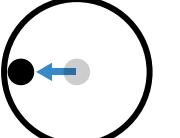
LED blinks red 1 time when position is measured



x 6

7

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



x 6

9

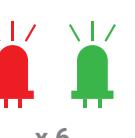
While LED blinks green 6 times, move the mouthpiece to the 9 o'clock position (left direction) time when position is measured



x 1

10

LED blinks red 1 time when position is measured



x 6

11

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