



## Circuit Playground Wearable

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## Guide Contents

Guide Contents	2
Overview	3
Hello Circuit Playground!	3
3D Printing & Circuit Playground	3
Parts & Supplies	3
Prerequisite Guides	3
3D Printing	4
Slice Settings for Ninjablex	4
To React or Not To React?	4
Customize Design	5
Put It Together	6
Insert Straps	6
Fasten Straps	7
Install Circuit Playground onto Bumper	8
Bumper and Strap	9
Fitting On Wrist	10
Plug In Battery	11

## Overview

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### Hello Circuit Playground!

Circuit Playground is our new all-in-one board aimed towards education and beginners. It features 10 NeoPixel LEDs, a motion sensor, temperature sensor, mini speaker, sound sensor, two buttons and a switch. It's a great way to practice programming on real hardware with no soldering or sewing required!

The on-board Atmega32u4 processor is Arduino compatible so, you can program it with the Arduino IDE and upload code via micro USB. It also has a JST connector, so you can plug in a lipo battery to make your projects portable.

### 3D Printing & Circuit Playground

There's lots of simple and easy ways to wear circuit playground. This project uses 3D Printing and flexible material to make a bumper and 2-piece strap.

### Parts & Supplies

- [Circuit Playground \(http://adafru.it/3000\)](http://adafru.it/3000)
- [3D Printer \(https://adafru.it/doT\)](https://adafru.it/doT)
- [Ninjabflex Filament \(http://adafru.it/2080\)](http://adafru.it/2080)

### Prerequisite Guides

Let's get familiar with Circuit Playground. Walkthrough the introduction guide.

- [Introduction to Circuit Playground \(https://adafru.it/ncG\)](https://adafru.it/ncG)

## 3D Printing



### Slice Settings for Ninjaflex

Depending on the 3D printer, Ninjaflex can be relatively challenging to print. The ideal type of 3D printer for printing Ninjaflex has a spring-loaded direct drive. Below are some recommend slice settings.

- 240C Extruder
- No-Heated Bed Required
- 30mm/s Default Printing Speed
- 0.2mm Layer Height

### To React or Not To React?

Retraction is where the extruder will pull filament out of the nozzle to avoid over extruding which can cause zips, blobs and other artifacts. Since Ninjaflex extrudes very slowly, it might be effective to disable retraction, or use a very small amount to prevent under extrusion.

cp-bumper.stl	54mm x 54mm x 4mm	
cp-strap-a.stl	96mm x 26mm x 2mm	
cp-strap-b.stl	96mm x 26mm x 4.5mm	

<https://adafruit.it/pbv>

<https://adafruit.it/pbv>

<https://adafruit.it/pbw>

<https://adafru.it/pbw>

<https://adafru.it/pbx>

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## Customize Design

If you're interested in adjusting the length or width of the strap, you can easily do so by modifying the "User Parameters" inside of Autodesk Fusion 360. Watch the video tutorial below to find out how simple it is.

## Put It Together

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### Insert Straps

Start by inserting **strap-a.stl** into one of the slots on the bumper. Pull it all the way through until the extension gets caught.

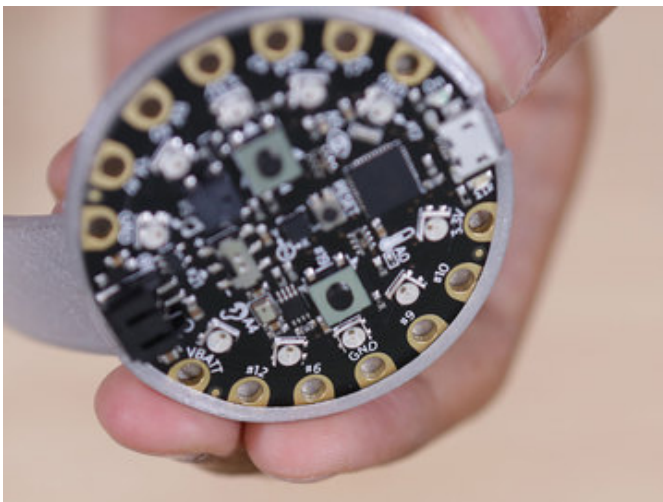
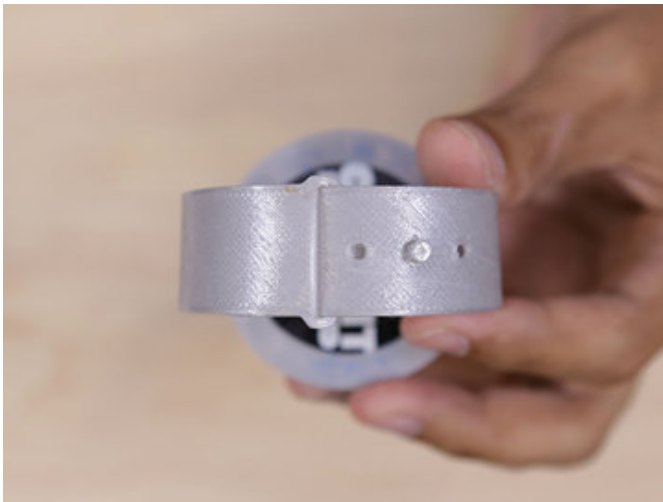
Insert **strap-b.stl** by pushing the extension stopper through the second slot. Pull the stopper through the slot.





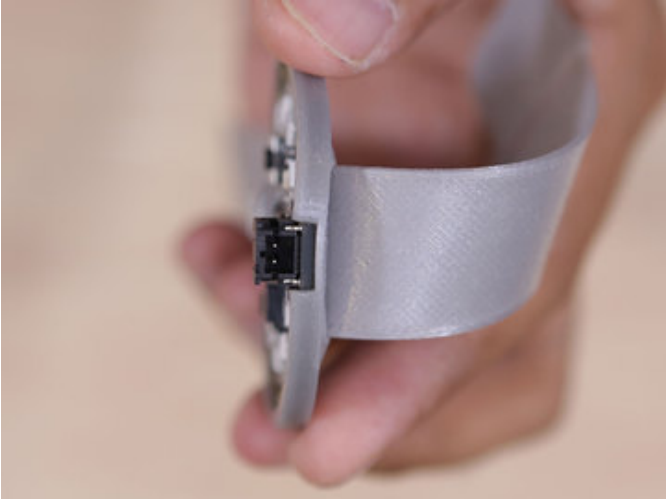
### Fasten Straps

Use the holes on **strap-a.stl** to adjust the size. The nub on **strap-b.stl** can be pressed through one of the holes. The excess from **strap-a.stl** can be inserted into the slot on **strap-b.stl**

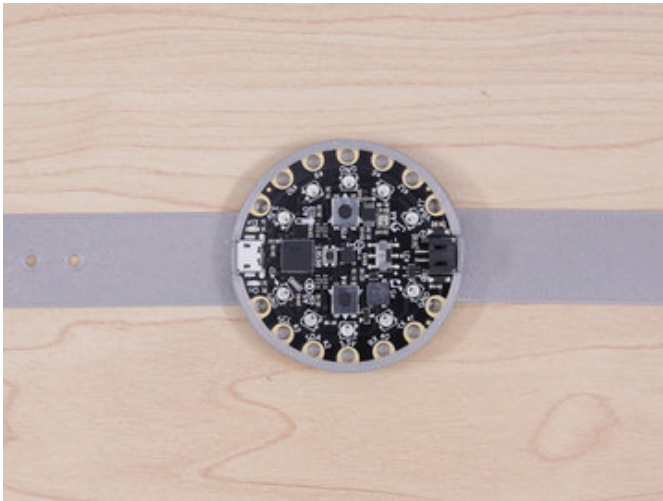


### Install Circuit Playground onto Bumper

Line up the JST and microUSB ports on the bumper so they're in line with the cutouts. The PCB from Circuit Playground is fitted into the bumper with the edges tucked into the lip. Press the PCB into the bumper so the edges are all tucked in.







## Bumper and Strap

The back of the bumper has an opening, revealing the lovely silk screen on the back of Circuit Playground.

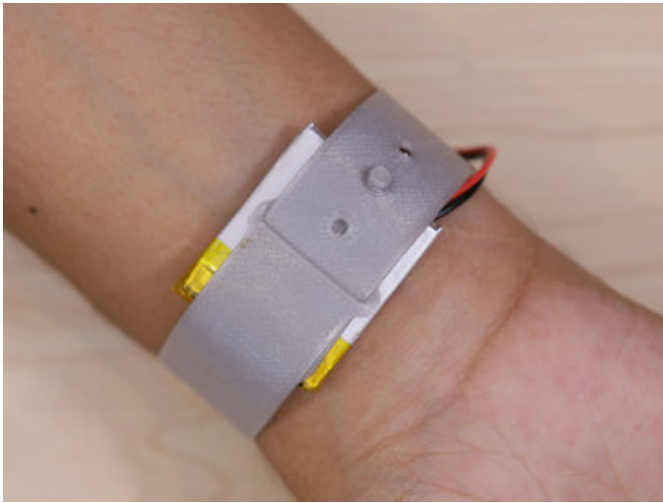


## Fitting On Wrist

While fitting the strap onto your wrist, you may find one of the extension stoppers will come loose and pull through the slots on the bumper.

If that happens, you might find it easier if you buckle the two straps together first, and then pull one of the extension stopper through the slot.

Then, install Circuit Playground onto the bumper while the fitted is secured to your wrist.



### Plug In Battery

A lipoly battery can be tucked underneath the PCB or band. Try both ways and see which is more comfortable and practice.

