

Make your own light-up glove

Transform an old glove into a piece of wearable technology with the BBC micro:bit and an RGB LED board. You can also experiment with putting it on canvas shoes, a badge or a t-shirt for a different wearable altogether.

Step 1: Gather the materials

Components

- 1 x BBC micro:bit
- 7 x 5050 WS2812 RGB LED board with integrated drivers (We used a NeoPixel Jewel but other brands are available.)
- Mini crocodile clips (optional)
- 2AAA battery holder
- 2 x AAA batteries

Equipment

- Conductive thread
- Normal thread
- Sewing needle
- Velcro (optional)

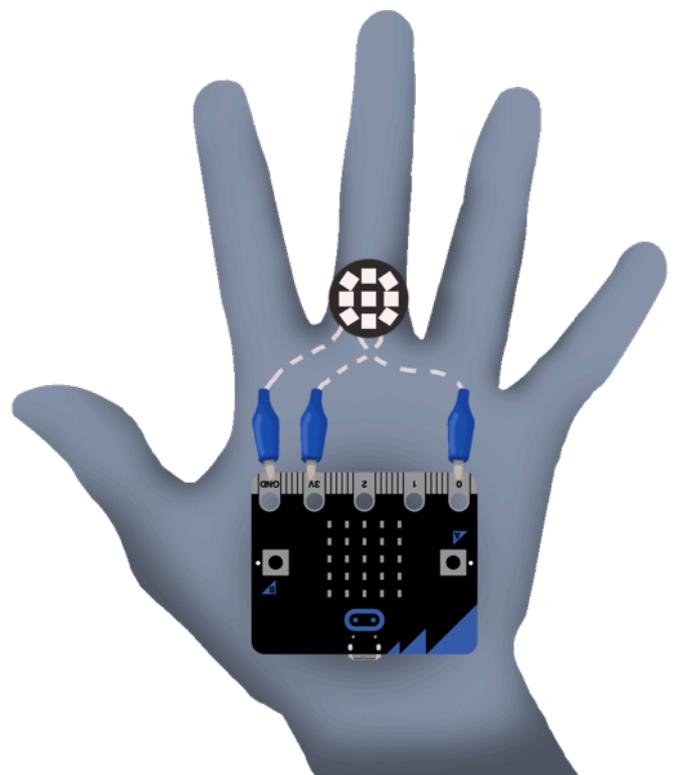
Step 2: Design your glove

Decide where you want to position your LED board. We've chosen the third finger so it looks almost like a ring when you put your glove on, but where you want it is entirely up to you.

Decide where you want to position your BBC micro:bit. You can have it visible so you can use the LEDs on the front to add to the design, or tuck it away under your glove. You do need to make sure that you can access Pin0, 3V and GND on the BBC micro:bit fairly easily with conductive thread or crocodile clips.

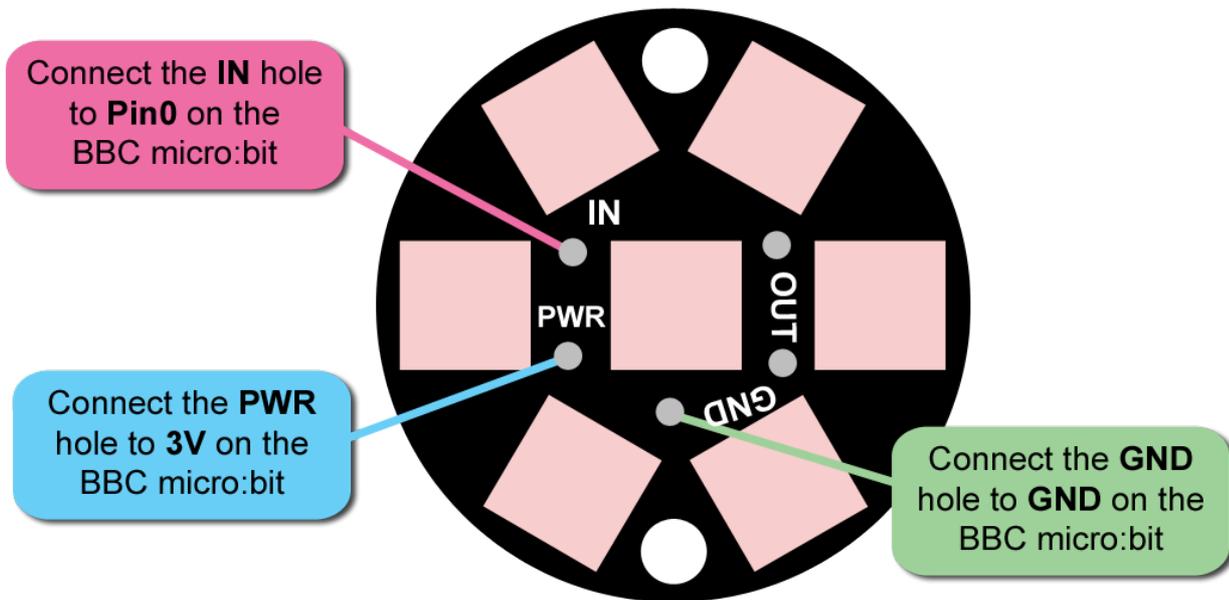
Sew your LED board onto the glove using normal thread and the two holes on the edge of the board.

Place the velcro strip on the bottom of your BBC micro:bit and attach it to your glove.



Step 3: Create the circuit

Use conductive thread to form your circuit using the diagram below.



If you want to re-use your BBC micro:bit in other projects, you will want to sew the thread to the crocodile clips and attach them to the BBC micro:bit rather than attaching the thread directly to the BBC micro:bit.

Thread a good length of conductive thread through your sewing needle and make a large knot at the end of your thread.

Using the needle, thread the conductive thread through the holes **IN**, **PWR** and **GND** on the RGB LED board, making sure that the knot sits tightly over the hole and forms a connection.

Connect these to **Pin0**, **3V** and **GND** respectively on your BBC micro:bit.

You have now formed your circuit.

Step 4: Download the code

Connect the BBC micro:bit to your computer using the USB cable.

Click on the hex file link on the Live Lessons website to view the code on the BBC micro:bit website (www.microbit.co.uk).

The script for your light up glove should now appear in your code window.

Click 'compile' to download the hex file from the BBC micro:bit website and drag it onto your BBC micro:bit. Your glove should now light up.

Step 5: Understanding the code

script my super glove

function main ()

```
{ control → in background do
  { basic → forever do
    { basic → show string("hello", 150)
    { basic → pause(400)
  } end
} end
{ var strip := △ neopixel → create(7)
{ □ mode := 1
{ basic → forever do
  { if □ mode = 1 then
    { □ pixel := math → random(7)
    { □ r := math → random(255)
    { □ g := math → random(255)
    { □ b := math → random(255)
    { strip → set pix(□ pixel, □ r, □ g, □ b)
    { strip → display
    { basic → pause(20)
    { strip → clear
  } else add code here end if
  { if □ mode = 2 then
    { □ pixel := math → random(7)
    { □ r := input → acceleration(x)
    { □ g := input → acceleration(y)
    { □ b := input → acceleration(z)
    { strip → set pix(□ pixel, □ r, □ g, □ b)
    { strip → display
    { basic → pause(20)
    { strip → clear
  } else add code here end if
} end
```

Displaying a message on the micro:bit

This is the part of the code that decides what appears on your BBC micro:bit.

Here we've said that whatever happens on the BBC micro:bit is done **in the background**. We've introduced a **forever loop** that displays the message (or **string**) "hello" over and over again, with a 400 millisecond **pause** between each word.

Setting up your LED board

This is the part of the code that sets up your LED board. This uses the neopixel library that's available on the micro:bit website.

Here we've told the program that there are 7 LEDs in the LED **strip** – the number of LEDs on the board.

We've also introduced a **variable** called **mode**, and said that when the program first starts up, the **mode** is 1.

What happens in each mode?

These two sections of code decide what happens on the LED board in each mode.

We've introduced two **conditional statements**.

The first says that **IF mode** is 1, then the program picks a **random** LED on the board, and assigns a **random** R (red) value, a **random** G (green) value, and a **random** B (blue) value to that LED. This decides the colour of the LED. We then **display** that colour on the LED for 20 milliseconds, before clearing it. This results in the 'sparkling' effect with random colours appearing for each LED.

The second says that **IF mode** is 2, then the program picks a **random** LED on the board, and assigns the R, G and B values of that LED based on the movement of the accelerometer on the BBC micro:bit. So as you move your micro:bit in different directions and at different speeds, the colours of the LED changes. As with the first mode, we **display** that colour on the LED for 20 milliseconds, before clearing it.

```
input → on button pressed(A) do
  ( mode := 1
end
input → on button pressed(B) do
  ( mode := 2
end
end function
```

Pressing the buttons

This section of code tells the program what happens when you press the buttons.

Here we've said that when you press button A, it sets **mode** to 1, and when you press button B, it sets **mode** to 2.

Step 6: Test and play

Disconnect the BBC micro:bit from your computer and plug in the battery pack (with the batteries inside).

Put your glove on and tuck the battery pack into it where it can't be seen. You now have a piece of wearable technology that you can take along with you and show off to your friends.