

# Microbit: BluBit Switch

This project uses a low-cost Microbit, coroplast (made famous by DIYAT extraordinaire, [Theresa Willkomm](#)), and foil to create a wireless double-enabled switch for computer or mobile device interaction. This project uses the MakeCode editor supporting easy drag & drop coding and an additional BLE HID library developed by Bill Seiver.

*\*\*This build is geared towards the nontechnical/ novice user and uses the MakeCode block-based programming language.*

## Materials List

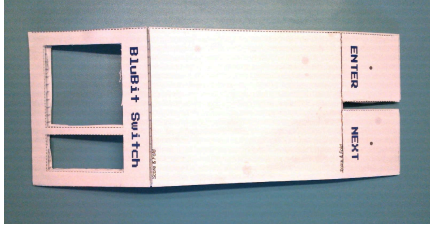
| Qty | Item                              |
|-----|-----------------------------------|
| 1   | Coroplast piece (4.25 x 11)       |
| 2   | Alligator Clips                   |
| 2   | Brads                             |
| 1   | Foil or copper tape (1 x 4)       |
| 1   | Tape (masking or duct)            |
| 1   | Rubberband                        |
| 1   | <a href="#">Cutting Template</a>  |
| 1   | <a href="#">Microbit hex file</a> |

## Equipment List

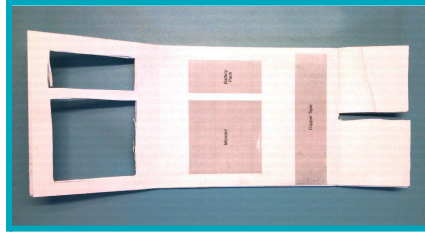
|                            |
|----------------------------|
| Microbit (GO Bundle)       |
| Wirecutter/ stripper       |
| Utility or Craft Knife     |
| Awl or screwdriver         |
| Computer (for programming) |
| iOS Device (for testing)   |



## Step #1: Print and Cut out Template Pieces



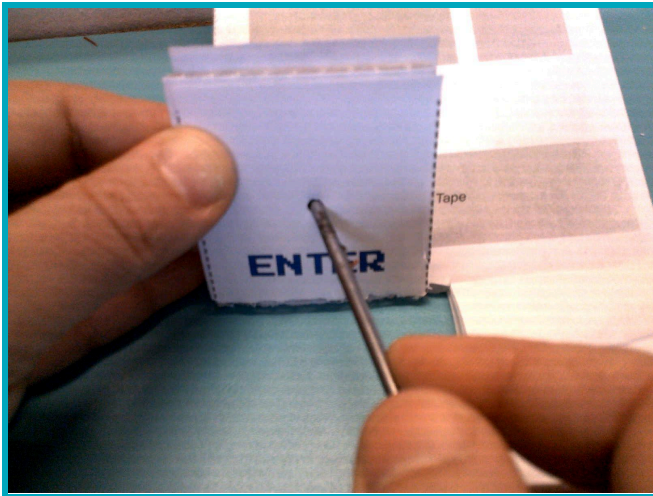
Outside



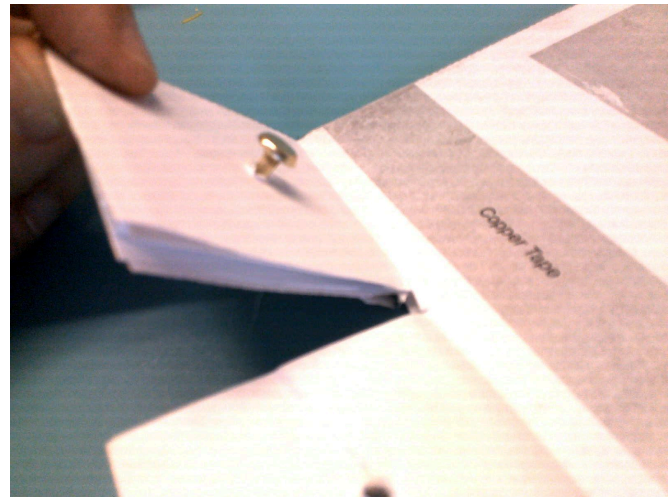
Inside

- ☐ Print out the provided template and cut through the midline of the page.
- ☐ Paste each side onto the coroplast piece.
- ☐ Cut as indicated by the dotted lines.
- ☐ Score and fold as indicated.

## Step #2: Prepare the Buttons

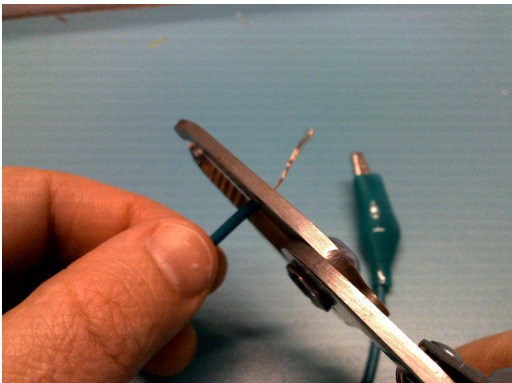


- ☐ Using an awl, pierce a hole where indicated by the template for both the "Enter" and "Next" buttons.



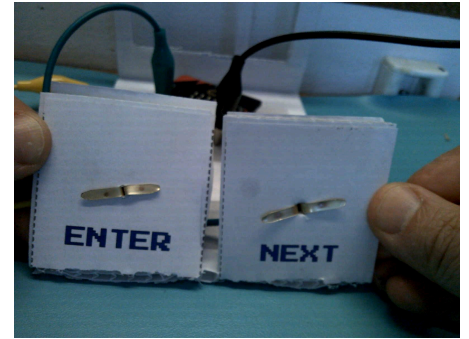
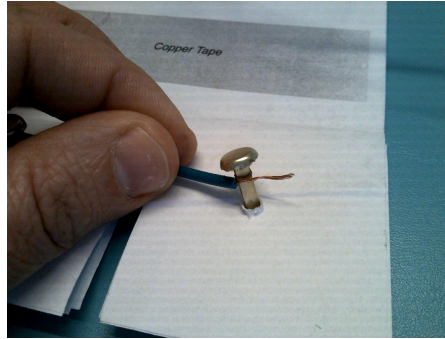
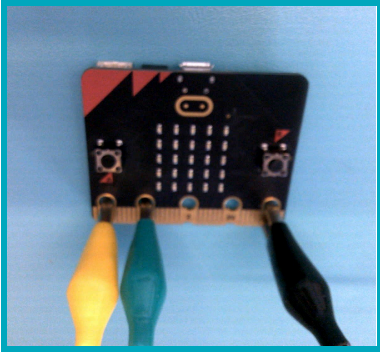
- ☐ Insert a brad through each hole. Ensure the cap of the brad is on the inside of the switch.

## Step #3: Prepare the alligator clips



- ☐ If you are working with intact alligator clips, cut two wires (4 halves) and prepare 3 for stripping.
- ☐ Using wire strippers, remove about 1" of insulation from each wire.

## Step #4: Connect the alligator clips

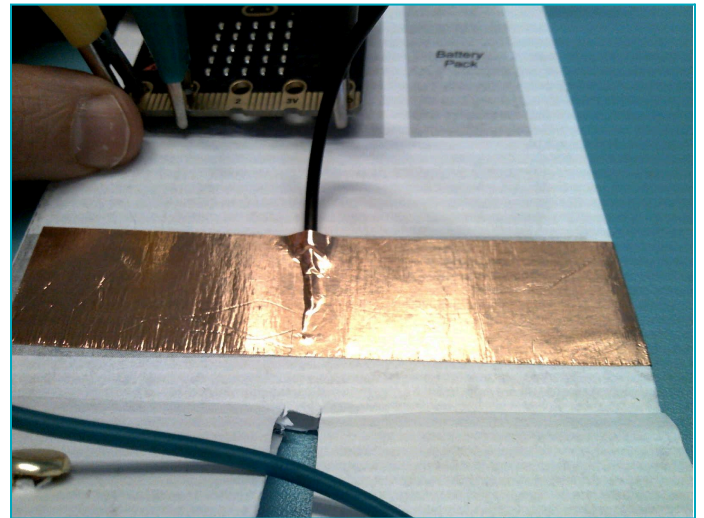
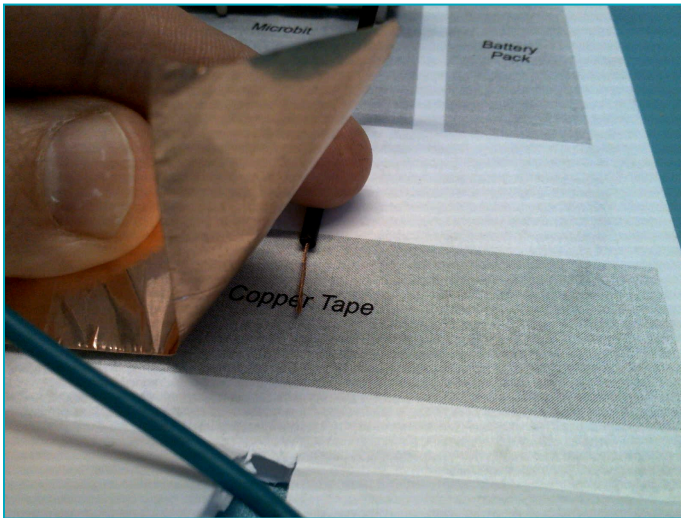


- ☐ Connect the alligator clips to the following pins: GND, 0 , and 1

- ☐ Loop the stripped wire around the brads as follows:
  - ☐ Pin 0 => ENTER
  - ☐ Pin 1 => NEXT

- ☐ Fasten the brads into place on the outside of the switch. You may want to apply a layer of tape over the brads.

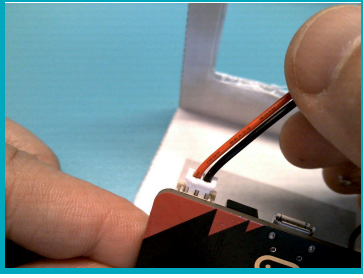
## Step #5: Attach the ground wiring



- ☐ Center the ground wire in the center of the block indicating copper tape.
- ☐ Layer the copper tape covering the stripped wire.

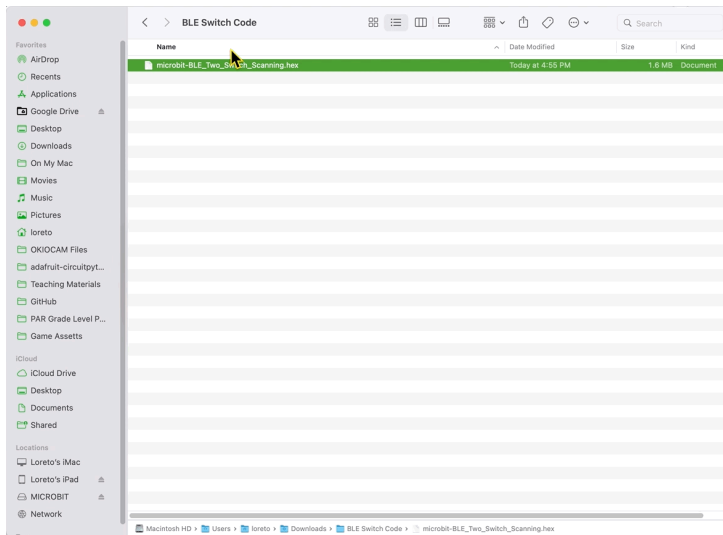
- ☐ If you have a plastic card available, scrape it along the copper tape to smooth out any folds or wrinkles which may effect conductivity.

## Step #6: Insert the battery pack



Plug in the battery pack at the top of the Microbit and insert the pack in the provided space. You may use double sided tape to secure into place.

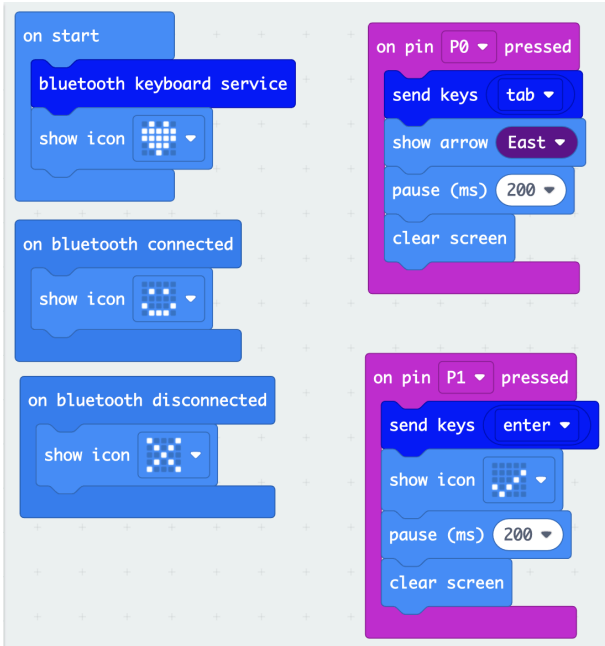
## Step #7: Flash the code



- ☐ Download the [hex file](#) (contains the code) onto your computer.
- ☐ Click and drag the file into the “Microbit” drive. You should see a flashing light on the back during the transfer process.

## Step #8: Code Explainer



|                                                                                  |                                                      |
|----------------------------------------------------------------------------------|------------------------------------------------------|
|  | <p><a href="#">Project link for modification</a></p> |
|----------------------------------------------------------------------------------|------------------------------------------------------|

### Step #9: Close the casing

|                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                  |                                                                                                                                 |
| <ul style="list-style-type: none"> <li><input type="checkbox"/> Close the top cover over the Microbit and battery.</li> <li><input type="checkbox"/> You may want to apply looped tape to stabilize the battery pack and Microbit to the inside of the case.</li> <li><input type="checkbox"/> Apply tape to the sides.</li> </ul> | <ul style="list-style-type: none"> <li><input type="checkbox"/> Place a rubber band over the buttons and ensure the brads make contact with the copper tape when pressed down.</li> </ul> <p>Adjust as needed.</p> |

### Step #10: Pairing with the iPad



- ☐ Launch the settings app
- ☐ Open the Bluetooth menu
- ☐ Locate the Microbit under the “Other Devices” menu (it will begin with “uBit”)
- ☐ Select “Pair” from the pop up menu.

\*\* For additional guidance/ troubleshooting on pairing visit the [BLE HID Github page](#)

## Step #11: Enable Switch Access



On the iPad open the Settings App and navigate to the **Accessibility Menu** and the **Switch Control** sub menu under PHYSICAL AND MOTOR

Follow the following sequence to add each external switch:

- ☐ Switches
- ☐ Add New Switch
- ☐ External
- ☐ Press the desired switch
- ☐ Name the switch
- ☐ Save
- ☐ Assign the switch an action
  - ☐ Move to Next Item
  - ☐ Tap

Return to the main Switch Control screen and toggle on Switch Control

\*\* Ensure scanning style is set to “Manual”. To learn more about the various switch scanning settings visit the [Apple support page](#).

## Variations

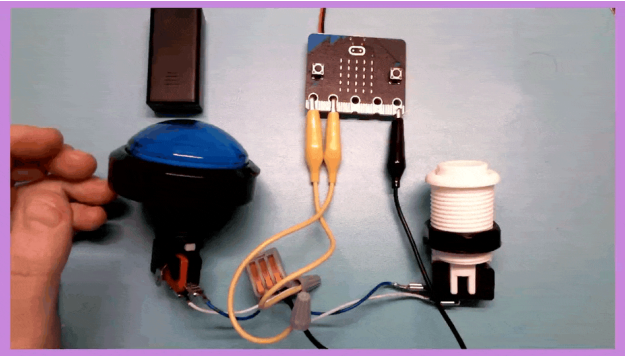
```

on pin P0 released
  show arrow East
  send keys tab
  pause (ms) 200
  clear screen

```

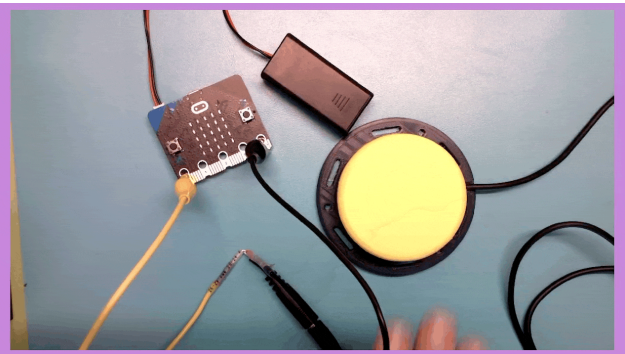
The Makecode editor provides an event block which triggers the code when a pin press is released instead of pressed. This option may be helpful for users who have weakness and prefer to rest on the switch and activate it by moving off the switch to activate it.

[The modified code is available here](#)

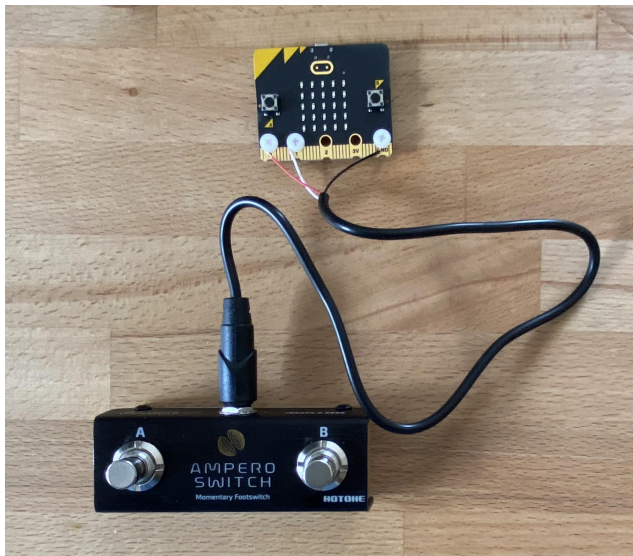


Connect commercially available arcade buttons which come in various sizes and pressure parameters.

This set up does not require soldering and uses wagos, wire caps, and jumper wires.



Create a mono jack connection to alligator clips using marine terminals in order to use pre-existing AT switches.



Create a set of foot switches using guitar foot pedal switches and nylon bolts to connect wires.

[Build plans link here](#)

