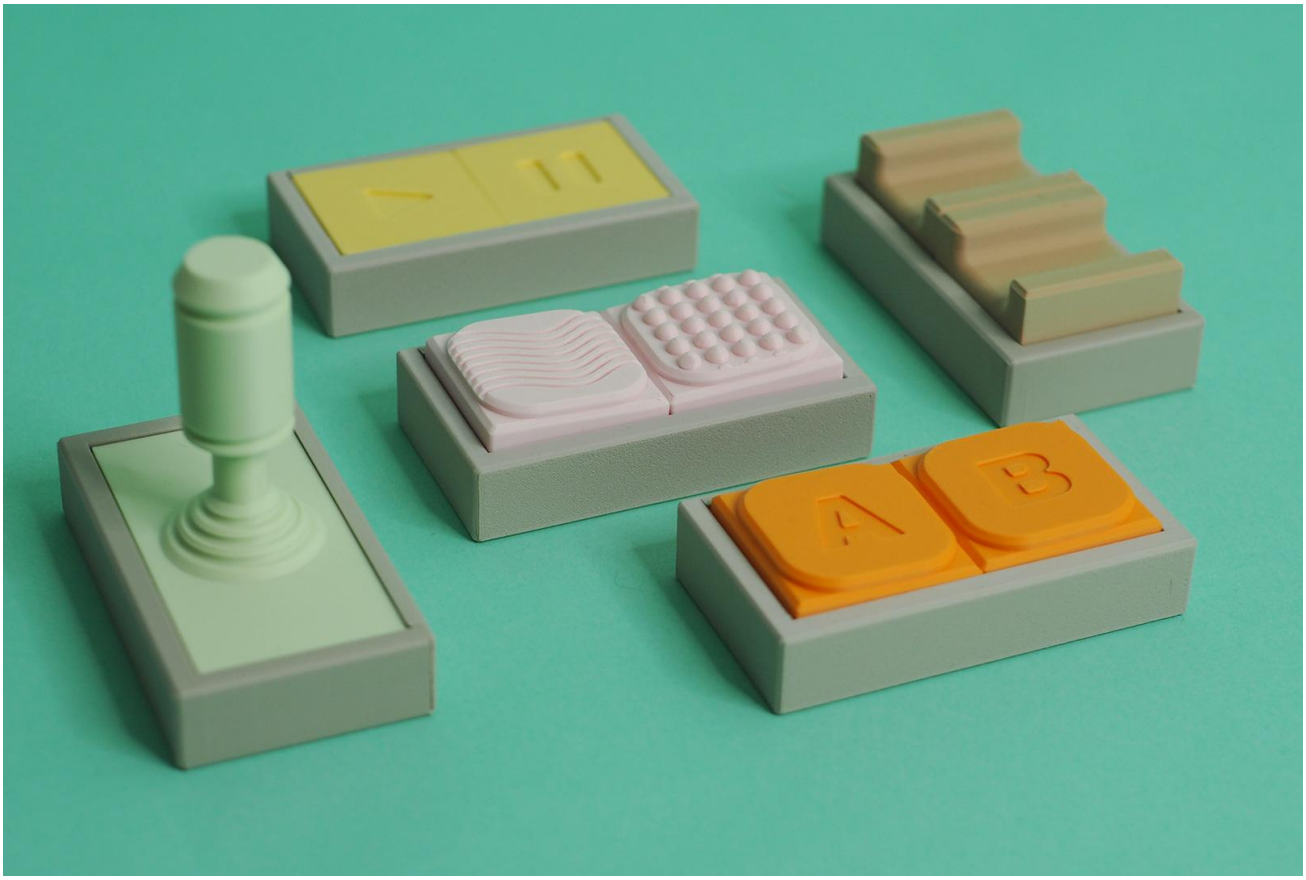
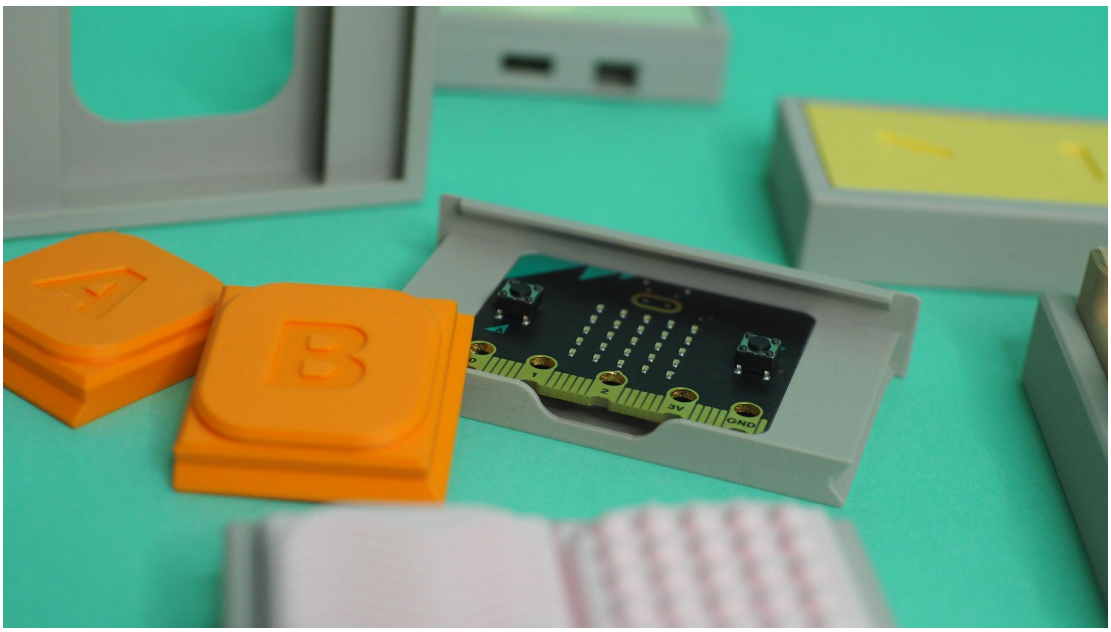
Maker Guide



Tap is a bluetooth dual switch access device that enables people with disabilities to control mobile phones, tablets and computers. It works by activating switch control on the selected device, and mapping Tap's customisable buttons to the desired functions - whether this be 'move to next item' and 'tap', or media functions such as 'play' and 'pause'.



Who

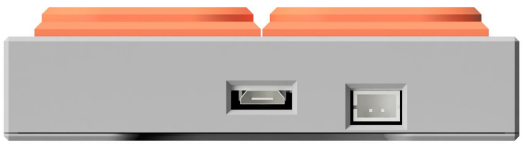
Tap is designed for people who have limited hand mobility and struggle to use traditional input methods for computer devices, such as keyboard and mouse, small buttons or touchscreens.

Why

It aims to empower individuals with physical and cognitive impairments to interact with technology, engage with their surroundings, and enhance their independence.

How

A Micro:bit v2 pocket-sized computer powers the device, sending ‘tab’ when button A is pressed and ‘enter’ when button B is pressed via Bluetooth. With switch control enabled on Android, iOS, or Chromebook, these inputs can be mapped to actions like ‘next’, ‘tap’, or media controls. Four 3D printed parts—case, lid, and two button caps—convert the built-in buttons into larger, more accessible ones by pressing directly onto them.



*21.9mm

*may differ depending
on button modules used

84.4mm

17.1mm

46.1mm

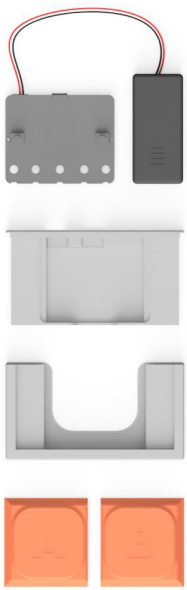
≈Weight: 45g

Parts List

*3D Printed Components

Description	Qty	≈ Cost (USD)	Purchase Link
Micro:bit v2 with Battery Pack *Alternatively, you can replace the battery pack with a USB type-B cable to power from your device.	1	$19.95	https://bit.ly/4djc88l
*3D Printed Cradle	1	$0.30 (PLA material cost)	-
*3D Printed Sliding Lid	1	$0.33 (PLA material cost)	-
*3D Printed A Button **Multiple options available - see next page	1	$0.17 (PLA material cost)	-
*3D Printed B Button **Multiple options available - see next page	1	$0.17 (PLA material cost)	-

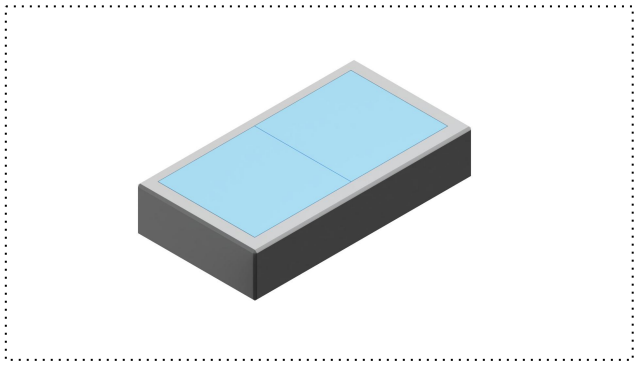
Tools Required
3D Printer with PLA filament



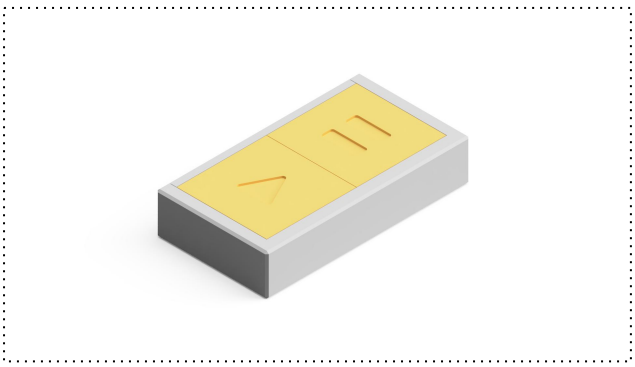
Button Options

The following button options are available for you to choose from in the model files folder.

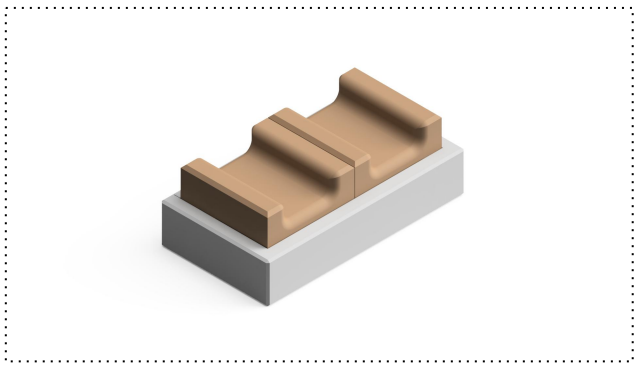
A/B Buttons (Raised)



Plain (Flat)

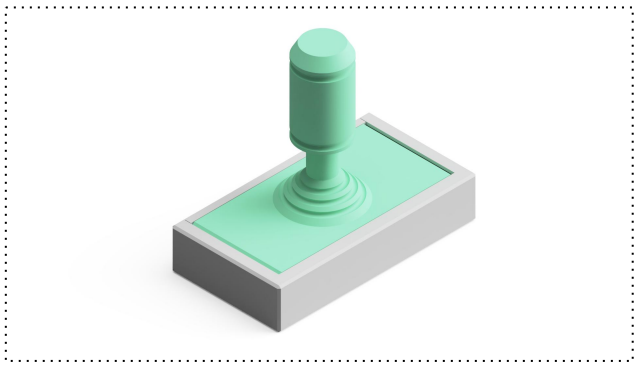


Play/Pause (Flat)



Finger Grooves (Raised)

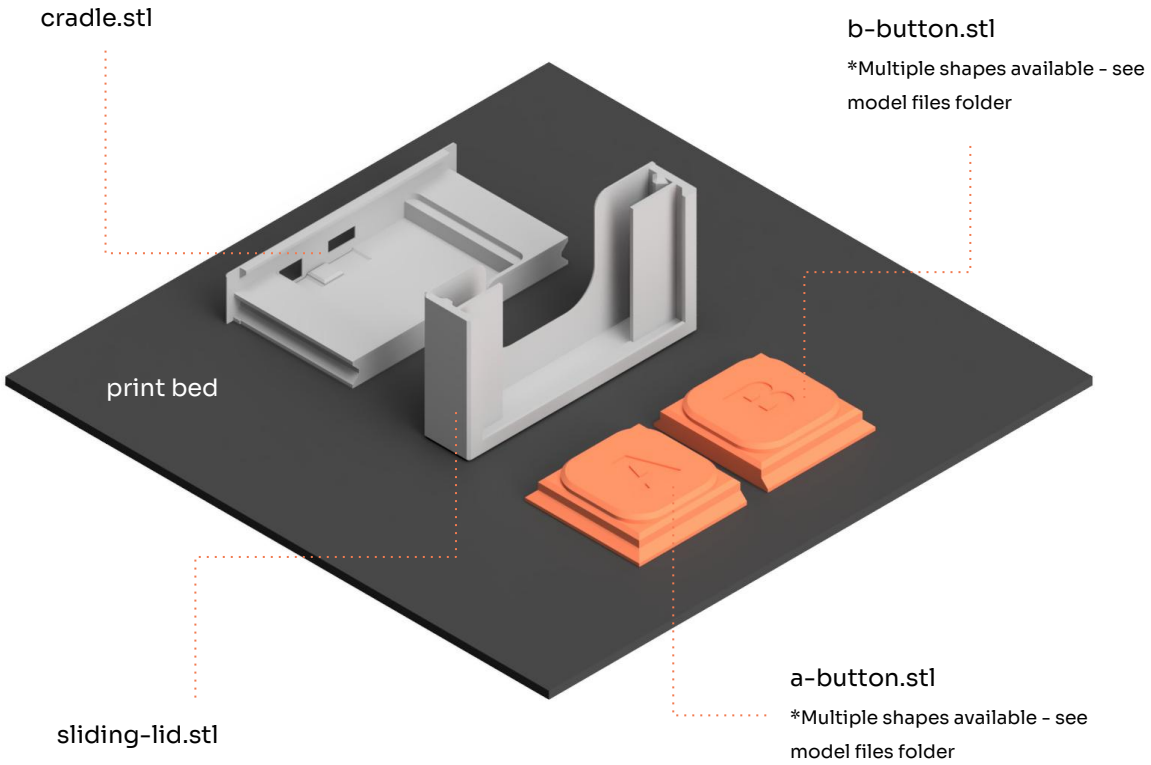
Textures (Raised)



Joystick *Coming soon

3D Printing

Print 1 of 1

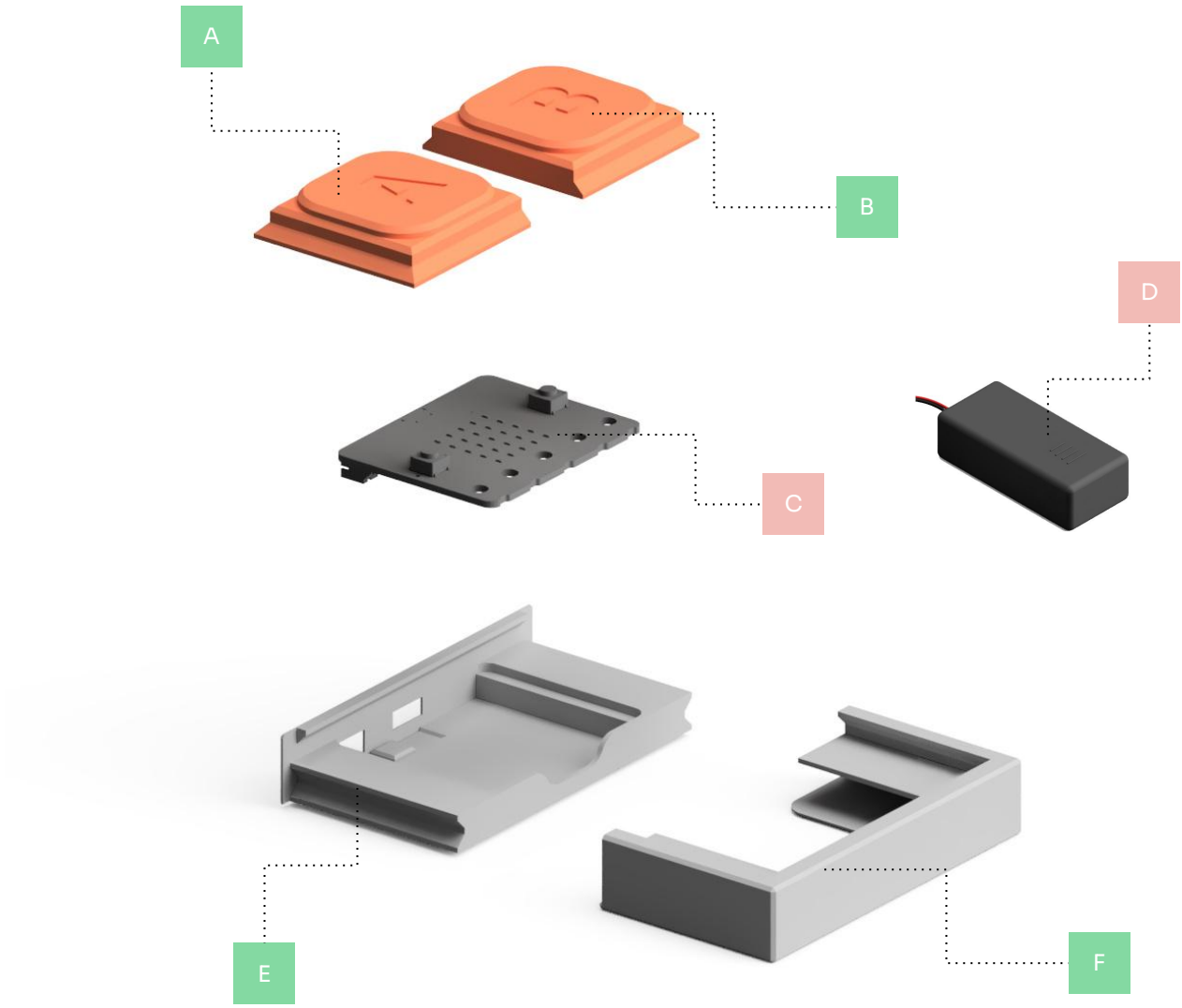


Settings	
Technology	FFF
Material	PLA
Nozzle Dlameter	0.4mm
Layer Height	0.2mm
Infill	15%
Support	None

All parts can be 3D printed on a single print bed. Alternatively, for multi-colour versions, you can use the individual STL files to set up multiple print beds as required.

Statistics	
Print Time	3 Hours
Mass	37g
Material Cost	$0.97 (USD)

Assembly



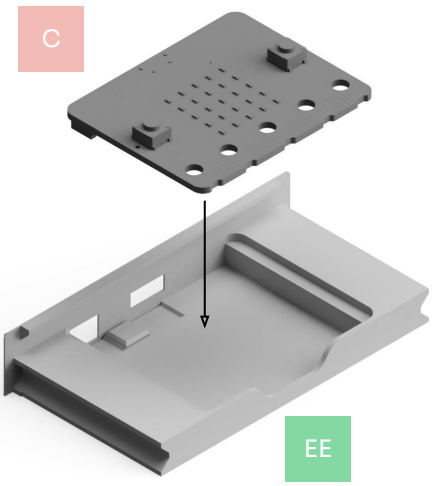
	A	1 x 3D printed A button
	B	1 x 3D printed B button
	C	1 x micro:bit v2
	D	1 x micro:bit v2 battery pack (2 x aaa)
	E	1 x 3D printed cradle
	F	1 x 3D printed sliding lid

Step 01

Connect your micro:bit to a computer via USB connection. Then copy the tabEnterOutput.hex file from the model files folder and paste it onto the micro:bit, just like you would copy and paste a file onto a USB stick!

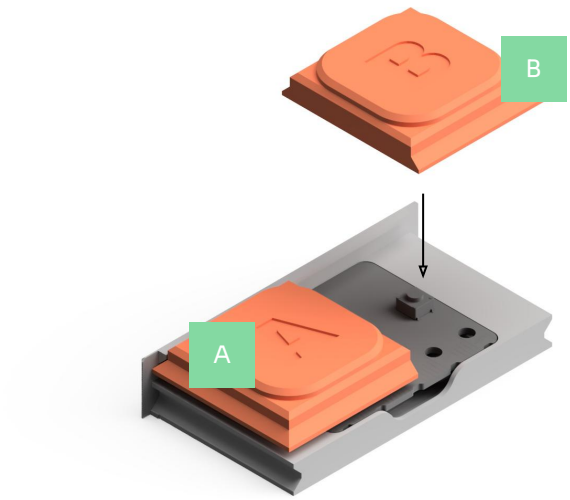
Step 02

Place the micro:bit into the 3D printed cradle with the LED side pointing upwards. When placing, tilt the micro:bit so the connection ports feed through the holes in the cradle first.



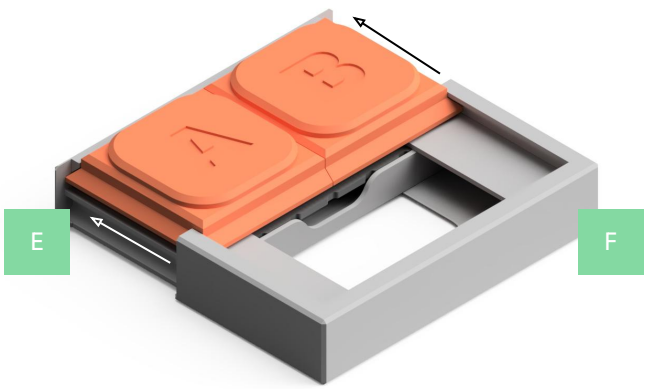
Step 03

Place the 3D printed A and B buttons on top of the micro:bit's existing switches. Ensure you line them up so the hole on the underside of the 3D printed buttons sit over the micro:bit switches.



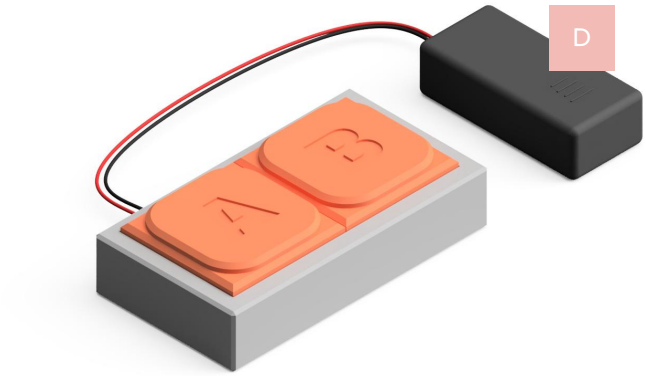
Step 04

Push the 3D printed sliding lid onto the device. Refer to the diagram below to guide you, ensuring the lid 'traps' the buttons from falling out.



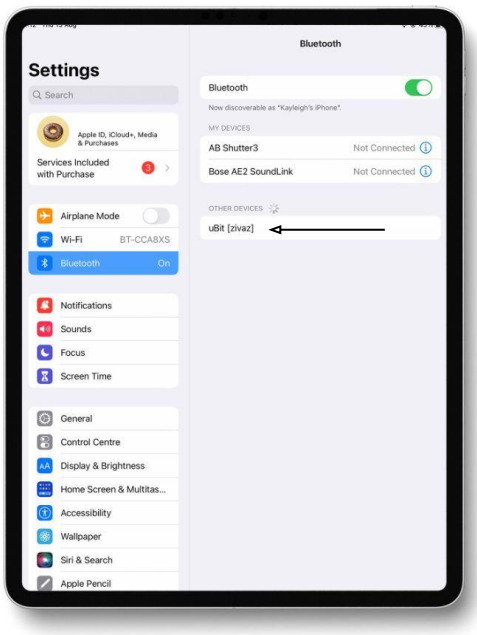
Step 05

Time to power up! Plug in the micro:bit's battery pack, or alternatively, use a USB type-B cable to power it from your device.



Step 06

Go to your device and pair the micro:bit in your bluetooth settings. The micro:bit will be named uBit.



Switch Access

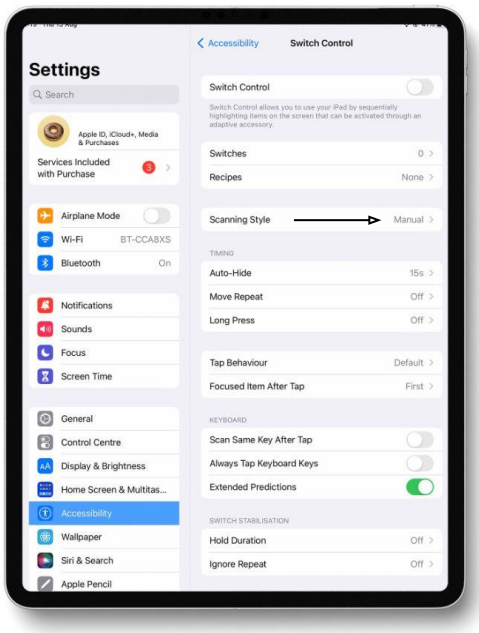
The next part of the assembly instructions involves activating switch access on your mobile, tablet or computer device. The instructions in this guide will show you how to set up ‘manual scanning’ on an iPad device with iOS. This will map the A button to the action ‘Move to Next Item’, and the B button to ‘Tap’. If you are using a different device, the steps will be similar, and below are some external links with further information.

Switch Access for Android: https://bit.ly/3X4ZxjQ
Switch Access for Chromebook: https://bit.ly/4dr5AVG

Depending on your requirements, you can also map the A and B buttons to different actions, such as controlling media with play and pause actions. Feel free to experiment with the options on your device!

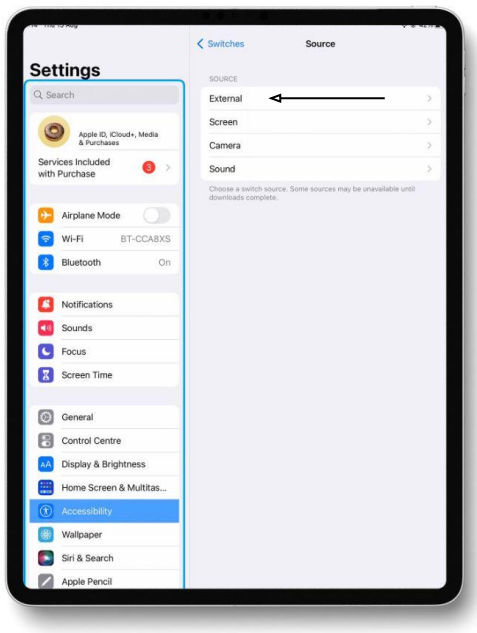
Step 07

On your iOS device, go to Settings > Accessibility > Switch Control and ensure scanning style is set to Manual.



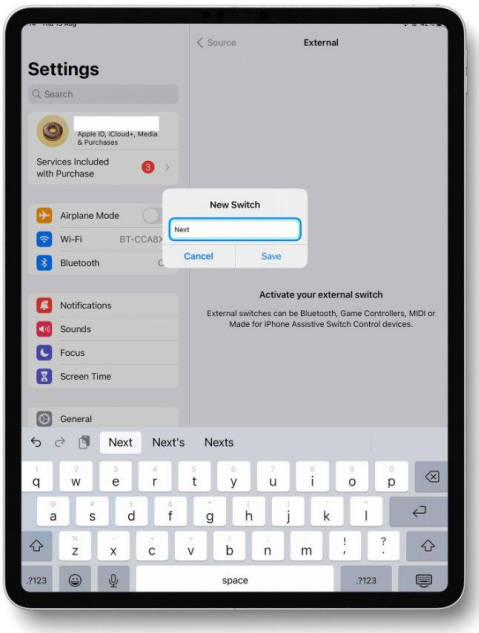
Step 08

In the Switch Control menu you are already in, go to Switches > Add New Switch > External.



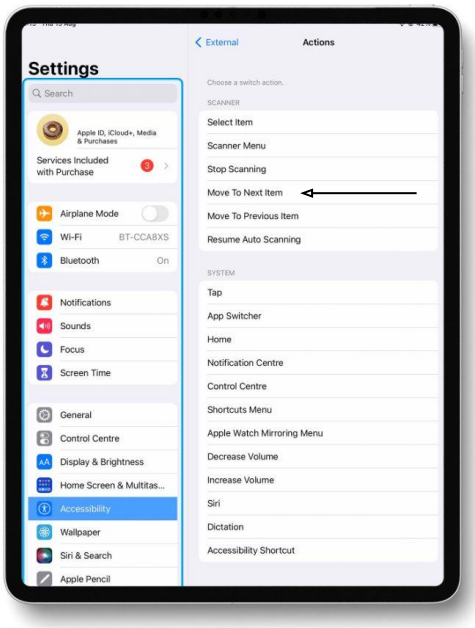
Step 09

You will now be prompted to activate your external switch. Simply press the A button on your Tap device and name it as ‘Next’ and press Save.



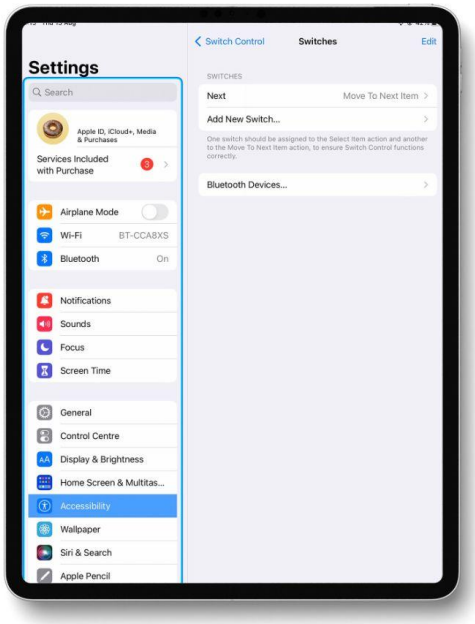
Step 10

You can now select which action you’d like your A button to activate. Select ‘Move to Next Item’.



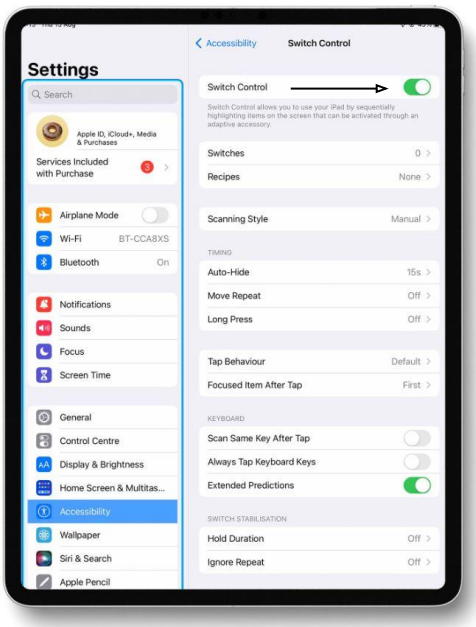
Step 11

Button A is now mapped! Repeat steps 8-10 for the B button but name the switch as ‘Tap’ and map it to the ‘tap’ action.

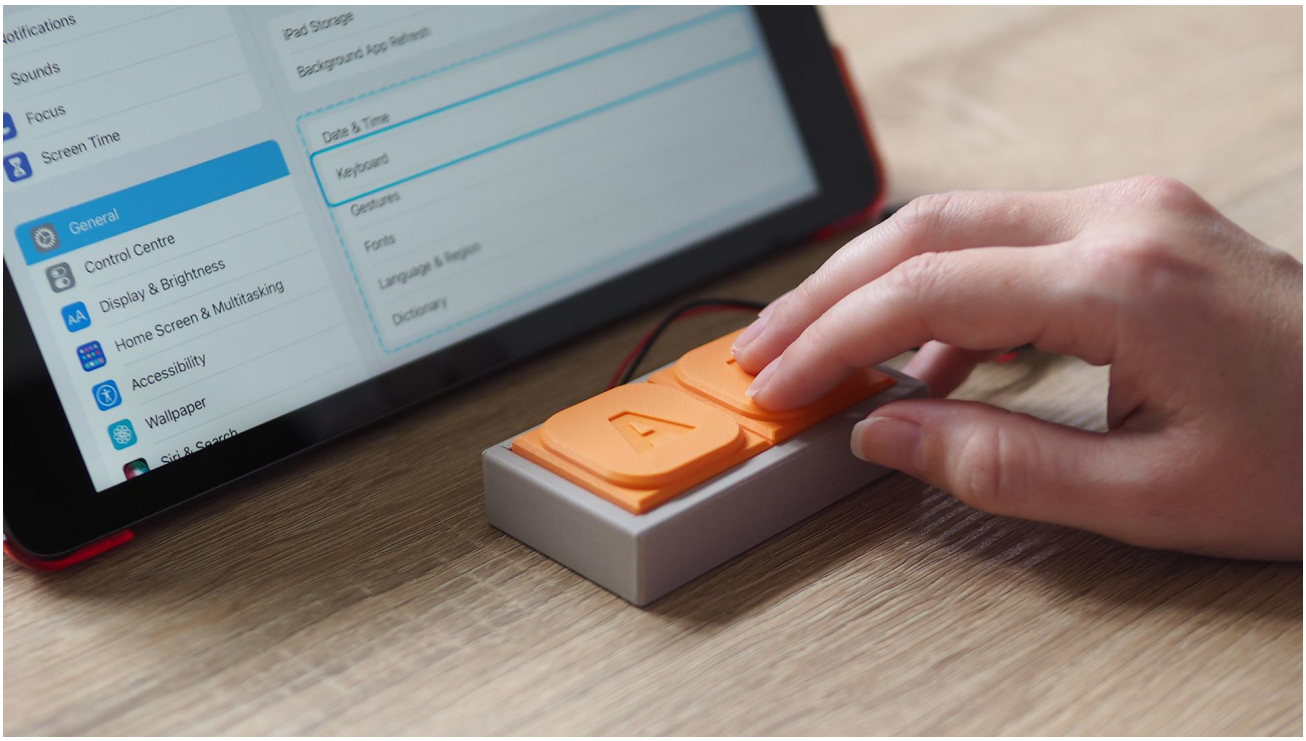


Step 12

The final step is to ensure Switch Control is toggled on and then you’re all set!



Usage



When switch control is activated, you'll see a blue border highlighting an item or a group of items. Pressing the A button will change what items are highlighted and once you reach the desired items, press the B button to select. To power off Tap, press and hold the flexure button on the underside of the device for 5 seconds. To power it up again, press the same button once.

Watch the Tap Overview Video

https://youtu.be/asjiQ1X_dK8?si=cA3Yo0PTJ3sLk7T2

Customising the Design

The Autodesk Fusion design is included in the model files, allowing you to easily modify the buttons and case. Additionally, we have created an online course guiding you through the process of creating your own custom Tap devices. Learn more here - https://bit.ly/4jwqPrU.

Evolving the Design

We are particularly interested in seeing how the community can evolve the design with physical modifications, such as mounting solutions, as well as code modifications that might integrate additional functionality.

Contacting the Designer

We welcome your feedback and suggestions. Please get in touch at hello@weareprintlab.com.