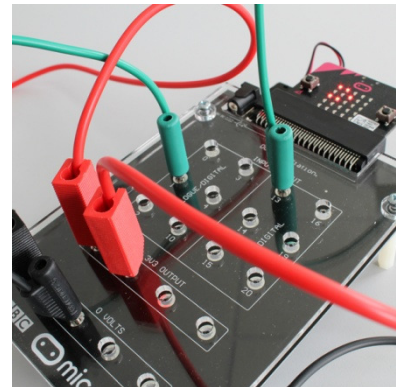# Instruction Sheet: Micro:bit Breakout Board

The micro:bit breakout board has been designed to increase the functionality of the micro:bit by exposing the edge connector into multiple 4mm input and output, digital and analogue connections. This enables basic or advanced electronic circuits and control systems to be created and programmed using both the micro:bit specific coding environments and traditional C/C++ coding languages.

Features
- Works with standard 4mm banana plug cables
- 12 input/output channels
    - 6 analogue/digital input and outputs
    - 4 digital input and outputs
    - 2 i2c/digital input and outputs
- 4 3V3 power output
- 4 GND channels
- External 5V DC power boost input

Assembly
The instructions below reference the "Assembly Images" sheet.

1. Check you have the correct parts. (Image 1)
    a. 1 x Breakout Board.
    b. 1 x Acrylic Cover.
    c. 4 x Screws.
    d. 4 x Legs.
2. Insert one screw though any one of the four corner holes on the acrylic cover. (Image 2)
3. Place one spacer over the screw as per image 3. Use a finger to hold the screw in place.
4. Line up the same hole on the breakout board with the screw from the acrylic board whilst still using your finger to hold the screw in place. The spacer should be between the acrylic cover the breakout board. (Image 4)
5. Place the breakout board on top of the acrylic cover ensuring the screw has gone through the corner hole. (Image 5)
6. Screw a leg onto the end of the screw. Do not fully tighten. (Image 5)
7. Repeat for the remaining three corner holes ensuing that you do not tighten the legs fully. (Image 7)
8. Once all legs have been attached tighten the legs fully. Do this using your finger as shown in image 8.
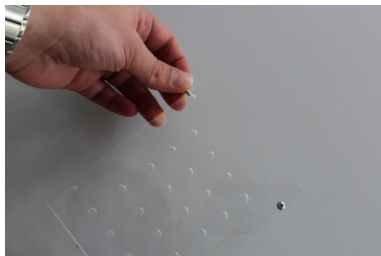9. Insert the pre-coded or un-coded micro:bit into the edge connector. (Image 9)
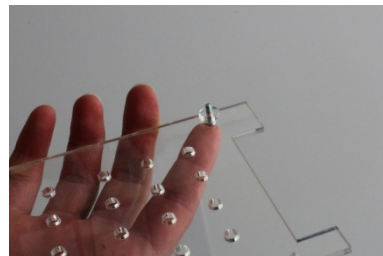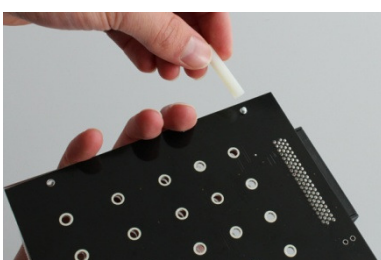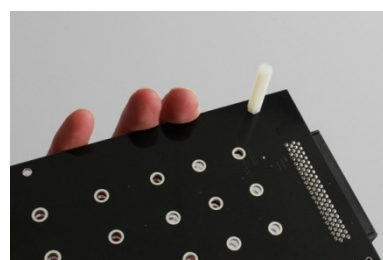10. Get coding!

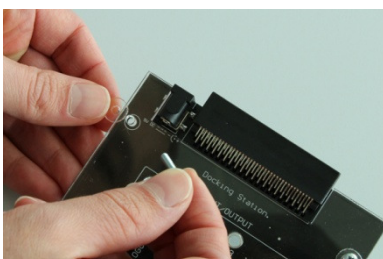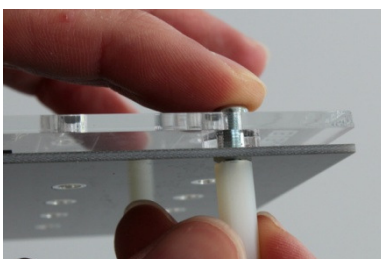# Assembly Images

1
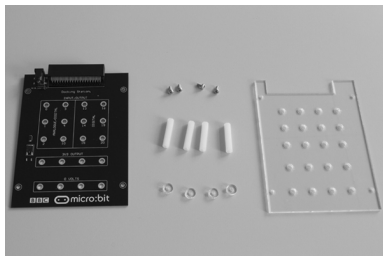
2

3

4

5

6

7

8

9

Input/output Channels

The table below illustrates each channel. (✓) shows that the channel is compatible.

Channel	Pin Number	Processor Number	Digital	Analogue	i2c
0	P0	P0_3	✔	✔	
1	P1	P0_2	✔	✔	
2	P2	P0_1	✔	✔	
3	P3	P0_4	✔	✔	
4	P4	P0_5	✔	✔	
10	P10	P0_6	✔	✔	
13	P13	P0_23	✔		
14	P14	P0_22	✔		
15	P15	P0_21	✔		
16	P16	P0_16	✔		
19	P19	P0_0	✔		✔
20	P20	P0_30	✔		✔

Channel
- Represents the channel number as per the breakout board.

Pin Number
- Represents the micro:bit edge connector input/output. (These numbers are used for programming in micro:bit specific coding environment).

Processer Number
- Represents the micro:bit processer channel. (These numbers are used for programming in mbed).
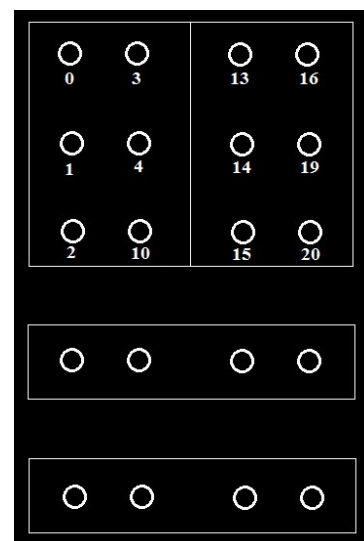
Digital
- Shows if the channel can be controlled using digital signal.

Analogue
- Shows if the channel can be controlled using analogue signal.

I2c
- Shows if the channel is used for i2c.

3V3 Power Output

The 4 x 3V3 OUTPUT channels offer a voltage of up to 3.3 volts from the micro:bit. This enables multiple components to be powered without the need for multiple connections through one input.

GND

The 4 x 0 VOLTS channels represent the GND input for your circuit. This enables multiple components to be used without the need for multiple connections through one channel.
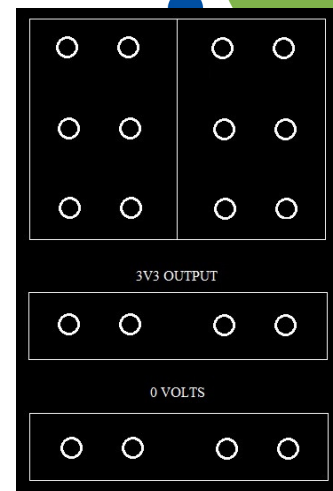
Micro:bit Specific Coding Environment

The micro:bit specific coding environment which includes blocks and Java Script can be found at www.pxt.io as well as information on how to use these coding languages.

Mbed Coding Environment

The mbed coding environment can be used for programming in C/C++. It allows access and full functionality to all of the micro:bit input/output channels. When programming the micro:bit in mbed for use with the breakout board the channels are represented by the processor numbers as per the input/output channels table.

See example below which shows how to represent the channels in mbed. The example will send a digital out signal for 2 seconds to channel 0 on the micro:bit breakout board. It will then stop the signal for 2 seconds. This will repeat indefinitely.

```
1  #include "mbed.h"
2
3  DigitalOut channel0(P0_3);
4
5  float Delay=2;
6
7  int main() {
8      while(1) {
9          channel0= 1;
10         wait(Delay);
11         channel0= 0;
12         wait(Delay);
13              }
14 }
```

External 5V DC Power Supply

The micro:bit breakout board does not include a 5V DC power supply due to the fact that the micro:bit offers up to 3.3 volts using it's battery pack.

If you are using a component that requires a higher voltage you can purchase a compatible 5V DC power supply from the ScienceScope website www.sciencescope.uk.