# KLIP MOTOR DRIVER *for the BBC micro:bit*

TECHNOLOGY DATA SHEET & SPECIFICATIONS

Introduction: The Klip Motor Driver for the BBC micro:bit does much more than simply drive motors; pins 0, 1, 2, 3V and GND are also broken out (just like the main pads on the BBC micro:bit itself), and there's a ZIP LED output as well, along with the battery voltage and another GND connection. All of these pads are designed specifically for use with crocodile clips and banana plugs.

The Klip Motor Driver can run two DC motors simultaneously, both clockwise and counter-clockwise, and at varying speeds. Some examples of a motor to use would be www.kitronik.co.uk/2547 with www.kitronik.co.uk/2594
The ZIP LED output connection is ideally suited for use with the ZIP Hex boards (www.kitronik.co.uk/35140) as they also have croc-clip connections. Finally, the main BBC micro:bit pin breakout section is great for controlling the Kitronik :CITY products: the STOP:bit (www.kitronik.co.uk/5642), the LAMP:bit (www.kitronik.co.uk/5643) and the ACCESS:bit (www.kitronik.co.uk/5646).
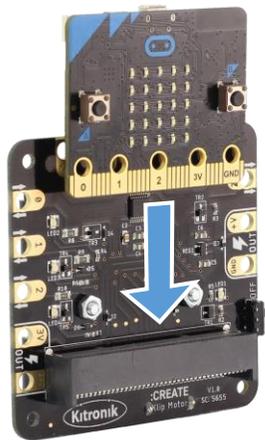
Power is provided via the integrated battery supply (3 x AA, ~4.5V), and the board then produces a regulated 3.3V supply which is fed into the 3V and GND connections to power the connected BBC micro:bit, removing the need to power the BBC micro:bit separately.

Note: If the BBC micro:bit is powered via its USB connector, and there are no batteries inserted, there will be no power at the 3V output connection – this is to provide protection for the BBC micro:bit.

Examples: For some starter ideas of how you could use the Klip Motor Driver board, go to: http://www.kitronik.co.uk/5655

Front View:

Motor 2 Outputs
Motor 1 Outputs
Pin 0 Connection
Pin 1 Connection
Pin 2 Connection
3.3V Output
GND Connection
ZIP LED Output
+V Output
GND Connection
Power Switch
BBC micro:bit Edge Connector

Rear View:

M3 Mounting Hole x4 in corners
3 x AA Battery Cage
70mm
72mm
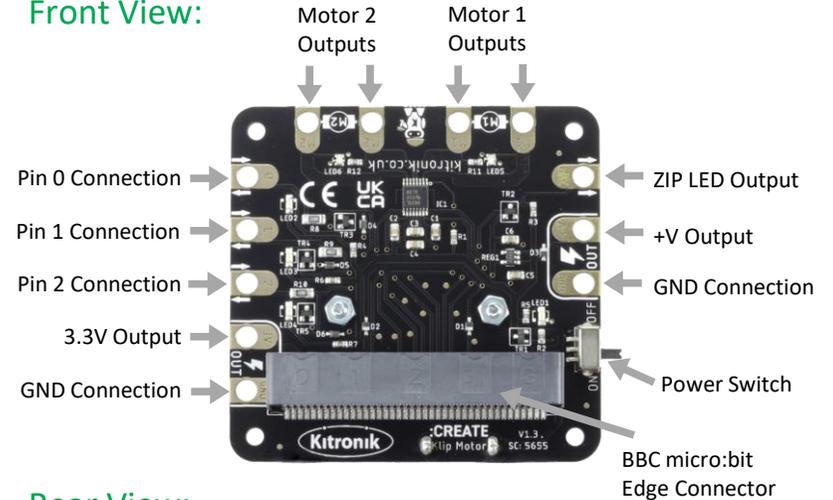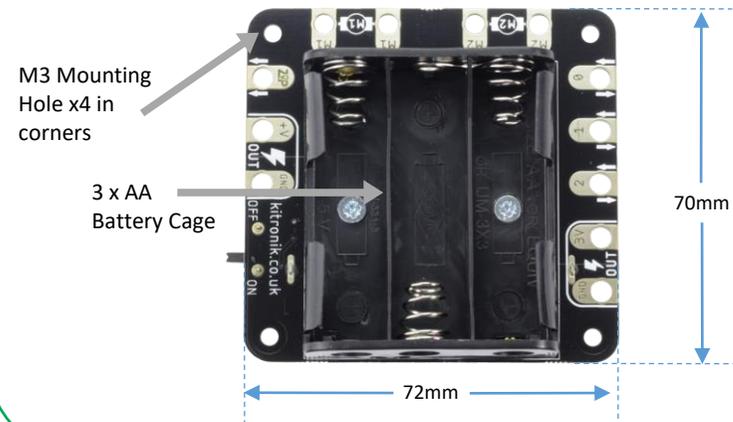
Electrical Information

Operating Voltage (Vcc)	+4.5V (3 x AA batteries – Rechargeable or Alkaline recommended)
Regulated Voltage (supply BBC micro:bit)	+3.3V
Max Current (@ rated Vcc)	6A (Total from switched supply) 150mA (Total from 3V output, allowing 100mA for BBC micro:bit) 15mA (Total from BBC micro:bit IO pins at any one time)
Croc-clip Connections	1 x 3.3V Output 1 x +V Output (battery voltage, maximum output 3A) 2 x GND 3 x BBC micro:bit IO Pins (Pins 0, 1 and 2) 1 x ZIP LED Signal Output 2 x Motor Outputs (2 channels each)

Inserting the BBC micro:bit:

To use the Klip Motor Driver board, the BBC micro:bit needs to be firmly inserted into the edge connector at the bottom of the board. The BBC micro:bit MUST have the LEDs visible to the user in order to be functional, as shown in the image to the right.
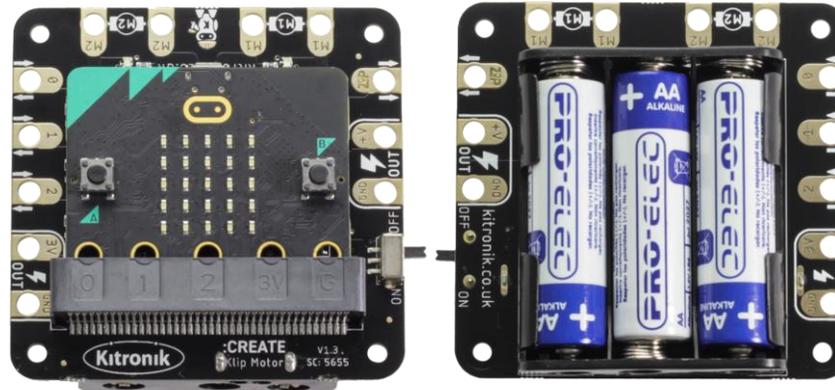
Inserting the Batteries:

The Klip Motor Driver requires 3 x AA batteries to provide power to the connected BBC micro:bit and any extra attached devices. These are shown inserted in the correct orientation in the image to the left.

LED Indicator Function

The Indicator LEDs on the board and their meaning.
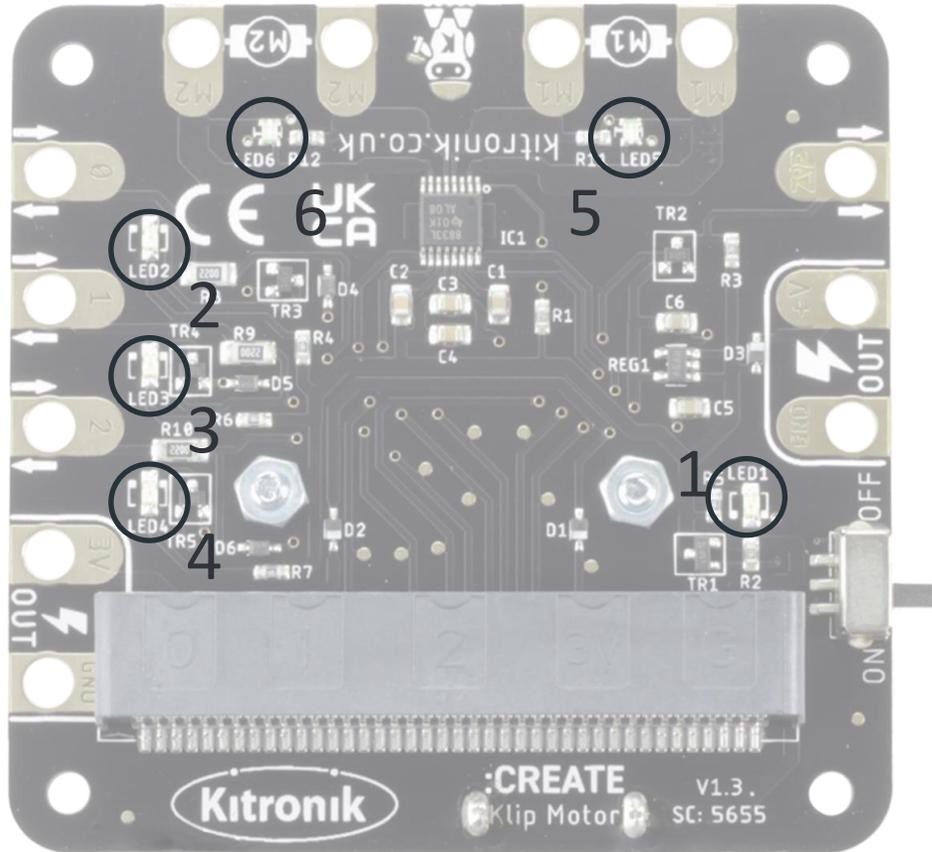
Key:

LED 1 -   *Power Indicator*

LED 2 -   *Pin 0 Indicator (On when the Pin is High)*

LED 3 -   *Pin 1 Indicator (On when the Pin is High)*

LED 4 -   *Pin 2 Indicator (On when the Pin is High)*

LED 5 -   *Motor Indicator (Red one way, Green the other)*

LED 6 -   *Motor Indicator (Red one way, Green the other)*

MakeCode Blocks Editor Code

Klip Motor Extension (https://github.com/KitronikLtd/pxt-kitronik-klip-motor)

turn motor 1 ▼ forward ▼ at speed 0

This block starts a specific motor (either 1 or 2) spinning in a set direction (forward or reverse) at a set speed (0 to 100%).

turn off motor 1 ▼

This block stops a specific motor spinning (either 1 or 2).

set prettyLights ▼ to string of 5 ZIP LEDs

This block sets up the ZIP LEDs attached to the Klip Motor board as a variable, enabling them to be controlled in the program. The number of ZIP LEDs can be changed to match the number connected, but BBC micro:bit pin connection is automatically assigned.

prettyLights ▼ show color ●

This block sets all the ZIP LEDs to be the colour selected in the colour picker (see right), and then makes those changes visible.

prettyLights ▼ show changes

This block makes changes visible on the ZIP LEDs, such as setting individual ZIP LED colours or rotating the LEDs.

prettyLights ▼ turn all ZIP LEDs off

This block turns off all the ZIP LEDs attached to the Klip Motor board.

prettyLights ▼ show rainbow

This block sets a rainbow pattern to be displayed across all the ZIP LEDs attached to the Klip Motor board. It can be used in conjunction with the rotate and show changes blocks to make the rainbow pattern move across all the ZIP LEDs.

prettyLights ▼ rotate ZIP LEDs by 1

This block moves all the colour settings for the ZIP LEDs along a certain number of ZIP LEDs in the string (the default is 1). The rotate block views the string of ZIP LEDs as a continuous loop, so the settings of the last ZIP LED will move to the first ZIP LED and so on.

prettyLights ▼ set brightness to Dim ▼

This block sets the brightness of the ZIP LEDs to one of the four brightness options (see right). These approximate to the following percentages: Dim = 10%, Normal = 50%, Bright = 80%, Super Bright = 100%. (Note: The brightness will only change for events occurring after this block is used).

✓ Dim
Normal
Bright
Super Bright

prettyLights ▼ set ZIP LED 0 to ●
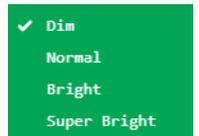
This block sets a particular ZIP LED to be the colour selected in the colour picker. However, this will not be made visible until the show changes block is called. (Note: The first ZIP LED in the string connected to the Klip Motor board will be 'ZIP LED 0', and the numbers count up from there).

There is also a MicroPython code example available at:
https://github.com/KitronikLtd/micropython-microbit-kitronik-klip-motor