Clippable Detector Board for the BBC micro:bit

www.kitronik.co.uk/5678

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Introduction:

The Clippable Detector board for the BBC micro:bit gives the ability to detect light and object, and to follow lines. The board works by using phototransistors to detect the reflectiveness of different surfaces. The board is compatible directly with the BBC micro:bit or other Kitronik boards such as the Klip Motor Board (www.kitronik.co.uk/5655).

The Clippable Detector board has 3 phototransistor sensors evenly spaced out from each other. The sensors provide an analogue voltage to the BBC micro:bit.

Five connections are required for full operation. These connections match those on a BBC micro:bit and can be attached using either bolts or croc-clip leads.
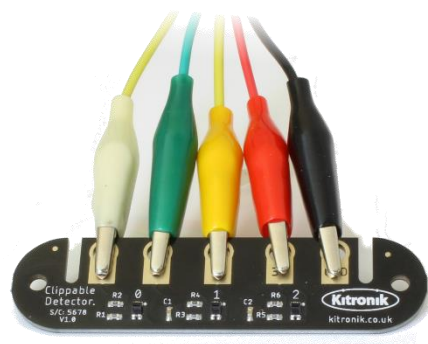
Layout and Dimensions:
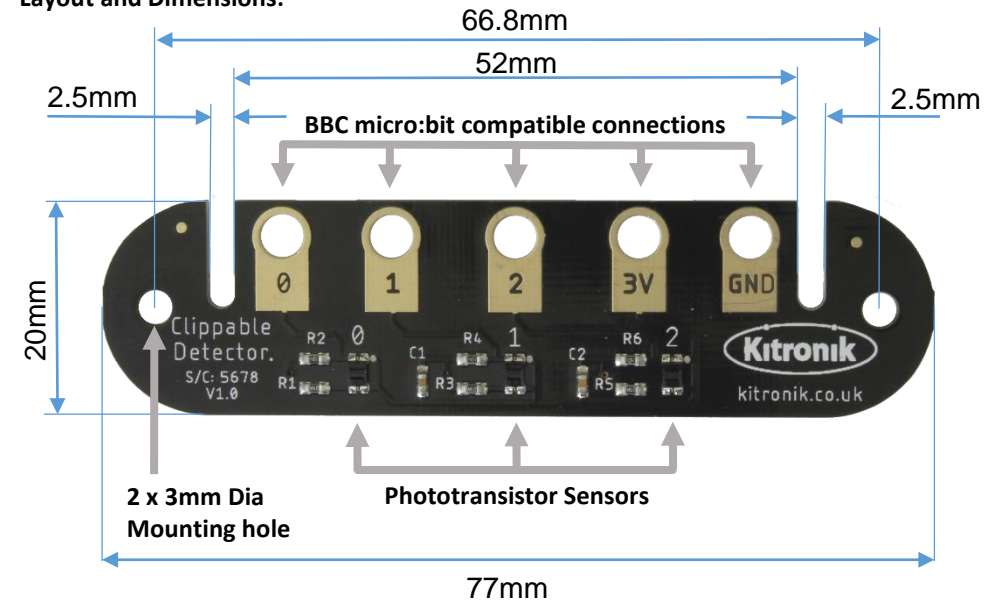
The Clippable Detector board is 2.8mm front to back (including components)

Electrical Specification:

Operating Voltage (Vcc)	2V – 5.5V
Number of output channels	3
Pinout of connector	P0 = Sensor analog output P1 = Sensor analog output P2 = Sensor analog output 3V = Voltage supply GND = Ground connection
Max Current (at 3V)	54mA

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Example Code

The example code uses the custom extensions for the Clippable Detector board and the Klip Motor (www.kitronik.co.uk/5655) for making a line following buggy.

MakeCode Blocks:
Make sure to import the extension into MakeCode by searching "Kitronik".

In the '…more' section of the Clip Detector extension is a block to set the sensitivity of the sensors. This can be switched between low, medium and high. This will be need to changed depending on what surfaces and lines are being used. The block should always be set within the 'on start' section of the code.

In the 'forever' loop, each if statement will check if the sensor on the allocated pin has detected a dark line. If it has, it will stop the motor on the same side. If not, then the motor will continue to drive forwards.

If the sensors are to be set up to detect objects, simply add the 'setup sensors for object detection' block into the 'on start' section of the code. The 'set sensitivity' block is not required in this mode.

Python Code:
The startup code will set reference levels to compare the analogue readings with. This can be customised for the required setup. In the example, each sensor will be set to a different level to show the differences between them.

The current analogue reading from the sensor is then compared to the sensitivity level. Depending on the outcome of the comparison, the display will show the corresponding character for each sensor that has detected.

This can be changed to give a Boolean true or false return, depending on the required coding. This could then be used to control the turning on and off of a motor.

For the MicroPython example code visit our GitHub page:
www.github.com/KitronikLtd/micropython-microbit-kitronik-clipdetector

```
on start
set sensors to Medium sensitivity
```

```
forever
if    sensor on pin P0 detects Dark    then
    turn off motor 2
else
    turn motor 2 forward at speed 75

if    sensor on pin P2 detects Dark    then
    turn off motor 1
else
    turn motor 1 forward at speed 75
```

```python
from microbit import pin0
from microbit import pin1
from microbit import pin2
from microbit import display

detectorSensitivityLow = 500
detectorSensitivityMedium = 400
detectorSensitivityHigh = 300

while True:
    if (pin0.read_analog() >= detectorSensitivityLow:
        display.show("L")
    elif (pin1.read_analog() >= detectorSensitivityMedium:
        display.show("C")
    elif (pin2.read_analog() >= detectorSensitivityHigh:
        display.show("R")
    else:
        display.clear()
```