:CREATE Simple Servo Control Board

TECHNOLOGY DATA SHEET & SPECIFICATIONS

Introduction: The Simple Servo board is designed for simple interface between a BBC micro:bit and being able to control of upto 3 servos.

Connecting the BBC micro:bit into the Simple Servo board is done by simply slotting the BBC micro:bit into the edge connector (see image below).

The board is powered from 3x AA batteries (with attached battery cage) which powers the servo's and is regulated to the required voltage to power a BBC micro:bit. The board includes a power switch to turn the servo's and BBC micro:bit on or off. The power LED at the top of the board indicates when the board is active.

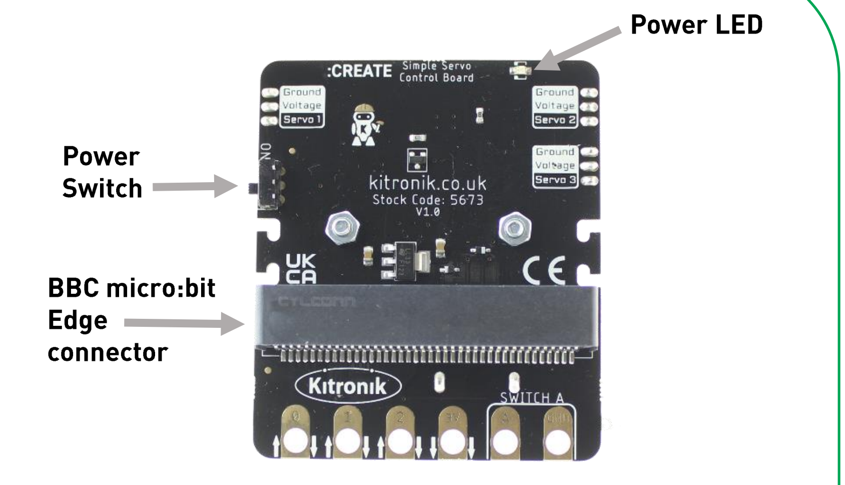
The servo pin header connections are on a 0.1 inch (2.54mm) pitch and are labelled on the board as to which is Power, Ground and Signal.

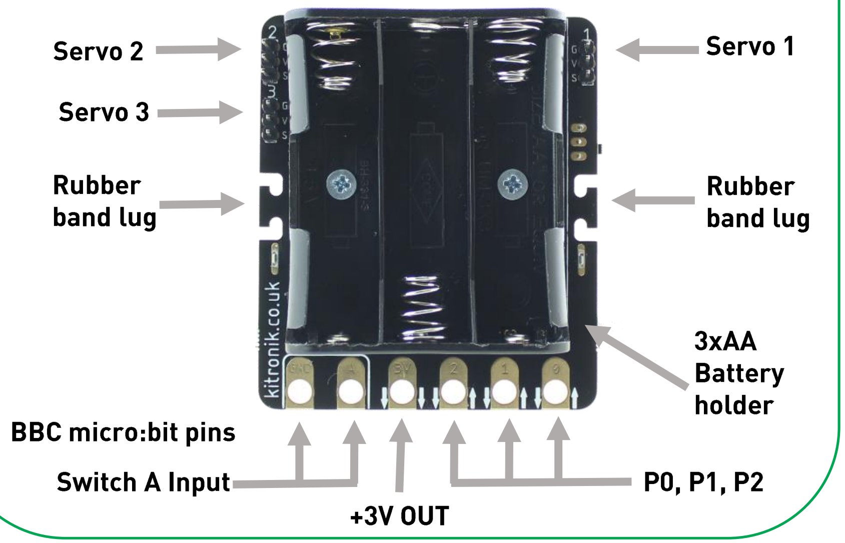
In addition to the servo connections are six croc-clippable pads to add additional circuitry. These pins from the BBC micro:bit are P0, P1, P2 which can be used for inputs and outputs, included as well is Switch A pin for creating your own external switch. Also broken out are 3.3V and a ground connection. These are only for outputting from the board and it is not possible to power the board from these croc-clip pads.

For more details on the electrical specification see the specifications table on the next page.

There is custom software create in MakeCode and microPython for the Simple Servo Board.

The Simple Servo board as two lugs on the side of the board which can be used for tying rubber band to secure to a surface.





Electrical Information

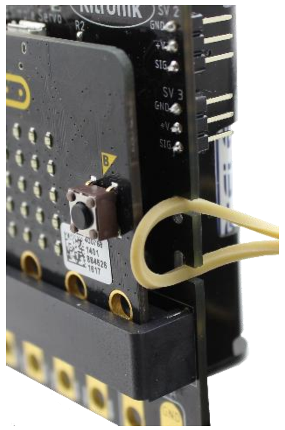
Operating Voltage (Vcc)	3x AA Batteries
3V Output	3V upto 0.75A max
Number of servos	Upto 3 servo's
Servo Connections	GND – Ground connection to the servo +V – Voltage connection to the servo SIG – Controlling PWM signal from the BBC micro:bit to the servo
Additional Input / Output Pins (Digital & Analogue)	P0 – ability to be used as a digital/analog read and write P1 – ability to be used as a digital/analog read and write P2 – ability to be used as a digital/analog read and write Switch A (P5) – primary use is for a switch input

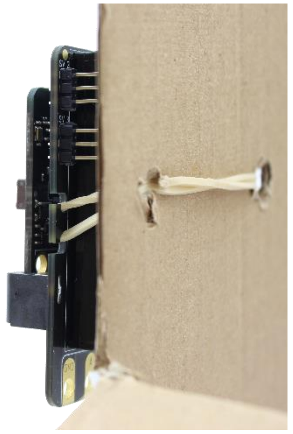
Using the mounting lugs

On the vertical sides of the Simple Servo Control Board there are cutout lugs. These are used to attached the Simple Servo Control Board with a rubber band and not requiring to use tools.

The left image shows the rubber band being looped over one of the lugs.

The right image shows the board attached to a piece of cardboard.





MakeCode Blocks Editor Code

Kitronik have created custom blocks for the Simple Servo board for use with MakeCode.

To add these blocks, first go to makecode.microbit.org and start a new project.
Under the “Advanced” section click on “Extensions”. In the next window search for “Simple Servo”.
Once the icon appears, click on the icon to import it into MakeCode.

The blocks have been separated into two different groups, blocks for 180 degree servo’s and 360 degree servo’s with a generic stop block that can be used for controlling the different types of servos.

Looking at the 180 degree servo blocks, there are two function blocks that can be used.

“set servo angle to…” allows the user to set the selected servo to a requested angle. This can range from 0 degrees to 180 degrees.

“set servo to central position” block when used will return the selected servo back to its central position, this is typically 90 degrees.

The 360 degree servo block has a selection of inputs, first is the required servo to control, followed by the required direction of rotation. The final input is the percentage of speed of rotation of the continuous servo.

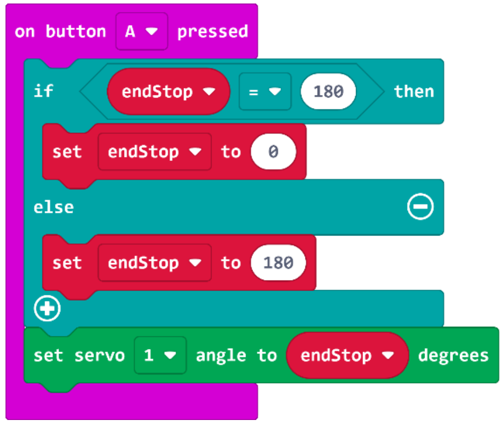
“stop servo” block will stop sending the PWM signal to the servo and the servo will stop driving. To start the servo moving again, any of the previous discussed blocks can be used.

Example Software

The example software (image to the right) uses the button A input to control the servo from a single button interface. In this example a 180 degree servo is being used.

The code first checks with an if-statements if the variable “endStop” is set to 180. If it is, then the variable is changed to be set to 0. The next time around when the button is pressed, the variable will not be equal to 180 and thus will run the blocks in the else section and set “endStop” to 180.

This variable is then used in the “set servo angle” block to set the position of the servo. Each time the button is pressed the servo will change from 0 degrees to 180 degrees.



```
on button A pressed
  if endStop = 180 then
    set endStop to 0
  else
    set endStop to 180
  set servo 1 angle to endStop degrees
```

microPython Class Code

Kitronik have created example code for initialising and controlling the servo's for the Simple Servo Board.

The class code can be found at the Github page:

https://github.com/KitronikLtd/micropython-microbit-kitronik-simple-servo

Example Software

This class needs to be added into the created microPython code before the example code on the right. For this example 180 degree servos will be controlled by the code.

The class will setup the requirements to be able to drive the servo's.

From this all that is needed in the main part of the microPython code is to create an instance. In the example 3 are created called servo1, servo2, sevo3 and assigned one of the three pins that are used on the BBC micro:bit connected to the servo's

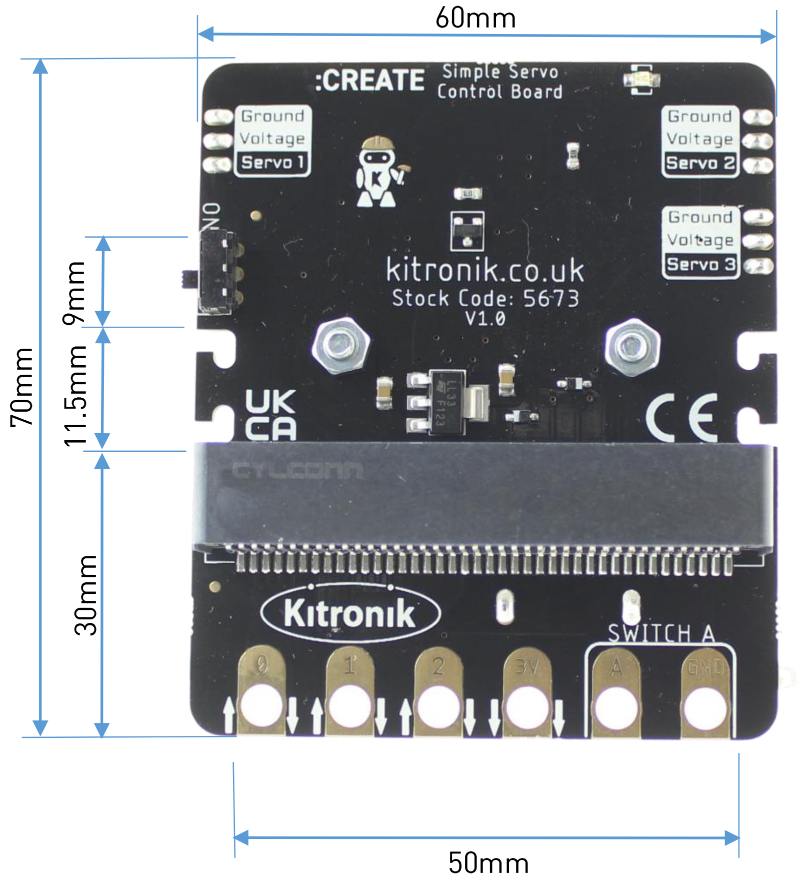
In the while loop, each instance is uses the function "write_angle", for a 180 servo (used in this example) the input range is 0 to 180.

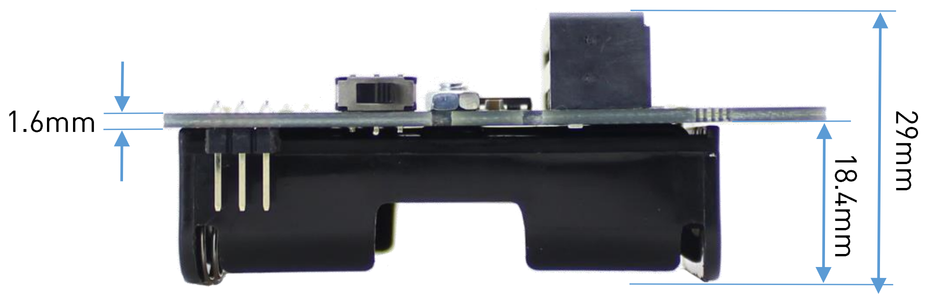
Stepping through the code, each servo is driven to opposite ends with pauses in-between. Then the servos return back to the central position (this is typically 90 degrees). Then the servos are turned off. To start driving the servos again can be done by just using one of the "write_angle" functions.

```
#set a variable for each servo pin
servo1 = simpleServo(pin8)
servo2 = simpleServo(pin15)
servo3 = simpleServo(pin16)

#loop the servos moving from one end stop to the other,
#followed by the servos returning to the centre
#then switch the servos off
while True:
  servo1.write_angle(180)
  servo2.write_angle(0)
  servo3.write_angle(180)
  sleep(1000)
  servo1.write_angle(0)
  servo2.write_angle(180)
  servo3.write_angle(0)
  sleep(1000)
  servo1.write_angle(90)
  servo2.write_angle(90)
  servo3.write_angle(90)
  sleep(1000)
  servo1.stop()
  servo2.stop()
  servo3.stop()
  sleep(1000)
```

Dimensions


60mm
70mm
9mm
11.5mm
30mm
50mm
:CREATE Simple Servo Control Board
Ground
Voltage
Servo 1
Servo 2
Servo 3
ON
kitronik.co.uk
Stock Code: 5673
V1.0
UK CA
CE
Kitronik
SWITCH A
0
1
2
3V
A
GND


1.6mm
18.4mm
29mm