Light Play 2 Blocks for Scratch

Version 0.2 of the Light Play hardware can control 3 rainbow lights and 1 motor. The board has a one input for a resistive sensor, which can either be a pair of alligator clips or a light sensor.

Light Blocks

turn on [all lights, light 1, light 2, light 3]
turn off [all lights, light 1, light 2, light 3]
toggle [all lights, light 1, light 2, light 3]
set [all lights, light 1, light 2, light 3] **color to** [red, orange, yellow, green, blue, purple, white, surprise]
fade [all lights, light 1, light 2, light 3] **to** [red, orange, yellow, green, blue, purple, white, surprise]
fade in [all lights, light 1, light 2, light 3]
fade out [all lights, light 1, light 2, light 3]
set fade speed [slow, faster, fastest]

Motor Blocks

turn on motor
turn off motor
reverse motor
toggle motor
set motor speed [slow, faster, fastest]

Sensor Blocks

when [clips are connected, clips are disconnected, shadow falls on sensor, light shines on sensor]

Byte Codes

All light and motor commands are encoded in a single byte sent from Scratch to Arduino, according to the following scheme:

Light Commands

[u u u x x y y y]
upper bits set command type:
000 = one argument light commands
001 = set color to
010 = fade to
011 = other/expansion
xbits set which light
ybits – other info

One argument light commands

[0 0 0 x x y y y]

the *x* bits select which light:

- 0 0 = all lights
- 0 1 = light 1
- 1 0 = light 2
- 1 1 = light 3

the *y* bits select which other light command:

- 0 0 0 = **turn on light**
- 0 0 1 = **turn off light**
- 0 1 0 = **fade in light**
- 0 1 1 = **fade out light**
- 1 0 0 = **toggle light**
- 1 0 1 = **set brightness low**
- 1 1 0 = **set brightness medium**
- 1 1 1 = **set brightness high**

Two argument light commands

set color to

[0 0 1 x x y y y]

the *x* bits select which light:

- 0 0 = all lights
- 0 1 = light 1
- 1 0 = light 2
- 1 1 = light 3

the *y* bits select which color:

- 0 0 0 = red
- 0 0 1 = orange

0 1 0 = yellow
0 1 1 = green
1 0 0 = blue
1 0 1 = purple
1 1 0 = white
1 1 1 = surprise

fade to

[0 1 0 x x y y y]

the *x* bits select which light:

0 0 = all lights
0 1 = light 1
1 0 = light 2
1 1 = light 3

the *y* bits select which color:

0 0 0 = red
0 0 1 = orange
0 1 0 = yellow
0 1 1 = green
1 0 0 = blue
1 0 1 = purple
1 1 0 = white
1 1 1 = surprise

Other kinds of light commands / expansion

[0 1 1 x x y y y]

the ybits select which other command

set fade speed

[0 1 1 x x 0 0 0]

xbits select speed:

0 0 = slow
0 1 = faster
1 0 = fastest

Motor commands

[1 0 0 x x y y y]

the *x* bits are currently unused

the *y* bits select which motor command:

0 0 0 = **turn on motor**
0 0 1 = **turn off motor**
0 1 0 = **reverse motor direction**
0 1 1 = **toggle motor**
1 0 0 = **set motor speed slow**

1 0 1 = **set motor speed faster**
1 1 0 = **set motor speed fastest**

Sensor codes

No sensor related commands sent from Scratch are necessary. The Arduino will do edge detection in its main event loop and transmit a byte to Scratch only when it detects an edge. The Scratch when blocks trigger on receipt of a byte.

A “0” signifies a “falling edge” – a transition from a high resistance to a low resistance state, that occurs when the metal clips are connected . A “1” signifies a “rising edge” – a transition from a low resistance to a high resistance state, that occurs when the metal clips are disconnected.

A “2” signifies a transition though a threshold that occurs when a shadow falls on a light sensor .
A “3” signifies a transition though a threshold that occurs when a light shines on thesensor