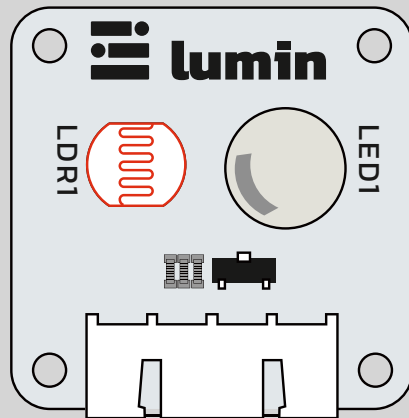


amomii Lumin

DATASHEET



Description

The amomii Lumin module is a versatile device that combines a powerful white LED and a Light-Dependent Resistor (LDR) to function as both a controllable light source and a light sensor. When used in tandem, these two components enable the Lumin to act as a grayscale sensor, capable of detecting different shades of gray, black, or white based on reflected light. This dual functionality makes the Lumin a foundational component for projects requiring light control, light detection, or grayscale differentiation.

Key Features

Dual Functionality: Serves as both a controllable LED and a light sensor in a single, compact module.

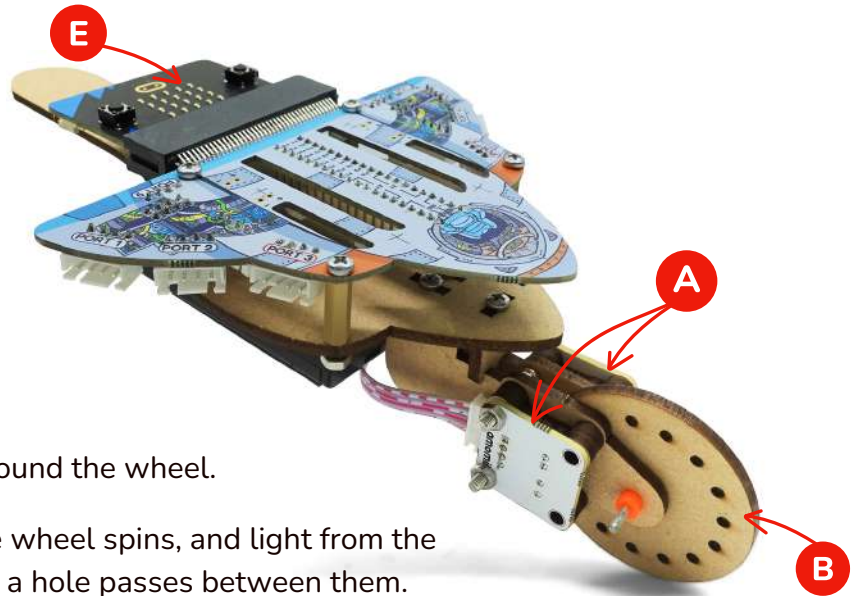
Grayscale Sensing: Can be used to detect varying levels of light reflection, making it ideal for distinguishing between different shades of black and white.

Digital and Analog Signals: The integrated LED is controlled by a digital signal, while the LDR provides an analog reading that corresponds to light intensity.

Example Applications

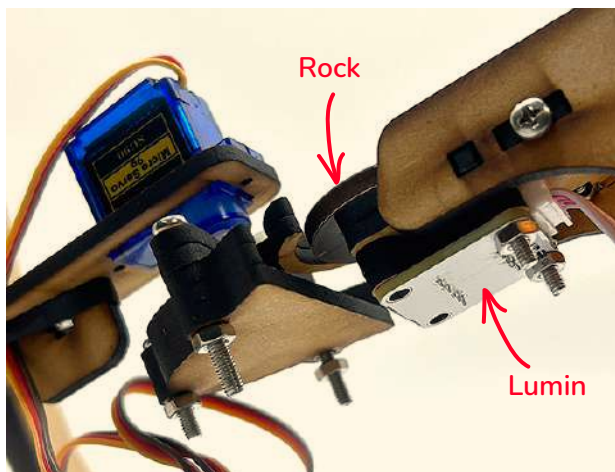
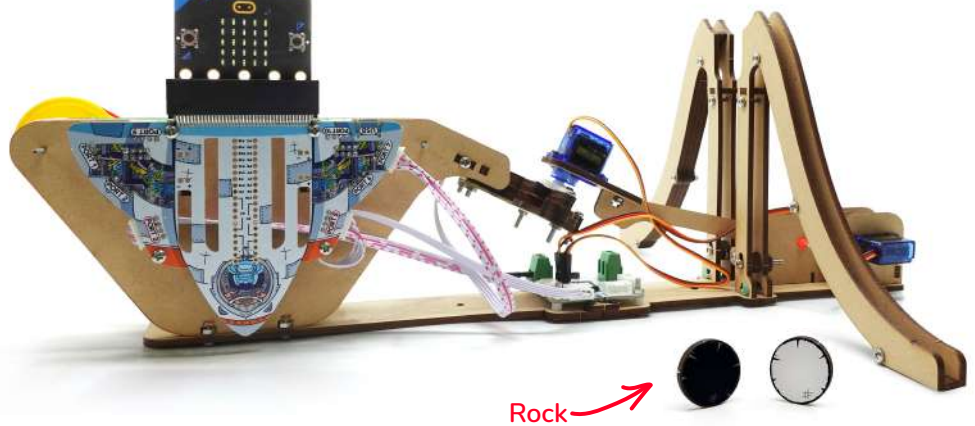
● Space Finder

- A** Two Lumin modules are mounted facing each other. One is used to shine light with its LED, and the other is used to detect the light with its LDR.
- B** There are evenly spaced holes around the wheel.
- C** When the machine is pushed, the wheel spins, and light from the LED shines on the LDR each time a hole passes between them.
- D** By counting how many times this happens, we can calculate the distance traveled!
- E** We use the buttons on the micro:bit to control the machine and the LED matrix to display results.

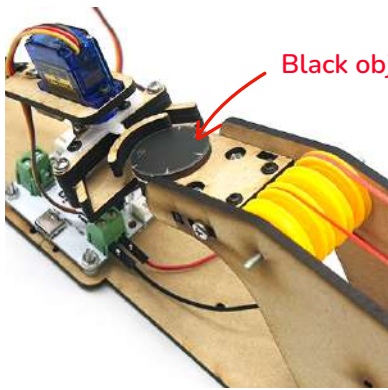


● Rock 'n' Roller

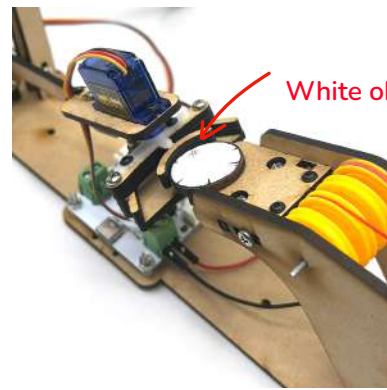
The Lumin module is transformed into a grayscale sensor for the Rock 'n' Roller project, where its purpose is to sort black and white rocks (wooden discs with stickers attached).



The Lumin module's LED shines light directly onto a rock, and the LDR measures the amount of light that reflects back.



The system is calibrated to recognize that black objects absorb most of the light and reflect very little, resulting in a low LDR reading.



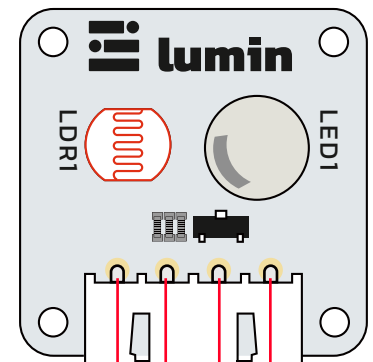
Conversely, white objects reflect most of the light, leading to a high LDR reading.

Connections

The Lumin module features a 4-pin XH connector with the following pinout:

The module is compatible with voltages ranging from 3V to 5V. It is important to ensure that the voltage supplied to the VCC pin is the same as the maximum voltage that the analog input can handle. For example, when using an Arduino Uno, you would supply 5V, while with the micro:bit and Bolt Board, you should supply 3.3V. The Bolt Board is specifically designed to provide the correct voltage, making it a safe and convenient option.

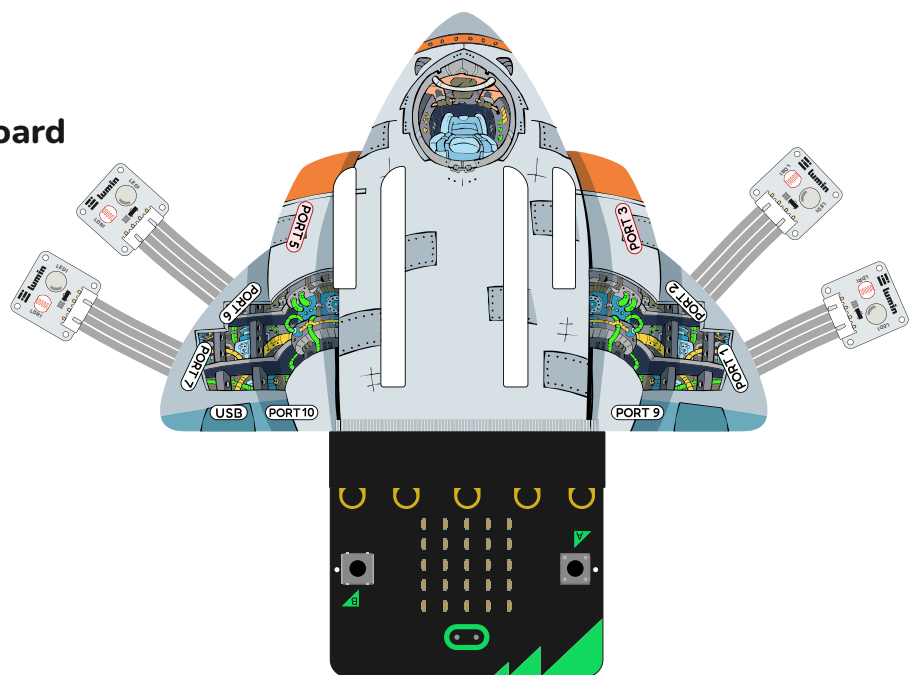
The LED pin does not directly power the LED. Instead, it serves as a signal to a MOSFET (Metal-Oxide-Semiconductor Field-Effect Transistor) on the module. This design allows the LED to be controlled safely with low-power signal level microcontrollers without drawing too much current.



GND (Ground)
VCC (Voltage)
LDR (Light-Dependent Resistor)
LED

• Connecting to The Bolt Board

The Bolt Board has multiple ports, but due to the need for an analog input from the LDR, the Lumin module is compatible with a limited number of them. The Lumin module can be connected to the Bolt Board using Ports **1, 2, 6, and 7**. These ports provide both power and the necessary analog pin to read data from the LDR.



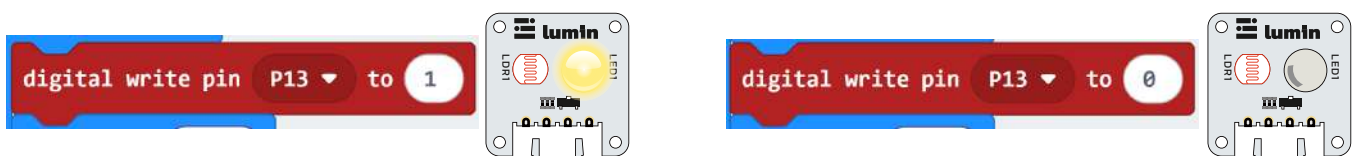
Coding

The Lumin module's dual functionality is controlled using a few key blocks in MakeCode. To keep the description concise, we will assume that a single Lumin is being used and is connected to the Bolt Board's Port 2.

● Controlling the LED

The LED is controlled using a 'digital write' block found in the Pins drawer. This block takes two parameters:

- The pin number on the micro:bit (P13 for the Lumin's LED).
- A digital signal, which can be a 1 (HIGH) to turn the LED on or a 0 (LOW) to turn it off.



● Reading the LDR

To read the light level from the LDR, you use the 'analog read pin' function, which is not a traditional block but a value-returning function.

- You must specify the pin you are reading from, which is P2 for the LDR on the Lumin module.
- The function returns an analog value ranging from 0 to 1023.
- A value close to 0 indicates complete darkness, a value close to 1023 indicates very bright light, and a value in between represents a dimmer light.



● Using the Lumin as a Grayscale Sensor

The Lumin module acts as a grayscale sensor by shining its LED light onto an object and then using the LDR to measure the amount of light that reflects back.

- Black objects absorb most light, resulting in a low analog reading from the LDR.
- White objects reflect most light, resulting in a high analog reading from the LDR. By reading the analog value from the LDR and comparing it to a predefined threshold, you can program the micro:bit to differentiate between black and white objects. The Rock 'n' Roller project uses this principle to sort rocks based on their color.

● Simple Coding Example

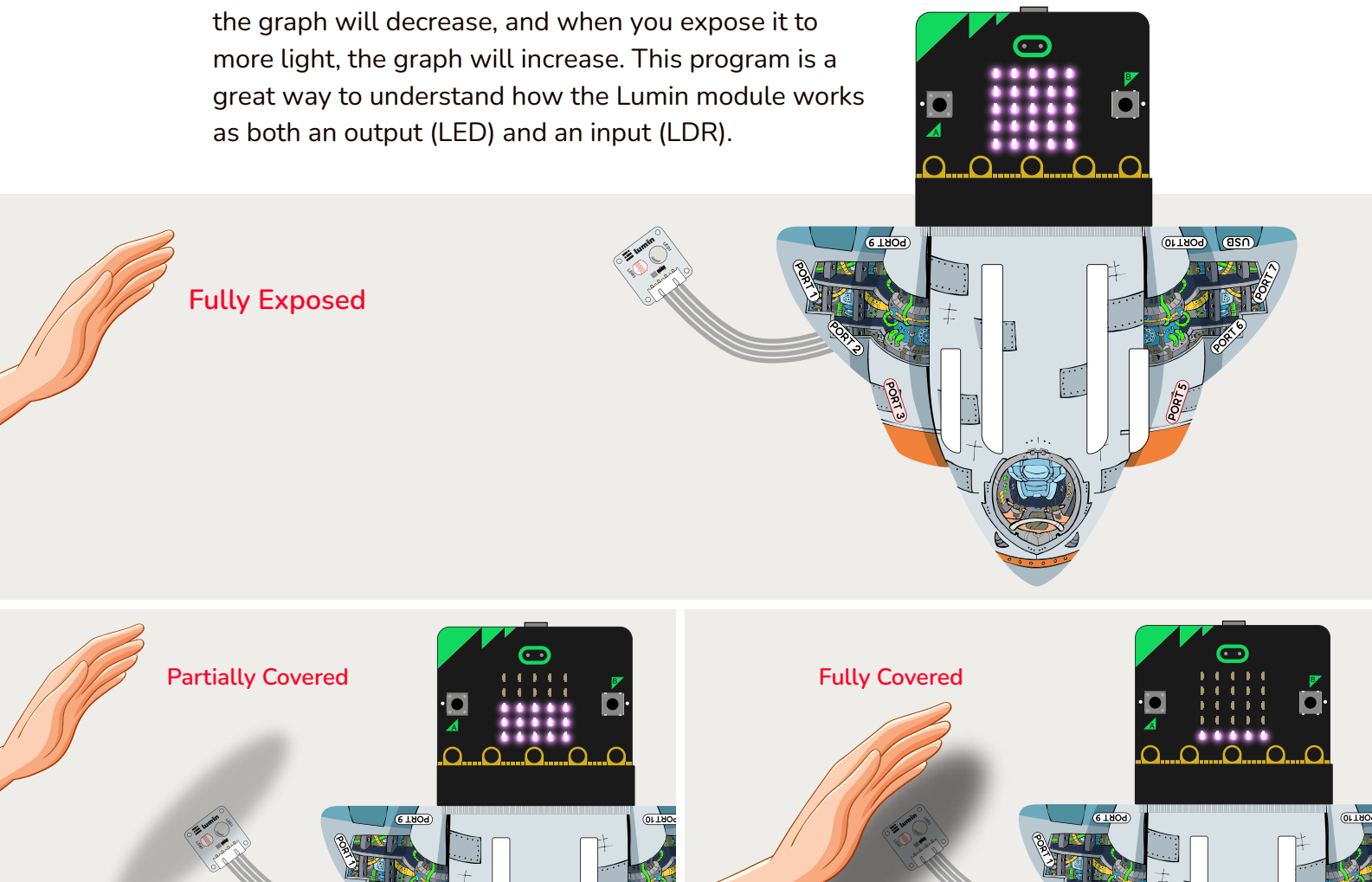
For this example, we will carry on with the Lumin module connected to Port 2 on the Bolt Board. Remember to adjust the pin numbers accordingly if you are using another port. The Lumin module's LED will be connected to the micro:bit's P13 and the LDR to P2.

This program will make the Lumin's LED blink twice at the beginning to show that you have control. Then, in the forever loop, it will read the light level from the LDR and display it on the micro:bit's LED matrix as a bar graph.

```
on start
  digital write pin P13 to 1
  pause (ms) 500
  digital write pin P13 to 0
  pause (ms) 500
  digital write pin P13 to 1
  pause (ms) 500
  digital write pin P13 to 0
  pause (ms) 500
forever
  plot bar graph of analog read pin P2 up to 1023
```

> What to expect:

- When you run the program, the LED on the Lumin module will blink twice.
- The micro:bit's LED matrix will display a bar graph representing the light level. When you cover the LDR, the graph will decrease, and when you expose it to more light, the graph will increase. This program is a great way to understand how the Lumin module works as both an output (LED) and an input (LDR).



Safety and Best Practices

The Lumin module is designed to be a safe and educational tool. To ensure a positive learning experience, please follow these best practices:

- **Compatibility:** The Lumin module was designed specifically for use with the Bolt Board (via the Ports mentioned in this doc ONLY). While it can be used with other microcontrollers, it is crucial to verify that the voltage and pin requirements are compatible to avoid damage. Incorrect connections can cause irreversible harm to the components.
- **Troubleshooting:** If the module becomes warm to the touch, immediately disconnect the power and allow it to cool down before inspecting the connections. If the issue persists, please contact amomii technical support.
- **Proper Handling:** Use caution when connecting and disconnecting the module to avoid bending pins.

By following these simple guidelines, you can ensure a safe and enjoyable experience with the Lumin module.

Revision History

Date	Revision	Changes
September. 01. 2025	1	First release