

# makeblock

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makeblock

neuron explorer kit

User Manual



# Foreword

Thank you for purchasing Makeblock Neuron.

This manual mainly includes the detailed descriptions for each block of the Neuron and the various combinations of blocks. We also provide a quick start guide in our product package. Before you read this manual, we recommend that you get to know how to play with the Neuron by referring to the quick start guide.

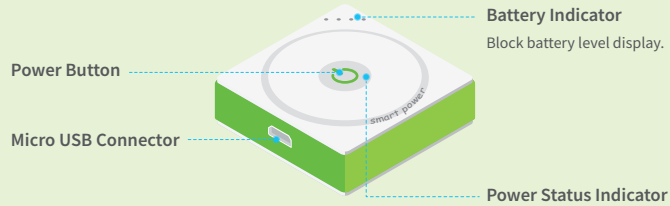
For more examples and documents, please visit the website:

<http://www.makeblock.com/steam-kits/neuron/>



## Smart Power

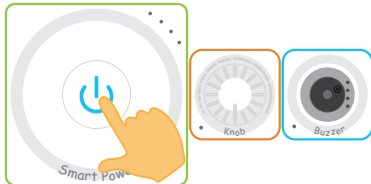
Supply power to other blocks. The built-in Bluetooth block allows you to connect the blocks to your phone or tablet and to program the blocks.



## How does it work?

### A. Supply power to other blocks.

Press the power button to power it on so that it can provide power to other blocks. To turn it off, long press the power button for about 3 seconds until all lights are off.



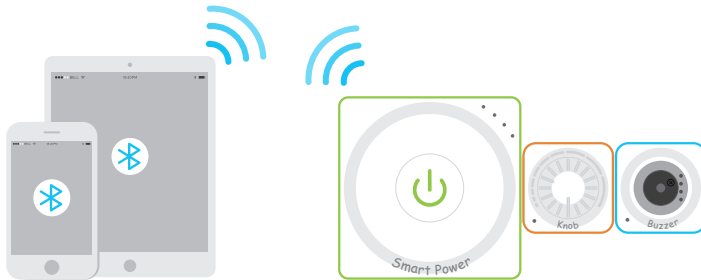
If the smart power is turned on but is not connected to other blocks, it will be automatically off after 16 seconds. Double press the power button to cancel or restart the function.

After the smart power block is turned on, the initialization will take about 1 second and the power status indicator will keep solid green during the initialization process.



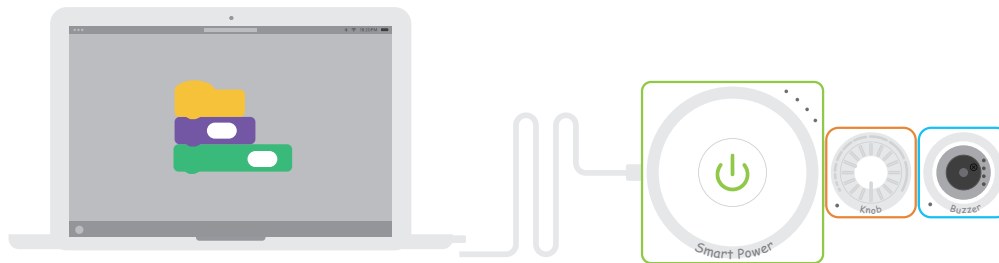
B. Connect Neuron to a mobile phone or tablet via Bluetooth and uses the Neuron app or Swift Playgrounds to program the blocks.

The power status indicator will turn green when the Bluetooth connection is completed.



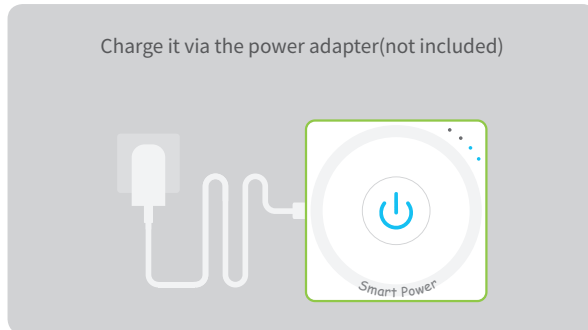
C. Connect blocks to computer via a USB cable and use mBlock 5 to program the blocks.

The power status indicator will turn green when the connection is completed.

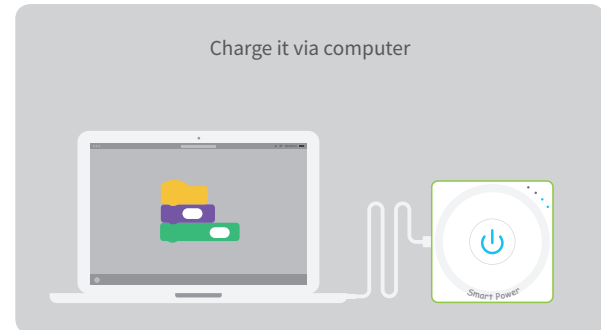


## Charge the smart power block

We recommend you to charge your smart power block when the last indicator is blinking.



OR



Tips: Please charge the block every three months when you set it aside.

## Specifications

Battery Capacity	950mAh	Input Current	< 1A
Output Voltage	DC 5V	Operating Temperature	0°C ~ 45°C
Input Voltage	DC 5V	Storage Temperature	-10°C ~ 55°C
Bluetooth transmission distance	Within 10 meters	Bluetooth Specification	BT 4.0
Frequency Band	2402 ~ 2480MHz	Output Power Class	≤ 4dBm



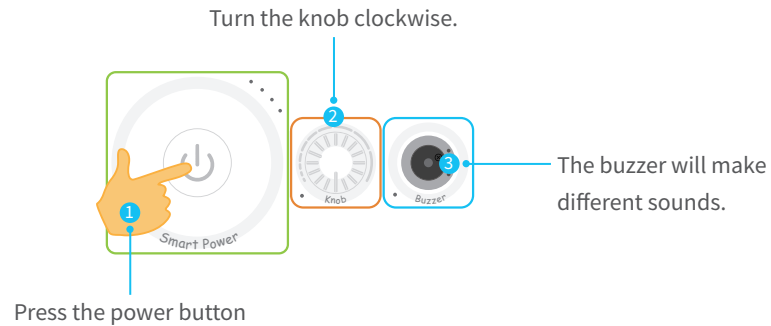




## Knob

The knob is an input block which is used to adjust values. When you connect the knob to output blocks, you can adjust the output effects by turning the knob. It's just like you adjust the volume by turning the knob on the speaker in daily life.

## Have a try!

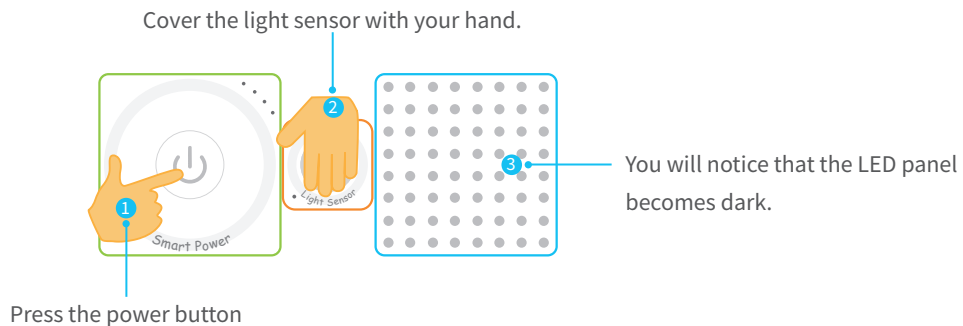




## Light Sensor

The light sensor can detect the intensity of light in the surrounding environment. The stronger the intensity of light received by the block, the stronger the output signal will be. In everyday life, the brightness of mobile phone screen will automatically change in response to the ambient light condition, which is credited to the light sensor.

Have a try!





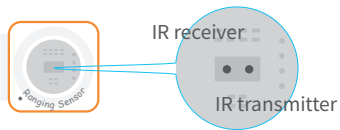
## Ranging Sensor

Ranging sensor can be used to measure distance between the block and the obstacle.  
Measurement range: 2cm ~ 200cm.

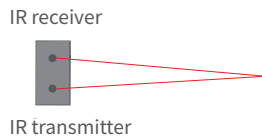
### Science Tips

How does the ranging sensor measure distance?

The ranging sensor includes an IR transmitter and an IR receiver.

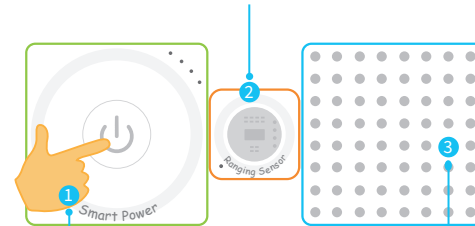


The IR transmitter emits infrared light which will be reflected when it hit an obstacle. After the reflected infrared light is received by the IR receiver, the distance between the obstacle and the block can be calculated by the time lag between transmission and reception.



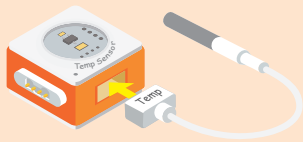
### Have a try!

Place your hand over the ranging sensor and gradually move your hand away from the sensor.



Press the power button

More lights will turn red on the LED panel.



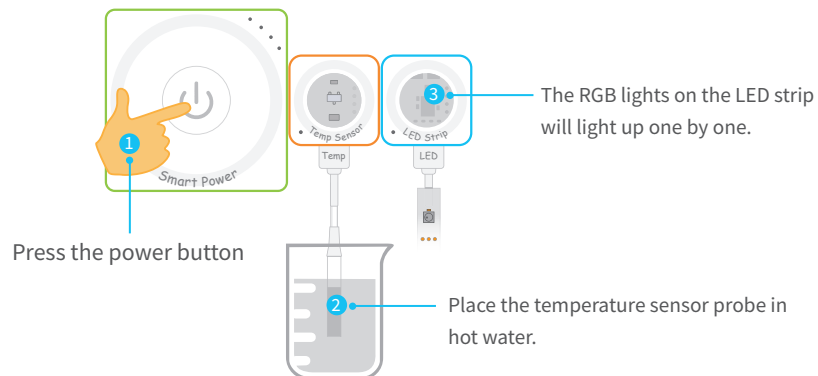
## Temperature Sensor

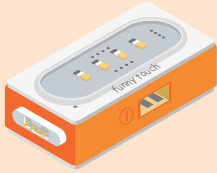
Plug the temperature probe into the slot. The temperature sensor can detect temperatures ranging from  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .

Accuracy:  $\pm 0.5^{\circ}\text{C}$  ( $-10^{\circ}\text{C} \sim 85^{\circ}\text{C}$ )

The probe cable of the temperature sensor may be damaged if temperature exceeds  $100^{\circ}\text{C}$ . Please use it carefully to avoid damaging the device.

Have a try!



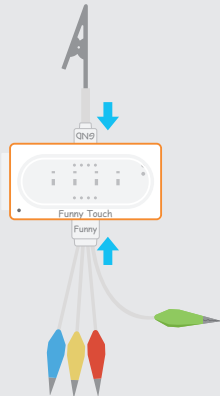


## Funny Touch

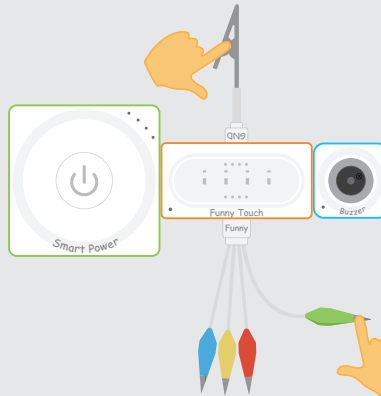
By connecting the Funny Touch to conductive objects (such as bananas, water) to turn the object into a touch switch. Check the conduction status between the Funny Switch and the GND wire to achieve simple and fun effects.

### How does it work?

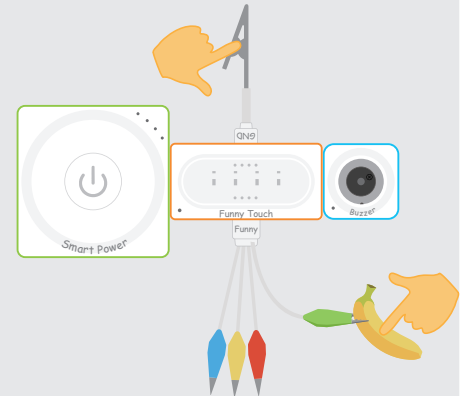
Plug the Funny Switch into the slot 1, plug the GND wire into the slot 2.

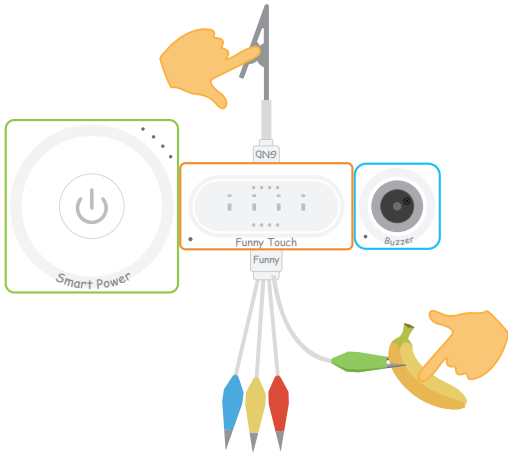


Connect blocks and touch the metal part of Funny Switch with one hand and the metal part of the GND wire clip with another hand. Look, the blocks chain starts to work now!



Use a Funny Switch to clip on a conductive object, such as a banana. Touch the banana with one hand and the metal part of the GND wire clip with another hand. See what will happen!





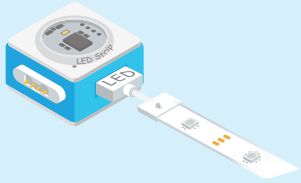
After the Funny Touch is connected to the buzzer, you can touch Funny Switches of different colors or touch several Funny Switches at the same time. Listen, the buzzer is making different sounds!



Colors of the Funny Switches	Musical alphabet	Sol-fa syllables
Blue	C4	Do
Yellow	D4	Re
Red	E4	Mi
Green	F4	Fa
Red, Green	G4	Sol
Yellow, Green	A4	La
Yellow, Red, Green	B4	Ti
Yellow, Red	C5	Do+
Blue, Red, Green	D5	Re+
Blue, Yellow, Red, Green	E5	Mi+
Blue, Green	E3	Mi-
Blue, Yellow, Green	F3	Fa-
Blue, Yellow, Red	G3	Sol-
Blue, Red	A3	La-
Blue, Yellow	B3	Ti-

## Output Blocks

The output block receives the signal from the input block and gives corresponding responses, such as making sounds and rotating the motor. In our everyday life, output blocks can be seen everywhere, like neon lights, alarms and so on.



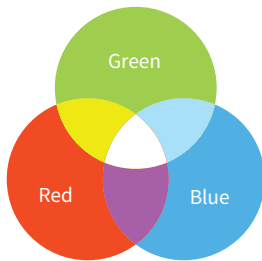
## LED Strip Driver + LED Strip

Insert the LED strip into the LED strip driver slot. The LED strip contains 15 RGB lights. With the Neuron app or mBlock 5, you can program the RGB lights to change their colors.

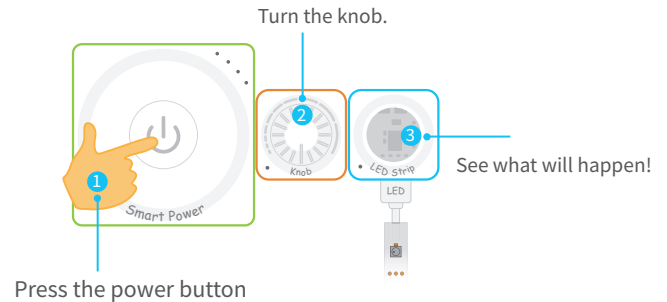
## Science Tips

Why do the RGB lights have so many colors?

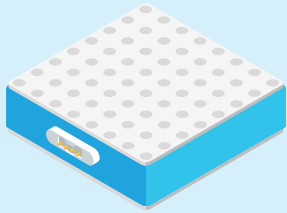
The RGB is an additive color model in which red, green and blue lights add together to reproduce nearly 16.78 million colors.



## Have a try!



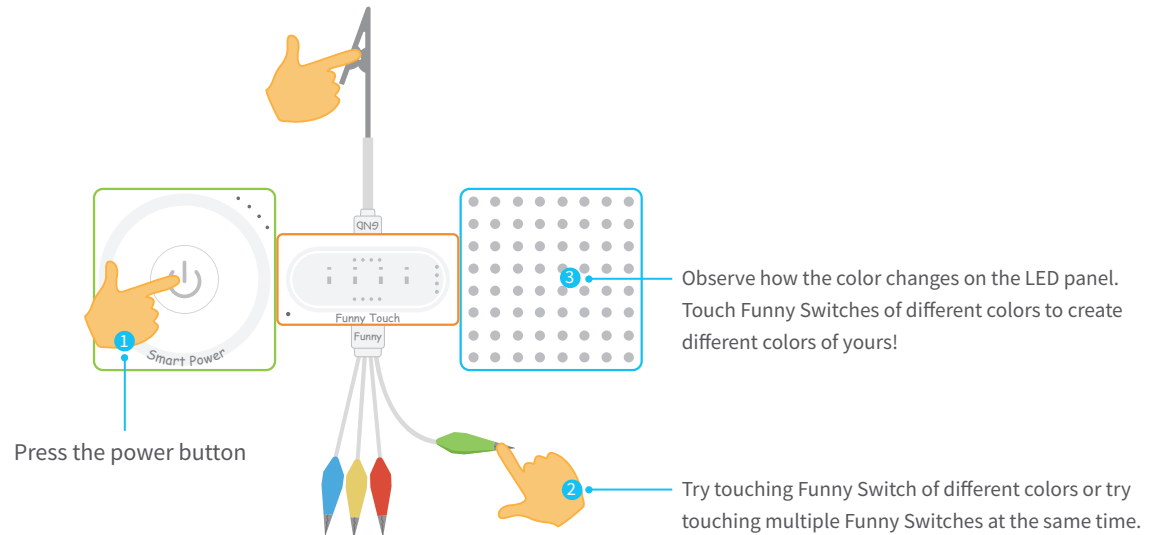




## LED Panel

The LED panel contains 64 RGB lights. With the Neuron app or Swift Playgrounds, you can program the RGB lights to change their colors.

Have a try!



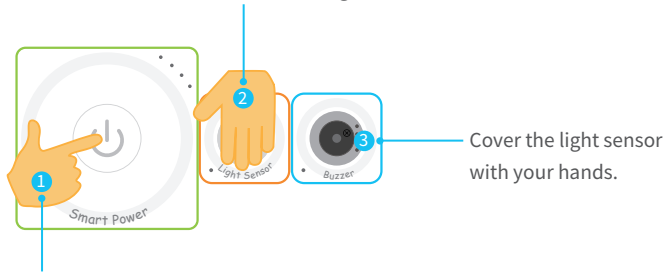


## Buzzer

The buzzer will make a sound when it receives an on signal. Programming the buzzer with the Neuron app or Swift Playgrounds can get different sound effects.

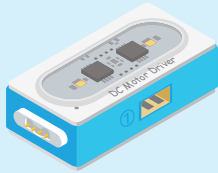
Have a try!

The sound of the buzzer changes.



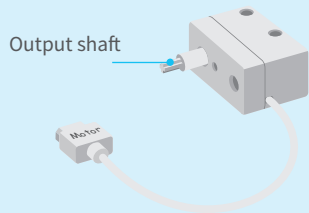
Press the power button

Cover the light sensor with your hands.



## Dual DC Motor Driver

The DC (Direct Current) motor driver can drive two DC motors simultaneously.



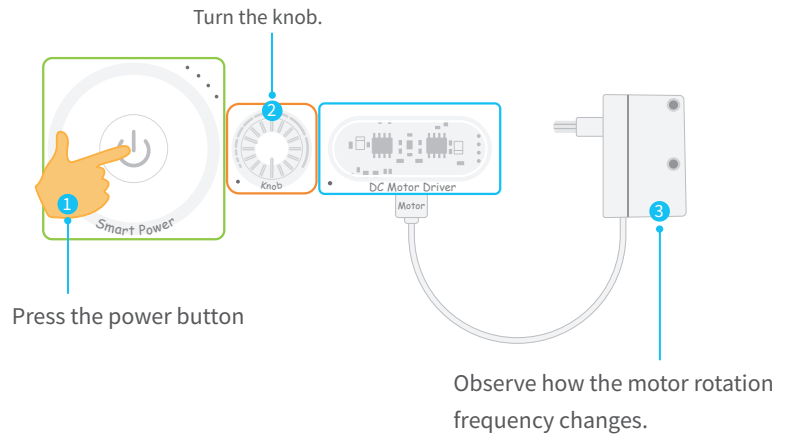
## DC Motor

Plug the motor into the dual DC motor driver's slot. The DC motor includes an output shaft. When the motor driver receives an on signal, the output shaft starts to rotate. The motor is compatible with LEGO parts.

## Motor Specifications

Rated Speed	12000±10% RPM
Rated Current	≤85 mA
Stall Torque	≥ 28 gf.cm
Stall Current	≤0.88 A
Gear Ration	1:48

Have a try!



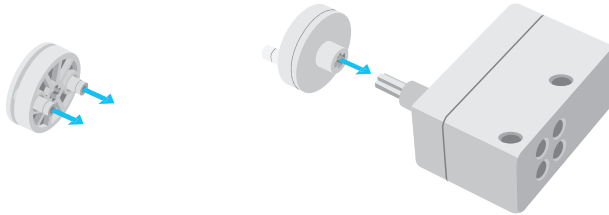


## Motor connector

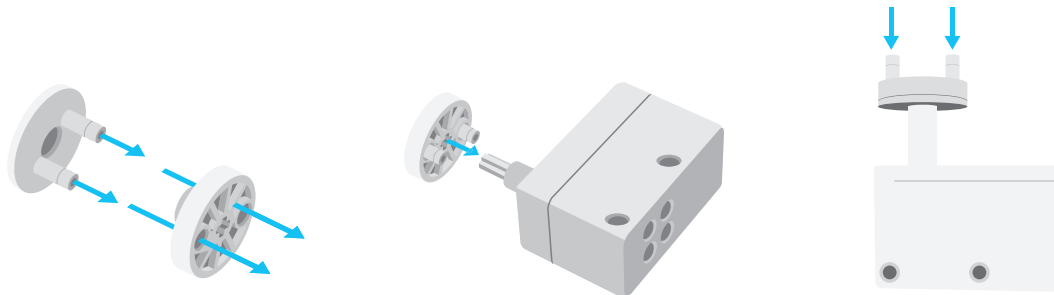
Used to fix the motor and paper craft.

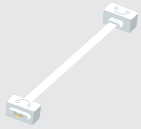
### How does it work?

#### Building instructions



#### Dismantling instructions





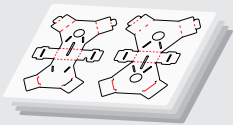
## Magnet Wire

Provide more flexible ways to connect blocks.



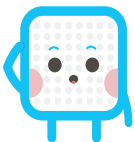
## USB Cable

Used for power supply and data transmission.



## Project Materials Package

We provide a wide range of building materials and electronic blocks. You can build your own projects like Piano and LED Sword. To get access to building guides, please sign in for the Neuron app or Swift Playgrounds.



### Why does the program stop running after exiting the Makeblock Neuron app?

The smart power block can not store programs, so it needs the app to run the program online.

### What should I do if the blocks give no response?

It might be caused by the following reasons:  
When not using the Neuron app or mBlock 5, the input block is not connected to the left of the output block.

The Neuron firmware upgrade process is interrupted (due to poor connection). Please try to upgrade firmware again.

The silicone case of the block was installed improperly, which may cause poor contact. Please make sure the silicone case is put in the correct place.

### Why does the Funny Touch block fail to work properly?

It might be caused by the following reasons:  
The power supply is unstable. Please use a high quality power adapter or a high quality portable power.

Mistakenly plug the Funny Switch to slot 2 and the GND wire to slot 1, please replug them to the correct slots.

### Why is the battery life getting poorer?

The smart power block uses a lithium-ion battery, multiple charges and discharges may decrease the battery life gradually.

To check more FAQs, please visit: <http://www.makeblock.com/cn/steam-kits/neuron>

**FCC STATEMENT:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

**RF warning statement:**

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

**IC STATEMENT:**

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.



Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



#### DECLARATION OF CONFORMITY

Declaration of conformity Hereby, Makeblock Co., Ltd., declares that this product is in compliance with the essential requirements and other relevant provisions of Directive RED 2014/53/EU and the RoHS directive 2011/65/EU

#### Caution:

Recommended for children of ages 6+.

Not suitable for children under ages 3.

Children need to be accompanied by adults when using the product.

To avoid the product damage, please don't disassemble, repair or modify this product yourself.



**WARNING:**

CHOKING HAZARD

- Small parts. Not for children under 3 years.  
Children to use only under adult's supervision.