@Makeblock

makeblock

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www.makeblock.com

D1.1.1_KD010105000

makeblock

neuron explorer kit

User Manual

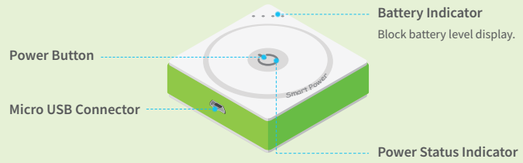
Foreword

Thank you for purchasing Makeblock Neuron.
The manual includes detailed descriptions for each block of the Neuron, and various examples of combinations of blocks. Before reading this manual, we recommend that you get to know the Neuron by firstly referring to the quick start guide, provided in the product package.

For more examples and multilingual user manuals, please visit:
更多玩法及多國語使用手冊下載，請查看網站：
Voor meer voorbeelden en meertalige gebruikershandleidingen, bezoek:
Pour plus d'exemples et de manuel de l'utilisateur dans d'autres langues, veuillez vous rendre sur:
Weitere Beispiele und mehrsprachige Benutzerhandbücher finden Sie unter:
Per ulteriori esempi e manuali utente multilingue, visita:
更なる遊び方及び多言語ユーザーマニュアルにつきましては、こちらのウェブサイトをご参照ください：
더 많은사례와 다국어 사용자 설명서를 보려면 다음을 확인해 주세요 :
Para mais exemplos e manuais de utilizador em várias línguas, visite:
Чтобы получить дополнительные материалы и документы на нужном вам языке, пожалуйста, посетите следующую web-страницу:
Para más ejemplos y manuales de usuario en más idiomas, por favor visita:
http://www.makeblock.com/steam-kits/neuron/

Energy & Communication Blocks

The energy and communication blocks provide power to the other blocks.
The communication blocks facilitate a variety of wireless communication. The blocks can communicate wirelessly with smart phones, tablets, and computers. The communication blocks can also make two series of blocks communicate with each other wirelessly.



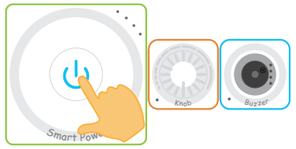
Smart Power

Supplies power to other blocks. The built-in Bluetooth module allows the Neuron to be connected to smart phones, tablets or computers, where the blocks can be programmed.

How does it work?

A. Supplies power to the other blocks.

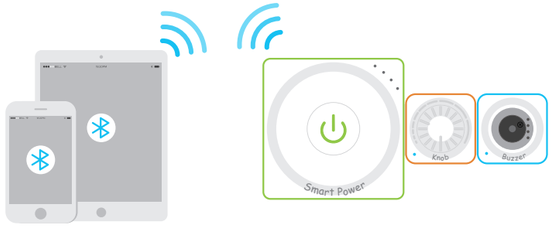
Press the power button to turn on the smart power block. To turn it off, hold the power button for around 3 seconds until all lights disappear.



If the smart power block is turned on but not connected to other blocks, it will automatically turn off after 16 seconds. Double click the power button to cancel or restart the function.
When the smart power block is turned on, an initialization period of 1 second occurs. During this period, the power status indicator will be remain solid green.

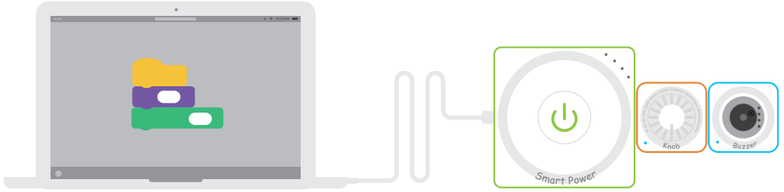
B. Connect Neuron to a mobile phone or tablet via Bluetooth and use the Neuron app or Swift Playgrounds to program the blocks.

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



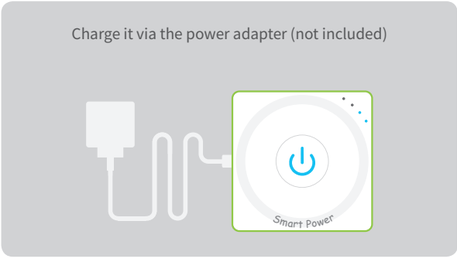
C. Connect blocks to computer via a USB cable and use mBlock 5 to program the blocks.

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

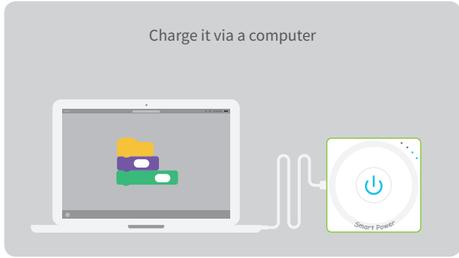


Charge the smart power block

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



OR



Tip: If the smart power block is not in regular use, charge it at least once every three months.

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

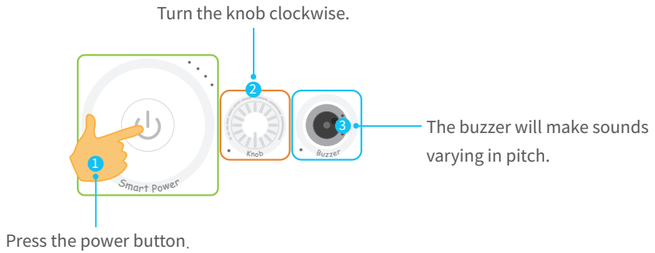
Input Blocks

The input blocks receive information such as sound, light, images or motions, from the environment. The information is converted into electrical signals and transmitted to the output blocks. These signals instruct the output blocks how to respond. Input blocks exist abundantly in daily life, like light switches and volume knobs.

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 works the same way as adjusting the volume on a speaker by turning the knob.

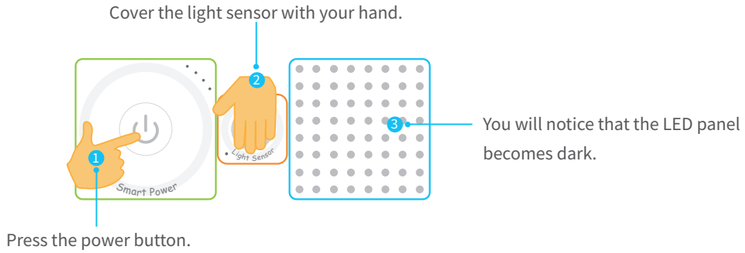
Have a try!



Light Sensor

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

Have a try!



Ranging Sensor

The ranging sensor is used to measure the distance between the sensor and an obstacle.

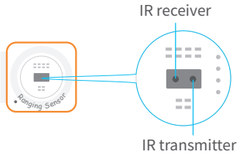
Measurement range: 2cm – 200cm

Class 1 Laser Product.
This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007.

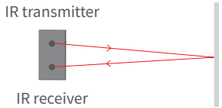
Science Tips

How does the ranging sensor measure distance?

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

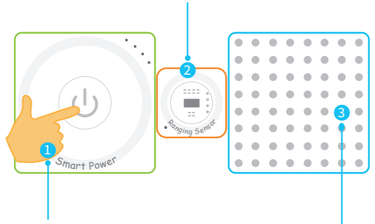


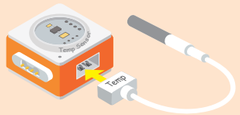
The IR transmitter emits infrared light which is reflected when it hits an obstacle. The reflected infrared light is detected by the IR receiver. The distance between the obstacle and the block can be calculated by the time lag between transmission and reception.



Have a try!

Place your hand over the ranging sensor and gradually increase the distance of your hand from the sensor.





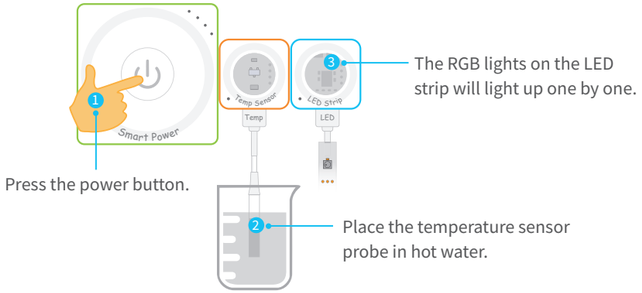
Temperature Sensor

Plug the temperature probe into the slot. The temperature sensor can detect temperatures ranging from -55°C to 125°C.

Accuracy: ±0.5°C (-10°C – 85°C)

Care should be taken if the measuring temperature exceeds 100°C, as this might damage the probe cable of the temperature sensor.

Have a try!

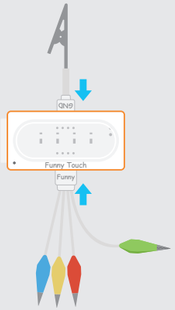


Funny Touch

Connecting the Funny Touch to conductive objects (such as bananas and water) will turn the objects into touch switches. Check the conduction status between the Funny Switch and the GND wire to achive simple and fun effects.

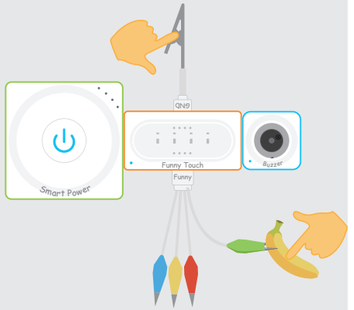
How does it work?

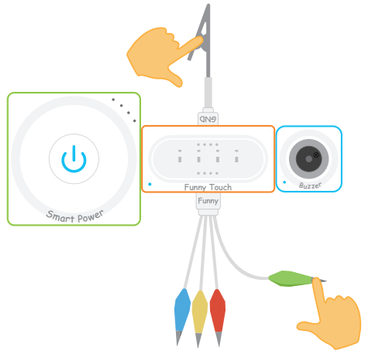
Plug the Funny Switch into the slot 1 and plug the GND wire into the slot 2.



Connect the blocks and touch the metal part of the Funny Switch with one hand and the metal part of the GND wire clip with the other hand. The series of block starts to work!

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!





When the Funny Touch is connected to the buzzer and one or several different colored Funny Switches are touched, the buzzer makes various 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

Output blocks receive signals from input blocks and give corresponding responses, such as making sounds or rotating motors. In everyday life, output blocks are everywhere. Both neon lights and alarms are examples.

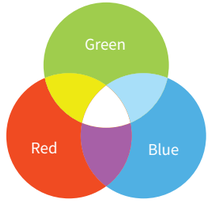
LED Strip Driver + LED Strip

Insert the LED strip into the LED strip driver slot. The LED strip contains 15 RGB lights. With the Neuron app or Swift Playgrounds, you can program the RGB lights to change the color.

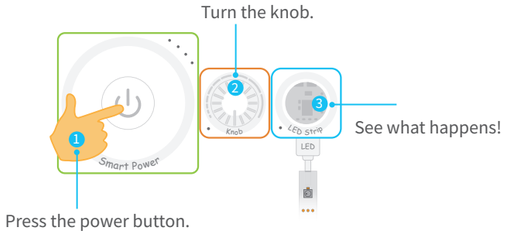
Science Tips

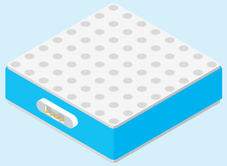
Why do the RGB lights have so many colors?

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



Have a try!

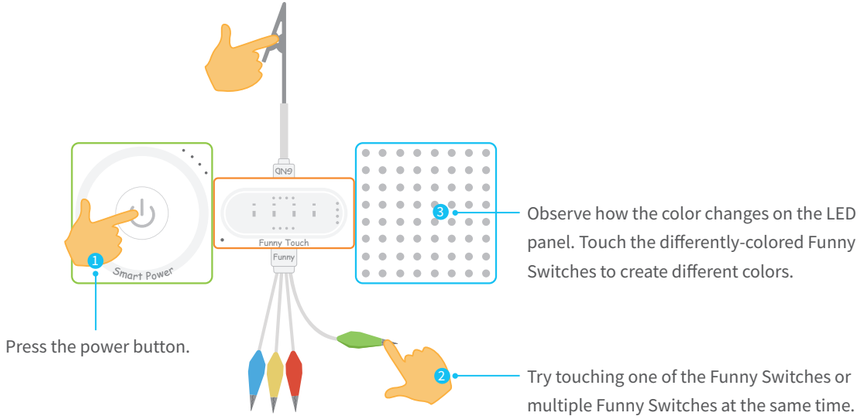




LED Panel

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

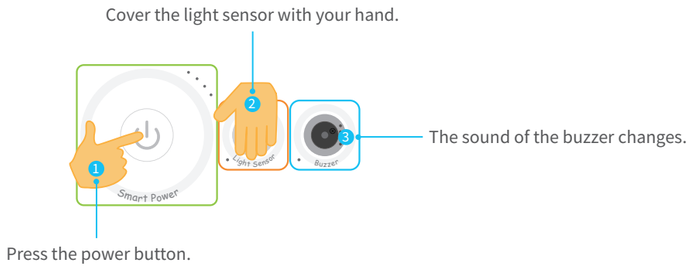
Have a try!

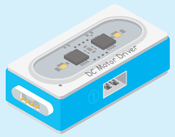


Buzzer

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

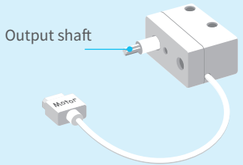
Have a try!





Dual DC Motor Driver

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



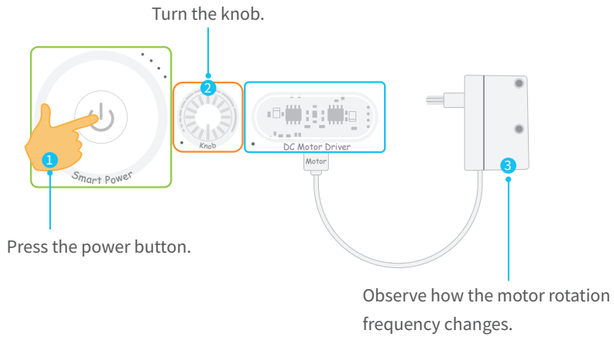
DC Motor

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

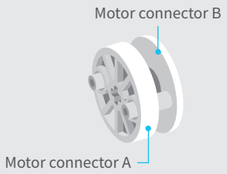
Rated Speed	12000±10% RPM
Rated Current	≤85 mA
Stall Torque	≥ 28 gf.cm
Stall Current	≤0.88 A
Gear Ration	1:48

Have a try!



Accessories

All included accessories make the operation of Neuron smooth. Some examples are the USB cable and the magnetic wire.

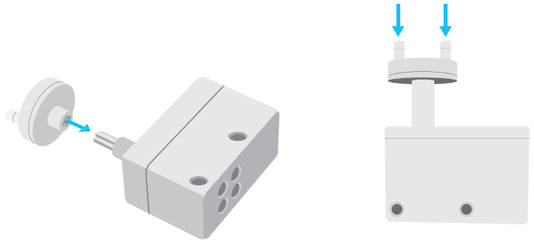


Motor connector

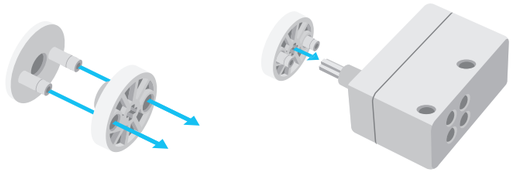
Motor connectors are used to fix the motors and the cut-outs in place.

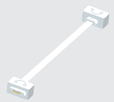
How does it work?

Dismantling instructions



Building instructions





Magnet Wire

Provide more flexibility when blocks are connected.

USB Cable

Used for power supply and data transmission.

Project Materials Package

We provide a wide range of building materials that can be combined with the electronic blocks to create projects like a piano, or an LED sword. To access the building guides, please go to the Neuron app or subscribe to Swift Playgrounds.

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

The smart power block cannot store programs. The app is needed to run the program on a device.

What should I do if any output blocks are not responsive?

It might be caused by the following reasons:
The Neuron blocks are not connected in the correct order. When the blocks are not connected to the Neuron app or Swift Playgrounds, the output blocks must be connected to the right of the input block, otherwise the output blocks will not be responsive.

The Neuron firmware upgrade process has been interrupted. Please try to upgrade the firmware in the Neuron app again.

The silicone case of the block is out of place, which can cause poor contact. Please adjust the casing.

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 switch them into 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/steam-kits/neuron

FCC STATEMENT

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
• This device may not cause harmful interference, and
• 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:
• this device may not cause interference, and
• 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 :
• l'appareil nedoit pas produire de brouillage, et
• 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 aged 6+.
To avoid the product damage, please don't disassemble, repair or modify this product yourself.
Please use the recommended adapter (DC 5V) to charge the product.
The product should be connected to the power supply in strict accordance with the limit on the number of power supplies.
The adapter used to charge the product (not included in the package) can not be used as a toy.
Please check the wires, plugs, housings or other parts periodically and stop using them if any damage has been found until they are well repaired.
Please make sure the product is powered off and disconnected from any external power supply when liquid is used to clean the product.

⚠ WARNING:

CHOKING HAZARD
Small parts. Not for children under 3 years.
To be used by children only when under adult supervision.

0-3 Age 6+