

Model: MN/E-1A

makeblock

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www.makeblock.com



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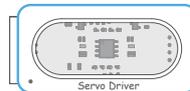
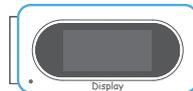
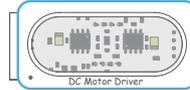
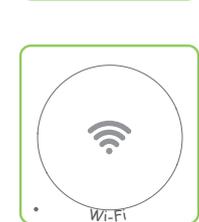
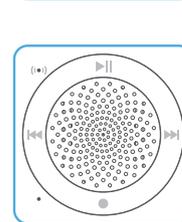
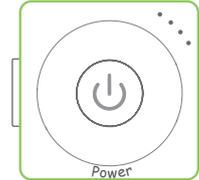
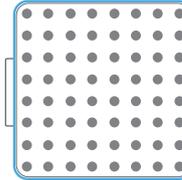
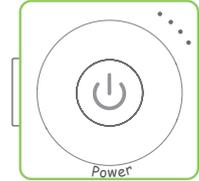
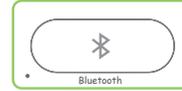


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neuron
creative lab kit

USER MANUAL



creative lab kit

P01 Parts List

P05 Meet Your Neuron

Colorful Blocks With Diverse Functions
Easy Connection
Offline Creating
Online Programming

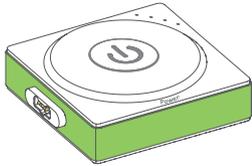
P09 Block Introductions

Energy & Communication Blocks
Input Blocks
Output Blocks

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Parts List



Power × 2



Wi-Fi



Bluetooth



Wireless Transmitter



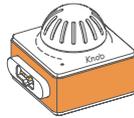
Wireless Receiver



Joystick



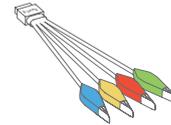
Button



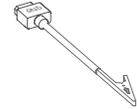
Knob



Funny Touch



Funny Switches



GND Wire



Light Sensor



Color Sensor



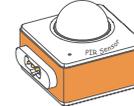
Gyro Sensor



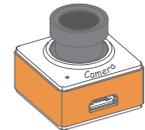
Humiture Sensor



Sound Sensor



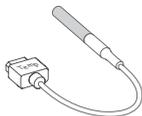
PIR Sensor



Camera



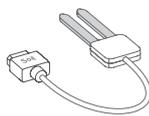
Temperature Sensor



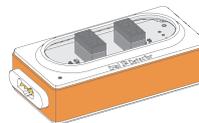
Temperature Probe



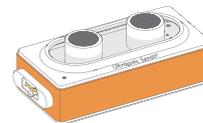
Soil Moisture Sensor



Soil Moisture Probe



Dual IR Detector



Ultrasonic Sensor



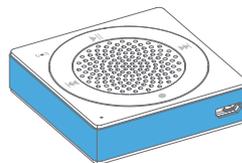
RGB LED



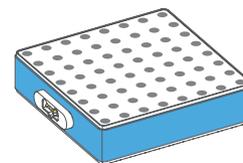
Buzzer



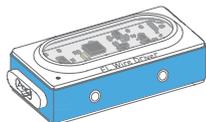
Display



Mic & Speaker



LED Panel



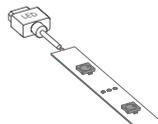
EL Wire Driver



EL Wire × 8



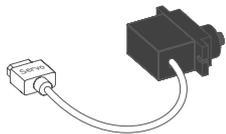
LED Strip Driver



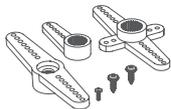
LED Strip



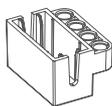
Dual Servo Driver



Servo × 2



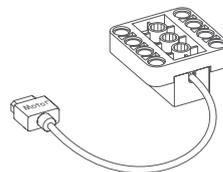
Servo Accessory Pack × 2



Servo Bracket × 2



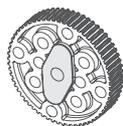
Dual DC Motor Driver



DC Motor × 2



Tyre × 2



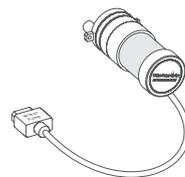
Wheel Hub × 2



Mini Auxiliary Wheel × 2



Crossed Shaft Connector × 2



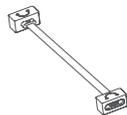
Water Pump



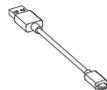
Laser Pointer



Magnet Wire (10cm) × 3



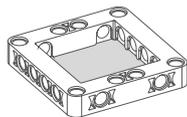
Magnet Wire (20cm) × 3



USB Cable (20cm) × 2



USB Cable (100cm) × 2



Neuron Board × 9



Friction Pin Connector × 36



Rubber Band × 20



Fixed Clip × 4



Gel Pad × 6

Meet Your Neuron

Colorful Blocks With Diverse Functions

The Neuron is classified into three categories according to color.

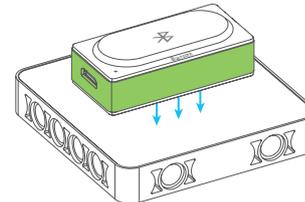
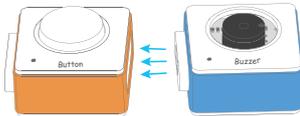
Energy & Communication blocks (Green): Provide power to other blocks. The communication block contains a Micro USB interface, you can connect the block to power bank or power adapter via USB cable to power the other blocks. The communication blocks also supply diverse wireless communication modes.

Input blocks (Orange): The input blocks collect information (such as sound and light) from the environment and send signals to change the output.

Output blocks (Blue): The output blocks receive signals from input blocks, and then do something, such as lighting up, moving or making a sound.

Easy Connection

- Magnetically snap together, experience the magic of Neuron.
- The back of the block is magnetically designed to snap the block to a Neuron board or magnetic board.



Offline Creating

When you use the Neuron without any software, you can create rich effects with the preset program. In this mode, the Neuron block will behave according to the data it received from the previous block.

Connection rules in this mode:

- The input block (orange) must be connected on the left side of the output block (blue).

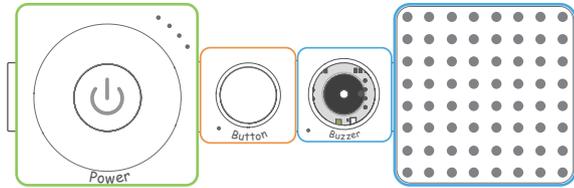
✓ Working normally!



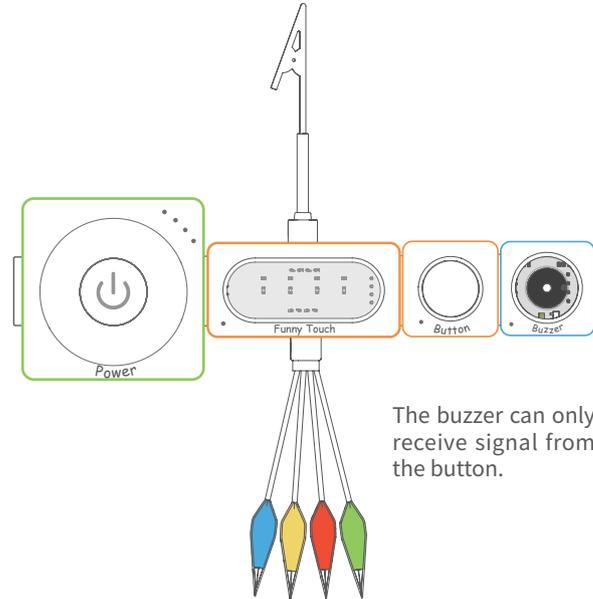
! Only working when you program the blocks via Makeblock Neuron app or mBlock.



- An input block can affect multiple output blocks, while an output block can only receive signals from its nearest input block.



Both the buzzer and LED panel can receive signal from the button.



The buzzer can only receive signal from the button.

Online Programming

Connect the Neuron blocks to a tablet, smart phone or computer, either with Bluetooth or Wi-Fi block, then you can design how Neuron blocks interact with each other by using Makeblock Neuron app or mBlock. Reboot the power block to switch online programming to offline creating.

Makeblock Neuron App

With Makeblock Neuron app, you can invent with electronic blocks without programming knowledge. You only need to draw lines between electronic blocks in an intuitive interface. This process also develops logical thinking and intuition about electronics. Furthermore, Makeblock Neuron app may control your invention remotely via its IoT (Internet of Things) functions, making it a perfect tool for education and creation.

How to begin?

1. Download the [Makeblock Neuron](#) app from  App Store or  Google play .
2. Ensure the Bluetooth or Wi-Fi block is connected to your chain.
3. Launch the app and follow the instruction on screen to connect your blocks to your mobile device.

Find more instruction at <http://neuron.makeblock.com/en/>

mBlock 5 (PC)

mBlock 5, based on Scratch 3.0, is a block- and text-based programming software designed for STEAM education. You can write programs for Neuron. You can also create fun games, stories, and animations. By combining the functionalities of AI and Internet of Things, mBlock 5 makes code learning simple and fun.

Download mBlock and find more information from: <http://www.mblock.cc>

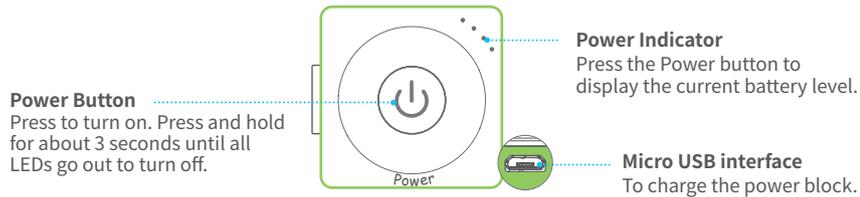
Block Introductions

Energy & Communication Blocks

Power

Provide power to other blocks.

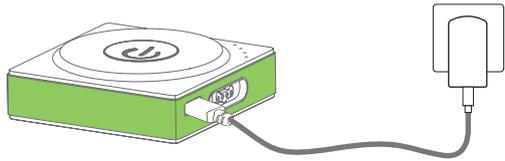
Appearance



Charge your power block

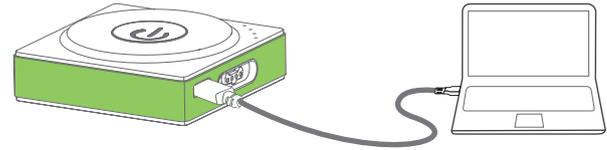
We recommend you to charge your power block when the last indicator is blinking.

Via power adapter



or

Via computer



Specifications

| | |
|------------------|--------|
| Battery Capacity | 950mAh |
| Output Voltage | DC 5V |
| Input Voltage | DC 5V |

| | |
|-----------------------|----------------|
| Input Current | < 1A |
| Operating Temperature | 0° C ~ 45° C |
| Storage Temperature | -10° C ~ 55° C |

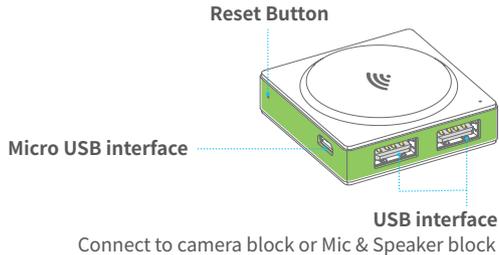
- Tips: 1. Please charge the block once every three months when not in use.
2. The power block cannot power the other blocks while it is charging.

Wi-Fi

The Wi-Fi block has three functions:

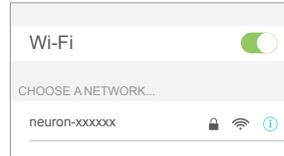
- Establish a wireless connection between the blocks and your mobile device, then you can program the blocks via Makeblock Neuron app.
- Connect to your router to use more features, like IoT(Internet of Things).
- Provide power to other blocks. It contains a Micro USB interface, you can connect the block to power bank or power adapter via USB cable to power the other blocks.

Appearance



How to use?

Connect your tablet or smart phone to the Wi-Fi block by using the network name (neuron-xxxxxx) and wireless password (makeblock). Then launch the Makeblock Neuron app and follow the instructions on the screen to use the Wi-Fi block.



Password: makeblock

Specifications

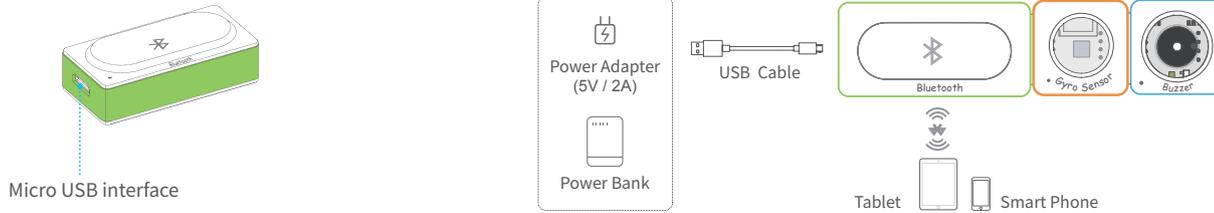
| | |
|------------------------|------------------------|
| Wireless Standards | IEEE 802.11b/g/n(HT20) |
| Communication Distance | 10m (Open environment) |
| Working Mode | STA/AP/STA+AP |

| | |
|-----------------------|--------------|
| Operating Voltage | DC 5V |
| Operating Current | 200mA |
| Operation Temperature | 0° C ~ 45° C |

Bluetooth

The Bluetooth block has two functions:

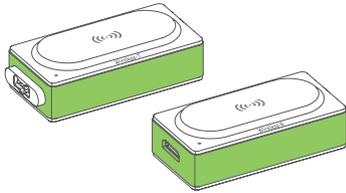
- Establish a wireless connection between the blocks and your mobile device within 10 meters, then you can program the blocks via Makeblock Neuron app.
- Provide power to other blocks. It contains a Micro USB interface, you can connect the block to power bank or power adapter via USB cable to power the other blocks.



Specifications

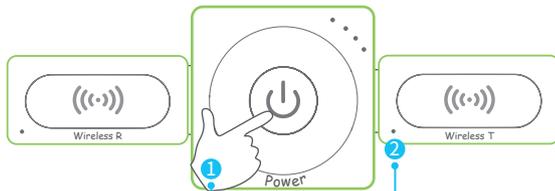
| | |
|-------------------------|----------------|
| Bluetooth Specification | BT 4.0 |
| Frequency Band | 2402 ~ 2480MHz |
| Output Power Class | ≤ 4dBm |

Wireless Transmitter + Wireless Receiver



Wireless receiver (Wireless-R) receives signals from wireless transmitter (Wireless-T) within 10 meters. With these two blocks, you can establish a wireless connection between two chains.

You may need to pair the two blocks before using: connect the two blocks to the power block as shown in the figure below.



Press

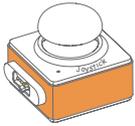
Watch the two indicators change from blinking to solid on, indicating that the pairing is successful.

Try it now!



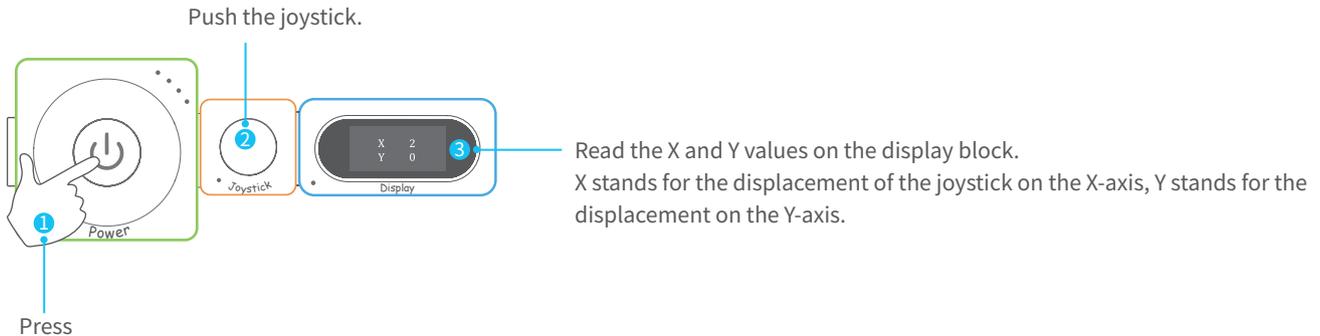
Input Blocks

Joystick

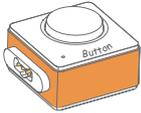


Push the joystick to control your creation (such as a remote control car) moving in the X-axis (left-right) or Y-axis (up-down) direction.

Try it now!



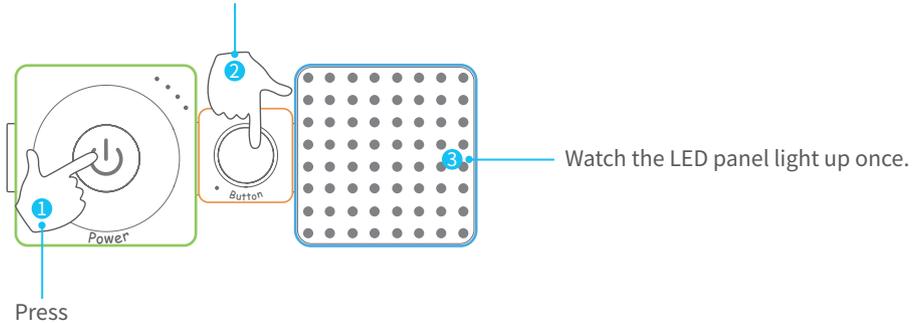
Button



Short press to turn something on and release to turn it off.
Press and hold for 5 seconds to stay in an active state.

Try it now!

Press and immediately
release the button.



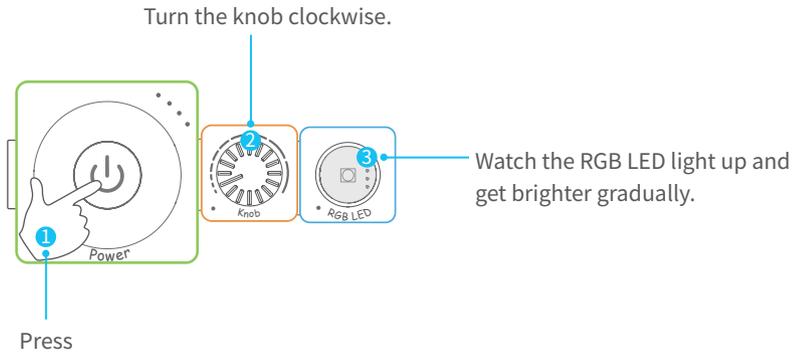
Press and hold the button block for 5 seconds, see what happens.

Knob



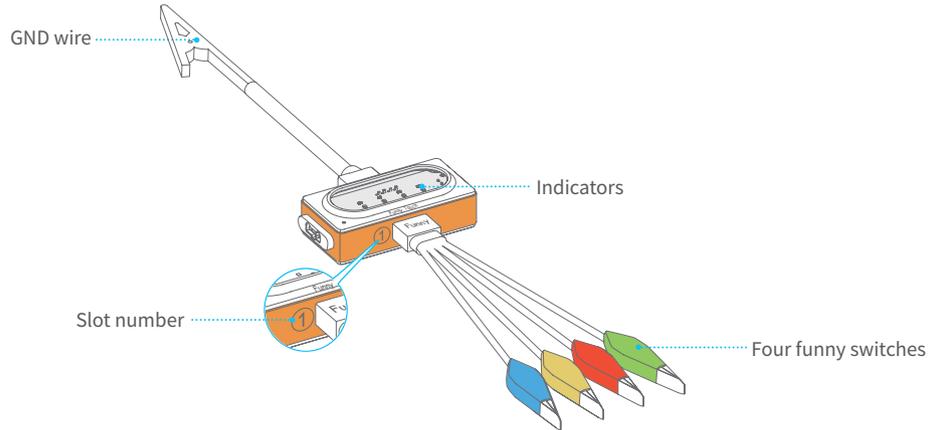
The knob is an input block that can adjust the numerical value. After connect it to the output block, you can turn the knob to adjust the output effect.

Try it now!



Funny Touch

Funny touch can be connected to any conductive object (such as bananas and water) and turn it into a touch switch. A simple and interesting interactive effect can be achieved by detecting the conducting state between funny switches and GND wire.

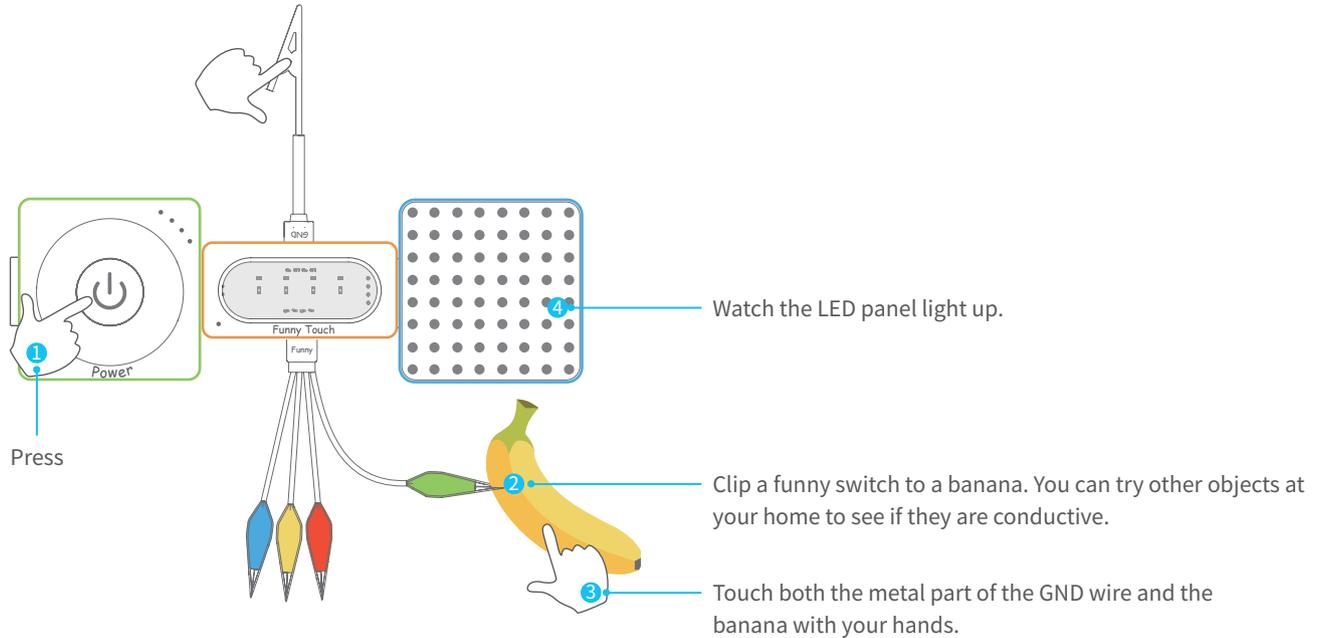


How to use?

1. Plug the funny switch to slot 1 and the GND wire to slot 2.
2. Clip a funny switch to a conductive object.
3. Hold the metal clip of the GND wire and touch the conductive object with the other hand, the relevant indicator will light up and the block will send out an on signal.

Tips: Alligator clip is sharp, please do not clip yourself with the funny switch or the clip of GND wire, it may hurt you.

Try it now!



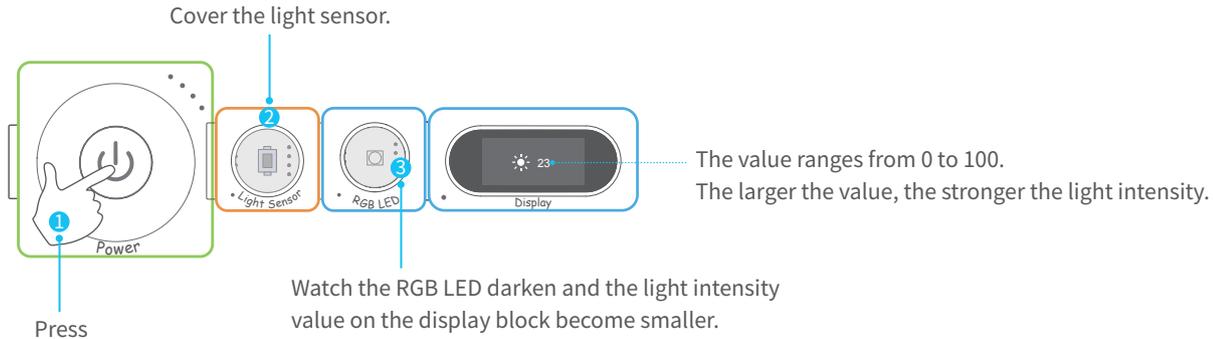
Try touching another funny switch or touching two funny switches simultaneously, see what happens.

Light Sensor

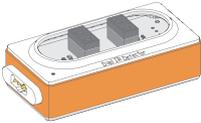


The light sensor can detect the light intensity of the surrounding area.
The more light it receives, the stronger signal it sends out.

Try it now!



Dual IR Detector

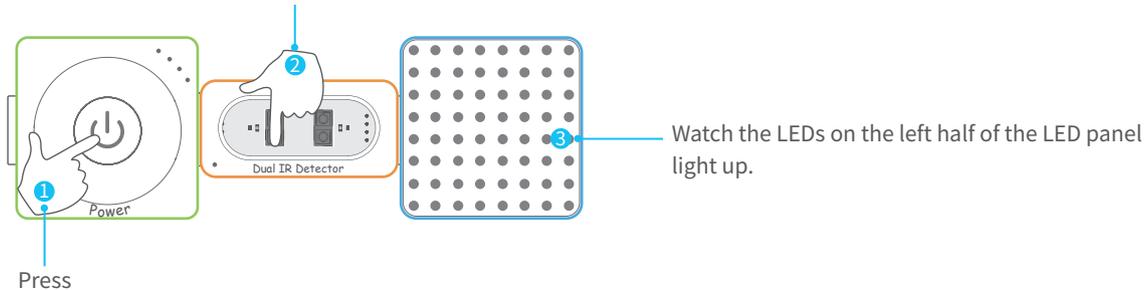


Dual IR detector block can be used to make your creation follow a black line on a white background or a white line on a black background. It contains two IR detectors which can be used to control the output.

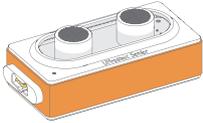
Detecting Range: 0 ~ 2cm

Try it now!

Cover the IR detector with your finger.



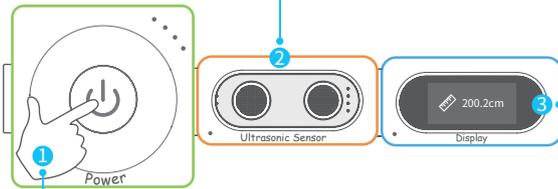
Ultrasonic Sensor



Ultrasonic sensor can be used to measure distance between the block and the obstacle, from 3cm to 300cm.

Try it now!

Put your hand right above the ultrasonic sensor.



Press

Read the distance value on the display block.

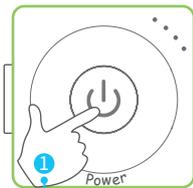
Color Sensor



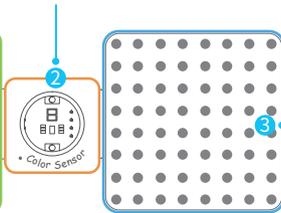
The color sensor can detect different colors.

Try it now!

Cover the color sensor with different colored objects.



Press



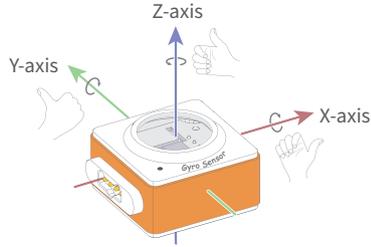
See what happens.

Gyro Sensor

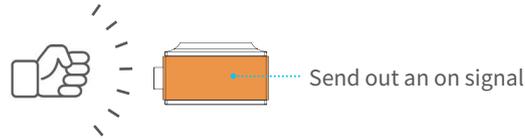


The gyro sensor is an ideal block for motion and posture detection of your creation. It can be used to measure the angular value and the acceleration information of your creation. When it detects a vibration, the sensor will send out an on signal.

Reference coordinates:

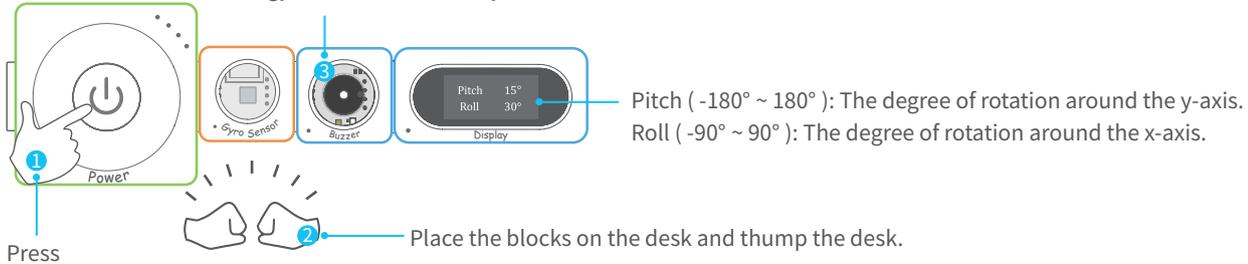


Detect a vibration:



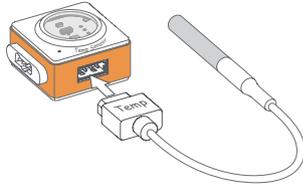
Try it now!

The buzzer will be activated when the gyro sensor detects any vibration.



Pick up the blocks and rotate it, see what happens.

Temperature Sensor

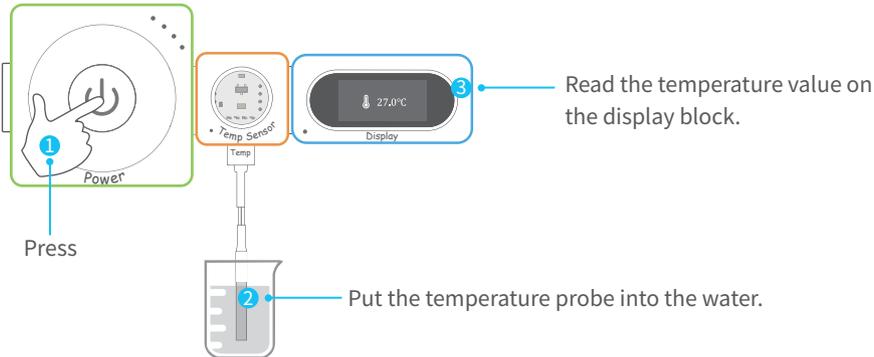


Get the temperature probe and plug it into the slot. The temperature sensor can detect temperatures from -55°C to 125°C .

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

Tips: The cable of temperature probe may be damaged when the temperature is over 100°C . Please be careful to protect the cable from damage.

Try it now!



Humiture Sensor



Humiture sensor can detect temperature and humidity of the surrounding area.

Specifications

| | |
|-------------------|---------------|
| Temperature Range | -40°C ~ 125°C |
|-------------------|---------------|

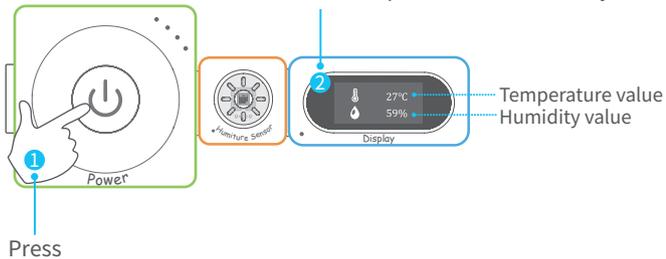
| | |
|----------------------|-------|
| Temperature Accuracy | ± 1°C |
|----------------------|-------|

| | |
|----------------|-----------|
| Humidity Range | 0% ~ 100% |
|----------------|-----------|

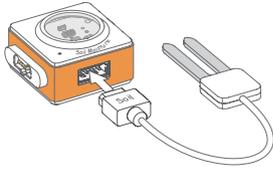
| | |
|-------------------|------|
| Humidity Accuracy | ± 3% |
|-------------------|------|

Try it now!

Read the temperature and humidity values.

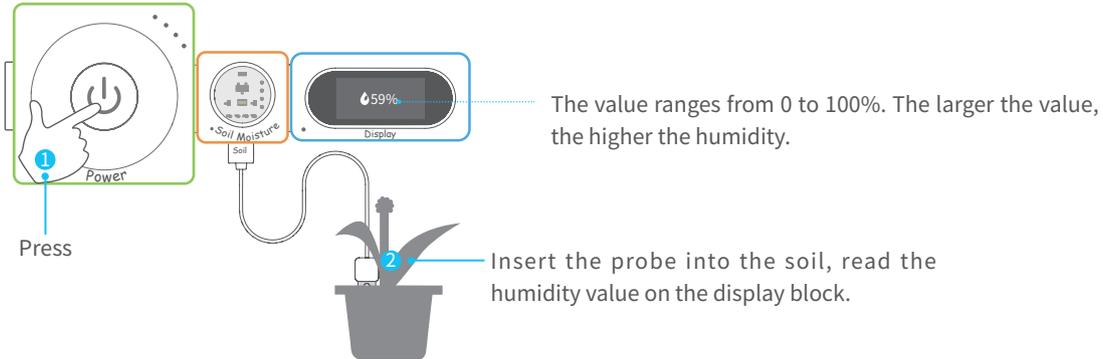


Soil Moisture Sensor



Get the soil moisture probe and plug it into the slot.
The soil moisture sensor can detect soil humidity.

Try it now!



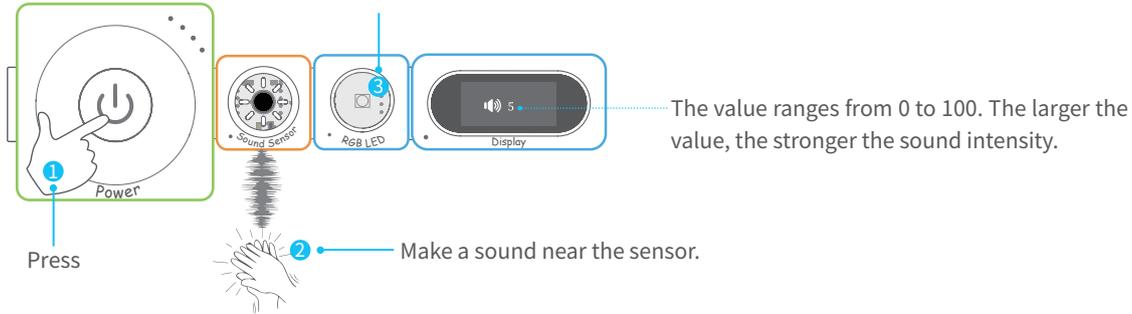
Sound Sensor



The sound sensor can detect the sound intensity of the surrounding area. The louder sound it receives, the stronger signal it sends out.

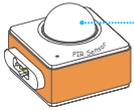
Try it now!

Watch the RGB LED light up and read the sound intensity value on the display block.



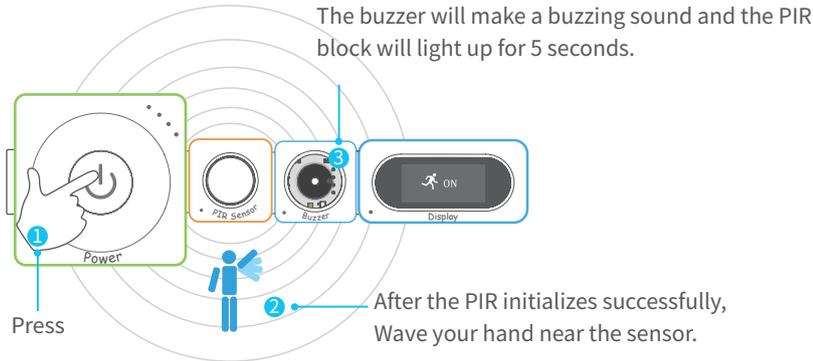
PIR Sensor

PIR sensor (Passive Infrared sensor) can detect motion from humans within 3 meters. If anyone moves in that range, the sensor will send out an on signal to the following block.



When powered on, the indicator will light up and it will take about 5 seconds for the block to initialize. Once successfully initialized, the indicator will go out.

Try it now!



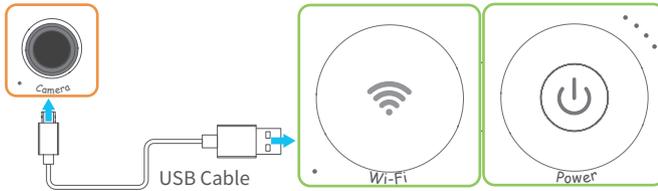
Camera



The camera block allows you to take pictures.

How to use?

Connect the block to Wi-Fi block via USB cable and control the block through Makeblock Neuron app.



Specifications

| | |
|-------------------------|--------------------------------|
| Resolution | 1280×720 |
| Pixel Size | 3.4um×3.4um |
| Max Image Transfer Rate | Full size @ 30fps |
| Power Consumption | 100uA (Standby)~240mW (Active) |
| Power Supply | USB Bus Power |
| Optical FOV | 100° |

| | |
|------------------------------|---|
| Temperature Range | Operating: -30°C ~ 70°C Stable Image: 0°C ~ 50°C |
| Lens Construction | 4G+IR |
| F/No | 2.97 |
| Effective Focal Length (EFL) | 2.4mm |

Output Blocks

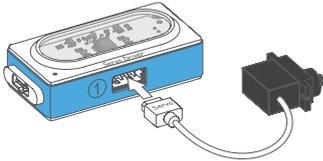
Dual Servo Driver



Slot number

The servo driver can drive two servos simultaneously.

Servo



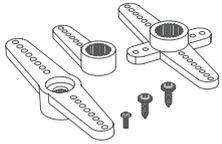
The servo can rotate from 0 to 180 degrees.
Plug the servo into the servo driver.

Servo Specifications

| | |
|-----------------------|--------------|
| Storage Temperature | -20°C ~ 60°C |
| Operating Temperature | -10°C ~ 50°C |
| Operating Voltage | 4.5V ~ 6.0V |
| Excessive Play | ≤ 1° |

| | |
|---------------------------|----------------|
| Idle Current (at stopped) | 6±1mA |
| Stall Torque (at locked) | 1.5±0.05 kg·cm |
| Limit Angle | 180° ± 10° |

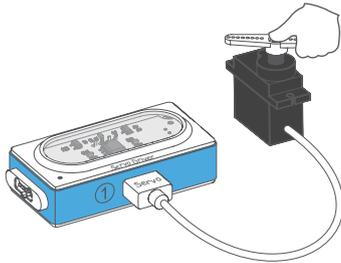
Servo Accessory Pack



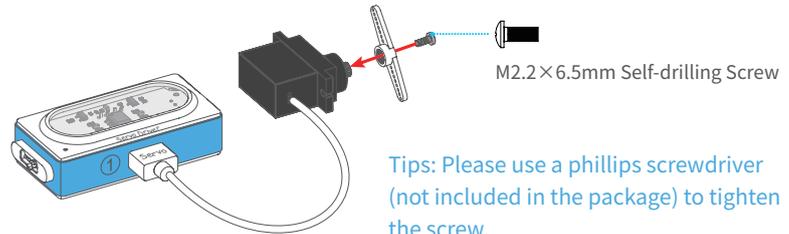
The servo accessory pack contains three different servo hubs to meet your needs. The servo hub is designed to attach objects to the servo.

How to use?

1. Connect the servo hub to the servo by pressing or using a screw (more permanent).



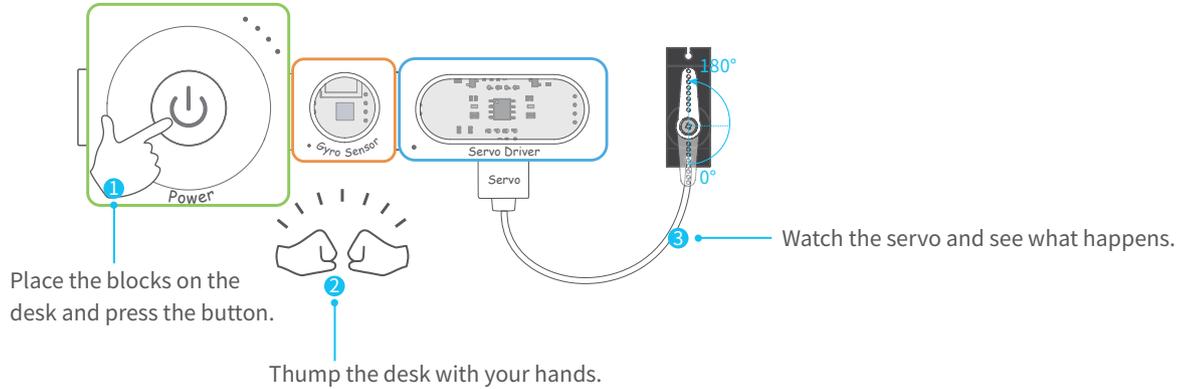
or



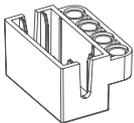
Tips: Please use a phillips screwdriver (not included in the package) to tighten the screw.

2. Attach objects to the hub.

Try it now!

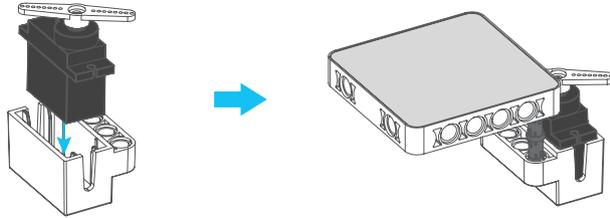


Servo Bracket

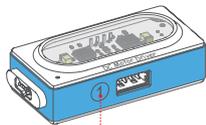


The servo bracket can be used to connect servo to the Neuron board or LEGO® blocks.

Connect servo to the Neuron board:



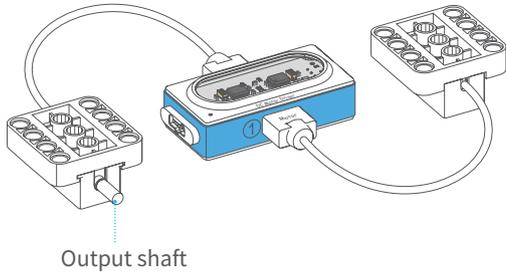
Dual DC Motor Driver



Slot number

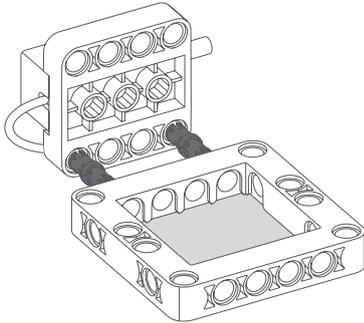
The DC (Direct Current) motor driver can drive DC motor or water pump, two devices can be driven simultaneously.

DC Motor



The DC (Direct Current) motor contains an output shaft. The shaft will rotate when the DC motor driver accept an on signal.

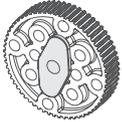
Connect DC motor to the Neuron board:



Motor Specifications

| | |
|---------------|--------------------|
| Rated Speed | $118 \pm 10\%$ RPM |
| Rated Current | 0.1 A |
| Rated Torque | 132 g. cm |
| Stall Torque | 590 ± 100 g.cm |
| Stall Current | 0.4 A |
| Gear Ration | 1:100 |

Wheel Hub



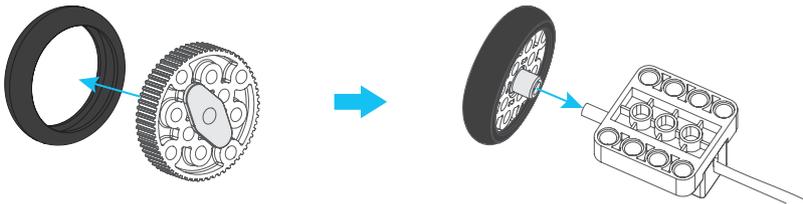
Made of plastic and can be used as a car's wheel.

Tyre



Tyre covers the wheel to protect it and provide traction between the wheel and the road.

Attach the wheel to the motor:



Crossed Shaft Connector



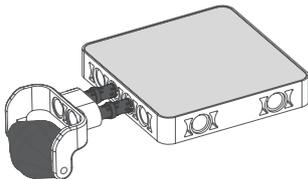
Works with DC motor, mechanical parts of Makeblock platform, LEGO® blocks and other materials to the DC motor.

Mini Auxiliary Wheel



Mini auxiliary wheel is compatible with LEGO® blocks, and can be used in light-load car body, making 360 degree movement easily.

Connect mini auxiliary wheel to the Neuron board:

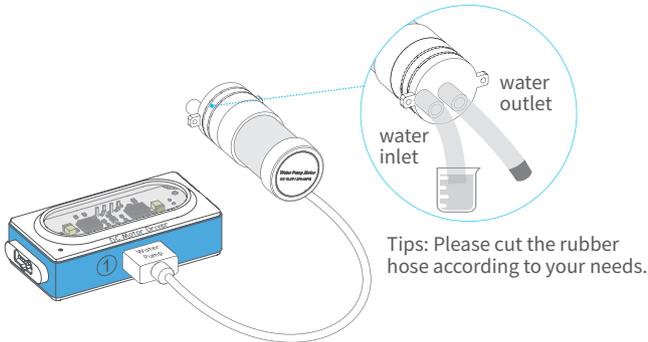


Water Pump



The water pump can be used for water priming pump, automotive pump and so on.

Follow the figure below to install the water pump.



Water pump Specifications

| | |
|-----------------------|--------------|
| Rated Voltage | DC 12V |
| Current (With load) | < 320mA |
| Operating Temperature | -10°C ~ 55°C |
| Operating Humidity | < 95% |
| Water Hole Diameter | 6.5mm |
| Noise | < 60dB |

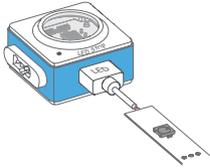
RGB LED



The RGB LED can emit various colors of light. Change the color or brightness of the RGB LED through Makeblock Neuron app or mBlock.

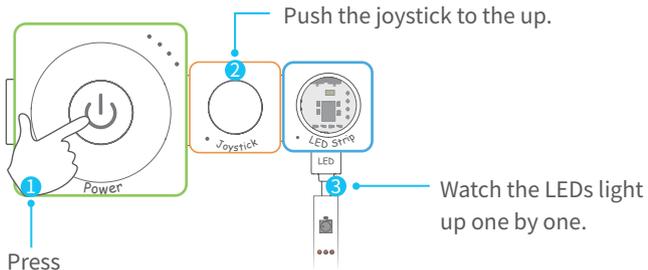
Tips: RGB is an additive color model in which red, green, and blue light are combined in various ways to reproduce a broad array of colors.

LED Strip Driver + LED Strip



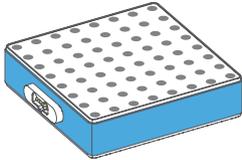
Get the LED strip and plug it into the slot. The LED strip contains 15 RGB LEDs. Change the color of each LED and do more interesting things through Makeblock Neuron app or mBlock.

Try it now! A special use case for LED strip.



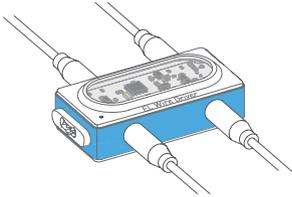
Push the joystick to the down, left or right, see what happens.

LED Panel



The LED panel contains 64 RGB LEDs. Change the color and do more interesting things through Makeblock Neuron app or mBlock.

EL Wire Driver + EL Wire



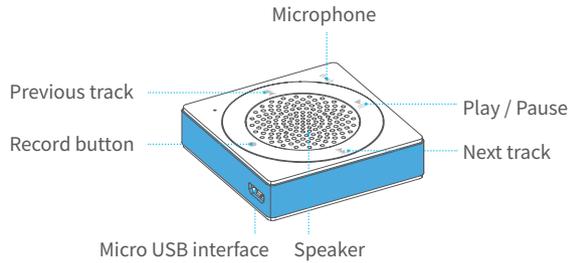
Get the EL wire (Electroluminescent wire) and plug it into the slot.
The EL wire driver can drive 4 EL wires simultaneously.

Attentions:

1. Do not turn on the driver before you plug the EL wires into the slots.
2. Do not bend the EL wire in acute angle.
3. Do not pull out or insert the EL wire when the driver is powered on.
4. Do not drag the wire when pulling out or inserting the EL wire.

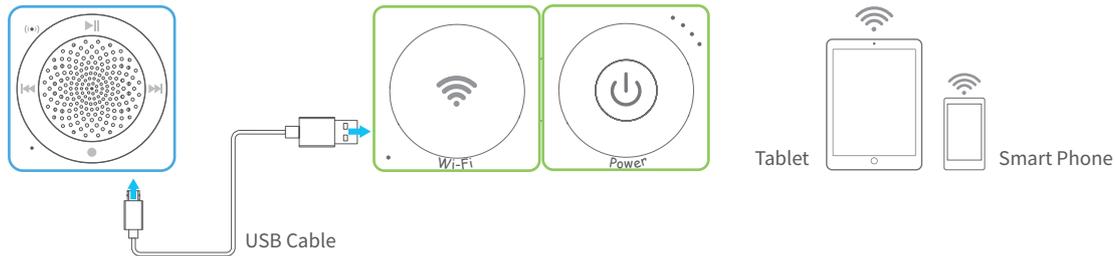
Mic & Speaker

Play a sound or speak into to record your voice.



How to use?

Connect the block to Wi-Fi block via USB cable, then control the block via Makeblock Neuron app.

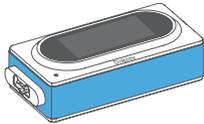


Buzzer



The buzzer makes a buzzing sound when it receives an on signal. You can program the buzzer to get a different sound by using Makeblock Neuron app or mBlock.

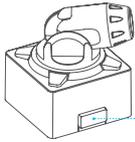
Display



Display the output parameters of the block in front of display block. Customize the display content via Makeblock Neuron app or mBlock.

Accessories

Laser Pointer



The laser pointer emits a coherent laser beam.

Press to emit laser beam.

Charge your laser pointer

Via power adapter



or

Via computer



Specifications

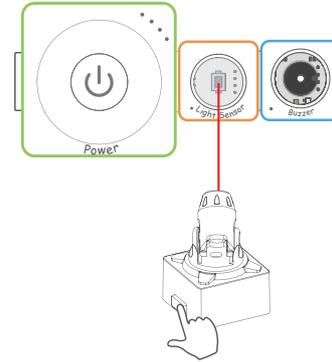
| | |
|------------------|-------|
| Battery Capacity | 85mAh |
|------------------|-------|

| | |
|--------------|-------------|
| Battery Life | ≥ 10 h |
|--------------|-------------|

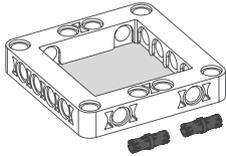
| | |
|----------------------|-----|
| Laser Transmit Power | 1mW |
|----------------------|-----|

Try it now!

1. Press the power button to turn on the chain.
2. Press the button on the laser pointer and focus the laser beam on the light sensor.
The buzzer will make a buzzing sound.



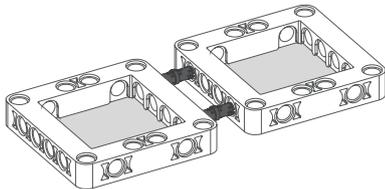
Neuron Board



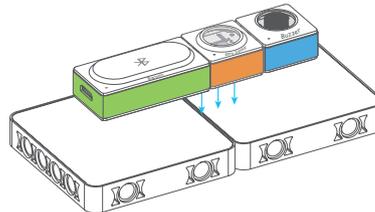
1. Snap Neuron blocks to the mechanical parts of Makeblock.
2. Snap Neuron blocks to LEGO® blocks.

How to use?

Connect two Neuron boards:

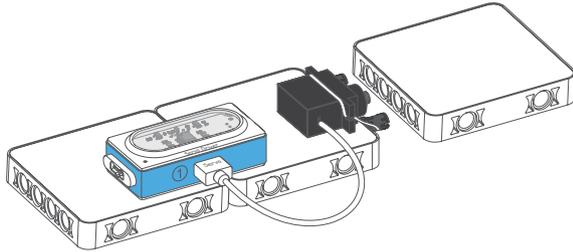


Snap the blocks to the Neuron boards:

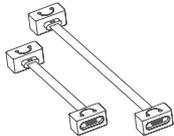


Rubber Bands

Used to fasten the servo to the Neuron boards.

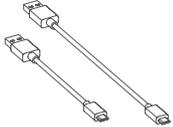


Magnet Wire



Provide a more flexible way to connect blocks, available with 10cm and 20cm.

USB Cable



1. Connect some specified blocks, such as camera, Mic & Speaker, Bluetooth, Wi-Fi.
2. Provide power and transmit the data.

Gel Pad



Gel pad can firmly paste the blocks to any surface and can be reused.

Fixed Clip



The fixed clip can be used for motor cable storage.

FAQ

Q: Why the program stops running after exiting the Makeblock Neuron app?

A: The Bluetooth block can not store programs, thus it needs the app to run the program.

Q: What should I do if the blocks have no response?

A: Reasons that may cause the problem:

- When not using the Makeblock Neuron app or mBlock, the input block must be connected on the left of the output block. Please refer to the Easy Connection section to check if the connection is correct.
- 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 connectivity. Please adjust the silicone case positions accordingly.

Q: Why does the battery life decrease?

A: The Power block uses a lithium-ion battery, multiple charges and discharges may decrease the battery life gradually.

Q: Why does the funny touch block goes wrong?

A: Reasons that may cause the problem:

- The power supply is unstable. Please use a power adapter or power bank of high quality.
- Mistakenly plug the funny switch to slot 2 and the GND wire to slot 1, please replug them to the correct slots.
- If the funny touch goes wrong when working with EL wire driver, please try to connect the two blocks to both sides of power block.

Q: What should I do if my tablet or phone cannot connect to the Wi-Fi block?

- When turned on, the Wi-Fi block will boot for a while. Please wait and refresh the Wi-Fi list on your device.
- Reset the Wi-Fi block and try again. While the Wi-Fi block is powered on, use a pin to press and hold the Reset button until the indicator goes out, then release the button, the Wi-Fi block will restore and reboot automatically.

Q: What should I do if the Wi-Fi block cannot connect to my home network?

- The network name or password is wrong, please re-enter the name and password.
- The network signal is too weak. Please close the Wi-Fi block to your router and try again.
- Special authentication is required when connecting to a public network. Please try to connect to another network with network name and password.

Find more FAQs, please visit <http://neuron.makeblock.com/faq>

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 n' 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



WARNING:

CHOKING HAZARD

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