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WORLD ROBOT OLYMPIAD ™

ELECFREAKS Future Innovators Set

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Elecfreaks Future Innovators set

1. Introduction

Designed for World Robot Olympiad's Future Innovators category, the ELECFREAKS Future Innovators Set is the ultimate toolkit for young robotics enthusiasts ready to shape the world of tomorrow. Developed in collaboration with the World Robot Olympiad Association, this advanced kit offers everything needed to excel in the Future Innovators category.

This comprehensive set includes:

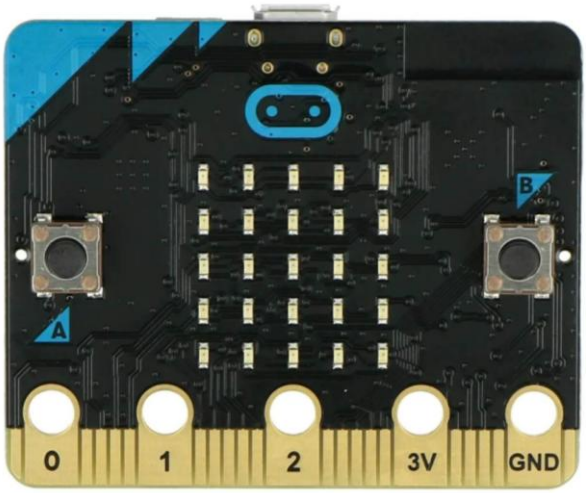
- 2 Controllers
- 6 Motors
- 30 Sensors
- Over 2000 Building Blocks

With this extensive range of components, teams have the tools to turn any concept into reality—from beginner projects to competition-grade entries ready for World Robot Olympiad International Final. The set also includes access to a complete learning platform designed by WRO. This platform offers classroom materials for educators teaching entire classes, as well as online courses for self-learners looking to master robotics at their own pace. Whether you're just starting out or aiming for the top of the podium, the Elecfreaks Future Innovators Set provides the resources, guidance, and inspiration you need to bring your ideas to life and lead the way in robotics innovation.

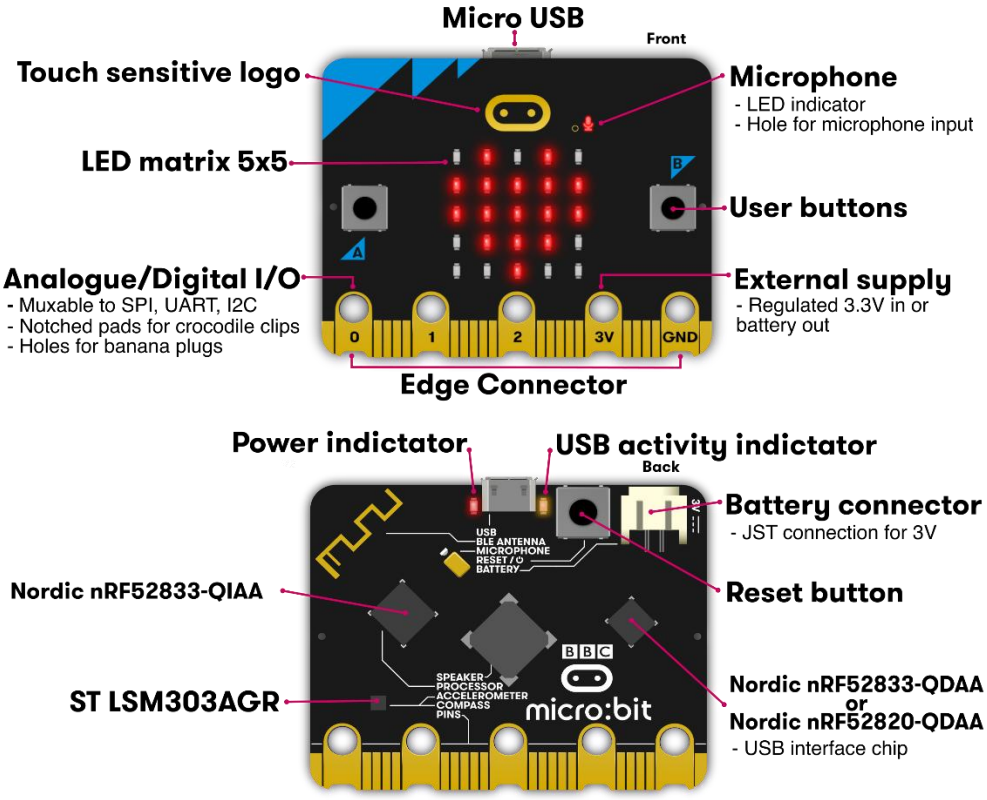
2. Micro:bit V2

2.1 About the Micro:bit

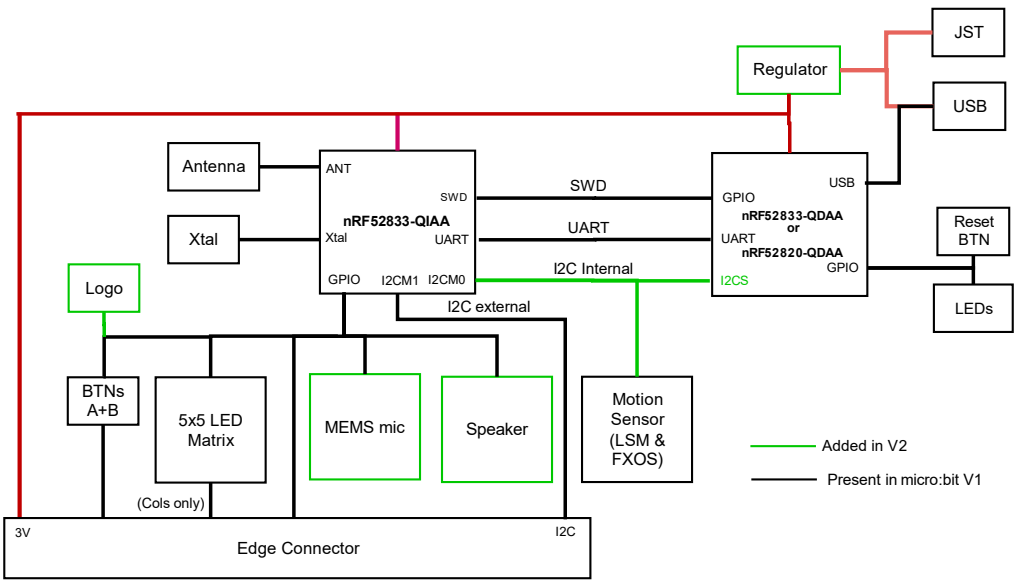
The Micro:bit is an easily programmable Single Board Computer (SBC) that contains an application processor with a variety of on-chip peripherals. Other peripherals are connected to this chip. An interface processor is connected to the application processor and manages communications via the USB interface, including the drag-and-drop code flashing process. The interface processor does not connect to any of the Micro:bit peripherals.



2.2 Hardware Guide



2.3 Hardware block diagram



2.4 nRF52 Application Processor

The nRF52 application processor is where user programs run. A single, complete application including user code, runtime code and Bluetooth stack is loaded and run directly from on-chip flash memory. All user accessible GPIO pins are provided by this processor. There is an on-board 2.4GHz radio peripheral used to provide Bluetooth and custom radio capabilities via an off-chip aerial.

2.5 Bluetooth Wireless Communication

The on-board 2.4GHz antenna supports Bluetooth communications via the Nordic S113 SoftDevice, which provides a fully qualified Bluetooth low energy stack. This allows the Micro:bit to communicate with a wide range of Bluetooth devices, including smartphones and tablets.

2.6 Low level radio communications

The on-board 2.4GHz transceiver supports a number of other radio communications standards, on which we build the Microbit-radio protocol This protocol provides a very simple small-packet broadcast radio interface between other devices that support it, such as other Micro:bit devices. The ‘radio’ interface that appears in a number of the languages on the Micro:bit is built on top of this protocol. Additionally, the Micro:bit runtime software adds a ‘group code’ to each data payload, allowing for simple user managed device addressing and filtering to take place.

2.7 Buttons

The two buttons on the front of the Micro:bit, and the one button on the back, are tact momentary push-to-make buttons. The back button is connected to the interface processor and to the nRF52 processor for system reset purposes. This means that the application will reset regardless of if it is powered from USB or from battery.

Front buttons A and B can be programmed in the user application for any purpose. A and B are debounced by software, which also includes short press, long press, and ‘both A+B’ press detection. Buttons operate in a typical inverted electrical mode, where a pull-up resistor ensures a logical ‘1’ when the button is released, and a logical ‘0’ when the button is pressed. Both A and B buttons are connected to GPIO pins that are also accessible on the Micro:bit edge connector.

2.8 Display

The display is a 5x5 array of LEDs. It is connected to the Micro:bit as a 5x5 matrix. Runtime software repeatedly refreshes this matrix at a high speed, such that it is within the user persistence of vision range, and no flicker is detected. This LED matrix is also used to sense ambient light, by repeatedly switching some of the LED drive pins into inputs and sampling the voltage decay time, which is roughly proportional to ambient light levels.

2.9 Motion sensor

The Micro:bit has a combined accelerometer and magnetometer chip that provides 3-axis sensing and magnetic field strength sensing. It also includes some on-board gesture detection (such as fall detection) in hardware, and additional gesture sensing (e.g. logo-up, logo-down, shake) via software algorithms. A software algorithm in the standard runtime uses the on-board accelerometer to turn readings into a board orientation independent compass reading. The compass must be calibrated before use, and the calibration process is automatically initiated by the runtime software. This device is connected to the application processor via the I2C bus.

The Micro:bit has a footprint for two different motion sensors: one made by ST (the LSM303AGR) and one by NXP (FXOS8700CQ). The Micro:bit DAL supports both of these sensors, detecting them at runtime. Only one sensor will ever be placed.

2.10 Temperature sensing

The nRF52 application processor has an on-board core temperature sensor. This is exposed via the standard runtime software, and provides an estimate of ambient temperature.

2.11 Speaker

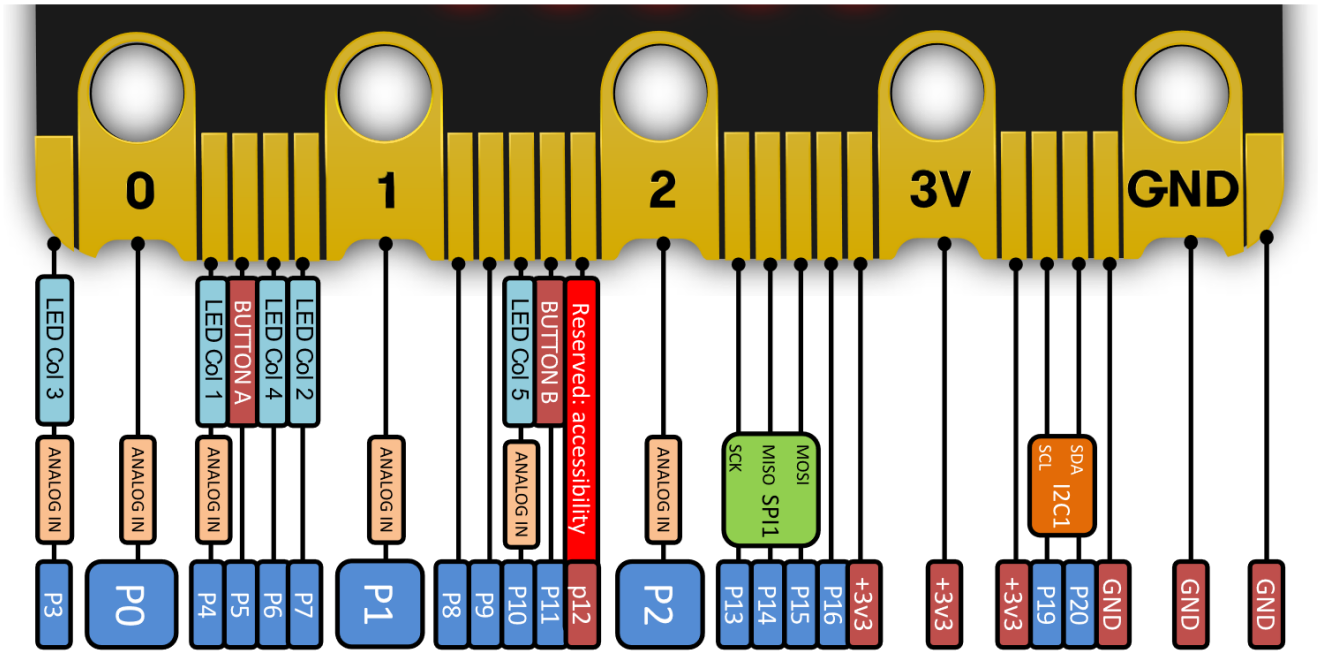
In addition to outputting sound via PWM on the pins, the Micro:bit has a PCB mounted magnetic speaker to which sound output is mirrored.

2.12 Microphone

An on-board MEMs microphone provides a sound input to the Micro:bit and a built in LED indicator on the front of the board shows the user when this is powered.

The microphone has an external bias circuit of 33K:1K (power to ground) and is AC-coupled to the microphone input pin.

2.13 General Purpose Input/Output Pins



Item	Details
Rings	3 large IO rings and two large power rings, 4mm plug and crocodile clip compatible
GPIO features	19 assignable GPIO pins
	2 are dedicated to the external I2C interface
	6 are used for display or light sensing feature
	2 are used for on-board button detection
	1 is reserved for an accessibility interface
	19 may be assigned as digital input or digital output
	19 may be assigned for up to 3 simultaneous PWM channels
	19 may be assigned for 1 serial transmit and 1 serial receive channel
	6 may be assigned as analog input pins
	3 may be assigned to an optional SPI communications interface
	3 may be assigned for up to 3 simultaneous touch sensing inputs
ADC resolution	10 bit (0..1023)
Edge Connector	Edge connector
Pitch	1.27mm, 80 way double sided.
Pads	5 pads, with 4mm holes

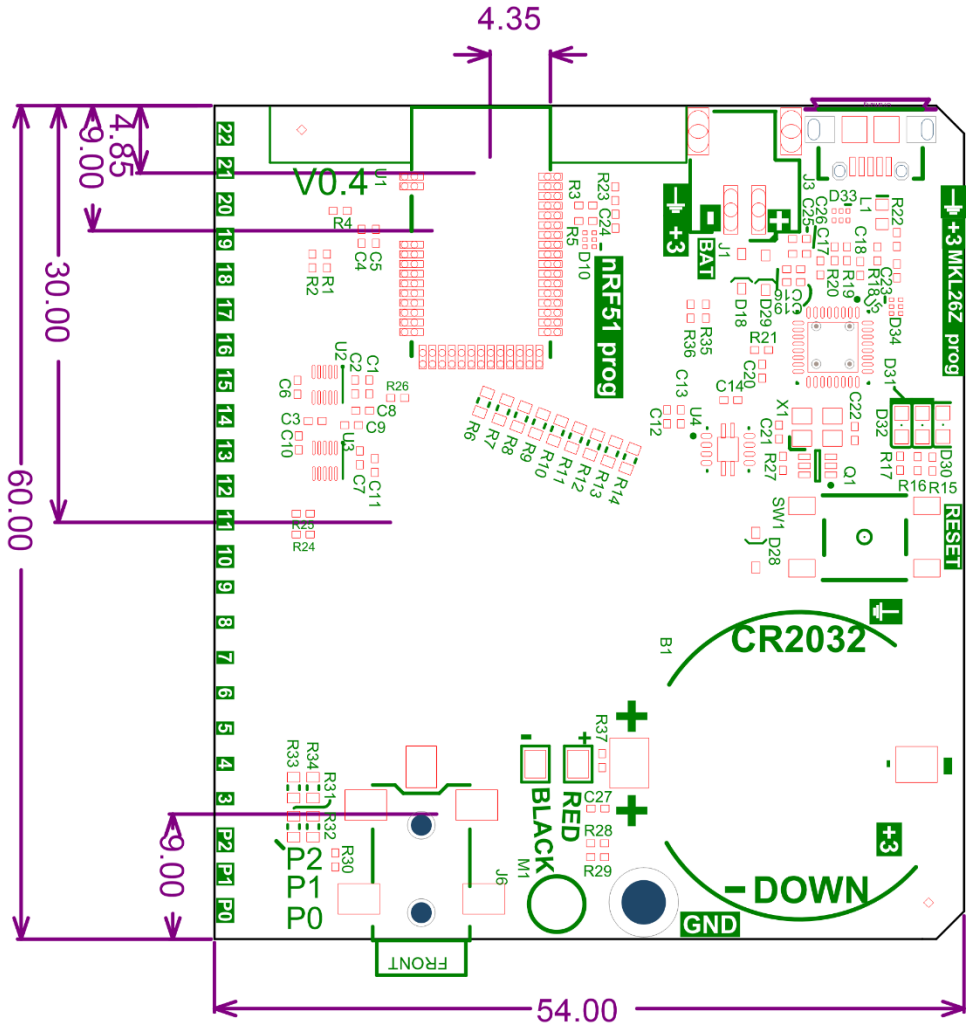
2.14 Power supply

Power to the Micro:bit may be provided via 5V on the USB connector, or via a 3V battery plugged into the JST connector. It is also possible (with care) to power the Micro:bit from the 3V /GND rings on the edge connector. The 3V /GND rings at the bottom can be used to supply power to external circuits. The board uses an LDO specified up to 300mA, with thermal cut-out for short circuit protection.

2.15 Interface

The interface chip handles the USB connection, and is used for flashing new code to the Micro:bit, sending and receiving serial data back and forth to your main computer.

2.16 Dimensions



3. Nezha Pro Breakout Board (EF05070)

3.1 Introduction

The Nezha Pro Breakout Board is a Micro:bit expansion board designed for education and creative programming, aiming to stimulate students' innovative thinking and hands-on skills. It not only integrates two convenient motor control buttons and a 4-way motor driver, but also comes with an 8-way sensor expansion port, providing students with a versatile platform for experimentation and exploration. These motor control buttons allow direct control of the motor's direction of rotation without connecting the Micro:bit, increasing flexibility of operation. All interfaces use RJ11 connectors with a dud-proof, anti-reverse plug design to ensure fast and accurate connections. The case of the expansion box is specially designed with interfaces that are compatible with LEGO and Fischertechnik building blocks, supporting students to combine electronic modules with mainstream building blocks to build personalized creative programming creations.

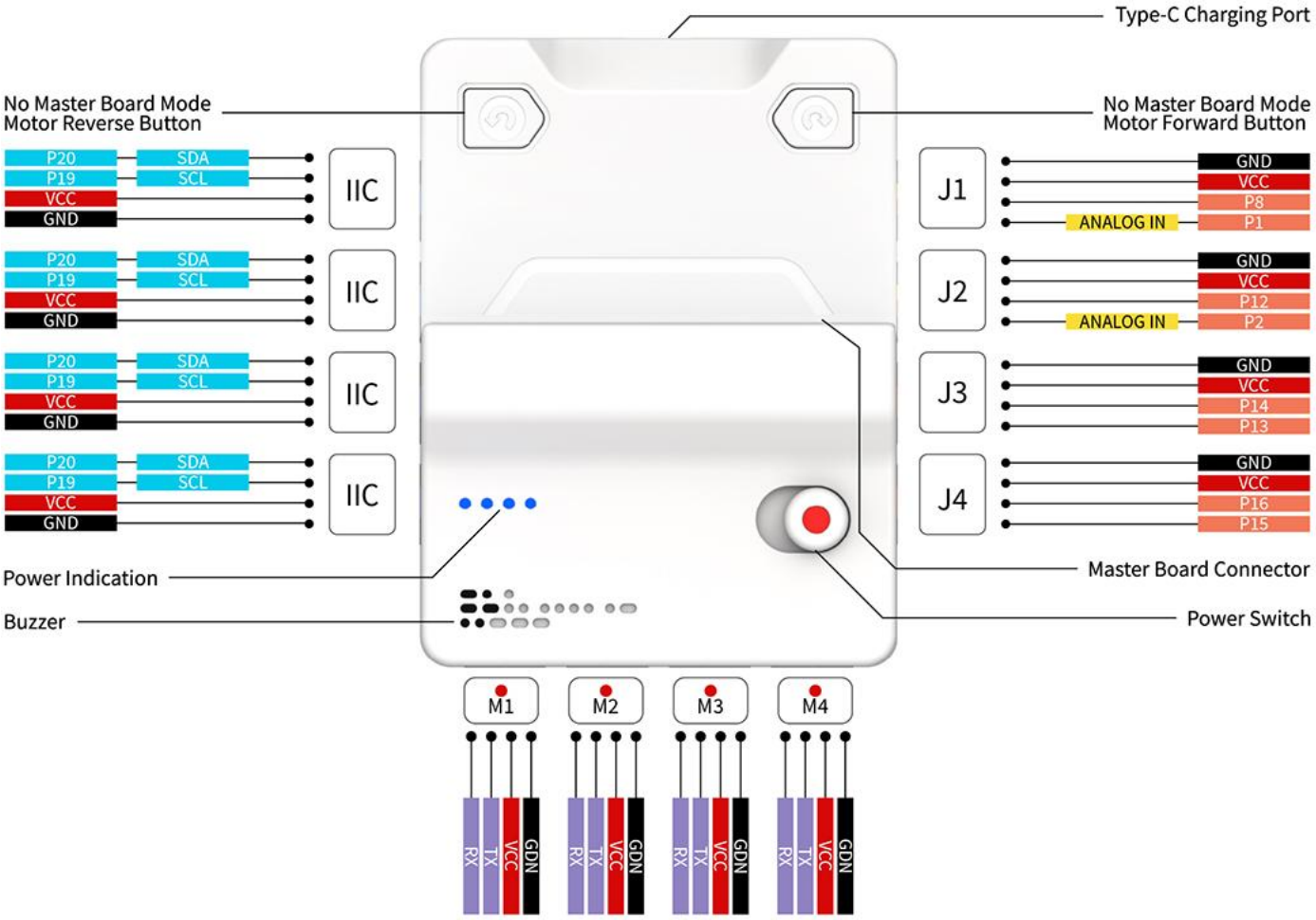
3.2 Characteristics

- Independent Motor Control
- RJ11 port design Colour recognition system
- Support for closed-loop motors
- Compatibility design
- Slide Power Switch

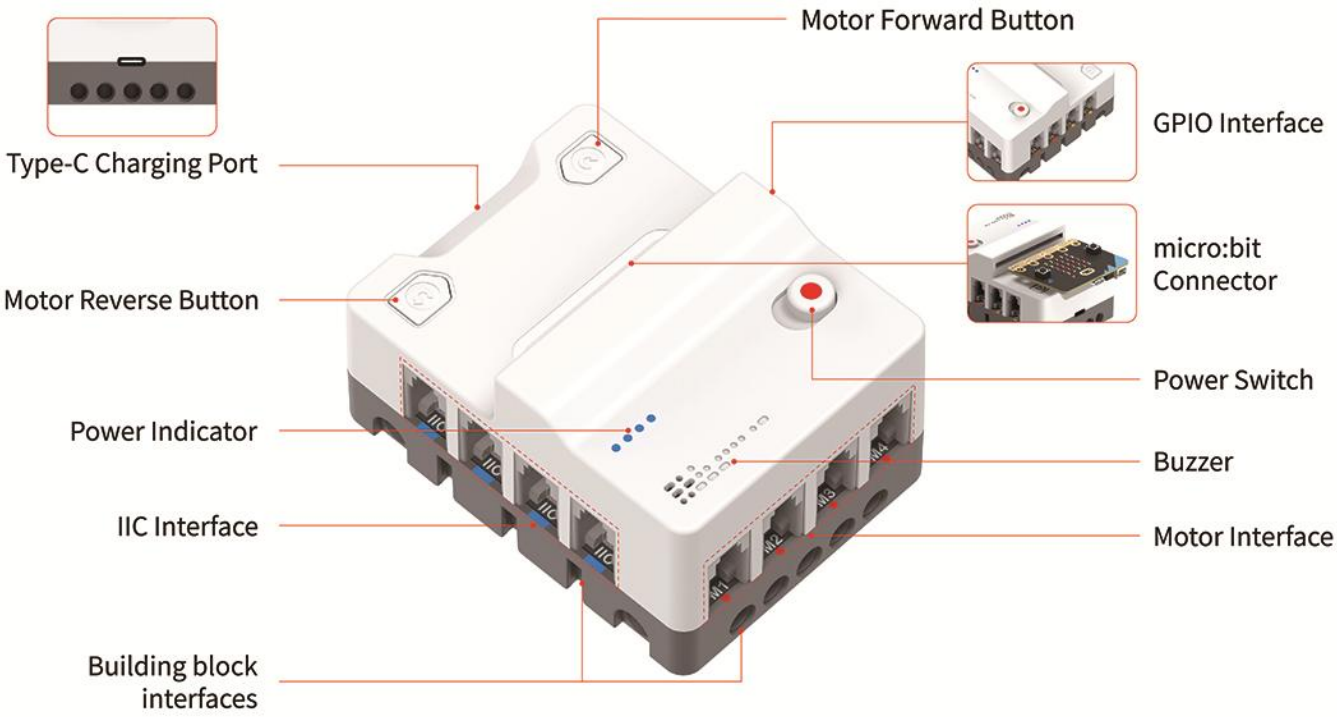
3.3 Technical Specification

Item	Parameter
Name	Nezha Pro Breakout Board
SKU	EF05070
Dimension	L80mm（Not include the Micro:bit） x W60mm x H44mm
GW	142g（Not include the Micro:bit）
Charging Voltage	5V
Charging Current	3A
Charging Time	50min
Battery Capacity	900mAh/6.6Wh
Max. Working Voltage	8.4V
Rated Working Voltage	7.4V
Min. Working Voltage	6.4V
Standby Current	0.01A
Micro:bit Supply Voltage	3.3V
Motor Output Working Voltage	6.4~8.4V
Motor Connection Rated Output Current	1A
Motor Connection Max. Output Current	2A
RJ11 Connection Output Voltage	3.3V
RJ11 Connection Output Max. Current	1.0A
Lasting Operation Time	45min（Connect the AI Lens, 4 Smart Motors, 2 LED modules, there might be some difference because of the testing environment and so on)
Motor Connectors	4 Units
Sensors Connectors	8 Units

3.4 Introduction to interface pins



3.5 Introduction to Main Modules

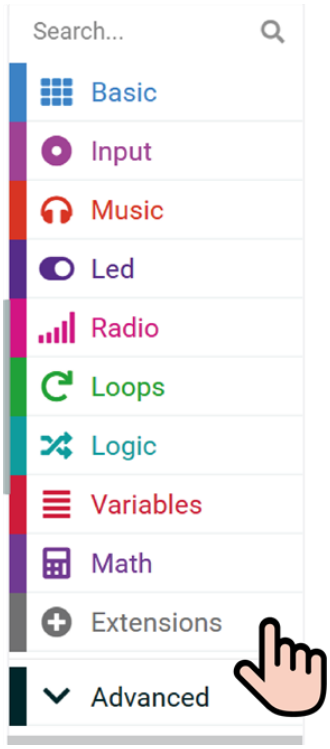


3.6 Power Indicator

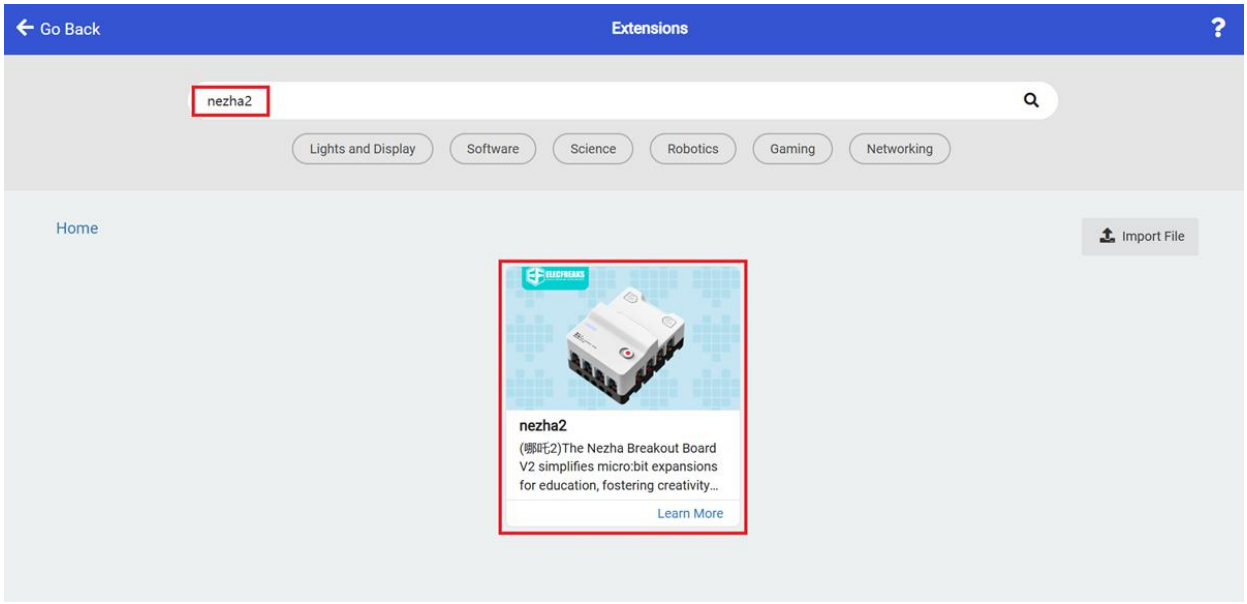
Current Status	LED 1	LED 2	LED 3	LED 4	Battery Capacity
Discharging Status	On	On	On	On	76% ~ 100%
	On	On	On	Off	51% ~ 75%
	On	On	Off	Off	26% ~ 50%
	On	Off	Off	Off	1% ~ 25%
Charging Status	On	On	On	On	100%
	On	On	On	Flashing	75% ~ 99%
	On	On	Flashing	Off	50% ~ 74%
	On	Flashing	Off	Off	26% ~ 49%
	Flashing	Off	Off	Off	0% ~ 25%

3.7 Programming initialization

For programming Nezha Pro Breakout board, we need to add an extension. Click "Extensions" in the MakeCode drawer to see more choices.

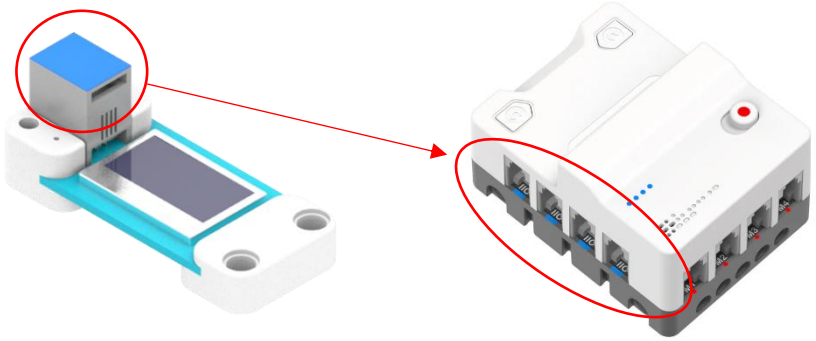


Search with "nezha2" and have it downloaded.



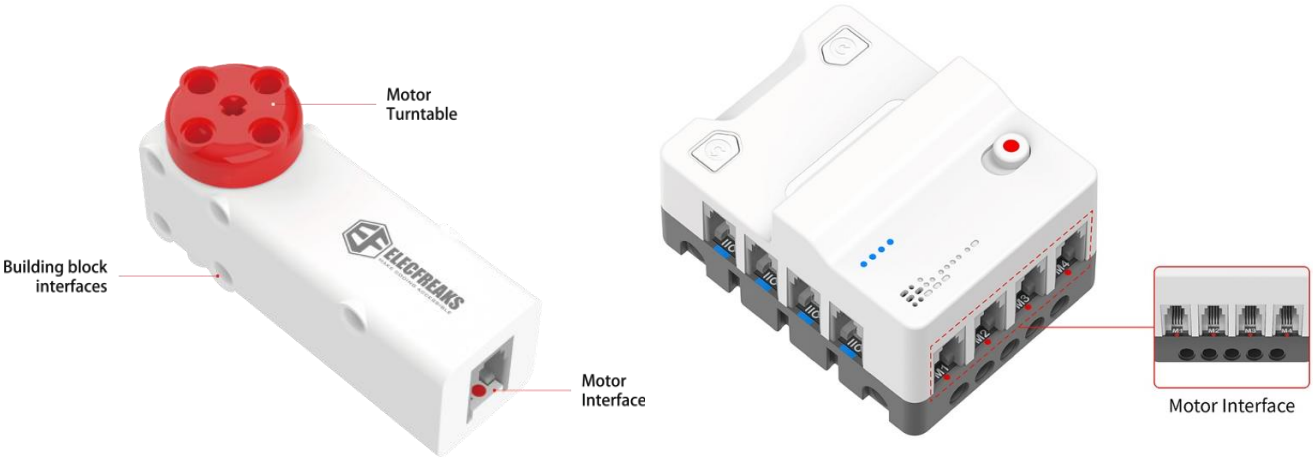
3.8 Interface Connectors

Each PlanetX sensor has a colour. Match it with the same colour on the Nezha Pro Breakout board. Use this table to see where to connect each sensor.



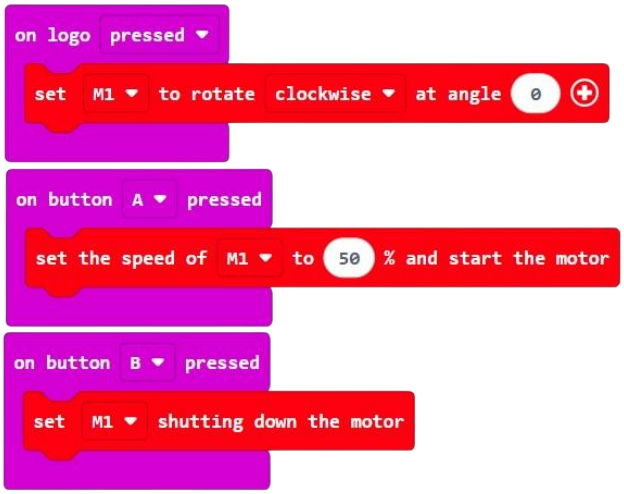
Item	Colour	Connection Type	Connection port
Smart Motor		UART	M1, M2, M3, M4
Sensor		IIC	IIC
		Analog GPIO	J1, J2
		Digital GPIO	J1, J2, J3, J4

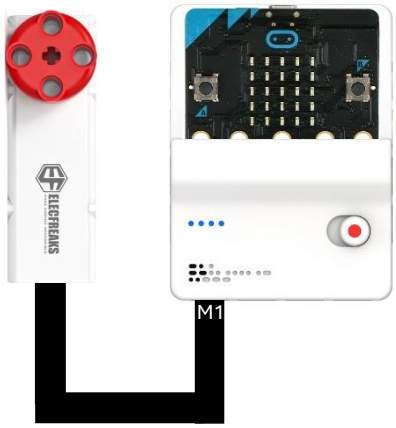
4. Smart Motors



4.1 Sample Code

Hardware Connection: Connect the PlanetX Smart Motor to the motor M1 port of the Nezha Pro Breakout Board Pro as shown in the picture.



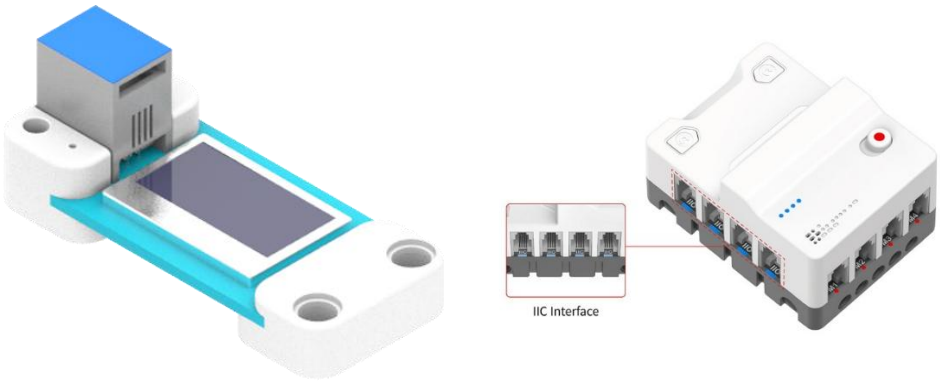


Result: When button A is pressed, the motor connected to port M1 starts to move with 50% of speed. When button B is pressed, the motor stops. When Micro:bit logo is pressed, The motor will start to move in it's first position automatically.

4.2 Technical Specification

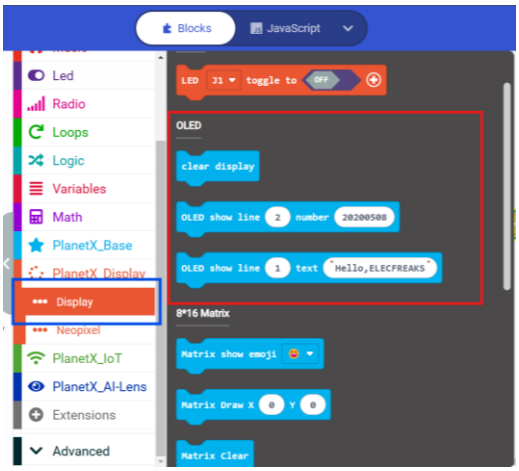
Item	Parameter
Product Name	PlanetX Smart Brick Motor
SKU	EF05071
Operating Voltage	5.0~9.0V
No-load Speed	125 rpm
StallTorque	≥29 Ncm
Accuracy	≤3°
Operating Travel Angle	360° * N
Connector Interface	RJ11
Building Block Interface	support
Speed Reading	support
Angle Reading	support
Protection Mechanisms	Temperature protection, blocking protection, voltage protection
Colour Recognition System	support
Weight	31g

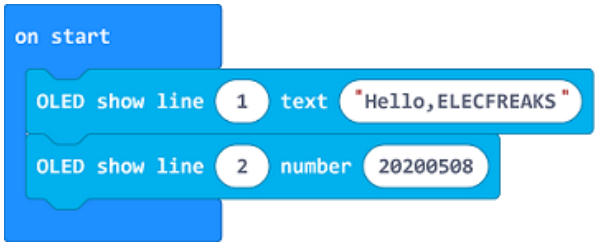
5. OLED Display (EF05016)



5.1 Sample Code

Hardware Connection: Connect the OLED module to IIC port in the Nezha Pro Breakout Board.

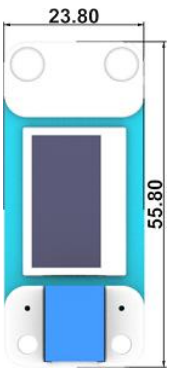




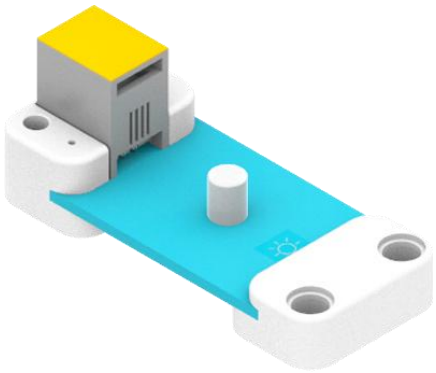
Result: The numbers set display on the OLED screen.

5.2 Specification

Item	Parameter
SKU	EF05016
Connection	RJ11
Type of Connection	IIC
Working Voltage	3.3V
Size	0.96
Resolution Ratio	128×64

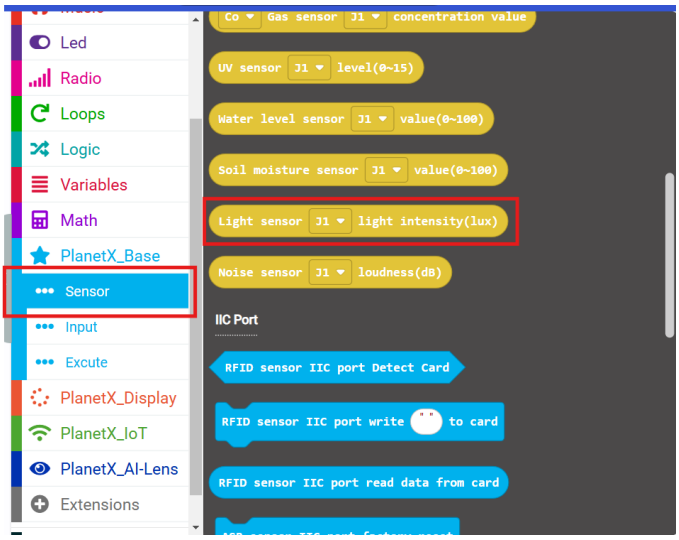


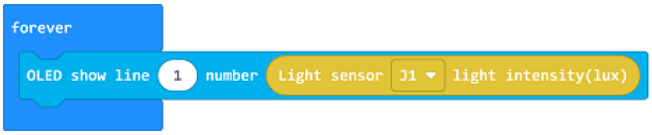
6. Light Sensor (EF05001)



6.1 Sample Code

Hardware Connection: Connect the light sensor to J1 port and the OLED module to IIC port in the Nezha Pro Breakout Board.

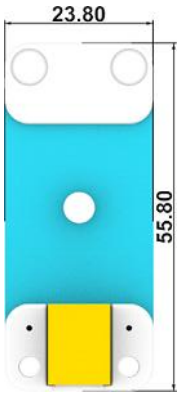




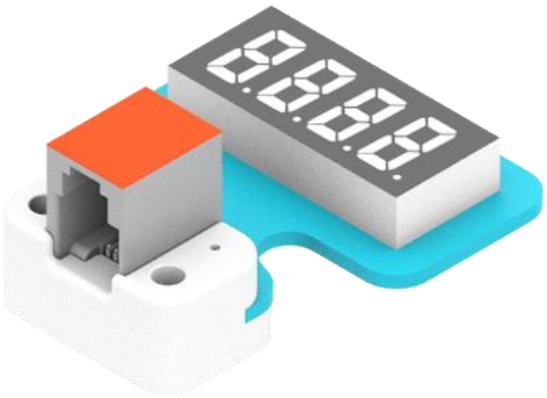
Result: The light intensity's value displays on the OLED module.

6.2 Specification

Item	Parameter
SKU	EF05001
Connection	RJ11
Type of Connection	Analog output
Working Voltage	3.3V

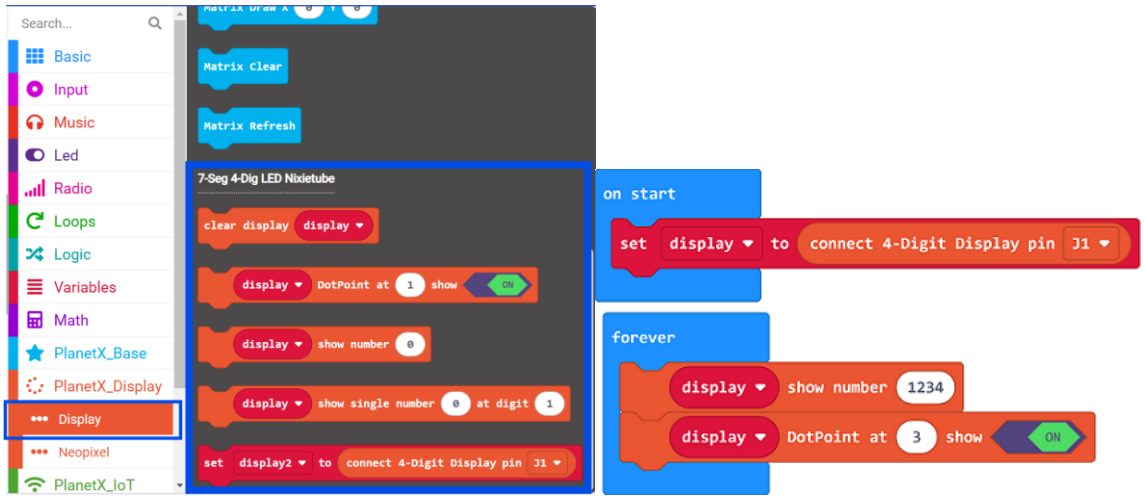


7. Seven-Seg LED Nixietube (EF05026)



7.1 Sample Code

Hardware Connection: Connect the 7-Seg LED Nixietube to J1 port in the Nezha Pro Breakout board.

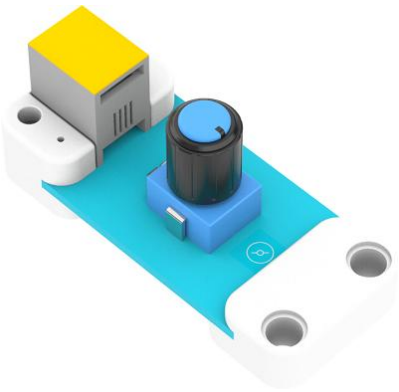


Result: Set it display 12.34.

7.2 Specification

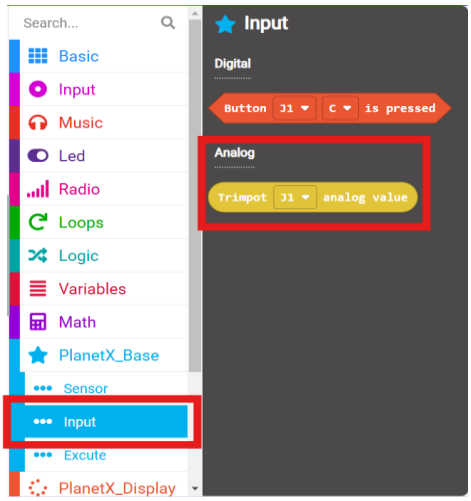
Item	Parameter
SKU	EF05026
Connection	RJ11
Type of Connection	Digital input
Working Voltage	3.3V
Core IC	TM1637

8. Analog Rotation Potentiometer (EF05018)



8.1 Sample Code

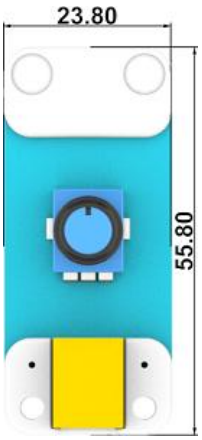
Hardware Connection: Connect the Analog Rotation Potentiometer to J1 port and the OLED module to IIC port in the Nezha Pro Breakout board.



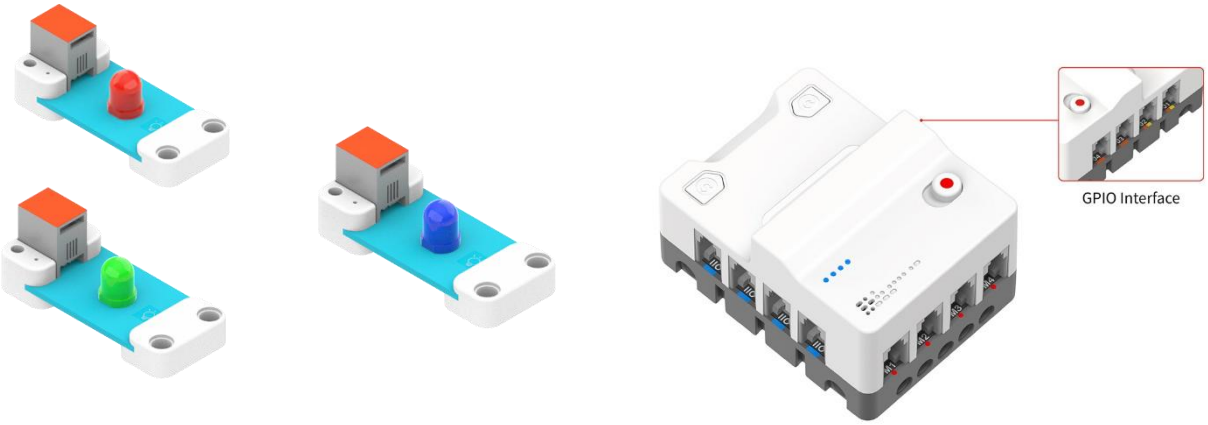
Result: The detected value displays on the OLED screen.

8.2 Specification

Item	Parameter
SKU	EF05018
Connection	RJ11
Type of Connection	Analog output
Working Voltage	3.3V

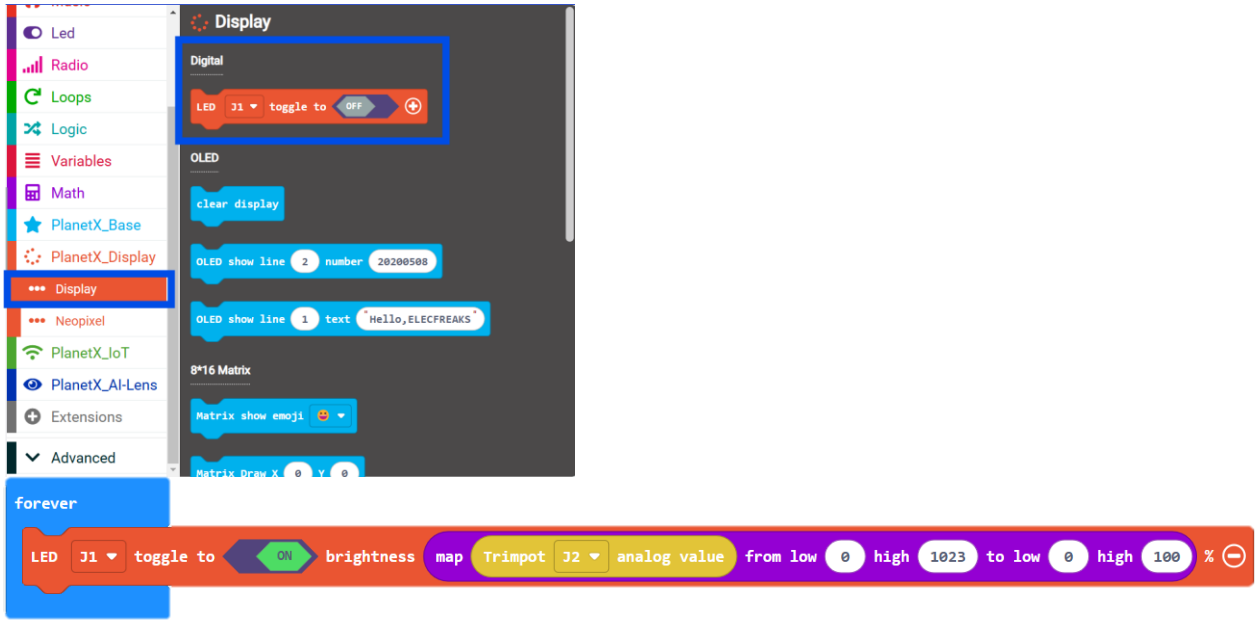


9. Red LED(EF05009), Green LED(EF05010), Blue LED(EF05011)



9.1 Sample Code

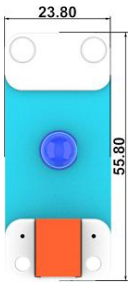
Hardware Connection: Connect the Red LED to J1 port and the potentiometer to J2 port in the Nezha Pro Breakout board.



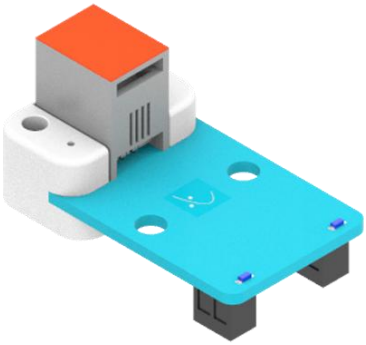
Result: The brightness is adjusted by the potentiometer by using a map block which can match Analog Data from 0 to 1023 with brightness from 0 to 100%.

9.2 Specification

Item	Parameter
SKU	EF05009, EF05010, EF05011
Connection	RJ11
Type of Connection	Analog input
Working Voltage	3.3V

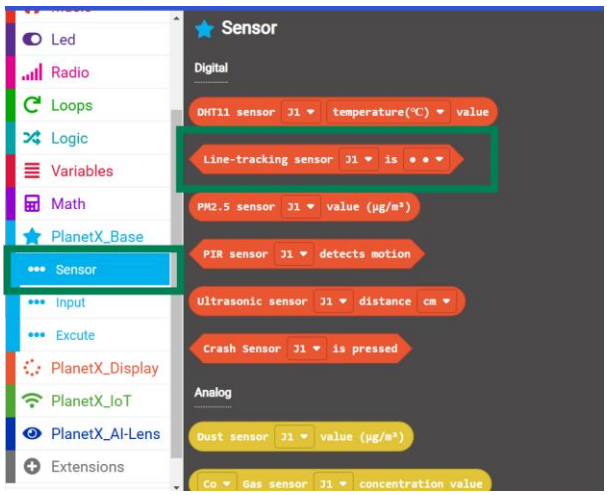


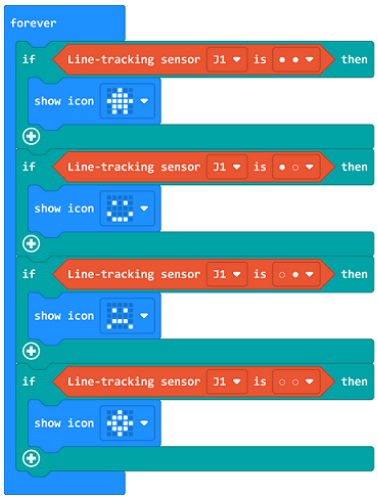
10. Two Channels Tracking Module (EF05019)



10.1 Sample Code

Hardware Connection: Connect the Two channels tracking module to J1 port in the Nezha Pro Breakout board.

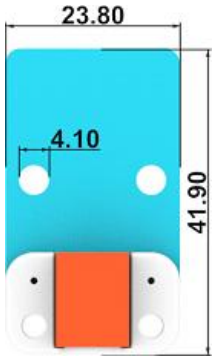




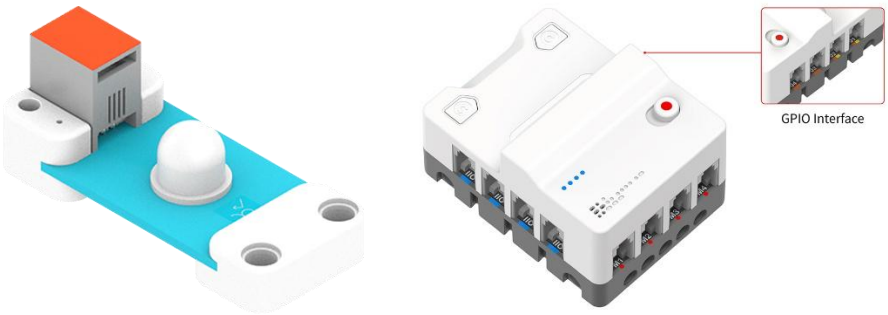
Result: Different icons display on the Micro:bit in accordance with the different status detected by the tracking module.

10.2 Specification

Item	Parameter
SKU	EF05019
Connection	RJ11
Type of Connection	Digital output
Working Voltage	3.3V
Effective Distance	8~11mm
Black Line	Low level output
White Line	High level output

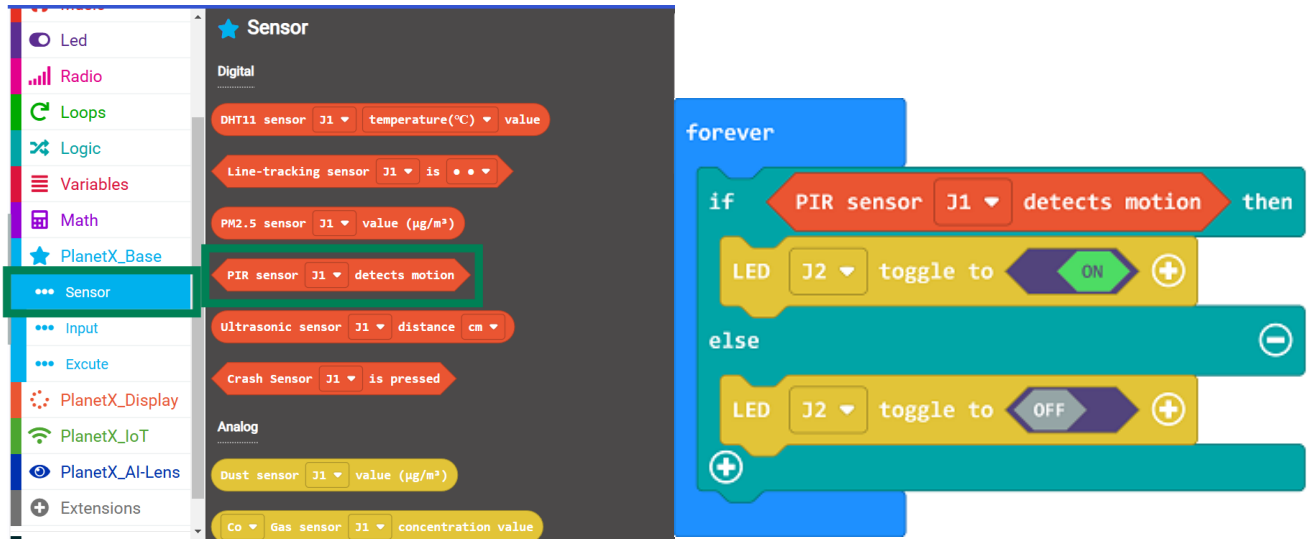


11. PIR Sensor (EF05002)



11.1 Sample Code

Hardware Connection: Connect the PIR sensor to J1 port and the LED to J2 port in the Nezha Pro Breakout board.

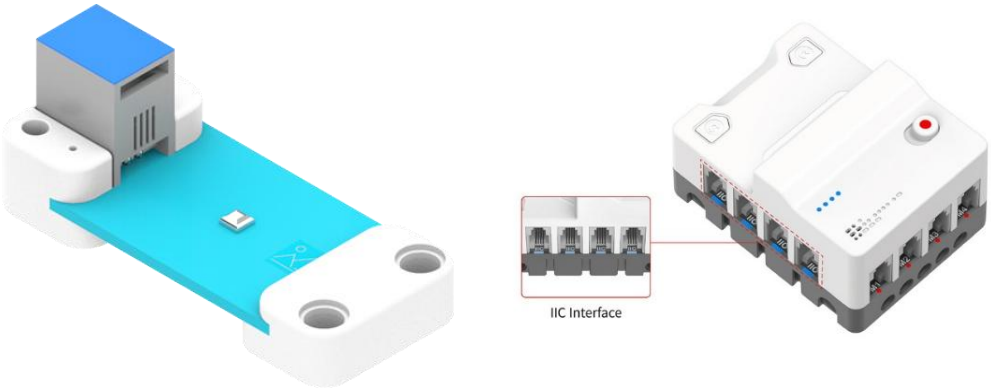


Result: The LED lights on while the motion being detected by the PIR sensor or the LED lights off.

11.2 Specification

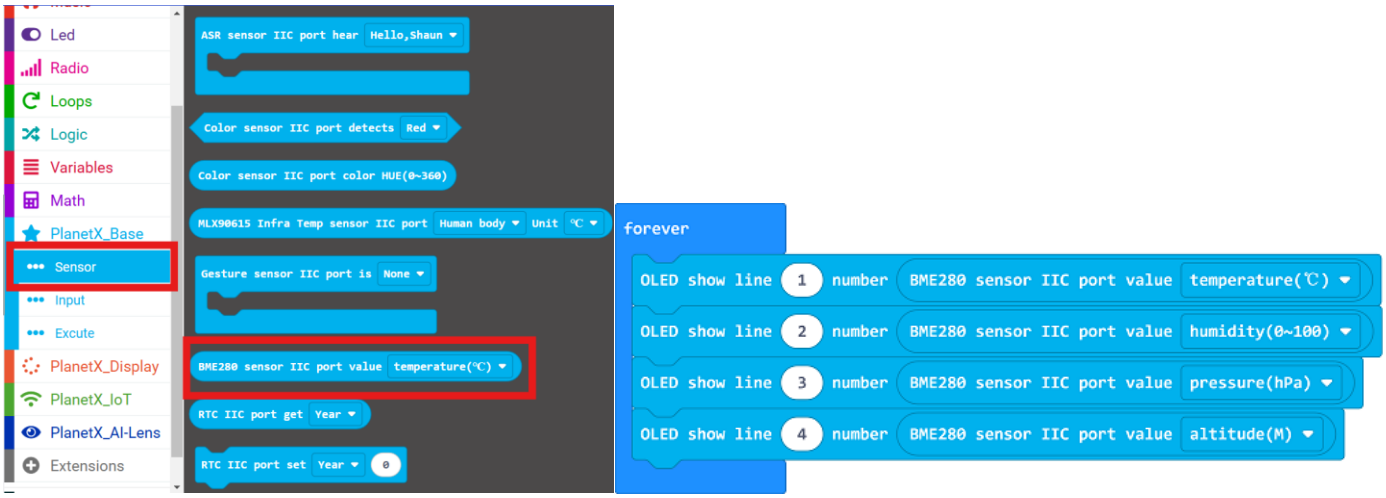
Item	Parameter
SKU	EF05002
Connection	RJ11
Type of Connection	Digital Output
Working Voltage	3.3V

12. BME280 Air Pressure Sensor (EF05022)



12.1 Sample Code

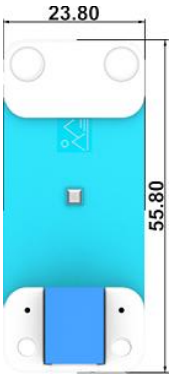
Hardware Connection: Connect the BME280 air pressure sensor to the IIC port and the OLED to the other IIC port in the Nezha Pro Breakout board.



Result: The values of the temperature, humidity, air pressure and the altitude in the current environment display on the OLED screen.

12.2 Specification

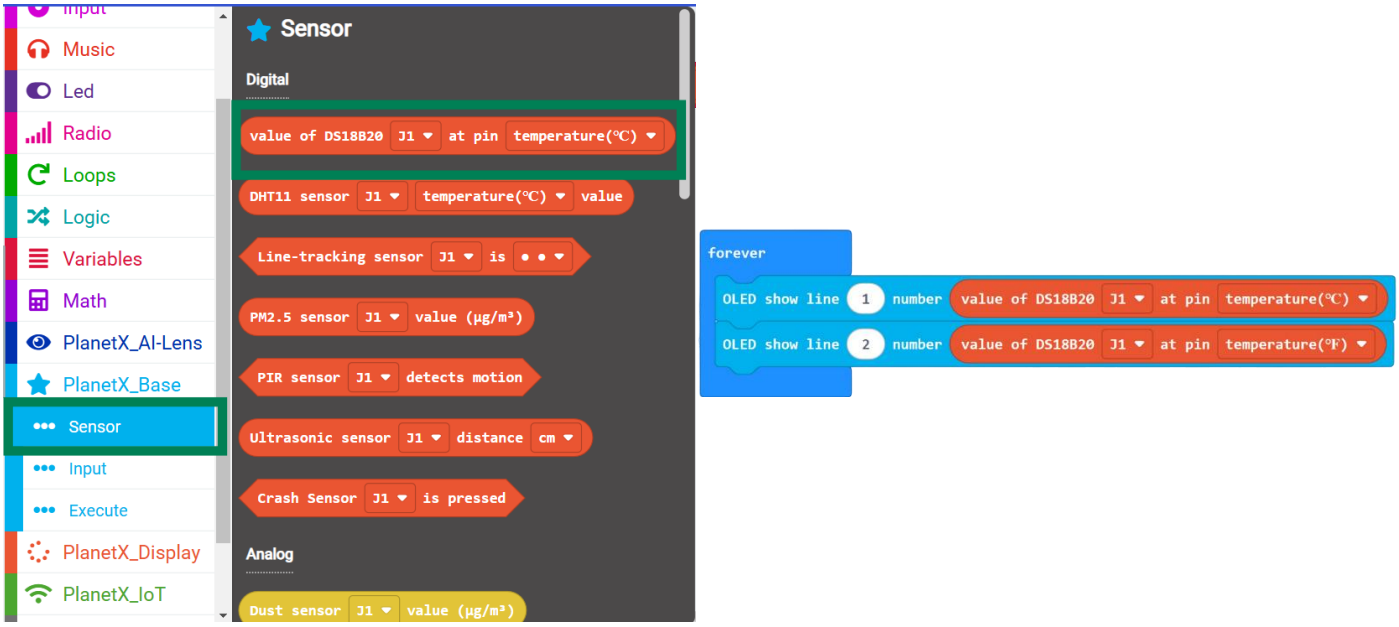
Item	Parameter
SKU	EF05022
Connection	RJ11
Type of Connection	IIC
Working Voltage	3.3V
Core IC	BME280



13. 18B20 Temperature Sensor (EF05041)

13.1 Sample Code

Hardware Connection: Connect the 18B20 Temperature sensor to J1 port and the OLED to the IIC port in the Nezha Pro Breakout board.

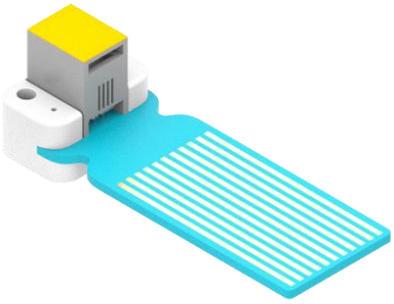


Result: The value detected by 18B20 temperature sensor displays on the OLED screen in Fahrenheit and Celsius.

13.2 Specification

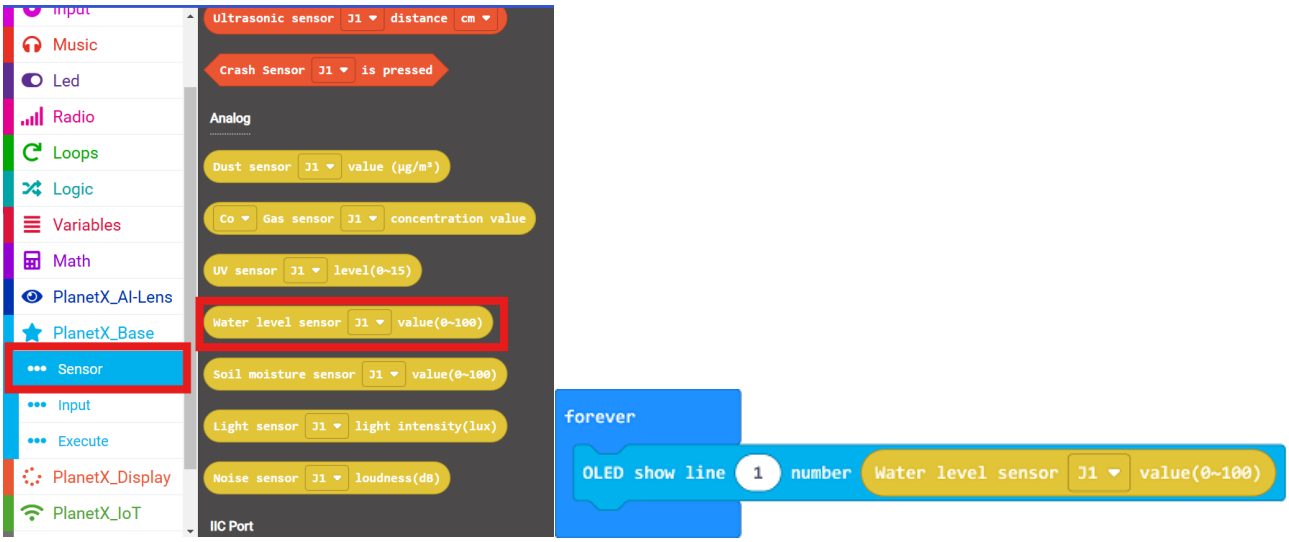
Item	Parameter
SKU	EF05041
Connection	RJ11
Type of Connection	Digital output
Working Voltage	3.3V

14. Water Level Sensor (EF05023)



14.1 Sample Code

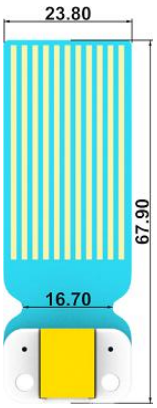
Hardware Connection: Connect the Water lever sensor to J1 port and the OLED to the IIC port in the Nezha Pro Breakout board.



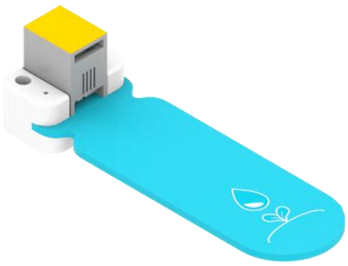
Result: The current value of the water level displays on the OLED screen.

14.2 Specification

Item	Parameter
SKU	EF05023
Connection	RJ11
Type of Connection	Analog output
Working Voltage	3.3V

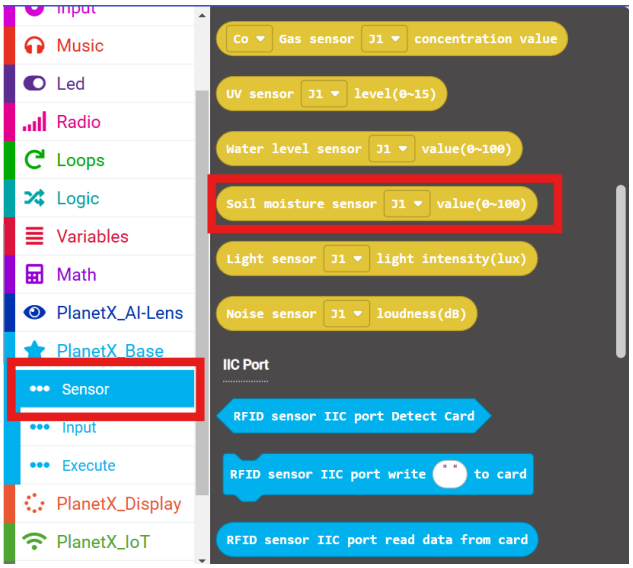


15. Soil Moisture Sensor (EF05005)



15.1 Sample Code

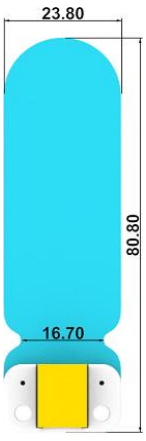
Hardware Connection: Connect the Soil moisture sensor to J1 port and the OLED to the IIC port in the Nezha Pro Breakout board.



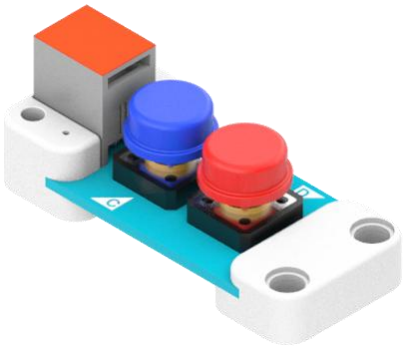
Result: The value of the current soil moisture display on the OLED module.

14.2 Specification

Item	Parameter
SKU	EF05005
Connection	RJ11
Type of Connection	Analog output
Working Voltage	3.3V

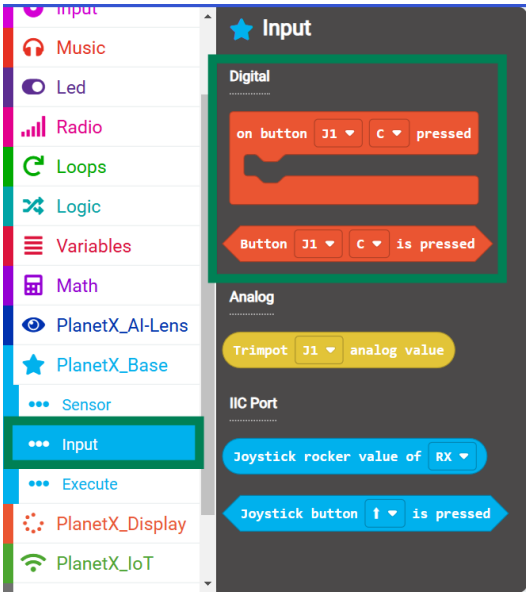


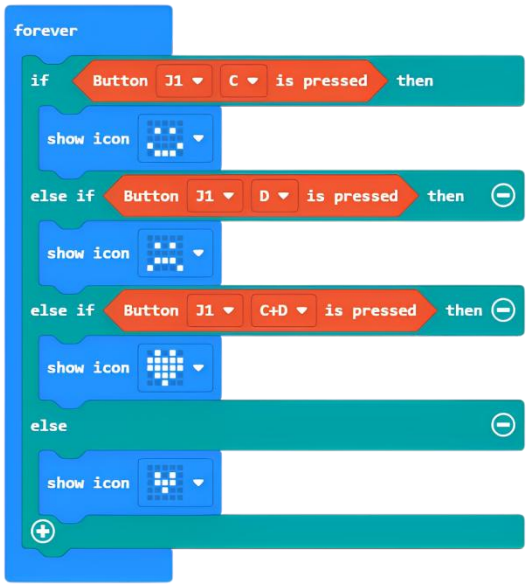
16. Push Button Module (EF05017)



16.1 Sample Code

Hardware Connection: Connect the Push-button module to J1 port in the Nezha Pro Breakout board.

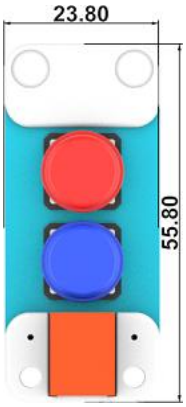




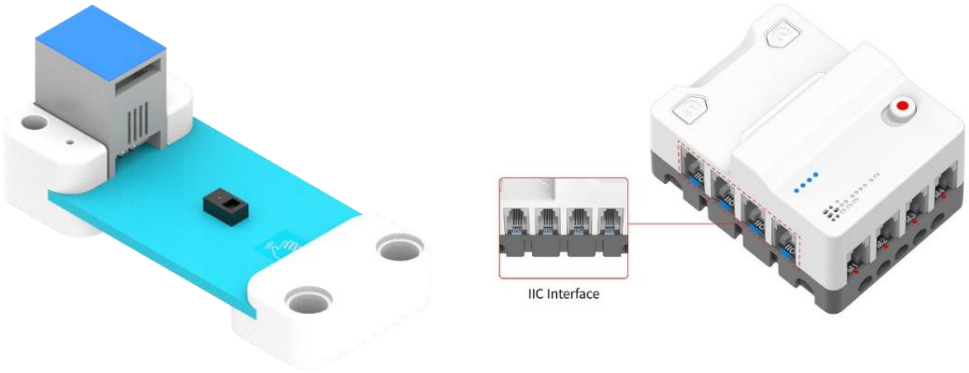
Result: The icons display on the Micro:bit accordingly with the order given by pressing button A or B or A+B.

16.2 Specification

Item	Parameter
SKU	EF05017
Connection	RJ11
Connections type	Digit output
Power	3.3V

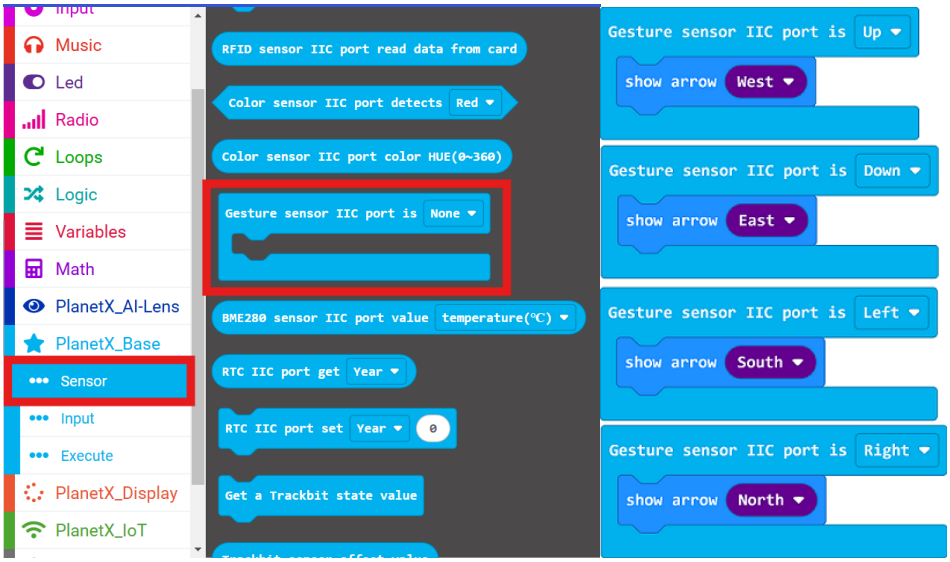


17. Gesture Sensor (EF05020)



17.1 Sample Code

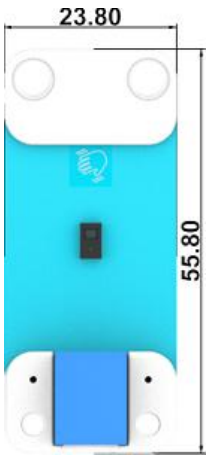
Hardware Connection: Connect the Gesture sensor to the IIC port in the Nezha Pro Breakout board.



Result: The equivalent icon for each gesture displays on the Micro:bit.

17.2 Specification

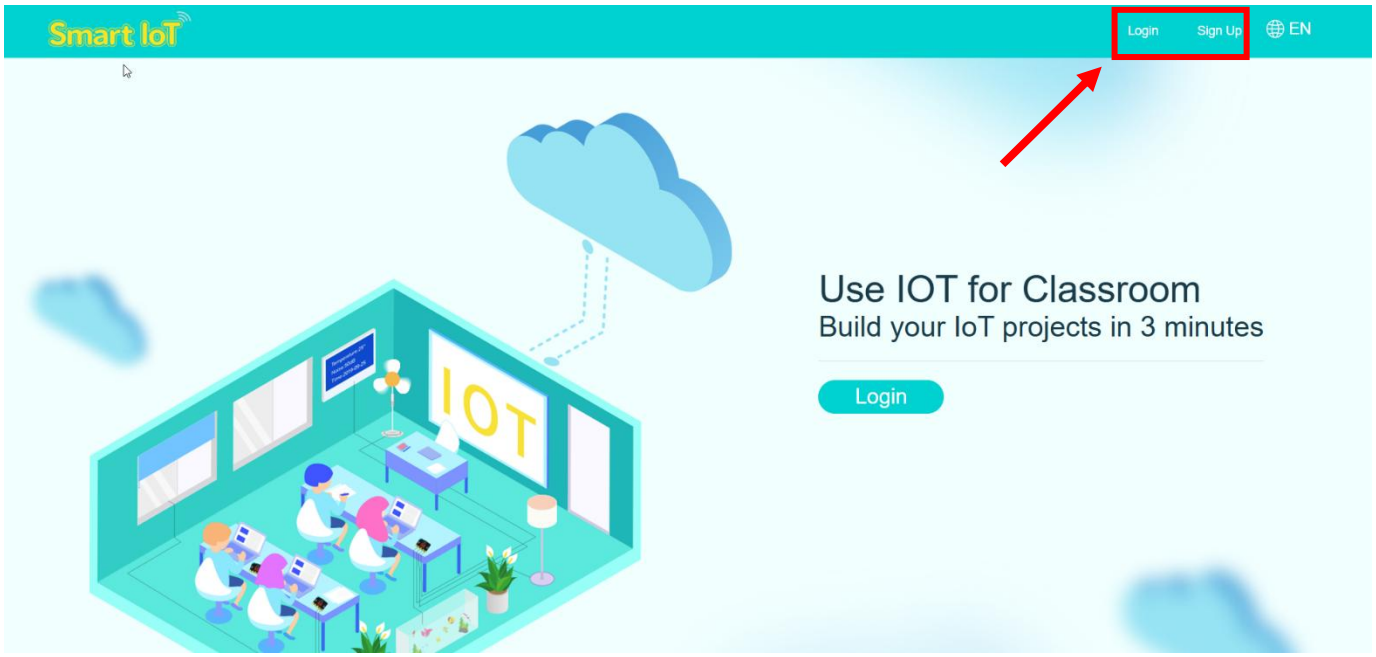
Item	Parameter
SKU	EF05020
Connection	RJ11
Type of Connection	IIC
Working Voltage	3.3V
Core IC	PAJ7620U2
Supported Gestures	Basic gestures (Up, down, right, left, forward, reverse, clockwise, anticlockwise.)



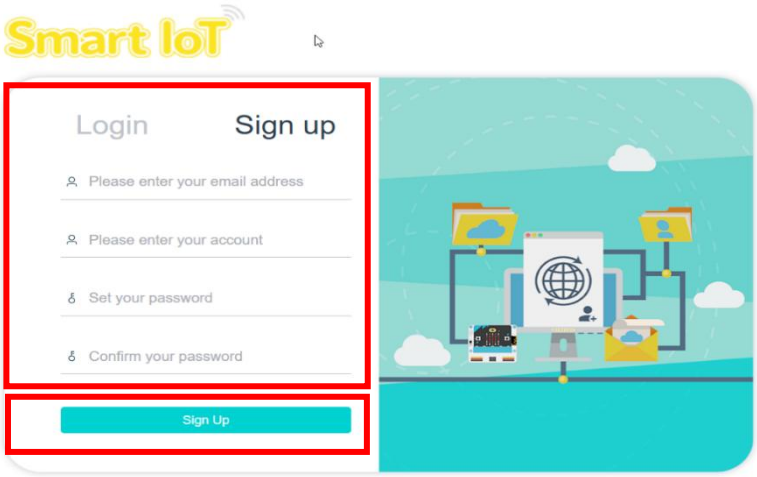
18. WIFI Module (EF05036)

18.1 Procedure for using WIFI Module with Smart IoT platform

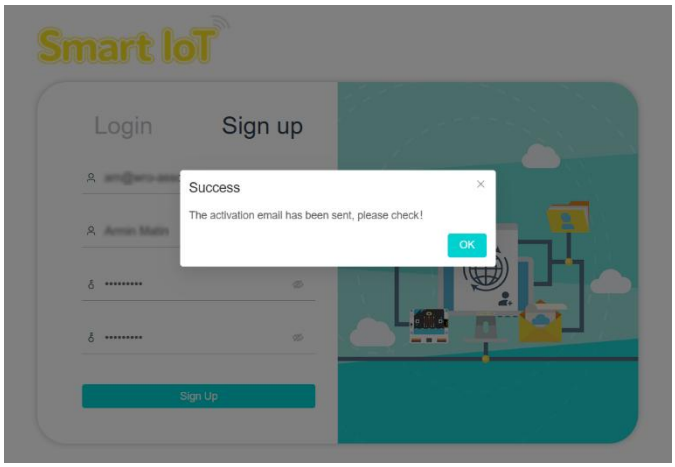
1. Go to **smartiot.space**
2. Click **Sign Up** at the top of the page. If you already have an account, click **Sign In** and go to step5.



3. Fill in your details and click **Sign Up**



4. Check your email for an activation message. Look for something similar to the image shown, then click **Activate Your Account** to get started.



[redacted]

Thank you for registering with the Smart IoT Platform. To complete your registration and activate your account, please click on the following link or copy and paste it into your web browser:

Activate Your Account

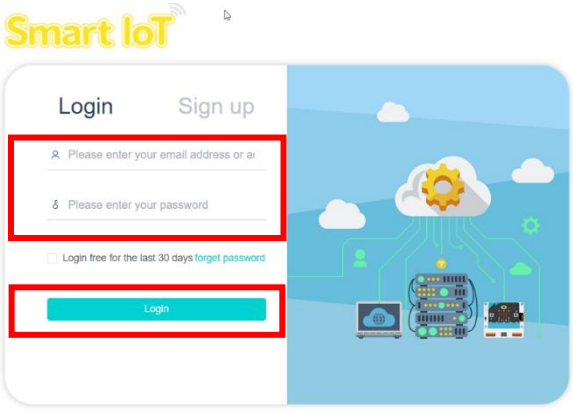
Please note that this activation link will expire in 30 minutes. If the link has expired, you may request a new one by logging into the platform and following the instructions.

If you did not make this request, you can safely ignore this email. Your account will not be activated unless you follow the activation link.

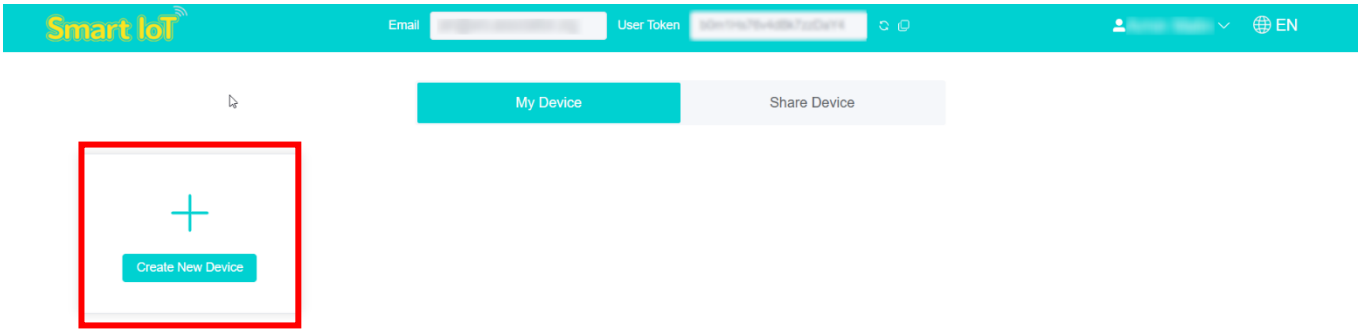
Should you have any questions or need further assistance, feel free to contact our support team at support@elecfreaks.com or visit our help center.

Best regards,
The Smart IoT Platform Team

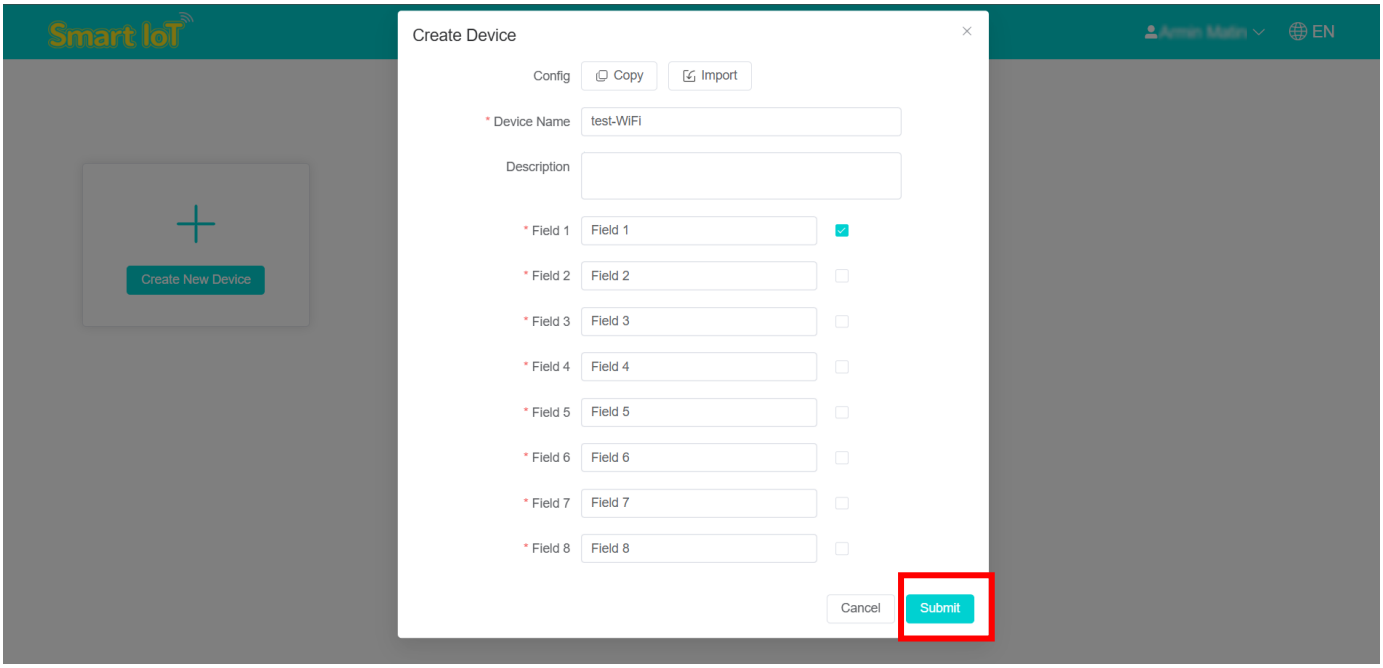
5. Log in with your email and password.



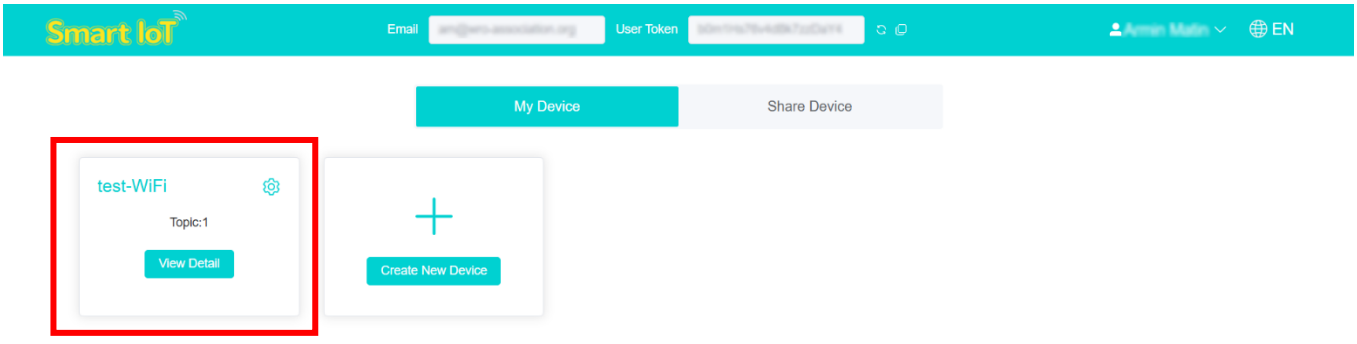
6. Click **Create a New Device** to set up your first device.



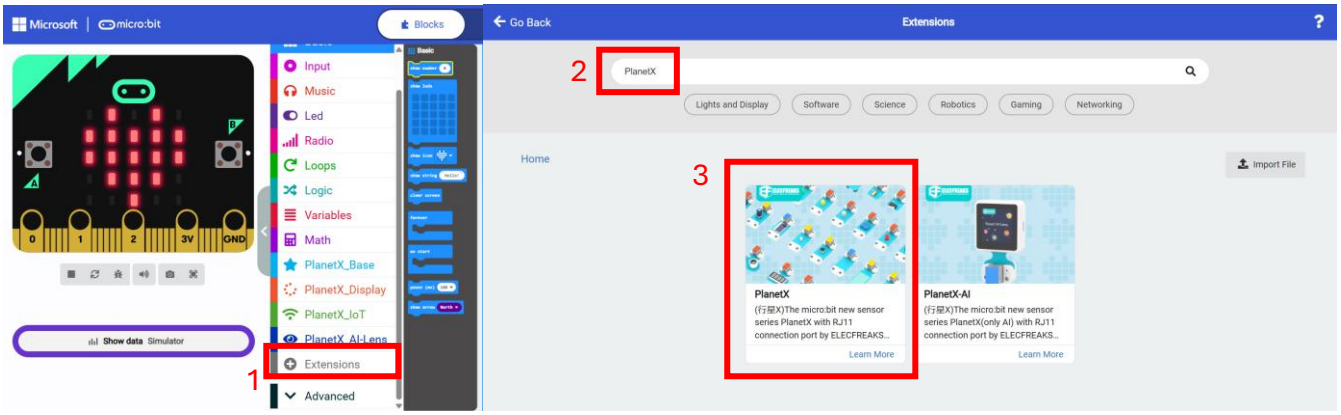
7. Give your device a name and choose how many fields you need for charts. Each field can display a real-time chart of a value. Select field 1, then click **Submit**.



8. Your device is now set up with a **Topic:1** tag. Click **View Details** to see your charts.



9. Connect the ultrasonic sensor to the J1 port and the Wi-Fi module to the J3 port in the Nezha Pro Breakout Board.
10. Open MakeCode and create a new project.
11. Add the PlanetX Sensors extension to MakeCode.



12. Use the following code to set up your WIFI router with your SSID and password. It will retry the connection if it is not established. (The full code can be found on https://makecode.microbit.org/_CiP6TjDzT3ev)

Note:

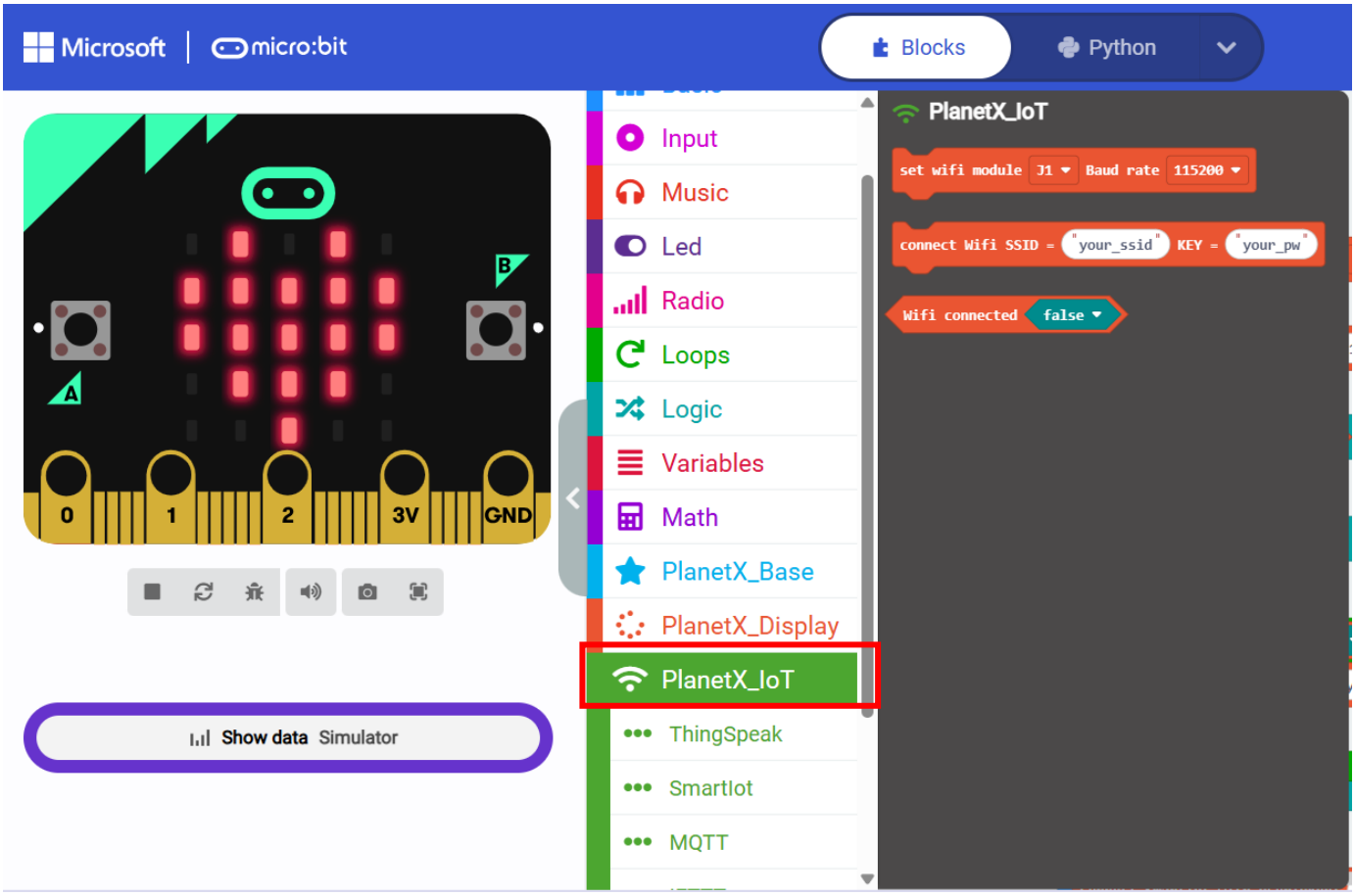
What are SSID and Password, and how can you find them?

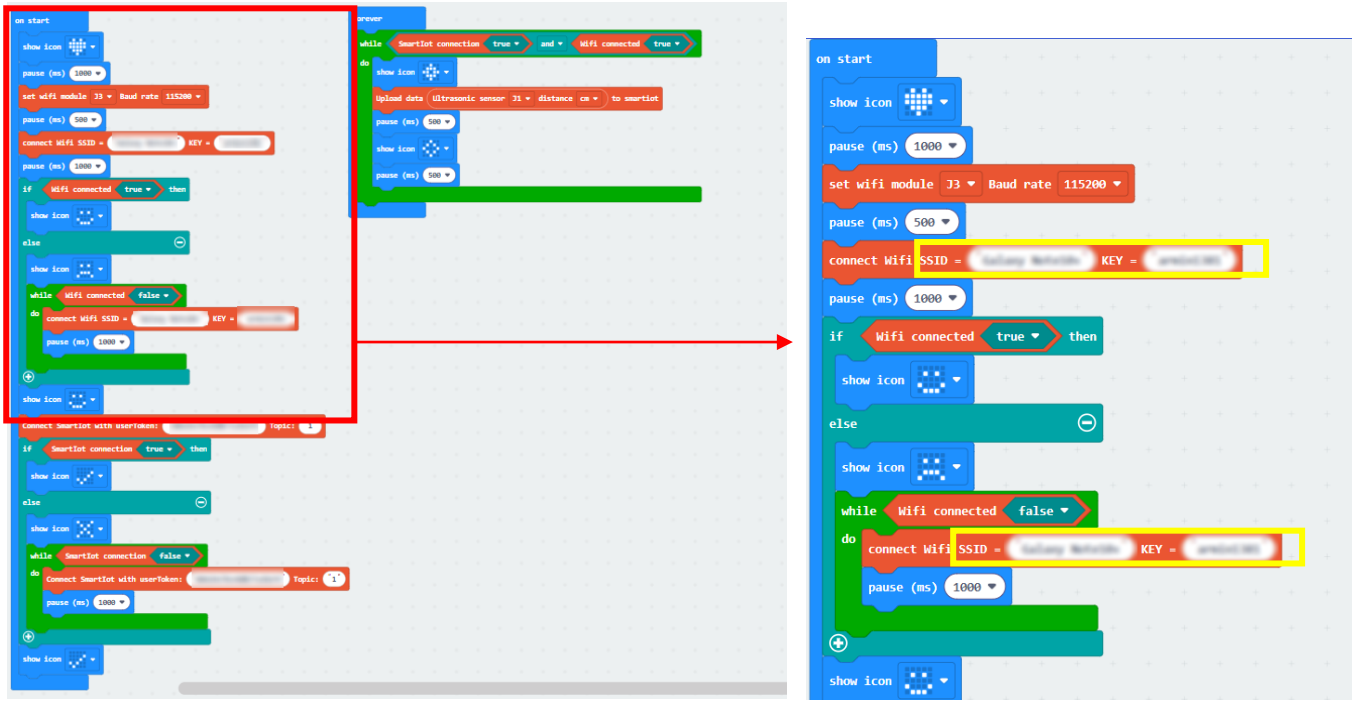
SSID stands for **Service Set Identifier**. Basically, it's just the **name of the WiFi network** you want to connect to. When you open the WiFi settings on your phone or laptop and see a list of networks like My WiFi, HomeNetwork, or Armin's WiFi, those names are SSIDs. The **password** is what allows your device to connect to that network. Most networks are protected with a password to keep them secure.

How can you find your SSID and password?

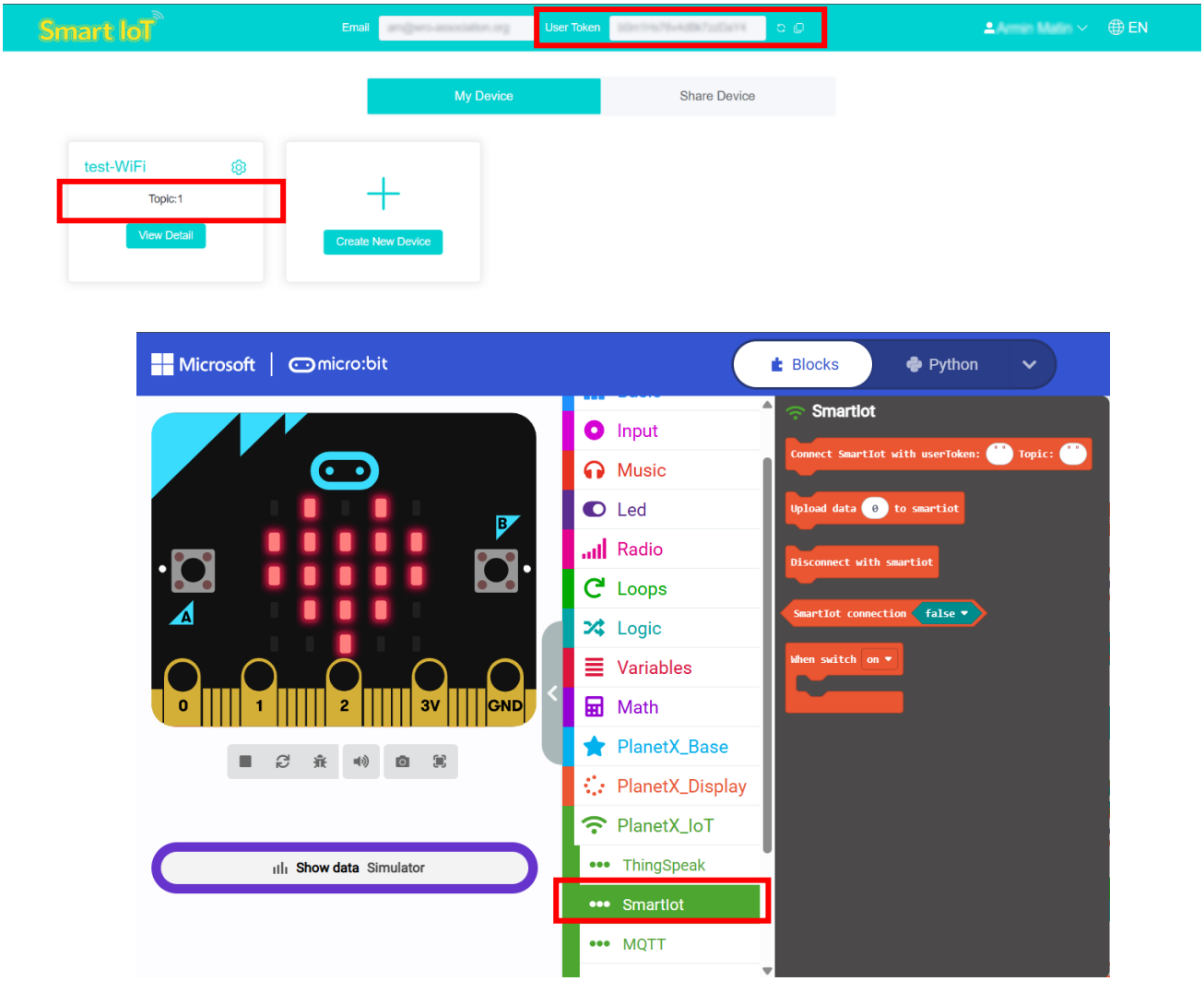
- **At home:** Check the **sticker on your WiFi router**. You'll usually see something like:
  SSID:TP-Link_5G
  Password: abc12345
- **At school:**
  - Ask your **teacher** or **IT support**
  - Look for a **sign or note** on the classroom wall or whiteboard
  - Check your **student portal** or any welcome materials you received

Just make sure to copy the SSID and password **exactly as they are** into your code. They are **case-sensitive**, so capital letters and spaces really matter.

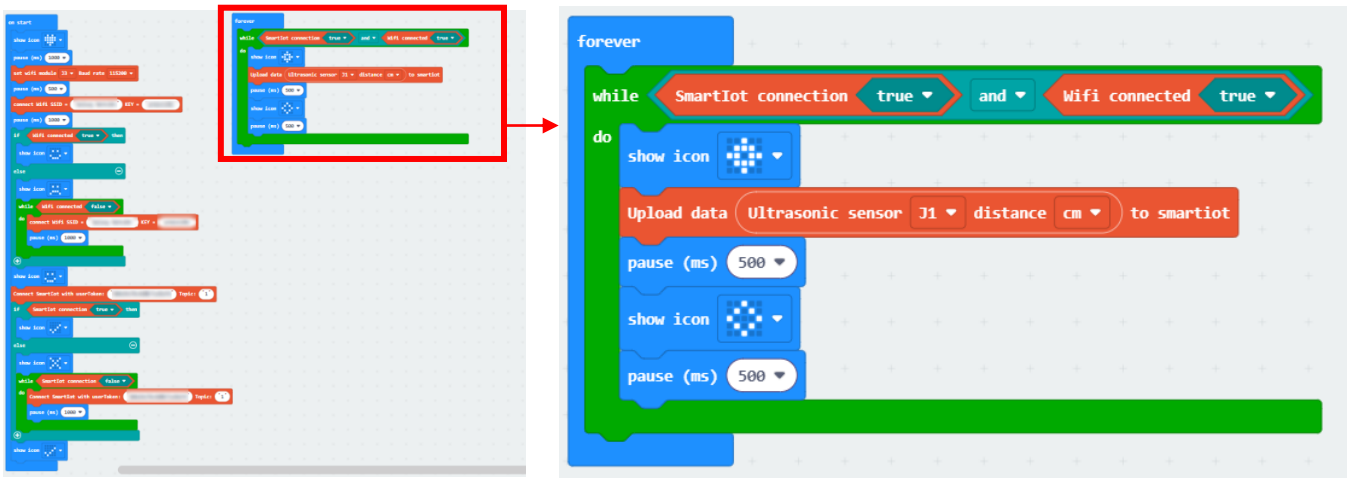

Microsoft
micro:bit
Blocks
Python
Input
Music
Led
Radio
Loops
Logic
Variables
Math
PlanetX_Base
PlanetX_Display
PlanetX_IoT
ThingSpeak
Smartlot
MQTT
PlanetX_IoT
set wifi module J1 Baud rate 115200
connect Wifi SSID = "your_ssid" KEY = "your_pw"
Wifi connected false
Show data Simulator
0
1
2
3V
GND


on start
show icon
pause (ms) 1000
set wifi module J3 Baud rate 115200
pause (ms) 500
connect Wifi SSID = KEY =
pause (ms) 1000
if Wifi connected true then
show icon
else
show icon
while Wifi connected false
do
connect Wifi SSID = KEY =
pause (ms) 1000
show icon
forever
while Smartlot connection true and Wifi connected true
do
show icon
upload data Ultrasonic sensor J1 distance cm to smartlot
pause (ms) 500
show icon
pause (ms) 500
Connect Smartlot with userToken: Topic: 1
if Smartlot connection true then
show icon
else
show icon
while Smartlot connection false
do
Connect Smartlot with userToken: Topic: 1
pause (ms) 1000
show icon

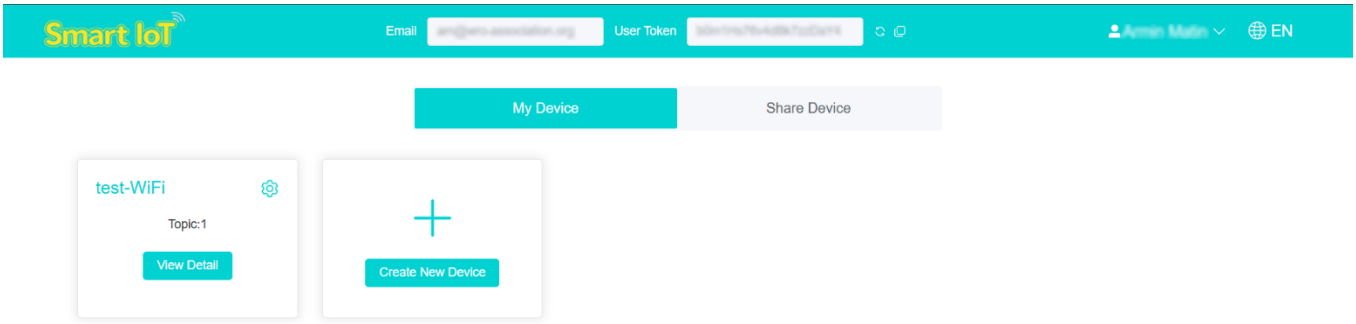
13. Use the following code to connect your WIFI module to the Smart IoT platform. The user token is available on the Smart IoT platform, so copy it into MakeCode. The topic number should match the device you created in step 8.The connection proccess will retry if the conncection is not establsihed.

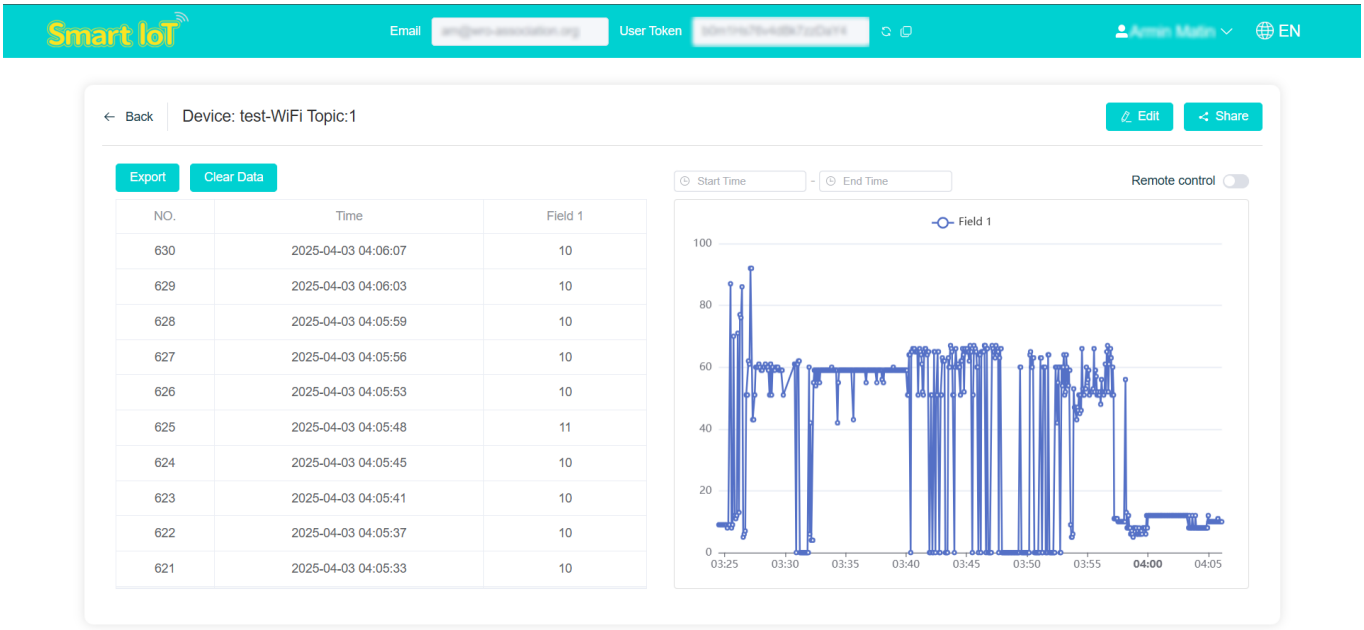


14. Use the following code to send data from the ultrasonic sensor connected to the J1 port in the Nezha Pro Breakout Board.



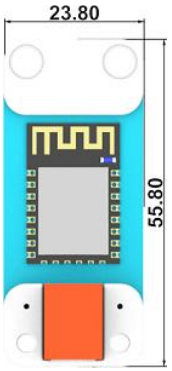
15. Now, you will see a real-time chart of the ultrasonic sensor measurements on the Smart IoT platform.



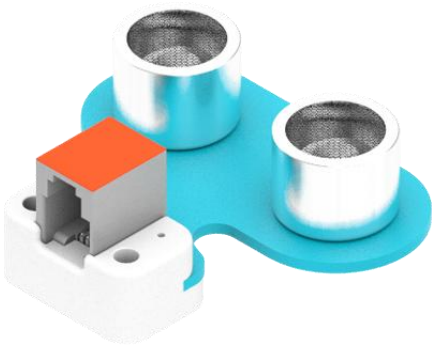


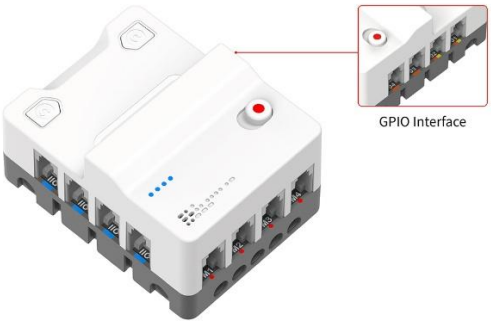
18.3 Specification

Item	Parameter
SKU	EF05036
Connection	RJ11
Connection Type	Serial Communication
Core IC	BL602



19. Sonar:bit(EF05007)





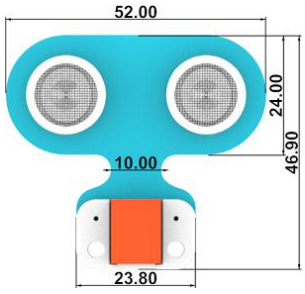
19.1 Sample Code

Hardware Connection: Connect the Sonar:bit to J1 port and the OLED module to the IIC port in the Nezha Pro Breakout board.

Result: The distance value displays on the OLED module.

19.2 Specification

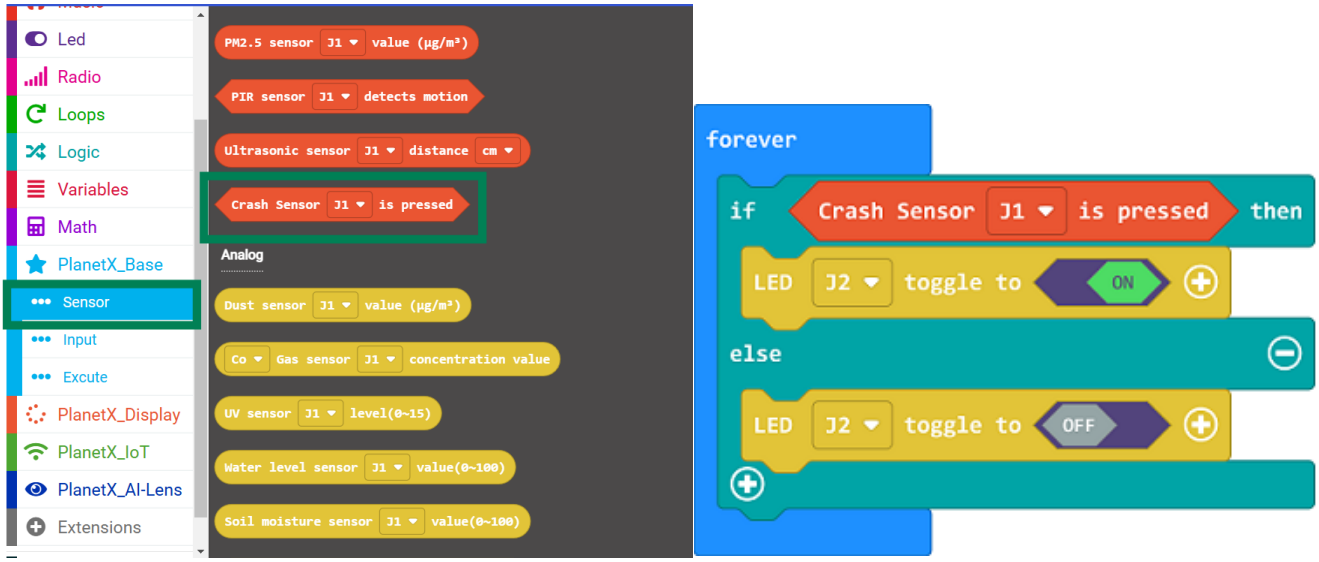
Item	Parameter
SKU	EF05007
Connection	RJ11
Type of Connection	Digital output
Working Voltage	3.3V



20. Crash Sensor (EF05008)

20.1 Sample Code

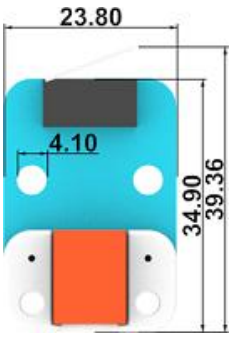
Hardware Connection: Connect the Crash sensor to J1 port and the LED to J2 port in the Nezha Pro Breakout board.



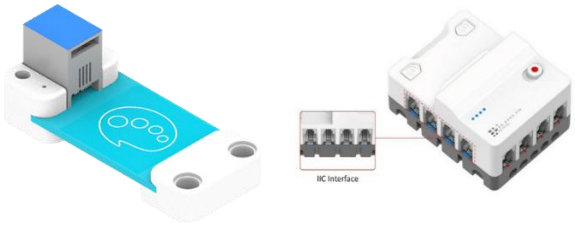
Result: The LED lights on if the crash switch was pressed or it lights off.

20.2 Specification

Item	Parameter
SKU	EF05008
Connection	RJ11
Type of Connection	Digital output
Working Voltage	3.3V



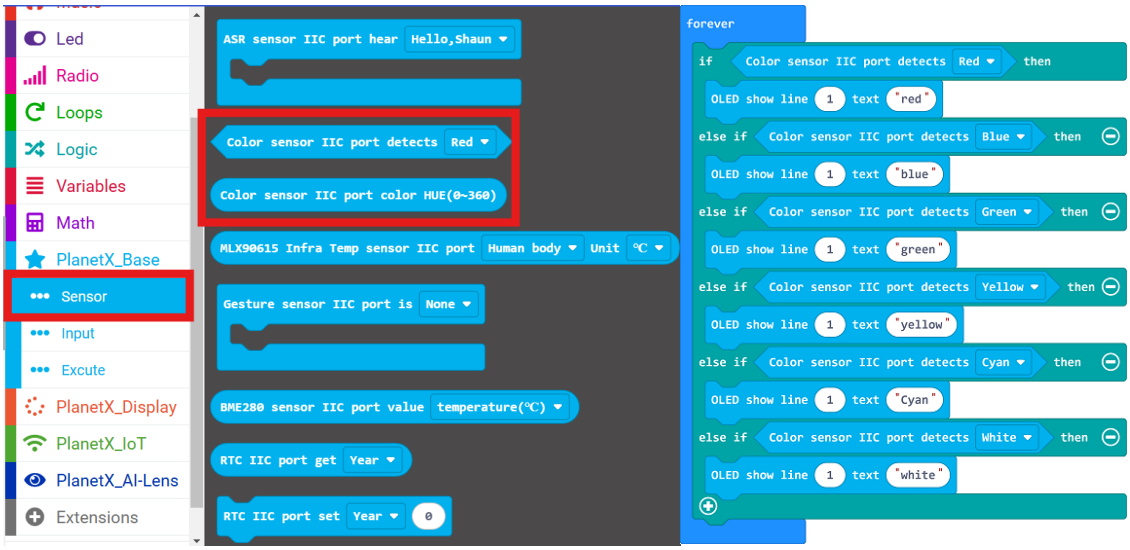
21. Colour Sensor (EF05006)



Note: *All the preset colors match the color cards in the AI Lens Kit. For any other colors not listed, it's best to judge them based on their HUE values, as the results can vary depending on the object's color and how light reflects off its surface.*

21.1 Sample Code

Hardware Connection: Connect the Colour sensor to IIC port and the OLED module to another IIC port in the Nezha Pro Breakout board.



Result: The colour of the detected object displays on the OLED module.

21.2 Specification

Item	Parameter
SKU	EF05006
Connection	RJ11
Type of Connection	IIC
Working Voltage	3.3V
Size	55.8 x 23.8 mm

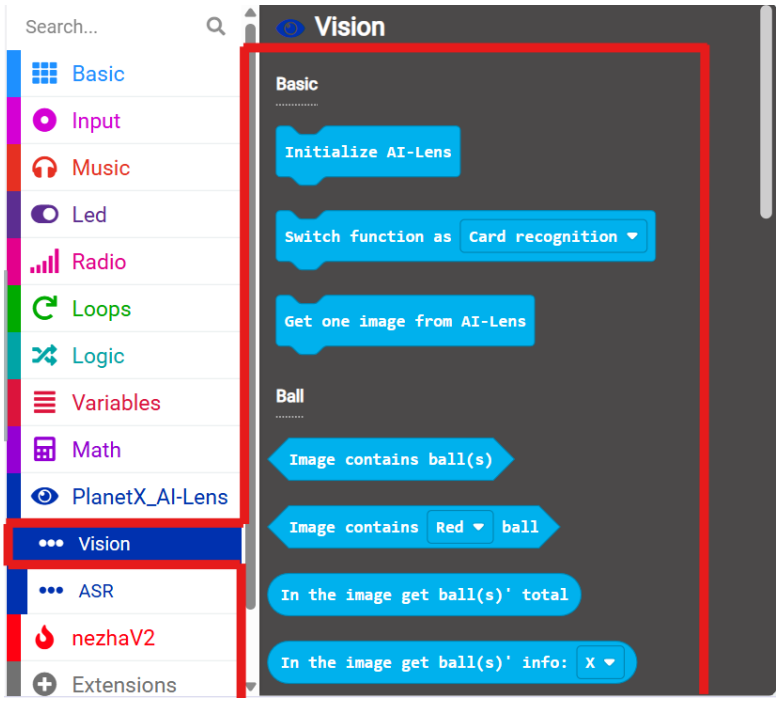
22. AI Lens

The AI Lens is an easy-to-use AI camera that supports face recognition, colour recognition, card recognition, line tracking, ball recognition, machine learning and more. It encapsulates complex AI concepts into hardware modules that are perceivable, understandable and fun for students.

AI training can be completed with just one button, getting rid of tedious training and complex visual algorithms, allowing you to focus more on the conception and implementation of the project.

22.1 Sample Code

Hardware Connection: Connect the AI Lens to the IIC port on the Nezha Pro Breakout board.



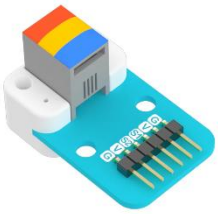
Result: A smile face displays on the Micro:bit if the the blue ball is recognized by the AI lens and a sad face display on the Micro:bit if it recognizes a red ball. A poker face will be displayed when none of the balls detected.

22.2 Specification

Item	Parameter
SKU	EF05045
Weight (GW)	Approximately 170g
Connection	RJ11
Connection Type	IIC
Working Voltage	3.3V
Working Current	300mA

23. GPIO Connector

ELECFREAKS PlanetX GPIO Adapter leads out all four wires of RJ11 interface, through which various third-party sensors can be connected freely. We Can use the Micro:bit Pins directly by using this Connector.



23.1 Specification

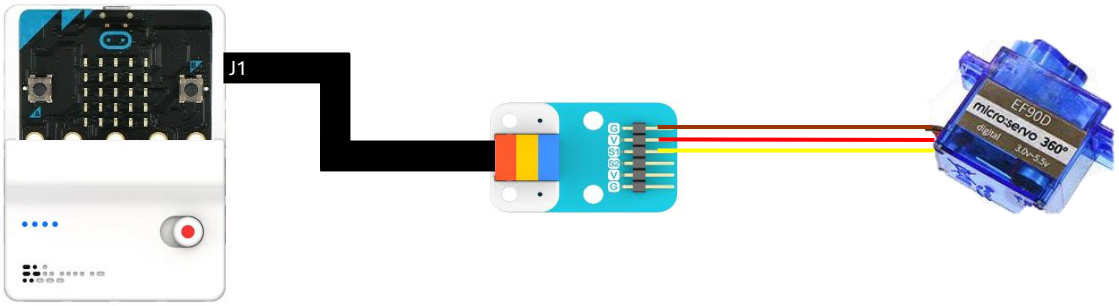
Item	Parameter
Connections	RJ11 4P4C
Power	3.3V
Connections type	Digital, Analog, IIC

24. Micro:Servo 360°

ELECFREAKS micro:servo is a kind of 360 deg analog servo. It is light and portable, a little bigger than 5 cent coin. It works at 3V voltage and uses pulse width to adjust speed of the servo rotation, which also can be used to make small robot modules, mechanical arm modules and intelligent car modules.

24.1 Sample Code

Hardware Connection: As shown in the picture, Connect the Micro Servo to GPIO Connector. Then Connect the GPIO Adaptor to j1 port in the Nezha Pro Breakout board.

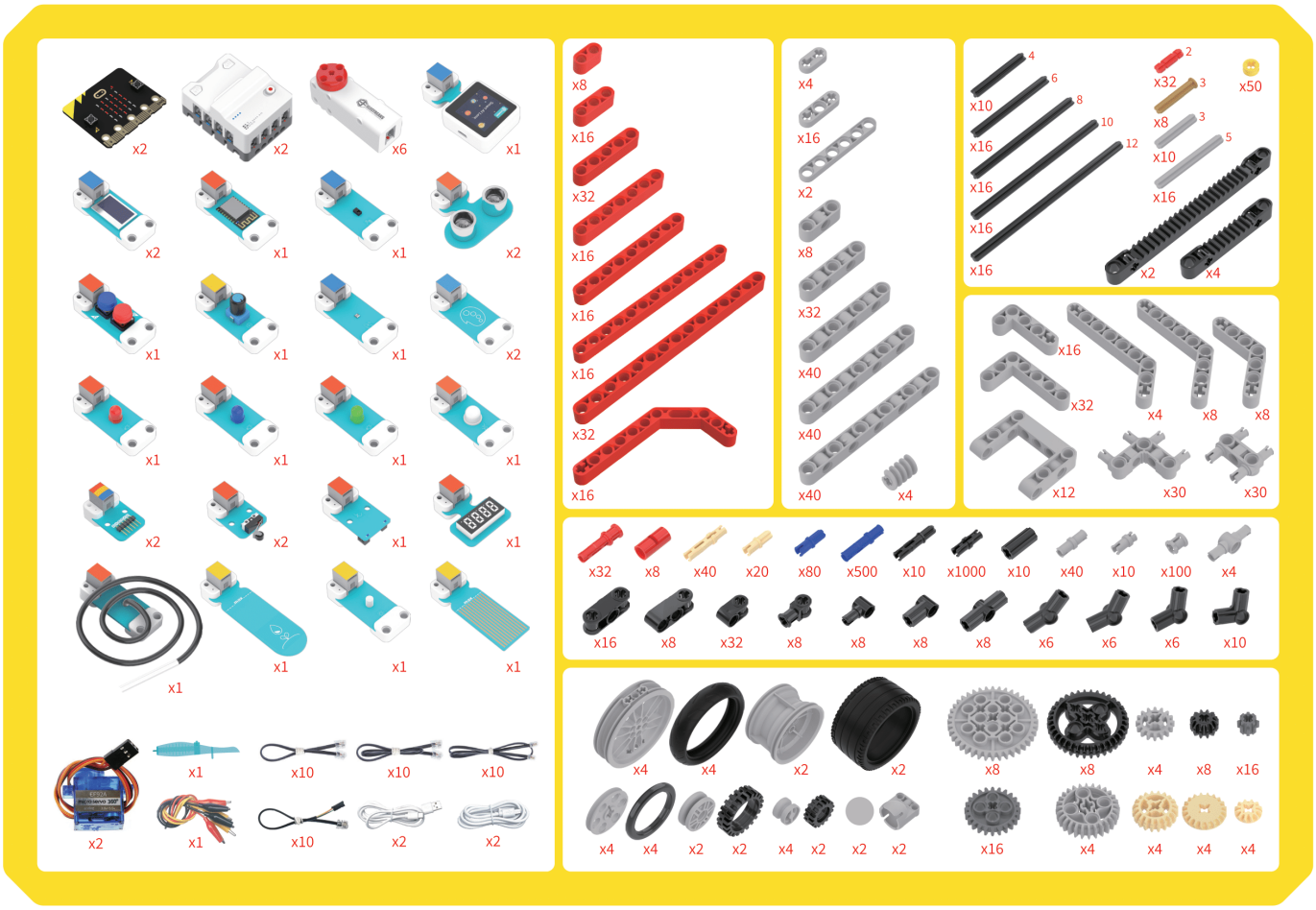


Result: The Servo Motor change it's direction on buttons press and stops by touching Micro:bit logo.

24.2 Specification

Item	Parameter
Product SKU	EF09081
Operating Voltage	3.0V-5.5V
Output Torque	1.6KG/CM
Specialty	Speed of the servo is adjusted by pulse width; 3V for Micro:bit
Operating Temperature	-30°C~+60°C
Materials	Plastic gears and plastic shell
Other Components	Fixed screws, multifunction Steering wheel.
Type	EF90D
Rotation Angle	360°
Dead Band Width	5us
Plug Type	Common JR/FUTABA
Servo Type	Digital servo

25. Packing List



26. Additional Details and References

https://tech.microbit.org/hardware/

https://wiki.elecfreaks.com/en/microbit/