

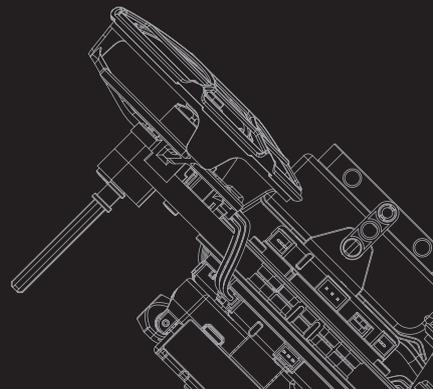
Makerfire

GHOST II



Product Introduction

Makerfire Technology Co., Ltd.



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Product Description



STEAM Education



STEAM education is the new style teaching way which mixed with Science, Technology, Engineering, Art and Maths. It emphasizes on motivating students' imagination and creativity, also improving the ability of thinking, solving the problem and cooperation.

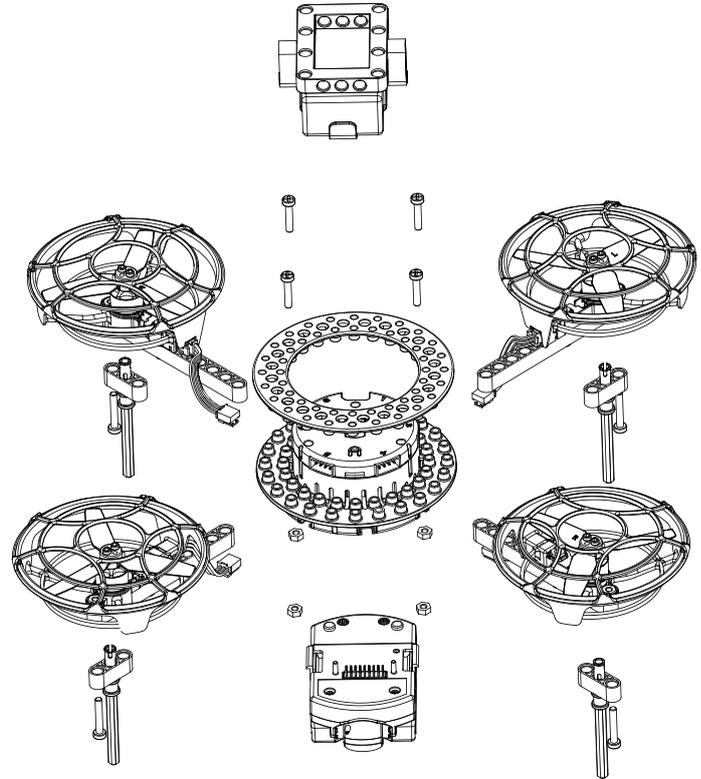
STEAM education is the quality-oriented education indeed, which was originated from United States and now spreads all over the world.

Aerial drone- Ghost

Ghost is a STEAM Educational aerial drone kit, customized for 8-16 years old students and can enhance their creative thinking.

Ghost is compatible with LEGO machinery parts, and it includes the powerful brushless system and built-in ultrasound and optical flow sensor.

Students can learn the drone structure, assemble Schematic, and get a deeper understanding about the aerial drone by the online/offline graphical programming.



Specifications

Wheelbase	200 mm
Flight controller	Ghost - II -MC-1
Motors	1106 4000KV Brushless
Propellers	Tri-Blade 3030
Battery	1200 mAh/11.1 V/LiPo 3S
Charger	AC 110-220 V/50 W/2-4S
Camera	1/3.2 Inch 8 million pixels f/2.4 Lens: 2.5mm (FOV 68°)
Max image size	1280*720
Image format	JPEG
Video format	MP4
Micro SD card	4GB (Included)

Hover	
Max hover time	7 Minutes (0 wind at a consistent 9mph (15kph))
Hover accuracy	Vertical: 50mm/1min Horizontal: 80mm/1min
Radio Transmitter	
Operating frequency range	2.4 GHz -----2.483 GHz
Operating distance	100 Meters
2.4G Wi-Fi operating range	Distance: 80 Meters Height: 50 Meters
Max flight speed	30 km/h (0 wind at a consistent 9mph (15kph))
Ghost II weight	325 G (Battery included)
Programming	Support: Mac Windows Android 4.1.2 or advanced version

Flight Controller

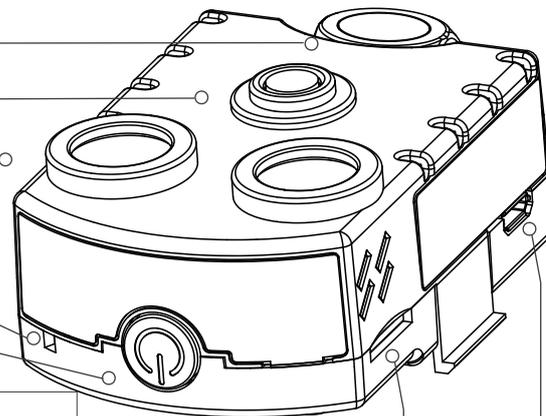
Camera

Optical Flow Sensor Module

Ultrasonic Module

Indicator Light

Power Switch



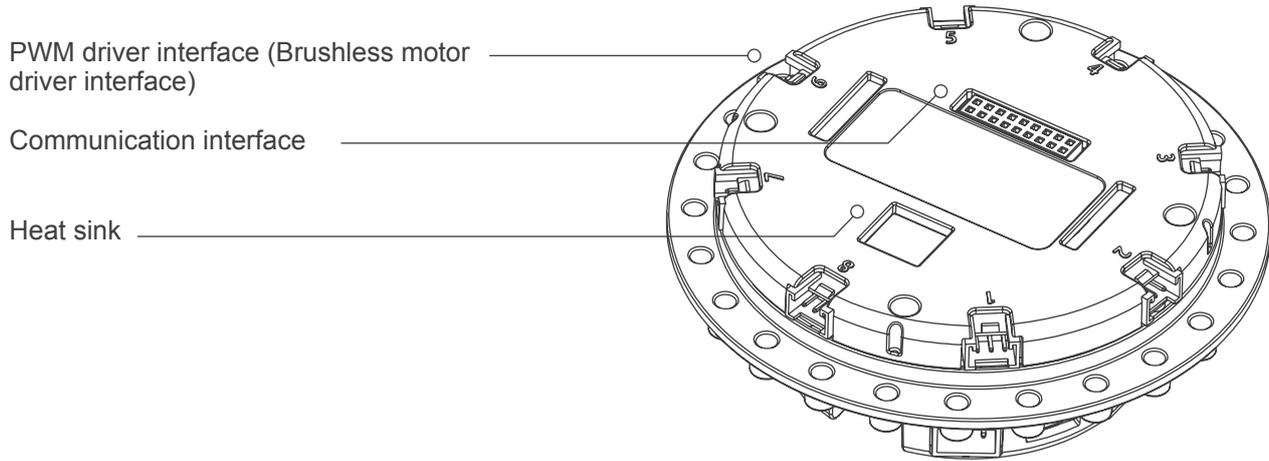
SD Card
Micro USB

Green Light solid: Take off waiting (Attitude hold and fixed point function)
Green Light flash slow: One-key landing(Fixed point movement)
Blue light flash: Photography mode (It can be take photo anytime)
Blue light flash fast: SD card failure
Blue light flash slow: Record mode(video recording)
Red light flash slow: Fail to connect (fail to connected with remote control or APP, fail to binding, no signal)
Red light flash fast: Low voltage protection landing automatically/Low voltage
Red light solid: System crash/System major failure
Red light and green light flash alternately: Sensor abnormality (Calibration fail, Optical flaw/ Ultrasonic/ Barometer abnormal, etc.)
Blue light and green light flash alternately: Gyroscope on the calibration
Red light and blue light flash alternately: Special flight mode(switch to sport mode, 360°flip, spin, etc.)

Failsafe: When the remote control loses the signal or exits abnormally from the APP, Ghost will land automatically to the ground.

Low voltage protection: When the battery voltage is lower than 10.5V, Ghost will activate the low voltage protection system, land automatically, and buzzer keeps buzzing.

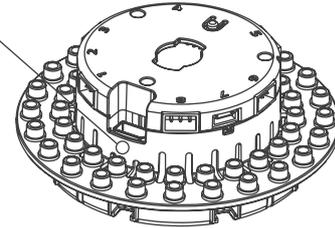
Smart Driver



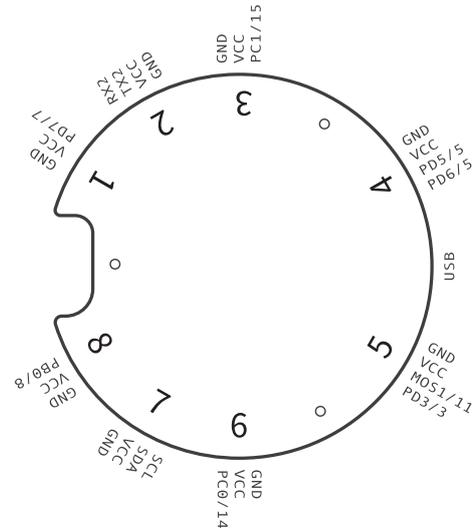
Smart driver can drive brushless motor and connect the hardware through the adapter cable and brushless power system;
The PWM driver interface can activate interface based on the customized mapping of Ghost in the Scratch.

Application Docking Station

Power interface



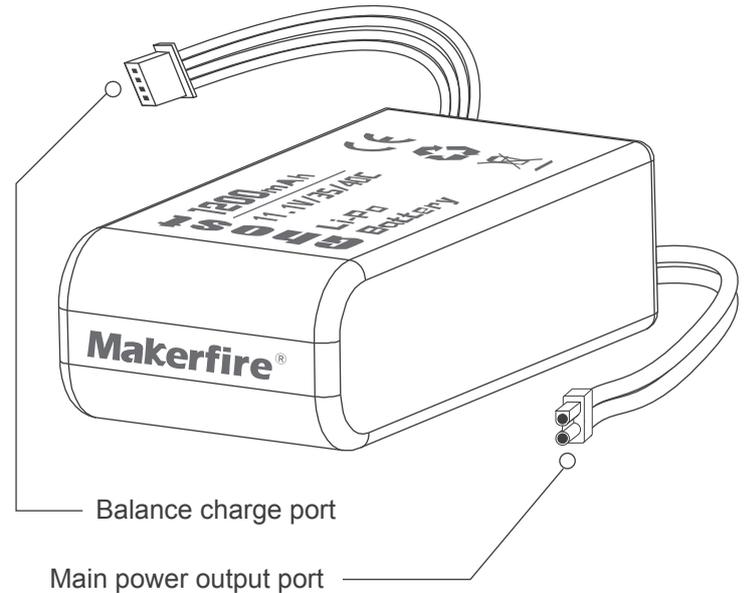
Expanding Interface Number	Type of the interface
No. 1 and No. 8	Digital I/O port
No. 2	UART 2
No. 3 and No. 6	Analog I/O port
No. 4 and No. 5	PWM output port
No. 7	IIC



Operation Guide-Bind

Note:Please follow the steps to bind

1. Turn on the radio transmitter(make sure the Ghost is powered off)
2. Push the right joystick to upper right 45°and press Mode Switch button at the same time, the L2 & L4 light will flash.
3. Press switch button of the flight controller, the radio transmitter will give a beep, the L2 & L4 lights will go out and the L1 light will solid.



Battery Charging Guide-The use of the charger

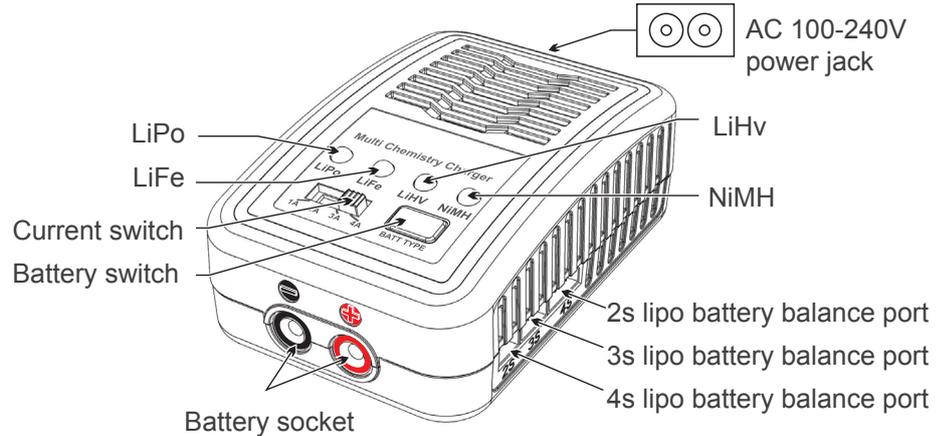
Battery configuration of Ghost: 3s LiPo Battery

Indicator status description

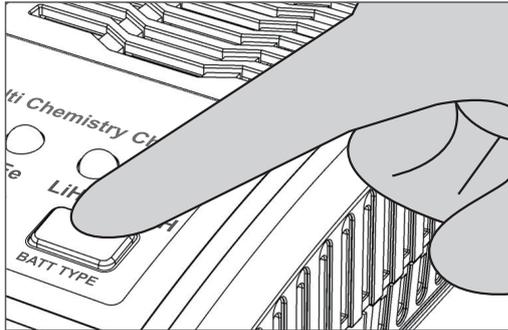
Red light and green light flash alternately	Ready to charge (stand by)
Red light solid	Electricity <25%
Red light flash	Electricity 25%-50%
Yellow light flash	Electricity 50%-75%
Green light flash	Electricity 75%-99%
Green light solid	Fully charged

Charging time reference:

Electric current	Charging time
4A	0.5 Hour
2A	1 Hour

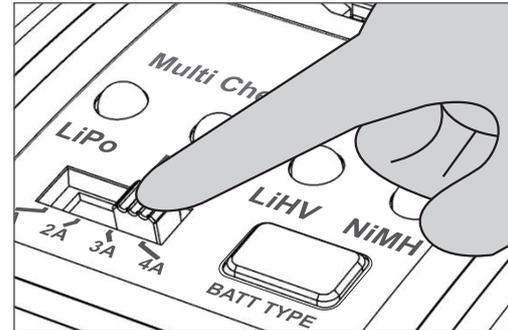


Battery Charging Guide-The use of the charger



Battery type switch

Select the battery type LiPo/LiFe by the slide switch. Set LiPo mode when charging the Ghost battery.



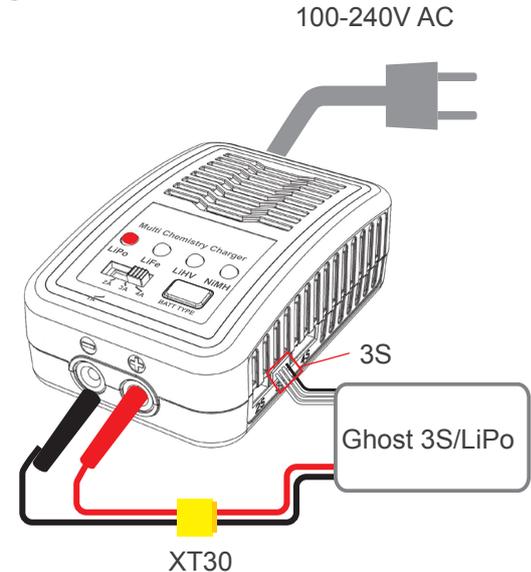
Current switch

Select 4A-level charging current, the max input current is 4A.

Battery Charging Guide-The use of the charger

Battery Charging Guide-The use of the charger

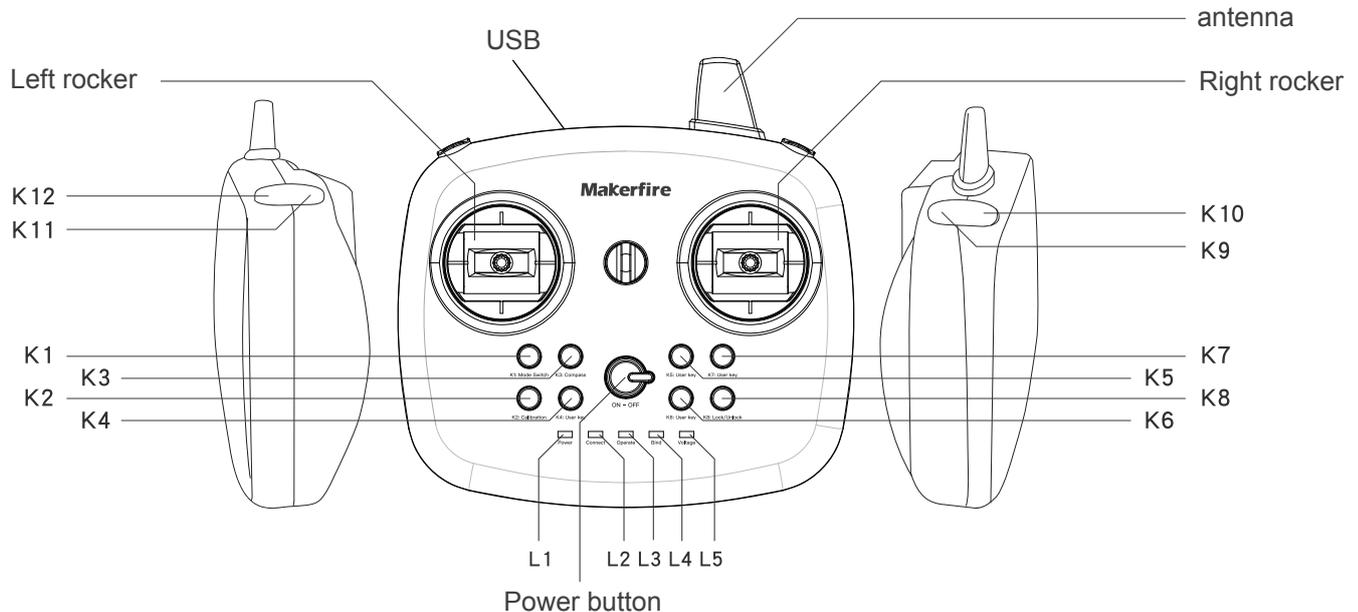
- 1) Insert the AC power cord into the charger and insert the plug as tight as possible to ensure a good connection.
- 2) Set the "BATT TYPE" as LiPo mode.
- 3) Set the charging current; select the proper charging current 1A/2A/3A/4A by the slide switch, we suggest to select 2A for the Ghost battery.
- 4) Insert the charging cable. Insert the black cable to the black negative socket with "-" and insert the red cable to the red positive socket with "+". Please insert the plug as tight as possible to ensure a good connection.
- 5) Connect the white balance wire to the "3s" balance port (in the middle) and the four LED lights will be all in flash status.
- 6) Connect the power electricity connector to XT30 plug, the four flashing LED will go out except the "LiPo" indicator LED solid.



Caution:

- 1) Charging cable will take the risk of short-circuit, please disconnect the XT30 plug before taking the battery when charging finished.
- 2) Please always make sure that your charger setting matches the battery type.
- 2) Please keep the charger in a well ventilated area, do not cover it by any flammable objects (towel, clothes etc.).
- 4) Never leave the charger unattended when it is connected to its power supply.

Operation Guide-Radio transmitter



Power switch button: Turn on/ turn off

K1: Online mode/offline mode switch

K2: Gyroscope calibration

K3: Magnetometer calibration

K4: Speed switch

K5: Spin 360°

K6: Bouncing mode K7: One-key landing

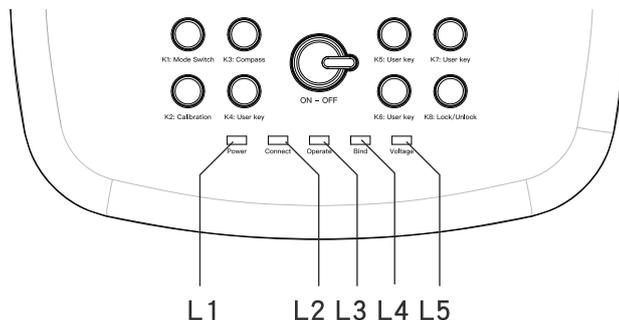
K8: Lock/unlock

K10: Photo mode

K12: Recording mode

Note: Radio transmitter distance is 100 meters, maximal flight height is 30 meters, please fly safely within the sight.

Operation Guide-Radio transmitter



L1: Indicator light for power status

Solid: Normal status

Go out: The radio transmitter is abnormal or low battery

L2: Indicator light for connection status

Go out: Connected successfully
Flash slowly: Fail to connect

L3: Indicator light for controlling mode

Solid: On line programming mode

Go out: Radio transmitter controlling mode

L4: Indicator light for binding status

Flash fast: Binding status

Go out: Normal status

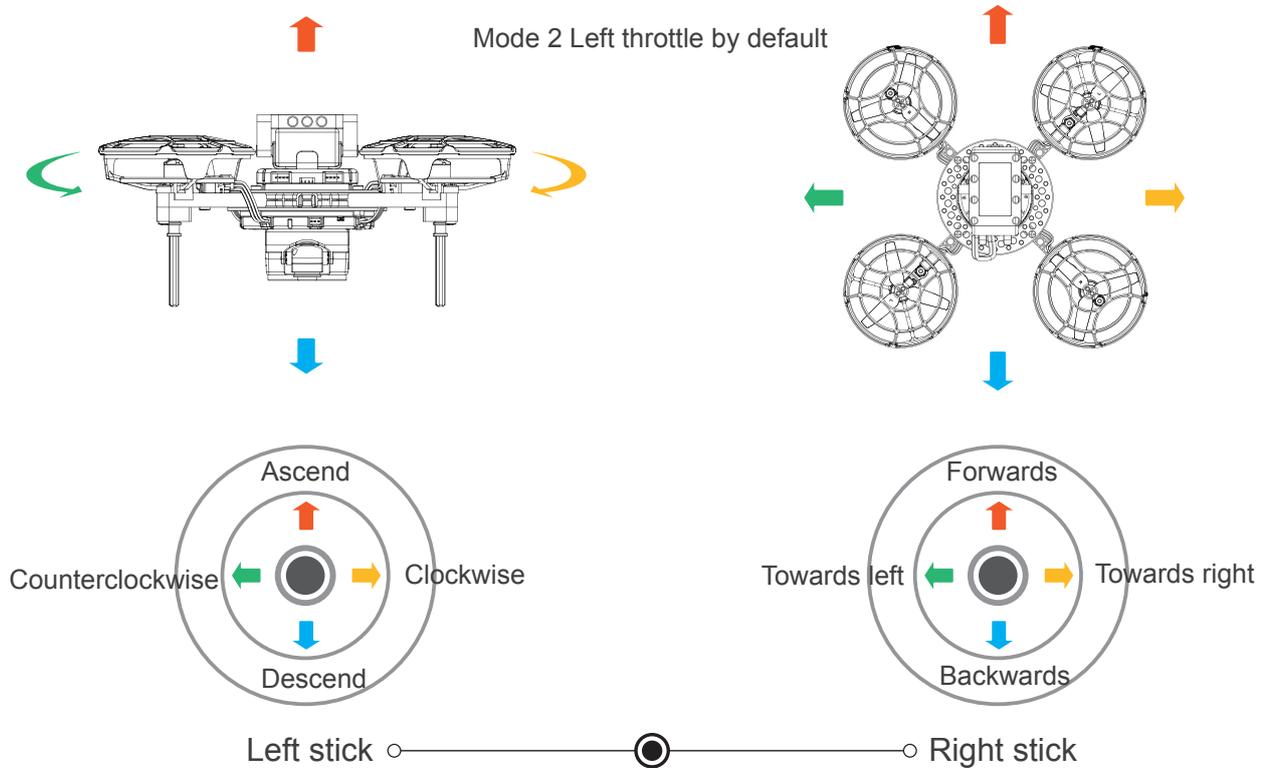
L5: Voltage indicator

Flash fast: Low battery of the drone

Flash slowly: Low battery of the radio transmitter

Note: L2 and L4 lights flashing fast indicate the Ghost drone goes into binding process

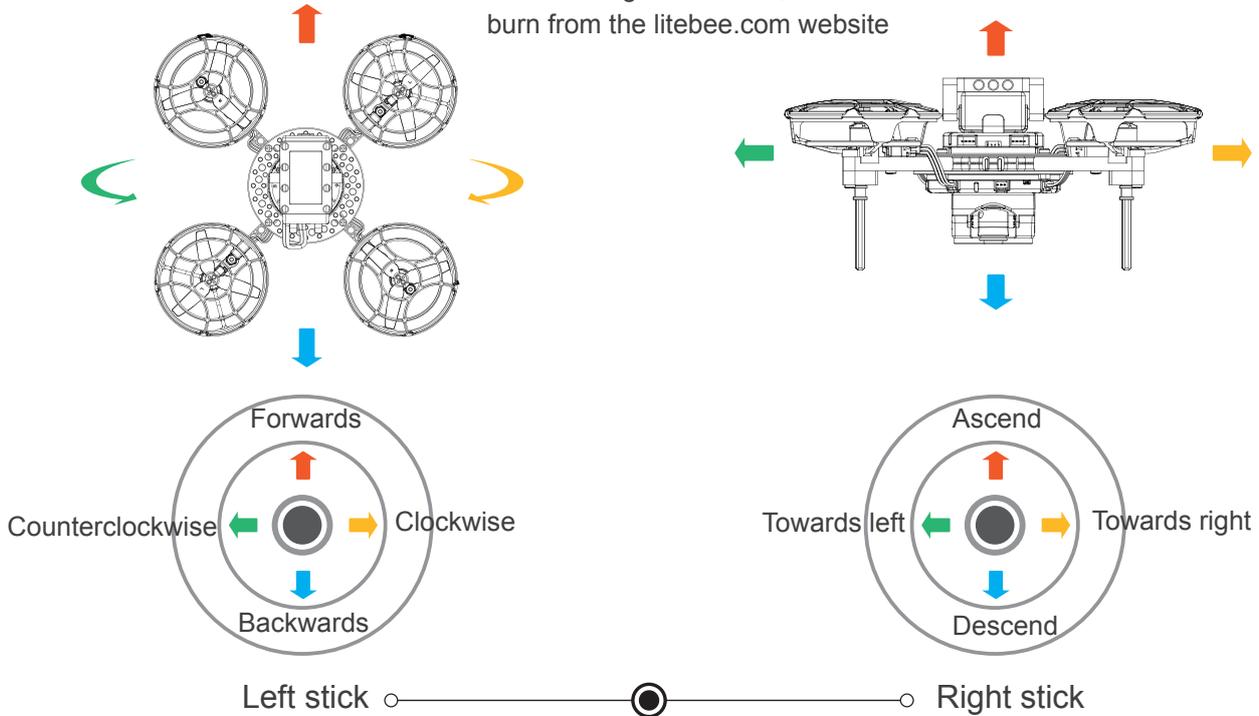
Operation Guide-Radio transmitter



Operation Guide-Radio transmitter

Mode 1 Right throttle

When change to Mode 1, download the software and burn from the litebee.com website



Operation guide-Fly with your phone

Android/iOS

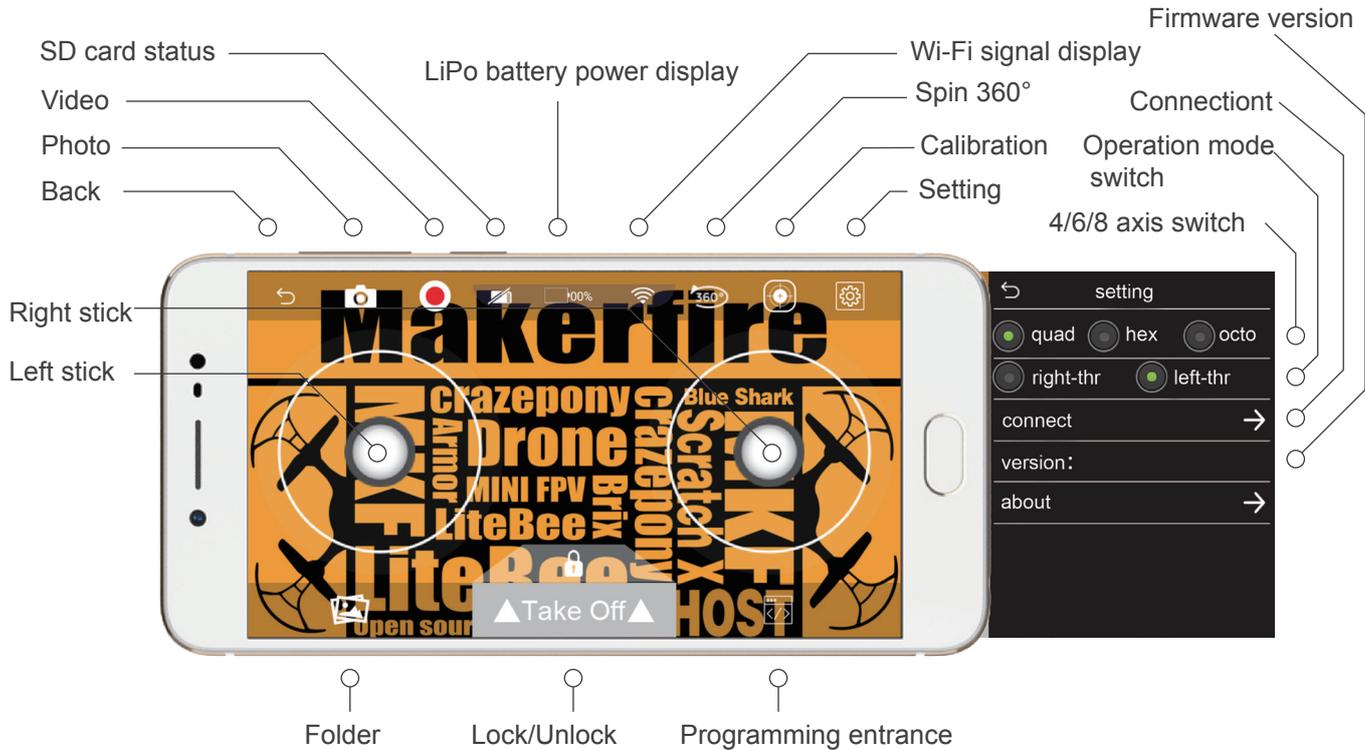
Scan Makerfire QR code and download the application,then unpack and install the App in your phone.

Open the application, click Ghost to get into the operation interface; based on Wi-Fi communication, palm device supports operation and image transmission; Connect Wi-Fi: “Ghost II_XXXXX”, password by default is “12345678”.



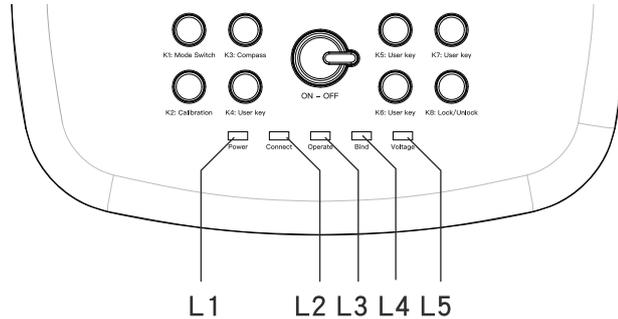
Android App requires Android 4.4 or advanced version

Operation guide-Fly with your phone

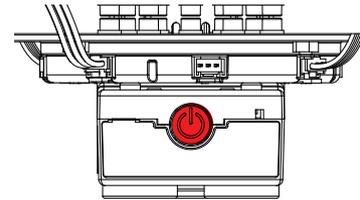


Operation Guide-Bind

Note: Please follow the steps to bind

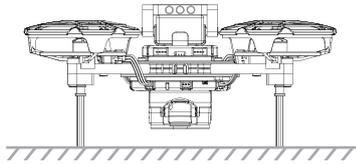


1. Turn on the radio transmitter (make sure the Ghost is powered off)
2. Push the right joystick to upper right 45° and press Mode switch button at the same time, the L2 & L4 light will flash.

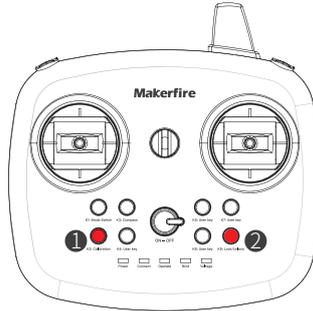


3. Press switch button of the flight controller, the radio transmitter will give a beep, the L2 & L4 lights will go out and the L1 light will be solid.

Operation Guide-Lock&Unlock



1. Put Ghost in the horizontal position.



2. 1) Press the calibration button, Ghost will have a “di” sound and finish the calibration in 5 seconds.
- 2) Press the Unlock button, Ghost starts to take off.

Note: need to make calibration every time before take-off.

Unlock
Landing



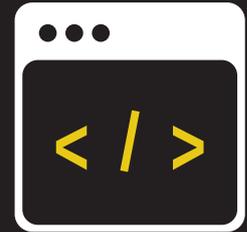
3. 1) Pull down the left joystick, when the Ghost lands to the ground, press the lock button.
- 2) Press one-key landing, Ghost will land vertically to the ground and lock automatically.



Operation Guide-Caution

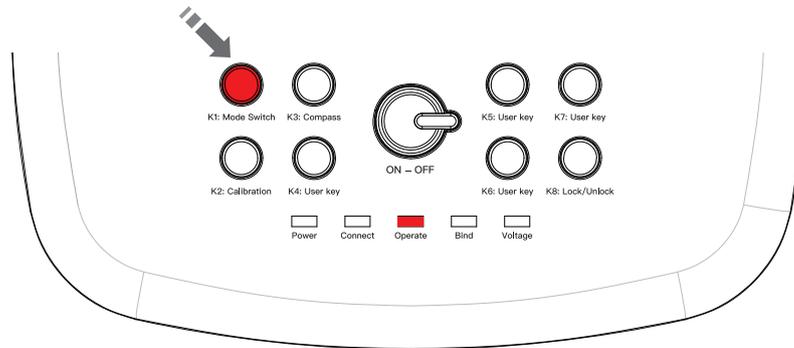
1. Make sure the Ghost drone is assembled in correct way before flying.
2. Make sure the battery is full charged and the motor wires are connected correctly.
3. Place the Ghost in the horizontal surface.
4. Press the calibration button before flying and wait for the blue and green lights stop flashing after a beep.
5. If you changed a battery when flying with your phone, please restart the APP before any operation.

2 Graphical Programming



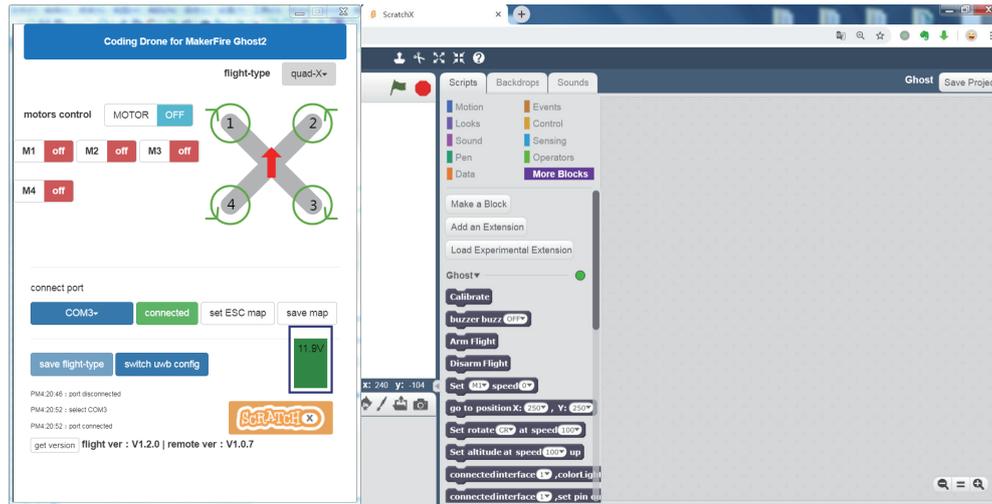
Computer programming-connecting devices

1. Turn on Ghost and radio transmitter, connect the radio transmitter to the computer with a USB cable
2. Press the K1 button, enter programming mode, operate indicator stays lit.



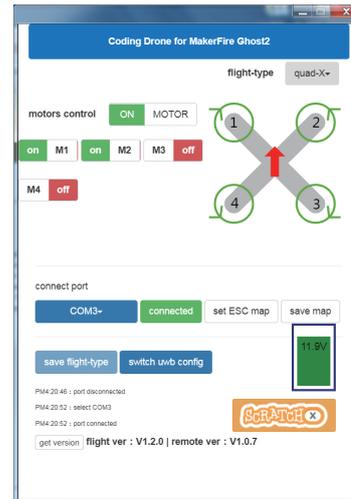
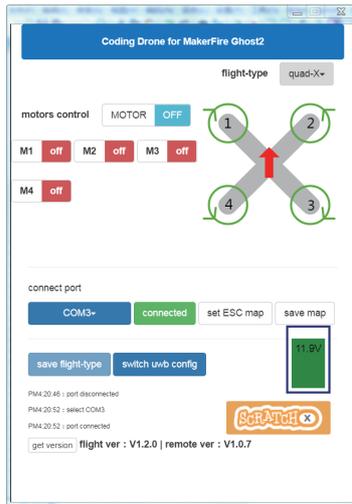
Computer programming-Software acquisition and installation

1. Go to <http://www.litebee.com>, download Ghost offline programming software (please download the software package that matches your computer's windows version)
2. Unpacking the package, install the driver, and install Google chrome
3. Open the "Offline version - run Begin" folder, extract the file "Ghost_bat", and double-click to open the file Begin, the following two pages appear



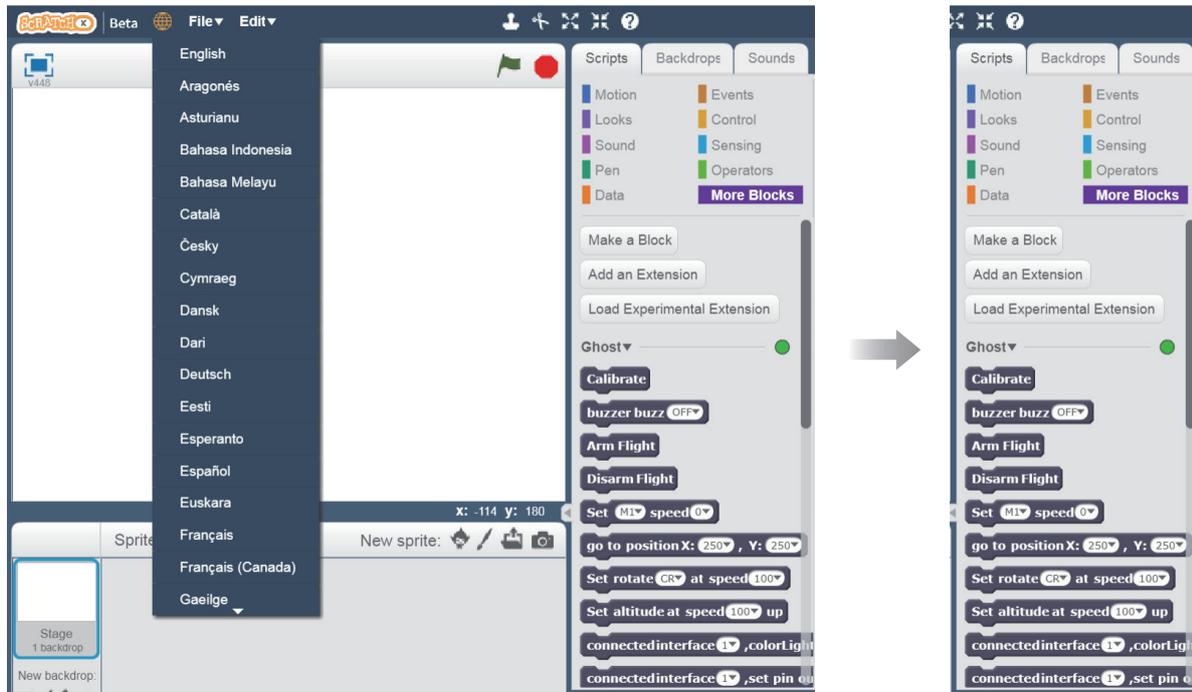
Computer programming-Software acquisition and installation

4. On the connection page, choose the serial port COM3, click Connect
5. After connection succeed, please check if the installed flight programming can run. Click “Motor” in the control to display “Start”; then click “off” in “M1” to display “on”. At this time, observe whether the blade rotates. If it rotated, the environment is set up successfully. Then click on "Scratch" in the lower right corner to enter the programming interface.



Computer programming-Software acquisition and installation

6. The initial programming language is English. You can query the fly instructions in “More blocks” to control Ghost.



Computer programming-Software acquisition and installation

The screenshot shows a web-based interface for configuring a drone. At the top, the title is "Coding Drone for MakerFire Ghost2". Below this, there's a "flight-type" dropdown menu currently set to "quad-X". To the left, there's a "motors control" section with a "MOTOR OFF" button and four motor status indicators (M1, M2, M3, M4), all currently "off". In the center, there's a diagram of a quadcopter with four rotors numbered 1 to 4, each with a green circular arrow indicating rotation direction. Below the diagram, there's a "connect port" section with a "COM3" dropdown, a "connected" status indicator, and buttons for "set ESC map" and "save map". Further down, there are buttons for "save flight-type" and "switch uwb config". A green box displays the "Aircraft voltage" as "11.9V". At the bottom, there's a "ScrATCH" logo and a "get version" button. The interface also shows some status logs and version information.

Coding Drone for MakerFire Ghost2

flight-type: quad-X

motors control: MOTOR OFF

M1 off, M2 off, M3 off, M4 off

connect port: COM3, connected, set ESC map, save map

save flight-type, switch uwb config

11.9V

ScrATCH

get version | flight ver : V1.2.0 | remote ver : V1.0.7

PM4.20.46 : port disconnected
PM4.20.52 : select COM3
PM4.20.52 : port connected

Motor control master switch (Click "Stop" to switch to "Start")

Single motor rotation test switch (used to test if the Ghost programming environment is built successfully)

PC connection

Switch space coordinate position

After selecting the flight type, you need to save the number of axes.

View historical operational data

Aircraft type selection (4 axes, 6 axes, 8 axes respectively)

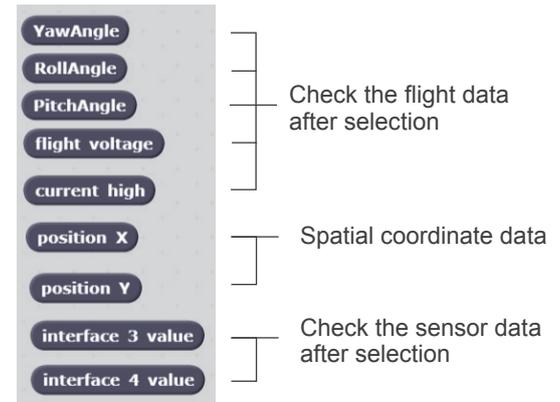
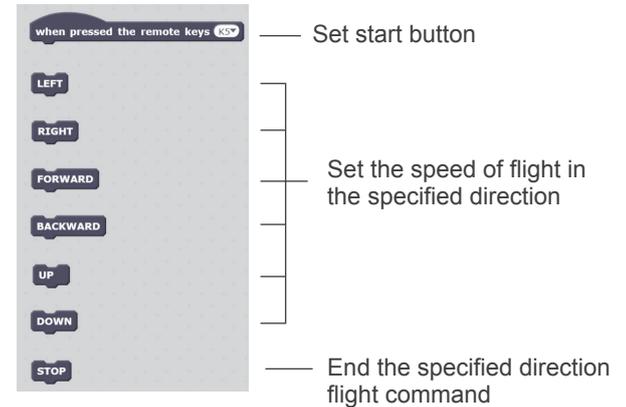
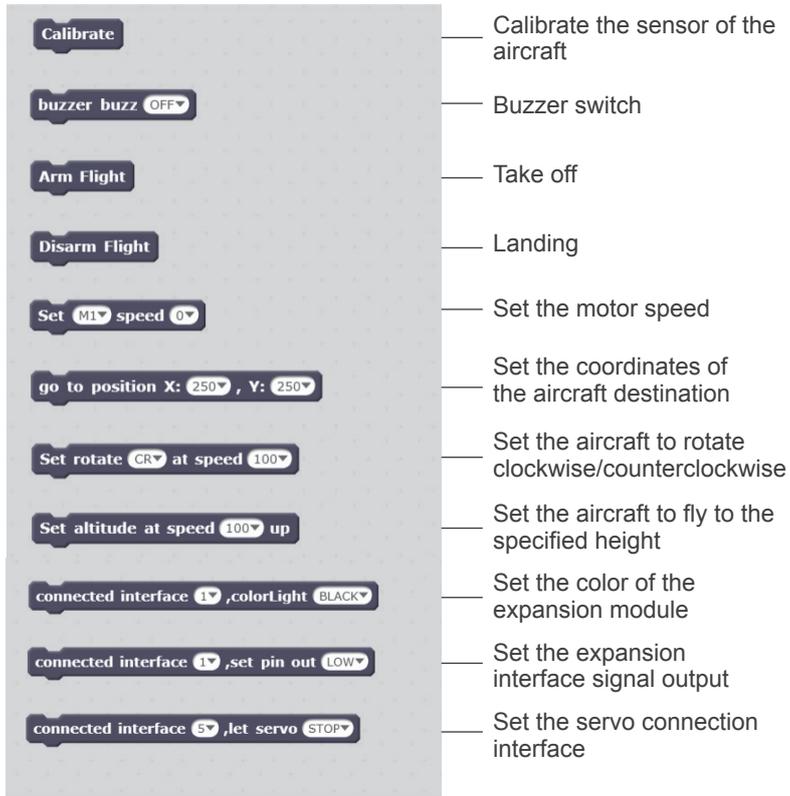
Aircraft type diagram (following the type of aircraft to change)

Motor custom mapping

Aircraft voltage display

Scratch web programming button

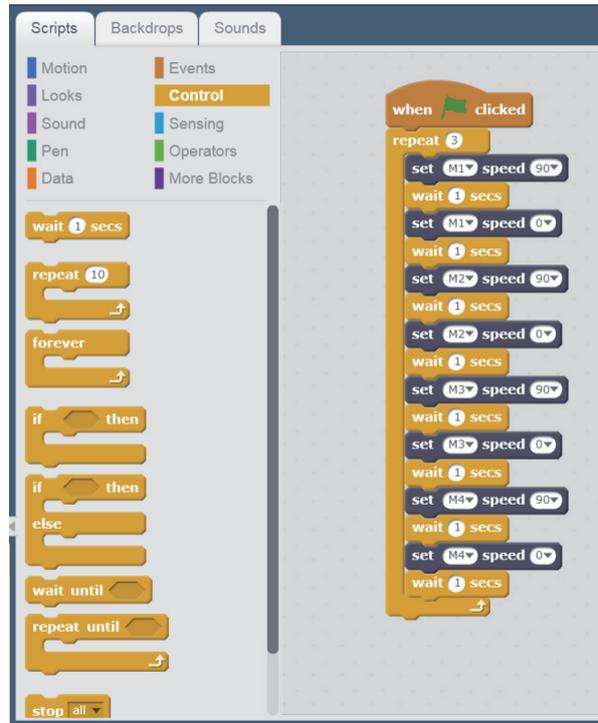
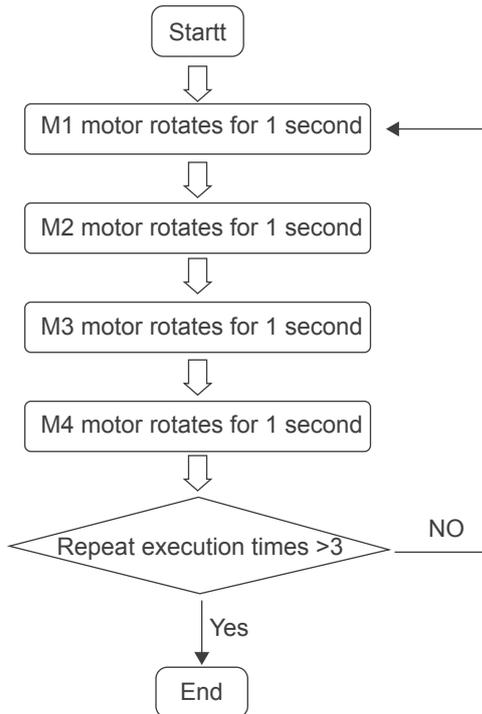
Computer programming-Software acquisition and installation



Computer programming-Task-based routine one

Task: Scratch sets the motor. In the order of number 1-4, each motor rotates at an idle value of 90 for 1 second, end the task after 3 cycles.

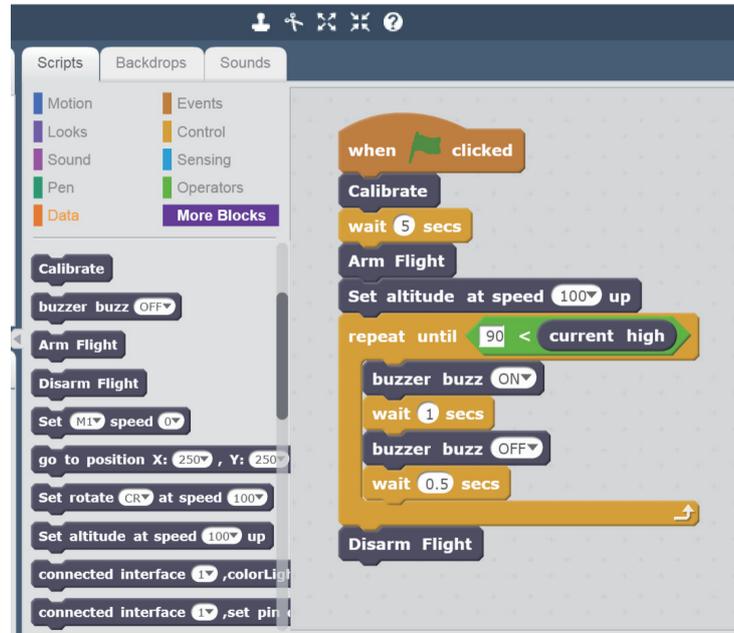
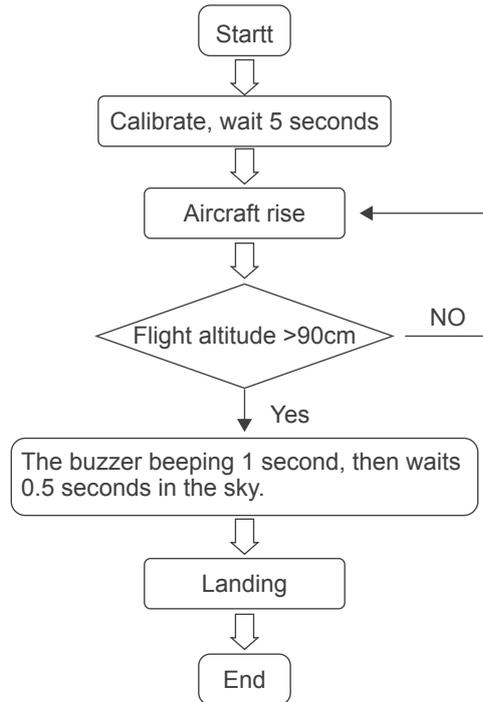
Routine idea:



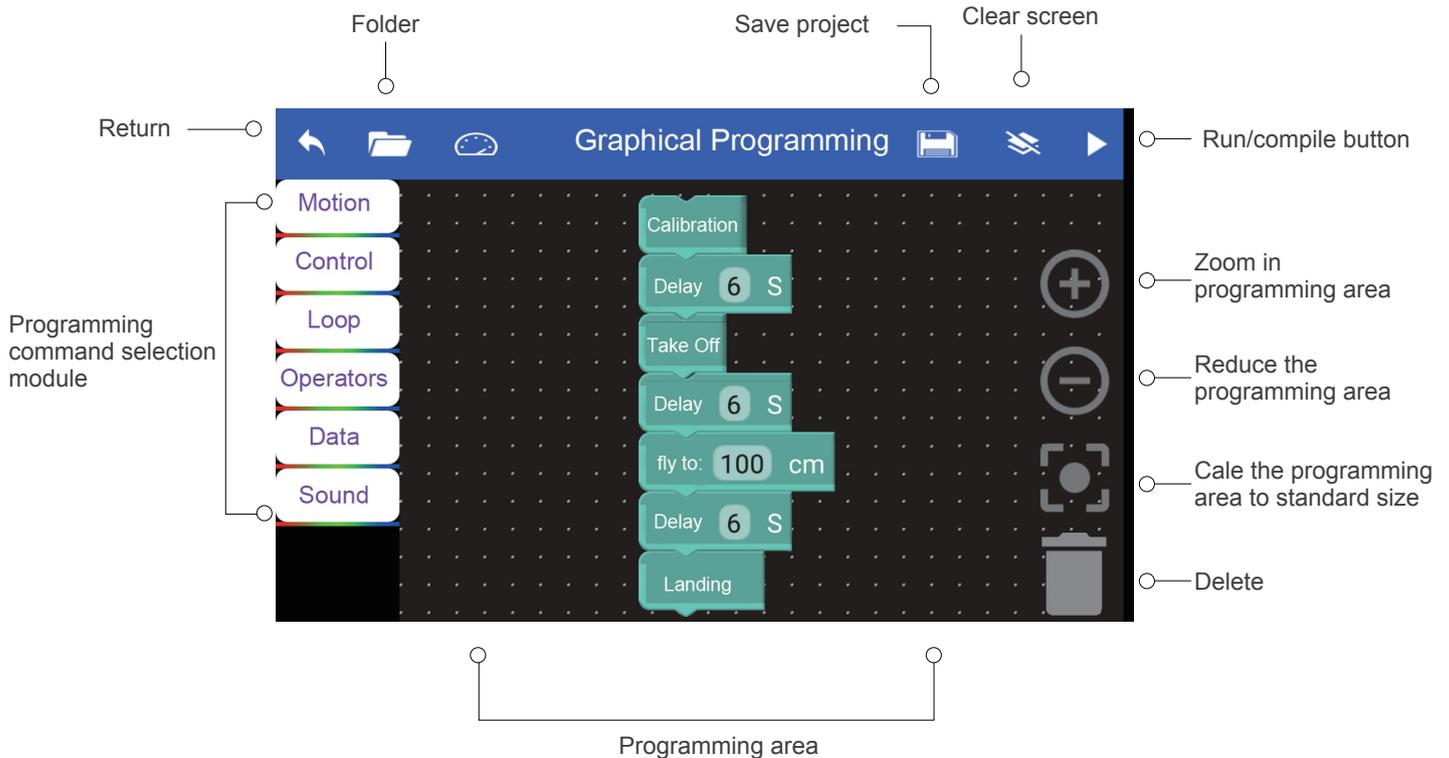
Computer programming-Task-based routine two

Task: Scratch programming control Ghost, calibration, wait 5 seconds, take off, fly Ghost to 100cm height, set buzzer beep when the flight altitude is higher than 90cm, buzzer beeping 1 second, wait 0.5 seconds in the sky, turn off the buzzer and land.

Routine ideas:

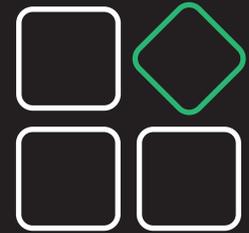


Graphical programming-Android programming interface





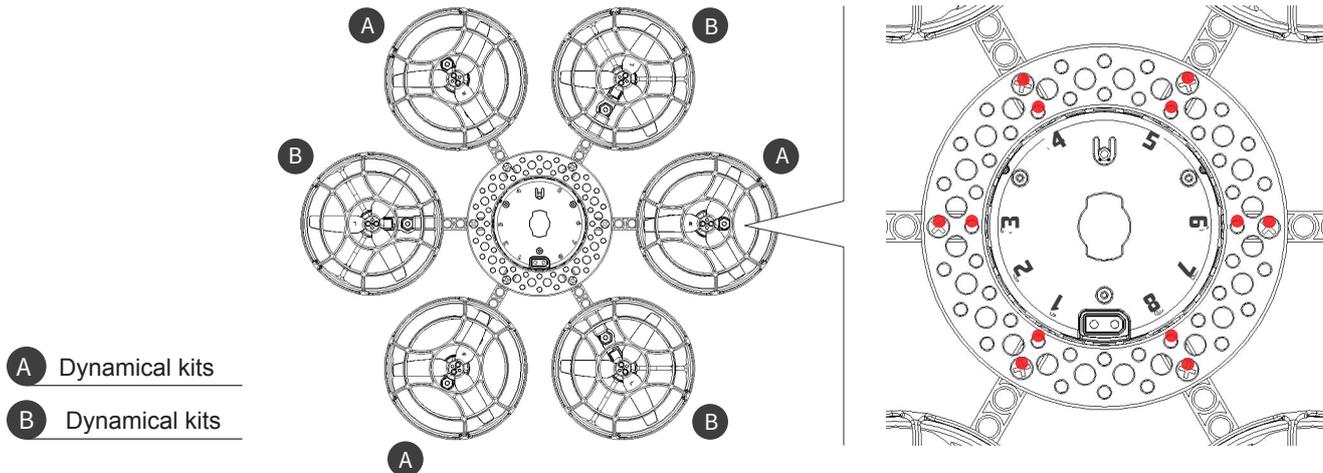
3 Application Development



Six-axis / Eight-axis expansion-six-axis installation

1. Before assembling the six-axis, in addition to the original accessories, additional preparation is required:

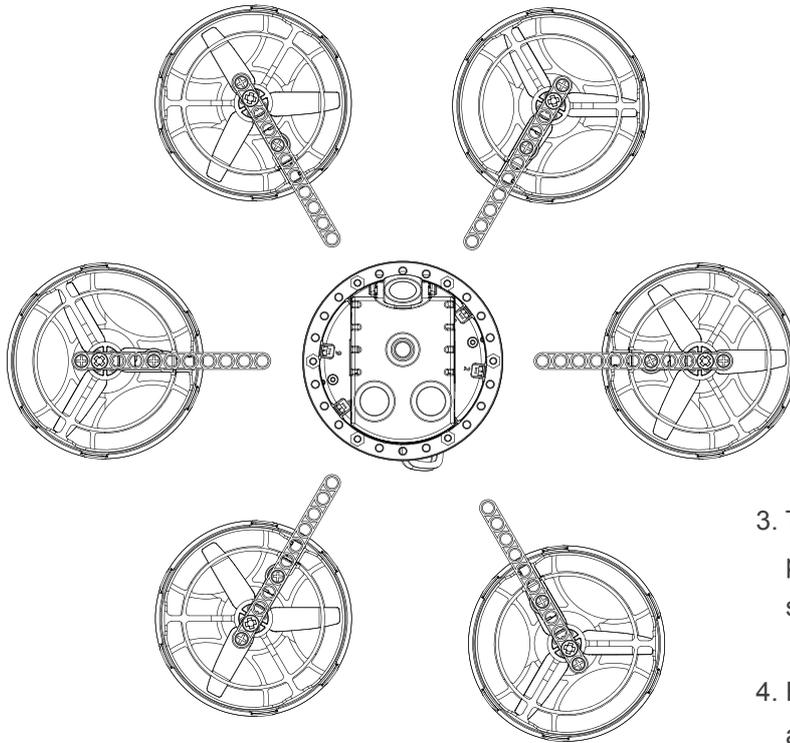
Dynamical kits(A)*1, Dynamical kits(B)*1, Power cable*2, eleven-hole structural rod*2, 1*5 cross shaft*2,
Long pin with bushing*2, Screw nuts*6, Screws (M3*15)*2, Screws (M3*20)*4, three-hole structural rod*2



2. Install the power kit in the position shown above, according to the installation method of the assembly manual.

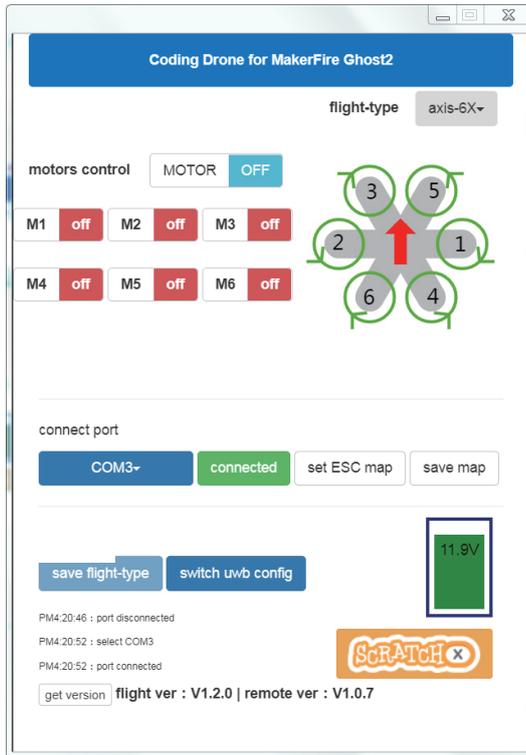
Note: 6-8 axis kits are not included in the package.

Six-axis / Eight-axis expansion-six-axis installation



3. Turn the aircraft upside down, and connect the power cables to the corresponding sockets as shown in the figure above.
4. Finally, install other accessories as shown in the assembly manual.

Six-axis / Eight-axis expansion-six-axis installation



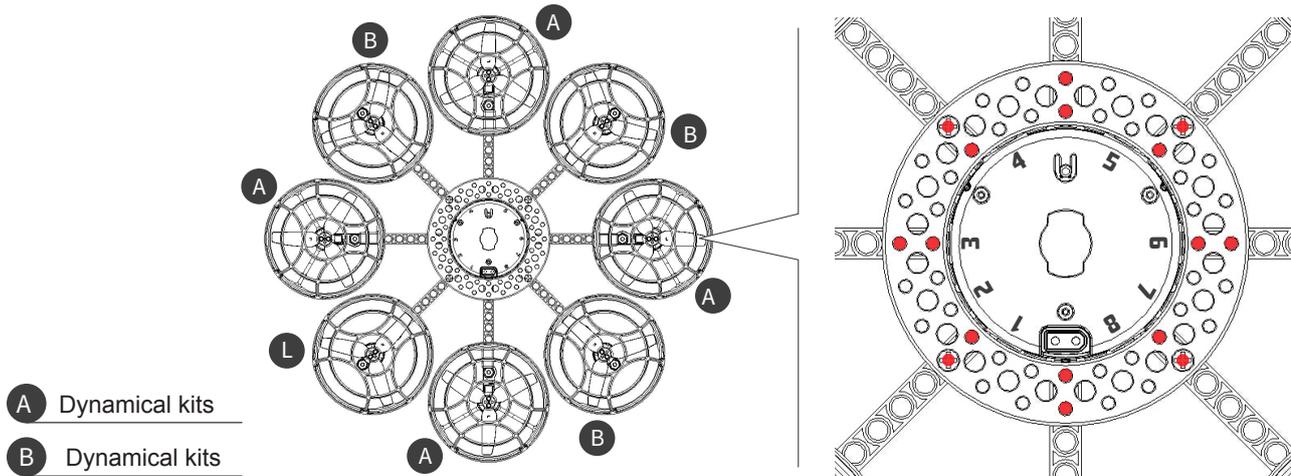
5. Open the Google App plugin - Ghost, open the radio transmitter and connect to the computer (note: the radio transmitter is in online mode)
6. Click “Select Serial Port”. After connecting, the port will automatically detect the current axis type of the aircraft. Please set the aircraft type to “6-axis X” in the upper right corner. Finally, click “Axis save” button to save.
7. Rebinding the Ghost with radio transmitter, then the aircraft can be operated to fly.

Six-axis / Eight-axis expansion-eight-axis installation

1. Before assembling the eight-axis, in addition to the original accessories, additional preparation is required:

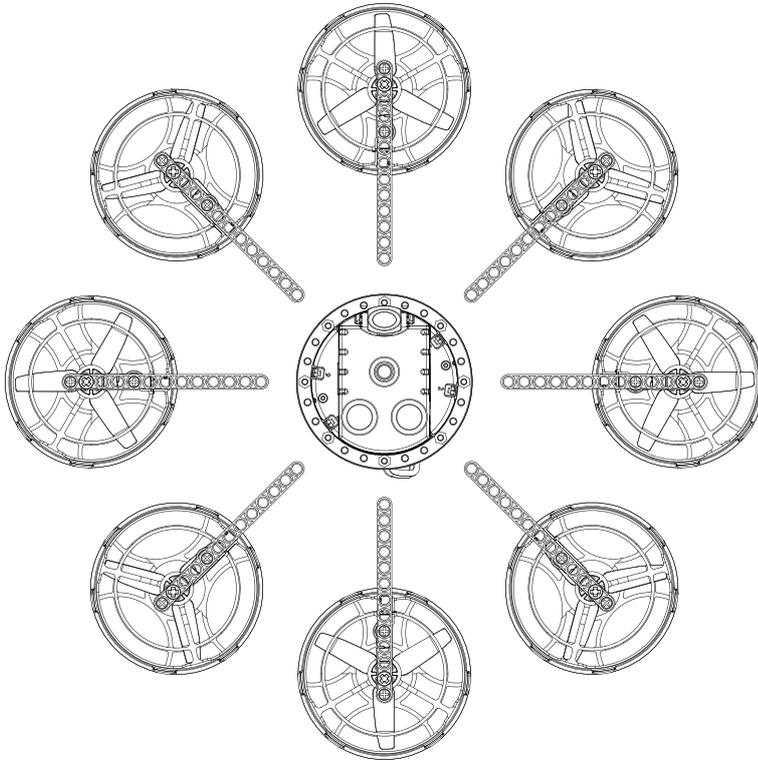
Dynamical kits(A)*2, Dynamical kits(B)*2, Power cable*4, Thirteen-hole structural rod*8, 1*5 cross shaft*4,

Long pin with bushing*4, Screw nuts*12, Screws (M3*15)*4, Screws (M3*20)*8, Three-hole structural rod*4



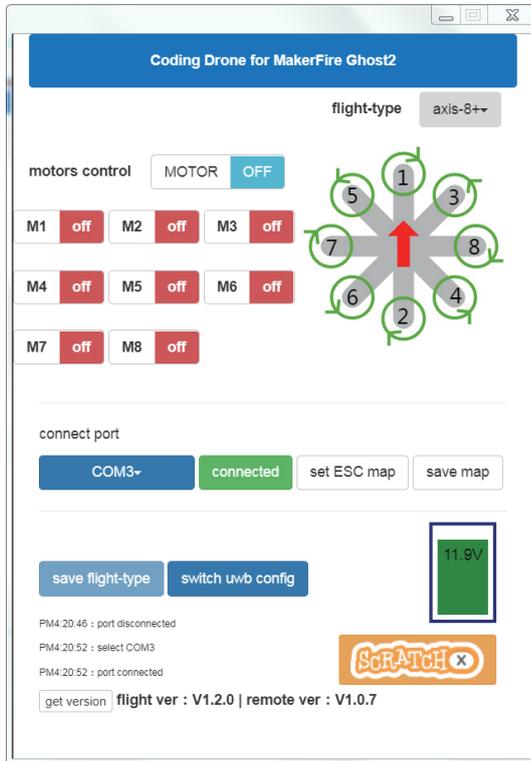
2. Install the power kit in the position shown above, according to the installation method of the assembly manual.

Six-axis / Eight-axis expansion-eight-axis installation



3. Turn the aircraft upside down, and connect the power cables to the corresponding sockets as shown in the figure above.
4. Finally, install other accessories as shown in the assembly manual.

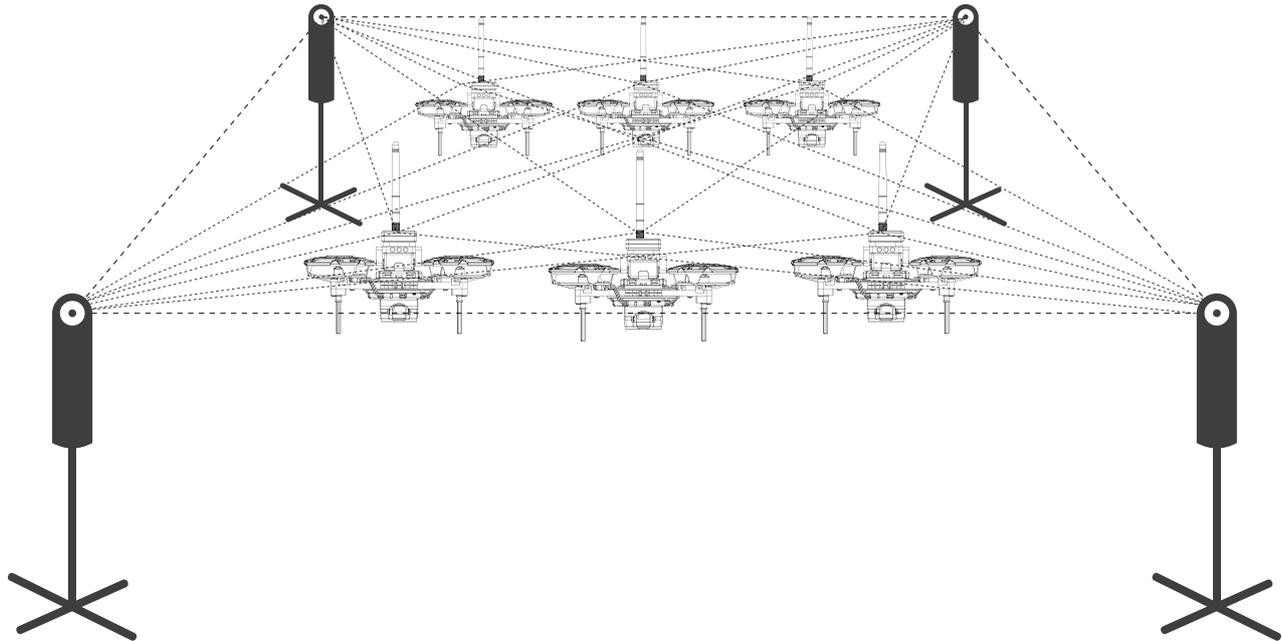
Six-axis / Eight-axis expansion-eight-axis installation



5. Open the Google App plugin - Ghost, open the radio transmitter and connect to the computer.
(note: the radio transmitter is in online mode)
6. Click "Select Serial Port". After connecting, the port will automatically detect the current axis type of the aircraft. Please set the aircraft type to "8-axis +" in the upper right corner. Finally, click "Axis save" button to save.
7. Rebinding the Ghost with radio transmitter, then the aircraft can be operated to fly.

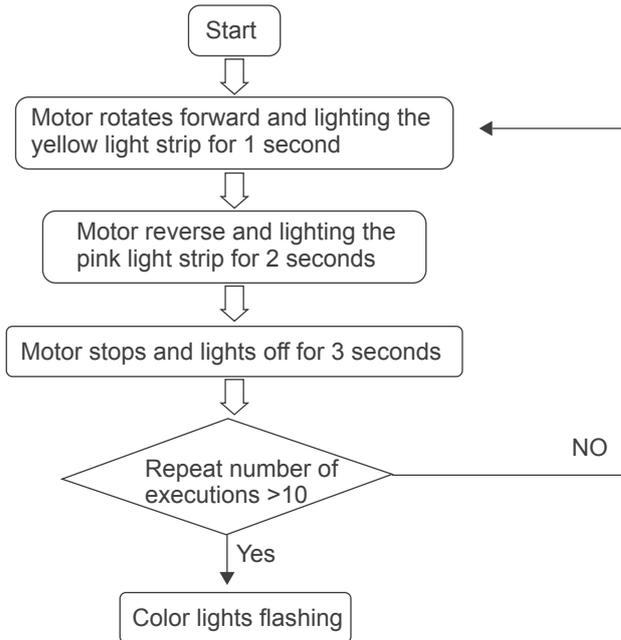
Indoor 3D positioning solution

By using a space coordinate positioning system to build a 3D space in an indoor environment, so that each Ghost can get accurate 3D coordinate data. It can be used for indoor programming flight shows or multi-level task programming.



Application docking station instance

Application docking station access to programmable lights and DC motors. Scratch programming controls the motor to rotate forward and lighting the yellow light strip for 1 second; then control the motor reverse and lighting the pink light strip for 2 seconds to execute 10 times in a loop. At the end, flash white light (each 0.4 seconds) to remind.



```
when clicked
repeat 10
  connect interface 1, set color YELLOW
  connect interface 6, set servo CR
  wait 1 secs
  connect interface 1, set color PINK
  connect interface 6, set servo CCR
  wait 2 secs
  connect interface 1, set color BLACK
  connect interface 6, set servo STOP
  wait 3 secs
forever
  connect interface 1, set color BLACK
  wait 1 secs
  connect interface 1, set color WHITE
  wait 1 secs
```

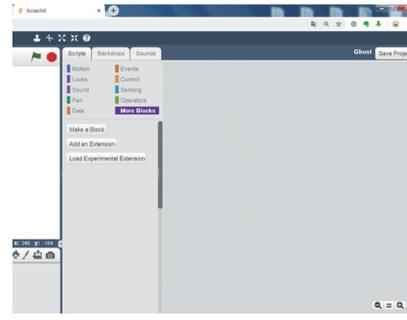
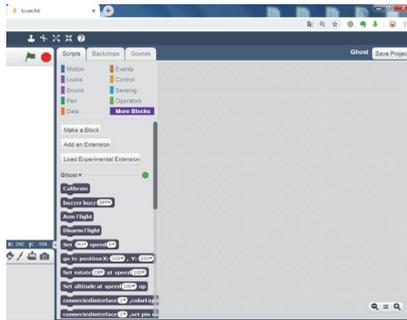
The Scratch code implements the logic shown in the flowchart. It starts with a 'when clicked' event. A 'repeat 10' loop contains: connecting interface 1 to yellow, interface 6 to CR, waiting 1 second, connecting interface 1 to pink, interface 6 to CCR, waiting 2 seconds, connecting interface 1 to black, interface 6 to STOP, and waiting 3 seconds. A 'forever' loop follows, containing: connecting interface 1 to black, waiting 1 second, connecting interface 1 to white, and waiting 1 second.

4 Frequently Asked Questions



Other aspects

- If the programming interface cannot be displayed completely when open Scratch interface, please use Google chrome to open it.

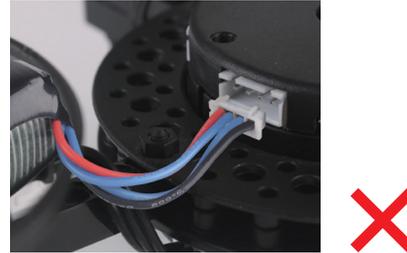


- If the PC can't read serial port when the radio transmitter is connected to it, please right-click Computer to open the device manager on your computer to check if there is a driver not installed prompt (with a yellow exclamation mark, as shown below). If so, please download the CP2102 driver from LiteBee's official website or use the Driver Wizard to detect and install.



Other aspects

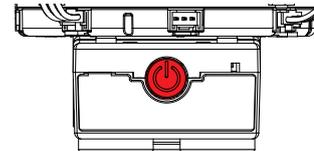
- The battery balance connector can be connected to the charger for charging, but be sure not to access to the application docking station.



- If the radio transmitter fails to connect to the flight controller when updating the radio transmitter or flight controller firmware, rebinding method as follows:



1. Turn on the radio transmitter (Ghost needs to be turned off)
2. Press the right joystick to the upper right corner for 45 degrees, and press the mode switch at the same time. Then the radio transmitter L2 and L4 lights will flash.



3. Turn on the aircraft, the buzzer will sound and the flight controller status indicator will be on. It means binding successful.



Disclaimer statement

This product is a multi-rotor aircraft. We recommend for children over 8 years old. Children under the age of 8 are required to be accompanied by adults. Please be careful when handling this product in the presence of children.

Please read this document carefully before using this product. This statement has important guidance for your safe use of this product and your legal rights. This product provides an easy flight experience when the power supply is working properly and the components are not damaged. Be sure to know your legal rights, responsibilities, and safety instructions before using this product, and also clear about that use this product may bring property damage, safety accidents and personal safety hazards. By using this product, you are deemed to have read, recognized and accepted all terms and conditions of this statement. The user is committed to being responsible for his non-compliant operations and the consequences thereof; the user undertakes to use the product solely for legitimate purposes and agrees to these terms and any relevant policies or guidelines that may be developed by us. We are not liable for any direct or indirect personal injury or property damage caused by failure to use this product in accordance with the safety guidelines.

LiteBee Series



LiteBee Brix
DIY building block drone



LiteBee
Scratch programming drone



Ghost II
Scratch/Arduino programming drone



 www.makerfire.com



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